A STEADY STREAM OF DATA IS COMING YOUR WAY

process industry monitor

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- may
- august
- november
- february

Oil and Gas
Refining
Chemical
Food Processing
Pharmaceutical
Pulp and paper
Power
Water and Wastewater

DUCKER worldwide

FLOW RESEARCH

AN IDEA NETWORK COMPANY

Every quarter Process Industry Monitor shines its spotlight on the process industries, looking for important events to discuss or highlight.

We find the events, report them, and place them in the context of the flow industry. PIM explains and interprets the importance of capital spending forecasts, the construction of new refineries and chemical plants, and new regulations that affect the need for more instrumentation.

PIM gives you the information you need for forecasting, marketing, and making decisions on product features.

Executive summary

This section gives an Executive Summary of this issue of Process Industry Monitor. It presents an overview of the entire issue and highlights the main findings.

Issues and perspectives

This section discusses issues related to all of the process industries. The May issue topics will include:

- Is the recession over?
- How did/does the recession affect the process industries and the instrumentation companies they rely on?

Industry monitors

The following sections monitor the eight main process control industries:

Oil and Gas

Refining

Chemical

Food Processing

Pharmaceutical

Pulp and paper

Power

Water and Wastewater

For each of these industry sections, we have the following categories:

- **In the news:** Important developments, mergers, acquisitions
- **Industry pulse:** Shipments, trends, and forecasts
- **New projects:** New construction, revamps and potential projects
- **Company closeup:** companies — how they use flowmeters, how they select them, their capacities, reorganizations
- **Implications for flow:** Analysis of the oil and gas news from a flow perspective

Each quarter we will shine the spotlight more brightly on one of the industries, expanding our coverage and commentary in that section.

Oil and Gas

In the news

Oil curb constant until July

OPEC is set to extend its stringent supply curbs through June, but options will remain open on output policy for the second half of the year.

The Organization of the Petroleum Exporting Countries slashed output by 1.5 million barrels per day (bpd) from January 1, while five non-aligned producers agreed to slice nearly 500,000 bpd in a joint bid to bolster prices.

OPEC, which controls two thirds of world exports, is confident that its non-OPEC colleagues, even wildcard Russia, will stretch their output curbs through June.

The United States, the world's biggest oil consumer, is concerned that OPEC may allow prices to overheat later this year before relaxing strict output cuts.

Washington's worries grew after OPEC Secretary-General Ali Rodriguez said he saw little prospect of the group raising supplies before the end of the year as a convalescing global economy had yet to regain a healthy appetite for oil.

But the senior OPEC delegate said producers were aiming to keep the OPEC basket above $20 a barrel.

Russia to limit output

Russia has agreed with local oil companies to limit output growth this year, but postponed a key decision on whether to stick with OPEC in curbing exports into the second quarter.

The world's No. 2 exporter, torn between the rival interests of growth-hungry companies and OPEC's calls for restraint, said it had plenty of time to decide whether to keep export limits beyond March to help support world prices.

"It's too premature to give any forecast. We have our commitments till April 1 and we have a whole month ahead of us," Energy Minister Igor Yusufov told reporters after talks with top OPEC officials in Moscow.

Senate debates Arctic oil drilling

The U.S. Senate is now debating a bill that would allow oil exploration n the Arctic National Wildlife Refuge in Alaska. Kenneth Bird, a geologist at the U.S. Geological Survey, says the coastal plain contains 3.2 billion barrels of "economically recoverable" oil.

More pipeline

The U.S. Senate is debating a national energy policy bill that will make it easier for gas utilities to get the needed capital to add roughly 255,000 miles of pipe over the next 20 years. Natural gas use is expected to increase by 50 percent during that time. The bill includes energy tax incentives.

California drilling

A case now headed to the U.S. Ninth Circuit Court of Appeals will determine the fate of 36 approved but undeveloped leases of the Santa Barbara County shoreline in California. California lawmakers and environmental groups are suing the U.S. Interior Department. A settlement could be reached by this fall.

New well leases in Michigan

The Michigan Department of Natural Resources (MDNR) announced the availability of new oil and natural-gas well leases around the Great Lakes, following a 1997 moratorium. Michigan is the only Great Lakes state to allow such drilling. Because state laws and international agreements prohibit oil-drilling platforms on the Great Lakes, wells are "directionally" drilled, boring down hundreds of feet before angling out under the lakes.

Oil and Gas

In the news

The Royal Dutch/Shell Group of Companies reported a very strong financial performance for the year 2001. As reported in February, financial results for the fourth were $1.9 billion delivered in a worsening economic environment. Full year adjusted CCS earnings were $12 billion, the second highest ever and only 9% below the record results of 2000.

Philip Watts, Chairman of the Committee of Managing Directors of the Royal Dutch/Shell Group of Companies attributed the continuing "robust profitability" to increased hydrocarbon production and record earnings in Oil Products and Gas and Power businesses. Watts expects major deals, ***including a deal with Texaco***, in the downstream in the U.S. and Germany to give Shell leading positions in those important markets.

Watts said the company has also brought on stream two major deepwater projects, Brutus in the Gulf of Mexico and Malampaya in the Philippines, and has had had major exploration successes in Nigeria and Brazil. In particular, Bonga SW, offshore Nigeria, was the largest hydrocarbon discovery of the year in the global upstream industry.

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Shell purchased its first five-year deal by signing a sale and purchase agreement March 10 with the Oman LNG LLC to sell 0.7 mtpa Liquefied Natural Gas (LNG) over five years to Shell Western (Shell) to supply Shell's downstream gas markets in Spain. Beginning this year, the gas will be delivered to Spain by Shell-owned LNG carriers, which Oman LNG has an option to replace with its own ship from 2004 onwards.

Oman LNG (OLNG) is a joint venture between the Government of Oman (51%), Royal Dutch/ Shell Group (30%), Total (5.54%) from France, Korea LNG (5%) from Korea, Partex (2%) from Portugal, and Japanese companies Mitsubishi (2.77%), Mitsui (2.77%) and Itochu (0.92).

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Shell Chemical Yabucoa, Inc has completed the purchase of the Yabucoa, Puerto Rico refinery from Puerto Rico Sun Oil Company, LLC. Financial terms of the transaction were not disclosed.

The plant had been in shutdown mode since May 2001. The companies have been engaged in the process of restarting the plant, in a production configuration consistent with Shell Chemical Yabucoa, Inc.'s plans.

Shell Chemical Yabucoa. Inc. will operate the facility so it can produce feedstock, which will be shipped by tanker to Shell's Deer Park, TX. and Norco, LA. chemical plants. The facility will also produce gasoline, diesel, jet fuel and residual fuels, which will primarily be used in Puerto Rico.

Oil and Gas

Industry pulse

Crude oil production rebounds from a year ago

U.S. crude oil production continued a steady rebound from low levels of a year ago to increase nearly 3 percent in January compared to January 2001, according to a statistical report by the American Petroleum Industry (API). Alaska production of 1.032 million barrels per day (b/d) was 5.3 percent higher than a year ago.

Imports, however, dropped about 11 percent year-over-year on top of a 9 percent decline in December. There was also a 30.9 percent drop in imported refined products, albeit compared to an unusually large amount the year before. Gasoline imports of 707,000 b/d were down 2.3 percent from a year ago.

Of the major products, only gasoline deliveries exceeded year ago levels with 8.216 million b/d, an increase of 1.9%. Gasoline received positive demand because retail prices were 24% lower than a year ago, personal income growth was moderate, and the weather was warmer than usual, offering more favorable driving conditions around the nation, said the report.

Deliveries of distillate fuel oil, used for diesel vehicles and home heating oil primarily, dropped 12.4% compared to January 2001, the biggest decline in more than 10 years. Abnormally warm weather was a factor, the report said.

Consumer demand declined in 2001

API's year-end statistical report for 2001 in the U. S. showed an overall decline in consumer petroleum demand of nearly 1 percent. Demand for most oil products weakened during the year except for gasoline, which rose by 1.4 percent.

Contributing to the decline were reduced air travel following the Sept. 11 attack, the slow economy, industries switching to natural gas, a weak demand for petrochemical feedstocks, and unusually warm winter temperatures.

There's good news for the longterm, however. **The Department of Energy predicts a 33 percent rise in oil and natural gas demand by the year 2020, with energy demand increasing one percent for every two percent growth in GDP.** The API reports that the current refining and delivery infrastructure in the U.S. is "stretched to the limit. Refiners will be required to make massive investments over the next 10 years, both to expand refinery capacity to meet consumer demand as well as to comply with government regulations."

However, this could be difficult due to historically low rates of return, according to the DOE. In fact, no major new refineries have been built in the U.S. in well over 20 years. Moreover, complex, time-consuming permitting requirements impede the ability of refiners to expand or retrofit facilities in order to increase capacity and regulations complicate the building of new pipelines to efficiently deliver energy to needed areas.

Some up, some down

- Some 853 rotary drilling rigs were active in the U.S. in February, 2002, down from an average 1,156 in 2001 and 918 in 2000.
- U.S. crude oil production in January 2002 was 5,920,000 b/d, up slightly from the same month last year with 5,759,000 b/d
- U.S. natural gas liquids production in January, 2,023,000 b/d was up from 1,381,000 b/d same month last year

Oil production down in UK

Oil production in the UK fell to its lowest level in six years according to August 2001 figures. Production was below two million barrels a day during June last year.

Oil and Gas

New projects

Conoco to expand European oil and natural gas production

Conoco has announced that it is expanding its European oil and natural gas production with new discoveries in the North Sea, off the coasts of the U.K. and The Netherlands.

The Houston-based company will also participate in development of the Clair field, the largest undeveloped field on the U.K. Continental Shelf. in the North Atlantic. Operated by BP, Clair's first phase is expected to produce recoverable reserves of 250 million barrels (60 million net). Production from the first development phase of Clair is expected to peak at 60,000 barrels of oil and 15 million cubic feet of gas. Its oil and gas reserves have remained untapped until now because the reservoir has been difficult to develop.

The discoveries include a significant natural gas discovery in the Dutch sector of the North Sea by Clyde Petroleum Exploratie B. V., a wholly owned subsidiary of Conoco. The well is located approximately 6 miles from the Clyde-operated pipeline and production facilities. Currently, the exploratory well produces natural gas at an initial rate of 43 million standard cubic feet of gas per day gross (mmscf/d), 19.55 mmscf/d net, from one perforation interval, and 39 mmscf/d gross, 17.7 mmscf/d net, from another. The company is reviewing various development options.

Conoco is seeking U.K. government consent for the fast track development of another recent natural gas discovery in block 49/16 in the North Sea, some 80 miles east of the coast of Lincolnshire, England. The discovery is another success for Conoco's policy of snuggle exploration and development -- the pursuit of gas and oil prospects with close proximity to existing processing and transportation facilities, making them commercially attractive and capable of rapid development.

Three abandoned fields to open

The UK Government has issued licenses to the Aberdeen–based oil company, Tuscan Energy, and its partner, Acorn to redevelop three abandoned oil fields in the North Sea. The Argyll Field and sister fields in Britain's oldest North Sea oil field were closed down and abandoned 10 years ago even though more than half of the oil reserves were untapped. New techniques in horizontal drilling now make production possible. It's expected that the companies

Possible projects in California

Nuevo Energy Co. is hopes to drill into an oil-rich field in state-controlled waters by crossing from its federal lease near Vandenberg Air Force Base.

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Venoco has offered to remove a plant and move gas processing offshore as part of a $50 million to $70 million project that would involve restarting two shoreline wells at Ellwood and routing a new undersea pipe.

Oil and Gas

Company closeup

This section examines in depth companies from this industry. We take a look at some of the projects being undertaken by the companies, their purchasing structure, how they make decisions about flowmeter purchases, and other subjects of interest. In the May issue we expect to write about Shell Oil Company and at least one other major oil and gas supplier. We will be looking at engineering service firms to understand better how they implement projects and specify products. We will also highlight news items on selected companies.

ChevronTexaco Corp. has announced a $9.4 billion capital and exploratory spending program for 2002 including $1.6 billion in noncash affiliates' expenditures.

The 2002 program is 22 percent lower than 2001 spending of about $12 billion. After adjusting for major acquisitions, divestitures and lease buy-backs, underlying spending in 2002 is about 9 percent lower than in 2001.

"ChevronTexaco's 2002 capital and exploratory program is smaller than the combined 2001 programs due to merger-related capital efficiencies, including high grading of opportunities, increased use of best practices, and procurement integration," said Chairman and CEO Dave O'Reilly. "While smaller, this program continues our long-term strategy to pursue high-return upstream growth projects, while improving our competitive position and returns in global downstream."

About 65 percent of the total spending, or about $6.1 billion, will be invested in worldwide exploration and production, with $1.8 billion expended in the United States. This is 14 percent less than the $7.1 billion spent last year.

The 2002 exploration program is expected to deliver $300 million lower exploration expense than pre-merger levels. Over 50 percent of the exploratory spending will be in the most promising prospects in the deepwater Gulf of Mexico, Brazil, and West Africa. The balance will be spent on exploration opportunities in areas such as Nova Scotia, Alaska, Norway, and China's Bohai Bay in addition to exploratory activities near existing core production areas.

"The larger and more diverse upstream portfolio of the merged company allows us to high-grade our exploratory program and focus our capital on those developments that best improve overall returns," said Peter Robertson, ChevronTexaco's vice chairman of upstream. "We are also working hard to ensure we have the right people skills, excellent teamwork and knowledge sharing, and world class processes, for selecting the best projects and executing them successfully," he added.

The worldwide upstream program includes significant longer-term growth projects in:

- Kazakhstan, where continued development of the Karachaganak and Tengiz fields will lead to next phase production increases in 2003 and 2005, respectively;
- Chad, where ongoing development of the Doba Field and associated Cameroon pipeline will come onstream in 2004;
- Nigeria and Angola, where investment continues in near-shore producing fields, deepwater development, and for facilities to commercialize associated gas and further reduce routine flaring;
- Venezuela, where further development of the Hamaca Field and associated crude upgrading facility are expected to reach full commercial production in 2004;
- Western Canada, where construction continues on the Athabasca Oil Sands project with expected bitumen production start up in late 2002 and synthetic oil production shortly afterwards.

Oil and Gas

Implications for flow

Flowmeters in the oil and gas industry are mainly used to measure the flow of liquid and gas, although some steam measurement also occurs. Included in the gas flow measurement is measurement of natural gas. This section discusses the implications of the data in this section for flow measurement.

In the worldwide survey of flowmeter users, oil & gas users were asked to report what percentage each type of flowmeter makes up out of all the flowmeters used. The results are as follows, in terms of units, based on oil & gas users worldwide:

Flowmeters Used in Oil & Gas Industry	Percent of Total Units
Differential Pressure	34.8%
Turbine	20.7%
Positive Displacement	16.5%
Magnetic	8.7%
Coriolis	7.0%
Other	12.3%

Turbine and DP flowmeters are widely used to measure natural gas flow, as are ultrasonic flowmeters.

Several factors are important for the financial health of oil & gas production companies. One is overall consumer demand. The other is the price of oil. Consumer demand in the United States for most petroleum products was down by about one percent in 2001, compared to 2000. The average price for a barrel of OPEC crude oil in February 2002 was $18.18. This is considerably below OPEC's official target range of between $22 and $28 per barrel. Oil prices have been below this range much of the time since September 24, 2001.

NOTE: The remainder of this section talks in more detail about the types of flowmeters used in oil & gas production. It looks at the importance of flow measurement in oil exploration and the measurement of natural gas in pipelines. Signs are that the demand for oil, the price of oil, and exploration for oil are all on the rise. These signs are very favorable for flow measurement in the oil & gas industry.

Refining

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Refining

New projects

LG International announced acquisition of a US $96 million (126 billion KRW) oil refinery plant construction project from Turkey`s nationally owned Tupras oil company, in partnership with LG Construction & Engineering. The project entails installation of sulfur processing facilities, including medium grade oil desulfurization apparatus, in the oil refinery complex in Izmir — Turkey`s third largest port.

The 30-month construction, groundbreaking in April, 2002 is forecast for completion by the end of 2004. As this award is the first part of a 3-phased Tupras project, LG Construction & Engineering is confident of securing second and third phase bidding advantage.

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Shell Canada Ltd. has awarded Fluor the engineering, procurement and construction management of the primary process units of its Athabasca Oil Sands Downstream Project, located in Fort Saskatchewan, Alberta. The facility is scheduled for completion in 2002.

When completed this facility will upgrade 161,300 barrels per standard day (BPSD) of Athabasca bitumen. The facility includes a crude/ vacuum unit and an 80,000 BPSD, two train LC-Finer hydrocracker. In addition to the process units, the project includes hydrogen manufacture, a sulfur block and offsites and utilities.

Fluor, in a joint venture with Colt Engineering, also is responsible for engineering, procurement and construction management of associated modifications to Shell's adjacent Scotford Refinery. Construction of the entire facility has been awarded to a joint venture that includes Fluor Constructors International, Inc.

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Syncrude Canada Ltd., has awarded a joint venture of Fluor and SNC-Lavalin the engineering and procurement of its Upgrading Expansion (UE-1) project. The UE-1 project will increase Syncrude's production of sweet synthetic crude by 98,000 barrels per day.

The scope of facilities for UE-1 includes the addition of a fluid coker, diluent recovery unit, light gas oil (LGO) aromatic saturation unit, hydrogen generation unit and sulfur plant; and the revamp of several process units in the existing Fort McMurray, Alberta, facility.

The project is scheduled for mechanical completion in 2003.

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Work on an oil refinery plus a gas utilization project in the port town of Lobito, **Angola** has made significant progresses thanks to a full-level commitment from the future partners, according to Angolan Oil Minister Botelho de Vasconcelos. The new refinery and the gas project form a total investment of $2.5 billion.

Angola produces approximately 600 billion cubic feet of gas 80 per cent of which is burned up at production fields. The oil ministry hopes to work with oil firms operating in the country to eliminate the waste.

Chemical

In the news

Industry pulse

New projects

Shell Chemicals Canada Ltd. has signed a contract with SGF Chimie to form a 50/50 limited partnership to build and operate the first world-scale polytrimethylene terephthalate (PTT) plant near Montreal, Québec, Canada. The partnership will be called PTT Poly Canada. The project value is estimated at over $100 million. PTT is a thermoplastic polymer that can be spun into both fibers and yarns that are long-wearing, inherently stain resistant and easy to clean. The facility should begin operation by the fourth quarter of 2003. The capacity will be 95,000 metric tons per year.

“The synergies with Interquisa Canada and Pétrochimie Coastal, the recognized expertise of our partnership and the calibre of the technologies and products are all measures of the success of this new project, which will strengthen the infrastructures of the east end of Montréal Petrochemical Centre. In doing so, it will consolidate the entire Québec petrochemical industry, which now includes among its components PX, PTA and at last, PTT,” stated Jacinthe Dauphin, President and Chief Operating Officer, SGF Chemical.

Closeup

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