ALASKA GEOLOGY

Luncheon Abstract

Distribution of Turbidite Elements From a Small, Sandy Basin Floor Fan, Tanqua Karoo, South Africa

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This promotes the January luncheon talk of the Alaska Geological Society,
to be held Thursday, January 21st, at the BP Energy Center.

The extraordinarily well-exposed outcrops of the Permian-age Skoorsteenberg Formation in the Tanqua Karoo sub-basin of South Africa provide excellent examples of deepwater basin-floor fan systems. There are a total of five sand-rich fans developed within the Tanqua Karoo, Fans 1 through 5, with major axes trending from north-south to east-west across the basin. Several fans, especially Fan 3, have almost continuous exposure from proximal to distal fan settings. These fans can be subdivided into so-called "turbidite elements", basically facies associations characterized by contrasting physiographic location within the fan system, constituent facies, dominant depositional processes and resulting reservoir architecture.

The major turbidite elements considered here include proximal channel (thalweg), overbank, crevasse splay and scours, erosional channel and aggradational channel fill and amalgamated and layered lobe / sheet deposits. Examination of proximal channel systems in Fan 3 shows that distinguishing true channels from channel-form bodies such as thalweg deposits and scours can be difficult and such bodies may be of similar size and filled with similar facies. Facies proportions within such channel systems can vary significantly, even over short distances. Associated overbank and crevasse splay elements generally have an overall tabular character, interrupted by lenticular and channel-form bodies associated with proximal crevasse splay and scour fill. However, unlike channel and associated channel thalwegs, the fill is dominated by Tcde beds. Although of limited vertical permeability because of pervasive Tde beds, net-to-gross sand in these facies can be relatively high and lateral continuity of individual sand packages of overbank and

AGS Luncheon

Date & Time: **Thursday, Jan. 21st, 11:30 am – 1:00 pm**

Program: **Basin Floor Fan, Tanqua Karoo, South Africa**

Speaker: **Mark Scheihing / William Morris**

Place: **BP Energy Center**

Reservations: **Please make your reservation before noon Tuesday, Jan. 19th, 2010.**

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crevasse splay elements can extend over thousands of feet.

Volumetrically, lobe / sheet elements dominate these fans. A number of recently published models of lobe / sheet fan deposition invoke construction by networks of distributary channels, in some models, extending to the terminus of the fans. However, outcrops of the Tanqua Karoo fans clearly show broadly tabular bodies, generally of high lateral continuity and exhibiting compensation and off-stacking. Channel-form bodies may not be true channels, but rather, more localized scours. In addition, rather than decreasing gradually in net-to-gross and high density turbidite content, lobe / sheet elements in the Tanqua Karoo typically exhibit relatively high net-to-gross and high proportions of Tab beds to the fan terminus.

A key to modeling fluid flow behavior in lobe /sheet elements is correctly capturing laterally continuous inter- and intra-fan shales (deterministic elements) and more laterally discontinuous intra-fan shales (stochastic elements). In addition, models need to represent the lateral continuity of turbidite elements and the transition between different turbidite elements. The fine-scale of bedding features in turbidite systems, particularly lobe / sheet system requires effective properties models of these features to capture the effects of thin facies types below even the resolution of detailed geological models.

About the Authors:

Mark H. Scheihing is currently Principal Geologist in the Western North Slope group of ConocoPhillips Alaska, Inc. where he works on reservoir characterization and geocellular modeling of assets across the Alaskan business units. Prior to joining ConocoPhillips in 2000, he worked in the upstream technology unit of ARCO in Plano, Texas, leading a group of reservoir geologists involved in technical service, training and applied technology development projects for ARCO upstream companies and has worked in various aspects of reservoir description during his time at ARCO. Before joining ARCO in 1982, he received his B.A. and Ph.D. degrees in geology from the University of Pennsylvania and his M.S. in geology from the University of Illinois at Urbana.

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