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STRUCTURAL INTERPRETATION OF THE UPPER PROTEROZOIC SURFACE AT THE MT. KITTY PROSPECT FROM SEISMIC DATA.

Memo by R. Russell
18th September 2007

1 INTRODUCTION

1.1 Background

The Mt. Kitty prospect in the southeastern Amadeus Basin is a structural high in the Palaeozoic and Proterozoic section which was probably produced by northeast-directed thrusting during the Petermann Ranges Orogeny. The primary target is the Upper Proterozoic Heavitree Quartzite which is thought to contain helium in fracture reservoirs. Ten seismic lines have been shot over the structure.

This memo describes the structural interpretation which has been carried out from the seismic sections. The intention has been to locate areas of high fracture density in the vicinity of the structural culmination of the structure.

1.2 The Data

The seismic sections were shot by Central Petroleum earlier this year. A reflector thought to be the Heavitree Quartzite was picked on the seismic lines by Central Petroleum staff.

Contour mapping has previously been done from the seismic of the Upper Proterozoic surface (Heavitree Quartzite) and other units in the sedimentary section. A structural interpretation was also attempted of the same surface which shows a series of disconnected northwest-southeast trending thrust faults. The direction of overthrust is from the southwest.

1.3 Technique

In the present work programme, fractures were interpreted on the seismic sections with particular emphasis on those which penetrated the Heavitree Quartzite horizon. Relative movement was estimated on the faults. The faults were then transferred as far as possible to a plan view of the Heavitree Quartzite surface. This interpretation is shown on Enclosure 1.

2 INTERPRETATION

The main features of the present interpretation are as follows:

2.1 Major Thrust fault

- A major thrust fault trending northwest-southeast controls the northeastern margin of the crest of the Mt. Kitty structure between seismic Lines 7 and 9 (F1, Enclosure 1).
- Thrusting is from the southwest and the overthrust plate forms the main culmination to the southwest of the fault.
- The main fault does not extend as far as line 10 in the southeast and is reduced in size on Line 7.

2.2 Mt. Kitty Structural Culmination

- The culmination contains secondary northwest trending reverse and normal faults which may intersect the main fault zone at depth. These faults are numbered F2 to F6 on Enclosure 1.
- These faults appear to be 'listric' thrust or reverse faults. They may control 'keystone' fault slices.
- Northeast-directed thrusting occurs in the southwest of the mapped area (F7, Enclosure 1).
- A wrench fault system throws down-to-the-west coinciding roughly with the southern part of seismic Line 7 (F8, Enclosure 1).

2.3 North of the Main Thrust Fault

- Imbricate thrust sheets occur in the structurally lower part of the Mt. Kitty prospect to the north of the main thrust fault. At least four such sheets can be recognised (S1 to S4).
- The thrusting is terminated along a major thrust fault at F9.
- To the northeast, the structural style appears to be extensional and compressional keystone-type faulting.

2.4 Recommended Drill Targets

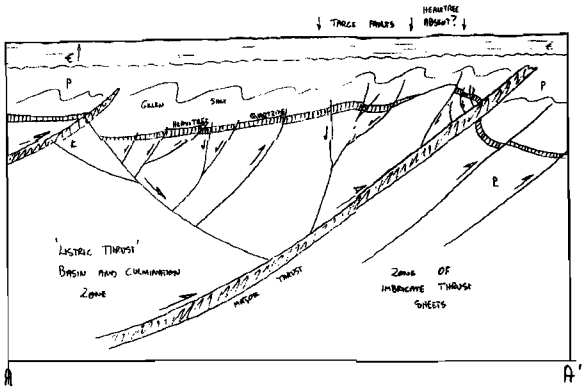
- Line 8 appears to be approximately central to the main culmination.
- The Heavitree Quartzite appears to be thin or absent on the crest of the Mt. Kitty structure. This is an area of little faulting.
- Faulting in the crestal area where the Heavitree is present occurs between shot points 642 and 847 on Line 8.

- The main faults intersect with Line 8 at shot points **642, 712, 793**, and a series of smaller faults between **820 and 847**.

    - The fault at sp **642** may be south of the possible trap

- At sp **712** is a similar fault throwing down-to-the-south but in a higher structural position. The target quartzite appears to be thick in this location.
- The fault at **793** is minor.
- Between sp's **820 to 847** is a significant fault zone in the crestal part of the structure. However, the target quartzite is thinning northwards towards the crest of the structure.

The writer would favour a drill target on Line 8 at shot point **712** or between about shot points **800 and 830**.



Schematic Cross Section
A - A'

KEY

- Thrust Fault, overthrust block indicated
- Normal or reverse fault, downthrow side indicated
- Possible Culmination in Heavitree Quartzite
- Target Fault Trends

Imbricate Thrust Sheets

Extensional/Compressional Faulting in Thrust Fold Depressions and Culminations. 'Listric Thrust' Features

Scale 1:100,000

CENTRAL PETROLEUM LIMITED

STRUCTURAL INTERPRETATION OF THE UPPER PROTEROZOIC HEAVITREE QUARTZITE, MT KITTY PROSPECT FROM SEISMIC SECTIONS 1 TO 10

By R. Russell August 2007

Horizontal Scale 1:100,000 ***ENCLOSURE 1***