Wednesday, January 25, 2006

Petroleum Club • 800 Bell (downtown)
Social 11:15 a.m., Lunch 11:45 a.m.

Cost: $30 with advance reservations, $35 for walk-ins, space available ($15 for Emeritus and Honorary).

The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org. If you have no Internet access, you can e-mail reservations@hgs.org, or call the office at 713-463-9476 (include your name, e-mail address, meeting you are attending, phone number and membership ID#).

*by **Jeff Pan** (speaker)*
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The Gunnison Field Discovery Story—Garden Banks Block 668, Gulf of Mexico

In April 2000, Kerr-McGee Oil and Gas Corporation and its partners Nexen Inc. and Cal Dive International drilled the discovery well of the Gunnison field in Garden Banks block 668 (GB 688). GB 668 is located about 155 miles southeast of Galveston, Texas, in 3200 feet of water. The Gunnison field (2P) proven reserves are estimated to be up to 120 million barrels of oil. The field currently produces 18,000 barrels of oil and 140 million cubic feet of gas through a truss SPAR as of the end of 2004.

The Gunnison field is located on the south side of a ramped mini-basin created by the loading of allochthonous salt. The field spans Garden Banks blocks 667, 668 and 669 (GB 667, 668 and 669). GB 667 and 668 were acquired in the 1996 OCS western lease sale by ORYX (later merged with Kerr-McGee in 1998) and Mariner, each with 50% working interests. GB 669 was leased solely by Vastar (part of ARCO, later acquired by BP) in the same sale. Working interests of GB 667, 668 and 669 were equalized among Kerr-McGee, Mariner and Vastar in 1998.

The initial evaluation of the GPI speculative 3D data resulted in small-sized prospects, and the Gunnison project was almost terminated prematurely.

The original prospect generation and evaluation of the 3 "shallow" objectives in the Gunnison mini-basin were primarily based on the regional geological work and study of the 2-D seismic data prior to 1998. In mid-1998, 3-D seismic data became available. At the time, the general area of Gunnison was covered by two different 3-D seismic surveys. Unfortunately, the field is located in the south end of the north survey (Western data) and north end of the south survey (Geophysical Pursuit Inc. [GPI] data). The edge effects hinder the reduction of uncertainties and progress of the evaluation. The initial evaluation of the GPI speculative 3D data resulted in small-sized prospects, and the Gunnison project was almost terminated prematurely.

Mapping of the reprocessed GPI 3D data in 1999 produced five new levels of amplitude-supported targets in a deeper interval. The predrill age prognosis of the eight targets ranged from Early Pleistocene to Late Pliocene. Several of the amplitudes conformed to down-dip structural limits and exhibited positive AVO response in good trapping configurations. The features of amplitude conformance and positive AVO significantly reduced the risk of the prospect. Geopressure analysis further mitigated the seal risk factor of the shallow targets; however, because of the difficulty of seismic imaging near the salt flank, the trap element remained the primary risk for the deep targets.

Due to the risk of the deeper objectives, poor imaging, low oil price (average $12) and budget issues, the two original partners opted not to participate. Kerr-McGee, as the operator, presented the prospect 33 times to 16 different companies to subscribe new partners. The Gunnison discovery Well GB 668 #1 was spudded in April 2000, with Kerr-McGee 50%, CXY Canadian OXY (now Nexen) 30% and Cal Dive International 20%. The Gunnison field was discovered just before midnight on Easter Sunday as the drill bit penetrated the first of 12 field pays (5 in the "shallow" and 7 in the "deep").

After 10 well penetrations, the greater Gunnison field was sanctioned for development in October 2001. The ups and downs of field size, extent of area, column heights, thickness and fluid quality were all addressed by the exploration and development teams. Thirty-two months after the discovery, on December 11, 2003, Gunnison field achieved first production from the first of three subsea wells. The field is now ramping up to its projected peak daily production rate of approximately 30,000 barrels of oil and 180 million cubic feet of gas. ■

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Biographical Sketches

Jeff (Gee-Shang) Pan is currently working as a senior exploration advisor in the GOM Deepwater Exploration Group, Kerr McGee Oil and Gas Corporation, Houston, Texas. Prior to joining Kerr McGee in 1998, he worked for Atlantic Richfield Company (ARCO) in Plano, TX, for 10 years. He received a BS degree in geology from National Taiwan University in 1979, an MA degree in geophysics from Princeton University in 1983 and a PhD in geophysics also from Princeton University in 1987. His interests are in prospect generation/evaluation, seismic processing, modeling and inversion, DHI/AVO analysis, predrill geopressure prediction and seal capacity analysis. He is a member of AAPG, EAGE and SEG and has served as an associate editor for SEG *Geophysics* between 2000 and 2003. He was the president of North America Chinese Earth Scientists Association in 2000 and 2001. He is currently serving as the president of Chinese American Petroleum Association (CAPA). His email is jpan@kmg.com.

Jim Fulcher, senior geologist, worked with Jeff Pan at Oryx and Kerr McGee. Fulcher earned a BS in geology at Texas A&M University in 1980 and an MS in geology at Texas A&M University in 1988. He joined Nexen in Dallas in 2005.