Use of Biostratigraphy to Reduce Risks, Increase Production and Reduce Environmental Concerns in Oil Well Drilling

DE-FG26-02NT15296

Goal

Biostratigraphy, as a tool, has not been pursued in recent years, but can help us in the search for subtle traps to increase production, reduce risks, and reduce environmental concerns in drilling for hydrocarbons. Biostratigraphy is the description and study of the fossil content of strata from the stratigraphical point of view, particularly for determining their time correlation and for inferring the conditions under which they were deposited. This field of study helps geologists determine stratigraphic time correlation and infer environments of deposition. This is to help explorationists sort out the productive sands and shales from those that are not productive.

Performers

Edward Marks & Associates
Cypress, CA

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Whittier, CA

Results

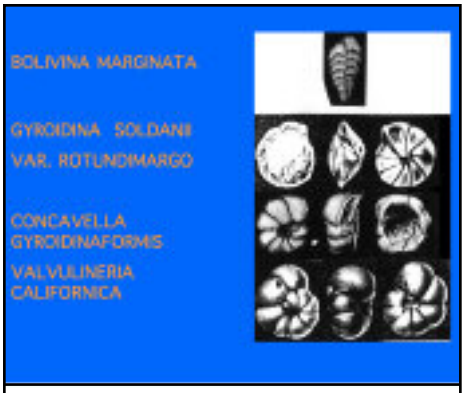
The major achievement has been to use biostratigraphy to sort out and identify the productive section from the non-productive section in a basin proven to contain hydrocarbons.

Benefits

The benefits to industry are many. By identifying the productive section, an operator can drill more intelligently into the target section. This reduces risk by narrowing down the target for production. This increases production, because fewer wells have to be drilled, and in a shorter time to find the target interval. This reduces environmental impacts by eliminating needless drilling where the target interval is unknown, even in a proven field.

Background

Rock samples from four wells were examined in the Santa Maria Basin, Santa Barbara County, CA. The intervals were selected to pinpoint known and unknown rock intervals in these wells. Electric logs were taken in three of the four well sections examined. The samples were examined both lithically and paleontologically, for the purpose of knowing their lithological and paleontological characteristics.



Examples of some foraminifera from the California Tertiary, keys to finding hydrocarbons in California. (after Kleinpell, 1938).

A percentage lithological study was made, and a lithic chart was prepared displaying the rocks found in the samples. The samples also were processed for paleontology and studied for fossil content. Index fossils found included benthic and pelagic foraminifera, radiolaria, diatoms, and algal cysts. Results were plotted on fossil distribution charts, and the index fossils plotted on range charts. Because of the refractory nature of the samples, some were not as productive as index fossils as they could be, but because of earlier work the researchers were able to get enough information to do the job.

Summary

By using paleontology, the researchers were able to correlate from the known sections to the unknown and find similar productive zones in the unknown. This was notable in the Triton No. 10 Blair and OTEC No. 1 Boyne wells.

Both benthic (bottom dwellers) and pelagic (floating specimens) provided age and environment information to find more oil. This was significant in the OTEC No. 1 Boyne well.

By using lithology, researchers were able to determine lithic characteristics of formations as well as determining the ages of the sediments (OTEC No. 1 Boyne well).

Current Status (August 2005)

All four well sections studied have been accessioned, processed, and completed for lithology and paleontology. Stratigraphic reports on all four wells have been forwarded. Researchers have prepared a final report after receiving a no-cost extension to the end of August 2005.

Funding

This project was selected in response to DOE's solicitation DE-PS26-02NT-15377, Research with Independents.

Publications

Reports on the following wells were submitted to DOE: OTEC No. 1 Boyne–Lithologic Report, July 24, 2003; OTEC No. 1 Boyne—Lithologic Chart, August 11, 2003; OTEC No. 1 Boyne—Stratigraphic Report, May 25, 2004; TRITON No. 10 Blair—Lithologic Report, November 2003; TRITON No. 10 Blair—Lithologic Chart, November 17, 2003; TRITON No. 10 Blair—Stratigraphic Report, November 29, 2004; SUN No. 5 Blair—Lithologic Report, December 22, 2003; SUN No. 5 Blair—Lithologic Chart, January 7, 2004; SUN No. 5 Blair—Progress Stratigraphic Report, May 27, 2005; SUN No. 5 Blair—Stratigraphic Report, June 3, 2005; CABOT No. 1 Ferrero-Hopkins—Lithologic Report, December 31, 2003; CABOT No. 1 Ferrero-Hopkins—Lithologic Chart, January 12, 2004; CABOT No. 1 Ferrero-Hopkins—Stratigraphic Report, June 27, 2005.

Project Start: July 22, 2002
Project End: September 9, 2005

Anticipated DOE Contribution: $75,000
Performer Contribution: $75,000 (50% of total)

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