MAR 19640007: RUSSET CREEK

Received date: Dec 31, 1964

Public release date: Jan 01, 1966

Gcut

19640007

A-37

IMPERIAL OIL LIMITED

GEOLOGICAL DEPARTMENT

Report on Iron Prospecting Permit No. 28

Russet Creek Area

Enclosures See Below

By J. C. Underhill

Date August 21, 1964.

Enclosures in Accompanying Envelope:

Figure 1	-	Reservation 3865 Outline Map with Well Control
Overlay to Fig. 1	-	Iron Prospecting Permit No. 28
Figure 2	-	Stratigraphic Columnar Section
Figure 3	-	Sedimentary Fill
Figure 4	-	Devonian Structure
Figure 5	-	Devonian to Precambrian Isopach
Figure 6	-	Elk Point to Precambrian Isopach
Figure 7	-	Precambrian Structure Map
Figure 8	-	Seismic Shot Hole Location, Elevations and Depth Map on P & NG Reservation 3865.

I N D E X

IN POCKET

-- FINAL REPORT --

Alberta P & NG Reservation 3865

History

Petroleum and Natural Gas Reservation 3865 was acquired at the Director of Mineral Rights Sale dated May 12, 1960 and became effective May 13, 1960. The Reservation contained 61,440 acres. The reservation is located in Townships 121 and 122 and Ranges 21 and 22 west of the Fifth Meridian.

Geological Evaluation

Figure 1 shows the areal extent of P & NG Reservation 3865 and Figure 2 the terminology used to describe the rock units underlying it.

Shell Steen River 14-29 represents the normal section of Palaeozoic fill within the Reservation and IOE Steen River 12-19, the abnormal section. Both wells have been used in compiling the stratigraphic section in Figure 2.

Access is gained by bush roads off the Mackenzie Highway, which lies only 6 miles southeast of the southeast corner of the reservation.

The Reservation covers swampy terrain of low relief which drains the Cameron Hills to the northwest into the Steen River to the south east.

The total post Precambrian sedimentary fill in the report area is approximately 4600' (Figure 3). The sediments and intrusives

...../2

range in age from early Middle Devonian to Quaternary.

Eroded Mesozoic rocks comprise some 370' of this total and consist mainly of marine Lower Cretaceous, grey to dark grey pyritic bentonitic shales. A 25' basal Cretaceous sandstone is the only coarse detritus of the Mesozoic section here.

In part of the Reservation, the Devonian section is eroded to the Winterburn limestones leaving only 170' of Winterburn. This section subcrops unconformably against the overlying Cretaceous beds. In the remainder of the Reservation, a volcanic and intrusive series subcrops unconformably against the normal Cretaceous. This series was penetrated in the IOE Steen River 12-19 borehole. The Devonian structure (Figure 4) shows regional flattening due to the erosion of the Upper Palaeozoic to the Winterburn, superimposed on the effect of local warping of rocks adjacent to the Steen River igneous and volcanic series.

The Devonian rocks offer the best prospect in the area. These sediments comprise some 3800' of the total sedimentary fill and thicken away from the Steen River series to the northeast and southwest (Figure 5). These sediments vary in age from the Upper Devonian Winterburn limestones to Middle Devonian red clastics of the Elk Point Group.

The best prospects in the area appear to be the limestones of the Slave Point formation, the crystalline dolomites of the Sulphur Point, dolomite of the Keg River and the basal Palaeozoic sand unit. Shell Steen River 14-29 tested a gas flow from the Slave Point top of 60 Mcf/day with a recovery of 90' of mud, while at Delcalta Lutose Creek 8-19, 740' of gassy oil cut salt water was recovered from the Sulphur Point dolomite. The Sun

...../3

Russet Creek 6-11 well yielded 510' of salt water from this formation. Neither the Keg River nor the Basal Palaeozoic Sand, although prospective, have been tested on the Steen structure to date.

Figure 6 shows the very uniform character of the sedimentary fill to the end of Elk Point time. A 'nose' effect or thickening in the Elk Point to Precambrian isopach (Figure 6) on the east flank of the present Steen River structure suggests the possibility of structure in this locale even as early as Precambrian time. However, the paleotopography must have been much subdued to permit the widespread and relatively uniform shallow seas to deposit the predominantly evaporitic sequence found here.

Figure 7 shows the present Precambrian structure. Its regional strike is to the northwest and southeast, and in the Reservation area, regional dips are to the northeast and southwest off the Steen River structure. The basal Palaeozoic sand which is well developed at Shell Steen River 14-29 is also prospective.

Figure 8 indicates our seismic coverage on Reservation 3865. Every effort was made to obtain a reasonable interpretation from this coverage. However, upon obtaining the results of our two wells, our interpretative reflections were found to be noise which was thought to be caused by some type of intrusion in the area.

APPENDIX I

Final Report on Iron Prospecting Permit No. 28

History

Iron Prospecting Permit No. 28 was filed on by Imperial Oil Enterprises Ltd. on June 26, 1963, and became operative on June 27, 1963. The Permit contained 87,781 acres in Townships 120 through 122 in Ranges 21 and 22 West of the Fifth Meridian.

Geological Evaluation

This Permit outlined on overlay #1 to Figure #1 was acquired prior to drilling the IOE Steen 12-19 (12-19-121-21-W5) in the event that mineralized basement rocks might be encountered. Subsequent drilling of the above mentioned well revealed a very shallow occurrence of basement rocks with no visible mineralization in cores or samples. Electrical logs also failed to indicate any mineralization in the borehole.

[redacted]

J. C. Underhill
Acting Division Exploration Mgr.

July 8, 1964

Comments on IOE Steen 12-19 598' Wavy Shale

1. This sample is definitely from Palaeozoic. The microfloral assemblage is not very rich or well preserved. However, following index species are definitely present.

(1) Archaeozonotriletes microreticulatus var. famenensis Naumova — Famennian of USSR; U. Devonian of Parry Islands (Abundant)

(2) Acanthotriletes famenensis Naumova — Famennian of USSR; U. Devonian of Parry Islands. (Common)

(3) A piece of Archaeotriletes sp. cf. A. conspicuus Naumova — M. Frasnian USSR (Rare)

(4) Hymenozonotriletes eximius Naumova — U. Frasnian (Rare)

(5) Retusotriletes semigonalis McGregor — Ghost River Fm. Alberta M-U. Devonian.

Besides these, forms like Microreticulatisporites sp., Endosporites sp., Lycospora sp. Reticulatisporites sp., Calamospora sp., Cristatisporites sp. etc. which make their entrance in Devonian are present.

Among the microplanktons Veryhachium reductum and Michystridium sp. are present, indicating a brackish, near shore environment. P.T.O.

On the basis of this assemblage following conclusions can be drawn:

1. The sample is probably U. Devonian in age.

2. The depositional environment was brackish, near shore.

[redacted]

STRATIGRAPHIC COLUMNAR SECTION P & NG Reservation 3865
To accompany Final Geological Report on P & NG Reservation 3865
(Section thickness taken from Shell Steen River 14-29-121-20-W5 Mer.)

PERIOD	GROUP	FORMATION	LITHOLOGY
QUATERNARY (30')			Recent gravels. mud.
LOWER CRETACEOUS	FORT ST. JOHN (348')		Shale. grey to dark grey pyritic in part.
	BULLHEAD (25'		Shale, dark grey to light grey brown and minor quartz, glauconitic sandstone.
DEVONIAN		Winterburn (167')	Limestone, grey brown to tan, silty, fragmental argillaceous with shale, green, flacky interbeds.
		Woodbend (1844')	Shale, grey green, silty in part with minor interbedded shaly limestone stringers.
	BEAVERHILL LAKE (534')		
		Slave Point (208')	Finely crystalline limestone.
	ELK POINT	Watt Mtn. (20')	Green shale.
		Sulphur Point (32')	Dolomite, buff, very fine to medium crystalline.
		Muskeg (632')	Interbedded anhydrite and finely crystalline dol., minor salt.
		Keg River (183')	Limestone, crypto-crystalline.
		Chinchaga (140')	Brown dolomite anhydrite.
		Meadow Lake (154')	Red shales and sandstones.
PRECAMBRIAN			Granite

Volcanic series & associated igneous rocks (cf. IOE Steen 12-19-121-21)

FIG. 2

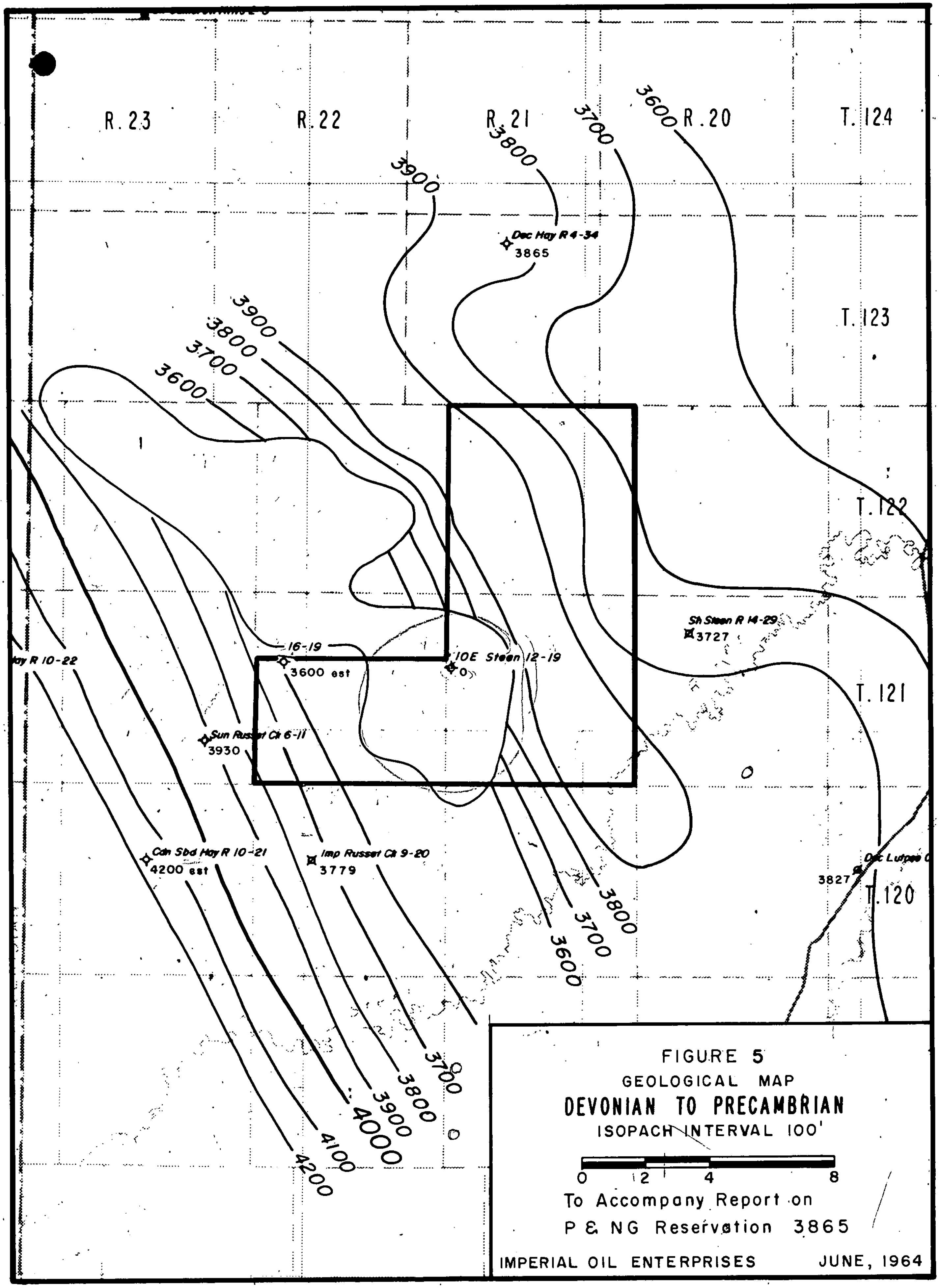


FIGURE 5
GEOLOGICAL MAP
DEVONIAN TO PRECAMBRIAN
ISOPACH INTERVAL 100'

To Accompany Report on
P & NG Reservation 3865

IMPERIAL OIL ENTERPRISES JUNE, 1964

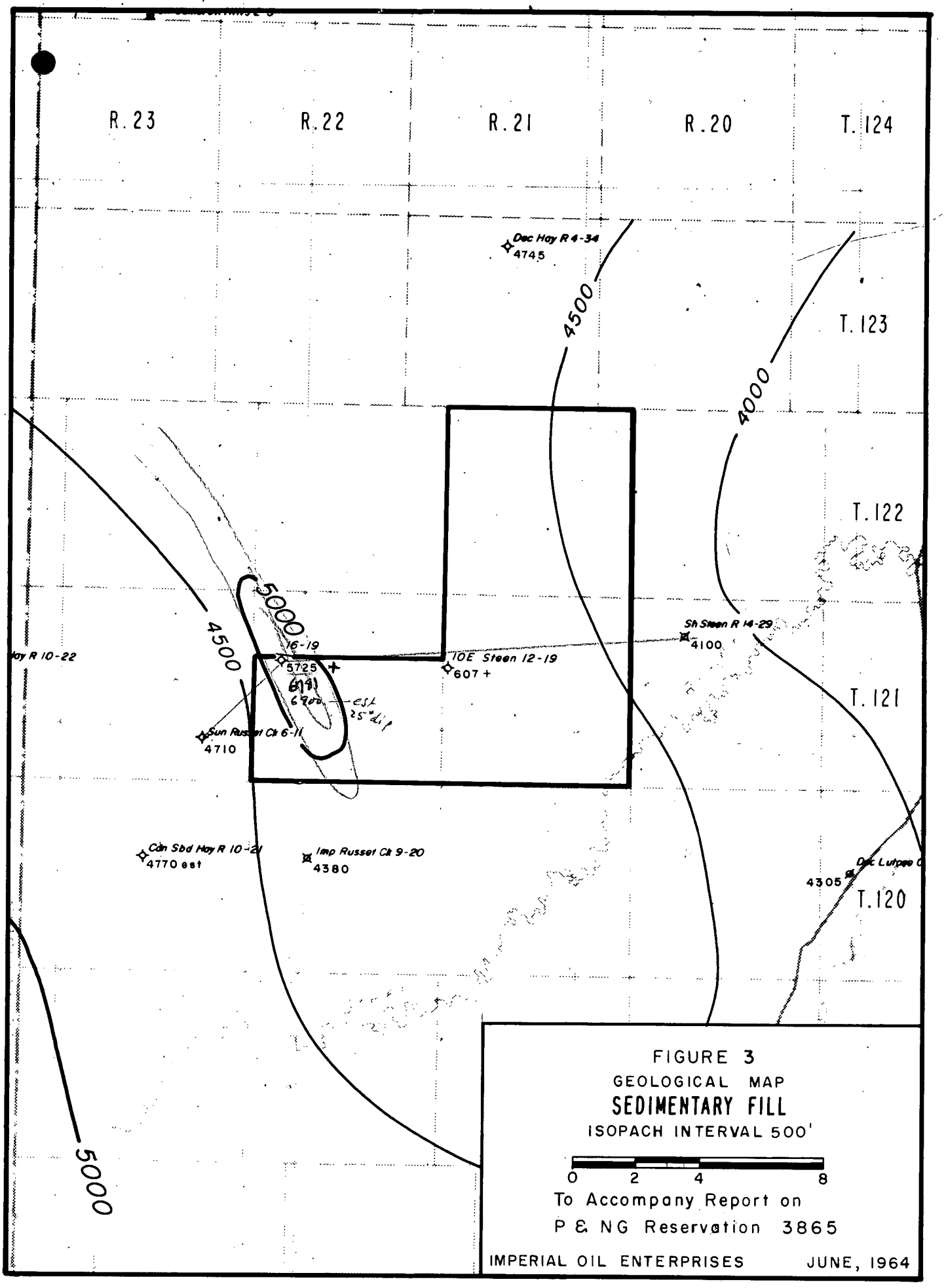


FIGURE 3

GEOLOGICAL MAP

SEDIMENTARY FILL

ISOPACH INTERVAL 500'

0 2 4 8

To Accompany Report on

P & NG Reservation 3865

IMPERIAL OIL ENTERPRISES JUNE, 1964

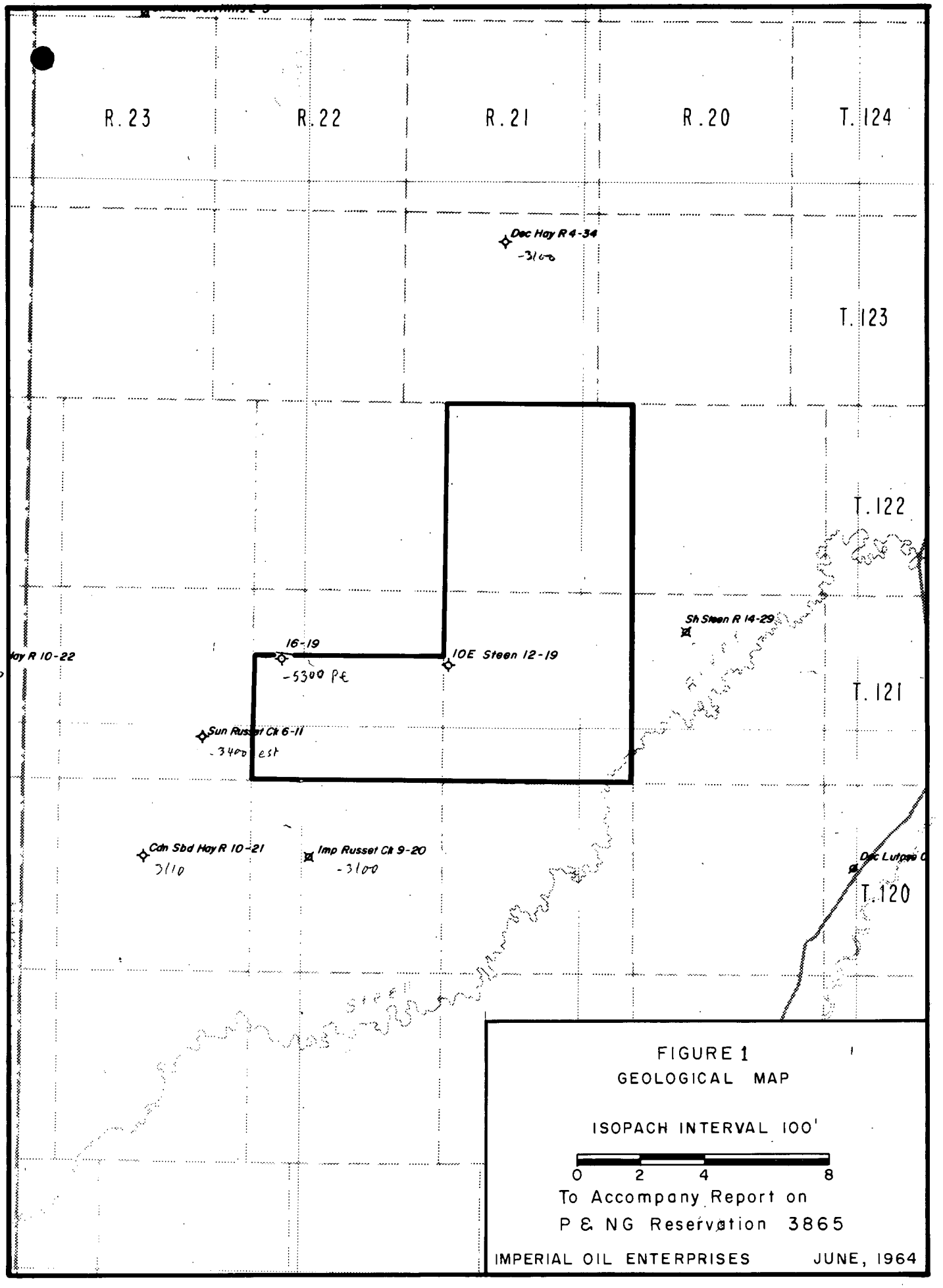


FIGURE 1
GEOLOGICAL MAP

ISOPACH INTERVAL 100'

0 2 4 8

To Accompany Report on
P & NG Reservation 3865

IMPERIAL OIL ENTERPRISES JUNE, 1964

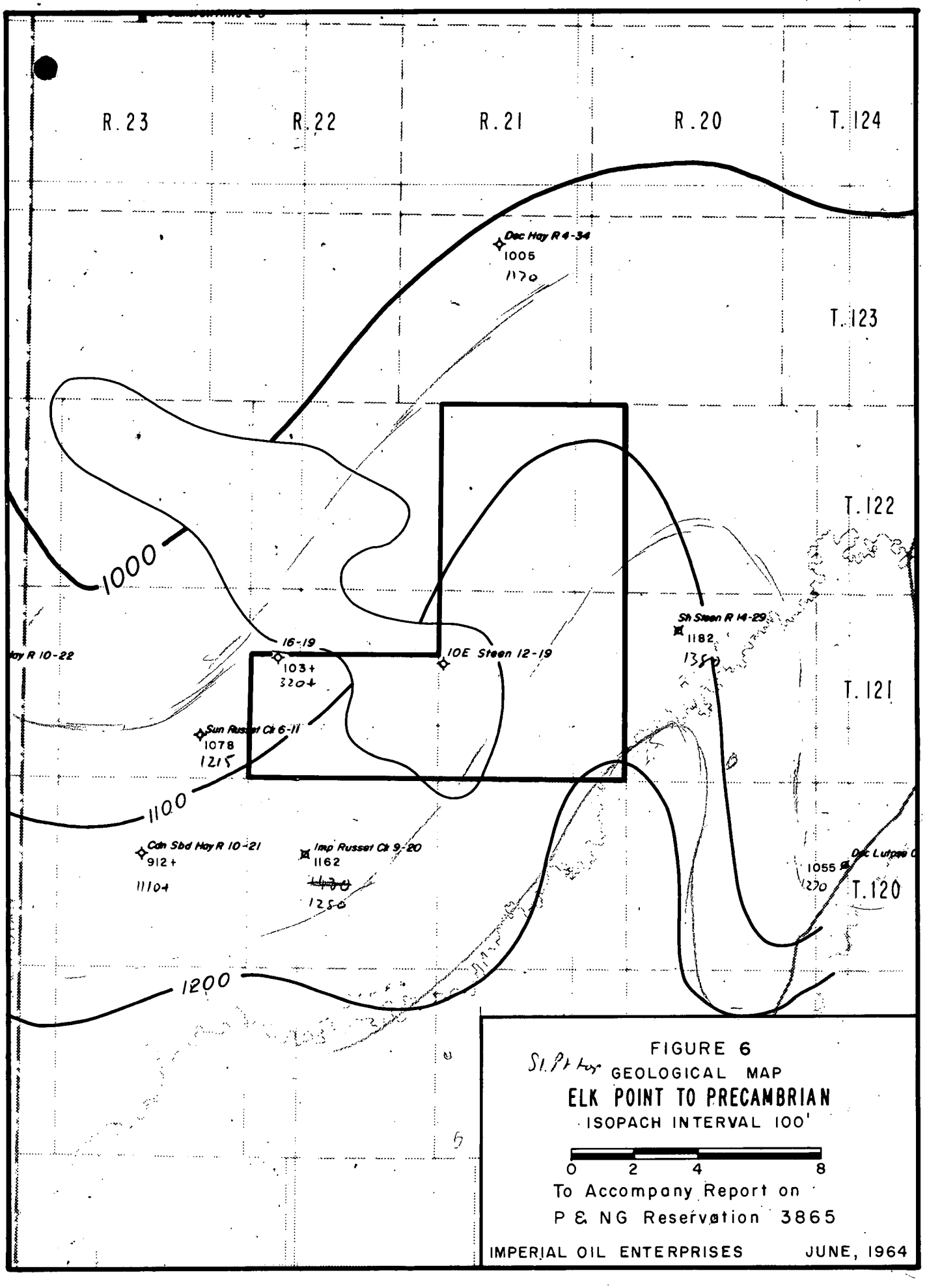


FIGURE 6

GEOLOGICAL MAP

ELK POINT TO PRECAMBRIAN

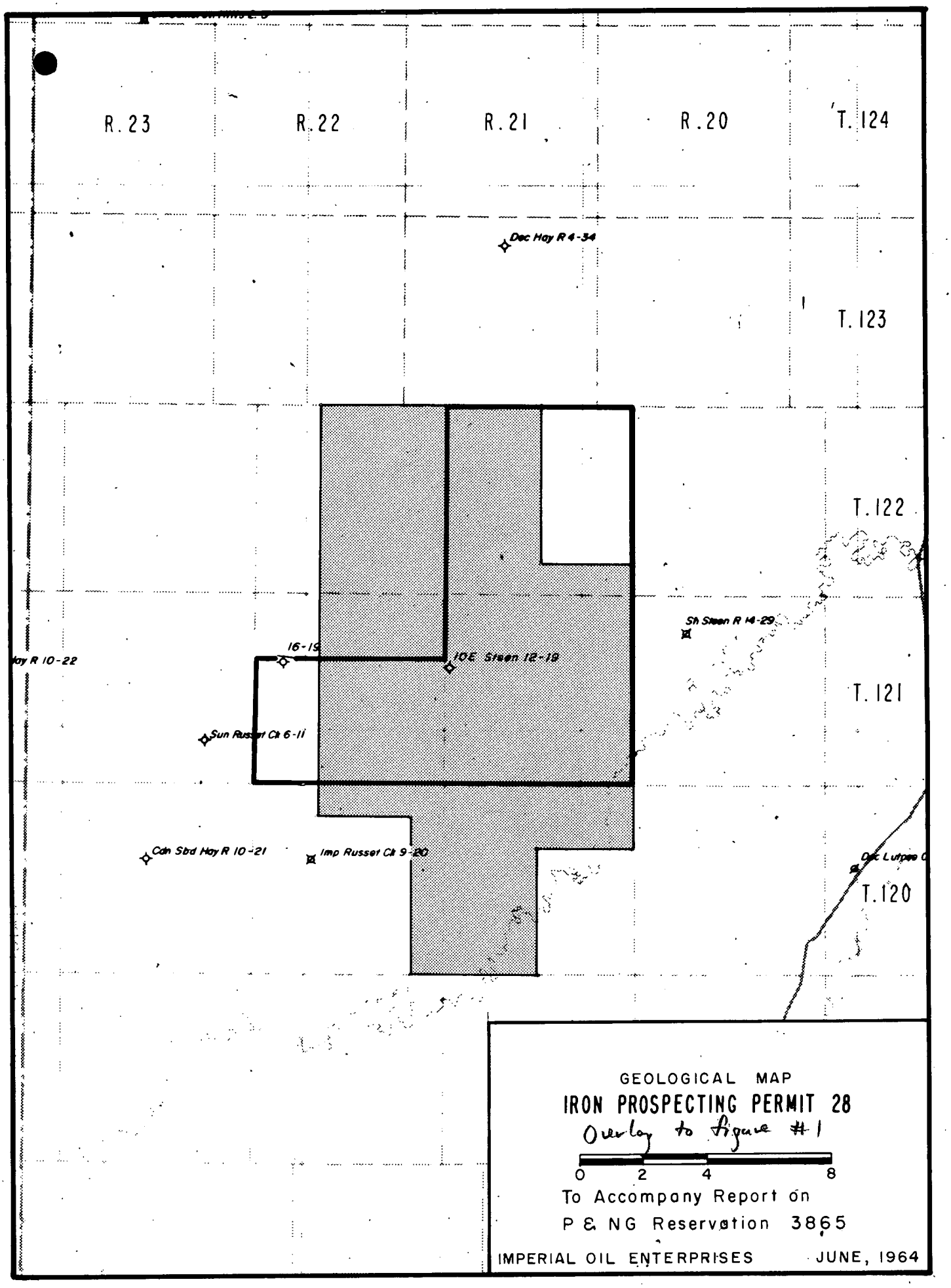
ISOPACH INTERVAL 100'

0 2 4 8

To Accompany Report on

P & NG Reservation 3865

IMPERIAL OIL ENTERPRISES JUNE, 1964



GEOLOGICAL MAP

IRON PROSPECTING PERMIT 28

Overlay to figure #1

To Accompany Report on

P & NG Reservation 3865

IMPERIAL OIL ENTERPRISES JUNE, 1964