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1. Oil and the Global Economy
Oil prices rebounded last Friday on better-than-expected Chinese factory data after six days of decline. At the close NY oil futures were up $2.75 a barrel to close at $105.97 and London crude was up $1.45 to close at $108.22. The IEA reported last week that global refining increased by 3.1 million b/d in June as new refining capacity came online and maintenance shutdowns at several big refineries concluded. Although Beijing reported a 9.7 percent increase in factory production during July over last year, there has been growing skepticism of late about the accuracy of China’s economic statistics which are not only reported very quickly, but have not been consistent with other indicators such as electric power consumption. The six day drop in prices – the longest this year – came among concerns that the Federal Reserve will start slowing quantitative easing in September.

US crude production in July increased to 7.5 million b/d, the highest level in 20 years. As US consumption of oil products is still weak, the EIA is forecasting that US domestic crude production will surpass imports for the first time since 1995. Net US oil product exports are expected to hit a record high of 1.54 million b/d in August as compared to 690,000 b/d a year ago. Refiners are expected to process 15.8 million b/d, the highest since August 2004, as more oil is getting to refineries along the Gulf Coast and US refinery maintenance has been completed.

US natural gas prices continued to slip on Friday, closing at $3.23 per million after the EIA reported rising inventories and forecasts of unseasonably cooler weather across much of the US. The cool weather is forecasts continue through the third week in August. Natural gas prices have now fallen to the point where they become attractive as an alternative to coal for those utilities that have the option to switch. The government approved exporting LNG from a third terminal last week. The US has now given approval to export up to 5.6 billion cubic feet of gas per day or about 8 percent of production. Nearly two dozen additional applications to export gas are still pending. Some lawmakers and companies who will benefit from the exports are complaining that the approvals are taking too long while others who fear the loss of cheap domestic natural gas are calling for a slower approval process.

2. The Middle East & North Africa
Iraq: The pace of the bombings seems to be increasing. Some 100 were killed and over 300 injured as 17 car bombs exploded across Baghdad and other cites this past weekend. An additional 50 were killed and 100 wounded in attacks on Tuesday. Oil production in June slipped to below 3 million b/d from an initial target of
3.7 million and various agencies are warning that more problems are ahead. Planned outages connected with rebuilding of export infrastructure are expected to reduce production below 2.5 million in September.

Coordinated bombings across the country made this the bloodiest Ramadan in years with more than 800 killed and a gridlocked government, which cannot even keep captured bombers in prison, unable to cope much less make progress.

The randomness of the violence is forcing the closure of cafes and sports events as people fear congregating anywhere that will attract bombers. The various political factions are not even talking to each other, much less reaching any agreements and the national polity is deteriorating rapidly.

Baghdad is planning to build a new northern export pipeline to Ceyhan, Turkey despite being unable to keep the current one running for more than a few days at a time because of terrorist attacks. There is nothing in sight short of return of US forces, an unlikely proposition, which can turn this situation around. There seems no other outlook than for oil exports continuing to slip.

**Egypt:** There has been little progress in the political standoff which has pro-Morsi supporters continuously in the streets and the new government threatening violence to clear the demonstrations. So far the government/army has exercised restraint and there have been few casualties.

Violence has been increasing in the Sinai in the five weeks since the Morsi government was overthrown. Insurgent groups are conducting nightly attacks on military and police installation and murdering those they do not like. The violence is starting to draw in Israelis who are concerned about attacks on the Red Sea resort of Eilat. Last week the Israelis conducted air strikes against insurgents allegedly preparing to fire missiles at Israeli territory.

Concerns are growing that the anarchy we are seeing in the Sinai will spread to the rest of Egypt unless there is a political settlement between the Islamists and the secularists.

**Syria:** The government is trying to consolidate its hold on the Damascus – Aleppo corridor. The rebels have started tearing up Alawite villages along the coast and the government is retaliating with aerial bombardment of Sunni villages. The government continues to lob large missiles in neighborhoods it believes support the insurgency. Moscow denies it has made a deal with the Saudis to back down on its support for the Assad government. There is little real progress in the situation—just increasing numbers of refugees and an ever growing body count. As the Jihadists pour into the country there are growing fears that it will become a center for terrorism in the years to come.

**Iran:** Newly sworn-in President Rouhani used his first news conference to call for serious negotiations to end the decade-old nuclear dispute. While these remarks appear to be seeking a settlement, it will take months of negotiations and concessions on both sides before we know how this is going to play out.

There is a new report that Tehran could start producing weapons-grade plutonium by next summer thereby complicating the dispute which has focused on enriching uranium with centrifuges.

**Libya:** Worker unrest at refineries and export terminals continues to restrict oil production and exports. Those who don’t have jobs want them, and those that do work for the oil industry want more pay. As best as can be determined from contradictory reporting is that exports are now about 600,000 b/d or about half of pre-unrest levels. Sporadic violence and assassinations continue across the country with no sign of a stable government in sight.

**Yemen:** The government said it uncovered an al Qaeda plot last week to seize port facilities and completely cut off exports of oil and LNG. The US and Britain have urged their nationals to leave the country as violence and threats increase.
3. The August Oil Market Review

The IEA in Paris reduced it forecast for the increase in global oil demand in 2014 by 100,000 b/d to 1.1 million b/d. Growth in demand for 2013 remains the same at 900,000 b/d. The cut in next year’s forecast is largely based on IMF economic projections which show China slowing and the US and EU stagnant. Global oil supply is believed to have increased by 575,000 b/d in July over June largely due to increased North American production.

OPEC production slipped by about 165,000 b/d in July due to the troubles in Iraq and Libya and despite an increase in Saudi production of about 100,000 b/d. This was the lowest OPEC production since March.

Global refinery demand increased by 3.1 million b/d in June, the largest monthly increase on record. At 77.2 million b/d, June processing was 2 million b/d higher than last year. Refining is expected to have increased further in July but to slow in August due to increased scheduled maintenance.

4. Quotes of the Week

- “Iraqi supply is going backwards this year, when a lot of the market expected it to be delivering the biggest growth outside the US. That’s a big shock.”
  -- Richard Mallinson, chief policy analyst at Energy Aspects consultancy

- “There is no longer any credible scientific debate about the basic facts: our world continues to warm, with the last decade the hottest in modern records, and the deep ocean warming faster than the earth's atmosphere. Sea level is rising. Arctic Sea ice is melting years faster than projected.... We can have both a strong economy and a livable climate. All parties know that we need both. The rest of the discussion is either detail, which we can resolve, or purposeful delay, which we should not tolerate.”
  -- By William D. Ruckelshaus, Lee M. Thomas, William K Reilly and Christine Todd Whitman, past Administrators of the US Environmental Protection Agency

5. The Briefs

- **China** is poised to top the US as the world's biggest importer of oil in October and will hold the ranking for all of 2014, according to forecasters at the US EIA. China's fuel consumption is targeted to increase to nearly 13 million b/d next year, a 13-per-cent increase from 2011 levels. (8/11 #10)

- **China** bought a record net 25.9 million metric tons of oil, or 6.13 million barrels a day, last month according to government data. (8/8 #2)

- **OPEC** kept estimates for global oil demand growth in 2014 unchanged amid a stable outlook for the world economy. World oil consumption will increase by 1 million b/d, or 1.2 percent, next year to about 90.8 million b/d. Increasing output from countries outside OPEC means demand for the organization's crude will slide to 29.7 million b/d, or about 600,000 a day less than its 12 members pumped last month. (8/11 #3)

- **The IEA** warned Friday that oil supply from OPEC nations was falling, as it raised its forecast for demand for the exporters group’s crude this year. It said continued supply outages in Iraq and Libya...may reduce the group's output in coming months. (8/11 #4)

- **North America's shale boom** is insulating the world from steep oil price spikes as several OPEC members struggle to maintain production due to unrest and infrastructure problems, the International Energy Agency said on Friday. (8/9 #6)

- **Wood Mackenzie** would have us believe that US oil production will exceed peak production by about 2 million b/d, and will increase present production by almost 70%. That would be awesome but seems highly unlikely based on the history of oil production decline in countries and basins around the world. (8/8 #25)
• So the **high costs and harsh decline rates** of the North American shales are two reasons for high WTI oil prices. Another reason that is starting to rear its ugly head is write-downs of shale formations. Shell was the first major to announce a major shale write-down in North America, writing down about $2 billion, mainly associated with liquid-poor shale projects. (8/6 #16)

• Recent billion-dollar write downs by **Shell** and some other majors are a sign they came to the shale boom late in the day, overpaying for lower-quality and less well-explored assets - not that the shale revolution is stuttering. (8/7 #28)

• **Smaller oil explorers** focused on high-margin shale drilling from Texas to North Dakota are set to outperform Big Oil this year. EOG Resources, Pioneer Natural Resources and Continental Resources are poised to reap bigger returns for investors than energy titans 15 times their market values as they devote almost all their drilling capital to higher-margin, domestic crude wells. (8/6 #19)

• **Iraq** has gone from being a leading source of growth in global oil supplies to an uncertain one in just the last 12 months – a development that is putting pressure on prices and posing challenges for policy makers in Baghdad, Washington and Riyadh. (8/9 #12)

• The production of **Libya**'s main grade of crude oil, called Es Sider, has collapsed after the terminal that exports the oil to global markets was shut by protesters, Libyan oil officials said late Wednesday. (8/9 #13)

• The oil company calls it "seepage." Environmentalists describe it as a "blow out." Either way, the leak at the **oil sands** project in Northern Alberta - which has spilled 280,022 gallons of oil across 51 acres since June - is stoking controversy over the energy source. (8/9 #21)

• **Iraq** has first production scheduled to come on line from three fields later this year: 150,000 b/d from the 13-billion-barrel supergiant West Qurna-2 by the end of this year or early 2014; 175,000 b/d from the 12.6-billion-barrel supergiant Majnoon oil field at the end of September; and up to 35,000 b/d from the Garraf oil field within a month. (8/8 #6)

• **Nigeria**'s oil production is set to rise to 2.5 million b/d in the next two weeks as repairs are completed on a major pipeline. Output in the first quarter fluctuated between 2.1 and 2.3 million b/d, well below the forecast production level of 2.48 million b/d. (8/8 #11)

• In **Nigeria**, foreign firms such as Royal Dutch Shell, Chevron, Eni and Total are only selling small blocks that are not worth their while -- those assets worst affected by theft and sabotage or fields that risk expropriation in a government push to promote local ownership. The oil majors intend to remain in Nigeria. (8/8 #10)

• Troops from former civil war foes **Sudan and South Sudan** clashed near a disputed oil field, threatening to spark fresh tensions along their poorly-marked common border. (8/7 #16)

• **Peak demand for oil?** Analysts at Citi think the world’s thirst for oil could peak in a few years at around 92 million barrels per day — as long as vehicle efficiency for cars and trucks keeps improving by about 2.5 percent per year. This is an unusual prediction, to say the least. For context, BP expects global oil demand to keep growing from 89 million barrels per day today to around 104 million barrels per day by 2030. (8/11 #18)

• The world doesn’t require an **oil production to peak** in order to suffer certain expected consequences of peak oil — like much higher oil prices. (8/6 #25)

• A conflict-of-interest ethics probe of the contractor assessing the environmental impact of TransCanada Corp.’s proposed **Keystone XL oil pipeline** has energized critics who say it should be grounds for the project to be delayed. (8/8 #22)

• **The proposed Keystone XL pipeline** would not have an impact on greenhouse gas emissions, a study by energy consultancy IHS CERA concludes. (8/11 #14)

• Shipping oil across **Canada** to the Atlantic coast, as TransCanada proposes to do with its Energy East project, is hardly the industry's first choice. Taking oil south to the Gulf coast via Keystone XL or west
through British Columbia are clearly more expedient options. Still, it's no surprise to see Energy East jump ahead in the queue, given the public and political opposition facing the other routes. (8/8 #26)

- **The 2013 spot prices for natural gas** at the Henry Hub are expected to average $3.71 a million BTUs, the EIA said Tuesday. It is lower than the $3.76 forecast in July. But the agency edged up its 2014 forecast to $3.95, from $3.91 expected in July. (8/7 #22)

- US regulators said they would propose for the first time **lowering the mandated consumption of corn ethanol** used in motor fuel, a reversal in policy that puts a powerful industry on the defense. (8/7 #24)

- In a five-year lease plan outlined in November 2011, the Bureau of Ocean Energy Management said the resource potential in the Atlantic Outer Continental Shelf "is not well understood and surveys of these areas are incomplete and out of date." (8/7 #25)

- **Chesapeake Energy** has given up a two-year legal fight to retain thousands of acres of natural gas drilling leases in New York State. (8/7 #27)

- **Australia** is forecast to surpass Qatar as the world's largest exporter of LNG by the end of the decade. (8/7 #30)

- The cost of moving **LNG** from the US into foreign markets has been estimated at $6/Million BTUs, and in 2012 the differential between US natural gas and LNG in Japan was $14/Million BTUs. The differential between the US and European markets was above $8/Million BTUs. These differentials provide a compelling economic case for LNG exports. (8/6 #25)

- The first of five shipments of liquefied natural gas from **Qatar** arrived at an Egyptian port to help address energy concerns, the Qatari government said. Tight demand for energy in Egypt exacerbated frustration with post-revolution political developments. (8/6 #18)

- In the **U.K.**, companies looking to explore and develop shale gas need to engage with local communities much earlier in the process if the country's fledgling industry is ever going to develop and have the transformative effect it has had in the U.S. (8/9 #23)

- **Royal Dutch Shell's** oil spill plans for drilling in **Alaska's** Beaufort and Chukchi seas don't violate environmental laws, a federal judge in Anchorage ruled in rejecting a challenge by conservation groups. (8/6 #20)

- Improved **rig efficiency** is consuming capital budgets faster. This is not good news for drillers who are finding that fewer rigs are needed to drill the same number of wells each year. Unless capex budgets expand, the drilling rig count is unlikely to improve during the balance of this year and it raises questions about the pace of drilling and the number of rigs needed in future years. (8/6 #23)

- The US drilling **rig count** decreased 4 units during the week ended Aug. 9 to reach a total of 1,778 rotary rigs. Rigs drilling for oil lost 3 units to reach 1,385, while those drilling for gas slipped 2 units to 388 rigs working. Compared with the same week last year, gas rigs were down 109 units. (8/11 #17)

- **In China**, surprisingly firm rebounds in exports and imports during July offered some hope that the world's second-largest economy might be stabilizing after more than two years of slowing growth, although an imminent rebound still looks unlikely. Imports of crude oil and iron ore rebounded from multi-month lows to record highs last month. (8/8 #14)

- As more **Chinese cities** propose license-plate lotteries and other ways of limiting the number of cars on the road, consumers are responding by buying more expensive automobiles with bigger engines. (8/8 #16)

- The EPA said it would give refiners until June 2014, a four-month extension, to increase the blend of **renewable fuels** in gasoline and diesel supplies. The announcement sparked mixed reaction; opponent said it seems short-sighted while green groups called for more action. (8/8 #23)

- The world's richest nations, moving to combat global warming, are cutting government support for **new coal-burning** power plants in developing countries, dealing a blow to the world's dominant source of electricity. (8/6 #5)
• At Japan’s **Fukushima plant**, a new rush of radioactive water has breached a barrier built to stop it, allowing heavily contaminated water to spill daily into the Pacific. As the scope of the latest crisis became clearer on Wednesday, Japan’s prime minister ordered his government to intervene in the cleanup of the plant. *(8/8 #17)*

• **Average global temperatures** in 2012 were roughly in line with those of the past decade or so, but the year still ranked among the 10 warmest on record as melting arctic ice and warming oceans continued to boost sea levels, NOAA said in a recent report. *(8/7 #5)*

### 6. Commentary: Interview with David Hughes—Whither Shale Oil?

By Steve Andrews

**Q: Andrews—Production from shale oil plays has been impressive and has taken the national energy dialogue by storm. When did you sense that the shale oil plays had the kind of muscle they are currently showing?**

A: Hughes—The Bakken certainly came on the radar five years ago, not only in the US but also in Canada. So it certainly caught my attention, but it wasn’t until I started working on my Drill-Baby-Drill report in 2012 that I really got into the data enough to truly understand what was going on with the Bakken. It certainly was phenomenal. I looked at production through May of 2012 for that report, and at that point it was already over half-a-million barrels per day. The Eagle Ford was not anywhere close to that, though the Eagle Ford has caught up and could even be ahead of the Bakken now.

So there is definitely muscle there. The big question is, how sustainable is that in the long term?

**Q: You’re known for following the numbers closely. Based on your analysis, how does your view of the next five years of shale oil production compare with that of a couple of the high-profile perspectives: the EIA’s and CitiGroup’s January 2012 forecast?**

A: It’s interesting that the EIA has changed their outlook. For example, if you look at the April 2012 Annual Energy Outlook, they projected close to 12,000 locations available to drill in the Bakken and Three Forks formations. In their April 2013 Outlook, they’ve projected 43,000 drilling locations, so they’ve almost quadrupled their estimate of the number. And in the Eagle Ford they’ve doubled their estimate of drilling locations to 22,000. As a result, they’ve doubled their estimate of recoverable oil. However, if you look at the 2013 EIA forecast for tight oil, they’re actually pretty conservative compared to CitiGroup. The 2013 EIA reference case forecast projects a second peak in US oil production in about 2019, reflecting a 2020 peak and decline of tight oil.

In last year’s Outlook, the EIA had an estimated EUR [Estimated Ultimate Recoverable] figure for the average Bakken oil well of 550,000 barrels of oil. Since then they’ve actually lowered that quite a bit, to an average of 93,000, 211,000 and 372,000 barrels for Montana, non-core North Dakota and core North Dakota areas, respectively, while radically increasing their estimate of drillable locations. So the EIA is a voice of conservatism compared to CitiGroup. Ed Morse’s January 2012 CitiGroup report suggested that the Bakken and Eagle Ford would each rise to more than one million barrels per day and would plateau there until at least 2022 and presumably beyond that.

But when you look at any projections they critically depend on how many drillable locations you have. I looked at EIA’s estimates for the Bakken and compared them to maps of well productivity and distribution (figures 1 and 2), and I would say they have over-estimated the number of remaining drillable locations by about 60%. So if the EIA’s well density for the Bakken—two wells per section—is correct, there may be 26,000 locations total. There have been about 6,000 wells drilled to date, so that leaves about 20,000 left to be drilled.
Figures – 1) Distribution of wells colored by highest one month production showing the EIA outline of the Bakken/Three Forks play area in light gray; 2) Close up of sweet spot in Sanish-Parshall area in the east-central portion of the field; 3) Well count and production for the Bakken/Three Forks in Montana and North Dakota through April 2012 (from Drillinginfo database with a 3 month trailing moving average); 4) Bakken monthly field production change per new well and the well count added per month illustrating that a drilling rate of 120 wells per month is required to hold production flat at the April production level of 725,000 b/d.

My estimate last year showed a peak in the Bakken in 2017 at nearly one million b/d, if you drilled 2,000 wells per year. But that was based on the EIA’s 2012 estimate of just under 12,000 well locations. Given the new EIA estimates of well locations I think the Bakken could reach the 2020 time range before declining. The Bakken is currently producing about 725,000 barrels per day from a little over 6000 wells (Figure 3). Right now the Bakken needs about 1440 wells per year just to offset field production decline (Figure 4). When the Bakken is going to peak depends on the number of well locations that are left and how fast you drill the wells. As you grow production, the number of wells you need simply to offset decline keeps on increasing.

In every shale play I’ve looked at there are always sweet spots. Those inevitably get drilled first. So as the sweet spots are drilled off, drilling has to move into lower quality parts of the reservoir. Therefore you need...
an ever-escalating number of wells drilled just to offset field decline. So if the Bakken were to hit a million barrels/day of production, which it probably will, it will then likely need about 2000 wells drilled per year just to offset decline.

So play that out: there are 20,000 locations remaining—optimistically. So we’re basically looking at 10 years or less for the Bakken—certainly not the rosy forecast, in terms of longevity, that comes out of places like CitiGroup.

**Q: By 10 years for the Bakken, you mean 10 years of high levels of production? Or medium levels?**

A: Ten years at levels above say half a million barrels per day. A near term rise to peak followed by decline. As you move into lower quality rock, production per well declines and so do the economics, as the cost of wells remains constant. So that will tend to constrain drilling. This also means that rising numbers of lower productivity wells will be required to offset field decline. So if those 20,000 locations exist, the peak of production in the Bakken could be around 2020, possibly sooner, followed by a decline. So the Bakken will continue to produce oil for decades, but at a much lower rate.

**Q: So the production curve for the Bakken might look like a steep ascent followed by a bit of a production plateau—maintained through a struggle—followed by what: a cliff?**

A: Yes, as soon as you run out of locations, then it’s a cliff, declining at 44% per year for the Bakken.

**Q: What do you see for the Eagle Ford in terms of peak production and timing?**

A: Last year I used the EIA’s 2012 estimated number of drillable locations—just under 12,000. Depending on how fast you drill wells, I projected a peak somewhere between 2015 and 2017, assuming 2000 and 2500 wells per year, respectively. They’re now drilling 3000 wells per year. Close to 10% of all wells drilled in the US are being drilled in the Eagle Ford. However, in its 2013 analysis the EIA increased its estimate of drillable locations to 22,000. They’re counting on 5.4 wells being drilled per section, in terms of that number of locations. I haven’t done the same spatial analysis as I did on the Bakken to examine the credibility of that EIA assessment for the Eagle Ford. Assuming they’re right, 22,000 locations would push the peak for the Eagle Ford out to around 2020.

But there’s quite a range of well qualities in the Eagle Ford. Some of them are really great, coming on at 700 barrels per day or greater. But with the variability, the same pattern will happen. The sweet spots will be saturated, then drilling will have to move to lower quality rock and the economics will degrade. But for now the economics of the Eagle Ford are very good, which is why there is so much drilling going on there.

**Q: Why do you think there is such a big difference between your analysis and CitiGroup’s?**

A: I’ve read the report and looked at their projections. I just wonder what kind of data they’ve actually looked at in order to come up with those projections. What I’ve used is basically all of the well production data, so I can calculate for any sub-area of any play the average well decline per year over time.

I’ve developed what I call the life-cycle of a shale play, based on both shale gas and tight oil. They’re very similar; typically they have very high well decline rates and high field decline rates in contrast to conventional oil fields. Early on in a shale play the average IPs [initial productivity] of wells rise quite dramatically, through the process of discovery of the sweet spots and concentrating drilling there, as well as applying better technology (longer horizontal laterals and more fracking stages). Eventually you hit a peak in the IP rate, which was hit in the Bakken in 2010. Since then, IPs in the Bakken have been flat. Since the Eagle Ford is a newer play than the Bakken, its IPs are increasing and there are still a lot of locations to drill in the sweet spots. Inevitably IPs will peak and fall, like every other mature shale play I’ve looked at.

If you look at the Haynesville shale gas play in Louisiana, the IPs peaked in 2010 and are now down about 20% below peak so they are running out of good quality ground. The well costs are staying the same but the well
productivity is declining no matter how much new technology they apply. In those mature shale plays, geology trumps technology every time.

**Q: What’s your view of the prospects for California’s Monterey shale oil play?**

A: The Monterey is hyped as being the number one shale play in terms of technically recoverable resources, according to the EIA. So far it really doesn’t stack up to either the Eagle Ford or the Bakken, if you look at well productivity. It’s a difficult play, very complex stratigraphically and broken up by a lot of faulting. And it really hasn’t generated the stellar production that would justify the hype, from what I’ve seen so far. I’m deeply in the weeds on a study of the Monterey. There’s a report prepared by the University of California which really hyped the Monterey as being a kind of solution for California’s debt problems. I’m still scratching my head about that one. They seem to be incredibly optimistic. The EIA is suggesting 13.7 billion barrels of recoverable oil from the Monterey and they’re suggesting 16 wells per section. That’s nearly 28000 wells, with each well producing a half-million barrels of oil. So far we haven’t seen anything like that. So the jury is definitely still out on the Monterey, from where I sit. I’ll come out with a more detailed analysis over the next few weeks.

**Q: When you add it all up, what’s the range you see for US production at a secondary peak from shale oil, and what’s the range as to when you anticipate that occurring?**

A: If you believe the new estimates from the EIA in terms of available drilling locations in the Bakken and Eagle Ford—which I’ve discounted somewhat—I would see a tight-oil peak in the 2020 to 2022 time range. If you look at the background declines of other traditional sources of oil, the EIA could be fairly close with their 2019 estimate for a secondary peak of all US oil, though I wouldn’t be surprised if it’s sooner than that. I consider their estimates of well locations fairly optimistic. And their assumption that the EURs from those wells will remain constant going forward is unlikely to happen given that the best parts of plays are drilled first.

**Q: What are some of the major factors that could impact your scenario both to the upside and downside?**

A: Again it boils down to the number of locations and their quality. When you look at the density of drilling in the sweet spots in the Bakken, considering that wells typically have 10,000 foot laterals, there are about four laterals per section, with the laterals spaced about 1400 feet apart (at the EIA’s estimated density of two wells per section). Presumably, they could drain about a 700 foot radius around the well. Is there interference when you drill with that density? If there is, then that number of wells doesn’t really get you more oil and it damages the economics. That would be the downside—an over-estimate in terms of the number of wells that you can actually put in a given area.

The upside is that I’ve underestimated the area that has potential in the Bakken/ThreeForks. I’ve said the EIA has overestimated the available drillable area by about 60%. If I’m wrong, there will be more locations.

If the Monterey actually comes through at scale, that would make a difference. It is 13.7 of 47 billion barrels in the EIA’s latest estimate for technically recoverable tight oil.

**Q: What about the world level? Are you getting a sense that there will be any significant shale oil produced in a timely fashion elsewhere around the world?**

A: Yes, there will be shale oil developed outside the US; there already is some in Canada. But the oil and gas culture here in North America is vastly different than what exists elsewhere in the world. So I think development of tight oil elsewhere is going to be much slower than it is in the US. We should look at tight oil as a brief reprieve in terms of the overall world supply picture. Conventional medium and light oil has basically been on a plateau since 2005. It has gone up a little bit, but the growth in liquids supply has really come from tar sands, heavy oil, tight oil, natural gas liquids and biofuels—in other words from expensive, difficult-to-develop sources. In my view the tight oil reprieve is not sustainable at high levels. But it is buying us a bit of time. I certainly don’t think people should be complacent about the oil supply picture going forward because of North American tight oil production.
Q: That is obviously a discordant message with the standard line from that which we hear from the press of late. How do the press and the industry respond to your message?

A: It spans a spectrum. If you talk to scientists and geologists, they are generally my biggest supporters. I have lunch with the manager of gas supply for a large multi-national whenever I am in Calgary. But he certainly can’t reiterate anything that we talked about when he goes back to work. Old (retired) colleagues at the Geological Survey of Canada are huge fans. People who actually work for the Canadian government are more reticent to share that view, although some of them do privately. People who have taken swipes at me, including a fellow from Forbes magazine, often appear to me to be industry shills, not scientists. A lot of what you hear in the press is people just filling column-inches, surveying opinions, repeating the new conventional wisdom. Not many of them have actually gone to the numbers and ground the data—that’s relatively rare. And a lot of the industry players have a vested interest in a certain point of view. I’m in the very enviable position of being retired with a federal government pension check. I don’t have any vested interest except for my four grandkids and my concern for what their future will be like. We really do have to rethink the whole paradigm of the human race’s high reliance on fossil fuel energy that has served us so well over the last century.

David Hughes is a geologist who served with the Geological Survey of Canada for more than three decades. He now heads the consultancy Global Sustainability Research Inc.