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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 668). 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 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.

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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. ■

HGS General Luncheon Meeting *continued on page 51*

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.

WebNotes *continued from page 61* In addition, we have a new feature for the HGS Website called "GeoBLOG!". Most of you are familiar with the idea of a web log or "Blog." The idea behind GeoBLOG! is to have an area where the Web Team can highlight hot topics and breaking issues in geoscience. The first topic was the startling finding by SEATOS (Sumatra Earthquake and Tsunami Offshore Survey) that there was no apparent seafloor displacement near the epicenter and adjacent plate boundary of the 2004 Sumatra-Andaman Earthquake. This has significant implications for our models on how earthquakes and tsunamis occur and may raise questions about the plate tectonic model itself!

HGA and GeoWives *continued from page 60* Petroleum Club Ladies Bridge, chaired by Daisy Wood. Daisy also continues to chair the ever popular Game Day in February. With a variety of games on the program, this is the Auxiliary's most popular and well attended event. What the heck is chicken foot anyway?? Get in the know and join us at the Junior League Tearoom on February 13, 2006!

The most recent event was December's well-received Christmas Luncheon at the Braeburn Country Club. Auxiliary member Pat Austin with her four-part harmonies presented a marvelous program, "Take Five." Many thanks go to Chairman Betty Alfred and her committee for their wonderful work.

This year's social program is expected to be one of the Auxiliary's most successful. Our current First Vice President, Winona Labbrandt Smith, is a wonderfully talented individual whom the Auxiliary is lucky to have serving its members.

• To assist the Houston Geological Society in any manner they shall request: Examples of this assistance have been to work with the Society during AAPG conventions in Houston, assisting the Society during Guest Night, helping at the Society office, and the list goes on. In addition to social events, the HGA also has helped with various technical projects. For example, during

We are still looking for one or two additional Website Committee members to help with additional areas identified for improvement of the site. My own experience thus far is that the Tendenci software that we use makes Website news reporting, event announcements, and article publishing very easy for people with basic computer editing and graphics skills.

Don't be shy. Give me a call (713-557-9076) or send me an e-mail (aberman@houston.rr.com) and ask about how you can join the Web Team! ■

Art Berman, *HGS Website Committee Chair*

Mary Harle's presidential term HGA members worked with the Houston Public Library filing drillers' logs donated to the library by the Society. Over 2,000 volunteer hours were given that year to complete the effort. And with oil and gas prices as high as they are now, those logs are getting a lot of renewed use!

Our most recent assistance was helping run the HGS Booth at the Conference for the Advancement of Science Teaching. Thanks to Society and Auxiliary members Jennifer Biancardi, Anne Rodgers, Betty Alfred and Annette and Tom Mather for giving so freely of their time. Also thanks to Janet Combes and Alison Henning for including us in this effort.

This article would not be complete without mentioning our current President, Norma Jean Jones. She is a grand leader, working many hours for the Auxiliary while still having time to work with her husband in their business, Spartan Petroleum, and traveling to AAPG meetings during Larry's tenure as Chairman-Elect of the House of Delegates. Her energy, creativity and spirit are an asset to the organization.

Please encourage your spouse to consider joining our organization. ■