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3D Petroleum Visualization: Workflows and Collaborative Solutions to Identify New Exploration Plays, Enhanced Reservoir Characterization and Improved Drilling and Wellbore Placement

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Abstract

Emerging plays, deeper zone exploration, along with complex reservoir development require the best possible workflows and collaborative solutions in today's competitive environment. The seismic amplitude play has been exhausted, today's E&P Companies must focus on the classic prospect and field elements of reservoir, trap, and charge. Deepwater field appraisal, development, and production operations increasingly require collaboration of multiple disciplines. This paper will evaluate how visualization workflows are used to de-risk reservoir presence and complexity. We will show how enhanced imaging tools and structural evaluation technology can further the understanding of trap risk and fault compartmentalization. How using 3D Petroleum Basin Modeling technology we can better predict charge potential, gas versus oil, and the presence of over-pressure. Enhanced geologic risk analysis through the use of 3D-Visualization workflows is essential to make commercial decisions in high cost deepwater and international settings. Reducing well count through better understanding of reservoir complexity and early prediction of reservoir performance can be enhanced through visualization technology. Of paramount importance to E&P Companies is safe drilling and risk reduction through the integration of geologic models with drill technology and pre-drill planning in a fully 3D environment. An integrated collaborative approach using visualization is increasingly needed to bring the basin wide knowledge into a single frame. 3D-Visualization is no longer a game changer technology, but a necessary tool used by petroleum professionals. Companies which fail to fully adopt visualization technology are now at a disadvantage.

Introduction

When oil was trading above \$ 100 USD we might expect there would be room in the market for both traditionalist line by line seismic interpreters and adopters of visualization technology. To some extent this was true, yet inflationary pressure on acreage entry expenses combined with high drilling costs conspired to make the exploration and production business more competitive as small to large companies struggled to maintain their reserves base. The World Economic Crisis which coincided with the failure of banking system has created a dramatic reversal of fortune in our industry. We now face continued high costs along with low oil prices. The cash constraints, caused by low oil price have occurred along with vanishing liquidity and access to capital. With this sudden change also comes great opportunity. Access to international blocks and domestic acreage has improved, companies are looking for partners to defray drilling expenses, and farmout activity has increased dramatically. With the change there is an ever increased need