

ENHANCED ANALYSIS OF 3-D SEISMIC SURVEY OVER A CARBONATE PROVINCE

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Seismic response from carbonate rocks varies from weak reflections (dim spots), associated with reef-like features, to strong reflections from carbonate rocks having a much higher velocity than the surrounding rocks. Amplitude, frequency, and velocity of seismic reflections can

be diagnostic of the presence of hydrocarbons.

A three dimensional (3-D) seismic survey was carried out for Philippines-Cities Services, Inc. by Geophysical Service, Inc. in February, 1978. One of the objectives of this 3-D survey was to define the shape and size of the productive Nido features. It was also important to determine the relative locations of these features. Finally, the 3-D seismic survey data were to be employed for locating new exploratory wells to increase the oil reserves within the Nido area.

A three dimensional seismic survey is well suited for resolving reflections anomalies from reef-like (dome shaped) features by employing some of the state-of-the-art processing techniques. Cities Service's Data Processing Center displayed these seismic data in various colors by using the Cit-Chrome (Pat.) seismic color processing system. These color plots can highlight seismic parameters such as: amplitude, frequency, absorption, energy and energy frequency. Cities' experience with frequency anomalies over known hydrocarbon saturated zones indicates that low frequency anomalies can be an indicator for the presence of hydrocarbons.

All of the 88 3-D seismic lines were processed in color to show "Energy Frequency" of the seismic reflections. These "Energy Frequency" color plots were laminated onto plexiglass sheets to form a 3-D color display. A close examination of this 3-D display reveals some interesting geophysical facts regarding the location of some of the non-commercial wells.

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