QPL. 13

For Bullo oil seepage see pages 11, 12.
Kununurra Rd 101 Kms west of Timber Ck
is T/O to Bullo River Station
About 30 km along road junction [illegible]
[illegible] camp spring where oil seepage is
Also cattle yard [illegible]

QUEENSLAND PETROLEUM PTY. LIMITED

BULLO RIVER FIELD GEOLOGICAL SURVEY - OP.225. NORTHERN TERRITORY.

SEPTEMBER/OCTOBER 19

BY A.C.M. LAING / J.K. WEBBY

QUEENSLAND PETROLEUM PTY. LIMITED.

BULLO RIVER FIELD GEOLOGICAL SURVEY - OP.225 NORTHERN TERRITORY.

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INTRODUCTION:

A field survey in the September/October 1982 period was conducted mainly in the Bullo River Station area but also briefly in Timber Creek area.

The purposes of the field survey were -

(a) To establish the existence of closed structures suitable as drilling targets.

(b) To check drilling rig access for these targets

(c) To confirm the general results of the photo-geological survey previously carried out.

(d) To check the field mapping of the BMR in the area.

(e) To try and find the location of the Bullo River oil seepage.

We would like to thank the Henderson Family of Bullo Station and Mr. and Mrs. Fogarty of Timber Creek for their assistance during the survey.

PREVIOUS WORK:

Traves (1954) searched for the Bullo River oil seepage in company with Hubert Owen then Senior Geologist, Mines Department, Darwin. He reported on the search which was unsuccessful as they had no vehicle arriving by boat and no air photographs.

Laing and Allen (1955) mapped the area up to the southwest part of OP.225.

Pontifex Morgan, Sweet and Reid (1968) described the geology of the Auvergne 1:250,000 sheet later published (Pontifex and Sweet (1972)) as a 1:250,000 geological map and explanatory notes. Sweet (1977) described the geology of the Victoria River region Northern Territory.

Laing (1981) described the preliminary petroleum prospects of OP.225. N.T.

Webby (1982) reported on the photogeology of OP.225. N.T.

PHYSIOGRAPHY:

The area is well watered and drained by tributaries of the Victoria River which flows north into Joseph Bonaparte Gulf. The main tributary of the Victoria River in the area is the Bullo River which is tidal about 20Km inland.

In general the physiographic divisions follow the northeast grain of the country with the Whirlwind Plains along the Baines River, the 275m scarp of the Pinkerton Range, dipping gently north to a long valley following the Spencer Range Fault with the Spencer Range to the northwest then the plain of the Bullo River which runs inland south west then turns south into the Bullo River Gorge.

Northwest of the Bullo River plains is the scarp of the Victoria River Fault with the more rugged country of the Lower Proterozoic further to the northwest.

The hills generally have steep rock scarps cropping on them and even on the plains there are areas of rock outcrop.

GEOLOGY:

Stratigraphy	Thickness Metres	Lithology
Bullo River Sandstone	300	Sandstone
Spencer Sandstone	50-150	Sandstone
Shoal Reach Formation	60-100	Dolomite siltstone, minor sandstone
Lloyd Creek Formation	20-100	Siltstone oolitic sandstone dolomite
Pinkerton Sandstone	50-100	Quartzitic sandstone
Saddle Creek Formation	100	Siltstone oolitic dolomite minor shale with a basal sandstone
Angalarii Shale	230+	Green shale and siltstone minor sandstone limestone dolomite

Stratigraphy	Thickness Metres	Lithology
Jasper Gorge Sandstone	45-200	Medium quartz sandstone minor shale
Bynoe Siltstone	150	Purple and green siltstone and shale
Skull Creek Limestone	300	Dolomitic Limestone
Unknown Section		
Fitzmaurice Group	?	Quartzitic sandstone basement

FITZMAURICE GROUP:

The Fitzmaurice Group occurs only north of the Victoria River Fault, where it is strongly folded and faulted and strongly outcropping.

The unit consists predominantly of quartzitic sandstone with siliceous growths on the quartz grains.

It is probably Middle or Lower Proterozoic in age as the Upper Proterozoic north of the Victoria River Fault in one location unconformably overlies it.

SKULL CREEK LIMESTONE:

The writer and R.J. Allen named this unit the type section is on the Skull Creek domes in the Jasper Gorge area. It consists of 300 metres of dolomitic limestone with minor chert quartz sandstone and siltstone.

The base of the unit is nowhere exposed. The Skull Creek Limestone grades north westward into the Timber Creek Siltstone and is unconformably overlain by the Bynoe Siltstone.

TIMBER CREEK FORMATION:

The writer and R.J. Allen named this unit consisting of purple siltstone with minor siliceous limestone. It grades laterally into the Skull Creek Limestone though the B.M.R. geologists Sweet, Pontifex and Morgan (1974) considered that the Timber Creek Formation underlay the Skull Creek Limestone. To substain this view they were forced to introduce an additional carbonate unit (Limbunya Group) where the Skull Creek Limestone grades into Timber Creek Formation both lying directly under the Jasper Gorge sandstone in the upper part of the East Baines River.

This type section is a hill on the east side of Timber Creek, 5 miles south of the Police Station. A well-defined marker bed of contorted chart boulders, in the section persists over an area of 5 or 6 square miles. Siliceous limestone predominates in the upper part of the formation.

The position of the gradational boundary has been estimated on the ground as the place where more than 10% purple siltstone enters into a predominantly limestone section. This was found to be about where a change in air photograph pattern took place from the distinctive limestone pattern to the pattern for bedded, fine grained, clastic rocks.

The Gradational boundary swings around west of the Skull Creek Limestone and south to the Sandford Gorge.

Five miles south of Timber Creek a 50 feet band of chert is found near the top of the Timber Creek Formation.

Current ripple marks are common in the siltstone of the Timber Creek Formation outcropping along Gibbie Creek north of Mt. Sandford Outstation. They were also found in limestone along the Humbert-Bullita Outstation track.

BYNOE SILTSTONE:

This is the same as a unit the writer and R.J. Allen defined named as the Coolibah Formation, the name being invalid because it had been used elsewhere. The unit Stubb Formation of the Delamere 1:250,000 geological map (Sweet 1972) is also equivalent.

This type section of the lower part of the Coolibah Formation was at the crossing of the Victoria River at Coolibah; and of the upper part on a mesa just south of the Timber Creek-Coolibah road, some 4 miles from Coolibah.

The total thickness of the formation measured in its type sections is 500ft. (150 metres).

The formation mostly consists of alternate 2 feet (0.6m) beds of purple siltstone and hard, light green, laminated shale. Both lithological types are dominantly siliceous but the formation becomes more calcareous in its lower part.

An indication of the environment of deposition can be obtained from the different sedimentary features seen. These included mud cracks, swash marks, ripple marks - all indications of shallow water deposition.

The Bynoe Siltstone overlies the Skull Creek Limestone unconformably and underlies the Jasper Gorge Sandstone with apparent conformity.

JASPER GORGE SANDSTONE:

The type section (Laing and Allen 1956) is in the Jasper Gorge where about 180m of red and white predominantly quartz sandstones overlie green shale of the Bynoe Siltstone.

This base of the Jasper Gorge Sandstone was traced by eye along the scarp south of the Timber Creek-Coolibah road. The basal red marker sandstone was not continuous over this distance but as one sandstone bed lensed out another appeared just under or over it.

On a mesa about 5 miles west of the Coolibah turn-off on the main road the following section was measured.

8m red sandstone outcropping
60m green and purple shale partly obscured by scree
15m red sandstone strongly outcropping.

The Jasper Gorge Sandstone can be traced on the air photographs west from Coolibah along the Victoria River to Timber Creek where only about 15m of red sandstone cap the mesa.

Further west still, south of Auvergne Homestead in the East Baines Gorge the Jasper Gorge Sandstone is about 45m thick. There it lies on Timber Creek Formation and is overlain by Auvergne Shales.

It is thought that the formation has a minimum thickness of 60m south of Auvergne, on the sandstone plateau east of the West Baines River.

South of the Sandford Gorge the Jasper Gorge Sandstone lies unconformably on the Timber Creek Formation. Further south still it is found as inliers in the Antrim Plateau Volcanics south of Mt. Sandford Outstation.

The Jasper Gorge Sandstone is a red, mainly current-bedded, quartz sandstone. It becomes progressively more felspathic southwards suggesting its source was in that direction. The round sand-size grains of quartz are either cemented with siliceous cement in optical continuity with the grains or with ferruginous cement.

Sedimentary features indicative of the origin of Jasper Gorge Sandstone are ripple marks, rain drop prints, mud cracks, salt crystal marks and probable worm tracks. There are conglomerates present containing mud pellets, shale and chart pebbles. The ripple marks are oscillation ripple marks. The following is a list of those measured in the Jasper Gorge area:

Wavelength.	Amlitude.	Index
10.37cm.	1.27cm	8
83.7cm	8.0cm	10
3.15cm	0.38cm	8
41.9cm	3.66cm	11.5
33.1cm	3.66cm	9.1
38.1cm	3.66cm	10.5

All that can be deduced is that the rocks containing the oscillation ripple marks must have been laid down in less than 110 metres of water, and probably in much shallower water close to a shoreline. As suggested by the mud cracks and rain prints.

South of Coolibah Homestead the Jasper Gorge Sandstone lies with probable disconformity on the Bynoe Siltstone. Of the chert and shale pebbles found in the sandstone, the chert pebbles appear to be from the Skull Creek Limestone, while some of the shale pebbles may be derived from the underlying Coolibah Formation.

In two places in Jasper Gorge itself and at the north end of Sandford Gorge (50Km north of Mt. Sandford Outstation), the Coolibah Formation grades up into the Jasper Gorge Sandstone without a distinct break.

In a small outlier five miles north of Bullita Outstation the Jasper Gorge Sandstone directly overlies the Skull Creek Limestone. This is apparently the case also in the Moolooloo Anticline on the eastern edge of the permit.

At Timber Creek and also on the Mt. Sandford-Victoria River Downs road, the Jasper Gorge Sandstone lies unconformably on the Timber Creek Formation.

STRUCTURE.

The Upper Proterozoic rocks dip gently (2-5 degrees) to the northwest. This uniform northwest dip is broken at the Spenser Range fault at the major Anticline the Bullo Structure, then by the Victoria River Fault which upthrows Lower Proterozoic rocks to the north.

There are a number of closed structures in the area. The most significant is the Bullo River culmination of the Bullo Anticline which is 65 sq.Km in area and bisected by a northwest trending fault (Bubble Spring Fault) with an upthrow of about 30m to the northeast. Along this fault are Camp spring and Bubble spring to the south both with oil traces and the probable site of Campbell's Bullo River oil seepage where the fault crosses New Yard Creek (see Petroleum Prospects). On the upthrow side of the fault basal Spenser Sandstone is exposed. On the down thrown side, Lloyd Creek Formation is exposed.

There are also 3 other culminations along the Bullo Anticline.

The one to the east along Nutwood Creek is bounded on the south by the Spenser Range Fault and consequently has a steep southern flank.West of the Bullo River Culmination are two other culminations the easterly one with Shoal Reach Formation exposed on the crest, the western with Saddle Creek Formation exposed on the crest.

In addition there is a closed structure, the Brolga Swamp anticline with 18 sq. km of closure near to the Victoria River Fault. The structures culminates in Spenser Sandstone.

The Victoria River Fault is a major feature on the north side of the basin with a zone of vertically dipping isoclinally folded sediments. Lower Proterozoic sediments are on the north (upthrown) side of the fault.

The Spenser Range Fault zone was closely investigated because the size of the throw across.it establishes the throw of the crestal fault on the Bullo River culmination.

Several horizons (continuous outcropping sandstone beds) were traced on the air photographs from the scarp of the Pinkerton Range both east and west of the Victoria River. The weak point in the correlation is across the Victoria River. It is only possible to correlate across the Spenser Range Fault where it dies out east of the Victoria River.

On the best correlation the lower part of the Spenser Sandstone outcrops north of the Spenser Range Fault with a small area along the Bubble Spring Fault with the top of the Pinkerton Sandstone outcropping.

PETROLEUM PROSPECTS:

Precambrian rocks are not generally regarded as good sources of oil, for they are mostly too metomorphosed, and rarely contain definite marine fossils. However, in the Northern Territory the Upper Proterozoic rocks are not metomorphosed in contrast to some Upper Palaeozoic rocks in Eastern Australia, or even some Mesozoic or Cainozoic rocks in other parts of the world. Moreover traces of marine life such as algae (Collenia), worm tracks and jelly fish prints have been found; and in some other parts of the world notably Russia, Proterozoic rocks contain large oilfields.

Meyerhoff (1982) cites two giant gas fields in the Proterozoic of the Lena Tunguska Province in Siberia and 13 other gas and oil fields.

SHOWS:

Stokes in the Beagle expedition landed in the Victoria River in 1839 and reported as follows:-

"The sandstone which prevailed everywhere was in a decomposed state, but there was a very decided dip in the strata to the southeast of about 30 degrees. On the east side of Water Valley (near Holdfast Reach), I found the same kind of slate, noticed before at Curiosity Peak; but what most interested me was a bituminous substance found near the bottom of the wells recently dug, and 23 feet from the surface of the ground. It was apparently of a clayey nature when first brought up, but became hard and dark upon exposure to the air, and ignited quickly when put into a flame of a candle".

He later used the bitumen so found here to caulk the Beagle, this was the very first discovery of a petroleum substance in Australia.

Tom Ronan in his memoirs refers to a spring in the Bullo River country which tasted of kerosene.

Oil seepages and residues have been found at several localities in the Northern Territory. Many appear to be in the base of the Lower Middle Cambrian Limestone or in the Lower Cambrian Antrim Plateau Volcanics. Traves (1955) considered that the asphaltite, found in these Volcanics at Pompey Springs originated from the underlying Upper Proterozoic sandstones.

Blatchford (1922) inspected the place from which Mr. Oakes first obtained asphaltite in the Kimberleys. It is located about ½ mile up the Negri River from its junction with the Ord River and about 1½ miles downstream from the place where the Ord River Station-Wyndham road crosses the Negri River. On Traves' (1955) map of the Hardman Basin, it appears to lie within the area of outcrop of the Negri Group (Lower Middle Cambrian). The succession at this place is:-

Negri Group

Antrim Plateau Group.

Upper Proterozoic Sandstone.

Asphaltite (pitch) was found also in a well at Texas Homestead, on the bank of the Ord River, some 5 miles upstream from the Negri junction.

Blatchford (1922, p.20) states:-

"In every instance which came before my notice the pitch was in the basalt or the limestone immediately above. It had not impregnated the limestone to any appreciable extent. In hand specimens, the basalt is seen to be extremely vesicular, the vesicles being sometimes empty, sometimes completely filled with pitch, lime or rarely silica, and very often partially filled with lime and pitch. It is further noticeable that thin veins of pitch sometimes impregnate the lime and at times the reverse. Not uncommonly the lime forms a coating to the vesicle, the central position being pitch. The pitch also fills the cracks in the rock and in form occurs in quite considerable quantities".

Several samples of the asphaltite were analysed by Dr. E.S. Simpson (1922). Two analyses made by him are as follows:-

No. 6507, junction Ord and Negri Rivers (Oakes' Find) submitted by Mr. P. Durack.

No. 8229, junction Ord and Negri Rivers (Oakes' Find) submitted by T. Blatchford.

	6507.	8229
C.	89.40	89.30
H.	7.26	6.95
S.	0.68	0.57
N.	0.41	0.36
O.	2.25	2.82
	100.00	100.00
ASH	0.43	0.49
VOLATILES	41.54	38.20
FIXED CARBON.	56.27	41.00
ASH	1.82	19.96
	100.00	100.00

VOLATILE MATTER.

WATER	1.74	1.90
OIL	19.89	16.00
GAS	19.91	20.30
	41.54	38.20

The high fixed carbon percentages in the above analyses seem to indicate that the asphaltite has been in the basalt a very long time. It is therefore likely that the oil seepage forming this asphaltite started and stopped sometimes in past geological time.

A further occurrence of asphaltite was examined by Opik and Traves in 1949 (Traves 1955) at Pompey Springs, 15 miles north-north-east of Mistake Creek Homestead.

Traves (1955) states:-

"At this locality there are a number of seepages along a fault line in the Antrim Plateau Volcancis, and on the margins of the seepages and in the neighbouring outcrops of vesicular basalt, a shiny black coating of asphaltite has been deposited. The water of the seepage is a dark colour and appears to be bringing up the oil residue".

Traves and Glover (personal communications) visited the same locality in June 1955 and collected some samples. These were tested by W.T. Chamberlain, D.Sc. consulting chemist, who stated (letter dated 24.11.55):-

"These samples have been examined and no traces of oil or material of petroleum origin could be detected"..

A further letter to Dr. Chamberlain was written to ascertain the exact tests carried out, but this information could not be obtained.

There are reports of another oil seepage from the Bullo River within the area discussed in this report.

The evidence is a sworn statement as follows:-

"I, William Archibald Campbell, of 51 George Street, Fitzroy, in the State of Victoria, Prospector do solemnly and sincerely declare

1. That I was prospecting the country in the vicinity of the Victoria River, Northern Territory, from the twentieth day of July 1904 to the twenty-eighth day of September 1904 for oil, coal and minerals and during the month of September I was exploring the country adjoining and to the southward of Shoal Reach, as charted in the British Admiralty Chart of the River, and I found a large tributary running into the said Shoal Reach, trending generally in a West to West-South-West direction. I explored this tributary and the ranges near to same, for a distance of approximately fifty miles from the said junction, navigation is practically stopped by a rock bar running across the said territory.

   Prospecting the adjoining ranges, I found distant about seven miles and bearing Southwest twenty degrees south from the said rock bar, a very conspicuous mountain peak with noticeable black rocks on its top. While examining in a gorge distant about three miles bearing north thirty degrees west from the said mountain, oil oozing from between the strata of the sandstone rock on the side of the gorge. I examined same, and brought samples of it back to my boat on the river and thence with me to Melbourne, and produced to me at the time of making this declaration and marked numbers One and Two are bottles containing samples of the said oil strained by me-------AND I make this solemn

declaration conscientiously believing the same to be true and by virtue of the provisions of an Act of the Parliament of Victoria rendering persons making a False Declaration punishable for wilful and corrupt perjury".

The bottles of oil were analysed as follows:

1) Labelled "Samples of Petroleum Oil, Victoria River, by W.A. Campbell".

"Specific gravity of original sample 0.826 at 15° C.
The oil was subjected to fractional distillation in the Engler distilling apparatus. The following fractions were obtained -

To 150° C. 16% (Napthas) Specific gravity 0.797 at 15° C.
150-300° C, 63% (Petroleum Burning Oils) Sp. Gr. 01807 at 15° C.

Above 300° C. 21% (Residual oils containing mineral lubricating oils) Total 100.0%

The sample contains 1% of saponifial oil and ½% of pitch.

The burning fractions were examined and found to resemble Borneo petroleum".

2) Labelled "Samples of Mineral Wax, Victoria River, Northern Territory by W.A. Campbell".

"The wax was purified and gave the following results:

Melting Points:- 54-59° C. (according to degree of purification)
Specific Gravity 0.90 at 15° C.

The wax was amorphous

The purified wax more closely resembles paraffin than ceresin in ozokerite.

The original sample contains 1.9% of saponifiable matter".

A party including D.M. Traves and H.B. Owen, (Senior Resident Geologist, Northern Territyr), attempted to find this seepage without success, and it was concluded that Campbell's directions were incorrect (Traves 1954).

The writer plotted Campbell's directions assuming that the rock bar was at the end of the tidal portion of the river as interpreted by Traves and Owen.

From this point at near to the correct bearing and distance there is a prominent peak forming one edge of the Bullo Structure closure and which has two bands of dark coloured sandstone dipping 8 degrees to the northwest on its crest. About three miles and close to 330° from this peak is the point where the crestal fault of the Bullo Structure (Bubble Spring Fault) crosses the gorge of New Yard Creek. No oil seepage was visible there but about 9Kms away there are two springs on this fault both emanating from travertine deposits. There is a more prominent scum on the water of Camp Spring (the southerly one) and some of this scum was collected for analysis.

The results were reported as follows by Analytical Services Pty.Ltd. -

"The scum was removed from the sample of water supplied, extracted with Freon 113 and scanned by the infrared spectrophotometer from 3200 to 2700 wave numbers. Peaks were obtained indicating the presence of CH bonding. The extract was then treated with chromatographic grade silica gel to remove animal or vegetable oils or fats and then re-scanned by IR. This confirmed the presence of hydrocarbon material.

The total water sample was then subjected to the quantitative determination of oil and hydrocarbons by a specific ASTM method. Your water sample was shown to contain 2.3 ppm of hydrocarbons".

This is believed to be the kerosene tasting spring referred to by Tom Ronan above and is accepted as a genuine oil seepage.

SOURCE:

The Angalarri Shale being at least 230m thick is a potential source and a sample was sent down to the AMF Laboratory for evaluation.

There are other potential sources and the presence of an oil seepage on the Bullo structure indicates there are some source rocks underneath.

RESERVOIR:

Potential reservoir beds include the Jasper Gorge Sandstone and also sandstones in the Saddle Creek Formation, Pinkerton Sandstone, Lloyd Creek Formation, Shoal Reach Formation where these occur in the subsurface.

Examination of surface samples of these formations indicate the presence of porosity and the lack of siliceous growths on the quartz grains except in part of the Jasper Gorge Sandstone.

TRAP ROCK:

The Angalarri Shale is an excellent trap rock and in there are also shale units in the Saddle Creek Formation, Lloyd Creek Formation and Shoal Reach Formation.

TRAPS:

1) BULLO RIVER STRUCTURE.

This anticlinal structure is 65 Kms long with four major culminations ranging in area of closure from 35 to 85 sq. kms.

The central and principal culmination of interest is the closure of 65 sq.km centred on the Bullo River and bisected by the Bubble Spring Fault passing through the oil seepage at Camp Spring.

2) BROLGA SWAMP STRUCTURE.

Has a closure of about 18 sq. km with Spenser Sandstone exposed on the crest.

CONCLUSIONS:

(a) There are 5 closed structures suitable as drilling targets.

(b) There is adequate drilling access for the Bullo River culmination the closed structure of most interest.

(c) The field survey confirmed the results of the photogeological survey.

(d) The BMR field mapping was generally correct but erroneous in -

(i) Interpreting the Timber Creek Formation as lying below the Skull Creek Limestone.

(ii) In interpreting the throw of the Spenser Range Fault and so the crestal fault on the Bullo River culmination.

(e) An oil seepage was found in the Bullo River area on the same fault along which the original Bullo River oil seepage is interpreted to occur.

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DESCRIPTION OF SAMPLES.

by J.K. Webby

SAMPLE NO. 7:	Bullo River Pale red brown siliceous Mud/Siltstone
SAMPLE NO. 12:	Cream moderate - poorly sorted subrounded fine-med qtz arenite-Kaolin matrix - prots from destruction of feldspars - faint trace of glauconite and odd coarse sand grain.
SAMPLE NO. 3:	Cream - pale yellow, moderately sorted subrounded medium quartz arenite abundant interlocking quartz overgrowths and trace of clay matrix. yellow brown porous (surface weathering) pits - appear to be ferich clay filled zones (perhaps?)
SAMPLE NO. 10:	Interbedded (parallel bedded) oolitic limestone calcite cemented oolitic limestone and very slightly sandy calcite cemented oolitic limestone
SAMPLE NO. 24:	Interbedded chloritic m/s + and fine sandstone pale green chloritic (fissile and talcy)mudstone pale brown mod-well sorted rounded very fine quartz arenite with small mudstone clasts and lathes and some oxidised and weathered clay matrix.
SAMPLE NO. 9:	White-cream poorly sorted subrounded medium quartz arenite with some clay matrix and evidence of silicification and quartz overgrowth . rare dark ferruginous grains.
SAMPLE NO. 30:	Red brown Festained mod sorted round quartz arenite - highly silicified - extensive remobilisation of silica - with some quartz grains still intact - some clay matrix, mostly orange red oxidised Fe stained.
SAMPLE NO. 7:	brown well rounded moderately sorted calcite cemented glauconitic quartz arenite - well developed porosity - probably surficial dissolution of calcite cement - some clay matrix.
SAMPLE NO. 22:	Pale green muddy limestone some secondary porosity.

DESCRIPTION OF SAMPLES. Contd.

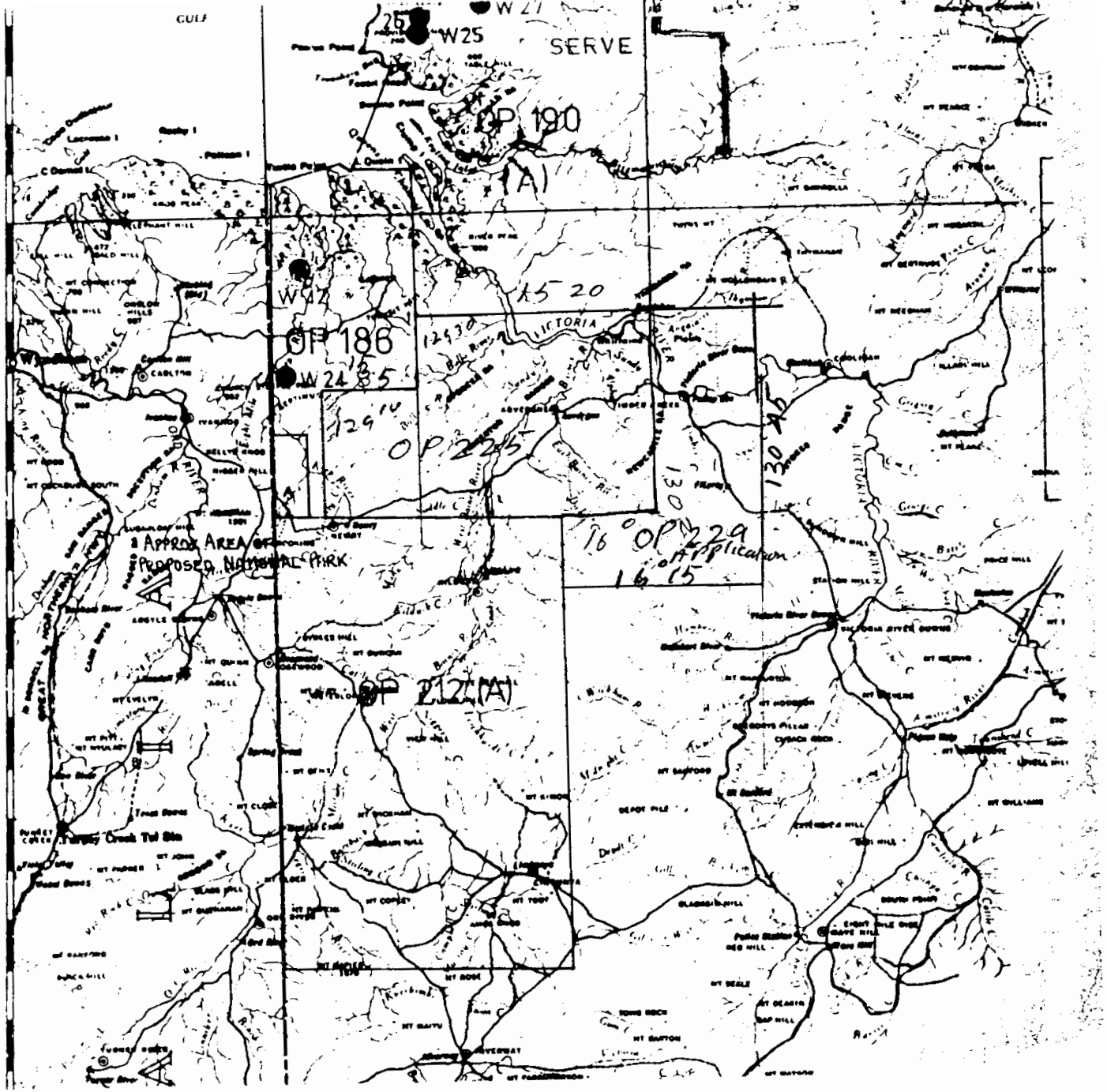
SAMPLE NO. 30: Red brown moderately to poorly sorted subangular coarse quartz arenite with some clay and fine sand matrix.

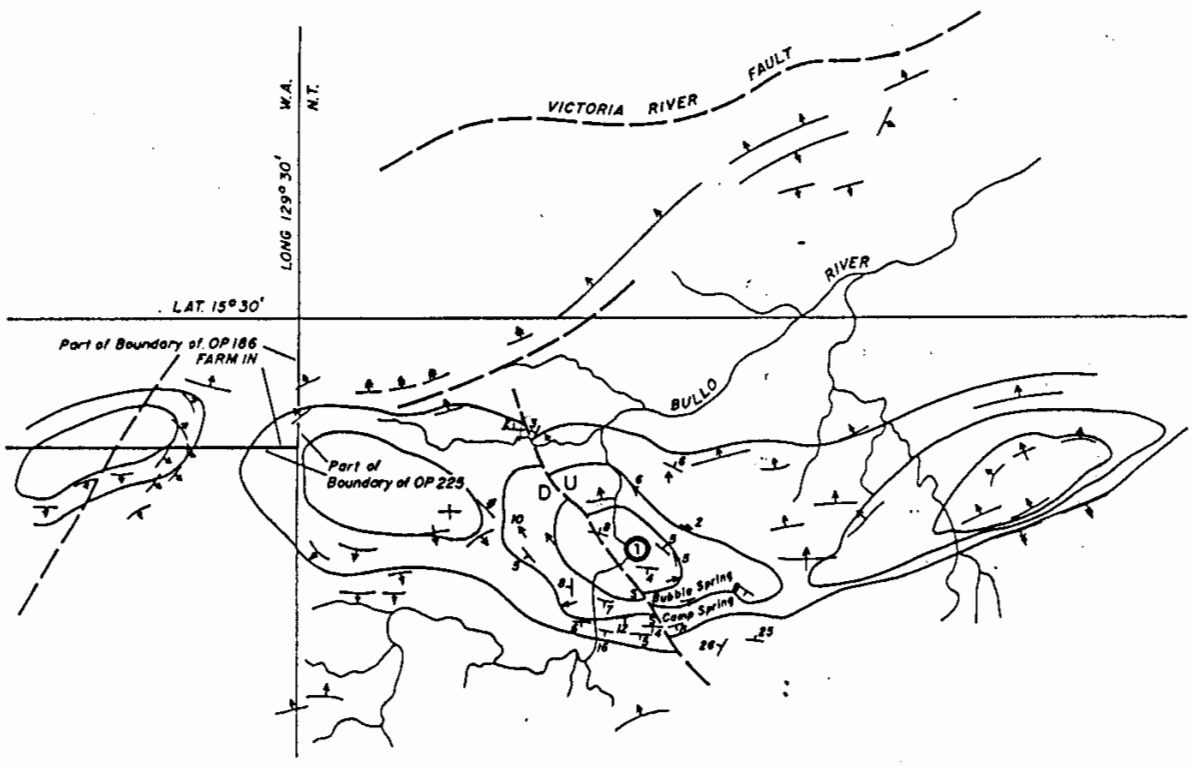
Second sample -
Red brown subrounded poorly sorted very coarse to granule quartz conglomerate with some clay and fine sand matrix.

Victoria River
Area
of 225

Scale

0 50 miles





PART OF OP 225 N.T.

SCALE

0 7 KM

LEGEND

Photogeological Dips

- Flat
- 0 - 2°
- 2° - 15°
- 15° - 30°
- 30° - 85°
- 85° - 90°

Formline Contours

Fault

① First Well Locations

PR82/79 Fig 2

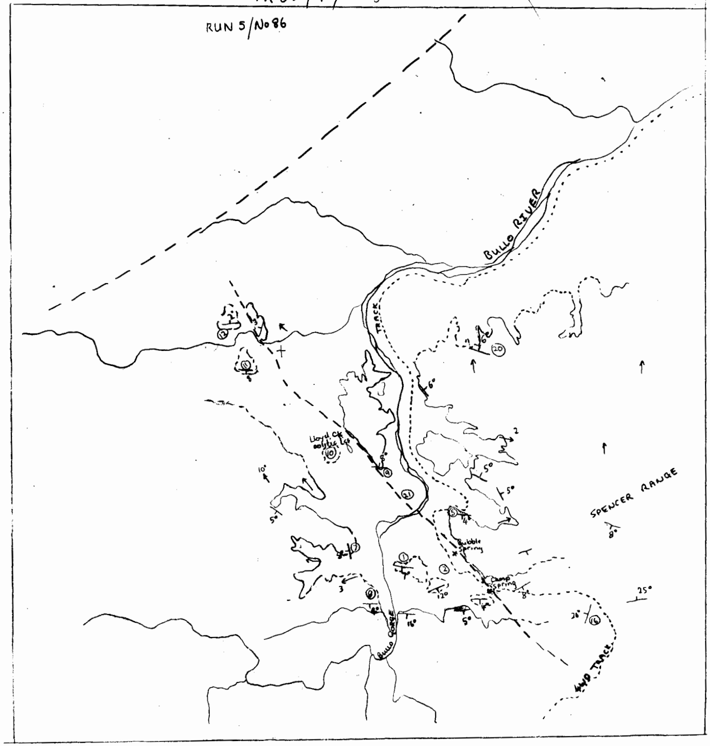

RUN 5/No86
BULLO RIVER
TRACK
SPENCER RANGE
Lloyd Ck oolitic Lst
Bubble Spring
Camp Spring
BULLO GORGE
4WD TRACK

Fig 2

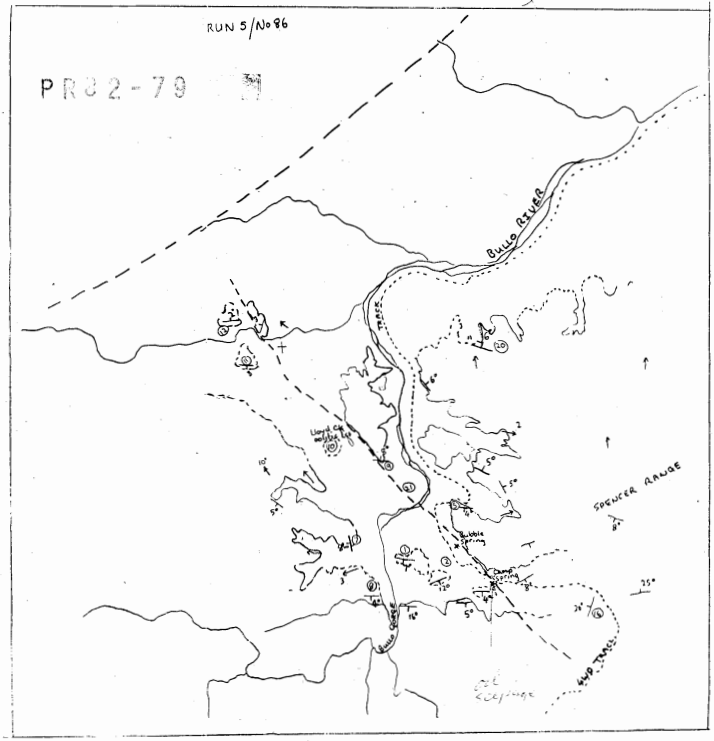
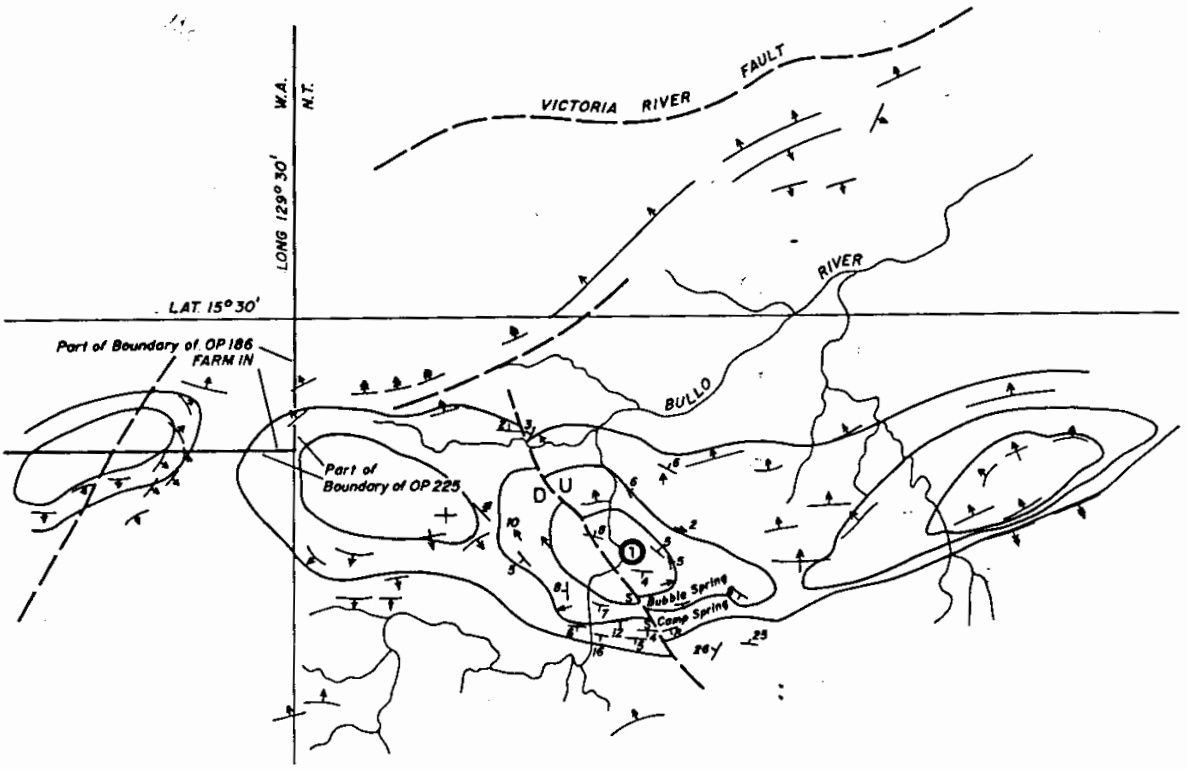


Fig 1



PART OF OP 225 N.T.

SCALE

0 7 KM

LEGEND

Flat	Photogeological Dips
0 - 2°	
2° - 15°	
15° - 30°	
30° - 85°	
85° - 90°	
Formline Contours	
Fault	
①	First Well Locations

PR 82/79

Victoria River
Area
OP 225
Scale

0 50 miles