



TINKER: PROPOSED FISCAL, ENVIRONMENTAL POLICIES THREATEN IOR

Further advances in improved oil recovery (IOR) promise substantial upside potential in expanding the world's stock of recoverable oil.

Achieving those advances means overcoming significant technological and economic hurdles, as well as environmental challenges.

But in the U.S., the biggest hurdle is a mélange of proposed new policies that threaten to strangle the nascent IOR boom in its infancy.

That sums up the chief IOR concern for Dr. Scott Tinker, director of the Bureau of Economic Geology at the University of Texas. Dr. Tinker, one of the most dynamic and sought-after speakers on energy issues, will deliver a special address at the 17th Improved Oil Recovery Symposium's All-Convention Luncheon on April 26, 2010. He is also the driving force behind an ambitious new feature film documentary on energy scheduled for release in late summer 2010 (*see sidebar, p. 3*).



Tinker

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*Dr. Scott Tinker,
Bureau of Economic Geology, U. of Texas*

POLICY CONCERNS

Noting the demand for liquid transportation fuels is expected to remain strong for the foreseeable future, Tinker pointed out that as the developing world continues to industrialize those countries are buying oil reserves and developing new oil resources: “They are being as environmentally sensitive as they can, but [the environmental challenge] isn't stopping them from developing their resources.”

He contrasts that situation with that of the U.S., where a whole suite of proposed new policies would remove some of the oil and gas producer incentives and add new taxes, with the ultimate effect on operator investments comparable to that of the windfall profits tax during 1980-88.

“The taxes being proposed now, combined with the removal of key incentives, will be crushing to an industry that is already pretty strained—contrary to popular dogma, international oil companies and large U.S. independents are not very healthy. My biggest concern is that the U.S. will put in place oil and natural gas policies that will set us so far back relative to the developing world that we won't keep a healthy economy; and energy underpins the economy—period,” Tinker said.

The concern goes beyond new fiscal constraints, he pointed out, citing onerous proposed new environmental strictures based mostly on misinformation.

“One of the great challenges is making sure that regulators, particularly federal regulators, understand that hydraulic fracturing has been going on successfully for decades, with very little problem to fresh water aquifers,” Tinker said. “The biggest challenge for shale gas plays, such as the Marcellus, is making sure that the critical technology, hydraulic fracturing, is still allowed.”

The EPA is looking at yet another study of hydraulic fracturing, Tinker noted. “Like prior studies, this one will probably have the underlying theme of: Is it safe, and should we even be doing it? If you take hydraulic fracturing out of the mix, then you can’t develop unconventional gas. It is that simple.

“If we look at Texas, the RRC [Railroad Commission] has been regulating the oil and gas industry for more than 80 years and has in place a successful framework for ensuring that all oil and gas activities, including fracing, do not impact groundwater or surface water.

“The RRC requires a drilling permit, notification of spud, notification of surface casing setting, and detailed reporting on the completion, such as perforations, depth, and more. Notice and permits for recompletions and plugging are also required. These regulations include strict well construction requirements that require several layers of steel casings and cement to protect groundwater. All waste generated during drilling and completion, including fracing, must be disposed of or recycled according to commission regulations. Fracing has been a common industry practice for more than 50 years in Texas, and commission records do not indicate a single documented water contamination case associated with hydraulic fracturing in Texas.”

That introduces a fresh irony into the policy debate: Using a poorly considered and politically motivated environmental regulatory hand to burden oil and gas development ultimately threatens the environment because hobbling oil and gas development hurts the economy.

“If we end up hurting our economy through perhaps well-intended but naïve policies, we’ll end up hurting the environment, because in a recession or struggling economic times, much less gets invested in the environment and environmental policies than when times are good,” Tinker said. “There is a disadvantage relative to our international neighbors, and there’s also a balance between energy, the economy, and the environment that I think most policymakers tend to underplay. Oil, natural gas, and coal are and will be critical components of the U.S. energy future for many decades—and fossil fuels allow us to bridge to alternative energies in a sensible way without hurting the economy.”

Tinker thinks it’s a top priority for the oil and gas industry to educate the voting public on that issue, and cited such education as the motivation for the documentary film.

IOR UPSIDE

Tinker sees a significant upside potential from IOR: “Most reservoirs have a pretty good gap between what’s recovered and what is ultimately moveable. It’s a balance between technology, cost, and recovery.”

He contends that IOR is an extremely important component of energy supply. While oil and gas prices are volatile—hobbling the more expensive projects temporarily when cash flow is negative—in the long term, economics favor IOR because of its reliance on existing infrastructure.

“IOR is critical because it allows us to extract oil where we’ve already found it,” he said. “So there are minimal new surface infrastructure, permits, regulations, and such things that go on for a new greenfield project.”

DR. SCOTT TINKER

Scott W. Tinker is Director of the Bureau of Economic Geology, the State Geologist of Texas, Director of the Advanced Energy Consortium, and a Professor holding the Allday Endowed Chair in the Jackson School of Geosciences at the University of Texas at Austin. He spent 17 years working in the oil and gas industry in exploration, production, and research prior to coming to UT in 2000. He is immediate past President of the American Association of Petroleum Geologists (AAPG) and past President of the Association of American State Geologists. Tinker was a Distinguished Lecturer for the AAPG (1997), Society of Petroleum Engineers (2002), and Distinguished Ethics Lecturer for the AAPG (2006-2007), and he won best paper awards in the AAPG Bulletin and Journal of Sedimentary Research. He holds appointments on the National Petroleum Council, National Research Council Board of Energy and Environmental Systems, Interstate Oil and Gas Compact Commission, and serves on several private, professional, and academic boards. His passion is building bridges between academia, industry, and government. Tinker holds a BS in geology and business administration from Trinity University, an MS in geological sciences from the University of Michigan, and a PhD in geological sciences from the University of Colorado.

Tinker also sees much untapped IOR potential offshore: “A lot of the oil fields in the Gulf of Mexico haven’t been waterflooded yet, much less had tertiary approaches, so there are definitely opportunities for extending the life of the world’s offshore fields.”

In addition, there is a major opportunity in the linkage of capturing anthropogenic CO₂ emissions and enhanced oil recovery, according to Tinker.

“It’s a great opportunity to take CO₂ from the [industrial plant] stacks, put it into oil fields to recover more oil, and then eventually sequester almost as much carbon in those fields as you produce from the oil,” he said. “There are going to be opportunities for this, if a price is put on carbon.”

Beyond any fiscal incentives for sequestering the greenhouse gas, the direct cost of CO₂ could also be reduced as more CO₂ enters the market, Tinker said: “Right now, we’re limited to natural CO₂ sources.”

TECHNOLOGY ADVANCES

Extracting more oil from known fields depends on more than just robust oil prices, Tinker noted; it also depends on industry continuing to press technology advances.

“I think it’s important that people recognize that reserves growth is a combination of technology and price—and, now and then, SEC rules,” he added.

“Technologically we’re seeing much better access to oil that is hard to contact,” he said, citing “tremendous” improvements in drilling and stimulating horizontal wells in both conventional and unconventional systems.

Tinker provided the example of the Bakken Shale, where long-reach horizontal laterals have run as much as 10,000 ft and the number of multiple-stage fracs has reached 28 and is approaching a “phenomenal” 30.

“This is not IOR, but this is certainly technology that can be applied to improved oil recovery in known fields as well.”

Another crucial area of technology advancement in IOR is industry’s ability to image the reservoir, notably gaining improvements in seismic resolution needed to better assess a formation’s fracture matrix, Tinker pointed out. He also pointed to the potential of nanotechnology and microtechnology to put sensors between wellbores to improve interwell illumination: “The tough part is contacting those pores that you otherwise can’t get to.”

IOR COST CUTTING

Tinker contends much of the technology advances in IOR will focus on cutting costs.

“There are economies of scale that are being gained now as these technologies become more commonplace,” he said.

He also sees cost-benefit opportunities in new hydraulic fracture technology advances:

“There are some neat things being done now in terms of looking beyond sand for proppants at new—initially more expensive, but stronger—materials that don’t

‘THE BRIDGE’ AN ENERGY EDUCATION INITIATIVE

“The Bridge” is a feature-length documentary film and permanent companion website designed to educate the public about the transition from fossil fuels to alternative energies: How long will it take; what will it look like; what choices will make the transition a smooth and gradual success; and which good intentions could have the opposite effect.

The companion website will include all findings from the film and serve as a user-friendly stop for energy information, permanent and continuously updated.

Dr. Scott W. Tinker, director of the Bureau of Economic Geology at the University of Texas, is the project’s guiding voice and on-camera narrator. Harry Lynch of Arcos Films, an award-winning documentary filmmaker with a diverse energy background, is producing the film and website.

The target release date for both elements is late summer 2010, with consideration of a limited theatrical release and telecast by one of the major cable television networks.

The \$3 million project, supported in part by the AAPG Foundation, is seeking funding and logistical support from corporations, individuals, and nonprofit organizations. More information about “The Bridge” can be found at <http://foundation.aapg.org/thebridgefund.cfm>.

THE MISSION

The project’s mission “is to create a culture of energy education, so that consumers can make wise energy decisions, in the ways they live, the products they buy, the culture they shape—to help ensure a secure energy future for us all.”

compact as much post-frac, and so the initial flow rates are higher and last longer. It's all about keeping the flow pathways open and contacting as much rock as possible."

Tinker suggested that cost-reduction efforts on all of the horizontal well technologies should be a top priority, such as "keeping costs down with slimmer holes, different kinds of liners, anything you can do to keep down the cost of drilling out the lateral and then stimulating it.

"Reliability is also a challenge; anything you can do to make these long lateral wells reliable saves a bunch of money."

He also emphasized the importance of getting information out of the horizontal leg of a well—"be it logging or production tests to know where the actual flow was coming from.

"Those are things that would improve not just primary recovery but also restimulation."

Use of fresh water in IOR operations is a "huge" issue going forward, contends Tinker—as is water disposal.

"Are there ways to combine produced waters, desalination, and perhaps better use of fresh water in our oil field operations? I'm sure there are.

"We haven't had considered improved use of water as much in the past, but quite often when you get on these efficiency roads, it looks tough on the front end, but you end up saving some money on the back end compared with what you thought you might."

ENERGY COSTS

Tinker would like to see industry place a major focus on saving energy in operations, "such as using wind and solar energy for electricity and saving the base-load power for when the sun's not up and the wind's not blowing."

Noting the huge energy costs of developing the Athabasca oil sands in Canada, Tinker pointed out that there has been some consideration of using nuclear energy vs. the current practice of burning natural gas for thermal energy and suggested that there may be other ways to secure energy that are cost-effective and cleaner.

"If a price is put on carbon, then you're going to either reduce or pay for emissions. If you can use 'clean' sources of electricity that don't have emissions, you will save money and energy in the long run."

He favors a strong push to realize net energy savings in an oil and gas business that itself is increasingly energy-intensive: "Desalinating water, capturing CO₂ and compressing it, using energy to convert really heavy oil or tar into liquids—these are all [energy-intensive] areas that have technology challenges. Any improvements made there to reduce the parasitic load of energy would be dollars in the bank."

Tinker noted that while 87% of the world's energy comes from fossil fuels, concerns over stability of future supply and carbon emissions have spurred a shift to alternative energy sources.

"We must navigate this transition very carefully to ensure the stability of economies and the health of the environment," he said. "And for this, a solid energy education is essential."

Tinker said he seeks to create what he considers to be the first balanced documentary on energy. "We're trying to showcase many different forms of energy, visiting premier facilities worldwide," he said. "It is important to get some balance in the melee of energy policies being considered."

The effort has taken—and will continue to take—Tinker and the film crew to energy production facilities around the world, including conventional oil (Middle East and Gulf of Mexico), unconventional oil (Canada), natural gas (Middle East), unconventional gas (Texas, Gulf of Mexico), coal (China, Wyoming), nuclear (France, Texas), hydro (Norway, China), biofuels (Brazil, U.S. Midwest), wind (Denmark, Texas), solar (Spain, California), geothermal (Iceland, California), and wave and tidal energy (Scotland, U.K.). "50% of the footage has been captured; it is very exciting," Tinker added.

In the process of all this globetrotting, Tinker and the filmmakers have filmed conversations with CEOs of the world's leading energy companies, top government officials, and cutting-edge energy scientists, seeking to deliver to viewers a true insider's perspective on what's happening in the world of energy.

IOR 2010 MARKS CONTINUED PROGRESS

The 17th Improved Oil Recovery Symposium (IOR 2010), scheduled to be held April 24-28 at the Renaissance Hotel and Convention Center in Tulsa, Okla., continues to mark progress toward an exciting and informative conference.

Prospective attendees are advised to register online at www.speior.org/registration.asp before March 25, 2010, when the registration fee increases by \$150.

STRONG INTEREST SHOWN

Despite a rollercoaster year for the oil and gas industry, interest remains strong in exhibiting at the symposium and sponsoring IOR 2010 events and other exposure opportunities.

Filling the exhibition floor is on pace to match that of the 2008 symposium, with 31 exhibitors already signed up and 4 months still to go. IOR 2008 sold out its 42 booths.

Six oil and gas companies, the U.S. Department of Energy, and the University of Tulsa all have pledged or underwritten Platinum-level sponsorships at IOR 2010. Sponsorships are still available at all levels, including application to specific events and handouts.

In other recent IOR 2010 developments:

- The April 25, 2010, Tulsa regional geology field trip has been secured under the leadership of acclaimed author and instructor Dr. Norman J. Hyne of the University of Tulsa.
- A change in instructor has been announced for the Petroleum Reserves short course (*see related story at right*).
- Oil Chem Technologies LLP has announced plans to bestow its second award for outstanding contributions to chemical enhanced oil recovery (*see related story, p. 6*).

TECHNICAL PROGRAM

According to Dr. Larry Lake, technical program chair, all final selections have been made on papers for the technical program of the biennial conference, which is sponsored by the Mid-Continent Section of the Society of Petroleum Engineers with support from SPE's Bartlesville, Okla., section.

NEW INSTRUCTOR ON TAP FOR RESERVES SHORT COURSE

There has been a change in instructor for the IOR 2010 short course on Petroleum Reserves (Changing Landscape).

Ryder Scott Co. President John Hodgkin will instruct the short course instead of Bob Wagner, consultant and retired Ryder Scott vice-president.

The course is expected to draw strong attention in light of significant changes in reserve reporting rules being implemented by the Securities & Exchange Commission (SEC).

NEW INSTRUCTOR

In addition to serving as company president, Hodgkin is a member of the board of directors of Ryder Scott. He joined the firm as a geologist in 1977. Prior to



Hodgkin

his election as president, he had direct responsibility for coordinating and supervising staff and consulting geologists, geophysicists, and petrophysicists of the company in ongoing reservoir evaluation studies worldwide.

After graduating from Texas A&M University with a BS degree in geology in 1974, he joined Gulf Oil Corp. in New Orleans as a development geologist working offshore Louisiana. Since joining Ryder Scott, he has been responsible for conducting numerous field studies of both U.S. and international properties. He is a Certified Petroleum Geologist and a registered Professional Geologist and Engineer in the State of Texas. Hodgkin is also a member of the American Association of Petroleum Geologists, Society of Petroleum Engineers (SPE), Society of Petrophysicists & Well Log Analysts, and Houston Geological Society. He has co-authored several SPE papers on reserves topics.

THE COURSE

This course is designed to instruct in the estimation of petroleum reserves

In all, 108 presentations and 20 alternates have been selected.

Lake sees the 2010 symposium's technical lineup as one that strongly addresses two of the biggest technical challenges today.



Lake

The largest change in IOR 2010's technical program will be the numerous papers on nanotechnology for oil recovery: "The application here remains unclear, but the potential is substantial."

*Dr. Larry Lake,
Chair, IOR 2010 Technical Program*

"There are at least two challenges on the horizon: 1) translating the nearly 50 years of IOR/EOR experience into practice, in effect commoditizing the technology; and 2) expanding the range of application of the technology. Too often have we been constricted into categories of application by screening guidelines," he said. "The IOR 2010 program addresses each through publications on field cases and on expansion of technologies."

Lake also noted a significant shift on topical emphasis in the IOR symposium in recent years.

"Definitely, there has been more emphasis on drilling, as well as technology bundles such as reservoir characterization," he pointed out. "Other ancillary technologies that will be seeing more application will be decision and risk analysis. The combination of these technologies will be more powerful—that is to say will recover more oil—than individual applications."

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PROGRAM DETAILS

The 3-day, 4-track technical program will have sessions devoted to the following topics:

- Polymer flooding (I and II).
- Heavy oil, thermal (I and II).
- Heavy oil, nonthermal.
- Alkaline surfactants (I and II).
- CO₂ EOR and sequestration (I and II).

under Securities & Exchange Commission (SEC) and SPE/World Petroleum Council (WPC) reserves definitions guidelines. The course discusses all definitions, including the latest developments and interpretations presented by the SEC and SPE/WPC. The course covers in detail the requirements that must be met to classify reserves as proved reserves but also discusses classifications of probable and possible reserves.

Following a review of reserves definitions, the course presents and discusses the main reservoir engineering and geoscience methods that are used to estimate reserves and how reserves definitions affect such estimates. Case examples will be presented to illustrate estimation methods, along with typical errors associated with reserves estimates and how to avoid them. In addition, the course covers supplemental estimation techniques, such as reservoir simulation and probabilistic methods to estimate reserves and how to properly apply such techniques.

NOMINATIONS SOUGHT FOR TOP CHEMICAL EOR CONTRIBUTOR

Nominations are being accepted until January 15, 2010, for Oil Chem Technologies LLP's award for outstanding contribution to chemical enhanced oil recovery.

The award is given to an individual whom his or her peers believe has made an outstanding contribution to field application of new, innovative technology in the field of chemical EOR. Qualified individuals will have been directly involved in the development of a chemical surfactant or a surfactant-related process that had been implemented successfully in the field in the 3 years preceding the 17th Improved Oil Recovery Symposium (IOR 2010) in Tulsa, Okla. The award will be presented during the IOR 2010 awards luncheon on Monday, April 26, 2010, in Tulsa.

According to Dr. Betty Felber, chair of the IOR 2010 awards committee, a nomination for the Oil Chem award must be accompanied by appropriate documentation supporting the nomination, such as technical papers and patents. The documentation should also include details about where the surfactant was used and the role that the nominee had in its design and imple-

- Surfactant polymer.
- Microbial EOR.
- Air and enriched gas.
- Low-salinity IOR.
- Nanotechnology.
- IOR strategies.
- Reservoir characterization.
- Conformance.
- Wettability modification.
- Simulation.
- IOR/EOR case studies.

In addition, the 2010 technical program will continue a recently initiated practice of SPE reciprocation with the European Association of Geoscientists and Engineers (EAGE).

IOR 2010 will feature “Best of Paris” presentations—some of the top papers gathered from the EAGE’s own biennial IOR conference that alternates with the SPE IOR conference; the latest such conference was held in Paris during April 27-29, 2009.

The previous such reciprocation on IOR occurred when EAGE featured a “Best of Tulsa” session at its 2009 Paris IOR conference. Prior to that, the SPE Mid-Continent Section-sponsored IOR 2008 (16th Improved Oil Recovery Symposium in Tulsa) offered a session entitled the “Best of Cairo,” featuring presentations from EAGE’s 2007 IOR symposium in the Egyptian capital.

Such reciprocations have been occurring for a number of years between the two professional societies, which formalized such collaborative arrangements under a memorandum of understanding signed Dec. 9, 2009.

Although the “Best of Paris” papers have not been selected yet, EAGE provided Dr. Lake with a shortlist of 10 top papers to be reviewed and considered for selection for IOR 2010.

Topics among those shortlisted papers include automated history matching, 4D seismic modeling, in-situ combustion and other thermal EOR, solvent injection, tracer tests, and CO₂ EOR.

Should enough of these EAGE papers be invited and those invitations accepted, IOR 2010 will add a special “Best of Paris” session as a fifth track on Wednesday, April 28, 2009.

mentation. A committee of peers in the field of chemical EOR will make the final choice from among the nominees. Nominations should be sent to the attention of “Oil Chem Award” at IOR@SPEIOR.ORG. Inquiries for further information should be addressed to Dr. Felber at IORImplement@spemail.org.



Dr. Betty Felber

PITTS FIRST AWARDEE

Oil Chem bestowed the first award for outstanding contribution to chemical EOR on Dr. Malcolm J. Pitts, president of Surtek Inc., in a special presentation at the 16th Improved Oil Recovery Symposium in Tulsa in April 2008.

Surtek is a Golden, Colo.-based technology developer that conceived the alkaline-surfactant-polymer (ASP) EOR process. The company works as consulting firm specializing in all phases of chemical flood design.

Pitts joined Surtek in 1980. During his tenure at Surtek, he has designed micellar-polymer, mobility control polymer, alkaline-polymer and ASP floods for 28 field projects. Pitts holds a BS in chemistry from the University of Colorado, an MS in chemistry from Purdue University, and a PhD in chemistry from Georgetown University. He served on the Society of Petroleum Engineers Board of Directors from 1995 to 1998 and was named a Distinguished Member in 2000. He is a Certified Professional Chemist and a Fellow of the American Institute of Chemists. He is a technical editor for SPE Reservoir Evaluation and Engineering and the Journal of Petroleum Science and Engineering.



Dr. Malcolm J. Pitts

Oil Chem Technologies, based in Sugar Land, Tex., supplies surfactants for chemical EOR.

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 IOR 2010 Graphic.....Greta Creekmore

Seventeenth IOR Committee Roster

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