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SML 221

LADY BUXTON

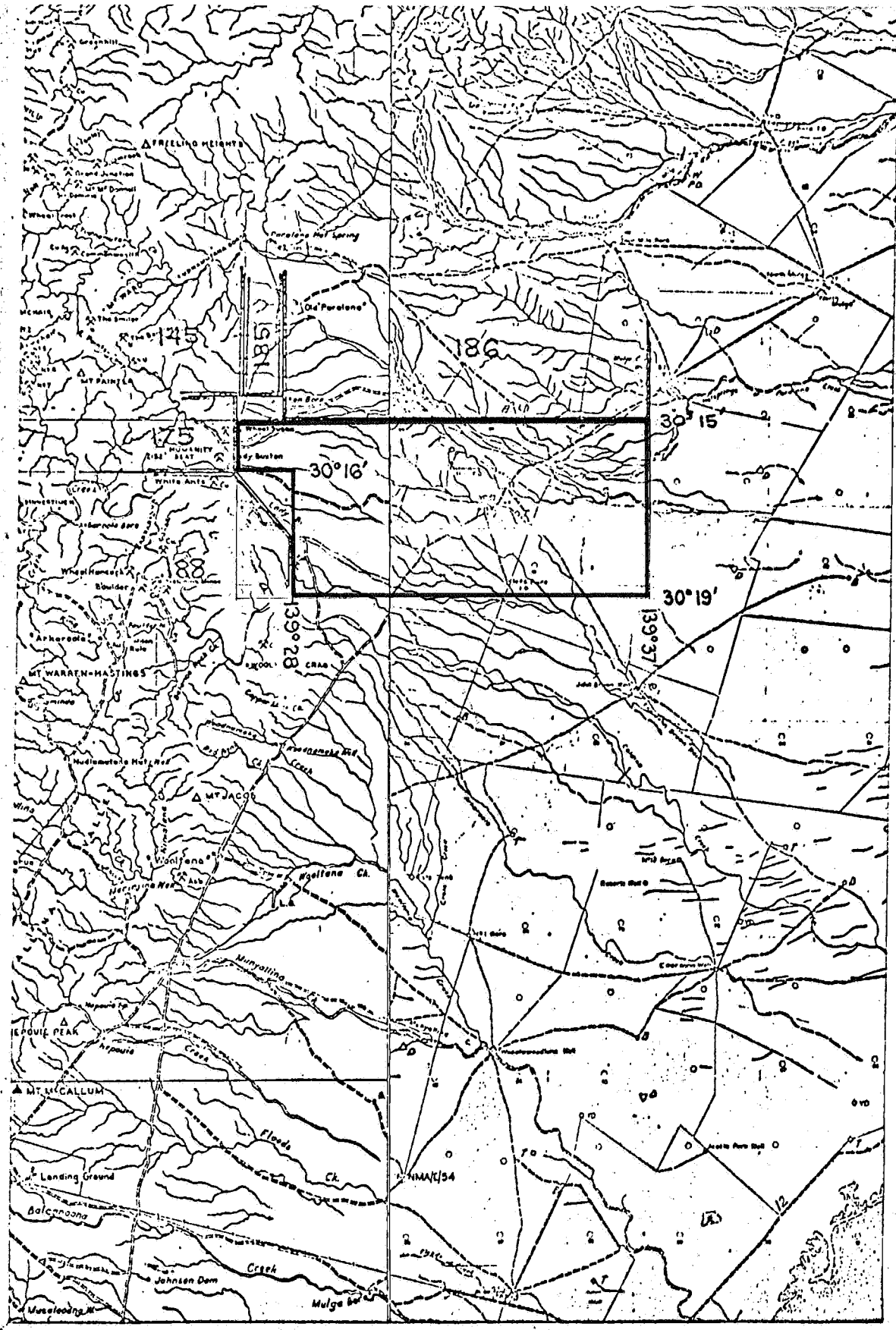
PROGRESS REPORTS TO LICENCE EXPIRY/RENEWAL FOR THE PERIOD 22/7/1968 TO 21/7/1970

Submitted by
Exoil NL and Petromin NL
1970

Enquiries: Customer Services Branch
Minerals and Energy Resources
7th Floor
101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
Facsimile: (08) 8204 1880

Government of South Australia
Primary Industries and Resources SA



EXOIL PTY. LTD. & TRANSOIL PTY. LTD.
& PETROMIN PTY. LTD.

SCALE 1:250000

MILES 0 2 4 6 8 10 MILES

DM. 1143/68

S.M.L. 221

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TENEMENT HOLDER: Exoil N.L. & Transoil N.L.

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1143/64

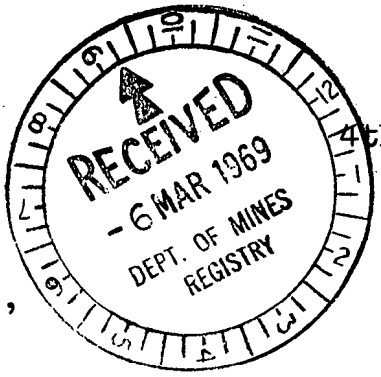
EXOIL NO LIABILITY

TECHNICAL OFFICE

TELEPHONES:
2 3914
2 3915
TELEGRAMS:
"EXOIL"
BRISBANE

1ST FLOOR, PERRY HOUSE
ELIZABETH STREET
BRISBANE, 4000

003



4th March, 1969.

The Director,
Department of Mines,
P.O. Box 38,
Rundle Street,
ADELAIDE. S.A.

Dear Sir,

Exoil N.L. & Transoil N.L. - S.M.L. 221
Six-Monthly Report for period ended 22nd January, 1969

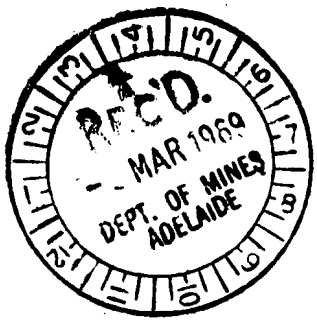
Work on this Special Mining Lease was confined to a review of the surface geology during the Six Months ended 22nd January, 1969.

On 10th October, 1968 the approval of the Minister for Mines was granted to an agreement with Petromin N.L., whereby that company can earn a one third interest from Exoil & Transoil in this Lease.

Subsequently Petromin N.L. has taken over exploration on this lease, drilling is scheduled for early in the next period.

Yours faithfully,

(W. Lawson)
Operations Manager



NO.

Director of Mines

ENV 1004

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M E M O R A N D U M

TO: B. FITZPATRICK COMPANY: Petromin N.L.

FROM: G. RAVELEIGH DATE: 30th June 1969

SUBJECT: SML's 186, 221, 245, 243 & 244

Progress Report to 24th June 1969

The final hole to be drilled by Exoil N.L. was 221-5. This hole was drilled to 630 feet T.D. and gamma-logged to 630 feet inside the drill stern by Down Under Well Services. A scintillation probe was used.

A kick of 5.3 times background was reported at 536 feet and had a width of approximately 1 foot. Samples indicate that the peak occurred in the tip of the grey shale which has been considered basement up till now.

An iridescent yellow flaky mineral coating sand and clay grains has been encountered in the samples from nearly all the holes from 221-2 to 221-5. These have been recorded on the sample descriptions. Some of the zones showing these coatings show a weak kick on the gammalog. Some samples of these have been sent to AMDEL for assay for U_3O_8 and determination of the yellow mineral.

Float/sink separations were done on samples showing 1% total small black grains. Intervals were combined for the separation. These "heavies" less the magnetic fraction (usually about 10% of the heavies) were sent to AMDEL for assay for U_3O_8.

Flagging along John Brown's Wash has been completed. 31 holes have been flagged; to be drilled by the new contractors, of which 11 have already had surface casing set.

I will forward a complete report at the earliest convenience.

G.R.

SOUTH AUSTRALIAN DEPARTMENT OF MINES
GEOLOGICAL SURVEY

GL129

SML 221

TYPE OF LOG (S): GAMMA. 100 CPS

DATE: 5/6/69

TIME: 1220 + 2230 hrs.

AREA: PARALANA

LOCATION: Lat. Long.

WELL: 221-3

ELEVATION G.L.: K.B.: Log from feet above G.L. DEPTH SCALE:

RUN NUMBER: One / / / /

FIRST READING: 65' / / / / LAST READING: 0' / / / /

CASING SHOE DEPTH ("):LOG feet DRILL feet TOTAL DEPTH:LOG feet DRILL feet

MUD: Type Density Viscosity Resistivity @ °F BHT @ °F

pH Fluid Loss cc/30 min. Filter Cake /32" R_{mf} @ °F R_{mc} @ °F

BIT SIZE: " ADDITIONAL CASING: (1) " set at feet (2) " set at feet

OPERATING TIME: 10 min. / / / /

RECORDED BY: B.A.C. BRICE

REMARKS:

EMV 1004 (I) - 1

DOWN UNDER WELL SERVICES Pty. Ltd

Gamma Ray -

COMPANY Petromin N.L.

AREA Paralana Creek. S.M.L. 221

WELL 221-5

STATE South Australia

LOCATION

ELEVATION
D.F.
K.B.
G.L.

COMPANY Petromin N.L.
WELL 221-5
LOCATION Paralana Creek
STATE South Australia

DEPT. OF MINES REGISTRY 1969

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	19 June 1969		Nature	Bentonite	
First Reading	0'		Density		
Last Reading	630'		Viscosity	@ °F	@ °F
Footage Logged	630'		Resistivity	@ °F	@ °F
Depth – driller	260'		Res.	@ °F	@ °F
Depth – logger	630'		pH		
Casing – driller	40'		Circ. Temp		
Casing – logger	—		B.H. Temp.		
Casing – Size	6"				
Bit Size	5 3/8"				
Logged by	L. READ				
Witnessed by	E. Hillwood / G. Reveleigh				

REMARKS Depth Taken From Ground Level.
1" G 10C Scintillation Probe Run inside 3 1/2" API Tool Joint Drill Pipe.
Scale Change to 1200 API Units For 2 tracks, 520'-560'
Low Count Peaks approx. every 20' are Tool Joints of Drill Stem.
Logging Speed 5'/minute.

ENV [redacted] 1004 (I)-2

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray -

COMPANY Petromin N.L.

AREA Paralana Creek S.M.L. 221

WELL 221-5

STATE South Australia

LOCATION

ELEVATION

D.F.

K.B.

G.L.

COMPANY Petromin N.L.

WELL 221-5

LOCATION Paralana Creek South Australia

RECEIVED 29 JUL 1969 DEPT. OF MINES REGISTRY

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	19 June 1969		Nature	Bentonite	
First Reading	0		Density		
Last Reading	630'		Viscosity	@ °F	@ °F
Footage Logged	630'		Resistivity	@ °F	@ °F
Depth – driller	660'		Res. @ BHT	@ °F	@ °F
Depth – logger	630'		pH		
Casing – driller	40'		Circ. Temp.		
Casing – logger			B.H. Temp.		
Casing – Size	6"				
Bit Size	5 3/8"				
Logged by	L. READ				
Witnessed by	E. Hillwood / G. Reveleigh				

REMARKS Depth Taken From Ground Level.
1" G 10C Scintillation Probe Run inside 3½" API Tool Joint Drill Pipe.
Scale Change to 1200 API Units For 2 tracks 520' - 560'
Low Count Peaks approx. every 20' are Tool Joints of Drill Stem.
Logging Speed 5'/minute

[redacted] GEOLOGICAL SURVEY

GL 128

SML 221

TYPE OF LOG (S): RESISTIVITY 5 OHMS.

DATE: 2/6/69

TIME: 1820 HRS TO 1855 HRS

AREA: PARALANA

LOCATION: Lat. Long.

WELL: 221-2

ELEVATION G.L.: K.B.: Log from feet above G.L. DEPTH SCALE:

RUN NUMBER: / / / /

FIRST READING: 551' / / / / LAST READING: 0' / / / /

CASING SHOE DEPTH ("):LOG feet DRILL feet TOTAL DEPTH:LOG feet DRILL feet

MUD: Type Density Viscosity Resistivity @ °F BHT @ °F

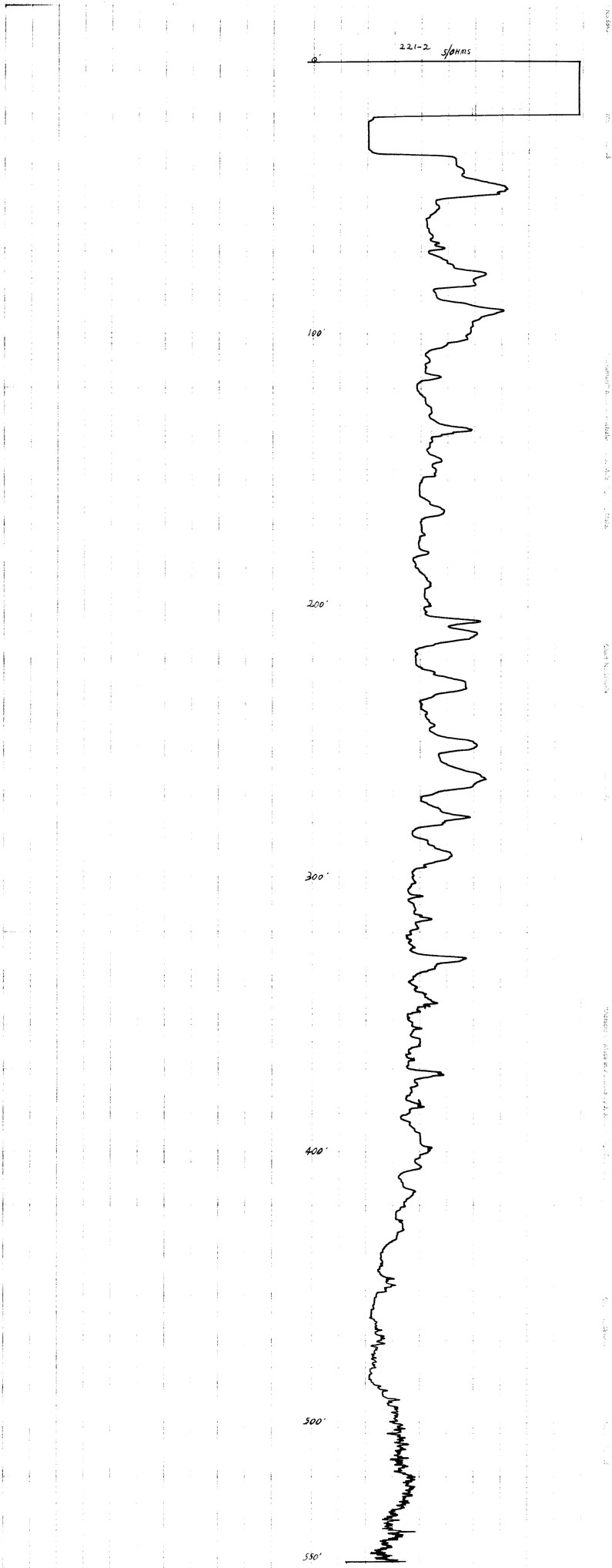
pH Fluid Loss cc/30 min. Filter Cake /32" R_{mf} @ °F R_{mc} @ °F

[redacted] " ADDITIONAL CASING: (1) " set at feet (2) " set at feet

OPERATING TIME: 35 min. / / / /

RECORDED BY: B.P.C. DAVIES

REMARKS:



SOUTH AUSTRALIAN DEPARTMENT OF MINES
GEOLOGICAL SURVEY

GL127

SML 221

100 4(L) -4-

TYPE OF LOG (S): GAMMA. 100 C.P.S.

DATE: 2/6/69 TIME: 1630hrs / 1800hrs

AREA: PARALANA LOCATION: Lat. Long.

WELL: 221-2

ELEVATION G. L.: K.B.: Log from feet above G. L. DEPTH SCALE:

RUN NUMBER: One / / / /

FIRST READING: 551' / / / / LAST READING: 0' / / / /

CASING SHOE DEPTH ("):LOG feet DRILL feet TOTAL DEPTH:LOG feet DRILL feet

MUD: Type Density Viscosity Resistivity @ °F BHT @ °F

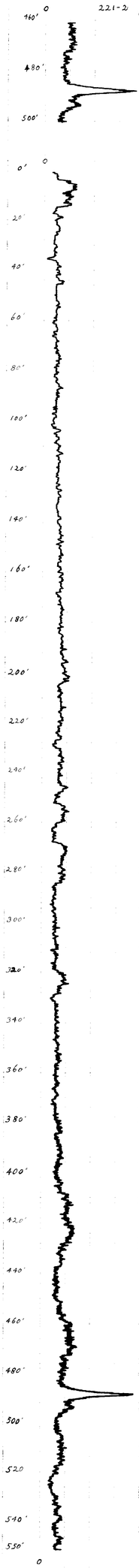
pH Fluid Loss cc/30 min. Filter Cake /32" R_{mf} @ °F R_{mc} @ °F

BIT SIZE: " ADDITIONAL CASING: (1) " set at feet (2) " set at feet

OPERATING TIME: 1½ hours / / / /

RECORDED BY: B A C BRICE

REMARKS: Rerun between 540' & 460'



Report on Drilling of SML 186 & 221

By Exoil N.L. for Petromin N.L.

to 24 - 6 - 69

Resume of Work Done

The following holes have been drilled by [illegible]
On SML 186 1A-3, 1B, 2B, 4A, 6A
On SML 221 5A, 7A, 8A, 9A, 221-1 (10A)
221-2, 221-3, 221-4, 221-5

Copies of the lithological descriptions, and Gammalog and E log tracings were forwarded through Brisbane at the completion of each hole.

Several samples of heavy minerals, separated by float/sink with bromoform, were forwarded to AMDEL for assay for U_3O_8 and determination of black grains. The magnetic fraction was removed before shipment to AMDEL.

Two samples containing the iridescent yellow flaky grains described in the lithology descriptions have been forwarded to AMDEL for determination and assay for U_3O_8.

Flagging sites along John Brown's Wash has been completed and the sites located on the photographs. 31 holes were flagged and 11 of these have surface casing set.

The new geologist took over from me just prior to completion of 221-5.

Summary of Geology

The sediments encountered thus far in drilling can be divided into two units. The lower units, presumably of Cretaceous age, is essentially a medium to dark grey shale. This unit has been considered basement. The upper unit is of Tertiary and Quarternary age and consists entirely of continental fluvial sediments.

The Lower Unit The Shale is very soft, structureless usually blue-grey, but varies from nearly white to black. Sections of it are often very carbonaceous. In three of the holes, a gammalog kick was recorded just below the contact between the shale and the [illegible] sediments. They are listed below :-

Hole No.	Peak x BG	Thickness	Depth
4 A	4 x	1.5 ft.	390 ft.
221-2	3 x	1.0 ft.	488 ft.
221-5	5 x	1.0 ft.	536 ft.

Due to hole conditions, this contact was not logged in the other holes except 9A, where the contact was indistinct.

The Upper Unit These sediments range in size from boulders to clay, are angular to sub angular and extremely poorly sorted. The clay content varies from 1% to about 60%. Most of the clay is washed out of the sample during drilling.

Lateral correlation between drill holes is almost impossible within this unit, and it is concluded that the sediments were deposited in aggradational type stream channels.

The sediments are generally oxidized, with zones of reduction occasionally associated with visible carbonaceous material. Sometime after drilling, hole 5A was found to be full of combustable gas, presumably methane.

Conclusions

Insufficient information has been collected to draw reasonable conclusions as to the value of the leases. Lithological correlation between holes is impractical, because of factors mentioned above. An attempt was made to use the colour of the sample as a reason indicator to correlate zones of reduction. However, insufficient data had been gathered to say that it was more than partially successful. When more data becomes available correlation of permeable zones between holes may be possible with the E. log.

ENV 1004

EXOIL NO LIABILITY

Well: PETEX 5A - 1 S.M.L. 221

Interval From	to	Sample description
Core No. 1		
80	90'	No recovery
Core No. 2		
90'	100'	Recovered 2 feet. Sandy clay. Light grey, soft, clay cementing quartz grains. Quartz grains consist of very fine to very coarse grained, clear, subangular, with black specks, some orange and orange-brown quartz, carbonaceous in part.
Core No. 3		
140'	152'	Recovered 11'10". The whole core consist of light grey-green shale, very carbonaceous, soft, with occasional limonitic and ferruginous staining in small veins. Silty in part.
Core No. 4		
152'	165'	Recovered 3'10"
152'	153'6"	Sandy clay. Light grey clay with clear quartz grains, microscopic [illegible] carbonaceous. Some olive-green clay [illegible] silty. Some dark red-brown and carbonaceous [illegible] soft. Some olive-dark brown, very micaceous [illegible].
153'6"	154'10"	Dark brown [illegible], [illegible] quartz grains. [illegible]. Some [illegible] grey-brown [illegible] very [illegible].

ENV 1004

EXOIL NO LIABILITY

Well: PETEX 5A SML.221

Interval From	To	Lithology	%	Sample description
0	5	Siltstone	100	Light brown, soft, carbonaceous with rare quartzite grains, trace angular clear quartz.
5	10	Siltstone	100	As above
10	15	Gravel	100	Quartz grains, clear, white, orange, pink red-brown gneissic, grains vary from rounded to angular, fine to coarse grained, inclusions of magnetite (?) haemetite (?) throughout quartz grains. (drilled through boulders).
15	20	Gravel	100	As above
20	25	Siltstone	30	Red-brown, soft
		Sandy Clay	40	Light to medium grey, soft, carbonaceous, gritty, with limonitic coating (Tertiary)
		Sand	30	Quartz grains very coarse grained, rounded, clear, orange, medium grey
25	30	Sandy Clay	70	As above
		Siltstone	20	As above
		Sand	10	As above
30	35	Sandy Clay	80	As above limonite coated
		Sand	20	Quartz grains fine to medium and some coarse grained, sub angular to rounded, dominantly clear, and some with white kaolinitic coating.
35	40	Sandy Clay	90	As above and micaceous
		Sand	10	As above
40	45	Sandy Clay	90	As above
		Sand	10	As above
45	50	Sandy Clay	100	As above
50	55	Sandy Clay	100	Light grey as above with red-brown limonitic coating
55	60	Sandy Clay	100	As above
60	65	Sandy Clay	100	As above
65	70	Sandy Clay	100	As above
70	75	Sandy Clay	60	As above
		Siltstone	40	Red brown, medium grey, soft, carbinaceous.
75	80	Sandy Clay	20	As above
		Siltstone	80	As above very carbonaceous, black specks.
80	85	Siltstone	80	Red-brown, carbonaceous, soft, very finely micaceous.
		Sandy Clay	20	Light grey, gritty, limonite coated
85	90	Sandy Clay	20	As above
		Siltstone	80	As above, carbonaceous, very finely micaceous.
90	95	Siltstone	100	Red-brown throughout, sandy in part.
95	100	Siltstone	80	Rich red-brown, light to medium grey, soft carbonaceous, micaceous, sandy in part.
		Sand	20	Medium to coarse grained quartz, sub rounded, possibly from the clay.
100	105	Siltstone	80	As above
		Sand	20	As above
105	110			No returns
110	115			No returns
115	120	Sand	70	Quartz grains fine to medium, subangular to sub rounded, dominantly clear, some yellowish with minute magnetic inclusions and free flakes of muscovite, with occasional gypsum crystals.
		Sandy Clay	30	Tan, red brown soft, overall sample colour lighter.
120	125	Sandy Clay	50	Tan, light brown, coarse grained quartz cemented in a clay matrix.
		Sand	50	Very coarse to pebble size quartz grains, dominantly clear angular and sub rounded. Overall sample colour tan-buff.
125	130	Sandy Clay	30	As above
		Sand	70	As above

Well: PETEX 5A SML.221

Interval From	To	Lithology	%	Sample description
130	135	Sand	80	As above. Very coarse grained to pebble size, and ferruginous in part, some black grains in quartz.
		Sandy Clay	20	As above
135	140	Sand	80	Quartz pebbles, rounded, light grey, clear.
		Sandy Clay	20	Light grey, red-brown, buff, tan
140	145	Sand	100	Quartz, fine to very coarse grained, feldspathic, clear with metalic inclusions and biotite also yellow-orange grains. (Water bearing sand)
145	150			No returns
150	155			No returns
155	160	Sandy Clay	100	Light grey with quartz grains, very carbonaceous in part.
160	165			No returns
165	170			No returns
170	175			No returns
175	180	Siltstone	100	Medium grey-green and dark brown, soft carbonaceous, gritty with quartz grains loosely cemented, clear, yellow-orange, some with black inclusions.
180	185	Sandy Clay	100	Light brown with quartz grains as above
185	190	Sandy Clay	100	Medium grey, soft with loose quartz grains, clear, yellow, orange, brown, sub rounded and sub angular with black specks in clear quartz.
190	195	Sandy Clay	100	Light grey with quartz as above.
195	200	Sandy Clay	80	As above
		Siltstone	20	Dark grey, brown, soft carbonaceous.
200	205	Sandy Clay	100	Medium grey, dark brown with loose quartz as above washed out of clay.
205	210	Sandy clay	100	Sample only showing free quartz from washed out clay, medium-coarse grained, rounded, clear, yellow, orange, brown and black specks.
210	215	Siltstone	50	Light grey - green and yellowish, soft, carbonaceous.
		Sandy Clay	50	Dark brown and medium grey with quartz as above.
215	220	Sandy Clay	100	As above
220	225	Sandy Clay	100	Medium grey clay with quartz as above.
225	230	Sandy Clay	100	Light to medium grey, some brown, abundant free quartz pebbles from clay, clear, yellow-orange, brown sub angular to sub round grains.
230	235	Siltstone	50	Dark brown - black, very carbonaceous, soft,
		Sandy Clay	50	Light grey as above with quartz grains.
235	240	Sand	100	Quartz grains medium grained and fairly uniform, sub angular, clear, orange, brownish, with fair abundance of very fine black grains. Some clay matrix. Sand probably washed out of clay (?)
240	245			No returns
245	250	Sand	100	Sand as above, washed out of clay (?)
250	255	Sandy Clay	100	Light grey to light brown, quartz grains coarse to very coarse clear, yellow - orange, grey, brown, sub angular to sub round.
255	260	Sandy Clay	100	Medium brown with quartz grains as above.
260	265	Sandy Clay	100	Medium brown - dark grey as above
265	270			No returns
270	275	Sandy Clay	100	Light grey, with some white kaolin, quartz grains as above with black specks.
275	280	Sandy Clay	100	As above
280	285			No returns
285	290			No returns
290	295			No returns

011

Interval From	To	Lithology	%	Sample description
295	300	Sandy Clay	100	Light brown clay with quartz as above
300	305	Sandy Clay	100	As above
305	310	Sandy Clay	100	Light brown clay with quartz
310	315	Sand	100	Quartz grains very fine to coarse grained, clear, yellow, orange, subangular, probably washed out of clay.
315	320	Sandy Clay	100	As above
320	325	Sandy Clay	70	Light brown with quartz as above
		Siltstone	30	Medium grey - greenish, soft
325	330	Sandy Clay	100	Light brown with quartz and black specks as above.
330	335	Siltstone	40	Light grey-green, yellow in part
		Sandy Clay	60	As above
335	340	Sandy Clay	100	Light brown - buff clay with quartz and black specks
340	345	Sandy Clay	90	As above
		Siltstone	10	Grey-green, yellowish on breaking
345	350	Sandy Clay	100	Light grey - brown with quartz and black grains
350	355	Sandy Clay	100	Light grey clay cementing quartz, clear yellow-orange, purple (rare), dark grey, fine to coarse grained.
355	360	Sandy Clay	80	Light grey, sandy, quartz grains loosely cemented, dominant, clear sub angular, some yellow and orange, black specks within quartz.
		Siltstone	20	Light grey some deep red - brown and sandy, with yellow staining in part.
Off Bit 360'		Sand	100	Quartz very fine grained, sub angular, dominantly clear, with yellow-orange, pinkish and rare green grains, also muscovite flakes, black specks throughout sample. Possibly the sand has been flushed out of the clay.

EMV 1004

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EXOIL NO LIABILITY

Well: PETEX 7A SML.221

Interval From	To	Lithology	%	Sample description
0	10	Gravel	100	Quartz fragments, siltstones, feldspars, micaceous, gypsum crystals, black grains in fragments from boulders, sample red-brown.
10	15	Gravel	100	As above
15	20	Gravel	100	As above
20	25	Sandy Clay	100	Red-brown, ferruginized, quartz grains fine grained, micaceous, hard.
25	30	Sandy Clay	100	Deep red-brown as above
30	35	Siltstone	100	Red brown, soft, muscovite flakes present, slightly carbonaceous and sandy in part.
35	40	Siltstone	70	As above
		Sandy Clay	30	Red brown, sandy, friable, with some very coarse quartz grains.
40	45	Siltstone	100	Red brown as above
45	50	Siltstone	100	Red brown, soft, slightly sandy,micaceous.
50	55	Siltstone	100	As above
55	60	Siltstone	100	As above
60	65	Siltstone	100	Red brown, soft, carbonaceous, micaceous
65	70	Siltstone	100	As above
70	75	Siltstone	100	Red-brown, as above and slightly sandy
75	80	Siltstone	100	Medium brown, micaceous, black grains, slightl sandy soft.
80	85	Siltstone	70	As above
		sandy clay	30	Light grey, micaceous, sandy
85	90	Siltstone	50	As above
		Sandy Clay	50	As above
90	95	Sandy Clay	100	Red brown to dark brown, soft, carbonaceous, slightly sandy
95	100	Siltstone	100	Medium brown to tan, soft.
100	105	Siltstone	100	Red brown, soft, sandy
105	110	Sandy Clay	40	Red brown, soft, sandy
		Siltstone	60	Red brown, sandy
110	115	Sand	50	Quartz grains fine grained, clear, frosty, angular to sub-rounded, muscovite flakes
		Clay	50	Light grey, mediumbrown.
115	120	Sand	40	As above with black grains and coarser quartz.
		Clay	60	As above
120	125	Clay	60	As above
		Siltstone	20	Light grey,soft, sandy
		Sand	20	As above
125	130	Siltstone	80	Light grey, tan, buff
		Sand	10	As above, trace yellow quartz
		Clay	10	Brown, light brown, sandy
130	135	Sandy Clay	100	Buff, soft clay cementing coarse to fine grained quartz micaceous.
135	140	Sandy Clay	100	As above
140	145	Sandy Clay	100	Buff clay with quartz pebbles, coarse grained and fine grained, quartz frosty, grey, angular to sub-rounded, some dark grey and red-brown.
145	150	Sandy Clay	90	As above
		Siltstone	10	Light grey to green,carbonaceous, micaceous
150	155	Sandy Clay	90	As above
		Siltstone	10	As above, but slightly sandy
155	160	Sandy Clay	90	As above and with white quartz
		Siltstone	10	As above but very micaceous.
160	165	Sandy Clay	100	Medium brown, buff, micaceous, with quartz and trace black grains.
165	170	Sandy Clay	100	Buff, red-brown ferruginized clay containing quartz and black grains, quartz white, frosty dark grey.
170	175	Sandy Clay	100	As above
175	180	Sandy Clay	100	Buff, medium brown, micaceous, with frosty yellow-brown, dark grey and black grains in quartz.

Well: PETEX 7A SML.221

015

Interval From	To	Lithology	%	Sample description
180	185	Sandy Clay	100	Medium brown clay with large muscovite flakes, dark grey quartz, black grains, trace light green-grey Siltstone.
185	190	Sandy Clay	100	As above
190	195	Sandy Clay	100	As above
195	200	Sandy Clay	100	Medium brown, traces of ferruginized clay, with quartz grains fine to very coarse grained, frosty, off-white, clear, some yellow, some deep red-brown with black specks in quartz.
200	205	Sandy Clay	80	Light brown with medium quartz grains.
		Siltstone	20	Light grey, carbonaceous, slightly micaceous.
205	210	Sandy Clay	100	As above
210	215	Sandy Clay	100	As above
215	220	Sandy Clay	60	Light brown, light grey
		Sand	40	Medium to very coarse grained quartz.
220	225	Sand	60	Frosty, yellow-brown, brown-red, fine to coarse grained, sub-angular to sub-rounded.
		Sandy Clay	40	Buff, light brown clay.
225	230	Sandy Clay	100	Clay and quartz as above
230	235	Sand	100	Quartz grains clear, frosty, off-white, yellowish with some black grain inclusions, traces of micaceous clay, buff, yellowish and deep red-brown. (Sand washed out of clay).
235	240	Sand	100	As above
240	245	Sand	40	As above
		Sandy Clay	60	Buff, light brown, cementingquartz grains.
245	250	Sand	100	As above coated in clay, with trace of brown-black clay, soft and carbonaceous.
250	255	Sand	100	Quartz grains frosty, off-white, yellowish brownish, sub-angular to sub-rounded, fine to very coarse grained, black specks in quartz and trace carbonaceous brown-black clay
255	260	Sand	100	As above and trace black-brown clay
260	265	Sandy Clay	100	Medium brown and some light grey clay cementing quartz grains as above.
265	270	Sandy Clay	100	Medium grey-brown, with yellow and red-brown stains, soft and carbonaceous in part.
270	275	Sandy Clay	100	Light grey with very fine quartz grains, larger grains frosty, yellowish and brown.
275	280	Sandy Clay	100	As above
280	285	Sandy Clay	100	Medium-light brown and dark grey clay cementing quartz grains.
285	290	Sandy Clay	100	Buff clay cementing quartz.
290	300	No Returns		
300	305	Sand	80	Quartz grains frosty, yellow - orange, red - brown, fine to very coarse grained, trace black grains.
		Siltstone	20	Medium grey, grey-brown, carbonaceous.
305	310	Sand	70	Quartz grains, clear, frosty, off-white, yellow-orange, fine to very coarse grained, angular to sub-rounded, containing black inclusions.
		Siltstone	30	Grey-green, medium and very dark brown, soft, very carbonaceous.
310	315	No Returns		
315	320	Sand	60	As above
		Siltstone	40	As above
320	325	Sand	70	As above
		Siltstone	30	As above
325	330	Sandy Clay	100	Buff with quartz as above
330	335	Sandy Clay	100	As above
335	340	Sandy Clay	100	Medium brown clay with some dark brown carbonaceous clay and quartz grains.
340	345	No Returns		
345	350	Sandy Clay	100	Medium to dark brown clay with sand as above.

Well:PETEX 7A SML.221

Interval From	To	Lithology	%	Sample description
350	355	Sandy Clay	100	As above
355	360	Sand	70	Quartz grains clear, frosty, yellowish very coarse grained sub angular.
		Siltstone	30	Light grey, grey-green, buff
360	365	Sandy Clay	100	Light grey-green, green-yellow, orange-brown, quartz grains fine and clear.
365	370	Siltstone	60	Light grey - buff, sandy in part, pale blue g grey.
		Clay	40	Dark-brown, very carbonaceous.
370	375	Clay	30	As above
		Siltstone	40	As above
		Sand	30	Fine to very coarse grained quartz, pinkish, red - brown, frosty, mauve.
375	380	Clay	50	Dark brown carbonaceous.
		Sand	50	As above
380	385	Sand	100	Quartz grains frosty, yellow, off white, coarse grained, and black grains (sand from clay).
385	390	Sand	100	As above
390	395	Clay	100	Medium brown, slightly sandy, dark brown - black very carbonaceous.
395	400	Clay	100	Medium brown and medium to dark grey. Dark brown-black and very carbonaceous.
400	405	No Returns		
405	410	No Returns		
410	415	Sandy Clay	100	Buff clay, with fine to very coarse grained quartz and micaceous.
415	420	Sandy Clay	100	As above
420	425	Sandy Clay	100	As above
425	430	Sand	100	Quartz grains, clear, frosty, yellowish - orange fine to very coarse grained, and coated with buff clay. Traces of black grain
430	435	Sandy Clay	100	Buff clay cementing quartz grains as above.
435	440	Sandy Clay	100	As above
440	445	Sandy Clay	100	As above
445	450	Sand	100	Quartz grains clear, frosty,yellow, orange, red-brown pebbles, traces of black grains, traces of buff, medium brown and brown-black carbonaceous siltstone.
450	455	No Returns		
455	460	Sand	100	Quartz as above, and grains coated with clay.
460	465	Sandy Clay	100	Buff clay with quartz as above.
465	470	Sand	100	As above grains with clay coating.
470	475	Sand	100	As above grains with clay coating.
475	480	Sand	100	As above with traces of light grey-blue shale (cretaceous?)
Off Bit				
480		Shale		Light grey green shale, soft, very carbonaceo traces of oxidation. Top of cretaceous.

ENV 1004

EXOIL NO LIABILITY

Well: PETEX 8A SML.221

Interval From	To	Lithology	%	Sample description
0	5	Siltstone	100	Medium brown, crumbly earthy, micaceous, very slightly carbonaceous in part, few quartz fragments with black minerals, also gypsum crystals present.
5	10	Siltstone	70	As above
		Gravel	30	Large quartz fragments, with large biotite flakes and some metalic inclusions.
10	15	Gravel	70	Gneissic quartz as above, some grains rounded mostly angular, some clear but dominantly ferruginous, with gypsum crystals showing typical twinning.
		Siltstone	30	As above
15	20	Gravel	100	Quartz grains very small to large fragments, clear, white, grey, ferruginous, mauve, gneissic, pinkish, gypsum and large muscovite flakes present.
20	25	Sandy Clay	70	Light grey clay, cementing fine grained quartz soft, sample coated with deep red-brown silty coating.
		Sand	30	Quartz grains also coated with ferruginous silty clay, grains vary from very fine to large pebbles which are gneissic in part.
25	30	Siltstone	90	Deep red-brown, soft, micaceous
		Sandy Clay	10	Light grey as above and coated with silty material.
30	35	Siltstone	100	Red-brown as above and slightly sandy in part.
35	40	Siltstone	80	As above
		Sandy Clay	15	As above
		Sand	5	Very fine to coarse grained quartz, probably from sandy clay.
40	45	Sandy Clay	60	Light grey, sandy, micaceous, soft, but coated with red-brown silty material.
		Siltstone	40	Red-brown as above
45	50	Siltstone	50	As above
		Sand	50	Quartz grains very fine to some pebble size, clear, yellowish, and gneissic fragments, some gypsum and free biotite flakes.
50	55	Sand	70	As above but dominantly very coarse to pebble grained and coated in silty material.
		Siltstone	30	Red-brown as above.
55	60	Sandy Clay	60	Light grey, sandy with fine grained quartz micaceous, soft.
		Sand	40	Very coarse grained, domina ntly clear, sub-angular.
60	65	Siltstone	100	Deep red-brown, soft, sandy in part, micaceous
65	70	Siltstone	100	As above
70	75	Siltstone	100	As above
75	80	Siltstone	100	As above
80	85	Siltstone	100	As above
85	90	Siltstone	100	As above
90	95	Siltstone	100	As above
95	100	Siltstone	100	As above slightly carbonaceous.
100	105	Siltstone	100	As above, slightly carbonaceous, some grey siltstone, but red coating.
105	110	Siltstone	100	As above
110	115	Siltstone	100	As above
115	120	Siltstone	100	As above, the sand silt has broken up into a very fine grained sand.
120	125	Sand	100	Quartz grains, clear, yellowish, uniformly grained, large muscovite to flakes, quartz dominantly sub-rounded.
125	130	Sand	80	Dominantly very coarse grained quartz, clear and yellowish, sub-angular to sub-rounded.
		Sandy Clay	20	Light grey, micaceous, slightly carbonaceous and sandy.

Interval From	To	Lithology	%	Sample description
130	135	Sand	80	As above with some orange quartz.
		Sandy Clay	20	As above
135	140	Sandy Clay	60	As above
		Sand	40	As above
140	145	Sandy Clay	100	Light grey, some ferruginous, sandy, medium hard, slightly carbonaceous inpart.
145	150	Sand	100	Fine to medium grained quartz, fairly well sorted, clear, frosty, yellowish some orange, subangular to subround, some muscovite flakes.
150	155	Sand	70	As above
		Sandy Clay	30	Light grey, some ferruginous, micaceous and sandy.
155	160	Sandy	90	As above
		Sandy Clay	10	As above
160	160	Sand	90	Fine to very coarse grained quartz sub-angular clear, frosty, yellow, yellow-orange, some muscovite flakes. The sand has been broken loose from the clay as all the grains are clay coated.
		Sandy Clay	10	Light grey, micaceous and very sandy.
170	180	Sandy Clay	10	Light grey, buff, covered with sand grains.
		Clay	90	Dark brown-black, very carbonaceous, soft, covered with very fine grained sand.
180	185	Clay	100	Dark brown-black as above
185	190	Clay	100	Tan, soft, sand covered
190	195	Sand	100	Clear, frosty, off-white quartz sub-angular and some rounded, trace orange
		Clay		Trace dark brown soft.
195	200	Sandy Clay	100	Light grey, very sandy with quartz grains in clay as above. Trace dark brown clay.
200	205	Sand	100	Quartz grains very coarse, clear, frosty, sub angular, one green grain (apetite?) some black grains in quartz.
205	210	Sand	100	As above, all sand formed from clay.
210	215	Sandy Clay	100	Fairly uniformaly sorted sand grains as above, loosely cemented in buff clay, traces of black grains.
215	220	Sandy Clay	100	As above
220	225	Sandy Clay	100	As above with some red staining.
225	230	Sandy Clay	100	Buff clay, cementing well sorted quartz grains with traces black grains.
230	235	Sandy Clay	100	As above
235	240	Sand	100	Clean quartz grains, clear, frosty yellow, some orange and rare black grains. Coarse grained and fairly uniformaly sorted, sub-angular and some clay on grains.
240	245	Sand	80	As above
		Siltstone	10	Dark tan-orange, micaceous and sandy
		Sandy Clay	10	As above
245	250	Sandy Clay	100	Buff clay cementing very fine to pebbly quartz grains, frosty, yellow, some orange.
250	255	Sandy Clay	100	As above
255	260	Sandy Clay	100	As above
260	265	Sandy Clay	100	As above, trace black grains
265	270	Sandy Clay	100	As above, trace black grains
270	275	Sandy Clay	100	As above
275	280	Sandy Clay	100	As above
280	285	Sandy Clay	100	As above, trace dark grey clay
285	290	Sandy Clay	100	As above 5% dark grey clay
290	295	Sandy Clay	100	As above trace grey clay
295	300	Sandy Clay	100	As above trace grey clay
300	305	Sandy Clay	90	As above trace dark brown clay
		Siltstone	10	Light grey green, sandy, traces of red-brown staining.

Well: PETEX 8A SML.221

Interval From	To	Lithology	%	Sample description
300	305	Light grey silt		Sand fine to very fine angular to sub angular c'less grey, orange brown buff 30% silt 60% clay 10% black grain 5% (approx) mostly mag. and il. but some metallic to vitreous, small.
305	310	Light grey sand		Sand as above 50% silt 40% clay 10% black grain as above occasional sand grain coated with bright yellow "clay" possibly limonite.
310	315	Light grey sand		As above except black grain 10% probably mostly mag. and il. smallshiny black grain present. Yellow coating present.
315	320	Light grey sand		As above black grain as above but 10%
320	325	Light grey sand		Sand as above 60% silt as above 30% clay 20% black grain as above 5%
325	330	Medium grey shale		Soft black and grey shale, also very soft light grey shale, yellow encrustation as above some parts of which are microxiline and shale.
330	335	Medium grey shale		Predominant black shale with grey and white shale chips, shale appears free of silt, probably black represents carbonaceous bands.
335	340	Grey shale		As above
340	345	Fine grey sand		Sand fine to very fine sub-angular colourless grey, white, orange, pink 70% silt 20% grey clay 10% occasionally fine shiny sand black grain.
345	350	Grey clayey sand		As above, clay 20% silt 20% sand 60%
350	355	Grey clayey sand		Sandcoarse to fine sub-rounded to sub-angular 50% silt and clay 10% black shale carb. 10% occasionally yellow and white limonite coated sand and clay grains.
355	360	Grey clayey sand		As above
360	365	Grey clayey sand		As above
365	370	Grey shale		Shale black, grey soft black carbonaceous.
370	375	Grey shale		Black grey and white shale lim. coatings red, brown yellow some iridescent.
375	380	Grey shale		Black grey, blue grey shale.
380	385	Grey silt		As above
385	395	Grey silt		As above
395	400	Grey shale		Predominant black shale carbonaceous some dark grey shale.
400	410	Dark grey shale		
410	415	Grey shale	70	As above
			30	Grey sand, medium grained to fine, sub rounded to sub angular.
415	420	Grey sand		Sand 70% sub angular to sub rounded colourless grey opaque white, canary yellow xlline encrustation some black carb. shale silt 30%
420	425	Grey silt		Mainly black and grey shale
425	440	Grey silt		As above
440	445	Black shale		Predominant black shale, some dark grey carb.
445	500	As above		
500	T.D.			

EHV 1004

EXOIL NO LIABILITY

Well: PETEX 9A SML.221

Interval From	To	Lithology	%	Sample description
0	5	Boulder Bed	100	Boulders of high grade metamorphic to [illegible] diameter. Subangular & subrounded. Sand angular brown c'less white. Clay brown
5	10	Boulder bed	100	As above
10	15	Boulder bed	100	As above
15	20	Boulder bed	100	As above
20	25	Brown clayey sand	100	Sand medium to fine grained subangular to angular c'less white brown 40% silt brown white 40% clay brown 20%. Traces of mica. Some black biotite agglomerate (6" casing to 20')
25	30	Brown clayey sand	100	As above
30	35	Brown clayey sand	100	Sand very coarse to fine subangular to angular 50% silt as above. 30% clay as above. 20% Trace black and white mica.
35	40	Red brown clayey sand	100	Sand coarse to fine poorly sorted angular to subrounded brown white colourless 50% silt as above 40% clay brown 10% traces mica gypsum.
40	45	Red brown clayey sand	100	Sand as above 70% silt 20% clay brown 10% Trace black and white micas. Trace gypsum
45	50	Red brown clayey sand	100	As above
50	55	Red brown clayey sand	100	Sand very coarse to fine. Angular to sub-angular 80% silt 10% clay brown 10% traces mica gypsum
55	60	Brown clayey sane	100	Sand is above 70% silt as above 20% clay brown 10% traces mica gypsum
60	65	Brown clayey sand	100	Sand coarse to fine sub angular to angular 40% silt brown 40" clay brwan 20% traces mica gypsum
65	70	Brown clayey sand	100	Sand occasionally coarse mainly medium to fine 40% c'less white brown silt 40% brown and white clay and gypsum matrix 20%. Traces mica
70	75	Brown clayey sand	40	Brown clayey sand as above
		Gypsum band	60	Gypsum bands quartz feldspars micas, clay white as above 60 - 80% Gypsum cement 20%
75	80	Brown clayey sand	100	As above. Occasional bands of gypsum sands as above
80	85	**Brown sandy** clay	100	Sand occasionally coarse medium mainly fine t. very fine subangular. Brown colourless white 30% silt brown, white 50% clay brown 20%. Traces mica.
85	90	Brown sandy clay	100	Sand as above 30% silt as above 40% clay brow 30% traces mica.
90	95	Red brown clayey sand	100	Sand medium to fine subangular to angular. Brown colourless 40% silt angular brown 30% clay brown 20% traces black and white mica
95	100	Red brown sandy clay	100	As above sand 30% silt 50% clay 20%
100	105	Brown sandy clay	100	Sand medium to fine angular colourless or bro 30%. Silt 20%, clay brown 30% traces mica.
105	110	Brown sandy clay	100	Sand as above 20%. Silt 50% brown angular clay brown 30% traces mica.
110	115	Brown sandy clay	100	As above
115	120	Brown sandy clay	100	As above. Sand 30% silt 40% clay 30%
120	125	Brown sandy clay	100	As above

Well: Petex 9A SML.221

Interval From	To	Lithology	%	Sample description
125	130	Brown clayey sand	100	Sand 70% quartz feldspars micas subangular t angular, sorting poor, medium to fine grain size. Silt and fine sand 20%. Clay brown 10% or less. Occasional very fine black grains.
130	135	Brown sand	100	Medium to very fine grained subangular to angular. Poorly sorted. Silt as above 5%. Clay less 5%. Mostly quartz colourless grey minor feldspar and mica. Occasional black grains.
135	140	Brown sand	100	As above. Occasional black grains.
140	145	Brown sand	100	As above clay content 5% white. >1% black grains
145	150	Brown sand	100	As above 1% black grains.
150	155	Brown sand	100	As above >1% black grain. Lustre dull to sub-vitrious.
155	160	Brown sand	100	As above. Grains subrounded to subangular. Clay content as above, 5%. Occasional black grains.
160	165	Brown sand	100	As above
165	170	Brown clayey sand	100	Sand fine to very fine grains subangular to angular. White colourless brown 30% silt white colourless brown angular 40%. Clay brown 30%.
170	175	Brown clayey sand	70	As above
		Sand	30	Medium grain subangular to subrounded grains as above.
175	180	Brown sand	100	Sand medium grain subangular to subrounded colourless to brown grey green trunsluscent. Brown clay 5%.
180	185	Brown sandy clay	100	Sand medium to fine, subangular to angul. 30% silt 30% clay white 40%. Traces mica.
185	190	Light brown sandy clay	100	As above
190	195	Light brown siltstone	100	Sand as above 20% silt white subangular angul 60% clay white 20%. Traces mica.
195	200	Light brown siltstone	100	Sand as above 10%. Very fine sand to silt angular. Colourless white buff traces mica. Clay approx. 5% some small metallic lustre black grains - ilmenite?
200	205	Light brown siltstone	100	Sand fine to very fine grain. Subangular to angular colourless white buff 50% silt white light brown angular 40% clay brown 10% trace mica 1% black grain some hematite.
205	210	Light brown siltstone	100	As above
210	215	Brown clayey sand	100	Sand coarse and fine, subangular to angular, colourless white brown 60% silt light brown 30% clay brown 10% traces white mica.
215	220	Brown clayey sand	50	Sand as above 40%, silt as above 40%, clay 2
		Light brown clay	50	Light brown grey-brown clay
220	225	Light brown siltstone	100	Silt very fine sand 60% clay white 40% trace mica.
225	230	Very light brown siltstone	100	As above
230	235	V.light grey siltstone	100	Sand as above 20%. Silt as above 40% clay white 40%. Traces mica.
235	240	Light grey Siltstone	100	As above .Stains of Mn (purple) and Fe (red) As above 20% quartz. Sand c'less and water c
240	245	Light grey siltstone	100	As above

Well: PETEX 9A SML.221

Interval From	To	Lithology	%	Sample description
245	250	As above	100	As above
250	255	Lt.grey clayey sand	100	Sand medium to fine grain subrounded to sub angular 30% silt as above 50% clay white 20% Traces mica. v. occasionally black grains (halmatite, ilmenite).
255	260	Lt.grey siltstone	100	As above except sand 20% silt 60%
260	265	Lt.grey siltstone	70	As above, some coatings of yellow Fe on crack in clay.
265	270	Grey siltstone	80	As above
270	275	Grey siltstone	100	As above
275	280	Grey siltstone	80	As above
280	285	N.S.		
285	290	Grey green siltstone	100	Silt pale grey to grey 40% clay pale grey to grey 60% occasionally water clear quarta grai
290	295	Lt. Brown clayey sand	100	Sand medium to fine c'less brown subrounded t subangular 70% silt white 20% clay 10% Traces mica as above 1% black grains dull to vitreou very fine.
295	300	Lt. brown clayey sand	100	Sand as above 40% silt as above 40% clay 20% Traces mica very occasionally Xlline bright yellow encrustations in sample - carnotite ?
300	305	Lt. brown sandy clay	100	As above Sand 30% silt 30% clay 40% traces mi as above 1% black grains as above.
305	310	Lt.brown sandy clay	100	As above
310	315	Lt. brown clayey sand	100	As above sand 70% clay and silt 30% some carnotite (?) encrustation.
315	320	Lt. brown clayey sand	100	As above - encrustation carnotite (?)
320	325	Lt.brown clayey sand	100	As above 1% black grains
325	330	As above	100	As above
330	335	As above	100	As above - occasional black grains
335	340	Lt. brown siltstone	100	Sand 20% medium to v. fine. Silt 70% clay 10% occasional black grains.
340	345	Dark grey shale	100	Silt content about 20%
345	350	Dark grey shale	100	As above
350	355	Lt. clayey silt	80	As above
		Black shale	20	As above
355	360	Black shale	70	As above
		Grey green clay	30	As above
360	365	Green grey & dk. grey shale	100	Occasional purple and buff stains of Mn & Fe. Traces mica.
365	370	N.S.		
370	375	Lt. & dark grey shale	100	As above
375	380	Dk.grey green shale	100	Patches red and yellow Fe stain. Some lighter grey shale.
380	385	As above	100	As above
385	390	As above	100	As above. approx. 20% fairly well rounded sand grains medium to fine. Some light grey shale.
390	395	N.S.		
395	400	Dk.grey green shale	100	As above

Well: PETEX 9A SML.221

Interval From	To	Lithology	%	Sample description
400	405	N.S.		
405	410	Dark grey shale	100	Occasional thin bands of indurated light grey to white siltstone often Mn or Fe stained.
410	480	As above		
480	485	Black shale	70	As above
		Bands of pink & white shale	30	Some sand grains medium to fine subrounded.
485	490	Dark grey shale	100	As above
490	500	As above		
500	505	Black shale		
505	510	Black shale		Thin bands white shale
510	515	Dark grey green shale		
515	520	Pink & white shale	80	
		Dark grey shale	20	
520	525	Black shale		
525	530	N.S.		
530	535	White & pink clayey sand	100	Sand subrounded c'less grey medium fine grain Cherry red hematite sta in. Yellow limonite patches.
535	540	Dark grey shale	40	
		White sandy shale	60	Sand medium sub angular. Clay white pink.
540	545	Dark grey shale		
545	550	Med.grey green shale		
550	555	Dark grey green shale		Minor beds of white, light grey and pink
555	660	As above		
660	665	Dark grey green shale		
665	670	Dark grey shale		Cherry red shale bands
670	675	Dark grey green shale		
675	680	Dark grey shale		Pink and white shale bands
680	685	Dark grey shale		
685	690	Dark grey shale		Mauve and white bands
690	700	Dark grey		Pink and white shale bands
700	705			Dark grey green shale with occasional bands of pink and white silty shale.
705	745	As above		
745	750	As above		Brown shale bands
750	765	As above		
765	770	Dark grey green shale		
770	775	Green grey shale		Brown & pink shale bands
775	780	Green silty shale		
780	T.D.			

ENV 1004

EXOIL NO LIABILITY

Well: PETEX 10A (Hole 221-1) S.M.L. 221

Interval From	To	Lithology	%	Sample description
0	5	Boulder beds		Boulders sand and clay (brown)
5	10	Boulder beds		Boulders sand and clay (brown)
10	15	Boulder beds		Boulders sand and clay (brown)
15	20	Boulder beds		Boulders sand and clay (brown)
20	25	Boulder beds		Boulders sand and clay (brown)
25	30	Boulder beds		Boulders sand and clay (brown)
30	35	Pebble beds		Pebbles 30% sand (red) 60% silt and clay 10
35	40	Pebble beds		Pebbles 30% sand(red) 60% silt and clay 10%
40	45	Brown clayey sand		Pebbles occasionally sand sub-angular to angular medium to fine grain c'less brown 50% silt brown 30% clay brown 20%. Trace mi blackgrain mainly mica.
45	50	Brown clayey sand		Pebbles sand silt clay as abowe blackgrain mainly mica, occasionally vitreous lustre (tourmaline ?)
50	55	Brown tinbite siltstone		Sand as abowe 20% silt as above some white clay brown and white 30%.Trace micas occasionally black grain as above.
55	60	Brown tinbite siltstone pebbles	70	As above, and gypsyferous Thin pebble band.
60	65	As above Pebbles	70 30	As above
65	70	Red Brown		Sand fine grained angular to sub-angular c'less white brown 60% silt 20% clay red brown 20%. Trace micas <1% fine sub-metalli lustre black grain.
70	75	As above		As above <1% same black grain
65	80	As above		As above with 1 - 2 % black grain
80	85	Brown sand		Sand as above medium to fine 60% some very coarse to pebble silt angular brown 30% cla brown 20% black grain <1% as above, more micas than as above.
85	90	Red brown siltstone		As above, occasionally dull black grain
90	95	Red brown siltstone		As above, very occasionally black grain
95	100	Red brown siltstone		As above, occasionally black grain
100	105	Brown coarse sand		Sand pebble to fine grain angular 80% silt and clay 20% 1-5% black grain in medium to fine traction.
105	110	Brown pebble bed		Pebbles and coarse sand 50% medium to fine sand 20% silt and clay 10% occasionally bl grain.
110	115	Brown pebble bed		As above. 1-5% black grain subuset lustre fine sand traction.
115	120	Brown pebble bed		As above, black grain
120	125	Brown pebble bed		As above, selection of black grain taken.
125	130	Brown pebble bed		As above, black grain as above.
130	135	Brown pebble bed		As above, coarse sand and pebbles 50% fine sand and silt 30% clay 20%
135	140	Brown pebble bed		As above
140	145		N.S.	
145	150	Brown coarse sand		Grit and coarse sand 30% medium to fine an 50% silt 10% clay 10% Trace micas.Trace b clay black grain two sizes medium sand,ver fine sand met. lustre 1%
150	160	Brown coarse sand		As above, black grain as above.

Interval From	To	Lithology	%	Sample description
160	165	Coarse brown sand		Sand very coarse to fine, angular to subangula 80% silt 20% Trace micas, black grain dull to subvitreous <1%
165	170	Very coarse brown sand		Sand grit to medium 80% fine sand and silt 15% clay 5% Trace mica black grain as above.
170	175	Very coarse brown sand		As above
175	180	Very coarse brown sand	40	As above
		Brown clayey sand	60	Sand medium to fine grain 50% silt 30% clay 20%
180	185	Very coarse brown sand		Brown clayey sand 20% as above
			80	as above
185	190	Pebble bed		As above. Grain size <1-6 mm.
190	195	Pebble bed		As above.
195	200	Brown sandy clay		Sand fine to medium angular c'less to brown <10% silt and clay brown 60% Trace micas, occasional small shiny black grain (very fine to silt size)
200	205	Brown sandy clay		As above
205	210	Brown sandy clay		As above
210	215	Brown sandy clay		As above
215	220	Brown sandy clay		As above
220	225	Brown clayey sand		Sand medium to fine angular c'less brown 70% silt clay brown 30% black grain 1% fine met. lustre.
225	230	Brown clayey sand		As above
230	235	Brown clayey sand		As above
235	240	Brown clayey sand		As above
240	245	Brown clayey sand		Sand very coarse to fine angular c'less brown 50% silt brown ang lar 30% clay brown 20% 1% fine black grain sub-met. to met. lustre.
245	250	Brown clayey sand		As above
250	255	Brown clayey sand		As above. Black grain <1%
255	260	Brown clayey sand		As above. Black grain 1%
260	265	N.S.		
265	270	Brown clayey sand		As above
270	275	Brown clayey sand		Sand very coarse to fine angular c'less brown white, grey <10% silt <10% clay 20% Trace micas black grain as above.
275	280	Brown clayey sand		As above
280	285	Brown clayey sand		As above
285	290	Brown clayey sand		As above
290	295	Brown clayey sand		As above
295	300	Brown clayey sand		As above
300	305	Brown clayey sand		Sand very coarse to fine 70% silt 20% clay 10% micaeus black grain less 1% ,et.-subvit. very fine to medium.
305	310	Brown clayey sand		As above

Hole 221-1 S.M.L. 221

Interval From	To	Lithology	%	Sample description
				024
315	320	Brown clayey sand		As above
320	325	Brown clayey sand		As above
325	330	Brown clayey sand		As above
330	335	Red brown clayey sand		Sand medium to very fine 50% silt white, light brown 30% clay red-brown 20% very fine black grain < 1% sub.-v. to vit.
335	340	Brown clayey sand		Sand as above 70% silt 20% clay 10% trace mica occasionally black grain.
340	345	Light brown clayey sand		As above
345	350	Light brown sand		As above clay <5%
350	355	Dark brown clayey sand		Sand mainly medium to very fine occasionally coarse 50% silt white and brown 30% clay 20% trace mica black grain as above
355	360	Light brown sand		Sand very coarse to medium <10% medium to very fine <10% silt 15% clay 5% or less occasionally black grain.
360	365	Light brown sand		As above
365	370	Light brown sand		As above
370	375	Light brown sand		As above
375	380	Light brown sand		Sand very coarse 5% coarse to medium 60% medium to very fine 20% silt 10-15% clay <5% occasionally black grain. Trace mica.
380	385	Light brown sand	As above	
385	390	Light brown sand		As above
390	395	Light brown sand		As above
395	400	Light brown sand		As above
400	405	Light brown sand		Sand coarse to fine grain 80% silt 15% clay < 5% trace micas occasionally black grain.
405	410	Light brown sand		As above
410	415	Lightgrey clayey sand		Sand very coarse to medium 15% medium to very fine 65% silt 10% clay 10% micas ≈ 1% black grain vitreous very fine grain occasionally micro occasionally medium dull
415	420	Light grey clayey sand	70	As above
		Dark grey shale	30	Dark grey to black shale, c'less sand incl.30
420	425	Light grey clayey sand	70	25% dark grey as above, 5% white soft siltst. occasionally large met. to vit.
		Shale	30	lustre black grain
425	430	Shale		Black as above 60% red 20% white 10% sand and clay as above
430	435	Shale		Black as above
435	440	Black shale		As above
440	445	Black shale		As above
445	450	Black shale		As above
450	455	Black shale		Mainly dark grey to black shale.Trace of whit red mauve, buff brown shales.
455	460	As above		
460	465	As above		
465	470	As above		
470	475	As above		
475	480	As above		Black shale 50% white and red shale 50%

ENV 1004

EXOIL NO LIABILITY

Well: 221-2 SML.221

Interval From	To	Lithology	%	Sample description
0	40	N.S.		Casing set to 30 ft. C[illegible] 35' boulders, sand and some silt. Brown to reddish brown. 35-40' Clayey sand lt.brown sand coarse to fine, fairly well indurated.
40	45	Lt.brown gravelly sand	100	Occas. boulders, mainly very coarse sand, sil and clay as above 10% colour lt.brown yellow iridscent red and orange coatings on some grains.
45	50	Lt.brown gravelly sand	100	As above. Occas. grains coated yellow iridscent red or as above
50	55	Lt.brown gravelly sand	100	As above. Grain coatings as above
55	60	Lt.Brown gravelly sand	50	As above
		Red brown clayey sand	50	Sand coarse to fine 40% fine to silt 50% clay as above 10% red brown very occas. black grains (hematite). Traces micas.
60	65	Red brown clayey sand	80	Occas. fragments of boulders, mainly coarse to medium sand grains, c'less to grey or pink.
		White siltstone	20	Fine white clayey siltstone clear quartz grains occas. coated with yellow iridscent red ochre.
65	70	Red brown clayey sand	20	As above
		White - v.lt. grey siltstone	60	Clayey white to light grey very fine sand & siltstone.
		White clay	20	Dull white clay (kaolin in part).
70	75	Lt.brown clayey sand		Lt. brown to pale grey white clayey sand. Sand grains coarse to fine angular. Occas. heavy black grains (Hematite) Traces mica. Clay content as above 20%
75	80	Lt.brown clayey sand		Mainly medium to lt.brown clayey sand & sand Occas. grains of white clay and white clayey siltstone as above.
80	85	Red brown clayey sand		Sand coarse to v. fine Clay & silt 20%. Lt.brown to red brown. Micas. Traces black grains mainly biotite & hematit
85	90	Lt. brown clayey sand	40	As above.
		Lt. grey to white clayey sand	60	Buff to off white clayey sand. Sand coarse to fine gr. Med. fine grains coated with a red yellow red ochre.
90	95	Lt. grey clayey sand		Sand coarse to fine subrounded. chips of larger pebbles clay on 10% buff to lt.grey With 1% small black grains non. mag. Occas. irid. stain as above.
95	100	Lt.grey pebbly sand		Pebbles & chips as above. 30% coarse to fine sand as above. clay buff to light grey < 10% Iridscent coating prevalent. Fine black grain 1% as above.
100	105	Lt.grey pebbly sand		Pebbles and chips 30%. Otherwise as above.
105	110	Lt.grey clayey sand		V. occas. pebbly fragments. Sand coarse to fine mainly medium to fine. Agg. with clay >10% buff to off white. Traces micas. V. occas. black grain.
110	115	Lt.grey clayey sand	50	As above
		Red brown clayey sand	50	Sand much coarsed then light grey sand. clay as above 10% Occ.fragments of boulders

Interval From	To	Lithology	%	Sample description
110	115			usually coated with red clay. Very occas. black grains mainly hematite.
115	120	Red brown clayey sand		Predominantly red clay coated sand as above. Occas. grains of light grey clay coated grains. Occas. black grains as above.
120	125	Red brown sand		Coarse to fine sand coated with red to dark brown clay. Clay < 10%. Occ. black grains biotite, hematite.
125	130	Red brown clayey sand		Clay red brown to dr. brown. 20% otherwise as above.
130	135	Red brown clayey sand		As above
135	150	N.S.		Drilling rate v. poor. probably clay free sand. Aquifer.
150	155	Coarse sand		Very coarse grained sand. Mica flakes, some fine sand. Small clays < 2% coating some grains of clay red brown.
155	160	Red brown medium sand		Mainly med. grained sand, but range coarse to very fine, clay red brown. Black grain 2% some hematite, some tourmaline.
160	165	Red brown sand		Coarse to med. grain sand angular to sub angular silt and clay <10%. Black grain > 2% micaceous.
165	170	Red brown sand		As above
170	175	Red brown sand		As above. Black grains ≈ 5% as above.
175	180	Red brown sand		As above. Black grain ≈ 2% as above
180	185	Red brown sand		Very coarse to med grain. angular to sub angular. Overall larger grain size than above. Micaceous. Black grain ≈ 2%.
185	190	N.S.		
190	195	Red brown clayey sand		Weakly biomodal, v. coarse and medium to fine grain sand. Silt and clay content > 10%. Grains sub angular. Black grain as above ≈ 1%
195	200	Red brown clayey sand		As above. Black grain as above ≈ 2-5%.
200	205	Red brown clayey sand		As above. Clay and silt ≈ 20%. Black grain < 1%.
205	210	Red brown clayey sand		As above
210	215	Red brown clayey sand		Coarse to v. fine sand angular to sub angular. Silt and clay 20% med. brown. Black grain very fine grained on 2 - 5%.
215	220	N.S.		
220	225	Red brown sand		V. coarse to v. fine grained sand angular to sub angular. silt and clay < 10% red brown. Black grain. Medium to fine. Mostly hematite as above 2%
225	230	Red brown gravel		Fine gravel angular. Coarse sand content small silt and clay < 10%. Occ. black grain.
230	235	Red brown sandy gravel		Predominantly gravel as above. Coarse to fine sand with 40% clay and silt 10%. Occas. black grain as above.
235	240	Red brown gravelly sand		Gravel as above 30%. Coarse to fine angular sand 60% as above. Clay and silt 10%. Black grain occas. and traces micas.
240	245	Red brown gravelly sand		As above. Bl.grain 1 - 2% as above.
245	250	Red brown clayey sand		Gravel on 30%. Coarse to fine sand 55% silt and clay as above 15% micaceous. Black grain as above 1 - 2%.
250	255	Red brown clayey sand		As above. Black grain as above < 1%

Well: Hole No.2221-2 SML.221

Interval From	To	Lithology	%	Sample description
255	260	Red brown clayey sand		As above. Black grain < 1% as above. clay red brown to dark brown. As above 20%.
260	265	Medium brown sand		Very coarse to very fine angular sand. 80%. Silt as above 15%. Clay light brown as above 5%. Black grain very fine. mainly hematite and magnitite. Some fourmaline 1%. Traces micas.
265	270	Medium brown sand		Mainly very coarse, angular sand 80%. Little orno. medium to fine sand. Very fine sand to silt 20%. Very little clay. Black grain as above < 1%.
270	275	Medium brown sand		Very coarse angular sand 30%. Medium to fine sand 40%. Very fine sand and silt 25%. Clay as above 5%. Black grain as above 1%.
275	280	Medium brown sand		As above. Black grain as above 3%
280	285	Medium brown sand		Mainly coarse sand 80% medium to fine sand as above 15%. Clay < 5%. Black grain as above 1%.
285	290	Med. brown gravelly sand		Mainly very coarse to granule size aand angular to sub angular. 70%. 20% med. to fine sand. Clay as above 10%. Black grain as above 1%. Traces micas.
290	295	Red brown gravelly sand		As above.
295	300	Medium brown sandy pebbles		Pebbles 5 - 15 mm diameter. sub angular 50% medium to fine v. angular sand some clay 50% Black grain as above rare.
300	305	Med. brown silty gravel		Pebbles 5 - 20 mm Diameter. Sub angular 40%. Medium to fine sand and clay 60%. Clay 10 - 15%. Traces mica. Large black grain and rock fragments. Very few small black gra
305	335	Medium brown silty gravel		As above
335	340	Medium brown silty sand		Gravel and 20% coarse to med. sand as above 40%. Medium to fine sand as above 30% Clay and silt 10%. Black grains very few. Traces micas.
340	345	Lt. brown silty sand		Mainly med to fine sand, some coarse, silt & clay content 30%; lt.brown to off white, v. small black grain as above 1%. Traces micas.
345	350	Med. brown silty sand		Gravel fraction as above 20%. Coarse to fine sand angular 70%. silt and clay 10%. black grain < 1%.
350	355	Medium brown silty sand		Sand gravel to fine as above 60% silt and clay as above 10%. Black grain < 1% traces micas.
355	360	Medium brown silty sand		As above
360	365	Medium brown sandy s'stone		Silt angular as above 40%, sand coarse to fin as above 40%. Clay as above 20%. very few black grains. Traces micas.
365	370			As above
370	375	Medium brown silty sand		Sand coarse to fine 70%. Silt and clay 30% Occas. black grain. with micas.
375	380			As above
380	385	Medium brown sandy s'stone		Sand coarse to fine angular. 50% silt and clay 50%. Very occas. black grains and micas.
385	390			As above.
390	395	Medium brown sand		Mainly medium to fine grain sand. Some coarse and fine silt and clay as above 10%. Black grain small (some hematite) 1%. Traces micas.
395	400			As above
400	405	Red brown clayey sand		Mainly coarse to fine angular sand. Some pebble fragments clay and silt red brown as above 20%. Black grain < 1%. Traces micas

Well: Hole No.2221-2 SML.221

Interval From	To	Lithology	%	Sample description
				028
405	415			As above
415	420	Medium brown sand		Mainly coarse and med. sand. Silt and clay content < 10%. Black grain as above 5% Mostly medium grain size. Some vitreous, very fine grain. Traces micas.
420	425	Medium brown sand		Sand as above. Black grain as above 2%. Traces micas.
425	430			As above.
430	435	Light brown sand	95	Mainly clear or white sand, medium to coarse. Silt and clay <5%. Black grain <1%.
		Dark brown shale	5	Soft structureless shale. Dark brown
435	440	Dark red brown shale	30	As above.
		Lt.grey sandy clay	40	Very soft lt.grey clay. C'less to white med. grain size sand and white silt. Black grain absent or rare.
		Lt.brown sand	30	As above
440	445	Light grey to lt.brown clayey sand	95	Very coarse to fine sand. 80% clay. Lt.grey to off white as above 20% or less. Black gr.
		Dk.Brown to Dk.Red silt	5	As above
445	450	Lt.grey sand		Very coarse to fine sand angular to sub angul Clay <10% lt.grey. Black grain < 1%. Sand grain as above 95% quartz.
450	455	Lt.grey clayey sand		As above. Clay as above ≈ 10%
455	460	Lt.grey sandy clay		Sand as above 40%. clay light grey to off white, speckled with deep red and buff to dull yellow. Traces micas. Black grain 1%
460	465	Lt.grey sandy clay		As above
465	470			As above
470	475	Light grey clayey sand		Sand as above 60%. Clay as above 40%
475	480	Light grey clayey sand		Sand as above 70%. Clay as above 30%
480	485	Med. grey shale		Shale with some sand & siltstone. Lt. to med. grey, some dark grey, red, drk.red brown. Some stained khaki, yellow and lt.red. Some surfaces of grains coloured bright yellow.
485	490	Med. grey shale		As above. Also some dull yellow shale, coate with iridscent yellow red mineral.
490	495	Med. grey shale		As above. Except there is no yellow shale, or iridscent coating.
495	500	Med. grey shale		As above
500	505	Med. grey shale		Mottled light and dark grey shale with some khaki, dull yellow and deep reds. s ilt and sand content 20%.
505	510			As above
510	515			As above. sand and silt content decreasing.
515	600	T.D.		As above.

EHV 1004

029

EXOIL NO LIABILITY

Well: Hole No.221-3 SML.221

Interval From	To	Lithology	Sample description
0	40	N.S.	Casing set to 40'. 0 - 30' boulders, sand and silt, medium brown to red brown micaceous. 30 - 40' lt. grey clayey sand, coarse to fine grained angular, 80%. Silt and clay lt. grey to off white 20%. Cracks coated with iridescent yellow, orange, red Fe. Occas. black grain, very fine grain to coarse grain.
40	45	Lt. brown sand	Sand mainly coarse to medium, angular to sub angular. Occas. larger pebbles. Fine silt and clay < 5%. Occas. micas. Black grain small angular to sub rounded approx. 1%.
45	60	Lt. brown sand	As above.
60	65	Lt. brown sand	Granule and pebble size grains. 50% angular to sub angular. very coarse to medium grained sand 50%. Little or no clay and silt. Occas. small black grain. Occas. biotite & muscovite flakes.
65	70	Lt. brown sandy gravel	Gravel as above 40%. Sand as above 30%. Fine to silt size grains approx. 20%. Clay approx. 10% Medium brown. Occas. black grains as above. Occas. mica as above.
70	75	Red brown clayey gravel	Gravel mainly pebble size approx. 40%. Sand granule to very fine. approx. 20%. Clay red brown occas. pale grey to white mottled patches, 30%. Occas. mica as above. Occas. black grain as above.
75	80	Red brown sandy clay	Sand coarse to very fine, angular to sub angular 40%. Clay red brown as above 60%. Occas. micas above. Occas. black grain as above.
80	85	Med brown clayey sand	Sand as above 80%. Silt and clay as above 20%. Occas. micas as above. Occas. black grain as above. Occas. pebble size grains.
85	90	Lt. brown sand	Granule and pebble size sand. angular 10%. V. coarse to medium sand angular to subangular 80%. Fine sand to silt and clay 10%. Occas. mica as above. Black grain as above approx. 1%.
90	95	Med brown sand	Sand mainly coarse angular to sub angular 80%. Medium to v. fine angular 20%. Silt and clay < 1%. Black grain 1%. Occas. mica as above.
95	100	Lt. brown pebbly sand.	Sand as above 90%. Pebbles and gragments angular to sub angular 10%. Black grain mainly magnetite and hematite. Some tourmaline 5%.
100	105	V. Lt.brown sand	Sand mainly coarse to medium. Angular to sub angular 80%. Sand fine to v. fine & silt 20%. Very little clay. Black grains 2%. Occas. very coarse to granule size grain. Occas. micas as above.
105	120	Lt. Brown sand	As above
120	125	Red brown clayey sand	Sand as above 80%. Silt and clay, red brown 20%. Occas. micas as above. Black grain as above < 1%.
125	130	Red brown sandy clay	Sand as above 40%. Granule to pebble size sand 20%. Clay as above 40%. Occas. black grains and micas as above.
130	135	Red brown sandy clay	As above

Well: Hole No.221-3 SML.221

Interval From	To	Lithology	Sample description
135	140	Red brown sand	Sand coarse to fine angular to sub angular approx. 80%. Silt and clay red brown 20%. Occas. micas and black grains as above < 1%
140	145	Red brown clayey gravel	Sand mainly coarse to pebble size, some medium to very fine clay red brown 10%. Black grain as above approx. 1%. Occas. mica as above.
145	155		As above.
155	160	Red brown clayey gravel	Gravel and sand as above. Clay between 5 - 10%. Black grains and micas as above.
160	165	Med. brown pebbly sand.	Sand as gravel and micas as above. Black grains approx. 2% as above.
165	170	Red brown sand siltstone	Sand medium to fine angular to sub angular 30%. Silt and clay red brown 70%. Occ. black grain.
170	175	Red brown sandy siltstone	Silt and clay as above 60%. Sand very coarse (some granule) to fine 40%. Occas. black grain and micas as above.
175	180		As above.
180	185	Medium brown sand	Granule to coarse sand, angular approx. 30% Medium to fine sand 70%. Little or no silt and clay. Occas. mica as above. Black grains mainly magnetite & hematite. some tourmaline 2%.
185	190	Med.brown clayey sand	Sand as above 90%. silt and clay 10%, medium brown. Occas. micas above. Bl. grain 1%.
190	195	Med. brown clayey sand	Sand as above approx. 80%. Silt and clay red brown to med. brown. 20%. Micas and black grain as above.
195	200	Med. brown clayey sand	As above, and including a few small pebble size grains.
200	205	Med. brown clayey sand.	Granule to coarse sand 50%. Medium to fine sand 40%. Silt and clay red brown to med. brown 10%. Occas. micas as above, Black grain 1%.
205	210		As above.
210	215	Red brown clayey gravel	Gravel pebble size angular to sub rounded. 30%. Medium to fine sand, red brown, silt and clay 70%. Occas. micas as above. Black grains 2%, mainly magnetite, hematite and biotite agg.
215	220	Lt.brown gravely sand	Gravel as above 20%. Sand very coarse to fine, mostly med. size. Occas. mica. Clay 5% med. brown. Black grain 2 - 3%, mainly magnetite and hematite.
220	225	Red brown clayey gravel	Gravel pebble size angular to sub rounded 20%. Medium to fine sand angular. Approx. 30% Silt and red brown clay 50%. Occas. mica as above. Black grain approx. 1 - 2 % as above.
225	230		As above.
230	235	Lt. brown sand	Granule to coarse grained sand 30%. angular to sub angular. Medium to fine sand 60%. Silt lt. brown 10%. Occas micas as above. Black grains approx. 1% as above.
235	240	Red brown clayey sand	Occas. pebbles, granult to coarse sand 40%. Medium to fine sand 40%. Silt and clay red brown 20%. Occas. micas and black grains.
240	245	Lt. brown gravelly sand	Gravel pebble to granuleangular as above 30% Sand mainly coarse to medium angular to sub angular 65%. Silt and clay med. brown 5% Occas. mica as above. Black grain 2% as above.
245	250	Med.brown clayey sand	Sand as above 90%. Clay med. brown 10%. Occas. micas as above. Black grain 1%. Occas. very soft, dull grain.
250	255	Red brown clayey sand	Gravel, pebble to granule 30%. Red brown sandy clay 70%. Black grain and black micas 2%.
255	260	Red brown clayey gravel	As above.

Well: Hole No.221-3 SML.221 031

Interval From	To	Lithology	Sample description
260	265	Red brown clayey sand	Granule to coarse sand 30%. Medium to fine sand 60%. Clay red brown 10%. Occas. black grain as above.
265	270	Red brown clayey sand	Occas. pebble size grains. Otherwise as above.
270	275	Med. brown gravelly sand	Pebble size sub angular to sub rounded 10%. Granule to coarse grains 60%. Med to fine 20% Clay 10%. Black grains 1%. Occas. micas.
275	280	Med. brown gravelly sand	Clay med. brown 10%. Otherwise as above.
280	285	Medium brown gravelly sand	Pebble fraction approx. 20%. Granule to coarse sand 40%. Med. to fine 30%. Clay as above 10%. Occas. mica as above. Black grains 1%.
285	290	Med. brown clayey sand	Pebble fraction 10%. Granule to coarse 30%. Med. to fine sand 50%. Clay 10%. med. brown Black grains and micas occas. as above.
290	295	Med. brown clay sand	As above
295	300	Med. brown clayey sand	Pebble fraction approx. 10%. Otherwise as above. Black grains approx. 1% as above.
300	305	Med. brown gravelly sand	Pebble to granule fraction approx. 30%. Coarse to fine sand 60%. Clay 10%. Occas. micas and black grains.
305	310	Med. brown clayey gravel	Pebble to granule 30%. Coarse to fine sand 50%, Clay 20%. Occas. mica and black grain as above.
310	325		As above
325	330	Medium brown clayey sand	50 Medium to fine grains sub angular sand 80% cla medium brown 20%. Occas. mica as above.
		Lt.grey clayey sand	50 Sand as above 70%. Clay fine, pale grey to white 30%. Occas. black grain - hematite.
330	345		As above
345	350	Med. brown clayey sand	Granule to coarse fraction angular 20%. Otherwise as above.
350	355	Medium brown clayey sand	As above. Black grain approx. 1%. As above
355	360	Med. brown clayey sand	As above
360	365	Med. brown sand	Sand as above > 90%. Clay < 10%. Occas. micas as above. Black grain approx. 1%
365	370	Med. brown clayey sand	Sand as above 90%. Clay as above 10%. Occas. mica as above. Black grains 1%.
370	375		As above.
375	380	Med. brown clayey sand	Sand as above 80%. Occas. gravel fragments. Clay 20%, mainly med. brown. Occas. patches of off white to grey. Occas. mica and bl.grain.
380	390		As above
390	395	Med. brown clayey sand	Gravel fragments 10%. Otherwise as above
395	400	Medium brown clayey sand	As above
400	405	Med. brown clayey sand	Gravel fragments < 10%. Otherwise as above
405	415		As above
415	420	Lt. brown sand	Sand v. coarse to fine angular to sub angular > 90% clay light brown < 10%. Occas.micas as above. Bl. grain approx. 1%. mainly tourmaline, magnetie and hematite.
420	425	Lt. brown sand	As above
425	430	Lt.brown clayey sand	Clay approx. 10% otherwise as above.
430	440		As above

Well: Hole No.221-3 SML.221

Interval From	To	Lithology	Sample description
440	445	Lt.brown clayey sand	Sand as above, clay light brown to lgt. grey approx. 10%. Occas. micas with black grain.
445	450	Lt. Brown clayey sand	Sand as above 90%. Clay mainly lt.grey to off white some brown. Occas. micas with black grain.
450	460	Lt. grey clayey sand	Sand fine grained to medium, c'less to white 70%. Clay lt. grey to off white 30%. Occas. micas. Bl.grain 1%
460	465	Lt. grey clayey sand	As above. Many of the grains are coated with a cryptoxllime, flakey, bright yellow to canary yellow material.
465	470	Lt.grey clayey sand	As above. Yellow Xls. as above. less intense.
470	475	Lt.grey clayey sand	As above. Some cherry red coloured grains, clayey (Hematite). Yellow crusts as above. More intense in patches, occas. form agg.
475	480	Lt. grey clayey sand	As above except clay mainly lt. grey also Hematitie. Red in patches. Yellow Xls as above.
480	485		As above.
485	490		As above. Yellow Xls. rare
490	500		As above.
500	505	Lt. grey sandy clay	Sand as above approx. 50%. Clay as above 50%. Yellow Xls rare. Irred. red (Fe) staining common.
505	515		As above
515	520	Lt.grey shale	Sand as above approx. 30%. Shale (clays) ltg. to medium grey. Occas. hematite stained. Yellow Xls rare or absent.
520	545	T.D.	

ENV 1004

033

EXOIL NO LIABILITY

Well: Hole No. 221-4 SML.221

Interval From	To	Lithology	%	Sample description
0	5	Sand and boulders	100	Very fine to pebble sized quartz, frosty, slightly orange, some black metallic inclusions, biotite flakes, granitic boulder fragments, sample colour medium brown.
5	10	Sand & boulders	100	As above
10	15	Sand & boulders	100	As above
15	20	Sand & boulders	100	Silty sand as above with large quartz and granitic fragments, grains sub round and angular.
20	25	Boulders	100	Very large fragments, quartzose granitic with hematite and pyrite crystals, micaceous, ferruginous.
25	30	Boulders	70	As above
		Sandy clay	30	Light-grey pale greenish siliceous clay cementing clear very fine quartz grains.
30	35	Boulders	80	As above
		Sandy clay	20	As above
35	40	Boulders	90	As above
		Sandy clay	10	As above
40	45	Siltstone	70	Red brown, slightly carbonaceous, medium soft with some black inclusions
		Sandy clay	20	Light grey-pale greenish, micaceous
		Boulders	10	As above
45	50	Siltstone	70	Red brown as above
		Sandy clay	30	As above
50	55	Siltstone	80	As above
		Sandy clay	20	As above
55	60	Sand	100	Very coarse grained quartz, subrounded, coated with ferruginous silt, some boulder fragments some quartz showing hematitic inclusions. Some quartz very fine grained.
60	65	Siltstone	30	Medium brown, sandy, some grey
		Sand	70	Very coarse grained quartz, subrounded - sub angular, some angular fragments from boulders (cavings).
65	70	Sand	100	Quartz clear, frosty off-white angular to subrounded, micaceous and metalifferous in part, some large boulder fragments.
70	75	Sandy clay	20	Light grey, slightly carbonaceous, ferruginous in part.
		Clay	10	Light grey-greenish, soft, very carbonaceous.
		Sand	70	As above, most quartz grains have ferruginous staining.
75	80	Sand	90	Very fine to very coarse grained, clear, frosty, ferruginous, large muscovite flakes present. Angular to some rounded grains.
		Clay	10	Pale grey greenish, carbonaceous, soft.
80	85	Siltstone	100	Red brown, soft carbonaceous, sandy in part. Some light grey with black inclusions. Some large muscovite flakes.
85	90	Siltstone	100	As above.

WET SAMPLES

90	95	Sand	100	Quartz grains medium grained, well sorted, clear, frosty, yellowish-orange, black specks scattered throughout sample, muscovite flakes present. Probably the clay content has been flushed out leaving only the sand. Overall sample colour is red brown.

Well: Hole No.221-4 SML.221

Interval From	To	Lithology	%	Sample description
95	100	Sand	100	As above, clay is more evident adhering to sand grains.
100	105	Sand	100	As above, clear, frosty, yellowish orange, brown and black specks.
105	110	Sand	100	As above, but grains coarse to v. coarse & very fine black grains, some clay still present
110	115	Sand	100	As above, but grains medium size and well sorted.
115	120	Sand	100	As above, overall still ferruginous appearance.
120	125	Sand	100	As above, multicoloured but medium to coarse grained.
125	130	Sand	100	As above
130	135	Sand	100	As above to very coarse grained.
135	140	Sand	100	As above, black grains still present
140	145	Sand	100	Multicoloured as above & grains are fine to very coarse.
145	150	Sand	100	As above, some boulder fragments.
150	155	Sand	100	As above
155	160	Sand	100	As above, multicoloured, poorly sorted, rounded and angular grains.
160	165	Sand	100	Quartz grains dominantly. v. coarse, clear, frosty, yellow, orange brown black-grey, angular to subrounded. Black grains only within quartz.
165	170	Sand	100	As above, gives impression of river gravels.
170	175	Sand	100	As above, some free black grains.
175	180	Sand	100	As above, but not so coarse, with black grains.
180	185	Sand	100	As above
185	190	Sand	100	As above, multicoloured, fairly well sorted.
190	195	Sand	100	As above
195	200	Sand	100	As above with river gravel and boulder fragments
200	205	Red brown coarse sand	100	Mostly coarse sand, range pebble to fine sand. Traces mica black grain $\angle$ 1%
205	210	Red Brown coarse sand	100	As above. black grain $\simeq$ 1% traces mica.
210	215	Red Brown coarse sand	100	As above. black grain $\simeq$ 1%
215	220	Red brown clayey sand	100	As above. black grain $\simeq$ 1%. Clay content each. 5% red brown.
220	225	Red brown clayey sand	100	Sand mainly very coarse to coarse grain. Some pebbles and some medium to fine grain. Silt 10% clay 5% black grain varying sizes 1% Traces mica.
225	230	Red brown clayey sand	100	As above
230	235	Red brown clayey sand	100	As above. sand 80% silt as above 10% clay as above 10%. $\nearrow$ 1% $\nearrow$ bl.grain 5%. Sub vitreous to dull. Magnetics and tourmaline.
235	240	Medium brown sand	100	Sand mainly medium grain 90% stained brown or red brown or orange silt 5% clay 5% black grain as above 5%.
240	245	Lt.Brown sand	100	Sand mainly very coarse to coarse 40% medium to very fine 40% silt 10% clay red brown 10% bl. grain as above 2% mainly ilmenite, occasional tourmaline, very occasionally biotite.
245	250	Lt.Brown sand	90	As above. Pebbles up to 10 mm. 5%
		White clayey siltstone	10	As above.
250	255	White clayey siltstone	10	As above
		Light brown sand	90	As above

Well: Hole No.221-4 SML.221

Interval From	To	Lithology	%	Sample description
255	260	Lt.brown sand	100	Sand pebbles to coarse 50% medium to v.fine 40% silt and clay 10% occasionally small black grain.
260	265	Lt.brown sand	100	Sand pebbles to coarse 50% medium to v.fine 40% silt and clay 10%. Nearly all grains sub angular to angular, very occasionally very small rounded. Occasionally black grain.
265	270	Lt.brown sand	100	As above with traces micas.
270	275	Lt.Brown sand	100	As above
275	280	Light brown sand	100	As above. black grain appears to be mostly hematite. Occasionally tourmaline
280	285	Lt.brown sand	100	As above
285	290	Lt.brown sand & pebbles	100	Pebbles 15%. very coarse to medium sand 30% medium to fine sand 30% silt and clay 10% occasional black grain. very occasionally biotite flakes.
290	295	Lt.brown sand & pebbles	100	As above. Pebbles 5% very coarse to med. sand. 40% traces micas.
295	300	Lt.brown sand & pebbles	100	As above
300	305	Lt.brown sand	100	Granules to coarse sand 35% medium to fine sa 50% silt 10% clay 5% occasionally large black grain hematite.
305	315	Lt.brown sand	100	As above
315	320	Lt.brown sand	100	As above. Black grain small vitreous some magnetite, some larger grain hematite. Total $<$ 1%
320	325	Lt.brown sand	100	As above
325	330	Lt.brown sand	100	As above except black grain total as above $<$ 1%
330	335	Lt. brown sand	100	As above black grain total $<$ 1%
335	340	Lt. brown sand	100	As above black grain total $<$ 1%
340	345	Lt.brown sand	100	As above black grain $<$ 1% as above.occasions yellow stained plagioclase crystals - canary yellow stain. Jarocite.
345	350	Lt. brown sand	100	As above. black grain $<$1% Yellow stain grain as above.
350	355	Lt.brown sand	100	Sand granules to coarse 50% coarse to fine 45 v. fine to silt 5%. Very few black grains. dull orange to yellow stains on quartz and feldspar probably Feox. as above 1% of grains
355	360	Light brown sand	100	As above
360	365	Lt.brown sand	100	Sand granules to coarse 40% medium to fine 40% silt & clay 20% trace micas. black grain $<$1% yellow and orange stained grains. very few.
365	370	Lt.brown sand	100	As above
370	375	Lt. brown sand	100	Sand granule to coarse 60% medium to very fine 30% silt and clay 10% very few black grains.
375	380	Lt.brown sand	100	Granule to coarse 30% medium to very fine 60% silt and clay 10% black grain 1% traces mica.
380	385	Lt.brown sand	100	Granule to coarse 30% medium to very fine 50% silt and clay 20% black grain 1%
385	400	As above	100	As above

Well: Hole No.221-4 SMI.221

Interval From	To	Lithology	%	Sample description
400	405	Very lt. brown sand	100	Occasionally very coarse to granule size. coarse to medium 50%. Medium to fine 45% silt and clay 5%. Black grain mainly very fine approx. 1% considerably more colourless quart (water clear) grains (all sizes) than previou ly yellow stained grains.
405	410	Very light brown sand	100	As above. Not quite as much c'less quartz as above.
410	415	Light brown sand	100	Coarse to medium 40% medium to very fine 40% silt and clay 20% black grain approx. 2%.
415	420			
420	425	Light brown sand	100	As above black grain approx. 5%
425	430	Light brown sand	100	As above. Occasionally yellow coated grains. Black grain approx. 3%
430	435	Light brown sand	100	As above. Black grain 1%
435	440	As above		As above
440	445	Light brown sand	100	As above. yellow coated grains absent.
445	450	Light brown sand	100	As above Black grain approx. 2%
450	455	Light brown sand	100	As above. Black grainapprox. 2% some tour-maline, medium grain size.
455	460	Light brown sand	100	As above
460	465	Light grey shale	50	Lt.grey clayey shale. Occasional bands red or buff siltstone iridescent Feox coating common.
		Light brown shale	50	As above
465	470	Light grey shale		As above. Iridescent Feox very prevalent
470	490	Light grey shale		As above
490	495	Light grey shale	30	As above
		Light brown sand	60	Coarse to medium 60% fine to very fine 20% silt and clay 10% black grain ∠1%
495	510	Light brown sand		As above
510	515	Light brown sand	50	As above
		Medium grey silt	50	Silt has approx. 30% fine grain clear quartz with iridescent Feox stain.
515-	520	Medium grey silt	50	As above
		Lt. Brown sand	50	As above. Occasional yellow clayey grains - sample taken.
520	525	Lt. Brown sand		Pebbles to coarse 30% medium to very fine gra 50% silt and clay 20% occasional yellow claye grain as above. Approx. 2% black grain.
525	530	Light brown sand		As above
530	535	Light brown sand		As above. Yellow clayey grain absent
535	540	Light brown sand		As above
540	550	Lt. brown sand	60	As above
		Dark grey shale	40	Shale medium to dark grey. very little salt content.
550	555	N.S.		
555	560	Dark grey s hale	40	
		Lt.grey silt	60	
560	565	Lt.grey silt		

Well No. Hole No.221-4 SML.221

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Interval From	To	Lithology	%	Sample description
565	570	Lt.grey siltstone		Occasional water clear quartz crystals mediu grain size. No Feox.
570	575	Medium grey shale		Bands of hematite some Feox.
575	580	Med. grey shale		As above. Yellow clayey grains.
580	585	Med. grey shale		As above. Yellow grains absent
585	590	Med grey shale		As above
590	595	Med. grey shale		As above
595	600	Med grey shale		As above
600	T.D.			

EHV 1004

EXOIL - PETROMIN

036

E.R.Hillwood
Minoil Services
Wellsite Geologist

WELL LOG

Well No. 22-45

Interval	Lithology	%	Description
0'- 40'	N.S.		Mainly medium to fine sand. Clay content is Ca 10% red brown. Occas. micas with bl.gr. Micas biotite with muscovite mus > bio. Bl.gr. few mag. lem. Occas. bands of coarser sand with boulders.
40'- 45'	Medium brown clayey sand		Sand mainly med.some coarse to fine. Angular to subangular < 90%. Silt and clay >10% medium brown to light brown. Occasional mica with black grain as above.
45'- 50'	Medium brown clayey sand		Cal0% large pebbles, fairly well rounded otherwise as above.
50'- 55'	Medium brown clayey sand		Granules very coarse with coarse sand angular to subangular 20%. Medium to fine sand 60% as above. Silt and clay 20% as above. Occasional micas as above. Black grain 1% as above.
55'- 60'	Medium brown sand		Sand as above > 90%. Clay with silt as above >10%. Occasional micas as above. Black grain Ca 1% as above.
60'- 65'	Medium brown clayey sand	80	Sand as above 80%. Silt and clay as above 20% Occasional mica with black grain as above.
	Light grey clayey sand	20	Sand, medium to fine angular to subangular 70%. Clay light grey to off-white 30%. Black grain Ca 1%.
65'- 70'	Medium brown sand		Mainly medium to fine sand, occasional coarse grains, angular to subangular >90%. Silt and clay <10% medium brown. Occas. micas as above. Black grain as above Ca 1%.
70'- 75'	N.S.		
75'- 80'	Medium brown sand		As above except rare coarse grain and more fine sand size.
80'- 85'	Medium brown sand		As above except more medium sand size
85'- 90'	Medium brown sand		As above. Black grain 1% as above.
90'- 95'	Medium brown sand		Mainly very coarse and coarse grain angular to subangular sand 70% medium to fine sand 20% Clay with silt Ca 10%. Occas. micas as above. Black grain as above < 1%.
95'-100'	Medium brown sand		As above except some granule size grains. Some grains coated with yellow crypto Xlline flakes. Black grain as above Ca 1%. Occas. micas as above.
100'-105'	Medium brown coarse sand		Granule to coarse grain angular to subangular 30%. Medium to fine sand as above 70%. Silt and clay < 5%. Occas. mica (bio. only). Black grain < 1% as above. Yellow Xllines rare or absent.
105'-110'	Medium brown coarse sand		Sand as above 90% clay 10% red brown. Occas. mica as above. Black grain < 1%

EXOIL - PETROMIN

E.R. Hillwood
Minoil Services
Wellsite Geologist

WELL LOG

Well No. 221-5

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110'-115'	Red brown coarse sand	As above
115'-120'	Red brown coarse sand	As above
120'-125'	Medium brown Coarse sand	As above except more coarse to medium sand,less granules
125'-130'	Red brown coarse sand	As above
130'-135'	Red brown coarse sand	As above. Occas. grain coated with yellow cryptoXlline flakes.
135'-140'	Red brown coarse sand	As above
140'-145'	Red brown coarse sand	Coarse sand as above. Fine to very fine sand 40%. Clay and silt red brown Cal0%. Black grain as above Cal%. Occas. mica biotite muscovite.
145'-150'	Red brown coarse sand	As above
150'-155'	Red brown gravel	Mainly granule to pebble size grain or frag. of pebble size grain 60%. Medium to fine angular sand 30% Clay red brown 10%. Occas. black grain as above. Mica rare (bio and mus.)
155'-160'	Red brown coarse sand	Granule to coarse grain angular to subangular sand 40%, medium to fine angular to subangular sand Ca 50%. Clay red brown Ca 10%. Black grain Ca 1%. Occas. micas as above.
160'-165'	Red brown coarse sand	As above
165'-170'	Red brown clayey gravel	Granule to pebble size 40%. Coarse to fine sand 40% clay 20%. Occas. mica with black grain as above.
170'-175'	Red brown clayey gravel	As above
175'-180'	Red brown clayey sand	Granule to pebbles 20% coarse to fine sand 60% clay 20%. Occas. mica with black grain as above.
180'-185'	Red brown coarse sand	Sand granule to coarse 40%. medium to fine sand 50% clay red brown Ca 10%. Occas. micas with black grain as above.
185'-190'	Red brown coarse sand	As above
190'-195'	Red brown coarse sand	As above
195'-200'	Red brown coarse sand	As above

EXOIL - PETROMIN

E.R. Hillwood
Minoil Services
Wellsite Geologist

WELL-LOG

Well: 221-5

Interval	Lithology	%	Description
200'-205'	Red brown coarse sand		As above
205'-210'	Medium brown clayey sand		Sand as above 80%. Silt and clay medium brown 20%. Occas. mica as above. Black grain Ca 1% as above.
210'-215'	Medium brown clayey gravel		Mainly pebble and granule size grains. 50%. Medium to fine sand 30% clay red brown 20%. Mica rare, occas. black grain.
215'-220'	Red brown clayey gravel		As above
220'-225'	Red brown gravel		Sand as above 90% clay as above 10%. Occas. mica and black grain as above.
225'-230'	Medium brown gravel		Pebble and granule size frag. mainly frag. of larger pebbles angular to subangular 60% very coarse to fine sand 40% Clay < 5%. Occas. black grain as above. Micas rare.
230'-235'	Medium brown gravel		As above
235'-240'	Medium brown gravel		As above
240'-245'	Red brown gravelly sand		Gravel fraction as above except some grains subrounded to well rounded. 40% medium to fine sand 55% clay red brown 5%. Occas. Micas (bio > mus.) Black grain as above Ca 1%.
245'-250'	Red brown gravelly sand		As above
250'-255'	Medium brown gravel		Gravel fraction as above 60% coarse to fine sand 40%. Clay fract. very small. Occas. blac grain and micas as above.
255'-260'	Red brown sand		Mainly med. sand some coarse to fine. Clay fract. Ca 5%. Black grain Ca 2% as abov
260'-265'	Medium brown sand		As above
265'-270'	Medium brown sand		As above
270'-275'	Medium brown sand		As above
275'-280'	Medium brown sand		As above except black grain Ca 1%.
280'-285'	Medium brown sand		As above except black grain Ca 2%
285'-290'	Medium brown sand		As above except Black grain Ca 1%

EXOIL - PETROMIN

E.R. Hillwood
Minoil Services
Wellsite Geologist

WELL LOG

Well No. 221-5

Interval	Lithology	%	Description
290'-295'	Medium brown sand		As above
295'-300'	Light brown sand		Sand coarse to fine angular to subangular 90% clay with silt light brown < 10%. Occas.micas. Occas. black grain as above
300'-310'	Grit	100	Angular essentially quartz with some granite and feldspar fragments. Brown
310'-375	Grit Sand	50 50	Angular - subangular poorly sorted grit and coarse-fine grained sand. Essentially quartz with feldspar and granite fragments. Pale brown.
375'-450'	Grit Sand Clay	60 30 10	Angular-subangular poorly sorted grit and coarse - fine grained sand with clay. Essentially quartz with feldspar and granite fragments. Pale Brown.
450'-455'	Gravel Grit Sand	50 40 10	Rounded pebbles and gravel with grit and coarse fine sands Pale Brown
455'-550'	Grit sand sand	60 30 10	Angular - subangular poorly sorted grit and coarse - fine grained sand with clay. Essentially quartz with feldspar and granite fragments. Pale brown.
550'-560'	Clay Grit Sand	10 80 10	First sample of grey clay. Possible top of Cretaceous. Clay intermixed with grit and sand. Grey and red brown mottled.
560'-660'	Clay Grit Sand	20 60 20	Grey clay intermixed with grit and gravel. Most of samples probably cavings from hole.

Depth of hole logged 630'

PETROMIN NO LIABILITY

Telephone 27-9664/5
Telegraphic Address
"Petromin" Sydney

Technical Office,
5th Floor, Interocean House,
201 George Street, Sydney 200

July 15th, 1969

The Director of Mines,
Department of Mines,
P.O. Box 38,
Rundle Street, 5000
Adelaide

SPECIAL MINING LEASE NO. 221

Report for the period ending 21st July, 1969

Summary

During the period, ten holes were drilled on this Special Mining Lease for a total footage of 5463 feet. Gamma-ray logging was carried out in each hole, but due to hole collapse only 3790 feet were logged.

The holes completed were labelled 5A, 5A-1, 7A, 8A, 9A, 221-1, 221-2, 221-3, 221-4 and 221-5.

In summary the results are as follows -

Hole No.	Depth Logged	Depth Drilled
5A	205'	360'
5A-1	234'	358'
7A	226'	480'
8A	480'	500'
9A	758'	780'
221-1	176'	580'
221-2	550'	600'
221-3	65'	545'
221-4	466'	600'
221-5	630'	660'
	3,790'	5,463'

Lithologic logs are appended to this report. Gamma-ray logs of all holes have been retained by the Department of Mines and consequently are not included.

Drilling

Drilling conditions continued to be difficult throughout the period. Near surface boulder beds were encountered throughout. This necessitated a change in procedure involving setting approximately 40 feet of surface casing in each hole. Due to movement in the boulder beds, to date it has been found impossible to retrieve this casing.

It is expected that drilling conditions will improve as progress is made towards the east and south.

Geology and Radio-activity

A report by the well-site geologist, G. Reveleigh is appended.

B. Fitzpatrick

B.F. Fitzpatrick
Exploration Manager
Petromin N.L.

14th January, 1970.

SPECIAL MINING LEASE NO. 221

PROGRESS REPORT FOR PERIOD ENDING 21ST JANUARY, 1970

SUMMARY:

Activity on SML.221 during the period has comprised the drilling of twenty-one rotary non-coring bore-holes. Lithological and gamma-ray logging of these holes has been undertaken by competent professional contractors. Weak radio-activity was detected in two of the holes drilled.

INTRODUCTION:

Special Mining Lease No. 221 covers an area of approximately 48 square miles on the western side of Lake Frome in South Australia.

Operations on the Lease are primarily directed towards evaluating the potential of the area for deposits of radio-active ores and the location of such deposits.

EXPLORATION:

Exploratory drilling for sedimentary uranium and other radio-active materials has continued throughout the period under review.

A total of twenty-one bore-holes have been drilled to an average depth of 512 feet, using a Mayhew 1,000 rotary drilling rig with mud circulation.

Nine of the holes drilled during the Period are situated along a creek system known as the John Brown Wash; the other twelve are sited along a smaller, unnamed, creek which runs through Paralana out station. Holes are spaced at approximately half-mile intervals.

Lithologic and gamma-ray logging of the twenty-one bore-holes was carried out and copies of each of the logs accompany this Report. The lighological logs are of cuttings recovered and are compiled by a contract well-site geologist. The gamma-ray logs are obtained using a slim probe run inside the drill rods by a contract geophysicist.

A plan showing locality of all holes drilled on SML.221 to date is attached to this Report.

..../2

Total footage drilled for Period = 10,755'

Total footage gamma-ray logged for Period = 10,675'

RESULTS:

Anomalous radio-activity was detected in holes 221-7 and 221-13. Both registered approximately twice background at a depth of about 195 feet. Holes drilled adjacent to these recorded lower activity in the corresponding depth zone. No other zones of anomalous radio-activity were detected elsewhere in the lease during the period under review.

SUB-SURFACE GEOLOGY:

Unconsolidated sediments of probably Tertiary to Recent age were intersected in all holes from surface to about 400 feet. These comprise a sequence of poorly sorted gravels, grits, sands, sandy clays and clays.

Gravels commonly occur in the top 40 feet of the section. The coarser sediments throughout are essentially composed of quartz with fragments of granite and feldspar.

The poorly sorted nature of the sediments suggests rapid erosion, short distance of transport and deposition in stream channels and outwash plains.

Colour of the sediments is from grey through yellow to reddish brown with the latter colour being most widespread. There is little evidence of post depositional chemical alteration of the sediments.

The lower section, ie. from about 400 feet to total depth, consists of grey, greenish-grey and dark grey carbonaceous clays with, in some holes, abundant gypsum. These sediments are considered to be of Cretaceous age with a zone of reworked material at the top.

CONCLUSIONS:

Drilling during the Period revealed one area of weak radio-activity.

CONTRACTORS FOR THE PROJECT ARE:

Geological:	Minoil Services
Geophysical:	Down Under Well Services P/L.
Drilling:	Austral Geo Prospectors

.....

16th January, 1970.

Gamma-ray logs of the following bore holes accompany this Report:

Special	Mining	Lease	No.	221.7
"	"	"	"	221.8
"	"	"	"	221.9
"	"	"	"	221.10
"	"	"	"	221.11
"	"	"	"	221.12
"	"	"	"	221.13
"	"	"	"	221.14
"	"	"	"	221.15
"	"	"	"	221.16
"	"	"	"	221.17
"	"	"	"	221.18
"	"	"	"	221.19
"	"	"	"	221.20
"	"	"	"	221.21
"	"	"	"	221.22
"	"	"	"	221.23A
"	"	"	"	221.24
"	"	"	"	221.25
"	"	"	"	221.26
"	"	"	"	221.27

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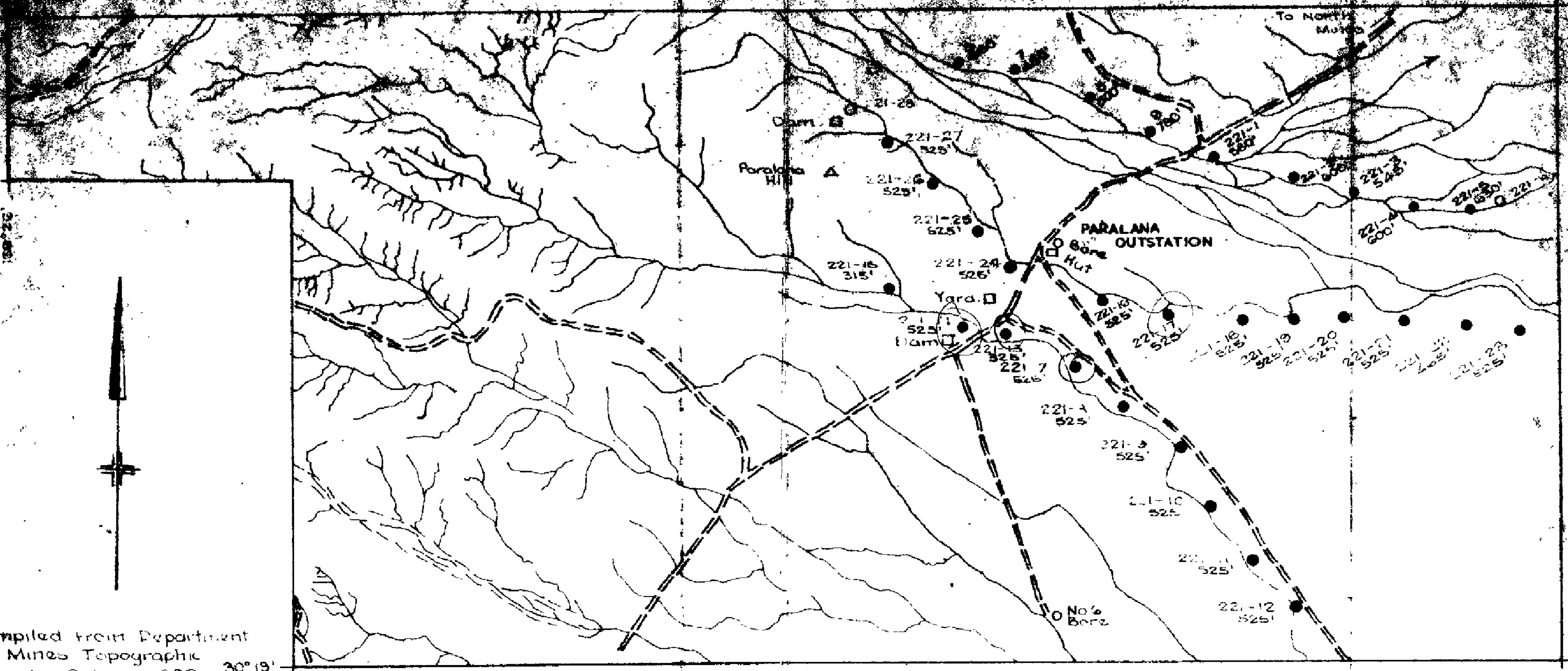


Note

Compiled from Department of Mines Topographic Sheets Callina 632 and Weltina 631

LEGEND

Symbol	Meaning
O	Drill Site
● 7 / 480'	Drill hole completed and total depth
● 7 / 480'	Hole logged, Xand/or resistivity
(dashed double line)	Track
(branching lines)	Creek

SCALE IN MILES

1 0 1 2

EXOIL N.L.-TRANSOIL N.L.-PETROMIN N.L.

SPECIAL MINING LEASE 221.

PLAN SHOWING

LOCATION OF DRILL HOLES

LAKE FROME AREA	URANIUM PROJECT	GEOLOGIST : E.R. HILLWOOD
DATE.	SOUTH AUSTRALIA	MINOIL SERVICES ADELAIDE

1004(II)-1

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.

AREA JOHN BROWN WASH

WELL 221-7

STATE SOUTH AUSTRALIA

PETROMIN N.L. 221-7 JOHN BROWN WASH SOUTH AUSTRALIA

	Run No. 1
Date	20th OCTOBER 1969
First Reading	522
Last Reading	0'
Footage Logged	522'
Depth – driller	525'
Depth – logger	524'
Casing – driller	NONE
Casing – logger	—
Casing – Size	—
Bit Size	4 3/4"
Logged by	K. BRADBURY
Witnessed by	J. WESTHOFF

TOOL TYPE G 10 C

LOGGING SPEED [illegible] PER MIN

TIME CONSTANT [illegible] SECONDS

REMARKS DEPTH DATUM IS GROUND LEVEL. LOG RECORDED THRO DRILL STEM

Depth

GAMMA RAY

A.P.I. Units

1004(II)-2

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

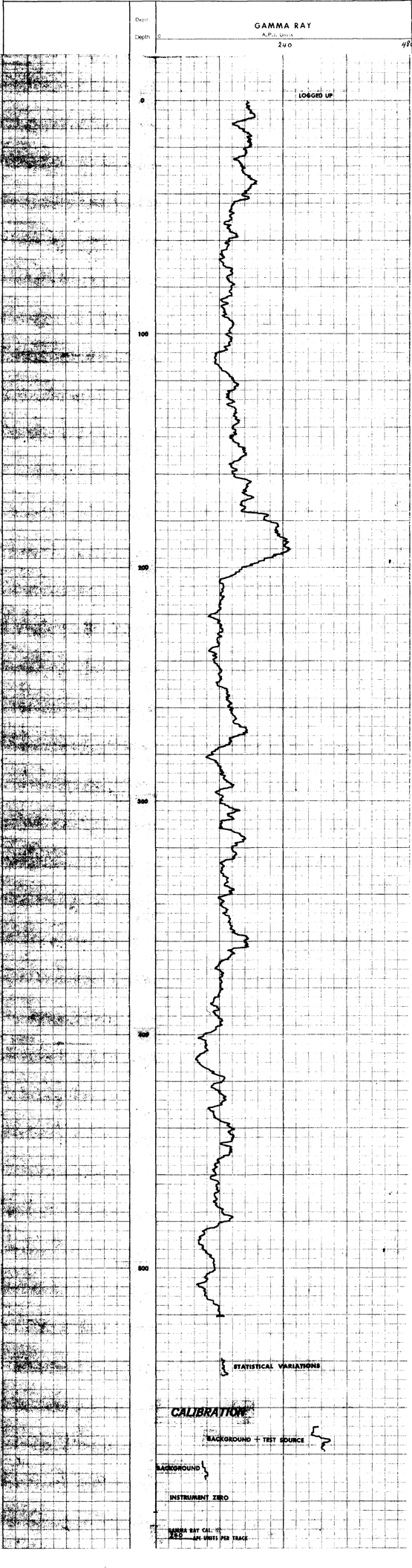
COMPANY PETROMIN NL
AREA JOHN BROWN WASH.
WELL 221 - 8
STATE SOUTH AUSTRALIA

LOCATION
WITHIN

COMPANY PETROMIN NL
WELL 221 - 8
FIELD JOHN BROWN WASH.
STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	21st OCTOBER 1969		Nature		
First Reading	521		Density		
Last Reading	0		Resistivity	@ °F	@ °F
Footage Logged	521		Res. @ BHT	@ °F	@ °F
Depth — driller	525'		pH		
Depth — logger	523'		Circ. Temp		
Casing — driller	NONE		Time		
Casing — logger	—		Tool Type	G.I.G.C	
Casing — Size	4 3/4"		Tool Diam	1"	
Bit Size			Logging Speed	15 PER MIN	
Logged by	K. BRADBURY		Time Constant	3 SECONDS	
Witnessed by	S. WESTHOFF.				

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED THRU DRILL STEM.



1004(II)-3

DOWN UNDER [redacted]

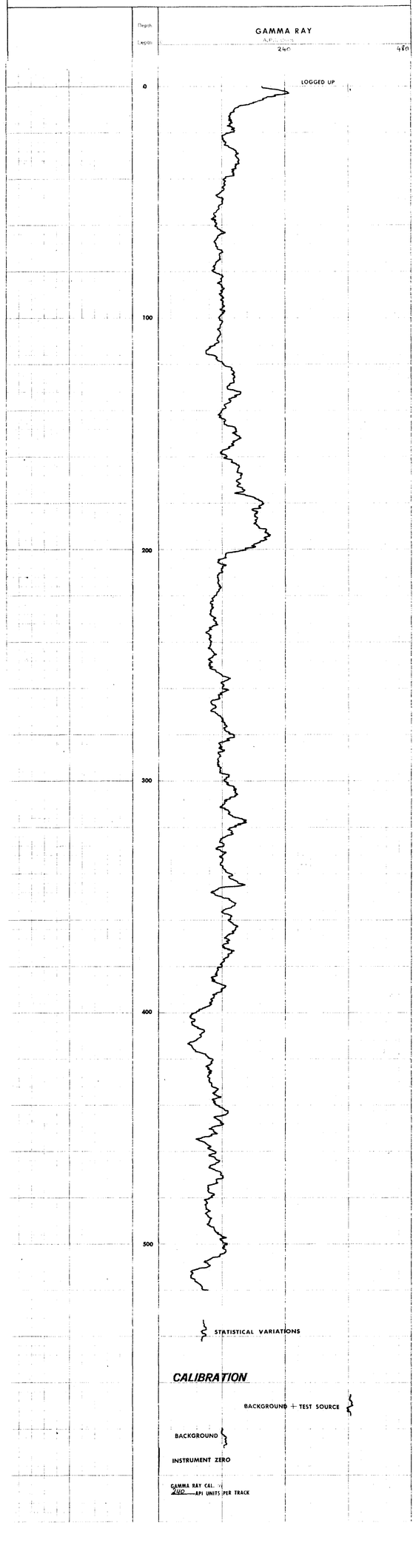
PETROMIN N.L. 221-9 JOHN BROWNS MARSH SOUTH WEST KALE R.

COMPANY PETROMIN N.L.
AREA JOHN BROWNS MARSH
WELL 221-9
SOUTH WEST KALE R.

Run No.	1
Date	22ND OCTOBER 1969
First Reading	520'
Last Reading	0'
Footage Logged	520'
Depth – driller	525'
Depth – logger	522'
Casing – driller	NONE
Casing – logger	
Casing – Size	
Bit Size	4 3/4
Logged by	K. BRADBURY E. HILLWOOD
Witnessed by	

100% LIME
100% DIAM.
LOGGING SPEED 15' PER MIN
TIME CONSTANT 5 SECONDS

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED THRU DRILL STEM



1004 (II) 4

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.
AREA JOHN BROWN WASH.
WELL 221 - 10
STATE SOUTH AUSTRALIA

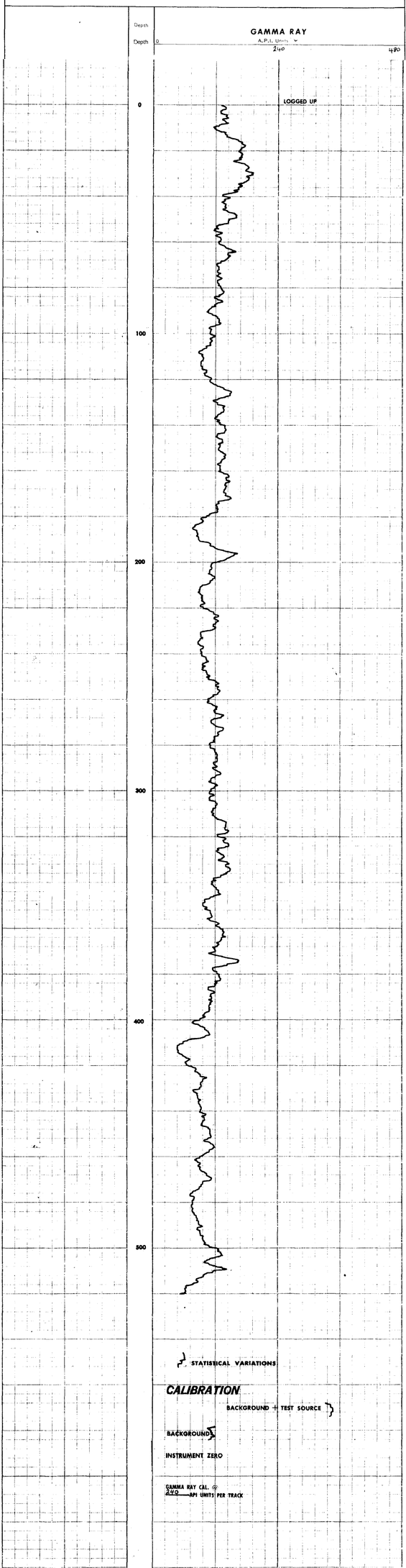
27 JAN 1969

LOCATION
ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L.
WELL 221 - 10
LOCATION JOHN BROWN WASH
STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	28th OCTOBER 1969		Nature		
First Reading	$20'		Density		
Last Reading	0		Viscosity	@ °F	@ °F
Footage Logged	$20'		Resistivity	@ °F	@ °F
Depth – driller	$25'		Res. @ BHT	@ °F	@ °F
Depth – logger	$22'		pH		
Casing – driller	NONE		Circ. Temp.		
Casing – logger	—		B.H. Temp.		
Casing – Size	—		Tool Type	G.L.O.C.	
Bit Size	4¾"		Tool Diam.	1"	
			Logging Speed	15' PER MIN.	
Logged by	K. BRADBURY		Time Constant	5 SECONDS	
Witnessed by	E. HILLWOOD.				

REMARKS DEPTH DATUM IS GROUND LEVEL.
LOG RECORDED THRU DRILL STEM.



1004(II)-5

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.
AREA JOHN BROWN WASH
WELL 221 - 11
STATE SOUTH AUSTRALIA.

LOCATION
ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L.
WELL 221 - 11
LOCATION JOHN BROWN WASH
STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2	MUD	Run No. 1		Run No. 2	
Date	NOVEMBER 5th 1969		Nature				
First Reading	520'		Density				
Last Reading	0		Viscosity	# °F		# °F	
Footage Logged	520'		Resistivity	# °F		# °F	
Depth – driller	525'		Res. @ BHT	# °F		# °F	
Depth – logger	522'		pH				
Casing – driller	NONE		Circ. Temp				
Casing – logger	—		B.H. Temp				
Casing – Size	—		TOOL TYPE	G IOC			
Bit Size	4¾"		TOOL DIAM	1"			
Logged by	K.A. BRADBURY		LOGGING SPEED	15' PER MIN			
Witnessed by	J. WESTHOFF		TIME CONSTANT	5 SEC.			

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED THRU DRILL STEM.

Depth
Depth

GAMMA RAY
A.P.I. Units
0 240

470

LOGGED

0
100
200
300
400
500

STATISTICAL VARIATIONS

CALIBRATION

BACKGROUND + TEST SOURCE

BACKGROUND

INSTRUMENT ZERO

GAMMA RAY CAL. @ 240 API UNITS PER TRACK

1004(II)-6

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY Petromin N.L.
AREA John Brown Wash.
WELL 221 – 12
STATE South Australia

LOCATION
ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L.
WELL 221-12
LOCATION JOHN BROWN WASH
STATE S. AUSTRALIA

	Run No. 1	Run No. 2
Date	8 Nov. 1969.	
First Reading	521'	
Last Reading	0'	
Footage Logged	521'	
Depth – driller	525'	
Depth – logger	523'	
Casing – driller	—	
Casing – logger	—	
Casing – Size	—	
Bit Size	4¾"	
Logged by	P. Goldstein	
Witnessed by	L. REAP.	

MUD	Run No. 1	Run No. 2
Nature	Aquagel	
Density		
Viscosity	@ °F	@ °F
Resistivity	@ °F	@ °F
Res. @ BHT	@ °F	@ °F
pH		
Circ. Temp		
B.H. Temp.		
Tool Type.	G. 10c.	
Diam	1"	
Log. Speed	min	
Time Constant	3 secs.	

REMARKS DEPTH DATUM IS GRD ...
LOG RECORDED THRU DRILL STEM

1004 (II) - 7

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

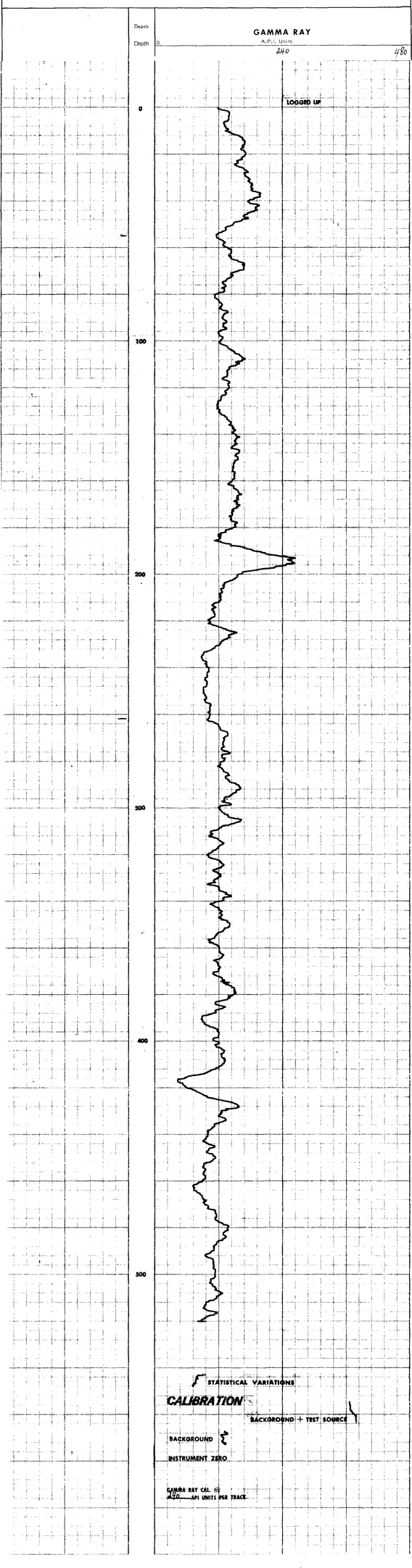
COMPANY PETROMIN N.L.
AREA JOHN BROWN WASH
WELL 221 - 13
STATE SOUTH AUSTRALIA

LOCATION
ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L.
WELL 221 - 13
LOCATION JOHN BROWN WASH
STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	OCTOBER 30th 1969		Nature		
First Reading	520		Density		
Last Reading	0'		Viscosity	@ °F	@ °F
Footage Logged	520'		Resistivity	@ °F	@ °F
Depth – driller	525'		Res. @ BHT	@ °F	@ °F
Depth – logger	522'		pH		
Casing – driller	NONE		Circ. Temp.		
Casing – logger	—		B.H. Temp.		
Casing – Size	—		Tool Type	G.10.C.	
Bit Size	7⅞"		Tool Diam.	1"	
			Logging Speed	15' PER MIN	
Logged by	K BRADBURY		Time Constant	5 SECONDS	
Witnessed by	J WESTHOFF				

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED THRU DRILL STEM.



1004(II)-8

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN. N.L.

AREA JOHN BROWN WASH

WELL 221 - 14

STATE SOUTH AUSTRALIA.

LOCATION

ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN. N.L.
WELL 221 - 14
LOCATION JOHN BROWN WASH.
STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2
Date	NOVEMBER 2ND 1969	
First Reading	320'	
Last Reading	0'	
Footage Logged	320'	
Depth – driller	325'	
Depth – logger	327'	
Casing – driller	NONE	
Casing – logger	—	
Casing – Size	—	
Bit Size	4 3/4"	
Logged by	K. BRADBURY	
Witnessed by	J. WESTHOFF	

MUD	Run No. 1	Run No. 2
Nature		
Density		
Viscosity	# °F	# °F
Resistivity	# °F	# °F
Res. + BHT	# °F	# °F
pH		
Circ. Temp		
BLH. Temp.		
TOOL TYPE	G.10-C	
TOOL DIAM	1"	
LOGGING SPEED	15 PER MIN	
TIME CONSTANT	5 SECONDS	

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED THRU DRILL STEM

Depth
Depth

GAMMA RAY
A.P.I. Units
0 240 480

LOGGED UP

0
100
200
300
400
500

STATISTICAL VARIATIONS

CALIBRATION

BACKGROUND + TEST SOURCE

BACKGROUND

INSTRUMENT ZERO

GAMMA RAY CAL. @ 240 API UNITS PER TRACK

1004(II)-9

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.
LOCATION
AREA JOHN BROWN WASH.
ELEVATION:
WELL 221 - 15
D.F.
K.B.
STATE SOUTH AUSTRALIA
G.L.

RECEIVED 27 JAN 1970 DEPT. OF MINES ADELAIDE

COMPANY PETROMIN N.L.
WELL 221 - 15
LOCATION JOHN BROWN WASH.
STATE SOUTH AUSTRALIA.

	Run No. 1	Run No. 2
Date	NOVEMBER 3RD 1969	
First Reading	308'	
Last Reading	0'	
Footage Logged	308'	
Depth – driller	315'	
Depth – logger	311'	
Casing – driller	NONE	
Casing – logger	—	
Casing – Size	—	
Bit Size	4 3/4	
Logged by	K. BRADBURY.	
Witnessed by	J. WESTHOFF.	

MUD	Run No. 1	Run No. 2
Nature		
Density		
Viscosity	@ °F	@ °F
Resistivity	@ °F	@ °F
Res. @ BHT	@ °F	@ °F
pH		
Circ. Temp		
B.H. Temp.		
TOOL TYPE	G 10 C	
TOOL DIAM	1"	
LOGGING SPEED	15' PER MIN	
TIME CONSTANT	5 SECONDS	

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED THRU DRILL STEM.

Depth
Depth

GAMMA RAY
A.P.I. Units
0 240 480

LOGGED UP

0
100
200
300

CALIBRATION

STATISTICAL VARIATIONS

BACKGROUND + TEST SOURCE

BACKGROUND

INSTRUMENT ZERO

GAMMA RAY CAL. @ 240 API UNITS PER TRACK

1004(II)-10

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

REGISTERED 27 JAN 1960 DEPT. OF MINES REGISTRY

COMPANY PETROMIN N.L.

AREA S.M.L. 221 (PARALANA CREEK)

WELL 221-16

STATE SOUTH AUSTRALIA

LOCATION

ELEVATION:

D.F.

K.B.

G.L.

COMPANY PETROMIN N.L. WELL 221-16 LOCATION S.M.L. 221 (PARALANA CREEK) STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	14th DEC. 1959		Nature	AQUA GEL	
First Reading	522'		Density		
Last Reading	0'		Viscosity	@ °F	@ °F
Footage Logged	522'		Resistivity	@ °F	@ °F
Depth – driller	521'		Res. @ BHT	@ °F	@ °F
Depth – logger	524'		pH		
Casing – driller			Circ. Temp		
Casing – logger			BH. Temp.		
Casing – Size			Type	G.L.G.	
Bit Size	4½"		" Dia	1"	
			Eagle Speed	15 FT/MIN.	
Logged by	P. GOLDSTEIN		Time Const.	5 SECS	
Witnessed by	E. HUMWOOD.				

REMARKS DEPTH DATUM IS GROUND LEVEL

NOT RECORDED THRU DRILL STEM

GAMMA RAY

A.P.I. Units

0 240 480

Depth

Depth

0

100

200

300

400

500

STATISTICAL VARIATIONS

CALIBRATION

BACKGROUND + TEST SOURCE

BACKGROUND

INSTRUMENT ZERO

GAMMA RAY CAL. @ 240 API UNITS PER TRACK

1004 (II) - 11

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.
AREA S.M.L. 221 (PARALANA CREEK)
WELL 221-17
STATE SOUTH AUSTRALIA

LOCATION
ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L. | WELL 221-17 | LOCATION S.M.L. 221 (PARALANA CREEK) | STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	5th DEC. 1969		Nature	AQUA GEL	
First Reading	522'		Density		
Last Reading	0'		Viscosity	@ °F	@ °F
Footage Logged	522'		Resistivity	@ °F	@ °F
Depth – driller	525'		Res. @ BHT	@ °F	@ °F
Depth – logger	524'		pH		
Casing – driller	—		Circ. Temp		
Casing – logger	—		B.H. Temp.		
Casing – Size	—		TOOL TYPE	G.10C.	
Bit Size	4 3/4"		" DIA.	1"	
			CABLE SPEED	15FT/MIN.	
Logged by	P. GOLDSTEIN		TIME CONST.	5 SECS.	
Witnessed by	E. HILLWOOD				

REMARKS DEPTH DATUM IS GROUND LEVEL.
LOG RECORDED THRU DRILL STEM.

1004(II)-12

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

RECEIVED 27 JAN 19 DEPT. OF MINES SOUTH AUSTRALIA

COMPANY PETROMIN N.L.
AREA S.M.L. 221 (YARRALANA CREEK)
WELL 221 - 18
STATE SOUTH AUSTRALIA

LOCATION:
ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L.
WELL 221 - 18
LOCATION S.M.L. 221 (YARRALANA CREEK)
STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	30 DEC. 1969		Nature	QUIK GEL	
First Reading	522'		Density		
Last Reading	0	t	Viscosity	# °F	# °F
Footage Logged	522'		Resistivity	# °F	# °F
Depth – driller	525'		Res. @ BHT	# °F	# °F
Depth – logger	521'		pH		
Casing – driller			Circ. Temp		
Casing – logger			B.H. Temp.		
Casing – Size			TOOL TYPE	G-10C	
Bit Size	6¾"		" DIA	1"	
			CABLE SPEED	15FT/MIN	
Logged by	R. GOODWIN		TIME CONST	5 SECS.	
Witnessed by	E. HILSDON				

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED FROM DRILL STEM

Depth
Depth

GAMMA RAY
A.P.I. Units
0 240 480

100
200
300
400

STATISTICAL VARIATIONS
CALIBRATION
BACKGROUND + TEST SOURCE
BACKGROUND
INSTRUMENT ZERO

GAMMA RAY CAL. @
SCALE LIGHT WHITE PEN TRACE

1004 (II) - 13

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.
AREA S.M.L. 221 (PARALANA CREEK)
WELL 221-19
STATE SOUTH AUSTRALIA

LOCATION
ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L.
WELL 221-19
LOCATION S.M.L. 221 (PARALANA CREEK)
STATE

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	1st DEC 1969		Nature	QUICK GEL	
First Reading	522'		Density		
Last Reading	0'		Viscosity	@ °F	@ °F
Footage Logged	522'		Resistivity	@ °F	@ °F
Depth – driller	525'		Res. @ BHT	@ °F	@ °F
Depth – logger	524'		pH		
Casing – driller	—		Circ. Temp		
Casing – logger	—		B.H. Temp.		
Casing – Size	—		TOOL TYPE	G.10C	
Bit Size	4 3/4"		DIA.	1"	
			CABLE SPEED	15 FT/MIN.	
Logged by	P. GOLDSTEIN		TIME CONST.	5 SECS	
Witnessed by	J. WESTHOFF				

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED THRU DRILL STEM.

1004(II)-14

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.
AREA S.M.L. 221 (PARALANA CREEK)
WELL 221-20
STATE SOUTH AUSTRALIA

LOCATION
ELEVATION:
D.F.
K.B.
G.L.

STATE
LOCATION S.M.L. 221 (PARALANA CREEK)
WELL 221-20
COMPANY PETROMIN N.L.

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	30th NOV. 1969		Nature	QUICK GEL	
First Reading	522'		Density		
Last Reading	0'		Viscosity	@ °F	@ °F
Footage Logged	522'		Resistivity	@ °F	@ °F
Depth – driller	525'		Res. @ BHT	@ °F	@ °F
Depth – logger	524'		pH		
Casing – driller	—		Circ. Temp		
Casing – logger	—		B.H. Temp.		
Casing – Size	—		TOOL TYPE	G.10C.	
Bit Size	4¾"		" DIA.	1"	
			CABLESPEED	15FT/SEC.	
Logged by	P. GOLDSTEIN		TIME CONST	5 SECS.	
Witnessed by	J. WESTHOFF				

REMARKS DEPTH DATUM IS GROUND LEVEL.
LOG RECORDED THRU DRILL STEM.

1004(II)-15

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

PETROMIN N.L
221-21
SML 221 (PARALANA CREEK)
SOUTH AUSTRALIA

COMPANY PETROMIN N.L

AREA SML 221 (PARALANA CREEK)

WELL 221-21

STATE SOUTH AUSTRALIA

LOCATION

ELEVATION:
D.F.
K.B.
G.L.

	Run No. 1	Run No. 2
Date	27th NOV 1969	
First Reading	522'	
Last Reading	0'	
Footage Logged	522'	
Depth – driller	525'	
Depth – logger	524'	
Casing – driller	—	
Casing – logger	—	
Casing – Size	—	
Bit Size	4 3/4"	
Logged by	P. GOLDSTEIN	
Witnessed by	J. WESTHOFF	

MUD	Run No. 1	Run No. 2
Nature		
Density		
Viscosity	@ °F	@ °F
Resistivity	@ °F	@ °F
Res. @ BHT	@ °F	@ °F
pH		
Circ. Temp		
B.H. Temp.		
TOOL TYPE	G.10C.	
" DIA.	1"	
CABLE SPEED	15 FT/MIN.	
TIME CONST.	5 SECS.	

REMARKS DEPTH DATUM IS GROUND LEVEL.
LOG RECORDED THRU DRILL STEM.

Depth

Depth

GAMMA RAY
A.P.I. Units
0 240 480

1004 (II) – 16

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.	LOCATION	STATE S. AUSTRALIA
AREA S.M.L. 221 (PARALANA CREEK)	ELEVATION:	LOCATION S.M.L. 221 (PARALANA CREEK)
WELL 221-22	D.F.	WELL 221-22
STATE SOUTH AUSTRALIA	K.B. / G.L.	COMPANY PETROMIN N.L.

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	16th NOV. 1969		Nature	AQUA GEL	
First Reading	462'		Density		
Last Reading	0'		Viscosity	@ °F	@ °F
Footage Logged	462'		Resistivity	@ °F	@ °F
Depth – driller	465'		Res. @ BHT	@ °F	@ °F
Depth – logger	463'		PH		
Casing – driller	—		Circ. Temp		
Casing – logger	—		B.H. Temp.		
Casing – Size	—		TOOL TYPE	G.10C.	
Bit Size	4 3/4"		TOOL DIA	1"	
			CABLE SPEED	15'/MIN	
Logged by	P. GOLDSTEIN		TIME CONST.	5 SECS.	
Witnessed by	L. READ				

RECEIVED 27 JAN 1970

REMARKS DEPTH DATUM IS GROUND LEVEL

LOG RECORDED THRU DRILL STEM.

1004(II)-17

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.
AREA S.M.L. 221 (PARALANA CREEK)
WELL 221-23
STATE SOUTH AUSTRALIA

LOCATION
ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L.
WELL 221-23
LOCATION S.M.L. 221 (PARALANA CREEK)
STATE S. AUSTRALIA

	Run No. 1	Run No. 2
Date	11th NOV. 1969	
First Reading	521'	
Last Reading	0'	
Footage Logged	521'	
Depth – driller	525'	
Depth – logger	523'	
Casing – driller	—	
Casing – logger	—	
Casing – Size	—	
Bit Size	4 3/4"	
Logged by	P. GOLDSTEIN	
Witnessed by	L. READ	

MUD	Run No. 1	Run No. 2
Nature	AQUA GEL	
Density		
Viscosity	@ °F	@ °F
Resistivity	@ °F	@ °F
Res. @ BHT	@ °F	@ °F
Circ. Temp.		
B.H. Temp.		
TOOL TYPE	G.10C.	
TOOL DIA.	1"	
CABLE SPEED	15'/MIN	
TIME CONST.	5 SECS.	

REMARKS DEPTH DATUM IS GROUND LEVEL.
LOG RECORDED THRU DRILL STEM.

1004(II)-18

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.
AREA S.M.L. 221 (PARALANA CREEK)
WELL 221-24
STATE SOUTH AUSTRALIA

LOCATION
ELEVATION:
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L.
WELL 221-24
LOCATION S.M.L. 221 (PARALANA CREEK)
STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	8th DEC. 1969		Nature	AQUA GEL	
First Reading	522'		Density		
Last Reading	0'		Viscosity	@ °F	@ °F
Footage Logged	522'		Resistivity	@ °F	@ °F
Depth – driller	525'		Res. @ BHT	@ °F	@ °F
Depth – logger	524'		pH		
Casing – driller	—		Circ. Temp		
Casing – logger	—		B.H. Temp.		
Casing – Size	—		TOOL TYPE	G.10C	
Bit Size	$4\frac{3}{4}$		" DIA.	1"	
			CABLE SPEED	15 FT/MIN.	
Logged by	P. GOLDSTEIN		TIME CONST.	5 SECS.	
Witnessed by	E. HILLWOOD				

RECEIVED 27 JAN 1970 DEPT. OF MINES

REMARKS DEPTH DATUM IS GROUND LEVEL.
LOG RECORDED THRU DRILL STEM.

1004(II)-19

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY	PETROMIN N.L.
AREA	S.M.L. 221 (PARALANA CREEK)
WELL	221-25
STATE	SOUTH AUSTRALIA
LOCATION	
ELEVATION: D.F.	
K.B.	
G.L.	

COMPANY PETROMIN N.L.
WELL 221-25
LOCATION S.M.L. 221 (PARALANA CREEK)
STATE SOUTH AUSTRALIA

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	9th DEC. 1969		Nature	AQUA GEL.	
First Reading	522'		Density		
Last Reading	0'		Viscosity	@ °F	@ °F
Footage Logged	522'		Resistivity	@ °F	@ °F
Depth – driller	525'		Res. @ BHT	@ °F	@ °F
Depth – logger	524'		pH		
Casing – driller	—		Circ. Temp		
Casing – logger	—		B.H. Temp.		
Casing – Size	—		TOOL TYPE	G.10C.	
Bit Size	4 3/4"		" DIA.	1"	
			CABLE SPEED	15FT/MIN.	
Logged by	P. GOLDSTEIN		TIME CONST.	5 SECS.	
Witnessed by	E. HILLWOOD				

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED THRU DRILL STEM

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DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

COMPANY PETROMIN N.L.

AREA S.M.L. 221 (PARANANNA CREEK)

WELL 221 - 26

STATE SOUTH AUSTRALIA

RECEIVED 27 JAN 1970 DEPARTMENT OF MINES

LOCATION

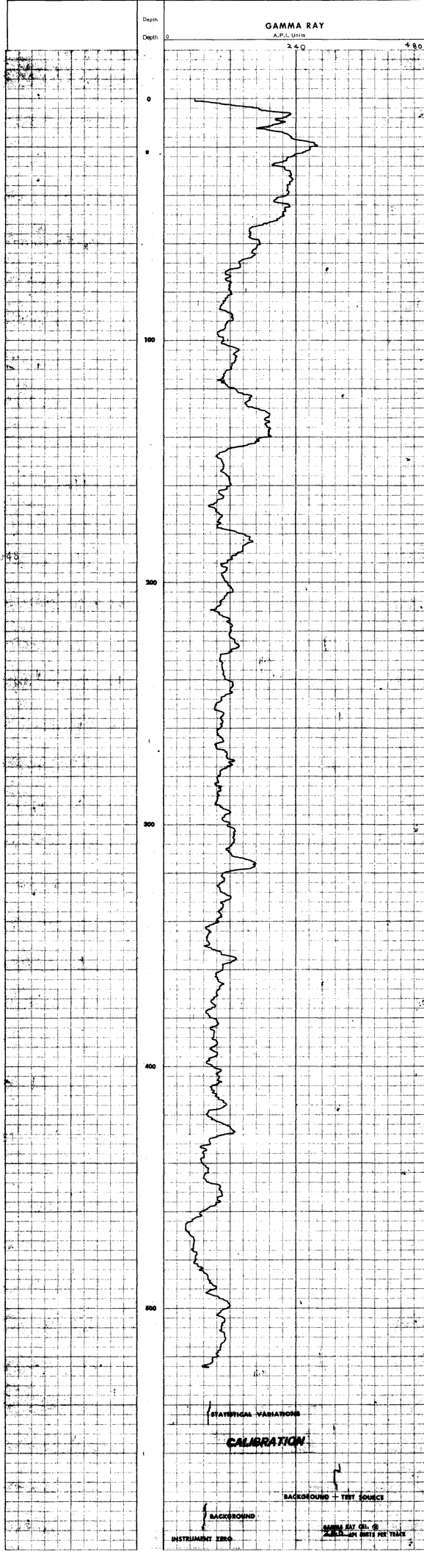
ELEVATION:
D.F.
K.B.
G.L.

STATE SOUTH AUSTRALIA
LOCATION S.M.L. 221 (PARANANNA CREEK)
WELL 221 - 26
COMPANY PETROMIN N.L.

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	10th DEC. 1969		Nature	BLACK GEL.	
First Reading	522		Density		
Last Reading	0		Viscosity	@ °F	@ °F
Footage Logged	522'		Resistivity	@ °F	@ °F
Depth – driller	524'		Res. @ BHT	@ °F	@ °F
Depth – logger	524'		pH		
Casing – driller	—		Circ. Temp		
Casing – logger	—		B.H. Temp.		
Casing – Size	—		Tool Type	G.10C	
Bit Size	4½"		" Dia.	1"	
			Cable Speed	15 ft/min	
Logged by	B. GOULDSTEIN		Time Const.	5 Secs.	
Witnessed by	J. WESTHOFF				

REMARKS DEPTH DATUM IS GROUND LEVEL.

LOG RECORDED THRU DRILL STEM.



1004 (II) - 21

DOWN UNDER WELL SERVICES Pty. Ltd.

Gamma Ray Log

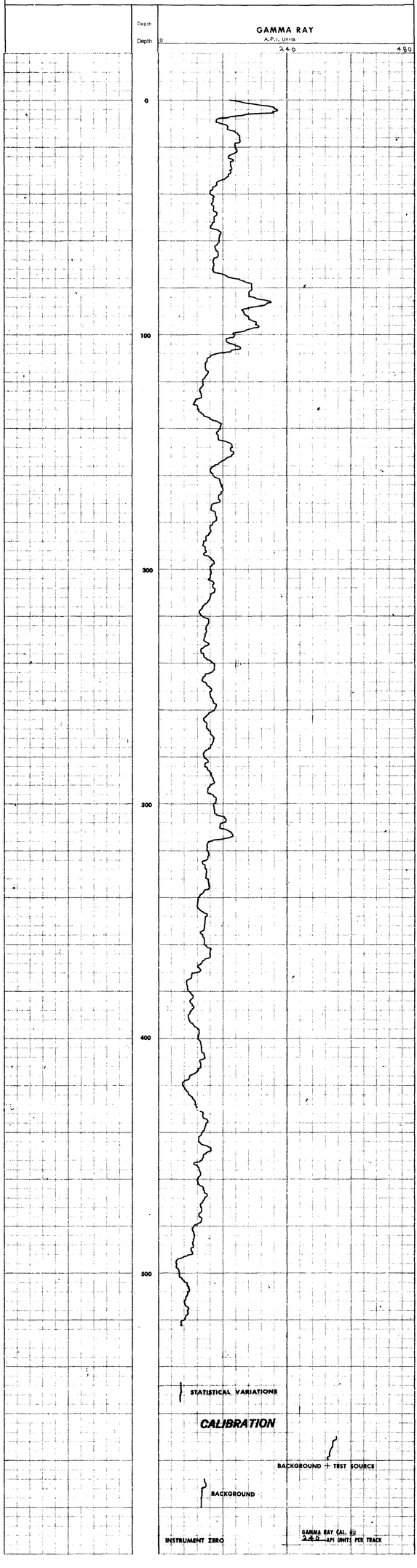
COMPANY PETROMIN N.L.
AREA S.M.L. 221 (PARANANA CREEK)
WELL 221 - 27
STATE S. AUSTRALIA

LOCATION
ELEVATION: x
D.F.
K.B.
G.L.

COMPANY PETROMIN N.L.
WELL 221 - 27
LOCATION S.M.L. 221 (PARANANA CREEK)
STATE

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	12th DEC. 1969		Nature	QUICK GEL	
First Reading	522'		Density		
Last Reading	0		Viscosity	# °F	# °F
Footage Logged	522'		Resistivity	# °F	# °F
Depth – driller	522'		Res. @ BHT	# °F	# °F
Depth – logger	524'		pH		
Casing – driller	-		Circ. Temp		
Casing – logger	-		B.H. Temp.		
Casing – Size	-		TOOL TYPE	GR-10C	
Bit Size	12¼"		" DIA	1"	
			CABLE SPEED	15 FT/MIN.	
Logged by	P. GOLDSTEIN		TIME CONST.	5 SECS.	
Witnessed by	J. WESTHOFF				

REMARKS DEPTH DATUM IS GROUND LEVEL
LOG RECORDED THRU DRILL STEM



Wellsite Geologist
J. Westhoff
Minoil Services

EMV 1004 [E]XOIL — PETROMIN Driller G. Sattler
Austral GeoProspectors

WELL LOG

Well No. 221-7

27 JAN 1970

INTERVAL	LITHOLOGY	%	DESCRIPTION
5'-20'	Gravel	70	Angular to subrounded gravel of various
	sand	30	rock types, with coarse sand similar in
			composition.
20'-45'	Sand	95	Coarse to fine subrounded to angular
	Gravel	5	sand, mainly quartzitic but also rock
			fragments, biotite, feldspars etc.
			some gravel sized chips also. Colour red - brown.
45'-80'	Sand	95	Predominantly fine sand but some coarse
	Gravel	5	sand and gravel. Fine sand dark red and
			contains some mica. Colour red.
80'-95'	Sand	90	Predominantly fine sand, mainly siliceous
	Gravel	10	but some calcareous. Slightly more
			coarse sand and gravel than above.
95'-115'	Sand	100	Medium to coarse sand, mainly siliceous
			Subangular to subrounded grains. Colour
			red - brown.

Wellsite Geologist
J. Westhoff
Minoil Services

EXOIL — PETROMIN

Driller G. Sattler
Austral GeoProspectors

WELL LOG

Well No. 221-7

INTERVAL	LITHOLOGY	%	DESCRIPTION
115'-135'	Sand	60	Predominantly fine quartzitic sand but
	Gravel	20	some coarse sand and gravel that
	clay	20	consist of various igneous and metamorphic
			rock types and minerals. Colour red.
135'-155'	sand	60	As above, but patches of grey and yellow
	Gravel	15	clay now more obvious
	Clay	25	
155'-165'	Sand	90	Predominantly coarse quartzitic sand
	Gravel	10	with some gravel. A little fine
			sand. Colour brown.
165'-195'	Sand	60	Mostly medium - fine quartzitic sand
	clay	40	with red grey and yellow clay. Micaceous
			minerals and feldspar common.
195'-210'	Clay	90	Predominantly grey clay with some red
	sand	10	and yellow clay. Fine medium sand grains of
			quartz, feldspar, mica and rock chips

Wellsite Geologist
J. Westhoff
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EXOIL — PETROMIN Driller G. Sattler
Austral GeoProspectors
WELL LOG Well No. 221-7

INTERVAL	LITHOLOGY	%	DESCRIPTION
210'-225'	Clay	60	As above, but now contains abundance of
	Sand	40	chips of fine grained, hard siliceous
			sediment. Colour - brown.
225'-335'	Sand	50	Mainly coarse siliceous sand with grey
	Clay	50	clay and in places red and yellow clay
			Precentages vary with samples, but
			roughly equal proportions overall.
			Colour brown to grey brown.
335'-380'	Clay	80	As above, but less sand and more
	sand	20	grey clay. Colour grey
380'-525'	Clay	95	As above, but more grey clay
	sand	5	colour grey. No gypsum visible.

Wellsite Geologist
J. Westhoff
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EXOIL — PETROMIN

Driller G. Sattler
Austral Geoprospectors

EHV 1004 WELL LOG

Well No. 221-8

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-30'			No samples - using rock bit
30'-105'	Sand	50	Fine red sand and clay with subangular
	clay	40	to subrounded grit and gravel, mainly
	grit	5	quartzitic. Traces of muscovite
	gravel	5	in fine sand. Colour - red.
105'-160'	Sand	30	Fine red sand and clay as above
	Gravel	30	but now more subrounded to subangular
	Clay	30	quartzitic grit and chips of
	grit	10	white calcareous rock.
			Subrounded to angular chips of quartzitic
			schist and gneiss. Colour brown.
160'-185'	Clay	70	Predominantly grey clay with
	sand	25	intermixed fine sand and red clay.
	Grit	5	subangular to subrounded quartz
			grit. Colour - grey brown
185'-300'	Clay	85	Intermixed grey, red and yellow clays

Wellsite Geologist
J. Westhoff
Minoil Services

EXOIL — PETROMIN Driller G. Sattler
Austral GeoProspectors
WELL LOG Well No. 221-8

INTERVAL	LITHOLOGY	%	DESCRIPTION
	Silt	14	with grey clay always predominant
	Grit	1	Some silt usually mixed with the
			clay. Subangular to subrounded quartzitic
			grit present in places.
			Colour grey to red grey.
300'-440'	Clay	89	As above, but with more light
	Silt	10	and dark grey clay
	Grit	1	Colour light grey
440'-525'	Clay	95	As above, but more dark grey
	Silt	4	clay. No gypsum observed but
	Grit	1	some subangular to subrounded quartz
			grains. Colour dark grey.

Wellsite Geologist
E. R. Hillwood
Minoil Services

EMN 1004

EXOIL — PETROMIN
Austral GeoProspectors

Driller G. Sadler

WELL LOG

Well No. 221-9

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-30'			No sample
30'-60'	Sandy clay	95	Red brown sandy clay with rounded quartz
	Gravel	5	gravel. Carbonaceous fragments.
60'-70'	Sand	60	Fine - coarse grained sand with red brown
	clay	20	clay and rounded gravel.
	Gravel	20	
70'-85'	Silt	70	Red brown silt with sub angular to rounded
	Gravel	30	essentially quartz gravel.
85'-115'	Clay	70	Red brown clay and silt with rounded
	silt	20	essentially quartz gravel & pebbles.
	gravel	10	
115'-120'	Grit	60	Sub-angular to rounded essentially quartz
	sand	20	grit, fine-coarse grained sand, rounded
	gravel	10	quartz gravel. Some feldspar and granite
	clay	10	fragments. Red brown clay.

Wellsite Geologist
E. R. Hillwodd
Minoil Services

EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors
WELL LOG Well No. 221-9

INTERVAL	LITHOLOGY	%	DESCRIPTION
120'-135'	Clay	90	Red brown clay with some grey mottling.
	Gravel	5	rounded essentially quartz grit and gravel.
	Grit	5	some pockets of white limey clay.
135'-145'	Clay	50	yellow brown clay & silt with rounded
	silt	40	quartz gravel.
	gravel	10	
145'-175'	clay	80	Red brown clay with some yellow brown and grey
	siltstone	20	mottling intermixed with off-white
			calcareous siltstone fragments.
175'-185'	clay	90	Grey, yellow brown and red brown mottled
	grit	10	clay with subangular quartz grit towards
			base.
185'-190'	Grit	90	Essentially quartz grit with red brown clay.
	clay	10	
190'-195'	Clay	100	Grey, yellow brown and red brown mottled
			clay.

Wellsite Geologist
E. R. Hillwood
Minoil Services

EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors
WELL LOG

Well No. 221-9

INTERVAL	LITHOLOGY	%	DESCRIPTION
195'-215'	Clay	60	Grey, yellow brown and red brown clay intermixed
	Grit	40	with sub-angular essentially quartz grit.
215'-230'	Clay	90	Dark grey clay with red brown and grey and purple
	Grit	10	mottling. Subangular essentially quartz grit.
230'-265'	Clay	90	Grey, yellow and red brown mottled clay with
	Grit	10	rounded quartz grit. Calcareous cemented
			bands.
265'-270'	Grit	70	Sub-angular to rounded essentially quartz
	clay	30	grit with grey clay. Calcareous cemented bands.
270'-290'	clay	90	Grey clay with sub-angular to rounded
	Grit	10	quartz grit.
290'-325'	Clay	95	Pale grey clay with some yellow brown and red
	grit	5	mottling. Quartz grit.
325'-380'	Clay	100	Pale grey clay with 20% dark grey to black
			calcareous clay.

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E. R. Hillwood
Minoil Services

EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors
WELL LOG Well No. 221-9

INTERVAL	LITHOLOGY	%	DESCRIPTION
380'-440'	Clay	100	Pale grey, grey and yellowish grey clay.
440'-525'	Clay	100	Dark grey, grey and pale grey clay with
			10% black carbonaceous clay.
			END OF HOLE.

EHN 1004

EXOIL — PETROMIN Driller G. Sadler

Wellsite Geologist
E. R. Hillwood
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Austral GeoProspectors

WELL LOG

Well No. 221-10

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-30'			No sample. Gravel & boulders
30'-40'	Gravel	30	Subangular-rounded essentially quartz
	Sand	30	gravel and fine-coarse grained sand.
	Clay	40	Red brown clay.
40'-70'	sandy clay	40	Red brown sandy clay and silt with
	silt	40	subangular - rounded gravel.
	Gravel	20	
70'-90'	Silt	100	Red brown silt.
90'-95'	Sandy clay	100	Red brown sandy clay.
95'-100'	Sand	50	Sub-angular - rounded fine-coarse
	sandy clay	50	grained sand with red brown sandy clay.
100'-110'	sandy clay	100	Red brown sandy clay.
110'-125'	Gravel	60	Rounded essentially quartz gravel with
	sand	20	sub-angular-rounded sand intermixed
	clay	20	with red brown clay.

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E. R. Hillwood
Minoil Services

EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors
WELL LOG Well No. 221-10

INTERVAL	LITHOLOGY	%	DESCRIPTION
125'-130'	Sand	80	Subangular-rounded essentially quartz
	gravel	10	sand with gravel and red brown clay
	clay	10	
130'-135'	Gravel	50	Quartz gravel with red brown clay
	clay	50	
135'-140'	Silty clay	100	Red brown with some grey mottlingsilty clay.
140'-145'	Sandy clay	60	Red brown sandy clay with quartz
	Gravel	40	gravel.
145'-185'	Silty clay	40	Red brown silty clay and clay. Some grey mottling
	clay	40	Gravel throughout
	Gravel	20	
185'-190'	Sand	50	Fine-coarse grained essentially quartz sand
	clay	50	with red brown clay.
190'-205'	Grit	60	Sub-angular-rounded essentially quartz grit
	Sand	30	with fine-coarse grained sand intermixed
	clay	10	with some red brown clay.

Wellsite Geologist
E. R. Hillwood
Minoil Services

EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors
WELL LOG

Well No. 221-10

INTERVAL	LITHOLOGY	%	DESCRIPTION
205'-210'	Grit	25	Sand and grit as above intermixed with
	sand	25	grey and red mottled sandy clay
	sandy clay	50	
210'-230'	sandy clay	90	Grey and red brown mottled sandy clay with
	siltstone	10	hard siliceous siltstone layers
230'-300'	sandy clay	90	grey clay with some yellow and red mottling
	grit	10	with quartz grit.
300'-315'	clay	90	grey clay with red and yellow mottling intermixed
	grit	10	with quartz grit.
315'-360'	clay	100	grey with some yellow brown and red
			mottling
360'-400'	clay	100	Grey, dark grey and off white clay. Some
			yellow and red mottling.
400'-525'	clay	100	Dark grey clay with some grey and pale
			grey clay.
			End of Hole.

Wellsite Geologist J. Westhoff
Minoil Services

EHV 1004 MINOIL — PETROMIN Driller G. Satler A.G.P.

WELL LOG Well No. 221-11

INTERVAL	LITHOLOGY	%	DESCRIPTION
0-15'			No sample
15'-50'	gravel	50	angular to subrounded fragments of
	grit	50	sandstone, quartzite, schist, gneiss etc.
50'-75'	sandy clay	90	Red brown sandy clay with some black
	grit and gravel	10	carbonaceous patches. Grit and gravel
			as before.
75'-85'	sandy clay	65	As above, but with more grit
	grit and gravel	35	and gravel.
85'-90'	sandy clay	100	red brown sandy clay
90'-105'	clay	50	red brown clay mixed with fine to
	sand	30	medium grained quartzic sand and
	grit and gravel	20	grit and gravel as above.
105'-110'	gravel	30	as above, but with more
	grit	30	grit and gravel. Grit and
	sand	20	gravel now predominantly
	clay	20	quartzite chips.

Wellsite Geologist
J. Westhoff
Minoil Services

EXOIL — PETROMIN

WELL LOG

Driller G. Satler A.G.P.

Well No. 221-11

INTERVAL	LITHOLOGY	%	DESCRIPTION
110'-150'	Clay	60	Brown clay, mixed with quartzic
	sand	20	sand. Grit and gravel sized
	Limestone	5	chips of quartzite and limestone
	grit & gravel	15	
150'-190'	Sandy clay	70	Brown sandy clay, grey in
	grit	30	places, with subangular to
			subrounded quartzic grit.
190'-195'	Grit	80	Quartzic grit as above, with some
	sandy clay	20	brown, grey and yellow sandy clay.
195'-270'	sandy clay	70	Brown and grey sandy clay, with
	grit	30	quartzic grit as before.
270'-315'	silty clay	95	Mostly light and dark grey clay
	grit	5	with lesser amounts of yellow
			and dark red clay, mixed with
			a little subangular to subrounded
			quartzitic grit.

Wellsite Geologist
J. Weschoff
Minoil Services

EXOIL — PETROMIN Driller G. Satler A.G.P.

WELL LOG

Well No. 221-11

INTERVAL	LITHOLOGY	%	DESCRIPTION
315'-340'	silty clay	75	As above, but now with
	sandstone	20	chips of fine, white quartzic
	grit	5	sandstone present
340'-360'	silty clay	85	as above, but with less
	sandstone	10	sandstone chips.
	Grit	5	
360'-455'	Clay	90	Medium to dark grey clay with
	grit	10	some light grey dark red
			and yellow clay. Grit as before
455'-460'	sand	60	subangular to subrounded coarse
	clay	35	quartzic sand, with clay and
	grit	5	grit as before.
460'-525'	clay	90	medium to dark grey clay, with
	grit and sand	10	some yellow and dark red clay.
			Subangular to subrounded grit and
			coarse sand, with percentage
			decreasing with copper.

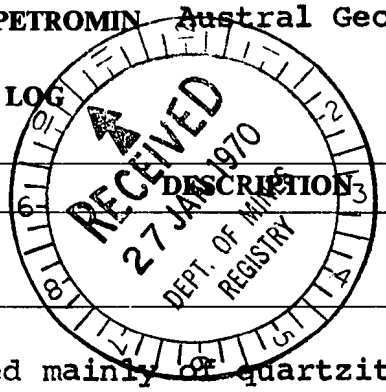
EMV 1004

Wellsite Geologists
R. Grasso & D.B. Clarke
Minoil Services

EXOIL — PETROMIN Austral GeoProspectors.

WELL LOG

Well No. 221-12



INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-15'			No samples
15'-40'	Pebbles	60	Grey; composed mainly of quartzitic and
	Sand	30	gneissic pebbles, medium to very coarse
	Clay	10	poorly sorted angular to subangular
			quartz feldspathic and ferromagnesium
			sand grains and minor silty clay.
40'-55'	Sand	60	Grey to light brown; composed mainly of
	clay	20	medium to coarse, poorly sorted quartz
	silt	15	and lithic grains with minor clay,
	Pebbles	5	silt and quartzitic and gneissic pebbles.
55'-80'	Sand	60	Medium brown; composed mostly of
	pebbles	20	poorly sorted angular to subangular,
	clay	15	medium to very coarse grained quartz
	silt	10	and lithic fragments withminor
			quartzitic and gneissic pebbles, clay
			and silt.

Wellsite Geologist
R. Grasso & D.B. Clarke
Minoil Services

EXOIL — PETROMIN

WELL LOG

Austral GeoProspectors

Well No. 221-12

INTERVAL	LITHOLOGY	%	DESCRIPTION
80'-90'	Clay	90	Red brown; composed mainly of red-brown
	sand	10	clay (mottled in places) with minor sandy
			and silty grains.
90'-95'	Grit	95	Brown stained, angular to subrounded
	clay	5	quartz and lithic grit fragments
			with poor to fair sorting, minor red-brown
			silty clay.
95'-140'	Clay	40	Red-brown, composed mainly of silty and
	sand	20	sandy clay with minor quartz and lithic
	pebbles	20	sand, grit and pebbles.
	grit	10	
	silt	10	
140'-150'	grit	60	Grey to medium brown; composed
	pebbles	10	mainly of poorly sorted angular, subangular
	clay	10	and subrounded quartz and lithic grit
	sand	10	fragments with minor quartzitic and
	silt	10	gneissic pebbles, sand, silt and clay.

Wellsite Geologist
R. Grasso & D.B. Clarke
Minoil Services

EXOIL — PETROMIN Austral GeoProspectors

WELL LOG Well No. 221-12

INTERVAL	LITHOLOGY	%	DESCRIPTION
150'-250'	Clay	70	Medium brown, silty and sandy clay,
	silt	20	with trace of mica ~~fx~~ flakes.
	sand	10	
250'-270'	Grit	70	Medium brown, composed mainly of
	sand	20	angular to subrounded, poorly sorted
	clay	10	quartz, feldspar and other lithic
			grit fragments with minor sand
			and clay.
270'-320'	Clay	70	Medium to red brown silty and
	silt	10	sandy clay. (Mottled light brown in
	Grit	10	places). Minor sand and grit
	sand	10	grains. Trace of quartzitic and
			gneissic pebbles. R.G.

Wellsite Geologists

R. Grasso & D.B. Clarke
Minoil Services

EXOIL — PETROMIN Austral GeoProspectors

WELL LOG

Well No. 221-12

INTERVAL	LITHOLOGY	%	DESCRIPTION
320'-335'	Clay	60	Red brown silty clay, minor grey clay
	gravel	10	Subangular & subrounded quartz and quartzite
	Grit	15	rock fragments comprise a gravel and grit.
	Limestone	15	White and fawn coloured angular fragments of
			limestone in gravel and grit size.
335'-340'	Clay	75	Red brown clay, subrounded quartz of
	gravel	5	gravel and grit size. White grey
	grit	10	fragments of silty limestone.
	limestone	10	
340'-345'	Clay	60	Red brown silty clay, subangular quartzite
	gravel	5	gravel, subrounded quartz gravel.
	grit	35	White quartz and quartzite grit
345'-370'	clay	65	Red brown clay. Gravel of subangular quartz
	gravel	15	and granite fragments, whiteand dark grey
	grit	20	quartzite fragments. Grit of granite,
			quartzite and quartz.

Wellsite Geologists
R. Grasso & D.B. Clarke
Minoil Services

EXOIL — PETROMIN Austral GeoProspectors

WELL LOG

Well No. 221-12

INTERVAL	LITHOLOGY	%	DESCRIPTION
370'-375'	Clay	50	Red brown clay, grit and gravel of subrounded
	grit	35	quartz and quartzite.
	gravel	15	
375'-440'	Clay	35	Red brown and light grey - orange clay.
	Gravel	25	Quartz and quartzite subrounded of gravel
	Grit	40	and grit size. Quartzite grey to red brown,
			some angular granitic fragments of gravel size.
440'-450'	Clay	60	Light grey and some brown clay, some whitish
	Grit	35	clay. Subrounded quartz and white
	Gravel	5	quartzitic grit, some of gravel size.
450'-495'	Clay	95	Dark and lighter grey clay, some white clay.
	Grit & gravel	5	Minor orange and red clay. Rounded
			quartz grit and gravel.
495'-525'	Clay	90	White and grey clays (approx. equal amounts)
	Gravel	10	Subrounded gravel of quartz and gneissic
			type of rock.

EHU 1004

Wellsite Geologist
J. Westhoff
Minoil Services

EXOIL — PETROMIN Driller G. Satler
Austral GeoProspectors
WELL LOG

Well No. 221-13

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-15'			No sample
15'-20'	sand	60	angular to subrounded sand to gravel
	grit	35	sized grains predominantly quartz
	gravel	5	and quartzite colour grey
20'-55'	clay	55	Predominantly red brown silty clay
	sand	30	with occasional grey patches, intermixed
	grit and gravel	10	with medium to coarse sand, grit
	sandstone	5	and gravel as before. Some chips
			of white to cream sandstone
55'-60'	Grit	40	sand, grit and gravel as above
	gravel	30	with a little red brown silty
	sand	20	clay.
	clay	10	
60'-80'	clay	80	red brown silty clay mixed with
	sand	10	fine to medium sand of quartz and
	grit	5	mica and some gravel chips.
	sandstone	5	some chips of a pink brown sandstone

Wellsite Geologist
J. Westhoff
Minoil Services

EXOIL — PETROMIN G. Satler A.G.P.

WELL LOG

Well No. 221-13

INTERVAL	LITHOLOGY	%	DESCRIPTION
80'-85'	Clay	60	Brown silty clay with some medium to
	Sandstone	30	coarse quartzic sand. Chips of
	Sand	10	pink quartzic sandstone calcareous in places
85'-100'	clay	70	Red brown silty clay intermixed with
	sand	20	subrounded to subangular quartzic
	grit and gravel	10	sand, grit and gravel, and fine
			mica flakes.
100'-105'	clay	65	brown to red brown silty clay with
	sandstone	30	sand as above, and chips of light
	sand	5	brown sandstone, calcareous in part.
105'-130'	clay	80	brown to red brown silty clay with
	sand	15	some patches of grey clay. Medium
	grit and gravel	5	to coarse sand of quartz, feldspar and
			mica and mainly quartzic grit and
			gravel.

Wellsite Geologist
J. Westhoff
Minoil Services

EXOIL — PETROMIN

WELL LOG

G. Satler A.G.P.

Well No. 221-13

INTERVAL	LITHOLOGY	%	DESCRIPTION
130'-135'	Grit	60	Subangular to subrounded gravel
	gravel	20	grit and sand consisting predominantly
	sand	15	of quartz and quartzite. Some red brown
	clay	5	silty clay.
135'-155'	clay	80	yellow to red brown silty clay with
	sand	15	occasional grey nodules. Sands of
	grit	5	quartz and mica and grit as above.
155'-175'	Clay	85	Multi-coloured clay - brown, red,
	sandstone	10	yellow, grey and some black carbonaceous
	sand	5	patches. Chips of white to cream fine
			quartzic sandstone.
175'-190'	clay	90	brown and yellow brown clay with
	sand	9	grey patches. Sand sized grains
	grit	1	of quartz and mica and some subrounded
			quartzic grit.

Wellsite Geologist
J. Westhoff
Minoil Services

EXOIL — PETROMIN G. Satler A.G.P.

WELL LOG

Well No. 221-13

INTERVAL	LITHOLOGY	%	DESCRIPTION
190'-195'	Grit	90	Grit and gravel sized grains
	gravel	10	subrounded to angular.
			predominantly quartz but some
			feldspar and granite.
195'-205'	Clay	75	Grey, yellow and brown silty
	grit & gravel	25	clay, with grit and gravel as above
205'-220'	clay	70	as above, but now with chips of
	sandstone	20	fine, white sandstone
	grit	10	
220'-225'	sandstone	60	White medium grained quartzic sandstone
	grit and gravel	40	chips with grit and gravel as before
225'-235'	clay	75	Yellow grey clay in upper five feet
	d sanstone	15	grading to red-grey clay in lower five feet.
	sand	10	some white sandstone chips as before
			especially in upper five feet. Medium coarse
			quartzic sand.

Wellsite Geologist
J. Westhoff
Minoil Services

EXOIL — PETROMIN G. Satler A.G.P.

WELL LOG Well No. 221-13

INTERVAL	LITHOLOGY	%	DESCRIPTION
235'-260'	clay	90	Grey to red grey clay with
	sand	5	subangular to subrounded quartzic
	grit	5	sand and grit.
260'-265'	grit	80	subangular to subrounded quartzic
	clay	15	grit, with some light grey and
	sand	5	yellow brown clay.
265'-300'	clay	65	grey clay, stained yellow in places
	grit	30	with varying amounts of quartzic
	sand	5	grit.
300'-340'	Grit	50	As above, but now more grit
	clay	45	and some fine white sandstone
	sandstone	5	chips.
340'-375'	clay	55	Grey clay, stained red and yellow
	grit	40	in places, with subangular to
	sandstone	5	subrounded grit, predominantly quartz,
			but some feldspar and granite. Fine white
			sandstone chips as above.

Wellsite Geologist
J. Westhoff
Minoil Services

EXOIL — PETROMIN G. Satler A.G.P.

WELL LOG

Well No. 221-13

INTERVAL	LITHOLOGY	%	DESCRIPTION
375'-525'	clay	60	clay is predominantly light to
	grit	35	dark grey, but some yellow, red and
	sand	5	green clay, and is silty in places.
			Subangular to subrounded quartz
			grit and sand. Occasional
			gravel sized grains. Some chips
			of chalky rock and siltstone.
			END OF HOLE

ENV 1004

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J. Westhoff
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EXOIL — PETROMIN Driller G. Satler

Austral GeoPsospectors
WELL LOG

Well No. 221-14

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-20'			No sample
20'-30'	Grit	60	Angular to subrounded fragments of quartz
	gravel	30	quartzite, granite, feldspars, schists etc.
	sand	10	sized from fine sand to gravel.
30'-45'	grit	55	as above, but now with
	sand	20	some red brown clay
	gravel	20	
	clay	5	
45'-55'	sandstone	50	grit and clay as above, but now
	grit	40	with chips of light brown
	clay	10	sandstone
55'-80'	clay	90	Predominantly red brown silty
	sand	5	clay, but with some fine sand
	grit	5	of quartz and mica, and a
			subangular to subrounded quartzic
			grit.

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EXOIL — PETROMIN G. Satler A.G.P.

WELL LOG

Well No. 221-14

INTERVAL	LITHOLOGY	%	DESCRIPTION
80'-90'	clay	80	As above but new with light brown
	sandstone	10	sandstone.
	grit	5	
	sand	5	
90'-130'	Clay	90	As above, without the sandstone
	grit	5	and with patches of grey clay
	sand	5	
130'-135'	Gravel	50	subangular to subrounded gravel
	grit	30	and grit with red brown clay
	clay	20	
135'-180'	clay	90	red brown clay with some grey
	grit	5	patches, increasing with depth
	sand	5	Fine to medium sand of quartz and
			muscovite. Quartzic grit as before
			and some chips of white to cream
			sandstone.

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EXOIL — PETROMIN G. Satler A.G.P.

WELL LOG

221-14
Well No.

INTERVAL	LITHOLOGY	%	DESCRIPTION
180'-255'	clay	90	Grey clay, with patches stained
	grit	8	red throughout, and yellow in
	sand	2	upper 20 feet. Subangular to
			subrounded grit, mainly quartz,
			and fine to medium sand as before.
255'-300'	Clay	60	Grey clay, silty in places and
	grit	40	patches of red and yellow
			clay in places, with grit sized
			particles of subrounded quartz and
			some chips of sandstone.
300'-395'	Clay	80	Clay as above, with subrounded
	sand	10	to subangular medium sand to
	grit	10	grit sized particles of quartz
395'-525'	clay	85	as above, but less grit
	sand	10	
	grit	5	
			END OF HOLE

Wellsite Geologist EHV 1004
J. Westhoff
Minoil Services

EXOIL — PETROMIN Driller G. Satler
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WELL LOG Well No. 221-15

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-10'	Gravel	40	Predominantly angular to subangular
	grit	40	chips of quartzite.
	sand	20	
10'-60'	sand	90	Red brown fine sand clayey in
	grit	10	places and with calcareous
			nodules in places, mixed with
			quartzic grit.
60'-95'	sand	80	As above, but with more
	grit	20	grit
95'-120'	clayey sand	90	Red brown clayey sand with
	Grit	5	occasional grey patches. Subangular
	gravel	5	to subrounded grit and gravel, predominantly
			of quartzite.
120'-130'	sand	70	Red brown fine sand mixed
	grit	30	with quartzic grit.
130'-140'	clayey sand	90	Red brown fine clayey sand with some yellow
	Grit	10	and grey patches. Grit as before.

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WELL LOG Well No. 221-15

INTERVAL	LITHOLOGY	%	DESCRIPTION
140'-150'	Grit	70	Angular to subrounded grains of
	sand	20	quartz, quartzite, sandstone and
	gravel	10	granite sized medium sand to gravel
150'-170'	Clayey sand	70	Red brown clay sand with some
	grit	20	grey patches. Grit and gravel
	gravel	10	as before.
170'-185'	Clay	60	Grey and yellow clay mixed
	Grit	30	with quartzic grit and gravel.
	sand	10	
185'-200'	clay	90	Grey clay, stained yellow in places
	Grit	10	with some grit as before.
200'-260'	Clay	95	Mostly grey clay, but patches of
	sand & grit	5	yellow and red clay in places.
			Some subrounded quartzic sand and
			grit.
260'-295'	clay	70	As above, but now more grit
	grit	30	

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WELL LOG

Well No. 221-15

INTERVAL	LITHOLOGY	%	DESCRIPTION
295'-315'	Grit	60	As above, but now more
	clay	40	grit
			TOTAL DEPTH.

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Wellsite Geologist
E.R. Billwood
Minoil Services
Well Sight Geologist

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WELL LOG

Well No. 221-16

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-20'	Gravel	60	Broken gravel, quartz and granite fragments
	grit	20	angular quartz grit with brown silt
	silt	20	
20'-130'	silt	90	Red brown silt with gravel throughout
	gravel	10	
130'-135'	grit	60	Angular quartz grit with fine coarse
	sand	40	grained sand
135'-180'	grit	50	Angular quartz grit some granite fragments
	silt	40	Brown silt and pale grey siltstone fragments
	siltstone	10	
180'-190'	sand	60	Angular fine coarse grained quartz sand and grit
	grit	20	intermixed with grey silt
	silt	20	
190'-205'	clay	50	Grey and red brown clay with angular
	grit	50	quartz grit.

EXOIL — PETROMIN

WELL LOG

Well Sight Geologist E. R. Hillwood

Well No. 221-16

INTERVAL	LITHOLOGY	%	DESCRIPTION
205'-230'	clay	100	Pale grey, grey and yellowish grey mottled clay.
230'-305'	clay	80	Pale grey, grey and yellowish grey mottled
	grit	20	clay with angular quartz grit throughout
305'-380'	clay	95	Dark grey and grey clay with some yellowish
	grit	5	grey mottling.
380'-525'	clay	100	Grey, dark grey and pale grey clay. Some yellow mottling.
			End of Hole

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WELL LOG

Well Sight Geologist E. R. Hillwood
Minoil Services

Well No. 221-17

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-15'	gravel	90	Angular and broken quartz gravel and grit
	grit	10	Some granite and feldspar fragments
15'-130'	Clay	50	Red brown clay with angular and broken gravel
	gravel	50	
130'-160'	sandy clay	100	Yellow brown and grey mottled sandy clay.
160'-280'	sandy clay	90	Grey sandy clay with some yellow mottling
	grit	10	angular quartz grit.
280'-330'	clay	100	Grey, yellowish grey stiff clay.
330'-530'	clay	100	Dark grey, grey and yellowish grey clay
			some red mottling.
			End of hole

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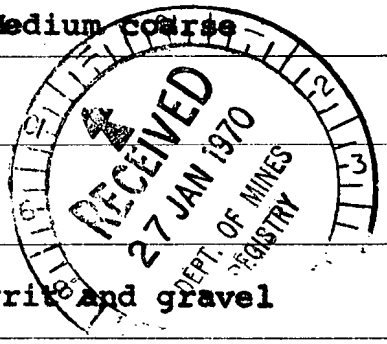
WELL LOG

Well Sight Geologist E. R. Hillwood, Minoil Services

Well No. 221-18

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-65'	gravel	50	Essentially quartz gravel rounded and broken
	grit	25	angular quartz grit. Medium coarse grained
	sand	25	sand.
65'-135'	clay	50	Red brown clay with angular quartz grit
	grit	30	rounded and broken gravel Medium coarse
	gravel	10	sand and sandy clay.
	sand	10	
135'-310'	grit	40	Angular essentially quartz grit and gravel
	gravel	30	some granite and feldspar fragments red,
	clay	30	brown clay and sandy clay.
310'-350'	gravel	80	Rounded and broken gravel. Essentially quartz
	grit	20	with granite and feldspar. Angular grit.
350'-400'	clay	50	Grey, myellow and red brown clay, & sandy clay
	gravel	25	with rounded and ~~xxxxx~~ broken gravel, angular
	grit	25	quartz grit.



EXOIL — PETROMIN

WELL LOG

Well Sight Geologist E. R. Hillwood, Minoil Services Well No. 221-18

INTERVAL	LITHOLOGY	%	DESCRIPTION
400'-445'	grit	70	Angular essentially quartz grit with gravel
	gravel	20	and grey red brown clay.
	clay	10	
445'-525'	clay	95	Pale grey and yellow grey stiff clay with
	grit	5	some grit and gravel.
			End of hole

ENV 1004

EXOIL — PETROMIN

Drillers Austral GeoProspec
G. Sadler

WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services

Well No. 221-19

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-55'	silt	10	Subrounded to angular coarse sand to gravel
	sand	20	sized fragments of quartz, quartzite, gneiss
	grit	30	and schist, with some brown clayey silt in
	gravel	40	places.
55'-100'	silt	50	Brown and grey clayey silt, with coarse sand
	sand	30	and grit as above.
	grit	20	
100'-135'	silt	75	Silty clay now predominantly red brown
	sand	15	in colour, with a little grey in places.
	grit & gravel	10	Sand to gravel as before
135'-140'	sand	20	Coarse sand to gravel as before.
	grit	40	
	gravel	40	
140'-305'	Silt	60	Red brown and brown clayey silt with coarse
	sand	20	sand to gravel, consisting mainly of quartz
	grit & gravel	20	and quartzite.

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WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services Well No. 221-19

INTERVAL	LITHOLOGY	%	DESCRIPTION
305'-375'	silt	30	As above, but with less clayey silt
	sand	30	
	grit & gravel	40	
375'-455'	silt	10	Subangular to subrounded coarse
	sand	30	sand to gravel, consisting of quartz,
	grit	20	quartzite, gneiss, schist and granite,
	Gravel	40	with some brown, grey and yellow
			clayey silt.
455'-525'	clay	20	Sand to gravel as above, with grey, brown
	sand	30	and yellow silty clay
	grit	20	
	gravel	30	

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WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services Well No. 221-20

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-65'	Sand	40	Subangular to subrounded medium to coarse
	grit	40	grained sand, grit and gravel.
	gravel	20	Consisting of quartz, feldspar and
			various rock types.
65'-70'	clay	20	Sand to gravel as above, now with some
	sand	30	brown and grey sandy clay.
	grit	20	
	gravel	30	
70'-95'	sand	50	Medium grained sand to grit as above
	grit	30	
	gravel	20	
95'-110'	clay	30	Brown and grey sandy clay with grit
	sand	20	and gravel as before.
	grit	20	
	gravel	30	

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WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services

Well No. 221-20

INTERVAL	LITHOLOGY	%	DESCRIPTION
110'-125'	clay	5	As above, but with less sandy clay
	sand	50	and gravel
	grit	35	
	gravel	10	
125'-175'	Sand	30	Brown sandy clay with grit and sand of
	grit	10	quartz and feldspar and angular to subangular
	gravel	40	gravel sized fragments of quartz and quartzite
	clay	20	
175'-210'	clay	30	As above, but with less sand, now
	sand	20	mainly fine grained and mixed with
	grit	10	the clay
	gravel	40	
210'-455'	clay	40	As above with less gravel
	sand	20	
	grit	30	
	gravel	10	

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WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services Well No. 221-20

INTERVAL	LITHOLOGY	%	DESCRIPTION
455'-505'	clay	70	Subangular to subrounded coarse
	sand	20	sand and grit, consisting of quartz
	grit	10	feldspar and various rock type fragments.
			Silty clay coloured mainly light grey, with
			some dark grey, red and yellow
505'-530'	clay	80	Clay now more plentiful, and coloured
	sand	15	mainly dark grey, with other colours as
	grit	5	before.

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WELL LOG

Well Sight Geologist J. Westhoff, Mnoil Services Well No. 221-21

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-55'	Sand	40	Angular to subrounded medium sand to gravel
	grit	30	sized grains of quartz, feldspar, schist and
	gravel	30	gneiss.
55'-75'	sand	40	Subangular to subrounded sand to gravel as
	grit	25	above, now with some brown and light grey
	gravel	20	silty clay.
	clay	15	
75'-85'	sand	50	As above, with clay now coloured red brown
	grit	20	
	clay	25	
	gravel	5	
85'-90'	clay	60	As above, with more silty clay
	sand	15	coloured red-brown with a little
	grit	5	light grey
	gravel	20	
90'-110'	sand	70	Subangular to subrounded medium sand to
	grit	30	grit, consisting mainly of quartz

EXOIL — PETROMIN

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WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services

Well No. 221-21

INTERVAL	LITHOLOGY	%	DESCRIPTION
			with some feldspar and other rock fragments.
110'-120'	sand	60	As above, but now with a little red-brown
	grit	30	silty clay
	clay	10	
120'-125'	Clay	60	Mainly red-brown silty clay with some
	Gravel	30	light grey patches
	sand	5	Sand to gravel as above
	grit	5	
125'-190'	Sand	50	Subangular to subrounded medium sand
	grit	30	to gravel sized fragments of quartz,
	gravel	20	feldspar, quartzite, schist and gneiss
190'-230'	Clay	20	As above, but now with some red-brown silty clay
	sand	30	
	Grit	20	
	gravel	30	

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WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services Well No. 221-21

INTERVAL	LITHOLOGY	%	DESCRIPTION
230'-250'	sand	60	Subangular to subrounded coarse sand and grit
	grit	40	sized patches of quartz, quartzite and gneiss
250'-265'	sand	50	As above, now with red-brown silty clay and
	grit	10	gravel
	gravel	20	
	clay	20	
265'-340'	sand	30	As above, now with both grey and brown silty
	grit	10	clay and white to cream coloured medium
	clay	40	to fine grained sandstone chips, which are
	gravel	10	calcareous in places
	sandstone	10	
340'-345'	sand	60	Coarse sand, grit and sandstone chips as above
	grit	30	
	sandstone	10	
345'-375'	sand	40	As above, but now with brown

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WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services Well No. 221-21

INTERVAL	LITHOLOGY	%	DESCRIPTION
	grit	5	and grey silty clay
	gravel	10	
	clay	25	
	sandstone	20	
375'-445'	clay	30	As above, but now with more clay, now coloured
	sand	20	mainly light grey, with some coloured red
	sandstone	20	brown. Sandstone coloured from white to
	grit	10	
	gravel	20	light pink brown
445'-485'	clay	90	Predominantly light grey clay, with
	sand	5	a little dark grey and red brown
	gravel	5	clay, with some sand and gravel
			predominantly quartz, feldspar and quartzite
485'-530'	clay	95	Clay now mainly dark grey, with
	sand	5	some light grey and red. Small
			amounts of medium grained quartzic sand.

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WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services Well No. 221-22

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-20'	Sand	90	Coarse sand to gravel sized fragments of
	grit & gravel	10	quartz, feldspar, schists, gneisses and mica.
			Subrounded to angular.
20'-40'	Grit	60	As above, bur now with more grit and gravel
	gravel	20	
	sand	20	
40'-85'	grit	30	As above, but now with some light brown silt
	gravel	30	
	silt	25	
	sand	15	
85'-120'	silt	50	Light brown clayey silt is now the dominant
	grit	30	constituent .
	gravel	10	
	sand	10	
120'-150'	grit	40	Angular to subrounded coarse sand and grit of
	sand	30	quartz, quartzite, schists and gneisses
	silty clay	30	with some light brown and light grey silty clay.

EXOIL — PETROMIN Driller G. Satler

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WELL LOG

Well Sight Geologist J. Westhoff

Well No. 221-22

INTERVAL	LITHOLOGY	%	DESCRIPTION
150'-190'	silty clay	40	As above, but with more silty clay,
	Grit	40	predominantly brown in colour.
	sand	20	
190'-270'	Grit	50	Light brown clayey siltstone, with angular
	siltstone	50	to subrounded grit, predominantly quartz,
			quartzite, gneiss and white calcareous
			sandstone chips.
270'-285'	Siltstone	70	As above, but with more of the light brown,
	grit	30	loosely consolidated siltstone.
285'-465'	sand	10	Coarse sand to grit sized particles and
	grit	40	siltstone as before, and with white
	siltstone	30	silty clay
	clay	20	

Wellsite Geologist
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EXOIL — PETROMIN
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WELL LOG

Driller G. Sadler

Well No. 221-23

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-5'	Grit	50	Brown sandy clay with subrounded
	sand	20	quartz, feldspar, quartz-biotite rock fragments
	clay	30	grit.
5'-15'	Grit	65	Subrounded quartz, feldspar and
	sand	35	quartz biotite rock fragments in grit
			to sand size.
15'-20'	Sand	100	Quartz - feldspar, occasional quartz rich
			rock fragment coarse sand.
20'-25'	Grit	100	Quartz - feldspar, quartz - biotite and
			gneissic fragments, generally subangular of
			medium to fine grit size.
25'-30'	Grit	100	Quartz, quartz - feldspar, quartz - biotite,
			quartzite and gneissic fragments, subangular
			to subrounded, all of grit size.
30'-40'	Gravel	90	Quartz, quartz - feldspar, quartzite and
	clay	10	gneissic subangular - subrounded fine gravel.
			Grey and red clay.

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EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors
WELL LOG Well No. 221-23

INTERVAL	LITHOLOGY	%	DESCRIPTION
40'-45'	Gravel	15	Quartz, quartz-feldspar, quartzite & gneissic
	grit	65	subangular fragments ranging from gravel
	sand	10	to sand size. Red clay.
	clay	10	
45'-55'	Grit	65	Quartz, quartz-biotite & gneissic fragments,
	gravel	15	subangular in gravel to fine grit size range.
	clay	20	Reddish and some light grey clay
55'-65'	Clay	45	Red brown & light grey clay.
	Gravel	25	Quartz, granitic, schistose and gneissic
	grit	30	fragments subangular to subrounded in
			gravel to fine grit size range.
65'-70'	clay	70	Red - brown clay, weakly carbonaceous,
	Gravel	30	Quartz and gneissic rock fragments of
			gravel - fine gravel size, generally sub-
			angular.

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WELL LOG

Well No. 221-23

INTERVAL	LITHOLOGY	%	DESCRIPTION
70'-80'	Clay	60	Red brown carbonaceous clay.
	Gravel	15	Quartz and gneissic subrounded fragments
	grit	25	of gravel and grit size.
80'-85'	Clay	65	Red brown carbonaceous clay with
	sand	30	sand and grit composed almost
	grit	5	entirely of quartz. Some recognisable
			as rock fragments.
85'-95'	Clay	50	Red brown and light grey clay
	grit	25	Mainly quartz, subrounded in coarse
	sand	25	sand to grit size range.
95'-115'	Clay	50	Quartz and gneissic rock
	grit	10	fragment subrounded fine grit to gravel
	gravel	40	Red brown weakly carbonaceous clay
115'-140'	Clay	30	Quartz and gneissic rock fragments
	Grit	60	generally subangular, of grit to gravel
	gravel	10	size, with red clay (occasional minor light grey
			clay).

Wellsite Geologist
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EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors
WELL LOG Well No. 221-23

INTERVAL	LITHOLOGY	%	DESCRIPTION
140'-145'	Grit	70	Fine grit to fine gravel sized
	gravel	30	quartz, granitic and gneissic
			generally subrounded fragments
145'-150'	Grit	35	Subrounded - subangular quartz
	gravel	15	& gneissic rock fragments of grit to
	clay	50	gravel size with red brown clay.
150'-160'	Clay	10	Subrounded mainly quartz fine grit to
	grit	70	gravel. Red brown clay.
	gravel	20	
160'-165'	clay	30	Red brown weakly carbonaceous clay.
	gravel	35	subangular - subrounded quartz & quartzite
	grit	35	gravel and grit.
165'-175'	clay	35	Red brown clay weakly carbonaceous - minor
	gravel	35	grey clay, subangular, subrounded quartz
	grit	10	some sandstone quartzite and gneissic fragments
			of gravel and grit size.

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D. B. Clarke
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EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors
WELL LOG Well No. 221-23

INTERVAL	LITHOLOGY	%	DESCRIPTION
175'-190'	Clay	65	Red brown weakly carbonaceous clay,
	gravel	25	Some minor grey clay, quartzite and quartzitic
	gravel	10	feldspar gravel and grit, subangular.
190'-205'	Clay	50	Red brown weakly carbonaceous clay
	gravel	20	Quartz, quartzite and gneissic subangular
	grit	30	rock fragments of fine grit to gravel size
205'-225'	clay	60	Quartz and quartzite subrounded gravel
	gravel	25	and grit in dark red brown carbonaceous
	grit	15	clay.
225'-235'	clay	65	Quartz medium - fine grit with dark red brown cla
	grit	35	coarser grit in 230'-235'.
235'-240'	clay	60	Red brown carbonaceous clay, quartz
	gravel	25	and quartzite gravel and grit, generally
	grit	15	subangular
240'-245'	clay	65	Dark red orange clay with quartz and gneiss
	gravel	5	fragment gravel and grit, generally subrounded
	grit	30	

Wellsite Geologist
D. B. Clarke
Minoil Services

EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors

WELL LOG Well No. 221-23

INTERVAL	LITHOLOGY	%	DESCRIPTION
245'-270'	sandstone	25	Purple to brown sandstone chips with dark
	clay	75	red orange carbonaceous clay
270'-295'	Grit	95	Quartz and quartz - feldspar medium to coarse
	clay	5	grit. Minor white sandstone fragments. Minor
			red brown clay.
295'-300'	Clay	55	Red brown and light grey clay, white
	sandstone	10	sandstone fragments. Subrounded quartz
	gravel	10	and quartzite gravel and grit.
	grit	25	
300'-305'	clay	75	Light grey, white and red brown silty clay
	grit	15	subrounded quartz and quartz - feldspar
	sandstone	10	grit, white and fawn sandstone
305'-320'	grit	50	Quartz and gneissic fragments generally
	gravel	30	subangular of grit to gravel size.
	clay	20	Some grey very silty clay (almost sandstone)
			Red brown carbonaceous clay.

Wellsite Geologist
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Minoil Services

EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors
WELL LOG Well No. 221-23

INTERVAL	LITHOLOGY	%	DESCRIPTION
320'-330'	Clay	20	Some minor white sugary sandstone, quartz and
	grit	40	gneissic fragments subangular in gravel
	gravel	40	size, subrounded in grit size. Some
			grey very silty clay, and red brown silty clay.
330'-350'	Clay	30	Red brown and light grey very silty clay.
	gravel	40	Gneissic, schistose and quartz subangular
	grit	30	to subrounded fragments compose the
			gravel and grit fractions.
350'-360'	Gravel	25	Grit and gravel of quartz, quartzite, gneiss and
	grit	75	granite fragments generally subrounded,
			quartz dominant in the grit.
360'-375'	clay	80	red brown clay, white hard silty clay.
	grit	20	quartz and quartzite subrounded grit
375'-435'	clay	100	Grey orange and green clay with
			red brown clay. Minor occasional
			quartzitic fragment, grit and gravel sized.

Wellsite Geologist
D.B. Clarke
Minoil Services

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WELL LOG

Well No. 221-23

INTERVAL	LITHOLOGY	%	DESCRIPTION
435'-460'	Clay	100	Green - grey (& orange) clay with more deep red clay. Occasional quartz gravel & grit.
460'-525'	Blue clay	40	Dark blue grey clay often with
	other clay	60	deep red and orange clay mottling.
			Also light grey - green and orange clay in lesser amounts.

EMV 1004

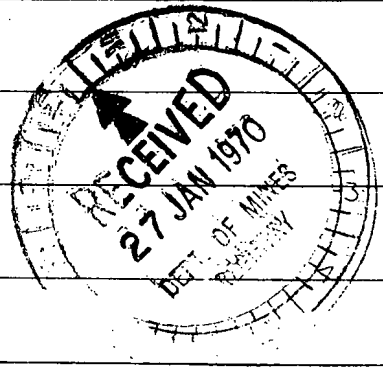
Wellsite Geologist
D. B. Clarke
Minoil Services

EXOIL — PETROMIN Driller G. Sadler

Austral GeoProspectors

WELL LOG Well No. 221-23a

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-5'	Grit	100	Subrounded quartz and quartzite grit.
			Minor biotite flakes.
5'-10'	Grit	85	Quartz and quartzitic subrounded grit, biotite
	gravel	15	flakes. Subangular gravel of gneiss
			quartzite.
10'-20'	Grit	85	Quartz and quartzite. Subrounded grit
	Gravel	15	Generally subrounded quartzite and gneissic
			gravel.
20'-30'	Gravel	35	Granite and pegmatite subangular to
	grit	40	subrounded gravel sized pebbles.
	sand	25	Subrounded quartz rich grit and sand.



EHV 1004

EXOIL — PETROMIN Drillers Austral GeoProspect

WELL LOG

Well Sight Geologist E. R. Hillwood, Minoil Services Well No. 221-24

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-20'	gravel	50	Angular and broken quartz gravel with
	silt	50	grey silt.
20'-95'	clay	80	Red brown clay with angular quartz
	grit	10	grit and broken gravel throughout
	gravel	10	
95'-105'	grit	50	subangular essentially quartz grit with
	gravel	50	granite and feldspar fragments. Rounded
			quartz gravel. Brown
105'-125'	silt	80	Red brown silt with rounded and broken
	gravel	20	quartz gravel.
125'-150'	clay	95	Yellow brown and grey mottled clay. Some
	grit	5	grit.
150'-155'	sand	70	Subangular quartz sand and grit
	grit	30	some granite and feldspar.
155'-185'	clay	90	Grey and yellow mottled clay. Some grit
	grit	10	

EXOIL — PETROMIN

WELL LOG

Well Sight Geologist E. R. Hillwood, Minoil Services Well No. 221-24

INTERVAL	LITHOLOGY	%	DESCRIPTION
185'-195'	Grit	50	Subangular quartz grit intermixed with
	clay	50	grey and yellow mottled clay.
195'-200'	clay	100	Grey and yellow mottled clay.
200'-225'	clay	95	Grey clay with some reddish mottling
	grit	5	quartz grit.
225'-300'	clay	90	Grey clay with some yellow and red clay
	grit	10	quartz grit.
300'-530'	clay	90	Pale grey clay with some yellowish
	grit	10	grey clay. Quartz grit and sand
	sand	10	throughout. Some sand
			End of hole

ENV 1004

EXOIL — PETROMIN Drilling contractors

Austral GeoProspectors

WELL LOG

Well Sight Geologist E.R. Hillwood, Minoil Services

Well No. 221-25

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-20'	gravel	90	Rounded and broken gravel with grey silt
	clay	10	
20'-65'	clay	90	Red brown clay with gravel
	gravel	10	
65'-115'	silt	80	Red brown silt with gravel and
	gravel	10	pale grey siltstone & fragments
	siltstone	10	
115'-130'	clay	90	Red brown clay with off white siltstone
	siltstone	10	fragments
130'-195'	clay	100	Grey and yellow brown mottled clay
195'-200'	clay	100	Dark grey, grey and yellow mottled clays
200'-525'	clay	90	Pale grey grey clay with some yellow
	grit	10	mottling. Angular quartz grit scattered
			throughout.
			End of Hole

ENV 1004

EXOIL — PETROMIN G. Sadler, Austral GeoPro

WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services Well No. 221-26

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-20'	Gravel	60	Angular to subangular coarse sand to gravel
	grit	30	sized fragments of quartz, quartzite, gneiss
	sand	10	and schist
20'-30'	Gravel	30	As above, now with red brown fine to
	grit	10	medium grained clayey sand
	sand	60	
30'-95'	Sand	80	Subangular to subrounded grit
	grit & gravel	20	and gravel as before, now with
			more fine to medium grained clayey
			sand, now coloured mainly brown
95'-145'	sand	80	Subangular to subrounded
	grit	20	medium to coarse grained sand and
			grit, consisting mainly of quartz and feldspar.
145'-175'	clay	30	sand and grit as above, now with
	sand	40	light grey silty clay and
	grit	20	off-white quartzic sandstone chips.
	sandstone	10	

EXOIL — PETROMIN Austral GeoProsp.

Driller G. Sadler

Well Sight Geologist J. Westhoff, Minoil Services

WELL LOG

Well No. 221-2

INTERVAL	LITHOLOGY	%	DESCRIPTION
175'-200'	clay	80	Light to dark grey clay with
	sand	20	some clay coloured red, yellow
			and brown, and medium grained
			quartzic sand.
200'-335'	clay	80	As above, but clay now
	sand	20	coloured light grey with yellow
			and brown staining in places.
335'-525'	clay	90	clay now coloured light to dark
	sand	10	grey, with some coloured red,
			yellow and brown.
			End of Hole

ENV 1004

EXOIL — PETROMIN Driller G. Sadler
Austral GeoProspectors

WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services Well No. 221-27

INTERVAL	LITHOLOGY	%	DESCRIPTION
0'-20'	gravel	80	Angular to subangular fragments of
	grit	20	quartzite, schist, gneiss and
			granite.
20'-40'	gravel	40	As above, now with brown
	grit	20	fine to medium grained clayey sand,
	sand	40	increasing from 20% to 60% with depth.
40'-55'	grit	70	As above, but with less
	sand	30	clayey sand and no gravel
55'-90'	grit	20	Angular to subrounded medium to
	sand	80	coarse grained sand and grit
			consisting of quartz, feldspar, muscovite
			and various rock types as above.
90'-140'	gravel	10	Medium grained sand to gravel
	grit	10	as above, with silty clay present
	sand	30	coloured mainly light grey, with
	clay	50	some coloured yellow and brown

EXOIL — PETROMIN G. Sadler Austral Geop.

WELL LOG

Well Sight Geologist J. Westhoff, Minoil Services Well No. 221-27

INTERVAL	LITHOLOGY	%	DESCRIPTION
			grained quartzic sand, with
			light grey silty clay.
455'-525'	clay	80	Silty clay with medium
	sand	15	grained sand to gravel as
	grit & gravel	5	before.
			End of Hole

ENV 1004

21 July 1970

SPECIAL MINING LEASE NO. 221

PROGRESS REPORT FOR SIX MONTHS - PERIOD ENDING 21 JULY 1970

SUMMARY:

Activity on SML 221 during the period has comprised geological reconnaissance mapping, levelling of bore-holes and appraisal of results of previous activity. No drilling was undertaken during the period.

INTRODUCTION

Special Mining Lease No 221 covers an area of approximately 48 square miles on the western side of Lake Frome in South Australia.

Operations on the Lease are primarily directed towards evaluating the potential of the area for deposits of radio-active ores and the location of such deposits.

EXPLORATION

Routine surfact geological mapping was continued during the period. Drill holes previously drilled were located accurately and collar heights were computed.

RESULTS

Assessment from earlier results indicate the necessity of drilling a series of exploratory drill holes in the vicinity of Paralana Out Station. These holes will be drilled during the next period.

CONCLUSIONS

Assessment of results from previous activities on Special Mining Lease 221 show the Lease to be prospective in several areas. Prospecting by drilling of these areas will be undertaken in the next 12 months.