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A map-based, integrated geological and economic approach for play analysis

K. Nifuku* (Inpex), K. Ogino (Inpex), K. Nakaoka (Inpex), Y. Okano (Inpex), T. Ito (Inpex), T. Todoroki (Inpex)

Summary

Play based exploration is an effective approach in the exploration of emerging and frontier plays in a basin. It is essential to evaluate and understand geological potentials of the plays, for instance geological risk and field size, together with their economic potential in order to identify the best areas to invest. This paper introduces a workflow of a map-based, integrated geological and economic approach for play analysis, which is based on our assessment in the deepwater Northern Gulf of Mexico.

Abstract

Play based exploration is an effective approach in the exploration of emerging and frontier plays in a basin. It is essential to evaluate and understand geological potentials of the plays, for instance geological risk and field size, together with their economic potential in order to identify the best areas to invest. This paper introduces a workflow of a map-based, integrated geological and economic approach for play analysis, which is based on our assessment in the deepwater Northern Gulf of Mexico.

The geologic and economic potential of individual plays were evaluated in a consistent way using this integrated approach. In the assessment, plays were defined and divided into play segments based on unique geological parameters (i.e., geological chance of success, undiscovered field size, and lead density). Geological potential maps were created using the play segment maps. Economic assessments were then made of each play segment. The economic model used for the analyses was constructed utilizing information from existing fields in the basin, as well as an integration of internal experience. The model generates a development scenario for a future discovery, including the timeline from appraisal phase to field abandonment, well counts, facility design, cost profile, and production profile derived from the given subsurface and surface conditions (e.g., reserves, field area, reservoir quality, water depth, etc.). The future field was assumed within each of a 15 x 15 mile grid in the study area, with subsurface and surface conditions provided for each field derived from the geological potential maps and other subsurface/surface condition maps. Economic potential maps were then constructed based on the model-generated development scenarios and economic values of each future field. The combination of the geological and economic potential maps enable to visualize potential exploration opportunities of a play in order to identify the best areas for investment.