

Diverse International Crowd Spells Success for Conference

Joel Parshall, JPT Features Editor

Nearly 1,200 people attended the SPE Latin American and Caribbean Petroleum Engineering Conference (LACPEC) held 31 May–3 June in Cartagena, Colombia. Participants came from more than 25 countries, representing some 270 operating and service companies, universities, research institutes, and governmental entities.

“The conference was a complete success from any point of view—not only in its organization, but also in the international and national participation,” said LACPEC 2009 General Chairperson Néelson Navarrete, vice president, E&P, Ecopetrol, principal sponsoring company of the conference. “We also enjoyed a high level of quality and diversity in the program, both in terms of content and the speakers. In addition to the excellent technical sessions, including research studies pre-

sented, we had opportunities to interact with the most important companies in the region and get to know their strategies and vision for the future.”

The theme of LACPEC was, “The Power of Integration is Energy.” Headlining the conference were three plenary sessions on Future Perspectives on the Oil Industry in Latin America and the Caribbean, Technical Issues for the Oil Industry, and Areas for New Reserves. LACPEC featured 21 technical sessions dealing with all aspects of field development and management concerns, formations and reservoirs, different kinds of hydrocarbons, recovery methods, drilling and completion issues, and diverse technologies. More than 160 technical papers were presented.

LACPEC also included a successful workshop for young professionals; a student paper contest for individu-

als at the undergraduate, master’s and PhD levels; and an exhibition with display booths of some 30 companies and organizations.

Perspectives on the Region

Opening a plenary session on future perspectives on the Latin American and Caribbean oil industry, Vinicio Suro-Perez, E&P director of planning, Pemex, noted that oil and gas is “a long-term industry.” Pemex has seen its oil production decline to 2.8 million BOPD last year from its peak of 3.2 million BOPD in 2004. Suro-Perez discussed the company’s growing investment, much of it focused on arresting this decline. This investment is directed toward several objectives, including exploration, optimizing development costs, and lowering production costs. The latter particularly will require quicker access to technology, he noted, especially technology specific to Mexico’s reservoirs and operations.

“From a technology standpoint, it is not enough to look at ourselves, but we will need to look outside of our borders,” Suro-Perez said. Pemex sees oil production stabilizing at between 2.6 and 2.7 million BOPD and the company has a goal of achieving 100% reserves replacement by 2012, he said. “Petroleos Mexicanos is a company in evolution, ready to move toward the future,” Suro-Perez concluded.

Solange da Silva Guedes, director, E&P, Petrobras, discussed her company’s 5-year strategic plan for 2009–13. Petrobras plans to invest USD 174 billion, a 55% increase over the 2008–12 strategic plan, and 60% of the investment under the new plan will go toward upstream operations. These will include development of the massive presalt and other Brazilian oil reserves,



A scene from the LACPEC exhibition floor.



Nelson Navarrete, LACPEC 2009 general chairperson and vice president, E&P, Ecopetrol, addresses the conference at opening ceremonies.

domestic and global natural gas development for the Brazilian market, and international E&P activities.

Substantial investment will go toward improved oil recovery (IOR) through projects designed to reduce decline rates and optimize costs in producing fields. Total Petrobras production, which has been growing at a 5.6% annual rate recently, is expected to grow at a 7 to 7.5% annual rate between 2010 and 2020—largely reflecting the planned presalt development, Guedes said.

Javier Gutierrez, president, Ecopetrol, highlighted recent developments in his company and, more broadly, the Colombian oil and gas sector. The government's reform of the industry, which ended Ecopetrol's state monopoly and has led to partial private capitalization of the company, has brought solid benefits to the company and the industry, according to Gutierrez. Foreign investment in Colombian oil and gas activity has significantly increased, with "some 80 to 90 companies of varying size" now operating in the country, and four bidding rounds for exploration licenses have been conducted within the last 20 months, Gutierrez said. More than 100 exploratory wells, a Colombian record, were drilled in 2008, including a significant number by companies other than Ecopetrol.

As a result of a 2006 public offering, Ecopetrol is now 10% privately owned, and the company is authorized to seek additional capitalization that would bring private ownership up to a 20%

level. "We are now in open competition with other companies and receive no favors from the government," Gutierrez said. He noted that within the 2 weeks before the conference, Ecopetrol had completed a USD 3.2 billion borrowing designed to optimize its financial structure—marking the first debt that the company had taken on in its history.

Hercilio Rivas, internal director, R&D, PDVSA, said that the world's economic crisis has had substantial impact on crude oil exporters, such as Venezuela. "The market was a victim of financial manipulation and a speculative bubble," he said. Venezuela needs an oil price of USD 70/bbl as a floor to sustain the investment required to meet its production goals, according to Rivas.

Venezuela's prolific Orinoco Belt has been estimated to hold 1.3 trillion bbl of oil reserves, with only 272 billion bbl having been recovered so far, Rivas said. Current production from the Orinoco is 800,000 BOPD of heavy crude oil plus 500,000 BOPD of improved oil—heavy oil that is diluted to raise it from 8°API gravity to 32°API.

Countries have a sovereign right to control production of their own resources, and this must stay under sovereign control, without being subject to interference from international treaties, Rivas said. While Venezuela is moving toward full government control over oil production, he said that the country welcomes international technology investment in its oil

and gas industry and has more than 27 international companies currently invested in technology activities. The use of secondary-recovery technologies in the Orinoco Belt has the potential to increase today's 7 to 8% recovery factor to more than 20%, and PDVSA believes that production can be increased to 3 million BOPD by 2020, Rivas said.

Ferdinando Rigardo, director, Caribbean Region, Repsol YPF, described Latin America and the Caribbean as areas with "good potential" and said that his company had participated in six of the 10 top recent discoveries in that region as a whole. Colombia, Peru, and Brazil afford better access to outside investment than do Mexico, Venezuela, Ecuador, and Bolivia, he noted. "Brazil, Peru, and Colombia are proving to have an environment competitive with other international areas," Rigardo said, adding that Brazil and Colombia specifically have the region's best exploration potential.

Cooperation between national and international oil companies is needed; a country's E&P risk should not be concentrated in one company, Rigardo said. Investment will be highest in the countries with the greatest incentives, and even smaller reserves can be developed under the right incentives. Cost, accessibility to international capital, and fiscal stability will be the major determinants of investment levels and which countries draw relatively more investment, Rigardo said.

Technical Issues for the Region

In a plenary session on industry technical issues for Latin America and the Caribbean, Eduardo Blanco, engineering manager, Argentina and Chile, BJ Services, discussed cementing practices and stimulation processes. He recalled that the industry once thought it would never be able to cement horizontal wells, and now cement jobs for horizontals are routinely modeled and performed.

"Technology has extraordinary surges whenever external issues put pressure on the industry," Blanco said. He pointed to futuristic complex intelligent completions that, once set, will make it unnecessary to pull tubing or temporarily kill the well in an intervention, always a risk to the formation. Blanco cited a report from the Alberta Research

Council, stating that improving reserves recovery to 57% is achievable.

A summary of E&P in Mexico was provided by Heber Cinco-Ley, director, Mexican Petroleum Institute (IMP), who focused on the multiple technical challenges involved in maintaining Mexican production levels. Those challenges include the harsher and more difficult environments in areas that Mexico will continue to explore and develop; the heavier oil believed to be prevalent in many of the potential new reservoirs, onshore and offshore; and improving the ability to develop matrix oil in naturally fractured reservoirs, he said.

Much of Mexico's exploration will focus on the Gulf of Mexico (GOM), where prospective resources have been estimated at 52 billion bbl, and deep-water and subsalt reservoirs will be major targets, Cinco-Ley said. In the production area, the use of foam surfactant is proving effective in increasing the recovery factor at the giant offshore Cantarell field, he said. Mexico is attempting to halt the field's decline and stabilize production at Cantarell. The huge Chicontepec field is also a major target for improved recovery efforts. Current recovery factors are as low as 2% in the field's low-permeability turbidites, and fracturing technologies are being employed in an effort to improve recovery, Cinco-Ley said. An IMP research project he discussed involves the use of air injection with catalyst as a potential IOR method.

Roberto Muñoz, vice president, Latin American Region, Halliburton, spoke about major technology challenges affecting the region, including improved recovery in new and old fields, development of nonconventional reservoirs, and digital efficiency modeling of key drilling and development processes.

Muñoz noted that maintaining the drilling trajectory of a 900-m lateral to place it within a 3- to 5-m-thick reservoir section once was considered impossible, but with today's geosteering technology is now routine. Microseismic mapping is unlocking nonconventional resources, he said, and he discussed how connectivity, enabling technologies, and integrated workflows have created the opportunity for digital efficiency modeling that extends the industry's ability to measure and optimize drilling

and completion effectiveness. "Soon, all the tools in the well will have an IP address," Muñoz said.

Peter Fontana, vice president, Latin America Region, Weatherford, discussed new formation-evaluation technologies that could benefit drilling and development activities in the region.

A new measurements-while-drilling tool provides real-time inclination and azimuthal gamma ray measurements taken within 2.3 ft of the drill bit, as opposed to other tools' measurements taken within 15 to 30 ft of the bit. The tool can enable greater geosteering precision and flatter drilling trajectories for more accurate wellbore placement and fewer sidetracks. Other new compact-tool designs can be used with conveyance technologies to run logging instruments to the bottom of highly deviated horizontal wells, without the need for wireline or coiled-tubing units or downhole tractors. Thus, equipment and personnel mobilization risks in remote, hard-to-access locations are minimized, and the risk of stuck tools, resulting in delayed or lost data, is eliminated.

Nelson Ney, president, Baker Hughes Latin America, noted that the region is unique in its political, social, and technical challenges but called the future in Latin America "brilliant." Major challenges include environmental issues, deepwater development, and improving recovery in marginal fields, according to Ney.

The difficulties of drilling horizontally in the Andean foothills, Ney said, are being met through advanced geosteering technologies that improve wellbore trajectory and through single-trip completions of multiple zones. Other topics he covered included reservoir-evaluation advances, the use of artificial lift (AL) with viscosity reducers and bottomhole heaters to improve heavy oil production, single-trip fracturing of multiple zones in tight formations, and field optimization. Remote monitoring of AL systems is an area "we have to work on" in Latin America, Ney said. He also addressed local-content issues and said that emphasis on reliability and health, safety, and environmental compliance would enable local manufacturing for the oil sector to expand.

Ricardo Beltrao, Production R&D manager, Petrobras, spoke about his company's technical challenges,

research, strategy, and other issues. Exploring and developing Brazil's huge presalt structures represents the company's biggest risk, he said, with these structures being situated beneath 2000 m of salt in 7000 m of water. Two wells are producing successfully in extended well tests. For the first project, the initial well had an investment cost of more than USD 200 million, excluding rig expense, and represented half of project capital expenditure by itself.

Petrobras has maintained spending levels on research, despite the economic downturn. The company's USD 1 billion invested yearly in research represents 1.1% of revenues, Beltrao noted.

Joao Felix, vice president, Marketing, Latin America, Schlumberger, said, "We [Schlumberger] invest in technology irrespective of the oil price at 147 or 37... and it's a core belief that we have that long-term it's the right thing to do."

Schlumberger is assisting Latin American operators in heavy oil characterization programs, in which technologies such as wellbore seismic are used to look 30 to 50 ft beyond the bit to optimize well placement. Increasingly, placements reflect eventual secondary and tertiary recovery needs as well as primary recovery. In the region's many mature fields, cross-well resistivity tomography is being used to characterize bypassed zones, without resorting to more expensive seismic methods. In deepwater fields, real-time downhole information transmitted from multiple, isolated, and independently, remotely controlled zones is enabling proactive reservoir management through "what we call logging while producing," Felix said.

New Areas for Reserves

In a plenary session on areas for new reserves, Armando Zamora, director of the Colombian state hydrocarbon agency, ANH, said that his country has an estimated 1% of Latin America's reserves but generates 10% of its oil and gas production. "With the little that we have, we make the most of it," he said, noting that Colombia traditionally has worked in harmony with the private sector. With 70 discoveries since 2004, Colombia now has 2.3 billion BOE of proven, 2.5 billion BOE of probable, and 5.6 billion BOE of possible reserves. A recent study placed a

50% probability on Colombia having from 30 to 80 billion BOE of potential reserves. The country "is becoming a new oil hub in the north of South America," Zamora said.

Daniel Saba de Andrea, president, Perupetro, stated a case for attracting increased oil and gas investment to Peru. He cited a gross domestic product that has been grown by 3.5% so far in 2009, despite the world economic downturn, and the country's commitment to commercial integration. Peru's Organic Law of Hydrocarbons has been in force without change since 1993, through three different administrations with differing orientations, Saba de Andrea noted. Contracts can only be altered by negotiation of the parties, not unilaterally by the government, he emphasized, and a record 92 contracts are now in place. Saba de Andrea pointed to the recent discovery in the Kinteroni field, where more than 2.3 Tcf of gas has been identified. Reserves at the Camisea field

are nearly 14 Tcf of gas, with current production averaging 300 MMcf/D, and potential exists for increasing heavy oil production in northern Peru to 200,000 B/D, he noted.

Also discussing E&P opportunities in Peru were Roberto Diaz-Coral, Region Pacific Countries Development manager, Repsol, and Pedro Grijalba, Energy manager, Petrobras, Peru.

Diaz-Coral spoke about his company's activities on Block 39 in the environmentally and culturally sensitive Marañon Basin, near the Ecuadorean border. The production area is 250 km from the nearest pipeline, with logistics conducted entirely by river transport and helicopter, and a biodiversity study of the area, involving the Smithsonian Institution, is under way. Geosteered extended-reach horizontal and multi-lateral wells are being drilled from pads optimized for minimal footprint.

Grijalba discussed heavy oil, new deepwater technology, and technology

that specifically has been developed in the Brazilian presalt that could be used in Peru's exploration frontiers. He praised Peru for having a royalty system tied substantially to the price of oil, which has helped sustain E&P activity as prices have declined.

José Alfonso Rodríguez Torres, manager, Reserves, Pemex, discussed his company's efforts to incorporate new reserves through exploration, exploitation, and deepwater development, to compensate for declines that have occurred since 2004 at the huge Cantarell field in the Bay of Campeche. Much of the activity will center on the vast Chicontepec field, northeast of Mexico City, and the GOM, source of more than 50% of Mexico's production, with increasing emphasis on deepwater areas, he said. At Cantarell, an ongoing pressure-maintenance program has helped to stabilize production at approximately 700,000 B/D, Rodríguez Torres said. **JPT**

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