INTERPRETATION OF

REPROCESSED SEISMIC DATA IN

OP 172 AND OP 57

by

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for

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REPROCESSED SEISMIC DATA
OP 172 AND OP 57

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ENCLOSURES

SUMMARY

The interpretation of the reprocessed data in OP 57 and OP 172 does not give us a positive answer as to the Permian thicknesses over the areas investigated. It does indicate though that the possibility of much thicker Permian section than the one encountered at Hale River and McDills may indeed exist in OP 172. As the next step in the Permian section investigation a combined reflection/refraction seismic program to cover the eastern areas is suggested.

INTRODUCTION

This interpretation of reprocessed seismic data in OP 172 and OP 57 was done for the purpose of outlining areas of possible potentially interesting Permian thicknesses. Although no definite results were anticipated, however, it was hoped to obtain a more reliable seismic mapping of the Permian by combining the reprocessed seismic data with the unreprocessed data pertinent to the area of investigation.

AVAILABLE SUBSURFACE CONTROL

Two subsurface control points and velocity surveys are available in OP 57: one at Amerada McDills No. 1 (Lat. 25° 43' 50", Long. 135° 47' 25"), and one at Amerada Hale River No. 1 (Lat. 25° 15' 50", Long. 136° 43' 35"). McDills No. 1 encountered 630 feet and Hale River No. 1 encountered 390 feet of Permian section. Hale River is on reprocessed Line 2Z, and McDills, which was also to have been reprocessed, is on Line AB. However, because tapes for Line AB were not available, McDills was tied into the reprocessed data for ten miles along Line AB and an additional eight miles along Line J, using field records (Encl. 1).

DISCUSSION OF RESULTS

Except for areas where the Permian section approaches its apparent subcrop edge, the character of the Permian seismic reflection energy bands is generally quite distinguished over most of the 470 miles (360 of interpreted seismic data miles of which have been reprocessed and 110 miles not reprocessed) of interpreted seismic data (Encl. 1). The correlation of a single continuous near top of the Permian reflection energy band was a much more difficult task as its character and continuity change due to the suspected gradual subcropping of the Permian section. It is felt, however, that the overall Permian correlation can be regarded as reliable from a regional approach (Encl. 2).

No reliable reflection appeared to be associated with the base of the Permian at the Hale River and McDills wells, and consequently the absolute depth of our base Permian horizon is not reliable. The same degree of unreliability also applies to our interpretation of Permian thickness (Encls. 3 and 4). Nonetheless, most of the reprocessed data gave sufficiently useful correlations at the near base Permian horizon to permit a regional type interpretation of Permian section thickening and thinning trends (Encl. 4). Reprocessed Lines 3H, 3J and 2E, as well as the un-reprocessed data, were felt to be too poor to even be worked into this regional type Permian thickness interpretation as it was thought that their inclusion could result in a misleading overall picture.

Three areas of possible potential Permian thicknesses emerge: (1) the Western Area, (2) the Southeastern Area, and (3) the Eastern Area (Encl. 1).

The Western Area

In the Western Area a Permian section in excess of 1000 feet could well exist on the downthrown side of an interpreted major fault trend. A fault displacement of up to 2000 feet at the near top of the Permian section downthrown to the northwest appears to be associated with the introduction of potentially prospective Permian section.

Due to the lack of subsurface control, the absence of reliable velocity information and the poor quality seismic data, it is felt that the next stage of exploration in this area should be an attempt to acquire reflection and refraction coverage. Such a program should be designed to find out the depth of the first definitely pre-Permian layers as well as to provide us with improved reflection data quality. The achieving of both objectives will give us a more reliable idea of the possibilities of Permian thicknesses. Since a fair amount of reflection energy appears to exist on the presently available seismic single-fold coverage at the assumed base of Permian level, it is thought that increased multiplicity at the recording stage would have a good chance of enhancing the seismic depiction of the Permian section.

The Southeastern and Eastern Areas

Our interpretation of reprocessed and un-reprocessed data indicates that Permian rocks of Gidgealpa Formation age may exist in the southeastern and eastern areas of the permit. A combined reflection and refraction survey is recommended as the next step in exploration of these areas. Again, the objective of the refraction survey would be to provide information on the pre-Gidgealpa Formation equivalent surface, which data, together with improved reflection definition, should result in a better estimate in the distribution and thickness of a post-Merrimelia Formation equivalent.

CONCLUSIONS

1. Three areas may have a suspected Permian section of sufficient thickness to be prospective for oil and gas generation, and all three may be worthy of further exploration. However, the eastern and southeastern areas are closer to exposed Triassic rocks than the western area, thus indicating the greater likelihood of finding subsurface Triassic in these areas. Therefore, the two eastern areas probably have greater potential than the western area.

2. The two eastern areas should be explored first, and if this exploration leads to a discovery, then the western area should also be explored.

3. As the reliability of geological inferences made from a seismic survey is in direct proportion to the quality of the seismic data, it cannot be emphasized too strongly that the quality of the results, and thus the quality of the operation, is of prime importance.

RECOMMENDATIONS

We propose that a seismic program, comprising 90 miles of six-fold reflection coverage, be conducted over the two eastern areas, together with three reversed refraction spreads. Our estimate of the approximate expenditure involved is $165,000, based on $1,500 per line mile of seismic survey and $10,000 per refraction spread. We stress the preliminary nature of this costing, and point out that these estimates could change appreciably, depending mainly on charges incurred from mobilization and logistics.

The further exploration of OP 172 will depend largely on the results of this program.

Respectfully submitted,

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