File papers

LANDMARK

GRAPHICS CORPORATION

H. Roice Nelson, Jr.
Senior Vice President

January 21. 1985

Mr. Don Speakman
Managing Editor
Petroleum News
6th Floor
148 Prince Edward Road West
Kowloon. Hong Kong

Dear Mr. Speakman:

Enclosed, as you requested in your telex of January 15, 1984 is a summary of LANDMARK's technology of interactive seismic interpretation workstations.

Please let me know if we can be of further assistance.

Regards,

Roice Nelson

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Integrating Seismic and Subsurface Date - An Interactive Interpretation Case History from Sterling County, Texas

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Subsurface control from nine wells and five seismic lines were used to define a new prospect using an interactive interpretation system. Tops from up to 13 horizons were triangulated and displayed in map and perspective to give a feel for trends at different geologic times. A new well, the Harris #1, showed a porous and prospective, but wet, carbonate section at the Wichita Albany. Time velocity pairs were used to convert these depth maps to time. The time horizons were projected onto five seismic lines that were available. These were adjusted to fit the reflectors. The seismic time horizons were converted to depth using the same layer cake velocity assumptions. Depth values from the seismic and well control were gridded, smoothed and displayed as final depth maps.

Stratal patterns were also interpreted on the seismic between the Wichita Albany and Base Wolfcamp horizons. These patterns were tied between lines and displayed in cross-section and fence diagrams. The sonic and density logs from the Harris #1 well were used to calculate the reflection coeffecient and create a synthetic trace which was overlaid on the seismic. Sections were flattened on the San Angelo to study the shape of the proposed reef at that time. Sags that could be due to velocity pushdowns were noted under the prospect. Horizons were displayed in map, cross-section and perspective to cross-check the interpretation in as many ways as possible. A synthetic section was made along a critical line using an advanced ray trace modeling package.

The interactive interpretation system provided a unique and useful method for detailed evaluation of the subsurface and seismic data. The capability to try out different interpretation concepts quickly, zoom on windows, build perspective maps and fence diagrams, dynamically change the color control, do seismic instantaneous phase analysis, as well as the map building tools provided multiple cross-checks on the prospect interpretation. This type of quality interpretation is required to reduce the number of dry holes.