

## Breaking the Barriers to E & P Knowledge Management

Shaoqing Sun<sup>1</sup> and Shengyu Wu<sup>1</sup>

<sup>1</sup>C&C Reservoirs

### ABSTRACT

“We are drowning in information, while starving for wisdom. The world henceforth will be run by synthesizers, people who are able to put together the right information at the right time, think critically about it and make important choices wisely” – Edward O. Wilson

In the E&P business world, exploration and production companies strive to have their data and information organized systematically and consistently to extract maximum value from this information and to capture the cumulative experiences of their staff. Unfortunately in the real world, this rarely happens due to company restructuring, personnel transfers and retirements, change in areas of focus and cost reductions. In order to achieve their goal, the companies must overcome the three key challenges facing E&P knowledge management. The first challenge is the lack of standards and rules to capture knowledge in a consistent manner. In order to establish standards and rules, sufficient basins, plays and reservoirs have to be studied to acquire a profound knowledge and understanding in the subject area - it is the chicken or the egg causality dilemma. The second challenge is the lack of a robust platform that allows direct and consistent use of the basin, field and reservoir knowledge in E&P decision-making. The third challenge is the lack of executive commitment to enforce adoption of knowledge management best practice.

In this paper, we would like to share some of the best practices in E&P knowledge management which is based on over 1000 field and reservoir studies from more than 100 basins around the world that have been completed since the mid-1990s. All of these field studies follow the same layout and format, covering exploration history, basin evolution, source rock, trap, seal, reservoir characteristics, resources, fluid properties, reservoir performance and improved recovery. These field studies provide a foundation to understand and categorize reservoirs according to their tectonic setting, trapping mechanism, depositional environment, sand-body type, diagenetic history, petrophysical properties, reservoir conditions, fluid properties, IOR/EOR methods and reservoir management practices. A comprehensive data model with more than 500 static and dynamic attributes has been established at both reservoir and field level. A hierarchy of classifications and value definitions has been applied to each of the text attributes, whilst algorithms, rules and guidelines have been developed for each of the numeric attributes. On the basis of the field studies, we have populated each of the 500 static and dynamic attributes into this data model for >1,400 reservoirs and codified the database and associated field study reports into an analog knowledge system.

The analog knowledge system provides the necessary robust platform, which allows users to organize and accumulate knowledge on their own prospects, discoveries, fields and reservoirs. Users can extend the data model by adding and defining attributes to their own internal specifications. The analog knowledge system also contains a set of powerful tools for searching, retrieving, characterizing and benchmarking a group of analogous fields and reservoirs based on defined relevant multiple criteria. These defined criteria enable potential solutions to be developed for the identified problems in exploration, development and production.

A comprehensive and standardized knowledge package on an oil and gas asset not only preserves the valuable lessons learned, but also allows instant benchmarking against global analogs to unravel hidden problems and identify solutions, in addition to recognizing the upside potential of the assets. The analog knowledge system has far-reaching capabilities that can help E&P professional staff in the critical facets of their work, such as peer reviews, post-drill audits, portfolio analysis, development planning, production forecasting, reservoir performance benchmarking and asset management.