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Discovering a Supergiant Gas Field With Dry Holes
(or: This is One Damned Difficult Business We Work In!)

Jere B. Jay, #2772, President of INNEX Energy LLC, Plano, Texas

The following article from the Dallas Chapter is the third in a new series submitted by SIPES chapters. It is copyrighted to Jere Jay and published with permission.

Introduction and Generic Ramblings.
The attached write-up gives a “tongue in cheek” explanation of the exploration and drilling history of one of the largest gas and condensate fields in the world, located in the Middle East. The informal style of the discussion in the exploration story on the following pages is intended to relay the feeling that the reader is actually making the observations described in the text and that the reader is dealing with the uncertainties inherent in the exploration business that we enjoy.

The facts about the first wildcat well in the field are as follows:
- It was a “dry” hole.
- It is very difficult to explain why!
- It penetrated the Permian hydrocarbon reservoirs far above the gas/water contacts that have been established for the field by later drilling.
- Subsequent drilling has defined a supergiant hydrocarbon accumulation drilled, tested, and proven productive by wells drilled down dip, updip, and lateral to the wildcat location! (Figure 1)
- How could this well have penetrated such a regionally permeable and porous zone as the Permian (that is apparently porous in

(Continued on Page 16)

President’s Column

William T. Goff III, #2068
Denver, Colorado

Earth Science Week, sponsored by AGI, was recently observed from October 12-19, 2003. Numerous geological and related professional associations, such as SIPES, and their respective members contribute many dollars and volunteer hours to educating our young people and potential future earth scientists about the third rock we call Earth. The intention, of course, is to expose the students to good science in the hopes they will make informed, educated decisions about social and political issues that affect their daily lives, such as groundwater management, energy resources, geo-hazards and global warming just to name a few. An

(Continued on Page 24)
The following information on national, state and environmental issues was presented to the SIPES Board of Directors on September 5, 2003 in Corpus Christi, Texas by Vice President of Natural Resources Brian Callhoun; Dan Reynolds, chairman of the SIPES State Legislative Affairs Committee; and Mike Austin, chairman of the SIPES Environmental Committee.

- **Economic Considerations**

  **Financial:** Has there been an ever so subtle shift in the perception of the direction of the financial drift of the country? It has now been determined that the mild recession ended over a year ago. In spite of the end of the recession, the rebound continues to also be mild. Did I hear in a news sound bite last week that our president declared that the nation’s economy has made the turn and that good times are just around the corner? In the financial markets it seems that perception is truly reality.

  Market fundamentals remain healthy for those companies focused on oil and gas exploration and production. Apparently outside investor capital is slowly finding its way back into this industry. Evidence of this growth can be found in the sustained growth of the drilling rig count. Personally, I like slow sustained growth as opposed to the roller coaster ride of the last few years. The marked swings in product prices and in the cost of drilling and production have created uncertainty in predicting finding cost and returns on investment. It is understandable why caution is still prevalent among the outside investment community. Most large investors perceive the U.S. as a mature province, therefore capital for true large exploration type prospects is limited. Merger and acquisition of producing properties still seem to be the preferred method of growth for most oil and gas companies.

  My perception is that due to a twenty-year exodus of experienced oil and gas professionals due to downsizing and retirement along with the paltry number of young people choosing oil and gas as a career choice, will leave this industry with a deficit of qualified personnel. While this is negative news for the nation as a whole, it does bode well for those of us still active in the industry, creating an excellent opportunity for the next few years. The question is how many is a few.

  **Insurance:** Everyone is painfully aware of how the escalating cost of insurance has impacted the bottom lines both in their business and also in their personal finances. Every aspect of insurance, from cost of well control to homeowners insurance has been impacted by recent world events. My insurance carrier has had a record year in value of premiums written and in profits. He seemed saddened when commenting that insurance coverage rates have apparently maxed out, and in some areas, rates have begun to show some downward adjustment due to competition among carriers.

- **Drilling Activity**

  According to the IHS Energy Rotary Rig Activity Survey for the week ending July 25, 2003, 1051 rigs were drilling for oil and gas in the United States and offshore waters. This represents a 23.1% net increase over numbers from a year ago. Consistent with the report prepared in June, all of the increase is in the land and inland waters category with a 29.1% increase. Of the 966 rigs drilling onshore, 875 were targeting natural gas. Offshore drilling has decreased by (continued)
19.8% over the same 12-month period. This fact seems surprising in light of the size of the reserve potential found in the offshore waters. In the same light the lead time for beginning exploration in the offshore waters is a minimum of 2 to 3 years, consequently the decreases may actually be a reflection of the downward pricing adjustments seen in 2000. The slow but steady increase in drilling activity is a healthy indicator of the continued recovery of the drilling sector. Resistance among operators to increases in drilling cost is holding exploration expenses down, but the increase in rig utilization forebodes improved service and performance. Surprisingly, the steel tubular business is not participating in this recovery. Reports of second quarter financials generally indicate lower shipments of oil field tubular goods and decreased profits.

Total drilling permits issued in the United States for June 2003, totaled 3,831. Onshore permits increased 29.6% to 3,751 from 2,895 year earlier numbers. Texas led all states with 960 permits followed by Oklahoma - 330, California - 220 and New Mexico 129. Offshore drilling permits decreased 15% from 94 to 80.

■ Energy Consumption and Demand

According to the projection in International Energy Outlook 2003, released by the U.S. Energy Information Administration, worldwide consumption of commercial energy is projected to grow by 58% over the next 25 years. Much of this growth will occur in the developing world, with China, India and South Korea leading the way. This same article also stated that in 2001, nuclear’s share of the world’s total energy supply was 19%. In 2025 it is projected that nuclear will only contribute 12% of the total energy supply. It us interesting to note that energy efficiency in the U.S. has increased as the U.S. economy has grown more complex. Until the mid 1970s the U.S. generated $750 in economic output per barrel of oil. That number has now increased to $1500 per barrel of oil. For comparison, Russia and Iran currently generate about $300 of economic output per barrel of oil.

For the fifth consecutive year OPEC’s share of world supply has lost ground to non-OPEC countries. It is anticipated that OPEC will fill only 24.6MMbbl/day out of the current world oil demand of 75MMbbl/day. Countries making significant production gains include Russia (640,000 bbl/day) and Kazakhstan (150,000 bbl/day).

Domestic Oil production for 2003 is expected to increase by about 62,000 bbl/day, or 0.9%, to a level of 5.80 million bbl/day. Production is expected to decrease somewhat in 2004.

■ Natural Gas

It is hard to pick up an industry publication and not find an article that is not optimistic about the future of natural gas pricing. (I did find one stating that the impending natural gas crisis is overstated.) Two of the biggest non-industry voices heard in the last few months proclaiming the need to replenish the natural gas reserves and supply were Vice-President Cheney and Alan Greenspan. Vice-president Cheney (who some would claim has a definite oil industry bias) in speaking to the IPA’s midyear meeting, called the administration’s energy policy “the first comprehensive and balanced energy plan in a generation. If we’re to avoid regular price spikes and chronic shortages, we must continue our progress in energy efficiency and conservation and increase energy production right here at home.” He also called for a “balanced approach to new concerns over natural gas supply and demand, including increasing domestic energy production.”

Also, Federal Reserve Chairman, Alan Greenspan, appearing before the Senate Energy and Natural Resources Committee, testified that more domestic production will be needed to prevent future supply-demand imbalances. He also commented that there are difficult tradeoffs between the need for natural gas and the resulting environmental concerns. Greenspan also urged Congress to consider building a reliance on liquefied natural gas imports.

Natural gas prices have fallen somewhat in the last few weeks. Current wellhead price is for spot delivery is approximately $4.80/MMBTU, which is down from highs in May of this year of $6.25. The floor price at which gas pricing shows resistance and begins to flatten or rebound appears to be around $4.60/MMBTU.

Underground gas storage in the U.S. stood at 1.949 TCF on July 18th. That was up 384 BCF from June 20th, but was down 537 BCF from year ago numbers. Storage numbers appear to be filling more rapidly and should be near capacity before winter consumption begins to drawdown reserves. Current futures pricing for January 2004 delivery at Henry Hub is at $5.447. If the winter demand is severe then we can expect a pricing scenario comparable to last winter. For what it is worth, the Farmers Almanac has predicted colder than normal temperatures this winter in the Northeast. Are there any future option players out there?

■ Crude Oil

As the summer driving season ended last week, crude oil prices took a hit of approximate $2.00/bbl, down from around $31/bbl. What a difference a week can make. OPEC continues to “restrain” production to maintain this target price for crude oil. The probability that Iraqi oil will be able to flow at capacity is becoming questionable. Iraq has the capacity to produce in excess of 2 million bbl/day, but continued instability in the region and sabotage to the infrastructure has prevented the production from reaching capacity. Long term futures projections for light sweet crude on the NYMEX

(continued)
exchange through December 2009 do not show any price projections below $24.60/bbl.

**Energy Legislation**

On July 31, 2003, the U.S. Senate approved their version of a comprehensive energy bill. Included in the package are much needed tax reforms and improved federal land policies that benefit independent oil and gas producers. The bill was overwhelmingly approved 84 to 14. A similar bill was approved in the House earlier this year. Hopefully in September, when Congress reconvenes, the House and Senate will act quickly in a conference committee, to eliminate the difference in the bills and send the compromise bill to the President by year end. Fears are that the recent electrical blackout in the northeast may deflect attention from the comprehensive energy bill and cause Congress to rush legislation through both houses that only addresses electrical consumption and ignore the comprehensive bill.

Republicans in the U.S. House have launched a special task force to address natural gas issues. The eighteen-member panel will address three main areas of inquiry: a) causes of the current natural gas shortage, b) the impact of gas prices on the economy, and c) short and long-term ideas to encourage a stable supply of natural gas. The task force is to conduct hearings and report to Speaker Hastert by September 30th. How do we make ourselves heard to this task force?

**State Legislative Activity**

**Texas**

The governor called a special session in June to deal with the issue of redistricting Texas’ congressional maps since democrats refused to deal with the issue in the regular session. If the special session wraps up without a new redistricting plan, the governor plans to call a second special session.

While redistricting has been the focus of the special session, other issues on the table concerning the oil and gas industry include a bill that would extend franchise tax to various forms of partnerships. SB 10, a bill that would change the jurisdiction of condemnation cases, is also a concern to TIPRO. If a jurisdiction decided to condemn an oil or gas property to clear the way for an infrastructure such as a highway, this bill would hurt the operator’s ability to receive fair treatment. For example, some counties have been aggressive at attempts to get properties condemned without paying a fair market value and in some cases no value at all. Although the bill has already passed the Senate, TIPRO is hoping to block it in the house.

The Texas Railroad Commission has finally implemented the statutory requirements of SB310 requiring tag plugs. In addition, the adopted rule made other changes including the ability to utilize more cost- effective alternative ways to plugging wells. Bonding requirements passed in SB 310 and are still an issue for the RRC. On July 15, 2003, it was ordered that the rules governing the bonding requirements were invalid. A proposal was passed by the RRC amending the rule which all hope will be more functional.

The RRC has also issued new rules governing naturally occurring radioactive materials (NORM) in oil fields.

**Oklahoma**

SB 535 passed extending the state’s gross production tax incentive for three more years. Also passing was HB 1569 that prevents habitable structures from being built within 125 feet of active wells unless otherwise agreed upon by the operator and the landowner.

On the downside, the new democratic governor vetoed a royalty checkstub bill that had been worked on by OIPA and royalty owner representatives.

**Colorado**

The Colorado Oil and Gas Association states that their top priority this session was to fight any attempts to increase taxes on the industry in light of the budget deficit facing the state. They also wanted to protect funding for the Colorado Oil and Gas Conservation Commission’s permit processing and field inspection. COGA believes that they were successful on both accounts although legislators took a portion of the COGCC’s emergency fund and took surplus severance tax monies to help balance the budget.

(continued)
Kansas
The state avoided both spending cuts and tax increases by accelerating some collections and delaying some expenditures. Lawmakers believe this tactic will give the state time to recover and grow out of the deficit by next year. KIOGA has remained active throughout the summer attending interim committee meetings to study taxation, economic development, worker’s compensation and unemployment insurance.

New Mexico
The Oil Conservation Division plans to present a final draft in July on new pit rules. The IPANM’s concerns are how these rules will affect drilling and workover pits. Among the revisions are proposals mandating pit liners and formal pit closures and regulations requiring netting and fencing around pits.

Mountain States
The problems which face producers in the mountain states include access to federal lands, extended delays in getting drilling permits, increased environmental activism challenging oil and gas activity and increased efforts by local governments to control the industry.

The industry had a significant victory when the U.S. District Court overturned an Interior Board of Land Appeals decision to suspend three coalbed methane leases in the Powder River Basin. The ruling will allow the BLM to again sell leases in the Powder River Basin.

The U.S. District Court in Wyoming ruled that the Roadless Area Conservation Rule violates both the Wilderness Act and The National Environmental Policy Act. This is the second time that a federal court has issued an injunction against the rule.

California
Right now most of the attention in California is focused on the governor recall movement and the budget deficit, although CIPA is also concerned about SB 18. This bill, if passed, would give Indian tribes more authority in land development on sites considered sacred by Native Americans.

Other National Issues
On July 1, the EPA published its definition of “common plan of development” for the National Pollutant Discharge Elimination System. Unfortunately, the definition is still unclear as to whether or not oil and gas operators must obtain NPDES permits before drilling.

Although S 14, “The Energy Policy Act of 2003,” passed through committee in April and was scheduled in the full Senate in early May, the energy bill is struggling to find time on the Senate floor. Energy Committee Chairman Pete Domenici, R-NM, states that if the bill is not done by the August break, it will be back on the schedule in September.

Environmental News

- Utah Governor Mike Leavitt (R) Named Chief of EPA

On August 11, 2003, President Bush named Utah Governor Mike Leavitt to head the EPA, pledging to help shift environmental regulation out of Washington to the states. Leavitt’s nomination was hailed by GOP lawmakers and business groups and criticized by Democrats and environmental groups. Business interests described him as a consensus-builder and a moderate, while environmental groups, nationally and in Utah, said he supported development over conservation and was a friend of the oil and gas industries. Leavitt, 52, has a very clear environmental policy, “To me, there is an inherent human responsibility to care for the Earth. But there’s also an economic imperative that we’re dealing with in a global economy to do it less expensively.”

Leavitt worked to bring thirteen states, thirteen tribal nations, three federal agencies, the private sector and environmental groups together to improve air quality in the Grand Canyon. He has been a leader in the West to address regional air issues and protect our national parks. He also worked on an agreement with the Interior Department to drop the “wilderness” designation for millions of acres in Utah, opening them to mining, drilling and road-building. He has advocated building a major highway through wetlands and sensitive shore areas around the Great Salt Lake. He opposed the Kyoto treaty on global warming.

His Senate confirmation hearings, to be scheduled in September, will probably provide the stage for a politically charged battle over the Bush environmental record. Four of the nine Democratic presidential candidates are in the Senate.

Lawsuit Filed Against EPA on Stormwater Runoff Regulations (NPDES Phase II)

On June 16, 2003, the law firm of Fulbright and Jaworski filed suit against the EPA on behalf of the membership of IPAA, U.S. Oil and Gas Association, Texas Independent Producers & Royalty Owners Association, the Texas Alliance and others. The suit alleges the EPA illegally extended its Stormwater Runoff regulations to include the oil and gas industry and could cost the industry about $100 billion yearly in lost drilling and production revenues.

If enacted, the regulations would require the industry to obtain a federal permit before drilling each well. It could take up to six months for the U.S. Fish and Wildlife Department to conduct their endangered species survey and for an archeologist to do an inspection.

Under Executive Order 12866, (58 FR51735, Oct. 4, 1993), EPA must determine whether the regulatory action is “significant” and, therefore, subject to OMB review if the annual effect on the economy is $100 million or more. The
Alliance estimates that the effect on U.S. drilling will be $8 billion annually and $90 billion in lost revenue from domestic oil and gas that would not be produced because of curtailed drilling.

The Alliance believes that the EPA mistakenly extended the Phase II regulations to include oil and gas exploration and production when Congress explicitly intended to exclude such activities. Section 402(1) of the Clean Water Act exempts mining and oil and gas operations from the requirement to obtain a permit under the storm-water permitting program for uncontaminated discharges.

EPA failed to conduct an economic valuation of the Phase II requirements as required by law. EPA incorrectly stated that only a few oil and gas drilling sites actually disturb more than one acre of land and incorrectly determined that the economic impact would be less than $100 million. Virtually all sites are larger than one acre, but smaller than five acres. The economic impact would be staggering.

**Public Lands Access Regains Upper Hand in Roadless Rule Suits**

In the seesaw legal battle over the Clinton administration's controversial Roadless Area Conservation Rule, the IPAMS reports that public lands access has regained the higher position. U.S. District Judge Clarence A. Brimmer in Wyoming ruled in July that the so-called roadless rule violates both the Wilderness Act and the National Environmental Policy Act.

The Roadless Area Conservation Rule, which was issued by the U.S. Forest Service shortly before President Clinton's term expired in January 2001, bans road building, logging and mining on 58.5 million acres of national forest lands in 38 states. Judge Brimmer found that the Forest Service violated NEPA by skirting proper procedures, hindering public input, and making the decision in "political haste." He called the roadless rule "a thinly veiled attempt to designate wilderness areas in violation of the clear and unambiguous process established by the Wilderness Act."

This is the second time a federal court has issued an injunction against the rule. In May 2001, Judge Edward Lodge in Idaho found the Forest Service had violated NEPA by failing to provide an adequate public comment process. That decision was overturned in December 2002 by the U.S. Court of Appeals for the Ninth Circuit in San Francisco.

An appeal of Brimmer's decision would have to be made in the more conservative U.S. 10th Circuit in Denver. IPAMS points out "An affirmation . . . of Brimmer’s ruling could set the stage for a showdown at the U.S. Supreme Court." (www.aogr.com/indust_digest.asp)

**Zunis Celebrate End of Salt River Project Fence Lake Coal Mine Bid**

(Zuni Pueblo, N.M.) - Salt River Project decided to abandon its planned Fence Lake Coal Mine and instead purchase coal in Wyoming after a twenty-year legal battle. SRP had planned to strip-mine coal on 18,000 acres of public and private land and build a 44-mile rail line from the mine to the Coronado generating station in St. Johns, Arizona.

In their effort to protect their sacred lake and surrounding burial grounds, the Zunis say they had spent millions over the past twenty years on legal help and scientific data to prove the potential damage posed by the proposed mine. SRP denied the mine would do any damage and said it could have been an economic boon for the state. A spokesman for the Arizona power company said the utility had always planned to closely monitor the environmental impact of the mine and would have stopped production if there was a negative influence on Zuni Salt Lake.

"The mine would have employed upwards of 175 people with an annual payroll of $13 million," said spokesman Scott Harelson, adding the mine would have generated millions in taxes and royalties for the state.

The railroad would have cut across the Zuni Sanctuary zone, where several burial grounds and pilgrimage trails are used by the Zuni, Navajo, Hopi, Acoma and Laguna peoples. The Zuni feared that groundwater pumped from the mine would dry up the spring-fed lake. The Zuni Salt Lake Coalition organized efforts in the Valley and were joined by the Sierra Club in Flagstaff and the Center for Biological Diversity in Tucson. (www.azcentral.com/news/articles/0807zuni007.html)

**Environmental Groups Sue to Block Drilling in Alaska’s Historic Katalla Oil Field**

Environmental and local land preservation groups have asked a U.S. district court in Alaska to block exploratory drilling in the historic Katalla oil field within the Chugach National Forest. The area was drilled from 1902 to 1933 but abandoned when the field appeared depleted.

On April 21, 2001, Cassandra submitted an operating plan to the U.S. Forest Service to drill three directional wells on private land owned by the Chugach Alaska Corporation, a Native American group. Under a 1982 settlement with the federal government, CAC’s oil and gas rights in the forest expire on December 31, 2004, unless the group has a producing well by that date.

The plaintiffs, Eyak Preservation Council, Alaska Center for the Environment, Cascadia Wildlands Project, National Wildlife Federation, and The Wilderness Society, allege the U.S. Forest Service ignored key environmental considerations when it issued a special use permit to Anchorage-based Cassandra Energy Corporation in December 2002. Specifically they argue, the 10,000 acre area east of Prince William Sound near a salmon spawning area (continued)
not be adequately protected, the USFS did not consider impacts of increased hunting and fishing on the roads and development site, the USFS only reviewed one exploratory well, and the USFS oil spill response system lacks a blowout contingency plan. If the district court does not take away the USFS permit, the plaintiffs will appeal the case to the Ninth Circuit. Cassandra officials expected the lawsuit, but will start development in mid-September.

**SINCH Act Gives Department of Interior Critical Habitat Leeway**

Rep. C.L. “Butch” Otter, R-ID, introduced a bill in July that would allow the secretary of interior discretion on designating critical habitat for endangered species. Otter’s bill, HR 2602, the Scientifically Identifying the Need for Critical Habitat (SINCH) Act, requires peer-reviewed science demonstrating that land should be protected before the Department of Interior can designate it as critical habitat. The bill also requires the secretary to accept and take into account data from property owners.


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CORPUS CHRISTI

Our July speaker, Randy Bissell, geologist with Headington Oil Company, presented an analysis of the outcrops of the Ross and Gull Island Formation of Western Ireland. Attendees were treated to a series of slides in which deep marine, continental slope, shelf deltaic, and fluvial systems were clearly distinguished. Mr. Bissell was first introduced to this area when he worked for Exxon as a member of the deep-water exploration team.

Dr. Jon Baskin, professor of biology at Texas A&M Kingsville, made a presentation in August of the “Fossils and Stratigraphy of the Nueces River Valley.” His extensive digs in local gravel pits have yielded numerous fossils of the early Pliocene and late Pleistocene. He has published 29 papers and book chapters, dealing mostly with fossil rodents and carnivores, and has named or co-named 7 new genera and 26 new species of fossil mammals.

Our September speaker, Robert W. Maxwell, Jr., is president and CEO of Suemaur Exploration and Production, LLC. Mr. Maxwell’s talk was entitled “Exploration Funding Alternatives for Private E & P Companies” and traced the trials and successes of a framework resembling an exploration cooperative to fund Suemaur’s growth and long-term capital needs.

Ed Riddle
Secretary

HOUSTON

The Houston chapter meets monthly, on the third Thursday, at the downtown Petroleum Club. The last quarter’s meetings featured two case histories that demonstrated innovative use of interpretive methods and one presentation featuring a new seismic reservoir delineation technology. In July, D.W. Wong, chief petroleum engineer with Object Reservoir, presented a “Case History of the Esenjay’s Frio Gas Fields.” Dr. Wong is an expert in pressure derivative method now commonly used in pressure transient analysis well tests.

The second case history presented in September was titled “Multiple seismic attributes improve the accuracy of reservoir property estimation.” The authors are Paul Jones, Gulf Coast Regional Manager for GeoPLUS Corporation, and Tom Wittick, #2576, president and founder of Lindon Exploration Company.

Their study demonstrates use of a statistical measure to determine the degree of correlation between certain seismic attributes and one or more useful reservoir properties using 3D seismic data. The authors have succeeded to improve on one method of relating and predicting certain physical reservoir properties by combining multiple seismic attributes. They demonstrate using an example that maps changes in the thickness of a sandstone reservoir in the Sooner field in Weld County, Colorado.

A similar though more automatic correlation of a unique set of seismic attributes to both favorable and unfavorable reservoir properties was presented in August by Aftab Alam, president of Prime Geosciences. His presentation was titled “Multi-attribute classification and visualization of 3D seismic data for the detection of hydrocarbon reservoirs.” Dr. Aftab Alam identified a small number of “prime” mutually independent seismic attributes. With these, he can completely describe, and reconstruct, the seismic trace. Known producing and nonproducing zones in a target formations measurably correlate to these “prime attributes” using a decision logic engine.

Wulf Massell
Secretary

IN MEMORIAM

We regret to note the passing of the following members:

S. Reed Gibbs, Jr., #1826 of Houston, Texas who died on October 24, 2003

William H. Hollingsworth, #1834 of Lafayette, Louisiana who died on October 23, 2003

George L. Scott, Jr., #2813 of Roswell, New Mexico who died on October 4, 2003

J. Donald Silberman, #2700 of Dallas, Texas who died on October 18, 2003

John B. Vreeland, #1422 of Corpus Christi, Texas February 26, 2003

James W. Watson, #1241 of Dallas, Texas who died on September 29, 2003
MIDLAND

Midland members and their guests enjoyed a variety of topics during the third quarter. These covered the spectrum from economics to wildcatting to regulatory issues. During the July and August meetings, 105 local members had their pictures taken for the national directory. The other 100+ local members are either too ugly to have their pictures made or so well preserved a picture is not necessary. We'll let the reader decide which is the case.

July’s speaker was Tim Dunn. His topic was entitled “The Economic Tectonics at Work in the Oil and Gas Business and the Effect on the Future of the Independent Producer.” This subject covered the truly seismic changes in the financial end of the oil and gas business that are currently taking place. Mr. Dunn is a resident of Midland, a SIPES member, and is currently CEO of CrownQuest. He grew up in Big Spring and graduated with a chemical engineering degree from Texas Tech in 1978. From there he went to work for Exxon Production Research in Houston, working primarily on projects for Aramco in Ghwar Field of Saudi Arabia. Tim joined the First City Bank of Houston in 1980 as an evaluation engineer, completed their credit training program, and then moved into energy lending as manager of oil and gas lending for Midland National Bank in 1983. He joined Parker and Parsley in 1987 to start an acquisition department, and later served as CFO and director. He left about a year prior to the acquisition of P&P by Mesa in 1996, which became Pioneer Natural Resources. In 1995, Mr. Dunn co-founded the predecessor of CrownQuest, and has been CEO since 1999.

In August, Alan Chamberlain enlightened those present on his pet subject: “Elephant Hunting in Nevada.” Mr. Chamberlain proved to be a dynamic and entertaining speaker. He is truly passionate in regard to his subject. Alan discussed the potential for giant oil and gas fields in the sequence stratigraphic model of the Mississippian Antler Basin. Railroad Commission rules affecting daily operations were presented at September’s luncheon. The speakers were Mark Henkhaus and Steve Boyer with the Railroad Commission office in Midland. Local members were impressed with the even-handed and common sense approach of local regulators to issues in the West Texas oilfield. Several examples were presented to illustrate in pictures what compliance and non-compliance looks like in a field.

Mr. Henkhaus graduated from Texas A&M University in 1982 with a B.S. degree in petroleum engineering. He has been with the Railroad Commission since 1982, with service in Pampa, Texas, as an engineer, in Wichita Falls as an assistant district director, and since 1990 in Midland as district director of the combined Midland and Lubbock districts. He is a registered professional engineer, a member of the Society of Petroleum Engineers, and a registered environmental professional.

Midland members look forward to the second annual mixer held in conjunction with the Permian Basin Landmen’s Association and the West Texas Geological Society to be held in November. Midland’s final meeting for 2003 will be held in November.

Marc Maddox
Secretary
DALLAS

The Dallas Chapter started this quarter with its July luncheon featuring Bob Young with Anadarko Petroleum as its guest speaker. Bob’s talk was “Anadarko’s Bossier Gas Play - A Sleeping Giant in a Mature Basin.” The talk was very well attended. It was very interesting talk, especially to a lot of folks here in Dallas that are involved in this particular play.

Next up was the September luncheon featuring Phil Carlisle. Phil’s talk was “Attributes of a Wolfcamp ‘Reef’ Play.” Phil has been very successful in this play using 3-D seismic and his talk was quite informative. Thanks to Jerry Watkins for putting together a great group of luncheon speakers.

On a sadder note, Dallas SIPES Chapter member Don Silberman passed away. We all want to keep Don in our minds and our prayers go out to his family as well.

Mark Rainer
Secretary

NEW ORLEANS

New officers and challenges greeted members at the September 16 luncheon after a three-month recess. Warming up the group with a thought-provoking presentation on Front Runner Field (Green Canyon Blocks 338, 339 and 382), Toby Roesler, chief geophysicist for Gulf of Mexico E&P at Murphy Exploration and Production, kept our attention with a talk titled “Blessed by Failed Hydrocarbon Indicators.” Mr. Roesler began with the pre-drill seismic interpretation and amplitude evaluations. After this overview, the members were asked to pick their preferred target out of four main amplitude anomalies identified during exploratory evaluations. After all answers were submitted, he advised that three of the four amplitude tests were unsuccessful. Perseverance ultimately prevailed as the secondary and tertiary targets’ objectives were encountered well developed and oil bearing. In spite of the fact that three of the four main objectives in the exploratory phase failed, it is noteworthy that the delineation and development of the field have been deemed successful with first product delivery scheduled for the third quarter of 2004. Estimated most likely recoverable reserves for the field are 129 mbboe. We thank Murphy E&P for candidly sharing their experiences with us.

Billy Geen
Secretary

OKLAHOMA CITY

The Oklahoma City Chapter September meeting kicked off the fall season with a presentation by Steve Sowers, environmental coordinator for the Oklahoma Energy Resources Board (OERB). (See Page ?). Steve provided an overview and update of the industry board’s abandoned site cleanup program. The program is funded by royalty and working interest owners through a voluntary assessment on production, and acts to contract and fund the cleanup of orphaned production facilities throughout the state. Land owners contact the Oklahoma Corporation Commission to get their sites listed, and the agency then prioritizes the sites and refers them to the OERB for restoration. To date, the program has cleaned up almost five thousand sites, with approximately a thousand more currently in process. The OERB has also engaged in an aggressive television ad campaign to advertise the program and advance a positive image of the oil industry by portraying us as family and friends who reside in the state and who take an active interest in the quality of the environment.

Upcoming talks are to include presentations from IOCHEM personnel on the extraction of iodine from Pennsylvanian Morrow sandstones in northwestern Oklahoma and our own Sherrill Howery on the geology of fishing in Oklahoma. The annual Christmas party is to be jointly held with the Oklahoma City Geological Society on December 3. More details will be available from the chapter shortly.

Tom Smith
Chairman

September guest speaker Steve Sowers, environmental coordinator for the Oklahoma Energy Resources Board (OERB).
SAN ANTONIO
The July and September meetings were spent discussing and fine tuning plans for the 2004 Annual Meeting. The discussions were led by Don McGregor, general chairman of the convention. Additionally, in September, National Director Bob Robinson reported on the recent Board meeting in Corpus Christi.

In August, our speaker was Robert J. (Bob) Scott, chief geologist for The Exploration Company (TEC) in San Antonio. His talk was “The Maverick Basin: New Technology – New Success.” TEC is the major player in the Basin, which straddles the Rio Grande, and is centered in Val Verde and Maverick counties, about 100 miles northwest of Laredo. Exploration objectives are principally Lower Cretaceous and Jurassic carbonates. Following is Bob’s abstract:

“The Maverick Basin is a small carbonate basin geographically associated with the large sand and shale-rich Gulf Coast Basin. Oil company managers have often rejected exploration programs for the Maverick Basin in favor of more glamorous objectives in the Gulf Coast Basin. As a result, the Maverick Basin has remained underexplored. In the past 10 years, new technologies like 3-D seismic and directional drilling have led to new plays and significant increases in production in the Maverick Basin. Three-D seismic has been absolutely essential. It has defined the structural framework of the Basin and found new reef trends and unique structural plays. Directional drilling is now allowing operators to produce oil and gas from low permeability reservoirs that have been troublesome in the past. Current activities place the Maverick Basin at the threshold of prominence for oil and gas exploration in the Gulf Coast area.”

Bill Wilbert
Chairman
FORT WORTH
Fort Worth did not meet in July or August. The first meeting for the fall was held September 18 at the Petroleum Club of Fort Worth. The speaker was W. D. "Dub" Watson, Ph.D. and his talk was titled “Tools of the Soul, Harnessing the Wind Within.” Dr. Watson spoke about the role that aptitudes play in your life. To live a productive life we must know what our aptitudes are. Dr. Watson defined aptitude as energy flowing through us that needs an outlet. How do we recognize aptitudes? There are several ways. We have an aptitude when: we get into a stimulus state and lose track of time while we are doing something we like; the unsolvable becomes solvable; work becomes fun; or we feel joy while doing something.

DENVER
John Curtis, professor at the Colorado School of Mines and director of the Potential Gas Agency, spoke to the Denver Chapter of SIPES in July at the monthly luncheon meeting held at the Wynkoop Brewery in Lower Downtown Denver. His presentation was titled “Potential contribution of Rocky Mountain natural gas to U.S. energy supply.” Dr. Curtis directs a team of 145 geologists, geophysicists, and petroleum engineers at the Potential Gas Agency in their biennial assessment of U.S. natural gas resources. His presentation reviewed their analysis of resource projections for the Rocky Mountain region. The total U.S. forecast for clastic and carbonate reservoirs is 958.3 tcf with 210.5 considered probable from existing fields beyond proved reserves, 325.0 tcf considered possible from new fields, and 422.8 considered speculative from frontier areas. The Rockies are expected to make up approximately 18% of these projected total reserves. Total coal bed reserves are forecast at 168.9 tcf, with probable reserves at 17.1 tcf, possible at 56.7 tcf, and speculative at 95.1 tcf. The Rockies are expected to contribute approximately 37% of these total coal bed reserves. Since 1980, the annual gas production in the Rockies has increased by 165%, while total U.S. production has increased only 0.6%. Increased consumption over that time has been made up with Canadian gas. Between 2002-2020, total U.S. production is expected to grow by 15.9 bcfd, with 7.6 bcfd coming from the Rockies. Dr. Curtis’ conclusions were that the U.S. gas supply has to grow, but the resource base looks to be out of production by 38%. Groundwater recharge levels would approach pre-development levels, and while there would be some decrease in groundwater discharge levels into rivers, it would be small compared to drought impact.

WICHITA
Our chapter held no meetings during June, July and August. We resumed our meeting schedule on September 17. A program was held featuring Curtis Covey with Covey - The Well Watchers who presented a comprehensive review of the principles and interpretation of the utilization of gas detectors in the Mid-Continent area. An operating manual and CD can be obtained by contacting Covey - The Well Watchers, 6548 Bedford Circle, Derby, KS 67037, Telephone (316) 776-0367, or e-mail cecovey@southwind.net
Also on September 17 our Board of Directors set the annual picnic for 5:00 P.M. on Friday, October 24 at Chapter Chairman Terry McLeod’s facility near Mulvane, Kansas.

Doug McGinness II is underway in organizing a symposium on the “Evolution and Present Day Status of Gas Purchasing Contracts.” This subject is very timely and the program is being planned for November 19.

FORT WORTH

JOHN CURTIS

JAMES TALBOT
Chairman

WICHITA

ORVIE HOWELL
Secretary

DENVER

BILL MILLER
Secretary

NEVER

NOVEMBER 2003
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StrataSearch
Jack Zordan, #2725
Golden, Colorado

StrataSearch, of Golden, Colorado, performs surface-based resistivity measurements to map deep-seated vertical migration plumes above oil and gas fields. This is an indirect approach to explore for new fields and extend old fields.

The electrical methods employed by StrataSearch were developed at the Colorado School of Mines to map geothermal reservoirs in the 70s and were later adapted to oil and gas exploration after considerable field research. These methods use a long insulated wire (1 to 2 miles) grounded at each end and a 100 kw generator and transmitter in the circuit at one end. Several hundred amperes of dc current are reversed in the wire nominally every 10 seconds. A large magnetic field is created around the wire which in turn creates secondary “eddy” currents that create a secondary magnetic field which is measured with a large coil as the currents diffuse downward from the surface of the earth. As these currents (similar to smoke rings) travel through rock layers of varying resistivities, a change in slope is generated in the voltage transient from the coil. The transients are recorded as voltage (amplitude) vs. time in profiles parallel to the transmitter and about 3 miles away with stations 528 ft. apart and then converted to apparent resistivity vs. time. They are plotted in the same manner as seismic traces and contoured horizontally across the page. This is a “unique” presentation with nothing done to the data. Characteristic “edge effects” are observed at the boundaries of oil and gas fields due to lateral changes in resistivity caused by the migration plume. Higher resistivities are measured over the field. Gas and diagenetic minerals in the plume displace water causing resistivity to increase. Modeling programs developed using Maxwell’s equations are used to invert the field curves to a 5-layer earth model from which a value of total conductance is calculated for each field location. Conductance is a measure of the thickness of the sedimentary column (to electrical basement) divided by the average resistivity of that column and is the most robust parameter available. Conductance profiles across oil and gas fields also yield characteristic anomalies. Depths to significant rock units are also calculated to produce structure maps. Structural mapping has been especially effective in the Columbia River basin through basalt flows. This method of defining oil and gas fields using the secondary magnetic field is called electromagnetic imaging (EMI).

An electric field is also generated by current flow in the earth around the grounded-wire transmitter. A method called resistivity mapping measures the electric field in a loose grid up to 5 miles from the transmitter for reconnaissance surveys to locate anomalies for follow-up with EMI or seismic. The spacing of field measurements is determined by the size of the target. Electric charges build up on the sides of vertical migration plumes due to lateral changes in resistivity. The charge build-up creates measurable anomalies above and around the plume. Values of apparent resistivity and total conductance are calculated and presented as contour maps. StrataSearch has participated in twelve discoveries in the U.S. and overseas including stratigraphic Morrow channel discoveries.

These low-cost methods penetrate generally to basement due to the large offsets from the transmitter and the large signal strength. According to present-day laws of physics, no electrical method can map a 10 ft. oil sand at 5000 ft. depth, although claims have been made to that effect. However, a vertical migration plume that extends hundreds or thousands of feet can be mapped. The plumes also correlate very well with the oil-water contact thereby defining the field limits; and they appear to have no measurable lateral component below the near surface. StrataSearch is available for contract surveys and also for participation in selected prospect development through Freedom Natural Resources in Fort Worth (Joe Sloboda, #2839).
Dry Holes Continued

Missed Pay Wildcat
Arabian Gulf

Recorded Reserves: Hundreds of TCF + Associated Condensate
Reason for Failure: UNCLEAR - Inadequate tests?
Formation damage? Low perm?

Reservoir: Permian carbonates interbedded with tight limestones and anhydrite.
Sabkha and shoreface depositional environments
Phi: 10-15%; Perm: 10-1000 md (ave. = 100); Comp: Dolomite/limestone partly oolitic

Shows: Original well had only minor trace oil shows and no gas shows while drilling reservoir section.

Structure: Huge culmination on a major regional arch. Producing field area covers an area of approximately 50 X 100 miles (3,200,000 acres)!!

Comments: Original focus was on oil, not gas, due to lack of gas market. The field covers an area as large as, or larger than, many producing basins in the world!

Drilling History (2 wells)

Wildcat Well #1
• First test of the structural closure and regional arch.
• Tested shallow Jurassic. Oil shows but recovered water on two DSTs.
• Drilled deeper to test Permian reservoirs.
  o Had only minor oil shows.
  o Had no gas shows even though it drilled 300’ above G/W contact that was later defined!
  o DST of the first reservoir recovered only minor amounts of oil and gas cut water. Possibly a tight section? Later wells tested this zone at < 1 to approximately 40 MMCF/D within the field.
  o Second zone was penetrated with NO shows and was not tested. Why were there no shows?
  • The well is over 150’ above tested gas proven by a downdip well drilled years later.
  • The zone #2 is one of the most prolific producers in the field.
  • The logs show porosity development in Zone 2 within the wildcat well.
  • The downdip well tested the same zone at over 35 MMCF/D.
  • Udpip wells tested the same zone at over 35 MMCF/D.
  • Was it damaged? Porous but tight? A failed test? Drilled overbalanced?
  o DST of the reservoir zone #4 flowed water at a rate of over 1000 barrels per day. “Shows” in this definite “wet” zone look similar to shows in reservoirs #1 and #2.

Well #2 – DISCOVERY WELL for gas in the Permian Reservoirs.
• Well was partly a “contract” obligation to test the Permian section.
• Tested at a rate over 50 MMCF/D.
• The supergiant field was delineated in the 1970’s and 1980’s.
• Initial production occurred in early 1990’s – over 20 years after discovery! Delay was due to lack of market.
• Engineering report placed large reserves for this portion of the field based partially on the porosity developed in this wildcat well even though the zones were tested tight or well!

Lessons
• Even one of the largest gas fields in the world can be drilled through and missed!!
• Dry holes can represent major missed pay and new opportunities.

Datasheet

Figure 1
FIELD OUTLINE SHOWING LOCATIONS OF WILDCAT WELL #1 AND DISCOVERY WELL #1

this well also) and not even get a show of gas? Just a reminder, we are dealing with several hundred TCFs documented by wells subsequently drilled in the area surrounding this well.

Frankly, there are no easy explanations for this dry hole. If you take a look at the datasheet for this “over-looked” giant accumulation, you can see that I have used lots of question marks. I don’t propose to have the answers, but the questions are significant and worthy of the time to think it through for yourself. Each of us must come to our own conclusions as we put ourselves in the shoes of the explorationists, engineers, drillers, and managers of the major company who drilled this unsuccessful wildcat.

SO, WHAT? … What’s the big deal about a dry hole drilled in 1967? There are several important reasons to try to understand this well.

• First is the exploration story that unfolds in the following write-up. How could anyone be smart enough to tell when a well such as this is truly a dry hole as compared to one that might have drilled through and overlooked huge reserves? We all need to think this through because the next dry hole we evaluate may be just like this one, representing substantial missed reserves and a new world-class opportunity to pursue.

• Second, this well is one of the primary wells used in a major engineering study to document tens of TCFs of recoverable gas on the south and west parts of this field. The numerous TCFs of gas on this block were partly based on the data documented in these zones by this wildcat well, a dry hole. The well was not tested in the #2 zone and the other tests (zones 1 and 4) were either tight or wet in the well. The Zone #2 was “assumed” to be productive and the TCFs of recoverable reserves were calculated! In addition, the tight or wet test of the #1 zone in the well was also “assumed” to somehow be unrepresentative of the true nature of the zone because the engineering study portrayed several TCFs of proven producible reserves contoured in this portion of the field based on this well. Would the same technical experts had documented these TCFs or even supported the idea of any reserves at all if they were evaluating this in 1967? It is always easier after a discovery is made – not so easy to define or even support the (continued)
Dry Holes Continued

ideas documenting the new opportunity that might result in a new discovery.

- Third, trying to understand the early data from this field is not just an academic or exploration problem. It represents the difficult questions and technical problems we all deal with on a daily basis in our business. The first well through this supergiant gas accumulation is a dry hole. Why the well failed to have shows or favorable test results in the producing zones begs to be explained and understood. Our intellectual curiosity demands that we know what the true story is for this well. Someday, in the not too distant future, we will discover the reasons for this wildcat's failure to detect the gas in this field with hundreds of TCFs of gas reserves even though it was drilled in the right place and tested the appropriate zones within the confines of this supergiant accumulation.

Please continue through the “discovery” below.

AN EXPLORATION STORY

TO: Friends and Fellow Explorationists

SUBJECT: Prospecting, Missed Pay, and Dry Holes

OK, let’s say that you’re the best, a hot shot explorationist assigned to develop new opportunities in the richest oil and gas province in the world, the Middle East. (This story is hypothetical so even though you might have a hard time imagining yourself as a “hot shot,” at least you can imagine working the Gulf!!) We’re going to work through this scenario as if you are the one exploring the region. I am going to bring you through by explaining what I believe was the available data at the time the wells were drilled. All right? Let’s get to work.

As part of your initial evaluation, you find this deep wildcat well in the files and you begin to evaluate it. It seems important and certainly is of interest because it is the deepest well drilled a huge regional Arch that is surrounded by major oil and gas production from multiple horizons. The Arch is an old geologic feature that is shown on all of the old literature for the region so you begin your exploration by looking at the deep wells around the Arch to see if any potential exists.

As you begin, you pick up the wildcat well to investigate the section drilled and the shows. First you notice that they penetrated the Upper Jurassic, which is the major producer in this part of the Gulf . . . Hmmm . . . The well had good oil and gas shows that look promising (Figure 2 and Figure 3) . . . but . . .hmmm . . . it appears that the DSTs recovered mostly water, so the zones tested mostly wet. Sort of odd when you (continued)
think about it. Here we are on one of the largest structures in the region and the main reservoirs are wet! That’s OK; you were more interested in the deeper Permian section which is another of the regional producers for this part of the Gulf. This well sure is a key data point since it’s the only well on the Arch to penetrate the deeper Permian Reservoirs.

The Permian section was penetrated from 8550’ to TD. Your evaluation of the mudlog shows that the well had no shows of oil to speak of and virtually no gas increase while drilling the section (Figures 4 and 5). The wildcat well tested the appropriate porosity zones of the carbonate reservoirs in the first and fourth Permian zones. The upper test (DST 6) recovered a little oil and gas cut water but generally appears wet. The composite log (Figure 5) has a neutron curve which indicates porosity development in the

zone tested. After evaluating the test and the log data, the zone might be interpreted to be porous, with low permeability and wet. This interpretation is confirmed by the lack of shows while drilling, the composition of the fluids recovered, and the low rates from the DST. The lower test (DST-7) was definitely wet, flowing at a rate of 1,440 barrels of water per day. The well looks pretty much like a dry hole; confirmed by the fact that it was plugged and abandoned by the major U.S. oil company who drilled it.

OK . . . So you continue to review the data from your historical files and you happen to come across this old structure map constructed on the top of the Jurassic carbonates made by a consulting firm (Figure 6). Wow . . . look at the huge closure shown for the Jurassic section on this Arch.

Just a little aside here . . . I’ve got to draw your attention to the scale of the map. The closure on this map measures approximately 95 miles north to south and 45 miles across (about 150 X 70 kilometers). Think about that scale for a moment - this is so large that it might just be curvature of the earth! Just joking, it really is an “Arch” . . . but it is as large as some entire basins around the world that are quite prolific!! Well, a huge closure here isn’t really a surprise since the Arch is a major regional high that has been known from the beginnings of the industry’s work in the region. The odd thing about it is that there is no production on the Arch even though there are penetrations of shallow and deep reservoirs. Looking at the map you notice that the “structure” has been tested by 7 wells drilling to test the shallower Jurassic reservoirs (results: shows but no production) and the wildcat well #1 that went deeper to test the Permian. Both of the deep wells tested the appropriate zones and were dry holes.

It looks like the Arch is a large basement high but there doesn’t seem to

(continued)
be much potential here. The appropriate zones have been tested by numerous wells drilled by major oil companies who found nothing... But, there are several large prospective closures within the structural high of the Arch shown on the map (cross hatched areas in Figure 6). Maybe you can develop a prospect somehow updip from a well. Wow! These closures are large; given the areal extent, there could be some sizable reserves here. Now you’re onto something... OOPS!... wait a minute; the largest, best-defined closure has been tested and the wildcat well is wet. Damn – no new prospects this month. Oh, well, at least you can now explain why this well was drilled where they drilled – to test a large structural anticline.

Now, wait just a dog-eared moment. I said at the beginning that you are a “hot shot” so nothing is going to get past you... There has to be something here, RIGHT?? I mean, this Arch and these closures are in the Middle East surrounded by billions of barrels of oil and gas. Regional arches tend to be excellent places to look for hydrocarbons. There has to be something here. Could there have been anything overlooked? It’s not real clear... you see, they drilled a Jurassic and Permian closure and they did test the shows that they had... It’s possible that the shows were probably just residual oil staining based on the fact that there were no associated gas shows at all. The fluids probably migrated through here and continued updip.

Okay, so your regional review continues and a month or two passes before you revisit this area. Now you reinvestigate the possibility that the wildcat well might have missed some reserves. Because of your regional work, you are now aware that the Permian is almost exclusively a gas producer in the region. You happen to notice something significant on the log header: the well was drilled in 1967 and, since there was no gas market in 1967, you can now explain why the major oil company didn’t follow up on their 1967 exploration program. Pretty observant of you. Now you feel a little better that there is the possibility of missed gas reserves in the area. Could the wildcat well have overlooked gas pay since they were most likely focused on oil reserves? You take the time to pull out the consultant’s structure map (Figure 6) and take another look. Even though the map is constructed on the shallower Jurassic level, the structure at the deeper Permian zone closely mimics the Jurassic. At least at this stage of regional exploration and idea assimilation, this map is a pretty good indicator of the Permian structure as well.

There are several large closures within the regional arch but the largest closure has already been tested by the wildcat well and it appears wet in the Jurassic as well as the Permian (continued)
sections. Hmmm, the well did recover some oil and gas cut mud on DST #6 in the Permian, but it really seems wet with no free hydrocarbons. Since the Permian is a regional gas producer, the well should have had some gas shows. So taking another look at the logs you realize that the well definitely did not have any gas shows while drilling through the zone. But still . . . maybe, . . . since it is so large it’s worth a try (the cross hatched high drilled by the wildcat well is over 10 miles long by 5 miles wide). And, if you could prove that the major oil company overlooked a gas play - then look at all of the highs that might be productive!! It’s worth a shot . . . after all, you haven’t had a descent prospect in some time and a big new play might help you get that next promotion that is overdue . . . So you gather all the data together and go upstairs to try and convince your engineering teammates that there is some potential in the area.

Now think this through . . . You take the well data and test data upstairs to your friendly engineers to get them “onboard” and to get some help interpreting the tests to determine the reasons why they might have overlooked some gas. “Are you nuts?” is the first comment from your teammates. “The well tested wet or tight or both . . . and you have the crazy idea that they overlooked something? Look, the well tested the appropriate zones in the Permian and it’s a dry hole. Even the good shows shallower in the Jurassic tested wet so certainly the deeper zones look wet. The structural high probably isn’t really there – maybe it is just a velocity problem or something. Go downstairs and quit bothering us until you come up with a viable prospect!”

Now, be honest with yourself . . . Take a minute to look at the logs and think it through. If you were the engineer or the explorationist on this project wouldn’t you interpret this the same way? WET or WET AND TIGHT! It’s actually a straightforward, rather uncomplicated well.

A week or two goes by and you just can’t seem to get the well and the Arch out of your mind, so you revisit the engineers one more time. After all, perseverance is a major asset in this business. After trying to convince them one more time, they really hit you with a blow . . . “If there were overlooked gas here there still isn’t a market - Hell, the only use for gas is to flood the fields for secondary recovery and all of these countries have more than enough of their own gas for their needs. Sorry, but we’d better focus on the Jurassic and Cretaceous sections nearby to find some oil.”

That’s OK. You gave it your best shot. Most ideas never fly and this one certainly never even got close to getting off of the ground. Put those files away and forget about it. But, wait a minute, could the wells have overlooked any oil in the shallower section (continued)
with the good oil shows? Nah, with seven wells already testing the closures, this structure has been pretty well evaluated!

**DISCUSSION**

The story you have just read is true (or sort of true) and reflects the exploration data and knowledge up into the early '70s.

... And now let's finish the story...

Recent drilling in the region (1970s and 1980s) has documented one of the largest gas fields in the world right where the wildcat well was drilled. The field covers most of the area shown on the old map (Figure 6) and is so large that it actually “spills” off the map to the north. It is reported to have HUNDREDS OF TCF of RECOVERABLE gas reserves with considerable volumes of condensate!

Reread the reserves number so you can get comfortable discussing reserves with hundreds of TCF!

OK, now take a look at the attached structure map of the gas field reservoir (Figure 7). You can see that the wildcat well is located almost 300’ high into the gas column and the drill stem test in the well from 8799’-8865’ certainly tested the first reservoir within the gas column. Now for another note, the wildcat well also penetrated the second and third reservoir zones within the limits of the field (maps not attached). In zone #2, for instance, the downdip well tested gas at over 35 MMcf/d with no water and the updip well tested the same zone at over 40 MMcf/d with no water! Now that you have this additional piece of data, how do you evaluate the shows and tests in the wildcat well? How come the well didn’t even have a show in the gas zone proven by subsequent drilling and delineation??? That’s not so easy to explain is it?

The wildcat well was the first well to drill through one of the largest gas fields in the world and didn’t even have a gas show in it!!!

Do you think the original project group interpreted the well to have documented huge gas reserves? Or more likely did they interpret the well to be wet or tight and recommended plugging and abandoning the well to move on to other projects? I have no intention to fault the original workers here because even after more than three decades and numerous additional wells being drilled in the region, the data and results from this well are difficult to explain. The original workers got the well drilled, tested the appropriate zones, and acted according to the results of their data. They did a good job, but still ended up with a dry hole.

So what’s the point of all of this? This is just an example of how an explorationist might have evaluated this play. If you were the explorationist assigned to work this trend...
in the early ’70s and you evaluated this abandoned dry hole, would you be smart enough to realize that this well drilled through major gas and condensate reserves? What clues could have told you to pursue your ideas and this project? Even if you recognized the potential, is there any way that you could convince your exploration and engineering team-mates? Let’s put the shoe on another foot . . . if a “hot shot” exploration team came up with the idea that there could be major gas reserves in this play and they put it all together and presented the concept to management (after all, the acreage was open during the early ’70s) how many of us would actively support this play idea?? Be honest now . . . remember, the structure has been tested at Cretaceous, Jurassic, and Permian levels by numerous wells located “on structure” and tested wet or uneconomic. I can just hear the thought process at work: “This exploration team probably needs to be disbanded and reassigned, it’s obvious that they aren’t working too well together if this is all they can come up with!”

By the way, if you look at Figure 8, you will see the continuation of the “old” Jurassic time structure map with the annotation regarding the “prospective” closure placed by the explorationist. This explorationist deserves an award in my book. Maybe no one took it seriously, but this worker put a large label on his map in such a position that no one could possibly miss it. Nothing timid about this annotation!! Was he correct? Well, the field has been delineated and pretty much covers the high that is shown, but the Permian structure is so huge that it continues even off the edge of his map. As it turns out, reserves of Cretaceous oil, Jurassic oil, and the Permian gas accumulations are so large that the production covers most of this map plus a much larger area extending far to the north. I would definitely nominate this map as a success!

Did this map ever make money for the company for which this explorationist was working? I don’t know, but I do know that shortly after the date of this map (December 1971) a consortium picked up this acreage and delineated recoverable reserves somewhere between 15-35 TCF on the acreage! As an interesting footnote, the Consortium entered this area looking for oil in the Jurassic reservoirs zone, the same zone that the “old” structure map is constructed on. The Consortium’s first discovery was finding oil in the Jurassic on the northernmost high crosshatched on the “time structure map” (Figure 6). Maybe this map is the reason that the Consortium picked up the acreage – or maybe they had an insightful exploration team who saw the potential, dreamed that a market would someday exist, and pursued the project with their management’s support. Whatever the actual scenario, there are major reserves here and this map was a great place to begin looking for them back in 1971!

**SUMMARY**
The point is that exploration is not an easy job, and the results of the wildcat well are not easily explained.
How can we do a better job of defining when a well has overlooked an accumulation as opposed to the very real chance that it is actually a dry hole? How can a manager spot the insightful work of a “hot shot” team compared to the half-baked concepts that sometimes float to the top?

I’ve always felt that the best place to prospect is with the dry holes because before they were dry holes, they were all good prospects ... good enough to get investors (management) to invest several million dollars to test an idea. People in charge of multi-million dollar budgets aren’t stupid . . . so . . . focusing on the “dry” holes is often the quickest way to come up with viable new prospects. How many wells similar to this wildcat well are out there that could have drilled through substantial reserves and are just waiting for us to reinterpret them? By knowing that real examples and major reserves such as this are often missed by previous efforts, we might focus more effort to understand “dry” holes a little more. They aren’t always just data points to get tops from. Often they are damn good prospects that were created by excellent geoscience teams (management and technical experts) who drilled them and just barely missed. Often, a slight change in geologic concepts, technology, economics, or the market in an area can cause someone’s old “dry” hole to become an attractive new “prospect,” just like this wildcat “dry” hole.

These comments are meant to stimulate our thought processes in an attempt to document cases of overlooked reserves so that we don’t accidentally walk away from one of our own wells or someone else’s wells that need to be reinterpreted.

A toast to all of us who try to unravel this complicated business we enjoy!

Jere Jay has been President of INNEX Energy LLC in Plano, Texas since 1999. Prior to that he worked domestic and international exploration projects for ARCO, including the project presented in this paper. He is actively compiling missed pay examples similar to this and is interested in any suggestions of similar stories. Feel free to send him your “oil patch stories” or other examples or comments at oilpatch@innex-energy.com, or send him a note at INNEX Energy, 5240 Tennyson Parkway, #224, Plano, TX 75024.

Figure 8

How can we do a better job of defining when a well has overlooked an accumulation as opposed to the very real chance that it is actually a dry hole? How can a manager spot the insightful work of a “hot shot” team compared to the half-baked concepts that sometimes float to the top?

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President's Column Continued

William T. Goff III

too common remark, “I cannot in good conscience recommend to my children, or any other young person that they consider a career in the earth sciences” (interpretation: the earth sciences=the energy business, and it is too mature for a new career). After all, who in their right mind would pursue a profession that is constantly down-sizing? Since becoming president of SIPES, I’ve heard this phrase, or variations on the theme, far too many times. However, given the apparent continuous stream of layoffs from the large companies, forming a defensible rebuttal to this negative outlook is about as winnable as arguing that Joe Namath was a better quarterback than Johnny Unitas (although everyone knows he was). But you will not win anyone over if you do not try. So, in the interest of defending and recommending the career choice that I have never regretted, and because I have always believed the glass is half full, consider the following comments before you agree with the short sellers of our profession:


- Drawing from data published in President Steve Sonnenberg’s column in the October issue of the AAPG Explorer, AAPG membership stood at 30,942 as of December 2002. This figure is down from a high of 43,803 in 1985 when geology was the degree to get in college, the “boom” was in full swing and buying high was fashionable. The December 2002 membership data is quite similar to 1980-81 data and has actually been relatively stable since 1995-96. Different regions grew while others shrank, but overall, the earth sciences remained stable in total number.

- In 1980, AAPG reported 50.5% of its members were under 40 years old (my estimate at 16,000). Now 23 years later, that same group or 47.0% of AAPG’s members are 41-55 years old (my estimate at 14,542). The good news is that we have aged 23 years and are still drilling. Again, overall, reflecting stability in the profession. Unfortunately, the message of stability has not reached the current under 40 group of professionals; although the good news is the student membership is growing.

- Surprisingly, the large companies where most of the layoffs occur employ only 20.0% of the AAPG population today.

- In 2002, independents and consultants represented 26.0% of AAPG members, up from 16.7% in 1980.

- The rig count has climbed to 1073 active rotaries in September. This represents a 16.0% gain year over year. In fact, drilling companies have added rigs to their fleets for the first time in quite awhile. This is a good thing.

- The future of natural gas in North America is very bright and will remain so if we continue to recruit and educate earth scientists. We, as a profession, must encourage our new colleagues to develop creative ideas and allow them reasonable access to the resources and the technology to develop the same.

- Although commodity prices are the strongest they have been since the “booming” 1980s, the industry has taken a measured approach to drilling, apparently demonstrating a lesson learned from the excesses of the 1980s.

- No industry is immune to economic cycles and overbuilding, not energy, telecom, high tech and not even manufacturing. In fact, it appears the days of spending one’s entire career with a single company have vanished.

- Because the under 40 age bracket is under-manned, and the demand for natural resources continues to remain strong, excellent opportunities exist for young earth scientists.

I believe the above information presents a strong case for encouraging young scientists to consider a career in the earth sciences. As all SIPES members know, the energy business offers the ability to continue to earn an income from projects completed years ago, much the way an inventor or company might derive income from a patent. I think this explains why the professional membership numbers remain stable and the independent/consultant ranks within the population have grown. In addition, unlike many other industries, the energy business affords an individual numerous opportunities to start their own business and greatly reduce the potential to be laid-off during the inevitable down economic cycle. This is very appealing to the entrepreneurial instincts of earth scientists. Again, the relative stability over two decades of the AAPG and SIPES data supports this conclusion.

Of course, earth science careers are not limited just to the energy business. Many exciting opportunities exist in oceanography, groundwater, geo-hazards, astro-geology and other fields. The human species will always need to cultivate the earth’s natural resources in a reasonable and responsible manner and earth scientists will be in the middle of the play.

So, the next time a young person asks my advice on an earth science career, I will tell them tales of the great people I have met, pontificate on the highs (crayfish boils and drilling deep wells), and briefly mention the lows (hotels in southeastern Colorado and explaining dry holes to anyone), in an exciting career that I continue to enjoy, and express my perception of the bright future of the earth sciences. I will tell them there will be days and even years they will question their sanity concerning their career choice. There are no career exceptions to this advice; not earth science, telecom/high tech, or even a union job. I will encourage them to pursue an earth science career if their heart is truly into doing so and at the very least, no matter what they choose to study, take and understand economics so they can see that train coming. Most importantly, I will tell them to do something they truly enjoy, not to just take the major du jour.

I would also like to remind everyone to start making travel plans to attend the excellent 41st Annual Meeting, co-hosted by our San Antonio Chapter and the national organization on March 17-19, 2003. The program and festivities to be held in this wonderful city will not disappoint.

Finally, I wish everyone a happy holiday season and may you all prosper in the coming new year. And by the way, I do have a bias toward Mr. Namath.
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