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## **THE GEOLOGY-ENGINEERING INTEGRATION TOOLKIT: A PROCESS TO INTEGRATE AND SHARE GEOLOGIC, PRODUCTION, AND ENGINEERING DATA, OCCIDENTAL OF ELK HILLS**

One challenge of multi-discipline teams is integrating engineering, production, and geologic reservoir characterization information. A related challenge is sharing integrated information in a format that is available to team members to incorporate into their daily work and decision-making. To address this challenge, a unique process using Oxy's computing platforms was developed at Elk Hills that facilitates direct access to geologic interpretations integrated with engineering data via desktop PCs without the need to use technical applications or refer to hardcopies.

The *Geology-Engineering Integration Toolkit* process consists of the following elements:

- 1) "Middleware" that enables separate geologic and engineering software and databases to dynamically share data, principally between OpenWorks, StratWorks, DIMS, and DSS.
- 2) Integration of geology, engineering, production, and injection data. CGM graphic plots are generated to capture this integrated information and are made accessible through Oxy's Intranet.
- 3) Team member's PCs have Viewer Software that enables easy plot viewing and manipulation.
- 4) An "Evergreen process" as engineering, injection, and production data are updated and the geologic interpretation modified.

Geologic data shared via this approach includes maps, cross-sections, and log plots for each well. In addition to geologic reservoir characterization information, log plots incorporate completion and well bore mechanical data and by-layer injection data. Completion, production, and injection data are merged and displayed on by-layer maps to assist with reservoir management. Use of this method at Elk Hills has led to a fundamental change in the way teams incorporate geologic and engineering information into decision-making, and contributed to improved, faster decisions.