



Abstract No : 1A7/2001
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SEISMIC DIRECT HYDROCARBON INDICATORS IN THE MALAYSIA-THAILAND JOINT DEVELOPMENT AREA

The use of seismic amplitudes in finding hydrocarbons in Tertiary clastic basins is well established. In this respect explorers in the Gulf of Thailand have experienced an exceptional track record of success. This paper provides a summary of how seismic Direct Hydrocarbon Indicators (DHI's) are being used in the Malaysia-Thailand Joint Development Area (MTJDA) to reduce risk through the entire cycle of Exploration through Appraisal and into Development.

Since 1995 sixteen wells have been drilled in the block without a single failure to flow hydrocarbons to the surface. In all cases the primary tool for identifying drillable targets has been the presence of amplitude anomalies that have conformed to structure. In the forward exploration program, amplitude anomalies continue to be a primary criterion for defining drillable prospects, but with the notable difference that trapping involves stratigraphic components.

In the appraisal of the gas holding areas which have been established around the exploration wells, quantitative and qualitative analysis of amplitude anomalies, with the aid of 3D seismic, forms the basis for determining the P1, P2 and P3 reserves and for deciding the optimum locations for the appraisal drilling program. For the development program 3D seismic data has been used extensively to provide the framework for the reservoir model as well as measurements of reservoir quality that have been tied to seismic amplitude variations. In addition, seismic amplitude and estimates of acoustic impedance derived from seismic are being used to select all development drilling targets.

Despite the success in using seismic amplitudes, a number of significant challenges remain. In particular, success is hampered by the ubiquitous presence of shallow gas, by the limitations imposed by the resolution of the seismic and by the presence of numerous thin coal beds that produce "false-positive" DHI responses. Together with an overview of the DHI successes, this paper provides examples of the principal limiting factors and some of the approaches being taken to address them. The relative merits of 2D versus 3D seismic and of various data attribute volumes and analysis techniques are discussed. Particular emphasis is placed on applying an integrated methodology that requires careful ties between seismic and wells and fully incorporates the geological model.