

DECEMBER 2, 2010

VOLUME 2 ISSUE 23

FEATURE: Shell Applies for 'Integral' Oil Sands CCS Permit

Shell Canada announced November 30 that it has submitted a regulatory application for its Quest carbon capture and storage (CCS) project located in central Alberta.

Quest is a fully integrated CCS project, meaning it will capture, transport (pipeline) and store carbon dioxide (CO₂). Hart spoke with Shell spokesman Adrienne Lamb who said that CCS "is an integral part of the company's overall greenhouse gas management portfolio."

Shell submitted the application on behalf of the Athabasca Oil Sands Project, a joint venture among Shell Canada Energy (60%) Chevron Canada Ltd. (20%) and Marathon Oil Canada Corp. (20%).

"Today's submission demonstrates the progress that has been made to advance Quest as we work towards the first application of CCS technology in the oil sands," said John Abbott, Shell's executive vice president of Heavy Oil. "Shell is pleased to have reached this stage of the project that will allow for a thorough review of all aspects of the project by regulatory agencies and provides a further opportunity for public review and comment."



The Scotford Upgrader is Shell's sole upgrading unit in Canada. The innovative CCS system is designed to remove up to 35% of emissions, the company says. Source: Shell Canada

The regulatory submission includes applications for each component of the project, including the capture, transport and storage of CO₂. The Energy Resources Conservation Board (ERCB) is the primary regulatory agency for the project. A

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cooperative Environmental Assessment was conducted to meet both provincial and federal requirements – with Alberta Environment acting as the lead party.

The Quest project would capture more than one million tonnes of CO₂ per year from the Shell Scotford Upgrader, located about 40 kilometers (km) northeast of Edmonton. The CO₂ would be transported by an 84-km pipeline to injection wells north of Shell Scotford and permanently stored more than 2 km underground, beneath several layers of impermeable rock.

A final investment decision on the proposed Quest project would not be taken until the regulatory process is complete. A decision to proceed with the project would depend on a number of factors, including but not limited to, the outcome of the regulatory process, economic feasibility and final project costs, and ongoing consultation with key stakeholders.

Lame told Hart that the CCS project will remove “up to 35% of the direct emissions from the Scotford Upgrader.” That, Lamb said, “is equivalent to taking 175,000 cars off the road.”

The Scotford Upgrader plant converts bitumen into lighter crude stocks using hydrogen produced from steam and natural gas.

According to Lamb, “A major byproduct from these hydrogen manufacturing units is concentrated CO₂ which is ideal for CO₂ capture.” If favorable permitting and invest-

ment decisions are granted by 2012, Lamb said CO₂ injections could begin “in 2015.”

Shell has been studying the CCS application since 2008, Lamb told Hart. More recently, Shell has executed a seismic program and drilled test wells near Fort Saskatchewan, Alberta, to map a key deep geological formation.

“That formation has the capacity for safe, long-term storage of CO₂,” Lamb said.

Other CCS projects in which Shell is involved include Weyburn-Midale CO₂ storage monitoring project in Saskatchewan and the Otway Basin Pilot CCS plant in Australia, which has been injecting CO₂ since April 2008.

Shell is also a part stakeholder (25%) in Australia’s pending CCS project at the Gorgon liquefied natural gas project. At that location, 3 to 5 million tons per year of CO₂ will be stored when it comes online, Lamb said, which will make it the largest CO₂ storage project in the world.

According to Lamb, CCS is among several methods Shell is using to reduce carbon emissions. Others include energy-reduction and efficiency-improvement initiatives and fuel-switching.

Lamb added that CCS has been identified as an opportunity for large-scale mitigation of CO₂ from Shell’s operations, so “Shell’s ambition is to develop substantial CCS capability and to ‘learn by doing’ as quickly as possible.”

– Greg Haas

MARKET FOCUS

Hart Energy Consultant: Diesel Is in the Driver’s Seat

In the aftermath of the global recession, diesel fuel demand will rebound and again drive global refined product demand and margins, according to a new global report released by Hart Energy Consulting. Low sulfur diesel markets will strengthen and remain strong for the foreseeable future.

Gasoline demand will experience significant reductions in the Atlantic markets, as vehicle economy standards are implemented and biofuels continue to penetrate the market. Excluding the ethanol contribution, gasoline demand for Europe plus North America will decline 20% from peak-2007 levels by 2020. By 2030, gasoline demand (less ethanol) will decline at least 37% below 2007 rates.

Refineries in Europe and North America will face tough challenges in reducing gasoline yield and meeting diesel needs, dictating refinery reconfiguration and rationalization.

Speaking about changes in regional diesel fuel trends, Terrence Higgins, executive director, Refining and Special

Projects, Hart Energy Consulting, said: “Gasoline growth will shift from the Atlantic markets to Asian and Middle East regions. However, even these markets are less promising as natural gas substitution and prospects for reductions in fuel subsidies will constrain growth in some developing markets.”

Expanding economies in China, India and the Middle East will make up a large portion of the gasoline demand reduction in the Atlantic market. But the report reveals that longer-term, these high-growth areas will see demand growth falling from 7+% annual rates to less than half this growth.

The full report includes geographic supply forecasts through 2030 for key petroleum commodities, demand outlooks for multiple refined products, an economic analysis of European high-cetane diesel and short- and long-term price and margin forecasts for refinery inputs and products.

For more information on the findings, methodology and geographical coverage, contact Higgins at +1.703.891.4815.

Marathon Closes Sale of Minnesota Downstream Assets

Marathon Oil Corp. December 1 announced that its wholly owned subsidiary Marathon Petroleum Co. LP (MPC) has closed the transaction with ACON Investments, LLC and TPG Capital for the sale of most of Marathon's Minnesota downstream assets. ACON and TPG formed Northern Tier Energy LLC (Northern Tier Energy) to operate the assets as a stand-alone company, according to the announcement.

Included in the transaction is the 74,000-barrel-per-day St. Paul Park refinery and associated terminals, 166 SuperAmerica convenience stores (including six stores in Wisconsin), SuperMom's bakery and commissary, SuperAmerica Franchising LLC, interests in pipeline assets in Minnesota and associated inventories.

Marathon said the total sales value is about US\$935 million, including Northern Tier preferred stock with a stated value of \$80 million. Approximately \$330 million of the total sales value is for the inventories associated with these operations.

According to Marathon, the transaction also contains earnout and margin support components where Marathon could receive up to an additional \$125 million over eight years or may be required to provide up to \$60 million of margin support to the buyers, subject to certain conditions. Any margin support paid will increase the total earnout amount that may be received by Marathon.

Valero Closes Sale of Oil Pipeline Stake to Genesis Energy

The sale of Valero Energy Corp.'s indirect 50% equity interest in Cameron Highway Oil Pipeline Co. was completed November 23, according to an announcement by the buyer – midstream energy master limited partnership Genesis Energy LP.

The announcement completes the deal first disclosed on October 25 by Valero, who reaped US\$330 million from the cash sale of its stake in Cameron, a joint venture that owns and operates the largest crude oil pipeline system in the Gulf of Mexico.

The remaining 50% equity stake is indirectly owned by Enterprise Products Partners, L.P. who also operates the joint venture.

The Cameron Highway pipeline system is a 380-mile, 24- and 30-inch diameter pipeline constructed in 2004, with a capacity to deliver up to 500,000 barrels of crude per day from developments in the Gulf of Mexico to major refining markets along the Texas Gulf Coast in Port Arthur and Texas City.

In a company announcement about the deal, Bill Klesse, Valero chairman and CEO, said: "This sale is part of our ongoing strategy of divesting non-core assets. At the end of a competitive process, we received an attractive price that unlocks significant value for our shareholders."

Valero said proceeds from the deal will likely be used for general corporate purposes. – [Greg Haas](#)

Merrill Lynch Banker: MLP Deals 'Here to Stay'

According to Oscar Brown, managing director and head of energy investing at Bank of America Merrill Lynch, deals in the U.S.-operated, master limited partnership (MLP) space "are here to stay."

Brown delivered his comments on November 18 at the 2011 Deloitte Oil and Gas conference in Houston. Outside of the white-hot unconventional shale gas and oil production sector, he said, "in the U.S. it's all about MLPs."

Brown told attendees that MLPs are "known for yields so you don't think about valuations in the same way. They trade at really big multiples because people are focused on the dividend yield and not really on the multiples themselves."

"What that allows," Brown said, "is for these guys to pay a lot of money for gathering assets and pipelines."

Brown added, "If we are right about (flat) gas prices in the near term as gas producing companies look to raise capital, if you can sell a midstream system for 10 or 11 times EBITDA

[earnings before income, taxes, depreciation and amortization], and if you trade at four times, you don't have to think too hard about that."

EBITDA is supposed to more clearly represent cash flow rather than earnings that are more volatile and often diverge wildly from cash flows.

Brown said the upstream, midstream and downstream energy mergers and acquisition business is likely to continue to be strong.

He said, "Cash balances are very high. In the S&P 500, there's about US\$3 trillion of cash sitting around on the corporate balance sheet."

"If you put the U.S. cash balances out there and throw on all the cash that the stock and wealth funds, private equity and the national oil companies have, the environment for M&A looks pretty good," Brown added.

– [Greg Haas](#)

Study: Alternative Fuel Pipelines Worth US\$3 Billion by 2015

According to a new industry study, specialty pipelines for the alternative fuels market will be valued at more than US\$3 billion by 2015. SBI Energy's Specialty Pipelines for Renewable and Alternative Energy Substances estimates that the total global market for specialty pipelines will show year-over-year increases of at least 30% through 2015.

"Specialty pipelines are required for several renewable and alternative energy substances due to corrosivity, lack of compatibility with conventional fuels distribution systems, industry and regulatory requirements, and the distributed locations of various renewable and alternative energy substances.

The report said that while currently, rail and tanker transportation are the predominant forms of long distance delivery for certain renewable energy sources, such as ethanol and

biodiesel, specialty pipelines represent the most cost-effective mode of transportation for highly produced energy products and substances.

Through 2015, the study said the market for specialty pipelines will expand due to several factors including the continued development of renewable and alternative energy substance production capacities, government and industry efforts to facilitate comprehensive transitioning of national energy economies and emerging trends of growth in the demand for various energy substances.

"Without adequate midstream transportation assets or infrastructure, otherwise marketable renewable and alternative energy substances are excluded from major energy markets and consumers," says Robert Eckard, SBI Energy analyst and author of the industry study.

Refinery Construction Cost Indices Continue Upward Creep

Construction and design costs in the downstream refining and petrochemical sectors rose 3% from first-quarter 2010 to third-quarter 2010, according to the latest edition of the IHS/CERA Downstream Capital Costs Index (DCCI).

In a November 17 announcement about the DCCI, the Colorado-based information services provider said it was the third straight increase for the index since prices bottomed out at 9% below peak 2008 levels. Costs are now just 4% below their 2008 peak.

The IHS/CERA DCCI is a proprietary measure of project cost inflation similar in concept to the Consumer Price Index (CPI) and provides a benchmark for comparing costs globally, the firm said.

According to IHS/CERA, the current DCCI rose from 175 to 180 over the past six months. The values are indexed to the year 2000, meaning that a project that cost US\$100 in 2000 would cost \$180 today, the organization said. Higher commodity prices and a weakening U.S. dollar continued to be a driving force behind the steady rise of costs in the downstream sector, IHS said.

"The momentum in the rise of costs back to pre-recession levels is really a 'slowmomentum' reflective of the broader global economic recovery," said Daniel Yergin, IHS/CERA chairman and author of the Pulitzer Prize-winning book, "The Prize." "Activity is increasing, and prices are rising, albeit with a healthy dose of caution."

Commodities prices were driven by the global economy's recovery and increased construction activity as the impact of the fiscal stimuli was felt by the wider economy, IHS said. Additionally, steel prices continued to show high degrees

of volatility as iron ore producers switched from adjusting prices annually to adjusting them every quarter, reflecting market-based demand-supply fundamentals, the firm said.

The continued weakening of the U.S. dollar also contributed to the rise of commodity prices while also driving up costs of equipment, labor and engineering and project management costs. The dollar's fall was driven by the U.S. Federal Reserve's second round of quantitative easing to reinvigorate the U.S. economy—the Fed recently announced a \$600 billion plan to purchase treasury bonds over the next eight months.

According to IHS/CERA, China plans to increase refining capacity by 50% in the next five years, and the Middle East is emerging as a major hub for petrochemicals with advantageous feedstock and government policies that incentivize diversification into other industries supported by petrochemicals.

"Large complex refineries with integrated petrochemicals are emerging as the 'new standard' to position the downstream sector for profitability," the IHS release said. "The capacity additions in Asia will also continue to put downward pressure on margins as excess capacity emerges in the face of tepid consumer demand.

"Refiners and petrochemical companies in Organization for Economic Cooperation and Development (OECD) countries – which have been rationalizing refining capacity – will continue to face rising pressure to shutdown older and less efficient plants with poor economics," the organization added.

Farooq Sheikh, lead researcher for the IHS CERA Capital Costs Analysis Forum for Downstream, said the "the economic outlook ahead appears to be mixed with rising

prospects that the recent momentum will give way to an impending slowdown.

“China also appears to be slowing down as the government increasingly restrains the fiscal stimulus and has recently increased interest rates by a quarter% in fear of a real estate bubble,” Sheikh said in the release.

The IHS release further stated: “Developing countries are showing increasing concerns about capital flows into

their markets creating an asset bubble. Capital controls and higher interest rates are being employed to temper unbridled growth.”

In conclusion, IHS/CERA said “another modest increase is expected in downstream capital costs in the near term as recovering construction activity and further increases in raw materials prices push costs closer to their prerecession highs.”

Who Will Clear the U.S. Refining Capacity Overhang?

Two speakers at the recent 2011 Deloitte Oil and Gas Conference in Houston shared perspectives on the capacity overhang in the refining industry. They and other speakers noted that the refining industry is in the downside of the cycle as evidenced by generally weak product demand and thin refining margins. If the weak forward outlook for motor gasoline demand holds, an upswing in margins would require the industry to clear out an overhang of excess refining capacity. But who is going to do that and how?

Sunoco Inc.’s CEO Lynn Elsenhans provided a succinct overview of market conditions.

“World demand for energy in the next 25 years will grow by something like 50%, but 87% of that growth will be in the non-OECD countries,” she said.

Elsenhans noted that the U.S. currently represents “just under 18 million barrels per day (b/d) of that demand and is actually expected in 2025 to be down to 14.9 million barrels.” She pointed out that “while the world is growing by 18%, the U.S. is declining by 16%.”

Elsenhans said: “We are a margins business, and when we have more supply than demand, it puts pressure on our margins. We’ve seen a great margin collapse.” The problem is acute. “In 2009,” Elsenhans recalled, “30% of U.S. refiners were operating in a negative cash flow. And clearly that cannot persist.”

Conference attendees heard numerous times from multiple speakers that U.S. refinery owners will likely rationalize their portfolios of operating assets either by sale or by closure.

Oscar Brown, managing director and head of energy investing for Bank of America Merrill Lynch, suggested that foreign oil producers and national oil companies may be eyeing U.S. refining and marketing assets to get a piece of the U.S. fuels market. And the environment for mergers and acquisitions “looks pretty good,” Brown said.

“I think the transactions that might come in the downstream,” Brown noted, “will probably be a little more creative around global players on the upstream diversifying and figuring out how to access the U.S. market.

“On the downstream, the golden age of refining is over – at least for now. I do believe in cycles, but this one is hard to wrap your mind around.”

Brown further noted that each refiner “is pointing at everyone else’s refineries and saying they should shut your refinery, but no one is going to do it themselves.”

“So you have this over-supply issue that isn’t going to be resolved for a while.”

Regarding the challenges in the European and U.S. refining markets, Elsenhans said “despite the closures of 2.3 million b/d in 2008 through to the current period, we [still] see 2.4 million b/d in excess refining capacity, and over half of that excess capacity is probably sitting right here in the U.S.”

Elsenhans offered her own experiences since taking the helm at Sunoco.

“We idled our Eagle Point refinery and then ended up permanently shutting it down. The play there was to get the utilization up in the two remaining refineries to between 90% [and] 95 % and to do that at the cost of just two refineries instead of three, and that seemed like a good idea, and we have been able to do that.”

Elsewhere, “at the Tulsa refinery, we were facing a very major investment there to meet new regulations, so we made the determination that if we could get an offer over our valuation of its continued operation then we would take that in place of turning that plant into a terminal,” Elsenhans said. She added “we were successful in that, and we sold the refinery in Tulsa.”

Elsenhans also said “it is very difficult to close a refinery even in the United States. What I think will happen are most refiners will hold [on] as long as they are positive cash [flow] over, let’s say one fiscal cycle. But what you will see is increasing regulatory requirements and that those regulatory requirements will have a cost – both the cost of operation but more importantly the capital cost to put it in, and I think that will likely be the catalyst to have refinery capacity go down.”

– Greg Haas

OPERATIONS

Sunoco CEO: Hybrids Likely Winner in Alternative Vehicles Race

"We want to be the premier supplier of transportation fuels in our market," Sunoco CEO Lynn Elsenhans told attendees at the recent 2011 Deloitte Oil and Gas Conference in Houston. The chief executive's comments covered a wide range of transportation and fuel topics, including ethanol, cellulosic ethanol, natural gas vehicles and electric vehicles (EVs).

But hybrid vehicles, she posited, will be "where the action is going to be."

Speaking first on the potential to jumping from 10% up to a 15% ethanol blend rate, she said "E15 is one of those things I might say 'don't try this at home,'" Elsenhans said at the conference. She added that "Supplying the E15 is not just as easy as simply adding 50% more ethanol into the fuel," over and above the amount blended into E10, a fuel comprised of 10% ethanol and 90% gasoline.

"The underlying hydrocarbon blendstock would have to change between what we currently do for E10 and E15. This starts to complicate the logistics aspects of providing fuel whether that's at the terminal or retail stations," Elsenhans said.

"You would have to have two different blendstocks and you would have to have to intermix two different blends of ethanol and then of course you have different customers who still want different octane capabilities," she added.

But, once the fuel refining and retailing industry "understands that this is a fuel that the customer wants, [then] we should be able to solve those problems," Elsenhans opined.

Noting that most automakers do not warrant vehicles for fuels that are more than 10% ethanol, she said: "No one wants to be providing a fuel that is bad for our customers' vehicles" and "we also don't want to take on the liabilities of producing those fuels if something were to happen to those vehicles."

When asked if drivers and automakers will make a switch to greater ethanol use, she replied, "I think this is going to be slow uptake, but I do think over a period of time that you will see this happen in part because you will see new vehicles that will be made to take this fuel."

Discussing capital costs to get to greater ethanol production capacity, Elsenhans noted that "if you just look at where we are, the economics around cellulosic [ethanol] and the lack of availability of it, ... it is hard to see that we will stay on the timeframe" to meet the second round of U.S. renewable fuel standards.

She noted that "right now the hurdle ... is that a capacity gallon of conventional ethanol, for a new plant, is roughly

US\$2 per gallon. For cellulosic, it's three to four times that. So cellulosic is not going to be economic unless the price of ethanol is going to be well over \$3 per gallon."

Discussing Sunoco's first purchase of an ethanol plant in Fulton, N.Y., Elsenhans said: "The difference between some of the other plants and that one is that this plant is sitting right in our marketplace."

"The driving force for us is we have to put ethanol in fuel. We have to make buy decisions everyday about how we are going to get that supply."

Compared to the \$2 per capacity gallon price for a new plant, Elsenhans noted that in Sunoco's purchase and restart of the Fulton plant that "we were able to do that with the initial purchase plus the capital we had to put in at less than thirty cents per capacity gallon."

Today, she said, "we use that plant to optimize around requirements and purchase our RINS [renewable fuel trading credits] to meet the mandates. We think that this plant has added future benefit in that it could be the site of a future cellulosic plant and that added optionality with something that particularly interested me."

For all the investment bankers and financial industry professionals attending the conference, she noted that "we would be interested in looking at similar situations [to add more ethanol capacity] where it fits our market footprint well and it would be at substantially lower [cost] than greenfield."

When asked about natural gas vehicles, Elsenhans offered that she sees them "both as a threat and an opportunity. For the refining side of the business it is clearly a threat. For the part of our business which is all about getting fuel choices to customers and getting disparate supply into the market via our logistics and retail, it's a potential opportunity.

"I think that for compressed natural gas, there's an economic driving force, in that today, gas is roughly \$4 per MMBtu ... And crude oil is selling at \$85 per barrel, ... natural gas is an unbelievable bargain on an (energy) basis."

"You are going to see an economic driving force to move more natural gas as a transportation fuel," she said, but "it's a cumbersome fuel in a sense that it requires large tanks and it takes a lot of space on the vehicle.

Likely, she said that for "fleets with known repeatable routes, it's already in that service and I think that kind of service will grow." However she cautioned that for long-haul trucking with routes that are not necessarily repeatable, "it will take a lot longer time to penetrate that market."

Speaking next on EVs, Elsenhans told attendees that “one of the issues on electric vehicles is charging time ... you can’t get many vehicles in there at a conventional service station to charge for long.” Rather, she said Sunoco is considering recharger opportunities at “parking garages at work, parking lots at shopping malls, maybe rest stops and restaurants along interstate highways.”

She said Sunoco will likely enter the EV recharging market, but “it’s not necessarily going to be at a conventional service station.”

“We would expect that the market share of hybrid type vehicles – both cars and light trucks – to be part of a share of vehicles that will grow significantly over time,” Sunoco’s CEO said. She then cited a research study that forecast “hybrid vehicle growth to 37% of the share of passenger car vehicles and 25% of light trucks by 2025.”

“So this,” Elsenhans said, “is where a lot of the action is going to be, and I think the other part of the action will be on diesel fuels and, most particularly, in light trucks, and a little less so on the gasoline side.” – [Greg Haas](#)

Enterprise Products Acquires Bankrupt Petchem and Terminal Operations

Enterprise Products Partners L.P. November 19 announced it has acquired out of bankruptcy a Houston facility that produces high-purity isobutylene (HPIB) and provides terminal services for refined products and petrochemicals.

The Houston Ship Channel plant – previously owned by Bigler LP and purchased for US\$38.5 million – is capable of producing more than 300 million pounds of HPIB annually. Of that amount, a substantial portion of which is under contract, according to Enterprise. Part of a 250-acre complex, the facility offers access to multiple transportation options, including marine, rail, truck and pipelines, according to the announcement.

“This acquisition complements our existing natural gas liquids, petrochemical services and refined products businesses and is a natural extension of our nearby Mont Belvieu operations, which will provide the raw materials for the plant,” said Michael Creel, Enterprise CEO.

“The integration of this facility will extend our value chain in the butane/isobutylene market and broaden the products and services offered by our petrochemical services business. Purchasing the assets through bankruptcy reflects Enterprise’s disciplined approach in pursuing acquisition opportunities that make sense financially and fit with our existing infrastructure.”

According to Enterprise Products, the facility features four pressurized spheres for the storage of HPIB and butanes. In addition, more than 450,000 barrels of storage capacity is available for a variety of refined products, currently accessible by barge. The plant is equipped with multiple truck and rail racks for product movements, along with rail car storage for as many as 105 rail cars. Additionally, the facility is located in close proximity to Enterprise liquids pipelines that transport natural gas liquids and refined products. The barge dock spans 340 feet of waterfront along the Houston Ship Channel and has a 16-foot draft.

U.S. EIA: Refiners Can Boost Diesel Yields With Little Investment

The U.S. Energy Information Administration (EIA) on November 17 released a new report showing how U.S. refiners could respond to the trend of growing global demand for middle distillates and declining Atlantic Basin demand for gasoline.

According to the report, “Increasing Distillate Production at U.S. Refineries – Past Changes and Future Potential” (see: [link to document](#)), the EIA finds that “in the short run, the [U.S.] refining industry could increase annual [middle distillate] yields by 3 to 5 percentage points on average over typical historical yields of about 35%.”

“Such yield increases could be achieved through operating changes and little or no capital investment. With more time and sustained higher diesel margins, refiners would spend capital on improved fractionation, and more refiners would move to catalysts favoring distillate production, resulting in further yield increases. With such investments, a longer-term

average annual yield increase might be in the range of 4 to 8 percentage points.”

Boosting refinery middle distillate yields is a strategy that is “likely to be an attractive option again for refiners as the economies of the United States and Europe improve,” according to the analysis.

“Although distillate margins are not likely to exceed gasoline margins to the degree they did in 2008 on a sustained basis, they may be sufficient to promote a more permanent U.S. refining yield shift toward middle distillates and away from gasoline as the diesel market rebounds from the recession.”

The report also cites a recent Valero Corp. analysis, which indicates that “a modern, fairly complex refinery should be able to increase the distillate yield (measured as a percent of crude input) by 7[%] to 13%. Note that to achieve the largest shift to distillate, Valero includes the addition of a hydrocracker, which is a long-run solution,” according to the EIA.

Looking back at the huge jump in distillate margins of 2007-2008, the EIA noted that "U.S. refiners had little time for making even modest capital changes. It is very likely that if those higher distillate-to-gasoline price differentials had

persisted longer, a number of refiners showing little yield-shift would have done more. But with the 2009 market retrenching to roughly the same margins for gasoline and distillate as seen in 2005-2007, further shifts have not taken place.

Pipeline Sabotage Claims Half of Crude Supply at Nigerian Refineries

A November 22 *Reuters* report said pipeline vandalism caused an outage at the 110,000 barrel-per-day (b/d) Kaduna refinery in Nigeria.

According to the report, citing an unnamed source who was said to have refinery operations knowledge: "There was some vandalism on the crude line." The source said the plant had been "shut for at least a week," *Reuters* said.

Imported crude oil is transported to the Kaduna refinery from Chevron Corp.'s oil terminal at Escravos, according to the report.

Reuters said it was unable to include comment by the state-owned oil company, Nigerian National Petroleum Corp. (NNPC).

A second source referenced in the report said three other Nigerian refineries are processing roughly 200,000 b/d, out of the nation's total refining capacity of 445,000 b/d.

Yet a November 23 report by *Bloomberg* noted that the country's national energy department said a pipeline explosion on the line also knocked out supply to the 125,000 b/d Warri refinery. The Kaduna refinery receives its crude from a pipeline connection further north on the damaged line, according to the report.

According to *Bloomberg*, a militant group known as MEND (Movement for the Emancipation of the Niger Delta), claimed responsibility for the pipeline explosion.

The reporters contacted Levi Ajuonuma, a spokesman for NNPC, who confirmed that the pipeline owned by the NNPC, had been sabotaged.

Low Turnout for Latest French Pension Protest

Agence French Presse (AFP) reported that turnout was low for the November 23 protests against pension reforms enacted by French President Nicolas Sarkozy that became law two weeks ago, according to an English language account at *Expatica.com*.

The renewed French union protests are unlikely to exacerbate the escalating cost of refined products on the U.S. East Coast that have resulted from lower U.S. imports of refined products from across the Atlantic in the wake of the earlier strikes which shut in all of France's refining capacity for weeks.

The *AFP* report noted that 27,000 French street protestors turned out before midday.

Bloomberg further reported that MEND said it is fighting to wrest local control of oil revenue for the Delta's ethnic minorities away from alleged "domination by Nigeria's majority ethnic groups."

Royal Dutch Shell Plc, ExxonMobil Corp., Chevron, Total SA and Eni SpA all have joint ventures with NNPC to process most of the West African nation's oil.

Ominously, *Bloomberg* noted that MEND spokesman, Jomo Gbomo, e-mailed a statement reading that the "attack and similar attacks on pipelines which will take place within the next few days" should illustrate "the futility of wasting the nations resources in combating militancy without addressing the underlying causes of agitation."

Nigeria is the biggest oil producer in Africa and the fifth-largest source of U.S. oil imports, yet the country relies on finished refined product imports to meet 70% of internal demand, according to *Bloomberg*.

The nation's remaining refining capacity is co-located at the Port Harcourt refinery, where two processing trains have a combined crude run capacity of 210,000 b/d.

According to a November 22 report by *The Nation* newspaper (Nigeria), NNPC officials are planning to upgrade and expand the refinery with a maintenance turnaround program undertaken with the original plant contractors, Spibat of France and the Japan Gasoline Corp.

The U.S. Energy Information Agency has said Nigeria's four refining processing trains have never been able to run at full capacity "as a result of poor maintenance, theft and fire."

— Greg Haas

That is a far cry from the millions that spilled into the highways and byways of the nation as they targeted the refining industry and ports in an effort to strangle the flow of crude and refined products.

The report quoted CGT union leader Bernard Thibault saying that the day's actions were intended to demonstrate that "the law on pensions does not put an end to debate and to mobilizations about retirement."

Yet, the report also said that Sarkozy sees the law "as the most important reform of his mandate."

In the end, the prior and current strikes and disruptions did not halt the President's efforts to raise the national retire-

ment age from 60 to 62, and the law was eventually passed by parliament.

The run-up to the bill's passage saw vociferous strikes by unionized labor at critical ports and refineries that blocked fuel deliveries to drivers and even airports in the Capital for days and weeks.

A November 19 report by *Bloomberg* cited International Energy Agency that showed October refinery throughput in

Europe fell to 11.5 million barrels in the month, which was the lowest run rate in nearly 2 decades.

That same article noted that U.S. gasoline refining margins "more than doubled this month" as a result of maintenance-related U.S. East Coast refinery shutdowns and the overall reduction in refined product imports due to tightness in the Atlantic basin trading region in the wake of the strikes in France. — [Greg Haas](#)

EPA Fines Out West, Terminal Connections Back East for Western Refining

On November 23, the U.S. Environmental Protection Agency (EPA) fined Western Refining Southwest, Inc. for failing to adequately monitor benzene discharges and illegally disposing hazardous waste. The company is in noncompliance of a Consent Agreement and Final Order (CAFO) filed in Aug. 2009. The release further noted that the EPA was taking action against the firm for improper sampling.

"It is important to everyone that companies are following proper protocols needed to protect the environment and public health," said Al Armendariz, EPA regional administrator. "When facilities fail to follow the rules, EPA will act quickly to ensure compliance with the law."

Western has received two noncompliance letters from the EPA within the past two months. The first letter of noncompliance dated Sept. 24, 2010, was for improper sampling on Aug. 20-22, 2010, and exceeding benzene levels in wastewater on June 24-25 and Aug. 23, 2010.

The second letter – dated Nov. 1, 2010 – related to similar offenses of improper collection of samples on Sept. 3-7 and improper disposal of hazardous waste on Sept. 30, 2010.

Western has 30 days to pay the levied fines after receiving the notification letters.

Western operates a petroleum refinery in Jamestown, N.M., about 17 miles east of Gallup. The refinery had multiple violations stemming from its storage and treatment of hazardous waste containing benzene, a human carcinogen present in petroleum.

In 2009, the EPA and New Mexico Environmental Department (NMED) brought the violations to the attention of Western. Western agreed to pay \$734,008, cease all discharges of benzene and close two aeration lagoons that received hazardous waste.

Western Refining operates a number of refineries and terminal assets, including the 40,000 barrel per day (b/d) refinery in New Mexico. The company's Web site says this is the only active refinery in the Four Corners area.

The company's El Paso, Texas, refinery has a crude oil throughput capacity of about 125,000 b/d.

On September 13, the company announced the safe and orderly shutdown of 66,300 b/d of refining capacity at its Yorktown, Virginia refinery. That U.S. East Coast saw the mothballing of the refining units there and now operates only as a refined products distribution terminal.

A November 21 *Dow Jones* report said the Yorktown terminal assets may be interconnected with the Colonial Pipeline system, based on a company filing with the U.S. Securities Exchange Commission.

Executives with both Western Refining and Colonial Pipeline Company reportedly confirmed that the interconnection talks are ongoing. The report said the potential interconnection could begin deliveries to and from the Yorktown Terminal by mid-2011.

The company also said during its November 4 call that "we are also in discussions regarding the potential sale of the Yorktown terminal assets." But, officials added, that the company is separating Yorktown's terminal assets from the refining assets.

And no matter the outcome of any potential sale of terminal assets, officials said: "we'll still keep the option of restarting the refinery...everything we're doing is positioning the refinery, when margins return and if they have the spread widen out back to more of a normal level, we'll be able to restart the facility and utilize the terminal assets to benefit the refinery."

This is the second crude oil processing plant that Western has converted in a Refinery-to-Terminal Conversion (RTT) project. The first was in Bloomfield, N.M., Gary Hanson, spokesperson for Western Refining, told Hart Energy during a September 14 call.

The company's small Bloomfield refinery, also located in the Four Corner's region, was idled in 2009. Hanson declined at the time to detail the capacity that was idled, although U.S. Department of Energy data shows the plant's atmospheric crude distillation unit had an operable capacity of 16,800 b/d.

After the company's first RTT in New Mexico, the Four Corner's region still receives its fuels from the Gallup refinery as well as the Bloomfield terminal which the company still operates, Hanson told Hart Energy.

— [Greg Haas](#)

'Excessive' Diesel Prices Garner Fines From Chinese Governmental Commission

China's National Development and Reform Commission (NDRC) announced November 23 that it will fine Sinopec and PetroChina for alleged "excessive" prices on diesel – a fuel that is in shortage because of a China government decision to slash grid-electric power, causing industries to switch-on diesel gen-set power.

According to a *Xinhua* news service report, six companies including the big refiners "were selling diesel at prices as high as 8% above the government set price."

"These companies also included local refineries and oil dealers in Shaanxi, Shandong and Jiangsu provinces and according to the NDRC, the [price hikes] have exacerbated the diesel shortage and disrupted market order. The NDRC urged local authorities to seize the illicit revenue from above-ceiling sales and fine the companies up to five-times of their income."

Both Sinopec and PetroChina are increasing diesel imports to cover shortages, while Sinopec said it had ceased diesel exports.

TECHNOLOGY

Alberta Accepts Long-Term CO₂ Storage Liabilities

Legislation introduced this month by the Alberta, Canada, government clarifies that the province would accept long-term liability for carbon dioxide stored underground from carbon capture and storage (CCS) schemes.

"This legislation ensures we are on track to reduce greenhouse gas emissions," said Alberta Energy Minister Ron Liepert. "By using some of the captured CO₂ for enhanced oil recovery, we expect it to double Alberta's conventional oil recovery, generating tens of billions of dollars in provincial royalties and taxes."

The Carbon Capture and Storage Statutes Amendment Act, 2010, Bill 24, clarifies ownership of "pore space" – that is, the tiny holes in porous rock where CO₂ "greenhouse" gas would be stored.

"Under the proposed legislation, the Alberta government would accept long-term liability for injected carbon dioxide once the operator provides data showing that the stored CO₂ is contained," according to a Ministry press release. "It would also establish a fund financed by CCS operators for ongoing monitoring costs and any required remediation. The legislation does not propose any changes to ownership of mine and minerals resources."

The government of Alberta earlier committed Cdn\$2 billion (US\$1.9 billion) to large-scale CCS projects in 2008, including Cdn\$440 million (US\$430 million) over the next three years.

COMPLIANCE ISSUES

'Diesel Emissions Reduction Act' Advanced by U.S. Senate Committee

Hundreds of environmental, public health, industry and government organizations are endorsing the reauthorization of the "Diesel Emissions Reduction Act," which was passed on November 30 by the U.S. Senate Environment and Public Works Committee (EPW). Ratification by the committee marks a "major step," according to a release that day by the Diesel Technology Forum (DTF).

Allen Schaeffer, the DTF's Executive Director lauded the move towards "a vital clean air program that has benefited communities in every single state in the nation."

The bipartisan legislation was introduced on November 18 by U.S. Senators George Voinovich (R-Ohio) and Tom Carper (D-Delaware) and cosponsored by several of their colleagues including EPW Chair Barbara Boxer (D-California) and Ranking Member James Inhofe (R-Oklahoma).

Schaeffer noted that "while it's been difficult lately to find environmental issues that have near-universal bipartisan

support among Democrats and Republicans, DERA has proven to be one program to do so. We are hopeful the full Senate and U.S. House will continue this bipartisan effort and reauthorize DERA," even perhaps before the new Congress returns to Washington, D.C. in late January.

DERA is a five-year reauthorization of a national and state grant and loan program created in 2005 aimed at reducing diesel emissions from older diesel engines and equipment. Unless reauthorized, the original DERA expires in fiscal year 2011.

Since 2005, nearly US\$500 million was invested by the federal government through DERA to upgrade and modernize an estimated 11 million diesel engines with soot and emission control filters and catalysts.

The trend toward diesel fuel use at the expense of conventional motor gasoline is taking place in the U.S., Europe and beyond.

The committee vote illustrates that U.S. legislators are working together on a bipartisan basis and committing U.S. funds to upgrade domestic diesel fleets to accom-

modate increased diesel use without accelerated diesel-related emissions.

— Greg Haas

Emerging Economies Overpower Recession, Drive Record CO₂ Expectations

Although carbon dioxide (CO₂) emissions have been falling in recession-torn North America, Europe and Japan, the economic-boom in China and India and elsewhere has led to major increases. That boom, according to a new study led by scientists at University of Exeter, explains why net global CO₂ emissions are likely to hit a record in 2010

According to a summary from *Science Daily*, the study is part of the annual carbon budget update by the Global Carbon Project.

In a paper published November 21 in the scholarly journal, *Nature Geoscience*, the study authors found that “despite the major financial crisis that hit the world last year, global CO₂ emissions from the burning of fossil fuel in 2009 were only 1.3% cent below the record 2008 figures. This is less than half the drop predicted a year ago.”

The global financial crisis has slashed CO₂ emissions in the U.S., Japan, France, Germany and “most other industrialized nations,” according to the report. “For example, U.K. emissions were 8.6% lower in 2009 than in 2008. Similar figures apply to the U.S. and other major economies.

“However, emerging economies had a strong economic performance despite the financial crisis, and recorded

substantial increases in CO₂ emissions (e.g. China +8% cent, India +6.2%),” according to the report.

Paltry reductions in carbon intensity “were caused by an increased share of fossil-fuel CO₂ emissions produced by emerging economies with a relatively high carbon intensity, and an increasing reliance on coal” without carbon capture and storage, according to the report.

“The study projects that if economic growth proceeds as expected, [then] global fossil fuel emissions will increase by more than 3% in 2010, approaching the high emissions growth rates observed through 2000 to 2008.”

One glimmer of hope found in the study was a recent expansion of forest CO₂ sinks in northern temperate latitudes, according to the study.

“For the first time, forest expansion in temperate latitudes has overcompensated [tropical] deforestation emissions and caused a small net sink of CO₂ outside the tropics,” said Professor Corinne Le Quéré, from the University of East Anglia and the British Antarctic Survey.

WSJ: ‘Permitorium’ Endangers Power Industry Investment. So Too In Refining

Wall Street Journal (WSJ) editors opined November 22 that the U.S. Environmental Protection Agency (EPA) is pushing through an unprecedented “permitorium” imposing a long-lived “de facto project moratorium” that “has stopped new power generation.” Two refining executives at recent conferences attended by Hart Energy told similar tales for their industry. The editorial noted that the EPA has “turned a regulatory firehose on U.S. business and the power industry.”

The *WSJ* listed 29 major regulations, 172 major policy rules and tighter regulations on six major pollutants. According to the editorial, the “EPA’s current assault is unprecedented,” since the administration appointed Lisa Jackson, whom the *WSJ* called “hyperactive.”

The editorial also flagged the EPA’s greenhouse gas (GHG) endangerment finding as a tactical push of the “White House’s climate-change goals, now that Senate Democrats have killed cap and trade.”

The editors entreated the new Congress to push back on what it said was President Obama’s agenda being driven by an “alphabet soup” of regulations.

The *WSJ* said this regulatory “ambush” could force retirement en-masse of the coal-fired power generators that produce half of the nation’s electric power.

The editorial further noted that uncertainty on sulfur and other pollutants “has resulted in a near-total freeze on EPA permits, imposing a de facto project moratorium that will last for the next 18 months at minimum.”

While states including Texas, Louisiana, Nevada, North Dakota and South Dakota have filed suit against the EPA, more are expected to join in, according to the *WSJ*, over restrictions to their “ability to permit new sources or expand existing sources.”

Some of the sources that concern the state of Texas and more include sources within the refining industry. They, too, face a daunting array of EPA regulations. Hart Energy’s October 7 issue of *Refinery Tracker* reported on the 2010 Environmental Conference of the National Petrochemical and Refiners Association.

In a speech during the event, Al Armendariz, the EPA’s Region 6 administrator for Texas and neighboring states, told

attendees that under his boss, Lisa Jackson, the EPA is “moving forward on a very aggressive schedule.”

Armendariz referred to Jackson’s own statement upon her January 2009 appointment that “the EPA is back on the job.”

The group was keen to hear from Armendariz on the Texas flexible permit fracas that erupted when Jackson’s agency “disallowed” the state’s permitting program that had been in force for decades under several prior administrations.

Armendariz listed three options to “de-flex” permits, including an optional audit program proposal which was released that day. Another approach, Armendariz said, would be for flexible permittees to open bilateral repermitting negotiations with the Dallas Region 6 offices.

Still another approach was said to be under negotiation between the EPA and the Texas state regulators, but to-date has not been released.

Armendariz explained that his focus “to get 140 facilities” new permits “was one of my main missions as being regional administrator. I want these permits to be dead and everyone to have new permits, and we can all go back to our day jobs.”

Toward that end, the Region 6 administrator made a push of his own by impressing upon the industry that “I think the time to evaluate what’s going to happen and see the lay of the land and is over.”

Armendariz followed that by saying: “There are a lot of tools within the EPA that we have not yet brought upon permit holders. ... I think you will find that it’s time to come back and get into the good graces of the EPA.”

More recently, Hart Energy attended the 2010 Global Refining Summit held by the World Trade Group in Houston. There, Marathon Oil executives discussed the largest U.S. refinery expansion project on record at their Garyville refinery in Indiana.

The project was conceived in 2004, broke ground in 2007 and reached completion in 2010. A new parallel refinery train added 180,000 barrel-per-day (b/d) of capacity to the original 1976-era 256,000 b/d refinery.

Marathon said more than US\$3.9 billion was invested and injected into the economy; schools and libraries were built from millions in collected taxes; thousands of constructors were employed; nearly 650 permanent jobs were created; and an already efficient and profitable refinery will likely become the nation’s top energy efficient refinery.

Hart asked Marathon if current federal environmental, GHG and ozone regulations would have changed the project timeline.

Jim Shoriak, director of refining group major projects at Marathon, said: “Obviously, we were very glad to have gotten

this project ... permitted when we did.... I doubt that we would make this type of investment, starting from scratch right now, with the environment that we see ourselves in.”

Shoriak added, “If you weren’t already moving ahead with a project like this, you would likely want to delay it.”

But why would a U.S. refiner delay a profitable expansion opportunity that would lower energy use and the plant’s environmental footprint?

Refinery strategic planners must now consider daunting GHG requirements including pending permitting standards for operating refiners, carbon taxes, low carbon fuel standards and GHG reporting rules that may divulge trade secrets. Others regulations include ozone standards, transport rules, boiler rules and environmental justice initiatives.

Lynn Elsenhans, Sunoco, Inc. CEO, told attendees at the 2011 Deloitte Oil and Gas Conference in Houston, “what you will see is increasing regulatory requirements and that... will have a cost, both the cost of operation but more importantly, the capital cost to put it in.”

Elsenhans cited “incredibly expensive” measures to deal with “new frontiers of environmental regulation” for bunker fuel sulfur and particulate matter.

Noting that the U.S. has an overhang of refining capacity, Elsenhans said: “I think that will likely be the catalyst to have refinery capacity go down.”

Unless you are a niche or low-cost provider, Elsenhans said that weak U.S. refining economic fundamentals may persist unless environmental regulations establish “requirements for spending that are so high that many people decide to throw in the towel and you get a rebalancing of the supply and demand balance that allows the margins to go back up.”

Another refinery executive took the podium at Deloitte’s conference and told attendees of barriers to investment in refining and across the energy space. Janet Clark, chief financial officer of Marathon Oil Corp. said that environmental costs “are the cost of staying in business. There’s no real return to those capital expenditures” Clark noted that over the last five years, “our major investments have been regulatory or environmental in nature.”

Yet, she said her company’s largest discretionary refinery investments have been at the Garyville Major Expansion and the heavy oil project at the Detroit refinery, which will allow the plant to process lower cost crude into higher value transportation fuels.

“To succeed in a more challenging environment,” Clark offered, “you’ve got to position yourself to take whatever gets thrown at you.” She noted recent years have been tough on refining, but refining is a cyclical industry. Regardless

of a current “perditorium,” Clark offered timeless insight into her emphasis on “making investments, recognizing the

uncertainty, but making the investments with the flexibility to adjust as the environment changes.” – [Greg Haas](#)

Gore Admits ‘Mistake’ of First-Generation Ethanol Support

Like many politicians in the late 1990s, former Vice President Al Gore supported substantial subsidies for ethanol made from corn. However in a recent speech at a green energy business conference in Athens, Greece, Gore said he made a mistake, according to a November 22 *Reuters* report.

Gore said he was wrong to support corn-based ethanol while in office and admitted that he was “more interested in farm votes for his presidential run than what was best for the environment.”

“It is not a good policy to have these massive subsidies for first-generation ethanol,” said Gore in the *Reuters* article. First-generation ethanol refers to the most basic, but also most energy-intensive, process of converting corn to ethanol for use in vehicle engines.

“First-generation ethanol I think was a mistake,” Gore continued in the report “The energy conversion ratios are at best very small,” he said, referring to how much energy is produced in the process.

According to *Reuters*, Gore linked his support for the original program to his presidential ambitions.

“One of the reasons I made that mistake is that I paid particular attention to the farmers in my home state of Tennessee, and I had a certain fondness for the farmers in the state of Iowa because I was about to run for president (in 2000).”

In 2009, total U.S. ethanol subsidies reached US\$7.7 billion, according to data from the International Energy Agency (IEA), and many of those tax credits will soon be up for renewal.

In the wake of record food prices in 2008, a food-versus-fuel debate erupted, and the biofuel industry was criticized heavily for helping stoke food prices, the report said.

According to *Reuters*, Gore said “the competition with food prices is real,” and he instead supports so-called second-generation technologies “that do not compete with food – using farm waste or non-food sources like switchgrass to make ethanol.”

Q&A

AspenTech’s IMOS Solution for the Refining and Marketing Industry

On November 10, Hart Energy hosted a Webinar with AspenTech that featured a presentation by representatives of BP who detailed the benefits and their experiences at BP’s refineries and terminals while implementing the AspenTech IMOS system.

Ethanol industry lobby groups reacted unfavorably to Gore’s comments in Greece.

“The contributions of first-generation ethanol to our nation’s economy, environment and energy production are not a mistake, but a success story,” Growth Energy CEO Tom Buis said in a statement responding to Gore’s regrets regarding his past position on corn-based ethanol.

Matt Hartwig, chief spokesman for the Renewable Fuels Association, said: “Now he tells us: Al Gore was for grain ethanol before he was against it.”

“I take Gore’s word for his own motivations, but he’s wrong on every other count,” Hartwig said. “As the U.S. Department of Agriculture reported in 2008, ethanol produces about 2.3 BTU of energy for every 1 BTU of inputs. That’s a big improvement from 2000 and before, when Gore supported ethanol.

“In fact, ethanol production keeps becoming more efficient: Over the five years preceding 2009, there was a 27% decrease in consumptive water use, a 22% reduction in fossil energy use, and a 7% increase in the amount of ethanol produced per bushel of grain.”

And ethanol production does not compete with the food supply, Hartwig said.

“Using virtually the same acres as two generations ago, America’s corn farmers produced the highest corn crop on record in 2009 – 13.2 billion bushels. About 4.2 billion bushels were used to produce a record 11.75 billion gallons of ethanol and 33 million metric tons of feed,” he added.

“While Gore said he supports cellulosic (non-grain) ethanol, he should heed President Obama’s statement that the ‘transition to [the next generation] will be successful only if the first-generation biofuels industry remains viable in the near term,’” Hartwig said. “First-generation ethanol creates the companies, the skilled workforce, the markets and the infrastructure that next-generation ethanol requires.”

– [Kristie Sotolongo](#)

asked AspenTech's Timothy Niziol to share with *Refinery Tracker* readers some of the questions and answers that he addressed with participants offline.

Refinery Tracker: *What were some of the common themes in the questions that you fielded during the call and even in your answers?*

Niziol, AspenTech: Let's set up the discussion for readers who were not on the call. Aspen Inventory Management and Operations Scheduling (Aspen IMOS) manages supply and demand balancing, inventory, nominations and exchanges management, movement scheduling, contract monitoring and provides decision support tools to further manage the petroleum supply chain.

Since Aspen IMOS is the primary repository of real-time inventory data, we heard a number of questions regarding inventory control. One of the main issues refiners are facing today is reducing working capital. The challenge is having visibility into their current and future inventory positions. With the inventory management capabilities in Aspen IMOS, refiners are able to run with leaner inventories and reduce working capital.

Integration was a common theme. We had several question on how Aspen IMOS integrates with terminal management systems and other Aspen products such as Aspen Petroleum Scheduler (formerly known as Aspen Orion) and Aspen Petroleum Supply Chain Planning (formerly known as Aspen DPO). Integration is accomplished with Aspen Enterprise Integration Framework that passes standard business documents between applications. The Aspen Refining & Marketing suite of products has been built to provide easy integration to other AspenTech products as well as third-party products.

Refinery Tracker: *What was another question that you fielded during the call and what can readers learn from your answers?*

Niziol, AspenTech: The second question with the most interest was "When did you (BP) start the IMOS implementation and how much would you say is complete?" The BP presenters Dennis Bak and Kevin Dewan provided the following response.

"The project started as a joint Aspen/BP development project back in 2004. There have been 3 releases under this joint development project. The initial release took place in summer 2008 and focused on product scheduling; the second release took place in fall 2009 and focused on enhanced product functionality; and the third release took place fall 2010 and focused on new crude functionality and performance improvements."

"Aspen IMOS is the core scheduling tool for BP on the West Coast for all the product, dark oil and soon to be crude oil

operations. Aspen IMOS data is reliable, complete and timely and accounting data is captured only once. Product releases that include new functionality and performance improvements are sent on an annual basis. BP will continue to roll out the IMOS solution to other locations in the upcoming years. Next on the project plan is the East of Rockies Value Chain."

Refinery Tracker: *What topic(s) did not come up during the webinar that you wish could be communicated here?*

Niziol, AspenTech: In addition to distribution scheduling, Aspen IMOS provides projections of future inventory (both crude and finished products) so that traders, refinery planners and schedulers and operations personnel can safely and efficiently perform their tasks reducing overall operating costs and lowering working capital requirements.

Refinery Tracker: *Where do you see the IMOS product line in the future's refining and marketing industry?*

Niziol, AspenTech: Aspen IMOS will play a more significant role as companies try to manage their working capital and minimize their trading risk. It will be critical for companies to view all of their inventories real time and will need to have a picture of future inventories. Additionally, Aspen IMOS, along with other Aspen solutions will play a major role as companies integrate refinery scheduling with distribution scheduling to continue to optimize product margins, improve operational efficiency and lower costs.

Refinery Tracker: *Who are your competitors in your key product markets and how are AspenTech solutions suited to compete?*

Niziol, AspenTech: For Aspen IMOS there is no direct competitor as there are no other solutions that have the depth and breadth of the product. The product was developed to fill in the gap between refinery scheduling, trading and operations. We typically see ERP systems and a few of the trading systems trying to compete in this space. No one solution provides all of the functionality required and each system has its strengths and weaknesses. A component of our strategy when developing Aspen IMOS was to build comprehensive integration capabilities so we could quickly connect with other systems to provide best-of-breed solutions.

Refinery Tracker: *What products are under development by others (e.g., Transport 4, etc.) that feed or will integrate with AspenTech solutions?*

Niziol, AspenTech: Aspen IMOS is a scheduling hub with information coming from many external sources such as pipeline scheduling, terminal management, trading and ERP systems. Aspen IMOS also collaborates with Aspen Petroleum Scheduler and Aspen Petroleum Supply Chain Planner.

— Greg Haas

PROJECT UPDATES

Africa

Uganda Energy Minister Amps Expectations for Hoima Refinery

According to a November 30 *Reuters* report, activities will ramp up in 2011 toward a 2012 start date for construction on the new Hoima refinery in Uganda.

Fred Kabagame Kaliisa, the country's energy minister, was quoted in the report as saying, "the whole of next year we'll go into serious planning for development ... That will include getting land and sitting with financiers and interested developers to tie into financing agreements."

Kaliisa told *Reuters* that "between 2012 and 2016, the development of the refinery will be phased."

He was further quoted within the report as saying: "We'll start with limited production to satisfy in-house market demand (20,000 to 25,000 barrels per day [b/d]), then we'll go into bigger production to satisfy the international market (up to 200,000 [b/d] for export)."

ESTIMATED TOTAL OUTPUT CAPACITIES OF PROPOSED PROJECTS	BARRELS/DAY
2010	372,000
2011	198,000
2012	220,000
2013	300,000
2014	1,385,000
2015	1,110,000
2016	200,000
Unspecified Date	4,963,500
GRAND TOTAL AFRICA	8,748,500

The most recent news tracked within Hart Energy's Refinery Tracker database shows the Hoima refinery was anticipated to be constructed at a 60,000 barrel-per-day capacity at a cost of US\$2.05 billion. Construction is slated to begin in 2012, with a completion target in 2015.

Asia

Once again, Asia's refining industry had a vigorous flow of news. In the period, ExxonMobil's Singapore refinery announced it will soon construct a planned diesel hydrotreater which will boost output by more than half, HPCL Mittal said it will begin a trial run at Bathinda Refinery in February next year, Essar's project group wins the EPC contract for Indian Oil Corporation's Paradip Refinery, and Russia's TNK-BP may enter Vietnam's downstream market.

HPCL Mittal Trial Run at the Bathinda Refinery in February 2011

On November 27, the *Daily Pak Banker* reported that the 180,000 barrel per day refinery being planned by HPCL-Mittal Energy in Bathinda, India, will start its trial runs in mid-February, according to a company source quoted in the report.

The project is nearing completion, with nearly US\$3.1 billion spent of the anticipated \$4.17 billion capital investment. The plant will start in full during May, 2011, according to the report. Other details included in the report include the description of a 1,104 kilometer pipeline being built at a cost of \$1.1 billion to supply Iraqi or Iranian crude to Bathinda from the Gujarat Mundra port. The refinery's product slate

ESTIMATED TOTAL OUTPUT CAPACITIES OF PROPOSED PROJECTS	BARRELS/DAY
2010	1,328,000
2011	368,000
2012	1,473,600
2013	370,000
2014	610,000
2015	492,000
2016	90,000
Unspecified Date	6,503,000
GRAND TOTAL ASIA-PACIFIC	11,234,600

will include annual production of 3.7 million tons of diesel, 1 million tons of gasoline, and 0.9 million tons of coke, according to the report.

HPCL Also Says Refinery May be Doubled in Future

According to a November 30 article by *Bloomberg*, HPCL's new refinery, when fully up and running, will be able to process 9 million tons of crude per year. But *Bloomberg* also reported that HPCL's director of refineries, K. Murali, said

COUNTRY/ DEVELOPMENT	LOCATION	COMPANY	CAPACITY/ COMPLETION DATE	NOTES
INDIA				
Crude Refinery	Bhatinda / Punjab	Hindustan Petroleum (HPCL), Mittal Investments	180,000 b/d; completion May 2011	Project is an equal JV with Mittal Energy Investment Pte. Ltd. in Singapore. Prelim Run Feb 2011, Full Start May 2011. 11,508 Crore Capital Expenditures (US\$4.16 Billion)
Crude Refinery	Paradip	Indian Oil	15 million ton per year; Q1 2012	Essar Projects awarded the EPC contract. Will start up in 2012 to make fuel for internal domestic consumption, not export.

that plant may later be expanded to 18 million tons a year. We will update the *Refinery Tracker Database* when the construction or startup timeline is released for this potential expansion project.

Exxon Mobil Singapore Refinery Hydrotreater

A November 22 *Bloomberg* report relayed that ExxonMobil's Singapore refinery will soon include a planned diesel hydrotreater which will boost output by more than 50%.

The report noted that production of the refinery's ultra-low-sulfur diesel (ULSD) will ramp to more than 25 million liters per day (157,000 barrels per day), up 9 million liters per day.

ExxonMobil's integrated refinery in Singapore processes about 605,000 barrels per day of crude into fuels and feedstock for the associated chemical plant and third-party industrial customers, according to the company's Web site.

The Singapore refinery employs about 750 people involved in the manufacturing of fuels, aromatics, industrial and automotive lubricants and base oils.

Recently completed and previously announced work ongoing at the Singapore plant – when completed next year – will make the site the largest petrochemical complex and integrated chemical and refining site owned and operated by ExxonMobil.

Company information shows that during the 1990's, the refinery saw a US\$1.3-billion investment for a hydrocracker, a catalytic reformer and an aromatics unit. The chemical plant saw \$1.4 billion for a hydroprocessor and aromatics complex.

Those projects were followed by a \$2-billion grassroots petrochemical plant which was fully integrated into the adjacent plant, the company's Web site noted.

ExxonMobil also has broken ground on its second, world-scale petrochemical project in Singapore integrated with the existing facilities. According to company information, mechanical completion and commissioning is expected in late 2010 through 2011. – **Greg Haas**

Essar Wins EPC Deal for IOC Refinery Project

Essar Projects announced November 22 that it won the engineering, procurement and construction (EPC) contract from Indian Oil Corporation Ltd (IOC) for the 15 million metric-tons-per-year Paradip refinery in Orissa.

The deal includes a lump-sum turn key package for the main refinery units valued at Rs. 1,400 crore (US\$3 billion). The first phase of the project is scheduled to be completed in 17 months “and will play an important part in satisfying the rising domestic demand for fuel” in India, according to Essar.

“With an explosive growth predicted for the EPC market in India in the coming years, [our] company is well poised to capture the potential,” said Essar Projects CEO Alwyn Bowden.

The scope for the IOC contract includes residual process design, detailed EPC, and commissioning and performance testing of core process units of the refinery, including the atmospheric vacuum unit, straight-run LPG treating unit, naphtha hydrotreating, naphtha fractionator unit, continuous catalytic reforming unit, sour water stripper unit and amine regeneration unit.

Russia's TNK-BP Looks to Enter Vietnam Downstream Market

Vertically integrated Russian oil major TNK-BP Ltd. is pursuing a stake in Vietnam's Dung Quat refinery as it prepares to export more crude to the Asian country, according to a November 19 *Dow Jones (DJ)* report citing company executives. “We are interested in entering into the downstream business in Vietnam,” Didier Baudrand, TNK-BP's executive vice president for downstream, told *DJ*.

According to the report, TNK-BP signed a memorandum of understanding with state-controlled PetroVietnam (Vietnam Oil and Gas Group) in August, which includes shipments of Russian Eastern Siberian Pacific Ocean (ESPO) crude to Vietnam's Dung Quat refinery.

“We are discussing with PetroVietnam what we could do with this type of asset,” Baudrand told *DJ*, referring to the Dung Quat refinery, without specifying the stake size TNK-BP could seek.

Located in Vietnam's central province of Quang Ngai, Dung Quat has a designed capacity to process 130,000 barrels of crude a day and meets one-third of the country's demand for oil products.

According to the *DJ* report, the move comes after TNK-BP – in a separate deal last month – agreed to buy BP's assets in Vietnam. The U.K. oil major, which owns half of TNK-BP, is reportedly selling assets as part of a larger pro-

gram to cover cleanup costs from the Gulf of Mexico oil spill, *DJ* said.

Originally, PetroVietnam said it may block the deal, the report said. However, on November 19, it signed the agreement with TNK-BP supporting the Russian company's bid to buy BP's assets – which includes a gas deposit in the offshore Block 06-1, a stake in a natural gas pipeline and a natural gas-fired power station, *DJ* said.

Europe and CIS

News hit this period that Rosneft's Board of Directors approved two refinery projects, and TNK-BP's Saratov Refinery announced the completion of Euro-3 revamps and the start of new Euro 5 improvements.

Rosneft Board OKs Two Refinery Projects

Rosneft's board of directors on November 26 approved a plan for setting up Eastern Petrochemical Company (Vostochnaya Neftekhimicheskaya Kompaniya) in the vicinity of Nakhodka, Primorsky Krai, with a capacity of 10 million tons per year.

Another project approved by the board is construction of a refinery in Grozny, the capital of Chechnya, with a capacity of up to 1 million tons per year.

We will update the *Refinery Tracker Database* when the construction or startup timeline is released for these potential grassroots projects.

TNK-BP's Saratov Refinery Completes Euro-3 Revamps, Plans For Euro 5

TNK-BP announced November 24 that they've begun the long march toward expansion of Euro-5 (10 parts per million sulfur) diesel and gasoline fuels production, having just upgraded for Euro-3 (350 ppm sulfur) fuel at the Saratov refinery.

"The Saratov Oil Refinery has begun producing gasoline and diesel fuel certified for conformance with Euro-3 stan-

dards as part of a long-term TNK-BP program to improve the quality and expand the range of its products," according to the company.

"The transition to Euro 3 fuel is one stage in a major investment program by TNK-BP, aimed at producing Euro-4 and Euro-5-standard petroleum products at the Saratov Oil Refinery. Over the next two years the company plans to build an isomerization unit at the refinery, to renovate its hydro treatment facilities and carry out other projects at a total cost of more than US\$300 million."

ESTIMATED TOTAL OUTPUT CAPACITIES OF PROPOSED PROJECTS	BARRELS/DAY
2010	351,000
2011	179,000
2012	585,000
2013	68,000
2014	24,000
2015	50,000
2016	248,000
Unspecified Date	2,034,000
GRAND TOTAL EUROPE & CIS	3,539,000

Latin America

On November 19, the *Latin American Herald-Tribune* reported that Venezuela has issued a state decree authorizing the formation of a joint venture between Petroleos de Venezuela SA (PdVSA) and Italian energy giant, ENI, aimed at building an oil refinery and an upgrade project to process crude from the massive Orinoco Belt. This report follows a stream of October news regarding actual or expected divestitures by PdVSA of other refining and downstream ventures in Germany, Brazil and the U.S.

According to the report, the joint venture was authorized to proceed with previously announced plans to build a heavy oil upgrader capable of converting 240,000 barrels per day

ESTIMATED TOTAL OUTPUT CAPACITIES OF PROPOSED PROJECTS	BARRELS/DAY
2010	315,000
2011	100,000
2012	907,000
2013	695,000
2014	550,000
2015	1,015,000
2016	540,000
Unspecified Date	2,435,000
GRAND TOTAL LATIN AMERICA	6,557,000

COUNTRY/ DEVELOPMENT	LOCATION	COMPANY	CAPACITY/ COMPLETION DATE	NOTES
BRAZIL				
Crude Refinery	Orinoco / Petrobcentenaria	Petrobras / ENI	240,000 b/d by 2016	US\$17 billion grass roots refinery project to run heavy Orinoco crude oil.

(b/d) of the heavy crude into lighter crude along with an adjacent diesel-oriented refinery with a crude-run capacity of 100,000 b/d. Finished diesel, according to the report, will be floated on the markets back to Europe.

The stakes in the Venezuelan venture are 60% PdVSA, 40% ENI, the report noted.

According to a November 22 *Bloomberg* report, PdVSA will invest US\$10 billion in the refining and Orinoco venture, while ENI will contribute \$7 billion. The refinery – owned and operated by the two partners in the Petrobcentenaria venture – reportedly will be readied for startup in 2016.

Bloomberg also reported that Eni CEO Paolo Scaroni said: “We’re ready to invest \$7 billion in these projects, and this will be one of the most important countries for our company.”

Eni funds in the amount of \$2 billion are also being directed, according to Scaroni’s reported comments, to the construction of a 900-megaWatt power plant fueled by natural gas produced from the Perla offshore region that Eni is helping to develop with PdVSA.

The deal for a refinery and upgrader was first intimated at the December 28, 2009, inking of an upstream venture between the two entities aimed at developing an area within the Orinoco Belt.

Venezuelan officials estimated that the Orinoco Belt contains roughly 280 billion barrels of heavy and extra-heavy crude, the Latin American Herald Tribune report noted. Estimates by the U.S. Geological Survey from January 2010 reportedly show the recoverable reserves of heavy oil being an estimated 513 billion barrels. That figure, the USGS reportedly noted, makes the Orinoco belt “the largest oil accumulation it had ever assessed.”

Refinery Tracker Issue No.22 noted that PdVSA recently sold its 50% stake in German Refiner Ruhr Oel to Russia’s Rosneft, as announced on October 15 in a deal valued at US\$1.6 billion.

Middle East

The Jerusalem Post reported on November 23 that three workers died and several more were injured at Israel’s Haifa Refinery. *Bloomberg* reported November 26 that Iraq will go it alone on funding the construction of four new grassroots refineries if other investors don’t step in.

Additional reports showed Venezuela President Hugo Chavez expressing interest in off-loading its stake in two refinery ventures in the Americas.

On October 12, *Business News Americas* reported that Brazilian officials said in an interview that PdVSA is expected to withdraw from their joint venture with Petrobras which was formed to own and operate the Abreu e Lima refinery.

Pondering the withdrawal of Venezuela from the project, Brazilian officials have said the economics for the plant will improve without PdVSA’s involvement. “The oil the Venezuelan company would bring is a heavier and costlier one to refine,” one Brazilian official was reported to have said.

That story also reported that capital expenditures for the Abreu e Lima Refinery are estimated at US\$12 billion and the startup is actually anticipated in November 2012.

Hart Energy’s *Refinery Tracker Database* shows that the Abreu e Lima Refinery project located in the state of Pernambuco is expected to have a capacity of 230,000 b/d and startup in 2013. This accelerated schedule and cost estimate will be noted for future *Refinery Tracker Database* updates.

Then, in an October 25 *Reuters* report, we read that PdVSA is likely looking to divest its wholly owned subsidiary, CITGO. CITGO operates a wide array of refining and marketing operations in the U.S.

The article included a gem of a quote by President Hugo Chavez who reportedly said the prior day that “CITGO is bad business. We have not been able to get out of it, we are subject to U.S. law.”

Chavez reportedly continued, saying “That company has eight refineries, I don’t know how many tanks, it distributes fuel via 8,000 stations in the United States, yet it makes us no profit.”

CITGO’s Web site states that the company directly owns or operates 749,000 b/d of refining capacity, including major refineries in Louisiana at Lake Charles, in Texas at Corpus Christi and in Illinois at Lemont. – **Greg Haas**

Gas Leak at Haifa Refinery Kills 3, Injures 5

The Jerusalem Post reported November 23 that three refinery workers died and five more were injured late-evening after a gas leak occurred at the Haifa refinery.

According to the *Post*, the victims who died were identified as George Za'atrah, 31, Tamer Marjiah, 33 and Tamer al-Haj, 18, each of whom was from the Nazareth region.

A refinery spokesperson said the leak was "contained shortly after discovery," the *Post* said.

The report also noted that a bromine gas leak was discovered at a storage container earlier the same day, and that leak was "quickly found and plugged."

Bromine, according to the *Post*, is "an extremely hazardous material which has the potential to cause serious injury and death."

A November 23 *Agence France Presse* report citing Israeli public radio said the men inhaled toxic fumes, which escaped as they were carrying out a repair.

According to an *Associated Press* report the same day citing Israel Radio, Pini Seeson, a local firefighter, who responded to the incident, said one worker collapsed while replacing a leaking seal, followed by the collapse of his colleague, who was overcome as he tried to extract him. Both wore protective gear, Seeson told Israel Radio, "but two others who went in unprotected to extract them were poisoned."

Oil Refineries Ltd. (ORL) owns and operates the plant in its hometown of Haifa, according to company information.

Israel's largest oil refinery is capable of refining about 9.8 million tons of crude per year or nearly 200,000 barrels per day (b/d). More than 75% of ORL's refined product output is consumed locally, with the rest exported throughout the Mediterranean basin.

According to a November 23 report by the *Haaretz* daily newspaper, Shlomo Katz, said: "the toxic gases that hurt the employees were a mixture of toxic substances, among them hydrogen sulfide (H2S)."

H2S was also mentioned in numerous reports as related to the death of a contractor worker at the Chalmette refinery in Louisiana on October 7. The 196,000 b/d Chalmette refinery is operated by ExxonMobil and is owned equally in a joint venture between ExxonMobil Venezuela's state oil company, PdVSA.

According to numerous media reports, a number of gas leaks – including H2S – and subsequent repairs occurred at the Chalmette plant in the days and hours leading up to the worker's death.

As Hart Energy reported in the October 21 *Refinery Tracker* newsletter, a fatality or catastrophe in the U.S. triggers the Department of Labor's Occupational Safety and Health Administration to conduct an inspection and prepare an Accident Investigation Summary.

ESTIMATED TOTAL OUTPUT CAPACITIES OF PROPOSED PROJECTS	BARRELS/DAY
2010	2,290,000
2011	1,060,000
2012	2,120,000
2013	0
2014	900,000
2015	475,000
2016	83,000
Unspecified Date	2,692,000
GRAND TOTAL MIDDLE EAST	9,620,000

In the last five years of available data (2002-2007), Hart Energy found that H2S gas was cited as a contributor or primary cause to scores of accidents involving workers.

The accidents, which we found in our search, involved 55 workers, who were injured while working in the presence of H2S gas. These accidents occurred at facilities that handled farm animal wastes and at sewage treatment plants, oil and petrochemical operations and others.

Of the 55 reported injuries, there were 17 fatalities over the five-year period. – **Greg Haas**

Iraq May Self-Fund a \$20 Billion Refinery Fleet

Bloomberg reported November 26 that Iraq will go it alone on funding the construction of four new grassroots refineries if other investors don't step in.

Deputy Oil Minister Ahmed al-Shamma reportedly said that his nation is ready to invest the US\$20 billion program alone if need be, according to the report.

Four refineries mentioned in the report include the first in Karbala and others in northern Kirkuk, eastern Maysan and southeastern Nassiriyah. Combined, they will boost Iraqi refining capacity by roughly 750,000 barrels per day (b/d).

While the country has three major refineries at present (located in Dora, Basra and Baiji), today they operate at 500,000 b/d rather than their original nameplate capacity of 700,000 b/d, according to the report. The report also said 30 other small refineries will add about 300,000 b/d of refining capacity to the national fleet, but gave no indication of their current operability.

The Hart Energy *Refinery Tracker* database notes that front-end engineering study contracts for the four refineries were awarded to Total, the Shaw Group and Foster Wheeler. The Kirkuk refinery study is due from Total by year-end 2010, according to *Refinery Tracker*. – **Greg Haas**

WORLDWIDE ESTIMATED TOTAL OUTPUT CAPACITIES OF PROPOSED PROJECTS	BARRELS/DAY
2010	4,961,000
2011	1,815,000
2012	6,130,600
2013	1,433,000
2014	3,869,000
2015	3,176,000
2016	1,161,000
Unspecified or Later Dates	19,009,000
TOTAL	41,554,600

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+1 713.260.5201

ghaas@hartenergy.com

ARI ROMAN

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Hart Energy Publishing

1616 S. Voss, Suite 1000

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