

Characterizing Remaining Potential of the Eastern Flank of the Ghaba Salt Basin, Oman, Using Play Fairway Analysis

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Abstract

The remaining potential of the eastern flank of the Ghaba Salt Basin, onshore Sultanate of Oman, has been characterized using a disciplined play fairway approach incorporating detailed well failure analysis, common risk segment mapping, and geophysical integration.

The stratigraphy of the area has been divided into 23 play intervals (18 proven and 5 unproven). Well failure analysis has been conducted over each play interval, and common risk segment maps have been created for each play. Identified prospect targets mapped on high quality 3D seismic are spatially linked back to the common risk segment elements to determine the play risks for each target. Prospect level risks are determined individually for each target. Target and prospect dependencies are also captured using the GIS-PAX Player software. In this way the impact of success of prospects on the remainder of the portfolio can be evaluated, and the highest value and play opening prospects which materially impact the portfolio volumes can be identified and high-graded. This spatially dependent analysis often results in prospect rankings different from those derived using non-spatial methods.

A further advantage of embedding the identified prospects into the play analysis is to enroll them in yet-to-find calculations using the Future Field methodology (Hood et al., 2023). In this methodology the sizes of unidentified features can be estimated stochastically, and the full exploration potential of an area or a play can be evaluated.

The portfolio analysis tool can be unitized to license blocks by risked volume and value (sum of EMV), and different oil price scenarios can be used as a sensitivity to remaining potential and value. This insight provides confidence that planned exploration programs are resilient at different oil price scenarios.

Play analysis integrated with historical results and prospect/portfolio analysis on a spatial platform provides answers to important exploration questions; from which is the best play or area, to which is the best prospect. This is in contrast to many workflows where the data are dispersed in different silos and managed in isolation. This disciplined play fairway analysis approach using the GIS-PAX Player software efficiently integrates data in one environment and assists companies in making better and faster decisions with a full audit trail.