The Administrator
Northern Territory Administration,
DARWIN. N.T.

Dear Sir,

Cancellation: Prospecting Authority No. 1604
(Orange Block)

We hereby request that Prospecting Authority No. 1604
(Orange Block) be cancelled because studies of logs, cuttings,
cores, thin-sections prepared from cores and liquid samples
from the Orange No. 1 Stratigraphic Test have yielded no
indications of non-petroliferous economic minerals.

We previously sent you copies of the wireline logs from
Orange No. 1, and single copies of the following items are
enclosed herewith:

1. Strip Log, Orange No. 1
2. Core Description, Orange No. 1
3. Core Samples for Thin-Section,
   Description of Hand Specimens,
   Orange No. 1
4. Description of 22 Thin-sections
   from Core Samples, Orange No. 1
5. Description of Sidewall Core,
   Orange No. 1.

Sincerely yours,

Roy M. Hopkins
Assistant to Chairman
(Technical)

cc: Director of Mines
    Darwin. w/encl.
ORANGE NO. 1

Core Samples for Thin Section.

Description of hand specimens, G. K. Williams.

Core No. 1. Pertnjara formation.

615' Sandstone - reddish orange; fine grained, fair sorting (silt to 1 mm); 10% non-quartz: dark and greenish rock fragments, light weathered feldspar; trace of heavy mineral; calcareous; some grain interpenetration little secondary silica. Trace of porosity.

624' Silty Sandstone - reddish orange; fine grained (silt to 1/2 mm); 15% non-quartz: dark rock fragments, feldspar, abundant heavy mineral grains; calcareous; tight.

Core No. 2. Mereenie formation.

1498' Sandstone - orange; fine grained, fair sorting (coarse silt to 1/2 mm); trace of weathered feldspar and heavy mineral grains; interpenetration of most grains, little secondary silica; several 1 mm leached spherical cavities; 10% ± porosity.

1502' Sandstone - orange, interlayered very fine and fine grained; slightly calcareous; trace of porosity - otherwise as at 1498'.

1506' Sandstone - orange; fine grained, fair sorting (silt to 1/2 mm); 5% non-quartz: light feldspar? grains; abundant secondary silica. Trace of porosity.

Core No. 3. Upper Pacoota - Horn Valley? formation.

2415' Sandstone - light grey; fine grained, well sorted except for scattered coarse grains; nearly all quartz, abundant heavy mineral grains; very fine mica; welded; tight.
Core No. 4. Pacoota formation.

2847' Sandstone - light grey, patches reddish; fine grained fair sorting (silt to 1/16 mm), trace of light clay grains, trace of heavy mineral grains; welded, tight. In red patches there is a trace of red shale as matrix and as grains; patches with a green shale film (shale pebble cast?); trace of slightly calcareous shell fragments.

2854' Sandstone - red; fine grained, poor sorting (coarse silt to 1 mm); trace of clay grains, 5-10% red and light clay matrix - all grains interpenetrated but outlined by the clay; patches and rare grains of green waxy shale; trace of porosity.

2858' Sandstone - white; medium grained, fair sorting (coarse silt to 1 mm); moderate welding; 5% pale green clay matrix; 5 to 10% porosity.

Core No. 5. Pacoota formation.

3160' Sandstone - patchy red and pale green to light grey; medium grained, fair sorting (1/16 to 1 mm); trace of white and pale green clay grains, trace of heavy mineral grains, trace of feldspar; trace of calcareous cement; moderate welding (all grains interpenetrated, little secondary silica). Trace of porosity.

3165' Sandstone - white; fine grained, fair sorting (1/16 to 1 mm); nearly all quartz, trace of heavy mineral grains; 5% clay matrix, mostly pale green with patches of red clay; only slightly welded, fairly friable; 5 to 10% porosity, one layer about 1 mm thick of sorted medium grained, very porous sand.

3171' Sandstone - light grey; fine grained fair sorting (1/16 to 1 mm); trace of heavy mineral grains, trace of mica; varicoloured flat shale pebbles; welded (vitreous); tight.
Core No. 6. Goyder formation.

4043'
Sandstone - greenish grey; fine grained, well sorted; 25% glauconite in fine and medium grains; abundant flat fossil debris - both non and slightly calcareous; the fossil debris and glauconite cause laminations; patches and laminae with abundant disseminated pyrite.

4064'
Dolomite - grey; fine to medium crystalline; faint medium to coarse colite or pellet texture; trace of pyrite, trace of glauconite; about 20% silt, rare shale pebble; one irregular parting of dark brownish grey silty shale.

4083'
Dolomite - grey; fine to coarse crystalline; very glauconitic, the glauconite pellets are in part altered to (or from) a copper-red shaly micromicaceous material; trace of fossil debris; one small pebble of coarse siltstone, very silty and sandy. (Nearly 50% of rock, residue is a welded porous skeleton of silt and fine sand).

Core No. 7. Jay Creek.

5237' 6"
Dolomitic Siltstone or Silty Dolomite - light grey; about 50% is silt, residue is a partly welded porous mass of coarse silt. (Although technically probably a siltstone, it has the appearance of a micro-crystalline carbonate and would be logged as such by many geologists; probably in the surface rock, the carbonate would be leached and it would be logged as a siltstone). About 10% of rock is clear crystalline anhydrite filling small vugs; irregular patches (flow structure?) of green silty shale; faint laminae.

5248' 3"
Dolomite - light grey; micro-crystalline; silty (25% silt); about 10% clear crystalline anhydrite in small vugs - much of the anhydrite has the same crystal orientation throughout the specimen.
5261
Dolomitic Siltstone - medium; grey, greenish tinge; micromicaceous; laminated, caused by variations in the dolomite and tiny dolomite content, also laminae of micaceous shale.

Core No. 8. Giles Creek Dolomite and shale.

7055
Dolomite - light brownish grey, cryptocrystalline, silty many patches of clear crystalline anhydrite (10% of specimen), faint lamination.

7065
Dolomite - brownish grey, crypto to micro-crystalline, very silty, anhydritic, laminae of black shale; faint relief, medium grained texture? abundant pyrite in small crystals, mostly in the shale laminae.

7067
Anhydritic dolomite - brownish grey, micro-crystalline, 50% of crystalline anhydrite in small to large blobs and in seams.

7071
Silty shale - mottled red and green. Some flow structure, some concentric colour bands, anhydritic inclusions.

Core No. 10

8712
Sandy siltstone - red-brown, unsorted mixture of shale, silt and sand grains up to 1 mm. Grains mostly quartz, trace of feldspar and very fine heavy mineral grains; subangular to rounded. Abundant mica, very slightly calcareous.
CORE NO. 1

Cored Interval 615'-625', 10' cut, 8'6\frac{1}{2}" recovered.
Recovery = 85.8% Pernjara sandstone.

The dip is apparently horizontal.
No show of oil, gas or water.
No fractures were observed.

SANDSTONE (4.5')
Red-brown, firm, porous, fine-grained rock with matrix and cement filling most of the quartz and lithic framework, leaving approximately 6% - 8% porosity. A few pores are visible and water migrates along these voids at grain boundaries. Soft lithic grains are squeezed into the framework interstices.

The attitude of the bedding is nearly flat, while cross laminations are faintly visible. A few, thin, red, clay pebbles occur at base of this interval.

There is no show of oil or gas, and no taste of salt water; however, this interval appears to be wet with fresh water.

SANDSTONE (4')
Hard, red-brown, grey and green-grey, dense, fine-grained rock with matrix and calcite-dolomite cement filling the framework completely. Micaceous laminations and faint cross laminations are present. At top and base of this interval there are thin clay pebbles up to 1\frac{1}{2}" long - the planes of their long axis lying parallel to the bedding planes.

Cored Interval 1498' - 1507' - Cut 9' - Recovery 100%.

Coring Time: 10 - 4 - 3 - 2 - 2 - 3 - 5 - 9 - 25.

(Core cones separated from bit and left in hole).

No shows. Dip is nearly flat.

1498 - 1499'

(Upper 1') SANDSTONE - Orange-brown, medium-grained, medium-sorted, porous rock with a framework of rounded and euhedral quartz grains with a trace of a black mineral.

Porosity is water-wet and occurs as .25 mm holes scattered in sandstone cemented with silica. No trace of oil or gas.

1499 - 1507'. SANDSTONE - Orange-brown, medium-grained, medium-sorted rock with rounded and euhedral grains, with trace of red clay and silt matrix, and with calcite and dolomite cement. It is for the most part dense but with streaks of low porosity that is water-wet. The dense layers tend to be grey to grey-green in colour while layers with porosity to be reddish. Laminted bedding is recorded by vague wavy intersecting planes of iron staining.


Cored Interval 2415' - 2416'. Cut 9" - recovered 2".

Recovery = 22.2%.

GREY QUARTZITE - No show.
CORE NO. 4. Pacoota sandstone.
Cored Interval 2,846 - 2,861' Cut 15', recovered 15'. Recovery = 100%.
Coring Time: 16,19,18,13,14,26,17,25,17,37,48,13,8,12,49.
Dip nearly flat. No show of oil or gas.

SANDSTONE (4')
Reddish-brown, fine grained rock with framework of jagged quartz with silty clay matrix, silica cement, and scarce shell fragments. There are a few red and green shale laminations and several open vertical fractures.

SANDSTONE (5')
Reddish-brown, medium grained, cross laminated sandstone with framework of colourless and orange (iron stained) jagged quartz grains. A few red shale grains are also present, as well as shale pebbles. There is a silty clay matrix, silica-dolomite cement, closed vertical fractured having marginal bleached zones, poorly outlined worm tubes, and a few red and green shale laminations.

SANDSTONE (6')
White, fine to coarse grained rock with framework of jagged quartz, with white silt matrix, silica cement, a few calcareous streaks, and few red shale laminations.
CORE NO. 5. Pacoota sandstone.

Cored Interval 3160 - 3173'; Cut 13'; Recovered 12'; Recovery 92%.

Coring Time: 47,50,27,12,28,12,7,7,8,8,27,27,56.

Dip nearly flat. Porosity wet, no show of oil or gas.

SANDSTONE (3') - Reddish-brown, fine to medium grained, rock with mottle of white areas, red, green and grey micaceous shale partings, clay pebbles and grains. The framework is mostly jagged quartz grains cemented with silica with minor amounts of rounded quartz, embedded in a red, silty clay matrix. Pores are present but scarce. Short vertical fractures are slightly calcareous and tight. When broken by hammer grains as well as core chips result. Accessory minerals include trace amounts of glauconite and pink dolomite. Bedding is thin to laminated, in part ruptured, wavy, and cross laminated.

SANDSTONE (4') - White, medium-grained poorly sorted sandstone with few orange (iron stained) quartz grains, a few red and green clay pebbles and trace amounts of finely divided pyrite. The rock is mottled by areas of white or reddish-brown matrix, on breaking with hammer many grains result and chips can be crushed with fingers. Pores are numerous and it was wet with water after remainder of core dried. There are parallel and cross laminations of sand grains. The quartz grains are mostly subrounded but many are welded and have jagged outlines.

SANDSTONE (5') - Red brown, white mottled, fine-grained, laminated sandstone with framework of subrounded quartz filled with silty clay matrix and silica cement. Lower half of interval has 15% red and green shale as very thin disrupted beds and lumps. One short vertical fracture is tight.
CORE NO. 6  Goyder formation.

Cored Interval 4041 - 4088: Cut 44', Recovery 44' 10.2%.

Coring Time: 24, 5, 7, 7, 5, 5, 7, 5, 7, 7, 5, 6, 8, 8, 9, 10, 12, 27, 20, 20, 25, 25, 20, 15, 28, 28, 15, 13, 15, 18, 25, 32, 22, 26, 25, 27, 34, 35, 38, 29, 43, 46.

Dips nearly flat, no porosity. No shows.

SANDSTONE - 4041-4042 (1') Interbedded grey very dolomitic argillaceous, glauconitic, fine-grained sandstone and dark grey finely micaceous shale. Shale is also present as laminae in the sandstone. Bedding is very.

DOLOMITE - 4042-4045 (3') Grey, silty fine to coarse crystalline, glauconitic and rock with many relic structures of pellets from 1-8 mm in size, brown oolites near 1 mm and pelosocpod? shell fragments all floating in dolomite spar and recrystallized into dolomite. The rock is slightly argillaceous, contains small amounts of white anhydrite and traces of pyrite. Bedding is irregular and intersecting.

SANDSTONE - 4045-4047 (2') Interbedded dark grey micaceous shale, grey dolomitic sandstone and grey very silty, argillaceous crystalline (.1-1 mm) dolomite with abundant glauconite grains and trace of pyrite.

DOLOMITE - 4047-4048 (1') Dolomite, grey fine to coarse crystalline carbonate with floating brown oolite relics up to 3 mm in size, all of which are recrystallized with dolomite and a few replaced by pyrite.

DOLOMITE - 4048-4049 (1') Dolomite, dark grey, silty argillaceous glauconitic fine crystalline dolomite with many irregular, intersecting shale laminae (almost stylolitic). Many broken brachiopod shells of a very small linguloid, ¼ inch black shale at base.
DOLOMITE - 4049-4063 (14')

DOLOMITE, grey silty micaceous dolomite with very thin beds and laminas of dark grey micaceous shale. Bedding is folded, distorted and reworked by organisms, planes have grooves and marks, glauconite occurs in thin beds and pink coarse crystalline anhydrite in pods.

SANDSTONE - 4063-4066 (3')

Top 4" is a dark green medium-grained rock with framework of quartz and glauconite and glauconitic cement. The remainder is a grey laminated, glauconitic, micaceous fine-grained sandstone with areas of red clay matrix that grades downward into glauconitic, dolomitic, medium-grained sandstone with small amount of red clay matrix and white coarse crystalline anhydrite cement. ½ inch black shale with glauconite at 4064 feet.

DOLOMITE - 4066-4071 (5')

Grey silty, sandy, argillaceous, glauconitic fine to coarse crystalline (up to 1 mm) dolomite with very irregular shale laminas some of which are vertical, others intersecting, with trace of pyrite and few pods of pink anhydrite laths.

SANDSTONE - 4071-4073 (2')

Grey dolomitic, glauconitic fine-grained rock.

SANDSTONE - 4073-4077 (4')

Grey dolomitic, glauconitic fine-grained sandstone with many thin dark grey micaceous shale interbeds, with few shale beds mixed with sand by organisms, many bedding plan marks and grooves, and with abundant glauconite at 4075, and two ½ inch beds of black shale associated with abundant glauconite.
DOLOMITE - 4077-4079 (2') Reddish grey argillaceous, micaceous fine to coarse crystalline (up to 1 mm) carbonate with beds of dark reddish grey finely micaceous shale.

SANDSTONE - 4079-4081 (2') Grey dolomitie, glauconitic, fine-grained rock with thin dark grey shale beds and laminae.

DOLOMITE - 4081-4083 (2') Grey glauconitic sandy medium crystalline carbonate with very thin dark grey shale beds and irregular micaceous shale laminae.

DOLOMITE - 4083-4085 (2') Grey glauconitic micaceous silty, sandy, medium crystalline carbonate with faint micaceous shale laminae.

CORE NO. 7 Jay Creek - Shannon.

Cored Interval 5226 - 5266'. Cut 40' Recovered 39'. Recovery 97%. No porosity, no shows oil or gas. Dips nearly flat.

Cutting time: 11,12,10,12,14,12,13,12,13,11,12,15,10,11,10,10,13,26,9,13,12,12,11,11,12,15,13,14,11,13,18,20,16,18,18,21,22.

DOLOMITIC 5226-5228 (2') Medium grey, slightly greenish micaceous, pyritic, in part shaly; faint mottling and lamination from variations in shale and dolomite content; some gentle flow structure, trace of cross-lamination.

SILTSTONE

SILTY SHALE 5228-5234'3 (6'3'') Dark red brown, slightly micaceous, a few irregular small lenses of above type siltstone; massive with faint wavy laminae.
DOLOMITIC SILTSTONE 5234'3-5245'6 (11'3") As above. Two layers 6" and 1" thick of anhydritic dolomite – grey microcrystalline, silty; anhydrite is clear, crystalline, in blebs to 2 mm. Silty shale (red in upper part, grey in lower part) is interlaminated throughout the section; these laminae vary from flat, wavy, stylolitic to slightly brecciated. A few small irregular fractures with probably some permeability.

RED SILTY SHALE 5245'6-5248'3 (2'9") as above, abundant small lenses of grey siltstone which show flow structure and some brecciation.

ANHYDRITIC DOLOMITE 5248'3-5249'6 (1'3") grey, micro-crystalline, silty; anhydrite crystals are oriented throughout the core. Sharp upper contact, fairly intricate flow structure dipping about 20°.

RED SILTY SHALE 5249'6-5252'3 (2'9") as above, small lenses and laminae of grey siltstone.

DOLOMITE SILTSTONE 5252'3-5265 (12'9") and SILTY DOLOMITE (gradational) as above, trace of anhydrite. About 10% is SHALE – medium grey, trace red, in laminae to lenses or layers up to 1" thick. Three near-vertical open fractures.

References to anhydrite may be gypsum.

CORE NO. 8 Giles Creek Dolomite.

Cored Interval 7053 - 7098' Cut 45. Recovered 38' Recovery 35% Comparison with Acoustic Velocity log suggests 7' perhaps missing at top and all depths should be 10' lower.

Coring Time: 2,11,10,11,14,11,11,12,14,14,14,14,14,11,15,14,15, 15,15,17,15,21,9,12,13,13,11,11,14,14,13,14,12,17, 14,17,17,16,16,17,19,16,9,16,14.

Dips nearly flat, no porosity, no shows of oil or gas.

7053 - 7060' Missing.
SHALE 7060 - 7065' 100%. Dark reddish-brown and dark brown, with 5" greenish-grey shale (at 7051'9"), poorly bedded, with laminae and irregular inclusions of sulphate mineral crystals (anhydrite and gypsum) lying roughly parallel to the bedding; hard; silty, micaceous in parts, dolomitic.

DOLOMITE 7065 - 7065'9" 100%. Light grey, grey and dark grey, bedding laminated and platy (1/16" - 1"), slightly contorted in places; hard, very fine crystalline to cryptocrystalline, silty, with thin lenses and laminae of pale pink and grey sulphate mineral crystals, no visible porosity.

SHALE 7065'9"-7074'8" 100%. Dark reddish brown and dark brown, with thin greenish grey shale bands (at top, and at 7058'19") having contorted contacts the lower band abounds in small irregularly shaped reddish brown shale inclusions; poorly bedded with slumped structures in places; hard, silty, micaceous in parts, dolomitic, numerous small inclusions of sulphate mineral crystals.

DOLOMITE 7073'8"-7074'11" 100%. Light grey, grey and dark grey, bedding slumped in places, hard, very fine crystalline to cryptocrystalline, silty, with lenses, slumped in places, and small inclusions of pale pink sulphate mineral crystals and numerous black shale partings. No visible porosity.

SHALE 7074'11"-7077'1" 100%. Interbedded dark reddish brown grey and greenish grey, bedding slumped in places, hard, silty micaceous in parts, dolomitic, numerous small inclusions of sulphate mineral crystals.
DOLOMITIC 7077'1" - 7078'5"
ANHYDRITE

Probably 21 minute foot and at 7077 on Acoustic Log.

SHALE 7078'5"-7082'8"

100%. Layers of light greyish brown and orange pink very fine and fine crystalline dolomitic anhydrite, and veins of clear white and orange pink, fine to medium crystalline anhydrite with numerous irregular, argillaceous, dolomitic inclusions, and black shaly partings.

DOLOMITE 7082'8"-7083'3"

100%. Interbedded dark reddish brown and greenish grey; bedding contorted thin fractures in dark reddish brown shale filled with greenish grey shale; hard and silty, micaceous in part, dolomitic, numerous small inclusions of sulphate mineral crystals.

SHALE 7083'3"-7085'4"

100%. Grey and dark grey; bedding slumped in places; hard, very fine crystalline to crypto-crystalline; silty; an irregular vertical fracture; no visible porosity. Irregularly bedded layer (maximum thickness 1") of sulphate mineral crystals below base.

SHALE 7085'4"-7098'4"

100%. Black, poorly bedded, hard, slightly micaceous, pyritic, numerous large irregularly shaped inclusions of sulphate mineral crystals near base.

SHALE 7098'4"-7098'4"

100%. Dark reddish brown and dark brown (80%), dark grey and greenish grey (20%), poorly bedded, hard silty, micaceous in part, dolomitic, several irregular bands and numerous small white inclusions of sulphate mineral crystals, and a few thin dark grey dolomite bands (less than 5%).

Cored Interval 7640 - 7678'.  Cut 38'.  Recovered 0 (Nil) 0%  
Coring Time: 5, 5, 9, 7, 5, 5, 6, 6, 6, 5, 7, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, Conn, 7, 7, 6, 6, 6, 12, 12, 7, 6, 10, 10, 10, 10, 10, 10, 10, 6, 7.

No core recovered probably due to wash out and erosion of salt and to balance of core slipping through core catchers.  There was little or no wear on diamond bit.  Upon next trip with bit fill on bottom suggests broken core had fallen out of barrel.

CORE NO. 10.  Arumbera Sandstone.

Dip apparently flat non-fossiliferous.  
No porosity, scattered pinpoint fluorescence only.

Cored Interval 8712 - 8724'.  Cut 12'.  Recovered 3'4".  Recovery 28%.  Corrected Depth 8708' - 8720'.  

Note: Core spilled on derrick floor on removal from core barrel.

1' 0"  Interlaminated SHALE (45%) and SILTSTONE (40%), with some SANDSTONE (15%) layers in bottom 2".  Dip 0°.

SHALE

Reddish-brown and dark brown; bedding surfaces reworked in places (organically with few fractures parallel to bedding and joined in places by short (½") vertical fractures; tough; silty, micaceous, particularly along bedding planes.

SILTSTONE

Reddish-brown; reworked bedding in places, with few thin shaly partings; few fractures parallel to bedding and joined in places by short (¼") vertical fractures, tough; micaceous, few included quartz grains up to 1mm across concentrated along bedding planes; grades in places into very fine sandstone.
SANDSTONE

Reddish-brown; graded bedding from fine-to very-fine-grained beds with numerous included medium, coarse and very coarse grains up to 1 1/2 mm across, and a few medium-grained stringers; sorting fair; subangular to subrounded grains, larger grains rounded; quartzose, micaceous, few dark coloured grains, argillaceous, well bonded by siliceous cement, slightly dolomitic, a few thin shaly inclusions; no porosity visible; some pin point blue fluorescence; framework: matrix filler - 8:2

1'1"

SHALE (70%) with interbedded laminae and thin lenses of SILTSTONE (30%), with 1/2" stringer of fine-grained, light greenish-brown, dolomitic quartzite at 8" from top. Dip 0°.

SHALE

Reddish-brown and dark brown; bedding surfaces reworked in places; tough; silty, micaceous. An included anhydrite pod at 10" from top.

SILTSTONE

Reddish-brown; reworked bedding in places, with few thin shaly partings; tough; micaceous, few included quartz sand grains.

0'4"

Interlaminated SHALE (50%) and SILTSTONE (40%), grading into SANDSTONE (10%). Dip 0°.

SHALE

Reddish-brown and dark brown; reworked bedding in places; tough; silty, micaceous.

SILTSTONE

Reddish-brown; reworked bedding in places, with few thin shaly partings; tough; micaceous.
SANDSTONE

Reddish-brown; graded bedding; very fine-grained; sorting good; subangular grains; quartzose, micaeous, few dark coloured grains, argillaceous, well bonded by siliceous cement, slightly dolomitic; no porosity visible; framework: matrix filler 8:2

SANDSTONE 012"

Reddish-brown; fine-to very fine-grained with included grains up to 1 mm across; sorting fair; subangular to subrounded grains; quartzose, few dark coloured grains, well bonded by siliceous cement, argillaceous; no porosity visible; framework: matrix filler 8:2; an irregular fracture trends parallel with bedding.

019"

Interlaminated SHALE (60%) and SILTSTONE (40%) Dip 0°.

SILTAHLE

Reddish-brown and dark brown; bedding surfaces reworked in places; tough; silty, micaeous.

SILTSTONE

Reddish-brown; reworked bedding in places, with few thin shaly partings; tough; micaeous.
SILTSTONE

Grey, hard, very argillaceous, dolomitic, slightly calcareous with a few very fine included, semi-transparent quartz grains.

Fossiliferous material of probable algal origin is present as light grey laths, partly pyritized. Pyrite content is very high, occurring predominantly as isolated flakes up to 1 mm in diameter.

Treated with cold, 10% hydrochloric acid, sample gives off an hydrogen sulphide odour, caused possibly, by reaction of the acid and marcasite, associated with the pyrite inclusions.

Although fractured, no matrix porosity indicated and a blue fluorescence gave no cut with carbon tetrachloride (CCl₄)
REPORT ON 22 THIN SECTIONS

FOR

MAGELLAN PETROLEUM CORPORATION
Or - 1

The rock is an orange-red, medium grained, stratified sandstone. In thin section sometimes elongated, sub-rounded to angular quartz grains make up 80% of the total. About 10% each of kaolinized orthoclase and limonite cement are present. The limonite is clearly seen rimming quartz grains. A little argillaceous material is suspected in the cement.

Stratification is emphasized by variations in grain size. The finer portions are richer in iron oxides. The rock appears well cemented and voids are absent.

Or - 2

This rock is essentially similar to Or - 1; a red medium grained stratified sandstone. It is however massive and more homogeneous. Quartz occurs as sub-rounded to angular grains. Many show parallel elongation. 70% of the rock is quartz and the balance kaolinized orthoclase and a few lithic fragments. A few small grains of haematite are present but the main cement is limonite. This rims the grains and fills the voids.

Or - 3

A medium grained orange-red sandstone. A faint stratification is present but the rock is essentially massive and homogeneous. Small holes are present in the hand specimen. In thin section the quartz is generally in rounded to sub-rounded grains. There

N.B. Some of the samples described in this report are limestones. Microscopic determination of dolomites is uncertain; accordingly calcite and dolomite has been termed 'carbonate.
are some secondary quartz overgrowths and a number of the grains show slight fractures and strain extinction. About 15% of the section consists of kaolinized rounded feldspar. The clastics are cemented by limonite. Voids make up an estimated 5% of the rock.

Or - 4

Orange-red medium grained sandstone. Lamination is present as black bands along finer grained quartz layers. Most quartz grains are rounded to sub-rounded in form and they make up 85% of the rock. Some secondary overgrowths are present. About 5% kaolinized feldspar is present, some of the fresher grains are andesine. The cement is limonite with fine quartz fragments and some argillaceous material. The lamination is emphasized by variations in quartz grain size. The rock is fairly porous along elongated voids parallel to the stratification.

Or - 5

Medium to fine-grained orange-red sandstone. Faint stratification may be observed but the rock is essentially massive and homogeneous. In section subrounded quartz grains make up 90%. Secondary overgrowths usually fill the intergranular spaces. Kaolinized potash feldspar and the occasional limonitized mafic mineral are present. Limonite cement makes up less than 5% of the section. Despite the pronounced
secondary overgrowths, a few elongated voids parallel to the bedding occur.

Or - 6

This rock is light green to mauve in colour. It is a fine-grained well cemented sandstone, massive and homogeneous. The quartz grains, about 1µ in diameter, are well sorted sub-rounded to angular and overgrown. They make up 90% of the section. The feldspar is kaolinized and the inter grain spaces are filled with mafic clusters of iron oxides. Secondary quartz overgrowth, iron oxides and kaolinized feldspar have filled most spaces although a few voids are still present.

Or - 7

The rock is a pale buff coloured, poorly sorted, medium grained well stratified sandstone with mauve coloured bands. In thin section sub-rounded quartz makes up 90% of the total. The grains show marked secondary overgrowths. Highly kaolinized feldspar makes up 5% of the section. The limonite cement is peppered with small ferruginous minerals.

Or - 8

The core is a red and grey spotted, coarse to medium grained sandstone. In thin section sub-rounded to angular quartz of variable grain size (but usually 2 - 3 µ in diameter) make up 80% of the section. Finer and more angular grains
along with ferruginous detritus fill up most of the intergranular spaces. Kaolinized feldspar is present and the limonite cement includes fine ferruginous grains. Voids amount to about 3% of the rock.

Or - 9

The core is a white medium to coarse massive homogeneous sandstone. It is poorly cemented but not crumbly. In section subrounded quartz (70%) and kaolinized orthoclase (30%) are poorly cemented by limonite and argillaceous material. The section appears to indicate a very porous rock showing voids in about 15% of the section.

Or - 10

The rock is a well cemented medium grained reddish brown massive sandstone. A few spots of white in limonitized sandstone are present. The quartz, about 90% of the section, is rounded to sub-rounded in form. Some embayment features are present but rare; secondary overgrowth and pore filling is common. Many quartz grains are cracked. Some kaolinized feldspar is present. A little limonite rims the quartz grains and porosity is low.
Or - 11

The core is a medium grained cross bedded (?) white to grey porous sandstone. In section subrounded to subangular quartz of 2 - 3 μ makes up 60%, in addition small 1/2 μ angular quartz makes up 30% of the rock. A small amount of sub-rounded kaolinized orthoclase is present. The cement is an argillaceous limonite which fills most of the intergranular spaces. However remaining voids make up about 2% of the section. Stratification is observed as continuous bands of small angular quartz.

Or - 12

The rock is a medium grained grey stratified sandstone with included red and green angular shale fragments. In thin section quartz shows as cracked rather poorly sorted sub-rounded grains sometimes showing embayment features. Strain extinction and secondary overgrowths are common. Potash feldspar shows alteration to kaolin. Ferruginous argillaceous material is present interstitially, small fragments of various sizes are present. Voids are absent.

Or - 13

The rock is a medium grained, well stratified, well cemented, homogeneous glauconitic sandstone. A shale contact is present. In section the rounded quartz grains are overgrown. Pore filling and embayment features are common. The glauconite
about 25% of the slide, occurs as rounded cryptocrystalline dark green grains. A light brown collophane mineraloid occurs parallel to the stratification. Calcite makes up 5% of the total and a small amount of iron oxide occurs interstitially.

Or - 14

The core is a medium to coarse grained impure carbonate rock. It is homogeneous with a slight stratification accentuated by dark coloured bands. In section the carbonate appears as small (1 - 3 μ) grains, and is the product of a recrystallized oolitic limestone. Small amounts of iron oxides are present, sometimes associated with an apple-green chlorite. Voids are absent.

Or - 15

The rock is a medium to coarse impure recrystallised limestone. It is massive and homogeneous. In section interlocking coarse and fine grained carbonate makes up 80% of the slide. Similar amounts of glaucophane and haematite are present together with a small amount of collophane. Fluid passage through the rock has produced minute styolites in the carbonate; iron oxides probably haematite (?) and argillaceous material being left behind.
Or - 16

The rock is a fine to medium grained grey stratified limestone. In thin section alternate laminations of very fine grained and coarser grained carbonate occur. Considerable amounts of quartz and feldspar occur in the coarser bands. Voids are filled with secondary gypsum. Fine grained anhydrite is possible with the fine grained calcite.

Or - 17

The rock is a well stratified, very fine grained, pale grey limestone. Gypsum crystals, a few millimetres long, occur. In this section fine and coarser grained carbonate granules alternate. Elongate crystals of gypsum grow perpendicular to the laminations. (Note this is a poor slide).

Or - 18

The core is a very fine grained light grey and dark grey laminated limestone. The laminations are discontinuous and wedge out. In section mineral identification is difficult owing to fine grain. However carbonate may be assumed to make up 95% of the rock with a small amount of detrital quartz. Limonite (?) occurs between lamellae separating very fine from fine calcite. An occasional very small elongated gypsum crystal may be seen.
The rock is a very fine grained unevenly laminated grey limestone. A small amount of salt appears to be present. In section the carbonate is fine grained. Gypsum, probably secondary, occurs in cracks perpendicular to the stratification and makes up about 5% of the rock. Limonite is present and the rock shows no pore spaces.

The rock is a very fine grained limestone. Wavy laminations are easily visible and due to thin bands of dark grey slightly coarser carbonate. In section most of the rock is fine grained carbonate but about 5% gypsum is scattered through the mass in small isolated spots. It appears to be penecontemporaneous with deposition. A little quartz is present and the dark streaks may be due to deposition from circulating fluids.

The core is a very fine grained grey massive limestone with a faint wavy stratification. The carbonate appears as peppered grains in large optically continuous crystals of syngenetic gypsum and as separate powder-sized grain accumulation. Secondary gypsum veins, 1 mm. wide, cut the rock. A shale fragment 2 mm. long is incorporated in the section.
The rock is a very fine grained grey-green shale mottled with chocolate brown and red colouration. Small round, white bodies of crypto-crystalline gypsum are present. Some of the gypsum has been lost during slide making. The shale is clearly showing various degrees of limonitization.