320001

Sec of M | A.D. | C.G. | E.O. | D.G.M.E.
D. DIR. | 10 SEP 1986 | Registra
DEPT. OF MINES
REF. No. 9131/86

T I L A N A-1

FINAL WELL REPORT

VOLUME 1 - GEOLOGY

SYDNEY

APRIL, 1986

320002

TILANA-1 FINAL WELL REPORT
LIST OF CONTENTS

VOLUME 1, GEOLOGY	PAGE
LOCATION MAP (FIGURE 1)	1
SUMMARY	2
CORRELATION DIAGRAM YOLLA-1 - TILANA-1 (FIGURE 2)	4
WELL SUMMARY SHEET	5
PREVIOUS WORK	6
STRATIGRAPHY	7
CONCLUSIONS	10
APPENDIX 1 CUTTINGS SAMPLE DESCRIPTIONS	
APPENDIX 2 SIDEWALL CORE DESCRIPTIONS	
APPENDIX 3 CONVENTIONAL CORE DESCRIPTIONS	
APPENDIX 4 DIPMETER SUMMARY	
APPENDIX 5 WIRELINE LOG ANALYSES	
APPENDIX 6 DRILLSTEM TEST RESULTS	
APPENDIX 7 PALEONTOLOGY - THE FORAMINIFERAL SEQUENCE	
APPENDIX 8 PALYNOLOGY	
APPENDIX 9 GEOCHEMISTRY	
APPENDIX 10 K/Ar40 AGE DATING	

VOLUME 2, GEOLOGICAL ENCLOSURES

ENCLOSURE 1 - TILANA-1 MONTAGE

ENCLOSURE 2 - DRILLING PANEL

ENCLOSURE 3 - COMPOSITE WELL LOG

ENCLOSURE 4 - EXLOG FORMATION EVALUATION LOG

ENCLOSURE 5 - EXLOG PRESSURE EVALUATION LOG

ENCLOSURE 6 - SCHLUMBERGER SEISMIC CALIBRATION LOG

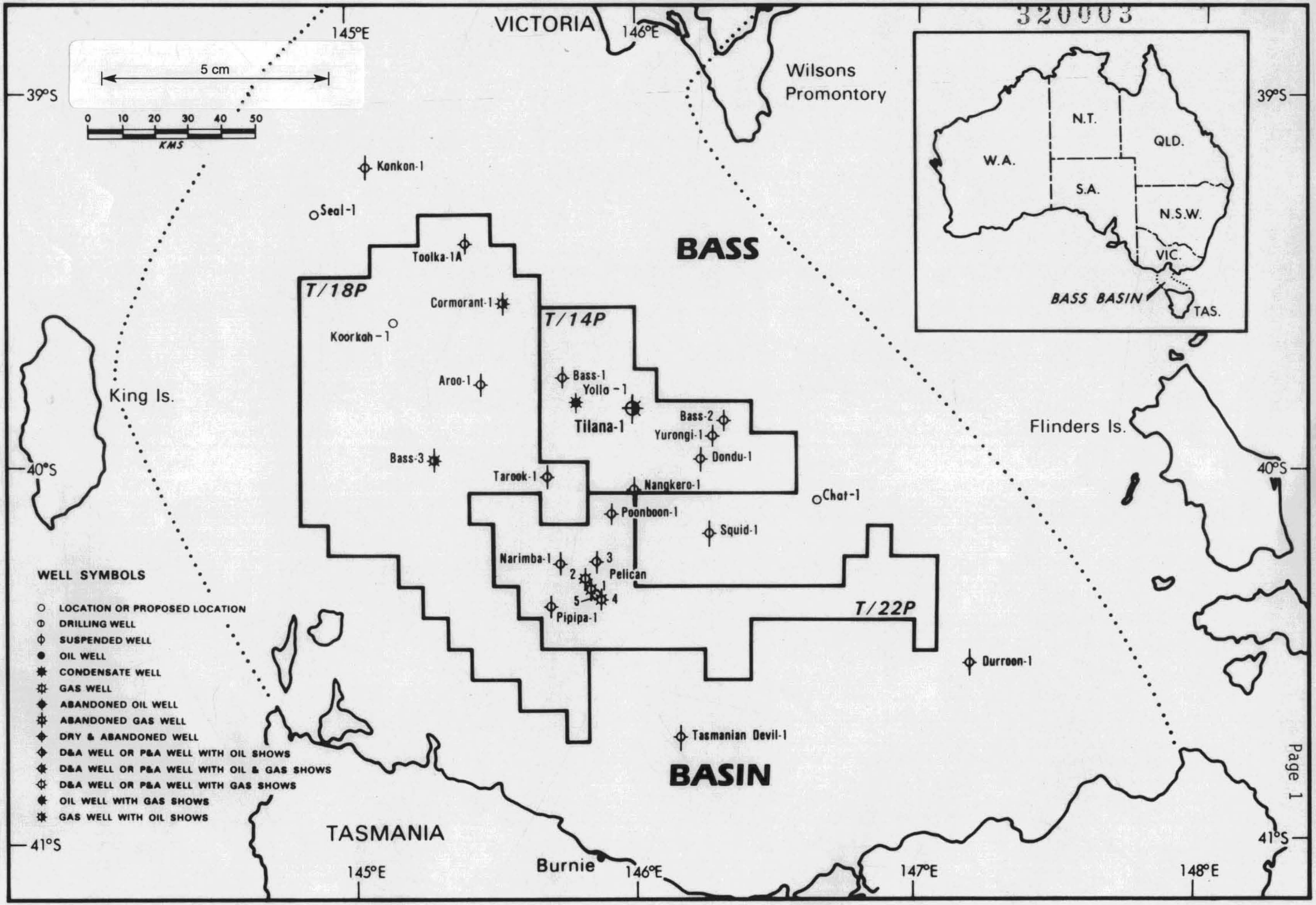
ENCLOSURE 7 - SCHLUMBERGER MINIMUM PHASE GEOGRAM

ENCLOSURE 8 - SCHLUMBERGER ZERO PHASE GEOGRAM

ENCLOSURE 9 - SCHLUMBERGER CYBERLOOK AND GLOBAL LOGS (9. A, B, C)

VOLUME 3, ENGINEERING REPORT

320003


VICTORIA
145°E
146°E
147°E
148°E
39°S
40°S
41°S
5 cm
0 10 20 30 40 50
KMS
Wilsons Promontory
N.T.
QLD.
W.A.
S.A.
N.S.W.
VIC.
TAS.
BASS BASIN
Konkon-1
Seal-1
BASS
Toolka-1A
T/18P
Cormorant-1
Koorkah-1
T/14P
Aroo-1
Bass-1
Yolla-1
Tilana-1
Bass-2
Yurongi-1
Dondu-1
Bass-3
Tarook-1
Nangkero-1
Chat-1
Poonboon-1
Squid-1
Narimba-1
Pelican
Pipipa-1
T/22P
Durroon-1
Tasmanian Devil-1
BASIN
King Is.
Flinders Is.
TASMANIA
Burnie
WELL SYMBOLS
LOCATION OR PROPOSED LOCATION
DRILLING WELL
SUSPENDED WELL
OIL WELL
CONDENSATE WELL
GAS WELL
ABANDONED OIL WELL
ABANDONED GAS WELL
DRY & ABANDONED WELL
D&A WELL OR P&A WELL WITH OIL SHOWS
D&A WELL OR P&A WELL WITH OIL & GAS SHOWS
D&A WELL OR P&A WELL WITH GAS SHOWS
OIL WELL WITH GAS SHOWS
GAS WELL WITH OIL SHOWS

TILANA-1

WELL SUMMARY

Tilana-1, was drilled in permit T/14P, and was the second in a series of wells operated by Amoco Australia Petroleum Company in the Bass Basin. T/14P is one of three permits operated by Amoco in the Basin, located between Victoria and Tasmania offshore Southeastern Australia (Figure 1). Amoco farmed in to this permit acquiring a 50 percent interest on March 25, 1984.

Tilana-1 was spudded on September 5, 1985 and located on shot point 5199 on seismic line B71A-50 in 81m of water some 16 kilometres south east of Yolla-1 (Enclosure 1). Its primary objective was to evaluate the Eocene interval of the Eastern View Coal Measures (EVCM) to a planned total depth of 2375m K.B. (Enclosure 2). It was this interval in the nearby Yolla-1 that encountered and recovered significant quantities of oil, condensate and gas. The Tilana-1 well was a test of a north-trending anticline with four-way dip closure at the top EVCM level of approximately 14.6 sq. km. (3600 acres).

Although it was not possible to confirm structural closure seismically below the Eocene level, good shows encountered while drilling below the Eocene were thought to possibly indicate the presence of structurally trapped hydrocarbons. Based upon the continued observance of hydrocarbon shows and porosity preservation, it was decided to drill ahead and determine the prospectivity of the Cretaceous section. By 3900m depth, drilling problems were experienced and further drilling of the Cretaceous was terminated.

Hydrocarbon shows were recorded within the Paleocene and Upper Cretaceous portions of the EVCM. During drilling, various fluorescence, cuts and crush cuts were observed in cuttings over the intervals 3081-3096m, 3260m, 3474m and 3573m, combined with significant gas peaks (Enclosure 4). Gas shows were recorded in sandstones from 2990m to total depth. Live light oil staining was observed in a number of sidewall cores, at 3084m, 3094m and 3197.5m, which was later confirmed by whole oil extract chromatography (Appendix 9).

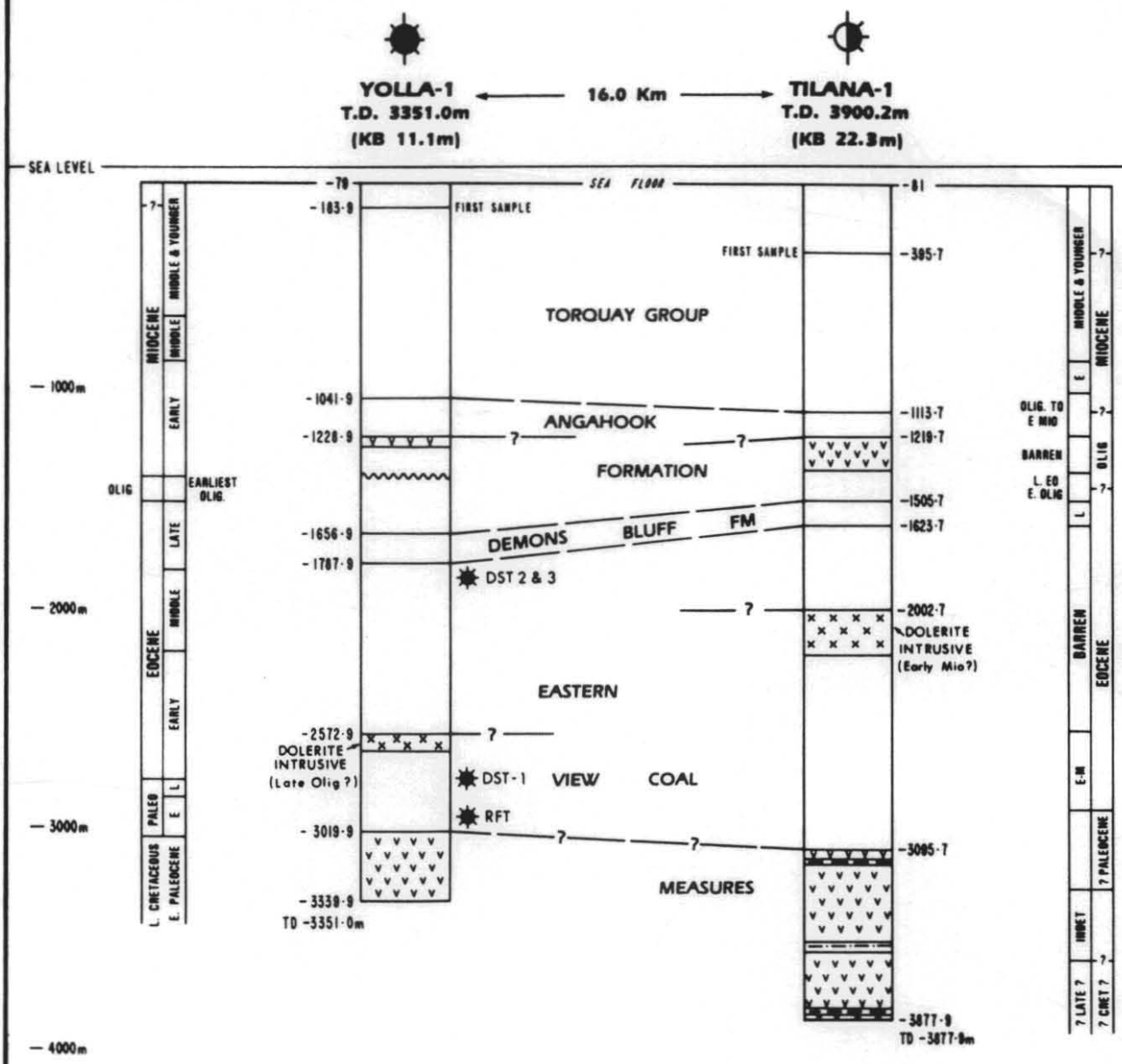
Log analyses confirmed the presence of hydrocarbons over intervals within the Paleocene and Upper Cretaceous within the EVCM (Appendix 5).

Three drillstem tests were performed over the intervals 3179-3185m, 3071-3075m and 3042-3048m, representing the thicker sands within the EVCM that had some hydrocarbon saturation (Appendix 6). None of these tests was successful in establishing a flow of formation fluids to surface, and the pressure data and rate of fluid influx suggest that the formations have limited permeability within the radius of investigation of the tests. However, it was not possible to precisely define any reservoir parameters such as horizontal permeability and skin, and, consequently, it has been difficult to analyse the poor performance of the reservoirs. Conventional cores 1 and 2, taken within the upper and middle zones of the EVCM testify to the good porosity and permeability character of the EVCM in general (Appendix 3).

The siliciclastics within the EVCM were intruded by numerous doleritic to gabbroic dikes of Early Miocene to Late Oligocene age (Appendix 10). Indeed, these intrusions were also observed within a predominantly basaltic sequence from 3118m to total depth. No age was determined for the basalt within Tilana-1 because of the severe mineralogical alteration affecting radiometric dating, but comparisons to Yolla-1 nearby, would suggest an Upper Cretaceous age. Core No. 3 was cut in amydgaloidal basalt which compared closely with that seen in Yolla-1 and Aroo-1. The most important difference between the basalt seen in Yolla-1 and in Tilana-1, was that both reservoir and source rocks were intercalated with the basalt flows in Tilana-1.

Vitrinite reflectance studies and Spore Colour Indices generated from palynological studies have shown these intrusives (and possibly the extrusives) had a significant local impact upon the thermal maturity of the sediments. Overmature sediments were recorded in the following intervals; 1660-2020m, 2260-2300m and 3800-T.D.,(Appendices 8 and 9). Nevertheless, significant sections of the well, from the Eocene to Upper Cretaceous had excellent source rocks for both oil and gas, with some sections being mature for the generation of both oil and gas. The presence of free oil and exsudatinite was noted in samples from 1675.7m to 3600m.

Tilana-1 was plugged and abandoned as a dry hole with oil and gas shows on November 25, 1985.



Amoco Australia Petroleum Company

FIGURE 2

CORRELATION DIAGRAM
YOLLA-1 AND TILANA-1 WELLS

5 cm

AUTHOR : K. GRANT , MAY 1986

WELL SUMMARY SHEET

COMPANY:	AMOCO AUSTRALIA PETROLEUM COMPANY	WELL:	TILANA-1
SPUDDED:	5 SEPTEMBER 1985	BASIN:	BASS BASIN
DATE T.D.:	18 OCTOBER 1985	PERMIT:	T/14P
RIG RELEASED:	25 NOVEMBER 1985	LATITUDE:	39° 53' 36.73" SOUTH
TOTAL OPERATING TIME:	84 DAYS	LONGITUDE:	145° 58' 41.97" EAST
DRILLING CONTRACTOR/RIG:	DIAMOND M.EXPLORATION CO / DIAMOND M EPOCH	S.P.:	5199
TOTAL DEPTH:	3900.2m	LINE:	B71A-50
WATER DEPTH:	81.0M	STATUS:	PLUGGED AND ABANDONED
KELLY BUSHING:	22.3M		DECLARED 9 BLOCK LOCATION AROUND WELL ON DECEMBER 12, 1985.

ISSUED: NOVEMBER, 1985
REVISED: MAY, 1986
BY: KG

FORMATION	RKB(m)	SUBSEA(m)	T.W.T.(msec)	LITHOLOGIC SUMMARY	REMARKS/SHOWS
TORQUAY GROUP	418	395.7		BIOCLASTIC LIMESTONE BECOMING CLAYEY AND SILTY WITH DEPTH	NO SHOWS
ANGAHOOK FORMATION	1136.0	1113.7	1.020	INTERBEDDED SANDSTONES, CLAYSTONES, SILTSTONES, COALS AND OCCASIONAL DOLOMITE. VOLCANIC FLOW IN MIDDLE OF UNIT	NO SHOWS
DEMONS BLUFF FORMATION	1528.0	1505.7	1.302	ANOXIC, PYRITIC SILTY CLAYSTONES WITH THIN SANDSTONES.	NO SHOWS
EASTERN VIEW COAL MEASURES	1646.0	1623.7	1.404	INTERBEDDED SANDSTONES, SILTSTONES, SHALES AND COAL WITH OCCASIONAL DOLOMITE STRINGERS.	MINOR OIL FLUORESCENCE WITH ASSOCIATED GAS PEAKS.
- top dolerite sill	2025.0	2002.7	1.646	FINE TO COARSE CRYSTALLINE DOLERITE CUM GABBRO	NO SHOWS.
TOTAL DEPTH	3900.2	3877.9	2.602		

	NO.	DEPTH (m)	CUT (m)	REC (m)	LITHOLOGY	REMARKS/SHOWS
CORES	1	1665.0-1682.0	17.00	10.7	v f gr SST w/ var amounts of cly mtx and minor clyst laminae.	No Shows
	2	2788.6-2807.00	18.40	18.40	v f to f gr SST w/ carb mat, coaly frag and var amounts of cly.	v tenuous pale yel cut fluor at 2801m and 2802m.
	3	3746.6-3752.04	5.44	5.44	Altered amygdaloidal basalt w/ calcite veins.	No shows.

DITCH CUTTINGS

From (m)	To (m)
418	3900

SIDEWALL CORES:

SUITE NO.	RUN NO.	FROM (m)	TO (m)	SHOT	RECOVERED
2	1	3065	1691	51	51
3	2*	3882	3870	4	4
3	3	3822	2994	30	28
				85	83

* Tool failed after first 4 SWC's of Run 2.

LOGS

SUITE 1: (1661-412m; GR to sea bed)
14 September
ISF-BHC-GR-SP-Cal (Run 1)

SUITE 2: (3070-1652m)
9 to 12 October
ISF-DDBHC-MSFL-GR-SP-Cal (Run 2)
LDL-CNL-GR (Run 1)
HDT (Run 1)
WST (Run 1)
CST (Run 1)

SUITE 3: (3902-2850M)
29 to 31 October
ISF-BHC-MSFL-GR-SP-Cal (Run 3)
LDL-CNL-GR (Run 2)
HDT (Run 2)
CST (Run 2 - 4 shots then failure)
WST (Run 2 - 5 levels then failure)
RFT (Run 1 - 24 attempts, 1 seat)
CST (Run 3 - Rec 28 of 30)

CASING

SIZE (inches x lb/ft)	30x	20 x 94	13 3/8x 68	9 5/8 x 47
LANDED AT (m)	203	412	1652	3311.7
CEMENT (Sacks)	2000	2000	2102	2130

DRILLSTEM TESTS

DST No. 1C: Perf 3179.0 - 3185.0
No flow, no pressure increase.
Reversed out - no visible gas or oil observed.

DST No. 2B: Perf 3071 - 3075m
No immediate indication of gas influx; weak blow in bubble bucket on running Schlumberger production logging tool.

DST No. 3: Perf 3042 - 3048m
Weak blow in bubble bucket; Fluid level in well rose 752m over 36 hour period.

PLUGS: 146.3 - 195.1m (inside 5 5/8" casing)

Plug-back total depth 3236.4m.

REMARKS:

PREVIOUS WORK

GEOLOGICAL

Tilana-1 was drilled in the central part of the Bass Basin (Permit T/14P) where previously 22 exploration wells, including Amoco's Yolla-1 discovery, have been drilled. Yolla-1 tested 580 bcpd and 15.1 mmcfgpd from Paleocene aged sandstones, and combined flows of 302 bopd, 892 bcpd and 12.82 mmcfgpd from sandstones of Eocene age, from within the Eastern View Coal Measures. Log analyses confirmed 58m of net pay in Yolla-1. Formation interval tests in Cormorant-1 recovered biodegraded oil and gas condensate from sandstones within the Eastern View Coal Measures. RFT's and F.I.T.'s in the Pelican-1, 2 and 4 wells recovered gas and condensate.

The stratigraphic sequence in permit T/14P is believed to contain up to 4600m of marginal marine and non-marine, early Cretaceous to Late Eocene clastic sediments overlain by a Late Eocene to Recent marine sequence up to 2100m thick. The primary reservoir objectives are sandstones within the Late Cretaceous to Late Eocene Eastern View Coal Measures. The Eastern View Coal Measures consists of sandstones interbedded with shales and coals deposited in nearshore marine to lacustrine environments.

GEOPHYSICAL

Geophysical surveys have been undertaken in the Bass Basin since 1960, with the more relevant surveys being shot during the years from 1972 to 1984. A number of lines from the previous surveys were reprocessed (324 km) to complement the Amoco 1984 TNK4 survey, in which 537 kms over T/14P were acquired. As part of a detailed infill survey of T/14P several lines were shot in the vicinity of the Tilana-1 well during October-November 1985 prior to the rig release. Because the survey was terminated before Tilana reached total depth no new lines were shot over the location.

STRATIGRAPHY

SUMMARY

The formation tops in Tilana-1 were determined utilizing all available data including well-site lithological descriptions, paleontology, palynology, and wireline logs. These data were also incorporated into the construction of the composite well log (Enclosure-3). A tabulated summary is presented below.

STRATIGRAPHIC TABLE
(FIGURES IN METERS)

FORMATION	TOP (RKB)	TOP (SUBSEA)	THICKNESS (IN WELL)	AGE
1. Sea Floor	102.0	79.7	-	
2. Torquay Gp.	102.0	79.7		Middle Miocene &
(first Sample)	418.0	395.7	1110.0+	Younger to Late Eocene.
Angahook FM	1136.0	1113.7	392.0	Early Miocene to Late Eocene.
Volcanics	1242.0	1219.7	154.0	? Oligocene
3. Demons Bluff	1528.0	1505.7	118.0	Late Eocene
4. Eastern View Coal Measures	1646.0	1623.7	2254.2	? Late Eocene to Cretaceous
Igneous Intrusion	2025.0	2002.7	212.0	Early Miocene
Main Volcanics	3118.0	3095.7	731.0	(+ Oligocene Intrusives)
Total Depth	3900.2	3877.9	-	

FORMATION DESCRIPTIONS

Torquay Group (418-1528m); Middle Miocene - Late Eocene.

In the Tilana-1 well the sediments of the Torquay Group range in age from Middle Miocene (and younger?) to Late Eocene. The upper part of the Torquay Group sediments may be divided into two main lithotopes. These consist of an upper (from 418-800m) 382 meter thick section of tan coloured bio-clastic limestones probably deposited as shoreline and back-reef detritus, and a 336 meter thick (from 800-1136m) unit of greenish-grey coloured, soft, microfossiliferous calcareous claystone, deposited in an inner-neritic to sublittoral environment. The bioclastic limestone is of Middle Miocene (and younger?) age and the calcareous claystone ranges in age from Early to Middle Miocene (planktonic foram zones G-D2). The lower part of the Torquay Group is represented by the sediments and volcanics of the Angahook Formation which in the Tilana-1 well is divisible into three lithological units with the top of the formation occurring at 1136 meters.

From 1136-1242 meters the Angahook consists of medium to coarse-grained poorly consolidated quartz sandstones interbedded with greenish-grey coloured, soft, calcareous claystones and minor coals and dense, reddish-brown coloured cryptocrystalline limestones. The coals (subbituminous-bituminous) are confined towards the top with thicker limestones present in the bottom half of the interval. The age of these sediments ranges from Oligocene to Early Miocene. The environment of deposition was marginal marine with restricted lagoonal and barrier beach/dune sedimentation dominant. The middle part of the Angahook Formation (from 1242-1396m) consists of 154 meters of rhyolitic volcanics of Oligocene (?) age.

Beneath the volcanic interval the basal part of the Angahook Formation (from 1396-1528m), consists largely of tan to brown coloured, soft, variably calcareous slightly microfossiliferous claystones and sandy to silty claystones interbedded with tan coloured very fine-grained, poorly consolidated quartz sandstones and minor tan coloured sandy dense cryptocrystalline limestones (in the upper part of the section). The age of these sediments ranges from Late Eocene to Early Oligocene. The sediments probably represent deposition in a marginal marine barred lagoonal environment.

Demons Bluff (1528-1646m); Late Eocene

In the Tilana-1 well the top of the Demons Bluff Formation occurrs at 1528 meters. The formation consists of sediments of Late Eocene age (planktonic foram zone K), that were deposited in a marginal marine environment with somewhat restricted water circulation. The dominant lithology is a dark reddish-brown coloured moderately hard calcareous, silty to sandy, fossiliferous pyritic claystone. The pyrite is variously abundant throughout the interval as a replacement mineral of forams and crinoid fragments.

Eastern View Coal Measures (1646m-3900.2m) Late (?) Eocene-Cretaceous (?)

The top of the Eastern View Coal Measures was picked at 1646 meters in the Tilana well because of obvious differences in lithologies and wireline log responses from the overlying Demons Bluff Formation. From 1646-2014 meters the lithological section consists of a series of generally fining-upward sandstones interbedded with claystones, siltstones and coals (mainly in the lower part of the section). The sandstones are predominantly light grey coloured, moderately sorted, very fine to medium-grained non-calcareous quartz sandstones. They are poorly to moderately consolidated and contain about 20-30% interstitial clay material. The siltstones are light to medium grey coloured, moderately soft, non-calcareous and contain abundant detrital mica and carbonaceous (?) material. The claystones are dark grey to black coloured, moderately soft, silty to sandy, non-calcareous and contain abundant detrital mica. Age diagnostic fossils are absent but by superposition the section is almost certainly Eocene in age, probably Middle to Late Eocene. The environment of deposition was marginal marine, possibly associated with deltaic distributary channels and interdistributary bays (or lagoons).

From 2014-2025 meters is an 11 meter thick unit of either tuff or altered doleritic basalt. Underlying (from 2025-2237m) the tuffaceous rock is a 212 meter thick gabbroic intrusion, which, based on K/Ar dating, has an age of 20.5+/- 1 million years (i.e. Early Miocene).

From 2237-3118 meters the section consists of interbedded quartz sandstones, siltstones, silty claystones and anthracitic coals and minor dolomitic limestones. The sandstones are white-tan coloured, generally very fine to fine grained, moderately hard with variable amounts of siliceous and clayey cementing materials. Below 2268 meters the sandstones become coarser-grained and are moderately to poorly sorted. The claystones are brownish-tan coloured (becoming greyish brown below 2566 meters), generally firm, non-calcareous, with varying amounts of detrital micas and dark coloured carbonaceous material and are variously abundantly silty. Siltstones are greyish-brown coloured, firm, non-calcareous and in places are very sandy and clayey. The dolomitic limestones are tan coloured, hard and brittle and cryptocrystalline. The anthracitic coals are particularly abundant in the top half of the interval and are generally closely associated with the claystones. They are black coloured, hard with irregular to subconchoidal fracture. The age of these sediments ranges from upper Early Eocene to Paleocene (middle M. diversus - upper Lower L. balmei zones) and they were probably deposited in brackish water swamp conditions associated with the upper or proximal part of a delta.

Below 3118 meters in the Tilana-1 well the E.V.C.M. consist of predominantly non-marine to marginal marine sediments and interbedded basaltic volcanics and dolerite intrusives. The sedimentary rocks from below 3118 meters to 3852 meters, are an assemblage of quartz sandstones, siltstones, shales and coals of Paleocene to Late Cretaceous age (upper Lower L. balmei - T. longus zones). The sandstones are whitesh coloured, generally fine-grained, moderately sorted, with silica and clayey cementing material possibly derived from the volcanics. The siltstones are dark brown coloured, generally very clayey, are firm to hard and non-calcareous. The shales are dark brown coloured, moderately hard, carbonaceous and variously silty. Coals are generally black coloured, hard anthracitic with subchoncoidal to irregular fractures. From 3852 - 3892 meters, the sandstones and siltstones become yellowish-tan coloured and have a 20-30 percent clay matrix. These rocks were deposited as sediments in non-marine environments.

The volcanics range from a hard relatively fresh unaltered dark greenish-grey coloured rock to a softer (often tuffaceous) lighter coloured rock with a mottled appearance. A 5.4 meter core of altered (weathered?) amygdaloidal basalt was recovered from 3746.6-3752 meters.

A "Junk Basket" sample of a coarser textured igneous rock with apparent gabbroic affinities was recovered from within the interval 3066-3311 meters. K/Ar dating on pyroxene from this sample gave an age of 28.3+/- 1.5 million years indicating a possible Late Oligocene intrusion perhaps associated with the Oligocene volcanics of the Angahook Formation. Below 3852 meters is a section of basaltic rocks to total depth of 3900.2 meters.

CONCLUSIONS

Equivalent sandstones within the Eastern View Coal Measures that flowed hydrocarbons in the Yolla-1 well did not contain productive hydrocarbons in the Tilana-1 well. After the comparisons of the drilling results of the Yolla-1 and Tilana-1 wells a number of possibilities may be cited to account for the lack of hydrocarbons in the Tilana-1 well, and these are as follows:

A. Upper E.V.C.M.

1. Data from vitrinite and pyrolysis analyses have shown that in general, the upper E.V.C.M. in the Tilana-1 and Yolla-1 wells does not have the potential to have generated large amounts of hydrocarbons. The dispersed organic matter present in the claystones and coals is dominated by vitrinite and inertinite with only minor exinite. With the overprint of the igneous intrusions removed, the upper E.V.C.M. has not reached a level of thermal maturity where volumetrically significant amounts of hydrocarbons could have been generated from terestrially derived organic matter (other than the exinite macerals resinite, bituminite and suberinite which together make up less than 20% of the D.O.M.). No significant shows of hydrocarbons were recorded in the upper part of the E.V.C.M. in the Tilana-1 well, despite the presence of reservoir quality sandstones. However, significant gas and condensate were tested from sandstones in the upper part of the E.V.C.M. in the Yolla-1 well. We can therefore conclude that these hydrocarbons migrated into the upper E.V.C.M. sandstones from source beds buried deeper (and therefore thermally more mature) in the section. It is probable that the migration of the hydrocarbons took place along non-sealing fault-zones. Such faults cutting the upper E.V.C.M. are present in the Yolla structure but are absent in the Tilana feature.

B. Lower E.V.C.M.

Despite the encouraging hydrocarbon shows recorded while drilling, live oil staining in several sidewall cores and the indicated presence of moveable hydrocarbons on the wireline logs, the testing of three sandstone intervals in the lower E.V.C.M. (at the equivalent stratigraphic level of the successful test in Yolla-1) did not recover hydrocarbons. This may be due to one or any combination of the following possibilities:

1. The sandstones in the lower part of the E.V.C.M. although demonstrating reasonable porosities, do not have significant permeabilities. Permeability reduction may be attributed to compaction and/or the presence of pore-space reducing clays. In this case, the shows of gas and oil seen while drilling could have been from hydrocarbons generated more or less in-situ and which were released from their confining pore space by the crushing action of the drill bit. Porosity/permeability reduction by compaction does not seem to be a likely significant factor since equivalent sandstones in the Yolla-1 well flowed very well on tests. The presence of depositionally introduced clays (environmentally controlled) in the Tilana area could account for the lack of effective permeability in the Tilana-1 well. Regional petrophysical analyses and sedimentological studies (core examination etc.) could help resolve this problem.

2. The formation tested may have been damaged during drilling. If this is the case, it is possible that the resultant reduction in permeability was caused by the reaction of the rock matrix (i.e. contained clays) to the drilling fluid rather than by drilling overweight. Descriptions of sidewall cores taken from the tested intervals indicate variable visual estimates of up to 10 - 20% white clay matrix which may have contributed to formation damage (by movement of fines or chemical reaction with the clays) as invasion by the drilling fluid took place.

   For future drilling in the Bass Basin, drilling mud should be designed that will minimize possible formation damage due to reactions of the filtrate with the rock matrix.

3. The tested intervals may be without structural closure. In this case the oil indications seen during drilling may represent residual hydrocarbons after migration through the section. Although seismic four-way structural closure could not be demonstrated convincingly at the level of testing in the Tilana-1 well, it was considered that the encouraging shows seen while drilling the interval might indicate structurally or stratigraphically trapped hydrocarbons. The dipmeter indicates only very low structural dip below the Eocene level.

By virtue of the uncertainties regarding the interpretation of the results of the drilling and testing of the Tilana-1 well, the Tilana area should still be regarded as a potential hydrocarbon province. It was with this rationale coupled with the extremely encouraging test results of the nearby Yolla-1 well that lead to the application by Amoco of a nine block Location over the Tilana area. The Location was granted by the Tasmanian Government on December 13, 1985.

APPENDIX 1

CUTTINGS SAMPLE DESCRIPTIONS

TILANA-1

418-455M (1371'-1493')

BIOCLASTIC CALCARENITE:

LT- MED GRY-TAN TO CRMY-WHT WITH VERY MINOR LT TO MED GRY/DOM FOSSIL AND SHELL DEBRIS OF 0.1 TO 2.00 MM SIZE. FOSS DOM CORAL, BRYOZOA, SPONGE SPICULES, FORAMS, STROMATALITES, PELECYPODS AND OTHER SHELLS/TR-ABUND V/FN TO CSE MICROXLN LS FRAGS AND AS PORE FILLINGS/TR FREE LT TO MED GRN GLAUC (?).

455-710M (1493'-2329')

BIOLCASTIC CALCARENITE:

CONT'D LT TO MED GRY-TAN, BECOMING GRNSH GRY-TAN FROM 535M (1755'),APPEAR ABUND YLW COLORATION FROM 575M (1886') FROM ANHEDRAL CALCITE /INCR COMPETENCY FROM 535M (1755') W/MARKED DECR FREE FOSSILS AND SHELL FRAGS AND APPEAR ABUND LT GRY, MED GRN, GLAUCONITIC FORAMS/CONT'D CORALS, BRYOZOA, SPICULES AND SHELL FRAGS AS LESS WELL PRESERVED.

710-760M (2329'-2493')

100% BIOCLASTIC CALCARENITE TO 745M (2444'), BECOMING TRACE CLYEY AT 690M (2664') AND INTERBEDDED WITH VERY MINOR THIN, CRYPTOXLN LIMESTONE FROM 745 TO 760M (2444'-2493').

BIOCLASTIC CALCARENITE:

LT-MED GRY-TAN, BECOMING GRNSH GRY-TAN FROM 535M (1755') WITH INCR TO ABUND DK GRN TO BLK, PELLETOID GLAUC(?) FROM 535M (1755') AND APPEAR ABUND YELLOW CALCITE FROM 575M (1886')/INCR COMPETENCY FROM 535M (1755') WITH MARKED DECR IN FREE MICROFOSSILS AND SHELL FRAGS AND APPEAR ABUND LT GRY FORAMS WITH TR-ABUND MED GRN GLAUC(?) INCLUSIONS/CONT'D CORALS, BRYOZOA, SPICULES AND SHELL FRAGS AS DOM POORLY PRESERVED/VIS POROS 15-25%.

LIMESTONE:

CRMY-WHT TO TAN-WHT/MOD HD, DENSE AND BRT/CRYPTOXLN TO RARE VERY FN MICROXLN.

760-800M (2493' - 2625')

DOM BIOCLASTIC, CLYEY CALCARENITE WITH BIOCLASTIC CALCILUTITE AT TOP.

BIOCLASTIC CALCARENITE:

LT-MED GRY-TAN WITH INCR CALCITIC CLY/CONT'D POORLY PRESERVED FOSSIL DEBRIS WITH APPEAR ABUND OOLITES/VIS POROS TO 5%.

BIOCLASTIC CALCILUTITE:

GRY-TAN, LT-MED GRY AND MED DK GRY/DOM MED TO VERY SOFT AND HYDRATABLE TO GD TR VERY HD, MED DENSE AND BRTL/MICROFOSSIL DEBRIS VERY FN TO FN, POORLY PRESERVED/GD TR PYRITIZED FRAGS/VIS POROS TO 5%/GD TR FRAGS WITH TR-ABUND DK GRN TO GRNSH-BLK, PELLETOID GLAUC(?)/.

800-1065M (2625'-3494')

THIN BEDDED, VARIABLY CALCAREOUS CLAYSTONE AND MINOR VARIABLY CALCAREOUS SHALE.

CALCAREOUS CLAYSTONE/SHALE:

DK GRN WITH TR-GD TR MED TAN MICROFOSSIL FRAGS/ALL MOD TO VERY SOFT WITH CLYSTN BLKY TO SUB-FIS AND SH AS POORLY TO HIGHLY FIS, ABUND SH WITH MED CURVILINEAR PARTING/DOM HIGHLY CALCITIC GD TR VERY FN-CSE SILTY TO RARE VERY FN SDY.

1065-1140M (3494'-3740')

CALCAREOUS CLAYSTONE (80-100%):

DK GRN VERY SOFT TO MOD SOFT, BLKY TO SUB-FIS MOD TO HIGHLY CALCITIC, MOD TO HIGHLY MICROFOSSILIFEROUS WITH RARE VERY FN TO CSE SILT, MED GRN GLAUC(?), MICA (MUSC) AND BLK MICROCARB/GD TR MED BRN CLYSTN AND APPEAR 10-20% BRNSH-TAN, EXTR HD, DENSE AND BRTL, CRYPTOXLN, CALCITIC DOLOMITE BET 1130M AND 1135M (3707' AND 3724').

1140-1185M (3740'-3888')

INTERBEDDED SANDSTONE, COAL, CLAYSTONE, SILTSTONE AND LIMESTONE.

SAND (70-100%): UNCONSOLIDATED DRILLING RESIDUE

MED-DK GRY, MED-CSE POOR SORT ANG-SUBANG QTZ WITH MINOR FELDS.

SUB-BITUMINOUS TO BITUMINOUS COAL: BEDS 0.3-1.0M THICK

BLK VERY HD, COMPACT, RESINOUS TO GLOSSY LUSTER/FRAC BLKY TO SUB-CONCHOID, RARE PYRITE; CRUSH CUTS CLR WITH VERY BRT AND INTENSE BLUE-WHT FLUOR LEAVING A DESICCATION RING OF LT BRN COLOR AND BRT BLUE-WHT FLUOR.

CLAYSTONE (20-30%:)

LT TAN TO GRNSH-TAN/VERY SOFT AND MOD HYDRATABLE/EXPLOSIVELY CALCITIC/MICRO FOSSILIFEROUS WITH RARE VERY FN TO CSE SILT.

SILTSTONE (TR-10%):

LT TAN/MOD HD/HIGHLY CALCITIC AND VERY CLYEY WITH ABUND TAN MICROFOSSILS.

LIMESTONE (TR-10%):

MED REDDISH-BRN TO REDDISH-TAN/EXTR HD, DENSE, BRTL, CRYPTOXLN AND HOMOGENEOUS WITH NIL VIS POROS.

1185-1250M (3888'-4101')

INTERBEDDED SANDSTONE AND CLAYSTONE WITH VERY MINOR LIMESTONE AND COALS.

SAND (50-60%):

CONT'D AS MED-CSE.

CLAYSTONE (30-40%):

GRY-WHT TO GRY-TAN/HIGHLY CALCITIC.

LIMESTONE (TR-10%):

REDDISH-BRN TO REDDISH-TAN, CRYPTOXLN.

COAL (TR-10% AS SLOUGH ?):

SUB-BITUMINOUS TO BITUMINOUS, REDDISH-BRN TO BLK.

CONFIDENTIAL
CLASS 1

320019

1250-1305M (4101'-4281')

INTERVAL TOPPED BY PUMICE, OBSIDIAN AND RHYOLITE AND APPAR INTERBEDDED WITH SANDS AND CLYSTNS AND "GRADING" TO OBSIDIAN THROUGH 1265M (4150') AND THEN AS RHYOLITE TO 1305M (4281').

PUMICE:

DK ''STEEL'' GRY WITH SUB-METALLIC LUSTER/EXTR HD. AND BRTL.

OBSIDIAN:

DK REDDISH BROWN VITROPHYRIC TO HOLOHYALINE GROUNDMASS WITH TR TO ABUND PERLITIC CRACKS AND AMYGDALS.

RHYOLITE:

VARIEGATED PURPLEISH-REDDISH BROWN, PORPHYRITIC WITH PHENOCRYSTS OF QUARTZ AND FELDSPAR; TRACE BIOTITE AND AUGITE(/) AND VARIOUSLY AMYGDALOIDAL.

1305-1398M (4281'-4586')

RHYOLITE (100%): AS ABOVE

NOTE:

EXTREMELY ABUND SD, CLYSTN, COAL SLOUGH (?).

1398-1480M (4586'-4856')

DOM CLAYSTONES WITH THIN (0.3-1.0M) INTERBEDS OF SANDSTONE AND LIMESTONE.

CLAYSTONE:

(60-80 PERCENT) LT-M TAN EXTR SOFT AND HYDRATEABLE/DOM MOD CALC/TR TO GD TR VERY FN TO CSE SILT TR-GD TR TAN MICROFOSSILS.

SAND:

UNCONSOL DRLG RESID/VERY FN, MOD WELL SORT/ANG, CLR TO FRSTED DOM QTZ WITH MINOR FELDSP/TR MED GRN, ANG GLAUC (?). MICA (MUSC) AND BLK MAFICS (?).

LIMESTONE:

LT-M REDDISH-TAN/EXTR HD, DENSE AND BRTL/CRYPTOXLN/ VERY SDY WITH VERY FN, SHARP, BRNSH DISSEM QTZ/TR TO GD TR MED GRN GLAUC (?)/ VIS POROS ABSENT.

1480-1545M (4856'-5069')

CLAYSTONE WITH 0.3-1.0M SANDSTONE INTERBEDS.

CLAYSTONE:

MED DK RED-BRN TO BRN/EXTR SOFT, SOL/TR-MOD CALC/ TR VERY FN-CSE SILT AND VERY FN SDY WITH GD TR TAN MICRO FOSSIL FRAGS/RARE DK GRN GLAUC (?) AND BLK MAFICS (?).

SANDSTONE:

LT TAN TO TAN-WHT/MOD SOFT AND EASILY FRI/VERY FN, MOD WELL SORT, ANG, CLR TO FRSTED DOM QTZ WITH MINOR FELDSP/TR MED GRN GLAUC (?)/RARE BLK MAFICS (?)/LT TAN, MOD CALC, KAOLINITIC (?) MATRIX/VIS POROS 15-25%.

1545-1665M (5069'-5463')

CLYST: 90% AS ABOVE

SST: 10% AS ABOVE

1664.97-1682.2M (5463'-5519')

CORE NO. 1

REC 17.23M (56.53')
1664.5 - 68.5M SST: V LT GRY, V F GR SUBANG, W SRT, MOD TO V FRI, NON-CAL. OCC DK GRNS. TOP V CLEAN BUT INCREASING CLAY CONTENT WITH DEPTH TO 30 - 40 PERCENT AT 1668.5M. BECOMES DKER WITH DEPTH FROM V LT GRY TO M TO DK GRY-BRN. VIS POROS 30 PERCENT AT TOP TO 10 PERCENT AT BASE. 1668.5 - 70.3M: SLTST M TO DK BRN-GRY, GRDS FROM VF SAND TO SLT, ANG. V FRI, NONCALC. 30 - 40 PERCENT CLY. ABUN MICA. 1670.3 - 74.5M SST: V LT TO LT GRY, V F GR, ANG, W SRT, V TO MOD FRI. LOCALLY HD. V CLYEY 20-30 PERCENT, NON CALC. OCC DK GRN, ABUN MICA. .5-2CM CLY LAM AT BASE. LOCAL CARB BANDS AT 1673.3M. VIS POROS 15-25 PERCENT; TR SPOTTY DK BRN. PYROBIT? AT 1664.8M, NO CUT OR CRUSH CUT FLUOR.

1682.2 - 1695M (5519'-5561')

SST (70 - 90%: LT GRY VF GR. SUBANG, W SRT. MOD FRI, V W CMT W/ WH CLY (30 - 40%) MTX - (LOCALLY 10 - 15 PERCENT): NON-CALC. OCC PY. VIS POROS 0-15% LOCALLY HIGHER. NO SHOWS. GRDS TO SLTST AT BASE. CLYST (10-30%): DK GRY TO BRN-GRY SFT. ABUN SLT AND VF ANG SND, NON CALC. OCC CALC MICRO FOSS FRAG. PY. MICMICA.

1695-1698M (5561'-5571')

POOR SAMPLE: VOLC SLOUGH; CLY SST: 85% LT GRY VF GR SUBANG GRD TO SLT, 40% CLY; NON-CALC TR CALC; OCC FREE M TO C GR CLR TO MLKY SUBANG QTZ.

CLYST: DK GRY 15%.

1698-1710M (5571'-5581')

SST: 100% LT TAN-GRY, VF GR WITH MOD ABUN LOOSE RND M TO V C GR, SUBANG, WSRT, MOD ABUN SLT, V ABUN WH CLY (20-45%), ABUN PY AND MICA (MUSC); NON-CALC TO OCC TR CALC, VIS POROS DOM 10% (CLY CHOKED) LOCALLY 20-25%.

1701-1710M (5581'-5610')

SST: 90% DOM V F GR AS ABOVE WITH APPROX. 30% M TO C CLR VIT SUBANG UNCONSOL QTZ.

CLYST: 10% DK GRY-BK, MOD SFT, PY, MICA, OCC MICROFOSS.

1710-1716M (5610'-5630')

SST 40% DOM M TO C GR UNCONSOL CLR TO MLKY QTZ, DOM SUBANG, PR SRT, OCC SPTY DK BRN PYROBIT?; OCC GRAN TO V OCC PEB SIZE.

CLYST: 30% DK GRY-BK, BLKY, SFT, NON-CALC, GLOSSY TEXTURE, CARBONACEOUS.

COAL: 30% BLK, V HD, V BRIT, BLKY TO SUB CONCH FRAC, GLOSSY TO SUBMETALLIC, OCC PY OCC ARG WITH MICA; OCC MED YEL MOD BRT MIN FLOUR.

1716-1722M (5630'-5650')

SST: 45% DOM M TO V C GR OCC GRAN AND ABUN VF TO F, ALL UNCONSOL, SMALLER SIZE MORE ANG, LARGER ANG TO SUBRND, SMALLER CLR QTZ, VC FROSTED, ABUN MICA, PYROBIT?, ABUN PY BLEBS.

CLY: 25% AS ABOVE

COAL: 30% AS ABOVE

1722-1725M (5650'-5659')

CLYST: 75%: DK GRY-BLK, V SFT AND HYDRATABLE, BLKY, NON-CALC, ABUN SLT AND VF SND, PY, MICA, SLKY LUSTRE.

SST: 15% V F GR M GRY V CLYEY, SUBANG AND M-VC UNCONSOL SUBANG.

COAL: 10% AS ABOVE

1725-1728M (5659'-5669')

SST 80%: LT GRY M TO VC GR UNCONSOL WITH MOD ABUN VF TO F CLYEY, ANG-SUBRND, V POOR SRT, CLR VIT TO FRSTED AND MLKY QTZ, ABUN PY AND MICA.

CLYST: 20%: M TO DK GRY-BK SLTY; 10% COAL SLOUGH?

1728-1731M (5669'-5679')

CLYST: 70% AS ABOVE, SLKY TEX

SST: 30% DOM V C TO M GR UNCONSOL WITH VF TO F; LARGER GRNS OCC WITH SPTY BLK PYROBIT? NO CUT.

1731-1734M (5689')

CLYST: 90% AS ABOVE

SST: 10% AS ABOVE

1734-1737M (5689'-5699')

CLYST: 60% DK GRY-BLK, V SFT AND HYDRATABLE, BLKY TO CCC SUB-FIS, ABUN PY AND MICA AND LOCALLY SLTY AND SNDY, NONCALC, SLKY LUSTRE.

SST: 40% LT GRY UNCONSOL M TO V C GR ANG TO SUBRND QTZ, ABUN MICA (MUSC) QTZ DOM MLKY AND FROSTED TO OCC CLR VIT, NON-CALC.

1737-1740M (5699'-5709')

CLYST: 80% AS ABOVE.

SST: 20% DOM LT GRY VF GR SUBANG WSRT MOD FRI V CLYEY (30%) AS PREVIOUSLY WITH ABUN M GR AND RARE C AND VC GR UNCONSOL; ABUN PY AND MICA (MUSC) IN SAMPLE.

1740-1743M (5709'-5719')

CLYST 59% DK GRY-BLK AS IN 1737M, V DRLG DISP, V SLTY.

SLTST 50%: LT GRY, V CLYEY (40-50%) V SIMILAR TO LT GRY V F GR SST AS ABOVE ONLY GR SIZE DECREASES TO SLT; ABUN PY AND MICA IN SAMPLE.

1743-1749M (5719'-5738')

COAL: 50%: DK GRY TO BLK, V HD AND EXT BRIT, BLKY FRAC, HIGH GLOSSY, OCC ARG.

SST: 35%: DOM LT GRY VF GR AS ABOVE V CLYEY GRD TO SLTST WITH MOD ABUN M TO C GR UNCONSOL.

CLYST: 15% AS ABOVE.

1749-1752M (5738'-5748')

COAL: 10%: SLOUGH?

SST: 70% LT GRY M TO C UNCONSOL WITH DOM LT GRY VF GR TO F CLYEY, NON-CALC

CLYST: 20%: DK GRY BLK; ABUN PY AND MICA.

1752-1755M (5748'-5758')

SST 90%: M TO VC GR UNCONSOL ANG TO SUBRND MLKY AND FROSTED TO OCC CLR VIT QTZ AND VF GR LT GRY TO TAN GRY SUBANG WSRT V CLYEY (30-40%) GRD TO SLTST; VIS POROS 10-15%.

CLYST: 10% DK GRY-BK; ABUN MUSC AND MOD ABUN PY.

1755-1758M (5758'-5768')

SST: 90% AS ABOVE

CLYST: 10% AS ABOVE

1758-1761M (5768'-5778')

SST: 90% V PR SRT VF TO VC GR OCC GRD TO SLT; DOM LT GRY

CLYST: 10% GRY, OCC SLTY; ABUN MUSC AND MOD ABUN PY.

1761-1764M (5778'-5787')

SST: 100% DOM MLKY FROSTED TO OCC CLR ANG TO SUBRND M TO VC GR QTZ MOD ABUN VF TO F LT GRY CLYEY OCC GRD TO SLT.

1764-1770M (5787'-5807')

SST: 80% DOM M GR, CONSOL VF TO VC UNCONSOL; GRD TO M GRY CLYEY SLTST.

CLYST: 20% AS ABOVE

1770-1776M (5807'-5827')

SST: 100% WH TO V LT GRY UNCONSOL DOM M TO V C MLKY TO CLR OCC GRANULES. ANG TO SUB-RND QTZ; ABUN VF TO F GR UNCONSOL AND OCC CONSOL. VIS POROS 30%. NONCALC, OCC BLK PYROBIT? CARB MAT LOCALLY ATTACHED TO GRNS. ABUN LOOSE PY AND MUSC.

1776-1779M (5827'-5837')

SST: 90% AS ABOVE

COAL: 10% BK V HD, EXT BRIT, HIGH GLOSS.

1779-1785M (5837'-5856')

SST: 90% DOM M TO V C GR UNCONSOL SUBANG-SUBRND, CLR TO MLKY OCC FRSTED QTZ, PR SRT, WITH MOD ABUN VF GR; WELL CMT WITH WH CLY. GRD TO SLT. C GR WITH OCC TAN-GRY CLY CMT AND QTZ OVERGROWTHS (SIL CMT). VIS POROS 30%.

CLYST: 10% DK GRY-BK, CARB GRD TO LIGNITIC HIGH GLOSSY, SFT, DISPERSIVE. ABUN MICA OCC PY THROUGHOUT SAMPLE.

1785-1788M (5856'-5866')

SST (100%) AS ABOVE.

1788-1794M (5866'-5886')

SST (80%): AS ABOVE

CLYST-SLTST: 20%; LT TO M GRY (SLT) TO DK GRY (CLYST) MOD SFT, FRI, V CLYEY, V SLTY, NONCALC. PY.

1794-1797M (5886'-5896')

SST (90%): M TO V C GR AS 1785M; 10% VF GR CLYEY.

1797-1803M (5896'-5915')

SST (90%): DOM M TO V C GR AS ABOVE

COAL: (10%): BLK TO DK GRY (ARG), V HD, EXT BRIT, BLKY, ABUN PY, HIGH GLOSS.

1803-1806M (5915'-5925')

SST (90%): DOM M TO VC GR DOM ANG, INCR QTZ OVERGROWTHS

COAL: (15%): WITH ARG COAL.

1806-1812M (5925'-5945')

SST (65%): AS ABOVE

COAL (35%): AS ABOVE

1812-1815M (5945'-5955')

SST (90%): M TO V C GR ANG TO OCC SUBRND, MLKY TO CLR OCC FRST QTZ. UNCONSOL.

COAL AND CARB CLYST: (10%): DK GRY-BLK HIGH TO MOD GLOSSY, PY.

1815-1818M (5955'-5965')

CLYST (70%): BLK, MOD SFT, V CARB GRD TO LIGNITE AND COAL, MOD SFT, BLKY MOD BRIT, SPECULAR LUSTRE, ABUN MICMICA AND MIC PY., NONCALC.

SST: 30%: M TO C UNCONSOL CLR TO MLKY PR SRT QTZ.

1818-1821M (5965'-5974')

SST (60%): AS ABOVE

CLYST (40%): MORE DOM ARG, LESS COALY.

1821-1824M (5974'-5984')

SST (90%): VF TO VC GR DOM UNCONSOL CLR TO MLKY SUBANG-SUBRND QTZ LT SILVERISH GRY; OCC V F GR TO SLT, W CMT WITH CLY.

CLYST (10%): DK GRY-BK, SFT CARBONACEOUS GRD V BRIT HIGH GLOSS COAL.

1824-1830M (5984'-6004')

SST (80%): VF TO V C GR DOM UNCONSOL AS ABOVE

SLTST (10%): LT TO M SILVER GRY, GRD TO V F SNDY, V CLYEY (40%), MOD SFT AND FRI, NON-CALC. ABUN PY, MICA.

COAL (10%): BLK V HD, EXT BRIT, V HIGH GLOSS (SUBMETALLIC) BLKY GRD TO CARB CLYST.

1830-1833M (6004'6014')

SST (90%): DOM C TO M WITH VC TO VF, ANG TO SUBRND MLKY TO CLR QTZ.

SLTST (10%): AS IN 1830M.

1833-1836M (6014'-6024')

SST (100%): UNCONSOL DOM C TO M WITH V C TO VF AS ABOVE

1836-1839M (6024'-6033')

SST (100%): MOD ABUN QTZ OVERGROWTHS. 10% COAL SLOUGH?

1839-1842M (6033'-6043')

SST (100%): VC TO VF UNCONSOL.

1842-1845M (6043'-6053')

SST (100%): SLIGHTLY MORE UNIFORM (C GR) AND MLKY TO FRSTD.

1845-1848M 6053'-6063')

SST (80%): UNCONSOL AS ABOVE

SLTST (20%): LT TO M GRY, SFT, FRI, GRDS TO VF SND, ABUN WH-GRY CLY CMT (40%), FNT LINEATIONS, MOD ABUN CARB MAT, PY.

1848-1851M (6063'-6073')

SST (65%): UNCONSOL VF TO VC GR AS ABOVE

SLTST (35%): LT TO M SILVERISH GRY, MOD SFT AND FRI OCC V DRLG DISP TO OCC MOD HD, GRD TO VF GR SST, V CLYEY 30-40% - LT GRY, FNT LIN, NONCALC, ABUN PY, OCC MICA, MOD ABUN FREE FLOATING M TO OCC C GR QTZ GRNS.

1851-1845M (6073'-6083')

SST (85%): UNCONSOL VC TO VF GR AS ABOVE

SLTST (15%): AS IN 1851M OCC GRD TO SLTY CLYST.

1854-1875M (6083'-6093')

SST (60%): UNCONSOL VF TO VC.

SLTST (30%): AS IN 1851M GRDS TO CLYST; MICA; DRLG DISPERSED

COAL (10%): BLK, V HD, V BRIT, HIGH GLOSS, BLKY FRAC, GRDS TO LIGNITIC CLYST; PY.

1857-1860M (6093'-6102')

SST (50%) AS ABOVE
COAL (30%) AS ABOVE
SLTST (20%): M SILVERISH GRY, V F LAM (0.5MM WITH V F GR SST).

1860-1863M (6102'-6112')

SST (50%): UNCONSOL VF TO VC

SLTST (50%): DRLG DISP AND V CLYEY (30-40%) GRD TO SLTY CLYST.

1863-1866M (6112'-6122')

SST (85%): UNCONSOL VF TO VC.
SLTST (15%): AS ABOVE

1866-1869M (6122'-6132')

SST (80%): VF TO VC UNCONSOL; ABUN PYRITE FRAG.

SLTST (20%): OCC FRAG SL CALC (30% HCL).

1869-1875M (6132'-6152')

SST (50%): VF TO VC UNCONSOL; OCC SPTY BLK CARB MAT AFFIXED TO GRNS.

SLTST (35%): V CLY - 30-50% M GRY TO OCC MLKY WH GRD TO SLTY CLYST

CLYST (15%): DK GRY, SFT, BLKY, OCC SLTY, PY.

1875-1878M (6152'-6162')

SST (40%): VF TO OCC UNCONSOL

SLTST (40%): AS IN 1875M WITH ABUN WH-OFF WH; OCC TR CALC.

CLYST (20%): AS IN 1875M.

1878-1881M (6162'-6171')

SST (20%) VF TO VC UNCONSOL

SLTST? (60%) OFF WH MOD HD TO HD, NONCALC, 30-50% WH CLY AND SIL CMT - GRD TO SLTY CLYST.

CLYST (10%).

1881-1884M (6171'-6181')

SST - SLTST: 75% OFF WH TO LT GRY, VF GR GRD TO SLT, 30-50% WH CLY AND SIL CMT MOD SFT TO V HD (SIL). NON-CALC.

CLYST: DK GRY TO BLK MOD SFT TO V HD (SIL).

SST (QTZITE) 5%: DK GRY TO MOTTLED GRY-WH, EXT HD W SIL, F TO M CLR QTZ COMPLETELY INTERLOCKING WITH DK GRY SIL.

1884-1887M (6181'-6191')

SST (60%): 80% VF GR OFF WH TO LT GRY WELL CMT WITH CLY AND SIL GRD TO SLTST; 20% M TO VC UNCONSOL.

CLYST (40%): DK GRY TO BLK GRD TO CLYEY SLTST, SFT TO V HD - SILICEOUS.

1887-1890M (6191'-6201')

SST (85%): LT GRY TO OFF WH VF GR GRD TO SLTSTONE (APPROX 50/50) WELL CMT WITH CLY AND SIL - MOD SFT TO V HD; OCC MGR; 10% UNCONSOL M TO C GR; CLYST (15%) DK GRY TO BLK MOD SFT TO OCC V HD (SIL) OCC SLTY AND SNDY.

1890-1893M (6201'-6211')

SST (75%): 80% VF GR OFF WH CLYEY (30%) MOD SFT TO MOD HD - OCC WITH SIL OVERGROWTHS, OCC POROS TO 15-20%.

SLTST (25%): V CLYEY M TO LT GRY, MOD SFT, OCC SL CALC MOD SFT TO HD, TRANSLUCENT.

1893-1899M (6211'-6230')

SST (85%): 60% F TO VF (40% M TO VC UNCONSOL). MOD SRT, W CMT WITH CLY AND OCC SIL, MOD FRI TO OCC HD.

SLTST (15%): DOM LT TO M GRY V CLY (40%).

1899-1902M (6230'-6240')

SST (95%): 90% M TO V C DOM UNCONSOL ABUN CMT WITH CLY (15%) AND SIL (10%) V F TO F. MOD HD TO SFT, MOD FRI.

1902-1905M (6240'-6250')

SST (100%): M TO VC GR OCC F GR DOM UNCONSOL MLKY TO CLR SUBANG QTZ, ABUN MICA (25% VIS POROS).

1905-1908M (6250'-6260')

SST (90%): 80% WH, VF GR, TO F ANG, W SRT, MOD FRI, MOD WELL CMT WITH CALC, TR SIL, AND UP TO 10% WH CLY, OCC LT TO M GRY CLYEY AND SLTY GRADING TO SLTST (10%). VIS POROS 15%. 20% OF SST UNCONSOL CLR VIT TO MLKY M TO VC GR QTZ. ABUN PY FRAG AND MUSC.

1908-1911M (6260'-6270')

SST (50%): V F GR AS IN 1908M, MOD CALC

COAL (40%): BLK, V HD, V BRIT, BLKY FRAC, HIGH GLOSS, ABUN PY, LINEATIONS.

SLTST (10%): LT TO M GRY, MOD SFT, FRI, 30-40% CLY, ABUN MICA.

1911-1914M (6270'-6280')

SST (60%): AS IN 1908M.

SLTST (40%): LT TO M GRY, MOD SFT, FRI, V CLYEY (30-40%), OCC GRD TO VF SND, ABUN F PY, ABUN CARB MAT. SLKY LUS, FNT LINEATIONS; TR CALC, V ABUN MUSC.

1914-1917M (6280'-6289')

SST (40%): AS IN 1908M WITH MORE CLY - 20-25%.

SLTST (60%): AS IN 1914M GRD TO VF SST, 30-50% CLY.

1917-1932M (6289'-6309')

SST (75%): AS IN 1908M AND 1914M.

SLTST (25%): AS IN 1908M AND 1914M.

1923-1926M (6309'-6319')

SST (70%): 90% VF GR WH W SRT ANG AS IN 1908M; 10% M TO C GR UNCONSOL.

SLTST (30%): LT TO M GRY GRD TO VF GR SST AS IN 19414M.

1926-1929M (6319'-6329')

HIGHLY MIXED SAMPLE OF VF GR SST, DK GRY SLTY CLYST AND UNCONSOL M TO V C QTZ.

1929-1938M (6329'-6358')

SST (65%): 70% WH, V F G TO F G, ANG, W SRT, MOD FRI SL CALC AND CLYEY (20%), VIS POROS 10-15%; 30% CLR VIT TO MLKY M TO V C GR UNCONSOL QTZ.

COAL (10%): DK BRN TO BLK, EARTHY TO HIGH GLOSS, MOD HD TO V HD AND BRIT, BLKY FRAC OCC V F PY.

SLTST (15%): LT TO M GRY, C SLT, ANG, MOD FRI, WELL CMT WITH CLY (30%) AND TR CALC. MICA, CARB MAT, GRDS TO VF SST. ABUN MICA IN SAMPLE, OCC PY.

1938-1941M (6358'-6368')

SST (60%): 70% WH VF TO F GR, ANG, W SRT, MOD FRI WELL CMT WITH WH CLY AND TR CALC TO FAIRLY CLN (VIS POROS 5 TO 15%). 30% M TO C UNCONSOL.

CLYST (25%): LT GRY, SFT, ABUN MICA IN LINEATIONS, SFT, MOD SLTY, NONCALC.

SLTST (15%): DK BRN GRY, V ORG RICH AS SLT IN AN ORG MATX (30-40%), ABUN MICA.

1941-1944M (6368'-6378')

SST (40%): WH VF GR AS ABOVE WITH DOLOMITIC AND CALC CMT.

CLYST (30%): LT GRY AND MICACEOUS AS IN 1941M BUT VAR SLT GRD TO SLTST.

DOLOMITIC LMST (30%): WH TO LT GRY, CRYPTOXTLN, TO INTERLOCKING MICROXTLN, HD TO MOD SFT, MOD BRIT, VAR SNDY AND CARB MAT AND ARG BNDS. NO VIS POROS.

1944-1950M (6378'-6398')

DOL LMST (40%): AS IN 1944M.

SST (60%): WH, VF TO F GR LT GRY, F GR, ANG, W SRT, HD TO MOD HD, WELL CMT WITH DOL AND CLY, MICA, NIL VIS POROS. OCC M GR QTZ. OCC GRDS TO SLTST.

1950-1953M (6398'-6407')

SST (75%): F TO M GR, WH, MOD PR SRT, ANG, MOD FRI, WELL CMT WITH SIL, CLY, AND TR DOL; CLR VIT TO MLKY QTZ. VIS POROS 5-10%.

COAL (15%): BLK V HD V BRIT.

CLYST (10%): LT BLK GRY, V SFT, V MICACEOUS, SUBFIS, NON-CALC.

1953-1956M (6407'-6417')

SST (90%): WH, M TO V C GR WITH OCC F GR, ANG TO SUBANG, MOD PR SRT, WELL CMT WITH SIL AND WH CLY AND TR CALC, HD TO MOD HD, MOD FRI, DOM DRLG DISP AS UNCONSOL GRNS. MUSC. VIS POROS 5-15%.

COAL (10%): BK, BRIT, HIGH GLOSS. PLATY

1956-1962M (6417'-6437')

SST (100%): AS IN 1956M. BUT DOM UNCONSOL.

1962-1965M (6437'-6447')

SST (100%): 50% WH TO LT GRY, F TO M GR, SUBANG TO RND, W SRT, MOD HD, WELL CMT WITH SIL, WH CLY AND TR CALC (DOL). VIS POROS 10%. 50% M TO VC UNCONSOL ANG-RND PR SRT CLR TO MLKY QTZ.

1965-1968M (6447'-6457')

SST (90%): VF TO C, WH, DOM ANG-SUBANG, W SRT, MOD HD TO FRI, WELL CMT WITH SIL, WH CLY, TR CALC (DOL); LARGER GR MORE UNCONSOL.

SLTST: CLYEY, LT GRY TO WH; MOD ABUN PY.

1968-1971M (6457-6467')

SST (80%): WH TO LT GRY OCC M GRY, DOM F TO M GR WITH ABUN VF GR AND OCC C TO VC LOOSE QTZ; WELL CMT W SIL AND OCC WH CLY AND TR DOL, OCC DK GRN, MOD ABUN PY, OCC FRAG V CLYEY (40-50%). OCC GRY-GRN SIL FRAG.

1971-1974M (6467'-6476')

SLTST (70%): WH TO LT GRY WITH OCC M GRY. ABUN VF BLK SPECS, SFT (CLYEY) TO MOD HD (SIL), GRD TO VF SNDY, 20-50% WH AND LT GY CLY, ABUN MICMICA, MOD ABUN PYRITE, OCC TR DOL.

SST (30%): DOM WH TO LT GY, F TO OCC M AND OCC VF GR, W SRT, ANG, MOD SFT TO HD (SIL, DOL), OCC PY. VIS POROS 10%. OCC LT GRY-GRN FRAG - SFT - MICACEOUS (ALTERED?).

1974-1977M (6476'-6486')

SLTST (90%): OFF WH TO LT GRY, DOM SFT AND FRI WITH ABUN CLY CMT (30-50%). OCC SIL AND HD, TR CALC, OCC PY.

SST (10%): AS IN 1984M OCC LT GRY FRAGS V SIL AND GLOSSY AND EXT HD AND BRIT.

1977-1980M (6486'-6496')

SLTST (90%): AS IN 1974-1977M.

SST (10%): THIN STRKS OF HIGHLY SIL SST, F TO M GR.

1980-1983M (6497'-6506')

SLTST (70%): AS ABOVE V SFT TO HD (SIL) ALL V CLYEY; WH TO M GRY.

SST (30%) HIGHLY SIL F TO M GR; MOD ABUN LT GRY-GRN SLTY MICA RICH FRAG ALTERED TO CHLORITES.

1983-1986M (6506'-6516')

SLTST (80%): WH TO OFF WH AND LT GRY V CLYEY. OCC SIL

SST (20%) AS ABOVE

1986-1989M (6516'-6526')

SLTST (90%): SFT TO HD

SST (10%): AS ABOVE

1989-1992M (6526'-6535')

SST (60%): WH VF TO M GR, ANG, MOD PR SRT, MOD HD, MOD FRI, WELL CMT WITH WH CALC AND SIL CMT OCC WH CLY CMT, MICA, OCC DK GRNS. VIS POROS 5-10%; OCC LT GRY HIGHLY SIL AND HD.

SLTST (40%): OFF WH TO LT GRY OCC GRN-GRY. GRD TO V F GR SST, ANG, W SRT MOD SFT AND FRI TO OCC HD, ABUN WH CLY CMT (20-40%), ABUN F MICA, GRN FRAG HAVE ALTERED APPEARANCE (ALTERED MICAS?).

1992-1995M (6535'-6545')

SST (30%): AS IN 1989M

SLTST (30%): AS IN 1989M

CLYST (40%): LT GRN, GRY AND TAN, SFT, MOTTLED WITH ALTERED CLAY MINERALS (CHLORITES?) ABUN SLT GRD TO SLTSTONE, MOD CALC. ALTERED BENTONITIC BEDS?

1995-2001M (6545-6565')

PR SAMPLE - LEFT IN HOLE WHILE TRIPPING BIT, DOM MED TO VC GR UNCONSOL SST.

2001-2004M (6565'-6575')

SST (60%): WH, DOM M GR WITH VF TO VC FRAG, ANG TO SUBANG, MOD PR SRT, MOD HD BUT FRI, WELL CMT WITH CALC, SL SIL AND OCC WH CLY. 5-10% VIS POROS.

CLYST (30%): MULTICOLOURED AND MOTTLED AS IN 1995M.

SLTST (10%): AS IN 1992M. OCC FRAG OF DK GRY/BLK MOD HD TO SFT CLYST (SLOUGH?) THROUGH ALL OF LAST SECTION.

2004-2007M (6575'-6585')

SST (80%): WH, M TO VC GR WITH OCC VF GR FRAG, ANG TO SUBRND, MOD PR SRT, MOD HD BUT FRI, WELL CMT WH CALC/DOL, SL SIL, OCC WH CLY, MICA, OCC PY, OCC DK GRNS VIS POROS 5-10%.

CLYST (20%): GRD TO SLTST, LT GRN, GRY OCC TAN, MOTTLED SFT, OCC SL CALC (DOL) OCC DK GRY CLYST - GLOSSY, CARB SLOUGH?

2007-2010M (6585'-6595')

SST (90%): M - C WITH OCC VC TO VF AS IN 2007M. VIS POROSITY 0-10% IN FRAG.

SLTY CLYST (10%): VARICOLOURED A/A TO MOTTLED

2010-2013M (6595'-6604')

SST (95%): AS IN 2007M DOM M - C GR

SLTY CLY (5%): A/A; TR DK GRY CLYST SLOUGH?

2013-2016M (6604'-6614')

SST (95%): WH, M TO C GR WITH OCC VF TO VC - LOOSE.

CLYST (5%): VARICOLOURED.

SST (2016-2020M (6614'-6627')

DOM M TO C GR SST CONTINUING FROM ABOVE SEQUENCE BUT BECOMING HDER INTBD WITH VOLC ASH (10 PERCENT) AS ABOVE.

SST (90 %): WH, M TO C GR WITH OCC VF TO VC, ANG TO SUB RND, MOD PR SRT, MOD HD TO V HD BELOW 2019M (6624') V F GR SST WITH 20% WH CLY AND GRDS TO SLT.

2020-2052M (6627'-6732')

INTERVAL CAPPED BY SFT, CLYEY VOLC ASH AS ABOVE FOLLOWED BY A THIN (0.5M) BED OF WELDED TUFF, FOLLOWED BY MED TO DK BASIC TO INTERMEDIATE VOLCANIC/IGNEOUS RK.

TUFF: WH TO OFF WH WITH OCC LT GRY, DOM HIGHLY ALTERED WITH 60% CLY MTX WITH FLOATING ANG SHARDS, OCC HIGHLY WELDED AND V HD.

VOLC/IGN: M GRY-GRN AT TOP, GLASSY TO CRYPTOXTLN WITH ANHED XTL ZONATIONS, ABUN VF BK SPECS. GRDS TO F XTLN BY 2025M (6644') AND INCREASES IN XTL SIZE TO MED XTLN BY 2040M (6693').

F XTLN: M GRY-GRN WITH VARICOL: GRN, GRY, WH, TAN, BRN, BLK, DOM CRYPTOXTLN GRNDMS WITH ANHED WH TO GRY AND LT GRN SUBHED FELDSPAR (PLAG?) WITH ABUN DK GRN TO BK PYROX/AMPHIB OCC ALTERED TO CHLORITES, DK GRY-BK MAGNETITE, DK RD-BRN BIOT: HIGHLY CALC SURFACE: MOD HD. AS XTL SIZE INCREASES, RK BECOMES LTER IN COLOUR, HDER AND MORE QTZ RICH (LESS THAN 10%): DOM WH FELD WITH DK GRN TO BLK FERRO-MAG MINERALS, MOD ABUN PY, SURF CALC DECREASES. ROCK LOOKS FRESH. TENTATIVE CLASSIFICATION: F TO M GR DOLERITE TO DIORITE.

2052-2148M (6732'-7047')

DOLERITE (100%): M TO DK GRN AND GRY GRN WITH ABUN DK BRN-BLK XTLS. MED GR EQUIGRANULAR XTLN IGNEOUS WITH FELD AND AMPHIBOLES DOM AND PYROX, BIOT. MAGNETITE AND QTZ. ACCESS. ABUN PY. BECOMES FINER DKER AND OPAQUE BETWEEN 2055-61M (6742'62') - LOOKS LIKE A CHILLED CONTACT - FOLLOWED BY 50-70% HIGHLY WELDED PYROCLASTICS BETWEEN 2064-73M (6772'-6801'): MULTICOLORED CRM, TAN, BRN, PNK, GRY, PURP. V HD, V BRIT, SUB CONCH FRAC, EVEN MINUTE SPHEROIDAL VESICLES? OCC FNT COLORATION BANDING. RK IS F XTLN AT 2073M AND SLOWLY GRDS TO M XTLN WITH DEPTH. MOD ABUN CALC AND INC CHLORITE (ALTERATION) WITH DEPTH.

2148-2237M (7047'-7339')

COARSE GRAINED DOLERITE CUM GABBRO: (100%) CLR, PL GRN AND GRY-BRN TO BRN-BLK AND LUSTROUS BLK (MAGNETITE AND ILMENITE), BECOMING DOMINANTLY PL GRN TO GRY-GRY, WHERE CHLORITIZED, EQUIGRANULAR TEXTURE CONSISTING OF MINOR QTZ DECREASING TO NIL BELOW 2187M (7175') WITH APPEARANCE OF TR AMNT TO MOD GRN-YEL OLIVINE (?) FELDSPAR, AMPHIBOLE/PYROXENE, BIOTITES/PHLOGOPITE, ABUN MAGNETITE, TR ILMENITE AND PYRITE. VARIABLE ALTERATION TO CHLORITE AND CLAYS, TR CALC ALTERATION; HARD.

2237-2259M (7339'-7411')

INTERBEDDED DEVITRIFIED GLASS/WELDED TUFF (?), FINE GRAINED PORPHYRITIC BASIC ROCK AND QUARTZ SST/ORTHOQUARTZITE.

DEVITRIFIED GLASS/WELDED TUFF: ORGE-PINK WITH V F WHITE SPECKS, MICROXTLN WITH VAGUE XL OUTLINES, TR DOLOMITE (DECR BELOW 2250M).

PORPHYRITIC BASIC ROCK (CHILLED MARGIN OF INTRUSION) MOTTLED GRN-GY AND GRY-BLK, LATH-LIKE PNENOCRYSTS OF FELDSPAR IN GRY-BLK MAFIC GROUNDMASS, TR DOLOMITIC, FIRM.

QUARTZ SST/ORTHOQUARTZITE: WH-M GRY, VF-M GR, MOD W SRT, ABNT CALC, DOLOMITIC, SIL AND PY CMTS IN VARIABLE AMNTS; OCC WH CLY MTX; VIS POROS 0-15%; HD TO V-HD.

2259-2280M (7411'-7480')

INTBD SST AND CLYST WITH TR ANTHRACITE

SST: A/A. BECOMING NON CALC.
CLST: GRY-BLK, V MICMICA, TR MICROCARB, NONCALC, BLKY-SUBFIS, HD.

ANTHRACITE: BLK, BRT LUSTRE (V.HIGH REFLECTANCE), BRIT, BLKY WITH CONCHOIDAL FRAC.

2280-2298M (7480'-7539')

INTBD CLYST, SLTST AND MINOR ANTHRACITE

SLTST: DOM DK GRY, GRDS IN PT TO VF GR SST, TR MICMICA AND MICCARB, NONCALC, FRI.

CLST: MGRY - GRY BLK, TR MICMICA, GRDS SLTST.

ANTHRACITE: A/A

2298-2316M (7530'-7598')

DOM SST WITH MINOR INTBD CLST: A/A

SST: CLR-WH-V PL ORGE, VF-M GR, (DOM F GR AS AGGREGATES), MOD SRT, SUBANG-SUBRND, SIL OVERGROWTHS, QTZ WITH VARIABLE CLY AND SIL CMTS, (INCL WH AND LT BRN CLYS), RARE MICA AND CARB MAT; FRI-HD; VIS POROS 5-20%.
INTBD WITH CLST: A/A.

2316-2325M (7598'-7629')

100% ANTHRACITE: BLK, LUSTRE, BRITLE WITH CONCHOIDAL FRAC.

2325-2338M (7629'-7670')

THINLY INTERBEDDED AND INTERGRADATIONAL SST, SLTST AND CLST.

SST: V PL ORGE TO PL YEL/BRN, VF GR TO OCC F GR, GRDS TO SLTST AND CLST IN PT, MOD SRTD, DOM SUBANG, WITH WH AND LT BRN CLY MTX AND PERVASIVE SIL CMT, TR DOL CMT, TR MICMICA AND MICCARB; HARD; VIS POROS 0-10%.

CLYST: YEL/BRN - DK GRY, TR MICMIC AND MICCARB, TR QTZ SLT, GRDS OCC TO SLTST, NONCALC, FRI-FIRM, BLKY - SUBFIS.

2338-2351M (7670'-7713')

100% ANTHRACITE: BLK, V BRT LUSTRE, BRIT, BLKY AND CONCHOIDAL FRAC.

2351-2430M (7713'-7971')

FINELY INTERBEDDED AND INTERGRADATIONAL SST, SLTST AND CLYST WITH ANTHRACITE BEDS AND ACCESSORY DOLOMITE.

SST: AS ABOVE

CLYST: YEL/BRN - DK GRY, AS ABOVE, BECOMING V CARB AND MICA WITH RARE PY.

CLYST: V PL ORGE- PL YEL/BRN, TR MICCARB, MICMICA AND PY, TR DOL, OCC V CALC; SFT - DOM FIRM; SUBFIS BLKY BECOMING DOMINANT OVER THE INTERVAL 2388-91M AND BELOW 2400M. GRDS TO SLTST IN PT.

TRACE-RARE DOLOMITE: PL YEL/BRN - MOD BRN, CRYPTOXTLN, TR MICARB, HD, BLKY AND BRIT.

ANTHRACITE: A/A AS BEDS OVER THE INTERVALS - 2356-58, 2366-67, 2372-73, 2375-55, 2393-95, 2412-17, 2426-27M.

2430-2442M (7971'-8012')

FINELY INTERBEDDED AND INTERGRADATIONAL SST, SLTST AND CLYST WITH ACCESSORY DOL AS BEFORE.

SST: V PL ORGE - PL YEL BRN, VF GR - OCC F GR, GRDS TO SLTST IN PT; DOM SUBANG, MOD SRTD;WH AND LT BRN CLY AND SIL CMT; TR DOL CMT; TR MICMICA AND MICCARB; HD; VIS POROS 0-10%.

CLYST: YEL/BRN - DK GRY; TR MICMICA AND MICCARB, TR QTZ; GRDS TO SLTST; NONCALC, FRI-FIRM, BLKY-SUBFIS.

DOL: PL YEL/BRN - MED BRN, CRYPTOXLTN, TR MICCARB, HD, BLKY AND BRIT.

2442-2460M (8012'-8070')

FINELY INTERBEDDED CLYST, SST WITH THIN ANTHRACITE BEDS AND TRACES OF DOL AND LST, SST BCMG CALC.

CLYST: V PL ORGE - PL YEL/BRN TO DK YEL/BRN; TR - MOD ABNT DISSEM PY, TR - MOD MICCARB, TR MICMICA; TR - OCC MOD SLTY GRDG TO SLTST IN PT, TR DOL; FIRM, SUBFIS BLKY.

SST: WH - V PL ORGE, VF GR GRDG TO SLTST AND LMST IN PT, SUBANG, MOD SRT; PERVASIVE WH CLY AND SIL CMT, BEING V CALC; TR DOL, TR MICMICA AND MICCARB; 0-10% VIS POROS.

DOL AND DOL LST: (TR - GD TR ONLY): WH - MED RED - DK RED/BRN, CRYPTOXLTN, RARE MICCARB, V HD, BRIT - ASSOC WITH DULL YEL MIN FLUOR

ANTHRACITE: AS BEFORE 2448-50M.

2460-2471M (8070'-8107')

MAINLY CLYST W/ABUND SS INTBDS, TR DOL, RARE THIN COAL BLK, ANTHRACITIC, AS ABOVE.

CLYST: PALE ORGE-YEL/BRN TO DK YEL/BRN, MOD PY, CARB, MICAC, VARIABLY SILTY BECOMES SLTST IN PT.

SST: WH-PALE ORGE, V FN-GR (GRAD TO SLTST IN PT), SUBANG, MOD SRTD, V ARG. W/WH CLAY, SILICA-CEM, OCC V CALC, TR DOL, MICA, CARBON, HD, POOR VIS POROS. COAL IN V THIN BEDS AND STREAKS.

2471-2487M (8107'-8159')

DOM SST W/MINOR CLYST, TR DOL AND DOL LS.

SST: WH, VF-F GR, RARE MED-GR, SUBANG, PRLY SRTED; POOR TO FAIR (?) VIS POR.

CLYST, DOL AND DOL LS AS PREVIOUSLY.

2487-2502M (8159'-8209')

MAINLY CLYST WITH ABUND THIN INTBDS OF SST, SOME THIN COALS, ALL AS ABOVE.

2502-2511M (8209'-8238')

PREDOM SST, SOME THIN CLYST BEDS, COAL STRKS AS THIN BEDS, TR DOL AND COMMON WH CALCITE.

SST: V FN/FN-GR, OCC MED GR, SUBANG, FRLY SRTD, FIRM TO HD IN PTS W/SILICA CEM, PT FRI, ARG AND CALC CEM AND SOME FREE WH. CALCITE, MINOR DOL CEM. VIS POROS V. POOR TO (?) FAIR IN SMALL PT (IN SIL AND ARG/CALC SS RESPECTIVELY) NO OIL SHOWS (COMMON MINERAL FLUOR DULL ORANGE, GIVES NO CUT OR CUT FLUORESC.)

2511-2520M (8238'-8268')

CLYST, W/LITTLE SS AND COAL INTBDS, ALL A/A

SST-GEN V POOR TO POOR VIS POROS, OCC FAIR WHERE ARG TO SL CALC RATHR THAN SIL CEMENTED. NO OIL SHOWS.

2520-2527M (8268'-8291')

COAL: BLK, MASSIVE, HD ANTHRACITIC, AS BEFORE.

2527-2529M (8291'-8297')

SST, AS ABOVE, W/THIN BEDS CLYST AND COAL. SS HAS V POOR VIS. POROS, NO SHOWS OF OIL.

2529-2559M (8297'-8396')

CLYST, TR SST, COMMON COAL IN THIN INTBDS.

CLYST: AS ABOVE, MED BRN, SOFT/FIRM, NONCALC, VAR CARB, SILTY, IN PT GRADES TO SLTST; FIRM TO HD, NONCALC, ARG, SCARCE V THIN SST; DOL TO SL CALC IN PT. COMMON COAL STRKS, THIN BEDS AS ABOVE.

2559-2566.5M (8396'-8420')

COAL: AS ABOVE.

2566-2579M (8420'-8461')

CLYST: BRN TO GRY-BRN, SFT TO SL FIRM, VAR SLTY, NON CALC, VAR CARB WITH OCC THIN BD COAL.

COAL: BLK, BRIT, ANTHRACITIC.

2579-2584M (8461'-8478')

COAL: BLK, BRIT, HD WITH THIN INTBD CLYST.

CLYST: BRN, AS ABOVE, IN PART SLTY AND RARE THIN SLTST.
SLTST: BRN-GRY, FIRM V ARG, SL CARB.

2584-2607M (8478'-8553')

CLYST: BRN TO BRN-GRY INC GRY BELOW 2595M, SFT TO FIRM, NONCALC, VAR SLTY AND CARB. THIN COAL BEDS IN TOP OF INTERVAL. RARE V THIN SST BDS BELOW 2592M.

SST: WH, VF GR, GRD TO SLTST, FIRM TO FRI, SIL IN PT AND ARG IN PT, PR VIS POROS APPROX 10%.

SLTST: GRY-BRN, ARG, FIRM.

2607-2614M (8553'-8576')

CLYST: MAINLY, WITH MINOR INTERBEDS OF SST, SLTST, DOL.

CLYST: BRN, SFT, VARIABLY CARB AND SLTY

SST: V F TO F GR, WELL SRTD, SUBANG WITH RARE TO COMMON V C GR MILKY QTZ, OCC WITH TRACES OF AMBER INCLUSIONS, WITH WH CLY CEM, OCC WH CLY MTX, PTS V SL FIRM WITH SIL CEM. VIS POROS V PR TO POSS FAIR IN PT (8 TO 10%?) WHERE MOST FRI.

2614-2620M (8576'-8596')

SST: ENTIRE INTERVAL SIM TO ABOVE - V F TO F GR, OCC TO COMMON V C GR, SUBANG TO OCC SUBRND MILKY QTZ, OCC TR OF AMBER, RARELY SIL CEM OCC WH CLAY MTX. VIS POROS, V PR (8%?) TO FAIR IN MORE FRIABLE PTS (10%?)

2620-2623M (8596'-8606')

SST WITH COAL INTERBEDS.

SST: SIM TO INTERVAL 2614-2620M, V F TO F GR OCC V C GR, SUBANG TO SUBRND CLR AND MILKY QTZ, TR AMBER INCLUSIONS (GAVE BRIGHT YEL NATURAL FLUOR BUT NO OBSERVABLE OIL FLUOR OR CUT).

COAL: BLACK, ANTHRACTIC, HD, WITH SOME BLK-BRN (LESS HD) WITH RARE TR OF AMBER, YEL FLUOR BUT NO CUT FLUOR OBSERVED IN AMBER.

2623-2644M (8606'-8674')

CLYST: WITH THIN SST INTERBDS, RARE COAL AS THIN STREAKS AND BEDS.

CLYST: BRN, SFT, SL FIRM IN PTS, VARIABLY CARB AND SLTY NON CALC.

SST: V THIN INTERBDS, WH, V F TO F GR OCC WITH C GR, SUB ANG TO SUBRNDED, FRI, WH CLY CEM OCC WH CLY MTX, PR TO V PR POROS IN GENERAL (8% OR LESS?) OCC FAIR WHERE MORE FRI (10%).

COAL: RARE BEDS, BLK HD, ANTHRACITIC ALMOST ENTIRELY, OCC BLK/BRN SL SFTER.

2644-2654M (8674'-8707')

DOM SST WITH FEW V THIN CLYST INTERBEDS.

SST: WH, V F F GR (SMALL PT F TO MED GR, OCC V C) SUBANG SUBRNDED, UNSORTED, FRI, WITH WH CLY CEM, GENERALLY VIS POROS FAIR (10-12%?)

CLYST: BRN, SFT VAR CARB AND SILTY

2654-2668M (8707'-8753')

DOM SST WITH NEARLY 50% CLYST IN INTERVAL

SST: M GR, WH, FIRM FAIR SRTING, SUBANG, WH CLY MTX AND CEM, NONCALC, PR TO FAIR VIS POR (8-10%?)

CLYST: BRN, SFT, SL SLTY, CARB BEDS ESP COMMON IN BASAL 6M.

2668-2685M (8753'-8809')

SST PREDOM WITH A FEW CLYST BEDS IN LOWER HALF OF UNIT

SST: V C, PEBBLY, QTZ, LOOSE, SUBANG-SUBRND, UNSRTD, IN SMALL PT MED TO C GR, SIL CEM, HD. POROS EST TO BE PR (LESS THAN 10%?)

CLYST: FEW THIN BEDS, BRN, SFT, SL SLTY AND CARB.

2685-2710M (8809'-8891')

SST WITH CLYST INTERBEDS PREDOM WITH DEPTH.
OCC THIN COALS.

SST: CREAMY WH, V C GR, SUBANG TO OCC SUBRNDED, UNSRTD, SL FIRMER THAN ABOVE INTERVALS, CLY CEM, VIS POROS PR (ABOUT 8-10%?). TR OF AMBER INCLUSIONS WITH BRIGHT YEL FLUOR BUT NO OBSERVABLE OIL FLUOR OR CUT.

CLYST: BRN, SFT, SL SLTY AND CARB, NONCALC.

COAL: BLK, HD, SUBCONCH FRAC, ANTHRACITIC, AND WITH SMALL PART BLK-BRN, (LESS HD) WITH IRREG FRAC ESP AT 2691-92M (SL INCR IN GAS FROM 3 TO 9 UNITS ABOVE TOTAL GAS IN INT).
OTHER COALS, AT 2702-2703M, 2704-2705M AND 2707-2709M. SOFTER BRN-BLK COAL MORE COMM AT 2704-2705M BUT STILL ONLY SMALL PART OF SAMPLE. GAS PEAK OF 16 UNITS IN LATTER INT.

2710-2721M (8891'-8927')

MAINLY SST, WITH MINOR CLYST INTERBEDS.

SST: WH, F TO C AND V C GR, PRLY SRTD, SUBANG TO OCC SUBRNDED, LOOSE TO PARTLY CEM BY WH CLY, NONCALC; PR VIS POROS (8%?), WITH TRACES OF AMBER INCLUSIONS, FLUOR BUT WITH NO FLUOR OF CUT.

CLYST: BRN, SFT, VAR CARB SLTY NONCALC.

2721-2732M (8927'-8963')

PREDOM SST, WITH MINOR CLYST INTERBEDS AND RARE THIN COAL STREAKS AND BEDS.

SST: V FN TO FN-GN, BECOMING COARSER WITH DEPTH, WITH SUBRNDED/SUBANG COARSE TO VERY COARSE QTZ GNS IN FINE GRAINED MTX, POORLY SRTED, LOOSE TO IN PART CEMENTED LOCALLY

2721-2732M (8927'-8963')

PREDOM SST, WITH MINOR CLYST INTERBEDS AND RARE THIN COAL STREAKS AND BEDS.

SST: V FN TO FN-GN, BECOMING COARSER WITH DEPTH, WITH SUBRNDED/SUBANG COARSE TO VERY COARSE QTZ GNS IN FINE GRAINED MTX, POORLY SRTED, LOOSE TO IN PART CEMENTED LOOSELY BY WHITE CLAY, NONCALC, POOR VIS. POROS (8-10%), TRACES OF AMBER AS INCLUSIONS, ENCRUSTATIONS ON GRAINS, SHOWING BRIGHT YELLOW FLUOR BUT NO OBSERVABLE FLUOR OF CUT. NO OIL SHOWS.

CLYST: MED BRN SFT VAR CARB SL SILTY NONCALC. OCC V THIN COAL BEDS STREAKS, BLK HD ANTHRACITIC.

2732-2748M (8963'-9016')

MAINLY SST WITH CONSIDERABLE THICKNESSES OF COAL BEDS IN UPPER 3M.

SST: FN-GN, OCC MED-GN, WH, SL FIRM TO FRI, VAR CARB WITH WH CLY CEM COMM APPLE GRN MIN GNS INCL SUBRNDED TO EUHEDRAL XTALS. FN-MED, POOR VIS. POROS (8%?) NO OIL SHOWS.

COAL: BLK, HARD, ANTHRACITIC

2748-2758M (9016'-9048')

CLYST: PREDOM WITH COMMON SST INTERBEDS EXCEPT IN MIDDLE OF INTERVAL.

CLYST: DK BRN, SFT TO PT FIRM, SLTY, NONCALC.

SST: SIM TO 2732-2748M - FN TO MED-GN, OCC CSE GNS, SUBRND/SUBANG. PRLY SRTED, LOOSE TO POORLY CEM BY WH CLY, POOR TO FAIR VIS POROS (8-12%?) NO OIL SHOWS.

COAL: VERY THIN STREAKS, BLK, ANTHRACITIC.

2758-2769M (9048'-9085')

SST WITH VARYING THICKNESSES OF CLYST INTERBEDDED, UNDERLAIN BY CLYSTN AND A 1-M COAL BED AT 2777-78M.

SST: V FN-FN-GN WITH COMM CSE GNS, PRLY SRTD, WH, COMM VERY LOOSE TO PRLY CEM WITH WH CLAY, FRI, VIS POROS POOR TO FAIR (8-12%?)

CLYST: DARKER BRN THAN PREVIOUSLY, SOFT TO SL FIRM, NONCALC SL SLTY AND VAR CARB.

COAL: BLK, ANTHRACITIC, BUT WITH SOME SOFTER, BRN-BLK;IRREG TO PLATEY FRACT RATHER THAN CONCHOIDAL.

2769-2786M (9085'-9140')

CLYST WITH OCC. V THIN SS BEDS.
CLYST: MED/DK BRN, SFT, SL CARB AND SLTY, NONCALC.

SST: THIN STREAKS, BEDS, AS PREV - V FN TO FN-GN, WITH COMM CSE GNS, SUBANG TO SUBRND, PRLY SRTD, FRI, LOOSE TO PRLY CEM BY WH CLY, VIS POROS POOR.

2786-2788.6M (9140'-9149')

SST: FINE TO COARSE-GN, UNSRTD, LOOSE GENERALLY, WITH SOME WEAKLY CEM BY WH CLY, SUBANG TO SUBRNDED QTZ GRNS. VIS POROS POOR TO (IN SMALL PART) FAIR (8-12%?).

2788.6-2807M (9149'-9211')

CORE NO. 2

SST: WITH CLAYSTONE AND V. THIN COALY MATERIAL.
SST: V F. - C GR, SANG, COMPACT: WHT CLY MATRIX IN PLACES; COAL FRAGS AND DISSEM BIOTITE; RIPPLE MARKS, BIOTURBATED: GENERAL FINING UPWARDS SEQUENCES. CLAYSTONE; MED DK BRN, MASSIVE, SOFT TO FIRM VARIOUSLY CARB AND SILTY IN PART.

2807.45-2889M. (9211'-9478')

PREDOM SST, WITH RARE THIN CLYST INTERBEDS AND THIN COAL BEDS OR THIN STREAKS AT 2825 AND 2834-2835M.

SST: WH, FN TO V C-GRND, PEBBLY, UNSRTD. QTZ. SUBANG AND SUBRNDED, MASSIVE, LOOSE TO WEAKLY CMTD BY WH CLY, PTS VARIABLY CARB, SLTY, COMMON BIOTITE FLAKES DESSEMINATED AND IN LAMINAE, NON CALC. VIS POROS POOR TO PERHAPS FAIR (10-12%).

CLYST: MED AND DRK BRN, SFT, VARIABLY CARB, IN PTS SLIGHTLY SLTY, NON CALC.

COAL: IN STREAKS, THIN BEDS, MAINLY V HD, ANTHRACITIC, BUT ALSO IN PT OF LESSER GRADE, WITH BLOCKY AND IRREGULAR FRACTURE RATHER THAN CONCH OR SUBCONCH.

2889-2928M (9478'-9606')

CLYST: ALMOST ENTIRELY, WITH RARE THIN BEDS OF COAL AT 2910-2911M, AND VERY THIN IGNEOUS RCK BODY AT 2928M.

CLYST: MED TO DRK BRN, SFT, SOMEWHAT CARB AND IN PTS SLIGHTLY SLTY, NONCALC.

COAL: BLK, HD, ANTHRACITIC, AND IN PART SFTR, BLOCKY FRACTURE.

IGNEOUS ROCK: COARSLY CRYSTALLINE, BLK AND DK GRN, WITH QTZ, HD, AS IN CORE NO. 2 AT DEPTH OF 2788.6M.

2928-2964M (9606'-9721')

CLYST: WITH POSSIBLY RARE V THIN IGNEOUS INTRUSIVE (CENTIMETERS THICK).

CLYST: MED/DRK BRN, NONCALC, SLIGHTLY CARB IN PT SLIGHTLY SLTY, FIRMER.

IGNEOUS ROCK: V V THIN VEINS OF COARSELY CRYSTALLINE, HD RCK, WITH DRK GRN AND BLK MINERALS, AND QTZ, AS SEEN PREVIOUSLY.

2964-2991M (9721'-9813')

SST WITH CLYST BEDS PREDOMINANT IN INTERVAL 2976-2988.5M. (9764-9805')

SST: WH, V FN TO MED-GRNED, OCC C GRNS, SUBANG, TO SUBRNDED. FAIR TO POOR SRTING, FRI, WEAKLY CMTD BY WH CLY, NONCALC, SLIGHTLY MICACEOUS (BIOTITE) AND CARB VIS POROS. VERY POOR (8%) TO FAIR IN VERY SMALL PT (12%).

CLYST: MED TO DRK BRN, NONCALC, SLIGHTLY CARB AND IN SMALL PT SLIGHTLY SLTY, FIRMER.

2991-3057M (9813'-10,029')

SST DOM, WITH CLYST INTBDS, ESP ABUND AT 3009-3018M (9872'-9901'): TRACES IGNEOUS INTRUSIVE THROUGHOUT, ESP COMMON THIN VEINS AT 3000-3009M (9842-9872'): AND THIN COAL BEDS AT 3040-3045M (9974'-9990').

SST: WH, F/C-GR, UNSRTED, SUBANG AND SUBRNDED QTZ, WITH NONCALC WH CLY CEM, FRI TO SL FIRM, VIS POROS POOR (8%): SST VARIES IN GR SIZE, IN PARTS BECOMING V F TO F GR, SLTY, DIRTY GRAY, GRD TO SLTST, V ARG, GRY-WH SL FIRM, PR POROS (LESS THAN 8%) AND COMMONLY F TO V C-GR, WH SUBANG AND SUBRNDED QUARTZ, LOOSE TO WEAKLY CEM BY WH CLY AND IN SMALL PART CALC, FIRM, TAN TO LIGHT BEIGE IN COLOUR, AT 3015-3024, (9892'-9921'). ALL SST TYPES GENERALLY MASSIVE, VAR CARB, PTS WITH SMALL BIOTITE FLAKES DISSEM AND IN LAMINAE.

CLYST: M/DK BRN, SFT VAR CARB, PARTS SL SLTY, BECOMING FIRMER, NONCALC.

COAL: BLK, HD, SUBCONCH AND IRREG BLKY FRAC, MOD HD.

IGNEOUS ROCK INTRUSIVE: AS PREVIOUISLY-C XTLN, DK GRN AND BLK, WITH QUARTZ, GENERALLY MOD CALC, HD.

3057-3066M (10,029'-10,059')

CLYST: M AND DK BRN, SFT, NONCALC, SL CARB, IN PT V SLTY.

3066-3082, (10,059'-10,111')

SANDSTONE WITH SOME CLAYSTONE INTERBEDDED AND, BELOW 3074M, SHALE.

SANDSTONE: WH, V F AND F-GR, SOME C GR, QTZ, SUBRND/SUBANG, FAIR SRT, FRI TO SL FIRM, CLY CEM, SL CARB, NONCALC.

CLYST: M BRN, SFT, VAR CARB, MOD SLTY, NONCALC.

SHALE: DK BRN, FIRM TO SL HD, MOD SLTY, NONCALC, IN PT SL CARB.

3082-3084M (10,111'-10,118')

SANDSTONE: V F AND F-GR, QTZ, W SRT IN GENERAL, SUB-ANG TO SUBRND, MOD FIRM TO FRI, SIL-CEM, SL ARG IN PT AND SL CARB, NONCALC. VIS POROS ABOUT 8 TO 10%.

3084-3116M (10,118'-10,223')

SANDSTONE WITH SHALE INTERBEDS, SOME CLYST, AND COAL AT 3098-3099M.

SANDSTONE: SIMILAR TO ABOVE - WH V F/F-GR, OCC C GR QTZ, SUBANG/SUBRND, FIRM TO FRI, PT ARG CEM, MAINLY SIL CEM, VAR CARB, SLTY, NONCALC.

SHALE: AS ABOVE - DK BRN, FIRM TO SL HD, VAR SLTY, CARB.

CLYST: M BRN, SFT, VAR CARB, SLTY NONCALC.

COAL: DK BRN TO BK, MOD SFT TO FIRM, BLKY FRAC.

3116-3153M (10,223'-10,344')

IGNEOUS ROCK: VOLCANICS, MULTICOLORED, IN PT MOTTLED, WITH PALE GRN, BLUISH GRN, GRY, BEIGE AND OFF WH, APHANITIC TO V F WITH INCLUSIONS OF GRN, BLUE-GRN, CLR-TRANSLUCENT AND GRY MINERALS, SUBHEDRAL, F TO V C, GLASS SHARDS INDICATE TUFFACEOUS VOLCANICS, IN PT MOD TO V CALC, SFT TO HD.

3153-3166M (10,344'-10,387')

IGNEOUS VOLC, AS PREVIOUSLY DESCRIBED: VARICOLORED MOTTLED PALE TO DK GRN, BLUE-GRN, BEIGE AND GRY, TUFFS, IN PT PROB WEATHERED WHERE GROUND-MASS SFT, CLYEY, FRESHER PARTS SHOW AN APHANITIC GROUND-MASS WITH GLASS SHARDS, INCLUSIONS OF F TO V C SUBHED XTLN OR SUBRND MATERIAL OF DIFFERENT COLORS (APPLE GRN, BK, GRY, TRANSLUCENT, WH), HD, CALC.

3166-3201M (10,387'-10,502')

SANDSTONE WITH INTERBEDDED SILTSTONE, SILTY SHALE AND OCC THIN COALS.

SANDSTONE: WH, PREDOM F-GR, IN PT WITH M AND C GR QTZ, COMPACT, FRI TO SL FIRM, IN PT SIL CEM, IN PT ARG OCC DK MINERAL GRAINS, MORE COMMON IN UPPER BEDS OF INTERVAL WHICH ARE SL TUFFACEOUS.

SILTSTONE: DK TO M BRN, VAR ARG, FIRM TO HD.

SHALE: M DK BRN, SLTY, SFT TO FIRM, NONCALC.

COAL: MAINLY BLK, HD, SUBCONCH FRAC, ANTHRACITIC, IN PT, HOWEVER, DK BRNISH BLK, M HD, OF LESSER GRADE THAN ANTHRACITE AND WITH BLKY FRAC.

3201-3222M (10,502'-10,571')

INTBD THIN BEDS OF IGNEOUS INTRUSIVES, SST, SLTST AND OCC COAL.

IGNEOUS INTRUSIVES: M AND DK GRN, WITH TRANSLUCENT OFF-WH AND BLK, C XTLN, HD TO SL FRI, MOD TO V CALC IN PT, WITH ABUN LARGE FRAG OF CALCITE, PINKISH WH.

SANDSTONE: WH, F-GR, OCC M AND C GR, QTZ, FAIRLY W SRT, FIRM TO FRI, OCC DK MIN GR, PROB OF IGNEOUS ORIGIN, CLY AND SIL CMT, POROS ABOUT 8%.

COAL: BLK, HD, SUBCONCH FRAC, ANTHRACITIC.

SILTST: DK BRN, FIRM TO HD, V ARG, NONCALC.

3222-3240M (10,571'-10,630')

INTBD IGN INTRUSIVES AND SLTST, WITH OCC SH AND COAL BEDS. SLTST AND SOME SH AT 3229-3240M COALS PROMINENT AT 3228-3229M.

IGN INTRUSIVES: MOD DK GRN-BLK, C XTLN, HD, IN PT MOD TO V CALC.

SLTST: DK BRN, FIRM TO HD, VAR CARB AND ARG, NONCALC.

SH: M TO DK BRN, SFT, SL SLTY, CARB, NON-CALC.

COAL: BLK, HD, WITH SUBCONCH TO IRREG FRAC AND IN PT DK BRNISH BK, SFTER, LOWER GRADE, BLKY FRAC.

3240-3288M (10,630'-10,787')

VOLC ROCKS WITH INTBD SLTST, COAL AND RARE SH AND SST BEDS. VOLC (TUFFS) PREDOM IN THE INTERVALS 3245-3258M AND 3285-3288M. COALS ESP COMMON AT 3243-3246M, 3257-3258M, AND 3273-3276M, WITH MINOR THIN BEDS BELOW.

VOLC: TUFFS, PALE GRN, BUFF, CRM-COLOURED, FIRM TO SFT, THE LATTER PROB WEATHERED, COMMONLY WITH C QTZ, OTHER MIN GR, GLASS SHARDS, VAR CALC TO NONCALC.

SLTST: DK BRN, MOD HD, V ARG, NONCALC.

SH: M/DK BRN, SFT, SL CARB, SLTY, NONCALC.

COAL: BLK, HD, SUBCONCH TO BLKY FRAC AND DK BRNISH BK, MOD HD TO SFTER, BLKY FRAC, LESSER GRADE COAL.

SST: RARE THIN BED, F-GR, FAIR SRT, WH, FIRM TO SL FRI, CLY AND SIL CMT, SL TUFFACEOUS AND IN PT SL CALC.

3288-3311.7M (10,787'-10,805')

VOLCANICS, WITH MINOR THIN INTERBEDDED SILTSTONE, SHALE AND POSSIBLY COAL.

VOLCANICS, BASALT AND TUFFS, APPARENTLY WEATHERED FOR THE MOST PART: LT BLU-GRY, GRNISH-BLU, BEIGE AND BUFF, APHANITIC GROUND-MASS, V SFT AND CLYEY, GEN WITH VARICOLOURED F AND C MIN GR AND ANG LITHIC FRAG, COMMON RND AND OVAL AMYGDULES OF TRANSLUCENT GRN COLOUR, SFT AND LESS BUFF AND BEIGE COLOURED ROCK, F XTLN, HD, MOD TO V CALC IN PT, AND WITH COMMON WH CALCITE VEINS.

SHALE: DK BRN TO BUFF-BRN, VAR CARB AND SLTY, HD TO MOD SFT, NONCALC, OCC WITH F TO C GR QTZ AS INCLUSIONS, SUBRND/SUBANG.

SILTSTONE: DK BRN, FIRM, V ARG, NONCALC.

COAL: BLK, HD, ANTHRACITIC WITH SUBCONCH FRAC AND BRNISH-BLK, MOD SFT TO FIRM, BLKY FRAC OF LOWER GRADE.

3311.7-3351M (10,865'-10,994')

VOLCANICS: BASALTIC AND TUFFACEOUS, PREDOM PALE GRN IN COLOUR, W/LESSER MED GRN, BEIGE, BUFF AND VARICOLOURED, BRICK RED COLOUR INCREASINGLY COMMON IN LOWER PT OF INT (10 TO 40%), ALL V SFT, CLYEY, APPARENTLY HEAVILY WEATHERED, F GR TO APHANITIC GROUNDMASS, W/RELICTS OF F TO C XTLN MINERAL GRNS, RARE C GR INCLUSIONS OF CLEAR, SUBRNDED QTZ.

3351-3441M (10,994'-11,289')

VOLCANICS: BASALTIC AND TUFFACEOUS, VARICOLOURED, V. ALTERED TO OCCASIONAL FRESH BASALT.(OCC. QTZ GRNS - PROB. SEDIMENTARY).

3441-3450M (11,289'-11,319')

VOLCANICS: BASALTIC AND TUFFACEOUS, VARICOLOURED, V ALTERED, V SFT.

3450-3459M (11319'-11,348')

INTERBEDDED BASALT WITH MINOR SLTST/SHALE. BASALT:- DOMINANTLY FRESH WITH MINOR ALTERED BASALT AS ABOVE, FINE GRAINED, FRACTURED, VERY HARD.

SLTST/SH: CARBONACEOUS, V HARD.

3459-3470M (11,348'-11,384')

BASALT WITH THIN INTERBEDS OF SLTST/SHALE BASALT:FRESH,V HARD.

SLTST/SHALE: CARBONACEOUS, V HARD.

3470-3480M (11,384'-11,417')

VOLCANICS WITH INTERBEDDED COAL AND SLTST/SHALE.

VOLCANICS: FRESH BASALT AND TUFFS - F GR, ALTERED, CLAYEY, MOD CALC, CLR QTZ, V SFT-FIRM.

COAL: THIN BEDS, ANTHRACITIC, HARD, IN PART BLEEDING GAS BUBBLES IN WET SAMPLE.

SLTST/SH: THIN BEDS, CARBONAC, HARD.

3480-3513M (11,417'-11,525')

VOLCANICS WITH MINOR THIN COAL AND SHALE INTERBEDS, AND MINOR FRACTURE FILL MINERALS.

VOLCANICS: BASALT AND TUFFS AS ABOVE.

COAL: BLK, ANTHRACITIC AND HARD WITH LESSER SOFT AND BRN-BLK.

SHALE: CARBONAC, MOD HARD.

FRACTURE FILL: QUARTZ, CALCITE, CHLORITE, CHERT.

3513-3534M (11,525'-11,594')

VOLCANICS WITH MINOR INTERBEDS OF SHALE, AND COAL AT 3531-34

VOLCANICS: BASALT AND TUFFS, BASALT AS ABOVE WITH TUFFS HAVING OCC QTZ GRNS AND ABNT CALCITE VEIN FILL, TUFFS BLEEDING GAS IN WET SAMPLE.

SHALE: CARBONAC, V, SOFT.
COAL: BRN-BLK, LOW GRADE, SOFT.

3534-3554M (11,594'-11,660')

VOLCANICS, WITH COAL AND SILTSTONE/SHALE COMMONLY INTERBEDDED.

VOLCANICS - TUFFS: WH, PALE GRY-GRN, FINE-GRAINED, VERY FRI TO V SFT, CLYEY, WEATHERED, SOME MEDIUM GREEN-GRAY, WH, FIRM TO HARD, SL. FRI, MOD TO V. CALC, BEIGE, BUFF, BLUE-GRN, RED, FIRM, VERY F-GR AND WITH LARGER MIN.GRNS, SUBHEDRAL, AS INCLUSIONS.

COAL: BLK, HD, SUBCONCHOIDAL FRACTURE, ESP AT 3534-35 AND 3542-3547M, SFTER, DK BRNISH-BLK BELOW 3581M.

SHALE: MEDIUM DK BRN, V SFT, CARB, VAR SILTY IN PT, BECOMING SLTST, FIRM TO HD. BOTH NON-CALC.

3554-3597M (11,660'-11,801')

PREDOM. SST, SHALE AND COAL, WITH MINOR INTERBDED VOLCANICS (TUFFS) ABOVE 3574M AND BELOW 3581M.

SANDSTONE: OFF-WH, AND LIGHT TAN, F-GR, WELL SRTD, SUBANG AND SUBRNDED, MAINLY SILICA-CEM, IN TOP PT, BUT MORE CLAY-CEM. BELOW 3570, WHERE IT BEC. DIRTY GRY IN COLOUR, LESS FIRM. VIS POROS V POOR.

SHALE: MEDIUM TO DK BRN, SFT TO IN PT FIRMER, CARB, NON-CALC. PREDOMINATES IN SECTION DRILLED AT 3594-97M.

COAL: BLK, FIRM TO HD, BLKY TO SUBCONCH FRACT, AND IN SOME HORIZONS, SFT, DK BRNISH-BLK, BLKY TO IRREG FRACT AND OF LESSER GRADE.

3597-3620M (11,801'-11,876')

VOLCANICS, WITH THIN INTERBEDS OF SHALE, SLTST AND COAL.

VOLCANICS: TUFFS: WH, PALE GRN-GRY, F-GRND, FRI TO V SFT, CLYEY, WEATHERED, SOME BEDS MEDIUM GRY-GRN, BEIGE, BUFF, BLUE-GRN, RED, FIRM TO HD, LESS (OR NON-) WEATHERED, MOD. TO V CALC, IN PT, SOME FREE CALC, AND RARE C-GR, SUBRNDED TO SUBANG CLEAR QTZ GRAINS AS INCLUSIONS.

SHALE: MED DK BRN, SFT, TO IN PT FIRM, SLIGHTLY SLTY, CARB, NON-CALC.

SLTST: DK BRN, FIRM TO HD, CARB, NONCALC.

COAL: MAINLY BLK, HD, WITH SUBCONCHOIDAL FRACTURE, SOME BEDS DK BRNISH-BLK, SFTER, WITH BLKY TO IRREG FRACTURE, OF LESSER RANK.

3620-3672M (11,876'-12,047')

IGNEOUS INTRUSIONS: PROB. DOLERITE TO GABBRO - MED TO COARSELY XTLN, DK GRNISH GRY (MACRO) BUT MED AND LIGHTER GRN AND WH, WITH V ABUN DK MINERALS UNDER THE MICROSCOPE, FIRM TO V HD, IN PTS V SLIGHTLY CALC.

3672-3692M (12,047'-12,113')

IGNEOUS INTRUSIVE WITH RARE TO COMMON FRAGMENTS OF SHALE, SLTST (POSSIBLE XENOLITHS?).

IGNEOUS: GABBRO, M GRN WITH WH, MED TO C GR, WITH ABUN MAFIC MIN, V HD, MOD CALC IN PT, RARE FREE CALCITE.

SHALE/SILTSTONE: M TO DK BRN, BAKED-LOOKING, EXT HD, CARB AND NON-CALC: POSS XENOLITHS(?).

3692-3702M (12,113'-12,146')

SHALE/SILTSTONE, WITH CONSIDERABLE INTRUSIVE AND EXTRUSIVE IGNEOUS ROCK.

SHALE AND SILTSTONE: M TO DKER BRN, SFT TO FIRM AND IN SMALL PT V HD, CARB AND NON-CALC, BELIEVED TO BE IN PLACE DUE TO OCCURRENCE ALSO OF TUFFS.

TUFF: WH, V LT GRNISH/GRY, SFT, AND SOME V F GR, XTLN, FORMER WEATHERED-LOOKING, THE LATTER PROB LESS SO, IN PT MOD CALC.

GABBRO: AS PREVIOUSLY - M GRN, WH, WITH ABUN BLK AND DK GRN MAFIC MIN, V HD, C-GR, MOD CALC IN PT.

3702-3708M (12,146'-12,165')

PREDOMINANTLY TUFF WITH MINOR SHALE

TUFF: WH - V LT GRN TO GY, ALTERED TO MOD FRESH, V F GR XTLN, MOD CALC, SFT.

SHALE: M-DK BRN, CARB, NONCALC, SFT-FIRM TO OCC V HD.

3708-3741M (12,165'-12,273')

100% BASALT
BASALT: PL YEL GRN TO LT GRN GY WITH WH SPECKS, OCC LT BRN GY, CRYPTO-MICROXTLN, EQUIGRAN TEXTURE, VAR FRESH-V ALTERED, WITH ALTERATION PRODUCTS A MIXTURE OF CHLORITE, CARBONATE AND CLYS, TR PY, V SFT - HARD (WHERE FRESHER). MINOR RED HEMATITIC ALTERATION IN INTERVAL 3723-29M.

3741-3746.6M. (12,273'-12,292')

100% SANDSTONE
V LT GY (WITH SALT AND PEPPER APPEARANCE). VF GR, SA-SR, V WELL SRTD, TR-MOD WH CLY MTX, TR CALC CMT, TR MICA AND CARB MAT, V FRI - OCC FIRM, FAIR-GOOD VIS POROS.

3746.6-3752M (12,292'-12,309')

CORE NO. 3

REC. 100%
ALTERED AMYGDALOIDAL BASALT.

3746.6-47M
CALCITE, AS PART OF LARGE FRACTURE FILL.

3747-52M
BASALT: V ALTERED, OFTEN AMYGDALOIDAL AND FRACTURED, GRY-GRN TO DUSKY GRN, V F GR, RELICT EQUIGRANULAR TEXTURE IN PART CONSISTING OF INTERLOCKING FELDSPAR AND MAFICS, TYPICALLY ALTERED AND REPLACED BY CHLORITES, CARBONATES AND CLAYS, TR PY, OCC ABNT IN VEINS, V HARD.
WITH AMYGDULES - UP TO 2CMS, MOSTLY FILLED WITH SILICA, CALCITE AND CHLORITE CLUSTERS, OCC PY.

3752-3831M (12,309'-12,569')

ALTERED AMYGDALOIDAL BASALT
AS BEFORE, GRY GRN - DUSKY GRN, V F GR WITH OCC RELICT INTERGRAN TEX CONSISTING OF INTERLOCKING FELD XTLS AND MAFICS, USUALLY REPLACED BY A MIXTURE OF CHLORITE, CARBONATE AND CLYS, OCC PY, FIRM - V HD.

COMMON HEMATITIC ALTERATION NOTED 3795-3804M SUGGESTING A WEATHERING SURFACE TO THE BASALT FLOW. MINOR DRILLBREAKS, e.g. 3783-3748M APPEAR TO BE QTZ-CALCITE FILLED FRAC AND VEINS.

WITHIN THIS INTERVAL: 3823-3825M (12,542'-12,594') SST: WH-V PL ORNG, VF-OCC M GR, PRLY SRTD, A-SA(?), 30% CLR SIL CMT, RARE WH CLY MTX, TR-COMMON LITHIC FRAGS, V HD, NIL-TR VIS POROS NO SHOWS.

3831-3888M (12,569'-12,756')

ALTERED AMYGDALOIDAL BASALT
(AS DESCRIBED BEFORE) WITH THIN INTERVALS OF SILICICLASTICS

3852-3856.5M (12,638'-12,652')

SST WITH ASSOC SLTST
SST: WH - V PL ORGE, VF-F GR, MOD SRTD, SA-SR DOM NON CALC TO OCC V CALC, TR SIL CMT; 20-30% WH CLY MTX, WITH TR OF BRN CLY MTX, TR LITHIC GR, FRI-FIRM, POOR VIS POROS (LESS THAN 10%).

SLTST: PL-DK YEL-BRN GRD TO V F GR SST A/A AND V CLAYEY TO CLST, MOD MICROCARB, TR MICMICA, SFT-FIRM, BLKY-SUBFIS.

3870-3072M (12,697'-12,703')

SST WITH ASSOC SLTST A/A

3888-3900M (12,756'-12,796')

DOLERITE/GABBRO: PL YEL GRN TO GRY-GRN TO DUSKY YEL-GRN, FRESH LOOKING, M-C GR EQUIGRAN TO INTERGRAN TEX CONSISTING OF FELD LATHS IN A LT BRN AND GRN MAFIC GROUNDMASS, MINOR OPAQUES PROB OF MAGNETITE AND ILMENITE, V HD, MINOR ALTERATION HAS TAKEN PLACE TO CARBONATE AND CHLORITE.

320052

APPENDIX 2

SIDEWALL CORE DESCRIPTIONS

TILANA-1

SUMMARY OF SIDEWALL CORE DESCRIPTIONS

WELL: TILANA NO. 1 LOG SUITE NO. 2 RUN NO: 1 SHOT: 51 RECOVERED: 51

DATE: OCTOBER 11, 1985 SERVICE COMPANY: SCHLUMBERGER GEOLOGIST: C. E. REVILLA

SHOT NO	DEPTH (M)	PULL (LBS)	REC'D (CM)	CONDTN (STATE)	ROCK TYPE	STAIN	OIL FLUOR %	CUT	CRUSH CUT	VIS.POR. %
1	3065	638	3.2	BROKEN	CLAYSTONE	-	-	-	-	-
2	3060	830	2.5	BROKEN	CLAYSTONE	-	-	-	-	-
3	3036	155	2.5	INTACT	SILTSTONE	-	-	-	TR YEL RESIDUE	5
4	3004	1049	2.5	INTACT	SILTSTONE	-	-	-	-	5-10
5	2974	677	3	INTACT	SANDSTONE	-	-	-	-	5
6	2967	177	1.9	INTACT	SANDSTONE	-	-	-	-	10
7	2945	151	2.0	INTACT	CLAYSTONE	-	-	-	-	-
8	2907	170	2.5	INTACT	CLAYSTONE	-	-	-	-	-
9	2863	516	2.8	INTACT	SANDSTONE	-	-	-	-	10
10	2829	190	2.5	INTACT	CLAYSTONE	-	-	-	-	-
11	2776	184	2.5	BROKEN	CLAYSTONE	-	-	-	-	-
12	2751	832	3.2	BROKEN	CLAYSTONE	-	-	-	-	-
13	2707	107	2.5	INTACT	CLAYSTONE/ALTERED VOLCANIC ASH(??)	-	-	-	-	-
14	2667	92	2.5	BROKEN	CLAYSTONE	-	-	-	-	-
15	2637.5	200	1.8	INTACT	CLAYSTONE	-	-	-	-	-
16	2610	613	2.5	INTACT	CLAYSTONE	-	-	-	-	-

320053

SUMMARY OF SIDEWALL CORE DESCRIPTIONS

WELL: TILANA NO. 1 LOG SUITE NO. 2 RUN NO: 1 SHOT: 51 RECOVERED: 51

DATE: OCTOBER 11, 1985 SERVICE COMPANY: SCHLUMBERGER GEOLOGIST: C E REVILLA

SHOT NO	DEPTH (M)	PULL (LBS)	REC'D (CM)	CONDTN (STATE)	ROCK TYPE	STAIN	OIL FLUOR %	CUT	CRUSH CUT	VIS.POR. %
17	2579	108	2.5	INTACT	CLAYSTONE	-	-	-	-	-
18	2549	203	2.0	BROKEN	CLAYSTONE	-	-	-	-	-
19	2514	131	3.2	BROKEN	CLAYSTONE	-	-	-	-	-
20	2486	107	2.0	BROKEN	CLAYSTONE	-	-	-	-	-
21	2464	97	2.5	INTACT	CLAYSTONE	-	-	-	-	-
22	2435	793	3.3	INTACT	CLAYSTONE	-	-	-	-	-
23	2403	100	2.5	BROKEN	SANDSTONE	-	-	-	-	10
24	2377.5	132	1.9	BROKEN	CLAYSTONE	-	-	-	-	-
25	2356	108	2.0	INTACT	CLAYSTONE	-	-	-	-	-
26	2330	594	3.8	INTACT	CLAYSTONE AND SANDSTONE, LAMINAE	-	-	-	-	5
27	2298	108	2.5	INTACT	CLAYSTONE	-	-	-	-	-
28	2268	331	2.3	INTACT	CLAYSTONE	-	-	-	-	-
29	1969	512	3.6	INTACT	CLAYSTONE	-	-	-	-	-
30	1941	891	4.1	INTACT	CLAYSTONE	-	-	-	-	-
31	1911	188	5.1	INTACT	CLAYSTONE	-	-	-	-	-
32	1883	128	4.1	INTACT	CLAYSTONE/ALTERED VOLCANIC ASH OR TUFF??	-	-	-	-	-

320054

SUMMARY OF SIDEWALL CORE DESCRIPTIONS

WELL: TILANA NO. 1 LOG SUITE NO. 2 RUN NO: 1 SHOT: 51 RECOVERED: 51

DATE: OCTOBER 11, 1985 SERVICE COMPANY: SCHLUMBERGER GEOLOGIST: C E REVILLA

SHOT NO	DEPTH (M)	PULL (LBS)	REC'D (CM)	CONDTN (STATE)	ROCK TYPE	STAIN	OIL FLUOR %	CUT	CRUSH CUT	VIS.POR. %
33	1878	121	2.5	INTACT	SANDSTONE	-	-	-	-	10
34	1867	601	4.1	INTACT	SANDSTONE	-	-	-	-	10
35	1829	0	3.8	INTACT	CLAYSTONE	-	-	-	-	10
36	1828	260	3.8	INTACT	CLAYSTONE	-	-	-	-	10
37	1820	452	3.8	INTACT	CLAYSTONE	-	-	-	-	10
38	1802.5	722	3.3	INTACT	SILTSTONE	-	-	-	-	5
39	1793	188	3.8	INTACT	SANDSTONE	-	-	-	-	10
40	1792.5	163	3.2	INTACT	SANDSTONE	-	-	-	-	10
41	1781	418	5.1	INTACT	CLAYSTONE	-	-	-	-	-
42	1770	98	3.2	INTACT	SANDSTONE	-	-	-	-	10
43	1769	271	3.2	INTACT	CLAYSTONE	-	-	-	-	10
44	1765	67	3.6	INTACT	SANDSTONE	-	-	-	-	10
45	1753	136	3.8	INTACT	CLAYSTONE AND SILTSTONE	-	-	-	-	5
46	1738	24	3.8	INTACT	CLAYSTONE AND SILTSTONE	-	-	-	-	5
47	1730	756	3.8	INTACT	SANDSTONE	-	-	-	-	5
48	1725	873	3.2	I	SILTSTONE	-	-	-	-	5

320055

SUMMARY OF SIDEWALL CORE DESCRIPTIONS

WELL: TILANA NO. 1 LOG SUITE NO. 2 RUN NO: 1 SHOT: 51 RECOVERED: 51

DATE: OCTOBER 11, 1985 SERVICE COMPANY: SCHLUMBERGER GEOLOGIST: C. E. REVILLA

SHOT NO	DEPTH (M)	PULL (LBS)	REC'D (CM)	CONDTN (STATE)	ROCK TYPE	STAIN	OIL FLUOR %	CUT	CRUSH CUT	VIS.POR. %
49	1716	743	3.8	1	SANDSTONE	-	-	-	-	5
50	1699	101	3.8	1	SANDSTONE AND SILTSTONE	-	-	-	-	5
51	1691	154	3.6	1	SANDSTONE	-	-	-	-	5

320056

SUMMARY OF SIDEWALL CORE DESCRIPTIONS

WELL: TILANA NO. 1 LOG SUITE NO. 3 RUN NO: 2 SHOT: 4 RECOVERED: 4

DATE: OCTOBER 31, 1985 SERVICE COMPANY: SCHLUMBERGER GEOLOGIST: G. M. KJELLGREN

SHOT NO	DEPTH (M)	PULL (LBS)	REC'D (CM)	CONDTN (STATE)	ROCK TYPE	STAIN	OIL FLUOR %	CUT	CRUSH CUT	VIS.POR. %
52	3882	30	2	GOOD	SANDSTONE	-	TR	-	YES	10
53	3878	563	2.5	FAIR	SILTSTONE/SANDSTONE	-	-	-	-	10
54	3875	296	2.5	FAIR	SANDSTONE	-	-	YES	YES	15
55	3870	420	2	GOOD	CLAYSTONE	-	-	-	-	-
* TOOL FAILURE AFTER FIRST FOUR SHOTS.										

320057

SUMMARY OF SIDEWALL CORE DESCRIPTIONS

WELL: TILANA NO. 1 LOG SUITE NO. 3 RUN NO: 3 SHOT: 30 RECOVERED: 28

DATE: OCTOBER 31, 1985 SERVICE COMPANY: SCHLUMBERGER GEOLOGIST: G. M. KJELLGREN

SHOT NO	DEPTH (M)	PULL (LBS)	REC'D (CM)	CONDTN (STATE)	ROCK TYPE	STAIN	OIL FLUOR %	CUT	CRUSH CUT	VIS.POR. %
56	3811	340	2.5	V. POOR	ALTERED BASALT	-	-	-	-	-
57	3751	130	1	GOOD	CLAYSTONE/SANDSTONE	-	-	-	-	10-15
58	3706	764	2	GOOD	CLAYSTONE	-	-	-	-	-
59	3690.6	143	2	POOR	CLAYSTONE	-	-	-	-	-
60	3621	1010	3	GOOD	CLAYSTONE	-	-	-	-	-
61	3584	756	2	GOOD	CLAYSTONE	-	-	-	-	-
62	3574	72	2	GOOD	CLAYEY SANDSTONE	-	-	-	-	10
63	3546.5	1020	2.5	GOOD	CLAYSTONE WITH COAL	-	TR	YES	YES	-
64	3407.5	1939	3	GOOD	ALTERED BASALT	-	TR	-	-	-
65	3341	1939	3	GOOD	ALTERED BASALT	-	-	-	-	-
66	3283	205	2.5	GOOD	CLAYSTONE/COALY CLAYSTONE	-	-	-	-	-
67	3237.5	248	1.5	GOOD	CLAYSTONE	-	-	YES	YES	-
68	3227	NO REC								
69	3214	294	3	GOOD	SANDSTONE	-	-	-	-	20
70	3202	192	2.5	GOOD	CLAYSTONE	-	-	-	YES	-
71	3197.5	663	3	GOOD	SANDSTONE	PATCHY	TR	YES	YES	15

320058

SUMMARY OF SIDEWALL CORE DESCRIPTIONS

WELL: TILANA NO. 1 LOG SUITE NO. 3 RUN NO: 3 SHOT: 30 RECOVERED: 28

DATE: OCTOBER 31, 1985 SERVICE COMPANY: SCHLUMBERGER GEOLOGIST: G. M. KJELLGREN

SHOT NO	DEPTH (M)	PULL (LBS)	REC'D (CM)	CONDTN (STATE)	ROCK TYPE	STAIN	OIL FLUOR %	CUT	CRUSH CUT	VIS.POR. %
72	3183	127	3	GOOD	SANDSTONE	-	-	-	-	15
73	3105	156	2.5	GOOD	CLAYSTONE	-	-	-	-	-
74	3094	354	4	GOOD	SANDSTONE	PATCHY	20-25	YES	YES	15
75	3084	444	2.5	GOOD	SANDSTONE/COAL	PATCHY	50-60	-	YES	20
76	3080	1302	2.5	GOOD	CLAYSTONE	-	-	-	YES	-
77	3074	1175	3	GOOD	SANDSTONE/COAL	TR	TR	-	YES	20
78	3072.5	894	3	GOOD	SANDSTONE	PATCHY	TR	-	-	20
79	3068	NO REC								
80	3047	510	2	GOOD	SANDSTONE	PATCHY	-	-	-	15
81	3044	362	3	GOOD	SANDSTONE/CLAYSTONE	EVEN	-	-	-	10
82	3037	1912	3	GOOD	SANDSTONE	PATCHY	-	-	-	20
83	3031.5	2048	3	GOOD	SANDSTONE	TR	-	-	-	15
84	3020.4	578	1.5	GOOD	SANDSTONE	TR	TR	-	-	15
85	2994.6	434	2	GOOD	SANDSTONE	TR	-	-	-	25

320059

320060

SIDEWALL CORE DESCRIPTIONS

CORE NO. 1 RUN 1 WELL: TILANA-1

DEPTH: 3065M

ROCK TYPE: CLAYSTONE

PULL: 638 LBS

RECOVERED: 3.18 CM

CONDITION: BROKEN

DESCRIPTION: DK BRN/GRY; FIRM, BLOCKY FRAC; NON CALC

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSH CUT:

CORE NO. 2 RUN 1 WELL: TILANA-1

DEPTH: 3060M

ROCK TYPE: CLAYSTONE

PULL: 829.5 LBS

RECOVERED: 2.54 CM

CONDITION: BROKEN

DESCRIPTION: DK BRN/GRY; FIRM, BLOCKY FRAC; NON CALC

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSH CUT:

SIDEWALL CORE DESCRIPTION

CORE NO. 3 RUN 1 WELL: TILANA-1

DEPTH: 3036M

ROCK TYPE: SILTSTONE

PULL: 155.3 LBS

RECOVERED: 2.54 CM

CONDITION: INTACT; MOD. CONTAM. DRILL MUD

DESCRIPTION: MED BRN, FIRM-SLTY HD, ARENACEOUS WITH LENSES OF VF GR QTZ; WHT CLAY MATRIX; NON-CALCAREOUS. VIS POROSITY 5%. NO FLUOR; TENUOUS VERY DULL YELLOW FLUOR OF CUT RESIDUE.

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSH CUT: NIL

CORE NO. 4 RUN 1 WELL: TILANA-1

DEPTH: 3004M

ROCK TYPE: SILTSTONE

PULL: 1049 LBS

RECOVERED: 2.54 CM

CONDITION: INTACT; MOD. CONTAM. BY DRILL MUD

DESCRIPTION: MED BRN/GRY; FIRM - SLT HD; V ARGIL, SLT AREN; NON-CALC; VIS POROS 5-10% - NO FLUOR, NO CUT.

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSH CUT: NIL

320062

SIDEWALL CORE DESCRIPTION

CORE NO. 5 RUN 1 WELL: TILANA 1

DEPTH: 2574M

ROCK TYPE: SANDSTONE

PULL: 677 LBS

RECOVERED: 3.18 CM

CONDITION: INTACT; MOD. CONTAM. DRILL MUD

DESCRIPTION: BRN/GRY; VF-F GR; FIRM; SLT ARG, PARTLY WITH CLAY MATRIX; ABUN MICA; CARB MATTER DISSEM; DK MIN GRNS; VIS POROS 5%; NO FLUOR OR CUT.

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 6 RUN 1 WELL: TILANA 1

DEPTH: 2967M

ROCK TYPE: SANDSTONE

PULL: 177.3 LBS

RECOVERED: 1.91 CM

CONDITION: INTACT; SEVERE CONTAM, DRILL MUD

DESCRIPTION: WHT; FGR FAIRLY WELL SORTED; FIRM WHT CLAY CEMENT WITH DISSEM MICA; COAL FRAGS AND LAMINAE OF CARB MATTER (? COAL), BLK VERY FINELY DIVIDED PARTICLES; VIS POROS 10% NO FLUOR OR CUT.

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 7 RUN 1 WELL: TILANA-1

DEPTH: 2945M

ROCK TYPE: CLAYSTONE

PULL: 151.2 LBS

RECOVERED: 2.03 CM

CONDITION: INTACT

DESCRIPTION: DK GRY; MASSIVE-SLT TABULAR, COMPACT, SL FIRM; NON-CLAC; NO FLUOR OR CUT.

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 8 RUN 1 WELL: TILANA-1

DEPTH: 2907M

ROCK TYPE: CLAYSTONE

PULL: 170 LBS

RECOVERED: 2.54 CM

CONDITION: INTACT

DESCRIPTION: DK GRY, MASSIVE-SLT TABULAR, COMPACT, SL FIRM; NON-CALCAREOUS.

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

SIDEWALL CORE DESCRIPTIONS

CORE NO. 9 RUN 1 WELL: TILANA-1

DEPTH: 2863M

ROCK TYPE: SANDSTONE

PULL: 516 LBS

RECOVERED: 2.79 CM

CONDITION: INTACT; MOD. CONTAM DRILL MUD

DESCRIPTION: OFF-WHT; V FG; SOFT; ARGILL. WITH OCCAS BLK LAM FINELY DIVIDED COAL OR OTHER CARB MATTER; VIS POROS 10%. NO FLUOR OR CUT.

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 10 RUN 1 WELL: TILANA-1

DEPTH: 2829M

ROCK TYPE: CLAYSTONE

PULL: 189.7 LBS

RECOVERED: 2.54 CM

CONDITION: INTACT

DESCRIPTION: MED BRN WITH IRREG GRY/LAM; COMPACT; NON-CLAC.

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

SIDEWALL CORE DESCRIPTIONS

CORE NO. 11 RUN 1 WELL: TILANA-1

DEPTH: 2776M

ROCK TYPE: CLAYSTONE

PULL: 183.3 LBS

RECOVERED: 2.54 CM

CONDITION: BROKEN

DESCRIPTION: DK BRN/GRY; COMPACT - SLTLY FIRM

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 12 RUN 1 WELL: TILANA-1

DEPTH: 2751M

ROCK TYPE: CLAYSTONE

PULL: 831.5 LBS

RECOVERED: 3.18 CM

CONDITION: BROKEN

DESCRIPTION: MED GRY/BRN WITH LT GRY LAM; COMPACT; SUB-FISS WITH IRREG LENSES AND LAM BLK COAL PARTICLES.

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

320066

SIDEWALL CORE DESCRIPTIONS

CORE NO. 13 RUN 1 WELL: TILANA-1

DEPTH: 2707M

ROCK TYPE: CLAYSTONE ? (ALTERED VOLCANIC ASH)

PULL: 106.8 LBS

RECOVERED: 2.54 CM

CONDITION: INTACT

DESCRIPTION: MED BEIGE; SOFT; MICROMICACEOUS, DISSEM VF BLK MIN GRAIN SOAPY/WAXY TEXTURE.

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 14 RUN 1 WELL: TILANA-1

DEPTH: 2667M

ROCK TYPE: CLAYSTONE

PULL: 91.7 LBS

RECOVERED: 2.54 CM

CONDITIONS: BROKEN

DESCRIPTION: MED-DK BRN; FAIRLY COMPACTED; MICROMICACEOUS

ODOR:

STAIN:

OIL FLUOR

MINERAL FLUOR

UNCRUSHED CUT:

CRUSHED CUT:

SIDEWALL CORE DESCRIPTIONS

CORE NO. 15 RUN 1 WELL: TILANA-1

DEPTH: 2637.5M

ROCK TYPE: CLAYSTONE

PULL: 200 LBS

RECOVERED: 1.78 CM

CONDITION: INTACT

DESCRIPTION: DK GRY-GRY BRN; COMPACT, SLIGHTLY FIRM, BLOCKY FRACTURE.

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 16 RUN 1 WELL: TILANA-1

DEPTH: 2610M

ROCK TYPE: CLAYSTONE

PULL: 613 LBS

RECOVERED: 2.54 CM

CONDITION: INTACT

DESCRIPTION: MED DK BRN; SOFT, MASSIVE

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

320068

SIDEWALL CORE DESCRIPTIONS

CORE NO. 17 RUN 1 WELL: TILANA-1

DEPTH: 2579M

ROCK TYPE: CLAYSTONE

PULL: 2.54 CM

CONDITION: INTACT

DESCRIPTION: MED DK BRN; SOFT MASSIVE

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 18 RUN 1 WELL: TILANA-1

DEPTH: 2549M

ROCK TYPE: CLAYSTONE

PULL: 203.2 LBS

RECOVERED: 2.03 CM

CONDITION: BROKEN

DESCRIPTION: MED DK BRN; MASSIVE, COMPACT, SLIGHTLY BRITTLE

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

SIDEWALL CORE DESCRIPTIONS

CORE NO. 19 RUN 1 WELL: TILANA-1

DEPTH: 2514M

ROCK TYPE: CLAYSTONE

PULL: 130.8 LBS

RECOVERED: 3.18CM

CONDITION: BROKEN

DESCRIPTION: MED DK BRN; MASSIVE, COMPACT, SLIGHTLY BRITTLE

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 20 RUN 1 WELL: TILANA-1

DEPTH: 2486M

ROCK TYPE: CLAYSTONE

PULL: 107.2 LBS

RECOVERED: 2.03 CM

CONDITION: BROKEN

DESCRIPTION: MED DK BRN; COMPACT, SUB-FISSILE, SLIGHTLY BRITTLE

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

SIDEWALL CORE DESCRIPTIONS

CORE NO. 21 RUN 1 WELL: TILANA-1

DEPTH: 2464M

ROCK TYPE: CLAYSTONE

PULL: 96.5 LBS

RECOVERED: 2.54 CM

CONDITION: INTACT

DESCRIPTION: MED DK BRN; COMPACT, FIRM, MASSIVE

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 22 RUN 1 WELL: TILANA-1

DEPTH: 2435M

ROCK TYPE: CLAYSTONE

PULL: 793 LBS

RECOVERED: 3.30 CM

CONDITION: INTACT

DESCRIPTION: MED DK BRN; COMPACT, FIRM, MASSIVE

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

320071

SIDEWALL CORE DESCRIPTIONS

CORE NO. 23 RUN 1 WELL: TILANA-1

DEPTH: 2403M

ROCK TYPE: SANDSTONE

PULL: 100.1 LBS

RECOVERED: 2.54 CM

CONDITION: BROKEN; MOD CONTAM DRILL MUD

DESCRIPTION: OFF-WHT; VF-F GR, FR SORT; VERY FRIABLE, CLAY MATRIX; DK BRN LAMS COAL (?) OR OTHER CARB MATTER; VIS POROS 10%

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 24 RUN 1 WELL: TILANA-1

DEPTH: 2377.5M

ROCK TYPE: CLAYSTONE

PULL: 131.7 LBS

RECOVERED: 1.91 CM

CONDITION: BROKEN

DESCRIPTION: WHT WITH V COMM DK BRN/BLK LAMS; SOFT; NON-CALC

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

320072

SIDEWALL CORE DESCRIPTIONS

CORE NO. 25 RUN 1 WELL: TILANA-1

DEPTH: 2356M

ROCK TYPE: CLAYSTONE

PULL: 108 LBS

RECOVERED: 2.03 CM

CONDITION: INTACT; SEVERE CONTAM DRILL MUD

DESCRIPTION: WHT WITH V COMM DK BRN/BLK LAMS; SOFT; NON-CALC

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 26 RUN 1 WELL: TILANA-1

DEPTH: 2330M

ROCK TYPE: CLAYSTONE AND SANDSTONE INTERLAMINATED

PULL: 593.5 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT

DESCRIPTION: SANDSTONE; VF GR, FRI, NON CALC. VIS POROS 5%
CLAYSTONE; DK BRN; SOFT; NON CALC; NO FLUOR OR CUT.

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

320073

CORE NO. 27 RUN 1 WELL: TILANA-1

DEPTH: 2298M

ROCK TYPE: CLAYSTONE

PULL: 108 LBS

RECOVERED: 2.54 CM

CONDITION: INTACT

DESCRIPTION: STEEL GRY; SLT FIRM; V ARGILL WITH COMM LAMS LT GRY SILT

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 28 RUN 1 WELL: TILANA-1

DEPTH: 2268M

ROCK TYPE: CLAYSTONE

PULL: 331.2 LBS

RECOVERED: 2.29 CM

CONDITION: INTACT

DESCRIPTION: DK STEEL GRY WITH BURNT APPEARANCE; SLT FIRM; OCCAS V LT GRY-OFF WHT PATCHES OF CLAY

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

SIDEWALL CORE DESCRIPTIONS

320074

CORE NO. 29 RUN 1 WELL: TILANA-1

DEPTH: 1969M

ROCK TYPE: CLAYSTONE (? ALTERED VOLCANIC ASH)

PULL: 511.7 LBS

RECOVERED: 3.56 CM

CONDITION: INTACT

DESCRIPTION: OFF WHT WITH LAMS MED GRY; SOFT, MASSIVE, SLT CALC; HYDRATABLE

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 30 RUN 1 WELL: TILANA-1

DEPTH: 1941M

ROCK TYPE: CLAYSTONE (? ALTERED VOLCANIC ASH)

PULL: 890.5 LBS

RECOVERED: 4.06 CM

CONDITION: INTACT

DESCRIPTION: DK BLUISH GRY; STIFF, SOAPY/WAXY TEXTURE; MASSIVE RARE TINY PATCHES OF VF QTZ SAND; FRIABLE, NON-CALC; RARELY MICROMICACEOUS

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

320075

SIDEWALL CORE DESCRIPTIONS

CORE NO. 31 RUN 1 WELL: TILANA-1

DEPTH: 1911M

ROCK TYPE: CLAYSTONE (? ALTERED VOLCANIC ASH)

PULL: 187.5 LBS

RECOVERED: 5.08 CM

CONDITION: INTACT

DESCRIPTION: DK BLUISH GRY; STIFF, SOAPY/WAXY TEXTURE; MASSIVE WITH RARE TINY PATCHES OF VERY, VERY FINE SAND; FRIABLE NON CALC; RARELY MICROMICACEOUS; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 32 RUN 1 WELL: TILANA-1

DEPTH: 1883M

ROCK TYPE: CLAYSTONE (? ALTERED VOLCANIC ASH)

PULL: 128 LBS

RECOVERED: 4.06 CM

CONDITION: INTACT

DESCRIPTION: WHT-OFF WHT WITH DK GRY PATCHES AND ISOLATED PURE WHT PATCHES, SOFT (? KAOLIN); NON CALC; MASSIVE

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

320076

SIDEWALL CORE DESCRIPTIONS

CORE NO. 33 RUN 1 WELL: TILANA-1

DEPTH: 1878M

ROCK TYPE: SANDSTONE

PULL: 121.3 LBS

RECOVERED: 2.54 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: STEEL GRY; VF GR, W SORT QTZ WITH COMM EUTHEDRAL CRYSTALS; SALT AND PEPPER APPEARANCE WITH V ABUN EXTREMELY FINELY DIVIDED BLK CARB (? COAL) MATTER; VIS POROS 10% NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 34 RUN 1 WELL: TILANA-1

DEPTH: 1867M

ROCK TYPE: SANDSTONE

PULL: 600.5 LBS

RECOVERED: 4.06 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: WHT OCCAS GRY PATCHES; F-VF QTZ SAND MATRIX WITH OCCAS CRS GRNS, CLEAR; FAIRLY WELL SRTD; COMPACT, RARE LGE CLASTS SILTSTONE/V.VF QTZ SAND WITH DK GRY LAM; VIS POROS 10%

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 35 RUN 1 WELL: TILANA-1

DEPTH: 1829M

ROCK TYPE: SANDSTONE

PULL: 0 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: WHT; VF-M GR OCCAS CRS GR, QTZ, POOR SORT; WHT CLAY CEMENT AND OCCAS AS MATRIX; MASSIVE; VIS POROS 10%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 36 RUN 1 WELL: TILANA-1

DEPTH: 1828M

ROCK TYPE: SANDSTONE

PULL: 259.5 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: WHT; F-CRS GR QTZ, UNSORTED; MASSIVE, FIRM, WEAKLY CEMENTED BY WHT CLAY; VIS POROS 10%

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 37 RUN 1 WELL: TILANA-1

DEPTH: 1820M

ROCK TYPE: SANDSTONE

PULL: 451.5 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: MED GRY; VF-F GR SOME MED CRS GR QTZ, POORLY SRTD, COMPACT, MICROMICACEOUS VAR ARG; VIS POROS 10%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 38 RUN 1 WELL: TILANA-1

DEPTH: 1802.5M

ROCK TYPE: SILTSTONE

PULL: 721.5 LBS

RECOVERED: 3.30 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: MED GRY WITH DARK PATCHES LENSES; COMPACT; V ARG; VIS POROS 5%

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

320079

SIDEWALL CORE DESCRIPTIONS

CORE NO. 39 RUN 1 WELL: TILANA-1

DEPTH: 1793M

ROCK TYPE: SANDSTONE

PULL: 188 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT, SEVERLY CONTAM MUD

DESCRIPTION: OFF-WHT; F-M GR QTZ; FRIABLE, WEAKLY CEMENTED BY CLAY; VIS POROS 10% NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 40 RUN 1 WELL: TILANA-1

DEPTH: 1792.5M

ROCK TYPE: SANDSTONE

PULL: 162.5 LBS

RECOVERED: 3.18 CM

CONDITION: INTACT, MOD SEVERE CONTAM DRILL MUD

DESCRIPTION: OFF-WHT; M-CRS GR QTZ; FAIR SORT, SANG-SRND, SOME EUHEDRAL CRYSTALS; LOOSE MASSIVE ROCK; VIS POROS 10%, NO FLUOR OR CUT.

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 41 RUN 1 WELL: TILANA-1

DEPTH: 1781M

ROCK TYPE: CLAYSTONE

PULL: 418 LBS

RECOVERED: 5.08 CM

CONDITION: INTACT

DESCRIPTION: DK GRY; STIFF, MASSIVE; NON-CALC

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 42 RUN 1 WELL: TILANA-1

DEPTH: 1770M

ROCK TYPE: SANDSTONE

PULL: 98.4 LBS

RECOVERED: 3.18 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: OFF-WHT, F GR WELL SRT, LOOSE, MASSIVE, SLT ARGIL; VIS POROS 10%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

320081

SIDEWALL CORE DESCRIPTIONS

CORE NO. 43 RUN 1 WELL: TILANA-1

DEPTH: 1769M

ROCK TYPE: SANDSTONE

PULL: 270.5 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: OFF-WHT, M-C GR, FAIR SRT, LOOSE, MASSIVE, SLT ARGIL; VIS POROS 10%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 44 RUN 1 WELL: TILANA-1

DEPTH: 1765M

ROCK TYPE: SANDSTONE

PULL: 66.9 LBS

RECOVERED: 3.56 CM

CONDITION: INTACT

DESCRIPTION: DK-LT GRY WITH WHT PATCHES; F-C QTZ WITH LGE CLASTS LAM CLYSTN, COAL FRAGS PEBS, NON-SORTED; GRY CLAY CEMENT; VIS POROS 10%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 45 RUN 1 WELL: TILANA-1

DEPTH: 1753M

ROCK TYPE: SILTSTONE AND CLAYSTONE

PULL: 135.7 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT

DESCRIPTION: OFF-WHT MATRIX, DK GRY LAMS; SILTSTONE V ARGIL; CLAYSTONE VAR SILTY, MICROMICACEOUS; SL FIRM; VIS POROS SILTSTONE 5%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 46 RUN 1 WELL: TILANA-1

DEPTH: 1738M

ROCK TYPE: CLAYSTONE AND SILTSTONE

PULL: 23.8 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT

DESCRIPTION: DK GRY WITH F-VC QTZ GR AS INCLUSIONS IN BOTH LITHOLOGIES; SL FIRM; PATCHES OF VF QTZ SAND (OFF-WHT); VIS POROS 5%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 47 RUN 1 WELL: TILANA-1

DEPTH: 1730M

ROCK TYPE: SANDSTONE

PULL: 756 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: DK GRY-GRY BRN, BANDED, VF- SILT WITH ARGIL MATRIX; FIRM; NON-CALC; MICACEOUS; VIS POROS 5%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 48 RUN 1 WELL: TILANA-1

DEPTH: 1725M

ROCK TYPE: SILTSTONE AND SANDSTONE

PULL: 872.5 LBS

RECOVERED: 3.18 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: DK GRY WITH LT GRY AND TAN LAMS; THIN LAMS VF SANDSTONE; V ARGIL; FIRM; VIS POROS 5%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 49 RUN 1 WELL: TILANA-1

DEPTH: 1716M

ROCK TYPE: SANDSTONE

PULL: 743 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: DK GRY-DK GRY/BRN, BANDED; VF-SILT, ARGILL MATRIX; FIRM; NON-CALC; MICROMICACEOUS; VIS POROS 5%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 50 RUN 1 WELL: TILANA-1

DEPTH: 1699M

ROCK TYPE: SANDSTONE AND SILTSTONE

PULL: 101 LBS

RECOVERED: 3.81 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: DK BRN/GRY; STIFF; VF-SILT WITH COMMON CRS QTZ; CLAY MATRIX, MICACEOUS; VIS POROS 5%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 51 RUN 1 WELL: TILANA-1

DEPTH: 1691M

ROCK TYPE: SANDSTONE

PULL: 154 LBS

RECOVERED: 3.56 CM

CONDITION: INTACT, MOD CONTAM DRILL MUD

DESCRIPTION: LT TAN; VF W SRT QTZ; ARGIL, OCCAS WITH LAMS AND THIN STRKS M-DK GRY ARGIL SANDSTONE: VIS POROS 5%; NO FLUOR OR CUT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 52 WELL: TILANA-1
SUITE 3 RUN 1

DEPTH: 3882M

ROCK TYPE: SANDSTONE

PULL: 30 LBS

RECOVERED: 2 CMS

CONDITION: GOOD

DESCRIPTION: SST: LT GY, DOM VF-F GR, RARELY M AND C GR, V PRLY STRD, A-SR, ABNT WHCLY MTX (20-25%), APPEARS MICRITIC IN PT, TR GY-BLK LITHIC FRAGS, TR LT BRN CLY, FIRM, PR VIS POROS 10%

ODOR: NIL

STAIN: NIL

OIL FLUOR: VERY DULL YELLOW; PATCHY

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: CLEAR - TRANSPARENT VERY PALE BLUE-WHITE

SIDEWALL CORE DESCRIPTIONS

CORE NO. 53 — WELL: TILANA-1
SUITE 3 RUN 1

DEPTH: 3878M

ROCK TYPE: SILTSTONE AND SANDSTONE

PULL: 563 LBS

RECOVERED: 2.5 CMS

CONDITION: FAIR - SOME MUD INVASION

DESCRIPTION: SLTST: BRN-BLK, GRDG TO V F GR SDY TO SST IN PART, COMMON MICCARB MAT, TR WH SPECKS (ALTERED LITHICS OR FELD?), V CLAYEY GRDG TO CLST IN PT, TR CALC, FIRM, BLKY.

SST: LT GY, VF-F GR, RARELY M GR, V PRLY SRTD, A-SA, ABNT WH CLY MTX (20-30%), MICRITIC IN PT, TR LT BRN CLY, TR GY BLK LITHIC FRAGS, FIRM, PR VIS POROS 10%

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: TRACE PINPOINT GOLD COLOUR

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 54 — WELL: TILANA-1
SUITE 3 RUN 1

DEPTH: 3875M

ROCK TYPE: SANDSTONE

PULL: 296 LBS

RECOVERED: 2.5 CMS

CONDITION: FAIR - BROKEN CORE

DESCRIPTION: SST: V LT GY, DOM VF-F GR, RARELY MGR, MOD STRD, A-SA, TR SILICA O/GROWTHS, 5-10% CLR-WH CALC CMT, 5-10% WH CLY MTX TR LT GY-GY BLK LITHICS, V FRI, FAIR - GOOD VIS POROS 15%

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: SLOW VERY PALE BLUE-WHITE

CRUSHED CUT: CLEAR TRANSPARENT PALE BLUE-WHITE

SIDEWALL CORE DESCRIPTIONS

CORE NO. 55 — WELL: TILANA-1
SUITE 3 RUN 1

DEPTH: 3870M

ROCK TYPE: CLAYSTONE

PULL: 420 LBS

RECOVERED: 2 CMS

CONDITION: GOOD

DESCRIPTION: CLST: BRN BLK, TR ANG QTZ SLT, 5% CALC, COMMON MICROCARBONAC MAT, TR LT GY PATCHES OF RELICT (?) FELD OR LITHIC GRS, SFT, LAMINATED, BLKY - WEAKLY SUBFIS

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 56 — WELL: TILANA-1
SUITE 3 RUN 1

DEPTH: 3811M

ROCK TYPE: VERY ALTERED BASALT

PULL: 340 LBS

RECOVERED: 2.5 CMS

CONDITION: V. POOR - MUD CONTAM

DESCRIPTION: V. ALTERED BASALT - BRN GY, ALTERED TO A CLST, RARE RELICT SUPERFINE EQUIGRANULAR TEXTURE, TR V FINE BLK STREAKY OPAQUES, TR CALC, SFT-FRIM

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 57 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3751M

ROCK TYPE: CLAYSTONE I/B WITH THIN COAL AND SANDSTONE

PULL: 130 LBS

RECOVERED: 1 CMS

CONDITION: GOOD

DESCRIPTION: CLST: DK GY, GRDG SLTY AND SUPERFINE SDY TO A DIRTY SST, TR MICMICA AND MICROPY (OCC AGGS), COMMON MICROCARBONAC MAT, SFT

SST: WH, SUPERFINE - VF GR, ANG. PRLY SRTD, WITH NIL - 20%+ WH AND LT BRN CRY MTX, V CALC IN PT, V FRI, VARIABLE VIS POROS, PR - GOOD IN PT (10-15% UP TO EST. 25%), BUT SANDS RARELY FORM CONTINUOUS LAMINAE OR BEDS

COAL: BLK, V THIN, WAVY AND DISCONTINUOUS, EARTH - SUBVIT LUSTRE, FRI, BLKY, BITUMINOUS - SUBBIT RANK

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 58 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3706M

ROCK TYPE: CLAYSTONE

PULL: 764 LBS

RECOVERED: 2 CMS

CONDITION: GOOD

DESCRIPTION: CLST: M GY-M-DK GY, COMMON ANG QTZ SLT, OFTEN AS FINE LAMINAE, TR MICMIC AND MICCARB, NONCALC, FIRM, BLKY - SUBFIS

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 59 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3690.5M

ROCK TYPE: CLAYSTONE

PULL: 143 LBS

RECOVERED: 2 CMS

CONDITION: POOR - MUD CONTAMINATION

DESCRIPTION: CLST: GY BLK, TR MICMICA, RARE PATCHY PY, NONCALC, MASSIVE, FIRM-HARD, BLKY FRAC

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 60 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3621M

ROCK TYPE: CLAYSTONE

PULL: 1010 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: CLST: GY BLK, COMMON ANG QTZ SLT, RARE MICMICA, MASSIVE APPEARANCE, FIRM-HAND WITH BLKY FRAC

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 61 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3584M

ROCK TYPE: CLAYSTONE

PULL: 756 LBS

RECOVERED: 2 CMS

CONDITION: GOOD

DESCRIPTION: CLST: DK GY, COMMON LT BRN ANG QTZ SLT AS THIN LAMINAE, ABNT FLAKES OF MUSC, COMMON BLK MICCARBONAC MAT, FIRM, MASSIVE, BLKY-SUBFIS

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 62 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3574M

ROCK TYPE: CLYEY SANDSTONE WITH THIN CLAYSTONE LAMINAE

PULL: 72 LBS

RECOVERED: 2 CMS

CONDITION: GOOD

DESCRIPTION: SST/CLYEY SST: LT GY, SUPERFINE - V F GR, A-SA, MOD PRLY STRD, WITH 10 TO OCC 25% WH CLY MTX, TR CALC, GR TR LT BRN MICA, COMMON CARBONAC MAT AS DISPERSED AND IN THIN LAMINAE (WISPY AND DISCONTINUOUS), SFT AND FRI, VIS POROS 10% WITH I/B

SNDY CLST: DK GY V THIN LAMINAE, COMMON BLK CARBONAC MAT, TRI MICMIC, V SFT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: RARE PALE YELLOW

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 63 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3546.5M

ROCK TYPE: CLAYSTONE WITH CARBONACEOUS LAMINAE

PULL: 1020 LBS

RECOVERED: 2.5 CMS

CONDITION: GOOD

DESCRIPTION: CLST: BRN GY - BRN BLK, TR-COMMON QTZ SLT, TR MICMICA COMMON MICROCARB MAT, FIRM, BLKY-SUBFIS WITH

COAL: BLK, THIN WAVY DISCONTINUOUS LAMINAE, FRIABLE, BLKY, VIT LUSTRE, BITUMINOUS GRADE.

ODOR: NIL

STAIN: NIL

OIL FLUOR: TRACE MODERATE BLUE-WHITE, SPOTTY

MINERAL FLUOR: NIL

UNCRUSHED CUT: CLEAR INSTANT PALE BLUE-WHITE

CRUSHED CUT: CLEAR MOD BLUE-WHITE

CORE NO. 64 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3407.5M

ROCK TYPE: ALTERED BASALT

PULL: 1939 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: ALTERED BASALT - DK GRN GY, ALTERED MOSTLY TO A SFT CLST (TALCOSE IN NATURE) INCL CHLORITES, MINOR LT RED HEMATITIC ALTERNATION, TR F GR BLK OPAQUES, OCC RELICT AMYGDALOIDAL AND INTERGRANULAR TEXTURE, V SFT, BLKY

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 65 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3341M

ROCK TYPE: ALTERED BASALT

PULL: 1939 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: ALTERED BASALT - GN GY, MOSTLY ALTERED TO CLAYS (INCL CHLORITES), TALCOSE IN APPEARANCE, COMMON DISSEM F GR BLK OPAQUES, TR CALC, RELICT OPHITIC - SUBOPHITIC TEXTURE OBSERVED IN PART, FIRM, BLKY

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 66 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3283M

ROCK TYPE: SANDSTONE WITH LAMINAE OF CLAYSTONE

PULL: 205 LBS

RECOVERED: 2.5 CMS

CONDITION: GOOD

DESCRIPTION: SST - LT GY, VF-F GR, A-SA, MOD WELL SRTD, TR-10% WH CLY MTX, PERVASIVE FRACTURING OF QTZ GRS, NO CMT, TR CLR MICMICA, TR-BCMG COMMON CARBONAC MAT, FRI-FIRM, VIS POROS 15%

COALY CLST/COAL LAMINAE - DK GY, INTIMATELY I/B WITH VF GR SST; COAL AS DISCRETE BODIES WITHIN LAMINAE, BLK, SUBVIT-VIT LUSTRE, BITUMINOUS TO SUBBIT RANK.

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: 10% SPOTTY DULL YEELOW-GOLD

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

320093

SIDEWALL CORE DESCRIPTIONS

CORE NO. 67 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3237.5M

ROCK TYPE: CLAYSTONE

PULL: 248 LBS

RECOVERED: 1.5 CMS

CONDITION: GOOD

DESCRIPTION: CLST: OL BLK, TR ANG QTZ SLT, TR CLR MICMICA, GD TR BLK-BRN BLK MICCARBONAC MAT, NONCALC, FIRM, BLKY-SUBFIS

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: VERY VERY PALE BLUE

CRUSHED CUT: VERY PALE BLUE

CORE NO. 68 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3227M

ROCK TYPE: -

PULL: 1993 LBS

RECOVERED: LOST BULLET

CONDITION:

DESCRIPTION:

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

320094

SIDEWALL CORE DESCRIPTIONS

CORE NO. 69 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3214M

ROCK TYPE: SANDSTONE

PULL: 293 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: SST: V LT GY - YEL GY, VF - F GR, A-SA, PROB WELL SRTD, PERVASIVE MICROFRACTURING OF QTZ GRS, TR-5% WH CLY MTX, TR LT BRN CLY MTX, TR CALC CMT, TR CLR MICMICA, TR M GY - DK GY LTHIC OR FELD GRS, V FRI, VIS POROS 20%

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 70 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3202M

ROCK TYPE: CLAYSTONE

PULL: 192 LBS

RECOVERED: 2.5 CMS

CONDITION: GOOD

DESCRIPTION: CLST: DK GY, TR ANG QTZ SLT, TR CLR MICMICA, BLEBS OF WH CLY, COMMON BLK MICROCARBONAC MAT, NONCALC, SFT, MASSIVE, BLKY

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: CLEAR VERY VERY PALE BLUE-WHITE

SIDEWALL CORE DESCRIPTIONS

CORE NO. 71 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3197.5M

ROCK TYPE: SANDSTONE WITH CLAYEY PATCHES

PULL: 663 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: SST: V LT GY - LT GY WITH M GY PATCHES, VF - F GR, A-SA, MOD SRTD, 5-10% WH CLY MTX, (ABUN GRANULATED QTZ AS APPARENT MTX), RARE MICRITIC CMT, TR MGY-M DK GY LTHIC GRS, TR BLK CARBONAC MAT, FRI, WITH PATCHES OF SDY CLST, M LT GY-M GY WITHIN; VIS POROS 15%

ODOR: NIL

STAIN: PATCHY VERY LIGHT BROWN

OIL FLUOR: TRACE PATCHY MODERATE BRIGHT BLUE-GREEN-WHITE

MINERAL FLUOR: NIL

UNCRUSHED CUT: CLEAR VERY PALE BLUE-WHITE

CRUSHED CUT: CLEAR VERY PALE BLUE-WHITE

CORE NO. 72 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3183M

ROCK TYPE: SANDSTONE WITH THIN CLAYSTONE LAMINAE

PULL: 127 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: SST: V LT GY - YELL GY, VF-F GR, A-SA, MOD WELL SRTD, TR - 10% WHT CLY MTX; TR BRN CLY MTX, NONCALC, TR F GR DK GRY FELD AND LTHIC GRS, TR BLK MICROCARB MAT; FRI; VIS POROS 15%, THIN CLST LAM: DK GRY, GRDS TO SST; COMM BLK MICROCARB MAT, V.SFT

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: RARE PINPOINT MODERATE YELLOW

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 73 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3105M

ROCK TYPE: CLAYSTONE

PULL: 156 LBS

RECOVERED: 2.5 CMS

CONDITION: GOOD

DESCRIPTION: CLST: M DK GY - OL GY, COMMON TO ABNT QTZ SLT GRDG TO CLAYEY SLTST IN PT, COMMON BLK MICCARB MAT, TR CLR MICMICA, NONCALC, SFT, BLKY

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 74 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3094M

ROCK TYPE: SANDSTONE

PULL: 354 LBS

RECOVERED: 4 CMS

CONDITION: GOOD

DESCRIPTION: SST: - MOTTLED LT OL GY - YEL GY, VF-F GR, A-SA. MOD-WELL SRTD, WITH 5-10% (MAX.) WH CLY MTX, (ABUN GRANULATED QTZ AS APPARENT MTX), NO CMT, TR M GY-OCC DK GY LITHIC FRAGS, TR BRN BLK MICROCARBONAC FLECKS, FRI-FIRM, VIS POROS 15%

ODOR: NIL

STAIN: PATCHY VERY LIGHT BROWN

OIL FLUOR: 20-25% PATCHY BRIGHT YELLOW-GREEN (IN BETTER QUALITY SANSTONE)

MINERAL FLUOR: NIL

UNCRUSHED CUT: INSTANT, SLOW BLOOMING MODERATE BRIGHT BLUE-WHITE

CRUSHED CUT: MODERATE BRIGHT BLUE-WHITE

SIDEWALL CORE DESCRIPTIONS

CORE NO. 75 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3084M

ROCK TYPE: SST

PULL: 444 LBS

RECOVERED: 2.5 CMS

CONDITION: GOOD

DESCRIPTION: SST: V LT GY, PROB VF-F GR - DIFFICULT TO ESTIMATE GRAIN SIZE DUE TO PERVASIVE FRACTURING OF QTZ GRS, PROB NO MTX, NO CMT, TR MGY-GY BLK LITHIC GS, TR BLK MICROCARB MAT, V FRI, VIS POROS 20%

NOTE: THE EXTREME GRANULATION OF THE GRAINS SUGGESTS LACK OF GRAIN SUPPORT MIX OR CMT AND DIRECTLY IMPLIES GOOD POROSITY AND RESERVIOR CHARACTERISTICS

COAL: UNBANDED, BRN BLK, SUBVIT LUSTRE, BLKY, BITUMINOUS GRAD

ODOR: NIL

STAIN: VERY LIGHT BROWN

OIL FLUOR: 50-60% DULL BLUE-WHITE, EVENLY DISTRIBUTED

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: VERY PALE BLUE-WHITE

CORE NO. 76 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3080M

ROCK TYPE: CLAYSTONE

PULL: 1302 LBS

RECOVERED: 2.5 CMS

CONDITION: GOOD

DESCRIPTION: CLST: M GY, COMMON ANG QTZ SLT, GRDG TO CLAYEY SLTST IN PT, ABNT BLK CARB MAT BCMG, THIN COALY DISCONTINUOUS LAMINAE IN PT, TR CLR MICMICA, NONCALC, FIRM, BLKY-SUBFIS

ODOR: NIL

STAIN: NIL

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: EXTREMELY PALE BLUE

SIDEWALL CORE DESCRIPTIONS

CORE NO. 77 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3074M

ROCK TYPE: SANDSTONE WITH THIN CARBONACEOUS LAMINAE

PULL: 1175 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: SST: V LT GY, VF-F GR, A-SA, MOD WELL SRTD, 5-10% (MAX) WH CLT MTX, (COMMON QTZ GRANULATION), NO CMT, COMMON BRN BLK TO BRN CARBONAC MAT, TR M GY TO GY BLK LITHIC GRS, TR ROSE-COLOURED QTZ, FRI-OCC FIRM, VIS POROS 20%

COAL: BLK, AS THIN DISCONTINUOUS AND WAVY LAMINAE, I/B WITH SST: AS ABOVE AND MINOR OL GY CLST. EARTHY TO VIT LUSTRE, BLKY FRACTURE, BITUMINOUS TO SUB-BITUMINOUS GRADE

ODOR: NIL

STAIN: RARE VERY LIGHT BROWN

OIL FLUOR: RARE PINPOINT MODERATE BRIGHT YELLOW-GOLD

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: CLEAR VERY VERY PALE BLUE-WHITE

CORE NO. 78 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3072.5M

ROCK TYPE: SANDSTONE

PULL: 894 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: SST: V LT GY, SUPERFINE - F GR, A-SA, MOD WELL SRTD, TR-10% WH CLY MTX, NONCALC, RARE CLR MICMICA, RARE MICCARB, TR M DK GY VF GR LITHIC OR FELD GRS, V FRI, VIS POROS 20%

ODOR: NIL

STAIN: TRACE PATCHY LIGHT BROWN

OIL FLUOR: TRACE EVEN PINPOINT DULL ORANGE

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 79 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3068M

ROCK TYPE: -

PULL: 1612 LBS

RECOVERED: LOST BULLET

CONDITION:

DESCRIPTION:

ODOR:

STAIN:

OIL FLUOR:

MINERAL FLUOR:

UNCRUSHED CUT:

CRUSHED CUT:

CORE NO. 80 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3047M

ROCK TYPE: SANDSTONE

PULL: 510 LBS

RECOVERED: 2 CMS

CONDITION: GOOD

DESCRIPTION: SST - V LT GY TO YEL GY, SUPERFINE - F GR, A-SA, MOD WELL SRTD, PERVASIVE FRACTURING OF QTZ GRS. TR - 5% WH CLY MTX, NONCALC, RARE LT BRN MICA, RARE LT-M GY F GR LITHIC OR FELD GRS, FRI-FIRM, VIS POROS 15%

ODOR: NIL

STAIN: TRACE LIGHT OCCASIONALLY MEDIUM BROWN PATCHY

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 81 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3044M

ROCK TYPE: INTERBEDDED SANDSTONE AND CLAYSTONE

PULL: 362 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: SST - LT OL GY, SUPERFINE - F GR, A-SA, PRLY SRTD, 10-20% WH CLY MTX, MINOR MICROFRACTURING OF QTZ GRS, RARE BLK MICCARB, RARE M LT GY F GR FELD GRS, FRI, VIS POROS 10%

CLST: OL GY WITH SUPERFINE WH FLECKS, COMMON BLK MICCARB TR SLT GRS, NONCALC, V FIRM-HD, BLKY

ODOR: NIL

STAIN: EVEN LIGHT OCCASIONALLY DARK BROWN

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 82 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3037M

ROCK TYPE: SANDSTONE

PULL: 1912 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: SST - VLT - LT GY, SUPERFINE - F GR, (SUPERFINE MAY BE PRODUCED BY MICROFRACTURING) A-SA, MOD WELL SRTD, TR -5% WH CLY MTX, PERVASIVE MICROFRACTURING OF SST, TR MGY F GR FELD GRS, FRI, VIS POROS 20%

ODOR: NIL

STAIN: TRACE LIGHT, OCCASIONALLY DARK BROWN, PATCHY

OIL FLUOR: TRACE FINE PINPOINT DULL YELLOW

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

SIDEWALL CORE DESCRIPTIONS

CORE NO. 83 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3031.5M

ROCK TYPE: SANDSTONE

PULL: 2048 LBS

RECOVERED: 3 CMS

CONDITION: GOOD

DESCRIPTION: SST - LT-MED LT GY, SUPERFINE - F GR, A-SA, MOD WELL SRTD, TR-5% WH CLY MTX, COMMON MICRO-FRACTURED QTZ GRS 5-10% CALC CMT, TR DK GRY F GR FELD GRS, RARE MUSC AND BLK CARB MAT, FRI, VIS POROS 15%

ODOR: NIL

STAIN: TRACE LIGHT, OCCASIONALLY DARK BROWN

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

CORE NO. 84 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 3030.4M

ROCK TYPE: SANDSTONE

PULL: 578 LBS

RECOVERED: 1.5 CMS

CONDITION: GOOD

DESCRIPTION: SST - V LT GY, SUPERFINE - F GR, A-SA, MOD WELL SRTD, TR - 5% WH CLY MTX, PERVASIVE MICRO-FRACTURING OF QTZ GRS, NONCALC, TR BLK CARB MAT AND M GY FELD GRS, FIRM, VIS POROS 15%

ODOR: NIL

STAIN: RARE-TRACE MEDIUM TO DARK BROWN

OIL FLUOR: RARE PINPOINT DULL ORANGE

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

320102

SIDEWALL CORE DESCRIPTIONS

CORE NO. 85 SUITE 3 RUN 2 — WELL: TILANA-1

DEPTH: 2994.6M

ROCK TYPE: SANDSTONE

PULL: 434 LBS

RECOVERED: 2 CMS

CONDITION: GOOD

DESCRIPTION: SST - WH TO V LT GY, SUPERFINE - V F GR, V WELL SRTD, A-SA, TR WH CLY MTX, EXTENSIVE MICROFRACTURING AND GRANNULATION OF QTZ GRS. (POSSIBLY PRODUCING SUPERFINE GRAIN SIZE AND WH CLY 'MTX'), NONCALC, TR BLK CARB MAT, RARE-TR CLR AND LT BRN MICA, V FRI, VIS POROS 25%

ODOR: NIL

STAIN: VERY RARE MEDIUM-DARK BROWN

OIL FLUOR: NIL

MINERAL FLUOR: NIL

UNCRUSHED CUT: NIL

CRUSHED CUT: NIL

320103

APPENDIX 3

CONVENTIONAL CORE DESCRIPTIONS

CORES 1,2 AND 3

TILANA-1

320104

5 cm

Amoco Australia Petroleum Company

WELL **TILANA No.1** CORE No. 1 SHEET 1 of 2

CORED 1664·97 - 1682·2 m = 17·23 m RECOVERED 1664·97-1675·77m =10·80m 62·7% SCALE 1:40

FM EASTERN VIEW COAL MEASURES DESCRIBED GMK DATE 25/11/85

CORE RATE METRES PER HR	GRAINSIZE	DEPTH METRES (R T)	LITHOLOGY	HYDROCARBONS	CORE ANALYSIS POR %	AIR PERM (md) Kh	Kv	RES. FLUIDS (%) So	Sw
24 12	CLAY		**FINAL SLABBED CORE DESCRIPTION** TOP OF CUT CORE No.1 1664·97 m						
		1665	1664·97-1669·2m Dom Sst w/ minor Clst lam. Section characterised by faulting & disrupted bedding in the form of distorted bedding, 'floating' blocks of sediment & minor soft sediment deformation.	NO SHOWS FOR ENTIRE CORE	29·3	1430			
					28·3	550			
					27·1	520			
		1666	NOTE: Core plugs were difficult to cut due to faults & fractures. Slickensides present at 1665·6m.		22·9	2·2			
					23·1	7·5			
			Sst : v lt gy, - lt gy, superfine - f gr, mod well srtd, a-sa, 5% silica cmt as qtz overgrowths, rare lt grn mica and dk brn translucent grs (zircon? tourmaline ?) fri-firm, v gd - exc visual porosity.		22·3	2·5			
		1667			21·6	1·3			
					23·7	5·6			
					24·4	6·0			
					25·4	42			
		1668			24·4	4·7			
					26·1	67			
					25·6	9·1			
		1669	1669·2 - 1673·32m Dom lt gy Sst w/ thin discontinous Clst lam; occ horizontal burrow.		26·5	13			
					28·1	30			
					25·6	4·5			
		1670	1670·5 - 1670·9m Highly pyritic - disseminated & occ aggregated.		22·5	1·2			
					28·4	95			
					28·1	340			
					21·9	84			
		1671							
					25·8	16			
					26·9	160			
		1672	Conjugate faults intersecting at 1671·98m						
					27	130			
					32	350			
		1673	1673·32 - 1673·95m i/b Sst & Clst : m gy, highly bioturbated, dom horizontal burrows ; few zones of preserved cross - lamination		28·2	830			
					26·5	9·6			
					25·6	230			
					25·6	210			
		1674	1673·95 - 1674·15 m Dom lt gy Sst w/ thin discontinuous Clst lam.						

5 cm

320105

Amoco Australia Petroleum Company

WELL: **TILANA No. 1** CORE No.: 1 SHEET 2 of 2

CORED: 1664·97-1682·2m = 17·23m RECOVERED: 1664·97-1675·77m = 10·8m 62·7% SCALE: 1:40

FM: EASTERN VIEW COAL MEASURES DESCRIBED: GMK DATE: 25/11/85

CORE RATE METRES PER HR	GRAINSIZE	DEPTH METRES (R T)	LITHOLOGY	HYDROCARBONS	CORE ANALYSIS POR. %	AIR PERM (md) Kh	Kv	RES. FLUIDS (%) So	Sw
24 12	CLAY	1674							
		1675	1674·15 - 1674·95 m Erosional bedding plane surface at 1674·15 m i/b Sst & Clst : highly bioturbated; dk brn gy appearance, mostly horizontal burrows, rarely vertical, no original lamination. 1674·33 m faint parallel inclined lam. 1674·95 - 1675·77 m Dom. v lt gy Sst w/ thin discontinuous Clst lam. Sst : v lt gy, v f gr, v well srtd, sa - sr, up to 10% silica cmt, v good visual porosity, fri - firm w/ Clst : dk gy, finely micro lam, mic carb, v soft. 1675·67 - 1675·69 m med dk - dk gy Clst lam - continuous, distorted w/ small flame and load structures.		28·7 26·9 21·5	750 30 220			
		1676							
		1677	BASE RECOVERED CORE NO. 1 1675·77 m						
		1678							
		1679							
		1680							
		1681							
		1682							
		1683	BASE CUT CORE NO.1 1682·2 m						

320106

Amoco Australia Petroleum Company

WELL: TILANA No. 1 CORE No.: 2 SHEET 1 of 2

CORED: 2788·6 - 2807·45m = 18·85m RECOVERED: 2788·6 - 2807·45m = 18·85m 100% SCALE: 1:40

FM. EASTERN VIEW COAL MEASURES DESCRIBED: GMK DATE: 26/11/85

CORE RATE METRES PER HR	GRAINSIZE	DEPTH METRES (R T)	LITHOLOGY	HYDROCARBONS	CORE ANALYSIS POR. %	AIR PERM. (md) Kh	Kv	RES. FLUIDS (%) So	Sw
24 12	CLAY	2788	FINAL SLABBED CORE DESCRIPTION TOP OF CUT CORE NO. 2 2788·6 m						
		2789	Core consists of 2 megacycles - A point bar sequence consisting of fining upward sands, (typically w/ current ripples & planar cross-beds) culminating in a shaley unit, occasionally w/ evidence of burrowing activity, root casts & isolated thin coaly horizons.	NO SHOWS FOR ENTIRE CORE	15·6	3·8			
					20·9	250			
					23·6	300			
					22·9	245			
		2790	Top of 1st megacycle - 2799·9 m, 2nd at 2788·6 m.		21·3	105			
			2788·6 - 2788·95m Dom Clst i/b w/ vf gr Sst & thin coal: v. finely current rippled & bioturbated; leaf impressions on shale bed surfaces		10·4	0·32			
					16·5	5·4			
		2791	2788·95 - 2789·85 m Dom m gr Sst w/ root casts.		16·6	8·9			
			2789·85 - 2792·2 m Dom Sst w/ thin Clst lam & occ Granule Beds - cross-bedded & current rippled - occ thin coaly horizons. Sst: yel gy, med gr, mod srtd, a - sa, 10-15% wh cly mtx, 5% + silica cmt as qtz overgrowths, rare blk carb specks, hard, fair visual porosity.		18·4	26			
					16·8	15			
					19·3	105			
		2792			18·4	90			
					19·3	99			
			2792·2 - 2793·45m Sst w/ occ qtz granules; few structures.		20·0	24			
		2793			18·2	26			
					16·9	10			
			2793·45 - 2799·25 i/b Sst & Clst w/ Sst dominant, typically cross-bedded & current rippled; occasionally burrowed in lower parts.		17·8	17			
		2794			17·2	15			
					13·4	0·91			
					12·6	0·54			
					14·2	2·2			
		2795			16·6	14			
			2795·6 - 2795·9 m Large scale cross-bedding or parallel bedding.		15·4	0·91			
					11·9	0·17			
		2796			15·9	0·77			
			Sst: v lt gy, v f gr, a - sa, prly srtd, 15 - 20% wh cly mtx, 5% sil cmt as qtz overgrowths, tr dk brn biot flakes, rare blk vit carb mat, v rare dk brn transl zircon, hard, poor visual porosity.		13·6	0·20			
					13·9	0·22			
		2797			15·5	0·50			
					13	0·17			
					15·6	0·99			
					12·2	0·13			
		2798							

5 cm

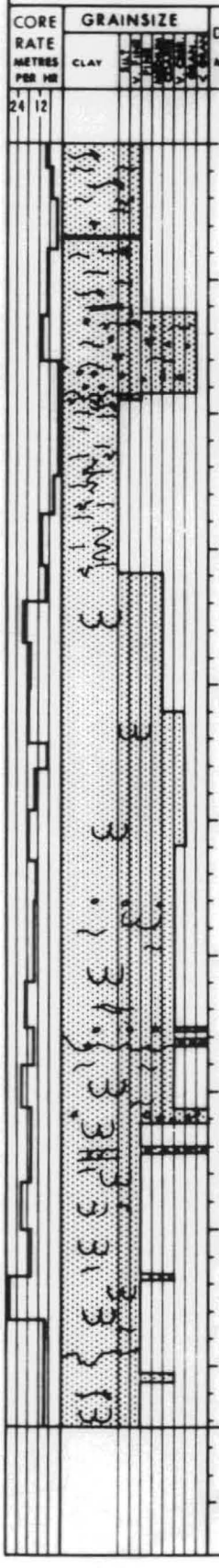
320107

Amoco Australia Petroleum Company

WELL: **TILANA No. 1** CORE No.: 2 SHEET 2 of 2

CORED: 2788·6-2807·45 m = 18·85 m RECOVERED: 2788·6-2807·45m = 18·85m 100% SCALE: 1:40

FM: EASTERN VIEW COAL MEASURES DESCRIBED: GMK DATE: 26/11/85



LITHOLOGY	HYDROCARBONS	CORE ANALYSIS POR. %	AIR PERM. (md) Kh	Kv	RES. FLUIDS (%) So	Sw
2798·7 m: Thin coal band	NO SHOWS FOR ENTIRE CORE	12·9	0·12			
		15·2	0·34			
		11·1	0·04			
		10·3	0·05			
		13·2	7·4			
2799·25 - 2799·9 m Dom Sst: up to grnl size w/ thin Clst lam - minor bioturbation.		12·4	2·4			
2799·9 m Top of 1st point bar cycle. 2799·9 - 2801·2 m i/b Clst & Sst: vf gr, highly bioturbated & churned. Burrows v. small - typically mm's dia & length. Clst: dk gy, tr v f gr qtz sdy, tr blk carb mat, non calc, sub fis, hard.		5·6	0·01			
		6·6	0·14			
2801·2 - 2805·25 m Wholly Sst w/ extr. rare Clst lam		21·3	660			
		21·3	950			
		20·7	955			
		19·9	870			
		22·5	1490			
		22·0	1450			
		9·0	0·95			
		22·5	770			
		19·2	135			
		19·4	115			
		19·3	200			
		18·0	68			
		18·9	145			
2805·15 m Sst: m dk gy w/ dk brn flecks, c - grnl size, v prly srtd, a - sa, 10 - 15% wh cly mtx, tr qtz overgrowths, 5% dk brn biot flakes, tr blk vit carb mat, tr clr musc flakes, fair vis porosity, v firm - hard.		15·7	425			
		16·3	11			
		16·6	12			
2805·25 - 2807·45 m Dom Sst w/ thin wavy to parallel, continuous to discontinuous Clst lam. Sst: v lt gy, v f gr, a - sr, prly srtd w/ 15 - 20% wh cly mtx, 5% sil cmt as qtz overgrowths, tr dk brn biot flakes, tr m gy (clayey) lithic grs, fair vis porosity, v firm - hard.		16·2	6·4			
		17·2	25			
		16	12			
		17·1	19			
		15·8	3·5			
BASE OF CUT & RECOVERED CORE NO. 2 2807·45 m						

5 cm

5 cm

320108

Amoco Australia Petroleum Company

WELL: **TILANA No. 1** CORE No.: 3 SHEET 1 of 1

CORED: 3746·6 - 3752·04m = 5·44m RECOVERED: 3746·6 - 3752·04m 5·44m = 100% SCALE: 1:40

FM: AMYGDALOIDAL BASALT DESCRIBED: GMK DATE: 25/10/85

CORE RATE METRES PER HR	GRAINSIZE (CLAY)	DEPTH METRES (R.T.)	LITHOLOGY	HYDROCARBONS	CORE ANALYSIS POR. %	AIR PERM. (md) Kh	AIR PERM. (md) Kv	RES. FLUIDS (%) So	RES. FLUIDS (%) Sw
2 1		3745							
		3746	TOP OF CUT CORE No.3 3746·6m						
		3747	Calcite to 3747m as part of large fracture fill, then Basalt.	NO SHOWS FOR ENTIRE CORE		NO CORE ANALYSES PERFORMED			
		3748	3748·4m Bcmg amygdaloidal Basalt : v altered, often amygdaloidal & fractured, gy grn - dusky grn, v f gr, relict equigranular texture in part consisting of interlocking feldspar & mafics, typically altered & replaced by chlorites, carbonates & clays, tr py, occ abnt in veins, v hard w/ amygdules - up to 2cms, mostly filled, w/ silica, calcite & chlorite clusters, occ py, w/ fractures & veins - filled w/ carbonate & py. No amygdules below 3750·8m						
		3749							
		3750							
		3751							
		3752							
		3753	BASE OF CUT & RECOVERED CORE 3752·04m						
		3754							
		3755							

320109

APPENDIX 4

DIPMETER SUMMARY

TILANA-1

STRUCTURAL DIP

The Schlumberger high resolution dipmeter tool was run over the intervals 1649-3072 meters and 2850-3900 meters. The data was processed using Schlumberger's CLUSTER PROGRAM. The table below sets out dip magnitude and azimuth for specific depth intervals where the data was considered to be reliable.

DEPTH INTERVAL (Meters)	DIP MAGNITUDE	DIP AZIMUTH
2350-2510	2 - 6 degrees	SW
2510-2550	4 degrees	SW
2550-2590	3 degrees	SW
2590-2645	5 degrees	SW
2645-2750	4 - 5 degrees	SW
2760-2795	5 degrees	SW
2795-2870	3 degrees	SW
2870-2905	3 degrees	WEST
2905-2955	2 degrees	SW
2955-2990	3 degrees	NW
2990-3118	2 degrees	NW
3190-3241	1 degree	SW
3555	6 - 8 degrees	SW
3875	5 - 6 degrees	SW

The dips indicated above are of fairly low magnitude with azimuths generally indicating a westerly structural dip. The 3 degree dip to the west between 2870-2905m may be reflecting depositional dip within a sandstone unit rather than a structural dip. The change in structural dip from southwest to northwest at around 2955 meters may indicate a disconformity between the sediments of uppermost Early Eocene age and Paleocene-aged sediments within the Eastern View Coal Measures.

APPENDIX 5

WIRELINE LOG ANALYSES

TILANA-1

SUMMARY

Based upon hydrocarbon shows while drilling and initial log interpretation, the interval from 3000-3250m was the main zone of interest in the Tilana-1 well. Nineteen RFT's were attempted but only test No.5 was considered valid. D.S.T.'s were conducted at three levels where logs indicated the possibility of recovering hydrocarbons (See Appendix 6 for D.S.T. results).

DISCUSSION

Log Quality

Schlumberger was the logging contractor for Tilana-1. All logs were of acceptable quality with the exception of the Sonic log in Run 1 (80-1661 meters). This log was characterized by extensive noise and cycle skipping.

Interpretation

Logs available over the interval of interest (2850-3902 meters) are shown below.

SURVEY	LOGS
1.	Induction-Spherically Focussed Micro-Spherically Focussed Borehole Compensated Sonic Gamma Ray
2.	Litho-density Compensated Neutron Gamma Ray
3.	Dipmeter
4.	Sidewall Cores
5.	Repeat Formation Tester

The log calculations for the interval of interest are shown in Table 1. Porosities and apparent matrix density were determined from the standard Compensated Neutron-Formation Density crossplot for fresh muds. Water saturations were calculated from the Archie equations (Eq. 1 and 2).

$$Sw = (F\ Rw/Rt)^{**}0.5 \qquad \text{Eq.1}$$

where

F = (Porosity**-2)
Rw = Formation water resistivity
= 0.1
Rt = Induction log resistivity

$$Sxo = (F\ Rmf/Rxo)^{**}0.5 \qquad \text{Eq. 2}$$

where

F = (Porosity**-2)
Rmf= Mud filtrate resistivity
= 0.12
Rxo= Micro-spherical focussed resistivity

Formation water resistivity in the above equation was deduced from the SP curve and resistivity log responses; however, the actual value at formation conditions is unknown. There is some evidence that formation water is fresher with a higher resistivity than that used in the calculations. For example, note the reversed SP at 3045 and 3073 meters. The presence of a 100% water bearing interval is not indicated. As an aid to the interpretation of the results of the logging program, a "cyberlook" log was prepared covering the interval 412-1661m and "global" logs (Enclosure 9) were prepared covering the intervals 1658-3065 and 3065-3900 meters. The global interpretations show various intervals that have indications of residual hydrocarbons. No moveable hydrocarbons are indicated.

Formation Tests

Numerous formation tests (Table 2) were attempted in order to define a pressure gradient and/or recover fluid. The combination of hole size and formation tester limitations prevented effective sampling except in one instance. Test No. 1 was not totally successful due to tool plugging; however, a seal could not be obtained upon retesting and further attempts were abandoned at that level. Test No. 5 was the only successful test in that 4900cc of mud filtrate was recovered after nearly two hours of testing. The poor fluid recovery and pressure response indicated that either the permeability was very low originally, or formation damage resulted from the fluid invasion. Log calculations support the former interpretation.

Amoco Australia Tilana No. 1
Table 1 - Wellsite Log Calculations, October 30, 1986

No.	Depth	RHOB	CNL	MSFL	SFL	ILD	Porosity (N-D)	App. ROMA	SXO[1]	SW[1]
1	2883.0-86.0	2.33	15.0	3.5	3.5	2.5	19.5	2.65	96	100
2	2961.0-62.5	2.38	18.5	6.0	7.0	7.0	19.0	2.70	75	63
3	2993.5-94.5	2.43	14.0	6.0	8.0	8.0	15.5	2.69	93	72
4	3017.5-18.5	2.38	15.0	5.0	7.0	7.0	17.5	2.67	90	68
5	3020.0-21.0	2.45	15.0	5.5	8.5	8.0	15.5	2.70	96	72
6	3036.0-37.0	2.40	19.0	4.5	6.0	6.5	18.5	2.72	90	67
7	3043.5-44.5	2.35	12.0	5.0	7.0	9.5	17.0	2.63	92	60
8	3045.0-47.0	2.33	16.0	5.0	7.0	8.5	19.5	2.66	80	56
9	3068.0-69.0	2.40	13.0	11.0	11.0	8.0	16.0	2.66	68	70
10	3071.5-72.5	2.38	16.0	10.0	10.0	8.5	18.0	2.67	62	60
11	3073.0-74.0	2.32	18.5	6.0	9.0	9.0	21.5	2.67	70	49
12	3075.0-77.0	2.45	15.0	6.5	8.5	8.5	15.0	2.71	92	72
13	3083.5-85.0	2.37	20.0	10.0	9.0	8.0	20.0	2.71	55	56
14	3086.0-87.5	2.46	19.0	6.5	8.5	8.5	17.0	2.73	85	64
15	3093.5-94.5	2.42	16.5	4.5	7.5	7.5	17.0	2.69	95	68
16	3095.0-96.0	2.45	20.0	11.0	9.0	7.0	18.0	2.74	58	66
17	3165.5-66.5	2.51	13.0	10.0	7.5	7.0	12.0	2.72	92	100
18	3169.0-70.0	2.45	13.0	7.0	8.0	10.0	14.0	2.69	95	71
19	3174.5-75.5	2.47	12.0	12.0	9.0	6.5	13.0	2.69	95	95
20	3179.0-80.0	2.45	14.0	6.0	9.0	9.0	14.5	2.70	99	73
21	3182.0-84.0	2.42	10.5	5.0	10.0	10.0	14.5	2.66	100	100
22	3197.0-98.0	2.46	12.0	8.0	11.0	10.0	13.5	2.69	92	74
23	3213.5-16.0	2.45	15.0	10.0	17.0	17.0	15.0	2.70	75	51
24	3226.0-27.5	2.45	16.5	4.0	15.0	15.0	16.0	2.72	100	51

[1] Water saturations based upon a=1, m=n=2, Rw=0.10, Rmf=0.12

320115
CONFIDENTIAL
CLASS 1

Amoco Australia Tilana No. 1
Table 2 - Repeat Formation Tester Results

Test No.	Depth (m)	Initial* Hydrostatic	Final Flowing	Buildup	Final Hydrost.	Temp. °C	Remarks
1	2884	4957	4291		4946	112.5	Tool Plugging
1A	2884	4945					No Seal
2	2966.5	5103					No Seal
2A	2966.7	5096					No Seal
2B	2966.2	5090			5088	115.6	Seal Failure
3	3020.5	5209				116.4	No Seal
3A	3020.4	5189					Seal Failure
4	3045.5	5251				117.3	No Seal
4A	3045.4	5210					No Seal
4B	3044.0	5197					No Seal
4C	3040.0	5204					No Seal
5	3072	5276		4412	5234		Rec 4900CC Mud Filtrate Res 0.738 Ohm-m @ 71°F 140 ppm nitrates
6	3183	5437				119.8	No Seal
6A	3182.5	5438					No Seal
7	3215	5518					No Seal
7A	3214.5	5507					No Seal
8	3226.5	5529					Seal Failure
8A	3226.5	5522					Seal Failure
8B	3226.4	5513					Seal Failure

* Hydrostatic pressures influenced by fluid being pumped into hole while running tester.

APPENDIX 6

DRILLSTEM TEST RESULTS

TILANA-1

INTRODUCTION

During drilling, a number of minor hydrocarbon shows were recorded within the depth interval 3000 - 3200 meters. After running and evaluating the Schlumberger wire-line logs it was decided to conduct drillstem tests over the following intervals; 3179 - 3185 meters, 3071 - 3075 meters and 3042 - 3048 meters. The recovery of gas samples during the testing indicates that there was communication with the formation through the perforations. However, all three drillstem tests were unable to establish flow of formation fluid to the surface.

DRILLSTEM TEST DATA SUMMARY

The pressure information recorded during DST No. 1A (3179-3185 meters) indicates an initial reservoir pressure of 4783 psia at 3182 meters. The pressure gradient corresponding to that pressure is 0.458 psia/ft or 8.8 lb/gal.

Representative formation water samples or formation fluid samples were not obtained due to the lack of flow in any of the DST's. Determination of Rw and the fluid composition of the reservoir is not possible.

Gas samples were retrieved during DST No. 2B. Analysis of these samples indicate a methane rich gas with a gravity of .74 and a gross heating value of approximately 1100 BTU per cubic foot of dry gas. These gas samples give an indication of the quality of the gas present over the DST intervals but cannot be interpreted as representative of the reservoir fluid considering the lack of flow during the drillstem test.

TEST PROCEDURE AND EQUIPMENT

The test procedure and sequence of events for each drillstem test was similar. Through-tubing perforating with 2.125" Enerjet guns was utilized for all perforations. First, all test tools were rabbited and internal diameters checked. Then the drillstem test string was run in the hole.

The DST string consisted of a tailpipe section, a packer, a safety joint to back off the packer if necessary, an hydraulic circulating valve, a bundle carrier with mechanical gauges, an hydraulic jar, an LPR-N tester valve, an APR-M2 circulating safety valve and reversing valve, an APR-A reversing valve, slip joints, a safety valve, and a surface readout nipple. Drill collars and 5.5" drill pipe completed the assembly.

The DST assembly was run in the hole and filled with enough water to provide an underbalance while perforating of between 1000 psia and 1750 psia. After pressure testing the fluid filled portion of the DST string and attaching the landing string, the packer was set. At this time all surface equipment was pressure tested and hooked up.

The LPR-N tester valve was opened and a 2.125" gauge cutter was run on slick line to ensure the tester valve was properly open. At this time, Schlumberger BOP's and lubricator with 2.125" Enerjet guns were rigged up and pressure tested. The guns were then run to depth and correlated and fired, with the well on a 1/4" choke.

The determination of reservoir parameters of Kh, skin boundaries and changes of these parameters within the radius of investigation of the tests is not possible due to the lack of flow during all drillstem tests. The attached Otis Well Test Reports and Halliburton Test Reports document the rate and pressure data collected during the tests.

Limited well productivity was evidenced by the total rise in the fluid level during DST No. 2B. The fluid level increased 752 meters over a period of 36 hours. The volume of the fluid entering the wellbore was 43.8 barrels. The average rate of influx was 1.2 barrels per hour.

DRILLSTEM TEST DATA

DST No. 1A - Perforated: 3179-3185 meters
Misrun due to loss of annulus pressure upon perforating.

Immediately upon perforating the test interval, the APR-M2 circulating valve opened establishing communication between the annulus and the test string above the LPR-N Tester Valve. The loss of annulus pressure caused the LPR-N tester valve to close, shutting in the test interval and allowing the pressure to build. Analysis of the pressure data after the LPR-N valve closed indicated a reservoir pressure of 4783 psia.

DST No. 1B - Open Perforations: 3179-3185 meters
Misrun due to LPR-N tester valve malfunction.

After rerunning the test string, 1550 psia pressure was applied to the annulus to try to open the LPR-N tester valve but without success. The LPR-N was set to open at 1200 psia annulus pressure. Attempted to open LPR-N by rocking annulus pressure from 200-1800 psia with no success. Pressured slowly up to 2000 psia sheared APR-A tool and reversed out. The LPR-N tester valve was tested at the surface and worked properly. The cause of the failure was not evident from inspection of the LPR-N tester valve.

DST No. 1C - Reperforated: 3179-3185 meters
No indication of flow after reperforating.

After rerunning the test string, the LPR-N tester valve was opened. A very weak intermittent blow was observed. Reperforated 3179-3185 meters with no blow at surface. Ran pressure gradient survey and tandem bottomhole samplers and retrieved two bottomhole samples from 2286 meters. The sampling depth was the depth of least gradient where gas would most likely be sampled. However, upon opening one of the samples at the wellsite no gas was present. The second sample was sent to Core Laboratories for fluid analysis. Subsequently the Core Lab results confirmed the wellsite observations that the completion fluid sampled contained no gas. After sampling, the DST string was pulled and an EZSV retainer was set at 3176 meters and the perforations were cement squeezed.

DST No. 2A - No perforations open
Perforating guns stuck in test string.

While tripping in to perforate, the perforating guns stuck at 2861 meters and while trying to pull free the wireline pulled out of the rope socket. Fishing efforts were unsuccessful and the test string was pulled.

DST No. 2B - Perforated: 3071-3075 meters
Perforated: 3042-3048 meters
No flow to surface, minimal indication of flow downhole.

Perforated 3071-3075 meters with no immediate indication of flow at the surface. Ran Schlumberger Production Logging Tool with intermittent weak blow. Perforated 3042-3048 meters with no immediate indication of flow at the surface. Intermittent weak blow at the surface was later observed. Ran pressure gradient survey and bottomhole samplers and retrieved three bottomhole samples across the perforated intervals.

The following samples were obtained. Sample No. 280 was sampled at a depth of 3045 meters and Sample No. 281 was sampled at a depth of 3073 meters. Sample No. 279 was sampled at 3072 meters and analyzed at the wellsite. After bottomhole sampling was completed the test string was reversed out and returns were monitored and sampled.

Core Laboratories analyses of the gas in samples 280 and 281 are tabulated below.

DEPTH (M)	GAS GRAVITY	BTU CONTENT	METHANE MOL %	ETHANE MOL %	PROPANE MOL %	NIT MOL %
3045	.735	1045	80.04	4.81	2.71	1.43
3073	.741	1198	79.67	6.32	3.93	5.89

No oil or condensate was recovered from either sample.

The wellsite analysis of Sample No. 279 indicated a gas similar in composition to that of Sample No. 281.

CORE LABORATORIES
Petroleum Reservoir Engineering

320120

Page : 1 of 5
File : AFL 85076
Well : Tilana #1

WATER ANALYSIS - BOTTOM HOLE SAMPLER #280

CHEMICAL COMPOSITION

Cations		Mg/L	Me/L
Calcium	(Ca)	45.0	2.25
Magnesium	(Mg)	12.0	0.987
Sodium	(Na)	2590	113
Potassium	(K)	70.0	1.79
Anions		**Mg/L**	**Me/L**
Hydroxide	(OH)		
Carbonate	(CO3)		
Bicarbonate	(HCO3)	4930	80.8
Sulphate	(SO4)	680	14.2
Chloride	(Cl)	1710	48.2
Nitrate	(NO3)	100	1.61

TOTALS AND BALANCE

Cations (Me/L) 118 Diff = 27.1
Anions (Me/L) 145 Sum = 262

Diff*100./Sum = 10.3%

Sodium / Total Cation Ratio = 95.7%

Remarks
Imbalance due to presence of iron, boron and traces.

DERIVED DATA

Total Dissolved Solids	Mg/L
A. Based on E.C.	6090
B. Calculated (HCO3=CO3)	7630
Total Hardness	162
Carbonate hardness	162
Non-Carbonate Hardness	
Total Alkalinity (Each as CaCO3)	4040

UNITS

Reaction - PH	7.5
Conductivity (E.C.)	
Micro-S/Cm at 25°C	10000
Resistivity OHM/M at 25°C	1.00

N.B. Mg/L = Milligrams per litre
Me/L = Milliequivs per litre

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgement of Core Laboratories, Inc. (all errors and omissions excepted), but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES
Petroleum Reservoir Engineering

WATER ANALYSIS - BOTTOM HOLE SAMPLER #281

CHEMICAL COMPOSITION

Cations		Mg/L	Me/L
Calcium	(Ca)	40.0	2.00
Magnesium	(Mg)	53.0	4.36
Sodium	(Na)	2470	107
Potassium	(K)	51.0	1.56
Anions		**Mg/L**	**Me/L**
Hydroxide	(OH)		
Carbonate	(CO3)	524	17.5
Bicarbonate	(HCO3)	3520	57.7
Sulphate	(SO4)	660	13.7
Chloride	(Cl)	2500	70.5
Nitrate	(NO3)	98.0	1.58

TOTALS AND BALANCE

Cations (Me/L) 115 Diff = 45.7
Anions (Me/L) 161 Sum = 276

Diff*100./Sum = 16.5%

Sodium / Total Cation Ratio = 93.1%

Remarks
Imbalance due to presence of iron, aluminium and traces.

DERIVED DATA

Total Dissolved Solids	Mg/L
A. Based on E.C.	7360
B. Calculated (HCO3=CO3)	8140
Total Hardness	318
Carbonate hardness	318
Non-Carbonate Hardness	
Total Alkalinity (Each as CaCO3)	3760

UNITS

Reaction - PH	9.2
Conductivity (E.C.)	
Micro-S/Cm at 25°C	11900
Resistivity OHM/M at 25°C	0.840

N.B. Mg/L = Milligrams per litre
Me/L = Milliequivs per litre

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgement of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

320122

CORE LABORATORIES
Petroleum Reservoir Engineering

File : AFL 85076
Well : Tilana #1

WATER ANALYSIS - CYLINDER #OBHS 29

CHEMICAL COMPOSITION

Cations		Mg/L	Me/L
Calcium	(Ca)	390	19.5
Magnesium	(Mg)	1300	107
Sodium	(Na)	11700	509
Potassium	(K)	330	8.44
Anions		**Mg/L**	**Me/L**
Hydroxide	(OH)		
Carbonate	(CO3)	24.2	0.805
Bicarbonate	(HCO3)	119	1.95
Sulphate	(SO4)	2900	60.4
Chloride	(Cl)	19700	557
Nitrate	(NO3)	2.3	0.037

TOTALS AND BALANCE

Cations (Me/L) 644 Diff = 24.0
Anions (Me/L) 620 Sum = 1260

Diff*100./Sum = 1.90%

Sodium / Total Cation Ratio = 79.1%

Remarks

DERIVED DATA

Total Dissolved Solids	Mg/L
A. Based on E.C.	37500
B. Calculated (HCO3=CO3)	36400
Total Hardness	6320
Carbonate hardness	97.6
Non-Carbonate Hardness	6230
Total Alkalinity (Each as CaCO3)	138

UNITS

Reaction - PH	8.6
Conductivity (E.C.)	
Micro-S/Cm at 25°C	47000
Resistivity OHM/M at 25°C	0.213

N.B. Mg/L = Milligrams per litre
Me/L = Milliequivs per litre

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgement of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES
Petroleum Reservoir Engineering

File : AFL 85076
Well : Tilana #1

HYDROCARBON ANALYSIS OF GAS SAMPLE

Test Cylinder #: 280

Component	Mol Percent	GPM
Hydrogen Sulphide	0.00	
Carbon Dioxide	8.86	
Nitrogen	1.43	
Methane	80.04	
Ethane	4.81	1.283
Propane	2.71	0.744
iso-Butane	0.60	0.196
n-Butane	0.65	0.204
iso-Pentane	0.23	0.084
n-Pentane	0.19	0.069
Hexanes	0.11	0.045
Heptanes plus	0.37	0.168
	100.00	2.793

Gas gravity (Air = 1.000): 0.735

Gross heating value (BTU per cubic foot of dry gas @ 14.696 psia and 60°F): 1045

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgement of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

HYDROCARBON ANALYSIS OF GAS SAMPLE

Test Cylinder #: 281

Component	Mol Percent	GPM
Hydrogen Sulphide	0.00	
Carbon Dioxide	0.19	
Nitrogen	5.89	
Methane	79.67	
Ethane	6.32	1.686
Propane	3.93	1.079
iso-Butane	0.75	0.245
n-Butane	0.84	0.264
iso-Pentane	0.19	0.069
n-Pentane	0.13	0.047
Hexanes	0.02	0.008
Heptanes plus	2.07	0.937
	100.00	4.335

Gas gravity (Air = 1.000): 0.741

Gross heating value (BTU per cubic foot of dry gas @ 14.696 psia and 60°F): 1198

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgement of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

320125

TEST OBJECTIVE

The test objective for **TILANA #1** was to conduct drill stem tests on the zones specified by the representative of **AMOCO AUSTRALIA PETROLEUM COMPANY** encompassing the following:-

1. To determine the initial reservoir pressure.

2. To determine reservoir parameters of Kh, skin, boundaries and changes in these parameters within the radius of investigation of the test.

3. To obtain representative water samples, if produced, to determine Rw and composition. Other tests may also be conducted on the sample.

4. To determine well productivity.

5. To compile an Otis computerised Well Test Report.

TEST NO.	INTERVAL	FORMATION	THICKNESS
1	3179 - 3185 METRES	SANDSTONE	6 METRES
2	3179 - 3185 METRES	SANDSTONE	6 METRES
3	3179 - 3185 METRES	SANDSTONE	6 METRES
4	3071 - 3075 METRES	SANDSTONE	4 METRES

DESCRIPTION OF OPERATIONS

COMPANY	: AMOCO AUSTRALIA PETROLEUM CO.
WELL	: TILANA #1
DST NO.	: 2
FORMATION	: SANDSTONE
INTERVAL TESTED	: 3179 - 3185 METRES
DATE	: 12TH NOVEMBER 1985

****

DST #2 is a re-run of DST #1.
The test string was run in the hole and displaced with 129 bbls of salt water.

At 0800 hours pressure was applied to the annulus to open the LPR-N valve. There was no indication at the bubble hose that the valve had opened.
The annulus was bled down and pressurized several times with still no positive indication of the LPR valve opening.

The Otis DHSIT and H.P. gauge were rigged up and run in the hole to determine the fluid depth.
After establising the fluid level had not changed the DHSIT and H.P. gauge were rigged down.

A CCL was run in the hole but was unable to pass 10,220 feet by wireline measurement indicating the LPR-N valve was still closed.
The CCL was rigged down and annulus pressure was bled off and then re-applied numerous times in an attempt to open the LPR-N.

With no positive indication to show the LPR-N valve was open the annulus pressure was increased to 2000 PSI which activated the APR-N valve resulting in the test string being reverse circulated, ending DST #2.

DESCRIPTION OF OPERATIONS

COMPANY	: AMOCO AUSTRALIA PETROLEUM CO.
WELL	: TILANA #1
DST NO.	: 4
FORMATION	: SANDSTONE
INTERVAL TESTED	: 3071 - 3075 METRES
DATE	: 19TH - 20TH NOVEMBER 1985

****

The test string was run in the hole and displaced with 99 bbls of salt water.

At 0654 hours the zone was perforated using 2-1/8inch enerjet guns 4 S.P.F. at 0° phasing, but with no indication at the bubble hose that the well was flowing.
After rigging down the spent perforating guns Schlumberger run in the hole with their Production Logging Tool.

The P.L.T. was pulled out of the hole and perforating guns run in but were unable to pass 2855 metres which indicated the guns were meeting a restriction round about the S.R.O. nipple.

The perforating guns were pulled to the surface and on close inspection sharp edges were noticed on a few of the bottom charges. These were filed down and the guns were run to depth without any problems.

At 2143 hours the 3042 - 3048 metres zone was perforated with no positive indication at the bubble hose the well was flowing.
The spent perforating guns were rigged down and the Otis lubricator rigged up and a bottom hole sampler, H.P. gauge and a CCL were run in the hole.
A bottom hole sample was taken at 10,080 feet and when opened at surface contained a slightly gaseous mud.

After conducting a gradient survey tandem bottom hole samplers, H.P. gauge and CCL were run in the hole and samples obtained across each set of perforations.

The Otis lubricator was rigged down and the test string reverse circulated, ending DST #4 and the testing programme for Tilana #1.

UE... OPE...ONS

OEC-872-1-B-SIN

TEST NUMBER	RIG NAME	PAGE	OF
DST#1-4	DIAMOND M. EPOCH	1	7

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
MR. JOE GUILLERY / RICHARD BYHAM	TONY WOOLHAM

DATE	TIME	OPERATIONS
03NOV85		A.WOOLHAM DEPARTED PERTH. OVERNIGHT IN DEVONPORT
04NOV85		H.THOMAS DEPARTED SALE FOR DEVONPORT. WOOLHAM AND THOMAS ARRIVED ON BOARD RIG
		STARTED CHECK-OUT P.T. EQUIPMENT. CHAN AND WONG DEPARTED SINGAPORE
05NOV85		CHAN AND WONG ARRIVED ON BOARD RIG
		PRESSURE TESTED SUBSEA TEST TREE / SUBSEA LUBRICATOR VALVE / SURFACE TEST TREE
		AND CHOKE MANIFOLD TO 5000 PSI - O.K. SWING OUT BOOMS AND SECURE
		STARTED LAYING PIPEWORK TO BOOMS.
		HOOKED UP ELECTRIC TO TRANSFER PUMP AND TEST - O.K.
06NOV85		CONTINUED LAYING PIPEWORK.
		HOOKED UP ELECTRIC TO DIESEL BURNER AND TEST - O.K.
07NOV85	0020	PICKED UP SUBSEA TEST TREE TO RIG FLOOR AND TORQUED UP JOINTS
	0115	SUBSEA TEST TREE RUN IN HOLE FOR SPACE OUT
	0210	PICKED UP SUBSEA LUBRICATOR VALVE / TORQUED UP JOINTS AND RUN IN HOLE
	0230	FLUTED HANGER LANDED OFF IN WEAR BUSHING
		UNABLE TO CLOSE RAMS ON SLICK JT. STARTED TO PULL LANDING STRING OUT OF HOLE
	0310	RE-ADJUSTED FLUTED HANGER AND RUN SUBSEA TEST TREE IN HOLE
	0330	SUBSEA LUBRICATOR VALVE RUN IN HOLE
	0400	CLOSED RAMS ON SLICK JOINT - O.K.
	0410	CLOSED BALLS ON SUBSEA TEST TREE AND PRESSURE TESTED TO 3000 PSI - O.K.

320128

SEQUENCE OF OPERATIONS

OEC-872-1-B-SIN

TEST NUMBER	RIG NAME	PAGE	OF
DST#1-4	DIAMOND M.EPOCH	2	7

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
MR. JOE GUILLERY / RICHARD BYHAM	TONY WOOLHAM

	DATE	TIME	OPERATIONS
1	07NOV85	0420	OPENED BALLS ON SUBSEA TEST TREE / PUMPED CLOSE BALL ON SUBSEA LUBRICATOR V/V
2			AND PRESSURE TESTED TO 3000 PSI - O.K.
3		0510	BREAK OUT SUBSEA LUBRICATOR VALVE AND STAND BACK IN DERRICK
4		0535	BREAK OUT SUBSEA TEST TREE AND STAND BACK IN DERRICK
5			COMPLETED RIG IN OF FLOWLINES
6			PRESSURE TESTED HEATER VALVES TO 5000 PSI - O.K.
7			PRESSURE TESTED GAS - OIL DIVERTOR VALVES / SEPARATOR BODY / SEPARATOR INLET -
8			BYPASSED VALVES. TANK INLET - BYPASSED VALVES AND OIL AND GAS FLOWLINES TO
9			1000 PSI - O.K.
10	08NOV85	0145	PICKED UP SUBSEA TEST TREE AND RUN IN HOLE
11		0300	PICKED UP SUBSEA LUBRICATOR VALVE AND RUN IN HOLE
12		0335	PICKED UP SURFACE TEST TREE AND MADE UP TO TEST STRING
13		0430	RIGGED UP SURFACE FLOWLINES
14		0630	PRESSURE TESTED SURFACE FLOWLINES AGAINST HEATER VALVES TO 5000 PSI - O.K.
15		0700	2-1/8 INCH GAUGE CUTTER RUN IN HOLE
16			GAUGE CUTTER AND VARIOUS SCHLUMBERGER TOOLS UNABLE TO PASS 3038 METRES
17		1600	BREAK OUT SURFACE FLOWLINES
18		1645	BREAK OUT SURFACE TEST TREE AND LAID DOWN
19		1725	BREAK OUT SUBSEA LUBRICATOR VALVE AND STAND BACK IN DERRICK

320139

SEQUENCE OF OPERATIONS

OEC-872-1-B-SIN

TEST NUMBER	RIG NAME	PAGE	OF
DST#1-4	DIAMOND M.EPOCH	3	7

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
MR. JOE GUILLERY / RICHARD BYHAM	TONY WOOLHAM

	DATE	TIME	OPERATIONS
1	08NOV85	1745	BREAK OUT SUBSEA TEST TREE AND STAND BACK IN DERRICK
2		2000	PRESSURE TESTED SURFACE TEST TREE TO 5000 PSI - O.K.
3	09NOV85		RIGGED IN NEW HANDRAILS ON BOTH BOOMS. FLUSHED THROUGH WATER LINES TO BURNERS
4		2330	PICKED UP SUBSEA TEST TREE AND RUN IN HOLE
5	10NOV85	0005	PICKED UP SUBSEA LUBRICATOR VALVE AND RUN IN HOLE
6		0015	MADE UP SURFACE TEST TREE TO TEST STRING
7		0045	PRESSURE TESTED SURFACE FLOWLINES TO 5000 PSI - O.K.
8		0145	2.125 INCH BLIND BOX RUN IN HOLE UNABLE TO PASS
9		0400	2-INCH GAUGE CUTTER RUN IN HOLE AND JARRED UP RESTRICTION
10		0630	SCHLUMBERGER STARTED TO RIG UP
11		0740	PRESSURE TESTED LUBRICATOR
12		0900	PERFORATING GUNS RUN IN HOLE
13		1225	SCHLUMBERGER UNABLE TO CORRELATE. STARTED PULLING GUN OUT OF HOLE
14		1340	SCHLUMBERGER RUN IN HOLE WITH GAMMA RAY / CASING COLLAR LOCATOR
15		1435	SCHLUMBERGER PULLED OUT OF HOLE WITH GAMMA RAY AND CCL
16		1710	SCHLUMBERGER RUN IN HOLE WITH GAMMA RAY AND CCL
17		2010	SCHLUMBERGER PULLED OUT OF HOLE WITH GAMMA RAY AND CCL
18	11NOV85	0315	SCHLUMBERGER RIGGED UP PERFORATION TOOL
19		0345	SCHLUMBERGER RUN IN HOLE WITH GUN

320130

SUBSEA OPERATIONS

OEC-872-1-B-SIN

TEST NUMBER	RIG NAME	PAGE	OF
DST#1-4	DIAMOND M.EPOCH	4	7

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
MR. JOE GUILLERY / RICHARD BYHAM	TONY WOOLHAM

	DATE	TIME	OPERATIONS
1	11NOV85	0534	SCHLUMBERGER PERFORATED WELL. STARTED DST #1 (REFER FIELD RDGS. FOR DATA)
2		0955	DST #1 - A MISRUN. TEST STRING REVERSE CIRCULATED
3		1025	RIGGED DOWN SURFACE FLOWLINES
4		1040	LAID DOWN SURFACE TEST TREE
5		1110	BREAK OUT SUBSEA LUBRICATOR VALVE AND STAND BACK IN DERRICK
6		1125	BREAK OUT SUBSEA TEST TREE AND STAND BACK IN DERRICK
7			PRESSURE TESTED SURFACE TEST TREE TO 5000 PSI - O.K.
8	12NOV85	0445	PICKED UP SUBSEA TEST TREE AND RUN IN HOLE FOR DST #2
9		0510	PICKED UP SUBSEA LUBRICATOR VALVE AND RUN IN HOLE
10		0530	PICKED UP SURFACE TEST TREE AND MADE UP TO TEST STRING
11		0745	MADE UP SURFACE FLOWLINES AND PRESSURE TESTED TO 5000 PSI - O.K.
12			STARTED DST #2 (REFER FIELD READINGS FOR FURTHER DATA)
13		1320	DST #2 - A MISRUN. REVERSED CIRCULATE WATER CUSHION
14			LAID DOWN SURFACE TEST TREE
15			BREAK OUT SUBSEA LUBRICATOR VALVE AND STAND BACK IN DERRICK
16			BREAK OUT SUBSEA TEST TREE AND STAND BACK IN DERRICK
17			BREAK OUT SURFACE TEST TREE AND LAID DOWN
18			GENERAL MAINTENANCE OF P.T. EQUIPMENT
19	13NOV85	0945	PICKED UP SUBSEA TEST TREE AND RUN IN HOLE

320131

QUE OF OF TIONS

OEC-872-1-B-SIN

TEST NUMBER	RIG NAME	PAGE	OF
DST#1-4	DIAMOND M.EPOCH	5	7

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
MR. JOE GUILLERY / RICHARD BYHAM	TONY WOOLHAM

	DATE	TIME	OPERATIONS
1	13NOV85	1000	PICKED UP SUBSEA LUBRICATOR VALVE AND RUN IN HOLE
2		1015	PICKED UP SURFACE TEST TREE AND MADE UP TO TEST STRING
3		1025	RIGGED UP SURFACE FLOWLINES TO 5000 PSI - O.K.
4		1105	PRESSURED UP ON ANNULUS TO OPEN LPR FOR DST #3 (REFER FIELD RDGS. FOR DATA)
5	14NOV85	2240	TEST STRING REVERSE CIRCULATED ENDING DST #3
6	15NOV85	0210	BREAK OUT AND LAY DOWN SURFACE TEST TREE
7		0240	BREAK OUT SUBSEA LUBRICATOR VALVE AND STAND BACK IN DERRICK
8		0300	BREAK OUT SUBSEA TEST TREE AND STAND BACK IN DERRICK
9		1500	PRESSURE TESTED SURFACE TEST TREE TO 5000 PSI - O.K.
10			GENERAL MAINTENANCE OF P.T. EQUIPMENT
11	16NOV85		GENERAL MAINTENANCE OF P.T. EQUIPMENT
12	17NOV85	0245	PICKED UP SUBSEA TEST TREE AND RUN IN HOLE
13		0330	PICKED UP SUBSEA LUBRICATOR VALVE AND RUN IN HOLE
14		0400	PICKED UP SURFACE TEST TREE AND MADE UP TO TEST STRING
15		0540	WIRELINE GAUGE CUTTER RUN IN HOLE TO 3000 METRES
16		0800	STARTED RIGGING UP SCHLUMBERGER LUBRICATOR
17		0940	PRESSURE TESTED SURFACE EQUIPMENT TO 5000 PSI - O.K.
18		1035	PUMPED CLOSE SUBSEA LUBRICATOR VALVE. PERFORATING GUNS RUN IN HOLE
19		1105	PUMPED OPEN SUBSEA LUBRICATOR VALVE

3201132

SEQUENCE OF OPERATIONS

OEC-872-1-B-SIN

TEST NUMBER	RIG NAME	PAGE	OF
DST#1-4	DIAMOND M. EPOCH	6	7

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
MR. JOE GUILLERY / RICHARD BYHAM	TONY WOOLHAM

	DATE	TIME	OPERATIONS
1	17NOV85	1155	PERFORATING GUNS STUCK IN HOLE. PULLED OUT FROM ROPE SOCKET.
2			STARTED PULLING GUN OUT OF HOLE
3		1350	OTIS WIRELINE RUN IN HOLE WITH FISHING TOOL
4		2130	OTIS WIRELINE UNABLE TO RETRIEVE PERFORATING GUNS
5		2330	RIGGED DOWN SURFACE TEST TREE
6	18NOV85	0005	BREAK OUT SUBSEA LUBRICATOR VALVE AND STAND BACK IN DERRICK
7		0030	BREAK OUT SUBSEA TEST TREE AND STAND BACK IN DERRICK.
8			GENERAL MAINTENANCE OF P.T. EQUIPMENT
9		2230	PICKED UP SUBSEA TEST TREE AND RUN IN HOLE
10		2300	PICKED UP SUBSEA LUBRICATOR VALVE AND RUN IN HOLE
11		2330	PICKED UP SURFACE TEST TREE AND MADE UP TO TEST STRING
12		2345	WIRELINE RUN IN HOLE WITH GAUGE CUTTER
13	19NOV85	0100	WIRELINE GAUGE CUTTER RUN TO DEPTH
14		0135	RIGGED UP SCHLUMBERGER LUBRICATOR
15		0300	PRESSURE TESTED SURFACE EQUIPMENT TO 5000 PSI - O.K.
16		0430	RIGGED UP PERFORATING GUNS AND RUN IN HOLE
17		0654	ZONE PERFORATED. STARTED DST #4 (REFER FIELD READINGS FOR FURTHER DATA)
18	20NOV85	1730	TEST STRING REVERSE CIRCULATED ENDING DST #4 / RIGGED DOWN SURFACE TEST TREE
19			BREAK OUT SUBSEA LUBRICATOR VALVE / SUBSEA TEST TREE / SURFACE FLOWLINES

3201-33

SEQUENCE OF OPERATIONS

OEC-872-1-B-SIN

TEST NUMBER	RIG NAME	PAGE	OF
DST#1-4	DIAMOND M.EPOCH	7	7

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
MR. JOE GUILLERY / RICHARD BYHAM	TONY WOOLHAM

DATE	TIME	OPERATIONS
21NOV85		CONTINUED RIG DOWN OF ALL P.T. EQUIPMENT FOR SHIPMENT TO HOBART
		CHAN / WONG AND THOMAS DEPARTED RIG
22NOV85		A.WOOLHAM OFFLOADED ALL TEST EQUIPMENT AND DEPARTED RIG FOR PERTH
		CHAN AND WONG DEPARTED MELBOURNE FOR SINGAPORE

320134

TEST STRING

TEST NUMBER	RIG NAME	DATE (DAY MO. YR.)	PAGE	OF
DST#1	DIAMOND M.EPOCH	10NOV85	1	1

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

TOP OF HOLE	DEPTH (FEET)		DEPTH M	KB ELEVATION (FT)	GROUND ELEV./WATER DEPTH (FEET)	REFERENCE ELEV.	MUD WT. (LBS./FT.)	INTERVAL TESTED (FEET)
				67	267	KB	-	3179-3185M

	ITEM #	DESCRIPTION	OUTSIDE DIAMETER (INCHES)	INSIDE DIAMETER (INCHES)	LENGTH M
	1	OTIS SURFACE TREE			
	2	XO 4-3/8 6STUB ACB X 4.5 IF P.	6.250	2.880	
	3	5-INCH DRILLPIPE	6.250	4.276	28.36
	4	XO 4.5 IF B. X 4.5 4STUB ACP.	6.250	2.880	0.37
	5	OTIS SUBSEA LUBRICATOR VALVE	10.750	2.880	1.62
	6	XO 4.5 4STUB ACB. X 4.5 IF PIN	6.250	2.880	0.20
	7	5-INCH DRILLPIPE	6.250	4.276	69.77
	8	XO 4.5 IF B. X 4.5 4STUB ACP.	6.500	2.880	1.10
	9	OTIS SUBSEA TEST TREE	10.750	2.880	4.42
	10	XO 4.5 4STUB ACB. X 4.5 IF PIN	6.500	2.880	0.55
	11	5-INCH DRILLPIPE 103 STANDS	6.250	4.276	2888.08
	12	XO 4-1/2 IF BOX /3-1/2 PH6 PIN	6.250	2.750	0.31
2991.00	13	OTIS SRO NIPPLE	4.625	2.280	0.60
	14	XO 3-1/2 PH6 BOX /4-1/2 IF PIN	6.250	2.875	0.34
	15	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.375	2.438	0.36
2993.00	16	5-INCH FULFLO SAFETY VALVE	5.000	2.250	1.45
	17	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.125	2.875	0.30
	18	3 EACH DRILL COLLAR	6.438	2.875	28.37
3023.00	19	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.313	0.30
3028.00	20	5-INCH SLIP JOINT - OPEN	5.000	2.250	5.53
3033.00	21	5-INCH SLIP JOINT - 1/2 OPEN	5.000	2.250	4.77
3037.00	22	5-INCH SLIP JOINT - CLOSED	5.000	2.250	4.01
3037.50	23	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.125	2.875	0.32
	24	9 EACH 6-1/2 DRILL COLLAR	6.438	2.875	85.60
	25	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.313	0.30
	26	APR-A	5.000	2.250	0.91
	27	APR-M2	5.000	2.250	2.29
3127.00	28	LPR-N TESTER	5.000	2.250	4.99
	29	5-3/8 BUNDLE CARRIER	5.375	2.250	2.43
	30	4-5/8 BIG JOHN JAR	4.625	2.250	1.58
	31	4-5/8 HYDRAULIC CIR. VALVE	4.625	2.250	2.20
	32	XO 3-1/2 IF BOX X 3-1/2 FH PIN	4.750	2.438	0.24
	33	4-5/8 FULFLO VR SAFETY JOINT	4.625	2.250	1.25
	34	9-5/8 RTTS TEST PACKER	7.800	3.000	1.10
	35	TAILPIPE 5-INCH DRILLPIPE	6.500	4.276	9.62
	36	WIRELINE GUIDE	6.375	2.813	0.51
	37				

320135

TEST STRING

TEST NUMBER	RIG NAME	DATE (DAY MO. YR.)	PAGE	OF
DST#2	DIAMOND M.EPOCH	12NOV85	1	1

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

TOP OF HOLE	DEPTH (FEET)		DEPTH M	KB ELEVATION (FT)	GROUND ELEV./WATER DEPTH (FEET)	REFERENCE ELEV.	MUD WT. (LBS./FT.)	INTERVAL TESTED (FEET)
				67	267	KB	9.0 GAL	3179-3185M

	ITEM #	DESCRIPTION	OUTSIDE DIAMETER (INCHES)	INSIDE DIAMETER (INCHES)	LENGTH M
	1	OTIS SURFACE TEST TREE			
	2	XO 4-3/8 8STUB ACB. X 4.5 IF P	6.250	2.880	
	3	5-INCH DRILLPIPE	6.250	4.276	93.04
	4	XO 4.5 IF B. X 4.5 4STUB ACP.	6.250	2.880	1.22
	5	OTIS SUBSEA LUBRICATOR VALVE	10.750	2.880	5.30
	6	XO 4.5 4STUB ACB. X 4-1/2 IF P	6.250	2.880	0.66
	7	5-INCH DRILLPIPE	6.250	4.276	288.91
	8	XO 4-1/2 IF B. X 4.5 4STUB ACP	6.500	2.880	3.63
	9	OTIS SUBSEA TEST TREE	10.250	2.880	14.51
102.0	10	XO 4.5 4STUB ACB. X 4.5 IF PIN	6.500	2.880	1.83
	11	5-INCH DRILLPIPE 103 STANDS	6.250	4.276	
	12	XO 4-1/2 IF BOX /3-1/2 FH6 PIN	6.250	2.750	1.03
2991.3	13	OTIS SRO NIPPLE	4.625	2.280	2.00
	14	XO 3-1/2 FH6 BOX /4-1/2 IF PIN	6.250	2.875	1.12
	15	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.375	2.438	1.20
2992.6	16	5-INCH FULFLO SAFETY VALVE	5.000	2.250	4.75
	17	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.125	2.875	1.00
	18	3 EACH DRILL COLLAR	6.438	2.875	93.13
	19	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.313	1.00
	20	5-INCH SLIP JOINT - OPEN	5.000	2.250	18.16
	21	5-INCH SLIP JOINT - 1/2 OPEN	5.000	2.250	15.66
	22	5-INCH SLIP JOINT - CLOSED	5.000	2.250	13.16
	23	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.125	2.875	1.00
	24	9 EACH 6-1/2 DRILL COLLAR	6.438	2.875	279.42
	25	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.313	1.00
3123.2	26	APR-A	5.000	2.250	3.00
3124.1	27	LPR-N TESTER	5.000	2.250	16.37
	28	5-3/8 BUNDLE CARRIER	5.375	2.250	7.97
	29	4-5/8 BIG JOHN JAR	4.625	2.250	5.20
	30	4-5/8 HYDRAULIC CIR. VALVE	4.625	2.250	7.22
	31	XO 3-1/2 IF BOX X 3-1/2 FH PIN	4.750	2.438	0.86
	32	4-5/8 FULFLO VR SAFETY JOINT	4.625	2.250	4.12
3137.3	33	9-5/8 RTTS TEST PACKER	7.800	3.000	3.61
	34	TAILPIPE 5-INCH DRILLPIPE	6.250	4.276	31.56
3148.0	35	WIRELINE GUIDE	6.375	2.813	1.67
	36				
	37				

320136

TEST STRING

TEST NUMBER	RIG NAME	DATE (DAY MO. YR.)	PAGE	OF
DST#3	DIAMOND M.EPOCH	14NOV85	1	1

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

TOP OF HOLE	DEPTH (FEET)		DEPTH M	KB ELEVATION (FT)	GROUND ELEV./WATER DEPTH (FEET)	REFERENCE ELEV.	MUD WT. (LBS./FT.)	INTERVAL TESTED (FEET)
				67	267	KB	9.0 GAL	3179-3185M

	ITEM #	DESCRIPTION	OUTSIDE DIAMETER (INCHES)	INSIDE DIAMETER (INCHES)	LENGTH M
	1	SURFACE TREE			
	2	5-INCH DRILLPIPE	6.250	4.226	93.04
	3	XO 4.5 IF B. X 4.5 4STUB ACP.	6.250	2.880	1.22
	4	OTIS SUBSEA LUBRICATOR VALVE	10.750	2.880	5.30
	5	XO 4.5 IF B. X 4.5 4STUB ACP.	6.250	2.880	0.66
	6	5-INCH DRILLPIPE	6.850	4.276	228.91
	7	XO 4.5 IF B. X 4.5 4STUB ACP.	6.500	2.880	3.63
	8	OTIS SUBSEA TEST TREE	10.750	2.880	14.51
	9	XO 4.5 4STUB ACB. X 4.5 IF PIN	6.500	2.880	1.83
	10	5-INCH DRILLPIPE	6.250	4.276	9475.33
	11	XO 4-1/2 IF BOX /3-1/2 PH6 PIN	6.250	2.750	1.03
2991.3	12	OTIS SRO NIPPLE	4.625	2.280	2.00
	13	XO 3-1/2 PH6 BOX /4-1/2 IF PIN	6.250	2.875	1.12
	14	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.375	2.438	1.20
2994.1	15	5-INCH FULFLO SAFETY VALVE	5.000	2.250	4.75
	16	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.125	2.875	1.00
	17	3 EACH DRILL COLLAR	6.438	2.875	93.13
	18	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.313	1.00
	19	SLIP JOINT - OPEN	5.000	2.250	18.16
	20	SLIP JOINT - 1/2 OPEN	5.000	2.250	15.66
	21	SLIP JOINT - CLOSED	5.000	2.250	13.16
	22	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.125	2.875	1.00
	23	6 EACH 6-1/2-INCH DRILL COLLAR	6.438	2.875	186.28
	24	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.688	0.85
3094.8	25	APR-A REVERSE TOOL	5.000	2.250	3.00
	26	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.188	2.750	1.06
	27	3 EACH 6-1/2 DRILL COLLAR	6.438	2.875	93.14
	28	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.313	1.00
3125.3	29	LPR-N	5.000	2.250	16.37
3132.1	30	5-3/8 BUNDLE CARRIER	5.375	2.250	7.97
	31	4-5/8 BIG JOHN JAR	4.625	2.250	5.20
	32	4-5/8 HYDRAULIC CIRC. VALVE	4.625	2.250	7.22
	33	XO 3-1/2 IF BOX X 3-1/2 FH PIN	4.750	2.438	0.84
	34	4-5/8 FULFLO VR	4.625	2.250	4.13
3137.9	35	9-5/8 RTTS TEST PACKER	7.800	3.000	3.61
	36	TAILPIPE DRILLPIPE	6.500	4.276	31.54
3149.1	37	WIRELINE GUIDE	6.375	2.813	1.62
BOTTOM OF HOLE	38				

320137

TEST STRING

TEST NUMBER	RIG NAME	DATE (DAY MO. YR.)	PAGE	OF
DST#4	DIAMOND M.EPOCH	17NOV85	1	1

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	BASS STRAIT

TOP OF HOLE	DEPTH (FEET)		DEPTH M	KB ELEVATION (FT)	GROUND ELEV./WATER DEPTH (FEET)	REFERENCE ELEV.	MUD WT. (LBS./FT.)	INTERVAL TESTED (FEET)
				67	267	KB	-	3071-3075M

	ITEM #	DESCRIPTION	OUTSIDE DIAMETER (INCHES)	INSIDE DIAMETER (INCHES)	LENGTH M
	1	OTIS SURFACE TEST TREE			
	2	XO 4-3/8 6STUB ACB. X 4.5 IF P	6.250	2.880	
	3	5-INCH DRILLPIPE	6.250	4.226	93.04
	4	XO 4.5 IF B. X 4.5 4STUB ACF.	6.250	2.880	1.22
24.4	5	OTIS SUBSEA LUBRICATOR VALVE	10.750	2.880	5.30
	6	XO 4.5 IF B. X 4.5 4STUB ACF.	6.250	2.880	0.66
	7	5-INCH DRILLPIPE	6.250	4.276	228.91
	8	XO 4.5 IF B. X 4.5 4STUB ACF.	6.500	2.880	3.63
97.0	9	OTIS SUBSEA TEST TREE	10.750	2.880	14.51
	10	XO 4.5 4STUB ACB. X 4.5 IF PIN	6.500	2.880	1.83
	11	5-INCH DRILLPIPE	6.250	4.276	9031.02
	12	XO 4-1/2 IF BOX /3-1/2 FH6 PIN	6.250	2.750	1.03
2855.0	13	OTIS SRO NIPPLE	4.625	2.280	2.00
	14	XO 3-1/2 FH6 BOX /4-1/2 IF PIN	6.250	2.875	1.12
	15	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.375	2.438	1.20
2856.3	16	5-INCH FULFLO SAFETY VALVE	5.000	2.250	4.75
	17	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.125	2.875	1.00
	18	3 EACH DRILL COLLAR	6.438	2.875	93.13
	19	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.313	1.00
2886.8	20	SLIP JOINT - OPEN	5.000	2.250	18.16
	21	SLIP JOINT - 1/2 OPEN	5.000	2.250	15.66
	22	SLIP JOINT - CLOSED	5.000	2.250	13.16
	23	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.125	2.875	11.00
	24	6 EACH 6-1/2 DRILL COLLAR	6.438	2.875	186.28
	25	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.688	0.85
2958.4	26	APR-A REVERSE TOOL	5.000	2.250	3.00
	27	XO 3-1/2 IF BOX X 4-1/2 IF PIN	6.188	2.750	1.06
	28	3 EACH 6-1/2 DRILL COLLAR	6.438	2.875	93.14
	29	XO 4-1/2 IF BOX X 3-1/2 IF PIN	6.125	2.313	1.00
2988.4	30	LPR-N	5.000	2.250	16.37
2993.4	31	5-3/8 BUNDLE CARRIER	5.375	2.250	7.92
2995.8	32	4-5/8 BIG JOHN JAR	4.625	2.250	5.20
2997.4	33	4-5/8 HYDRAULIC CIRC. VALVE	4.625	2.250	7.22
	34	XO 3-1/2 IF BOX X 3-1/2 FH PIN	4.750	2.438	0.84
	35	4-5/8 FULFLO VR	4.625	2.250	4.12
3001.6	36	9-5/8 RTTS TEST PACKER	7.800	3.000	3.61
	37	TAILPIPE DRILLPIPE	6.500	4.276	31.56
3012.3	38	WIRELINE GUIDE	6.375	2.813	1.67

BOTTOM OF HOLE

320138

EQUIPMENT LIST

1	SUBSEA TEST TREE	78-EO-80
1	SUBSEA LUBRICATOR VALVE	78-EO-85
1	SURFACE TEST TREE	
1	TRANSFER PUMP	
1	CHOKE MANIFOLD	3INCH 10000 PSI 5-VALVE c/w WILLIS positive and adjustable chokes
1	HEATER	2MMBTU GAS FIRED INDIRECT
1	SEPARATOR	1440 PSI 3PHASE
1	TANK	100 BBLS 50 PSI
1	PORTABLE LABORATORY	
2	CB-12 BURNERS	

BSU... ICE ... PLI... DAT...

OEC-889-2

TEST NUMBER	RATE NUMBER	AREA	PAGE	OF
DST #3	ONE	BASS STRAIT	1	1

CUSTOMER	WELL NAME OR NUMBER	FIELD	FORMATION
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	SANDSTONE

ELEVATION (FEET)	STANDARD CONDITIONS	WELL IS	INTERVAL TESTED (FEET)
	☒ 14.73 psi 60°F ☐ OTHER PRESS. TEMP	☒ PERFORATED ☐ OPEN HOLE	3179 - 3185 M.

SAMPLE # 1

DATE WELL SAMPLED	TIME WELL SAMPLED	SAMPLING TOOL NAME	SAMPLING TOOL NUMBER	SAMPLING TOOL VOLUME (CC)	SHIPPING CONTAINER NUMBER	SHIPPING CONTAINER VOLUME (CC)	HOURS WELL ☐ FLOWING ☐ SHUT-IN BEFORE SAMPLING
14NOV85	2045	LEUTERT		600	OBHS 29	635	

DOWN HOLE CONDITIONS

BOTTOM HOLE PRESSURE @ (DEPTH IN FEET) psig	BOTTOM HOLE TEMP. @ (DEPTH IN FEET) °F	SAMPLING DEPTH (FEET)	SAMPLING DEPTH PRESSURE (psig)	GAS-OIL CONTACT (FEET)	OIL-WATER CONTACT (FEET)
2137		7500	2137		

TRANSFER CONDITIONS

SURFACE SAMPLE PRESS. (°F)	SURFACE SAMPLE TEMP. (°F)	TRANSFER PRESS. (psig)	TRANSFER TEMP. (°F)	FIELD BUBBLE POINT PRESS. (psig)	FIELD BUBBLE POINT TEMP. (°F)	VOLUME OF Hg REMAINING WITH SAMPLE (CC)	OUTAGE TAKEN IN SAMPLE CONTAINER (CC)	SHIPPING PRESSURE (psig)
	60					35		

SURFACE FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CASING PRESS. (psig)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	OIL GRAVITY @ 60°F (°API)	OIL BSW (-)	OIL C_f *	OIL W_f *	GAS GRAVITY (air=1)	GAS Fpv	WATER FLOW RATE (BPD)	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP COND (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP COND (MCF/BBL x BBL/MMCF)
		1400														

SAMPLE # ___

DATE WELL SAMPLED	TIME WELL SAMPLED	SAMPLING TOOL NAME	SAMPLING TOOL NUMBER	SAMPLING TOOL VOLUME (CC)	SHIPPING CONTAINER NUMBER	SHIPPING CONTAINER VOLUME (CC)	HOURS WELL ☐ FLOWING ☐ SHUT-IN BEFORE SAMPLING

DOWN HOLE CONDITIONS

BOTTOM HOLE PRESSURE @ (DEPTH IN FEET) psig	BOTTOM HOLE TEMP. @ (DEPTH IN FEET) °F	SAMPLING DEPTH (FEET)	SAMPLING DEPTH PRESSURE (psig)	GAS-OIL CONTACT (FEET)	OIL-WATER CONTACT (FEET)

TRANSFER CONDITIONS

SURFACE SAMPLE PRESS. (°F)	SURFACE SAMPLE TEMP. (°F)	TRANSFER PRESS. (psig)	TRANSFER TEMP. (°F)	FIELD BUBBLE POINT PRESS. (psig)	FIELD BUBBLE POINT TEMP. (°F)	VOLUME OF Hg REMAINING WITH SAMPLE (CC)	OUTAGE TAKEN IN SAMPLE CONTAINER (CC)	SHIPPING PRESSURE (psig)

SURFACE FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CASING PRESS. (psig)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	OIL GRAVITY @ 60°F (°API)	OIL BSW (-)	OIL C_f *	OIL W_f *	GAS GRAVITY (air=1)	GAS Fpv	WATER FLOW RATE (BPD)	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP COND (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP COND (MCF/BBL x BBL/MMCF)

COMMENTS: DUPLICATE SAMPLE WHEN OPENED AT SURFACE CONTAINED MUDDY WATER AND NO PRESSURE

* C_f IS MEASURED CORRECTION FACTOR FOR CORRECTING OIL VOLUME FROM SEPARATOR TO STOCK TANK CONDITIONS. IT INCLUDES WEATHERING FACTOR, W_f, AND A METER NONLINEARITY EFFECT, M. $C_f = M W_f$

320140

...SURFACE SAMPLE DATA

OEC-889-2

TEST NUMBER	RATE NUMBER	AREA	PAGE	OF
DST #4	ONE	BASS STRAIT	1	1

CUSTOMER	WELL NAME OR NUMBER	FIELD	FORMATION
AMOCO AUSTRALIA PETR. CO.	TILANA #1	WILDCAT	SANDSTONE

ELEVATION (FEET)	STANDARD CONDITIONS	WELL IS	INTERVAL TESTED (FEET)
	☒ 14.73 psi 60°F ☐ OTHER PRESS. TEMP	☒ PERFORATED ☐ OPEN HOLE	3071 - 3075 M.

SAMPLE # 1

DATE WELL SAMPLED	TIME WELL SAMPLED	SAMPLING TOOL NAME	SAMPLING TOOL NUMBER	SAMPLING TOOL VOLUME (CC)	SHIPPING CONTAINER NUMBER	SHIPPING CONTAINER VOLUME (CC)	HOURS WELL ☐ FLOWING ☐ SHUT-IN BEFORE SAMPLING
20NOV85	1600	LEUTERT		600	SHIPPED IN SAMPLER	600	

DOWN HOLE CONDITIONS

BOTTOM HOLE PRESSURE @ (DEPTH IN FEET) (psig)	BOTTOM HOLE TEMP. @ (DEPTH IN FEET) (°F)	SAMPLING DEPTH (FEET)	SAMPLING DEPTH PRESSURE (psig)	GAS-OIL CONTACT (FEET)	OIL-WATER CONTACT (FEET)
3923	267	3072M	3923		

TRANSFER CONDITIONS

SURFACE SAMPLE PRESS. (psig)	SURFACE SAMPLE TEMP. (°F)	TRANSFER PRESS. (psig)	TRANSFER TEMP. (°F)	FIELD BUBBLE POINT PRESS. (psig)	FIELD BUBBLE POINT TEMP. (°F)	VOLUME OF Hg REMAINING WITH SAMPLE (CC)	OUTAGE TAKEN IN SAMPLE CONTAINER (CC)	SHIPPING PRESSURE (psig)

SURFACE FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CASING PRESS. (psig)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)
	61	1400					

OIL GRAVITY @ 60°F (°API)	OIL BSW ( )	OIL C_f *	OIL W_f *	GAS GRAVITY (air = 1)	GAS Fpv *	WATER FLOW RATE (BPD)	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP COND (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP COND (MCF/BBL x BBL/MMCF)

SAMPLE # 2

DATE WELL SAMPLED	TIME WELL SAMPLED	SAMPLING TOOL NAME	SAMPLING TOOL NUMBER	SAMPLING TOOL VOLUME (CC)	SHIPPING CONTAINER NUMBER	SHIPPING CONTAINER VOLUME (CC)	HOURS WELL ☐ FLOWING ☐ SHUT-IN BEFORE SAMPLING
20NOV85	1630	LEUTERT		600	SHIPPED IN SAMPLER	600	PERFS. 3042 - 3048 M.

DOWN HOLE CONDITIONS

BOTTOM HOLE PRESSURE @ (DEPTH IN FEET) (psig)	BOTTOM HOLE TEMP. @ (DEPTH IN FEET) (°F)	SAMPLING DEPTH (FEET)	SAMPLING DEPTH PRESSURE (psig)	GAS-OIL CONTACT (FEET)	OIL-WATER CONTACT (FEET)
3885	264	3045M	3885		

TRANSFER CONDITIONS

SURFACE SAMPLE PRESS. (psig)	SURFACE SAMPLE TEMP. (°F)	TRANSFER PRESS. (psig)	TRANSFER TEMP. (°F)	FIELD BUBBLE POINT PRESS. (psig)	FIELD BUBBLE POINT TEMP. (°F)	VOLUME OF Hg REMAINING WITH SAMPLE (CC)	OUTAGE TAKEN IN SAMPLE CONTAINER (CC)	SHIPPING PRESSURE (psig)

SURFACE FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CASING PRESS. (psig)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)
	61	1400					

OIL GRAVITY @ 60°F (°API)	OIL BSW ( )	OIL C_f *	OIL W_f *	GAS GRAVITY (air = 1)	GAS Fpv	WATER FLOW RATE (BPD)	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP COND (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP COND (MCF/BBL x BBL/MMCF)

COMMENTS:

SAMPLES WERE TAKEN SEPARATELY AT DIFFERENT DEPTHS ACROSS PERFORATIONS
SAMPLES SHIPPED IN LEUTERT SAMPLERS. PROBABLE CONTENTS GASEOUS MUD

* C_f IS MEASURED CORRECTION FACTOR FOR CORRECTING OIL VOLUME FROM SEPARATOR TO STOCK TANK CONDITIONS. IT INCLUDES WEATHERING FACTOR, W_f, AND A METER NONLINEARITY EFFECT, M. $C_f = M W_f$

3201 41

SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO YR)	PAGE	OF
DST#1	TILANA #1	1440PSI 3PHASE SEPARATOR	09NOV85	1	3

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	0	--

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

	TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
	DAY	FLOW OR SHUT-IN DURATION	TUBING PRESS	TEMP	CASING PRESS	BHP	BHT	MAN. CHOKE	HEATER CHOKE	ORIFICE SIZE	STATIC PRESS	DIFF. PRESS.	TEMP.	GAS GRAVITY (AIR=1)	# 1 TANK OR METER READING	# 1 OIL TEMP	OIL GRAVITY	W_t	# 1 TANK OR METER READING	SALINITY
	24 HOUR CLOCK	(HOURS)	(PSIG)	(°F)	(PSIG)	(PSIG)	(°F)	(64THS IN)	(64TH) IN)	(INS)	(PSIG)	($_{H_2O}^{IN}$)	(°F)	% H_2S	# 2 TANK OR METER READING (INS OR BBL)	# 2 OIL TEMP (°F)	@60°F °API	BSW (%)	# 2 TANK OR METER READING (INS. OR BBL)	(%)
1	09 1800	0.00	TEST STRING RUN IN HOLE AND																	
2	09 1800	0.00	DISPLACED WITH 129 BBLS OF WATER																	
3	11 0534	0.00	ZONE PERFORATED USING 2-1/8 INCH ENERJET GUNS 0	53	1420	0.0	0	0												
4	11 0535	0.01	LOSS OF ANNULUS PRESSURE 5	53	0	0.0	0	0												
5	11 0536	0.03	12	53	0	0.0	0	0												
6	11 0537	0.04	WELL OPENED TO FLARE ON 32/64-INCH ADJ. CHOKE 20	53	0	0.0	0	32												
7	11 0538	0.06	1	53	0	0.0	0	32												
8	11 0539	0.08	0	53	0	0.0	0	32												
9	11 0540	0.09	0	53	0	0.0	0	32												
10	11 0541	0.11	0	53	0	0.0	0	32												
11	11 0542	0.13	WELL SHUT IN AT CHOKE MANIFOLD 0	53	0	0.0	0	0												
12	11 0543	0.14	WEAK BLOW AT BUBBLE HOSE 0	53	0	0.0	0	0												
13	11 0544	0.16	0	53	0	0.0	0	0												
14	11 0545	0.18	0	53	0	0.0	0	0												
15	11 0546	0.19	0	53	0	0.0	0	0												
16	11 0547	0.21	0	53	0	0.0	0	0												
17	11 0548	0.23	NO BLOW AT BUBBLE HOSE 0	53	0	0.0	0	0												

320142

SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO YR)	PAGE	OF
DST#1	TILANA #1	1440PSI 3PHASE SEPARATOR	11NOV85	2	3

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	0	-

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF. RANGE (INS H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	BHP (PSIG)	BHT (°F)	MAN. CHOKE (64THS IN)	HEATER CHOKE (64THS IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF. PRESS. (IN H_2O)	TEMP (°F)	GAS GRAVITY (AIR=1) / % H_2S	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP / # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W_t BSW (%)	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	SALINITY (%)
1 11 0549	0.24	RAMS OPENED. STRONG BLOW AT BUBBLE HOSE 0	53	0	0.0	0	0					1							1
2 11 0550	0.26	WELL OPENED TO FLARE ON 32/64 INCH ADJ. CHOKE 18	60	0	0.0	0	32					2							2
3 11 0551	0.28	10	65	0	0.0	0	32					3							3
4 11 0552	0.29	20	70	0	0.0	0	32					4							4
5 11 0553	0.31	WELL SHUT IN AT CHOKE MANIFOLD 170	74	0	0.0	0	0					5							5
6 11 0554	0.33	180	73	0	0.0	0	0					6							6
7 11 0555	0.34	185	73	0	0.0	0	0					7							7
8 11 0556	0.36	184	72	0	0.0	0	0					8							8
9 11 0557	0.38	197	72	0	0.0	0	0					9							9
10 11 0558	0.39	197	72	0	0.0	0	0					10							10
11 11 0559	0.41	STARTED PRESSURE UP ON ANNULUS 196	72	0	0.0	0	0					11							11
12 11 0600	0.43	800	72	700	0.0	0	0					12							12
13 11 0605	0.51	870	70	700	0.0	0	0					13							13
14 11 0606	0.53	SCHLUMBERGER STARTED PULLING OUT OF HOLE 872	70	700	0.0	0	0					14							14
15 11 0610	0.59	870	69	700	0.0	0	0					15							15
16 11 0615	0.68	860	67	700	0.0	0	0					16							16
17 11 0620	0.76	BLED PRESSURE OF STRING THRU 32/64-IN ADJ. CHOKE 850	65	700	0.0	0	32					17							17

320143

FIE. EADINGS
SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO YR)	PAGE	OF
DST#1	TILANA #1	1440PSI 3PHASE SEPARATOR	11NOV85	3	3

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	0	—

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	BHP (PSIG)	BHT (°F)	MAN. CHOKE (64TH IN)	HEATER CHOKE (64TH IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF PRESS. (IN H_2O)	TEMP (°F)	GAS GRAVITY (AIR=1) % H_2S	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP / # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W_1 BSW (%)	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS. OR BBL)	SALINITY (%)
1 11 0622	0.79	WELL SHUT IN AT CHOKE MANIFOLD 120	64	700	0.0	0	0												
2 11 0623	0.81	130	62	700	0.0	0	0												
3 11 0624	0.83	117	62	700	0.0	0	0												
4 11 0625	0.84	110	62	700	0.0	0	0												
5 11 0630	0.93	84	61	700	0.0	0	0												
6 11 0645	1.18	65	60	700	0.0	0	0												
7 11 0700	1.43	ANNULUS PRESSURE BLED OFF 56	59	0	0.0	0	0												
8 11 0715	1.68	46	58	0	0.0	0	0												
9 11 0723	1.81	CHOKE OPENED FULLY TO BLEED DOWN STRING 45	57	0	0.0	0	128												
10 11 0940	4.09	OPENED RAMS 150	0	0	0.0	0	0												
11 11 0945	4.18	PULLED WEIGHT ON STRING TO TEST PACKER 155	0	0	0.0	0	0												
12 11 0945	4.18	PACKER STILL SET 155	0	0	0.0	0	0												
13 11 0953	4.31	CLOSED RAMS. STARTED PUMPING DOWN ANNULUS 155	0	0	0.0	0	0												
14 11 0955	4.34	WELL OPENED TO BURNER TO REVERSE OUT H20 CUSHION 155	0	0	0.0	0	0												
15 11 1020	4.76	MUD AT SURFACE. STOPPED PUMPING. END OF DST#1																	
16																			
17																			

Computer-Forms Tucson Phone

320144

HE[illegible]EADINGS
SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO. YR.)	PAGE	OF
DST#2	TILANA #1	1440PSI 3PHASE SEPARATOR	11NOV85	1	3

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

	TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
	DAY	FLOW OR SHUT-IN DURATION	TUBING PRESS.	TEMP.	CASING PRESS.	BHP	BHT	MAN CHOKE	HEATER CHOKE	ORIFICE SIZE	STATIC PRESS.	DIFF PRESS.	TEMP	GAS GRAVITY (AIR=1)	# 1 TANK OR METER READING	# 1 OIL TEMP	OIL GRAVITY	W_t	# 1 TANK OR METER READING	SALINITY
	24 HOUR CLOCK	(HOURS)	(PSIG)	(°F)	(PSIG)	(PSIG)	(°F)	(64THS IN)	(64THS IN)	(INS)	(PSIG)	($\frac{IN}{H_2O}$)	(°F)	% H_2S	# 2 TANK OR METER READING (INS. OR BBL)	# 2 OIL TEMP (°F)	@60°F °API	BSW (%)	# 2 TANK OR METER READING (INS. OR BBL)	(%)
1	11 2100	0.00	TEST STRING RUN IN HOLE WITH 129 BBLS OF										1							1
2	11 2100	0.00	SALT WATER CUSHION										2							2
3	12 0757	0.00	PRESSURE TESTED ANNULUS TO 400 PSI - O.K. 0	56	400	0.0	0	0					3							3
4	12 0800	0.05	PRESSURED UP ANNULUS TO OPEN LPR VALVE 0	56	1440	0.0	0	0					4							4
5	12 0800	0.05	NO RESPONSE AT BUBBLE HOSE 0	56	1440	0.0	0	0					5							5
6	12 0803	0.05	BLED OFF ANNULUS PRESSURE 0	56	0	0.0	0	0					6							6
7	12 0804	0.01	PRESSURED UP ANNULUS. NO RESPONSE AT BUBBLE HOSE 0	56	1360	0.0	0	0					7							7
8	12 0815	0.18	NO INDICATION OF FLOW AT BUBBLE HOSE 0	56	1550	0.0	0	0					8							8
9	12 0831	0.44	OTIS DHSIT AND HP GAUGE RUN IN HOLE 0	56	1540	0.0	0	0					9							9
10	12 0900	0.93	0	56	1540	0.0	0	0					10							10
11	12 0906	1.03	HP GAUGE STABILIZED AT 4500 FEET 0	56	1540	0.0	0	0					11							11
12	12 0926	1.36	HP GAUGE PULLED TO 4000 FT. FOR GRADIENT STOP 0	56	1540	0.0	0	0					12							12
13	12 0930	1.43	HP GAUGE STARTED PULLING OUT OF HOLE 0	56	1540	0.0	0	0					13							13
14	12 1000	1.93	0	56	1540	0.0	0	0					14							14
15	12 1010	2.09	HP GAUGE AT SURFACE 0	56	1540	0.0	0	0					15							15
16	12 1027	2.38	RIGGED DOWN HP GAUGE AND DHSIT. RIGGED UP CCL 0	57	1540	0.0	0	0					16							16
17	12 1030	2.43	CCL RUN IN HOLE 0	57	1540	0.0	0	0					17							17

Computer Forms Texas Flare

320145

FIELD READINGS
SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO. YR.)	PAGE	OF
DST#2	TILANA #1	1440PSI 3PHASE SEPARATOR	12NOV85	2	3

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY	FLOW OR SHUT-IN DURATION	TUBING PRESS	TEMP	CASING PRESS	BHP	BHT	MAN CHOKE	HEATER CHOKE	ORIFICE SIZE	STATIC PRESS	DIFF PRESS	TEMP	GAS GRAVITY (AIR=1)	# 1 TANK OR METER READING	# 1 OIL TEMP	OIL GRAVITY	W_t	# 1 TANK OR METER READING	SALINITY
24 HOUR CLOCK	(HOURS)	(PSIG)	(°F)	(PSIG)	(PSIG)	(°F)	(64TH) (IN)	(64TH) (IN)	(INS)	(PSIG)	(IN_{H_2O})	(°F)	% H_2S	# 2 TANK OR METER READING (INS OR BBL)	# 2 OIL TEMP (°F)	@60°F °API	BSW (%)	# 2 TANK OR METER READING (INS. OR BBL)	(%)
1 12 1137	3.54	CCL UNABLE TO PASS 10220 FEET 0	61	1560	0.0	0	0					1							1
2 12 1137	3.54	STARTED PULLING OUT OF HOLE 0	61	1560	0.0	0	0					2							2
3 12 1229	4.41	CCL IN LUBRICATOR. CLOSED SWAB VALVE 0	62	1580	0.0	0	0					3							3
4 12 1230	4.43	ANNULUS PRESSURE BLED DOWN 0	62	0	0.0	0	0					4							4
5 12 1240	4.59	PRESSURED UP ON ANNULUS 0	62	1840	0.0	0	0					5							5
6 12 1240	4.59	NO INDICATION OF FLOW AT BUBBLE HOSE 0	62	1840	0.0	0	0					6							6
7 12 1243	4.64	BLED DOWN ANNULUS PRESSURE 0	62	700	0.0	0	0					7							7
8 12 1246	4.69	PRESSURED UP ON ANNULUS 0	62	1900	0.0	0	0					8							8
9 12 1246	4.69	NO INDICATION OF FLOW AT BUBBLE HOSE 0	62	1900	0.0	0	0					9							9
10 12 1249	4.74	BLED DOWN ANNULUS PRESSURE 0	62	600	0.0	0	0					10							10
11 12 1250	4.76	PRESSURED UP ANNULUS 0	64	1900	0.0	0	0					11							11
12 12 1250	4.76	NO INDICATION OF FLOW AT BUBBLE HOSE 0	64	1900	0.0	0	0					12							12
13 12 1255	4.84	BLED DOWN ANNULUS PRESSURE 0	64	0	0.0	0	0					13							13
14 12 1302	4.96	PRESSURED UP ANNULUS 0	64	1700	0.0	0	0					14							14
15 12 1302	4.96	NO INDICATION OF FLOW AT BUBBLE HOSE 0	64	1700	0.0	0	0					15							15
16 12 1312	5.13	PRESSURED UP ANNULUS. AFR-N OPENED 0	64	2000	0.0	0	0					16							16
17 12 1312	5.13	TEST STRING U-TUBING 0	64	2000	0.0	0	0					17							17

Computer-Forms Texas Plains

320146

SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO. YR.)	PAGE	OF
DST#2	TILANA #1	1440PSI 3PHASE SEPARATOR	12NOV85	3	3

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	BHP (PSIG)	BHT (°F)	MAN. CHOKE (64TH IN)	HEATER CHOKE (64TH IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF. PRESS. (IN H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP / # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W_f BSW (%)	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS. OR BBL)	SALINITY (%)
1 12 / 1317	5.21	CHOKE MANIFOLD BYPASS OPENED																	
		54	64	0	0.0	0	0												
2 12 / 1317	5.21	CUSHION FLOWING TO FLARE / END OF DST #2																	
		54	64	0	0.0	0	0												
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

320147

Computer-Forms Tegeon Moore

SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO.	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO. YR.)	PAGE	OF
DST#3	TILANA #1	1440PSI 3PHASE SEPARATOR	13NOV85	1	4

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	BHP (PSIG)	BHT (°F)	MAN. CHOKE (64TH IN)	HEATER CHOKE (64TH IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF PRESS. (IN H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP / # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W_f BSW (%)	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS. OR BBL)	SALINITY (%)
1 13 0300	0.00	TEST STRING RUN IN HOLE AND																	
2 13 0300	0.00	DISPLACED WITH 129 BBLS OF SALT WATER																	
3 13 1107	0.00	PRESSURED ANNULUS TO OPEN LPR																	
		0	60	1380	0.0	0	0												
4 13 1107	0.00	NO INDICATION AT BUBBLE HOSE																	
		0	60	1380	0.0	0	0												
5 13 1111	0.06	VERY WEAK BLOW AT BUBBLE HOSE																	
		0	60	1380	0.0	0	0												
6 13 1117	0.16	INTERMITTENT BLOW OBSERVED AT BUBBLE HOSE																	
		0	60	1400	0.0	0	0												
7 13 1120	0.20	BUBBLE HOSE SHUT IN																	
		0	60	1380	0.0	0	0												
8 13 1125	0.29	NO INDICATION OF BUILD-UP																	
		0	60	1380	0.0	0	0												
9 13 1145	0.62																		
		0	61	1260	0.0	0	0												
10 13 1157	0.82	PUMPED UP ANNULUS PRESSURE																	
		0	60	1400	0.0	0	0												
11 13 1330	2.37	ANNULUS PRESSURE DROPPING STEADILY																	
		0	61	1120	0.0	0	0												
12 13 1330	2.37	NO INDICATION OF BUILD-UP AT SURFACE																	
		0	61	1120	0.0	0	0												
13 13 1334	2.44	BLED OFF ANNULUS PRESSURE. OPENED RAMS																	
		0	61	0	0.0	0	0												
14 13 1345	0.18	CLOSED RAMS. PRESSURED UP ANNULUS																	
		0	63	1400	0.0	0	0												
15 13 1445	0.16	RIGGED UP SCHLUMBERGER LUBRICATOR AND																	
		0	63	1400	0.0	0	0												
16 13 1445	0.16	PRESSURE TESTED TO 5000 PSI - O.K.																	
		0	63	1400	0.0	0	0												
17 13 1530	0.90	PUMPED CLOSE SUBSEA LUBRICATOR VALVE																	
		0	62	1400	0.0	0	0												

320148

FIELD READINGS
SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO.	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO. YR.)	PAGE	OF
DST#3	TILANA #1	1440PSI 3PHASE SEPARATOR	13NOV85	2	4

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS (PSIG)	TEMP (°F)	CASING PRESS (PSIG)	BHP (PSIG)	BHT (°F)	MAN. CHOKE (64TH IN)	HEATER CHOKE (64TH IN)	ORIFICE SIZE (INS)	STATIC PRESS (PSIG)	DIFF PRESS (IN H_2O)	TEMP (°F)	GAS GRAVITY (AIR=1) % H_2S	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP / # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W_f BSW (%)	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS. OR BBL)	SALINITY (%)
1 13 1530	0.90	RIGGED UP PERFORATING GUNS 0	62	1400	0.0	0	0												
2 13 1605	1.49	PUMPED OPEN SUBSEA LUBRICATOR VALVE 0	61	1300	0.0	0	0												
3 13 1605	1.49	PERFORATING GUNS RUN IN HOLE 0	61	1300	0.0	0	0												
4 13 1740	3.07	PERFORATING GUNS UNABLE TO PASS 3035 METRES 0	60	1280	0.0	0	0												
5 13 1740	3.07	STARTED PULLING OUT OF HOLE 0	60	1280	0.0	0	0												
6 13 1850	4.24	RIGGED DOWN PERFORATING GUNS 0	58	1280	0.0	0	0												
7 13 2125	6.82	2-INCH GAUGE CUTTER RUN IN HOLE 0	55	1300	0.0	0	0												
8 13 2135	6.99	MEDIUM BLOW OBSERVED AT BUBBLE HOSE 0	55	1300	0.0	0	0												
9 13 2235	7.99	GAUGE CUTTER RUN TO 3185 METRES 0	55	1320	0.0	0	0												
10 13 2235	7.99	STARTED PULLING OUT OF HOLE 0	55	1320	0.0	0	0												
11 13 2255	8.32	RIGGED DOWN GAUGE CUTTER 0	55	1320	0.0	0	0												
12 13 2320	8.74	2.125-INCH BLIND BOX RUN IN HOLE 0	55	1320	0.0	0	0												
13 13 2345	9.15	BLIND BOX RUN TO 3185 METRES 0	55	1320	0.0	0	0												
14 13 2345	9.15	STARTED PULLING OUT OF HOLE 0	55	1320	0.0	0	0												
15 14 0025	9.82	RIGGED DOWN OTIS WIRELINE 0	55	1320	0.0	0	0												
16 14 0025	9.82	STARTED RIG-UP PERFORATING GUNS 0	55	1320	0.0	0	0												
17 14 0300	12.40	PUMPED CLOSE SUBSEA LUBRICATOR VALVE 0	55	1330	0.0	0	0												

320149

FIELD READINGS
SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO.	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY, MO, YR)	PAGE	OF
DST#3	TILANA #1	1440PSI 3PHASE SEPARATOR	14NOV85	3	4

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	BHP (PSIG)	BHT (°F)	MAN CHOKE (64TH IN)	HEATER CHOKE (64TH IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF PRESS. (IN H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP / # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W_t BSW (%)	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS. OR BBL)	SALINITY (%)
1 14 0300	12.40	PERFORATING GUNS IN LUBRICATOR																	
		0	55	1330	0.0	0	0												
2 14 0400	13.40	PUMPED OPEN SUBSEA LUBRICATOR VALVE																	
		0	57	1340	0.0	0	0												
3 14 0400	13.40	PERFORATING GUNS RUN IN HOLE																	
		0	57	1340	0.0	0	0												
4 14 0530	14.90	PERFORATING GUNS AT DEPTH																	
		0	58	1340	0.0	0	0												
5 14 0546	15.17	TEST ZONE RE-PERFORATED -																	
		0	58	1340	0.0	0	0												
6 14 0546	15.17	NO INDICATION OF FLOW AT BUBBLE HOSE																	
		0	58	1340	0.0	0	0												
7 14 0617	15.69	PERFORATING GUNS START OUT OF HOLE																	
		0	59	1340	0.0	0	0												
8 14 0712	16.60	PUMPED CLOSE SUBSEA LUBRICATOR VALVE																	
		0	60	1350	0.0	0	0												
9 14 0725	16.82	STARTED RIGGING DOWN SPENT PERFORATING GUNS																	
		0	60	1350	0.0	0	0												
10 14 0725	16.82	AND LUBRICATOR																	
		0	60	1350	0.0	0	0												
11 14 0900	18.40	STARTED RIGGING UP OTIS H.P. GAUGE																	
		0	60	1350	0.0	0	0												
12 14 1015	19.65	H.P. GAUGE RUN IN HOLE FOR GRADIENT SURVEY																	
		0	58	1360	0.0	0	0												
13 14 1037	20.02	H.P. GAUGE AT 3000 FEET FOR GRADIENT STOP																	
		0	58	1360	0.0	0	0												
14 14 1311	22.59	H.P. GAUGE AT 10449 FEET																	
		0	55	1380	0.0	0	0												
15 14 1800	27.40	WIRELINE COMPLETE GRADIENT SURVEY																	
		0	54	1400	0.0	0	0												
16 14 1800	27.40	PUMPED CLOSE SUBSEA LUBRICATOR VALVE																	
		0	54	1400	0.0	0	0												
17 14 1915	28.65	RIGGED UP 2 X 600 CC. B.H.S. AND H.P. GAUGE																	
		0	54	1400	0.0	0	0												

Computer-Forms Tester Floors

320150

FIELD HANDINGS
SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO. YR.)	PAGE	OF
DST#3	TILANA #1	1440PSI 3PHASE SEPARATOR	14NOV85	4	4

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3179-3185M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	BHP (PSIG)	BHT (°F)	MAN. CHOKE (64TH IN)	HEATER CHOKE (64TH IN)	ORIFICE SIZE (INS)	STATIC PRESS (PSIG)	DIFF. PRESS. (IN H_2O)	TEMP (°F)	GAS GRAVITY (AIR=1) % H_2S	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP / # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W_t BSW (%)	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	SALINITY (%)
1 14		SAMPLERS RUN IN HOLE																	
1930	28.90	0	54	1400	0.0	0	0												
2 14		SAMPLERS AT 7500 FT. SET TO GO OFF AT 2045																	
2015	29.65	0	54	1400	0.0	0	0												
3 14		SAMPLERS STARTED PULLING OUT OF HOLE																	
2105	30.49	0	54	1400	0.0	0	0												
4 14		SAMPLING PRESSURE 2152 PSIA AT 216 DEG.F.																	
2105	30.49	0	54	1400	0.0	0	0												
5 14		SAMPLERS AT SURFACE. RIGGED DOWN WIRELINE																	
2200	31.40	0	54	1400	0.0	0	0												
6 14		SAMPLER #1 OPENED & CONTAINED SALT WATER ONLY																	
2200	31.40	0	54	1400	0.0	0	0												
7 14		APR-A V/V OPENED TO REVERSE CIRC. TEST STRING																	
2240	32.07	0	54	2600	0.0	0	0												
8 14		ENDING DST #3																	
2240	32.07	0	54	2600	0.0	0	0												
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

320151

FIELD READINGS
SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY, MO, YR)	PAGE	OF
DST#4	TILANA #1	1440PSI 3PHASE SEPARATOR	16NOV85	1	4

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3071-3075M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	BHP (PSIG)	BHT (°F)	MAN. CHOKE (64TH) (IN)	HEATER CHOKE (64TH) (IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF. PRESS. (IN H_2O)	TEMP (°F)	GAS GRAVITY (AIR=1) % H_2S	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP / # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W_f BSW (%)	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS. OR BBL)	SALINITY (%)
1 16 / 2100	0.00	TEST STRING RUN IN HOLE AND																	
2 16 / 2100	0.00	DISPLACED WITH 99 BBLS OF WATER																	
3 19 / 0654	0.00	ZONE PERFORATED USING 2-1/8 INCH ENERJET GUNS																	
		0	50	1420	0.0	0	0												
4 19 / 0655	0.01	NO INDICATION OF FLOW AT BUBBLE HOSE																	
		0	50	1420	0.0	0	0												
5 19 / 0700	0.09	NO INDICATION OF FLOW AT BUBBLE HOSE																	
		0	50	1420	0.0	0	0												
6 19 / 0730	0.59	SCHLUMBERGER STARTED OUT OF HOLE WITH																	
		0	50	1420	0.0	0	0												
7 19 / 0730	0.59	PERFORATING GUNS																	
		0	50	1420	0.0	0	0												
8 19 / 0835	1.68	PERFORATING GUNS AT SURFACE																	
		0	50	1420	0.0	0	0												
9 19 / 0835	1.68	PUMPED CLOSE SUBSEA LUBRICATOR VALVE																	
		0	50	1420	0.0	0	0												
10 19 / 1200	5.09	SCHLUMBERGER P.L.T. RUN IN HOLE																	
		0	58	1440	0.0	0	0												
11 19 / 1306	6.19	MEDIUM BLOW OBSERVED AT BUBBLE HOSE																	
		0	58	1340	0.0	0	0												
12 19 / 1455	8.01	P.L.T. AT SURFACE																	
		0	57	1350	0.0	0	0												
13 19 / 1455	8.01	PUMPED CLOSE SUBSEA LUBRICATOR VALVE																	
		0	57	1350	0.0	0	0												
14 19 / 1625	9.51	OPENED SUBSEA LUBRICATOR VALVE																	
		0	57	1360	0.0	0	0												
15 19 / 1625	9.51	RUN IN HOLE WITH PERFORATING GUNS																	
		0	57	1360	0.0	0	0												
16 19 / 1630	9.59	MEDIUM BLOW AT BUBBLE HOSE																	
		0	58	1360	0.0	0	0												
17 19 / 1750	10.93	PERFORATING GUN UNABLE TO PASS S.R.O. NIPPLLE																	
		0	57	1360	0.0	0	0												

320152

SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO. YR.)	PAGE	OF
DST#4	TILANA #1	1440PSI 3PHASE SEPARATOR	19NOV85	2	4

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3071-3075M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	BHP (PSIG)	BHT (°F)	MAN. CHOKE (64TH) (IN)	HEATER CHOKE (64TH) (IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF. PRESS. ($\sqrt{IN\ H_2O}$)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# 1 TANK OR METER READING # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W_f BSW (%)	# 1 TANK OR METER READING # 2 TANK OR METER READING (INS. OR BBL)	SALINITY (%)
1 19 1752	10.96	BLED OFF ANNULUS PRESSURE. CLOSED LPR-N 0	57	0	0.0	0	0					1							1
2 19 1819	0.45	OPENED LPR-N 0	56	1180	0.0	0	0					2							2
3 19 1822	0.05	PERFORATING GUNS START OUT OF HOLE 0	56	1180	0.0	0	0					3							3
4 19 1855	0.60	PERFORATING GUNS AT SURFACE 0	56	1160	0.0	0	0					4							4
5 19 1855	0.60	PUMPED CLOSE SUBSEA LUBRICATOR VALVE 0	56	1160	0.0	0	0					5							5
6 19 1900	0.68	RIGGED DOWN PERFORATING GUN AND MODIFY 0	56	1160	0.0	0	0					6							6
7 19 2010	1.84	PUMPED OPEN SUBSEA LUBRICATOR VALVE · 0	54	1330	0.0	0	0					7							7
8 19 2010	1.84	MEDIUM BLOW AT BUBBLE HOSE 0	54	1330	0.0	0	0					8							8
9 19 2011	1.86	PERFORATING GUNS RUN IN HOLE 0	54	1330	0.0	0	0					9							9
10 19 2100	2.68	MEDIUM BLOW AT BUBBLE HOSE 0	54	1330	0.0	0	0					10							10
11 19 2140	3.34	MEDIUM BLOW AT BUBBLE HOSE 0	54	1330	0.0	0	0					11							11
12 19 2143	3.39	PERFORATE ADD ON ZONE 3042 - 3048 METRES WITH 0	54	1330	0.0	0	0					12							12
13 19 2143	3.39	2-1/8 INCH ENERJET GUN 0	54	1330	0.0	0	0					13							13
14 19 2144	3.41	NO OBVIOUS CHANGE TO MEDIUM BLOW AT BUBBLE HOSE 0	54	1330	0.0	0	0					14							14
15 19 2150	3.51	WEAK BLOW AT BUBBLE HOSE 0	54	1330	0.0	0	0					15							15
16 19 2200	3.68	WEAK BLOW AT BUBBLE HOSE 0	54	1330	0.0	0	0					16							16
17 19 2311	4.86	PUMPED CLOSE SUBSEA LUBRICATOR VALVE 0	54	1360	0.0	0	0					17							17

320153

Computer-Aided Testing Program

FIELD ADMOS
SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO YR)	PAGE	OF
DST#4	TILANA #1	1440PSI 3PHASE SEPARATOR	19NOV85	3	4

CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF. RANGE (INS H_2O)	STATIC PRESSURE TAKEN
3071-3075M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
DAY / 24 HOUR CLOCK	FLOW OR SHUT-IN DURATION (HOURS)	TUBING PRESS. (PSIG)	TEMP. (°F)	CASING PRESS. (PSIG)	BHP (PSIG)	BHT (°F)	MAN. CHOKE (64TH) (IN)	HEATER CHOKE (64TH) (IN)	ORIFICE SIZE (INS)	STATIC PRESS. (PSIG)	DIFF PRESS. (IN H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	# 1 OIL TEMP / # 2 OIL TEMP (°F)	OIL GRAVITY @ 60°F °API	W, BSW (%)	# 1 TANK OR METER READING / # 2 TANK OR METER READING (INS OR BBL)	SALINITY (%)
1 19 2311	4.86	PERFORATING GUNS AT SURFACE 0	54	1360	0.0	0	0					1							1
2 20 0020	6.01	PUMPED OPEN SUBSEA LUBRICATOR VALVE 0	54	1380	0.0	0	0					2							2
3 20 0020	6.01	MEDIUM BLOW AT BUBBLE HOSE 0	54	1380	0.0	0	0					3							3
4 20 0045	6.43	VERY WEAK BLOW AT BUBBLE HOSE 0	52	1390	0.0	0	0					4							4
5 20 0045	6.43	RIGGED DOWN SCHLUMBERGER 0	52	1390	0.0	0	0					5							5
6 20 0100	6.68	NO BLOW AT BUBBLE HOSE 0	52	1390	0.0	0	0					6							6
7 20 0110	6.84	STARTED RIG-UP OTIS LUBRICATOR - 0	52	1390	0.0	0	0					7							7
8 20 0150	7.51	PRESSURE TESTED LUBRICATOR TO 4000 PSI - O.K. 4000	52	1390	0.0	0	0					8							8
9 20 0200	7.68	H.P. GAUGE - B.H. SAMPLER RUN IN HOLE 0	52	1390	0.0	0	0					9							9
10 20 0300	8.68	INTERMITTENT BLOW AT BUBBLE HOSE 0	52	1400	0.0	0	0					10							10
11 20 0334	9.24	MEDIUM BLOW AT BUBBLE HOSE / FLUID LEVEL 2150 FT 0	52	1400	0.0	0	0					11							11
12 20 0400	9.68	MEDIUM BLOW AT BUBBLE HOSE 0	52	1400	0.0	0	0					12							12
13 20 0430	10.18	WEAK BLOW AT BUBBLE HOSE 0	52	1400	0.0	0	0					13							13
14 20 0500	10.68	WEAK BLOW AT BUBBLE HOSE 0	50	1430	0.0	0	0					14							14
15 20 0600	11.68	B.H.S. AT DEPTH 10080 FEET 0	50	1430	0.0	0	0					15							15
16 20 0620	12.01	TOOK B.H. SAMPLE AT 3609 PSIA & 272 DEG.F. 0	50	1430	0.0	0	0					16							16
17 20 0645	12.43	WIRELINE START OUT OF HOLE 0	50	1430	0.0	0	0					17							17

Computer-Forms Texaco Plano

320154

SINGLE STAGE UNIT
OEC - 905-1-A

TEST NO	WELL NAME OR NUMBER	TEST UNIT DESCRIPTION	DATE (DAY MO YR)	PAGE	OF
DST#4	TILANA #1	1440PSI 3PHASE SEPARATOR	20NOV85	4	4

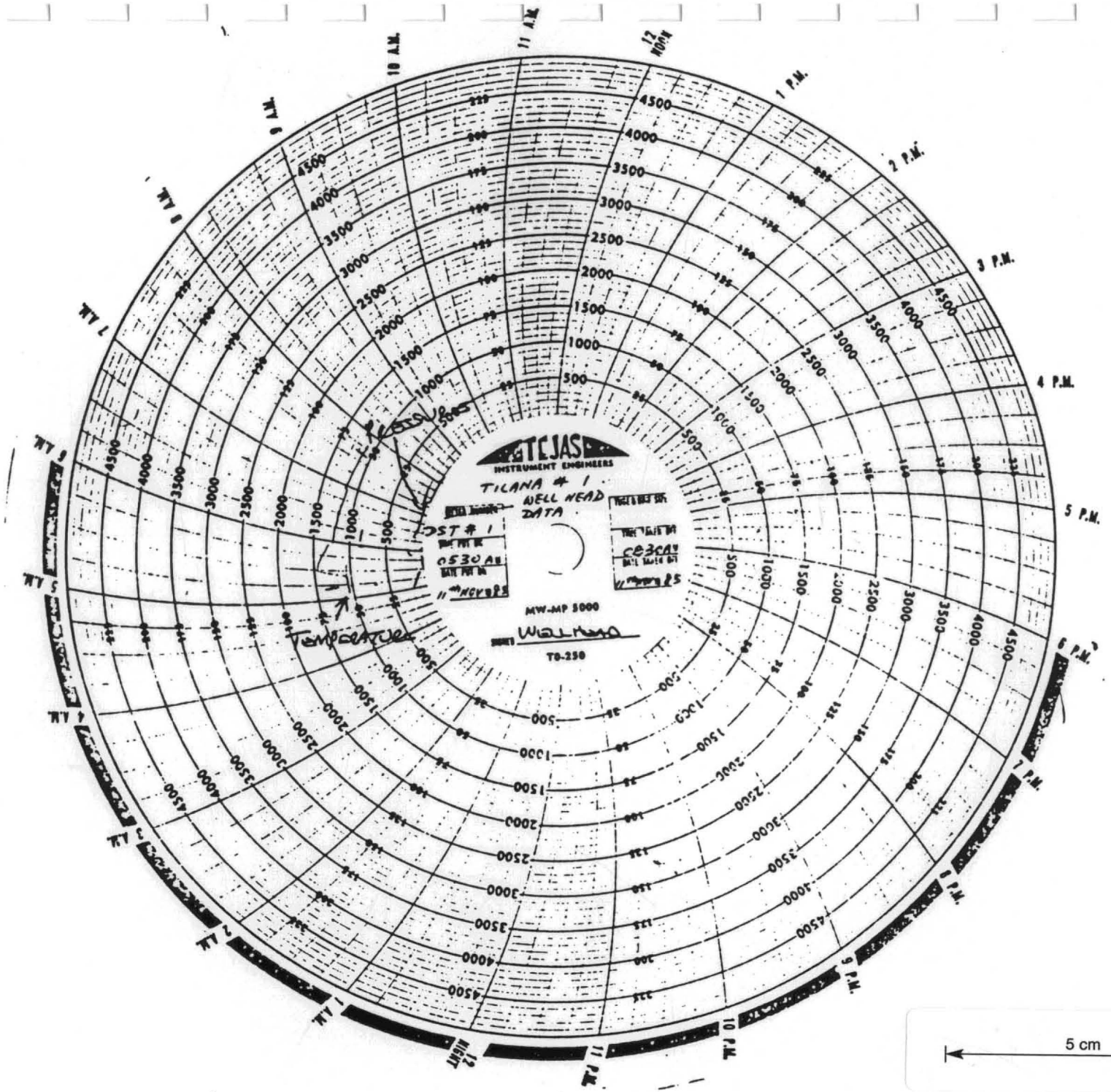
CUSTOMER	FIELD	FORMATION	OIL METER SIZE	METER RANGE (BBLS)
AMOCO AUSTRALIA PETR. CO.	WILDCAT	SANDSTONE	2	6-60 GPM

INTERVAL TESTED	BHP SURVEY DEPTH	GAS PRODUCED TO	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
3071-3075M (FT.)	(FT.)	☐ PIPELINE ☒ FLARE	5.501 (INS)	0-200	☐ UPSTREAM ☒ DOWNSTREAM

	TIME		WELLHEAD DATA			DOWNHOLE DATA		FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING				WATER METERING	
	DAY	FLOW OR SHUT-IN DURATION	TUBING PRESS.	TEMP	CASING PRESS.	B H P	B H T	MAN. CHOKE	HEATER CHOKE	ORIFICE SIZE	STATIC PRESS.	DIFF. PRESS.	TEMP	GAS GRAVITY (AIR=1)	# 1 TANK OR METER READING	# 1 OIL TEMP	OIL GRAVITY	W_t	# 1 TANK OR METER READING	SALINITY
	24 HOUR CLOCK	(HOURS)	(PSIG)	(°F)	(PSIG)	(PSIG)	(°F)	(64THS IN)	(64THS IN)	(INS)	(PSIG)	($IN\ H_2O$)	(°F)	% H_2S	# 2 TANK OR METER READING (INS. OR BBL)	# 2 OIL TEMP (°F)	@ 60°F °API	BSW (%)	# 2 TANK OR METER READING (INS. OR BBL)	(%)
1	20		WEAK BLOW AT BUBBLE HOSE																	
	0700	12.68	0	50	1440	0.0	0	0												
2	20		B.H. SAMPLE AT SURFACE																	
	0830	14.18	0	51	1440	0.0	0	0												
3	20		OPENED SAMPLE. GASEOUS MUD																	
	0900	14.68	0	51	1440	0.0	0	0												
4	20		OTIS H.P. GAUGE RUN IN HOLE TO DETERMINE																	
	1000	15.68	0	53	1440	0.0	0	0												
5	20		FLUID DEPTH																	
	1000	15.68	0	53	1440	0.0	0	0												
6	20		WEAK BLOW AT BUBBLE HOSE																	
	1100	16.68	0	55	1440	0.0	0	0												
7	20		VERY WEAK BLOW AT BUBBLE HOSE																	
	1130	17.18	0	55	1440	0.0	0	0												
8	20		NO BLOW AT BUBBLE HOSE																	
	1145	17.43	0	55	1440	0.0	0	0												
9	20		NO BLOW AT BUBBLE HOSE																	
	1200	17.68	0	55	1440	0.0	0	0												
10	20		NO BLOW AT BUBBLE HOSE																	
	1300	18.68	0	55	1440	0.0	0	0												
11	20		H.P. GAUGE AT SURFACE																	
	1320	19.01	0	55	1440	0.0	0	0												
12	20		RIGGED UP C.C.L. / H.P. GAUGE AND																	
	1350	19.51	0	55	1440	0.0	0	0												
13	20		BOTTOM HOLE SAMPLER																	
	1350	19.51	0	55	1440	0.0	0	0												
14	20		WIRELINE AND TOOLS RUN IN HOLE																	
	1425	20.09	0	55	1440	0.0	0	0												
15	20		WIRELINE STARTED PULLING OUT OF HOLE W/SAMPLERS																	
	1645	22.43	0	55	1440	0.0	0	0												
16	20		SAMPLERS AT SURFACE																	
	1730	23.18	0	55	1440	0.0	0	0												
17	20		REVERSED CIRCULATE TEST STRING ENDING DST #4																	
	1730	23.18	0	55	1440	0.0	0	0												

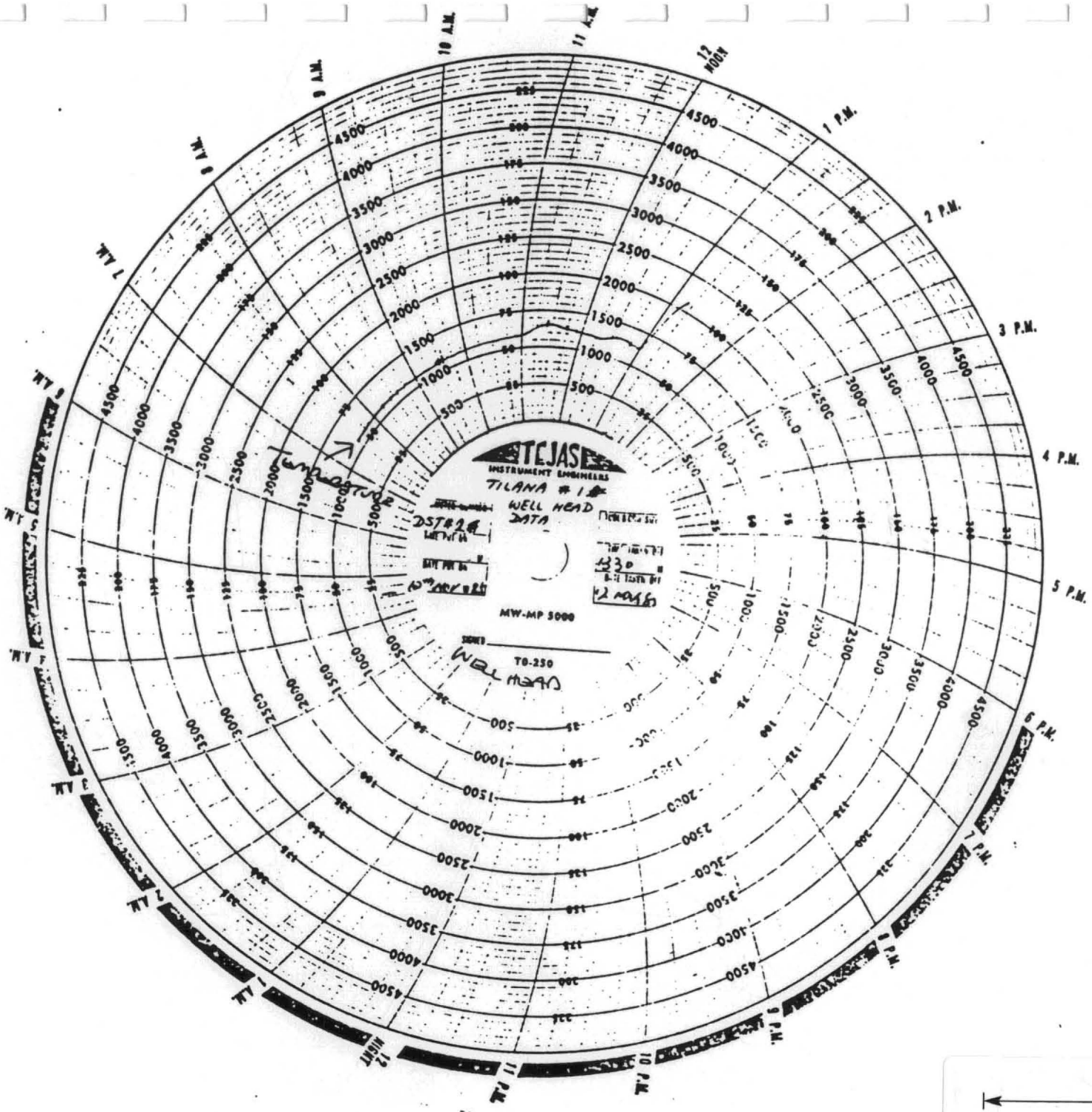
Computer-Forms Tucson Phoenix

320155


TEJAS
INSTRUMENT ENGINEERS
TILANA # 1
WELL HEAD
DATA
DST # 1
0530 AM
11th NOV 85
MW-MP 5000
WELLHEAD
TO-250
PRESSURE
TEMPERATURE
12 NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
12 NIGHT
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
6 A.M.
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.

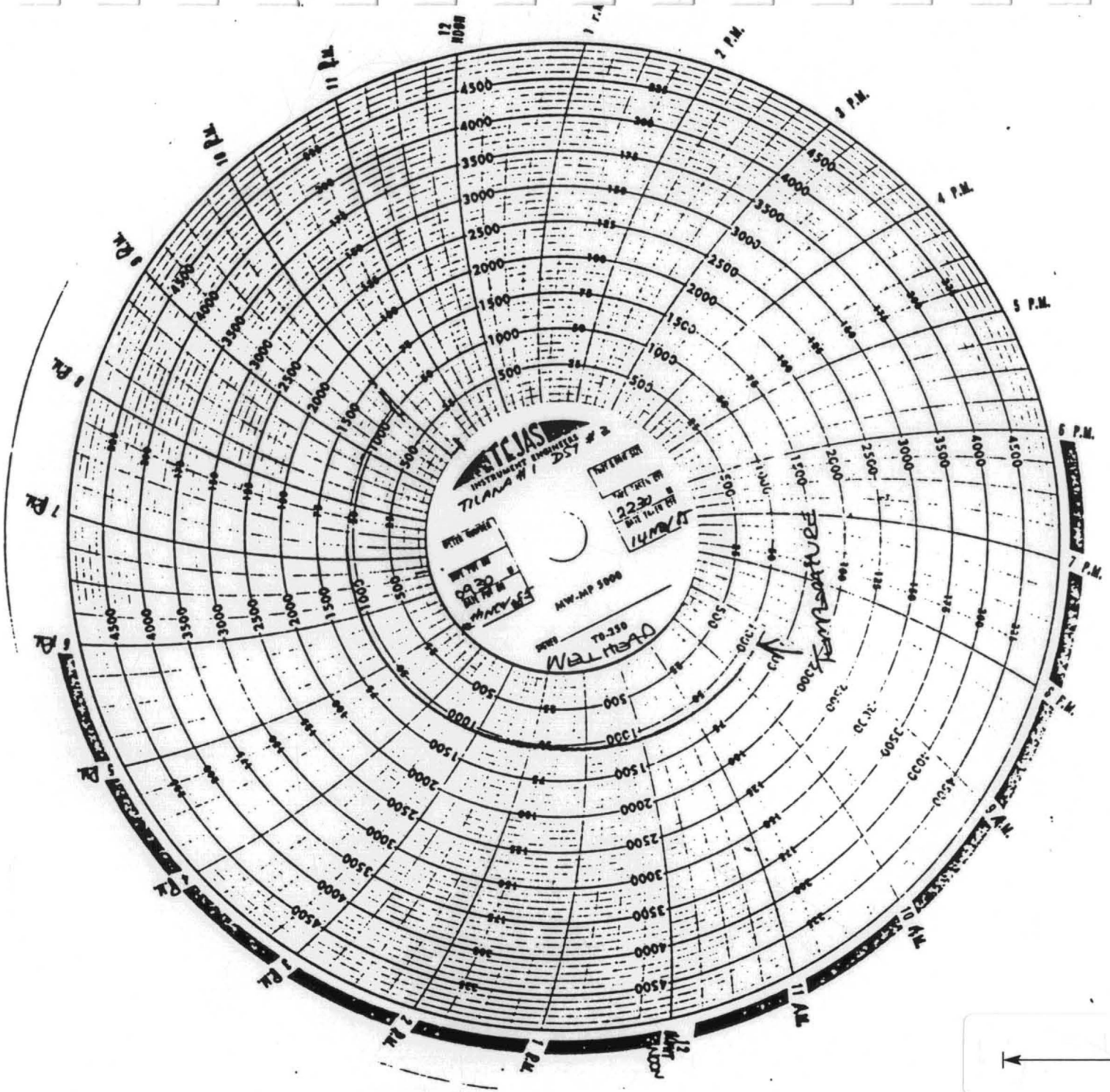
320156

5 cm


TEJAS
INSTRUMENT ENGINEERS
TILANA #1
WELL HEAD
DATA
DST#2
MW-MP 5000
TO-250
WELL HEAD
12 NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
12 NIGHT
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
6 A.M.
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.

320157

5 cm


TEJAS
INSTRUMENT ENGINEERS
TILANA #1 DST #2
MW-MP 5000
WELLHEAD
TEMPERATURE
12 NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
12 MIDNIGHT
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
6 A.M.
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
12 NOON

5 cm

320158

TEJAS
INSTRUMENT ENGINEERS
TILANA # 1 DST #3
MW-MP 5000
TR-250
12 NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
12 MIDNT
11 A.M.
10 A.M.
9 A.M.
8 A.M.
7 A.M.
6 A.M.
5 A.M.
4 A.M.
3 A.M.
2 A.M.
1 A.M.

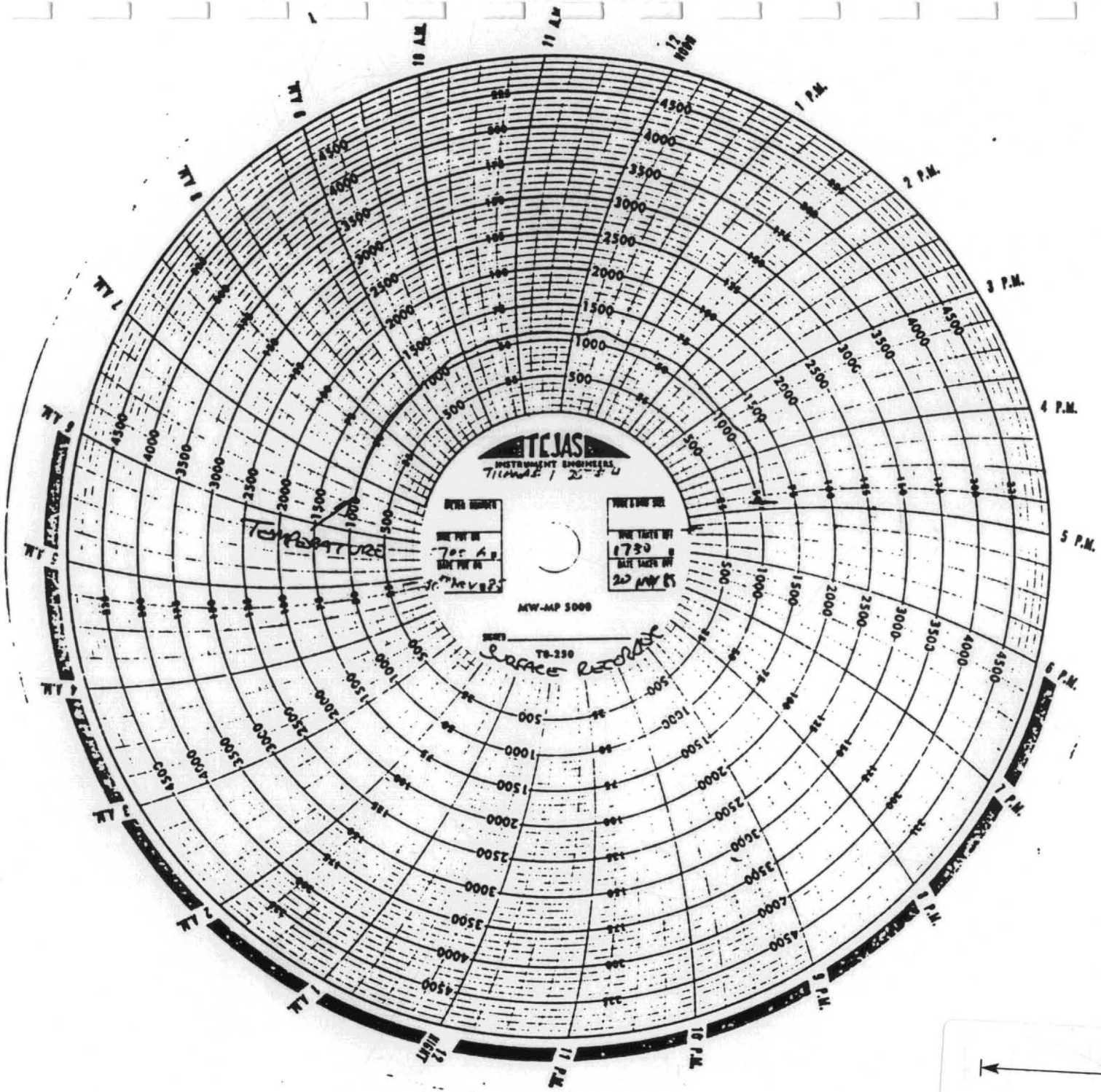
320159

5 cm

TEJAS
INSTRUMENT ENGINEERS
MW-MP 5000
T8-250
SURFACE RETURNS
12 NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
12 MIDNT
10 A.M.
9 A.M.
8 A.M.
7 A.M.
6 A.M.
5 A.M.
4 A.M.
3 A.M.
2 A.M.
1 A.M.

320160

5 cm


TEJAS
INSTRUMENT ENGINEERS
MW-MP 5000
TB-250
TEMPERATURE
SURFACE RECORDER
1730
20 MAY 85
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
12 NIGHT
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
6 A.M.
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
12 NOON

5 cm

320161

320162

APPENDIX 7

THE FORAMINIFERAL SEQUENCE

IN

TILANA-1

PART 1 : 420-1650M

PART 2 : 1400-3300M
(SELECTED SAMPLES)

MODIFIED FROM REPORTS
BY DR. D. TAYLOR

SUMMARY

Paleontological analyses were conducted on Tilana-1 samples from the interval 420 meters to 1650 meters in order to define the foraminiferal zones within the Torquay Group (including the Angahook Formation), and the Demons Bluff Formation. Further work was done on selected samples from 1400-3300m within the Eastern View Coal Measures to evaluate the extent of marine influences during deposition. Based upon the results of the paleontological analyses, two periods of marine ingression are thought to have had minor influence on the deposition of the sediments of the E.V.C.M. Marine influences are evident within the intervals 2592-2602m and 2943-2952m.

PART 1 (420-1650M)

INTRODUCTION

Twenty intervals of ditch cutting samples were examined between 420 and 1650 meters from Tilana-1. Initially, sampling was at 100m intervals, but this was narrowed at some horizons in order to more accurately establish unit tops or achieve greater biostratigraphic control where planktonic faunas were poorly represented; as within the Demons Bluff Formation. Downhole contamination was minimal, with displacement being no more than 10 metres at the top of the Demons Bluff.

A summary of the Tilana-1 is given on Table 1; whilst distributional data of planktonic and benthonic foraminifera, other fauna and sediment grain analysis are presented as Tables 2 and 3. Biostratigraphic reliability is shown on Table 4.

EOCENE - Demons Bluff Formation - top between 1520 and 1530 metres.

Top picked on first appearance pyritic tubes and discs of biogenic origin and of fine grained, grey coloured specimens of the arenaceous foraminifera Haplophragmoides spp. The sampled interval 1550-60m contained a sparse planktonic fauna of Globigerinatheka index, Globigerina (Subbotina) linaperta and G. (S.) angiporoides (S.L.) indicating a biostratigraphic position corresponding with the top of the Eocene (refer detailed discussion in Lindsay, 1985).

? OLIGOCENE - ANGAHOOK FORMATION Top 1150m.

Basically a quartz sand sediment packet intersected by volcanogenic rocks (? basalt) between 1400 and 1260 metres. Both above and below the volvanic rocks, the sands contain numerically sparse benthonic faunas; but no planktonic foraminifera were found. The benthonic assemblages cannot be considered as biostratigraphically diagnostic, so that an Oligocene age is inferred by:-

i) Stratigraphic position in Tilana-1, between Late Eocene (at 1550m) and Early Miocene (at 1100m).

ii) Comparison with similar sequences of sediments and volcanics; particularly that discussed by Abele & Page (1974, p.147-148 & Fig. 4) along the Victorian coastline near Anglesea.

Abele & Page (l.c.) obtained radiometric ages for the basalts of between 26.5 to 27 m.y. (mid Oligocene) which is consistant with extrapolation of planktonic foraminiferal data.

It cannot be ascertained whether this Tilana Unit unconformably underlies the Early Miocene bioclastic limestone. In Yolla-1 this relationship appears to be unconformable as the fine grained quartz silty sandstone contained Early Oligocene (Zone J) planktonic foraminifera between the Early Miocene bioclastic sediments. This Yolla quartz silty sandstone unit was correlated with the Jan Juc Formation on faunal similarities. However, it now seems more appropriate to correlate the Yolla sandstone with that in Tilana, where a tentative correlation with the Angahook Formation is made.

EARLY to MID MIOCENE - Bioclastic Carbonates - top at 800m.

Low diversity planktonic faunas represented Zone G at the base (1100-10m) with the sequence extending up to the Mid Miocene Zone D-2 at 800-10m. The initial sediments were calcareous siltstones deposited in paleodepths at or below 100m. Low to moderate energy conditions were evident. At and above 1000m bryozoal debris were the dominant elements of the residue grains, suggesting increase in the energy regime transporting debris from elevated banks into a relatively deep area. Filling of this deep was evident from decrease in paleodepth, up section (refer Table 1). A similar situation was postulated for Yolla-1.

MID MIOCENE or YOUNGER - from 760-420m.

Sparse planktonic faunas did not permit biostratigraphic designation. Paleodepth continued to decrease up section, with very shallow conditions at 420m (highest sample) evident by the total dominance of Elphidium spp. and related genera.

PART 2 (1400-3300M)

INTRODUCTION

In order to evaluate the extent of marine influence during the deposition of the Eastern View Coal Measures (E.V.C.M.) it was decided to selectively search for Foraminifera in this unit, as previously few samples had been examined from below the Demons Bluff Formation.

Selection of samples was based on reports of Dinoflagellates by Roger Morgan. Added to this suite of fifteen ditch cutting samples were chip samples of conventional core supplied by Amoco. The selection criterion proved reliable in that only five of the eighteen samples were barren of fauna. Sample data is given with the distributional data on Table 6. None of the faunas found were considered to have been caved from the uphole section of the well.

The following report concentrates on the paleo-hydrology, with paleo-salinity trends plotted on Table 4. However, at the end of the report, comment is made on tentative biostratigraphic correlation of samples at 2592, 2943 and 3300 metres, as shown on Table 5.

PALEO-HYDROLOGY

The presence of foraminiferal and molluscan assemblages enabled the construction of a Paleo-salinity plot for the E.V.C.M. between 2385 and 2952 metres in Tilana-1. This plot is presented as Table 4. with data added from higher in the section; after Taylor (1985).

A weakly brackish (0.5 to 5p/000) to fresh water hydrological regime persisted, despite paleo-salinity fluctuations with two incursions of oceanic waters (35p/ooo) bearing rich Dinoflagellate and sparse planktonic foraminiferal assemblages at 2592 and 2943 metres. Both these incursions were preceeded by an interval barren of planktonic microfossils. Thus periodic penetrations of oceanic waters increased the salinity of this shallow enclosed sea. Immediately following each ingression the more saline waters were severely diluted by stream discharge before being recharged by sea water during another marine ingression.

The fluctuations between stream discharge and sea water incursions are also displayed by the distribution of disseminated plant debris within the sediment.

Morphologically simple arenaceous assemblages were the only Foraminifera found associated with this plant debris, as these were the only forms that could withstand acidic conditions generated by the decomposition of the vegetative materials. Dinoflagellates were rare in these organically rich sediments, enhancing the interpretation that deposition occurred adjacent to fresh water disgorging from streams. It is noted that the lower salinity tolerance is less than 5p/ooo for living representatives of the genera in these assemblages; namely Ammobaculities, Psammospheara and Reophax (refer Boltovskoy & Wright, 1975, and apthorpe, 1980).

Shale rich samples, where both plant debris and Foraminifera were absent, were probably deposited in low salinity water with foraminiferal growth restricted by the lack of nutrients usually provided by the vegetative matter.

Plant debris was also absent where planktonic assemblages were recorded. Such assemblages of both Foraminifera and Dinoflagellates mark marine ingressions at 2592 and 2943 metres. These 'high sea-level' events no doubt inhibited the spread of stream discharge material to the depositional site, thus explaining the absence of plant debris in these shale rich samples. Paleo-salinity of these two marine ingressive 'peaks' would have been within the range of sea water (30 to 35p/ooo) as planktonic Foraminifera have a very narrow salinity tolerance range, in contrast to the wide salinity range of arenaceous Foraminifera.

The ingressive shales with planktonic microfossils were also deposited and/or buried in acidic environments. However, this acidity was due to anaerobic conditions with sulphur forming bacteria producing pyrite which infilled Foraminifera and other fossils (see Table 6). These infills became internal moulds when the calcitic test walls were dissolved by acids generated by the microbiological processes. The biogenic pyritization and destruction of calcite was complete at 2943 metres, whilst the sample at 2592 metres does have the calcitic tests, including those of benthonic Foraminifera. Between 2592 and 2602 metres the pH may have approached that of normal sea water (7.8 to 8.3), as benthonic Foraminifera would neither have grown nor been preserved in media with lower, acidic ph.

The indication of increased oxygenation between 2592 and 2602 metres suggests that this marine ingression was stronger than that between 2943 and 2952 metres. This conclusion is supported by a greater percentage of Dinoflagellates at 2592 metres than elsewhere in the E.V.C.M. in Tilana-1. This 2592 metre ingressive peak may have been a widespread marine event throughout the Bass Basin.

No Dinoflagellates were reported between 2952 and 3300 metres, but an occurrence of rare Dinoflagellates at 3300 metres was associated with an abundance of bivalve, molluscan, calcitic shell fragments. These fragments had a maximum thickness of 2mm, were bi-lamellid, having a thick prismatic layer and a thin lamellar layer. The depositional environment could have been intertidal or strand line, with a paleosalinity within the range of sea water.

BIOSTRATIGRAPHY

Table 5 graphs the recorded ranges of Eocene Planktonic Foraminifera, along the Southern Australian margin and around New Zealand. By using correlation of concurrent biostratigraphic ranges, it would appear that the Tilana sample at 2592 metres was deposited in the basal part of the Middle Eocene, whilst that at 2943 metres has a biostratigraphic position, straddling the Early/Middle Eocene boundary. The Table also shows the biostratrgraphic position, within the Late Eocene, of the planktonic ingression at 1550 metres (Demons Bluff Formation).

The palynological age for the 3300 metres sample, was Paleocene. The association with mollusca could imply that this horizon represents the marine ingressive event of the Pebble Point Formation in the Otway Basin.

REFERENCES

APTHORPE, M., 1980 - Foraminiferal distribution in the estuarine Gippsland Lakes system, Victoria. Proc. Roy. Soc. Vict., 91; 207-232.

ABELE C. & PAGE, R.W., 1974 - Stratigraphic and isotopic ages of Tertiary basalts at Maude and Aireys Inlet, Victoria, Australia.

Proc. Roy. Soc. Vict., 86 (2); 143-150.

BOLTOVSKOY, E & WRIGHT, R., 1976 - Recent Foraminifera. Dr. W. Junk - The Haque.

LINDSAY, J.M. 1985 - Aspects of South Australian Tertiary foraminiferal biostratigraphy, with emphasis on studies of Massilina and Subbotina. Spec. Publ. S. Aust. Dept. Mines and Energy, 5; 187-231. Ludbrook Honour Volume.

TAYLOR, D., 1985 - The Foraminiferal sequence in Tilana-1 - Bass Basin. Report to Amoco Australia Petroleum Company, October 30th, 1985.

320168

AGE	Sample depth of 'tops' in metres	PLANKTONIC FORAMINIFERAL ZONES	PALEO-DEPTH ESTIMATES 0 100m	UNIT TOP in METRES	LITHO-UNITS and PALEO-ENVIRONMENTS
MID MIOCENE and YOUNGER	420	?			UNNAMED CARBONATES ≡ TORQUAY GROUP Richly bioclastic limestone with dominance of worn bryozoal fragments. High energy winnowing of biogenic sands evident. Accumulation rates relatively high with depositional depth gradually decreasing up section.
		?			
		?			
MID MIOCENE	800	D-2			
		E-1			
EARLY MIOCENE	990	E-2		1040	Calcareous siltstone - lower energy & deeper water deposit than above.
		F			
		G			
?EARLY MIOCENE to ?OLIGOCENE	1150	?		1150	ANGAHOOK FORMATION. Lithologically divisible into three units - i) Upper quartz sand, grain texture suggests wind transport thus part of a barrier/dune system. ii) Volcanogenic material. iii) Basal calcareous cemented fine quartz sandstone. Micro-fossils suggest barrier barred lagoonal system.
v v v v v v v v v v v v v v v	1260	v v v v v v v v v			
? EARLY OLIGOCENE to LATE EOCENE	1400	?		1520 to 1530	
LATE EOCENE	1550	K			DEMONS BLUFF FORMATION. Anoxic pyritic siltstone indicated restricted marginal marine environment.
	1650				

TABLE 1: INTERPRETED FORAMINIFERAL SEQUENCE - TILANA # 1 - BASS BASIN.

* Only ditch cutting samples available

vvv Volcanogenic materials correlateable with Anglesea region (onshore Victoria) thus have a possible chronostratigraphic age of ≈26.5 - 27 m.y. ≡Mid Oligocene (refer Abele & Page, 1974).

5 cm

David Taylor,
October 24, 1985.

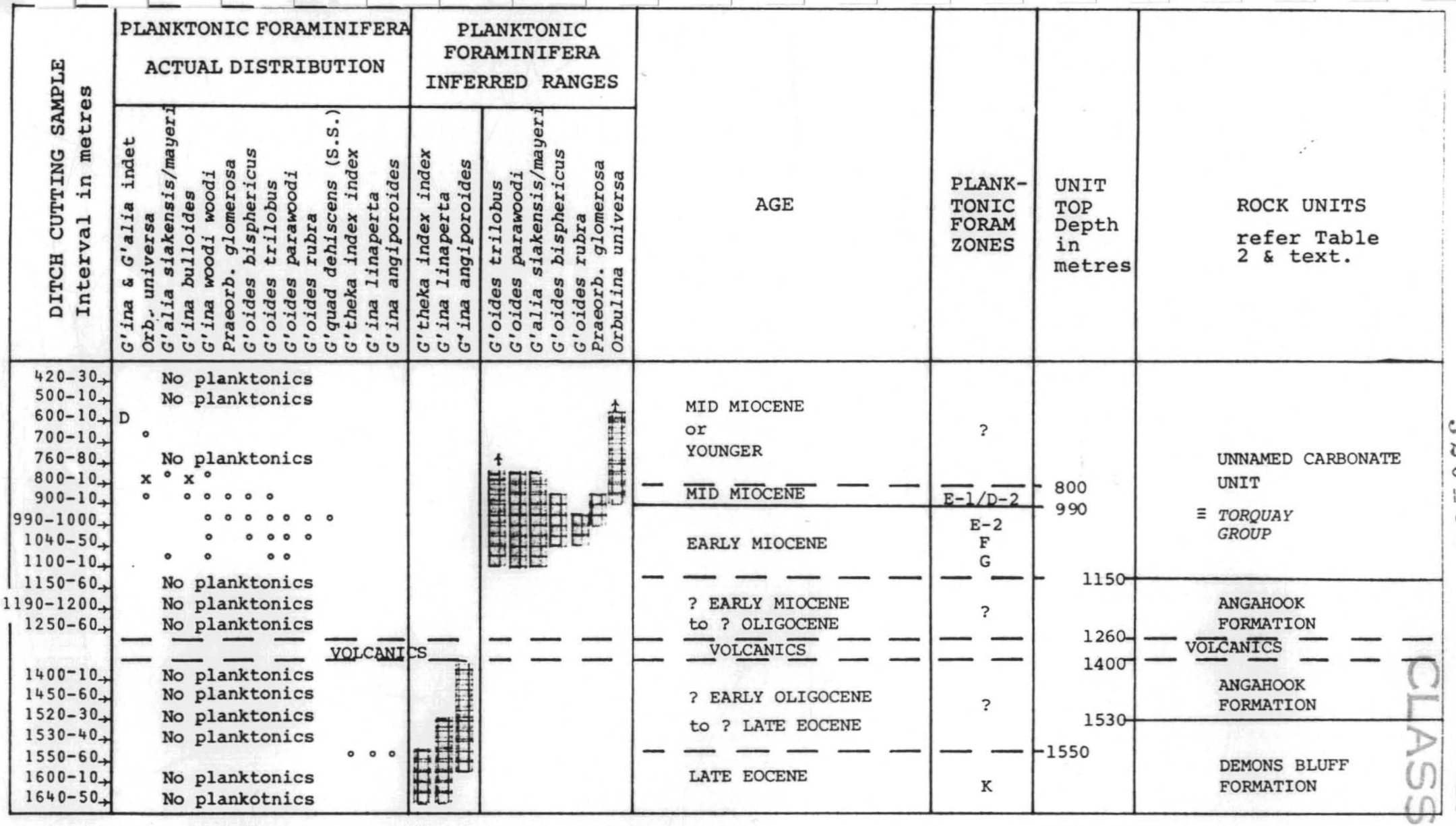


TABLE 2: STRATIGRAPHIC DATA - TILANA # 1 - BASS BASIN.

Symbols: ° = 1-20 specimens
x = >20 specimens
D = Dominant 60% of specimens
Documented range for Bass Strait Basins

5 cm

David Taylor,
October 22, 1985.

320169 CONFIDENTIAL CLASS 1

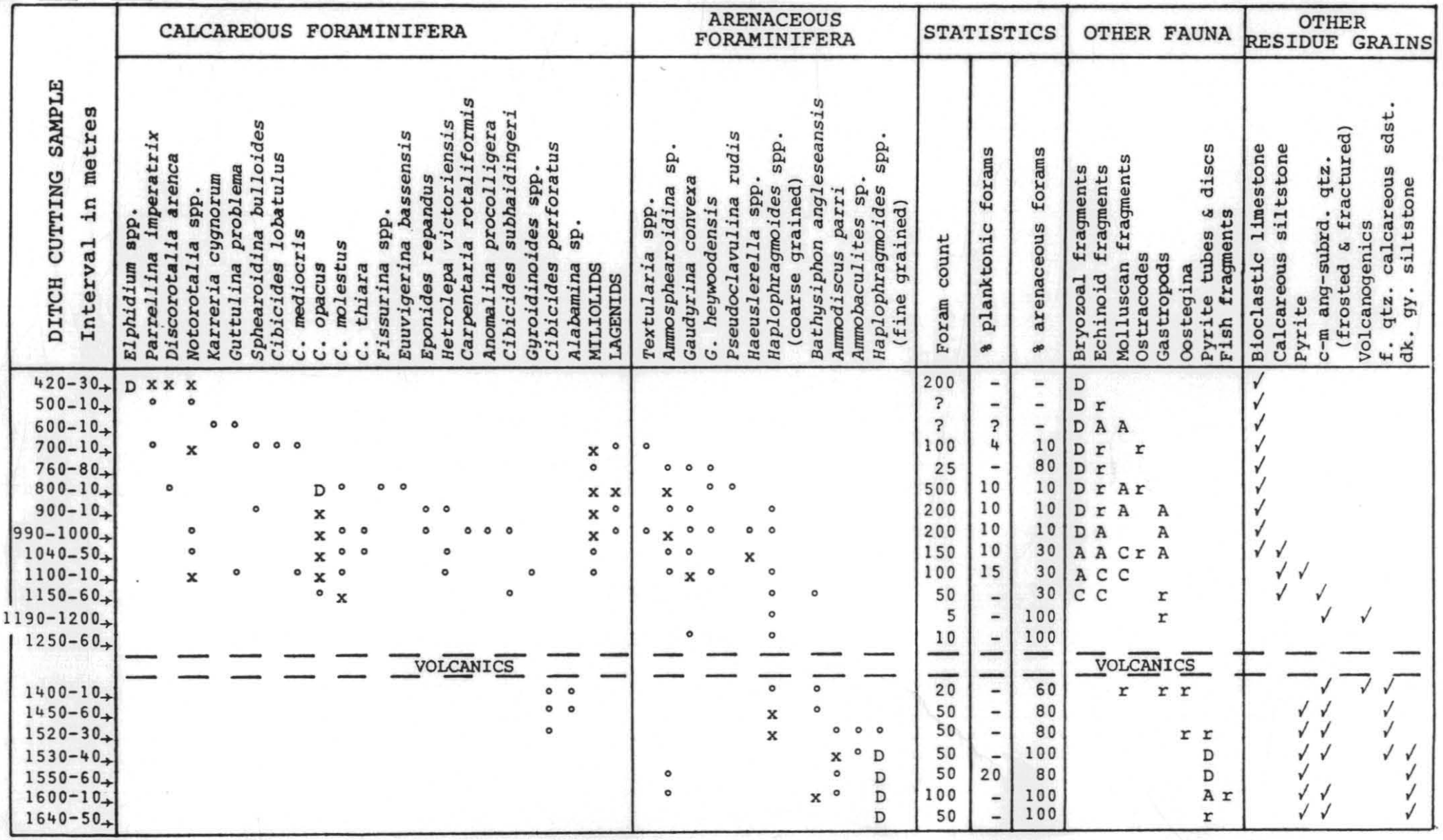


TABLE 3: BENTHONIC FORAMINIFERA and RESIDUE GRAIN DISTRIBUTION - TILANA # 1 - BASS BASIN.

Symbols: ° = 1-20 specimens
x = >20 specimens
D = Dominant >60% of fauna
A = Abundant
C = Common
r = rare
✓ present

David Taylor,
October 23, 1985.

320170

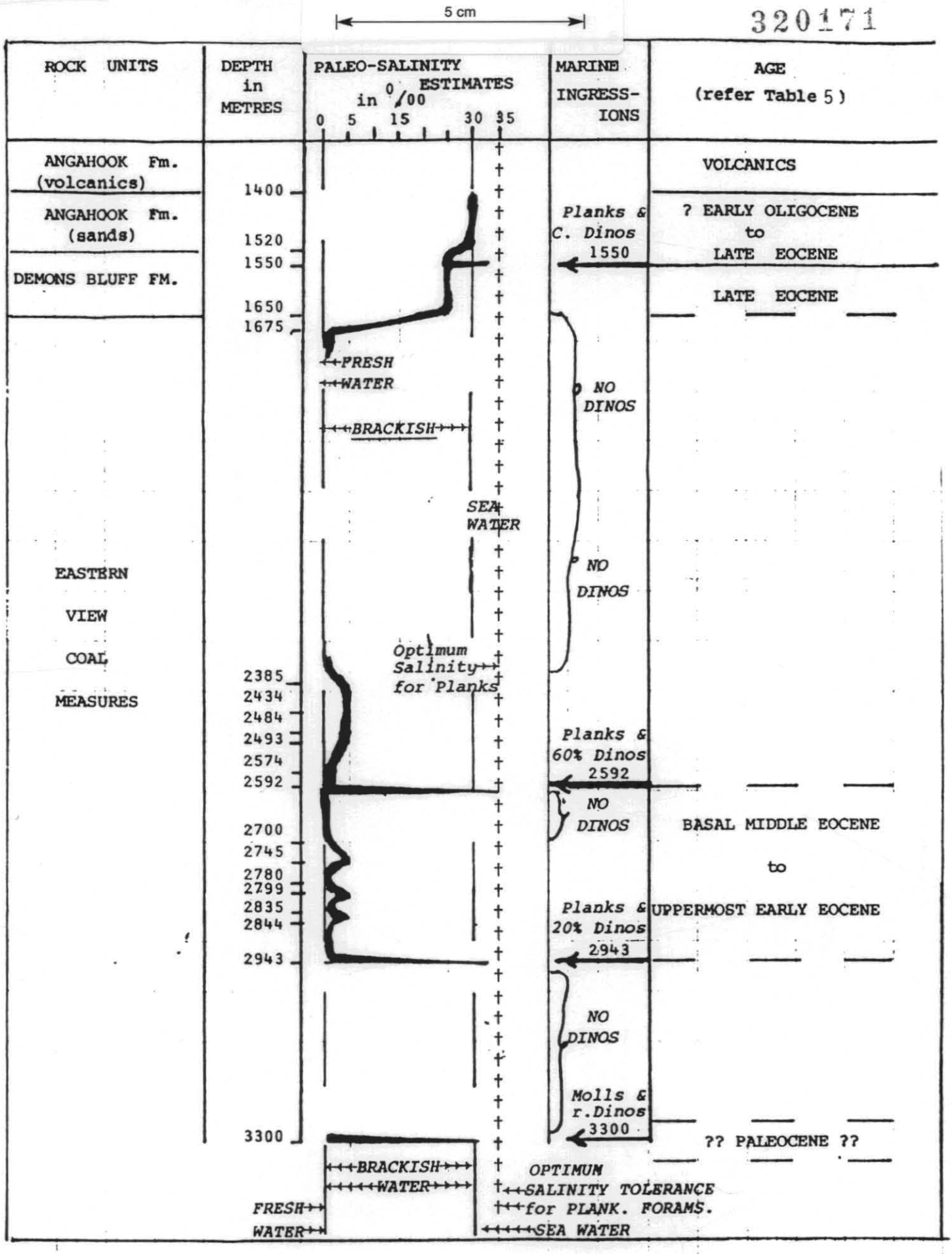


TABLE 4 - PALEO-SALINITY INTERPRETATIONS for PALEOGENE SEQUENCE in TILANA # 1

← = Marine ingressive event with depth in metres- arrow size is relative to strength of sea water invasion.

Planks = Planktonic Foraminifera. Moll = Bivalve mollusca

Dinos = Dinoflagelates with frequency.

David Taylor, December 23rd, '85.

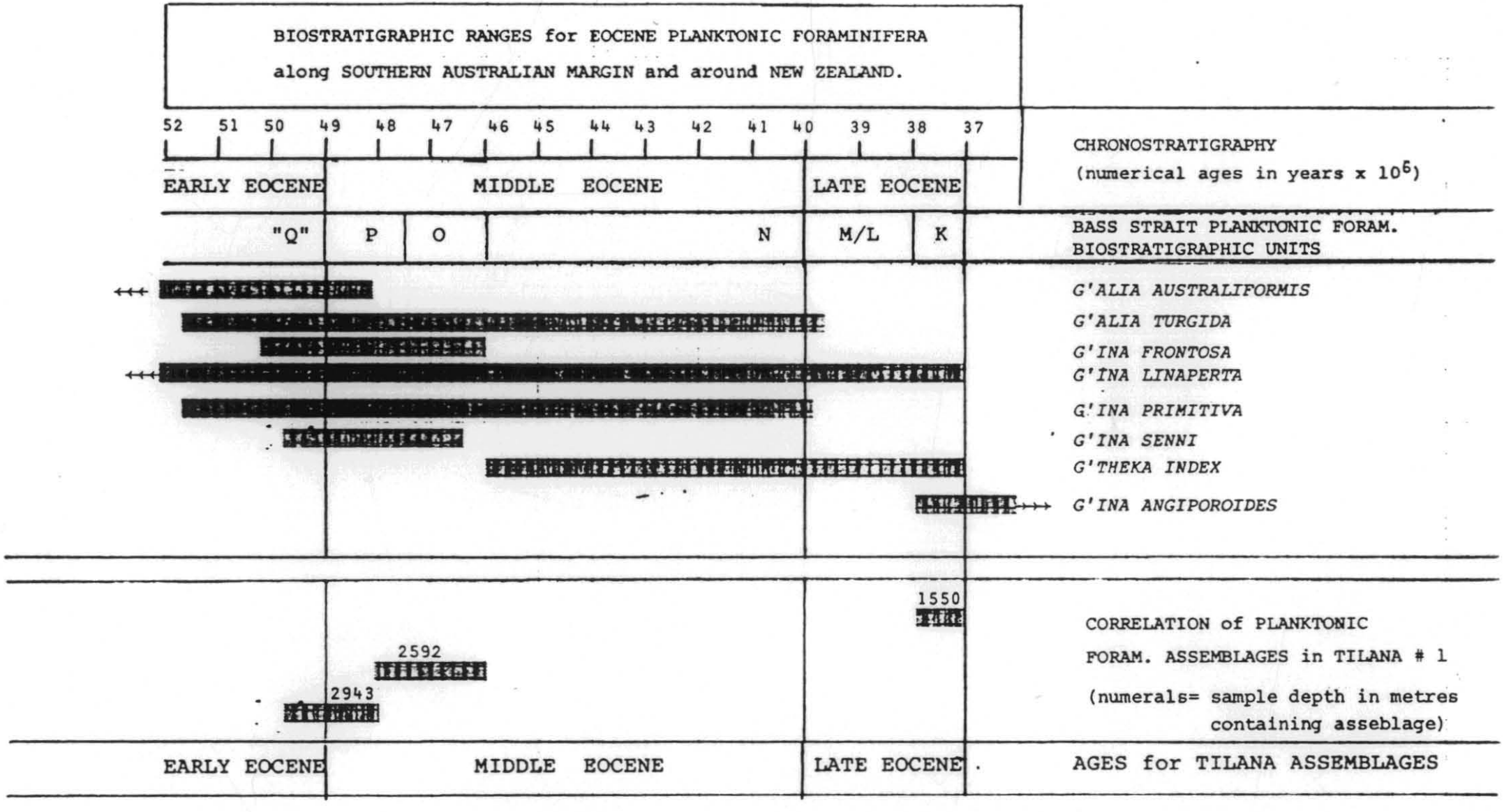


TABLE 5 - EOCENE PLANKTONIC FORAMINIFERAL BIOSTRATIGRAPHIC RANGE CHART - TILANA # 1.

(For distribution of species listed above, refer Table 3 for TILANA # 1)

David Taylor

December 22nd, 1985

5 cm

32017

SAMPLE DEPTH in metres CC = Conventional Core 2385-94= Ditch Cuttings Interval.	FORAMINIFERA ✓ present NFF= not found	PLANKTONIC FORAMINIFERA						CALCAREOUS BENTHONICS			ARENACEOUS BENTHONICS					%Planktonic Foraminifera	% Calcareous Benthonic Foraminifera	% Arenaceous Benthonic Foraminifera	Molluscan Fragments	Biogenic pyrite as discs, spheres & tubes	Pyrite moulds of calcite shells	Calcite shell material intact	SAND/SHALE RATIO	Disseminated plant debris	Pellet Glauconite	'Green Clay' ?Glauconite?	DINOFLAGELLATE FREQUENCY from Roger Morgan	DEPTH in metres at interval top.
		G'ina frontosa	*G'ina senni*	*G'ina linaperta*	*G'alia turgida*	*G'alia australiformis*	*G'ihe primitiva*	*Cibicides spp*	*Pullenia sp.*		*Reophax sp*	*Ammbaculites spp.*	*Psammosphaera sp.*	*Bathysiphon sp.*	*Trochammina sp.*														
1675.5 (CC#1	NFF																						60/40				?	1675.5
2385-94	✓										8	2						100%		5	?		30/70	✓			tr.	2385
2434-43	✓										5	5						100%	Shell			100%	20/80	✓			tr.	2434
2484-93	✓										5	5						100%					90/10	✓			tr.	2484
2493-04	✓										10	2	4					100%					60/40	✓			tr.	2493
2574-83	✓												5					100%					20/80	✓			?	2574
2592-01	✓	2	1	1	1			3	1		5			5		30%	20%	50%	Mould	30	30%	70%	5/95		✓		60%	2592
2700-09	✓											3	3					100%					20/80	✓			tr.	2700
2736-45	✓										10	2	4					100%					70/30	✓	✓		tr.	2736
2745-54	✓										10	5	5					100%		2	?		70/30	✓	✓		tr.	2745
2788.6(CC#2)	NFF																						0/100				?	2788.6
2800 (CC#2)	NFF																						0/100				?	2800
2799-09	✓										10		3					100%		5	?		80/20	✓			tr.	2799
2835-44	NFF																						95/ 5				tr.	2835
2844-53	✓										10	5	10	5	2			100%					95/ 5		✓		tr.	2844
2943-52	✓	1	1	1	1	1	1						6			50%		50%		20	100%	nil	5/95		✓		20%	2943
3291-00	NFF																						50/50			✓	?	3291
3300-05	●																		PRISMS			100%	50/50			✓	tr.	3300

TABLE 6 - MICROPALEONTOLOGICAL DATA from EASTERN VIEW COAL MEASURES in TILANA # 1

● = Abundant bivalve molluscan fragments - no Foraminifera found.

tr.= trace

N.B. Numbers only (ie. 5) are actual counts in given area of residue.

David Taylor December 24, 1985

5 cm

32017

520173A

APPENDIX 8

PALYNOLOGY

OF

TILANA-1

MODIFIED FROM REPORT
BY DR. R. MORGAN

INTRODUCTION

48 samples (26 cuttings, 19 sidewall cores, 3 core plugs) from the interval 1540-3878 were analyzed for age, depositional environment and as control for thermal maturity. The stratigraphic section represented by the samples spans the Maastrichtian T. Longus to Early Oligocene upper N. Asperus Zones. Depositional environments range from non-marine to marginal marine. Spore coloration indicates that the section from the upper M. Diversus through the lower L. Balmei zones is thermally mature for liquid hydrocarbon generation.

Palynomorph occurrence data are the basis for the assignment of the studied section to six spore-pollen units of Maastrichtian to Early Oligocene age. The zonation is that of Stover and Evans (1973) and Stover and Partridge (1973), set up in the Gippsland Basin, and modified for the Bass Basin by Partridge (1973).

No formal dinocyst zonation has been published for the Gippsland or Bass Basins, although Harris (1985) has recently published some dinocyst zones for part of the Eocene of the St. Vincent and Otway Basins. Partridge (1976) published a table showing zone names in the Gippsland Basin but charts defining these zones were never published.

Maturity data was generated in the form of Spore Colour Index, and is plotted on Figure 1 Maturity Profile of Amoco Tilana-1. The data might be considered to be unreliable as they are largely generated from cuttings samples. However, given the available sidewall core control, the low level of contamination seen during biostratigraphic work, these data are considered reliable.

PALYNOSTRATIGRAPHY

A. 1540-1650m (both cutts) : upper N. asperus Zone

Assignment to the upper Nothofagidites asperus Zone is based on negative evidence. Indicators for both the overlying p. tuberculatus and underlying middle N. asperus Zones were absent. Key species indicating a middle N. asperus or younger zonal assignment include Proteacidites tuberculatus and P. rectomarginus.

Of the dinocysts present, only Deflandrea phosphoritica and Phthanoperidinium comatum are age significant, and indicate only a lower N. asperus or younger assignment.

Cretaceous reworking is minor, but seen in both cuttings samples.

Environments are nearshore marine, as shown by dinocyst contents of 2% at 1540-50m and 5% at 1640-50m, and low to moderate diversity.

Spore colours are generally yellow/brown, indicating marginal maturity for oil, and immaturity for gas/condensate. However, in the deeper sample (1640-50m), about 5% of palynomorphs have higher maturity, up to mid brown spore colours (mature for oil and gas/condensate). As no sidewall cores are available, it is impossible to determine if these are reworked, or if the cuttings intervals includes a gradation of maturity, higher at the base and lower at the top.

B. 1575.7m (swc) - 2330.0m (swc) : indeterminate

All samples in this interval are barren of recognizable palynomorphs and dominated by inertinite. Traces of highly carbonized fragments are seen intermittently and indicate that the section is post-mature due to excessive heating.

C. 2356.0-2464.0m (swcs) : upper M. diversus Zone

The interval is assigned to the upper Malvacipollis diversus Zone at the base on the oldest occurrences of Myrtaceidites tenuis (2435.0m) and Proteacidites pachypolus (2464.0m) and at the top by the absence of younger indicators. Spinozonocolpites prominatus was conspicuously present in these samples.

Dinocysts are present in all four samples and include Homotriblium tasmaniense in the upper two samples, and Muratodinium fimbriatum in the lower three samples. This association occurs only in the upper M. diversus and lowermost P. asperopolus Zones in the Gippsland Basin, and so broadly confirms the spore-pollen assignment.

Marginally marine environments are indicated by the presence of low diversity dinocysts (about 5 species) comprising 2-5% of palynomorphs. Spores and pollen are common and diverse.

The interval is peak mature at the top, and mature at the base. Spore colours show a gradation from dark brown (2356.0m), mid brown (2394-2403m cutts) to light brown (2435.0 and 2464.0m). All samples are thus mature for oil, and all except the deepest are mature for gas/condensate.

D. 2493m (cutts)-2751m (swc) : lower and middle M. diversus Zones

The interval is assigned to the lower and middle Malvacipollis diversus Zones on the absence of younger indicators detailed above, and on the oldest occurrences of Malvacipollis diversus, spinozonocolpites prominatus and Periporopollenites demarcatus in the sample at 2751.0m. However, other interpretations are possible.

First, the uppermost sample (2493-2502m) could be assigned to the upper M. diversus Zone on dinocyst evidence discussed below.

Second, the lowermost sample contains the youngest occurrences of Lygistepollenites balmei and Gambierina rudata, and could therefore be assigned to the underlying L. balmei Zone. These youngest occurrences are considered herein to be reworked, in view of the other evidence mentioned above. However, some downhole contamination of the sidewall core at 2751.0m has undoubtedly occurred, as shown by the presence of Proteacidites pachypolus and Triporopollenites ambiguus.

Third, within the interval, the oldest occurrences of Polycolpites esobalteus and Proteacidites clarus at 2593-2602m (cutts) and of Liliacidites lanceolatus at 2549.0m (swc) suggests that the interval 2493 (cutts)-2602m (cutts) could belong to the middle M. diversus Zone, and the interval 2637.5m (swc)-2751.0m (swc) to the lower M. diversus Zone. However, the samples from 2637.5m and 2667.0m are dominated by cuticle, and therefore have low diversity spore pollen assemblages. The absence of middle M. diversus indicators may be partly due to these poor assemblages, and not time stratigraphy. In addition, the cuttings samples in this interval show evidence of caving.

In summary, the lack of good assemblages in the available sidewall cores, and the lack of more and uncontaminated sidewall cores near the base of the interval confuse clear interpretation. It seems best to lump the lower and middle M. diversus zones as herein.

Dinocysts occur in all samples. The presence of Homotriblium tasmaniense at 2493-2502m suggests its assignment to the upper M. diversus Zone. However, in the absence of supporting spore-pollen evidence, it is considered cabed, along with the more obvious Areosphaeridium arcuatum. The samples at 2549.0m and 2593-2602m contain common Morkallacysta pyramidalis. The samples at 2745-54m and 2751.0m contain Apectodinium hyperacantha indicating assignment to the lower M. diversus or younger zones.

Non-marine to marginally marine environments are suggested by the rare to very rare low diversity dinocysts. In most samples, they are rare to very rare and of low diversity, indicating marginal marine conditions. In three samples (2549.0m, 2593-2602m and 2667.0m) they comprise 20%, 70% and 50% of palynomorphs respectively, with Morkallacysts pyramidalis dominant, and the only dinocyst species at 2667.0m. This suggests non-marine, possibly lacustrine, environments.

Spore colours of light brown at the top, grading to mid brown at the bottom, indicate maturity for oil generation throughout, and maturity for gas/condensate generation at the base.

E. 2776m (swc)-2952m (cutts) (2907m in swc) : upper L. balmei Zone

Assignment to the upper Lygistepollenites balmei Zone is indicated at the top by the youngest occurrences of Gambierina rudata and Lygistepollenites balmei in place, and at the base by the oldest occurrences of Proteacidites incurvatus (2943-52m cutts), Proteacidites grandis (2907.0m swc), Cyathidites gigantis (2799-2808m, cutts) and of certain dinocysts, discussed below. The deepest core or sidewall core sample containing upper L. balmei Zone indicators is the swc sample at 2907.0m where Proteacidites grandis indicates this assignment.

Dinocysts occur in several samples, and include Apectodinium homomorphum which indicates an upper L. balmei or younger assignment.

Marginal marine and non-marine environments are indicated. Dinocysts never exceed 5% of palynomorphs and are always of low diversity. Morkallacysta pyramidalis can be common, suggesting non-marine lacustrine environments. The low diversity assemblages otherwise suggest marginally marine conditions.

Spore colours in the mid brown range indicate maturity for both oil and gas/condensate generation.

F. 2974.0m (swc)-3300m (cutts) (3105m in swc) : lower L. balmei Zone

Assignment to the lower Lygistepollenites balmei Zone is indicated by the absence of younger or older indicators. The presence of L. balmei down to the base of this interval tends to confirm the assignment. Although L. balmei can occur in the underlying T. longus Zone, it is extremely scarce. The youngest occurrence of Tetracolporites verrucosus at 3105.0m indicates the lower half of the Lower L.balmei Zone at that point. Triassic and Permian reworking are rare but present in this interval.

Non-marine environments are indicated by the total absence of dinocysts other than rare Mokallacysta pyramidalis, and the fairly abundant cuticle and spores and pollen.

Spore colours range from mid brown at the top to dark brown at the base, and indicate a range from maturity to full maturity for oil and for gas/condensate.

G. 3390m (cutts)-3584m (swc) : indeterminate

This interval consists of three cuttings samples and a swc. The cuttings contain extremely lean assemblages which show a range of spore colour from mid brown through dark brown to black. It seems likely that the fossils seen in these cuttings samples are entirely caved (hence the wide range of spore colours) and that the "in situ" material is entirely post mature and so barren. Nothing older than the overlying L. balmei Zone was seen. Caved material includes the dinoflagellate Apectodinium homomorphum, suggesting an upper L. balmei or younger assignment.

The single swc at 3584m contains a dark brown, reasonably diverse assemblage. However, it lacks both L. balmei (which would indicate the L. balmei Zone) and T. confessus (which would indicate the T. longus Zone). The species present indicate a T. longus - L. balmei assignment. Minor contamination of the sidewall core includes light brown Apectodinium homomorphum.

Non-marine environments are indicated by the lack of marine dinocysts, and the presence of Morkallacysts suggests lakes.

From the black spore fragments seen, it is most likely that the section is mostly post-mature for oil and for gas/condensate. The single swc shows that thin intervals may be fully mature.

H. 3597-3606m (cutts) : T. longus Zone

This single cuttings sample was processed as an urgent sample during downhole drilling, and Tricolpites confessus was seen in a water mount, indicating assignment to the Tricopites longus Zone. Despite extensive logging of additional material, this observation cannot be duplicated in this or other samples nearby. There is, however, no reason to doubt the identification. Some caving has occurred into the sample, including Cyathidites gigantis, but most specimens appear to be in place and with uniform dark brown to brown/black spore colours.

Non-marine environments are indicated by the absence of dinocysts, common tracheid fragments, and spores and pollen.

Spore colours of dark brown to brown/black indicate post-maturity for oil, but peak maturity for gas/condensate.

I. 3690.5 (swc)-3878 (swc) : indeterminate

The four samples (3 swc, 1 cuttings) from this interval are all dominated by inertinite, with only extremely scarce recognisable fossils. These fossils are all longranging forms in the Late Cretaceous to Early Tertiary and show a range of spore colours, suggesting that they are at least partly caved.

They are not inconcistent with the T. longus assignment above, but do not independently confirm it.

Considering the doubtfully "in situ" nature of these fossils, environmental conclusions are probably invalid. No marine indicators were seen, however.

Spore colours range from very dark brown to black fragments. The lower maturity fossils may be caved, but could also be in place in a section of mixed maturity. In any case, the section is post-mature for oil and largely or perhaps wholly post-mature for gas/condensate.

CONCLUSIONS

A. The section drilled spans the Maastrichtian T. longus to Early Oligocene upper N. asperus Zones. The lower and middle M. diversus Zones cannot be reliably separated from each other. The lower and middle N. asperus Zones cannot be identified, but are probably represented by the post-mature section between 1675.7 and 2052m. The Demons Bluff Formation appears to be slightly younger here than elsewhere, but there may be good geological reasons, or the sample at 1640-50m (cuttings) may be caved into a post-mature "in situ" assemblage.

B. The section appears to be significantly more marine than elsewhere, particularly in the upper L. balmei to upper M. diversus interval.

C. Caving seems to be more common and persistent in this section than in other wells in the programme. This suggests lower confidence levels for the oldest occurrence picks made from cuttings (base upper L. balmei, base lower M. diversus, base middle M. diversus) which may therefore have been picked slightly too low.

D. Maturity appears to follow a good trend, with major deviations associated with the interbedded igneous rocks. The upper barren zone is much thicker than the associated sill, especially overlying the sill. Local heating, perhaps from a nearby feeder dyke, may be responsible. The lower barren zone extends to the base of the well, and reflects the large amount of igneous rock in the sequence. Lower maturity bands apparently exist between the thick igneous bodies, giving a pattern of variable maturity in cuttings. Unfortunately, the interbedded sediments do not reach sufficient thickness to adequately insulate the paynomorphs and so permit accurate age dating.

320180

REFERENCES

Harris, W.K. (1985) Middle to Late Eocene Depositional Cycles and Dinoflagellate Zones in Southern Australia Spec. Publ., S. Aust. Dept. Mines and Energy 5 : 133-144

Partridge, A.D. (1973) Revision of the Spore-pollen Zonation in the Bass Basin Esso unpubl. palaeo. rept. 1983/74

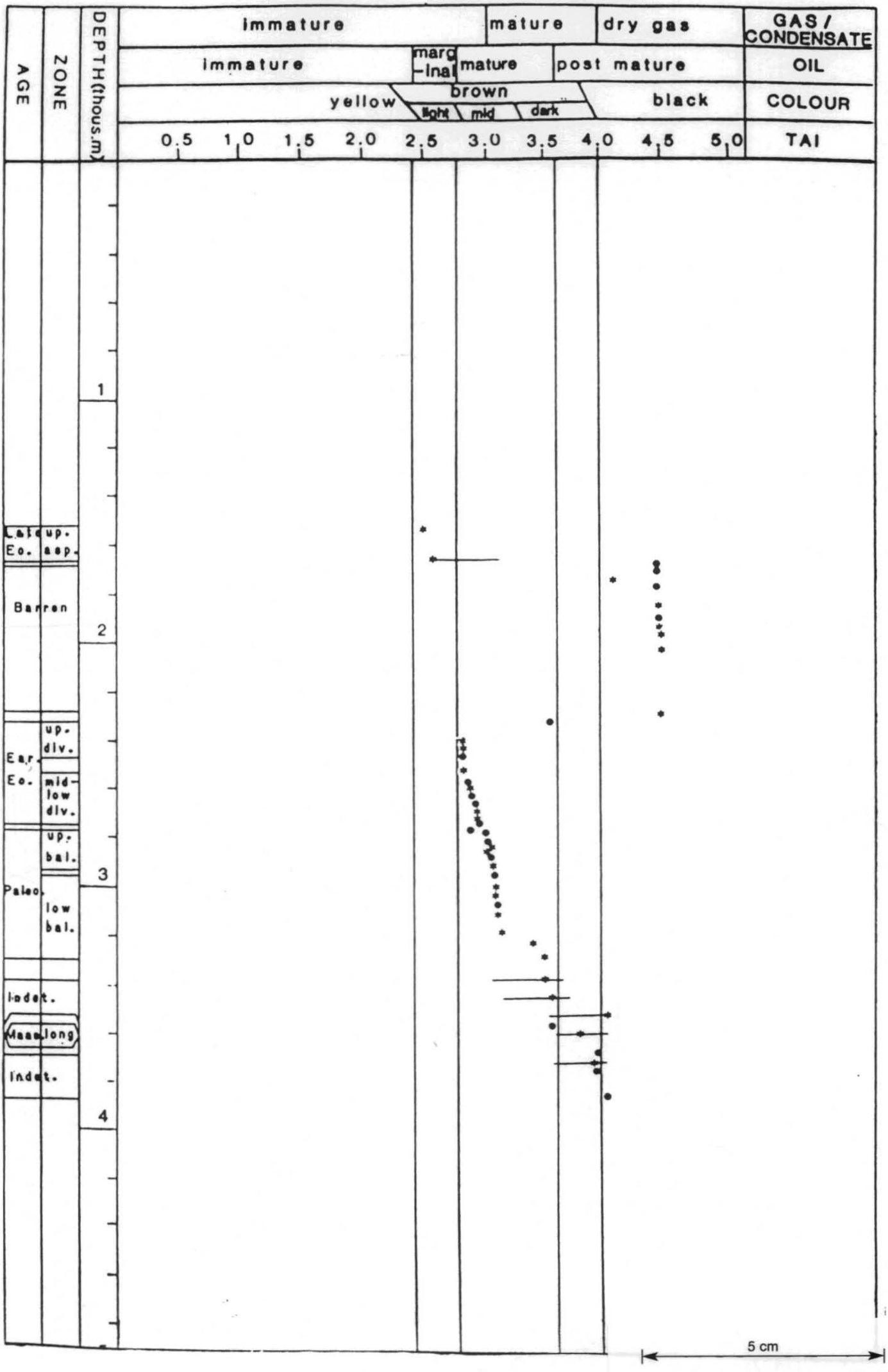
Partridge A.D. (1976) The Geological Expression of Eustacy in the Early Tertiary of the Gippsland Basin Aust. Pet. Explor. Assoc. J., 16 : 73-79

Stover, L.E. and Evans, P.R. (1973) Upper Cretaceous - Eocene Spore Pollen Zonation, offshore Gippsland Basin, Australia Spec. Publ. geol. soc. Aust., 4 : 55-72

Stover, L.E. and Partridge, A.D. (1973) Tertiary and Late Cretaceous Spores and Pollen from the Gippsland Basin, South-eastern Australia Proc. R. Soc. Vict., 85 : 237-286

320181

MATURITY PROFILE - TILANA - 1



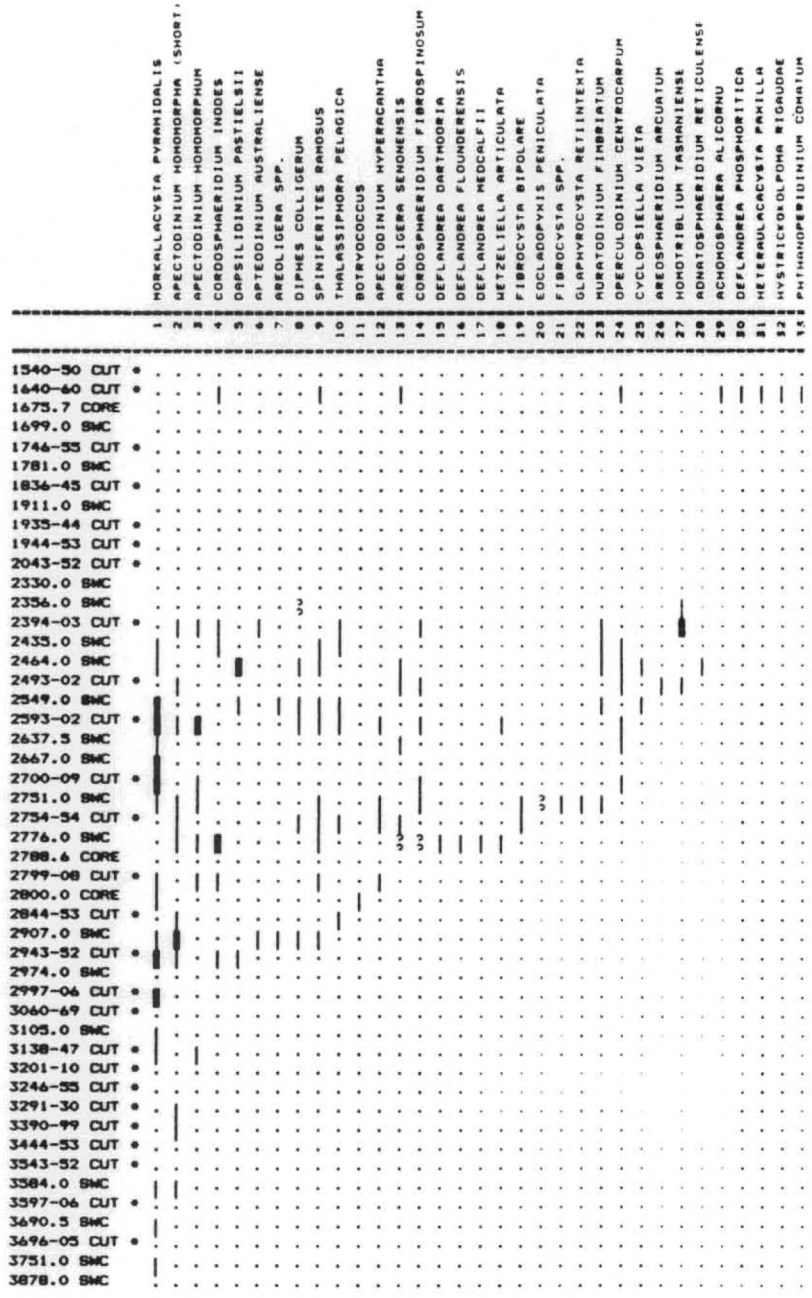
TILANA #1 DINOS

DESCRIPTION:

PALYNOLOGICAL INTERPRETATION BY ROGER MORGAN FOR AMOCO - JANUARY-FEBRUARY 1986
N.B. ALL SAMPLE DEPTHS ARE IN METRES
• = QUICK TURNAROUND SAMPLES

CHECKLIST OF GRAPHIC ABUNDANCE BY LOWEST APPEARANCE

= Abundant
= Common
= Few
= Rare
= Very Rare
? = Questionably Present
. = Not Present



	PHTHANOPERIDINIUM SPP.
	34
1540-50 CUT	* .
1640-60 CUT	* .
1675.7 CORE	.
1699.0 SWC	.
1746-55 CUT	* .
1781.0 SWC	.
1836-45 CUT	* .
1911.0 SWC	.
1935-44 CUT	* .
1944-53 CUT	* .
2043-52 CUT	* .
2330.0 SWC	.
2356.0 SWC	.
2394-03 CUT	* .
2435.0 SWC	.
2464.0 SWC	.
2493-02 CUT	* .
2549.0 SWC	.
2593-02 CUT	* .
2637.5 SWC	.
2667.0 SWC	.
2700-09 CUT	* .
2751.0 SWC	.
2754-54 CUT	* .
2776.0 SWC	.
2788.6 CORE	.
2799-08 CUT	* .
2800.0 CORE	.
2844-53 CUT	* .
2907.0 SWC	.
2943-52 CUT	* .
2974.0 SWC	.
2997-06 CUT	* .
3060-69 CUT	* .
3105.0 SWC	.
3138-47 CUT	* .
3201-10 CUT	* .
3246-55 CUT	* .
3291-30 CUT	* .
3390-99 CUT	* .
3444-53 CUT	* .
3543-52 CUT	* .
3584.0 SWC	.
3597-06 CUT	* .
3690.5 SWC	.
3696-05 CUT	* .
3751.0 SWC	.
3878.0 SWC	.

SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

INDEX NUMBER	SPECIES
29	ACHOMOSPHAERA ALICORNU
28	ADNATOSPHAERIDIUM RETICULENSE
2	APECTODINIUM HOMOMORPHA (SHORT)
3	APECTODINIUM HOMOMORPHUM
12	APECTODINIUM HYPERACANTHA
6	APTEODINIUM AUSTRALIENSE
13	AREOLIGERA SENONENSIS
7	AREOLIGERA SPP.
26	AREOSPHAERIDIUM ARCUATUM
11	BOTRYOCOCCUS
14	CORDOSPHAERIDIUM FIBROSPINOSUM
4	CORDOSPHAERIDIUM INODES
25	CYCLOPSIELLA VIETA
5	DAPSILIDINIUM PASTIELSII
15	DEFLANDREA DARTMOORIA
16	DEFLANDREA FLOUNDERENSIS
17	DEFLANDREA MEDCALFII
30	DEFLANDREA PHOSPHORITICA
8	DIPHES COLLIGERUM
20	EOCLADOPYXIS PENICULATA
19	FIBROCYSTA BIPOLARE
21	FIBROCYSTA SPP.
22	GLAPHYROCYSTA RETIINTEXTA
31	HETERAULACACYSTA PAXILLA
27	HOMOTRIBLIUM TASMANIENSE
32	HYSTRICKOKOLPOMA RIGAUDAE
1	MORKALLACYSTA PYRAMIDALIS
23	MURATODINIUM FIMBRIATUM
24	OPERCULODINIUM CENTROCARPUM
33	PHTHANOPERIDINIUM COMATUM
34	PHTHANOPERIDINIUM SPP.
9	SPINIFERITES RAMOSUS
10	THALASSIPHORA PELAGICA
18	WETZELIELLA ARTICULATA

320185

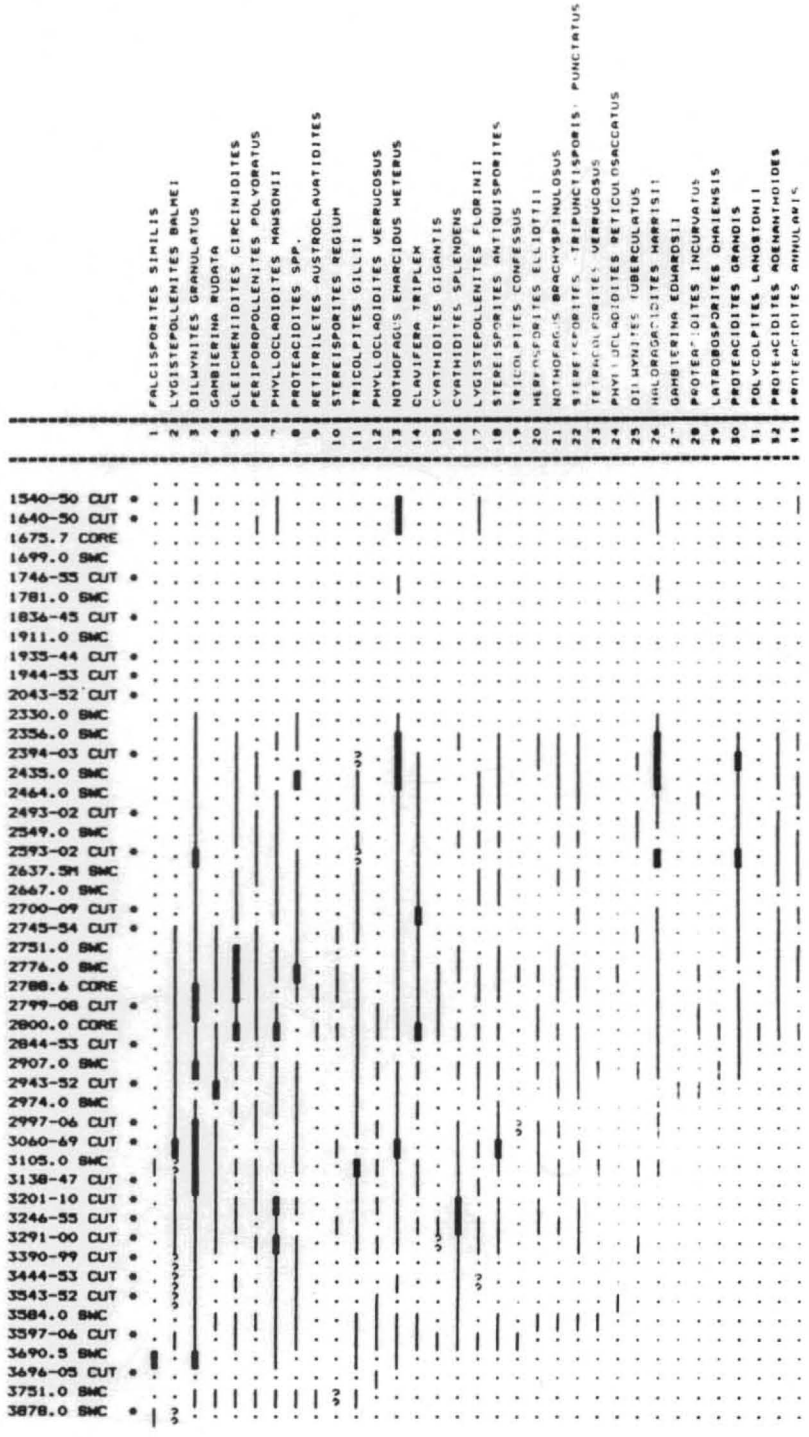
TILANA #1 S/P

DESCRIPTION:

PALYNOLOGICAL INTERPRETATION FOR AMOCO BY ROGER MORGAN JANUARY-FEBRUARY 1986.
** ALL SAMPLE DEPTHS ARE IN METRES **
* = QUICK TURNAROUND PROCESSING

CHECKLIST OF GRAPHIC ABUNDANCE BY LOWEST APPEARANCE

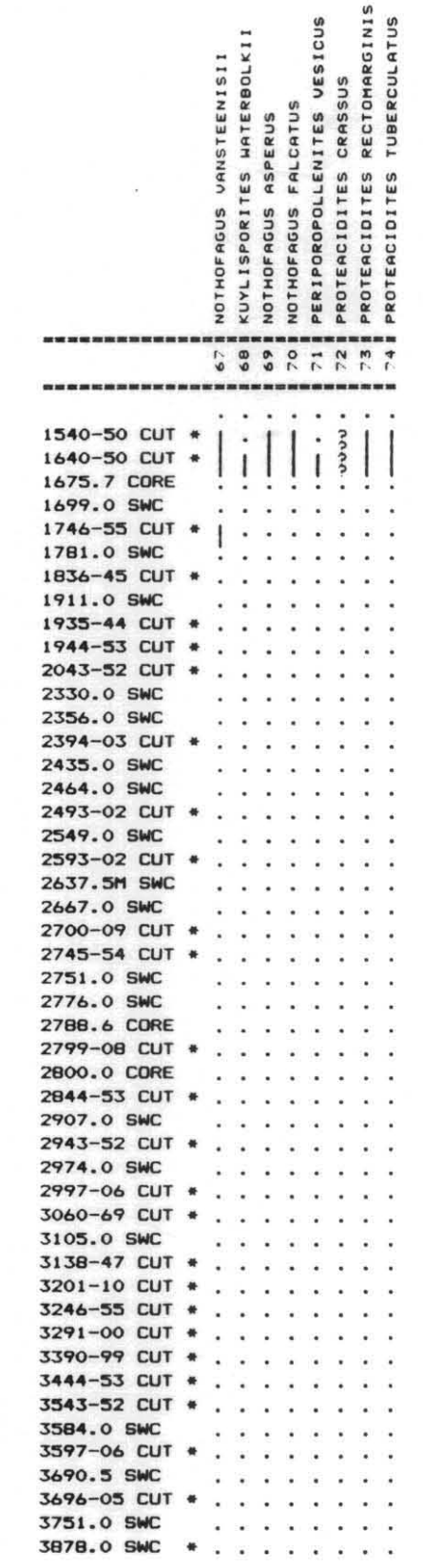
= Abundant
= Common
= Few
= Rare
= Very Rare
? = Questionably Present
. = Not Present



320186

PROTEACIDITES TENUIEXINUS
VERRUCOSISPORITES KOPUKUENSIS
MALVACIPOLLIS SUBTILIS
NOTHOFAGUS FLEMINGII
PODOSPORITES MICROSACCATUS
AUSTRALOPOLLIS OBSCURUS
ERICIPITES SCABRATUS
MALVACIPOLLIS DIVERSUS
PERIPOROPOLLENITES DEMARCATUS
PROTEACIDITES PACHYPOLUS
SPINIZONOCOLPITES PROMINATUS
TRIPOROPOLLENITES AMBIGUUS
PROTEACIDITES ORNATUS
BANKSIEACIDITES ELONGATUS
MYRTACEIDITES PARVUS/MESONESUS
PROTEACIDITES LAPIS
PROTEACIDITES PSEUDOMOIDES
RICCIA BOXATUS
POLYCOLPITES ESOBALTEUS
PROTEACIDITES CLARUS
LILIACIDITES LANCEOLATUS
PROTEACIDITES "HEAVY GRANDIS"
INTRATRIPOROPOLLENITES NOTABILIS
BEAUPREAIDITES VERRUCOSUS
CUPANIEIDITES ORTHOTEICHUS
LILIACIDITES BAINII
POLYCOLPITES SIMPLEX
PROTEACIDITES KOPIENSIS
TRICOLPORITES ESTOUTUS
ANACOLOSIDITES ACUTULLUS
MYRTACEIDITES TENUIS
PROTEACIDITES LEIGHTONII
TRICOLPITES PHILLIPSII
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
1540-50 CUT *
1640-50 CUT *
1675.7 CORE
1699.0 SWC
1746-55 CUT *
1781.0 SWC
1836-45 CUT *
1911.0 SWC
1935-44 CUT *
1944-53 CUT *
2043-52 CUT *
2330.0 SWC
2356.0 SWC
2394-03 CUT *
2435.0 SWC
2464.0 SWC
2493-02 CUT *
2549.0 SWC
2593-02 CUT *
2637.5M SWC
2667.0 SWC
2700-09 CUT *
2745-54 CUT *
2751.0 SWC
2776.0 SWC
2788.6 CORE
2799-08 CUT *
2800.0 CORE
2844-53 CUT *
2907.0 SWC
2943-52 CUT *
2974.0 SWC
2997-06 CUT *
3060-69 CUT *
3105.0 SWC
3138-47 CUT *
3201-10 CUT *
3246-55 CUT *
3291-00 CUT *
3390-99 CUT *
3444-53 CUT *
3543-52 CUT *
3584.0 SWC
3597-06 CUT *
3690.5 SWC
3696-05 CUT *
3751.0 SWC
3878.0 SWC *
5 cm

320187


NOTHOFAGUS VANSTEENISII
KUYLISPORITES WATERBOLKII
NOTHOFAGUS ASPERUS
NOTHOFAGUS FALCATUS
PERIPOROPOLLENITES VESICUS
PROTEACIDITES CRASSUS
PROTEACIDITES RECTOMARGINIS
PROTEACIDITES TUBERCULATUS
67
68
69
70
71
72
73
74
1540-50 CUT *
1640-50 CUT *
1675.7 CORE
1699.0 SWC
1746-55 CUT *
1781.0 SWC
1836-45 CUT *
1911.0 SWC
1935-44 CUT *
1944-53 CUT *
2043-52 CUT *
2330.0 SWC
2356.0 SWC
2394-03 CUT *
2435.0 SWC
2464.0 SWC
2493-02 CUT *
2549.0 SWC
2593-02 CUT *
2637.5M SWC
2667.0 SWC
2700-09 CUT *
2745-54 CUT *
2751.0 SWC
2776.0 SWC
2788.6 CORE
2799-08 CUT *
2800.0 CORE
2844-53 CUT *
2907.0 SWC
2943-52 CUT *
2974.0 SWC
2997-06 CUT *
3060-69 CUT *
3105.0 SWC
3138-47 CUT *
3201-10 CUT *
3246-55 CUT *
3291-00 CUT *
3390-99 CUT *
3444-53 CUT *
3543-52 CUT *
3584.0 SWC
3597-06 CUT *
3690.5 SWC
3696-05 CUT *
3751.0 SWC
3878.0 SWC *
5 cm

SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

INDEX NUMBER	SPECIES
63	ANACOLOSIDITES ACUTULLUS
39	AUSTRALOPOLLIS OBSCURUS
47	BANKSIEACIDITES ELONGATUS
57	BEAUPREAIDITES VERRUCOSUS
14	CLAVIFERA TRIPLEX
58	CUPANIEIDITES ORTHOTEICHUS
15	CYATHIDITES GIGANTIS
16	CYATHIDITES SPLENDENS
3	DILWYNITES GRANULATUS
25	DILWYNITES TUBERCULATUS
40	ERICIPITES SCABRATUS
1	FALCISPORITES SIMILIS
27	GAMBIERINA EDWARDSII
4	GAMBIERINA RUDATA
5	GLEICHENIIDITES CIRCINIDITES
26	HALORAGACIDITES HARRISII
20	HERKOSPORITES ELLIOTTII
56	INTRATRIPOROPOLLENITES NOTABILIS
68	KUYLISPORITES WATERBOLKII
29	LATROBOSPORITES OHAIENSIS
59	LILIACIDITES BAINII
54	LILIACIDITES LANCEOLATUS
2	LYGISTEPOLLENITES BALMEI
17	LYGISTEPOLLENITES FLORINII
41	MALVACIPOLLIS DIVERSUS
36	MALVACIPOLLIS SUBTILIS
48	MYRTACEIDITES PARVUS/MESONESUS
64	MYRTACEIDITES TENUIS
69	NOTHOFAGUS ASPERUS
21	NOTHOFAGUS BRACHYSPINULOSUS
13	NOTHOFAGUS EMARCIDUS/HETERUS
70	NOTHOFAGUS FALCATUS
37	NOTHOFAGUS FLEMINGII
67	NOTHOFAGUS VANSTEENISII
42	PERIPOROPOLLENITES DEMARCATUS
6	PERIPOROPOLLENITES POLYORATUS
71	PERIPOROPOLLENITES VESICUS
7	PHYLLOCLADIDITES MAWSONII
24	PHYLLOCLADIDITES RETICULOSACCATUS
12	PHYLLOCLADIDITES VERRUCOSUS
38	PODOSPORITES MICROSACCATUS
52	POLYCOLPITES ESOBALTEUS
31	POLYCOLPITES LANGSTONII
60	POLYCOLPITES SIMPLEX
55	PROTEACIDITES "HEAVY GRANDIS"
32	PROTEACIDITES ADENANTHOIDES
33	PROTEACIDITES ANNULARIS
53	PROTEACIDITES CLARUS
72	PROTEACIDITES CRASSUS
30	PROTEACIDITES GRANDIS
28	PROTEACIDITES INCURVATUS
61	PROTEACIDITES KOPIENSIS
49	PROTEACIDITES LAPIS
65	PROTEACIDITES LEIGHTONII
46	PROTEACIDITES ORNATUS
43	PROTEACIDITES PACHYPOLUS
50	PROTEACIDITES PSEUDOMOIDES
73	PROTEACIDITES RECTOMARGINIS
8	PROTEACIDITES SPP.
34	PROTEACIDITES TENUIEXINUS
74	PROTEACIDITES TUBERCULATUS
9	RETITRILETES AUSTROCLAVATIDITES
51	RICCIA BOXATUS
44	SPINIZONOCOLPITES PROMINATUS
22	STEREISPORITES (TRIPUNCTISPORIS) PUNCTATUS
18	STEREISPORITES ANTIQUISPORITES
10	STEREISPORITES REGIUM
23	TETRACOLPORITES VERRUCOSUS
19	TRICOLPITES CONFESSUS
11	TRICOLPITES GILLII
66	TRICOLPITES PHILLIPSII
62	TRICOLPORITES ESTOUTUS
45	TRIPOROPOLLENITES AMBIGUUS
35	VERRUCOSISPORITES KOPUKUENSIS

320189

APPENDIX 9

PETROLEUM GEOCHEMISTRY

OF

TILANA-1

PART 1 HYDROCARBON SOURCE ROCK EVALUATION

PART 2 VITRINITE REFLECTANCE AND KEROGEN TYPING

PART 1 MODIFIED FROM REPORT BY
STEVE CADMAN AND
GARRY WOODHOUSE OF ANALABS

PART 2 MODIFIED FROM REPORT BY
BRIAN WATSON OF AMDEL

INTRODUCTION

Organic geochemical analyses was carried out on 130 cuttings samples and 10 sidewall cores. The aim of the study was to evaluate the source rock potential and thermal maturity of the drilled sediments of the E.V.C.M. particularly where shows were recorded during drilling. The program utilized screening of samples by C1-C7 headspace gas analyses and T.O.C. determination. Selected samples were then analyzed by the Rock-Eval method, extraction/liquid chromatography (E.O.M.) and C12+ saturate/whole extract GLC. Vitrinite reflectance measurements (Ro) and kerogen typing were carried out on 19 of the samples. The results of these analyses may be found in the following figures and tables in the modified analabs report (i.e. Part 1).

Type of Analysis	Figure	Table
C1-C7 headspace gas chromatography	1	1,5,6
% total organic carbon determination	1,2,4,5	2
Rock-Eval pyrolysis	2,3	2
Extraction and liquid chromatography	4	3
C12 + saturate/whole extract GLC	5	4
Vitrinite Reflectivy (Ro)	1,2,4,5	
Chromatograms	6,7	

Igneous intrusions and volcanics have somewhat complicated the thermal maturity profile in the Tilana-1 well. Nevertheless, extrapolation of results from samples unaffected by the igneous rocks indicates that the interval 2300-3800 is thermally mature for the generation of light oil from resinite-rich dispersed organic matter. Kerogen typing indicates that the rocks penetrated by the well are predominantly gas-prone. However, although thin the intervals 2382-2391m, 2562-2571m, 3174-3201m and 3570-3579m contain moderate quantities of oil prone organic matter and may have sourced quantities of both oil and gas. Whole extract chromatography indicated that migrated oil was present in sidewall cores from 3084m, 3094m and 3197.5m. Pyrolysis gas chromatograms from samples at 2364-2373m and 2697-2706m indicate these rocks to be excellent potential sources of gas/condensate although only moderately mature. If rocks equivalent to these intervals were present at greater depth off-structure they could have generated significant amounts of hydrocarbons.

PART 1 HYDROCARBON SOURCE ROCK EVALUATION

A. Thermal Maturity

The sediments penetrated in Tilana-1 can be divided into the following maturity intervals:

Interval (m)	Maturation	Generation Capability
1698 - 2300	Combusted	-
2300 - 3100	Moderately mature	Early oil generative
3100 - 3800	Mature	Oil generative
3800 - 3870	Very mature	Wet gas/condensate

However, it is possible that higher thermal maturities have been attained in sediments affected by igneous intrusives in deeper section adjacent to this well.

Vitrinite reflectance data provided by Amdel and lithological information from Amoco indicate sediments between 1698m and 2300m have been radically affected by the igneous intrusion occurring between 2020m and 2270m. At least 300m of sediments above and 30m below the intrusive appear to have been affected, with vitrinite reflectance values in excess of 3.0% Ro (combusted) being recorded over this zone.

Below this igneous body, vitrinite reflectance measurements increase on a fairly even trend, although, undoubtedly some values have been influenced by other intrusive and extrusives deeper in the section. Generally, sediments between 2395m and 3100m are thought to be moderately mature and in the early stages of oil generation. Below 3100m, mean vitrinite reflectance values in excess of 0.80% Ro are recorded. This indicates these rocks are approaching the peak stage of oil generation. However, it is probable that in the vicinity of the deeper igneous bodies, higher thermal maturities may have been attained. This may be the case with the sample at 3870m which gave a mean vitrinite reflectance value of 1.59% Ro.

Tmax data generally agrees well with the above. Immediately below the dolerite intrusion at 2020m to 2270m Tmax temperatures exceed 440 degrees C indicating sediments at this depth are mature. Between 2400 and 2800m values average around 435 to 440 degrees C (indicating moderate thermal maturity) while in the deeper, mature section Tmax temperatures well above 440 degrees C are found.

C12+ saturate and whole extract gas chromatograms from cuttings and sidewall cores in this well are generally representative of indigenous organic matter. Although n-alkane distributions show a marked skewing towards the high molecular weight compounds they are thought to be typical of moderately mature terrestrially sourced extracts. The level of thermal maturity shown by these extracts is in reasonable agreement with vitrinite and Tmax data. Chromatograms from the two deepest samples (3570-3579, and 3858-3867m), appear to show more mature n-alkane configurations which correlates well with the virtinite reflectance values of 1.16% Ro and 1.59% Ro recorded at these depths. However, it is also possible that these samples have been influenced by small quantities of out of place hydrocarbon reservoired over these intervals.

C1-C7 headspace data clearly shows the increased thermal maturity of the sediments between 1700 and 2300m which have been affected by the dolerite intrusion. Over this zone there is a significant increase in % gas wetness. The iC4/nC4 ratio does not appear to have been greatly affected over this interval, but this may be due to the very low levels of iso and normal butane measured here.

B. Hydrocarbon Source Characterisation

Organic richness (TOC) is generally good to excellent in most of the nineteen (19) cuttings samples analysed (Table 2). Large variations in TOC values are probably due to the presence of coaly horizons, which, in places, give excellent S1 and S2 Rock-Eval pyrolysis yields. Hydrogen indices are low to moderate (50-180) in a majority of these samples suggesting many of the sediments analysed are dominantly gas prone with limited potential as liquid hydrocarbon sources. However, higher hydrogen indices recorded in the organic rich intervals 2364-2391m, 2562-2571m, 2697-2706m, 3174-3201m and 3570-3579m indicate sediments around these depths may be at least moderately oil prone.

Eight of the richer cuttings samples were extracted, separated and submitted to C12+ saturate gas/liquid chromatography. Most proved to be rich in extractable organic matter with relatively high proportions of aromatic compounds (probably reflecting the coaly nature of these sediments). C12+ saturate chromatograms from the shallower cuttings samples (Figure 6-1 to 6-5) show a pronounced skewing of the n-alkane distribution towards the higher molecular weight n-alkanes. These chromatograms are thought to represent moderately mature, indigenous organic matter comprised predominantly of high molecular weight 'waxy' terrestrially sourced compounds. The small n-alkane 'hump' between C12+ and C17 noted in several chromatograms from these shallower samples (Figure 4A) is not thought to represent out of place hydrocarbon in this instance, (production indices are relatively uniform over these intervals). Small quantities of resinite (which is known to be oil generative at low thermal maturity) indigenous to these sediments may have sourced these low molecular weight n-alkanes.

C12+ saturate chromatograms from the two deepest cuttings samples (3570-3579m and 3858-3867m) are of a different character. Both show a skewing of their n-alkane distributions towards the low molecular weight compounds, while the deepest sample (Figure 4B) shows a pronounced n-alkane 'hump' between carbon numbers thirteen and nineteen. Although the character of these chromatograms is predominantly influenced by mature, indigenous organic matter, it is also probable that small quantities of out of place hydrocarbon is present at these depths.

C. Evidence of Out of Place Hydrocarbon

Ten (10) sidewall cores were extracted in an attempt to identify and characterise any out of place hydrocarbon. All gave insufficient total extract hields for separation by liquid chromatography. Whole extract chromatograms were greatly influenced by aromatic and NSO compounds reflecting the overall scarcity of reservoir hydrocarbons (represented by a predominance of n-alkanes). The only sidewall cores where appreciable quantities of n-alkanes were found are at 3084m and 3094m. Here, the n-alkane distributions are skewed towards the high molecular weight compounds. It is possible that these traces represent reservoir hydrocarbons whose low molecular weight compounds have been lost during water-washing. However, it is thought more likely that these n-alkane distributions are largely influenced by indigenous coals noted in these sidewall cores.

Small quantities of reservoir hydrocarbon may be present in the sidewall core at 3197.5m. The n-alkane 'hump' is centered around the C17 peak and may represent minor amounts of good quality light oil. This hydrocarbon is similar in character to that thought to be present in the cuttings sample at 3858-3867m and to a lesser extent at 3570-3579m.

Headspace data (Table 1) seems to confirm the presence of small quantities of this out of place hydrocarbon in the above cuttings samples (slightly greater levels of C5-C7 compounds). A production index for the deeper sample also seems to be anomalously high. However, it is possible that the n-alkane 'hump' between C13 and C19 on the C12+ saturate chromatogram at 3858-3867m may be due in part to very mature indigenous organic matter present at these depths.

In summary, the quantities of reservoir hydrocarbon thought to be present in the sidewall cores at 3084, 3094 and 3197.5m are likely to be very small due to the low levels of extractable organic matter in these samples. Limited amounts of out of place hydrocarbon may be present in a cuttings sample at 3858-3867m, but its character is largely masked by the mature, indigenous organic matter.

FIGURE 1

MARCH 1988

ANA-LOG

HYDROCARBON SOURCE ROCK EVALUATION

AMOCO AUSTRALIA PETROLEUM COMPANY

TILANA 1

320194

LIME
DOLOMITE
CLAY
SILT
SAND
COAL
IGNEOUS
META
EVAPORITE

IN METRES ■ IN FEET □

SAMPLE TYPE
■ CUTTINGS
□ CONV. CORE
□ SWC

SAMPLE QUALITY
□ POOR
□ FAIR
■ GOOD

C1 - C7 LIGHT HYDROCARBON

C1 - DRY GAS
C2 - C4 - WET GAS +
C1 - C4 - TOTAL GAS ×
C5 - C7 - CONDENSATE

% GAS WETNESS = $\frac{C2 - C4}{C1 - C4} \times 100$

iC4 - ISOBUTANE
nC4 - NORMAL BUTANE

PRE OIL WINDOW
OIL WINDOW
WET GAS/COND
THERMAL C_1

INDIGENOUS KEROGEN
ALGINITE
EXINITE
VITRINITE
INERTINITE
OIL / GAS

LITHOLOGY (Percent) 20 40 60 80
DEPTH
ORGANIC CARBON (Percent of Rock) 1 2 4 8 16 32
C1 - C4 ppm 100 1000 10000
% GAS WETNESS 25 50 75
C5 - C7 ppm 100 1000 10000
iC4/nC4 1 2 3
▲ VITRINITE REFLECTANCE .6 1.2 1.8
INDIGENOUS KEROGEN 25 50 75 % IND

1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600 3700 3800 3900

No data

ANALABS OIL AND GAS DIVISION. 52 Murray Road, Welshpool, W.A. 6106.
TEL: (09) 458 7999 Telex : Analab AA92580.

5 cm

FIGURE 2

MARCH 1988

ANA-LOG

HYDROCARBON SOURCE ROCK EVALUATION

AMOCO AUSTRALIA PETROLEUM COMPANY

320195 TILANA 1

LIME
DOLOMITE
CLAY
SILT
SAND
COAL
IGNEOUS
META
EVAPORITE

IN METRES ■ IN FEET □

SAMPLE TYPE
■ CUTTINGS
□ CONV. CORE
□ SWC

SAMPLE QUALITY
□ POOR
□ FAIR
■ GOOD

S_1 = VOLATILE HYDROCARBONS (HC) ×

S_2 = HC GENERATION POTENTIAL

$S_1 + S_2$ = TOTAL HYDROCARBON + S_3 = ORGANIC CO_2

PI = PRODUCTION INDEX $= \frac{S_1}{S_1 + S_2}$

HI = HYDROGEN INDEX $= \frac{S_2}{TOC} \times 100$

OI = OXYGEN INDEX $= \frac{S_3}{TOC} \times 100$

T_{max} [Max. Temp. S_2]

PRE OIL WINDOW | OIL WINDOW | WET GAS/COND | THERMAL C_1

INDIGENOUS KEROGEN
□ ALGINITE
▨ EXINITE
▨ VITRINITE
■ INERTINITE
OIL / GAS

LITHOLOGY (Percent) 20 40 80 80 | DEPTH | ORGANIC CARBON (Percent of Rock) 1 2 4 8 16 32 | PYROLYSIS YIELD (mg/g Rock) S_1; S_1+S_2 .5 1 2 4 8 16 32 | S_3 1 2 3 4 | PI .2 .4 | ■ HI ▲ OI 100 200 300 | T_{max} °C 435 480 | ▲ VITRINITE REFLECTANCE .6 1.2 1.8 | INDIGENOUS KEROGEN 25 50 75 % IND

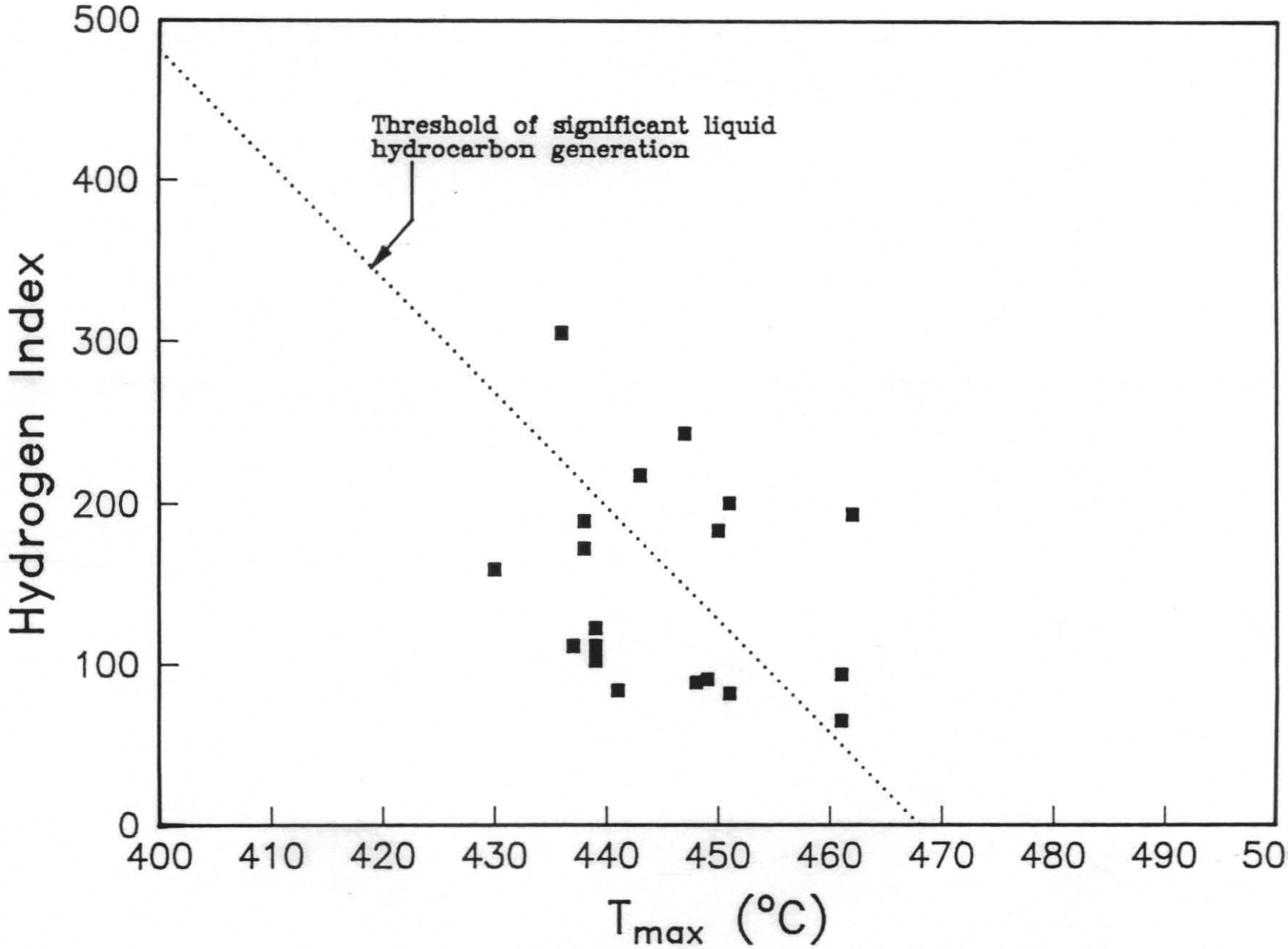
1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600 3700 3800 3900

No data

ANALABS OIL AND GAS DIVISION. 52 Murray Road, Welshpool, W.A. 6108.
TELS (08) 458 7988 Telex : Analab AA92560.

5 cm

FIGURE 3
TILANA 1
HYDROGEN INDEX vs T_{max}



5 cm

CONFIDENTIAL
CLASS 1

320[illegible]

FIGURE 4

MARCH 1986

AMOCO AUSTRALIA PETROLEUM COMPANY

HYDROCARBON SOURCE ROCK EVALUATION

320197

TILANA 1

LIME
DOLOMITE
CLAY
SILT
SAND
COAL
IGNEOUS
META
EVAPORITE

IN METRES ■ IN FEET □

SAMPLE TYPE
■ CUTTINGS
□ CONV. CORE
□ SWC

SAMPLE QUALITY
□ POOR
□ FAIR
■ GOOD

EXTRACTABLE ORGANIC MATTER (E.O.M.)

▨ TOTAL EXTRACTABLE ORGANIC MATTER
■ SATURATE (SAT.) HYDROCARBON (H.C.)
□ AROMATIC (AROM.) H.C.
⁝⁝ NITROGEN-SULPHUR-OXYGEN (N.S.O)
▤ ASPHALTENE (ASPH)

TOTAL H.C.
NON H.C.

PRE OIL WINDOW
OIL WINDOW
WET GAS/COND
THERMAL C_1

INDIGENOUS KEROGEN
□ ALGINITE
⁝⁝ EXINITE
▨ VITRINITE
■ INERTINITE
OIL / GAS

LITHOLOGY (Percent) 20 40 80 80
DEPTH
ORGANIC CARBON (Percent of Rock) 1 2 4 8 16 32
E.O.M. RICHNESS (ppm) 4000 8000 12000 16000
SAT/AROM ■ ▲ ASPH/NSO 1 2
H.C. / Non H.C. 1 2 3
SAT/TOC ■ XXX EOM/TOC 25 50 75
▲ VITRINITE REFLECTANCE .8 1.2 1.8
INDIGENOUS KEROGEN 25 50 75 % IND

1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900

No data

ANALABS OIL AND GAS DIVISION. 52 Murray Road, Welshpool, W.A. 6106.
TEL: (08) 458 7899 Telex : Analab AA92580.

5 cm

FIGURE 5A

MARCH 1988

ANA-LOG

HYDROCARBON SOURCE ROCK EVALUATION

AMOCO AUSTRALIA PETROLEUM COMPANY

320198

TILANA 1

LIME
DOLOMITE
CLAY
SILT
SAND
COAL
IGNEOUS
META
EVAPORITE

IN METRES ■ IN FEET □

SAMPLE TYPE
■ CUTTINGS
□ CONV. CORE
□ SWC

SAMPLE QUALITY
□ POOR
□ FAIR
■ GOOD

C_{12+} SATURATE GAS CHROMATOGRAPHY

Prist/Phyt	Environment	Prist/NC17 Rock	Prist/NC17 Oil	Environment	C21+C22 / C28+C29	Environment	CPI	Environment
< 3.0	Reducing	< 1.0	< 0.5	Open Water	> 1.5	Marine and/or Mature	<= 1.1	Marine and/or Mature
3.0 - 4.5	Mixed	1.0 - 1.5	0.5 - 1.0	Restricted	1.2 - 1.5	Mixed	> 1.1	Terrestrial and/or Immature
> 4.5	Oxidising	> 1.5	> 1.0	Coal Swamp	< 1.2	Terrestrial and/or Immature	CPI Carbon Preference Index	

PRE OIL WINDOW
OIL WINDOW
WET GAS/COND
THERMAL C_1

INDIGENOUS KEROGEN
□ ALGINITE
▨ EXINITE
▨ VITRINITE
■ INERTINITE
OIL / GAS

LITHOLOGY (Percent) 20 40 80 80
DEPTH
ORGANIC CARBON (Percent of Rock) 1 2 4 8 16 32
ALKANE % DISTRIBUTION
PRIST/PHYT 1 2 3 4 5 6 7
PRIST/NC17 .5 1 1.5
21+22/28+29 2 4 6
CPI 1 1.5
▲ VITRINITE REFLECTANCE .6 1.2 1.8
INDIGENOUS KEROGEN 25 50 75 % IND

1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900

No data

ANALABS OIL AND GAS DIVISION. 52 Murray Road, Welshpool, W.A. 6106.
TEL: (08) 458 7988 Telex : Analab AA92560.

5 cm

FIGURE 5B

MARCH 1988

ANA-LOG

HYDROCARBON SOURCE ROCK EVALUATION

AMOCO AUSTRALIA PETROLEUM COMPANY

TILANA 1

320199

LIME
DOLOMITE
CLAY
SILT
SAND
COAL
IGNEOUS
META
EVAPORITE

IN METRES ■ IN FEET □

SAMPLE TYPE
- ■ CUTTINGS
- □ CONV. CORE
- □ SWC

SAMPLE QUALITY
- □ POOR
- □ FAIR
- ■ GOOD

C_{12+} SATURATE GAS CHROMATOGRAPHY

Prist/Phyt	Environment	Prist/NC17 Rock	Prist/NC17 Oil	Environment	C21+C22 / C28+C29	Environment	CPI	Environment
< 3.0	Reducing	< 1.0	< 0.5	Open Water	> 1.5	Marine and/or Mature	<= 1.1	Marine and/or Mature
3.0 - 4.5	Mixed	1.0 - 1.5	0.5 - 1.0	Restricted	1.2 - 1.5	Mixed	> 1.1	Terrestrial and/or Immature
> 4.5	Oxidising	> 1.5	> 1.0	Coal Swamp	< 1.2	Terrestrial and/or Immature	CPI Carbon Preference Index	

PRE OIL WINDOW
OIL WINDOW
WET GAS/COND
THERMAL C_1

INDIGENOUS KEROGEN
- □ ALGINITE
- ▨ EXINITE
- ▨ VITRINITE
- ■ INERTINITE

OIL / GAS

LITHOLOGY (Percent) 20 40 60 80

DEPTH

ORGANIC CARBON (Percent of Rock) 1 2 4 8 16 32

ALKANE % DISTRIBUTION

PRIST/PHYT 1 2 3 4 5 6 7

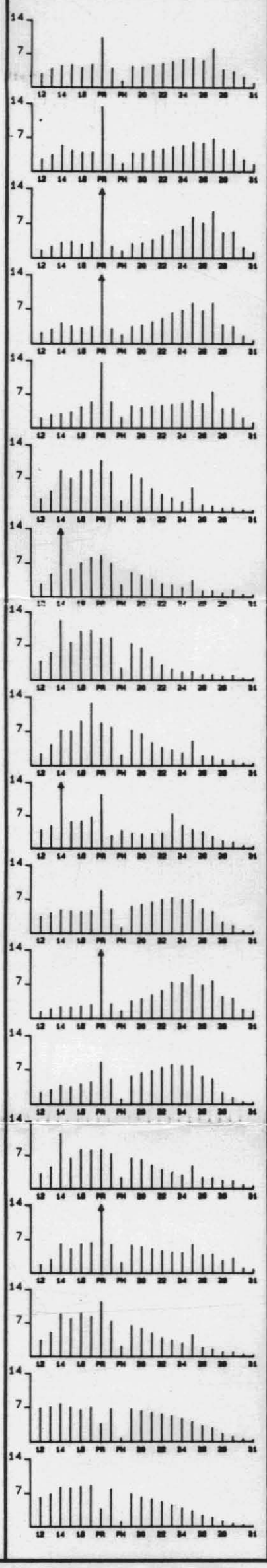
PRIST/NC17 .5 1 1.5

21+22/28+29 2 4 8

CPI 1 1.5

▲ VITRINITE REFLECTANCE .6 1.2 1.8

INDIGENOUS KEROGEN 25 50 75 % IND



ANALABS OIL AND GAS DIVISION. 52 Murray Road, Welshpool, W.A. 6106.
TEL: (08) 458 7999 Telex : Analab AA82560.

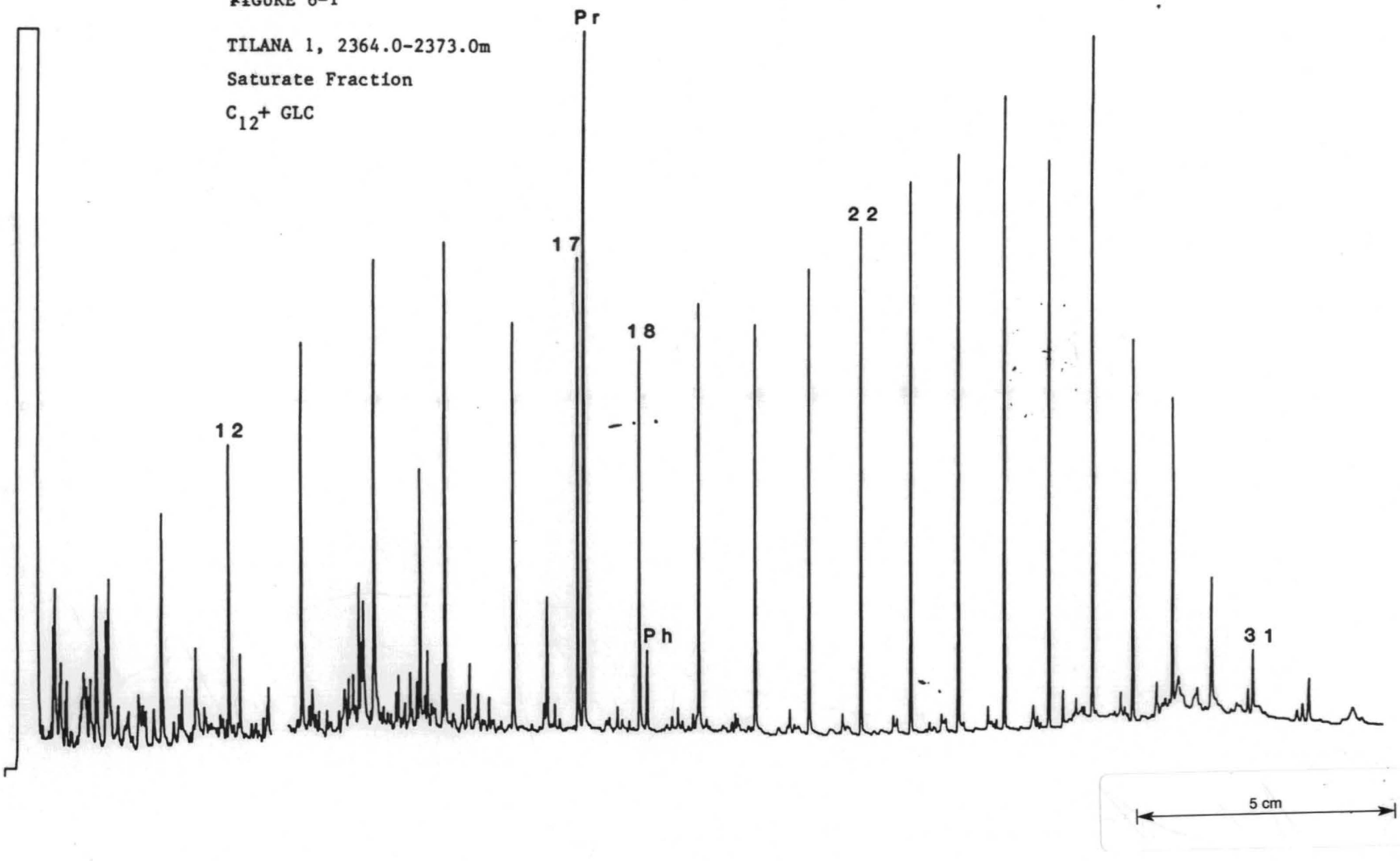
5 cm

FIGURE 6-1

TILANA 1, 2364.0-2373.0m

Saturate Fraction

C_{12}+ GLC



320300

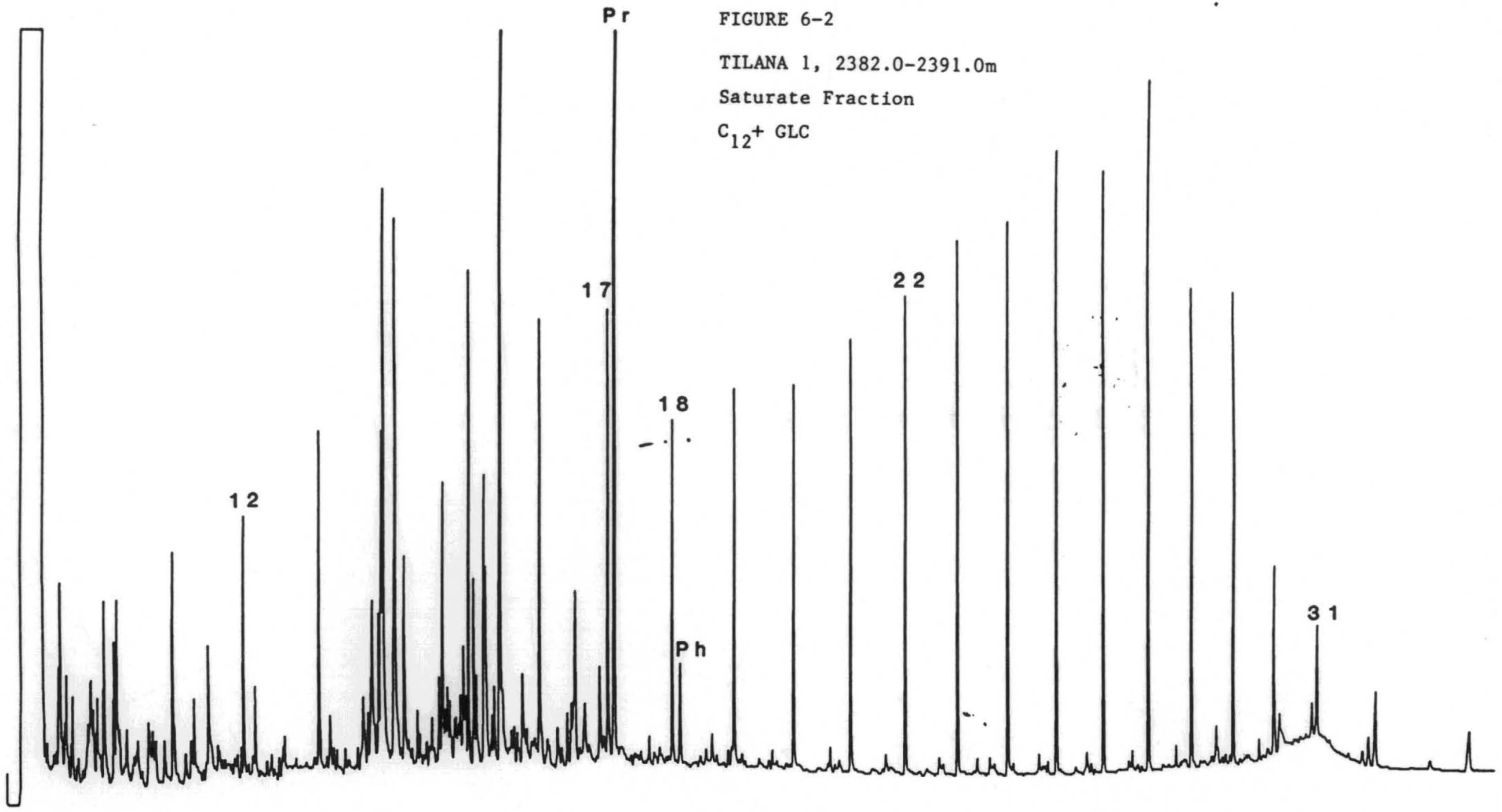


FIGURE 6-2

TILANA 1, 2382.0-2391.0m

Saturate Fraction

C_{12}+ GLC

320201

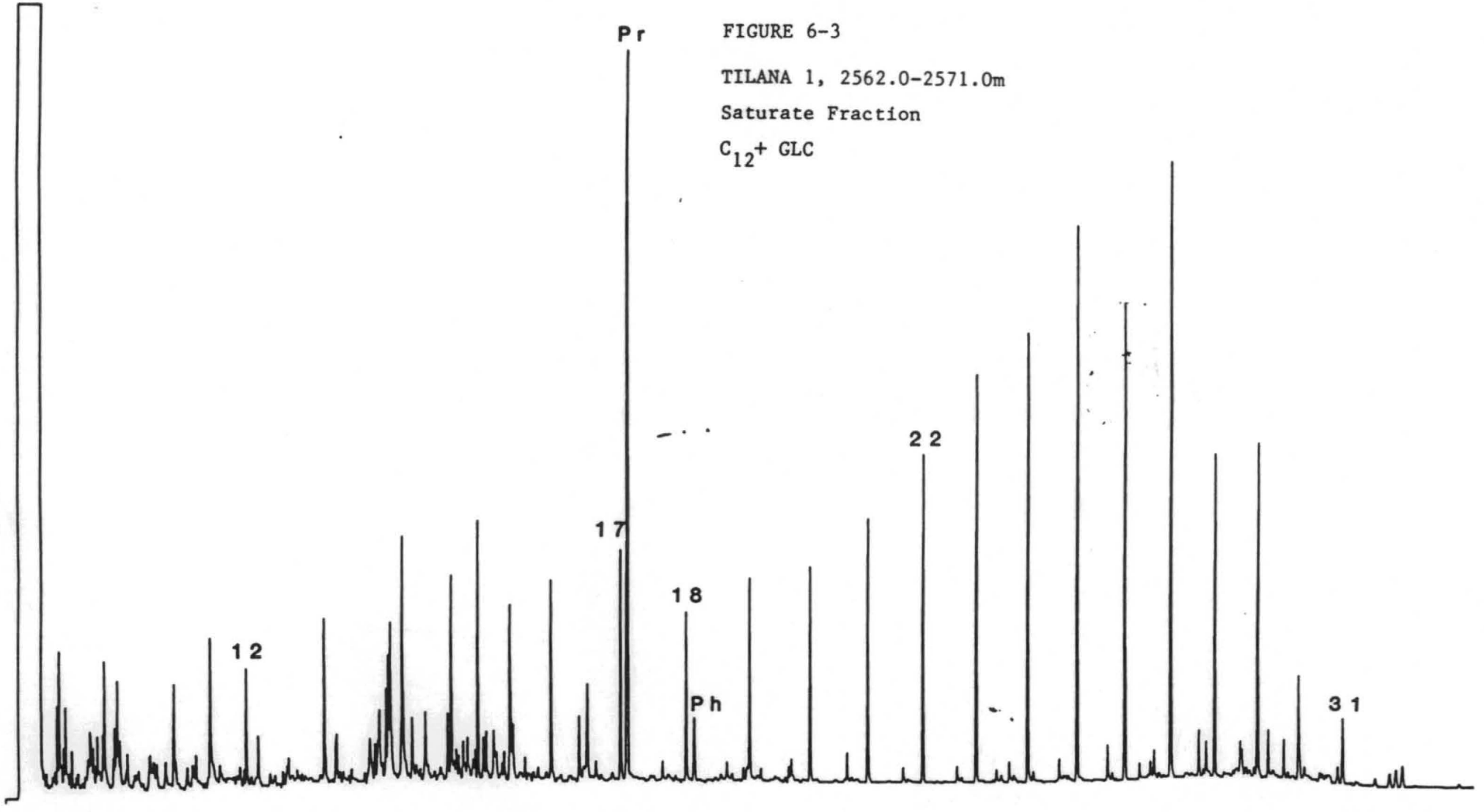


FIGURE 6-3

TILANA 1, 2562.0-2571.0m

Saturate Fraction

$C_{12}+$ GLC

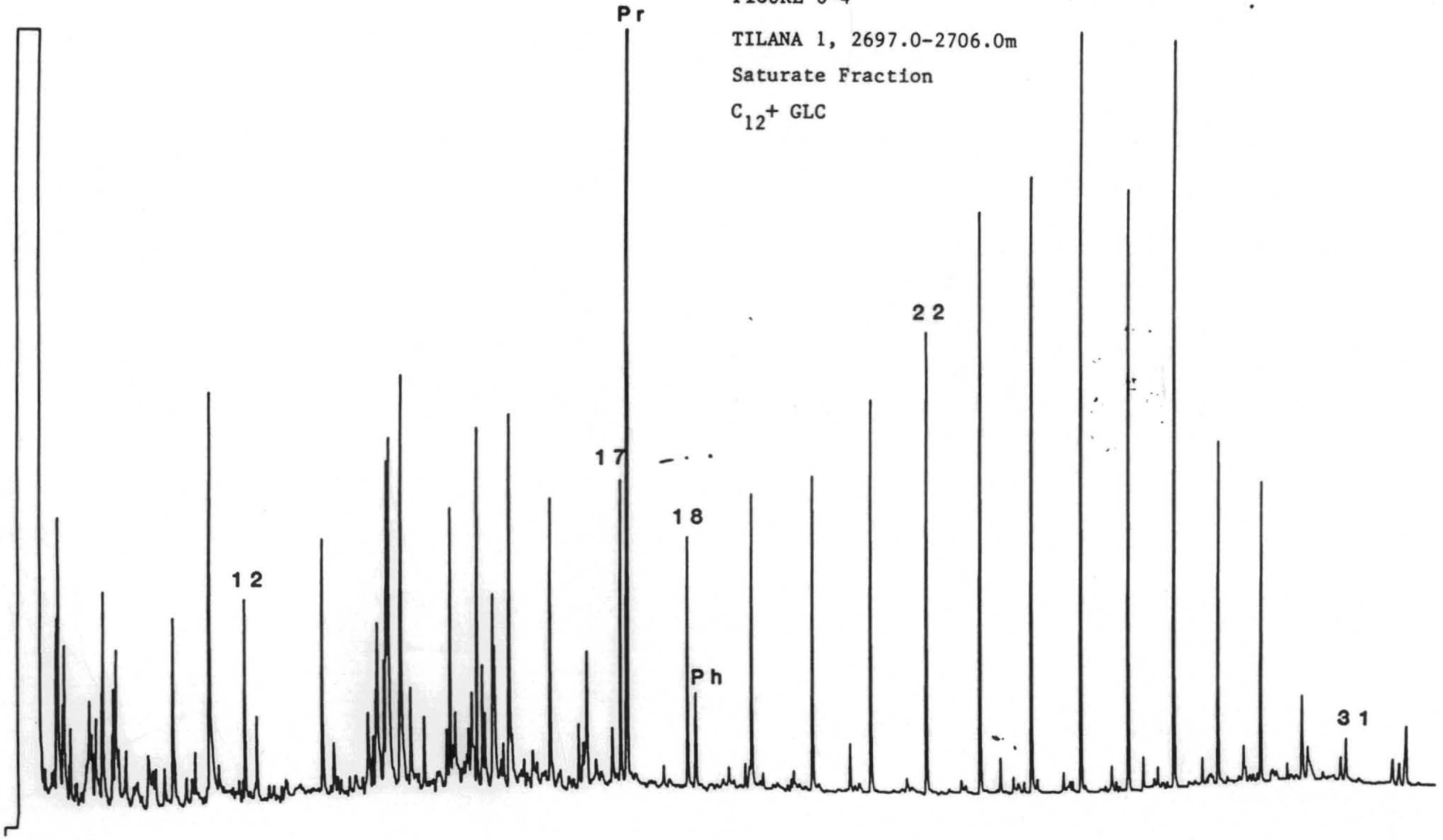
320202

FIGURE 6-4

TILANA 1, 2697.0-2706.0m

Saturate Fraction

C_{12}+ GLC



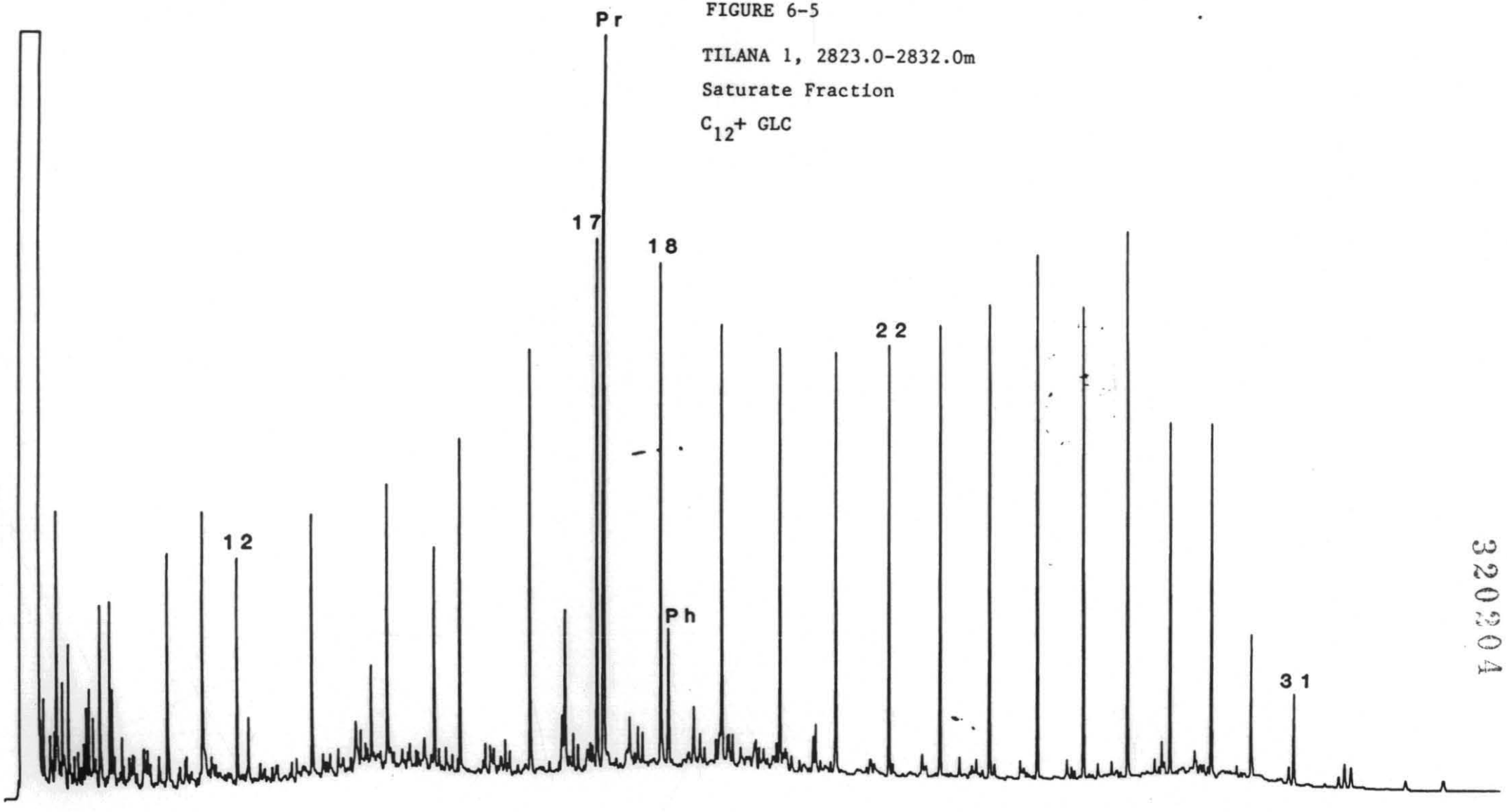
320203

FIGURE 6-5

TILANA 1, 2823.0-2832.0m

Saturate Fraction

C_{12}+ GLC



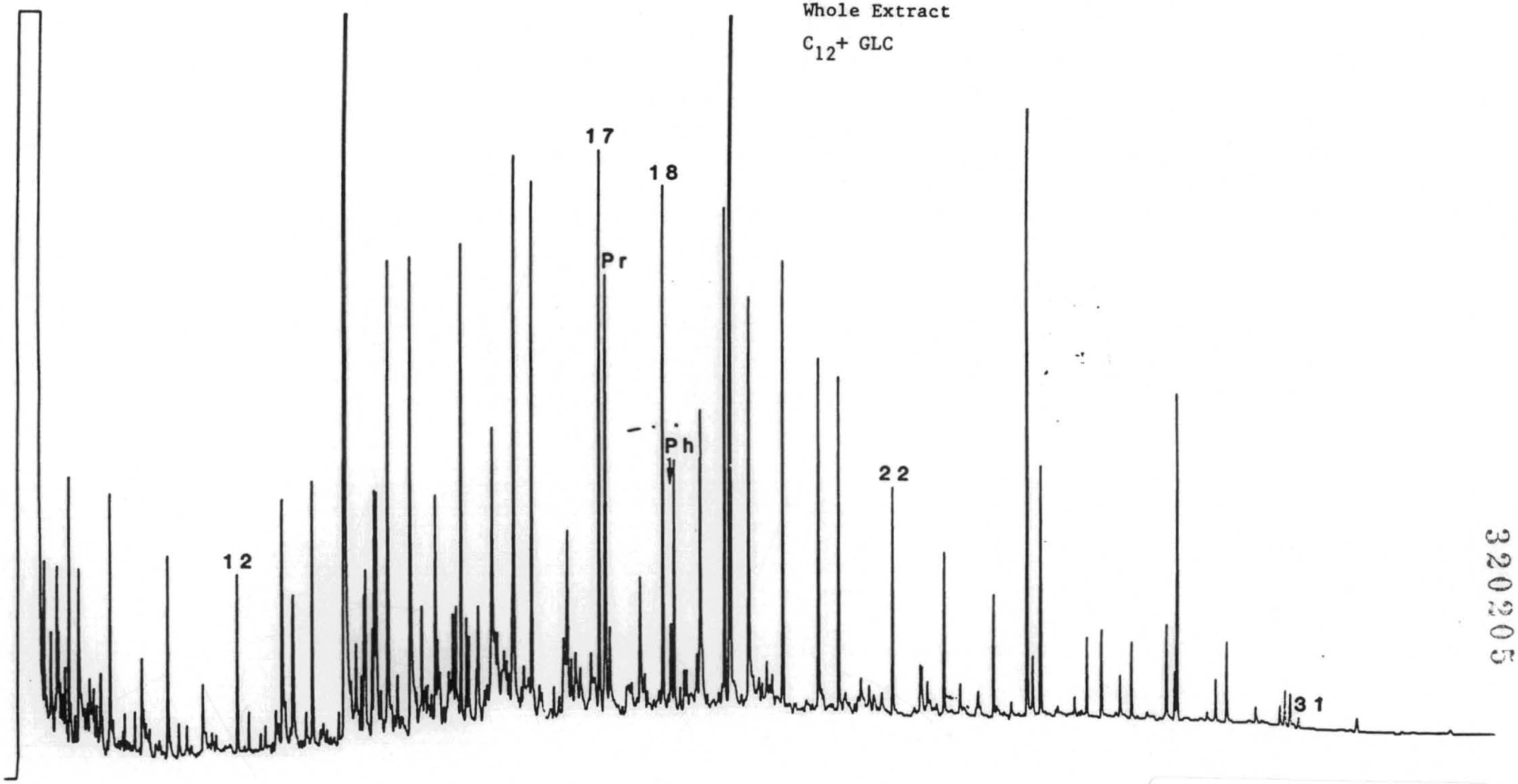
320204

FIGURE 6-6

TILANA 1, 3020.4m SWC 84

Whole Extract

C_{12}+ GLC



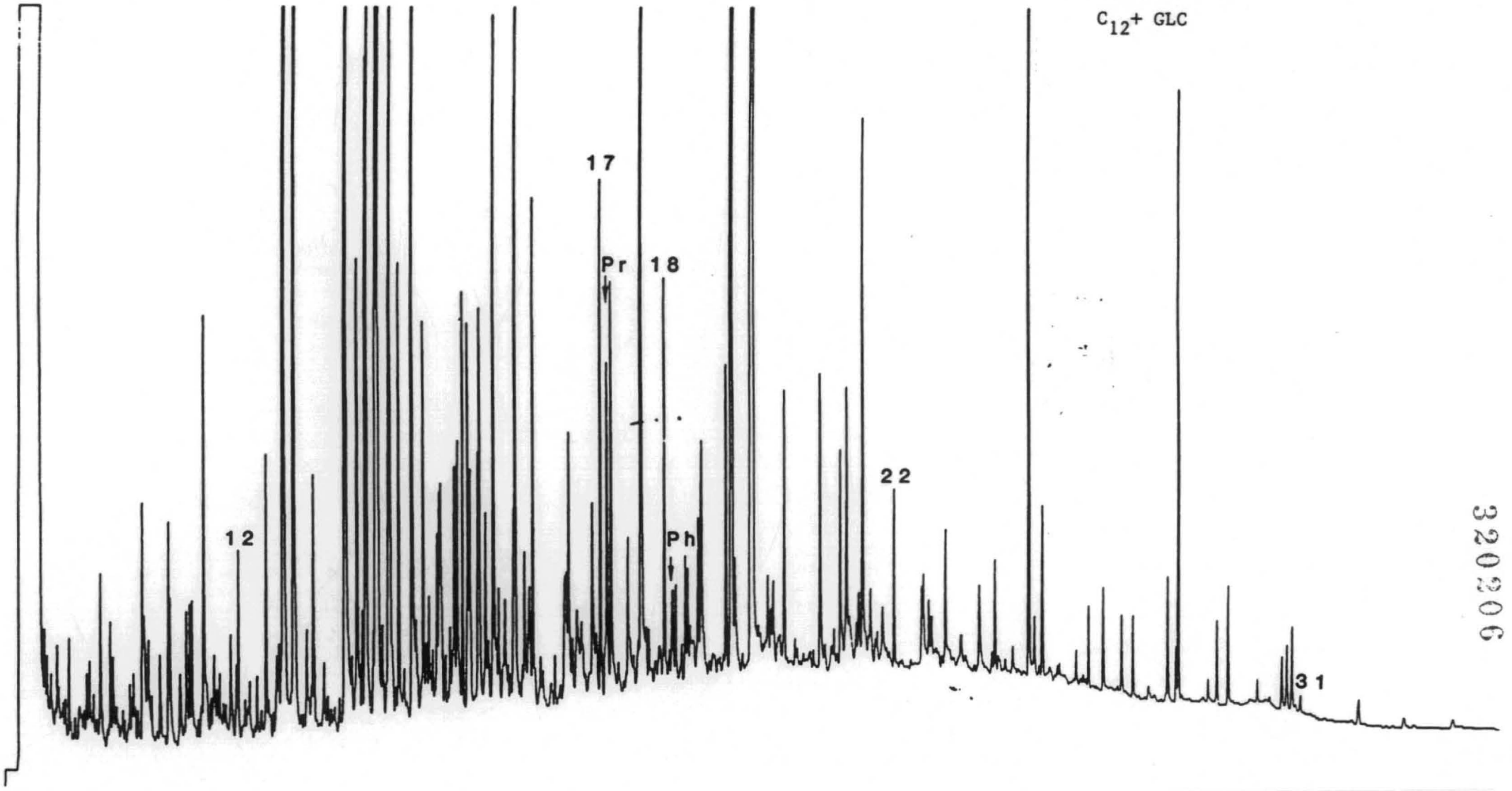
320205

FIGURE 6-7

TILANA 1, 3044.0m SWC 81

Whole Extract

$C_{12}+$ GLC



320206

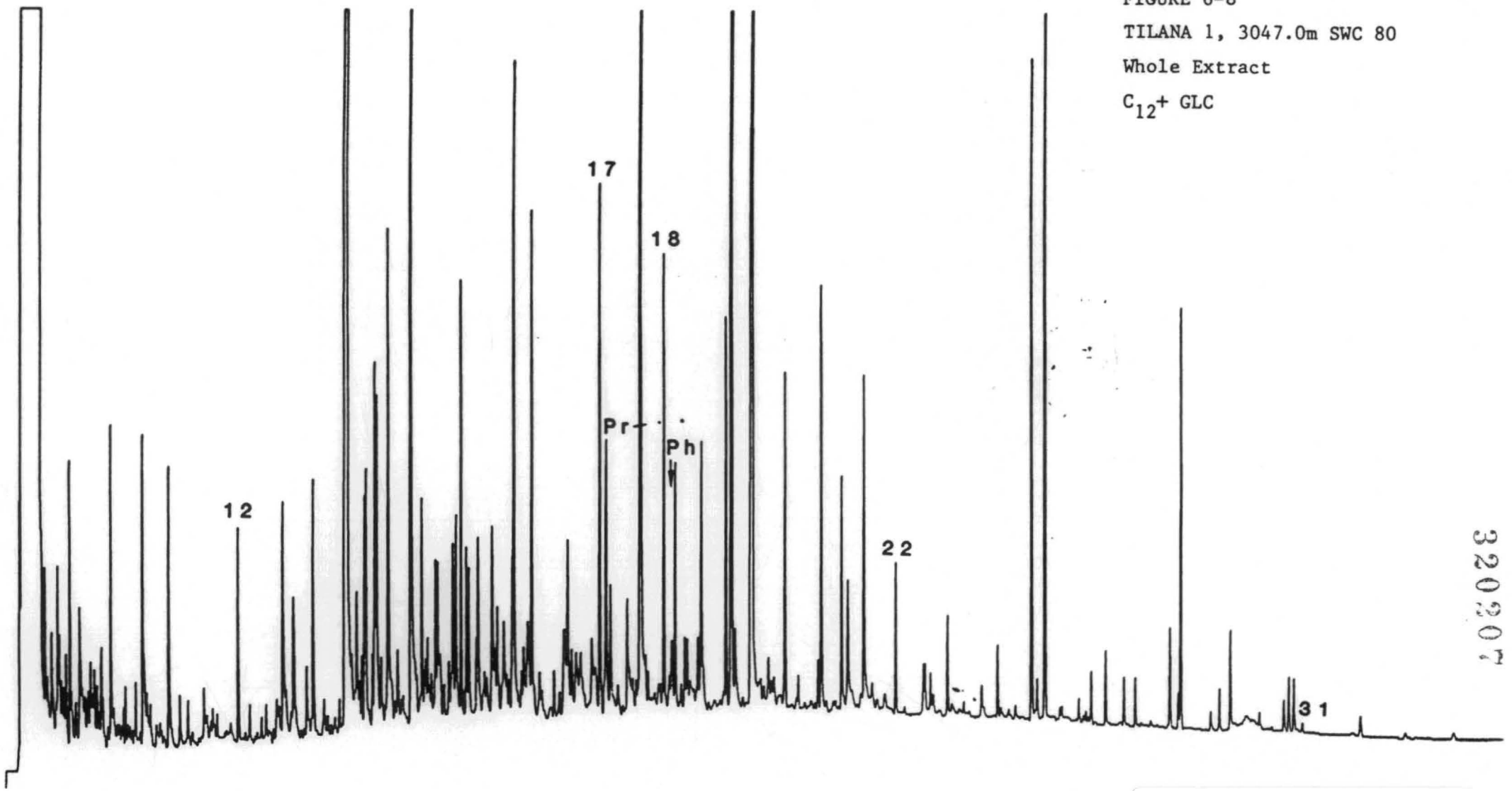


FIGURE 6-8
TILANA 1, 3047.0m SWC 80
Whole Extract
C_{12}+ GLC

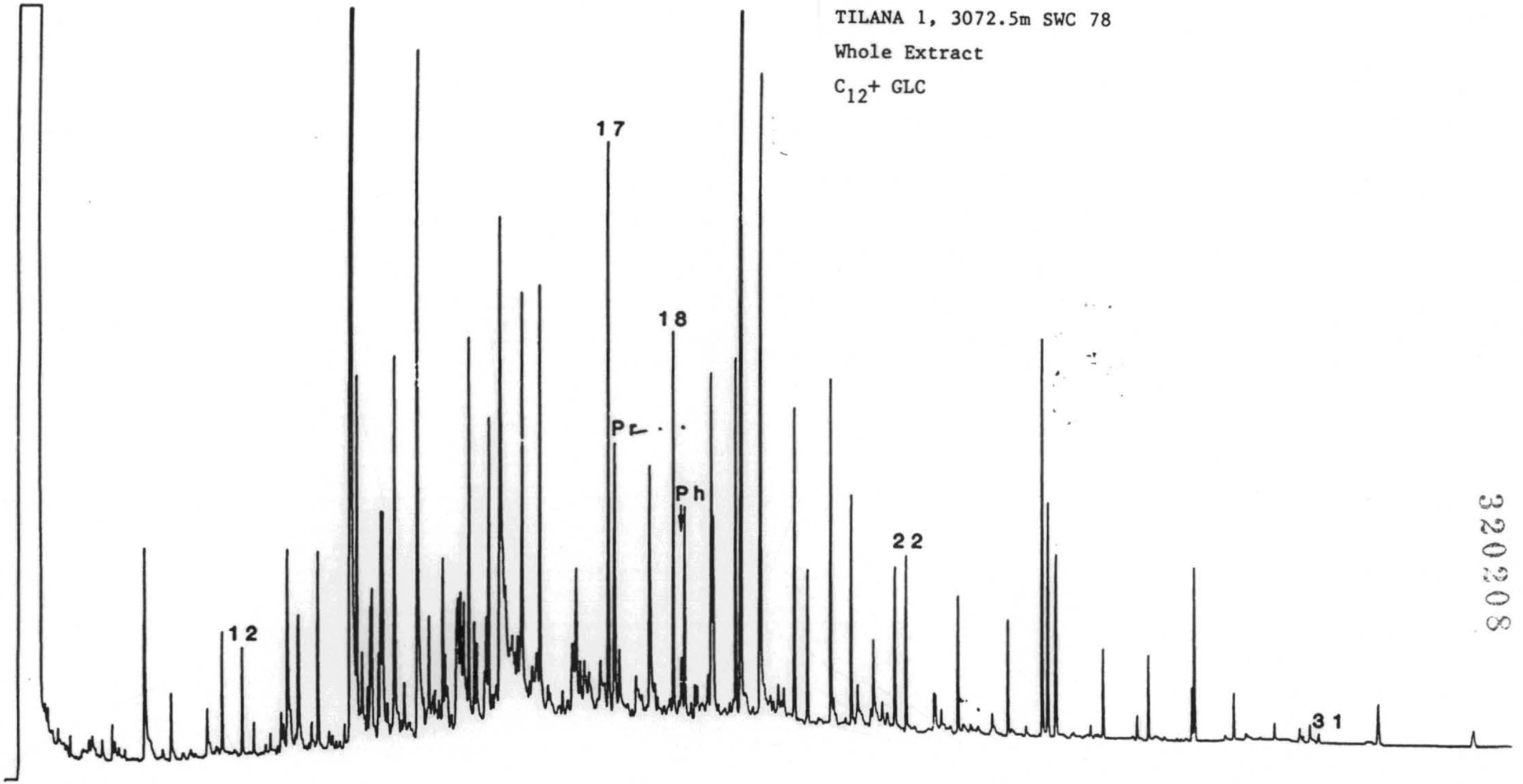
320207

FIGURE 6-9

TILANA 1, 3072.5m SWC 78

Whole Extract

C_{12}+ GLC



320208

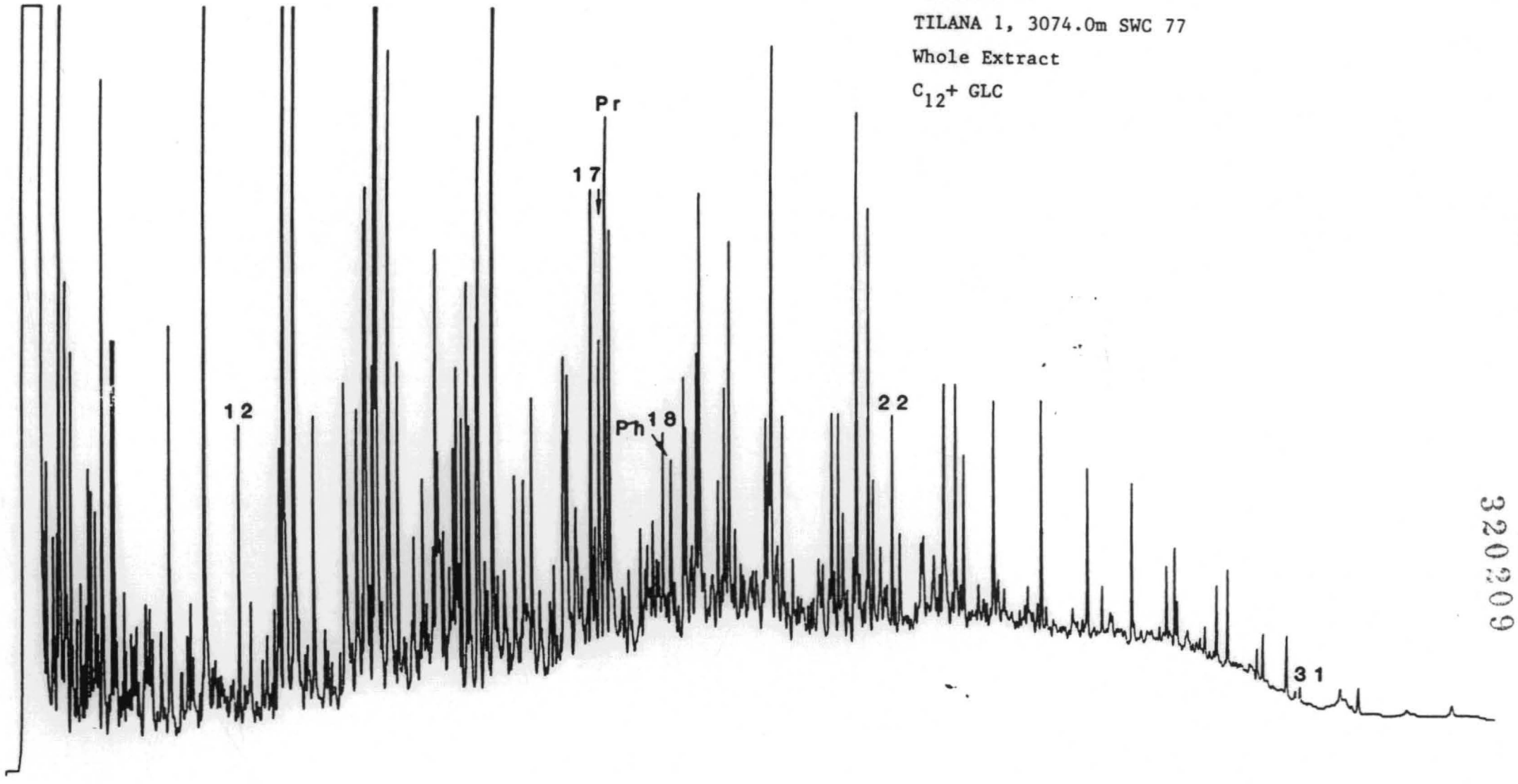
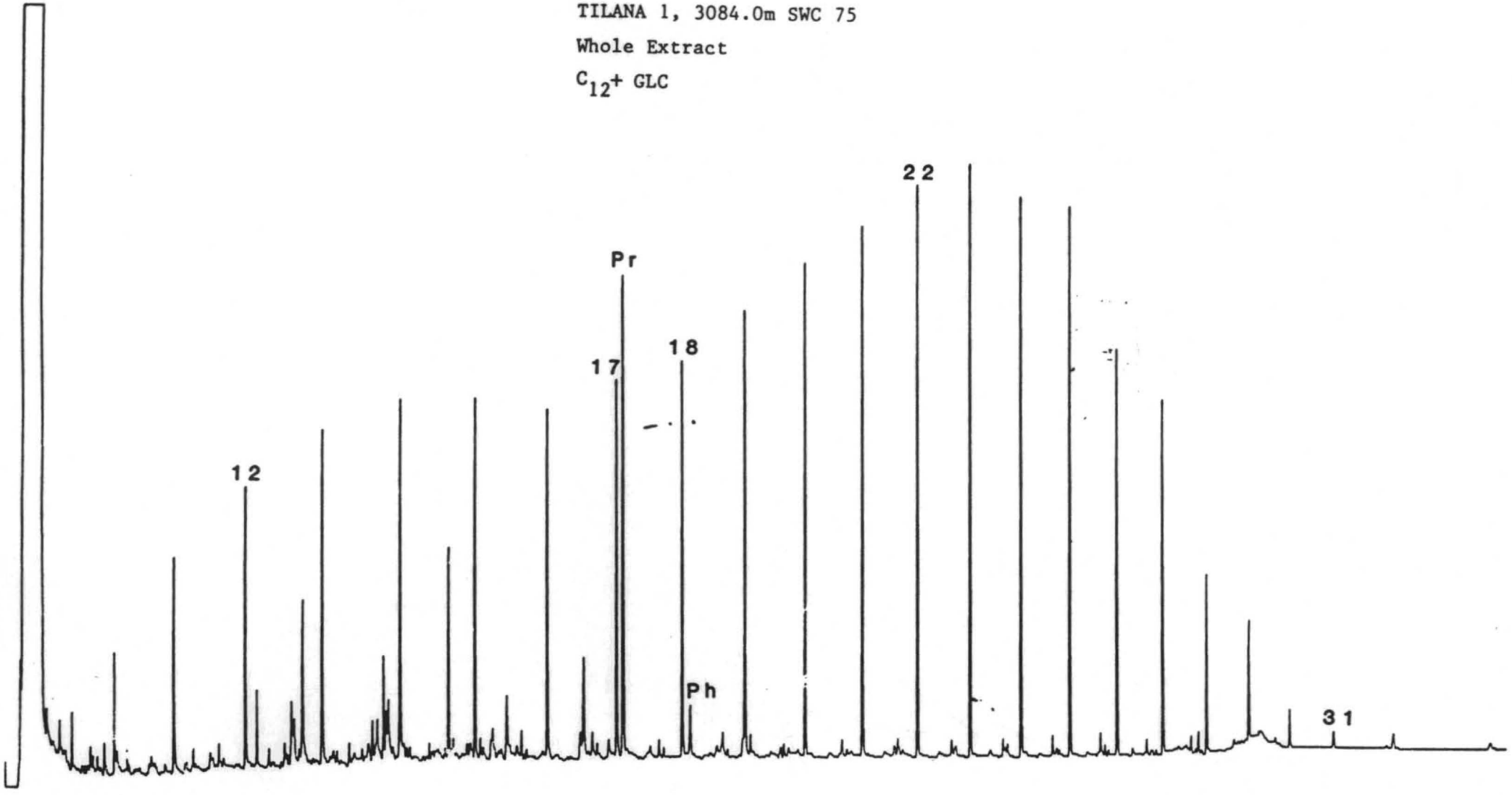


FIGURE 6-10
TILANA 1, 3074.0m SWC 77
Whole Extract
C_{12}+ GLC

320209

FIGURE 6-11
TILANA 1, 3084.0m SWC 75
Whole Extract
C_{12+} GLC



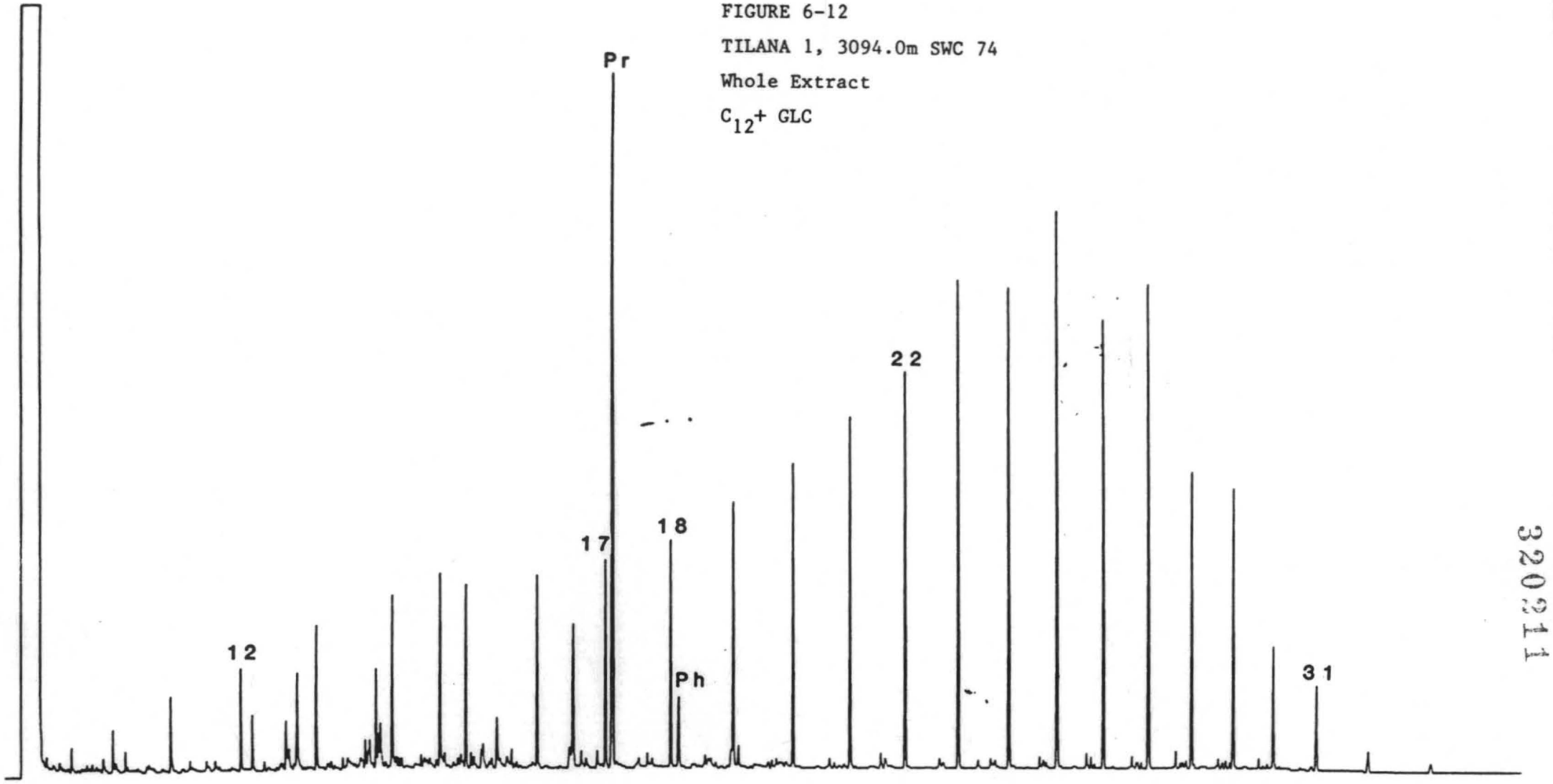
320210

FIGURE 6-12

TILANA 1, 3094.0m SWC 74

Whole Extract

C_{12}^{+} GLC



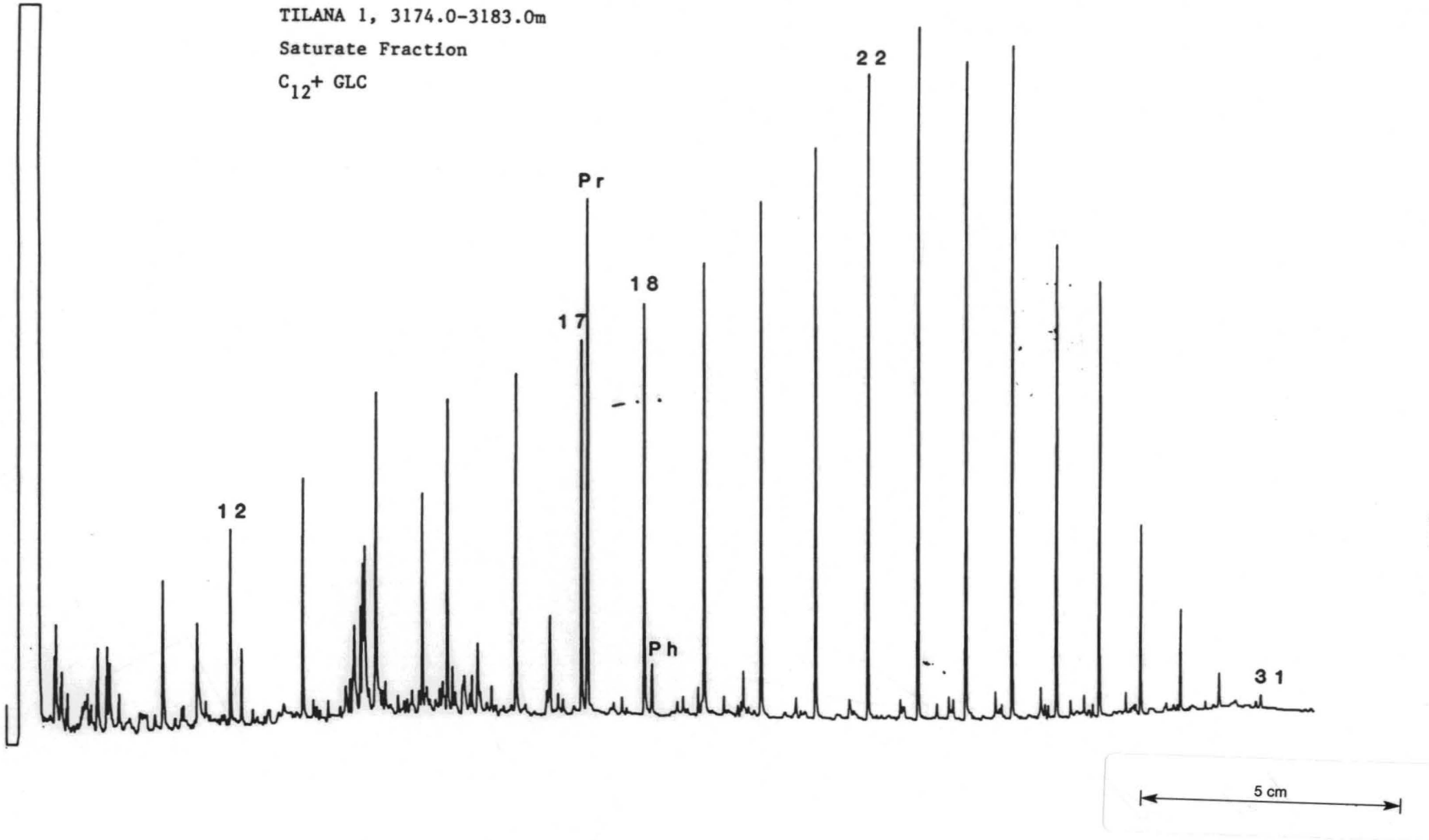
320211

FIGURE 6-13

TILANA 1, 3174.0-3183.0m

Saturate Fraction

C_{12}+ GLC



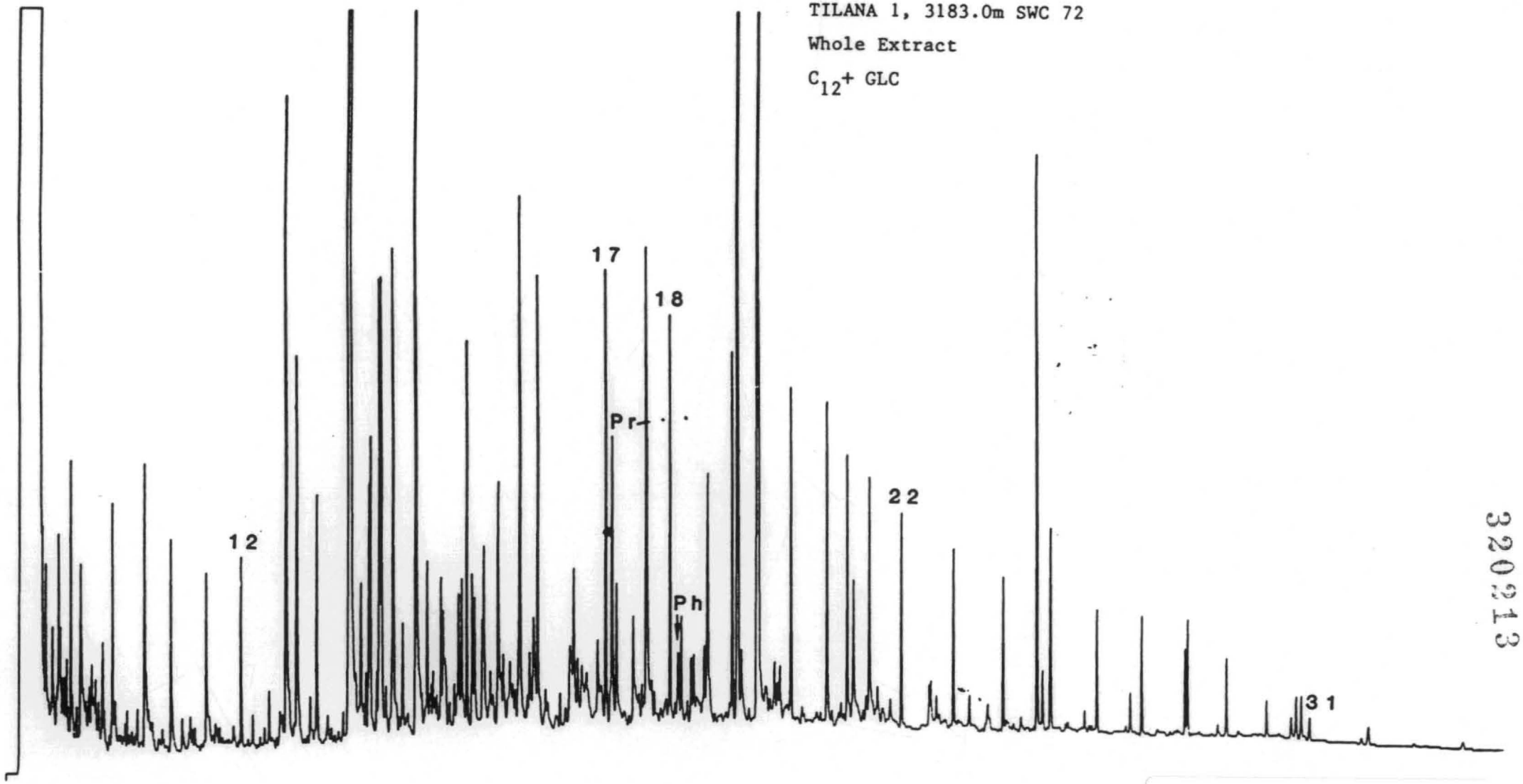
320912

FIGURE 6-14

TILANA 1, 3183.0m SWC 72

Whole Extract

C_{12}+ GLC



320213

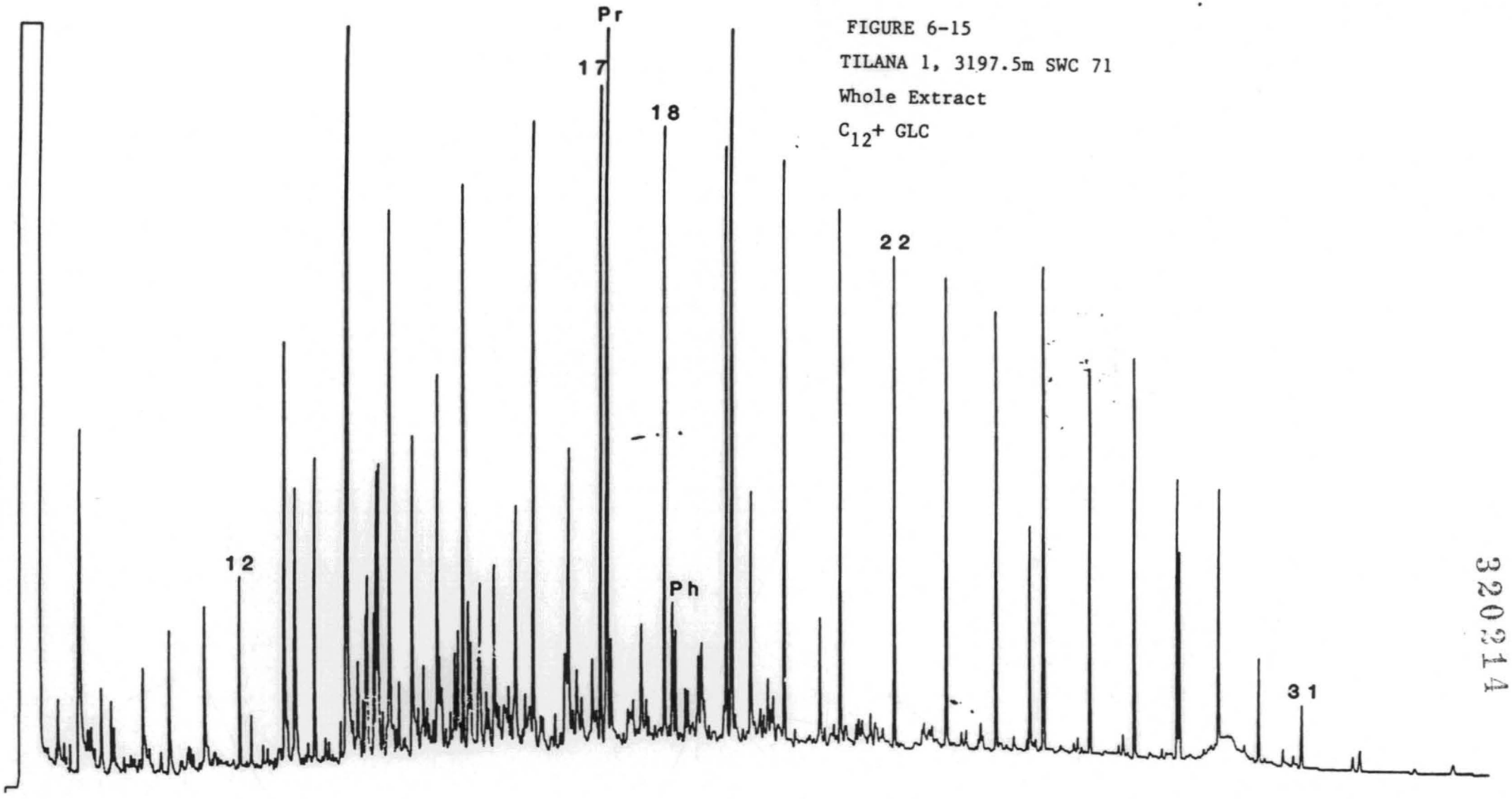


FIGURE 6-15
TILANA 1, 3197.5m SWC 71
Whole Extract
C_{12}+ GLC

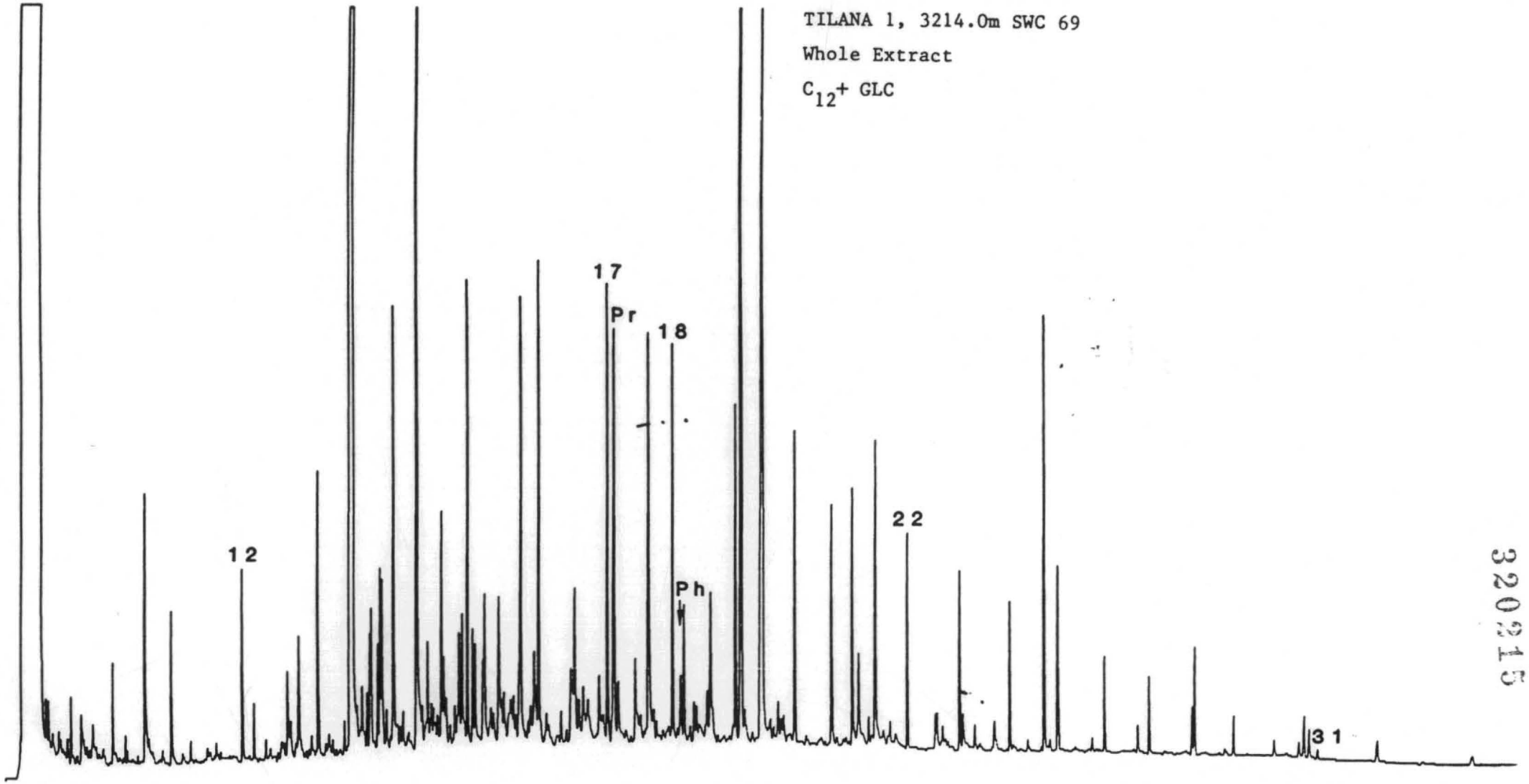
320214

FIGURE 6-16

TILANA 1, 3214.0m SWC 69

Whole Extract

C_{12}^{+} GLC



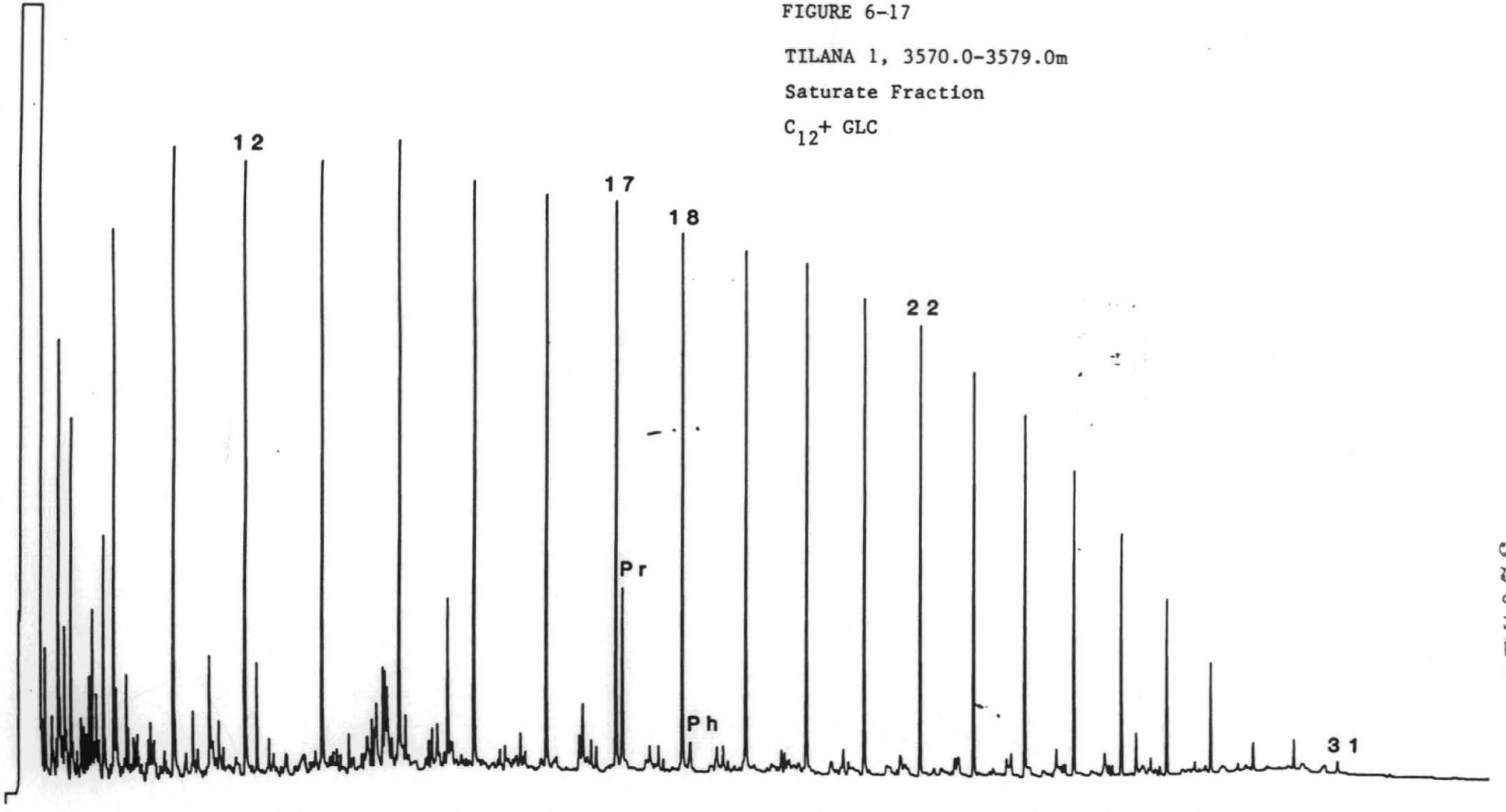
320215

FIGURE 6-17

TILANA 1, 3570.0-3579.0m

Saturate Fraction

C_{12}+ GLC



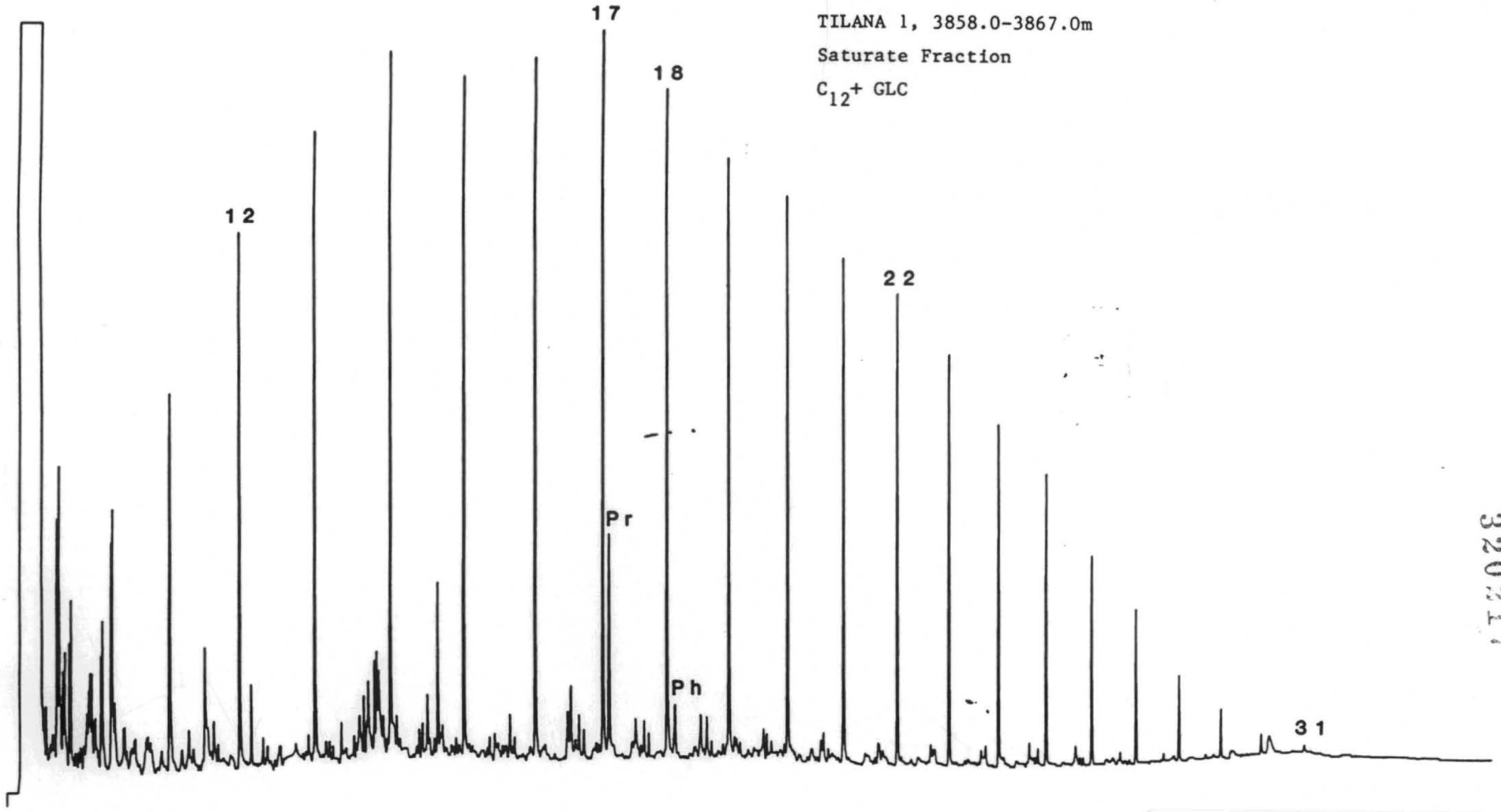
320216

FIGURE 6-18

TILANA 1, 3858.0-3867.0m

Saturate Fraction

C_{12}+ GLC



320211

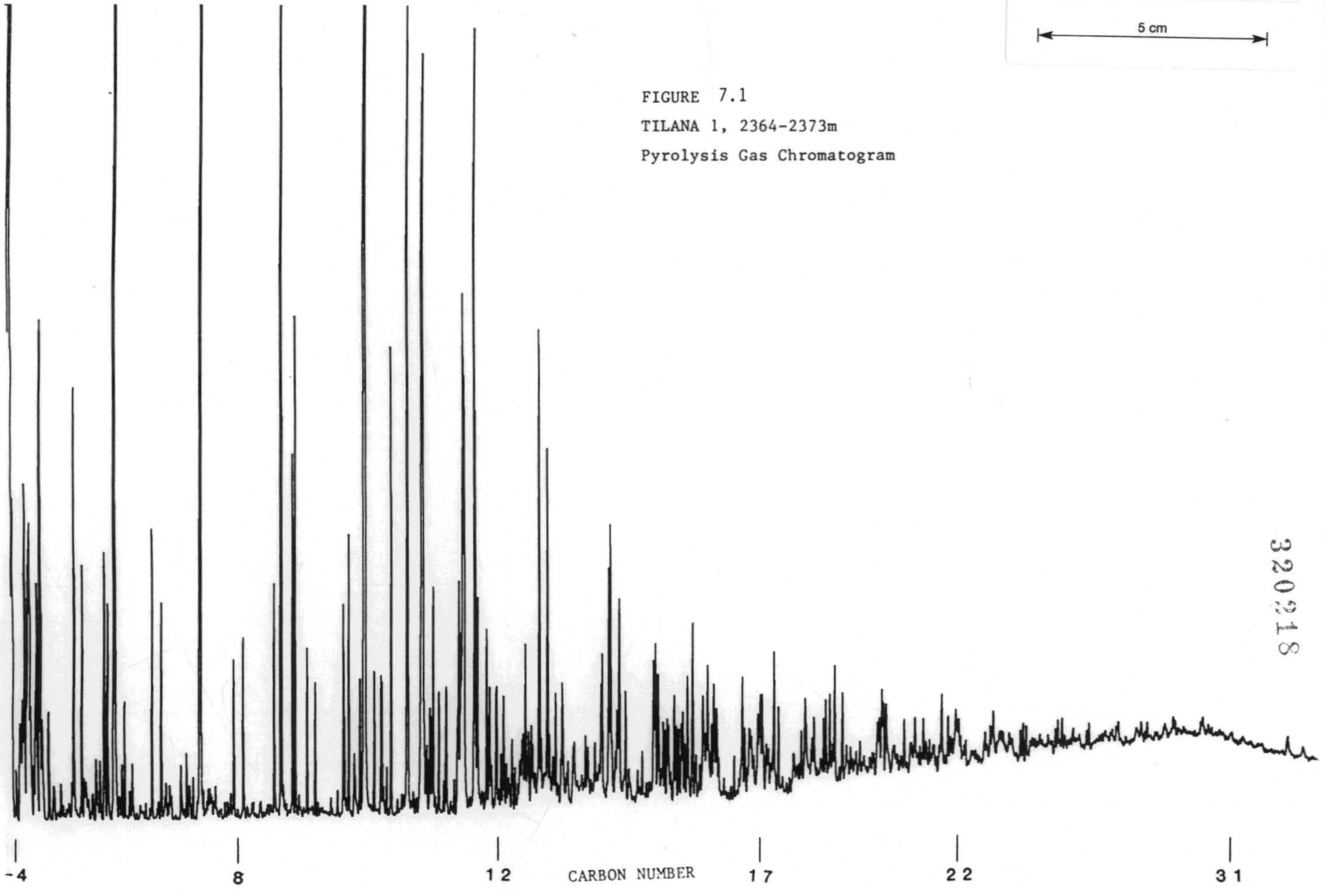


FIGURE 7.1

TILANA 1, 2364-2373m

Pyrolysis Gas Chromatogram

320218

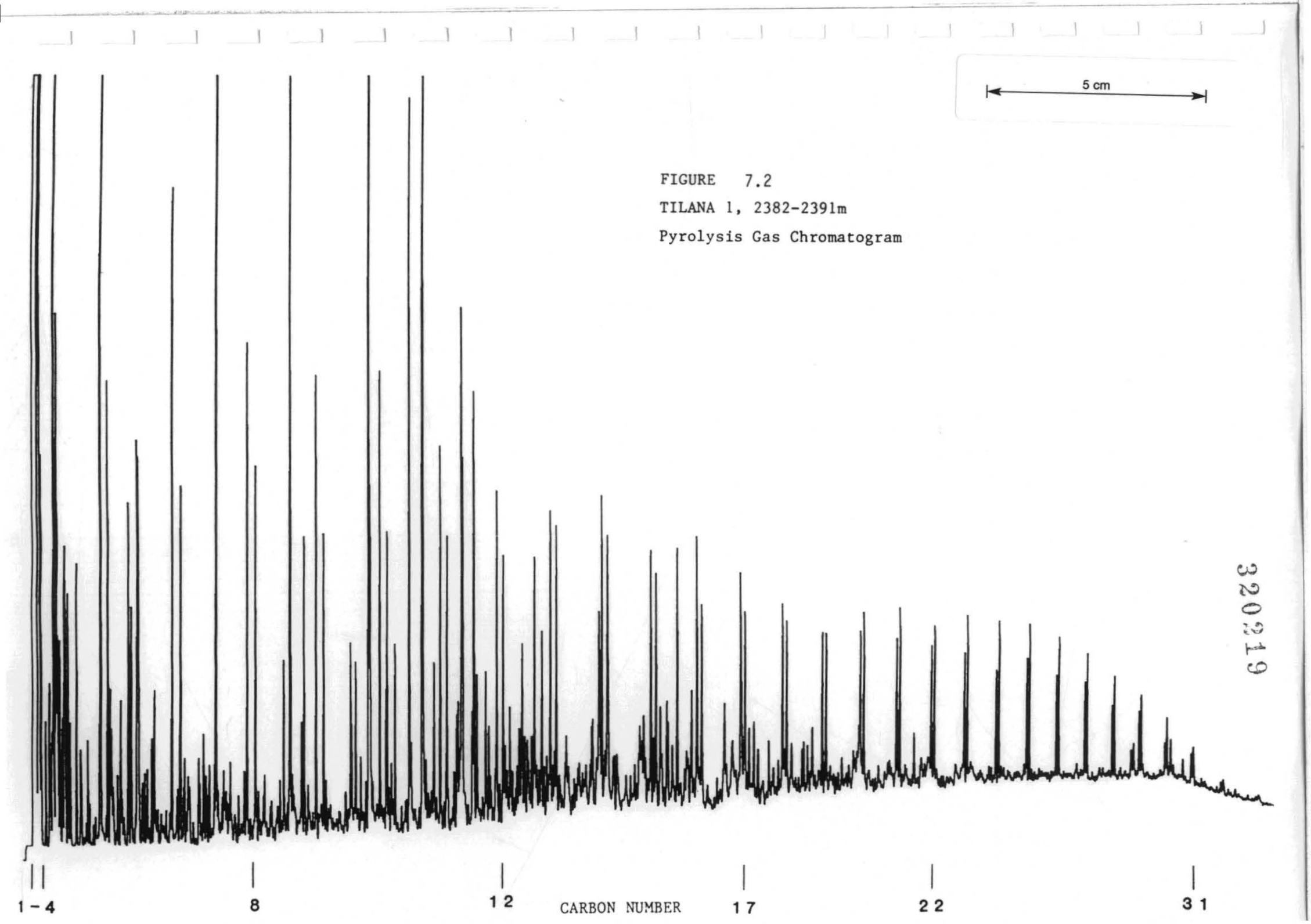


FIGURE 7.2

TILANA 1, 2382-2391m

Pyrolysis Gas Chromatogram

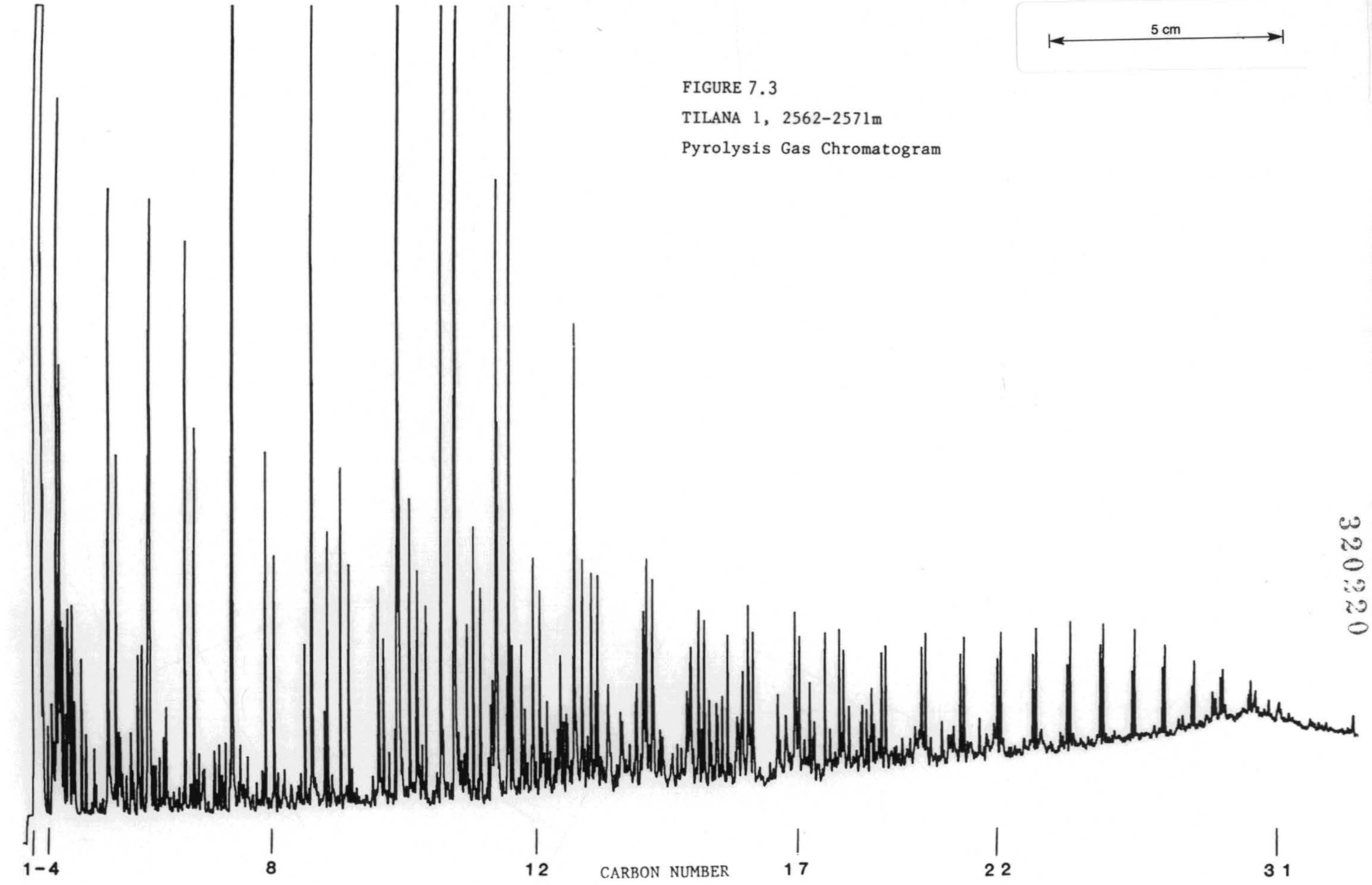


FIGURE 7.3

TILANA 1, 2562-2571m

Pyrolysis Gas Chromatogram

320220

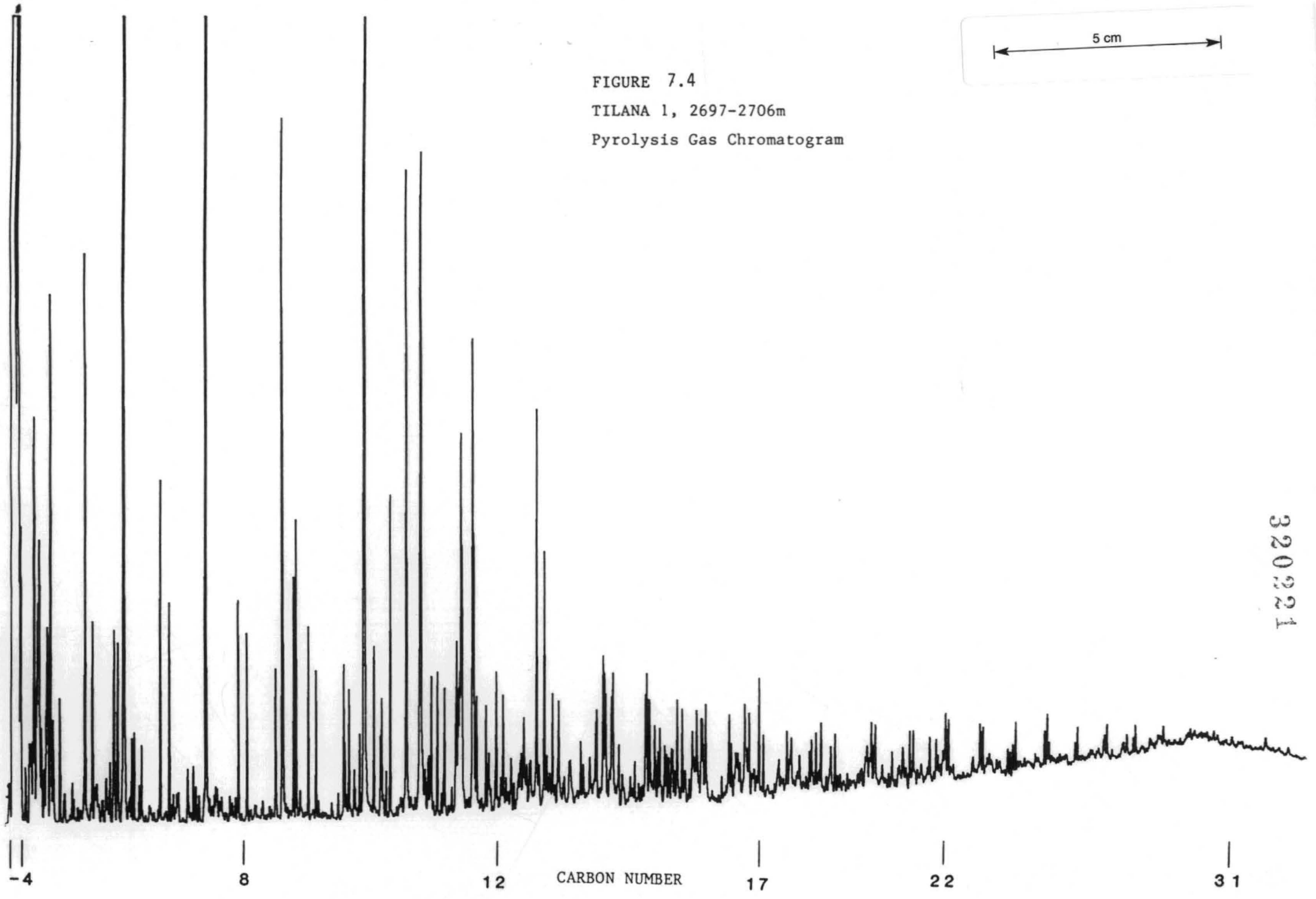


FIGURE 7.4

TILANA 1, 2697-2706m

Pyrolysis Gas Chromatogram

320221

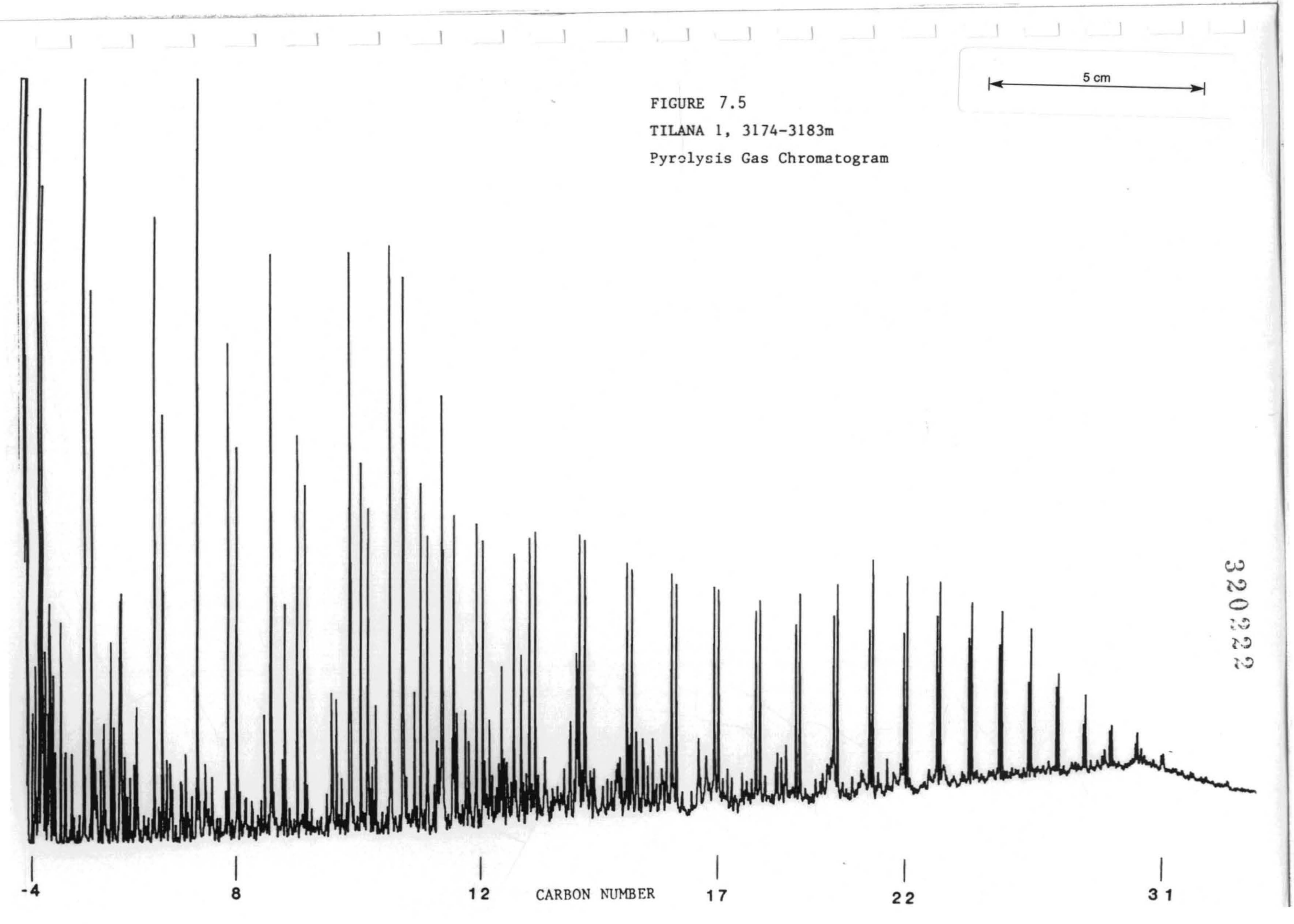


FIGURE 7.5

TILANA 1, 3174-3183m

Pyrolysis Gas Chromatogram

320022

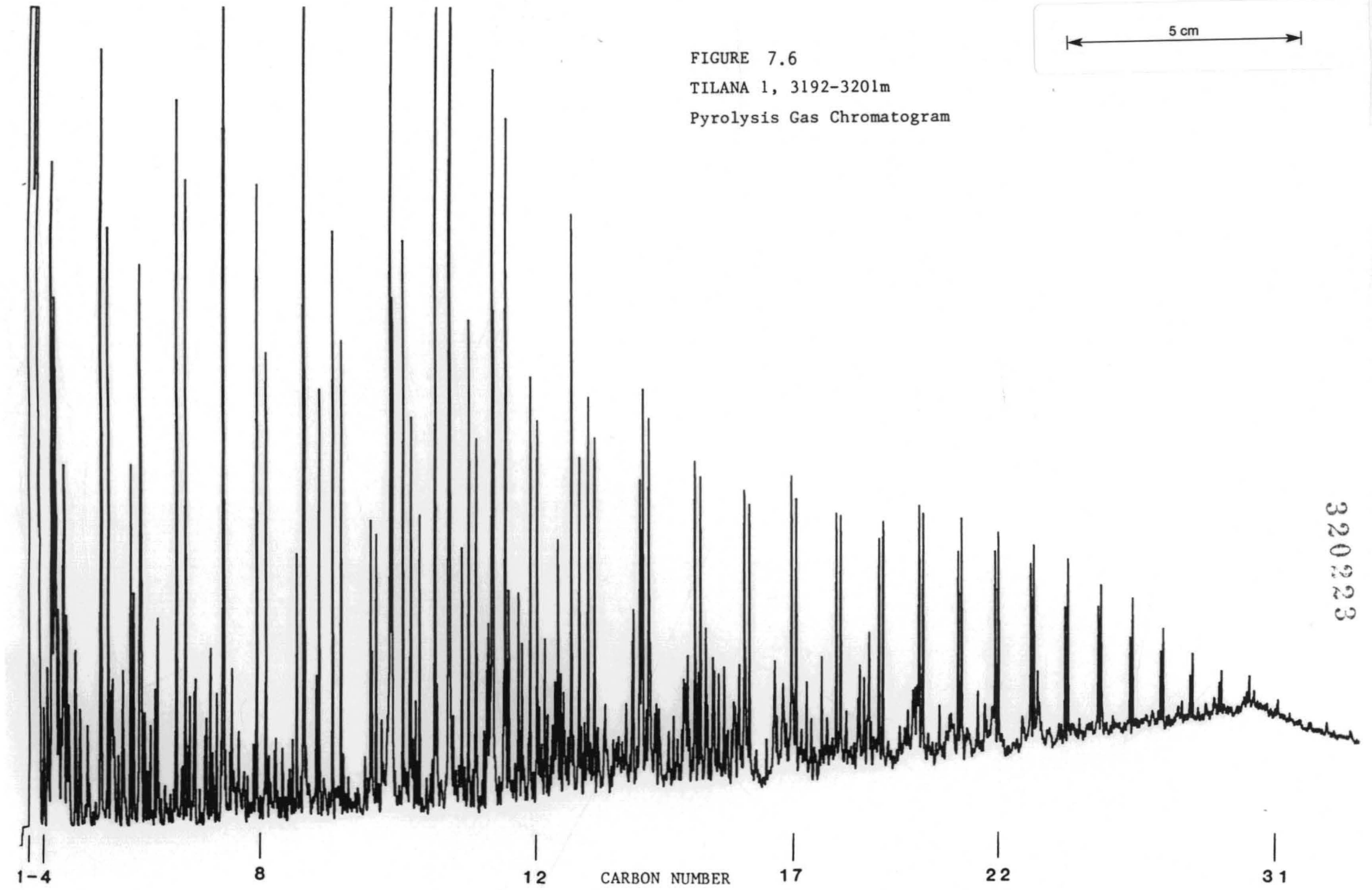


FIGURE 7.6

TILANA 1, 3192-3201m

Pyrolysis Gas Chromatogram

320223

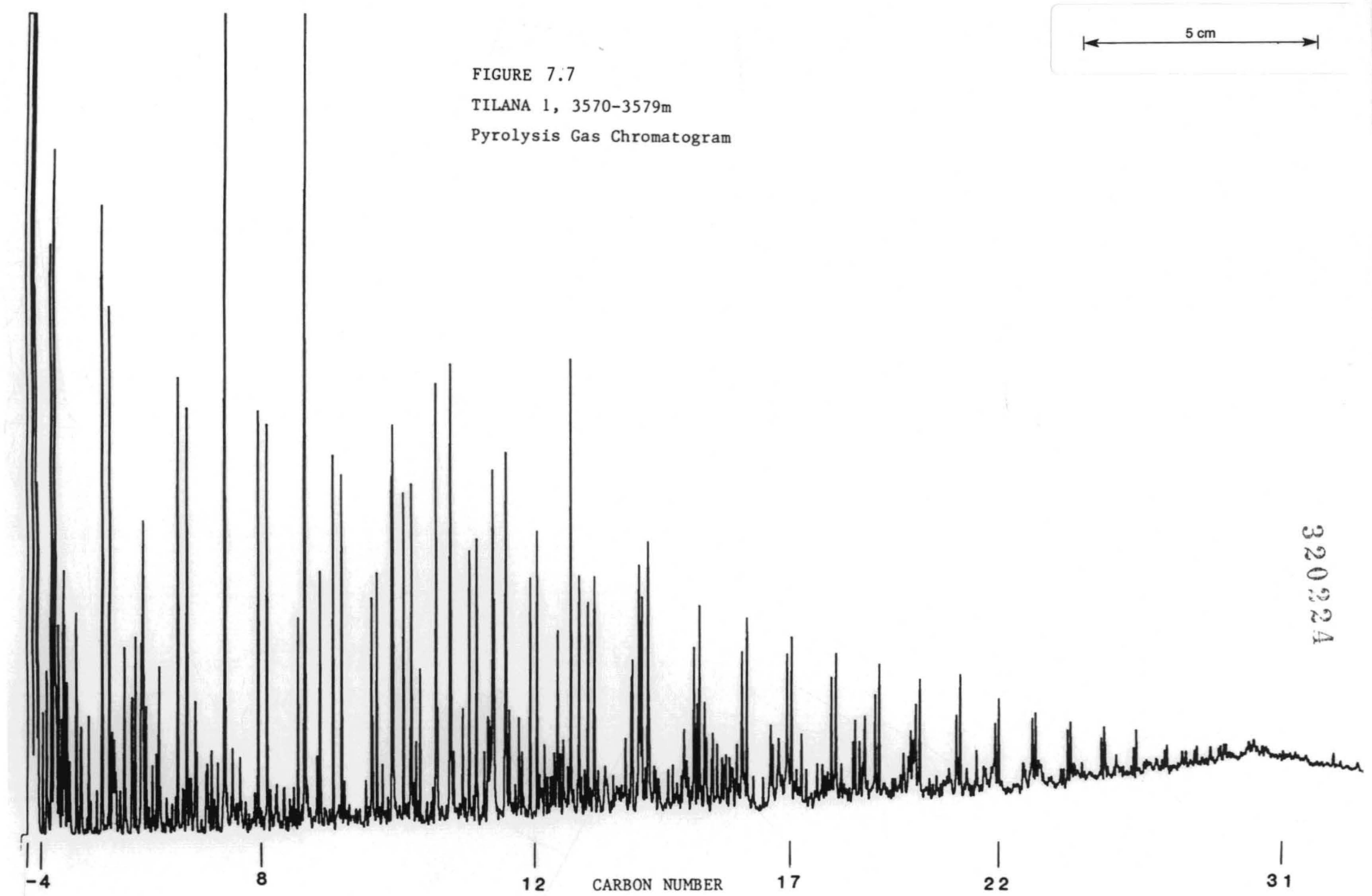


FIGURE 7.7

TILANA 1, 3570-3579m

Pyrolysis Gas Chromatogram

320224

320225

TABLE 1

WELLNAME = TILANA 1

DATE OF JOB = NOVEMBER 1985

HEADSPACE ANALYSIS DATA

DEPTH(m)	METHANE	ETHANE	PROPANE	ISOBUTANE	BUTANE	C1-C4	C2-C4	%WETNESS	C5-C7	i-C4/n-C4
1698.0-1707.0	28499.0	1352.4	131.8	<0.1	<0.1	29983.2	1484.2	5.0	<0.1	bdl
1716.0-1725.0	19845.9	1296.5	60.2	<0.1	<0.1	21202.6	1356.7	6.4	<0.1	bdl
1734.0-1743.0	21616.3	3192.4	115.6	<0.1	<0.1	24924.4	3308.1	13.3	<0.1	bdl
1752.0-1761.0	2212.2	504.9	26.8	<0.1	<0.1	2743.8	531.7	19.4	<0.1	bdl
1770.0-1779.0	7595.7	1100.0	49.8	0.5	0.9	8746.8	1151.1	13.2	0.6	0.57
1788.0-1797.0	2264.0	344.5	17.3	0.5	0.3	2626.6	362.6	13.8	0.9	1.40
1806.0-1815.0	13177.1	1973.3	90.3	2.9	1.2	15244.8	2067.7	13.6	6.8	2.40
1824.0-1833.0	4255.9	1818.6	120.3	6.0	4.6	6205.4	1949.4	31.4	7.4	1.31
1842.0-1851.0	1229.1	1208.0	115.4	<0.1	<0.1	2552.5	1323.4	51.8	<0.1	bdl
1860.0-1869.0	196.2	33.9	1.4	<0.1	<0.1	231.5	35.3	15.3	1.6	bdl
1878.0-1887.0	182.3	117.1	8.5	0.7	0.4	309.1	126.8	41.0	0.8	1.67
1896.0-1905.0	194.0	275.4	26.8	<0.1	<0.1	496.2	302.2	60.9	<0.1	bdl
1914.0-1923.0	548.9	612.6	86.8	7.3	10.0	1265.5	716.6	56.6	69.7	0.73
1932.0-1941.0	1626.0	800.5	127.3	11.9	6.7	2572.3	946.3	36.8	6.4	1.79
1950.0-1959.0	1683.8	1230.2	237.7	29.4	12.5	3193.6	1509.8	47.3	9.0	2.35
1968.0-1977.0	627.4	318.8	91.9	13.1	8.1	1059.3	431.9	40.8	16.8	1.63
1986.0-1995.0	46.2	38.2	9.6	0.7	0.9	95.6	49.3	51.6	22.7	0.80
2004.0-2013.0	350.6	108.9	12.8	0.9	1.0	474.2	123.6	26.1	5.5	0.88
2022.0-2031.0	87.9	32.8	5.9	0.6	0.7	127.9	40.0	31.3	3.9	0.80
2040.0-2049.0	29.0	9.2	2.1	0.3	0.3	40.8	11.8	28.9	2.9	1.18
2058.0-2067.0	256.0	78.6	23.1	2.0	1.7	361.3	105.3	29.2	7.4	1.16
2076.0-2085.0	42.5	20.6	5.5	0.6	0.5	69.7	27.2	39.0	4.7	1.27
2094.0-2103.0	4.3	1.0	0.2	<0.1	<0.1	5.5	1.3	22.7	6.3	bdl
2112.0-2121.0	50.7	36.1	7.7	1.1	1.0	96.6	45.9	47.5	2.1	1.08
2130.0-2139.0	54.7	9.1	1.9	0.1	0.1	65.9	11.3	17.1	9.6	1.00
2148.0-2157.0	217.7	59.1	12.0	0.6	0.5	289.9	72.1	24.9	29.1	1.33
2166.0-2175.0	16.5	5.6	1.4	0.2	<0.1	23.8	7.3	30.7	3.1	bdl
2184.0-2193.0	79.2	47.5	18.4	3.5	2.1	150.8	71.6	47.5	6.2	1.64
2202.0-2211.0	65.1	20.7	4.3	0.6	0.5	91.2	26.1	28.6	6.3	1.15
2220.0-2229.0	78.3	24.6	3.8	0.4	0.4	107.5	29.2	27.1	4.0	1.07
2238.0-2247.0	102.0	23.1	3.7	<0.1	<0.1	128.7	26.7	20.7	8.3	bdl
2256.0-2265.0	7104.5	2323.8	280.3	16.4	11.7	9736.7	2632.3	27.0	10.1	1.40
2274.0-2283.0	3743.9	220.9	22.9	1.7	1.7	3991.1	247.2	6.2	4.9	0.97
2292.0-2301.0	25075.1	3175.4	612.4	20.6	16.6	28900.0	3824.9	13.2	16.0	1.24
2310.0-2319.0	327751.	14184.9	752.3	14.8	14.8	342717.	14966.8	4.4	<0.1	1.00
2328.0-2337.0	73674.5	2417.3	188.2	18.6	14.9	76313.4	2638.9	3.5	8.9	1.25
2346.0-2355.0	48643.2	3227.9	557.6	38.2	53.5	52520.3	3877.1	7.4	<0.1	0.71
2364.0-2373.0	301997.	14863.4	4760.3	650.7	569.7	322841.	20844.1	6.5	170.1	1.14
2382.0-2391.0	173074.	8285.0	3225.1	604.5	423.7	185612.	12538.3	6.8	170.3	1.43
2400.0-2409.0	3464.9	161.7	63.6	16.4	7.3	3713.8	248.9	6.7	<0.1	2.25
2418.0-2427.0	114334.	6145.5	2075.7	493.8	235.7	123285.	8950.6	7.3	137.0	2.09
2436.0-2445.0	1936.9	116.0	33.7	9.5	5.4	2101.5	164.6	7.8	8.7	1.74
2454.0-2463.0	172.8	6.7	0.8	<0.1	<0.1	180.4	7.5	4.2	2.5	bdl
2472.0-2481.0	811.6	47.3	10.5	4.5	1.4	875.2	63.6	7.3	16.1	3.33
2490.0-2499.0	60048.2	4053.9	1199.1	409.3	129.8	65840.3	5792.1	8.8	107.6	3.15
2508.0-2517.0	80093.5	3088.9	501.5	154.0	71.8	83909.7	3816.2	4.5	74.5	2.15
2526.0-2535.0	64409.1	3341.3	801.4	188.5	63.8	68804.1	4395.0	6.4	40.7	2.96
2544.0-2553.0	13517.6	1283.7	486.4	173.9	83.9	15545.5	2027.8	13.0	91.9	2.07

N.B. 1. GAS CONCENTRATIONS EXPRESSED IN PPM (VOL. GAS/VOL. SEDIMENT)
2. bdl = BELOW DETECTION LIMIT

320226

TABLE 1 (cont)

WELLNAME = TILANA 1

DATE OF JOB = NOVEMBER 1985

HEADSPACE ANALYSIS DATA

DEPTH(m)	METHANE	ETHANE	PROPANE	ISOBUTANE	BUTANE	C1-C4	C2-C4	%WETNESS	C5-C7	i-C4/n-C4
2562.0-2571.0	148358.	11854.0	3470.9	678.4	236.2	164597.	16239.6	9.9	117.1	2.87
2580.0-2589.0	130944.	6134.8	1694.7	309.0	98.1	139181.	8236.7	5.9	34.6	3.15
2589.0-2598.0	19527.1	1971.8	887.4	211.2	119.7	22717.2	3190.0	14.0	111.7	1.76
2607.0-2616.0	12893.9	706.4	438.8	162.6	115.3	14317.0	1423.2	9.9	98.6	1.41
2625.0-2634.0	21264.1	1072.8	413.6	142.3	102.8	22995.7	1731.6	7.5	94.8	1.38
2643.0-2652.0	825.7	115.3	74.1	13.7	11.4	1040.2	214.6	20.6	<0.1	1.20
2661.0-2670.0	48161.2	2179.1	750.6	245.7	155.3	51491.8	3330.6	6.5	124.7	1.58
2679.0-2688.0	11333.1	807.8	357.3	117.9	92.6	12708.7	1375.6	10.8	54.9	1.27
2697.0-2706.0	150684.	8319.2	2762.4	406.5	212.6	162385.	11700.7	7.2	47.2	1.91
2715.0-2724.0	27661.2	3134.7	1583.5	283.1	204.3	32866.7	5205.5	15.8	74.8	1.39
2733.0-2742.0	41794.2	5340.8	2177.3	408.9	163.5	49884.7	8090.5	16.2	<0.1	2.50
2751.0-2760.0	14793.4	1492.3	866.8	242.7	218.1	17613.4	2820.0	16.0	206.4	1.11
2769.0-2778.0	12702.9	898.6	616.6	221.8	221.8	14661.7	1958.8	13.4	245.5	1.00
2787.0-2796.0	70178.0	2995.0	788.2	147.6	124.1	74232.9	4054.9	5.5	102.0	1.19
2805.0-2814.0	11197.3	1513.0	1017.6	259.3	235.2	14222.4	3025.1	21.3	239.1	1.10
2823.0-2832.0	53623.7	4811.7	3004.2	924.4	690.6	63054.6	9430.9	15.0	604.9	1.34
2841.0-2850.0	26010.6	2561.0	1090.7	228.5	196.5	30087.4	4076.8	13.5	183.6	1.16
2859.0-2868.0	4346.3	339.4	198.1	45.2	48.7	4977.7	631.4	12.7	49.1	0.93
2877.0-2886.0	1478.5	341.5	221.5	40.8	49.2	2131.4	652.9	30.6	63.3	0.83
2895.0-2904.0	3283.5	331.0	382.5	96.7	117.7	4211.4	927.9	22.0	93.1	0.82
2913.0-2922.0	39275.5	3744.8	2858.2	575.2	682.7	47136.3	7860.8	16.7	460.0	0.84
2931.0-2940.0	52459.3	2429.1	1157.4	285.8	340.1	56671.6	4212.3	7.4	246.4	0.84
2949.0-2958.0	1962.5	444.9	453.7	116.6	122.2	3100.0	1137.4	36.7	96.3	0.95
2967.0-2976.0	9506.2	650.3	490.9	97.4	116.9	10861.7	1355.5	12.5	67.7	0.83
2994.0-3003.0	17229.8	1395.6	901.0	220.8	206.8	19953.9	2724.1	13.7	120.4	1.07
3013.0-3021.0	5718.2	510.7	347.9	105.9	123.5	6806.2	1088.0	16.0	96.3	0.86
3030.0-3039.0	11093.6	1154.9	707.3	178.6	201.2	13335.6	2242.0	16.8	145.0	0.89
3048.0-3057.0	1460.4	581.8	816.3	225.4	295.7	3379.5	1919.2	56.8	223.2	0.76
3066.0-3075.0	20038.7	1738.5	924.6	183.8	139.1	23024.7	2986.0	13.0	90.7	1.32
3084.0-3093.0	8255.2	2080.1	1660.9	384.6	353.3	12734.1	4478.9	35.2	296.8	1.09
3102.0-3111.0	4720.9	885.9	514.8	93.4	89.4	6304.5	1583.6	25.1	75.0	1.04
3120.0-3129.0	3446.7	409.9	206.7	34.2	36.7	4134.2	687.5	16.6	34.3	0.93
3138.0-3147.0	511.3	94.0	61.4	10.3	13.4	690.5	179.2	25.9	14.9	0.77
3156.0-3165.0	1799.7	215.3	133.6	29.7	36.3	2214.6	414.9	18.7	58.8	0.82
3174.0-3183.0	600888.	50581.5	14123.1	1577.5	1278.0	668448.	67560.1	10.1	612.1	1.23
3192.0-3201.0	75511.9	5602.2	1854.1	348.4	300.5	83617.1	8105.2	9.7	212.9	1.16
3210.0-3219.0	6323.9	1567.7	833.5	96.9	132.5	8954.6	2630.7	29.4	65.9	0.73
3228.0-3237.0	160.4	101.2	132.6	29.5	48.6	472.4	312.0	66.0	61.1	0.61
3246.0-3255.0	45916.1	3910.6	1166.1	145.8	152.3	51290.9	5374.8	10.5	144.3	0.96
3264.0-3273.0	35058.5	3719.5	1300.3	182.0	215.5	40476.0	5417.4	13.4	282.6	0.84
3282.0-3291.0	367.3	99.5	43.6	5.5	8.5	524.5	157.2	30.0	14.0	0.64
3300.0-3309.0	13375.9	659.7	135.3	20.7	20.9	14212.5	836.6	5.9	24.7	0.99
3318.0-3327.0	2363.9	230.2	67.8	11.0	12.7	2685.5	321.6	12.0	17.1	0.86
3336.0-3345.0	1358.2	138.7	42.2	6.1	7.8	1552.9	194.7	12.5	10.8	0.79
3354.0-3363.0	2442.2	236.0	89.9	20.4	19.5	2808.1	365.9	13.0	28.6	1.05
3372.0-3381.0	5833.9	543.6	199.2	29.2	35.7	6641.6	807.7	12.2	65.1	0.82
3390.0-3399.0	1165.7	125.9	45.5	7.3	8.8	1353.2	187.5	13.9	13.1	0.82
3408.0-3417.0	134.5	22.7	9.0	0.8	1.0	167.9	33.4	19.9	3.7	0.80

N.B. 1. GAS CONCENTRATIONS EXPRESSED IN PPM (VOL. GAS/VOL. SEDIMENT)
2. bdl = BELOW DETECTION LIMIT

TABLE 1 (cont)

WELLNAME = TILANA 1

DATE OF JOB = NOVEMBER 1985

HEADSPACE ANALYSIS DATA

DEPTH(m)	METHANE	ETHANE	PROPANE	ISOBUTANE	BUTANE	C1-C4	C2-C4	%WETNESS	C5-C7	i-C4/n-C4
3426.0-3435.0	28.9	6.2	2.9	0.2	0.4	38.7	9.8	25.2	1.1	0.60
3444.0-3453.0	56.3	16.2	8.9	1.3	2.1	84.9	28.6	33.7	4.6	0.61
3462.0-3471.0	40.8	20.6	16.7	15.9	10.6	104.7	63.9	61.1	41.0	1.50
3480.0-3489.0	23441.1	6231.2	1706.5	329.7	213.1	31921.6	8480.6	26.6	200.3	1.55
3498.0-3507.0	1672.4	1292.5	604.4	201.0	95.1	3865.4	2193.1	56.7	129.1	2.11
3516.0-3525.0	134.3	71.2	52.9	38.6	16.6	313.5	179.2	57.2	25.7	2.33
3534.0-3543.0	21221.8	6825.2	1878.1	181.1	230.2	30336.4	9114.6	30.0	172.0	0.79
3552.0-3561.0	50188.3	9485.8	2501.1	309.2	304.0	62788.4	12600.1	20.1	272.9	1.02
3570.0-3579.0	258253.	33248.3	6784.1	710.6	793.1	299789.	41536.1	13.9	602.9	0.90
3588.0-3597.0	18700.7	3827.3	893.7	77.4	95.0	23594.1	4893.4	20.7	52.8	0.81
3606.0-3615.0	9843.4	2373.1	527.2	43.7	68.0	12855.4	3012.0	23.4	82.1	0.64
3624.0-3633.0	15492.5	3400.0	838.0	110.9	123.3	19964.8	4472.3	22.4	194.9	0.90
3642.0-3651.0	17813.7	3334.0	741.8	83.1	99.2	22071.8	4258.1	19.3	159.8	0.84
3660.0-3669.0	3622.2	1153.0	280.2	22.2	35.7	5113.4	1491.1	29.2	65.3	0.62
3678.0-3687.0	1290.5	317.0	92.9	10.3	19.1	1729.8	439.3	25.4	33.4	0.54
3696.0-3705.0	3762.0	591.2	178.7	19.0	31.9	4582.7	820.8	17.9	79.2	0.60
3714.0-3723.0	12505.9	2149.9	488.8	64.1	69.7	15278.4	2772.6	18.1	111.6	0.92
3732.0-3741.0	2014.7	492.8	172.5	44.1	45.8	2769.9	755.2	27.3	98.4	0.96
3750.0-3759.0	2108.1	380.6	200.4	44.9	47.4	2781.4	673.3	24.2	106.8	0.95
3768.0-3777.0	1136.7	161.3	67.6	11.6	14.3	1391.5	254.8	18.3	77.9	0.81
3786.0-3795.0	726.2	105.7	42.5	8.2	8.8	891.4	165.2	18.5	25.1	0.94
3804.0-3813.0	2629.4	592.6	228.9	41.1	43.7	3535.7	906.2	25.6	119.0	0.94
3822.0-3831.0	13937.3	2504.2	503.8	48.5	58.1	17051.9	3114.6	18.3	139.3	0.83
3840.0-3849.0	22373.2	3043.1	564.2	52.2	80.0	26112.7	3739.5	14.3	129.4	0.65
3858.0-3867.0	28599.7	5536.8	1174.3	111.6	175.5	35597.9	6998.1	19.7	548.2	0.64
3876.0-3885.0	19179.8	2404.2	572.9	88.9	100.2	22345.8	3166.1	14.2	199.6	0.89
3894.0-3900.0	10176.0	1442.1	316.7	30.1	43.9	12008.7	1832.8	15.3	104.2	0.69

N.B. 1. GAS CONCENTRATIONS EXPRESSED IN PPM (VOL. GAS/VOL. SEDIMENT)
2. bdl = BELOW DETECTION LIMIT

320228

TABLE 2

ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = TILANA 1

DATE OF JOB = MARCH 1986

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI
2364.0-2373.0	451	7.90	55.81	1.39	63.71	40.15	0.12	5.29	27.83	200	4
2382.0-2391.0	443	4.39	37.63	1.97	42.02	19.10	0.10	3.49	17.32	217	11
2418.0-2427.0	438	2.96	37.37	4.01	40.33	9.32	0.07	3.35	21.66	172	18
2490.0-2499.0	430	0.62	7.97	1.97	8.59	4.05	0.07	0.71	4.99	159	39
2508.0-2517.0	439	0.42	3.21	1.89	3.63	1.70	0.12	0.30	2.89	111	65
2562.0-2571.0	436	7.33	99.85	2.81	107.18	35.53	0.07	8.90	32.64	305	8
2625.0-2634.0	437	0.32	2.61	1.74	2.93	1.50	0.11	0.24	2.35	111	74
2661.0-2670.0	448	1.06	6.17	1.25	7.23	4.94	0.15	0.60	6.94	88	18
2697.0-2706.0	438	3.34	50.26	2.71	53.60	18.55	0.06	4.45	26.51	189	10
2787.0-2796.0	439	0.75	4.15	1.04	4.90	3.99	0.15	0.41	3.40	122	30
2823.0-2832.0	441	0.14	0.94	1.25	1.08	0.75	0.13	0.09	1.13	83	110
2913.0-2922.0	439	0.39	2.45	1.65	2.84	1.48	0.14	0.24	2.40	102	68
2931.0-2940.0	451	0.47	2.54	1.35	3.01	1.88	0.16	0.25	3.10	81	43
3174.0-3183.0	447	6.98	60.74	2.70	67.72	22.50	0.10	5.62	24.90	243	10
3192.0-3201.0	450	1.45	11.38	1.18	12.83	9.64	0.11	1.06	6.21	183	19
3264.0-3273.0	449	0.35	2.27	0.79	2.62	2.87	0.13	0.22	2.51	90	31
3552.0-3561.0	461	2.28	11.47	0.94	13.75	12.20	0.17	1.14	12.22	93	7
3570.0-3579.0	462	6.66	41.29	0.16	47.95	258.06	0.14	3.98	21.35	193	1
3858.0-3867.0	461	0.29	0.96	0.49	1.25	1.96	0.23	0.10	1.50	64	32

TMAX = Max. temperature S2 | S1 = Volatile hydrocarbons (HC) | S2 = HC generating potential
S1+S2 = Potential yield | S3 = Organic carbon dioxide | PI = Production index
PC = Pyrolysable carbon | TOC = Total organic carbon | HI = Hydrogen index
OI = Oxygen Index | nd = no data

TABLE 3

Summary of Extraction and Liquid Chromatography

Wellname: TILANA 1

Date of Job: MARCH 1986

A. Concentrations of Extracted Material

				-------Hydrocarbons--------			-----Nonhydrocarbons-----		
Depth(m)	Weight of Rock Extd. (grams)	Total Extract (ppm)	Loss on Column (ppm)	Saturates (ppm)	Aromatics (ppm)	HC Total (ppm)	NSO's (ppm)	Asphaltenes (ppm)	NonHC Total (ppm)
2364.0-2373.0	17.5	18194.3	3272.6	5029.0	5856.2	10885.2	4036.5	nd	4036.5
2382.0-2391.0	43.0	8811.6	1626.9	3555.3	2192.5	5747.8	1437.0	nd	1437.0
2562.0-2571.0	42.1	13966.7	2438.1	4365.0	4048.2	8413.3	3115.4	nd	3115.4
2697.0-2706.0	60.9	7954.0	1081.4	3052.3	2196.9	5249.3	1623.4	nd	1623.4
2823.0-2832.0	57.6	659.7	131.9	182.3	152.8	335.1	192.7	nd	192.7
3020.4	14.5	117.2	nd	nd	nd	nd	nd	nd	nd
3044.0	18.0	88.9	nd	nd	nd	nd	nd	nd	nd
3047.0	21.5	74.4	nd	nd	nd	nd	nd	nd	nd
3072.5	26.2	84.0	nd	nd	nd	nd	nd	nd	nd
3074.0	31.0	1171.0	nd	nd	nd	nd	nd	nd	nd
3084.0	22.6	1508.8	nd	nd	nd	nd	nd	nd	nd
3094.0	31.9	1539.2	nd	nd	nd	nd	nd	nd	nd
3174.0-3183.0	24.5	17546.9	2626.1	5444.1	4073.0	9517.1	5403.8	nd	5403.8
3183.0	21.0	90.5	nd	nd	nd	nd	nd	nd	nd
3197.5	21.7	147.5	nd	nd	nd	nd	nd	nd	nd
3214.0	21.0	71.4	nd	nd	nd	nd	nd	nd	nd
3570.0-3579.0	71.3	11259.5	2111.3	2688.4	2804.4	5492.8	3655.4	nd	3655.4
3858.0-3867.0	84.3	772.2	119.8	198.1	137.6	335.7	316.7	nd	316.7

na = not applicable nd = no data

320230

TABLE 3

Summary of Extraction and Liquid Chromatography

Wellname: TILANA 1

Date of Job: MARCH 1986

B. Compositional Data

	-----Hydrocarbons------			-----Nonhydrocarbons------			EOM(mg)	SAT(mg)	SAT	ASPH	HC
Depth(m)	%SAT.	%AROM.	%HC's	%NSO's	%ASPH.	%Non HC's	TOC(g)	TOC(g)	AROM	NSO	Non HC
2364.0-2373.0	33.7	39.2	72.9	27.1	nd	27.1	65.4	18.1	.86	nd	2.7
2382.0-2391.0	49.5	30.5	80.0	20.0	nd	20.0	50.9	20.5	1.62	nd	4.0
2562.0-2571.0	37.9	35.1	73.0	27.0	nd	27.0	42.8	13.4	1.08	nd	2.7
2697.0-2706.0	44.4	32.0	76.4	23.6	nd	23.6	30.0	11.5	1.39	nd	3.2
2823.0-2832.0	34.5	28.9	63.5	36.5	nd	36.5	58.4	16.1	1.19	nd	1.7
3020.4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3044.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3047.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3072.5	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3074.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3084.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3094.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3174.0-3183.0	36.5	27.3	63.8	36.2	nd	36.2	70.5	21.9	1.34	nd	1.8
3183.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3197.5	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3214.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3570.0-3579.0	29.4	30.7	60.0	40.0	nd	40.0	52.7	12.6	.96	nd	1.5
3858.0-3867.0	30.4	21.1	51.5	48.5	nd	48.5	51.5	13.2	1.44	nd	1.1

na = not applicable nd = no data

320231

TABLE 4

Summary of Gas Chromatography Data

Wellname: TILANA 1 Date of Job:MARCH 1986

A. Alkane Compositional Data

Depth(m)	Prist./Phyt.	Prist./n-C17	Phyt./n-C18	CPI(1)	CPI(2)	(C21+C22)/(C28+C29)
2364.0-2373.0	8.30	2.17	.32	1.20	1.23	1.37
2382.0-2391.0	8.85	3.39	.44	1.12	1.11	.98
2562.0-2571.0	11.00	4.61	.57	1.28	1.25	.80
2697.0-2706.0	9.06	4.53	.57	1.25	1.24	1.32
2823.0-2832.0	6.17	2.49	.40	1.23	1.23	1.13
3020.4	4.83	1.21	.27	1.88	1.91	5.26
3044.0	3.45	1.04	.36	1.63	1.64	2.75
3047.0	3.64	.83	.27	1.32	1.28	4.79
3072.5	4.24	.69	.26	1.59	1.59	3.81
3074.0	3.03	1.72	1.39	1.10	1.09	2.34
3084.0	8.17	1.91	.22	1.12	1.10	3.56
3094.0	10.07	5.03	.48	1.23	1.20	1.22
3174.0-3183.0	8.83	1.92	.19	1.13	1.12	4.00
3183.0	3.76	1.01	.30	1.40	1.39	2.82
3197.5	6.87	2.29	.36	1.33	1.27	1.68
3214.0	5.55	1.38	.28	1.46	1.47	4.88
3570.0-3579.0	5.43	.50	.10	1.05	1.04	4.54
3858.0-3867.0	4.03	.43	.12	nd	1.06	6.92

TABLE 4

Summary of Gas Chromatography Data

Wellname: TILANA 1 Date of Job:MARCH 1986

B. n-Alkane Distributions

DEPTH(m)	nC12	nC13	nC14	nC15	nC16	nC17	iC19	nC18	iC20	nC19	nC20	nC21	nC22	nC23	nC24	nC25	nC26	nC27	nC28	nC29	nC30	nC31
2364.0-2373.0	2.8	3.9	4.5	4.7	4.1	4.8	10.4	3.9	1.3	4.4	4.3	4.7	5.0	5.4	5.8	6.2	5.6	8.2	3.7	3.3	2.2	.9
2382.0-2391.0	2.4	3.3	5.4	4.3	3.9	3.9	13.4	3.4	1.5	3.8	3.8	4.3	4.6	5.1	5.4	6.0	5.8	6.8	4.7	4.5	2.4	1.4
2562.0-2571.0	1.6	2.4	3.1	3.3	2.8	3.2	14.9	2.4	1.4	2.9	3.0	3.7	4.6	5.7	6.4	8.3	7.1	9.5	5.1	5.3	2.2	1.1
2697.0-2706.0	2.1	2.8	4.1	3.5	3.1	3.3	14.9	2.9	1.6	3.4	3.7	4.4	5.1	6.2	6.7	8.1	6.6	8.2	3.8	3.4	1.5	.6
2823.0-2832.0	2.1	2.8	3.0	3.3	4.4	5.4	13.5	5.4	2.2	4.6	4.2	4.5	4.7	4.9	5.2	5.7	5.1	7.5	4.1	4.1	2.1	1.1
3020.4	2.6	4.4	8.7	7.0	8.6	8.9	10.8	8.4	2.2	7.9	7.1	4.9	3.7	2.9	2.0	5.1	1.4	1.3	.8	.8	.4	.2
3044.0	2.7	4.7	24.2	5.7	7.0	8.2	8.5	6.9	2.5	5.1	4.5	3.7	2.7	2.5	2.0	3.4	1.3	1.3	.9	1.5	.6	.4
3047.0	3.7	5.6	12.2	7.7	10.0	10.2	8.5	8.6	2.3	7.4	6.5	4.6	3.0	2.2	1.5	1.7	1.1	1.1	.7	.9	.3	.3
3072.5	2.3	4.2	7.2	7.0	9.0	12.6	8.7	7.8	2.0	7.2	6.4	4.6	3.6	3.1	2.5	4.9	1.9	1.8	1.1	1.0	.4	.3
3074.0	4.0	4.9	16.5	5.7	5.8	6.7	11.5	2.7	3.8	3.2	3.0	3.1	3.2	7.4	4.9	4.0	3.5	2.5	1.5	1.2	.6	.3
3084.0	3.4	4.1	4.7	4.5	4.4	4.6	8.7	4.9	1.1	5.5	5.9	6.4	6.9	7.3	7.0	6.9	5.0	4.4	2.3	1.5	.5	.3
3094.0	1.2	1.9	2.4	2.3	2.5	2.9	14.4	3.0	1.4	3.6	4.0	4.8	5.7	7.3	7.3	8.9	6.8	7.6	4.4	4.1	1.8	1.5
3174.0-3183.0	2.3	2.9	3.8	3.5	4.0	4.5	8.5	5.0	1.0	5.6	6.3	6.8	7.4	8.0	7.8	7.7	5.6	5.1	2.3	1.3	.5	.2
3183.0	3.1	4.5	11.5	6.3	8.2	8.0	8.1	7.2	2.2	6.4	6.1	4.9	4.0	3.3	2.8	4.7	2.3	2.2	1.6	1.5	.7	.5
3197.5	1.7	2.8	6.0	5.0	6.0	6.3	14.3	5.8	2.1	5.7	5.4	5.0	4.6	4.3	4.2	5.8	3.8	3.9	2.6	3.1	1.0	.7
3214.0	3.3	5.0	8.8	7.8	8.9	8.3	11.4	7.2	2.1	6.4	5.8	4.9	3.8	3.4	2.8	4.5	1.8	1.5	.9	.9	.4	.2
3570.0-3579.0	6.8	7.1	7.7	7.0	6.5	7.0	3.5	6.7	.6	6.6	6.3	5.9	5.6	5.1	4.6	3.9	3.1	2.7	1.6	1.0	.5	.2
3858.0-3867.0	6.0	6.8	8.2	8.1	8.4	8.6	3.7	7.9	.9	6.8	6.1	5.8	5.1	4.5	3.8	3.2	2.3	1.8	1.0	.6	.2	<0.1

na = not applicable nd = no data

TABLE 5-1

ALKANE AND ALKENE COMPONENT ANALYSIS FROM PYROLYSIS-GC

Well name: TILANA 1 Date: 1986

Sample: 2364-2373m

Carbon No.	----Alkane + Alkene-----			---------Alkane---------			---------Alkene---------			Alkane/Alkene
	A	B	C	A	B	C	A	B	C	
1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5	1.181	0.6591	0.0237	0.541	0.3019	0.0108	0.640	0.3572	0.0128	0.85
6	0.959	0.5352	0.0192	0.338	0.1886	0.0068	0.621	0.3466	0.0125	0.54
7	0.620	0.3460	0.0124	0.295	0.1646	0.0059	0.325	0.1814	0.0065	0.91
8	0.451	0.2517	0.0090	0.234	0.1306	0.0047	0.217	0.1211	0.0044	1.08
9	0.389	0.2171	0.0078	0.181	0.1010	0.0036	0.208	0.1161	0.0042	0.87
10	0.349	0.1948	0.0070	0.170	0.0949	0.0034	0.179	0.0999	0.0036	0.95
11	0.435	0.2428	0.0087	0.273	0.1524	0.0055	0.162	0.0904	0.0032	1.69
12	0.454	0.2534	0.0091	0.219	0.1222	0.0044	0.235	0.1312	0.0047	0.93
13	0.487	0.2718	0.0098	0.311	0.1736	0.0062	0.176	0.0982	0.0035	1.77
14	0.240	0.1339	0.0048	0.093	0.0519	0.0019	0.147	0.0820	0.0029	0.63
15	0.220	0.1228	0.0044	0.103	0.0575	0.0021	0.117	0.0653	0.0023	0.88
16	0.628	0.3505	0.0126	0.308	0.1719	0.0062	0.320	0.1786	0.0064	0.96
17	0.549	0.3064	0.0110	0.251	0.1401	0.0050	0.298	0.1663	0.0060	0.84
18	0.370	0.2065	0.0074	0.235	0.1312	0.0047	0.135	0.0753	0.0027	1.74
19	0.168	0.0938	0.0034	0.168	0.0938	0.0034	nd	nd	nd	nd
20	0.169	0.0943	0.0034	0.169	0.0943	0.0034	nd	nd	nd	nd
21	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
22	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
23	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
24	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
26	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
27	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
28	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
29	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
30	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
31	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC

TABLE 5-2

ALKANE AND ALKENE COMPONENT ANALYSIS FROM PYROLYSIS-GC

Well name: TILANA 1 Date: 1986

Sample: 2382-2391m

Carbon No.	----Alkane + Alkene-----			---------Alkane---------			---------Alkene---------			Alkane/Alkene
	A	B	C	A	B	C	A	B	C	
1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5	1.744	0.6563	0.0379	0.690	0.2596	0.0150	1.054	0.3966	0.0229	0.65
6	1.724	0.6487	0.0375	0.514	0.1934	0.0112	1.210	0.4553	0.0263	0.42
7	1.295	0.4873	0.0281	0.534	0.2009	0.0116	0.761	0.2864	0.0165	0.70
8	1.082	0.4072	0.0235	0.475	0.1787	0.0103	0.607	0.2284	0.0132	0.78
9	0.940	0.3537	0.0204	0.390	0.1468	0.0085	0.550	0.2070	0.0119	0.71
10	0.876	0.3296	0.0190	0.335	0.1261	0.0073	0.541	0.2036	0.0118	0.62
11	0.871	0.3278	0.0189	0.413	0.1554	0.0090	0.458	0.1723	0.0100	0.90
12	0.796	0.2995	0.0173	0.365	0.1373	0.0079	0.431	0.1622	0.0094	0.85
13	0.808	0.3041	0.0176	0.402	0.1513	0.0087	0.406	0.1528	0.0088	0.99
14	0.947	0.3564	0.0206	0.551	0.2073	0.0120	0.396	0.1490	0.0086	1.39
15	0.750	0.2822	0.0163	0.369	0.1389	0.0080	0.381	0.1434	0.0083	0.97
16	0.837	0.3150	0.0182	0.345	0.1298	0.0075	0.492	0.1851	0.0107	0.70
17	0.590	0.2220	0.0128	0.284	0.1069	0.0062	0.306	0.1151	0.0066	0.93
18	0.560	0.2107	0.0122	0.263	0.0990	0.0057	0.297	0.1118	0.0065	0.89
19	0.513	0.1930	0.0111	0.251	0.0945	0.0055	0.262	0.0986	0.0057	0.96
20	0.473	0.1780	0.0103	0.254	0.0956	0.0055	0.219	0.0824	0.0048	1.16
21	0.455	0.1712	0.0099	0.254	0.0956	0.0055	0.201	0.0756	0.0044	1.26
22	0.365	0.1373	0.0079	0.205	0.0771	0.0045	0.160	0.0602	0.0035	1.28
23	0.408	0.1535	0.0089	0.215	0.0809	0.0047	0.193	0.0726	0.0042	1.11
24	0.370	0.1392	0.0080	0.215	0.0809	0.0047	0.155	0.0583	0.0034	1.39
25	0.380	0.1430	0.0083	0.215	0.0809	0.0047	0.165	0.0621	0.0036	1.30
26	0.305	0.1148	0.0066	0.182	0.0685	0.0040	0.123	0.0463	0.0027	1.48
27	0.301	0.1133	0.0065	0.165	0.0621	0.0036	0.136	0.0512	0.0030	1.21
28	0.241	0.0907	0.0052	0.143	0.0538	0.0031	0.098	0.0369	0.0021	1.46
29	0.206	0.0775	0.0045	0.111	0.0418	0.0024	0.095	0.0357	0.0021	1.17
30	0.111	0.0418	0.0024	0.072	0.0271	0.0016	0.039	0.0147	0.0008	1.85
31	0.120	0.0452	0.0026	0.073	0.0275	0.0016	0.047	0.0177	0.0010	1.55

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC

TABLE 5-3

ALKANE AND ALKENE COMPONENT ANALYSIS FROM PYROLYSIS-GC

Well name: TILANA 1 Date: 1986

Sample: 2562-2571m

Carbon No.	----Alkane + Alkene-----			---------Alkane---------			---------Alkene---------			Alkane/Alkene
	A	B	C	A	B	C	A	B	C	
1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5	2.140	2.1368	0.0655	0.770	0.7688	0.0236	1.370	1.3679	0.0419	0.56
6	2.099	2.0959	0.0642	0.586	0.5851	0.0179	1.513	1.5107	0.0463	0.39
7	1.399	1.3969	0.0428	0.561	0.5602	0.0172	0.838	0.8367	0.0256	0.67
8	1.123	1.1213	0.0344	0.493	0.4923	0.0151	0.630	0.6291	0.0193	0.78
9	0.961	0.9596	0.0294	0.397	0.3964	0.0121	0.564	0.5632	0.0173	0.70
10	0.866	0.8647	0.0265	0.363	0.3625	0.0111	0.503	0.5022	0.0154	0.72
11	0.865	0.8637	0.0265	0.404	0.4034	0.0124	0.461	0.4603	0.0141	0.88
12	0.745	0.7439	0.0228	0.359	0.3585	0.0110	0.386	0.3854	0.0118	0.93
13	0.803	0.8018	0.0246	0.417	0.4164	0.0128	0.386	0.3854	0.0118	1.08
14	0.830	0.8288	0.0254	0.412	0.4114	0.0126	0.418	0.4174	0.0128	0.99
15	0.792	0.7908	0.0242	0.353	0.3525	0.0108	0.439	0.4383	0.0134	0.80
16	0.772	0.7708	0.0236	0.360	0.3595	0.0110	0.412	0.4114	0.0126	0.87
17	0.680	0.6790	0.0208	0.295	0.2946	0.0090	0.385	0.3844	0.0118	0.77
18	0.564	0.5632	0.0173	0.260	0.2596	0.0080	0.304	0.3035	0.0093	0.86
19	0.524	0.5232	0.0160	0.278	0.2776	0.0085	0.246	0.2456	0.0075	1.13
20	0.547	0.5462	0.0167	0.284	0.2836	0.0087	0.263	0.2626	0.0080	1.08
21	0.531	0.5302	0.0162	0.287	0.2866	0.0088	0.244	0.2436	0.0075	1.18
22	0.423	0.4224	0.0129	0.240	0.2396	0.0073	0.183	0.1827	0.0056	1.31
23	0.374	0.3734	0.0114	0.214	0.2137	0.0065	0.160	0.1598	0.0049	1.34
24	0.425	0.4244	0.0130	0.253	0.2526	0.0077	0.172	0.1717	0.0053	1.47
25	0.434	0.4333	0.0133	0.247	0.2466	0.0076	0.187	0.1867	0.0057	1.32
26	0.313	0.3125	0.0096	0.194	0.1937	0.0059	0.119	0.1188	0.0036	1.63
27	0.285	0.2846	0.0087	0.166	0.1658	0.0051	0.119	0.1188	0.0036	1.39
28	0.207	0.2067	0.0063	0.118	0.1178	0.0036	0.089	0.0889	0.0027	1.33
29	0.152	0.1518	0.0046	0.081	0.0809	0.0025	0.071	0.0709	0.0022	1.14
30	0.096	0.0959	0.0029	0.063	0.0629	0.0019	0.033	0.0330	0.0010	1.91
31	0.067	0.0669	0.0020	0.040	0.0399	0.0012	0.027	0.0270	0.0008	1.48

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC

TABLE 5-4

ALKANE AND ALKENE COMPONENT ANALYSIS FROM PYROLYSIS-GC

Well name: TILANA 1

Date: 1986

Sample: 2697-2706m

Carbon No.	----Alkane + Alkene-----			---------Alkane---------			---------Alkene---------			Alkane/Alkene
	A	B	C	A	B	C	A	B	C	
1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5	1.379	0.6931	0.0261	0.564	0.2835	0.0107	0.815	0.4096	0.0155	0.69
6	1.285	0.6458	0.0244	0.354	0.1779	0.0067	0.931	0.4679	0.0177	0.38
7	0.796	0.4001	0.0151	0.326	0.1638	0.0062	0.470	0.2362	0.0089	0.69
8	0.564	0.2835	0.0107	0.259	0.1302	0.0049	0.305	0.1533	0.0058	0.85
9	0.506	0.2543	0.0096	0.225	0.1131	0.0043	0.281	0.1412	0.0053	0.80
10	0.466	0.2342	0.0088	0.186	0.0935	0.0035	0.280	0.1407	0.0053	0.66
11	0.480	0.2412	0.0091	0.258	0.1297	0.0049	0.222	0.1116	0.0042	1.16
12	0.507	0.2548	0.0096	0.212	0.1066	0.0040	0.295	0.1483	0.0056	0.72
13	0.452	0.2272	0.0086	0.275	0.1382	0.0052	0.177	0.0890	0.0034	1.55
14	0.333	0.1674	0.0063	0.165	0.0829	0.0031	0.168	0.0844	0.0032	0.98
15	0.254	0.1277	0.0048	0.127	0.0638	0.0024	0.127	0.0638	0.0024	1.00
16	0.434	0.2181	0.0082	0.228	0.1146	0.0043	0.206	0.1035	0.0039	1.11
17	0.161	0.0809	0.0031	0.070	0.0352	0.0013	0.091	0.0457	0.0017	0.77
18	0.400	0.2010	0.0076	0.257	0.1292	0.0049	0.143	0.0719	0.0027	1.80
19	0.259	0.1302	0.0049	0.114	0.0573	0.0022	0.145	0.0729	0.0027	0.79
20	0.250	0.1257	0.0047	0.141	0.0709	0.0027	0.109	0.0548	0.0021	1.29
21	0.198	0.0995	0.0038	0.104	0.0523	0.0020	0.094	0.0472	0.0018	1.11
22	0.320	0.1608	0.0061	0.138	0.0694	0.0026	0.182	0.0915	0.0035	0.76
23	0.204	0.1025	0.0039	0.083	0.0417	0.0016	0.121	0.0608	0.0023	0.69
24	0.149	0.0749	0.0028	0.089	0.0447	0.0017	0.060	0.0302	0.0011	1.48
25	0.156	0.0784	0.0030	0.089	0.0447	0.0017	0.067	0.0337	0.0013	1.33
26	0.109	0.0548	0.0021	0.063	0.0317	0.0012	0.046	0.0231	0.0009	1.37
27	0.102	0.0513	0.0019	0.061	0.0307	0.0012	0.041	0.0206	0.0008	1.49
28	0.080	0.0402	0.0015	0.053	0.0266	0.0010	0.027	0.0136	0.0005	1.96
29	0.027	0.0136	0.0005	0.027	0.0136	0.0005	nd	nd	nd	nd
30	0.014	0.0070	0.0003	0.014	0.0070	0.0003	nd	nd	nd	nd
31	0.010	0.0050	0.0002	0.010	0.0050	0.0002	nd	nd	nd	nd

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC

TABLE 5-5

ALKANE AND ALKENE COMPONENT ANALYSIS FROM PYROLYSIS-GC

Well name: TILANA 1 Date: 1986

Sample: 3174-3183m

Carbon No.	----Alkane + Alkene-----			---------Alkane---------			---------Alkene---------			Alkane/Alkene
	A	B	C	A	B	C	A	B	C	
1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5	2.043	1.2409	0.0498	0.923	0.5606	0.0225	1.120	0.6803	0.0273	0.82
6	1.991	1.2093	0.0486	0.726	0.4410	0.0177	1.265	0.7684	0.0309	0.57
7	1.566	0.9512	0.0382	0.716	0.4349	0.0175	0.850	0.5163	0.0207	0.84
8	1.316	0.7993	0.0321	0.624	0.3790	0.0152	0.692	0.4203	0.0169	0.90
9	1.118	0.6791	0.0273	0.507	0.3080	0.0124	0.611	0.3711	0.0149	0.83
10	1.048	0.6366	0.0256	0.482	0.2928	0.0118	0.566	0.3438	0.0138	0.85
11	1.033	0.6274	0.0252	0.524	0.3183	0.0128	0.509	0.3092	0.0124	1.03
12	0.983	0.5971	0.0240	0.485	0.2946	0.0118	0.498	0.3025	0.0121	0.97
13	0.978	0.5940	0.0239	0.508	0.3086	0.0124	0.470	0.2855	0.0115	1.08
14	1.129	0.6858	0.0275	0.665	0.4039	0.0162	0.464	0.2818	0.0113	1.43
15	0.961	0.5837	0.0234	0.480	0.2916	0.0117	0.481	0.2922	0.0117	1.00
16	0.941	0.5716	0.0230	0.426	0.2588	0.0104	0.515	0.3128	0.0126	0.83
17	0.953	0.5789	0.0232	0.414	0.2515	0.0101	0.539	0.3274	0.0131	0.77
18	0.827	0.5023	0.0202	0.429	0.2606	0.0105	0.398	0.2417	0.0097	1.08
19	0.678	0.4118	0.0165	0.364	0.2211	0.0089	0.314	0.1907	0.0077	1.16
20	0.619	0.3760	0.0151	0.355	0.2156	0.0087	0.264	0.1604	0.0064	1.34
21	0.743	0.4513	0.0181	0.412	0.2502	0.0101	0.331	0.2010	0.0081	1.24
22	0.756	0.4592	0.0184	0.393	0.2387	0.0096	0.363	0.2205	0.0089	1.08
23	0.622	0.3778	0.0152	0.328	0.1992	0.0080	0.294	0.1786	0.0072	1.12
24	0.587	0.3565	0.0143	0.333	0.2023	0.0081	0.254	0.1543	0.0062	1.31
25	0.541	0.3286	0.0132	0.298	0.1810	0.0073	0.243	0.1476	0.0059	1.23
26	0.433	0.2630	0.0106	0.251	0.1525	0.0061	0.182	0.1105	0.0044	1.38
27	0.328	0.1992	0.0080	0.182	0.1105	0.0044	0.146	0.0887	0.0036	1.25
28	0.217	0.1318	0.0053	0.123	0.0747	0.0030	0.094	0.0571	0.0023	1.31
29	0.146	0.0887	0.0036	0.078	0.0474	0.0019	0.068	0.0413	0.0017	1.15
30	0.086	0.0522	0.0021	0.054	0.0328	0.0013	0.032	0.0194	0.0008	1.69
31	0.035	0.0213	0.0009	0.024	0.0146	0.0006	0.011	0.0067	0.0003	2.18

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC

TABLE 5-6

ALKANE AND ALKENE COMPONENT ANALYSIS FROM PYROLYSIS-GC

Well name: TILANA 1 Date: 1986

Sample: 3192-3201m

Carbon No.	----Alkane + Alkene-----			---------Alkane---------			---------Alkene---------			Alkane/Alkene
	A	B	C	A	B	C	A	B	C	
1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5	2.838	0.3230	0.0520	1.428	0.1625	0.0262	1.410	0.1605	0.0258	1.01
6	2.272	0.2586	0.0416	0.733	0.0834	0.0134	1.539	0.1751	0.0282	0.48
7	1.780	0.2026	0.0326	0.758	0.0863	0.0139	1.022	0.1163	0.0187	0.74
8	1.448	0.1648	0.0265	0.640	0.0728	0.0117	0.808	0.0920	0.0148	0.79
9	1.271	0.1446	0.0233	0.541	0.0616	0.0099	0.730	0.0831	0.0134	0.74
10	0.848	0.0965	0.0155	0.361	0.0411	0.0066	0.487	0.0554	0.0089	0.74
11	1.186	0.1350	0.0217	0.560	0.0637	0.0103	0.626	0.0712	0.0115	0.89
12	1.131	0.1287	0.0207	0.532	0.0605	0.0097	0.599	0.0682	0.0110	0.89
13	1.142	0.1300	0.0209	0.553	0.0629	0.0101	0.589	0.0670	0.0108	0.94
14	1.108	0.1261	0.0203	0.560	0.0637	0.0103	0.548	0.0624	0.0100	1.02
15	0.983	0.1119	0.0180	0.483	0.0550	0.0089	0.500	0.0569	0.0092	0.97
16	1.004	0.1143	0.0184	0.469	0.0534	0.0086	0.535	0.0609	0.0098	0.88
17	1.013	0.1153	0.0186	0.504	0.0574	0.0092	0.509	0.0579	0.0093	0.99
18	0.948	0.1079	0.0174	0.511	0.0582	0.0094	0.437	0.0497	0.0080	1.17
19	0.733	0.0834	0.0134	0.374	0.0426	0.0069	0.359	0.0409	0.0066	1.04
20	0.734	0.0835	0.0135	0.346	0.0394	0.0063	0.388	0.0442	0.0071	0.89
21	0.719	0.0818	0.0132	0.418	0.0476	0.0077	0.301	0.0343	0.0055	1.39
22	0.727	0.0827	0.0133	0.392	0.0446	0.0072	0.335	0.0381	0.0061	1.17
23	0.620	0.0706	0.0114	0.319	0.0363	0.0058	0.301	0.0343	0.0055	1.06
24	0.454	0.0517	0.0083	0.253	0.0288	0.0046	0.201	0.0229	0.0037	1.26
25	0.432	0.0492	0.0079	0.232	0.0264	0.0043	0.200	0.0228	0.0037	1.16
26	0.332	0.0378	0.0061	0.191	0.0217	0.0035	0.141	0.0160	0.0026	1.35
27	0.253	0.0288	0.0046	0.146	0.0166	0.0027	0.107	0.0122	0.0020	1.36
28	0.159	0.0181	0.0029	0.097	0.0110	0.0018	0.062	0.0071	0.0011	1.56
29	0.101	0.0115	0.0019	0.058	0.0066	0.0011	0.043	0.0049	0.0008	1.35
30	0.056	0.0064	0.0010	0.041	0.0047	0.0008	0.015	0.0017	0.0003	2.73
31	0.033	0.0038	0.0006	0.026	0.0030	0.0005	0.007	0.0008	0.0001	3.71

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC

TABLE 5-7

ALKANE AND ALKENE COMPONENT ANALYSIS FROM PYROLYSIS-GC

Well name: TILANA 1 Date: 1986

Sample: 3570-3579m

Carbon No.	----Alkane + Alkene-----			---------Alkane---------			---------Alkene---------			Alkane/Alkene
	A	B	C	A	B	C	A	B	C	
1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5	2.608	1.0768	0.0504	1.271	0.5248	0.0246	1.337	0.5520	0.0259	0.95
6	2.176	0.8985	0.0421	0.948	0.3914	0.0183	1.228	0.5070	0.0237	0.77
7	1.801	0.7436	0.0348	0.908	0.3749	0.0176	0.893	0.3687	0.0173	1.02
8	1.497	0.6181	0.0290	0.786	0.3245	0.0152	0.711	0.2936	0.0138	1.11
9	1.258	0.5194	0.0243	0.621	0.2564	0.0120	0.637	0.2630	0.0123	0.97
10	1.089	0.4496	0.0211	0.548	0.2263	0.0106	0.541	0.2234	0.0105	1.01
11	1.083	0.4472	0.0209	0.613	0.2531	0.0119	0.470	0.1941	0.0091	1.30
12	1.007	0.4158	0.0195	0.521	0.2151	0.0101	0.486	0.2007	0.0094	1.07
13	0.956	0.3947	0.0185	0.521	0.2151	0.0101	0.435	0.1796	0.0084	1.20
14	1.236	0.5103	0.0239	0.816	0.3369	0.0158	0.420	0.1734	0.0081	1.94
15	0.747	0.3084	0.0144	0.420	0.1734	0.0081	0.327	0.1350	0.0063	1.28
16	0.848	0.3501	0.0164	0.428	0.1767	0.0083	0.420	0.1734	0.0081	1.02
17	0.993	0.4100	0.0192	0.534	0.2205	0.0103	0.459	0.1895	0.0089	1.16
18	0.691	0.2853	0.0134	0.407	0.1681	0.0079	0.284	0.1173	0.0055	1.43
19	0.449	0.1854	0.0087	0.231	0.0954	0.0045	0.218	0.0900	0.0042	1.06
20	0.444	0.1833	0.0086	0.245	0.1012	0.0047	0.199	0.0822	0.0038	1.23
21	0.502	0.2073	0.0097	0.301	0.1243	0.0058	0.201	0.0830	0.0039	1.50
22	0.347	0.1433	0.0067	0.176	0.0727	0.0034	0.171	0.0706	0.0033	1.03
23	0.360	0.1486	0.0070	0.192	0.0793	0.0037	0.168	0.0694	0.0032	1.14
24	0.236	0.0974	0.0046	0.126	0.0520	0.0024	0.110	0.0454	0.0021	1.15
25	0.257	0.1061	0.0050	0.172	0.0710	0.0033	0.085	0.0351	0.0016	2.02
26	0.149	0.0615	0.0029	0.087	0.0359	0.0017	0.062	0.0256	0.0012	1.40
27	0.106	0.0438	0.0020	0.062	0.0256	0.0012	0.044	0.0182	0.0009	1.41
28	0.073	0.0301	0.0014	0.040	0.0165	0.0008	0.033	0.0136	0.0006	1.21
29	0.071	0.0293	0.0014	0.040	0.0165	0.0008	0.031	0.0128	0.0006	1.29
30	0.011	0.0045	0.0002	0.009	0.0037	0.0002	0.002	0.0008	<.0001	4.50
31	0.007	0.0029	0.0001	0.007	0.0029	0.0001	nd	nd	nd	nd

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC

320239

TABLE 6-1

PARAMETER SUMMARY FOR PYROLYSIS GAS CHROMATOGRAPHY

Well name: TILANA 1 Date: 1986

Sample: 2364-2373m

Parameter	Value			
	A	B	C	D
C1-C4 abundance (all compounds)	63.15	35.244	1.266	
C5-C8 abundance (all compounds)	9.77	5.451	0.196	
C5-C8 abundance (alkanes+alkenes)	3.21	1.792	0.064	
C9-C14 abundance (all compounds)	15.38	8.585	0.308	
C9-C14 abundance (alkanes+alkenes)	2.35	1.314	0.047	
C15-C31 abundance (all compounds)	11.70	6.529	0.235	
C15-C31 abundance (alkanes+alkenes)	2.10	1.174	0.042	
C5-C31 abundance (all compounds)	36.85	20.565	0.739	
C5-C31 abundance (alkanes+alkenes)	7.67	4.280	0.154	
C5-C31 alkane abundance	3.89	2.170	0.078	
C5-C31 alkene abundance	3.78	2.110	0.076	
C5-C8 alkane/alkene				0.781
C9-C14 alkane/alkene				1.126
C15-C31 alkane/alkene				1.418
C5-C31 alkane/alkene				1.029
C1-C4 abundance/S2				0.632
C5-C31 abundance/S2				0.368
(C1-C5)/C5+ abundance				1.939
R	64.54	36.021	1.294	
PI x PC x TOC				18.24

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC
D = (no units)
R = [(C1-C4)+(Proportion alkenes x (C5-C31))]
N.B. C1-C4 and C5-C31 are for all compounds
PI = Production index
PC = Pyrolysable carbon
S2 = Rock-Eval S2 value
TOC = Total Organic Carbon

320240

TABLE 6-2

PARAMETER SUMMARY FOR PYROLYSIS GAS CHROMATOGRAPHY

Well name: TILANA 1 Date: 1986

Sample: 2382-2391m

Parameter	Value			
	A	B	C	D
C1-C4 abundance (all compounds)	47.85	18.006	1.040	
C5-C8 abundance (all compounds)	15.24	5.734	0.331	
C5-C8 abundance (alkanes+alkenes)	5.85	2.199	0.127	
C9-C14 abundance (all compounds)	21.08	7.931	0.458	
C9-C14 abundance (alkanes+alkenes)	5.24	1.971	0.114	
C15-C31 abundance (all compounds)	15.84	5.959	0.344	
C15-C31 abundance (alkanes+alkenes)	6.99	2.628	0.152	
C5-C31 abundance (all compounds)	52.15	19.624	1.133	
C5-C31 abundance (alkanes+alkenes)	18.07	6.799	0.393	
C5-C31 alkane abundance	8.29	3.118	0.180	
C5-C31 alkene abundance	9.78	3.681	0.213	
C5-C8 alkane/alkene				0.609
C9-C14 alkane/alkene				0.883
C15-C31 alkane/alkene				1.073
C5-C31 alkane/alkene				0.847
C1-C4 abundance/S2				0.479
C5-C31 abundance/S2				0.522
(C1-C5)/C5+ abundance				1.096
R	52.95	19.926	1.150	
PI x PC x TOC				6.282

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC
D = (no units)
R = [(C1-C4)+(Proportion alkenes x (C5-C31))]
N.B. C1-C4 and C5-C31 are for all compounds
PI = Production index
PC = Pyrolysable carbon
S2 = Rock-Eval S2 value
TOC = Total Organic Carbon

320241

TABLE 6-3

PARAMETER SUMMARY FOR PYROLYSIS GAS CHROMATOGRAPHY

Well name: TILANA 1 Date: 1986

Sample: 2562-2571m

Parameter	Value			
	A	B	C	D
C1-C4 abundance (all compounds)	64.59	64.496	1.976	
C5-C8 abundance (all compounds)	9.89	9.877	0.303	
C5-C8 abundance (alkanes+alkenes)	6.76	6.751	0.207	
C9-C14 abundance (all compounds)	16.47	16.446	0.504	
C9-C14 abundance (alkanes+alkenes)	5.07	5.062	0.155	
C15-C31 abundance (all compounds)	9.05	9.031	0.277	
C15-C31 abundance (alkanes+alkenes)	7.19	7.175	0.220	
C5-C31 abundance (all compounds)	35.41	35.355	1.083	
C5-C31 abundance (alkanes+alkenes)	19.02	18.988	0.582	
C5-C31 alkane abundance	8.49	8.482	0.260	
C5-C31 alkene abundance	10.52	10.506	0.322	
C5-C8 alkane/alkene				0.554
C9-C14 alkane/alkene				0.865
C15-C31 alkane/alkene				1.081
C5-C31 alkane/alkene				0.807
C1-C4 abundance/S2				0.646
C5-C31 abundance/S2				0.354
(C1-C5)/C5+ abundance				2.052
R	68.32	68.216	2.090	
PI x PC x TOC				19.85

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC
D = (no units)
R = [(C1-C4)+(Proportion alkenes x (C5-C31))]
N.B. C1-C4 and C5-C31 are for all compounds
PI = Production index
PC = Pyrolysable carbon
S2 = Rock-Eval S2 value
TOC = Total Organic Carbon

TABLE 6-4

PARAMETER SUMMARY FOR PYROLYSIS GAS CHROMATOGRAPHY

Well name: TILANA 1 Date: 1986

Sample: 2697-2706m

Parameter	Value			
	A	B	C	D
C1-C4 abundance (all compounds)	65.53	32.937	1.242	
C5-C8 abundance (all compounds)	11.21	5.636	0.213	
C5-C8 abundance (alkanes+alkenes)	4.02	2.022	0.076	
C9-C14 abundance (all compounds)	13.33	6.701	0.253	
C9-C14 abundance (alkanes+alkenes)	2.74	1.379	0.052	
C15-C31 abundance (all compounds)	9.92	4.986	0.188	
C15-C31 abundance (alkanes+alkenes)	3.13	1.572	0.059	
C5-C31 abundance (all compounds)	34.47	17.323	0.653	
C5-C31 abundance (alkanes+alkenes)	9.90	4.973	0.188	
C5-C31 alkane abundance	4.49	2.258	0.085	
C5-C31 alkene abundance	5.40	2.716	0.102	
C5-C8 alkane/alkene				0.596
C9-C14 alkane/alkene				0.928
C15-C31 alkane/alkene				1.143
C5-C31 alkane/alkene				0.831
C1-C4 abundance/S2				0.655
C5-C31 abundance/S2				0.345
(C1-C5)/C5+ abundance				2.206
R	67.40	33.873	1.278	
PI x PC x TOC				7.349

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC
D = (no units)
R = [(C1-C4)+(Proportion alkenes x (C5-C31))]
N.B. C1-C4 and C5-C31 are for all compounds
PI = Production index
PC = Pyrolysable carbon
S2 = Rock-Eval S2 value
TOC = Total Organic Carbon

TABLE 6-5

PARAMETER SUMMARY FOR PYROLYSIS GAS CHROMATOGRAPHY

Well name: TILANA 1 Date: 1986

Sample: 3174-3183m

Parameter	Value			
	A	B	C	D
C1-C4 abundance (all compounds)	46.95	28.518	1.145	
C5-C8 abundance (all compounds)	16.75	10.172	0.408	
C5-C8 abundance (alkanes+alkenes)	6.92	4.201	0.169	
C9-C14 abundance (all compounds)	19.64	11.928	0.479	
C9-C14 abundance (alkanes+alkenes)	6.29	3.820	0.153	
C15-C31 abundance (all compounds)	16.67	10.122	0.407	
C15-C31 abundance (alkanes+alkenes)	9.47	5.754	0.231	
C5-C31 abundance (all compounds)	53.05	32.222	1.294	
C5-C31 abundance (alkanes+alkenes)	22.68	13.775	0.553	
C5-C31 alkane abundance	11.10	6.745	0.271	
C5-C31 alkene abundance	11.57	7.030	0.282	
C5-C8 alkane/alkene				0.761
C9-C14 alkane/alkene				1.017
C15-C31 alkane/alkene				1.092
C5-C31 alkane/alkene				0.959
C1-C4 abundance/S2				0.470
C5-C31 abundance/S2				0.530
(C1-C5)/C5+ abundance				1.057
R	53.09	32.247	1.295	
PI x PC x TOC				14.42

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC
D = (no units)
R = [(C1-C4)+(Proportion alkenes x (C5-C31))]
N.B. C1-C4 and C5-C31 are for all compounds
PI = Production index
PC = Pyrolysable carbon
S2 = Rock-Eval S2 value
TOC = Total Organic Carbon

TABLE 6-6

PARAMETER SUMMARY FOR PYROLYSIS GAS CHROMATOGRAPHY

Well name: TILANA 1 Date: 1986

Sample: 3192-3201m

Parameter	Value			
	A	B	C	D
C1-C4 abundance (all compounds)	50.41	5.737	0.924	
C5-C8 abundance (all compounds)	16.15	1.838	0.296	
C5-C8 abundance (alkanes+alkenes)	8.34	0.949	0.153	
C9-C14 abundance (all compounds)	19.38	2.206	0.355	
C9-C14 abundance (alkanes+alkenes)	6.69	0.761	0.123	
C15-C31 abundance (all compounds)	14.05	1.599	0.258	
C15-C31 abundance (alkanes+alkenes)	9.30	1.058	0.170	
C5-C31 abundance (all compounds)	49.59	5.643	0.909	
C5-C31 abundance (alkanes+alkenes)	24.33	2.768	0.446	
C5-C31 alkane abundance	11.53	1.312	0.211	
C5-C31 alkene abundance	12.80	1.457	0.235	
C5-C8 alkane/alkene				0.745
C9-C14 alkane/alkene				0.868
C15-C31 alkane/alkene				1.094
C5-C31 alkane/alkene				0.901
C1-C4 abundance/S2				0.504
C5-C31 abundance/S2				0.496
(C1-C5)/C5+ abundance				1.205
R	56.76	6.459	1.040	
PI x PC x TOC				0.747

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC
D = (no units)
R = [(C1-C4)+(Proportion alkenes x (C5-C31))]
N.B. C1-C4 and C5-C31 are for all compounds
PI = Production index
PC = Pyrolysable carbon
S2 = Rock-Eval S2 value
TOC = Total Organic Carbon

TABLE 6-7

PARAMETER SUMMARY FOR PYROLYSIS GAS CHROMATOGRAPHY

Well name: TILANA 1

Date: 1986

Sample: 3570-3579m

Parameter	Value			
	A	B	C	D
C1-C4 abundance (all compounds)	57.86	23.890	1.119	
C5-C8 abundance (all compounds)	14.37	5.933	0.278	
C5-C8 abundance (alkanes+alkenes)	8.08	3.337	0.156	
C9-C14 abundance (all compounds)	16.98	7.010	0.328	
C9-C14 abundance (alkanes+alkenes)	6.63	2.737	0.128	
C15-C31 abundance (all compounds)	10.79	4.456	0.209	
C15-C31 abundance (alkanes+alkenes)	6.29	2.598	0.122	
C5-C31 abundance (all compounds)	42.14	17.400	0.815	
C5-C31 abundance (alkanes+alkenes)	21.00	8.672	0.406	
C5-C31 alkane abundance	11.03	4.554	0.213	
C5-C31 alkene abundance	9.97	4.117	0.193	
C5-C8 alkane/alkene				0.939
C9-C14 alkane/alkene				1.218
C15-C31 alkane/alkene				1.236
C5-C31 alkane/alkene				1.106
C1-C4 abundance/S2				0.579
C5-C31 abundance/S2				0.421
(C1-C5)/C5+ abundance				1.628
R	62.06	25.625	1.200	
PI x PC x TOC				11.80

nd = no data
A = % of S2
B = mg/g Rock
C = (mg/g Rock)/TOC
D = (no units)
R = [(C1-C4)+(Proportion alkenes x (C5-C31))]
N.B. C1-C4 and C5-C31 are for all compounds
PI = Production index
PC = Pyrolysable carbon
S2 = Rock-Eval S2 value
TOC = Total Organic Carbon

Part 2: Vitrinite Reflectance and Kerogen Typing

ANALYTICAL PROCEDURE

Representative portions of each sidewall core (crushed to -14+35 BSS mesh) were obtained with a sample splitter and then mounted in cold setting Glasscraft resin using a 2.5 cm diameter mould. Each block was ground flat using diamond impregnated laps and carborundum paper. The surfaces were then polished with aluminium oxide and finally magnesium oxide.

Reflectance measurements on vitrinite phytoclasts, were made with a Leitz MPV1.1 microphotometer fitted to a Leitz Ortholux microscope and calibrated against synthetic standards. All measurements were taken using oil immersion (n = 1.518) and incident monochromatic light (wavelength 546 nm) at a temperature at 23+1 degree C. Fluorescence observations were made on the same microscope utilising a 3 mm BG3 excitation filter, a TK400 dichroic mirror and a K510 suppression filter.

RESULTS

The vitrinite reflectance data is presented in Table 1. Figure 1 is a plot of vitrinite reflectance versus depth and includes the locations of the major flows and intrusions.

Descriptions of the dispersed organic matter are summarised and presented in table form (Tables 2-4).

DISCUSSION

Maturity

The vitrinite reflectance data (Table 1, Figure 1) indicates that the sampled portion of the sedimentary section penetrated by Tilana-1 (1540-3870 metres depth interval) is mature for the generation of light oil from resinite-rich DOM (threshold VR = 0.45%; Snowdon and Powell, 1982). The hydrocarbon generating potential from this type of organic matter should be exhausted at a maturity level of VR = 0.8% (Mukhopadhyay and Gormly, 1984). This level of maturity is exceeded in sediments from the following intervals in Tilana-1; 1660-2300m, 3000-TD.

Significant gas generation from woody-herbaceous organic matter (vitrinite and to a lesser extent inertinite) commences at VR = 0.6% (Monnier et al., 1983). On this basis, the sediments below 2300 meters depth in Tilana-1 are the most likely sources of quantities of gas.

Oil generation from terrestrial organic matter rich in exinites other than resinite, suberinite and bituminite occurs within the vitrinite reflectance range VR = 0.7-1.2% (Connan and Cassou, 1980). The top of this oil generation window occurs at approximately 2950 meters depth in Tilana-1, although narrow intervals of sediments with maturities in this range occur near the intrusives and volcanics.

Overmature sediments occur in the following intervals (largely due to the presence of igneous rocks rather than burial): 1660-2020m, 2260-2300m, 3800-TD.

The assymetrical variation of maturity around the sill (2020-2259 metres depth) may possibly be due to the passage of super-heated steam through permeable reservoir rocks above the sill. Alternatively there may be another intrusion in the interval 1800-2000 meters depth, nearby, but laterally displaced from the Tilana-1 location.

The depth interval of overmature sediments immediately below this sill in Tilana-1 is quite similar to the intervals of overmature sediments around the sill in Yolla-1 suggesting that the heat flows from these two sills may be similar.

Organic Richness

Organic richness ranges from poor to excellent in the samples studied with DOM contents on a whole sample basis, ranging from less than 0.1% to more than 40%. Samples with good to excellent organic richness (DOM contents more than 5%) generally contain coals. The organic content of the shales and siltstones in the Eastern View Coal Measures at the Tilana-1 location generally lie in the range 0.5-2%. However, organic richness is significantly higher in some shales.

Dispersed organic matter is generally very rare or absent from the sandstones in this sequence. The organic matter in these units generally consists of a mixture of intertinite and oil.

CONFIDENTIAL
CLASS 1

Kerogen type and Source Quality

The Eastern View Coal Measures are rich in vitrinite (60-90%) and exinite (5-30%, generally 15-25%). Inertinite contents are low and lie in the range less than 5-15%. Coals in the sample from 3597-3600 meters depth were possibly deposited in the Cretaceous and contain significantly more inertinite (35%) and less vitrinite (50%) than coals from the Eastern View Coal Measures.

Sporinite, resinite, cutinite and suberinite are the most abundant exinite macerals in the coals and carbonaceous shales from Tilana-1. The ?Cretaceous coals (3597-3600 meters depth) are slightly richer in cutinite than coals from the Eastern View Coal Measures.

Dispersed organic matter in the shales and siltstone from Tilana-1 is similar to that of the coals although generally more inertinite-rich. Lamalginite and bituminite are commonly major components of the exinite in these sediments along with sporinite, resinite and cutinite.

Free oil and exsudatinite are present in the following samples as indicated:

Depth (meters)		Abundance (% of sample)
1675.7+	O	Approx 0.5
2385-2394	E	Approx 1
2493-2502	E	less than 0.1
2592-2601	E	less than 0.1
2700-2709	E	0.1-0.5
2788.8+	E	0.5-1
2799-2808	O	less than 0.1
2907*	O	Approx 0.1
2997-3006	O**	Approx 0.1
3080*	O	Approx 0.1
3147-3156	O	Approx 0.1
3237-3246	O	less than 0.1
3283*	O	Approx 0.1
3435-3444	O	less than 0.1
3546.5	O	less than 0.1
3584*	O	less than 0.1
3597-3600	O	less than 0.1

E = exsudatinite
O = free oil
\+ = core
* = SWC
** = possibly a contaminant from the drilling mud

Intervals with the best source quality as indicated by the organic petrology are listed over:

Depth (m)		% of DOM Exinite	% of DOM Vitrinite	Major Exinite Macerals
1640-1650		60	10	Bituminite
2385-2394		25	65	Sporinite, resinite, suberinite
2493-2502	coal	25	70	Suberinite, sporinite, resinite,
	siltst.	55	5	Lamalginite, liptodetrinite
2592-2601	coal	25	65	Sporinite, resinite,
	siltst.	35	60	Lamalginite, telalginite
2700-2709	coal	25	60	Sporinite, resinite,
	shl.	25	5	Sporinite, lamalginite
2788.8	coal	25	70	Resinite, sporinite, bituminite
2799-2808	shl+siltst.	35	15	Sporinite, lamalginite
3237-3246	coal+shl.	25	70	Sporinite, resinite

5. CONCLUSIONS

1. Sediments from several intervals in Tilana-1 have good source potential, and sufficient maturity, for the generation of both liquid and gaseous hydrocarbons. Intervals with the best source potential are listed below:

Depth (m)	Type of hydrocarbons likely to have been generated
1640-1650	1
2385-2394	1 & 2
2493-2502	1 & 2
2592-2601	1 & 2
2700-2709	1 & 2
2788.8	1 & 2
3237-3246	1,2 & 3

1 = light naphthenic oil.
2 = gas/condensate
3 = oil

2. The vitrinite reflectance data indicates that the sedimentary section is sufficiently mature for the generation of:

   - light naphthenic oil and condensate from resinite-rich DOM in the interval 1540-3150 meters depth (VR = 0.45-0.8%).

   - gas from the woody-herbaceous DOM (vitrinite) below 2950 meters depth (VR threshold = 0.6%).

   - oil from DOM rich in exinites other than resinite, bituminite and suberinite in the interval 2950-3800 meters depth (VR = 0.7-1.4%).

3. The presence of exsudatinite indicates that hydrocarbons have been generated from sediments in the following intervals:

2385-2394m
2493-2502m
2592-2601m
2700-2709m
2788.8m

4. Free oil is present in the following samples:

1675m
2799-2808m
2907m
2997-3006m
3080m
3147-3156m
3237-3246m
3283m
3435-3444m
3546.5m
3584m
3597-3600m

5. ?Cretaceous coals are richer in inertinite than the Eastern View Coal Measures indicating that they are probably more gas/condensate prone. However, this observation is based on one sample and may not apply to the ?Cretaceous coals in general.

TABLE 1: SUMMARY OF VITRINITE REFLECTANCE MEASUREMENTS, TILANA-1

Depth (m)	Mean Maximum Reflectance (%)	Standard Deviation	Range	Number of Determinations
1540-1550	0.57	0.04	0.51-0.62	9
1640-1650	0.60	0.06	0.50-0.71	16
1675.7++	3.11	0.26	2.66-3.56	8
1737-1746	3.45	0.27	2.92-3.90	32
1836-1845	3.84	0.45	3.26-4.52	19
1944-1953	4.93	0.52	4.14-5.72	18
2043-2052	-	-	-	-
2285-2294	3.55	0.27	2.96-4.04	19
2395-2394	0.73	0.08	0.61-1.01	31
2493-2502	0.65	0.08	0.54-0.84	31
2592-2601	0.69* (0.62)	0.08	0.55-0.84	35
2700-2709	0.74*	0.06	0.57-0.85	36
2788.8++	0.62	0.03	0.56-0.71	36
2799-2808	0.62	0.05	0.48-0.73	29
2907+	0.60	0.05	0.52-0.69	16
2997-3006	0.83	0.08	0.70-1.11	28
3080+	0.75	0.07	0.63-0.86	29
3147-3156	0.83	0.09	0.66-0.96	8
3237-3246	0.92	0.06	0.80-1.02	31
3283+	0.93	0.08	0.73-1.04	22
3291-3300	0.94	0.07	0.80-1.09	32
3390-3399	0.91	0.02	0.89-0.92	2
3435-3444	0.87	0.06	0.74-0.94	7
3546.5+	0.98	0.07	0.76-1.10	29
3584+	1.08	0.06	0.98-1.18	13
3597-3600	1.16	0.08	0.97-1.31	31
3870+	1.59	0.19	1.30-1.92	24

*Influenced by caved cuttings.

( )preferred value.

+SWC.

++Core.

VITRINITE REFLECTANCE Vs. DEPTH PLOT, TILANA-1

3209253

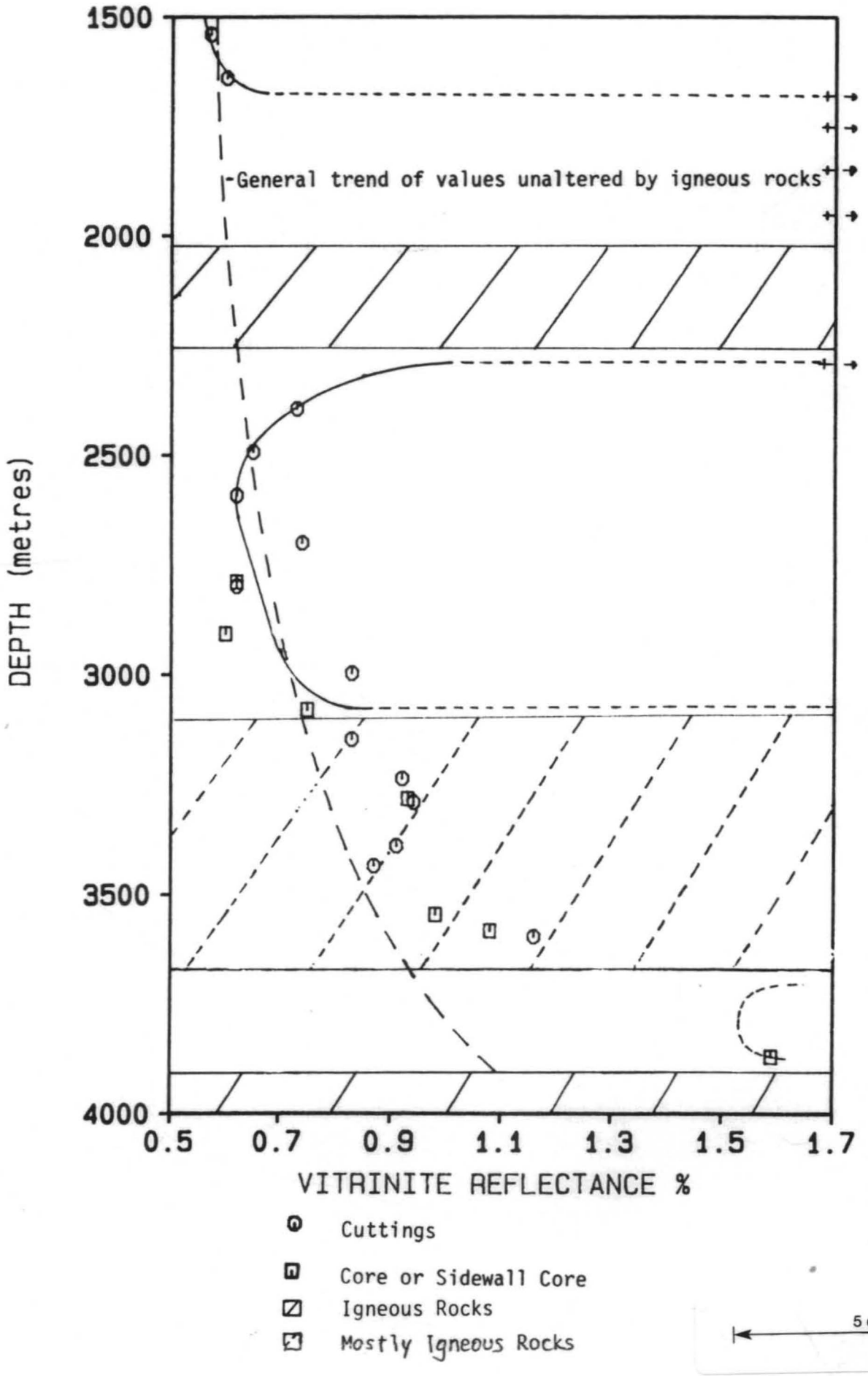


TABLE 2: PERCENTAGE OF VITRINITE, INERTINITE AND EXINITE IN DISPERSED ORGANIC MATTER, TILANA-1

Depth (m)		Percentage of		
		Vitrinite	Inertinite	Exinite
1540-1550	Sst.+Siltst.	5	85	10
1640-1650	Shale	10	30	60
1675.7++	Siltstone	10	65	25
1737-1746	Carb Shl+Coal	80	5	15
1836-1845	Shl+Coal	90	5	5
1944-1953	Carb Shl+Coal	85	5	10
2043-2052	Shale	-	100*	-
2285-2294	Shale+Coal	70	20	10
2385-2394	Coal+Siltst.	65	10	25
2493-2502	Coal	70	5	25
	Siltstone	5	40	55
2592-2601	Coal	65	10	25
	Shale+Siltst.	60	5	35
	Carbonate	<5	75	20
2700-2709	Coal	60	15	25
	Shale	5	70	25
2788.8++	Coal	70	<5	25
2799-2808	Sandstone	<5	90	5
	Shale+Siltst.	15	55	35
2907+	Coal	75	5	20
	Shale	5	85	10
2997-3006	Shale+Siltst.	10	75	15
	Coal	80	5	15
3080+	Siltstone	30	60	10
3147-3156	Siltstone	<5	85	10
3237-3246	Coal+Carb Shl	70	<5	25
	Siltstone	25	60	15
3283+	Sandstone	5	90	<5

.../cont.

TABLE 2: (Continued)

Depth (m)		Percentage of		
		Vitrinite	Inertinite	Exinite
3291-3300	Coal+Carb. Shl	70	<5	25
	Siltstone	35	45	20
3390-3399	Coal	65	5	30
	Shale+Siltst.	30	60	10
3435-3444	Siltstone	5	90	5
3596.5+	Siltstone	25	70	<5
3584+	Siltstone	10	85	5
3597-3600	Coal	50	35	15
	Siltstone	5	80	15
3870	Siltstone	15	75	10

*Graphite.

+SWC.

++Core.

TABLE 3: ORGANIC MATTER TYPE AND ABUNDANCE, TILANA-1

Depth (m)	Estimated Volume of DOM (%)	Estimated Volume of Exinites	Exinite Macerals
1540-1550	0.5-1	Ra	bmite,spo,cut
1640-1650	5-15	Ab	bmite,lipto,spo,cut
1675.7++	1-3	Ra-Sp	?oil,bmite
1737-1746	10-20	Ra	spo,res,cut
1836-1845	1-2	-	-
1944-1953	∿5	Ra	spo,res,cut
2043-2052	0.1*	-	-
2285-2294	5-10	Ra-Sp	spo,lipto,cut
2385-2394	>40	Ab	spo,res,sub,exs,cut,lipto,bmite
2493-2502	5-10	Co	lipto,lama,sub,spo,res,cut,?phyto, exs,thuc
2592-2601	5-10	Sp-Co	lama,spo,res,cut,tela,lipto, ?phyto,sub,exs,bmite
2700-2709	>40	Ab	spo,res,cut,lama,sub,exs,lipto, ?phyto,tela
2788.8++	>40	Ab	res,spo,bmite,cut,exs
2799-2808	3-5	Ra	spo,res,lama,cut,tela,bmite, phyto,oil
2907+	0.5-1	Ra	phyto,lama,spo,?oil,tela
2977-3006	1-3	Ra	spo,oil,phyto,lama,cut,res,tela, sub,bmen
3080+	1-2	Ra-Vr	?oil,spo,cut,lipto,res
3147-3156	<0.5	Vr	lipto,?oil,spo,cut
3237-3246	15-25	Co	spo,res,bmite,cut,sub,oil
3283+	0.5-1	Vr	?oil,thuc,spo
3291-3300	15-25	Co	res,spo,bmite,lipto,cut
3390-3399	0.5-1	Tr	spo,cut,res,lama,sub
3435-3444	<0.5	Tr	spo,?oil
3546.5	1-2	Vr	spo,?oil,cut,exs
3584+	∿1	Ra	lama,?oil
3597-3600	20-30	Sp	spo,cut,res,?oil
3870+	1-2	Ra	lama,lipto

*Graphite.

+SWC.

++Core.

TABLE 4: EXINITE MACERAL ABUNDANCE AND FLUORESCENCE CHARACTERISTICS, TILANA-1

Depth (m)	Exinite Macerals	Lithology/Comments
1540-1550	bmite(Ra;d0),spo(Vr;mY-m0),cut (Tr;m0)	chiefly silty sandstone, 10-20% siltstone. Caved coals of lower and higher maturity.
1675.7++	?oil(Ra-Sp;i0),bmite(Ra;d0-NoFl)	siltstone. Bituminite is extensively micrinitised ?oil occurs as small accumulations (up to 0.03 mm).
1640-1650	bmite(Ab;d0-dB),lipto(Ra;mY-m0), spo(Ra-Vr;m0-d0),cut(Vr;m0)	shale with silty bands.
1737-1746	spo(Ra;NoFl),res(Vr;NoFl),cut (Vr;NoFl)	chiefly silty sandstone and siltstone, ∿20% coal (anthracite), ∿10% carbonaceous shale. The lack of exinite fluorescence is a function of overmaturity.
1836-1845	spo(Ra;NoFl),res(Vr;NoFl)	chiefly sandstone, 5-10% shale, <5% coal (anthracite) and coke. Exinite fluorescence as above.
1944-1953	spo(Ra;NoFl),res(Ra;NoFl),cut (Vr;NoFl)	chiefly sandstone, ∿5% carbonaceous shale, ∿5% coal (anthracite); exinite fluorescence as above.
2043-2052	-	chiefly igneous rocks, ∿1% shale.
2285-2294	spo(Ra;NoFl),lipto(Ra;NoFl),cut (Ra;NoFl)	chiefly shale, 5-10% coal (anthracite) and coke, ∿5% carbonate; exinite fluorescence as above.
2385-2394	spo(Ab;m0-d0),res(Ab;d0-dB),sub (Co-Ab;d0-dB),exs(Sp-Co;mY-dB), cut(Sp;m0-d0),lipto(Ra;m0-dB), bmite(Vr;d0)	chiefly coal, ∿20% sandstone, 5-10% siltston with DOM rich bands; the variation of fluorescence colours of exsudatinite (primary oil) indicate the possibility more than one phase of oil generation.
2493-2502	lipto(Co;m0),lama(Sp;mY-d0),spo (Sp;mY-m0),res(Sp;m0-dB),cut(Ra; mY-m0),?phyto(Tr;m0),exs(Tr;m0), thuc(Tr;m0-d0)	chiefly siltstone, 5-10% coal, ∿5% carbonate; thucholite is evidence of oil migration. Exsudatinite is primary oil (i.e. formed in situ).
2592-2601	lama(Ra-Sp,mY-d0),spo(Ra-Sp; m0-d0),res(Ra;m0-dB),cut(Ra;m0-d0),tela(Ra;iY-m0),lipto(Ra; m0-d0),phyto(Ra-Vr;mY),sub(Vr; NoFl),exs(Tr;iYG),bmite(Tr;d0)	chiefly shale and siltstone, 10-20% carbonate, 5-10% coal; some coals contain up to 30% exinite (mostly sporinite and resinite).
2700-2709	spo(Ab;m0-d0),res(Ab;m0-dB),cut (Co;m0-d0),lama(Ra;m0),sub(Vr; d0),exs(Vr;iY-iG,d0-dB),lipto (Vr;m0-d0),?phyto(Vr-Tr;mY), tela(Tr;iY)	chiefly coal, 10-20% siltstone; resinite and suberinite are extensively micrinitised and have dull fluorescence, indicating that oil generation from these macerals is nearly complete.
2788.8++	res(Ab;iG-d0),spo(Ab;mY-d0), bmite(Ab-d0),cut(Co-Ab;m0), exs(Sp;dB)	coal; resinite as above. Some coal fragments contain up to 35% exinite. Some sporinite i slightly oxidised.
2799-2808	spo(Ra;m0-d0),res(Ra;m0-NoFl), lama(Ra;mY-m0),cut(Vr;m0-d0), tela(Vr;m0),bmite(Vr;d0),phyto (Tr;m0),oil(Tr;iYG)	chiefly sandstone, 5-10% siltstone and shale, <5% coal; resinite as above. Oil occurs as small accumulations (<0.03 mm) in the siltstone cuttings.

.../2

TABLE 4: (Continued)

Depth (m)	Exinite Macerals	Lithology/Comments
2907+	phyto(Ra;iY),lama(Ra;m0),spo(Vr;m0),?oil(Vr-Tr;iYG-iY),tela(Tr;iY-i0)	shale with silty bands; ?oil occurs in silty sections.
2997-3006	spo(Ra;m0-d0),oil(Ra-Vr;iG-i0),phyto(Vr;m0),lama(Vr;m0),cut(Vr-Tr;m0-d0),res(Vr-Tr;m0-d0),tela(Tr;m0),sub(Tr;d0),bmen(Tr;d0)	chiefly sandstone, 10-15% siltstone, <5% coal; oil and bitumen occur interstitial to quartz grains in the sandstone and siltstone cuttings.
3080+	?oil(Ra-Vr;iY-G),spo(Vr-d0),cut(Vr;d0),lipto(Vr;m0-d0),res(Tr;dB)	sandy siltstone; oil is most abundant in the sandy portions.
3147-3156	lipto(Vr;m0-d0),?oil(Vr;iYG),spo(Vr;m0),cut(Vr;m0)	chiefly sandstone, 10-15% siltstone; oil as above.
3237-3246	spo(Co;m0-d0),res(Sp-Co;d0-NoFl),bmite(Sp;d0),cut(Ra;m0-d0),sub(Vr;d0-dB),?oil(Tr;iG,m0)	chiefly sandstone, 15-20% coal, 10-15% siltstone, ~10% carbonaceous shale; resinite and suberinite as above. Oil as above.
3283+	?oil(Vr;iG-iY),spo(Tr;d0),thuc(Tr;NoFl)	silty sandstone; thucholite is evidence of oil migration.
3291-3300	res(Co;dB-NoFl),spo(Co;d0),bmite(Co;dB-NoFl),lipto(Sp;d0-dB),cut(Ra;d0)	chiefly carbonaceous shale, 20-30% sandstone, 10-20% coal, 10-15% siltstone; fluorescence colours of resinite and bituminite indicate oil generation from these macerals is nearly complete.
3390-3399	spo(Tr;m0),cut(Tr;m0),res(Tr;m0),lama(Tr;m0),sub(Tr;d0)	chiefly volcanics, <5% siltstone and shale, <1% coal.
3435-3444	spo(Tr;d0),?oil(Tr;iY)	chiefly sandstone, ~10% volcanics, <5% siltstone; ?oil as above.
3546.5+	spo(Vr;d0),?oil(Vr-Tr;iY),cut(Tr;dB),cut(Tr;d0)	siltstone with stringers of coal, oil as above.
3584+	lama(Ra;NoFl),?oil(Vr-Tr;iYG)	siltstone, fluorescence colour of the sporinite in this sample indicates that this sample is over-mature for oil generation.
3597-3600	spo(Sp;NoFl),cut(Sp;NoFl),res(Sp;NoFl), ?oil(Tr;iY)	chiefly sandstone, 20-30% coal, 10-20% siltstone; oil as above. Exinite fluorescence colours indicate that this sample is over-mature.
3870+	lama(Ra;NoFl),lipto(Ra;NoFl)	Siltstone; exinite as above.

+SWC.

++Core.

320259

KEY TO DISPERSED ORGANIC MATTER DESCRIPTIONS

MACERAL GROUPS

V	Vitrinite
I	Inertinite
E	Exinite

EXINITE MACERALS

spo	Sporinite
cut	Cutinite
res	Resinite
sub	Suberinite
lipto	Liptodetrinite
fluor	Fluorinite
exs	Exsudatinite
phyto	Phytoplankton
tela	Telalginite
lama	Lamalginite
bmite	Bituminite
bmen	Bitumen
thuc	Thucholite

ABUNDANCE (by vol.)

Ma	Major	>15%
Ab	Abundant	2-15%
Co	Common	1-2%
Sp	Sparse	0.5-1%
Ra	Rare	0.1-0.5%
Vr	Very Rare	∿0.1%
Tr	Trace	<0.1%

FLUORESCENCE COLOUR AND INTENSITY

G	Green	i	Intense
Y	Yellow	m	Moderate
O	Orange	d	Dull
B	Brown		

320260

TILANA #1

1675.7 M ; CORE #1

SORTED LIST

2.66 2.94 3.02 3.04 3.08 3.3 3.32 3.56

Number of values= 8

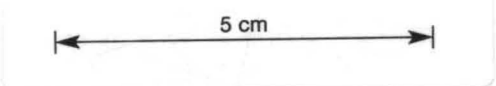
MEAN OF VALUES 3.115

STD DEVIATION .257

HISTOGRAM OF RESULTS

Values are reflectance multiplied by 100

```
266 - 270  | ▒
271 - 275  |
276 - 280  |
281 - 285  |
286 - 290  |
291 - 295  | ▒
296 - 300  |
301 - 305  | ▒▒
306 - 310  | ▒
311 - 315  |
316 - 320  |
321 - 325  |
326 - 330  | ▒
331 - 335  | ▒
336 - 340  |
341 - 345  |
346 - 350  |
351 - 355  |
356 - 360  | ▒
```



320261

TILANA #1

2788.8 M ; CORE #2

SORTED LIST

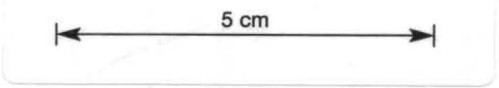
.56	.58	.58	.58	.59	.59	.59	.59	.6	.6
.61	.61	.61	.61	.61	.61	.62	.62	.62	.62
.62	.62	.62	.62	.63	.63	.63	.64	.64	.65
.65	.66	.66	.67	.68	.71				

Number of values= 36

MEAN OF VALUES .62
STD DEVIATION .031

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100

56 - 60 |
61 - 65 |
66 - 70 |
71 - 75 |



320262

TILANA #1

2907 M ; SWC 8

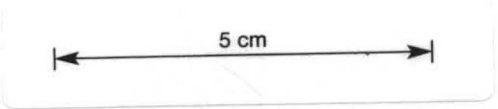
SORTED LIST

.52 .54 .55 .56 .57 .57 .59 .59 .59 .62
.62 .63 .64 .65 .66 .69
Number of values= 16

MEAN OF VALUES .599
STD DEVIATION .046

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100

52 - 54 |
55 - 57 |
58 - 60 |
61 - 63 |
64 - 66 |
67 - 69 |



320263

TILANA #1

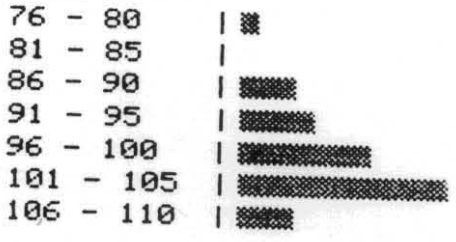
3546.5 M ; SWC 33

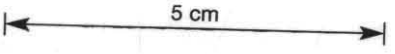
SORTED LIST

.76 .86 .86 .9 .92 .92 .92 .94 .97 .97
.98 .98 .99 .99 1 1.01 1.01 1.01 1.02 1.02
1.02 1.02 1.03 1.04 1.04 1.05 1.07 1.08 1.1
Number of values= 29

MEAN OF VALUES .982
STD DEVIATION .073

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100





TILANA #1

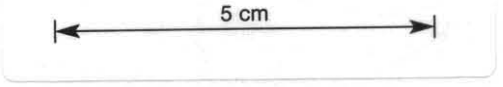
3584 M ; SWC 61

SORTED LIST
.98 1 1.02 1.06 1.06 1.08 1.08 1.12 1.12 1.12
1.12 1.14 1.18
Number of values= 13

MEAN OF VALUES 1.083
STD DEVIATION .056

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100

98 - 102 | ▓▓▓
103 - 107 | ▓▓
108 - 112 | ▓▓▓▓▓▓▓
113 - 117 | ▓
118 - 122 | ▓



320265

TILANA #1

3283 M ; SWC 66

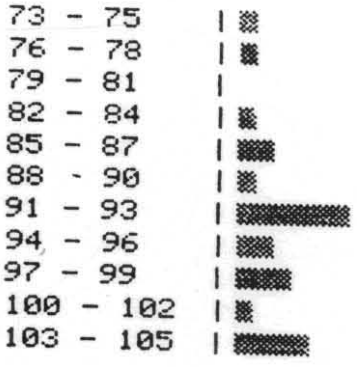
SORTED LIST

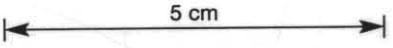
.73	.78	.84	.87	.87	.89	.91	.92	.92	.93
.93	.93	.94	.95	.98	.99	.99	1.01	1.03	1.03
1.03	1.04								

Number of values= 22

MEAN OF VALUES .932
STD DEVIATION .079

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100





320266

TILANA #1

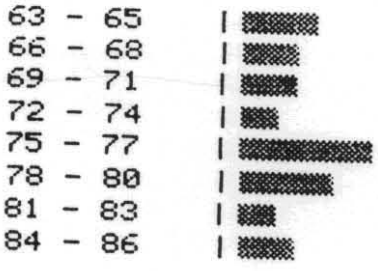
3080 M ; SWC 76

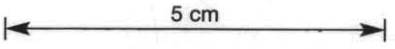
SORTED LIST

.63 .63 .65 .65 .66 .67 .68 .7 .71 .71
.74 .74 .75 .76 .77 .77 .77 .77 .77 .78
.78 .8 .8 .8 .81 .81 .84 .84 .86
Number of values= 29

MEAN OF VALUES .747
STD DEVIATION .065

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100





320267

APPENDIX 10

PETROLOGY AND GEOCHRONOLOGY

OF

TILANA-1

PART 1: K/Ar40 DATING AND PETROGRAPHY CUTTINGS SAMPLE 2043-2052M.

PART 2: K/Ar40 DATING JUNK SUB SAMPLE INTERVAL 3118-3350M.

MODOFIED FROM REPORTS
BY DR. ALAN WEBB - AMDEL

INTRODUCTION

In order to help with correlations with the Yolla-1 well and to determine the nature of the igneous rocks encountered during the drilling of Tilana, K/Ar40 dating and petrological determinations were carried out on samples from the intervals 2043-2052m and 3066-3311m. The cuttings sample from 2043-2052m was an altered fine-grained gabbro which appeared to have had an intrusive rather than extrusive origin. Based upon the K/Ar40 analyses of the contained pyroxene, the age of the Gabbro is 20.5 (+/- 1.0) million years (i.e. Early Miocene). The junk sub-sample (bit run 16) from within the interval 3066-3311m was identified as a fine-grained slightly altered dolerite. Based upon analyses of the pyroxene the age is estimated at 28.3 (+/- 1.5) million years.

Part 1 : K/Ar40 Dating and Petrography Cuttings Sample 2043-2052m.

PROCEDURES

The composite sample was washed to remove the drilling mud and a few chips of the igneous rock crushed and examined microscopically to determine the minerals present. Biotite was noted but attempts to concentrate it by flotation methods were unsuccessful. A pyroxene concentrate was therefore prepared from the 2043-2052m sample and analysed for K and radiogenic 40Ar. A thin section was prepared from several of the larger chips and a description is given below.

PETROGRAPHY

Sample: Tilana-1, 2043-2052m: TSC 46043

Rock Name: Gabbro

The rock is a medium to fine grained gabbro composed essentially of plagioclase and pyroxene in approximately equal proportions. Because the rock chips are generally finer than 4-5 mm, accurate estimation of abundance of the mineral components is difficult.

Pyroxene is purplish-brown in colour and occurs as sub-ophitic plates up to 2 mm in length. Smaller (0.5 mm) euhedral and non-ophitic crystals are also common. Very little alteration of the pyroxene has occurred.

Plagioclase occurs as narrow laths, up to 1 mm in length, enclosed or partially enclosed by the pyroxene but more commonly, as tabular to equidimensional grains. An extensive, cloudy alteration is present in much of the feldspar but the refractive index appears to be close to 1.55, suggesting it is andesine. The plagioclase is therefore less calcic than in normal gabbros. Compositional zoning is present and many grains show unusual recrystallisation or replacement textures. Both isotropic and weakly birefringent ?zeolites are present as replacement grains within the feldspar. These minerals also occur as interstitial patches. Pale green chloritic alteration in sheaf and rosette-like masses is also present in the feldspar.

320269
CONFIDENTIAL
CLASS 1

Small apatite granules are common and opaque grains (possibly ilmenite) make up about 5% of the rock and are intimately intergrown with a red-brown biotite. The ilmenite frequently has a skeletal structure and very fine ?secondary opaque lamellae have formed along the cleavage planes of calcite.

The rock is too altered for total rock K-Ar dating and there is insufficient biotite present to permit a suitable mineral concentrate to be prepared. The pyroxene is the only fresh and sufficiently abundant mineral present that could be used for K-Ar dating. The gabbro appears to be of intrusive rather than extrusive origin.

GEOCHRONOLOGY

The K and Ar analyses are given in Table 1. The age is similar to but slightly younger than that determined on biotite from a somewhat similar gabbro from Yolla No. 1. However, as pyroxenes are not always as reliable as biotites for dating, and taking into consideration the very low levels of K and radiogenic Ar present in the pyroxene, it is not feasible to attempt to detect any significant digfference in age between the two gabbros.

320270

TABLE 1: POTASSIUM-ARGON RESULTS

Sample	%K	$^{40}Ar^{*}$ ($\times 10^{-12}$ moles/g)	$^{40}Ar^{*}/^{40}Ar$ Total	Age†
Tilana #1 2043-52m	0.0411	1.4793	0.178	20.5±1.0
Pyroxene	0.0417			

* Denotes radiogenic ^{40}Ar.

† Age in Ma with error limits given for the analytical uncertainty at one standard deviation.

Constants : $^{40}K = 0.01167$ atom %

$\lambda\beta = 4.962 \times 10^{-10} y^{-1}$

$\lambda\varepsilon = 0.581 \times 10^{-10} y^{-1}$

Part 2: K/Ar40 Dating - Junk Sub Sample from the Interval 3066-3311m (Bit Run 16)

PROCEDURES

Bit Run 16 sample (3066-3311m) contained two basic igneous rock types. Three thin sections of this material were prepared and examined.

The finer grained basaltic material is extensively altered (see below) and is unsuitable for dating. A coarser grained, doleritic variety contains fresh pyroxene and a concentrate of this mineral was prepared and analysed for K and radiogenic Ar.

PETROGRAPHY

TSC 45813, 45814

These two samples are similar, although exhibiting colour differences due to varying degrees of weathering.

The rock is a fine grained, porphyritic basalt, with phenocrysts up to 1 mm in length comprising about 5% of the volume. The original nature of the phenocrysts is uncertain because they are now replaced by calcite and secondary quartz in varying proportions. Thin veins of chlorite also traverse the phenocrysts. In the second section, the phenocrysts are mainly calcite - chlorite and the phenocryst outlines suggest original ferromagnesian minerals (pyroxene and/or olivine).

The groundmass consists of randomly oriented plagioclase laths, usually less than 0.3 mm in length, set in an extensive matrix of pale green chlorite. The plagioclase shows slight alteration and albite twinning is still apparent.

Fine (less than 0.010 mm) opaques are disseminated throughout the chlorite. These are whiteish in reflected light and are possibly leucoxene.

The second sample shows a greater alteration of the plagioclase and widespread calcite veining. Both rocks are far too altered to yield K-Ar dates that could be interpreted with any degree of confidence.

TSC 45815

This is a fine grained doleritic rock, with a maximum grain size of about 1 mm, and is generally much coarser grained than the basalts described above. It is composed predominantly of plagioclase and pyroxene, with altered ?olivine, opaque grains (both iron oxides and pyrite), calcite, epidote and minor biotite. Fine needles of apatite occur as an accessory mineral.

Fine grained micas and serpentine minerals occur in masses with outlines suggesting original olivine crystals.

The pyroxene is a titaniferous augite, purple in colour with some colour zoning. Euhedral to subhedral grains are common, and some tend to be sub-ophitic, being partially locked with plagioclase laths. The pyroxene is generally very fresh and is the least altered mineral present.

Plagioclase is probably labradorite and varies from fresh to strongly altered. It is replaced by both chlorite and epidote.

Calcite occurs mainly as scattered grains up to about 0.1 mm across and does not appear to be replacing any specific mineral.

Chlorite, in addition to replacing plagioclase and ?olivine, is widespread as an interstitial phase. It is often associated with a secondary mineral with a radiating habit and anomalous blue interference colours - possibly a member of the edidote group. Epidote with normal birefringence is also present.

Thin flakes of biotite up to 0.2 mm in length are relatively fresh but not sufficiently abundant to produce a mineral concentrate. Pyroxene is the only mineral present that could be used for K-Ar dating.

GEOCHRONOLOGY

The K-Ar analyses and age are given in Table 2. The result is similar to that determined on pyroxene from Tilana-1, 2043-2052m, and it is possible that the present sample represents material from this higher stratigraphic level.

The pyroxene from both samples is a strongly coloured titen-augite, although there are differences in the remaining mineral assembly of the two samples, e.g. the previous sample contained extensive zeolitic alteration whereas the present sample had a chlorite - calcite epidote alteration.

320273

TABLE 2: POTASSIUM-ARGON RESULTS

Sample	%K	$^{40}Ar^{*}$ ($\times 10^{-12}$ moles/g)	$^{40}Ar^{*}/^{40}Ar_{Total}$	Age†
Tilana #1 Junk Sub Bit Run 16 Pyroxene	0.105 0.106	5.2181	0.103	28.3 ± 1.5

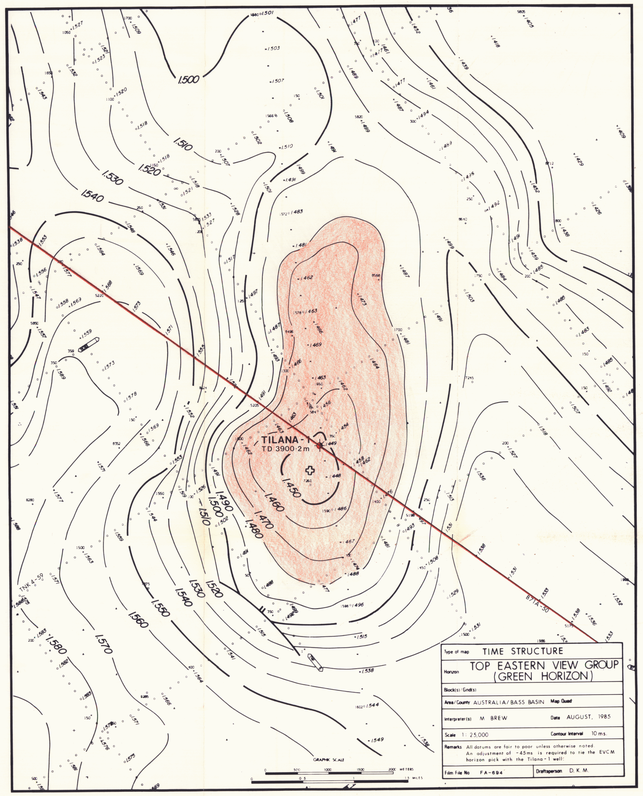
* Denotes radiogenic ^{40}Ar.

† Age in Ma with error limits given for the analytical uncertainty at one standard deviation.

Constants: ^{40}K = 0.01167 atom %

λ_{β} = $4.962 \times 10^{-10} y^{-1}$

λ_{ϵ} = $0.581 \times 10^{-10} y^{-1}$


TILANA-1
TD 3900·2m
1500
1510
1520
1530
1540
1550
1560
1570
1580
1590
1600
1610
1620
1630
1640
1650
1660
1670
1680
1690
1700
1710
1720
1730
1740
1750
1760
1770
1780
1790
1800
1810
1820
1830
1840
1850
1860
1870
1880
1890

Amoco Australia Petroleum Company

WELL **TILANA No.1**

LOCATION **BASS STRAIT TASMANIA**

AREA T/14 P

SURFACE LOCATION LAT 39°53'36·73"S, LONG 145°58'41·97"E

BOTTOM HOLE LOCATION

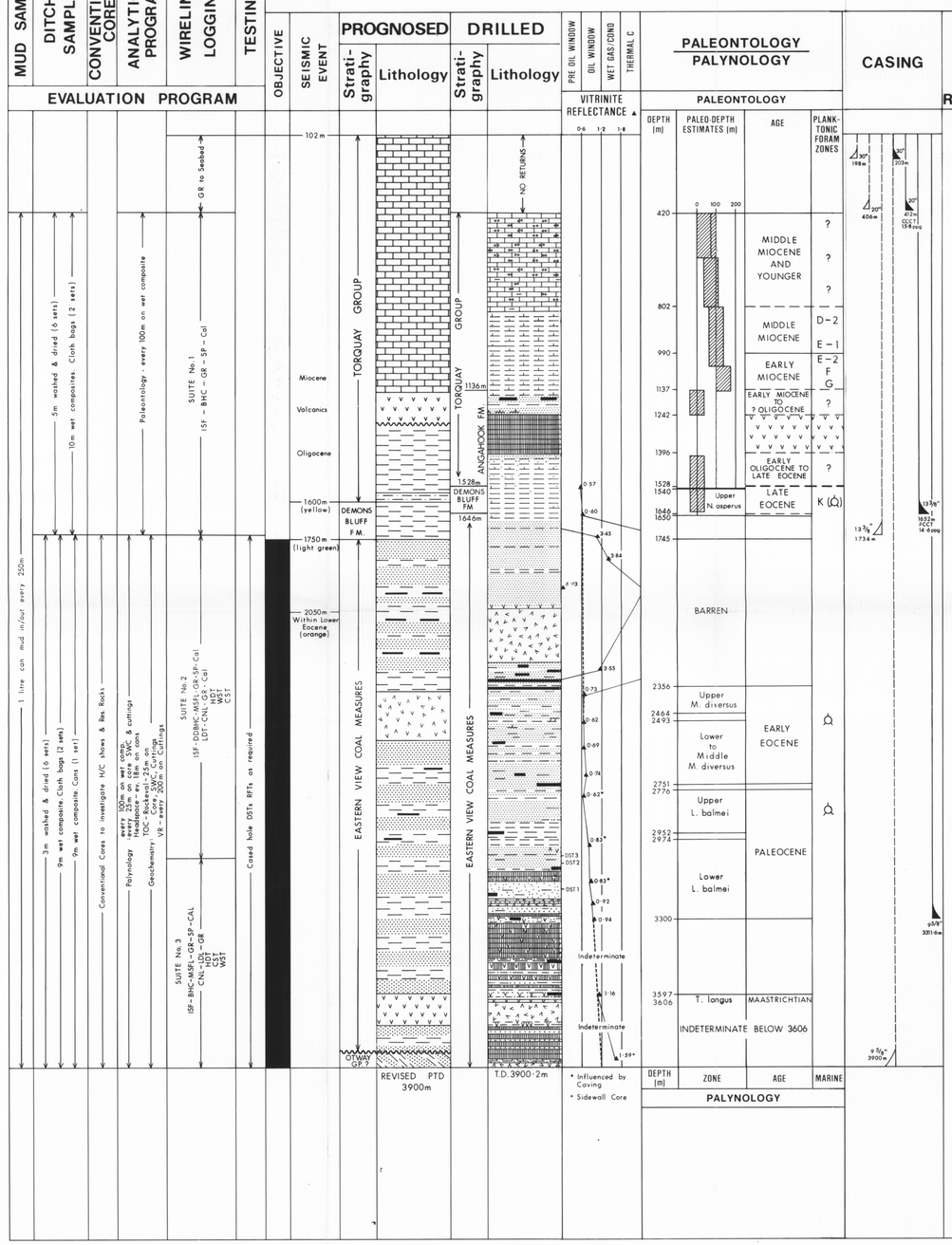
SPUD September 5, 1985 (2030hrs)

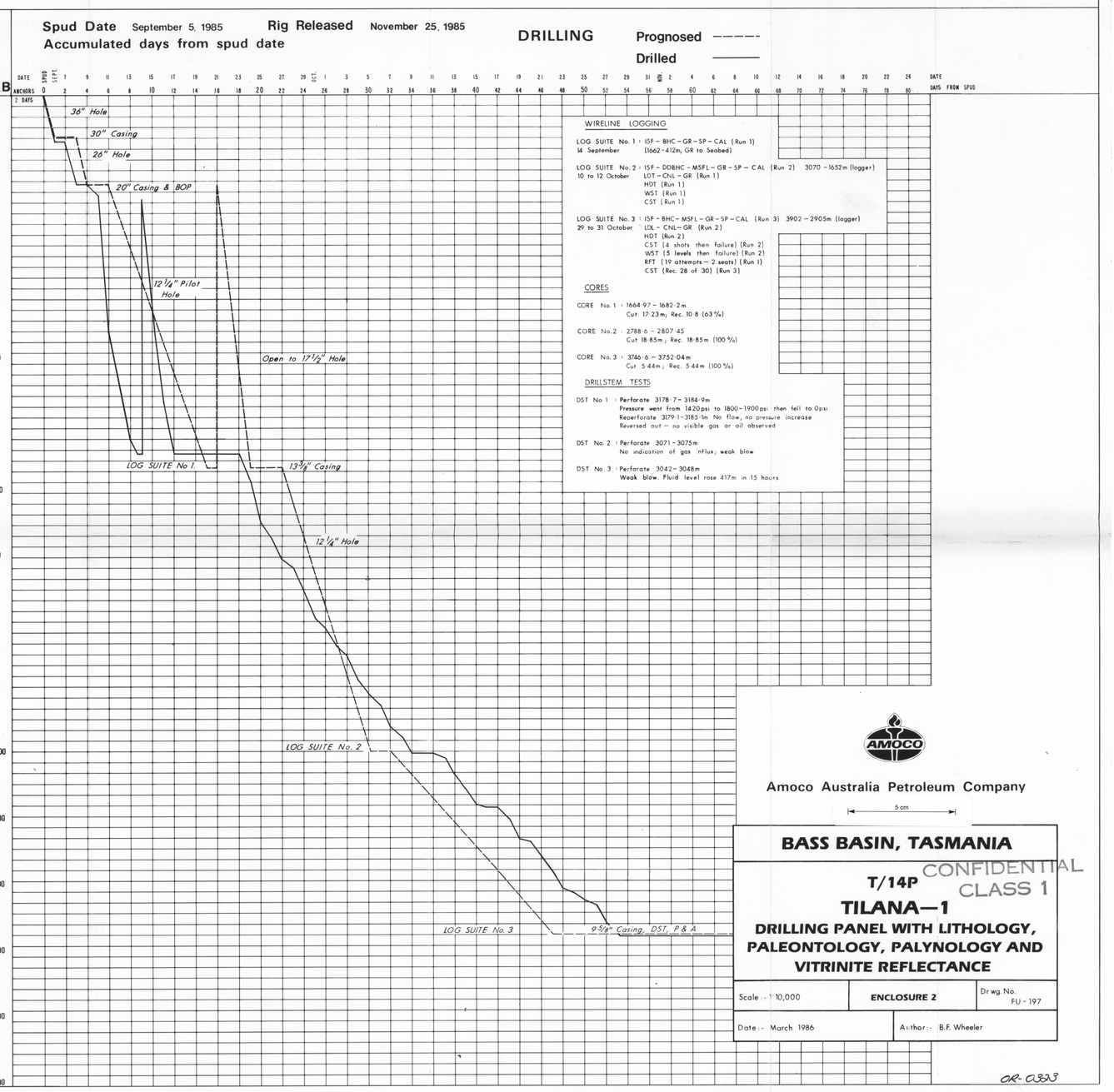
COMPLETION Tested 25th November 1985

WATER DEPTH /KB ELEV. 81m (265·75') / 22m (73')

DRILLERS TD. 3900.2m RKB

DRILLING HISTORY





WIRELINE LOGGING

LOG SUITE No. 1 : ISF – BHC – GR – SP – CAL (Run 1)
14 September (1662–412m, GR to Seabed)

LOG SUITE No. 2 : ISF – DDBHC – MSFL – GR – SP – CAL (Run 2) 3070 – 1652m (logger)
10 to 12 October LDT – CNL – GR (Run 1)
HDT (Run 1)
WST (Run 1)
CST (Run 1)

LOG SUITE No. 3 : ISF – BHC – MSFL – GR – SP – CAL (Run 3) 3902 – 2905m (logger)
29 to 31 October : LDL – CNL – GR (Run 2)
HDT (Run 2)
CST (4 shots then failure) (Run 2)
WST (5 levels then failure) (Run 2)
RFT (19 attempts – 2 seats) (Run 1)
CST (Rec. 28 of 30) (Run 3)

CORES

CORE No. 1 : 1664·97 – 1682·2m
Cut 17·23m; Rec. 10·8 (63 %)

CORE No. 2 : 2788·6 – 2807·45
Cut 18·85m; Rec. 18·85m (100 %)

CORE No. 3 : 3746·6 – 3752·04m
Cut 5·44m; Rec. 5·44m (100 %)

DRILLSTEM TESTS

DST No 1 : Perforate 3178·7 – 3184·9m
Pressure went from 1420psi to 1800–1900psi then fell to 0psi
Reperforate 3179·1–3185·1m No flow, no pressure increase
Reversed out – no visible gas or oil observed

DST No. 2 : Perforate 3071 – 3075m
No indication of gas influx; weak blow

DST No. 3 : Perforate 3042 – 3048m
Weak blow. Fluid level rose 417m in 15 hours

Amoco Australia Petroleum Company

5 cm

BASS BASIN, TASMANIA

T/14P CONFIDENTIAL CLASS 1

TILANA—1

DRILLING PANEL WITH LITHOLOGY, PALEONTOLOGY, PALYNOLOGY AND VITRINITE REFLECTANCE

Scale :- 1:10,000	**ENCLOSURE 2**	Drwg.No. FU - 197
Date :- March 1986	Author :- B.F. Wheeler	

OR-0393

320275

AMOCO AUSTRALIA PETROLEUM COMPANY

COMPOSITE WELL LOG

TILANA-1 CONFIDENTIAL CLASS 2

(RECORD)

Permit: VIC/P-19 (T) Well: TILANA-1 Drilling Contractor: ODECO (AUST.) PTY. LTD.

Field: Wildcat Rig: ODECO DRILLING RIG #3 Spud Date: 19th. JUNE, 1979

Location: LAT. 38° 31' 29.1" S. LONG. 148° 07' 45.0" E. Total Depth: 2,438 m. (8,000 ft.)

Elevation: 25 m. (82 ft.) above M.S.L. Completed: 28th. JULY, 1979

WELL DATA

Casing: 30" @ 124 m. (406 ft.) 20" @ 1,000 m. (3,281 ft.) 13 3/8" @ 1,800 m. (5,906 ft.) 9 5/8" @ 2,438 m. (8,000 ft.)

Hole Size: 36" to 124 m. (406 ft.) 26" to 1,000 m. (3,281 ft.) 17 1/2" to 1,800 m. (5,906 ft.) 12 1/4" to 2,438 m. (8,000 ft.)

Mud: SEAWATER/GEL/HI-VIS PAC Mud Weight: 1.03 - 1.20 kg/l (8.6 - 10.0 lb/gal)

LOGGING DATA

RUN	DATE	INTERVAL LOGGED
WIRELINE LOG AND SERVICES		
1	19/7/79	1,000 - 1,800 m. (3,281 - 5,906 ft.)
2	20/7/79	1,800 - 2,438 m. (5,906 - 8,000 ft.)
3	21/7/79	1,800 - 2,438 m. (5,906 - 8,000 ft.)
4	22/7/79	1,800 - 2,438 m. (5,906 - 8,000 ft.)
5	23/7/79	1,800 - 2,438 m. (5,906 - 8,000 ft.)
6	24/7/79	1,800 - 2,438 m. (5,906 - 8,000 ft.)
7	25/7/79	1,800 - 2,438 m. (5,906 - 8,000 ft.)
8	26/7/79	1,800 - 2,438 m. (5,906 - 8,000 ft.)
9	27/7/79	1,800 - 2,438 m. (5,906 - 8,000 ft.)
10	28/7/79	1,800 - 2,438 m. (5,906 - 8,000 ft.)



LEGEND

LITHOLOGIC SYMBOLS

FAUNAL SYMBOLS

MISCELLANEOUS SYMBOLS

OPERATIONAL SYMBOLS

RIFT SYMBOL

SAMPLE RETURNS NO

DOOLENA

WAARRE

FLAXMANS

EASTERN VIEW COAL MEASURES

LATROBE GROUP

STRZELECKI GROUP

LOWER CRETACEOUS

UPPER JURASSIC

MIDDLE JURASSIC

LOWER JURASSIC

TRIASSIC

PERMIAN

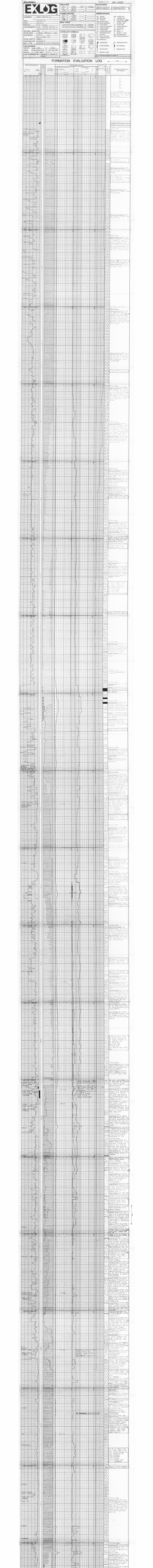
CARBONIFEROUS

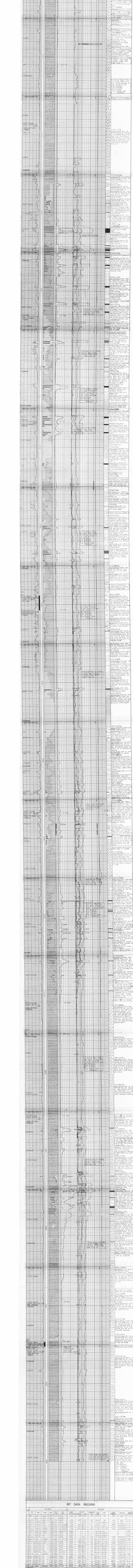
DEVONIAN

ORDOVICIAN

CAMBRIAN

PRE-CAMBRIAN


EXLOG
FORMATION EVALUATION LOG



BIT DATA RECORD

| BIT DATA | | |

ENCLOSURE 5 OR 0823 320278

EXLOG

COMPANY AMOCO AUSTRALIA
WELL TILANA No.1
FIELD WILDCAT
REGION BASS STRAIT
COORDINATES LAT: 39° 53' 36.73" S
LONG: 145° 58' 41.37" E
API WELL INDEX NO.
SPUD DATE 5TH SEPTEMBER 1985
ELEVATION RKB - MSL 22M
RKB - SEABED 82M
TOTAL DEPTH 3900M
CONTRACTOR DIAMOND M
RIG / TYPE DIAMOND M EPOCH / SSUB

LOG INTERVAL
DEPTH FROM 420M TO 3900M
DATE FROM 10 SEPT. TO 28 OCT '85
SCALE 1 : 5000 UNIT 216 GEMDAS X
LOG PREPARED BY FELL, HODGE, NEW STRAUTINS

HOLE SIZE

36"	TO	209M	12¼"	TO	3900M
26"	TO	416M		TO	
17½"	TO	1662M		TO	

CASING RECORD

30"	AT	207M		AT	
20"	AT	413M		AT	
13⅜"	AT	1651M		AT	

MUD TYPES
SEAWATER/GEL/LIGNOSULF TO 1662M
FRESHWATER/GEL/POLYMER TO 3900M
TO

LITHOLOGY SYMBOLS
LIMESTONE, DOLOMITE, ANHYDRITE AND GYPSUM, HALITE, COAL AND LIGNITE, CLAY, SHALE, SILT AND SILTSTONE, SILTY SANDSTONE, SAND AND SANDSTONE, CONGLOMERATE, CHERT, IGNEOUS UNDIFFERENTIATED

EXLOG SUITE
FORMATION EVALUATION LOG ■ WIRELINE DATA PRESSURE LOG ■
PRESSURE EVALUATION LOG ■ TEMPERATURE DATA LOG ■
DRILLING DATA PRESSURE LOG ■ GEMDAS COMPUTER LOGS ■

ABBREVIATIONS

NB	NEW BIT	SVG	SURVEY GAS
RRB	RERUN BIT	C	CARBIDE TEST
CB	CORE BIT	W	MUD DENSITY PPG
WOB	WEIGHT ON BIT	V	FUNNEL VISCOSITY
RPM	REVS PER MINUTE	F	FILTRATE– API
FLC	FLOW CHECK	FC	FILTER CAKE
CR	CIRCULATE RETURNS	PV	PLASTIC VISCOSITY
PR	POOR RETURNS	YP	YIELD POINT
NR	NO RETURNS	SOL	SOLIDS — %
LAT	LOGGED AFTER TRIP	SD	SAND — %
BG	BACKGROUND GAS	S	SALINITY — PPM Cl
TG	TRIP GAS	RM	MUD RESISTIVITY
STG	SHORT TRIP GAS	RMF	FILTRATE RESISTIVITY
CG	CONNECTION GAS		
SWG	SWAB GAS		

CASING SEAT — WIRELINE LOG RUN
CORED INTERVAL — TEST INTERVAL
NO RECOVERY — WIRELINE TEST
SIDEWALL CORE

GAS — 100 Total gas units is equivalent to 2% methane in air
OIL — Based on live oil in unwashed cuttings and percentage staining of washed cuttings

PRESSURE EVALUATION LOG

DEPTH AND DRILLING DATA
ESTIMATED FORMATION BALANCE GRADIENT + ESTIMATED NORMAL FORMATION BALANCE GRADIENT
MUD DENSITY OUT (●) EQUIVALENT CIRCULATING DENSITY (ECD) (○)
FORMATION FRACTURE PRESSURE GRADIENT ESTIMATED □ LEAK-OFF TEST ■
ESTIMATED OVERBURDEN PRESSURE GRADIENT (▲)

PPG

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600 3700 3800 3900 4000 4100

5 cm

ENCLOSURE 6 OR-0323 320279

Schlumberger

PERTH COMPUTING CENTRE

SEISMIC CALIBRATION LOG

(Adjusted Continuous Velocity Log)

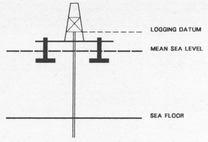
CONFIDENTIAL CLASS 1

Company:	AMOCO AUSTRALIA PETROLEUM CO.		
Well:	TILANA #1		
Field:	WILDCAT		
Country:	AUSTRALIA		
Reference No:	540415	Interval:	0.00 to 3900.00
Date Logged:	30/10/85	Date Processed:	13/11/85
Location:	039 53' 36.96S		145 58' 42.2" E
Elevations:	KB: 22.3 M	DF: 22.0 M	GL: -79.9 M
Permanent Datum:	MSL	Depth Units:	METRES

FIELD RECORDING:	Engineer:	R. WINSLOE	Location:	VEA	Program Version:	26.4 85/02/09
COMPUTATION:	Analyst:	M. SANDERS	Centre:	ASJ	Baseline:	12.4

ELEVATION ABOVE MEAN SEA LEVEL

Logging Datum:	22.3 M
Seismic Reference Datum:	MSL
Sea Floor	-79.9 M



Total No. of Check Levels:	31 (from 700 to 3300 m below KB)
Velocity Log Depth Reference:	SRD
Velocity Log Time Reference:	SRD

Run	Date	Tool Type		Bit Size/ Depth	Casing Size/ Depth	Top Depth	Bottom Depth
1	14/09/85	SLS		17 1/2" @ 1661 M	20" @ 413 M	413 M	1661 M
2	09/10/85	SLS		12 1/4" @ 3066 M	13 3/8" @ 1661 M	1661 M	3070 M
3	29/10/85	SLS		12 1/4" @ 3900 M	13 3/8" @ 1661 M	2850 M	3900 M

WST Run	Date	Gun Offset	Accel. Offset	Gun Elevation	Accelerometer Elevation	Gun Azimuth	Accel. Azimuth
1	11/10/85	46.5 M	46.5 M	3.86 M below MSL	3.86 M below MSL	85°	85°
2	30/10/85	46.5M	46.5M	3.86 M below MSL	3.86 M below MSL	85°	85°

REMARKS

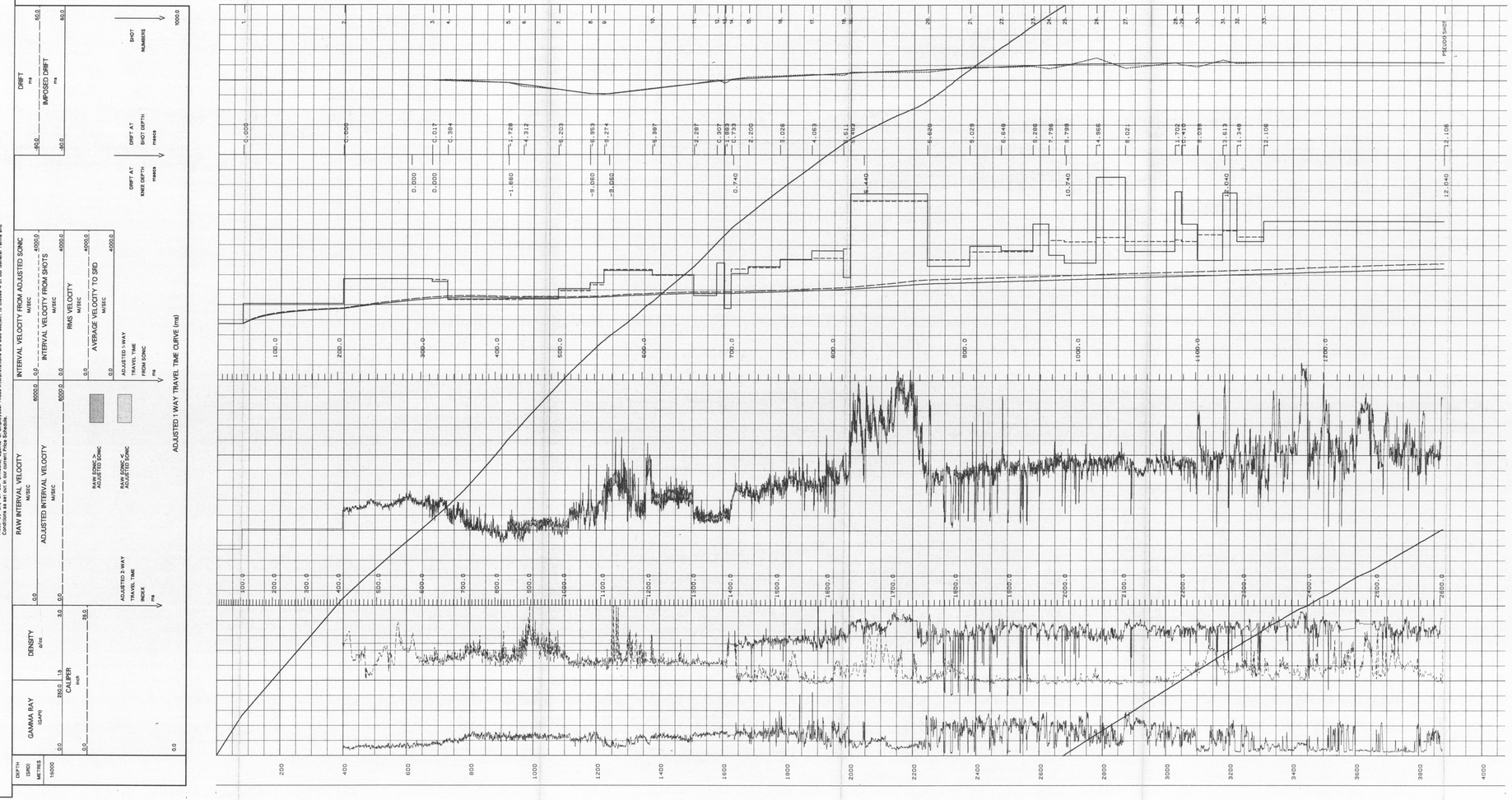
Sonic log interval 420 - 3900 metres below KB
Density log interval 1660 - 3900metres below KB
Bottom shot @ 3300 M below KB, drift extrapolated to TD
Imposed shot at sea floor and top of sonic

5 cm

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretations made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.



COMPANY AMOCO AUSTRALIA PETROLEUM CO.
FIELD WILDCAT
WELL TILANA #1
COUNTRY AUSTRALIA

Schlumberger

DOCUMENT 7 GR 0367

230550

Schlumberger

PETRO COMPUTING CENTRE

GEOGRAM*

MINIMUM PHASE

(Synthetic Seismogram)

* A TRADE MARK OF SCHLUMBERGER

Company	AMOCO AUSTRALIA PETROLEUM CO.
Well	TILANA #1
Field	WILDCAT
Country	AUSTRALIA
Permanent Datum	MSL
Elevation	KB 23.3 M
Log Measured From	KB 23.3 M
Drilling Measured From	KB
Location	039 57 39.56S
Date Logged	30/10/85
Run No.	ONE
Depth Logged	3010.0M
Date Processed	13/11/85
	DF 23.0 M
	GL -789.8 M
	146 58' 42.7" E
	Depth Units METRES

CONFIDENTIAL CLASS 1

ECHO INFORMATION

Seismic Type	Marine	Source	Airgun
Energy Point	4 meters	Location	Aft. Port Quarter
Energy Datum	ELEVATION ABOVE MEAN SEA LEVEL		
Energy Depth	22.3 M		
Sea Floor	-789.8 M		
Sonic Calibration by Check Shots	YES	Sonic Edited By Petrom	YES
Two-Way Time Sample Interval	2 ms	Environment	offshore
Time Variant Drift Corrections Applied			
Maximum Time Deviation Drift Curve	NO		

No.	Date	Log Run	Log Interval	Top	Bottom
1	30/10/85	ONE	3010' @ 600 M	3010 M	600 M
2	29/10/85	ONE	10100' @ 3080 M	3080 M	3010 M
3	28/10/85	ONE	12100' @ 3690 M	3690 M	3080 M

No.	Type	Size	Depth	Fluid Density
1	10/28/85	8.5	3690 M	1.04
2	29/10/85	8.5	3080 M	1.04
3	30/10/85	8.5	3010 M	1.04

No.	Type	Size	Depth	Fluid Density
1	10/28/85	4500	3690 M	1.04
2	10/29/85	4500	3080 M	1.04
3	30/10/85	4500	3010 M	1.04

No.	Type	Size	Depth	Fluid Density
1	10/28/85	3.50 M 9.5#/FT	3690 M	1.04
2	10/29/85	3.50 M 9.5#/FT	3080 M	1.04
3	30/10/85	3.50 M 9.5#/FT	3010 M	1.04

No.	Type	Size	Depth	Fluid Density
1	10/28/85	3.50 M 9.5#/FT	3690 M	1.04
2	10/29/85	3.50 M 9.5#/FT	3080 M	1.04
3	30/10/85	3.50 M 9.5#/FT	3010 M	1.04

Transducer	Type	Depth	Recorder
Source	40 M	600 M	600 M
Streamer	40 M	600 M	600 M

GEOGRAM MODEL - CALCULATIONS

Read one data model of horizontal plane layers.
No lateral simulation.

POLARITY

An angstrom wave, reflected by an increase in acoustic impedance with depth, is displayed as a wiggle trough (negative number).

SIGNATURES

All signatures displayed in the Geogram results correspond to a wavelet processed with earth-attenuation coefficient of 0.0 (A laminated or sonoboric formation with depth).

Scale for proof at A3 : 3000 metres/plane 6"
Density log source: 3000 metres/plane 6"
Time Scale = 375 in/sec

1 cm

The well name, location and borehole reference data were furnished by the customer.

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretations made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.

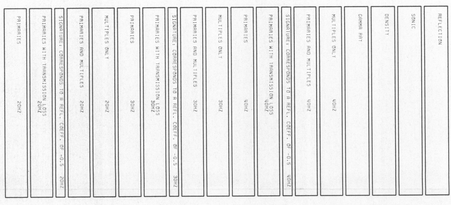
FOLD HERE

CLIENT : AMOCO AUSTRALIA PETROLEUM CO.
FIELD : WILDCAT
WELL : TILANA #1

GR▸ RHOB▸ DTM▸ REFL▸

GEOGRAM FROM WST
RICKER WAVELETS
MINIMUM PHASE
NORMAL POLARITY

TILANA #1

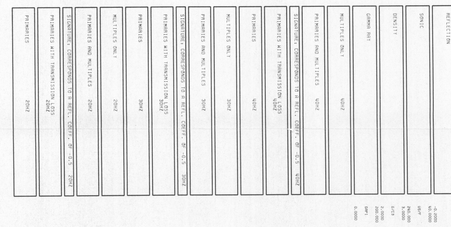


CLIENT : AMOCO AUSTRALIA PETROLEUM CO.
FIELD : WILDCAT
WELL : TILANA #1

GR▸ RHOB▸ DTM▸ REFL▸

GEOGRAM FROM WST
RICKER WAVELETS
MINIMUM PHASE
REVERSE POLARITY

TILANA #1



Schlumberger

COMPANY	AMOCO AUSTRALIA PETROLEUM CO.
FIELD	WILDCAT
WELL	TILANA #1
COUNTRY	AUSTRALIA

5 cm

ENCLOSURE # GR-0004

Schlumberger

PERTH COMPUTING CENTRE

GEOGRAM*

ZERO PHASE

(Synthetic Seismogram)

* A mark of Schlumberger

CONFIDENTIAL CLASS 1

Company	AMOCO AUSTRALIA PETROLEUM CO.				
Well	TILANA #1				
Field	WILDCAT				
County	OFFSHORE				
State	AUSTRALIA				
Reference No.	54435				
Date Logged	30/05/89	Date Processed	13/07/89		
Odex Logged	3070	Interval	0.00 to 3900.00		
Location	038 53' 39.96S		145 58' 43.2" E		
Elevations:	KB 23.3 M	DF 23.0 M	GL -79.8 M		
Permanent Datum	MSL	Depth Units	METRES		

LOG INFORMATION

Run No.	Top Log Interval	Bottom Log Interval	Scale	Tension	Speed	Density	Neutron	Gamma Ray	Resistivity	Sonic	Caliper	Other
1	1429.00 M	3900.00 M	1:500									
2	1429.00 M	3900.00 M	1:200									
3	1429.00 M	3900.00 M	1:500									
4	1429.00 M	3900.00 M	1:200									

Depth Ref.	Type	Depth	Elevation
Kelly Bushing	Permanent Datum	0.00 M	0.00 M
Drill Floor	Log Measured From	23.0 M	23.0 M
Ground Level	Drilling Measured From	-79.8 M	-79.8 M

Run No.	Bit Size	Casing Size	Casing Depth	Fluid Type	Density	Viscosity	Fluid Loss	Source of Sample	Rm @ Temp	Rmf @ Temp	Rmc @ Temp	Source Rmf / Rmc	Rm @ BHT
1	12.250 IN	9.625 IN	1429.00 M	SEAWATER	1.03 SG	0.00 CP	0.00 CC		0.000 @ 0.00 °C	0.000 @ 0.00 °C	0.000 @ 0.00 °C		0.000 @ 0.00 °C
2	8.500 IN	7.000 IN	3900.00 M	SEAWATER	1.03 SG	0.00 CP	0.00 CC		0.000 @ 0.00 °C	0.000 @ 0.00 °C	0.000 @ 0.00 °C		0.000 @ 0.00 °C

GEOGRAM MODEL DESCRIPTIONS

Sonic Transit Time	189.0 µs
Density	2.35 g/cc
Porosity	0.0 %
Lithology	Limestone
Pore Fluid	Water
Shale Correction	None

Sonic Log Interval 4120 - 3900 metres below KB
Density log interval 4000 - 3900 metres below KB
Time Scale = 375 mm/sec

REMARKS

Sonic Log Environmental Corrections Applied
Mnemonic Prior To Correction: DT
Mnemonic After Correction: DTCO

Time Vertical Depth Conversion Applied	NO
Mnemonic Prior To Conversion	
Mnemonic After Conversion	

Sonic Edited By Analyst	YES
Sonic Edited By Checkshots	YES
Environment	offshore

Two Way Time Sample Interval 2 ms

Sonic Calibration By Check Shots

Sea Floor -79.8 M

Sonic Logging Tool Type(s) SDT

Sonic Logging Tool Serial Number(s) 1021

Sonic Logging Tool Eccentralized YES

Sonic Logging Tool Pad Offset(s) 0.0 IN

Sonic Logging Tool Pad Azimuth(s) 0.0 DEG

ELEVATION ABOVE MEAN SEA LEVEL

Permanent Datum MSL

Elevation of Permanent Datum 0.0 M

Log Measured From KB 23.3 M Above Permanent Datum

Drilling Measured From DF 23.0 M Above Permanent Datum

Ground Level GL -79.8 M Above Permanent Datum

POLARITY

An increase in acoustic impedance (e.g., an increase in density with depth) is displayed as a white trough under normal polarity.

SIGNATURES

All signatures displayed in the Geogram results correspond to a wavelet with a zero phase spectrum (wavelet of -0.5 X Ricker + 1 X Ricker).

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretations made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.

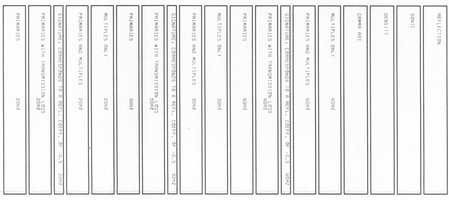
320531

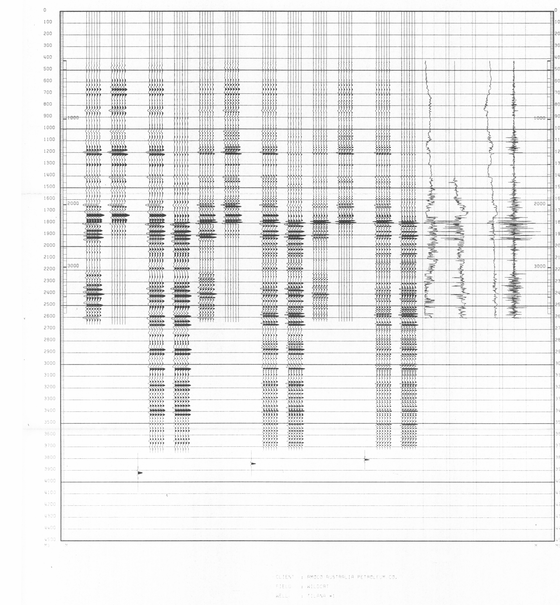
CLIENT : AMOCO AUSTRALIA PETROLEUM CO.
FIELD : WILDCAT
WELL : TILANA #1

DEV.-325.00/4 SPRK-325.00/4 ——— SHAL-325.00/4 SHUS-325.00/4 DEEP-325.00/4 SPRK-325.00/4 ——— SHAL-325.00/4 SHUS-325.00/4 DEEP-325.00/4 SPRK-325.00/4 ——— SHAL-325.00/4 SHUS-325.00/4 DR ▸ RHST ▸ DITH ▸ REFL ▸

GEOGRAM FROM WST
RICKER WAVELETS
ZERO PHASE
NORMAL POLARITY

TILANA #1

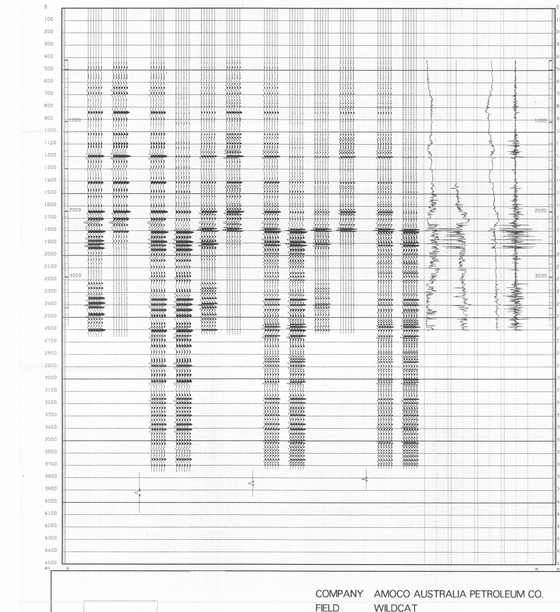




GEOGRAM FROM WST
RICKER WAVELETS
ZERO PHASE
REVERSE POLARITY

TILANA #1





Schlumberger

COMPANY AMOCO AUSTRALIA PETROLEUM CO.
FIELD WILDCAT
WELL TILANA #1
COUNTRY AUSTRALIA

Schlumberger
Private

Company		Well	
Field		Location	
County		State	
Country		Service Order	
Permanent Datum		Elevation	
Log Measured From		Above Permanent Datum	
Drilling Measured From			

DUAL WATER GLOBAL

TOOL NAME

TOOL DESCRIPTION

Run Number		Date	
Depth Driller		Depth Logger	
Bottom Logged Interval		Top Logged Interval	
Type Fluid in Hole		Salinity, PPM Cl	
Density		Viscosity	
Fluid Loss		Sample Source	
Resistivity		Temperature	
Resistivity		Temperature	
Resistivity		Temperature	
Source of Sample			
Rm @ Measured Temp			
Rmf @ Measured Temp			
Rmc @ Measured Temp			
Source of Rmf and Rmc			
Rm @ BHT			
Time Since Circulation			
Time Since Circulation			
Max. Rec. Temp.			
Equipment Number			
Location			
Recorded By			
Witnessed By			

THE USE, DISCLOSURE, REPRODUCTION OR TRANSFER OF THIS DOCUMENT AND ANY INFORMATION CONTAINED HEREIN IS SUBJECT TO THE TERMS AND CONDITIONS OF THE AGREEMENT OR OTHER BUSINESS ARRANGEMENT UNDER WHICH IT WAS DELIVERED. ACCEPTANCE OF THIS DOCUMENT AND ANY INFORMATION CONTAINED HEREIN CONSTITUTES ACKNOWLEDGMENT AND AGREEMENT TO THE FOREGOING TERMS AND CONDITIONS.

Run Number		Date	
Depth Driller		Depth Logger	
Bottom Logged Interval		Top Logged Interval	
Type Fluid in Hole		Salinity, PPM Cl	
Density		Viscosity	
Fluid Loss		Sample Source	
Resistivity		Temperature	
Resistivity		Temperature	
Resistivity		Temperature	
Source of Sample			
Rm @ Measured Temp			
Rmf @ Measured Temp			
Rmc @ Measured Temp			
Source of Rmf and Rmc			
Rm @ BHT			
Time Since Circulation			
Time Since Circulation			
Max. Rec. Temp.			
Equipment Number			
Location			
Recorded By			
Witnessed By			

Notes:

Water Salinity

Run Number											
Date											
Depth Driller											
Depth Logger											
Bottom Logged Interval											
Top Logged Interval											
Type Fluid in Hole											
Salinity, PPM Cl											
Density											
Viscosity											
Fluid Loss											
Sample Source											
Resistivity											
Temperature											
Resistivity											
Temperature											
Resistivity											
Temperature											
Source of Sample											
Rm @ Measured Temp											
Rmf @ Measured Temp											
Rmc @ Measured Temp											
Source of Rmf and Rmc											
Rm @ BHT											
Time Since Circulation											
Time Since Circulation											
Max. Rec. Temp.											
Equipment Number											
Location											
Recorded By											
Witnessed By							

DUAL WATER* GLOBAL

Schlumberger

COMPUTER PROCESSED INTERPRETATION

Company: Texaco Exploration and Production Inc.
Well: TEXACO ET AL KWADE CONTINUOUS PETROLEUM CO.
Field: KWADE
County: TEXAS
State: TEXAS
Location: 37°14'00"N 100°00'00"W
Permanent Datum: KB
Elevation: 3124 ft
Log Measured From: KB
Drilling Measured From: KB
Elevation: KB 3124 ft GL 3112 ft
API Serial No.: 42-421-31-0000
Run Number: ONE
Depth Driller: 3600.00
Depth Logger: 3601.00
Bottom Logged Interval: 3600.00
Top Logged Interval: 3100.00
Casing Driller: 8.625 @ 3100.00
Casing Logger: 3100.00
Bit Size: 7.875
Type Fluid in Hole: WATER
Density: 8.4
Viscosity: 28
pH: 7.0
Fluid Loss: 0
Source of Sample: FLOWLINE
Rm @ Meas. Temp: 0.2 @ 70
Rmf @ Meas. Temp: 0.2 @ 70
Rmc @ Meas. Temp: 0.2 @ 70
Source of Rmf / Rmc: MEASURED / CALCULATED
Rm @ BHT: 0.2 @ 70
Time Since Circulation: 24 HRS
Time on Bottom: 0600
Max. Recorded Temp.: 70
Equipment Number: 1
Location: 1 MI NE OF KUTZ
Recorded By: J. SMITH
Witnessed By: MR. JONES

CONFIDENTIAL
CLASS 1

FIELD NOTE: The well name, location and borehole reference data were furnished by the customer.

DISCLAIMER: All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our General Terms and Conditions set out in our current Price Schedule.

RIG NO.	Engineer: A.KOOP	Logged Interval: 3100-3600'	CASING DEPTH
DRILLING CONTR.	Position: A.CHELUNDA	Witness: Mr. Jones	Log

BOR MEASUREMENTS

R_m @ BHT @ 3600.0 | R_{mf} @ 70 | R_{mc} @ 70 | MFT @ 70 | 1537.0000 Z | Rt Dist @ 70 | SLM

Remarks
Interval 1 in the Kinzarka Valuesa.
and
Interval 2 in the Kinzarka Valuesa.

3 in

1D CBIH Computation Parameters: DK-1SH1100

Bottom	Top	R_w	T_{wb}	R_{wb}	T_w	SAL_w	$1/F_w$	$1/F_{wb}$
3600.00	3100.00	.09	100.00	.10	70	76.56	.80	169.00
3100.00	3085.00	.10	93.00	.10	70	76.56	.80	169.00

1B CBIH Computation Parameters: SAND

Bottom	Top	BHV_{sd}	R_{sd}	T_{sd}	T_{wsd}	T_{msd}	GR_{sd}	T_{hc}	K_{sd}	TP_{sd}
3600.00	3085.00	2.64	1.63	91.20	4.78	30.00				

1D CBIH Computation Parameters: Mineral 1

Bottom	Top	BHO_1	N	Δt_1	U	GR	T_{h1}	K	TP
3600.00	3085.00	2.90	15.00	40.00	15.00	50.00			

1E CBIH Computation Parameters: Mineral 2

Bottom	Top	BHO_2	N	Δt_2	U	GR	T_{h2}	K	TP
3600.00	3085.00	2.65	30.00	60.00	9.00	15.00			

1D CBIH Computation Parameters: CLAY

Bottom	Top	BHO_{cl}	R_{cl}	Δt_{cl}	U_{cl}	GR	T_{hcl}	K_{cl}	EA_{cl}	TP_{cl}
3600.00	3118.00	2.60	36.00	90.00	8.70	140.00				
3118.00	3085.00	2.60	36.00	90.00	8.70	150.00				

Depth: MET/M 1200

Formation Characteristics

Hydrocarbon Analysis

Porosity Photo Analysis

Formation Analysis for Volume

Matrix

Differential Caliper

Caliper - BS (Inch)

Caliper - BS (Inch)

CLASS 1 CHECKED ENTRY

CSU 1483 kg

CONFIDENTIAL CLASS 1

THIS INFORMATION IS FURNISHED IN CONFIDENCE AND SUBJECT TO THE TERMS AND CONDITIONS OF AGREEMENT BETWEEN THE OPERATOR AND THE COMPANY TO WHOM IT IS FURNISHED. NEITHER IT NOR ANY COPY OF IT MAY BE DISCLOSED TO ANY PERSON NOT AUTHORIZED BY THE OPERATOR OR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SUPPLIED. NEITHER THE OPERATOR NOR THE COMPANY GUARANTEES THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION, AND NEITHER THE OPERATOR NOR THE COMPANY SHALL BE LIABLE FOR ANY LOSS OR DAMAGE SUFFERED BY THE USER OF THE INTERPRETATIONS OR INTERPRETATIONS MADE BY ANY OF ITS OFFICERS, AGENTS OR EMPLOYEES. THESE TERMS AND CONDITIONS MAY BE MODIFIED OR AMENDED BY AGREEMENT IN WRITING.

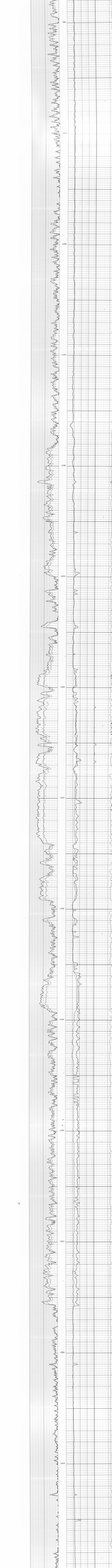
LIS dlis 4

Created 2020/07/08 10:28

CONFIDENTIAL CLASS 1

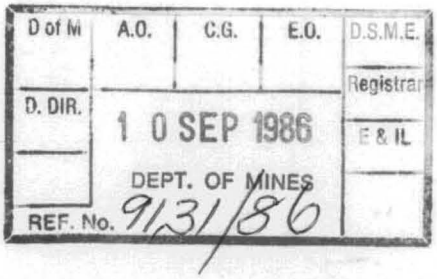
NAME VALUE	UNIT	DEPTH / X	NAME VALUE	UNIT	DEPTH / X
START TOOL	DEGF	0.0000	GDEV	DEGF	0.0000
END TOOL	DEGF	0.0000	GDEV	DEGF	0.0000

FL-CHAN		FL-CHAN	
FL-MAP-SLICE	0.0000	FL-CHAN	0.0000
FL-MAP	0.0000	FL-CHAN	0.0000



320285

CONFIDENTIAL
CLASS 1



FINAL WELL REPORT

TILANA NO 1

MARCH 1986

W. C. COWAN

C. D. CORNELL

R. J. WALLA

J. G. RANKIN

T. L. MOSNESS

320286

I N D E X

		PAGE
I	Summary Section	
	- Final Well Report Data Sheet	1
II	Introduction	2
III	Summary Section	
	- Operations by Intervals	3
	- Well Cost Summary Sheet	5
IV	Discussion	
	- Summary of Daily Drilling Reports	6
	- Casing and Cementing Report	19
	- Pipe Tally Records	23
	- Mud Summary	28
	- Bit Records	52
	- Bottom Hole Assemblies	54
	- Directional Surveys	55
	- Well Location Map	62
	- Time Distribution	63
	- Contractors Lost Time	66
	- Form 46 - Drilling and Completion Program	69
	- Form 850 - Well or Platform Authorization	70
	- Plug and Abandon Data	71
	- Workboat Performance Evaluation	72
	- Amoco Storage Areas	75
	- Contractors	76
	- Anchor Pattern	78

I

DATA SHEET

COUNTRY	:	Bass Strait, Australia
WELL NAME	:	Tilana No. 1
LOCATION	:	Lat. 39 Deg 53' 39.7346" South Long. 145 Deg 58' 41.969" East
SP LOCATION	:	SP5199 along seismic line B71-A-50
WATER DEPTH	:	Approximately 81.7 m (268 ft)
ROTARY KELLY BUSHING	:	Approximately 22.5 m (74 ft) above MSL
TOTAL DEPTH	:	3900.3 m (12,796 ft) RKB
DRILLING CONTRACTOR/RIG	:	Diamond M Exploration Company/Diamond M Epoch (Semisubmersible)
ARRIVE ON LOCATION	:	3 September 1985 at 0830 hours
SPUD DATE	:	5 September 1985 at 2030 hours
RIG RELEASE DATE	:	25 November 1985 at 0900 hours
DAYS ON WELL	:	83 days
TOTAL WELL COST	:	US$10.79 MM (Estimated)
STATUS OF WELL	:	Permanently Plug and Abandon
WELLHEAD SYSTEM	:	Cameron 18-3/8" WS-I, 10,000 psi
CASING SETTING DEPTHS	:	30" - 203.3 m (667 ft) RKB 20" - 412.4 m (1,353 ft) RKB 13-3/8" - 1652.0 m (5,420 ft) RKB 9-5/8" - 3311.7 m (10,865 ft) RKB

320288

II INTRODUCTION

Tilana No 1, an Exploratory Well drilled in the T/14P Permit Area of the Bass Strait of Australia, was drilled to evaluate the geologic possibilities of a 1.9 MM acre permit area. The subject well was drilled at SP 5199 along seismic line B71-A-50.

The primary objective of this well was to evaluate the early Eocene horizons expected to be encountered below 1750 m (5741 ft) RKB.

Secondarily, the Tilana No 1 was to evaluate geologic development of the Eastern View Coal Measures group.

The Eastern View Coal Measures group was encountered at 2300.7 m (7548 ft) RKB. Drilling continued to a total depth of 3900.3 m (12,796 ft).

Tilana No 1 was spudded on 5 September 1985 and required 53 days to reach total depth. 83 operational days were required to drill, evaluate, test and abandon. The total gross estimated cost incurred was US$10.79 MM.

III OPERATIONS BY INTERVALS

36" HOLE AND 30" CASING

Tilana No 1 was spudded September 5, 1985, at 2030 hours. The 36" hole was drilled in 4-1/2 hours to 208.8 m (685 ft) RKB, without incident. Seawater was used as the drilling fluid, and cuttings were circulated to the ocean floor.

A total of 100.9 m (331 ft) of 30" x 1" wall casing was run and cemented with 2000 sxs 'G' cement with 1% CaCl2. The 30" shoe was set at 203.3 m (667 ft) RKB.

The 30" casing shoe was drilled out at 0930 hours, 7 September 1985.

26" HOLE AND 20" CASING

The 30" casing was drilled out using a 26" drilling assembly. Drilling continued to a TD of 416 m (1365 ft) RKB using seawater and hi-vis sweeps. A total of 310.9 m (1020 ft) of 133 ppf, 20" casing was run along with the Cameron WS-I 18-3/4", 10,000 psi wellhead.

The casing was cemented at 412.4 m (1353 ft) with 1500 sxs 'G' cement extended with 2.5% Gel at 12.8 ppg and tailed in by 500 sxs 'G' neat cement. The BOP and riser were then run and landed.

The 20" CSG shoe was drilled out at 1830 hours, 9 September 1985.

17-1/2" (12-1/4" PILOT HOLE) HOLE AND 13-3/8" CASING

Upon drilling out the 20" casing with a 17-1/2" bit an FCCT was conducted to 15.3 ppg. The 17-1/2" bit was replaced with a 12-1/4" bit, and the pilot hole was drilled using a seawater/prehydrated gel mud system to 1661.8 m (5452 ft) RKB.

Logs were run and a 17-1/2" drilling assembly was used to open the hole to 1661.8 m (5452 ft) RKB. A total of 11 jnts of 72 ppf and 121 jnts of 68 ppf 13-3/8" casing was run and landed with the shoe at 1652.0 m (5420 ft) RKB. The casing was cemented with 1167 sxs 'G' extended cement and 500 sxs 'G' neat cement and additives.

The cement was never fully displaced due to both top and bottom SSR plugs releasing ahead of the lead slurry. The casing was drilled out, circulation established through an EZSV, and an inner-string cement job performed with 1589 sxs 'G' extended cement and 513 sxs 'G' neat cement. The slurry was displaced and normal drilling operations continued.

The 13-3/8" casing shoe (EZSV) was drilled out at 1730 hours, 22 September 1985, (17 DFS).

12-1/4" HOLE SECTION AND 9-5/8" CASING

The 13-3/8" EZSV, was drilled out and an FCCT of 14.6 ppg was obtained. Drilling continued using a freshwater gel mud system to a TD of 3900.3 m (12,796 ft) RKB. A total of 3 cores were cut at 1663.6 m - 1682.2 m (5458 ft - 5519 ft), 2788.6 m - 2807.2 m (9149 ft - 9210 ft), and 3746.6 m - 3752.1 m (12,292 ft - 12,310 ft). Logs were run at 3066.0 m (10,059 ft) and at TD.

Final TD was reached at 0230 hours 28 October 1985. The 12-1/4" hole interval required 31 days to complete.

Logging operations were completed on 31 October 1985.

Tilana No 1 was subsequently plugged back to 3314.7 m (10,875 ft) and 9-5/8" casing run and cemented. A total of 268 joints of 47 ppf N-80 casing was run. The well was cemented with 630 sxs of extended 'G' lead slurry and 1500 sxs of neat 'G' cement with 35% silica flour.

Drilling operations concluded on 5 November 1985. The 12-1/4" hole/9-5/8" casing interval required 39 days to complete.

The casing was cleaned out to 3236.4 m (10,618 ft) RKB and readied for testing operations. A total of 2 zones were tested. Testing operations concluded 22 November 1985. The well was permanently plugged and abandoned. Operations for Tilana No 1 concluded at 0900 hours 25 November 1985. The total gross well cost is estimated to be US$10.79 MM.

EST WELL COST-US DOL.
WELL: TILANA #1
ATD: 3900M (12,796')

		ITEM TOTAL
1	Rig	4,209,302
2	Work Boats	962,299
3	Standby Boat	199,412
4	Helicopter Base Charge	398,965
5	E-Log Base Charge	432,547
6	Mud Logging Base Charge	130,425
7	Mud Laboratory	8,303
8	Solids Equipment	39,435
9	DST - Otis	86,176
10	DST - Halliburton	11,125
11	Diving	201,035
12	Rental Tools	291,620
13	Mud Engineer	25,155
14	Mud Consultant	22,931
15	Cementer & Pressure testing	43,586
16	Weather Forecast	12,784
17	Communications	17,020
18	Well Site Supervision	139,597
19	Wharfage, Labour & Assoc.	153,079
20	Directional Surveys	6,027
21	Rig Mob/Demob	0
22	Misc Mob/Demob	190,600
23	Location Survey	119,122
24	Rig Positioning Survey	83,758
25	Helicopter Hourly Charges	76,379
26	E-Log Services	698,268
27	DST Services	265,013
28	Rig Fuel	328,819
29	Heli Fuel	22,049
30	Work Boat Fuel	67,552
31	Drill Water	3,000
32	Bits	151,500
33	Mud Material	191,228
34	Cement & Additives	108,698
35	Cementing Services	29,303
36	Misc. Services	48,616
37	Casing Accessories	30,543
38	Miscellaneous	414,479
	TOTAL INTANGIBLES	10,219,750
	TANGIBLES	
39	Wellhead	183,536
40	Casing	387,659
	TOTAL TANGIBLES	571,195
	EST TOTAL WELL COST	10,790,945

320292

DISCUSSION

VI SUMMARY OF DAILY DRILLING REPORTS

DAY	SEPTEMBER	OPERATION
0	4	Arrive on location and commence anchoring operations.
0	5	Finish anchoring and pretensioning operations. Start ballasting rig down to drilling depth.
1	6	Finish ballasting down to 16.8 m (55 ft) drilling draft. Rotary bushing elevation above seabed is 104.2 m (342 ft). Position rig with two final position with anchors. Final position Lat - 39 Deg 53' 36.7346" S Long. 145 Deg 58' 41.969" E. Pick up 12 jts 5" DP and run TGB. TGB settled 4"-6", release the TGB. Observed slope indicator at 3/4 Deg. Make up spud BHA and TIH. Drill 36" hole to 208.8 m (685 ft). Circulate and sweep hole with a 60 BBL high viscosity pill. Drop survey and make a wiper trip. No fill. Survey 208.8 m (685 ft) - 3/4 Deg.
2	7	POOH with the drill string. Position the PGB on the spider beams. Rig up and run 100.9 m (331.18 ft) of 30" - 1" wall casing. Make up the 30" running tool in 30" housing and land in the PGB. Back out the running tool and run 91.4 m (300 ft) of cement inner string. Make up running tool in housing. Run and set PGB in TGB. Rig up Howco. Test cement lines and cement with 2000 sacks of class 'G' + 1% CaCl2 mixed at 15.8 ppg at 1.15 cuft/sx with 238 bbls of seawater. Float held OK, WOC 1 hour. Back out running tool. POOH, and wash 20" housing and PGB. POOH and lay down running tool. WOC. Make up 26" BHA and TIH. Tagged cement at 199 m (653 ft).
3	8	Drill 26" from 208.8 m - 416 m (685 ft - 1365 ft). Surveys: 276.2 m (906 ft) - 0 Deg, 416.1 m (1365 ft) - 1/2 Deg. Circulate and sweep hole with a 60 bbl. High viscosity pill. Wiper trip had no fill. Spot 500 bbl of mud and POOH for 20". Run 20" casing.(3 joints)

DAY	SEPTEMBER	OPERATION
4	9	Finish running 20" casing. Ran a total of 23 jts of 20", 133#, Grade 'B' casing + 1 shoe joint + 1 X/O jt + 18-3/4" wellhead housing for a total of 310.9 m - 406.3 m (1020 ft - 1333 ft). Make up cementing inner string TD 12.2 m (40 ft) from cement shoe. Make up wellhead running tool and TIH. Land 18-3/4" wellhead in the 30" housing, pull 20000 lb. over pull. Rig up Howco and test lines to 3500 psi. Cement lead w/ 1500 sacks class 'G' + 2.5% Gel (Prehydrated) at 12.8 ppg at 1.94 cuft/sx. Tail w/ 500 sacks Class 'G' neat at 15.8 ppg at 1.15 cuft/sx. Cement in place at 1300 hours. Floats held OK. Back out running tool and POOH. Wash out wellhead and PGB. Pick up riser equipment and run BOP. Testing choke and kill lines to 5000 psi as riser was run. Land riser, close collet and over pull 50,000 lb. Hook up choke and kill goosenecks, riser tensioners, diverter, and diverter lines.
5	10	TIH with test plug. Test all components to 250 psi low and 5000 psi high, upper and lower annulars tested to 2500 psi - OK. Reset test plug with TIW valve below and tested shear rams to 250 psi and 7000 psi - OK. Tested kelly, kelly cock, floor valves and manifold. Set wear bushing. Make up 17-1/2" bit and TIH. Tagged cement at 392.3 m (1287 ft). Drill cement from 392.3 m - 411.2 m (1287 ft - 1349 ft). Circulate and test casing to 500 psi - OK. Drill shoe and cement to 413.3 m (1356 ft) and run CCCT to 500 psi leak off, EMW = 15.7 ppg. Drill cement, encountered void from 414.2 - 416.1 m (1359 ft - 1365 ft). Drill to 418.2 m (1372 ft) (2.1 m (7 ft) of new formation) and run FCCT. Leaked off at 475 psi for an EMW of 15.3. POOH for 12-1/4" bit, and jars. Drill 12-1/4" hole from 418.2 m - 465.7 m (1372 ft - 1528 ft). Rig repair for 2 hours.
6	11	Drill 12-1/4" hole from 465.7 m - 1098.2 m (1528 ft - 3603 ft). Surveys: 586.1 m (1923 ft) - 3/4 Deg, 734.3 m (2409 ft) - 1/2 Deg, 1043.6 m (3424 ft) - 1/2 Deg.

DAY	SEPTEMBER	OPERATION
7	12	Drill 12-1/4" hole from 1098.2 m - 1332.0 m (3603 ft - 4370 ft). Round trip to change bit. Wash and ream 987.9 m - 1123.5 m (3241 ft - 3686 ft), precautionary wash 18.3 m (60 ft) to bottom. Surveys: 1198.2 m (3931 ft) - 1/4Deg, 1292.4 m (4240 ft) - 1/4Deg.
8	13	Drill 12-1/4" hole from 1332.0 m - 1605.4 m (4370 ft - 5267 ft). Survey 1510.9 m (4957 ft) - 1/4 Deg. Lost partial returns from 1383.8 m - 1391.4 m (4540 ft - 4565 ft). Lost 300 bbls in 4 hours. Circulate samples at 1417.3 m (4650 ft).
9	14	Drill 12-1/4" hole from 1605.4 m - 1661.8 m (5267 ft - 5452 ft). Short trip to shoe, ream bridge from 1286.6 m - 1415.5 m (4221 ft - 4644 ft). RIH to bottom, 3 m (10 ft) fill. POOH, R/U Schlumberger, run ISF-SLS-GR-SP-CAL, R/D Schlumberger.
10	15	R/D Schlumberger, L/D drillpipe and BHA. RIH w/ 17-1/2" bit, open hole from 412.4 m - 983.6 m (1353 ft - 3227 ft).
11	16	Open 12-1/4" hole to 17-1/2" from 983.6 m - 1426.5 m (3227 ft - 4680 ft). Lost 65 bbls of mud in 10 hours.
12	17	Open 12-1/4" hole to 17-1/2" from 1426.5 m - 1661.8 m (4680 ft - 5452 ft). No further mud losses. Circulate and condition mud prior to 13-3/8" casing. Drop multishot and POOH. M/U and RIH with 17-1/2" bit for cleanout trip.
13	18	RIH, 1.5 m (5 ft) of soft fill. Circulate and condition hole. POOH. Retrieve wear bushing. R/U and run 11 jts of 13-3/8", 72 ppf, N-80, buttress casing. Run 121 jts of 13-3/8", 68 ppf, N-80, buttress casing. Shoe depth at 1652.0 m (5420 ft), float collar at 1627.7 m (5340 ft). Circulate prior to cementing.

DAY	SEPTEMBER	OPERATION
14	19	Circulate casing, perform FCCT to 11.1 ppg EMW. Repair cement unit recirculator. Mix and pump 1167 sxs Class 'G' cement at 1.94 cuft/sx, 12.8 ppg, 10.8 gal/sx freshwater w/ 0.5% CFR-2 and 2.5% BWOC pre-hydrated bentonite. Mix and pump 500 sxs Class 'G' tail slurry at 1.15 cuft/sx, 15.8 ppg and 3.5 gal/10 BBL HR-6L. Lead slurry was cut short 443 sxs due to slow (2 bpm) pump rate. Drop dart, did not seat in top plug, displace cement with rig pumps. Top and bottom wiper plug seated in float collar ahead of cement slurry. Back out running tool, POOH. RIH w/ 12-1/4" drilling assembly. Drill firm cement from 614.8 m - 1310.7 m (2017 ft - 4300 ft).
15	20	Drill cement from 1310.7 m - 1624.3 m (4300 ft - 5329 ft). Drill wiper plugs, float collar. Wash and tag shoe at 1651.4 m (5418 ft). Displace casing to mud, POOH. Well flowed 8 bbls, RIH to bottom and weight up to 9.0 ppg. POOH and SLM. P/U running tool, RIH. Couldn't circulate through shoe.
16	21	POOH w/ running tool. RIH and drill shoe. POOH. RIH w/ running tool, replace seals, RIH and circulate casing. POOH, L/D running tool. RIH w/ 13-3/8" EZSV on wireline and set at 1621.6 m (5320 ft). POOH. RIH w/ cement stinger assembly and sting into EZSV. Mix and pump 1589 sxs Class 'G' cement at 1.94 cuft/sx, 12.8 ppg and 2.5% BWOC pre-hydrated bentonite, 0.5% CFR-2, and 10.8 gal/sx freshwater. Tail in with 513 sxs Class 'G' cement at 1.15 cuft/sx, 15.8 ppg and 3.5 gal/10 bbl HR-6L and 5 gal/sx freshwater. Displace w/ cement unit. Final pump pressure 1300 psi. Unsting from EZSV. POOH 13 stands. Circulate down choke and kill lines to wash BOP and riser. Circulate hole clean of cement, 120 bbls of cement recovered.

320296

DAY	SEPTEMBER	OPERATION
17	22	POOH w/ stinger. L/D drill pipe. RIH and wash wellhead. POOH. RIH and set 13-3/8" seal assembly. Test to 5000 psi. Test BOP and manifold. POOH. Run 13-3/8" wear bushing. RIH w/ 12-1/4" drilling assembly. Tag cement at 1616.7 m (5304 ft). Drill cement from 1616.7 m - 1619.1 m (5304 ft - 5312 ft). Drill on EZSV at 1619.1 m (5312 ft). Displace hole to mud.
18	23	Drill on EZSV. Drill cement to 1652.6 m (5422 ft). Perform CCCT to 14.3 ppg, no leakoff. Drill to 1663.3 m (5457 ft). Perform FCCT of 14.6 ppg. Test taken to leakoff. POOH. P/U reverse circulating junk basket and RIH. Cut junk core from 1663.3 m - 1663.6 m (5457 ft - 5458 ft). POOH. Recover 3 lbs of EZSV junk. P/U core barrel and RIH.
19	24	RIH w/ core barrel. Cut core No. 1 from 1663.6 m - 1682.2 m (5458 ft - 5519 ft). POOH, recover core, L/D barrel. Recover 10.7 m/18.3 m (35 ft/60 ft), 58% recovery. P/U 12-1/4" drilling assembly and RIH. Open core hole from 1663.6 m - 1682.2 m (5458 ft - 5519 ft). Circulate samples, drill from 1682.2 m - 1793.8 m (5519 ft - 5885 ft).
20	25	Drill 12-1/4" hole and survey from 1793.8 m - 1926.4 m (5885 ft - 6320 ft). Circulate samples, and POOH. P/U monel collars and RIH. Drill from 1926.4 m - 1976.7 m (6320 ft - 6485 ft).
21	26	Drill 12-1/4" hole from 1976.7 m - 2001.9 m (6485 ft - 6568 ft). Circulate, drop survey, POOH. RIH w/ new bit, drill from 2001.9 m - 2058.3 m (6568 ft - 6753 ft).
22	27	Drill 12-1/4" hole from 2058.3 m - 2110.8 m (6753 ft - 6925 ft). Short trip to shoe, no drag, no fill. Drill from 2110.8 m - 2158.9 m (6925 ft - 7083 ft).

DAY	SEPTEMBER	OPERATION
23	28	Drill 12-1/4" hole and survey from 2158.9 m - 2186.4 m (7083 ft - 7173 ft). Circulate samples, POOH. RIH w/ new bit. Drill from 2186.4 m - 2206.5 m (7173 ft - 7239 ft).
24	29	Drill 12-1/4" hole from 2206.5 m - 2239.4 m (7239 ft - 7347 ft). Circulate samples. Drill from 2239.4 m - 2324.4 m (7347 ft - 7626 ft). Circulate samples and short trip. Max gas from coal stringers at 6.6%. No drag or fill.
25	30	Drill 12-1/4" hole from 2324.4 m - 2429.6 m (7626 ft - 7971 ft). Circulate samples, drop survey, POOH.
	OCTOBER	
26	1	POOH, retrieve wear bushing. RIH and test BOP and manifold. Run wear bushing. RIH w/ drilling assembly. No fill. Drill 12-1/4" hole from 2429.6 m - 2471.7 m (7971 ft - 8109 ft).
27	2	Drill 12-1/4" hole from 2471.7 m - 2566.4 m (8109 ft - 8420 ft).
28	3	Circulate samples w/ a high viscosity sweep, drop survey, POOH. RIH and drill 12-1/4" hole from 2566.4 m - 2616.1 m (8420 ft - 8583 ft).
29	4	Drill 12-1/4" hole from 2616.1 m - 2623.7 m (8583 ft - 8608 ft). Circulate samples. Drill from 2623.7 m - 2679.2 m (8608 ft - 8790 ft). Circulate samples. Drill from 2679.2 m - 2713.1 m (8790 ft - 8901 ft). Circulate and survey. Drill from 2713.1 m - 2726.5 m (8901 ft - 8945 ft).
30	5	Drill 12-1/4" hole from 2726.5 m - 2783.5 m (8945 ft - 9132 ft). Circulate samples. Drill from 2783.5 m - 2788.6 m (9132 ft - 9149 ft). Circulate samples. Drop survey and POOH. P/U 18.3 m (60 ft) core/barrel and RIH.
31	6	RIH w/ core barrel. Cut core No. 2 from 2788.6 m - 2807.2 m (9149 ft - 9210 ft). POOH. Recover core, service barrel, L/D barrel. RIH w/ drilling assembly. Ream core hole from 2788.6 m - 2807.2 m (9149 ft - 9210 ft). Drill 12-1/4" hole from 2807.2 m - 2834.7 m (9210 ft - 9300 ft). 100% core recovery, predominately sandstone, no shows.

320298

DAY	OCTOBER	OPERATION
32	7	Drill 12-1/4" hole from 2834.7 m - 2934.0 m (9300 ft - 9626 ft).
33	8	Drill 12-1/4" hole from 2934.0 m - 2964.2 m (9626 ft - 9725 ft). Circulate samples. Drill from 2964.2 m - 2990.7 m (9725 ft - 9812 ft). Circulate samples. Drill from 2990.7 m - 2991.9 m (9812 ft - 9816 ft).
34	9	Drill 12-1/4" hole from 2991.9 m - 3015.7 m (9816 ft - 9894 ft). Circulate samples. Drill from 3015.7 m - 3041.6 m (9894 ft - 9979 ft). Circulate samples. Drill from 3041.6 m - 3060.2 m (9979 ft - 10,040 ft).
35	10	Drill 12-1/4" hole from 3060.2 m - 3066.0 m (10,040 ft - 10,059 ft). Circulate samples and drop multi-shot, POOH to log. R/U wireline and run ISF/BHC/MSFL/GR/SP/CAL, LDL/CNL/GR, HDT.
36	11	Continue running HDT. R/D wireline, RIH for a wiper trip. POOH and R/U wireline, run WST.
37	12	Continue running WST. Run CST guns, R/D wireline. Test BOP. RIH and drill from 3066.0 m - 3077.0 m (10,059 ft - 10,095 ft).
38	13	Drill 12-1/4" hole from 3077.0 m - 3159.3 m (10,095 ft - 10,365 ft).
39	14	Drill 12-1/4" hole and circulate samples from 3159.3 m - 3227.9 m (10,365 ft - 10,590 ft). Survey at 3216.6 m (10,553 ft) - 3/4 Deg at S 10 E.
40	15	Drill 12-1/4" hole from 3227.9 m - 3293.4 m (10,590 ft - 10,805 ft).
41	16	Drill 12-1/4" hole from 3293.4 m - 3311.7 m (10,805 ft - 10,865 ft). Circulate samples and drop survey. POOH for bit change. RIH, ream tight spots at 2300.0 m - 2315.3 m (7546 ft - 7596 ft) and 2577.4 m - 2589.6 m (8456 ft - 8496 ft). Pipe stuck at 2743.2 m (9000 ft). Circulate and work pipe free. Back ream tight hole at 2743.2 m (9000 ft).

320299

DAY	OCTOBER	OPERATION
42	17	Circulate hi-vis pill, RIH and ream tight hole at 2798.1 m - 2813.3 m (9180 ft - 9230 ft), 2836.2 m - 2859.1 m (9305 ft - 9380 ft), 2864.8 m - 2877.3 m (9399 ft - 9440 ft). Stuck pipe at 2877.3 m (9440 ft). Work free and circulate and condition mud. Ream tight hole at 2877.3 m - 2880.1 m (9440 ft - 9449 ft), 2902.3 m - 2907.8 m (9522 ft - 9540 ft). Back ream 2902.3 m - 2907.8 m (9522 ft - 9540 ft). Ream 2907.8 m - 2913.6 m (9540 ft - 9559 ft). RIH to 3287.9 m (10,787 ft).
43	18	Ream 3287.9 m - 3311.7 m (10,787 ft - 10,865 ft). Drill 12-1/4" hole from 3311.7 m - 3352.2 m (10,865 ft - 10,998 ft). POOH for a wiper trip to 2133.6 m (7000 ft). Ream at 2515.2 m - 2527.4 m (8252 ft - 8292 ft). RIH and ream at 2657.9 m - 2670.1 m (8720 ft - 8760 ft). Precautionary wash and ream last 9 m (30 ft) to bottom. Drill 3352.2 m - 3362.6 m (10,998 ft - 11,032 ft).
44	19	Drill 12-1/4" hole from 3362.6 m - 3450.7 m (11,032 ft - 11,321 ft).
45	20	Drill 12-1/4" hole from 3450.7 m - 3456.5 m (11,321 ft - 11,340 ft). Circulate samples, drop survey, POOH for bit change. Test BOP. RIH, ream 3431.5 m - 3456.5 m (11,258 ft - 11,340 ft). Drill from 3456.5 m - 3465.6 m (11,340 ft - 11,370 ft).
46	21	Drill 12-1/4" hole from 3465.6 m - 3540.3 m (11,370 ft - 11,615 ft).
47	22	Drill 12-1/4" hole from 3540.3 m - 3608.9 m (11,615 ft - 11,840 ft).
48	23	Drill 12-1/4" hole from 3608.9 m - 3686.6 m (11,840 ft - 12,095 ft).
49	24	Drill 12-1/4" hole from 3686.6 m - 3694.2 m (12,095 ft - 12,120 ft). Circulate samples, drop survey, POOH. RIH, precautionary wash and ream 3674.1 m - 3694.2 m (12,054 ft - 12,120 ft). Drill from 3694.2 m - 3711.0 m (12,120 ft - 12,175 ft).

DAY	OCTOBER	OPERATION
50	25	Drill 12-1/4" hole from 3711.0 m - 3746.6 m (12,175 ft - 12,292 ft). Circulate samples, drop survey. POOH to core. RIH with core barrel.
51	26	Continue RIH with core barrel. Cut core No. 3 from 3746.6 m - 3752.1 m (12,292 ft - 12,310 ft). POOH, recover 5.6 m (18-1/2 ft) of core. Test BOP. RIH with 12-1/4" drilling assembly. Ream core hole from 3746.6 m - 3752.1 m (12,292 ft - 12,310 ft). Drill 12-1/4" hole from 3752.1 m - 3753.7 m (12,310 ft - 12,315 ft).
52	27	Drill 12-1/4" hole from 3753.7 m - 3843.6 m (12,315 ft - 12,610 ft). Sweep hole with hi-vis pill.
53	28	Drill 12-1/4" hole from 3843.6 m - 3900.3 m (12,610 ft - 12,796 ft). Circulate samples. Wiper trip, no drag, 4.6 m (15 ft) fill. Circulate and condition to log.
54	29	Continue to condition hole. Tight hole on bottom 4.6 m (15 ft). Ream 3895.7 m - 3900.3 m (12,781 ft - 12,796 ft). Circulate and condition hole. Drop multi-shot, POOH. R/U wireline, run ISF/MSFL/BHC/GR/CAL sonic log failed.
55	30	Rerun BHC. Run CNL/LDT/GR. Run HDT. Run CST. Run WST.
56	31	Run RFT log. RFT misrun. Run CST, R/D Schlumberger.
	NOVEMBER	
57	1	RIH w/ bit #25. Circulate and condition mud at 1652.0 m (5420 ft). RIH to 3200.4 m (10,500 ft), break circulation. Wash and ream from 3882.6 m - 3896.9 m (12,738 ft - 12,785 ft). Ream tight hole from 3896.9 m - 3900.3 m (12,785 ft - 12,796 ft). Raise mud weight from 9.9 - 10.1 ppg while circulating, mix 2 ppb gilsonite.

DAY	NOVEMBER	OPERATION
58	2	Continue reaming tight hole from 3896.9 m - 3900.3 m (12,785 ft - 12,796 ft). Pipe stuck, jar free. Raise mud weight to 10.2 ppg. Pump hi-vis pill to clean hole, POOH to plug back to run casing at 3314.7 m (10,875 ft). POOH and RIH open ended. Place a balanced cement plug from 3900.3 m - 3607.7 m (12,796 ft - 11,836 ft).
59	3	POOH to 3554.6 m (11,662 ft) and circulate. Place a balanced plug from 3554.6 m - 3261.1 m (11,662 ft - 10,699 ft). POOH to 3183.7 m (10,445 ft) and circulate. POOH and RIH with dress off assembly and dress cement from 3261.1 m - 3314.7 m (10,699 ft - 10,875 ft). Circulate prior to POOH to run 9-5/8" casing.
60	4	POOH. Retrieve wear bushing. R/U rig floor to run 9-5/8" casing. Make up hanger assembly with SSR plug set. Stand back in derrick. Run 268 jts of 47 lb/ft, N-80, buttress casing. Pick up hanger.
61	5	M/U hanger and continue RIH on landing string. Washed 5.4 m (18 ft) fill to shoe depth of 3311.7 m (10,865 ft). Land hanger and circulate casing. Mix and pump 630 sxs class 'G' cement w/ 2 1/2% BWOC Gel, 0.75% CFR-2, 0.8% Halad-22 and 10.8 gal/sx drill water at 12.8 ppg and 1.94 cu ft/sx. Tail in with 1500 sxs class 'G' cement with 35% Silica Flour and 0.75% CFR-2, 0.8% Halad-22, 0.4% HR-12 and 6.6 gal/sx drill water at 15.6 ppg and 1.56 cu ft/sx. Displace with rig pumps. Plug not bumped. Release running tool and RIH w/ wash tool. Spot a clean gel pill and run seal assembly. POOH w/ seal assembly, change out test cup to 8-1/2". Run and set seal assembly.

DAY	NOVEMBER	OPERATION
62	6	Continue testing BOP. L/D D.C. from derrick. RIH with 8-1/2" casing scraper. Circulate, test casing to 3000 psi. Displace hole to seawater, clean mud pits.
63	7	M/U test fluid. Displace casing with test fluid. POOH. R/U wireline, run CBL. RIH w/ DST test tools.
64	8	Continue RIH w/ test tools. POOH looking for a leak in DP. RIH, and set RTTS at 3139.8 m (10,301 ft). R/U surface equipment.
65	9	Test surface equipment to 5000 psi. Open LPR-N, R/U Otis wireline and run 2-1/8" gauge ring. No go past 3038.0 m (9967 ft). RIH w/ more sinker bars, no go past 3038.0 m (9967 ft). R/U Schlumberger wireline, RIH w/ 2" gauge ring, no go past 3038.0 m (9967 ft). POOH w/ test string. Clean scale from DC's.
66	10	RIH w/ test string. POOH looking for leaks. Replace safety valve and slip jnt. RIH w/ test string. Set packer at 3139.8 m (10,301 ft). R/U surface lines, test to 5000 psi. Open LPR-N. R/U Otis wireline, RIH w/ 2-1/8" gauge ring, no go past 3129.1 m (10,266 ft). RIH w/ 2" gauge ring, no go past 3129.1 m (10,266 ft). POOH w/ wireline. R/U perf guns.
67	11	Continue R/U perf guns. RIH w/ guns, no correlation. POOH. RIH w/ CCL/GR, GR tool malfunction. Run CCL/GR. Wait on daylight to perforate. Perforate at 3178.8 m - 3184.8 m (10,429.0 ft - 10,448.7 ft) at 4 spf and 0 Deg phase. POOH w/ perf guns.
68	12	Continue POOH w/ perf guns. Left 61 m (200 ft) of wireline in the hole plus CCL, perf gun, sinker bars. R/D surface equipment, unseat RTTS, POOH. Recover wireline in APR-M2. RIH with test string. Set RTTS at 3137.6 m (10,294 ft). R/U surface equipment.

DAY	NOVEMBER	OPERATION
69	13	Test surface equipment to 5000 psi. Open well to flow. No flow. RIH w/ Otis SRO gauge, fluid level at 917.4 m (3009.8 ft). RIH w/ Otis CCL, LPR-N closed, L/D CCL. Attempt to open LPR-N, no good. Reverse out, R/D surface equipment, POOH. Dress tools, RIH with test string.
70	14	RIH w/ test string. Set packer at 3137.6 m (10,294 ft). Open well, conduct DST as per program. RIH w/ perf guns, no go past 3035.2 m (9958 ft). POOH w/ wireline, RIH w/ Otis gauge ring to 3185.2 m (10,450 ft). RIH and perforate from 3179.1 m - 3185.2 m (10,430 ft - 10,450 ft).
71	15	Observe well, no flow. POOH w/ wireline. RIH w/ pressure gauges. POOH w/ gauges. Reverse out test string, unseat packer, POOH.
72	16	POOH w/ test string. R/U and run gauge ring and junk basket. Run and set EZSV at 3176.0 m (10,420 ft). RIH and sting into EZSV, pump 100 sxs Class 'G' cement w/ additives as per program. Squeeze 20 bbls at 1 bbl/min and 500 psi. POOH, RIH w/ bit and scraper.
73	17	RIH w/ scraper. Tag cement at 3168.7 m (10,396 ft). POOH, M/U test string and RIH. Set packer at 3001.7 m (9848 ft). Run Otis gauge ring.
74	18	POOH w/ gauge ring. RIH w/ perf. guns. Guns stuck at 2860.6 m (9385 ft). Pull out of rope socket. POOH w/ wire. Attempt to recover guns w/ overshot, no good. Release packer, POOH w/ test string. Recover guns in drill collars.
75	19	L/D Howco Test Tools. P/U test tools and RIH. Set packer at 3000.8 m (9845 ft). RIH w/ perf guns.
76	20	Perforate from 3070.9 m - 3074.9 m (10,075 ft - 10,088 ft). Conduct DST as per program. Perforate from 3042.5 m - 3048.3 m (9982 ft - 10,001 ft). Conduct DST as per program.

DAY	NOVEMBER	OPERATION
77	21	Conduct DST as per program. Reverse test string and unseat packer. POOH w/ Test String.
78	22	L/D drill collars. Run gauge ring and junk basket. RIH and set EZSV at 3038.9 m (9970 ft) on wireline. RIH and sting into EZSV. Squeeze 10 bbls cement at 1/2 bbl/min and 3400 psi. Unsting and spot 10-1/2 bbls cement on top of EZSV, test plug to 2500 psi. POOH. RIH and set balanced plug from 195.1 m - 146.3 m (640 ft - 480 ft). POOH. Flush BOP and riser w/ seawater. RIH and perforate from 121.9 m - 121.3 m (400 ft - 398 ft). Well static. POOH w/ wireline.
79	23	Retrieve W.B, pull BOP. R/U charges, detonate charge on 4th attempt. Could not pull. R/U charge No. 5, blow wellhead, recover same and breakdown.
80	24	Breakdown wellhead, retrieve TGB from seabed. Pull anchors, secure rig for tow, WOW for boats.
81	25	Continue to pull anchors, rig under tow to Koorkah No. 1 at 0900 hours, 25 November, 1985.

320305

Casing – Cementing Report

Form 20 (6 79)

Company: AMOCO AUSTRALIA | Attach Form 18

Well	Area	Field
TILANA NO 1	BASS STRAIT T-14/P	WILDCAT
Rig	**Casing Size**	**Date**
DIAMOND M EPOCH	(30 ")	SEPTEMBER 6, 1985

Cement Data

Job Type (Check one)	Well Depth	Bit Size	Mud Weight (Prior to cementing) In	Mud Weight (Prior to cementing) Out
☒ (1) Single Stage ☐ (1) and (2) Two Stage	685	26" BIT X 36" HOLE OPENER	8.6	8.6

Cement Interval	From	To	Total	Remarks
1.	667.04	335.86	331.18	CEMENT RETURNS TO SEABED
2.				

	Cement Type	Sacks	Yield (Cu. Ft./Sk)	Slurry Volume (Cu. Ft.)	Lbs./Gal.	Additives and amount (Pre blend)
1 Lead	'G'	2000	1.15	2300	15.8	
1 Tail						
2 Lead						
2 Tail						

	Mixed Water Used Type	Amount	Additives and amount (Pre mixed in water)
1 Lead	SEAWATER	238 BBLS	1% CACL2 (BWOC)
1 Tail			
2 Lead			
2 Tail			

(a) Total Slurry Volume (cu. ft.) 1	2	(b) Gauge Hole Volume (cu. ft.) 1	2	(c) Caliper Volume (cu. ft.) 1	2	Average Hole Size 1	2	% Excess 1	2
2300		715		N/A		N/A		222	

Note: % Excess is calculated on basis of (a-b) ÷ b with no caliper survey or by (a-c) ÷ c with caliper survey (within the cement interval)

No. of Bbl's to Displace Plug ☐ Rig Pump or ☒ CMT Unit		Calculated		Actual
	1	20	1	20
	2	DID NOT BUMP PLUG	2	

* Casing Data

Last Casing Set (measured from RKB)	Size	Weight	Grade
N/A	"		

Final Casing String – Top to Bottom (RKB to top of CSG string 335')

Joints	Description	Length	Set @ RKB
	SHOE JT BOTTOM		667.04
1	30" 1" WALL SHOE JT	41.60	625.44
6	30" 1" WALL CASING	242.72	382.72
1	30" HOUSING	46.86	335.86

Total Joints in string	Total Joint length	
8	(331.18)	

Centralizers: Quantity	Make	Type
0		

Total Section Covered	Spacing

Overall Job Remarks:

Operational Times	
Start CSG in @	0830 Hrs.
Running CSG	6 Hrs. 30 Min's.
Circulating 1	Hrs. 30 Min's.
2	Hrs. Min's.
Mixing CMT 1	2 Hrs. Min's.
2	Hrs. Min's.
Displacing 1	Hrs. 5 Min's.
2	Hrs. Min's.
Plug Bumped @	2100 6/9/85
w/1	Psi
w/2	Psi
Total Time	9 Hrs 5 Min's.
Survey: Run CBL	Temp None
Top of CMT @	SEABED
Based upon	OBSERVATION
Toolpusher	
Cementer	
Co Rep.	

* Casing measurements in ☒ feet ☐ meters

Company Representative: S. MAXWELL/R. L. MEYERS

320306

Casing – Cementing Report

Form 20 (6-79)

20

Company: AMOCO AUSTRALIA PETROLEUM — Attach Form 18

Well	Area	Field
TILANA NO 1	BASS STRAIT - T14P	WILDCAT
Rig	**Casing Size**	**Date**
DIAMOND M EPOCH	(20" ")	8 SEPTEMBER, 1985

Cement Data

Job Type (Check one)	Well Depth	Bit Size	Mud Weight (Prior to cementing) In	Out
☒ (1) Single Stage ☐ (1) and (2) Two Stage	1365	26"	8.6	8.6

Cement Interval		From	To	Total	Remarks
	1.	1356	335	1019	CEMENT TO SEA BED
	2.				

	Cement Type	Sacks	Yield (Cu. Ft./Sx)	Slurry Volume (Cu. Ft.)	Lbs./Gal.	Additives and amount (Pre blend)
1 Lead	'G'	1500	1.94	2910	12.8	
1 Tail	'G'	500	1.15	575	15.8	
2 Lead						
2 Tail						

	Mixed Water Used: Type	Amount	Additives and amount (Pre mixed in water)
1 Lead	SEAWATER	386 BBLS	2.5% GEL (PRE HYD) + .5 G/S NF-1
1 Tail	SEAWATER	60 BBLS	
2 Lead			
2 Tail			

(a) Total Slurry Volume (cu. ft.)		(b) Gauge Hole Volume (cu. ft.)		(c) Caliper Volume (cu. ft.)		Average Hole Size		% Excess	
1	2	1	2	1	2	1	2	1	2
3485		1744		N/A		N/A		100	

Note: % Excess is calculated on basis of (a-b) ÷ b with no caliper survey or by (a-c) ÷ c with caliper survey (within the cement interval)

No. of Bbl's to Displace Plug	Calculated		Actual	
☐ Rig Pump or ☒ CMT Unit	1	26	1	26
	2		2	

* Casing Data

Last Casing Set (measured from RKB)	Size	Weight	Grade
667 FT	30 "	310	B

Final Casing String – Top to Bottom (RKB to top of CSG string 335')

Joints	Description	Length	Set @ RKB
	BOTTOM OF SHOE JT	-	1352.65
1	SHOE JOINT 20" 133 #/FT	43.66	1308.99
23	20" 133 #/FT GRADE 'B'	887.26	421.73
1	20" 133 #/FT CROSS OVER JT	40.30	381.43
1	18 3/8" WELLHEAD TO SEATING PT	46.50	334.93
1	SEATING PT TO DATUM LINE	1.93	333.00
	5" HEAVY WEIGHT DP	333.00	0

Total Joints in string: 26 — Total Joint length: (1019.65)

Centralizers: Quantity: N/A — Make — Type

Total Section Covered — Spacing

Overall Job Remarks:

Operational Times

Start CSG in @ 2300 7/9/85 Hrs.

Running CSG 10 Hrs. 0 Min's.

Circulating 1 ____ Hrs. 30 Min's.
2 ____ Hrs. ____ Min's.

Mixing CMT 1 3 Hrs. 30 Min's.
2 ____ Hrs. ____ Min's.

Displacing 1 ____ Hrs. 10 Min's.
2 ____ Hrs. ____ Min's.

Plug Bumped @ N/A
w/1 ____ Psi
w/2 ____ Psi

Total Time 14 Hrs 10 Min's.

Surveys Run
CBL ____ Temp. ____ None ____
Top of CMT @ seabed
Based upon OBSERVATION

Toolpusher
Cementer
Co. Rep.

*Casing measurements in ☒ feet ☐ meters

Company Representative: S. MAXWELL/R. L. MEYERS

320307

Casing – Cementing Report

Form 20 (6-79)

Company: Amoco Australia Pet Co. | Attach Form 19

Well	Area	Field
Tilana # 1	Bass Strait	--

Rig	Casing Size	Date
Diamond M Epoch	(13-3/8") ")	21 September, 1985

Cement Data

Job Type (Check one)	Well Depth	Bit Size	Mud Weight (Prior to cementing) In	Mud Weight (Prior to cementing) Out
☒ (1) Single Stage ☐ (1) and (2) Two Stage	5452'	17-1/2"	9.0	9.0

Cement Interval		From	To	Total	Remarks
	1.	5420'	1153'	4267'	13-3/8" shoe - 200' inside 20"
	2.				

	Cement Type	Sacks	Yield (Cu. Ft./Sx)	Slurry Volume (Cu. Ft.)	Lbs./Gal.	Additives and amount (Pre blend)
1 Lead	Class G	1589	1.94	3083	12.8	
1 Tail	Class G	513	1.15	590	15.8	
2 Lead						
2 Tail						

	Mixed Water Used. Type	Amount	Additives and amount (Pre mixed in water)
1 Lead	Drill Water	418 bbls	Gel - 2.5% BWOC, 0.5% CFR-2
1 Tail	Drill Water	60 bbls	3.5 gal / 10 bbl HR - 6L
2 Lead			
2 Tail			

(a) Total Slurry Volume (cu. ft.) 1	(a) 2	(b) Gauge Hole Volume (cu. ft.) 1	(b) 2	(c) Caliper Volume (cu. ft.) 1	(c) 2	Average Hole Size 1	Average Hole Size 2	% Excess 1	% Excess 2
3673		3030						20%	

Note: % Excess is calculated on basis of (a-b) ÷ b with no caliper survey or by (a-c) ÷ c with caliper survey (within the cement interval)

No. of Bbl's to Displace Plug ☐ Rig Pump or ☒ CMT Unit		Calculated		Actual
	1	82 bbls	1	82 bbls
	2		2	

* Casing Data

Last Casing Set (measured from RKB)	Size	Weight	Grade
1353'	20 "	0.625" / 133 lb	

Final Casing String – Top to Bottom (RKB to top of CSG string ____) 337.29'

Joints	Description	Length	Set @ RKB
1	13-3/8"x 18-3/4" csg hanger	2.30	339.59
121	68 lb, N-80, buttress csg	4659.59	4999.18
11	72 lb, N-80, buttress csg	420.38	5419.56

Total Joints in string: 133 | Total Joint length (5082.27')

Centralizers: Quantity: None | Make | Type

Total Section Covered | Spacing

Overall Job Remarks:

Cement mixed and pumped @ ± 3-1/2 bbl/min

EZSV cmt retainer @ 5320' wireline meas.

Float collar + shoe drilled out 20 Sept 1985

Operational Times

Start CSG in @	1900	Hrs.		
Running CSG	10	Hrs.	-	Min's.
Circulating 1	4	Hrs.	-	Min's.
2		Hrs.		Min's.
Mixing CMT 1	2	Hrs.	40	Min's.
2		Hrs.		Min's.
Displacing 1	-	Hrs.	20	Min's.
2		Hrs.		Min's.

Plug Bumped @ N/A

w/1 ____ Psi

w/2 ____ Psi

Total Time 17 Hrs. 0 Min's.

Surveys Run: CBL ____ Temp. ____ None ____

Top of CMT @ 1153'

Based upon Calculations

Toolpusher C. Jenkins

Cementer Cashman/Cosby

Co. Rep. J. Guillory/G. Cowan/ J.G. Rankin

*Casing measurements in ☒ feet ☐ meters

Company Representative: Jack G. Rankin

320308

Casing – Cementing Report

Form 20 (6-79)

Company: AMOCO AUSTRALIA | Attach Form 19

Well: TILANA NO 1 | Area: BASS STRAIT | Field: EXPLORATION

Rig: DIAMOND M EPOCH | Casing Size: (9 5/8") | Date: 4 NOVEMBER, 1985

Cement Data

Job Type (Check one)	Well Depth	Bit Size	Mud Weight (Prior to cementing) In	Mud Weight (Prior to cementing) Out
☒ (1) Single Stage ☐ (1) and (2) Two Stage	PBTD 10,875'	12 1/4"	10.2 ppg	10.2 ppg

Cement Interval		From	To	Total	Remarks
	1.	10,875'	4720'	6155'	
	2.				

	Cement Type	Sacks	Yield (Cu. Ft./Sx)	Slurry Volume (Cu. Ft.)	Lbs./Gal.	Additives and amount (Pre blend)
1 Lead	Class "G"	630	1.94	1222	12.8	N/A
1 Tail	Class "G"	1500	1.56	2340	15.6	35% Silica Flour
2 Lead						
2 Tail						

	Mixed Water Used Type	Amount	Additives and amount (Pre mixed in water)
1 Lead	Drill Water	162 bbls	0.3% HR-12 2.5% BWOC Gel, 0.75% CFR-2, 0.8% Halad-22
1 Tail	Drill Water	235.7 bbls	0.75% CFR-2, 0.8% Halad-22, 0.4% HR-12
2 Lead			
2 Tail			

(a) Total Slurry Volume (cu. ft.) 1	(a) 2	(b) Gauge Hole Volume (cu. ft.) 1	(b) 2	(c) Caliper Volume (cu. ft.) 1	(c) 2	Average Hole Size 1	Average Hole Size 2	% Excess 1	% Excess 2
3562				2797		14.2"		27.4%	

Note: % Excess is calculated on basis of (a-b) ÷ b with no caliper survey or by (a-c) ÷ c with caliper survey (within the cement interval)

No. of Bbl's to Displace Plug ☒ Rig Pump or ☐ CMT Unit		Calculated		Actual
	1	764.8 bbls	1	761.7 bbls
	2		2	

* Casing Data

Last Casing Set (measured from RKB)	Size	Weight	Grade
5420 FT	13 3/8"	72,68 lb/ft	N-80

Final Casing String – Top to Bottom (RKB to top of CSG string 333 FT)

Joints	Description	Length	Set @ RKB
1	9 5/8" Cameron WSI Hanger	16.07	349.07
2-267	9 5/8", 47 #/FT, N-80, buttress	10,431.66	10,780.73
268	9 5/8", as above w/ float collar	42.11	10,822.84
269	9 5/8" as above w/ shoe	42.18	10,865.02

Total Joints in string: 269 | Total Joint length: (10,532.02')

Centralizers: Quantity: None | Make | Type

Total Section Covered | Spacing

Overall Job Remarks:

Continual pumping and consistent density throughout job.

Note: TOC for Silica = 6365' (based on Calc)

Operational Times

Start CSG in @	1430	Hrs.		
Running CSG	12	Hrs.	-	Min's.
Circulating 1	3	Hrs.	-	Min's.
2		Hrs.		Min's.
Mixing CMT 1	1	Hrs.	45	Min's.
2		Hrs.		Min's.
Displacing 1	1	Hrs.	45	Min's.
2		Hrs.		Min's.

Plug Bumped @ Not Bumped

w/1 ____ Psi

w/2 ____ Psi

Total Time 18 Hrs. 30 Min's.

Surveys Run: CBL ____ Temp. ____ None ____

Top of CMT @ 4720'

Based upon Calculation

Toolpusher: J. Bracey

Cementer: P. Unwin

Co. Rep: S. Maxwell

* Casing measurements in ☒ feet ☐ meters

Company Representative: S. Maxwell/ J. C. Rankin

320309

(Permanent Detailed Record)
Form 19 (6-79)

Attach to Form 20

Field	Well No.	Article	Size	Date
BASS STRAIT T-14/P	2	30" CASING	30"	SEPTEMBER 6, 1985

Note: For casing and tubing with Hydril, Extremeline, or similiar joints, record shoulder to shoulder measurements; for other tubulars, record measurement from outer edge of mill coupling to last engaged thread on field end.

Measurements made with
☒ Decimal Footage Tape
☐ Meters Centimeters Tape

Note: Denote Centralizers on or Between Joints With (X)

No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters	
1	40	55	51			101			151			201		
2	40	73	52			102			152			202		
3	40	03	53			103			153			203		
4	41	38	54			104			154			204		
5	40	98	55			105			155			205		
6	39	05	56			106			156			206		
7	41	60	57	SHOE JT		107			157			207		
8	46	86	58	WELLHEAD HOUSING		108			158			208		
9			59			109			159			209		
10			60			110			160			210		
11			61			111			161			211		
12			62			112			162			212		
13			63			113			163			213		
14			64			114			164			214		
15			65			115			165			215		
16			66			116			166			216		
17			67			117			167			217		
18			68			118			168			218		
19			69			119			169			219		
20			70			120			170			220		
21			71			121			171			221		
22			72			122			172			222		
23			73			123			173			223		
24			74			124			174			224		
25			75			125			175			225		
26			76			126			176			226		
27			77			127			177			227		
28			78			128			178			228		
29			79			129			179			229		
30			80			130			180			230		
31			81			131			181					
32			82			132			182					
33			83			133			183					
34			84			134			184					
35			85			135			185					
36			86			136			186					
37			87			137			187					
38			88			138			188					
39			89			139			189					
40			90			140			190					
41			91			141			191					
42			92			142			192					
43			93			143			193					
44			94			144			194					
45			95			145			195					
46			96			146			196					
47			97			147			197					
48			98			148			198					
49			99			149			199					
50			100			150			200					

Tally of Joints Not Run

No.	Feet or Meters	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		

No. Joints Delivered:

No. Joints Run: 8

Total Run – Overall: 331.18'

Top Pipe Below:
☒ Rotary Drive Bushing
☐ Derrick Floor

Depth Landed: 667.04' RKB

Operational Data

Casing Makeup Torque 20,000..... ft.-lbs.

Hanging Weight @ Setting Depth 125,000... lbs.

Pick Up Weight-Drag Setting Depth 130,000 lbs.

Set Down Weight-Drag Setting Depth 120,000..

Casing Hung in Tension w/ .....lbs. on hanger

Item(s) No. — Pipe Run

1 Size 30" Weight 1" WALL Grade X-56 Type Joint D. Q. NS-60 Range III Qty. 1

2-7 Size 30" Weight 1" WALL Grade X-56 Type Joint D. Q. NS-60 w/ D.L. 501 DVT SHOE Range III Qty. 6

___ Size ___ Weight ___ Grade ___ Type Joint ___ Range ___ Qty. ___

8 Size 30" Weight 1" WALL Grade ___ Type Joint 30" CAMERON WELLHEAD w/ D.Q. NS-60 Range III Qty. 1

S. MAXWELL

Approved - Company Representative

320310

(Permanent Detailed Record)
Form 19 (6-79)

24

Attach to Form 20

Field	Well No.	Article	Size	Date
BASS STRAITS - TILANA	1	94 #/FT GRADE 'B'	20"	SEPTEMBER 7, 1985

Note: For casing and tubing with Hydril, Extremeline, or similiar joints, record shoulder to shoulder measurements; for other tubulars, record measurement from outer edge of mill coupling to last engaged thread on field end.

Measurements made with
☐ Decimal Footage Tape
☐ Meters Centimeters Tape

Note: Denote Centralizers on or Between Joints With (X)

No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters	
1	38	58	51			101			151			201		
2	38	56	52			102			152			202		
3	38	52	53			103			153			203		
4	38	73	54			104			154			204		
5	38	54	55			105			155			205		
6	38	54	56			106			156			206		
7	38	53	57			107			157			207		
8	38	54	58			108			158			208		
9	38	76	59			109			159			209		
10	38	60	60			110			160			210		
11	38	53	61			111			161			211		
12	38	75	62			112			162			212		
13	38	72	63			113			163			213		
14	38	60	64			114			164			214		
15	38	54	65			115			165			215		
16	38	60	66			116			166			216		
17	38	58	67			117			167			217		
18	38	55	68			118			168			218		
19	38	54	69			119			169			219		
20	38	53	70			120			170			220		
21	38	56	71			121			171			221		
22	38	53	72			122			172			222		
23	39	33	73			123			173			223		
24	40	30	74	CROSSOVER JT.		124			174			224		
25	43	66	75	SHOE JT.		125			175			225		
26	46	50	76	18 3/4" WELLHEAD T TO SEAT PT.		126			176			226		
27			77			127			177			227		
28			78			128			178			228		
29			79			129			179			229		
30			80			130			180			230		
31			81			131			181					
32			82			132			182					
33			83			133			183					
34			84			134			184					
35			85			135			185					
36			86			136			186					
37			87			137			187					
38			88			138			188					
39			89			139			189					
40			90			140			190					
41			91			141			191					
42			92			142			192					
43			93			143			193					
44			94			144			194					
45			95			145			195					
46			96			146			196					
47			97			147			197					
48			98			148			198					
49			99			149			199					
50			100			150			200					

Tally of Joints Not Run

No.	Feet or Meters	
1	38	75
2	37	90
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		

No. Joints Delivered: 25

No. Joints Run: 23 + WELLHEAD + SHOE JT + CROSSOVER

Total Run – Overall: 1019.65'

Top Pipe Below:
☒ Rotary Drive Bushing
☐ Derrick Floor

Depth Landed: 1353'RKB

Operational Data

Casing Makeup Torque 10,000..... ft.-lbs.

Hanging Weight @ Setting Depth 120.K.... lbs.

Pick Up Weight-Drag Setting Depth 130.K.. lbs.

Set Down Weight-Drag Setting Depth..110.K..

Casing Hung in Tension w/ 120.K. lbs. on hanger

Item(s) No. — Pipe Run

Item(s) No.	Size	Weight	Grade	Type Joint	Range	Qty.
1-23	20"	133#	B	DRILL QUIP	3	23
24	20"	133#	B	CROSSOVER	3	1
25	20"	133#	B	SHOE JOINT	3	1
26	18 3/4"			WELLHEAD		1

Approved - Company Representative S. MAXWELL/ R. L. MEYERS

320311

(Permanent Detailed Record)
Form 19 (6-79)

25

Attach to Form 20

Field	Well No.	Article	Size	Date
TILANA # 1	1		13-3/8	18 Sept, 1985

Note: For casing and tubing with Hydril, Extremeline, or similiar joints, record shoulder to shoulder measurements; for other tubulars, record measurement from outer edge of mill coupling to last engaged thread on field end.

Measurements made with
☐ Decimal Footage Tape
☐ Meters Centimeters Tape

Note: Denote Centralizers on or Between Joints With (X)

No.	Feet or Meters	No.	Feet or Meters	No.	Feet or Meters	No.	Feet or Meters	No.	Feet or Meters
1	SHOE 1 92	51	38 86	101	38 34	151		201	68 Lb. Pipe
2	37 46	52	39 34	102	39 06	152		202	39 58
3	39 12	53	38 84	103	39 05	153		203	39 54
4	COLLAR 1 49	54	39 01	104	38 34	154		204	38 93
5	37 38	55	38 51	105	38 55	155		205	39 19
6	38 04	56	39 74	106	39 42	156		206	39 45
7	37 09	57	38 75	107	37 98	157		207	39 80
8	38 94	58	39 16	108	38 56	158		208	39 16
9	38 69	59	39 20	109	37 57	159		209	34 35
10	36 25	60	39 43	110	38 70	160		210	39 44
11	38 65	61	39 04	111	39 38	161		211	39 42
12	38 74	62	39 48	112	39 36	162		212	39 75
13	36 61	63	39 21	113	38 59	163		213	33 95
14	37 81	64	38 93	114	37 70	164		214	Pup 10 34
15	39 75	65	39 51	115	39 16	165		215	Pup 14 40
16	39 36	66	37 50	116	39 76	166		216	HGR 2 31
17	39 63	67	38 94	117	39 42	167		217	
18	39 76	68	38 20	118	38 42	168		218	
19	39 43	69	39 84	119	38 60	169		219	
20	38 53	70	39 30	120	39 70	170		220	
21	39 70	71	39 71	121	39 01	171		221	
22	38 85	72	39 15	122	38 62	172		222	
23	38 94	73	39 15	123	38 32	173		223	
24	38 86	74	38 27	124	39 67	174		224	
25	39 05	75	39 75	125	39 36	175		225	
26	39 45	76	39 20	126	38 30	176		226	
27	38 61	77	36 29	127	39 77	177		227	
28	39 39	78	39 75	128	38 86	178		228	
29	39 36	79	39 80	129	39 45	179		229	
30	39 60	80	39 42	130	38 68	180		230	
31	38 12	81	37 60	131	39 71	181			
32	37 16	82	37 30	132	39 78	182			
33	39 46	83	39 43	133	PUP 15 18	183			
34	37 49	84	39 53	134	PUP 14 75	184			
35	38 10	85	38 76	135	HGR 2 30	185			
36	39 00	86	38 33	136	TOT	186			
37	39 54	87	34 96	137	5082 23	187			
38	39 78	88	38 72	138		188			
39	38 70	89	37 45	139		189			
40	38 80	90	39 77	140		190			
41	38 78	91	39 60	141		191			
42	38 60	92	39 87	142		192			
43	39 40	93	36 88	143		193			
44	38 59	94	38 73	144		194			
45	37 09	95	39 02	145		195			
46	39 55	96	39 37	146		196			
47	39 76	97	38 47	147		197			
48	39 43	98	39 25	148		198			
49	39 16	99	39 02	149		199			
50	39 76	100	38 78	150		200			

Tally of Joints Not Run

No.	Feet or Meters 72 LB	Pipe
1	39	30
2	39	42
3	39	35
4	39	58
5	39	33
6	38	89
7	39	21
8	35	71
9	38	80
10	38	95
11	39	07
12	39	21
13	38	75
14	38	98
15	38	71
16	39	10
17	38	95
18	39	55
19	38	00
20	39	45
21	37	26
22		
23		
24		
25		
26		
27		
28		
29		

No. Joints Delivered: 168

No. Joints Run: 132

Total Run – Overall: 5082.23'

Top Pipe Below:
☒ Rotary Drive Bushing
☐ Derrick Floor

Depth Landed: 5420' . RKB

Operational Data

Casing Makeup Torque ..... ft.-lbs.

Hanging Weight @ Setting Depth 270,000 lbs.

Pick Up Weight-Drag Setting Depth 285,000 lbs.

Set Down Weight-Drag Setting Depth 270,000

Casing Hung in Tension w/ ..... lbs. on hanger

Item(s) No. 1862.73 1942.12 1277.08 Pipe Run

1-13 Size 13-3/8 Weight 72 Grade N-80 Type Joint Buttress Range ____ Qty. ____

14-135 Size 13-3/8 Weight 68 Grade N-80 Type Joint Buttress Range ____ Qty. ____

136 Size [illegible] Weight ____ Grade ____ Type Joint Cameron CSG Hanger Range ____ Qty. ____

____ Size ____ Weight ____ Grade ____ Type Joint ____ Range ____ Qty. ____

Approved - Company Repres[illegible]

Field	Well No.	Article	Size	Date
BASS STRAIT - TILANA	1		9 5/8"	4 NOVEMBER, 1985

Note: For casing and tubing with Hydril, Extremeline, or similiar joints, record shoulder to shoulder measurements; for other tubulars, record measurement from outer edge of mill coupling to last engaged thread on field end.

Note: Denote Centralizers on or Between Joints With (X)

Measurements made with
☒ Decimal Footage Tape
☐ Meters Centimeters Tape

No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters	
Shoe 1	42	18	51	39	31	101	38	72	151	38	74	201	38	05
Float 2	42	11	52	39	47	102	38	47	152	39	66	202	39	55
3	39	63	53	39	46	103	39	28	153	39	65	203	39	15
4	39	25	54	39	16	104	39	20	154	39	50	204	39	47
5	39	42	55	39	56	105	39	46	155	39	41	205	39	46
6	38	87	56	39	50	106	39	10	156	39	40	206	39	48
7	38	78	57	38	53	107	39	45	157	39	43	207	39	36
8	39	44	58	39	49	108	37	48	158	39	25	208	39	48
9	39	30	59	39	45	109	38	70	159	39	92	209	39	26
10	39	48	60	39	46	110	39	45	160	36	50	210	38	88
11	39	40	61	39	46	111	38	56	161	39	68	211	39	44
12	39	61	62	39	29	112	39	45	162	39	47	212	38	70
13	39	46	63	39	45	113	39	64	163	39	67	213	39	42
14	39	49	64	39	46	114	39	36	164	39	46	214	39	62
15	39	46	65	39	30	115	39	45	165	39	13	215	36	92
16	38	93	66	39	07	116	39	64	166	39	46	216	39	64
17	39	13	67	39	28	117	39	53	167	39	48	217	39	66
18	39	26	68	39	28	118	39	47	168	39	42	218	39	24
19	39	32	69	39	25	119	39	45	169	39	19	219	39	50
20	38	95	70	37	99	120	39	28	170	39	33	220	39	48
21	39	33	71	39	26	121	39	54	171	39	64	221	39	65
22	39	43	72	38	96	122	39	20	172	39	48	222	39	31
23	39	52	73	39	28	123	39	45	173	39	45	223	39	35
24	39	43	74	39	04	124	39	48	174	39	48	224	39	49
25	39	12	75	39	05	125	39	47	175	39	46	225	39	18
26	39	48	76	39	45	126	39	43	176	39	43	226	39	10
27	39	59	77	38	93	127	39	46	177	39	62	227	39	01
28	39	50	78	39	35	128	38	18	178	39	48	228	39	02
29	39	52	79	39	38	129	38	82	179	38	79	229	39	52
30	39	48	80	39	48	130	38	21	180	39	40	230	39	24
31	39	36	81	38	45	131	39	13	181	39	07			
32	38	89	82	39	51	132	39	62	182	39	25			
33	39	13	83	39	64	133	38	70	183	39	65			
34	39	47	84	39	28	134	39	61	184	39	50			
35	39	44	85	39	45	135	39	48	185	39	20			
36	39	07	86	39	45	136	39	50	186	38	15			
37	39	28	87	39	14	137	39	50	187	38	32			
38	39	52	88	39	47	138	39	52	188	38	28			
39	38	75	89	39	44	139	39	43	189	38	84			
40	39	38	90	39	62	140	39	28	190	38	50			
41	39	23	91	39	45	141	39	49	191	39	44			
42	39	49	92	38	34	142	39	64	192	39	44			
43	39	39	93	39	33	143	38	05	193	39	45			
44	39	48	94	39	28	144	39	48	194	39	49			
45	39	43	95	38	80	145	39	49	195	39	48			
46	38	56	96	38	29	146	39	64	196	39	11			
47	39	07	97	37	02	147	39	23	197	39	48			
48	39	47	98	38	43	148	37	20	198	39	46			
49	38	77	99	39	28	149	39	54	199	39	44			
50	38	82	100	39	64	150	39	55	200	39	46			

Tally of Joints Not Run

No.	Feet or Meters	
1	39	49
2	38	98
3	39	67
4	39	66
5	39	35
6	39	39
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		

Cont on next page

No. Joints Delivered: 275

No. Joints Run: 269

Total Run – Overall:

10,532.02'

Top Pipe Below:

☒ Rotary Drive Bushing
☐ Derrick Floor

Depth Landed: 10,865.02' RKB

Operational Data

Casing Makeup Torque ..... ft.-lbs.

Hanging Weight @ Setting Depth 510..... lbs.

Pick Up Weight-Drag Setting Depth 535..... lbs.

Set Down Weight-Drag Setting Depth 505.....

Casing Hung in Tension w/ .....lbs. on hanger

Pipe Run

Item(s) No.											
1	Size 9 5/8"	Weight 47	Grade N-80	Type Joint buttress/shoe	Range	Qty. 1
2	Size 9 5/8"	Weight 47	Grade N-80	Type Joint buttress/float	Range	Qty. 1
3-268	Size 9 5/8"	Weight 47	Grade N-80	Type Joint buttress	Range	Qty. 266
269	Size 9 5/8"	Weight 47	Grade N-80	Type Joint buttress/hanger	Range	Qty. 1

Approved - Company Representative

320313

Attach to Form 20

Form 19 (6-79)

27

Page 2

Field	Well No.	Article	Size	Date

Note: For casing and tubing with Hydril, Extremeline, or similiar joints, record shoulder to shoulder measurements; for other tubulars, record measurement from outer edge of mill coupling to last engaged thread on field end.

Note: Denote Centralizers on or Between Joints With (X)

Measurements made with
- ☐ Decimal Footage Tape
- ☐ Meters Centimeters Tape

No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters		No.	Feet or Meters	
1	39	49	51			101			151			201		
2	39	08	52			102			152			202		
3	39	47	53			103			153			203		
4	39	30	54			104			154			204		
5	39	49	55			105			155			205		
6	39	31	56			106			156			206		
7	39	26	57			107			157			207		
8	38	99	58			108			158			208		
9	38	60	59			109			159			209		
10	39	46	60			110			160			210		
11	37	85	61			111			161			211		
12	39	35	62			112			162			212		
13	39	52	63			113			163			213		
14	39	50	64			114			164			214		
15	39	49	65			115			165			215		
16	38	88	66			116			166			216		
17	39	39	67			117			167			217		
18	39	40	68			118			168			218		
19	39	50	69			119			169			219		
20	39	47	70			120			170			220		
21	39	50	71			121			171			221		
22	39	18	72			122			172			222		
23	39	48	73			123			173			223		
24	39	66	74			124			174			224		
25	39	21	75			125			175			225		
26	38	42	76			126			176			226		
27	39	66	77			127			177			227		
28	39	32	78			128			178			228		
29	39	55	79			129			179			229		
30	39	28	80			130			180			230		
31	36	09	81			131			181					
32	39	33	82			132			182					
33	39	64	83			133			183					
34	39	50	84			134			184					
35	39	28	85			135			185					
36	39	58	86			136			186					
37	38	60	87			137			187					
38	38	21	88			138			188					
39	hanger		89			139			189					
40	16	07	90			140			190					
41			91			141			191					
42			92			142			192					
43			93			143			193					
44			94			144			194					
45			95			145			195					
46			96			146			196					
47			97			147			197					
48			98			148			198					
49			99			149			199					
50			100			150			200					

Tally of Joints Not Run

No.	Feet or Meters	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		

No. Joints Delivered:

No. Joints Run:

Total Run – Overall:

Top Pipe Below:
- ☐ Rotary Drive Bushing
- ☐ Derrick Floor

Depth Landed:

Operational Data

Casing Makeup Torque ..... ft.-lbs.

Hanging Weight @ Setting Depth ..... lbs.

Pick Up Weight-Drag Setting Depth ..... lbs.

Set Down Weight-Drag Setting Depth.....

Casing Hung in Tension w/ .....lbs. on hanger

Item(s) No.

Pipe Run

_____ Size _____ Weight _____ Grade _____ Type Joint _____ Range _____ Qty. _____

_____ Size _____ Weight _____ Grade _____ Type Joint _____ Range _____ Qty. _____

_____ Size _____ Weight _____ Grade _____ Type Joint _____ Range _____ Qty. _____

_____ Size _____ Weight _____ Grade _____ Type Joint _____ Range _____ Qty. _____

Approved - Company Representative _____

320314

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

BAROID MUD SUMMARY
PREPARED BY:

DISCUSSION BY INTERVAL

S. ECKFIELD
M. SEWELL

36" HOLE 342 - 685 ft (104.2 - 208.8 M)

Tilana No. 1 was spudded at 20:30 hours on September 15, 1985. 36" hole was drilled to 685 ft using seawater with returns to the sea bed. High viscosity Gel pills flocculated with Lime were pumped to clean the hole. Prior to a wiper trip after reaching casing point, 450 bbls of Hi-Vis mud was spotted in the hole. The wiper trip encountered no bridges or fill.

30" casing was set without problems with the shoe at 667 ft.

26" HOLE 685 - 1365 ft (208.8 - 416.0 M)

This section was drilled with seawater and high viscosity Gel pills flocculated with Lime.

After tagging cement with a 26" bit, the float collar, shoe and rat-hole were drilled out with seawater. Drilling continued with 30-40 bbl high viscosity pills pumped every 100 ft. At casing point of 1365 ft, a 60 bbl pill was circulated to clean the hole. During a wiper trip to the 30" casing shoe, a bridge was encountered while running in the hole. The bridge was reamed out and after running back to bottom, an 80 bbl high viscosity pill was used to sweep the hole. Another wiper trip encountered no obstruction or fill. The hole was then displaced with 500 bbls of Hi-Vis mud prior to pulling out.

20" casing was set at 1353 ft without problems.

320315

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

DISCUSSION BY INTERVAL

17 1/2" HOLE 1365 - 5452 ft (416.0 - 1662.7 M)

A 12 1/4" pilot hole was drilled with Seawater-Prehydrated AQUAGEL mud for logging purposes. After logging, the hole was opened to 17 1/2" with the same mud system.

Seawater and High Vis pills were used to drill to 2,600 ft before mudding up with a prehydrated AQUAGEL-DEXTRID-Q BROXIN system.

Mud weights were run as low as practical and ranged from 8.6 ppg (Seawater) to 9.2 ppg while drilling, and raised to 9.5 pg to run 13 3/8" casing. Solids control equipment was run continuously while drilling and sand traps were dumped regularly. The rheology was inverted 1 : 2 to aid hole cleaning. PAC-R was used to supplement the prehydrated Q-MIX to achieve a high YP. The PV ranged from 8 - 23 and the YP was kept at 16 to 32. High Vis pills were used to flush the hole prior to POOH to log and run casing. Fill was not a problem and rheology was judged adequate for this interval.

Filtration control was obtained with Q-MIX and DEXTRID and the API fluid loss was maintained at 18 cc., reducing to 7.5 cc at logging point. During the hole opening phase, the filtrate was allowed to increase to 10.2 cc and reduced to 8.0 cc for running casing.

The solids content was normal for this type of mud, rising from 5% to 7% at logging depth. Solids control remained fairly stable during hole opening operations. The mud consumption rate of 1.34 bbl/ft reflects dilution rates of 450%, which is not unusual for this hole size through dispersive formations.

The clay content was maintained at 25 - 30 lb/bbl with Q-MIX to provide the required mud properties of viscosity, filtration control and lubricity in a seawater environment.

The pH was maintained at 11.0+ to prevent corrosion and the possibility of carbonate contamination.

320316

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

DISCUSSION BY INTERVAL

$17^1/2$" HOLE (Cont'd)

Mud costs were only $7.55 per ft, which reflects fast penetration rates and fairly stable hole conditions. This interval accounted for 11% of the total mud costs. Bulk AQUAGEL amounted to 42% of the interval cost. Other costs were Barite (10%), filtration control products DEXTRID and PAC (18%), CAUSTIC SODA (13%) and Q-BROXIN dispersant for prehydration (8%). Our programmed cost estimate did not include filtration control treatment, high pH and Barite, however the actual interval cost is similar to programmed cost on a pro-rata basis.

No major hole problems were encountered. While tripping at 4240 ft in $12^1/4$" pilot hole, a bridge was hit at 3241 ft while RIH and it was washed and reamed from 3241 - 3686 ft.

At 4530 ft, approximately 300 bbls of mud were lost to the formation, however the hole then healed itself. The mud weight at the time was 9.1 ppg. On a short trip prior to logging, the hole was tight at 5340 - 4501 ft while POOH. While RIH, a bridge was hit at 4221 ft and the bit was reamed to 4644 ft. No problems were experienced while logging.

While opening the hole to $17^1/2$", slight mud losses occurred (5 - 10 bbl/hr) from 4350 - 4410 ft. The logs showed a washed out hole below the 20" shoe.

$12^1/4$" HOLE 5452 - 12796 ft (1661.7 - 3900.0 M)

The $12^1/4$" Hole interval (7343 ft) was drilled in 39 days with a Freshwater-AQUAGEL-Polymer mud to 11,600 ft and then converted to a Low-Lime system to control carbonate contamination.

320317

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

DISCUSSION BY INTERVAL

$12^1/4$" HOLE (Cont'd)

Mud properties were set by the Operator. In general, properties were adjusted to control sloughing formations, carbonate contamination, and a relatively high B.H.T. of 265°F. Mud weights were increased from 9.0 ppg to 10.2 ppg during the interval to control hole problems.

The rheology was adjusted to ensure a clean hole when shale sloughing problems began. The YP was run at 15 - 20, however below 10,865 ft the rheology became slightly higher due to increasing carbonate contamination.

At 11,600 ft the mud was converted to a Low-Lime mud to stabilize rheology. Viscosity humps were experienced on bottoms-up after trips. The high B.H.T. affected rheology readings, which tended to increase as the mud cooled during trips and reduce as the mud heated up while circulating. A rheometer heating cup was ordered in order to standardize tests at 120°F. This would have reduced fluctuations in recorded rheology, but didn't arrive at the rig until T.D.

The API filtrate loss was held at approximately 5 cc at the Operator's request. The HPHT filtrate loss ran at 20-22 cc (220 - 280°F) during most of this interval and was held at this level despite increasing B.H.T. The HPHT was lowered to 18 cc to conform to the Operator's specifications while reaming to bottom at T.D. This was achieved with additions of AQUAGEL, Q-BROXIN and Gilsonite.

The solids content was run at maximum acceptable levels with the A.S.G. ranging from 2.9 - 3.2 due to constraints on water consumption. Mud solids did not appear to be detrimental to the hole condition. The shale shaker screens were fairly coarse (60 over 80 mesh on tandem screen shakers). Better solids control equipment is being installed for the next well in order to reduce water consumption and this may help obtain a reduced solids content in future.

320318

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

DISCUSSION BY INTERVAL

12 1/4" HOLE (Cont'd)

Drilled solids content ranged from 12 - 55 lb/bbl averaging 23 lb/bbl Approximately 25 lb/bbl clay was maintained in the mud for HPHT filtration control.

Alkalinity was critical for rheological control due to carbonate contamination and was controlled with Lime or Caustic Soda. The pH rose to 12.6 when treating with Lime.

The original Baroid mud program bears little resemblance to the final mud system used, due to differences in casing depth and the problems that the formation presented. Dilution rates (2.5 bbl/ft) were twice those anticipated due to extensive hole wash-out and the mediocre solids control equipment mentioned above. With rig desilters, desanders and two Sweco units running as desilters, surface mud losses were 30 - 40 bbl/hr. Total dilution requirements were 18,125 bbl or 17 times the hole volume. Solids control and mud costs are closely related and so costs should be reduced by the proposed modifications to the solids control equipment which are in hand.

Hole Problems

Carbonate contamination experienced on Yolla No. 1 was repeated on Tilana No. 1. Below 11,000 ft the rheology became erratic and carbonate contamination was diagnosed. The pH had been maintained at 11.0+ in anticipation of this problem. Light treatments of Lime had failed to stabilize the mud, so the Operator ordered conversion to a Low-Lime mud by addition of 0.5 ppb Lime. The final Lime content of the mud was 2.2 ppb.

Carbonate contamination could come from: a. gas release from cuttings as they are drilled and as they near the surface; b. from free formation gas and; c. degradation of organic mud products above 300°F.

320319

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

DISCUSSION BY INTERVAL

12 1/4" HOLE (Cont'd)

Situation a. can be treated by raising the pH to 11 to convert bicarbonates to carbonates, then adding Lime to treat out carbonates as Calcium Carbonate. With case b., higher mud weights will solve the problem. Case c. calls for use of thermally stable mud products. It is suspected that case a. existed on Tilana No. 1 since : No CO_2 gas influxes were seen by Exlog; carbonate contamination increased in the mud pits during trips; and higher mud weights at T.D. (10.2 ppg) did not ease the problem, as would be expected if free CO_2 was entering from the formation. However diagnosis is uncertain and the source of carbonates may be from more than one area. While circulating at T.D., it was found that 0.4 ppb Lime was being consumed between the pump suction and the flowline (see Mud Report No. 58).

Problems were encountered with hole wash-out and sloughing. At the start of the interval the mud weight was allowed to drift up to 9.3 ppg with drilled solids, due to increasing depth and economics of mud treatments. At 10,865 ft a trip was made. While RIH, sections had to be reamed at 7546 - 7596 ft and 8456 - 8496 ft. The pipe became stuck at 9,000 ft but came free after the mud weight was raised to 9.5^{+} ppg. The trip then continued to bottom. On bottoms-up, the shakers were heavily loaded with shale and coal.

With the mud weight at 9.7 ppg, a trip was made and tight spots were reamed while RIH at 8252 - 8292 ft and 8720 - 8760 ft. After tight connections at 12,024 ft and 12,057 ft, the mud weight was increased to 9.8 ppg. With 9.8 ppg mud, a trouble free trip was made, and a further trip was made for a core barrel with 9.7 ppg mud. A core was cut at 12,304 - 12,310 ft.

While drilling ahead after coring, the hole became tight at 12,352 ft. During the next trip, the hole was tight at 12,784 - 12,769 ft and the mud weight was raised to 9.9 ppg.

320320

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

DISCUSSION BY INTERVAL

$12^1/4$" HOLE (Cont'd)

Diorite formation was encountered just before the logging depth of 12,796 ft and problems were experienced reaming to bottom through this formation after a short wiper trip before logging. The mud weight was raised to 10.2 ppg without improvement in bottom hole conditions although the rest of the hole was in good shape. Different mud treatments used to help ream through the Diorite included Gilsonite, high weight-high viscosity (14.0 ppg) pills and addition of 4 drums of TORQ-TRIM II.

Orders to POOH to log came before the hole was reamed to T.D. The trip out of the hole experienced no drag and 54 hours were spent logging without a wiper trip.

After logging, the decision was made to drill ahead and no problems were encountered while RIH until 12,785 ft. 23 hours were spent washing and reaming the diorite formation without success. 4" propellor shaped splinters of siltstone, $^1/8$" - $^1/4$" blocky pieces of basalt and chunks of diorite were seen on the shakers on bottoms-up after logging. The hole took a long time to clear the basalt and some diorite. The long splinters of siltstone were unusual and may have come from a stringer drilled above the diorite. A stabilizer was opposite the stringer while attempting to ream.

Hole washout was generally bad ($17^1/2$" caliper) and can be correlated to unstable shales associated with approximately 50 coal stringers penetrated throughout the interval. The high BHT of 265^oF and the high pH precluded the use of temperature sensitive polymers such as starch.

Other wells in Tasmanian waters have been drilled with significantly higher mud weights which may have been used to alleviate hole problems. Hole washout may be alleviated by a combination of:

1. Raising the mud weight according to nature of cuttings and hole problems. This may or may not coincide with increases in pore pressure or gas.

320321

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

DISCUSSION BY INTERVAL

$12^1/4$" HOLE (Cont'd)

2. Addition of Gilsonite may help to seal smaller fractures in shales.

3. Keep YP high enough to clean hole and prevent turbulent flow.

320322

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

CONCLUSIONS AND RECOMMENDATIONS

In the $17^1/2$" hole, the Seawater-Q Mix system performed well. In future wells, it is recommended that this system be used immediately after drilling out the 20" shoe to avoid hole washout. The mud properties, especially fluid loss and pH may be relaxed, depending on the hole condition and the Operator's desire to maintain a safety factor in the mud specifications.

In the $12^1/4$" hole, mud properties should be specified to allow for :

1. Sloughing/fractured shales.

2. Carbonate contamination.

3. High B.H.T. (265^oF).

The required mud properties and improved hole conditions may be achieved by :

1. Ensuring suitable hole cleaning and hydraulics by maintaining a low "N factor".

2. Adjusting mud weights according to hole conditions by observing cuttings and trip conditions.

3. Maintaining high pH (11 - 12) and 1 ppb Excess Lime to stabilize rheology.

4. Use of temperature/pH stable polymers such as PAC and DFLC or THERMATHIN.

The solids control equipment is being improved by installation of a second centrifuge to clean the underflow of the desilters. The object of this is to reduce water consumption. All solids including Barite will be discarded with the present arrangement. If higher mud weights are to be used on future wells, it would be advantageous to split the effluents from the solids control equipment in order to salvage Barite as well as the liquid phase, thus discarding drill solids only. Basic suggested modifications to existing system are shown in the Appendix.

320323

CONCLUSIONS AND RECOMMENDATIONS (Cont'd)

All in all, the mud system used was suitable for the Bass Basin, in as much as it is a flexible system capable of being modified to suit conditions that have been encountered in Yolla No. 1 and Tilana No. 1. It is recommended that the modified system be used on future wells.

320324

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

WELL TESTING

$9^5/8$" Casing was run and cemented at 10,865 ft. The mud inside the casing which had been used for drilling was displaced with Seawater.

Prior to mixing a new fluid for the well testing program, all the mud pits, ditches and solids control equipment were flushed and cleaned.

1340 bbls of Freshwater-Polymer fluid were mixed with the following composition:-

10 ppb	AQUAGEL
1 ppb	CAUSTIC SODA
4 ppb	DEXTRID
2 ppb	PAC-L
1 ppb	PAC-R

This mixture was then weighted up to 9.0 ppg with Barite and displaced into the hole, replacing the Seawater inside the casing.

Numerous problems were experienced with mechanical tool failures, wireline tools hanging-up and plugging of the tools with particulate matter (? scale) from the test string. Many days were lost in overcoming these problems.

The well was perforated and opened, but no hydrocarbons were detected and only a small influx of fluid occurred (salt water).

A small reduction in rheology of the test fluid was noted as a result of its ageing at 260^oF downhole. Rheology was raised with the addition of 0.5 ppb PAC-R while circulating prior to pulling out of the hole to squeeze off the perforations with cement.

320325

AMOCO AUSTRALIA PETROLEUM
TILANA NO. 1

WELL TESTING (Cont'd)

Fluid properties were mainly stable throughout the testing period of 9 days. Typical properties were :

Weight	9.0 ppg
Funnel Viscosity	115 - 130 sec/qt
Plastic Viscosity	25 - 30 cps
Yield Point	30 - 36 lb/100 ft^2

320326

CONFIDENTIAL

CLASS 1

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL RECAP

COMPANY	AMOCO AUST.	MUD TYPES	SEAWATER WITH HI-VIS PILLS	HOLE SIZE	36"
WELL	TILANA NO.1			INTERVAL TO	685 ft
LOCATION	T14/P, BASS BASIN			FROM	342 ft RKB
COST/DAY	$1,698.00			FEET DRILLED	343 ft
COST/FT	$ 9.93	CONTRACTOR	DIAMOND M. DRILLING		
COST/BBL	$ 5.48	DRILLING DAYS/PHASE	2		
RECAPPED BY	D. QUINN, M. SEWELL	ROTATING HRS/PHASE	4.5		
DATE	8 September 1985			MUD CONSUMPTION FACTOR	1.8 bbl/ft

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
AQUAGEL	100 lb	13.21			240			3,170.40
LIME	25 kg	5.38			17			91.46
SODA ASH	40 kg	14.01			2			28.02
CAUSTIC SODA	70 kg	53.93			2			107.86
								3,397.74
MATERIAL NOT CHARGED TO DRILLING								
BARITE	100 lb	8.66			132	(FOR TGB)		1,143.12
CALCIUM CHLORIDE	25 kg	7.78			34	(FOR CEMENTING)		264.52
								1,407.64

CHEMICAL VOLUME		
FRESH WATER	620 bbl	
SEA WATER		
TOTAL MUD MADE		
COST LESS BARYTES		$3,397.74
COST WITH BARYTES		$3,397.74

COMMENTS

THIS SECTION WAS DRILLED WITH RETURNS TO THE SEA-BED USING SEAWATER AND HIGH VISCOSITY SPUD MUD.

320327

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL RECAP

COMPANY	AMOCO AUSTRALIA	MUD TYPES	SEAWATER WITH HI-VIS PILLS	HOLE SIZE	26"
WELL	TILANA NO.1			INTERVAL TO	1365 ft
LOCATION	T14/P, BASS BASIN			FROM	685 ft
COST/DAY	$1,296.12			FEET DRILLED	680 ft
COST/FT	$ 3.81	CONTRACTOR	DIAMOND M. DRILLING		
COST/BBL	$ 3.70	DRILLING DAYS/PHASE	2		
RECAPPED BY	D. QUINN, M. SEWELL	ROTATING HRS/PHASE	7.0		
DATE	9 September 1985	MUD CONSUMPTION FACTOR			1.03 bbl/ft

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
AQUAGEL	100 lb	13.21			180			2,377.80
SODA ASH	40 kg	14.01			3			42.03
CAUSTIC SODA	70 kg	53.93			2			107.86
LIME	25 kg	5.38			12			64.56
								2,592.25
MATERIAL NOT CHARGED TO DRILLING								
SURFLO W-300	200 l	193.06			2	(FOR CEMENTING)		386.12
AQUAGEL	100 lt	13.21			40	(FOR CEMENTING)		528.40
								914.52

CHEMICAL VOLUME		
FRESH WATER	700 bbl	
SEA WATER		
TOTAL MUD MADE	700 bbl	
COST LESS BARYTES		$2,592.25
COST WITH BARYTES		$2,592.25

COMMENTS

THIS SECTION WAS DRILLED WITH RETURNS TO THE SEABED USING SEAWATER WITH HIGH VISCOSITY SPUD MUD.

320328

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL RECAP

COMPANY	AMOCO AUSTRALIA	MUD TYPES	SEAWATER-PREHYDRATED GEL-STARCH	HOLE SIZE	17½"
WELL	TILANA NO.1			INTERVAL TO	5452 ft
LOCATION	T/4/P, BASS BASIN			FROM	1365 ft
COST/DAY	$3,086.00			FEET DRILLED	4087 ft
COST/FT	$ 7.55	CONTRACTOR	DIAMOND M. DRILLING		
COST BBL	$ 5.66	DRILLING DAYS/PHASE	10		
RECAPPED BY	S. ECKFELD, M. SEWELL	ROTATING HRS/PHASE	111.5		
DATE	5 November 1985			MUD CONSUMPTION FACTOR	1.34 bbl/ft

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
LIME	25 kg	5.38			22			118.36
ALUMINIUM STEARATE	20 kg	28.44			4			113.76
AQUAGEL	100 lb	13.21			1000			13,210.00
BARITE	100 lb	8.66			380			3,290.80
DEXTRID	25 kg	25.52			178			4,542.56
Q-BROXIN	25 kg	15.11			180			2,719.80
CAUSTIC SODA	70 kg	53.93			77			4,152.61
SODA ASH	40 kg	14.01			11			154.11
PAC-R	25 kg	85.53			16			1,368.48
PAC-L	25 kg	85.53			14			1,197.42
								30,867.90
NOT CHARGED TO DRILLING								
AQUAGEL	100 lb	13.21			59	(FOR CEMENTING)		779.39
SURFLO W-300	200 lt	193.06			2	(FOR CEMENTING)		386.12
								1,165.51

CHEMICAL VOLUME	100 bbl	
FRESH WATER	3950 bbl	
SEA WATER	1400 bbl	
TOTAL MUD MADE	5450 bbl	
COST LESS BARYTES		$27,577.10
COST WITH BARYTES		$30,867.90

COMMENTS

DRILLED 12¼" PILOT HOLE. LOST APPROX. 300 BBL MUD TO FORMATIONS AT 4530 - 4560 ft
INITIAL DRILLING WITH SEAWATER AND HI-VIS PILLS.

320329

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL RECAP

COMPANY AMOCO AUSTRALIA
WELL TILANA NO. 1
LOCATION T14/P, BASS BASIN
COST/DAY $6,341.00
COST/FT $ 33.68
COST/BBL $ 13.64
RECAPPED BY M. SEWELL
DATE 5 NOVEMBER 1985

MUD TYPES FRESHWATER-GEL-POLYMER
CONTRACTOR DIAMOND M. DRILLING
DRILLING DAYS/PHASE 39
ROTATING HRS/PHASE 583.5

HOLE SIZE 12¼"
INTERVAL TO 12,796 ft
FROM 5,452 ft
FEET DRILLED 7,344 ft
MUD CONSUMPTION FACTOR 2.47 bbl/ft

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
BULK AQUAGEL	100 lb	13.21			6486			85,680.06
SACK AQUAGEL	100 lb	13.21			59			779.39
BULK BARITE	100 lb	8.66			6650			57,589.00
SODA ASH	40 kg	14.01			41			574.41
CAUSTIC SODA	70 kg	53.93			302			16,286.86
CAUSTIC SODA	25 kg	19.26			87			1,675.61
Q-BROXIN	25 kg	15.11			1188			17,950.68
DEXTRID	50 lb	25.52			588			15,005.76
PAC-R	50 lb	85.53			139			11,888.67
LIME	25 kg	5.38			345			1,856.10
ALUMINIUM STEARATE	12.5 kg	28.44			23			654.12
KWIK SEAL	40 lb	19.68			15			295.20
PAC-L, DRISPAC S/L	50 lb	85.53			291			24,889.23
SRUFLO W-300	55 gal	193.06			2			386.12
TORQ TRIM II	55 gal	402.85			4			1,611.40
SODIUM BICARB.	50 kg	19.81			20			396.20
POTASSIUM NITRATE	50 kg	45.01			44			1,980.44
CELPOL	25 kg	50.00			22			1,100.00
CARBONOX	50 lb	13.20			179			2,362.80
GILSONITE	25 kg	50.00			53			2,650.00
HME	20 lt	50.00			27			1,350.00
SACK BARITE	100 lb	8.66			42			363.72
								247,325.78
NOT CHARGED TO DRILLING								
CONDET	55 gal	122.26			4	(FOR RIG WASH)		489.04
SAPP	25 kg	35.15			3	(BROKEN)		105.45
GILSONITE	25 kg	50.00			10	(BROKEN)		500.00
AQUAGEL	100 lb	13.21			30	(CEMENT/PILL)		396.30
BARITE	100 lb	8.66			100	(CEMENT SPACER)		866.00
								2,356.79

CHEMICAL VOLUME
FRESH WATER 1394 bbl
SEA WATER 16731 bbl
TOTAL MUD MADE 18125 bbl
COST LESS BARYTES $189,373.06
COST WITH BARYTES $247,325.78
COMMENTS

320330

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL SUMMARY

COMPANY	AMOCO AUSTRALIA	MUD TYPE	SEAWATER + HI-VIS PILLS	HOLE SIZE	FEET DRILLED	DRILLING DAYS
WELL	TILANA NO.1		SEAWATER-QMIX			
LOCATION	T14/P, BASS BASIN		FRESHWATER-GEL-POLYMER-LIME	36"	343	2
COST/DAY	$4,658.00			26"	680	2
COST/FT	$ 22.82			17½"	4087	10
COST/BBL	$ 11.40	TOTAL ROTATING HRS	706.5	12¼"	7344	39
RECAPPED BY	M. SEWELL	TOTAL DAYS ON HOLE	61 + TEST			
		TOTAL DEPTH	12,796 ft	TOTAL	12453 ft	53 Days
		MUD CONSUMPTION : WELL AVERAGE		2.0 bbl/ft		

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
BULK AQUAGEL	100 lb	13.21			7906			104,438.26
SACK AQUAGEL	100 lb	13.21			59			779.39
BULK BARITE	100 lb	8.66			7030			60,879.80
SACK BARITE	100 lb	8.66			42			363.72
SODA ASH	40 kg	14.01			57			798.57
CAUSTIC SODA	70 kg	53.93			383			20,655.19
CAUSTIC SODA	25 kg	19.26			87			1,675.62
QBROXIN	25 kg	15.11			1368			20,670.48
DEXTRID	50 lb	25.52			766			19,548.32
PAC-R	50 lb	85.53			155			13,257.15
LIME	25 kg	5.38			396			2,130.48
ALUM. STEARATE	12.5 kg	28.44			27			767.88
KWIK SEAL	40 lb	19.66			15			294.90
PAC-L/DRISPAC	50 lb	85.53			305			26,086.65
SURFLO W300	55 gal	193.06			2			386.12
TORQ TRIM II	55 gal	402.85			4			1,611.40
SODIUM BICARB.	50 kg	19.81			20			396.20
POTASSIUM NITRATE	50 kg	45.01			44			1,980.44
CELPOL	25 kg	50.00			22			1,100.00
CARBONOX	50 lb	13.20			179			2,362.80
GILSONITE	25 kg	50.00			53			2,650.00
H.M.E.	20 lt	50.00			27			1,350.00
								284,183.67
NOT CHARGED TO DRILLING								
BARITE	100 lb	8.66			232			2,009.12
SURFLO W-300	55 gal	193.06			4			772.24
CALCIUM CHLORIDE	25 kg	7.78			34			264.52
AQUAGEL	100 lb	13.21			129			1,704.09
GILSONITE	25 kg	50.00			10			500.00
SAPP	25 kg	35.15			3			105.45
CONDET	55 gal	122.26			4			489.04
								5,844.46

CHEMICAL VOLUME		
FRESH WATER	6,664 bbl	
SEA WATER	18,131 bbl	
TOTAL MUD MADE	24,795 bbl	
COST LESS BARYTES		$222,913.61
COST WITH BARYTES		$284,183.67
COMMENTS		

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

DRILLING FLUID PROPERTY RECAP

COMPANY AMOCO AUSTRALIA PETROLEEM WELL TILANA NO.1

DATE 1985	DEPTH Ft	HOLE SIZE	TEMP F°	WEIGHT ppg	VIS SEC	PV	YP	GELS 10 sec	GELS 10 min	WATER LOSS A.P.I.	CAKE mm	pH	Pf	Mf	Cl mg/l	Ca mg/l	SAND %	SOLIDS %	WATER %	OIL %	MBC ppb	HPHT 200°F	REMARKS TREATMENT FORMATION
SEPTEMBER																							
6	685	36"																					SEAWATER + HI-VIS SWEEPS NOT LOGGED
7	685	"																					RUN 30" CASING " "
8	1265	26"																					SEAWATER + HI-VIS SWEEPS " "
9	1365	"																					RUN 20" CASING " "
10	1533	12¼"																					SEAWATER + HI-VIS SWEEPS LMST
11	3476	"	86	8.8	48	8	18	12	25	18.5	2	9.9	Tr	.3	11500	680	Tr	5	95	-	17		12¼" PILOT HOLES,MUD UD LMST,CLYST
12	4320	"	102	9.0	48	8	22	10	20	18.5	2	11.2	.4	.7	14000	120	Tr	6	94	-	20		BIT TRIP, DRILL CLYST,VOLCS
13	5110	"	115	9.1	42	8	32	15	25	11.0	2	11.5	.9	1.3	12000	Tr	Tr	7	93	-	27		MUD LOSSES, DRILL VOLC,SLTST,CLY
14	5452	"	-	9.2	45	10	20	12	19	8.0	2	12.0	1.4	2.5	12000	40	Tr	7	93	-	27		POH TO LOG CLYST,SLTST,SS
15	2690	17½"	-	9.2	41	9	16	5	18	7.5	2	11.4	.7	1.8	9000	40	Tr	6	94	-	30		OPEN HOLE TO 17½" LMST,CLYST
16	4560	"	-	8.9	42	9	18	5	22	9.5	2	11.1	.3	1.2	10000	40	Tr	6	94	-	27		" " " " CLYST,LMST,SLT
17	5452	"	-	9.2	46	12	26	7	32	10.2	2	12.0	3.1	5.0	9800	40	Tr	7	93	-	27		" " " " VOLC,SLTST,CLY
18	5452	"	-	9.5	47	11	24	15	36	8.0	2	11.8	.8	1.4	9000	60	Tr	9	91	-	30		CIRC & COND.HOLE,POH TO RUN 13-3/8" CSG
19	5453	12¼"-		SEAWATER																			DRILL CEMENT WITH SEAWATER -
20	5453	"	-	9.0	54	6	19	11	24	22.0	3	9.8	.2	0.4	3500	200	Nil	5	95	-			DRILL CMT,DISPLACE CSG W/MUD -
21	5453	"	-	9.0	54	6	19	11	24	22	3	9.8	.2	0.4	3500	200	0	5	95	-			
22	5325	"	97	8.9	47	20	13	2	5	3	1	11	2.7	3.4	3500	20	Tr	4	96	-	25	25	DRILL, CMT RETAINER
23	5460	"	100	8.9	45	14	12	2	5	4.0	1	11.5	2.8	3.6	3500	24	Tr	4	96	-	25	22	DRILL
24	5873	"	100	9.0	45	16	12	2	6	4.0	1	11.5	2.1	2.9	4000	35	Tr	5	95	-	25	21	DRILL
25	6467	"	100	9.0	45	16	10	2	8	3.8	1	11.0	1.9	2.6	3600	30	Tr	5	95	-	25	20	DRILL
26	6750	"	102	9.1	48	21	15	3	12	3.8	1	10.5	1.2	2.4	3400	20	Tr	5	95	-	25	20	DRILL DIORITE
27	7075	"	103	9.1	54	24	20	5	15	3.6	1	10	.45	.7	3300	100	Tr	5	95	-	25	22	DRILL,10-20 FT/HR "
28	7236	"	105	9.1	52	20	17	4	12	3.8	1	10	.3	.6	3400	80	Tr	5	95	-	25	23	DRILL (16 HR)
29	7625	"	106	9.1	47	17	7	3	5	3.6	1	10.5	.45	.7	3400	120	Tr	5	95	-	25	21	DRILL (24 HR) SLTST
30	7971	"	114	9.25	50	21	12	4	10	3.8	1	10.5	.65	.9	3400	100	Tr	5	95	-	25	21	

320331

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

DRILLING FLUID PROPERTY RECAP

COMPANY AMOCO AUSTRALIA PETROLEUM WELL TILANA NO.1

DATE 1985	DEPTH Ft	HOLE SIZE	TEMP F°	WEIGHT ppg	VIS SEC	PV	YP	GELS 10 sec	GELS 10 min	WATER LOSS A.P.I.	CAKE mm	pH	Pf	Mf	Cl mg/l	Ca mg/l	SAND %	SOLIDS %	WATER %	OIL %	MBC ppb	HPHT 200-220°F	REMARKS	TREATMENT	FORMATION
OCTOBER																									
1	8095	12¼"	106	9.3	49	22	13	5	13	3.8	1	10.5	.6	1.3	3300	140	Tr	6	94	-	25	21	DRILL (10 HR)		SLTST,CLYST
2	8410	"	107	9.6	48	22	12	5	16	3.8	1	10.5	.4	.7	3200	120	Tr	7	95	-	25	21	DRILL (24 HR)		SLTST,CLYST
3	8570	"	115	9.4	50	21	13	4	11	3.6	1	10.5	.45	.7	3400	120	Tr	6	94	-	25	21	DRILL (12 HR)		CLYST
4	8928	"	122	9.3+	50	22	14	4	14	3.9	1	10	.35	.6	3500	100	Tr	6	94	-	25	2@	DRILL (24 HR)		SLST,CLYST
5	9149	"	117	9.4	15	23	14	5	16	3.9	1	10.5	.65	.95	3300	120	Tr	6	94	-	25	22	DRILL (10 HR)		SLTST,CLYST,COAL
6	9242	"	120	9.3	52	25	18	5	13	4.5	1	11.8	.8	1.5	3000	80	Tr	5	95	-	25	21	DRILL (4 HR)		
7	9588	"	132	9.3+	52	24	18	5	13	5.3	1	11.7	.9	1.9	3000	60	Tr	5	95	-	25	21	DRILL (24 HR)		
8	9884	"	135	9.3	59	26	19	5	12	4.8	1	11.3	.8	1.5	2800	60	Tr	6	94	-	25	21	DRILL (24 HR)		
9	10020	"	141	9.3+	62	25	22	6	12	5.4	1	11.7	.9	1.9	2500	40	Tr	6	94	-	25	21	DRILL (24 HR)		
10	10059	"	147	9.3	57	24	17	5	11	5.6	1	11.6	.9	1.9	2100	40	Tr	6	94	-	25	22	DRILL (6 HR)		
11	10059	"	138	9.3	64	23	20	5	12	5.9	1	11.3	.8	1.6	2200	40	Tr	6	94	-	25	-	E-LOGS		
12	10080	"	133	9.3	73	24	25	6	13	5.8	1	10.5	.3	.6	2300	40	Tr	6	94	-	25		WIPER TRIP		
13	10345	"	147	9.3	57	24	18	5	10	6.0	1	11.1	1.1	2.3	2200	40	Tr	5	95	-	25	22	HP-HT @ 220°F		VOLC
14	10571	"	143	9.2+	59	24	18	6	13	6.5	1	10.6	1.4	2.7	2300	10	Tr	5	95	-	24	22	DRILL (24 HR)		VOLC, SLTST,COAL
15	10783	"	138	9.3	57	21	16	5	12	6.3	1	10.6	1.4	2.6	2100	20	Tr	5	95	-	24	22	DRILL (23 HR)		" " "
16	10865	"	140	9.3	55	20	16	5	13	6.5	1	10.5	1.2	2.2	2100	30	Tr	5	95	-	24	22	DRILL (12 HR)		
17	10865	"	129	9.7	80	34	29	12	26	5.0	1	11.0	1.6	3.7	2000	10	Tr	8	92	-	29	22	RAISE MBT,YP,WT,pH DUE TO TIGHT HOLE		
18	11000	"	137	9.7	74	32	27	8	25	5.0	1	11.0	2.0	3.6	2100	Tr	Tr	8	92	-	28	18	DRILL (22 HR)		
19	11309	"	142	9.6	77	30	23	6	19	5.4	2	11.0	1.8	3.2	2200	Tr	Tr	8	92	-	28	19	DRILL,SOLIDS HIGH.INCR.SOLIDS CONTROL AND DILUTION		
20	11360	"	138	9.5+	63	30	28	9	24	5.6	2	11.0	1.3	3.5	2200	80	Tr	8	92	-	28	19	DRILL,TREAT FOR CO_2		BASALT
21	11602	"	155	9.6+	77	30	34	11	27	5.8	2	11.2	1.1	2.9	2200	40	Tr	8	92	-	28	20	DRILL,TREAT FOR CO_2		VOLC.

3203332

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

DRILLING FLUID PROPERTY RECAP

COMPANY AMOCO AUSTRALIA PETROLEUM WELL TILANA NO.1

DATE 1985	DEPTH ft	HOLE SIZE	TEMP F°	WEIGHT ppg	VIS SEC	PV	YP	GELS 10 sec	GELS 10 min	WATER LOSS A.P.I.	CAKE mm	pH	Pf	Mf	Cl mg/l	Ca mg/l	SAND %	SOLIDS %	WATER %	OIL %	MBC ppb	HPHT 200-220°F	REMARKS TREATMENT FORMATION
OCTOBER -																							
22	11820	12¼"	154	9.6	48	20	23	3	10	6.5	2	12.5	5	7	3400	48	Tr	8	92	-	26	21	DRILL (24 HR) VOLCS
23	12086	"	150	9.8+	48	24	22	4	11	5.1	2	12.5	4.1	5.3	2700	46	Tr	8.5	91.5	-	26	21	DRILL (24 HR) "
24	12167	"	143	9.9	54	26	22	4	13	5.2	2	12.5	4.4	6.0	2600	60	Tr	8.6	91.4	-	26	20.5	DRILL (8½HR) "
25	12292	"	145	9.8	44	19	16	3	8	4.8	1	12.4	6	7.6	2300	28	Tr	8.4	91.6	-	26	20	DRILL,REDUCE WT W/DILUTION VOLC, SST
26	12307	"	113	9.9	64	26	32	10	25	5.2	1	12.2	5.4	7.2	2300	36	Tr	8.5	91.5	-	25	-	CUT CORE VOLC
27	12580	"	127	9.7	44	18	15	4	9	5.2	1	12.6	5.7	7.1	2000	32	Tr	8.5	91.5	-	26	21	DRILL,TREAT ALKAL. "
28	12795	"	143	9.7+	49	19	16	4	12	4.7	1	12.6	5.7	7.15	2100	36	Tr	8.5	91.5	-	26	-	DRILL (20 HR), T.D. "
29	12796	"	143	9.9	47	19	15	3	8	5.3	1	12.6	5.6	6.7	2100	32	Tr	8.4	91.6	-	26+	23	LOGS,REAM,COND MUD,RAISE WT,ADD LIME
30	12796	"	N.A.	9.9	79	40	33	12	29	5.8	2	12.8	5.2	7.6	2100	28	Tr	8.4	91.6	-	26	-	LOG, PF DECREASING IN PITS, INCR. VIS
31	12796	"	N.A.	9.9	72	38	27	6	22	5.6	2	12.8	6.6	57.9	2100	120	Tr	8.4	91.6	-	26+		TREAT SURFACE MUD W/LIME, LOG
NOVEMBER																							
1	12796	"	140	10.1	48	22	12	3	12	5.3	1	12.5	3.6	5.1	2100	36	Tr	11	89	-	25	18	REAM, CIRC, RAISE MUD WT
2 (IN)	12796	"	140	10.2	48	25	15	3	8	6.6	1	12.5	3.8	4.5	2300	80	Tr	11	89	-	25	18)	CHECKS SHOW HEAVY CARBONATE CONTAMINATION
2 (OUT)	"	"	140	10.2	52	28	14	7	14	8.0	3	12.6	3.8	6.8	2300	65	Tr	11	89	-	25	20 }	LIME IN=1.5 ppb,OUT =1.1 ppb
3	10874	"	141	10.2	46	23	15	3	12	6.3	1	12.3	3.3	4.9	2300	60	Tr	11	89	-	25	18	PLUG BACK,TREAT W/GILSONITE FOR TORQUE
4	10874	"																					RUN 9-5/8" CASING
									TESTING														
5	10875	"	-	10.2	49	20	15	3	11	5.8	1	12.5	4.5	5.9	2300	80	Tr	11	89	-	25		RUN 9-5/8" CASING
6	10875																						TEST FLUID IN PREPARATION
7	10812		70	9.0	150	42	68	10	13	4.5	1	12.3	1.7	2.3	800	20	-	3.5	96.5	-	10		TEST FLUID
8	10812	"	-	9.0	130	30	40	5	10	4.2	1	12.0	1.7	2.3	800	20	-	3.5	96.5	-	10		TEST FLUID
9	10812	"	-	9.0	120	26	36	5	10	4.4	1	12.3	1.7	2.3	800	20	-	3.5	96.5	-	10		" "
10	10812	"	-	9.0	120	29	36	5	9	4.1	1	12.2	1.5	2.4	1000	20	-	3.5	96.5	-	10		" "
11	10812		-	9.0	120	28	35	5	10	4.2	1	12.2	1.5	2.4	1000	20	-	3.5	96.5	-	10		" "
12	10812		-	9.0	120	26	34	5	10	4.1	1	12.1	1.2	2.0	1000	20	-	3.5	96.5	-	10		" "

47

320333

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

DRILLING FLUID PROPERTY RECAP

COMPANY AMOCO AUSTRALIA PETROLEUM WELL TILANA NO.1

DATE 1995	DEPTH ft	HOLE SIZE	TEMP F°	WEIGHT ppg	VIS SEC	PV	YP	GELS 10 sec	GELS 10 min	WATER LOSS A.P.I.	CAKE mm	pH	Pf	Mf	Cl mg/l	Ca mg/l	SAND %	SOLIDS %	WATER %	OIL %	MBC ppb	HPHT 200-220°F	REMARKS	TREATMENT	FORMATION
NOVEMBER																									
13	10812	12¼"	-	9.0	117	25	34	5	10	4.3	1	12.1	1.0	1.8	900	20	-	3.5	96.5	-	10		TEST FLUID		
14	10812	"	-	9.0	105	25	30	4	9	4.7	1	12.3	1.5	2.2	900	20	-	3.5	96.5	-	10		" "		
15	10812	"	150	9.0	70	36	55	5	10	4.6	1	12.0	1.3	1.9	700	30	-	3.5	96.5	-	10		" "	RAISED RHEOLOGY WITH PAC-R WHILE CIRC.	
16	10812		-	9.0	110	31	40	4	8	4.4	1	12.0	1.2	1.8	700	10	-	3.5	96.5		10		" "		
17	10396	"	139	9.0	70	30	38	4	8	4.6	1	11.9	1.1	1.7	700	10	-	3.5	96.5	-	10		" "		
18	10396	"	-	9.0	110	30	33	4	8	4.5	1	11.8	1.0	1.4	800	20	-	3.5	96.5	-	10		" "		
19	10396	"	-	9.0+	110	29	30	3	6	4.4	1	11.7	0.9	1.3	800	40	-	3.5	96.5	-	10		" "		
20	10088	"	-	9.0+	108	28	29	2	5	4.4	1	11.7	0.8	1.2	800	40	-	3.5	96.5	-	10				
21	10088	"	-	9.0	108	27	29	2	5	4.4	1	11.7	0.8	1.2	800	40	0	3.5	96.5	-	10				
22	P & A			9.0	65																				
23	P & A			9.0	55																				

32033 4

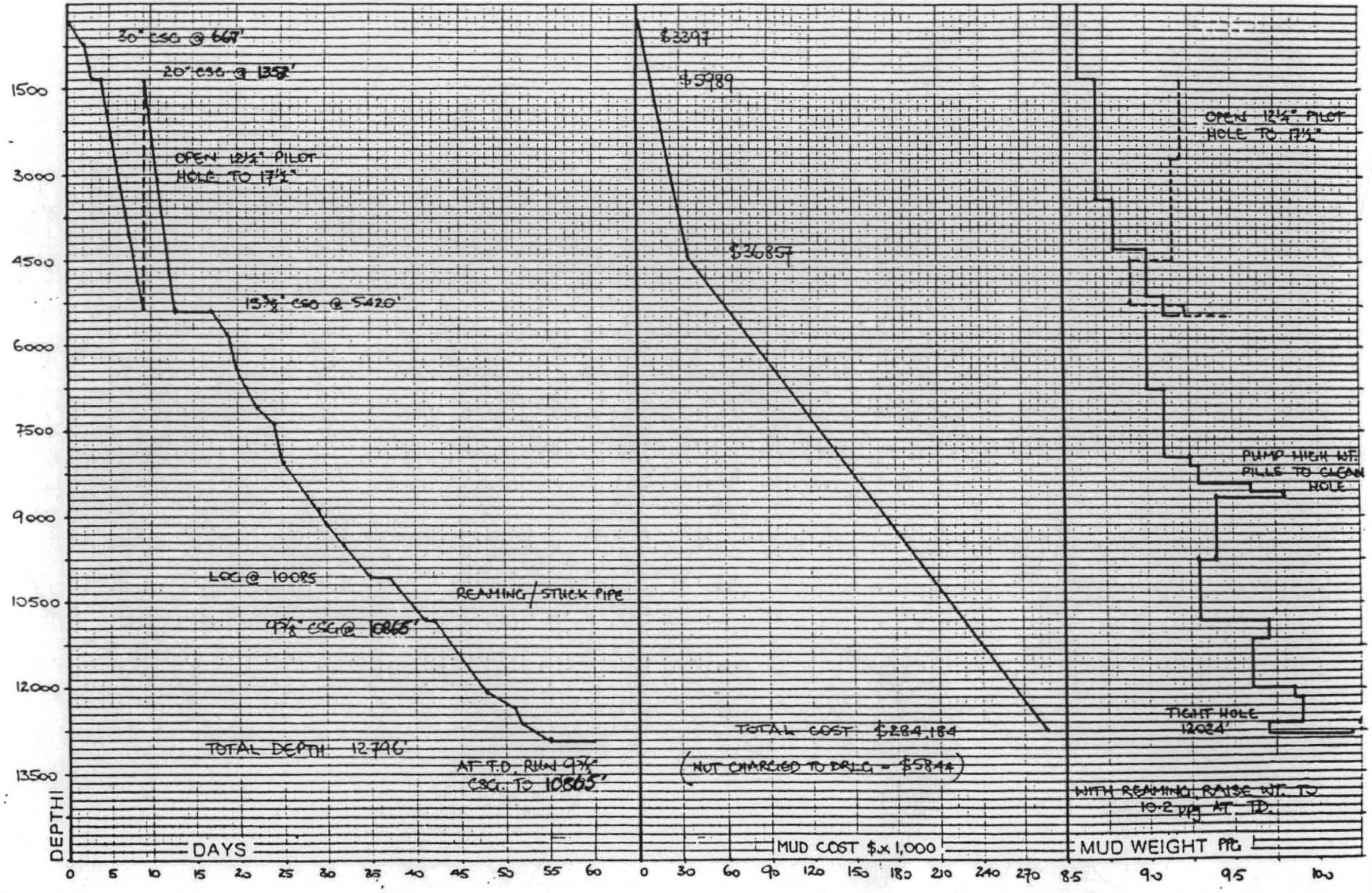
Baroid Australia PTY. LTD./NL INDUSTRIES INC.

GRAPH SUMMARY

5 cm

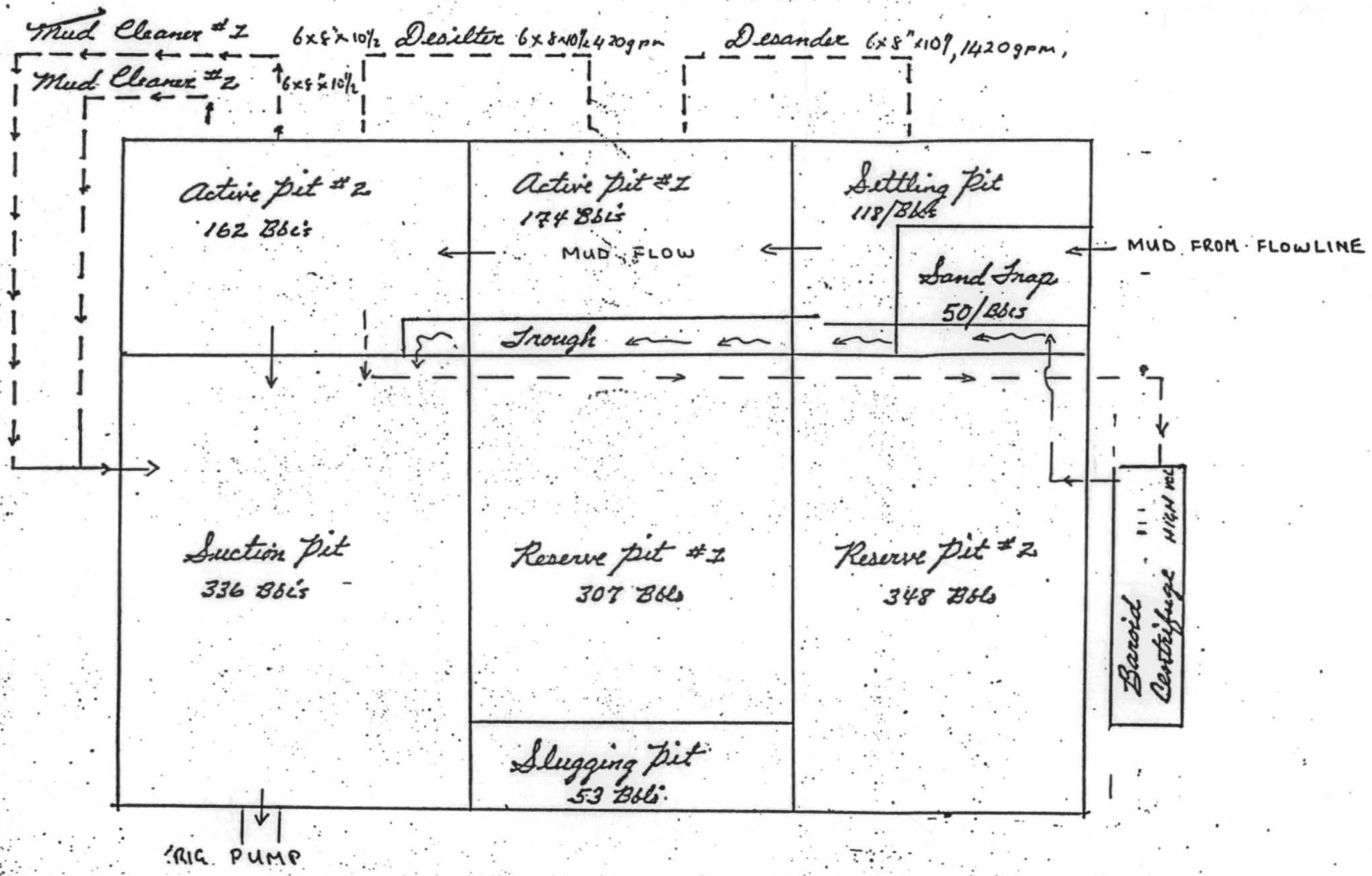
OPERATOR AMOCO AUSTRALIA

WELL TILANA No. 1



49

3203335

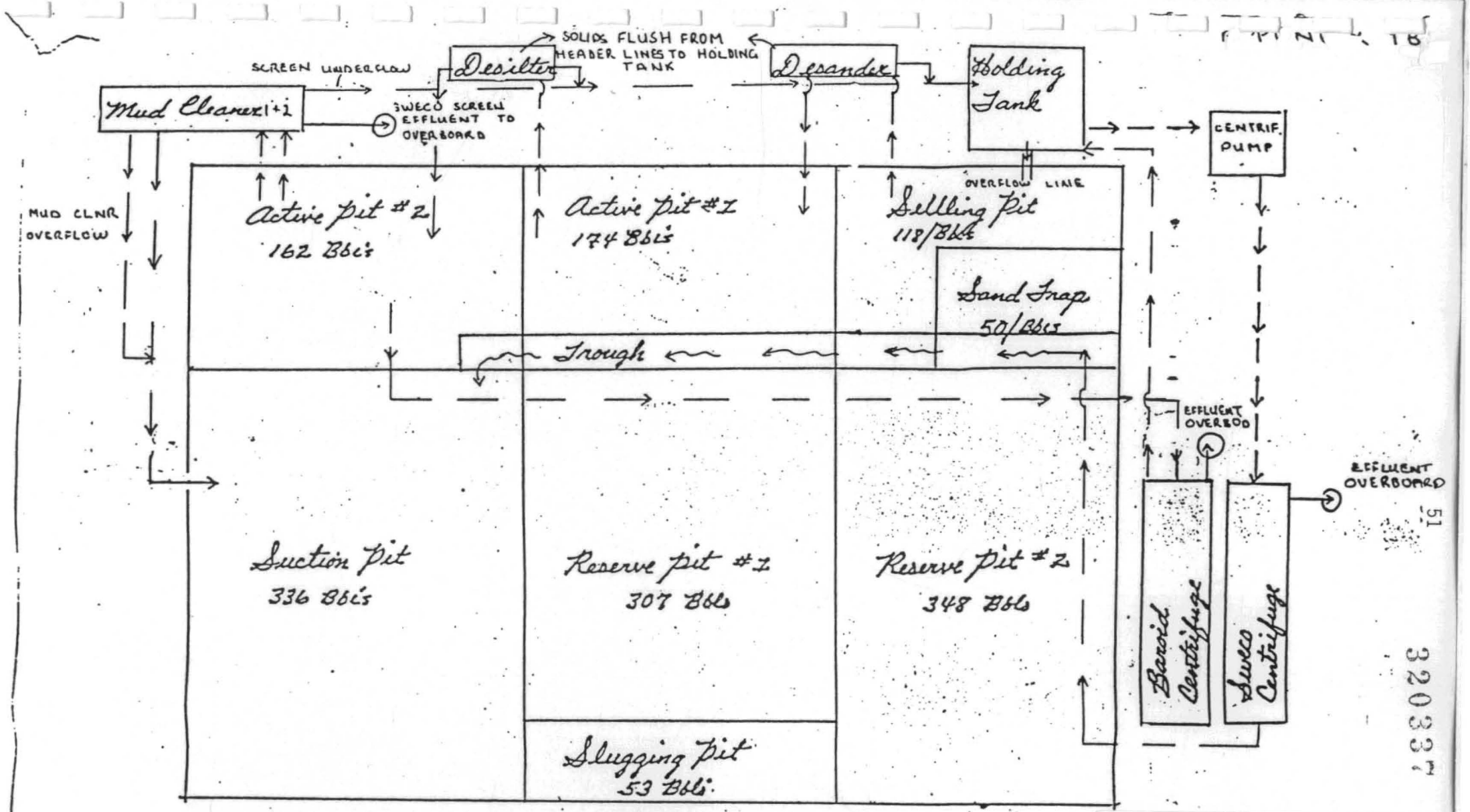


Diamond "M" Epoch mud System as of November 2, 1985

5 cm

50

320336



51

3203331

① Desilter and Mud Cleaners discharge into holding tank.
② Baroid Centrifuge discharge into holding tank. (UNDERFLOW).
③ Effluents processed through Sweco Centrifuge for final solids cut < 5 microns?
④ UNDERFLOW from Sweco Centrifuge discharged into trough or into reserve pits 1 or

BIT RECORD

COMPANY	CONTRACTOR	COUNTY	STATE
AMOCO AUSTRALIA	DIAMOND M		

LEASE	WELL NO	SEC	TOWNSHIP	RANGE	BLOCK	FIELD
TILANA	1				T/14 -P	BASS STRAIT

TOOL PUSHER	DRILL PIPE	DRAW WORKS	
DAY DRILLER	TOOL JOINT MAKE SIZE TYPE	POWER H P	UNDER SURF
EVENING DRILLER	DRILL COLLAR NO O D I D LENGTH	PUMP NO 1 MAKE MODEL STROKE	INT DATE
MORNING DRILLER	DRILL COLLAR NO O D I D LENGTH	PUMP NO 2 MAKE MODEL STROKE	T D DATE

BIT NO	BIT SIZE	BIT MFGR	BIT TYPE	SERIAL NO OF BIT	JET SIZE 1	2	3	DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/HR	WEIGHT 1000 LBS	ROTARY R P M	VERT DEV	PUMP PRESS	PUMPS No	Liner	SPM	MUD Wt	Vis	DULL CODE T	B	G	REMARKS FORMATION, CIRC FLUID, ETC	DATE
1	26	SMITH	DGJ	ER-7449	14	14	14	685	342	4.5	4.5	76	8/10	60	3/4	650	½	6½	75	Seawater		1	1	I		
2 RR1	26	SMITH	DGJ	ER-7449	14	14	14	1365	680	7	11.5	97.1	8	80	½	1600	½	6½	76	Seawater		2	2	I		
3	17½	SMITH	DSJ	XD-63953	18	18	18	1372	7	0.5	12	14	5/10	50/60		2420	½	6½	76	Seawater		1	1	I		
4	12¼	SMITH	SDT	CH-1803	15	15	18	4241	2865	31	43	92.4	20/25	100		2380	½	6½	74	8.8	50	4	4	1/8		
5	12¼	SMITH	F-2CE	EX-0030	13	11 13	13	5452	1211	32	75	37.8	35/40	100	2	2800	½	6½	74	9.2	50	6	2	1/8		
6	17½	SMITH	SDGHC	XD-9457	16	16 12	16	5452	4099	48	123	85.4	20	120	2	2800	½	6½	68	7.2	45	5	3	1/8		
RR6	17½	SMITH	SDGHC	XD-9457	16	16 12	16	5452		Clean-up Trip																
8	12¼	SMITH	SDGH	EX-2108	OPEN			5419		Drill Cmt												4	3	1/8		
9	12¼	SMITH	SDT	AV-3240	OPEN			5452	3	Drill Shoe																
RR9	12¼	SMITH	SDT	AV-3240	OPEN			5457	35	Drill EZSV & Cmt												7	6	1/8		
11	8 15/32	DB	CB	9504004				5519	62	2.5	169	24.8	15	60/90	1	1800	½	6½	80	8.9	45	10%				
12	12¼	SMITH	SDGH	ER-8739	15	15	15	6320	861	21	190	41	30	100	½	2250	½	6½	60	9.0	45	6	3	1/8		
13	12¼	SMITH	SVH	AJ-0457	15	15	15	6568	248	7.5	197.5	33.1	35/40	100	3/4	2250	½	6½	60	9.1	48	4	2	I		
14	12¼	SMITH	F-2	XD-5301	15	15	15	7173	605	44	241.5	13.8	35/40	80/90	1¼	2320	½	6½	60	9.1	52	1	2	I		
15	12¼	SMITH	F-3	MA-4257	15	15	15	7971	798	48.5	290	16.5	40/45	80/90	3/4	2430	½	6½	60	9.2	50	8	8	I		
16	12¼	SMITH	F-3	CH-2990	14	14	14	8420	449	34	324	13.2	40/45	80/90	1½	2600	½	6½	45	9.3	45	1	8	I	Plugged Jet	
17	12¼	SMITH	F-2CE	EV-9501	13	13 8	13	9149	729	43.5	367.5	16.8	40/50	80/90	1½	2890	½	6½	60	9.3	50	2	2	1/8		
18	8 15/32	DB	CB	9504004				9210	61	3	370.5	20.3	5/10	85	1½	3000	½	6½	60	9.3	50	15%				
19	12¼	SMITH	F-2	EV-9275	14	14	14	10,059	910	76	446.5	12	40/45	90	13/4	2900	½	6½	60	9.3	57	3	7	I		
20	12¼	SMITH	F-2	EV-9465	14	14	14	10,865	806	76	522.5	10.6	45	90	3/4	2850	½	6½	60	9.3	55	4	6	I	Lost seal on 1 cone	
21	12¼	SMITH	F-2	EV-6008	14	14	14	11,340	475	45½	568	10.4	40/45	90	3/4	3000	1	6½	94	9.5	63	8	6	¼	Broken inserts	10/20

SMITH REPRESENTATIVE PHONE

Compliments of SMITH SMITH TOOL
P.O. BOX C19511 • IRVINE, CALIF. 92713-9511
DIVISION OF SMITH INTERNATIONAL, INC.

320338

BIT RECORD

COMPANY	CONTRACTOR	COUNTY	STATE
AMOCO AUSTRALIA	DIAMOND M		TASMANIA

LEASE	WELL NO	SEC	TOWNSHIP	RANGE	BLOCK	FIELD
T-14/P	TILANA 1					BASS STRAIT

TOOL PUSHER	DRILL PIPE	DRAW WORKS	
DAY DRILLER	TOOL JOINT MAKE SIZE TYPE	POWER H P	UNDER SURF
EVENING DRILLER	DRILL COLLAR NO O D I D LENGTH	PUMP NO 1 MAKE MODEL STROKE	INT DATE
MORNING DRILLER	DRILL COLLAR NO O D I D LENGTH	PUMP NO 2 MAKE MODEL STROKE	T D DATE

BIT NO	BIT SIZE	BIT MFGR	BIT TYPE	SERIAL NO OF BIT	JET SIZE 1	2	3	DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/HR	WEIGHT 1000 LBS	ROTARY R P M	VERT DEV	PUMP PRESS	PUMPS No	Liner	SPM	MUD Wt	Vis	DULL CODE T	B	G	REMARKS FORMATION, CIRC FLUID, ETC	DATE
22	12¼	STC	F-3	XB-2703	14	14	14	12,120	780	77	645	10.1	45	90	1¼	3000	2	6½	118	9.9	54	5	5	I		10/24
23	12¼	STC	F-2	XE-0200	14	14	14	12,292	172	16½	661½	10.4	45	90	2	3000	2	6½	118	9.8	48	2	3	I	Pull CD to Core	10/25
24	12¼	STC	F-2	EV-9368	14	14	14	12,796	486	44	672½	11	45	90	2 1/3	2900	2	6½	121	9.7	44	3	6	1/8	Pulled at T.D.	10/29
25	12¼	STC	SV4	XB-1674	15	15	15	12,796	-	-	672½	-	-	-	2 1/3	2120	2	6½	100	10.1	48	6	3	1/8	Ream bottom 15 FT	11/02

Compliments of SMITH TOOL

SMITH REPRESENTATIVE PHONE

P.O. BOX C19511 • IRVINE, CALIF. 92713-9511
DIVISION OF SMITH INTERNATIONAL, INC.

53

320339

COMPANY	WELL NAME & NO.	FIELD:	COUNTRY	SPUD DATE	HIG RELEASE
AMOCO AUSTRALIA	TILANA NO 1		AUSTRALIA		

BHA NO.	BIT NO.	BOTTOM HOLE ASSEMBLY	WOB	RPM	DEPTH IN	DEPTH OUT	ANGLE BELOW	ANGLE ABOVE
			DRILLING PARAMETERS					
1	1	12¼ Bit | 36" H.O | Bit Sub | 3-9½" DC | XO | 6-8" DC | XO | 12-5" HWDP | DP	10	60	343	685	½	0.
2	2	26" Bit | Bit Sub | 3-9½" DC | XO | 9-8" DC | XO | 15-5" HWDP | DP	5	90	685	1365	½	½
3	3	12¼" Bit | Float Sub | 3-9½" DC | XO | 9-8" DC | XO | 1-5" HWDP | 6¼" Jar | 17-5" HWDP | DP	40	100	1365	5452	1	½
4	5	17½" Bit | Float Sub | 2-8" Monel | 9-8" DC | XO | 1-5" HWDP | 6¼" Jar | 17-5" HWDP | DP	25	120	5452	5452	2	1
5	11	12¼" Bit | Junk Sub | Float Sub | 2-8" Monel | 6-8" DC | XO | 1-5" HWDP | 6¼" Jar | 16-5" HWDP | DP	20	80	5452	6330	½	2
6	23	12¼" Bit | Junk Sub | Float Sub | 2-8" Monel | 13-8" DC | XO | 1-5" HWDP | 6¼" Jar | 16-5" HWDP | DP	40	90	6330	12310	2	½
7	24	12¼" Bit | Bit Sub | 2-8" Monel | 13-8" DC | XO | 1-5" HWDP | 6¼" Jar | 16-5" HWDP | DP	35	90	12310	12796	2 1/3	2

54

3203410

Eastman Whipstock (Aust) Pty. Ltd.

WELL DEFLECTION SURVEY

for

AMOCO

TILANA NO:1

Slot : 1
Well : 1

55

Survey Reference : S01284.4AM

320341

Measured Depth	Drift Angle	Drift Direction	Course Length	Vertical Depth	Vertical Section	RECTANGULAR COORDINATES		Dogleg Severity
0.00	0.00	0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00
1352.00	0.00	0.00	******	1352.00	0.00	0.00 N	0.00 E	0.00
1368.00	0.25	290.00	16.00	1368.00	0.01	0.01 N	0.03 W	1.56
1459.00	0.50	296.00	91.00	1459.00	0.24	0.24 N	0.58 W	0.28
1551.00	0.50	299.00	92.00	1550.99	0.62	0.62 N	1.29 W	0.03
1642.00	0.00	0.00	91.00	1641.99	0.81	0.81 N	1.64 W	0.55
1734.00	0.00	0.00	92.00	1733.99	0.81	0.81 N	1.64 W	0.00
1824.00	0.00	0.00	90.00	1823.99	0.81	0.81 N	1.64 W	0.00
1915.00	0.00	0.00	91.00	1914.99	0.81	0.81 N	1.64 W	0.00
2007.00	0.00	0.00	92.00	2006.99	0.81	0.81 N	1.64 W	0.00
2098.00	0.25	164.00	91.00	2097.99	0.62	0.62 N	1.59 W	0.27
2190.00	0.00	0.00	92.00	2189.99	0.43	0.43 N	1.53 W	0.27
2280.00	0.00	0.00	90.00	2279.99	0.43	0.43 N	1.53 W	0.00
2370.00	0.25	135.00	90.00	2369.99	0.29	0.29 N	1.39 W	0.28
2462.00	0.00	0.00	92.00	2461.99	0.15	0.15 N	1.25 W	0.27
2553.00	0.25	111.00	91.00	2552.99	0.08	0.08 N	1.07 W	0.27
2644.00	0.00	0.00	91.00	2643.99	0.00	0.00 N	0.88 W	0.27
2735.00	0.25	227.00	91.00	2734.99	-0.13	0.13 S	1.03 W	0.27
2825.00	0.25	238.00	90.00	2824.99	-0.37	0.37 S	1.34 W	0.05
2915.00	0.25	239.00	90.00	2914.99	-0.57	0.57 S	1.67 W	0.00
3006.00	0.25	157.00	91.00	3005.99	-0.92	0.92 S	1.79 W	0.36
3098.00	0.25	125.00	92.00	3097.99	-1.23	1.23 S	1.54 W	0.15
3280.00	0.25	161.00	182.00	3279.99	-1.85	1.85 S	1.07 W	0.08
3370.00	0.25	198.00	90.00	3369.99	-2.24	2.24 S	1.06 W	0.18
3459.00	0.25	179.00	89.00	3458.98	-2.62	2.62 S	1.12 W	0.09
3550.00	0.50	193.00	91.00	3549.98	-3.21	3.21 S	1.18 W	0.29
3642.00	0.25	244.00	92.00	3641.98	-3.67	3.67 S	1.55 W	0.43
3733.00	0.25	148.00	91.00	3732.98	-4.01	4.01 S	1.64 W	0.41
3824.00	0.25	278.00	91.00	3823.98	-4.27	4.27 S	1.82 W	0.50
3916.00	0.00	0.00	92.00	3915.98	-4.25	4.25 S	2.01 W	0.27

Continued on next page ...

320342

Measured Depth	Drift Angle	Drift Direction	Course Length	Vertical Depth	Vertical Section	RECTANGULAR COORDINATES		Dogleg Severity
4104.00	0.25	163.00	188.00	4103.98	-4.64	4.64 S	1.89 W	0.13
4197.00	0.50	197.00	93.00	4196.98	-5.24	5.24 S	1.89 W	0.35
4289.00	0.75	190.00	92.00	4288.97	-6.21	6.21 S	2.13 W	0.28
4382.00	1.00	193.00	93.00	4381.96	-7.60	7.60 S	2.41 W	0.27
4475.00	1.00	171.00	93.00	4474.95	-9.21	9.21 S	2.47 W	0.41
4662.00	0.50	133.00	187.00	4661.93	-11.33	11.33 S	1.34 W	0.36
4756.00	0.25	109.00	94.00	4755.93	-11.65	11.65 S	0.82 W	0.31
4850.00	0.50	108.00	94.00	4849.93	-11.84	11.84 S	0.23 W	0.27
4943.00	0.50	127.00	93.00	4942.92	-12.22	12.22 S	0.49 E	0.18
5036.00	0.75	193.00	93.00	5035.92	-13.12	13.12 S	0.81 E	0.77
5129.00	0.75	152.00	93.00	5128.91	-14.30	14.30 S	0.97 E	0.56
5223.00	1.00	137.00	94.00	5222.90	-15.46	15.46 S	1.80 E	0.36
5316.00	1.25	134.00	93.00	5315.88	-16.77	16.77 S	3.08 E	0.28
5409.00	1.50	138.00	93.00	5408.85	-18.37	18.37 S	4.63 E	0.29
5435.00	2.00	142.00	26.00	5434.84	-18.98	18.98 S	5.14 E	1.98
5444.00	1.75	141.00	9.00	5443.84	-19.21	19.21 S	5.32 E	2.80
5537.00	1.60	123.00	93.00	5536.80	-21.02	21.02 S	7.33 E	0.59
5630.00	1.25	135.00	93.00	5629.77	-22.47	22.47 S	9.13 E	0.49
5723.00	1.20	132.00	93.00	5722.75	-23.84	23.84 S	10.57 E	0.09
5816.00	1.30	136.00	93.00	5815.72	-25.25	25.25 S	12.03 E	0.14
5909.00	1.00	149.00	93.00	5908.71	-26.73	26.73 S	13.16 E	0.43
6002.00	1.00	147.00	93.00	6001.69	-28.11	28.11 S	14.02 E	0.04
6095.00	0.80	175.00	93.00	6094.68	-29.47	29.47 S	14.49 E	0.51
6188.00	0.60	184.00	93.00	6187.67	-30.61	30.61 S	14.50 E	0.24
6281.00	0.70	206.00	93.00	6280.67	-31.62	31.62 S	14.23 E	0.29
6374.00	0.70	212.00	93.00	6373.66	-32.61	32.61 S	13.68 E	0.08
6467.00	0.70	208.00	93.00	6466.65	-33.59	33.59 S	13.11 E	0.05
6560.00	1.00	213.00	93.00	6559.64	-34.78	34.78 S	12.41 E	0.33
6653.00	0.80	252.00	93.00	6652.63	-35.65	35.65 S	11.28 E	0.68
6746.00	0.80	230.00	93.00	6745.62	-36.28	36.28 S	10.15 E	0.33

Continued on next page ...

57

320343

Measured Depth	Drift Angle	Drift Direction	Course Length	Vertical Depth	Vertical Section	RECTANGULAR COORDINATES				Dogleg Severity
6839.00	0.80	232.00	93.00	6838.61	-37.09	37.09	S	9.14	E	0.03
6932.00	1.00	219.50	93.00	6931.60	-38.11	38.11	S	8.10	E	0.30
7025.00	1.30	237.00	93.00	7024.58	-39.35	39.35	S	6.71	E	0.49
7118.00	1.30	233.00	93.00	7117.56	-40.56	40.56	S	4.98	E	0.10
7211.00	1.20	243.00	93.00	7210.54	-41.63	41.63	S	3.26	E	0.26
7304.00	1.00	252.00	93.00	7303.52	-42.32	42.32	S	1.61	E	0.28
7397.00	1.00	246.00	93.00	7396.50	-42.90	42.90	S	0.10	E	0.11
7490.00	1.25	266.00	93.00	7489.49	-43.34	43.34	S	1.66	W	0.50
7583.00	0.80	242.00	93.00	7582.47	-43.79	43.79	S	3.25	W	0.66
7676.00	0.70	224.00	93.00	7675.46	-44.52	44.52	S	4.22	W	0.27
7769.00	0.25	171.00	93.00	7768.46	-45.23	45.23	S	4.44	W	0.63
7862.00	0.60	56.00	93.00	7861.46	-45.46	45.46	S	3.91	W	0.80
7955.00	0.60	58.00	93.00	7954.45	-44.93	44.93	S	3.10	W	0.02
8048.00	0.70	23.00	93.00	8047.45	-44.15	44.15	S	2.42	W	0.43
8141.00	0.70	28.00	93.00	8140.44	-43.12	43.12	S	1.93	W	0.07
8234.00	0.75	22.00	93.00	8233.43	-42.05	42.05	S	1.44	W	0.10
8327.00	1.00	12.00	93.00	8326.42	-40.70	40.70	S	1.02	W	0.31
8420.00	1.20	14.00	93.00	8419.40	-38.96	38.96	S	0.62	W	0.22
8513.00	1.20	13.00	93.00	8512.38	-37.06	37.06	S	0.16	W	0.02
8606.00	1.25	16.00	93.00	8605.36	-35.14	35.14	S	0.33	E	0.09
8699.00	1.50	28.00	93.00	8698.34	-33.07	33.07	S	1.17	E	0.41
8792.00	1.50	21.00	93.00	8791.30	-30.86	30.86	S	2.18	E	0.20
8885.00	1.60	24.50	93.00	8884.27	-28.53	28.53	S	3.15	E	0.15
8978.00	1.60	27.00	93.00	8977.23	-26.20	26.20	S	4.28	E	0.08
9071.00	1.50	16.00	93.00	9070.20	-23.85	23.85	S	5.20	E	0.34
9164.00	1.50	22.00	93.00	9163.17	-21.55	21.55	S	5.99	E	0.17
9257.00	1.50	32.00	93.00	9256.13	-19.39	19.39	S	7.10	E	0.28
9350.00	1.30	27.00	93.00	9349.11	-17.41	17.41	S	8.22	E	0.25
9443.00	1.00	41.00	93.00	9442.09	-15.86	15.86	S	9.26	E	0.44
9536.00	0.75	44.50	93.00	9535.08	-14.82	14.82	S	10.22	E	0.27

Continued on next page ...

320344

Measured Depth	Drift Angle	Drift Direction	Course Length	Vertical Depth	Vertical Section	RECTANGULAR COORDINATES		Dogleg Severity
9629.00	0.60	52.00	93.00	9628.07	-14.09	14.09 S	11.04 E	0.19
9722.00	0.50	77.00	93.00	9721.07	-13.71	13.71 S	11.84 E	0.28
9815.00	0.60	93.00	93.00	9814.06	-13.64	13.64 S	12.72 E	0.20
9908.00	0.60	93.00	93.00	9907.06	-13.69	13.69 S	13.69 E	0.00
10001.00	1.00	106.00	93.00	10000.05	-13.90	13.90 S	14.97 E	0.47
10043.00	0.75	97.00	42.00	10042.04	-14.03	14.03 S	15.60 E	0.68
10059.10	0.70	112.00	16.10	10058.14	-14.08	14.08 S	15.80 E	1.22
10152.10	0.90	117.00	93.00	10151.13	-14.62	14.62 S	16.98 E	0.23
10245.10	1.00	123.00	93.00	10244.12	-15.39	15.39 S	18.31 E	0.15
10338.10	0.80	113.00	93.00	10337.11	-16.07	16.07 S	19.60 E	0.27
10431.10	0.70	122.00	93.00	10430.10	-16.63	16.63 S	20.68 E	0.17
10524.10	0.60	140.00	93.00	10523.10	-17.32	17.32 S	21.47 E	0.24
10617.10	0.50	149.00	93.00	10616.09	-18.05	18.05 S	21.99 E	0.14
10710.10	0.30	178.00	93.00	10709.09	-18.66	18.66 S	22.17 E	0.30
10803.10	0.70	234.00	93.00	10802.09	-19.36	19.36 S	21.83 E	0.63
10896.10	0.80	237.00	93.00	10895.08	-20.05	20.05 S	20.82 E	0,12
10989.10	1.20	242.00	93.00	10988.06	-20.88	20.88 S	19.42 E	0.44
11082.10	1.10	240.00	93.00	11081.05	-21.78	21.78 S	17.79 E	0.12
11175.10	1.10	238.00	93.00	11174.03	-22.70	22.70 S	16.26 E	0.04
11268.10	1.30	241.00	93.00	11267.01	-23.69	23.69 S	14.58 E	0.23
11361.10	0.40	172.00	93.00	11360.00	-24.85	24.85 S	14.00 E	1.31
11454.10	0.30	189.00	93.00	11453.00	-25.41	25.41 S	14.00 E	0.15
11547.10	0.20	163.00	93.00	11545.99	-25.81	25.81 S	14.03 E	0.16
11640.10	0.10	273.00	93.00	11638.99	-25.97	25.97 S	13.90 E	0.27
11733.10	0.30	55.00	93.00	11731.99	-25.74	25.74 S	13.83 E	0.41
11826.10	0.40	49.00	93.00	11824.99	-25.39	25.39 S	14.27 E	0.11
11919.10	0.60	74.00	93.00	11917.99	-25.01	25.01 S	14.98 E	0.31
12012.10	0.50	89.00	93.00	12010.98	-24.87	24.87 S	15.86 E	0.19
12105.10	1.00	68.00	93.00	12103.98	-24.63	24.63 S	17.05 E	0.60
12198.10	1.70	37.00	93.00	12196.95	-23.31	23.31 S	18.77 E	1.06

Continued on next page ...

59

320345

Measured Depth	Drift Angle	Drift Direction	Course Length	Vertical Depth	Vertical Section	RECTANGULAR COORDINATES		Dogleg Severity
12291.10	1.70	47.00	93.00	12289.91	-21.27	21.27 S	20.61 E	0.32
12384.10	1.70	49.00	93.00	12382.87	-19.42	19.42 S	22.66 E	0.06
12477.10	1.60	24.00	93.00	12475.83	-17.29	17.29 S	24.24 E	0.78
12570.10	1.70	17.00	93.00	12568.79	-14.78	14.78 S	25.18 E	0.24
12663.10	2.00	21.00	93.00	12661.74	-11.94	11.94 S	26.16 E	0.35
12756.10	2.30	23.00	93.00	12754.68	-8.71	8.71 S	27.46 E	0.33

CALCULATION METHOD : Radius of curvature
SLOT COORDINATES : 0.00 N 0.00 E
BOTTOM HOLE LOCATION : Referenced to SLOT
DISTANCE : 28.81
DIRECTION : 107.59

Report Units : Feet

SURVEY RUN INFORMATION

MAGNETIC MULTIPLE SHOT SURVEY TIED TO SLOT SURFACE
CO-RDINATES AT 1352 FT MD
SURVEYED DEPTHS : 1368 TO 5435 FT MD.
SURVEYOR : G.SAYERS DATE:17-SEP-85

SURVEY TIED TO PREVIOUS SURVEY AT 5435 FT MD.
SURVEYED DEPTHS : 5444 TO 10043 FT MD.
SURVEYOR : M.NEWTON

SURVEY TIED TO PREVIOUS SURVEY AT 10043.00 FT MD.
SURVEYED DEPTHS : 10059.10 TO 12756.10 FT MD. (DMS)
SURVEYOR : G. SAYERS DATE : 28-OCT-85

60

320346

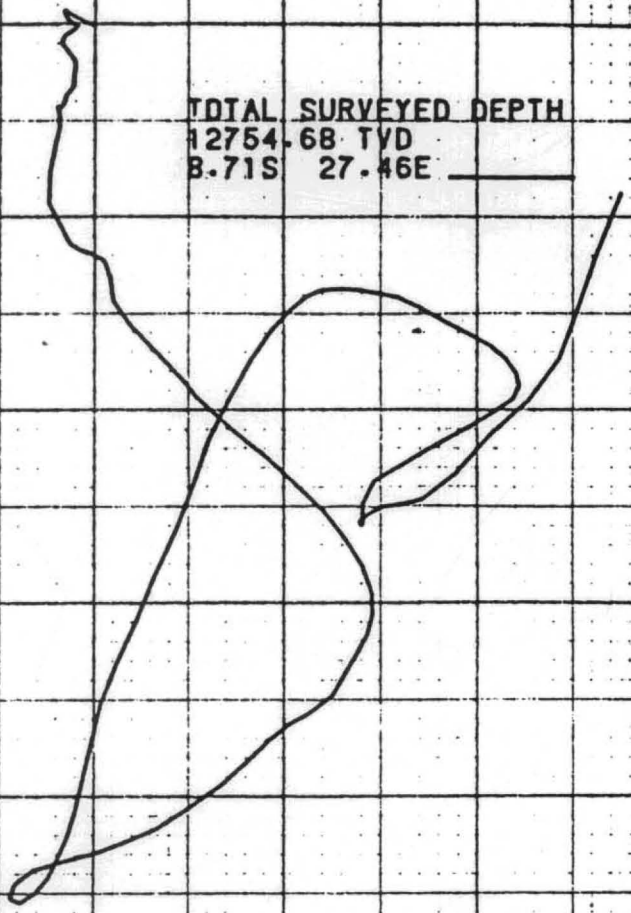
320347

61



Prepared by:
Eastman Whipstock

TOTAL SURVEYED DEPTH
12754.68 TVD
8.71S 27.46E



SCALE 1"=1OFT.

TOTOL SURVEYED DEPTH : 12756.10 MD
12754.68 TVD
-8.71 SECT

5 cm

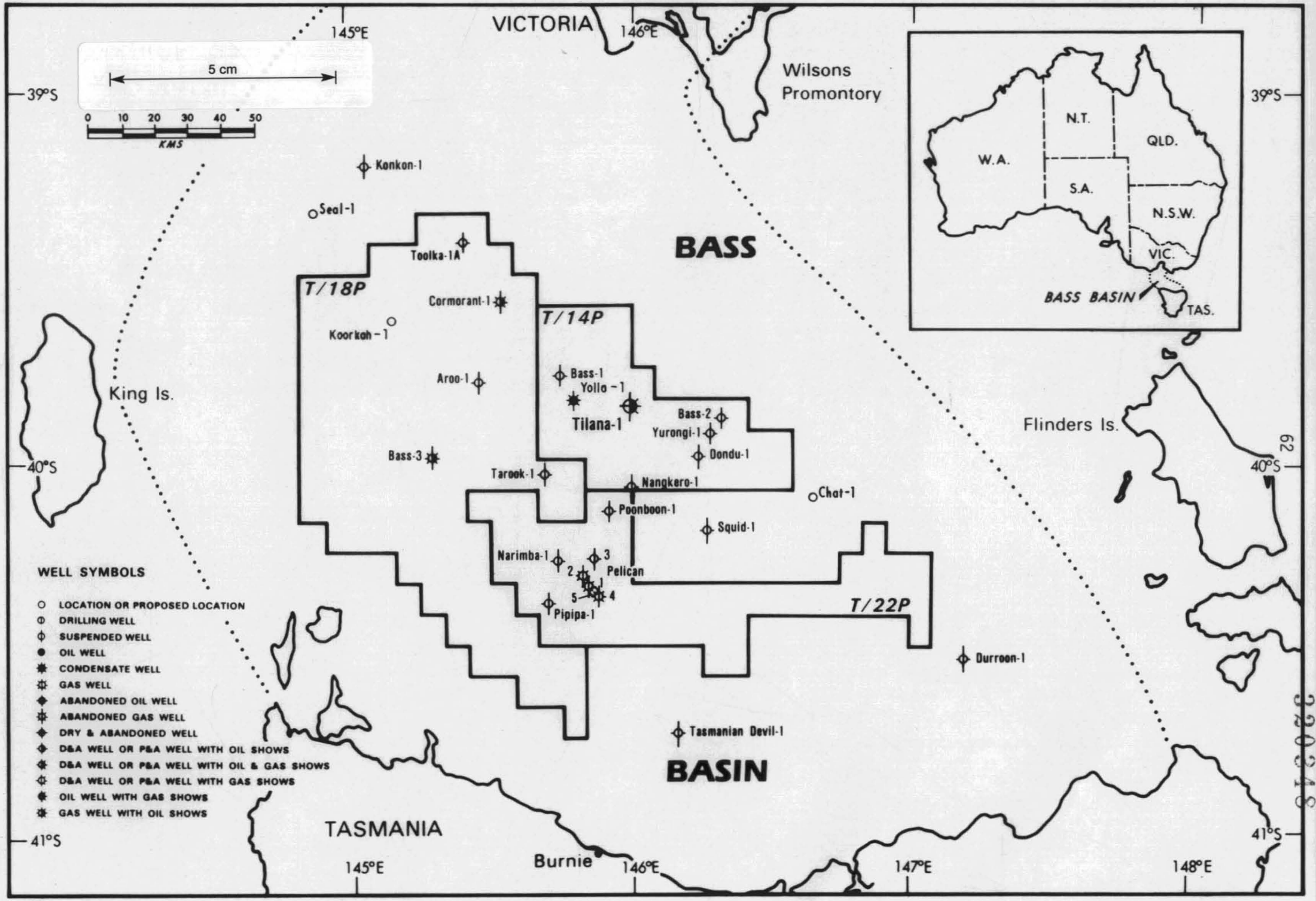
0 2000
V.SECTION PLANE: NO°00'E 2000

SURVEY:SO1284.4AM

LE 1"=2000FT.

AMOCO
TILANA NO:1
BASS STRAIT

WELL: 1 SLOT: 1


VICTORIA
145°E
146°E
147°E
148°E
39°S
40°S
41°S
5 cm
0 10 20 30 40 50
KMS
Wilsons Promontory
Konkon-1
Seal-1
Toolka-1A
BASS
T/18P
Cormorant-1
Koorkoh-1
T/14P
Aroo-1
Bass-1
Yolla-1
Tilana-1
Bass-2
Yurongi-1
Dondu-1
Bass-3
Tarook-1
Nangkero-1
Chat-1
Poonboon-1
Squid-1
Narimba-1
Pelican
Pipipa-1
T/22P
Durroon-1
Tasmanian Devil-1
BASIN
King Is.
Flinders Is.
TASMANIA
Burnie
N.T.
QLD.
W.A.
S.A.
N.S.W.
VIC.
TAS.
BASS BASIN
WELL SYMBOLS
LOCATION OR PROPOSED LOCATION
DRILLING WELL
SUSPENDED WELL
OIL WELL
CONDENSATE WELL
GAS WELL
ABANDONED OIL WELL
ABANDONED GAS WELL
DRY & ABANDONED WELL
D&A WELL OR P&A WELL WITH OIL SHOWS
D&A WELL OR P&A WELL WITH OIL & GAS SHOWS
D&A WELL OR P&A WELL WITH GAS SHOWS
OIL WELL WITH GAS SHOWS
GAS WELL WITH OIL SHOWS

TIME DISTRIBUTION

TOW OUT AND ANCHORING

Time Breakdown

	Hours	%
W.O.W.	22	18.3
Anchoring	26 1/2	22.0
Ballast/Position Rig	19	15.7
Tow Out	53	44.0
	120 1/2	100.0

36" HOLE AND 30" CASING

Time Breakdown

	Hours	%
Drilling	4 1/2	10.5
Conditioning/Circulating	1 1/2	3.5
Tripping	3	7.0
Rig Repair	1 1/2	3.5
Running/Cementing/Drillout Casing	19 1/2	45.3
W.O.C.	7	16.2
P/U Drill String	6	14.0
	43.0	100.0

26" HOLE AND 20" CASING

Time Breakdown

	Hours	%
Drilling	6	10.5
Conditioning/Survey	2	3.5
Tripping	5 1/2	9.7
Survey	1	1.8
Running/Cementing/Drillout Casing	19	33.3
Run BOP	12 1/2	21.9
Test BOP/Casing	11	19.3
	57	100.0

320350

17 1/2" HOLE AND 13 3/8" CASING

Time Breakdown

	Hours	%
Drilling	63.5	20.2
Opening Hole	48.5	15.6
Wash & Ream	4.0	1.3
Conditioning/Circulating	18.5	5.9
Tripping	28.0	8.9
Service Rig	1.0	0.3
Rig Repair	4.5	1.4
Survey	4.5	1.4
Logging	5.5	1.7
Running/Cementing/Drillout Casing	134 1/2	42.8
Test BOP's/Casing/FCCT	1.5	0.5
	314	100.0

12 1/4" HOLE AND 9 5/8" CASING

Time Breakdown

	Hours	%
Drilling New Hole	528	48.6
Opening Hole	5 1/2	0.5
Washing and Reaming	26 1/2	2.5
Coring	14 1/2	1.3
Conditioning/Circulate	87	8
Tripping	219 1/2	20.2
Service Rig	6	0.6
Repair Rig	1	0.1
Deviation Survey	10 1/2	0.9
Logging	93	8.5
Running/Cementing/Scraping Casing	26 1/2	2.4
Wait on Cement	16	1.5
Testing BOP/Casing/FCCT	21	1.9
L/D Drill String	4	0.4
Tight Hole	23 1/2	2.2
Plug Back	2	0.2
Dress Plug	1 1/2	0.1
Daylight Savings Time	1	0.1
	1087	100.0

320351
CONFIDENTIAL
CLASS 1

DRILL STEM TESTING

Time Breakdown

	Hours	%
Condition/reverse Circulate	7 1/2	2.2
Squeeze Cement	3	0.9
Evaluation	3	0.9
Wait on Daylight	6 1/2	1.9
Wireline	137 1/2	40.4
Trip Test String	183	53.7
	340 1/2	100.0

P & A

Time Breakdown

	Hours	%
Condition/Circulate	1/2	0.7
Tripping	5 1/2	7.3
Wireline	7 1/2	10.0
Retrieve BOP	10	13.3
Lay Down Drill String	16 1/2	22.0
W.O.W.	7	9.3
Retrieve Anchors	7	9.3
De-ballast Rig	5	6.7
P & A	14	18.7
Backload Workboats	2	2.7
	75	100.0

LISTING BY CONTRACTOR OF LOST TIME ON TILANA NO 1

CONTRACTOR - HALLIBURTON

Date	Time Lost	Cause of Lost Time
19 September 1985	2 Hours	Repairing Convertor Fan Belt on Cement Unit.
19 September 1985	14.5 Hours	Both top and bottom
20 September 1985	24 Hours	Plugs was released
21 September 1985	24 Hours	Before pumping cement
22 September 1985	12.5 Hours	When only bottom plug should have been released.
10 November 1985	1 Hour	R.T.T.S. Packer hung up in well head.
10 November 1985	5 Hour	Seal leaking in safety valve and replacing one slip jt. in D.S.T. string.
12 November 1985	24 Hour	APR-M-2 sampler valve opening at moment of perforation.
13 November 1985	24 Hour	LPR-N tester valve not operating properly.
19 November 1985	1.5 Hours	Slip jt. leaking in D.S.T. string when pressure testing.
TOTAL	132.5 Hours	

CONTRACTOR - S.O.S - DIAMOND M

Date	Lost Time	Cause of Lost Time
12 September 1985	1 Hour	Union meeting.
TOTAL	1 Hour	

CONTRACTOR - DIAMOND M

Date	Lost Time	Cause of Lost Time
6 September 1985	1.5 Hours	T.V. umbilical parted

Date	Lost Time	Cause of Lost Time
9 September 1985	1.5 Hours	Repairing valves on choke and kill manifold.
10 September 1985	2.0 Hours	
10 September 1985	2.0 Hours	Change out kelly hose.
11 September 1985	1.5 Hours	Change union on swivel.
28 September 1985	1. Hour	Installing clamps on compensator hose and repairing shale shaker.
8 November 1985	5 Hours	Wash out in drill pipe when R.I.H. with D.S.T. No 1.
9 November 1985	24 Hours	5 ft pipe scale in drill collars.
25 November 1985	3 Hours	Repairing anchor winch motor on No 5 and 6 anchor winches.
TOTAL	41.5 Hours	

CONTRACTOR - ICI

Date	Lost Time	Cause of Lost Time
23 November 1985	6.5 Hours	First charge did not sever 9 5/8 - 13 3/8 - 20" - 30" casing.
TOTAL	6.5 Hours	

WAITING ON WEATHER

Date	Lost Time	Cause of Lost Time
4 September 1985	11 Hours	Waiting on weather to complete.
September 1985	0.5 Hours	Anchors and boat crew rest period.
24 November 1985	7 Hours	Waiting on weather to complete pulling anchors.
25 November 1985	12.5 Hours	Waiting on weather to complete pulling anchors.
TOTAL	31 Hours	

CONTRACTOR - SCHLUMBERGER

Date	Lost Time	Cause of Lost Time
30 October 1985	3.5 Hours	Sonic failed on first run.
	4.5 Hours	Ran 30 shot C.S.T. tool, had 4 successful shots, then tool failed.
	3 Hours	Repairing C.S.T. tool.

Date	Lost Time	Cause of Lost Time
	3 Hours	W.S.T. tool failed after
31 October 1985	0.5 Hour	shooting 5 of 11 planned levels.
31 October 1985	4 Hours	Repaired W.S.T. tool, reran, tool failed.
31 October 1985	1 Hour	RIH with RFT tool unable to function tool in casing, P.O.H. checked packer, RIH.
	0.5 Hour	Repair winch motor on Schlumberger unit.
	10 Hours	Complete RIH with R.F.T. attempted 19 settings had 2 seats.
11 November 1985	4.5 Hours	RIH to perforate correlation incorrect, POH.
	3 Hours	Run C.C.L. and Gamma Ray to obtain correlation Gamma Ray failed, POH.
	1 Hour	Repaired Gamma Ray tool.
	6.5 Hours	Waiting on daylight due to correlation and Gamma Ray tool not working.
14 November 1985	8 Hours	Schlumberger unable to get perforating gun below 3035.2 m (9958 ft).
18 November 1985	19 Hours	Perforating Gun stuck at 2860.5 m (9385 ft) attempt to free with no success, P.O.H. with test string.
19 November 1985	19 Hours	Complete pulling and reran test string due to perforating gun becoming stuck on the 18 November.
20 November 1985	3.5 Hours	Run in with perforating gun unable to pass SRO nipple at 2855 m (9366.6 ft) POH repair charges that appeared to be hanging on a pin SRO nipple.
22 November 1985	1 Hour	Perforate at 121.9 m (400 ft) misrun on first attempt.
TOTAL	95.5 Hours	

320355

AMOCO AUSTRALIA 07 PETROLEUM COMPANY

NAME OF COMPANY

FORM 46 3-65

DRILLING AND COMPLETION PROGRAM

FILE NO. 400

DATE 26 August, 1985

WELL NAME TILANA WELL NO. NO. 1 FIELD

COUNTRY AUSTRALIA PROVINCE BASS STRAIT, TASMANIA AREA BASS BASIN T-14P

LOCATION

SEISMIC LINE B71-A-50 SP5199 39 DEGREES 53' 36.96" SOUTH LAT. 145 DEGREES 58' 42.2" EAST LONG

OBJECT

EOCENE

METHOD OF DRILLING

TYPE TOOLS	DEPTH INTERVAL
Rotary	ML. To 7792' RKB

SPECIAL SURVEYS

TYPE	DEPTH INTERVAL.ETC
ISF-BHC-GR-SPCal (GR to Mudline)	1333' - 5720' (406 - 1743m)
DLL-CR-SP-MSFL-Cal	5690' - 7792'
LDT-CNL-GR-Cal	(1734 - 2375m)
LSS-CR	" "
HDT	" "
VSP	" "

REMARKS

SPECIAL TEST

TYPE	DEPTH INTERVAL ETC
RFT	As Required
DST	As Required
CST	As Required

REMARKS

APPROXIMATE DEPTHS OF GEOLOGICAL MARKERS

ESTIMATED ELEVATION

MARKER	DEPTH	ELEVATION
Torquay Group (ML)	335',(102m)	262',(80m)SS
Demons Bluff	5250' (1600m)	5177',(1578m)SS
*Eastern View Coal Meas.	5741' (1750m)	5668',(1728m)SS
*Within Lower Eocene Poss Volcanics	6725' (2050m) 3800'-4200' (1160-1280m)	6652' (2028m)SS
TOTAL DEPTH	7792' (2375m)	7719 (2353m)SS

* POSSIBLE PAY # PROBABLE COMPLETION INTERVAL

DRILL CUTTING SAMPLES

FREQUENCY	DEPTH INTERVAL	
5m	1343'RKB - 5720'RKB	(6 sets) W+D
3m	5720"RKB - 7792'RKB	(6 sets) W+D
10m Composite	1343'-5720'RKB (2sets)	Wet
9m Composite	5720'-7792'RKB (2sets)	Wet
9m Composite	5720'-7792' Cans (1 set)	

REMARKS

The above conforms with requirements of the Petroleum (Submerged Lands) Act 1967, Clause 14.

1 litre cans of drilling fluid every 250m From 1333' (406m) to total depth.

MUD PROGRAM

APPROXIMATE INTERVAL	TYPE MUD	WEIGHT #/GAL w/Viscous Sweeps	VISCOSITY SEC. API	W.L. CC/30M	OTHER SPECIFICATIONS
ML - 1343' (409M)	Seawater				
1343'-5720' (1743m)	SW/CEL/DISP	8.9 - 9.2	40-50	15 or Less	YV 8-20
5720'-7792' (2375m)	FW/CEL/DISP	8.9 - 12.5	40-50	10 or Less	YV 6-20 HTHP 20 or Less

REMARKS

Properties of the Mud System are described in the detailed Operations Plan.

CASING PROGRAM

CASING STRING	EST. DEPTH	CASING SIZE *	HOLE SIZE *	SX. CEMENT	TYPE CEMENT	DESCRIPTION OF LANDING POINT,ETC
CONDUCTOR	648' (198m)	30"	36"	2000	Class "G" + Additives	
SURFACE	1333' (406m)	20"	26"	2000	"	
INTERMEDIATE	5690' (1734m)	13 3/8"	12 1/4" Opened to 17 1/2" By Caliper"			Basal/Demons Bluff
OIL STRING	7782' (2372m)	9 5/8"	12 1/4" By Caliper		"	TD
LINER CASING						

REMARKS

1. All Casing Points are tentative.
2. Cement Compositions to be Lab tested.
3. 30" & 20" Casing to be Cemented by Inner String method.

*NORMAL. THE TUBULAR GOODS ALLOCATION LETTER SPECIFIES CASING SIZES TO BE USED. HOLE SIZES WILL BE COVERNED BY CONTRACT.

CORING PROGRAM

Conventional Cores to more thoroughly investigate shows and potential reservoir rocks will be cut upon recommendation by the wellsite geologist and concurrence by Amoco's Sydney Office.

COMPLETION PROGRAM

Authorised completion program will be furnished on decision to complete Well.

GENERAL REMARKS

PREPARED BY	APPROVED:	APPROVED:
	OPERATING AREA MANAGER	COMPANY MANAGER

320356

API Well Identifier Code			
Design	Country Code	Well Number	Sub Code
1 2	3 4 5	6 7 8 9 10	11 12
917	033	037.94	00

AMOCO AUSTRALIA PETROLEUM COMPANY
Name of Company

Well or Platform Authorization

[X] Well Or [ ] Platform

[ ] Construct [ ] Recomplete [ ] Revision [ ] Development Well [X] Offshore

[X] Drill [ ] Repair [ ] Cancel [X] Exploratory Well [ ] Onshore

[ ] Multiple Completion [ ] Extension Well

Well or Platform Identification	Field	
TILANA NO. 1	T-14P	
Country	**Depth**	**Formation**
Australia	2375 M	Late Cretaceous

Surface Location
Lat. 39° 53' 36.96" South, Long. 145° 58' 42.2" East

Bottom Hole Objectives
Late Eocene - Late Cretaceous

Rig Cost: 47 Days @ $ 45,500 Per Day — Company Working Interest: 50 %

Other Interest (Describe): SAOGC 25% Cue Group 25%

			Gross Amount
Intangible Costs	Mobilization		$ 550,000
	Platform Fabrication		$
	Platform Transportation and Installation/Location Preparation		$
	Drilling Intangibles 47 Days @ $ 131,779 Per Day		$ 6,193,600
	Demobilization		$
		Total Intangibles	$ 6,743,600
Tangible Costs	Platform Materials		$
	Well Equipment		$ 562,650
		Total Tangibles	$ 562,650

	Net Amount	Gross Amount
Total This Authorization	$	$ 7,306,250
Budget Estimate	$	5,900,000

Remarks And/Or Action By Other Offices

See Attachments

CONCURRED
Date Aug 29, 1985
Meeting 328
Amoco Production Company
Management Committee - CSA/FE REGION

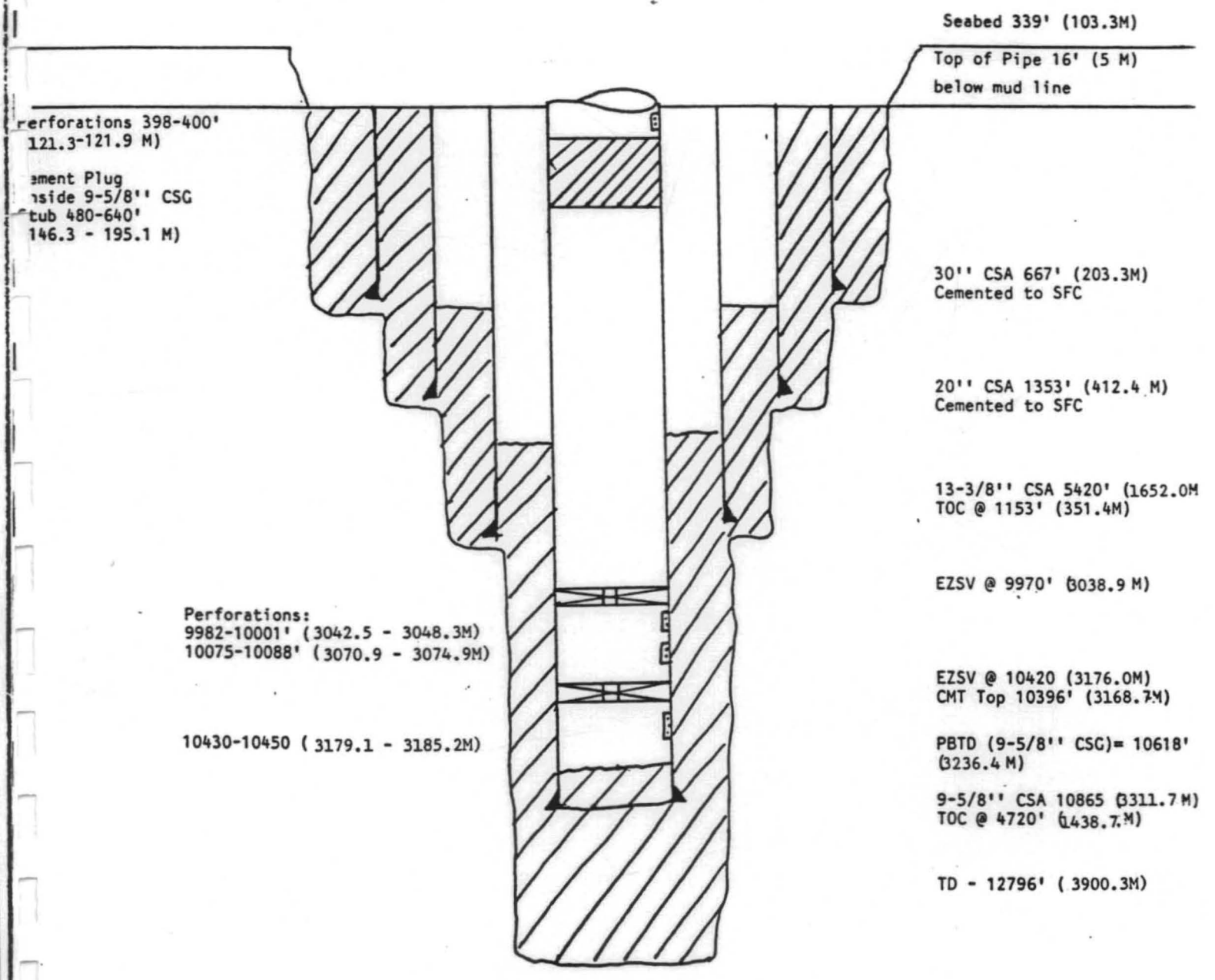
Recommended [signature] Date [ ] Authorized [ ] Rejected Date

320357

TILANA # 1

WELLBORE - DIAGRAM

CONDITION AT ABANDONMENT



* Wellbore left permanently P&A'D. Casing was shot off 16' below mud line, and all Subsea wellhead equipment and casing stubs were retrieved.

5 cm

320358

WORKBOAT PERFORMANCE EVALUATION

Amoco employed two workboats to service the Diamond M. Epoch during Tilana No. 1. These vessels were named the Atlas Van Diemen/Lady Kirry and the Atlas Hartog/Lady Lorraine. Both vessels were re-named during their contract with Amoco.

The following is a performance evaluation listed under Pros and Cons.

Pros

1). Vessels completed their required tasks.

2). Vessels did not contribute to any weather down time.

3). Vessels did not contribute to any labour disputes.

Cons

1). Vessels unable to work in seas greater that 5 ft.

2). Vessels require daylight to offload after arriving on location and after a suitable rest period.

3). Vessels unable to accurately gauge bulk tanks after discharge.

4). Vessels unable to manouvere in moderate weather while alongside to relieve tension on mooring lines.

5). Vessels unable to pull out 4800' of anchor chain as originally planned for the anchor pattern.

However, boats did pull out 4400' of chain which proved adequate.

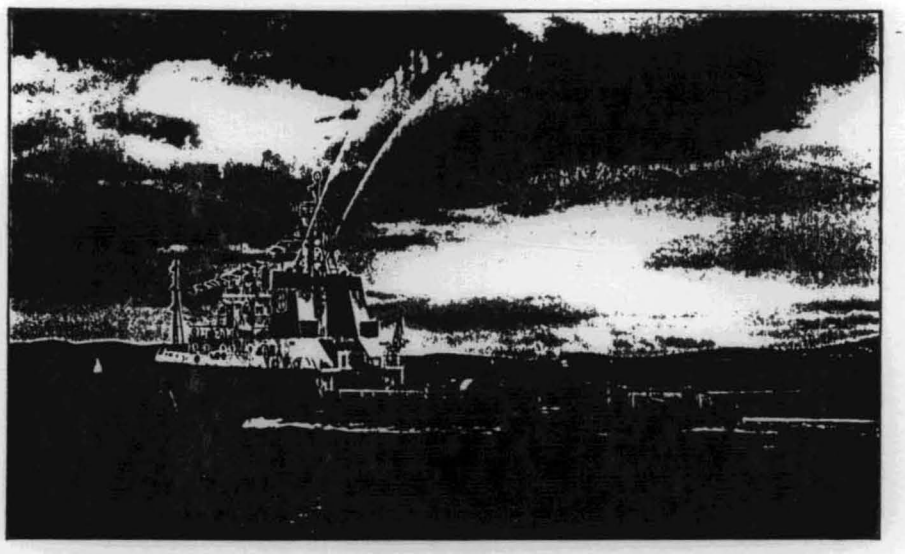
Conclusions

Both vessels accomplished their specified duties while under contract. However, the vessels did not demonstrate any outstanding performances.

Both vessels were marginal in horsepower and bollard pull requirements. They demonstrated their marginal capabilities continuously throughout the operation.

In future operations in the Bass Strait, larger workboats with greater horsepower and bollard pull would handle the job requirements with some reserve to spare. However, these larger boats were not available due to timing and cost factors.

320359



AUSTRALIAN OFFSHORE SERVICES

6000 BHP ANCHOR HANDLING TUG SUPPLY VESSEL

m.v. LADY KIRRY

CALL SIGN:
VJQD

BUILT:
1984, Hudong Shipyard, Shanghai

CLASSIFICATION:
Lloyds + 100A1 Anchor handling Tug/Supply + LMC UMS

FLAG:
Australian

DIMENSIONS:

Length o.a.	60.85 m
Beam, moulded	13.00 m
Depth, moulded	6.20 m
Full load draft	5.06 m
G.R.T. 1252	N.R.T. 375

MACHINERY:

Main Engines	4 x 1500 BHP M.A.N. 12V 20/27 diesel engines, total 6000 BHP, 2 x CP propellers in fixed nozzles.
Bow Thruster	Jastrum BU-80V CP transverse tunnel thruster 556 HP 6.8 tonnes thrust.
Electrical Generators	2 x Van Kaick 245KW 440V 60Hz 3-phase driven off main engine gearboxes. 2 x Van Kaick 245KW 440V 60Hz 3-phase driven by 2 x M.A.N. 5L 20/27 565 BHP auxilliary engines.

SPEED AND CONSUMPTION:

Economical supply role (2 engines)	about 11.5 knots on about 8 tonnes/day.
Service speed (2 engines)	about 12.3 knots on about 10.4 tonnes/day.
Full power loaded condition or towing (4 engines)	about 14 knots on about 19 tonnes/day.

TOWING AND ANCHOR HANDLING:

Bollard Pull	78 tonnes at M.C.R.
Winch	Norwinch low pressure hydraulic double drum waterfall winch rated at 250 tonnes static load and 180 tonnes at 8.5m/min line pull
Drum Capacity	Tow Drum 960m x 57m steel wire rope Working Drum 960m x 57m steel wire rope.
Rig Chain lifters	Two non declutchable for 64mm and 82mm inch rig chain cable
Towing Bollards/Guides	Two hydraulic vertical rope guide pins 1.4m high and 24 tonnes static side force remotely controlled from bridge
Stern Roller	4.88 metres x 1.83 metres diameter with 180 tonnes SWL
Powered Reel	One hydraulic storage reel fitted above tow winch capacity 960m x 57m diameter wire.
Chain Lockers	2 rig chain lockers with capacity 60cu. metres

CAPACITIES:

Deck cargo	about 500 tonnes
Clear deck space	30.6m x 10.0m
Deck loading	5 tonnes/m²
Total DWT	1172 tonnes
Fuel oil	about 442 tonnes
Drill/ballast water	about 519 tonnes
Potable water	about 227 tonnes
Cement/bulk materials	4 Smatco low pressure tanks totalling 170cu. metres
Refrigerated storage	about 12cu. metres cooler about 8.5cu metres freezer

PUMPING:

Fuel oil	100cu. metres/hour at 65m head
Pot Water/Drill Water	80 cu. metres/hour at 65m head
Bulk materials	Two Tanabe VLH2114 compressors each rated at 13.7cu. metres/min. Remote control system from deck and Bridge Refrigerated air dryer.

Computerised measuring system with printouts for liquid cargoes.

EXTERNAL FIREFIGHTING
Two remotely controlled fire monitors situated atop bridge each with capacity 10000 litres/min with throw at 167 metres.

ANCHORS AND MOORING:

Anchors	2 x Danforth stockless high holding
Cables	2 x 450m x 32mm U2 grade steel cable
Tugger Winch	2 x Norwinch LV-10 low pressure hydraulic 10 tonne S.W.L. with drum capacity 300m x 34mm wire equipped for remote control
Capstans	2 x Norwinch C-9 low pressure hydraulic 10 tonne S.W.L. at after end work deck

ACCOMMODATION:

Crew	9 x 1 berth
Contractor	2 x 1 berth
Passengers	2 x 6 berth
Fully airconditioned	

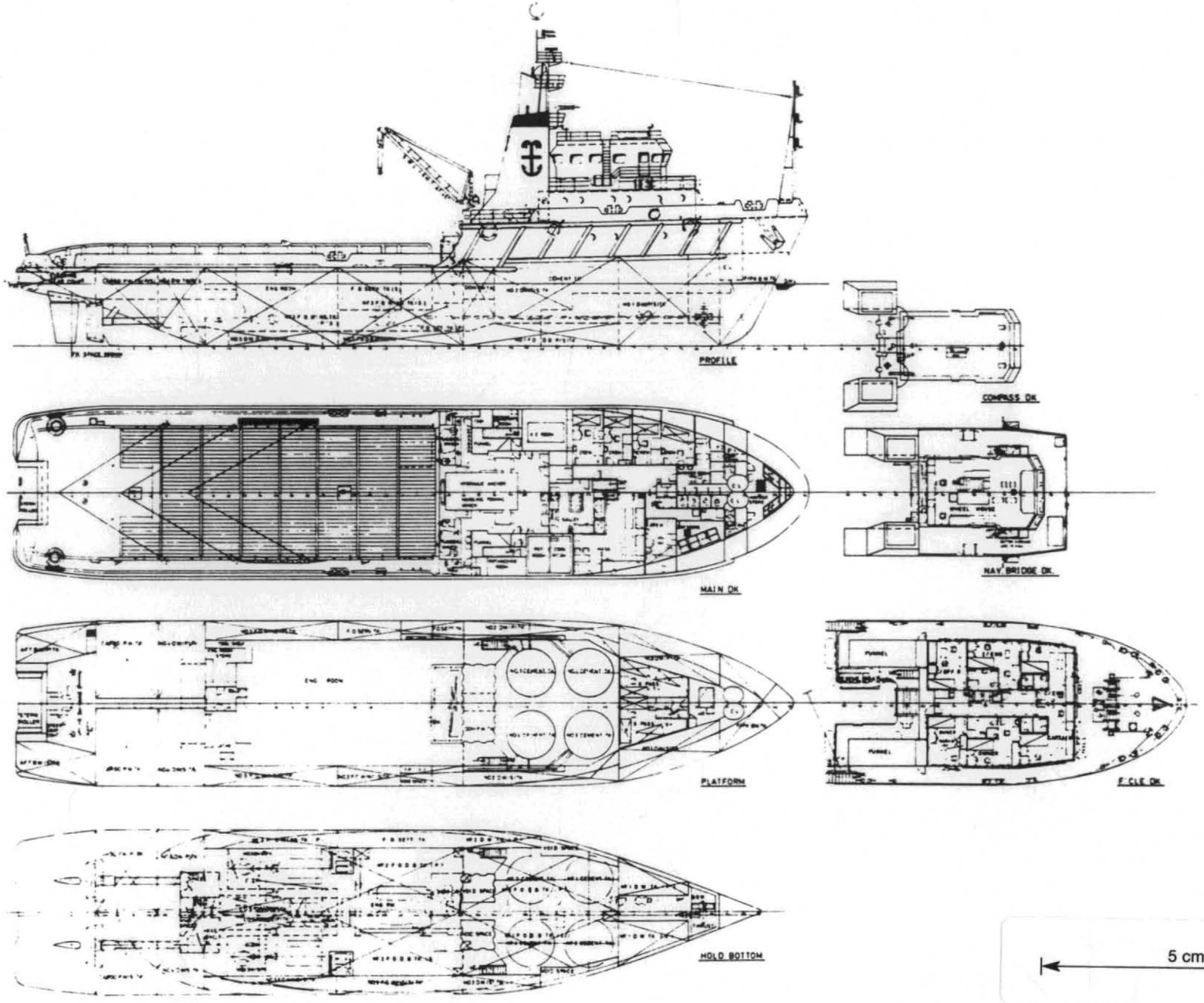
ELECTRONICS:

Satellite Navigator	Furuno FSN-70
Radars	2 x Furuno FR 1011/2
Echo Sounder	Furuno FE 502
Auto Pilot	Tokyo Keiki connected to Gyro and Magnetic Compasses
Gyro Compass	Tokyo Keiki ES-11A
Doppler Speed Log	Furuno MF-220
Radio main	Sailor R 1120 T1127 400 watt
standby	Sailor R 110 T 124 140 watt
VHF	Sailor RT145
RDF	Furuno FD-120B

LIFESAVING EQUIPMENT:
40HP 5 man inflatable rescue boat. Statutory liferafts, life buoys, life jackets and flares.

MISCELLANEOUS:
1.5 tonne SWL crane with 6.7m outreach, fitted on starboard side boat deck. Oil dispersant system fitted. Spark arresters fitted to engine silencers. Double hull throughout in compliance IMO Regulations A.160

Australian Offshore Services
45 William Street, Melbourne, G.P.O. Box 88A, Melbourne, Vic. 3001. Tel: (03) 61 3122. Telex: 32236. Fax: (03) 614 5064.
111 St. George's Terrace, G.P.O. Box 117C, Perth, W.A. 6001. Tel: (09) 321 3055. Telex: 93924. Fax: (09) 325 7210.

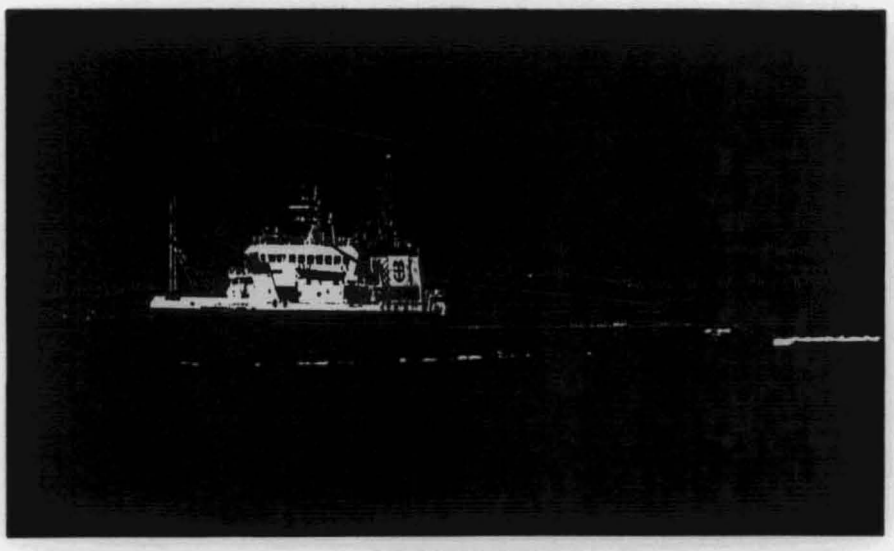


73A

320360

320361

AUSTRALIAN OFFSHORE SERVICES



7040 BHP ANCHOR HANDLING TUG SUPPLY VESSELS

m.v. LADY CAROLINE/ LADY LORRAINE

LADY CAROLINE
Call Sign VJQA
Built December 1981 State Dockyard, Newcastle, NSW.

LADY LORRAINE
Call SignVJQB
Built June 1982 State Dockyard, Newcastle, NSW.

CLASSIFICATION:

DNV NV + 1A1 Supply Ship/Tug + MVEO

FLAG:
Australian

DIMENSIONS:

Length o.a.	64.65 m
Beam, moulded	13.80 m
Depth, moulded	6.90 m
Full load draft	6.00 m
G.R.T. 1179	N.R.T. 517

CAPACITIES:

Deck cargo	about 800 tonnes
Clear deck space	36.5 x 10.7m
Deck loading	5 tonnes/m^2
Total DWT	1816 tonnes (Lady Lorraine) 1921 tonnes (Lady Caroline)
Fuel oil	about 660 tonnes
Drill/ballast water	about 650 tonnes
Potable water	about 345 tonnes
Glycol	about 91 tonnes
Cement/bulk materials	4 low pressure tanks each 42.5cu. metres totalling 170cu. metres.
Refrigerated storage	about 8cu. metres freezer and about 8cu. metres cooler

SPEED AND CONSUMPTION:

Economical supply role	about 11 knots on about 9 tonnes/day.
Service speed	about 13 knots on about 15 tonnes/day.
Full power/towing	about 14 knots on about 20 tonnes/day.

TOWING AND ANCHOR HANDLING:

Bollard Pull	87 tonnes at M.C.R.
Winch	Braatvaag low pressure hydraulic triple drum waterfall winch rated at 250 tonnes static and 150 tonnes at 6.8m/min
Drum Capacity	Tow Drum 1000m x 64mm steel wire rope. Working Drums 500m x 64mm steel wire rope
Rig Chain lifters	Two non declutchable for 76mm rig chain
Towing Bollards/Guides	Two hydraulic vertical rope guide pins for'd stern roller with 25 tonnes static side thrust remotely controlled from bridge
Stern Roller	3.66m x 1.83m diameter 250 tonnes S.W.L.
Chain lockers	2 rig chain lockers are situated below winch with total capacity 150cu. metres, coated for carriage ballast/drill water.

MACHINERY:

Main Engines	2 x 3520 BHP Nohab Polar F216V-825, totalling 7040 BHP, 2 x Ulstein CP propellers in fixed nozzles.
Bow Thruster	Ulstein 150-TV CP tunnel thruster driven by 725HP Caterpillar D-348 diesel 7 tonnes thrust.
Electrical Generators	3 x Kato 230KW 415V Ac 50Hz driven by 3 x Caterpillar D3408 auxilliary engines. 1 x Kato 125KW 415V AC 50Hz harbour set driven by Caterpillar 3406 PCT engine.

PUMPING:

Fuel oil	190 cu. metres/hour at 60m head
Potable water	50cu. metres/hour at 60m head
Drill/Ballast water	Two pumps each capable 160cu. metres/hour at 60m head
Glycol	40cu. metres/hour at 60m head
Bulk materials	Two compressors each rated 11.4cu. metres/minute at 420 kPa discharge rate about 25cu. metres/hour against total head 40m.

EXTERNAL FIREFIGHTING:
One Skum manual fire monitor fitted with water barrel and spray deflector mounted on walkway between funnels, capacity 10000 litres/minute range 100 metres.

ANCHORS AND MOORING:

Anchors	2 x AC-14 high holding anchors
Cables	2 x 500m x 34mm U3 high strength steel cable
Tugger Winch	2 x Brattvaag low pressure hydraulic 15 tonne S.W.L. with drum capacity 300m x 34mm steel wire rope equipped for remote control
Capstans	2 x Brattvaag low pressure electro hydraulic 10 tonne S.W.L. at aft end work deck with local controls

ACCOMMODATION:

Crew	9 x 1 berth
Contractor	2 x 1 berth
Passengers	2 x 6 berth
Fully airconditioned	

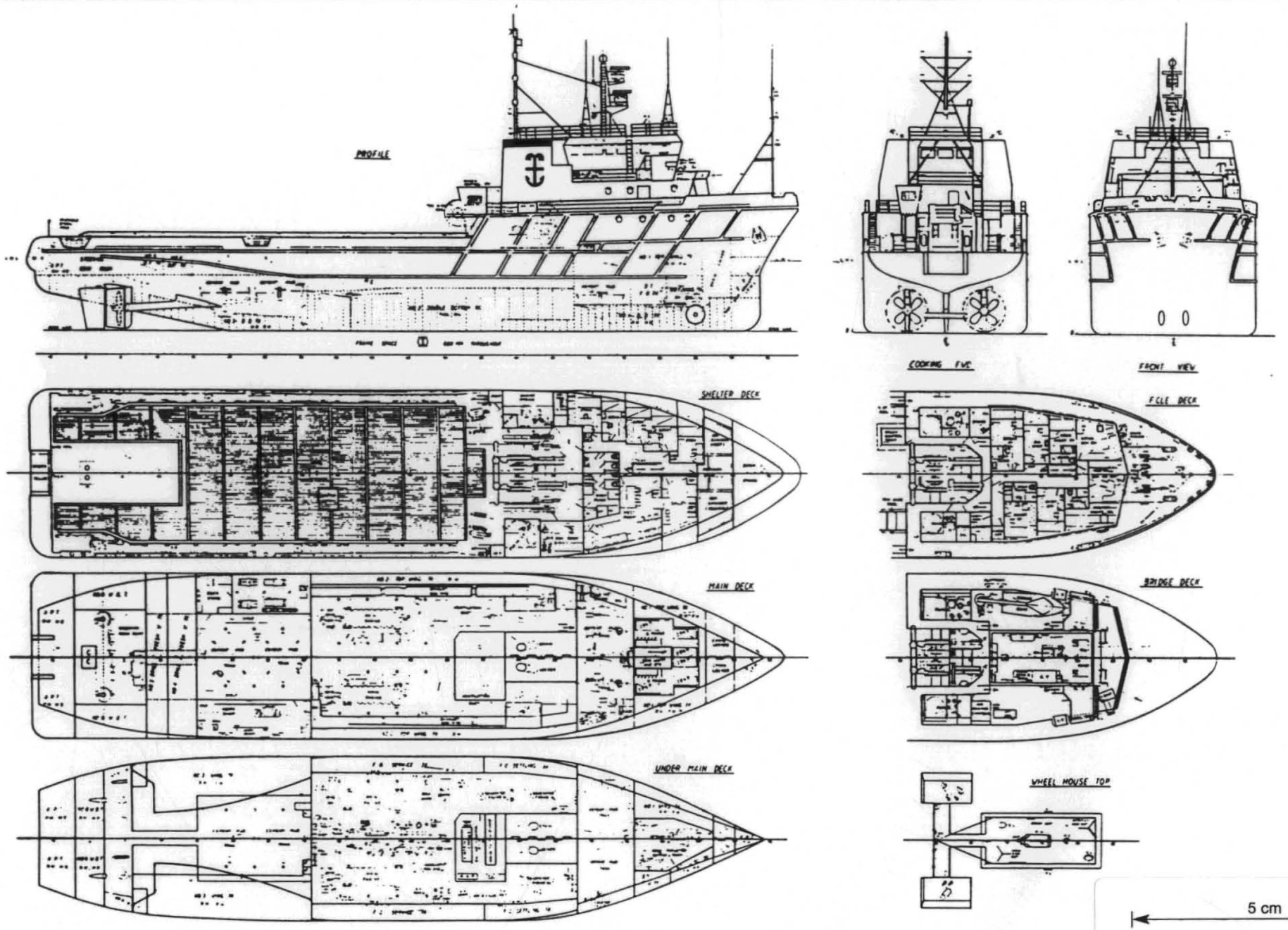
ELECTRONICS:

Radars	2 x Decca R.M. 916c
Echo Sounder	Simrad EN 1C
Auto Pilot	Decca 550 Gyro and Magnetic
Gyro Compass	Plath Navigat 2
Radio main	Sailor R1117 T1127
standby	Sailor R 110 T 124
VHF	Sailor RT144B

LIFESAVING EQUIPMENT:
One 4.7m 35h.p. rescue boat and launching davit on bridge deck. Statutory life rafts, life buoys, life jackets and flares.

MISCELLANEOUS:
Two 415V 3-phase 50 Hz reefer container power outlets on work deck. Enclosed control room overlooking work deck with remote controls for anchor handling winch, tuggers and pins.

Australian Offshore Services
45 William Street, Melbourne, G.P.O. Box 88A, Melbourne, Vic. 3001. Tel: (03) 61 3122. Telex: 32236. Fax: (03) 614 5064.
111 St. George's Terrace, G.P.O. Box 117C, Perth, W.A. 6001. Tel: (09) 321 3055. Telex: 93924. Fax: (09) 325 7210.



14A

320362

AMOCO STORAGE AREAS

MACQUARIE WHARF NO. 4 (See Figure No 1)

2 pipe racks @ 50' x 70'	=	325 M2 (3500 FT2)
1 bulk plant @ 60' x 50'	=	279 M2 (3000 FT2)
Macquarie Wharf No 4	=	876 M2 (9430 FT2) (275 LINEAR METERS OF WHARFAGE)
Covered Shed	=	2664 M2 (28,676 FT2) (USAGE AVERAGES 890 M2/MONTH)

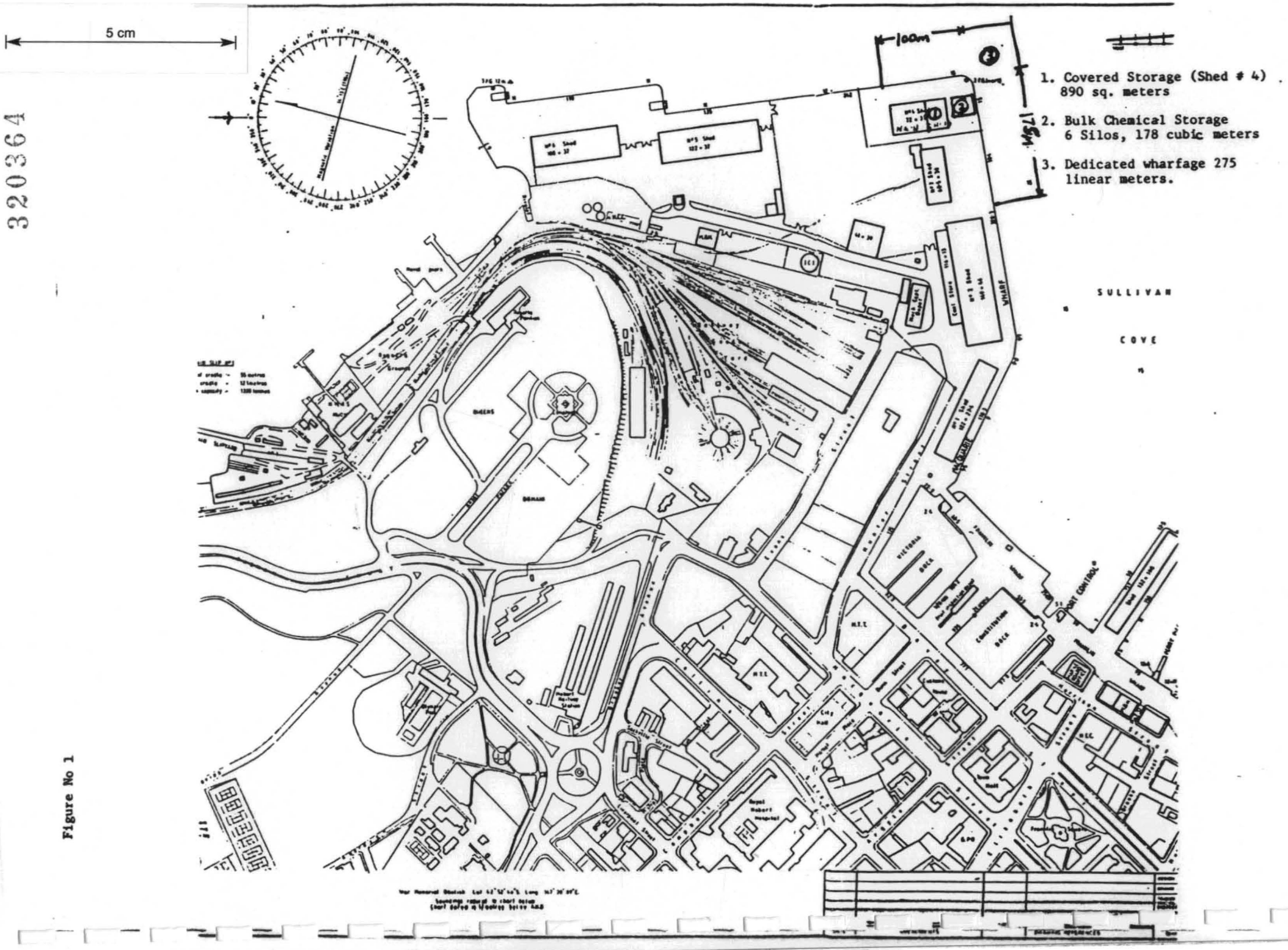
HALE STREET (See Figure No 2)

Pipe yard	=	1769 M2 (19,040 FT2)
Warehouse used for mud and cement storage	=	836 M2 (9000 FT2)

LAMPTON AVE - OFFICE (See Figure No 3)

Office Centre	=	780 M2 (8400 FT2)
Warehouse used for storehouse stock	=	525 M2 (5650 FT2)
Yard	=	5790 M2 (61,455 FT2)

320364



1. Covered Storage (Shed # 4) 890 sq. meters
2. Bulk Chemical Storage 6 Silos, 178 cubic meters
3. Dedicated wharfage 275 linear meters.

Figure No 1

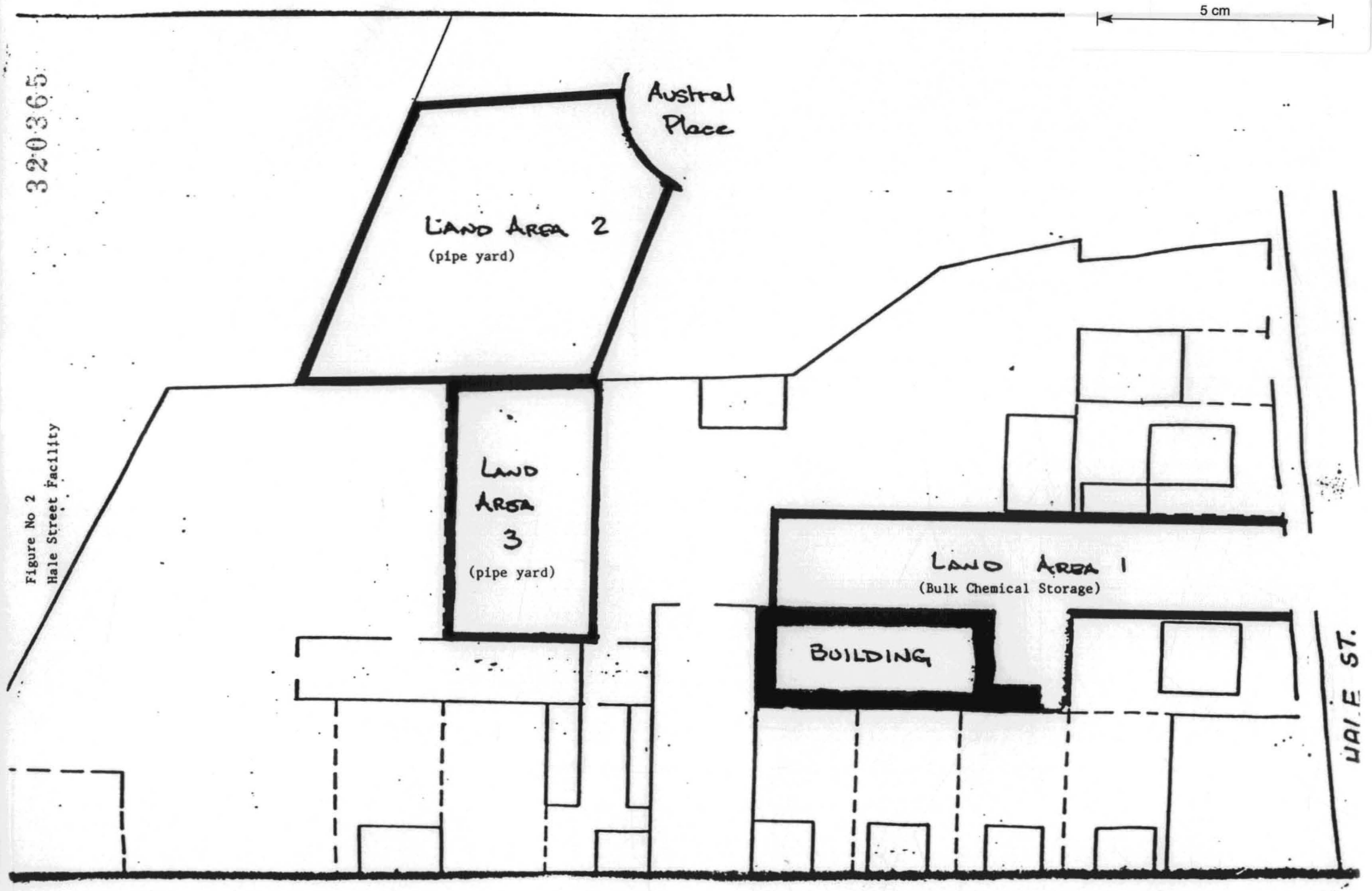
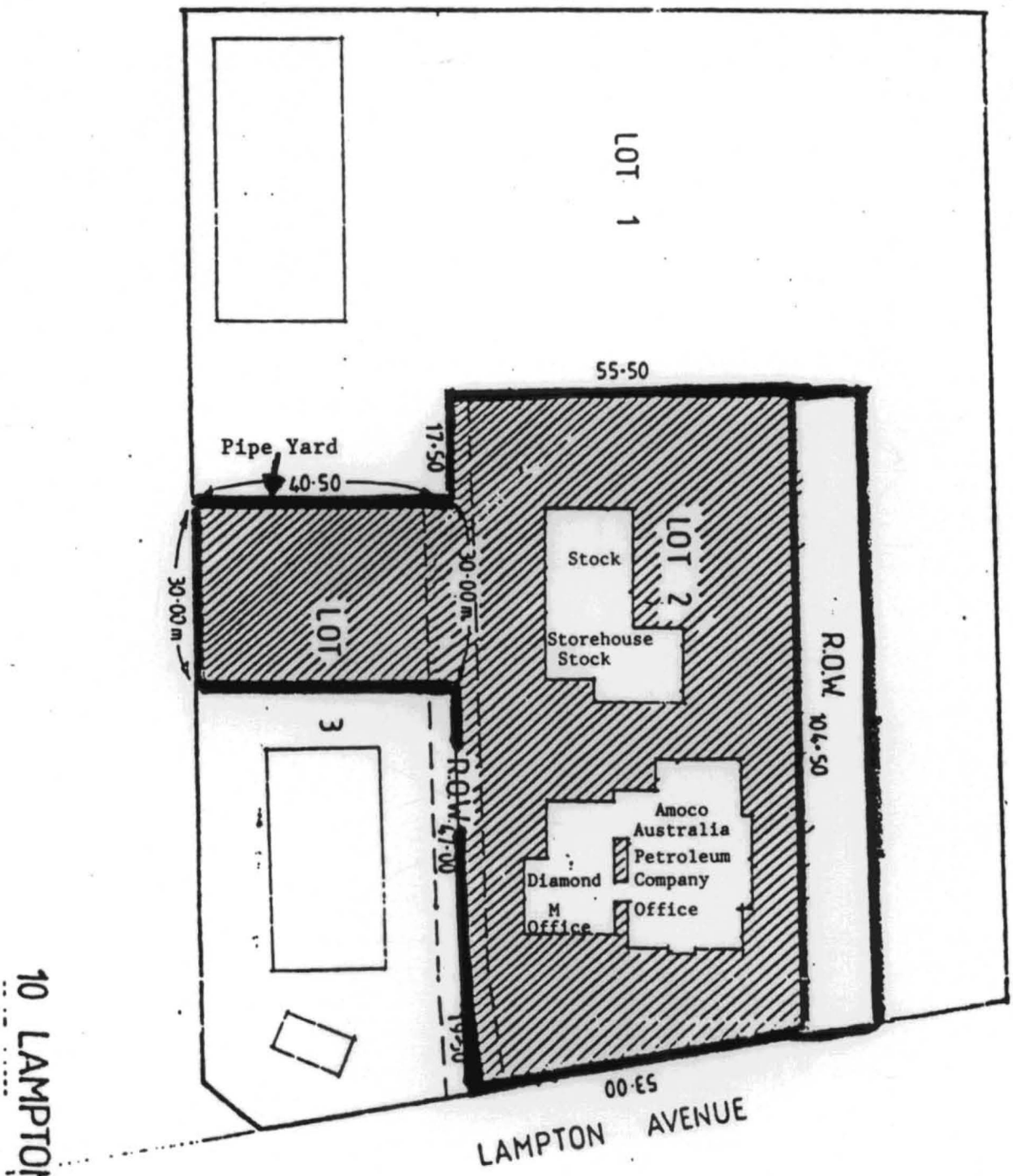


Figure No 2
Hale Street Facility

320366

Figure No 3

AMOCO AUSTRALIA PETROLEUM COMPANY
HOBART, TASMANIA OPERATIONS OFFICE



CONTRACTORS

1.	Diamond M	(Rig)
2.	Halliburton	(Cement & Tools)
3	Otis	(DST)
4.	Baroid	(Mud)
5.	Tri-State	(Tools)
6.	Exlog	(Mud Log)
7.	SubSea International	(Divers)
8.	Eastman Whipstock	(Directional)
9.	Schlumberger	(Logs)
10.	Cameron Iron Works	(Wellhead)
11.	Drilling Fluids Systems Australia	(Mud Cleaners)
12.	Diamond Boart	(Corebarrel/Stabilizers)
13.	Lloyds Aviation	(Helicopters)
14.	A.O.S.	(Boats)
15.	Taylor Brothers	(Labor/Machining)
16.	T.N.T	(Transport)
17.	Wards Express Service	(Transport)
18.	Hazell Brothers	(Transport)
19.	Baker Inspection Service	(Pipe Inspection Service)
20.	Speciality Press Printers	(Printers)
21.	Thompson Business Center	(Manuals)
22.	Thrifty Rent-A-Car	(Pool Cars)
23.	Ansett Air Freight	(Air Freighters)
24.	Tasman Oil Tools	(Rental Tools)
25.	Australian Oilfield Services	(Rental Tools)

26.	Ocean Routes	(Weather Forecast)
27.	LSE - IFCO	(Communications)
28.	Rutledge Oilfield Services	(H2S Training)
29.	Dril Quip International	(Casing Connectors)
30.	Geomex	(Location Survey)
31.	ICI Explosives	(Wellhead Recovery)
32.	Weatherford	(Casing Crews)
33.	Smith International	(Bits)
34.	P & O Australia	(Transport)
35.	Thorpe Transport	(Transport)

320369

ANCHOR PATTERN: TILANA NO 1

