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MUSINGS FROM THE OIL PATCH

July 6, 2010

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Note: *Musings from the Oil Patch* reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating oilfield service companies. The newsletter currently anticipates a semi-monthly publishing schedule, but periodically the event and news flow may dictate a more frequent schedule. As always, I welcome your comments and observations. Allen Brooks

Wind Power Costs And The Economics Of Utilities

As Rhode Island and Massachusetts electricity consumers are discovering, wind power is not cheap...not by a long shot!

We were admonished by a reader of the last issue of the *Musings* that we may have gone too deeply into an analysis of the politics and rate-setting mechanics for wind power in Rhode Island. There are two reasons why we have focused on this project along with the Cape Wind project in Nantucket Sound offshore Massachusetts. First, we are a National Grid (NGG-NYSE) rate payer in Rhode Island and second, we are concerned about the economics of electric utilities being turned upside down by the state's renewables mandates and the push for high-cost offshore wind power. As Rhode Island and Massachusetts electricity consumers are discovering, wind power is not cheap...not by a long shot! In fact, the two power purchase agreements National Grid has entered into in these states carry per kilowatt-hour (kWh) prices for wind power that are more than twice the cost of alternative power supplies from natural gas-fueled or nuclear-powered plants.

By incorporating wind into the region's power supply mix, consumers' electricity bills will fall

One of the popular claims by wind power supporters is that wind is free. As a result, they promote the view that by incorporating wind into the region's power supply mix, consumers' electricity bills will fall, or at least that the projected rise in their bills will be reduced. A study conducted for the New England transmission system concluded that by adding Cape Wind's power into the grid, electricity bills would be reduced in the long term, what is called "suppression pricing." In their determination, the study's authors determined that because power prices in the region are determined hourly and are set by the highest cost supply source at the time, when low-cost wind power satisfies some of the region's demand, there would be less high-cost power supplies needed thus reducing the peak pricing point and saving consumers money. According to the study, it will

The true cost of wind power is obscured by the large tax and financing subsidies granted to wind farm owners

be some time before this happens because there will not be sufficient wind power available for many years to impact the high-cost power spectrum.

The biggest problem for wind power, however, is that its cost is generally underestimated and its value is overestimated. Why is that the case? Largely because the true cost of wind power is obscured by the large tax and financing subsidies granted to wind farm owners. Secondly, wind power's cost calculations are usually based on assumptions that are little more than guesses until the wind farm has been built and is in operation. The principle problem for the value of wind power is its intermittent nature. As a result, the value of the capacity of wind power is low since it only has value when the wind blows, which is generally not all the time, and in many cases wind is strongest when electricity demand is low.

The value of any power source is a function of how much power it can supply at the peak electricity demand point. Due to the intermittent nature of wind, it is unreliable or not dispatchable (able to be programmed for sending out) to meet this requirement. The variable nature of wind creates additional costs. First and foremost is the need to provide backup power supplies to meet the variability of wind-generated power. Second is the challenge confronting transmission operators that receive wind energy; their grids need to have the capacity to accept all the wind power whenever it is generated, which can fluctuate wildly, even over short time periods. If the power is not required to meet customer electricity demand, the surplus wind power needs to be initially rejected or dumped off the grid. In contrast to Europe where energy storage alternatives exist to use this surplus wind power, we do not have a use for it here in the U.S.

The net effect is to hike the per unit transmission cost of all the power moving along those lines

Managing the scheduling of wind power has created a market for wind forecasting software and early wind predictive hardware, all increasing the cost of operating transmission grids. One belief in managing wind power is that if the turbines are spread over a large enough area, the natural variability in wind will help to even out the power flow, translating a highly variable supply into a more stable one like conventional power sources. The final cost factor is the need to size transmission facilities to carry the maximum amount of wind power that can be generated. This becomes a challenge given wind power's variability since at some times it will produce its nameplate capacity while at other times it will be only a small fraction of that capacity. Therefore, transmission lines must be capable of carrying the maximum output leading to greater investment in over-sized facilities. The net effect is to hike the per unit transmission cost of all the power moving along those lines. It is akin to the social cost of maintaining a fire department in a community. You may only use its resources once or twice, but since you never know when a fire may break out, the community must bear the full cost of the fire department every day.

The Congressional Research Service reported that estimates for

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Wind power supply shows that it is greatest in the early morning hours between 1am and 6am and then again at night from 6pm to midnight

integration costs for wind power into the transmission grid range from \$1.85 to \$4.97 per MWh. It also said that in 2008 the Bonneville Power Administration established a wind integration charge of \$2.82 per MWh, or equivalent to \$0.0282/kWh.

Additional cost issues for the grid are that much of the wind power is being built long distances from where the power is needed requiring new lines and adding to the amount of power that is lost during its transmission. Solving both of these issues will increase utility costs that will be borne by their customers. Several studies estimate that about 22,000 miles of new high power transmission lines will be needed in this country at a cost of \$20 billion. Not only are these numbers large, the miles of lines needed suggest all sorts of transmission line approval battles will need to be fought at additional cost.

In a study of the future of the natural gas industry, there was a section on demand that discussed the advantage of natural gas-fueled power plants as backup for wind power. The discussion contained a series of graphs that we have included in a nearby exhibit. The three graphs show how natural gas demand will increase or shrink compared to a base case for power supplies for generating electricity. As shown in red in the graphs (Exhibit 2), wind power supply is greatest in the early morning hours between 1am and 6am and then again at night from 6pm to midnight. This does not match electricity's demand pattern. Because nuclear, coal and biomass power are stable sources of electricity supply, other power sources must expand and contract their contribution over the 24-hour day. Another renewable fuel supply source – solar – is clearly very time specific during the day. As a result, natural gas has become the preferred fuel for meeting the variable electricity needs during the day – increasing its supply from early morning until a peak at mid-day and then shrinking as the rest of the day progresses.

Exhibit 1. Natural Gas Is Least Costly Fuel For Electricity
Table 2. Assumptions for Generating Technologies

Technology	Overnight Cost in 2008 (2008\$ per Kilowatt of Capacity)	Assumed Capacity Factor	Type of Project Developer
Wind	\$1,900	34%	IPP
Coal	\$2,600	85%	Utility
Nuclear	\$3,700	90%	Utility
Natural Gas	\$1,200	70%	IPP

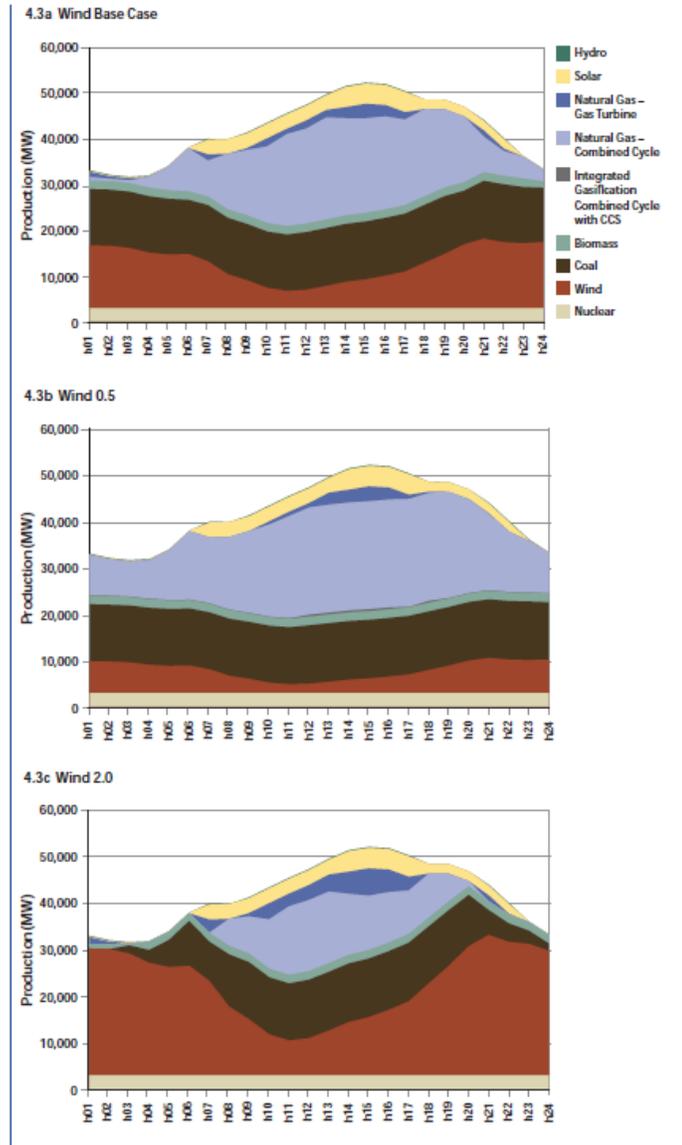
Sources: Overnight capital costs estimated by CRS based on a review of published information on recent power projects. Capacity factor for coal plants is from Massachusetts Institute of Technology, *The Future of Coal*, 2007, p. 128. Natural gas plants are assumed to operate as baseload units with a capacity factor of 70%. Capacity factor for wind from California Energy Commission, "Comparative Costs of California Central Station Electricity Generation Technologies," December 2007, Appendix B, p. 67. Nuclear plant capacity factor reflects the recent industry average performance as reported in EIA, *Monthly Energy Review*, Table 8.1. Also see Appendix A to this report.

Source: Congressional Research Service

A reason for the increased role is the low cost of natural gas power plants. That cost advantage was demonstrated in the Congressional Research Service’s 2008 Wind Power In The United States report. It showed that the cost per kilowatt of capacity for natural gas plants was the lowest of the four fuels rated and was significantly lower when the cost is adjusted for the assumed capacity factor.

Exhibit 2. Wind Power Variability Adds Backup Power Costs

Figure 4.3 Impact of Wind on a One-Day Dispatch Pattern



Source: MIT Study On The Future Of Natural Gas

The second graph shows what happens to natural gas demand if wind power is only half of the base case assumption. In that example, natural gas will have to increase in order to supply a much

Wind turbines only start generating electricity when the wind speed exceeds about six miles per hour

Many wind farms are built assuming a 20-year turbine life, but experience is showing that the life may be closer to 10-15 years

greater share of power during the nighttime hours. The last graph shows that when wind power is twice as prolific as in the base case, the need for natural gas shrinks dramatically and becomes only an important power source during the peak electricity demand period of late morning through early evening. The point of these graphs is to show how variable wind power is and how much backup supply is needed from more reliable and dispatchable power sources. The biggest problem with wind power is that the cost of this backup power is never included in the wind power cost estimates.

A further example of the challenge of estimating wind power costs is to determine how much power will actually be generated from a particular wind farm. Because of wind's variability, we know wind turbines do not produce power 100% of the time. In fact, wind turbines only start generating electricity when the wind speed exceeds about six miles per hour (mph). They reach their peak generating efficiency at about 32 mph and shut down when wind speeds exceed 56 mph. Estimating how much time the wind blows in the peak power generating range is a key variable in forecasting wind power cost.

Other costs that are not known going into a wind farm project include the operating and maintenance costs along with the replacement costs during the lifetime of the turbines. There is a question about the productive lifetime of turbines, which appears to be much shorter than conventional power plants. Many wind farms are built assuming a 20-year turbine life, but experience is showing that the life may be closer to 10-15 years.

There is also a question about the amount of electricity to be produced over the useful lifetime of turbines allowing for out of service time and the deterioration in their output as blades and transmissions wear out. Finally there is the cost of decommissioning of wind farms that has not been determined. This cost can be delayed if the turbines are replaced as they wear out, but the cost of extending wind farm lives to match those of conventional power plants is never considered in the competitive costs comparisons.

Exhibit 3. Assumptions Impact Wind Power Cost

	Example #1	Example #2
Capacity of "wind Farm" (kW)	50,000	50,000
Assumed Capacity Factor	30%	30%
Annual Electricity Production (kWh)	131,400,000	131,400,000
Assumed Useful Life	20 years	10 years
Electricity Produced During Useful Life (kWh) (131,400,000 x years of useful life)	2,628,000,000	1,314,000,000
Overnight Capital Cost	\$100,000,000	\$100,000,000
Overnight Capital Cost per kWh During Useful Life	\$0.038 per kWh	\$0.076 per kWh

Source: Science & Public Policy Institute

In examining the impact of just one of these variables, the nearby chart shows the impact on the cost per kWh for wind power if the assumed useful life of the turbines is half the original assumption. In

this case, by assuming turbine productive lives go from 20 years down to 10, the cost of power doubles from \$0.038/kWh to \$0.076/kWh. Just this one assumption change takes wind power from being cheaper than alternative power sources to merely comparable.

A recent study by Jerry Graf published by *MasterResource.com* of the economics of wind power from the Cape Wind project calls into question its financial viability. It also highlights how important tax credits and other subsidies will be to the project's success. Based on the size of the Cape Wind project (420 megawatts (MW) of capacity) and its supposed capability to supply three-quarters of the 230 MW of power demand of Cape Cod and the island, average output is expected to be 172.5 MW, or about 41% of the rated capacity. If one assumes that the turbines will experience 85% uptime, they will operate 7,446 hours per year. This means they will produce 1,284 gigawatt-hours (GWh) of power per year. (7,446 hours x 172.5 MW = 1,284 GWh/year.) Mr. Graf confirmed this calculation from the Cape Wind web site that estimates the number of hours of power it could have supplied since wind monitoring commenced. Mr. Graf's estimate is within 11% of the Cape Wind estimate.

While \$50 million is an attractive amount of income, it pales when compared to the estimated \$2 billion construction cost of the wind farm

If the wholesale value of electricity in Massachusetts is about \$50/MWh, the power generated by Cape Wind will be worth about \$70 million. Mr. Graf then subtracted about \$20 million for annual operating and maintenance costs leaving about \$50 million per year of operating income. While \$50 million is an attractive amount of income, it pales when compared to the estimated \$2 billion construction cost of the wind farm. These economics point out why Cape Wind's power cost is more than twice that of alternative power sources. It also highlights the importance tax credits and subsidies awarded to the wind farm operator play in the project's economics.

Exhibit 4. EIA Study Shows Huge Subsidies For Renewables

Table 35. Subsidies and Support to Electricity Production: Alternative Measures

Fuel/End Use	FY 2007 Net Generation (billion kilowatthours)	Alternative Measures of Subsidy and Support	
		Subsidy and Support Value 2007 (million dollars)	Subsidy and Support Per unit of Production (dollars/megawatthours)
Coal	1,946	854	0.44
Refined Coal	72	2,156	29.81
Natural Gas and Petroleum Liquids	919	227	0.25
Nuclear	794	1,267	1.59
Biomass (and Biofuels)	40	36	0.89
Geothermal	15	14	0.92
Hydroelectric	258	174	0.67
Solar ¹	1	14	24.34
Wind	31	724	23.37
Landfill Gas	6	8	1.37
Municipal Solid Waste	9	1	0.13
Unallocated Renewables	NM	37	NM
Renewables (subtotal)	360	1,008	2.80
Transmission and Distribution	NM	1,235	NM
Total	4,091	6,747	1.65

NOTES: Total may not equal sum of components due to independent rounding.

Unallocated renewables include projects funded under Clean Renewable Energy Bonds and the Renewable Energy Production Incentive.

NM = Not meaningful.

¹Net generation rounded to the nearest whole number. The actual value is 583 million kilowatthours.

Sources: Energy Information Administration, Forms EIA-906, "Power Plant Report;" Form EIA-920, "Combined Heat and Power Plant Report;" October 2006-September 2007.

Source: EIA

If a wind farm is 50 MW in size and has a 30% capacity factor, it would produce 131,400/kWh/year and generate an annual tax credit of \$2,759,400

A 2008 study by the Energy Information Administration (EIA) calculated that wind power was receiving a \$0.2377/kWh subsidy in 2007. This was the third greatest subsidy following refined coal at \$0.2981 and solar at \$0.2434. But that subsidy is probably understated as it did not include the impact of double-declining depreciation allowed for wind farms but not other power plants. Nor did the EIA estimate include the benefit from the Wind Production Tax Credit (WPTC) of \$0.021/kWh for the first ten years of operation. If a wind farm is 50 MW in size and has a 30% capacity factor, it would produce 131,400/kWh/year and generate an annual tax credit of \$2,759,400. Over the ten year life of the credit this subsidy would equate to a total tax credit of \$27,594,000 for the wind farm owner.

Wind farm operators are also offered the opportunity to accept an investment tax credit (ITC) equal to 30% of the cost of the project in the first year in lieu of the WPTC. Depending upon the financing and tax situation of the wind farm owner, the ITC may have greater economic value than the WPTC.

These offshore wind projects are necessary for the utilities to be able to meet their state RPS mandates

These tax subsidies also ignore the value of subsidies from state and local governments and other subsidies and mandates available to wind power and other renewables. For example, Federal government agencies are mandated to purchase 5% of their electricity needs in 2010-2012 from renewable power sources. This mandate increases to 7.5% starting in 2013 and thereafter. The federal mandate is in addition to the various Renewable Portfolio Standard (RPS) mandates of states dictating how much renewable power must be purchased by their local utilities. As highlighted in the discussions surrounding the Cape Wind and Rhode Island offshore wind projects, these offshore wind projects are necessary for the utilities to be able to meet their state RPS mandates.

“We know people like wind, but not in their backyard”

The impact of these renewable power mandates, which is a popular mechanism for driving renewable power projects in Europe, was driven home in the *European Energy Review* interview with Anders Eldrup, CEO of Denmark's Dong Energy AS. In response to a question about the business case for wind power absent government subsidies, Mr. Eldrup responded, “I think maybe you can make a business case for onshore wind without subsidies. I would not exclude that. For offshore wind it is not possible in the near or mid-term future. It is quite complicated to do these offshore constructions. The reason we made it part of our business is that politicians want more wind. At the same time we know that in our part of the world the population density is high. We know people like wind, but not in their backyard. So you would not get the permissions you need if you only stay onshore. That's why we said, OK, if governments want wind, then we must do it offshore.” It is interesting how the impact of political mandates clash with the population's willingness to embrace wind turbines in their backyards and are forcing power companies to look at offshore sites that are the most expensive and least proven as the solution. This will further add to consumer costs.

Utilities must take their cheapest energy supplies – coal and natural gas – and turn them into the supply sources for meeting the variation in electricity demand

The net impact of including wind and most renewables in the electricity supply mix will be to raise consumer power costs. As state RPS mandates force local utilities to buy power from renewable energy sources at high prices it will change their cost structure. We are forcing utilities to install the highest cost power as the baseload supply. Utilities must take their cheapest energy supplies – coal and natural gas – and turn them into the supply sources for meeting the variation in electricity demand. That means running some of these plants in a spin mode, or merely idling them, until they are needed to meet surging electricity demand, which has the effect of raising the per-unit-cost of power. It also means that carbon emissions will be greater with wind and solar due to the continued operation of backup power plants.

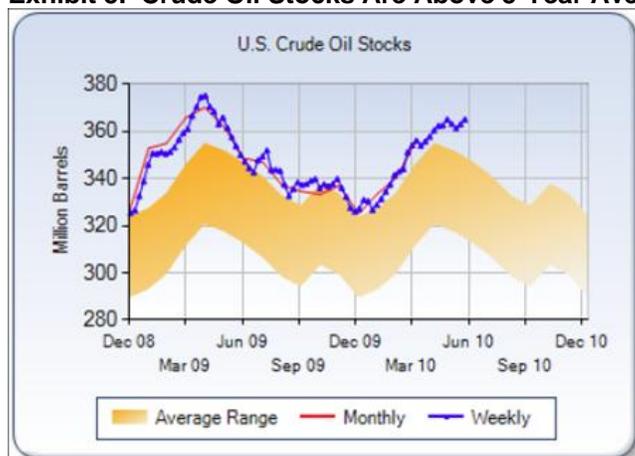
As much as we would like to believe that including wind and other renewable power sources in our electricity supply mix will lower our long-term electricity costs, we are hard pressed to see exactly how it will happen given the additional costs and investments needed, and especially if they are mandated by laws. This is especially true if those renewable power sources turn out to very short operating lives. For the time being, put us in the skeptical camp.

Middle East: Oil Industry's And World's Next Black Swan?

They should be scanning the horizon for what might be the next black swan to visit this industry

The public, along with most political and investment pros remain mesmerized by the continuing oil spill news out of the Gulf of Mexico and what the implications may be for the energy business. Maybe, however, they should be scanning the horizon for what might be the next black swan to visit this industry. With U.S. crude oil and refined petroleum product inventories above the five-year average of inventories there is a certain confidence among industry execs and investors about our near-term supply situation. Yes, exploration drilling in the deepwater of the Gulf is barred by the federal government's drilling moratorium and it has impacted shallow-water

Exhibit 5. Crude Oil Stocks Are Above 5-Year Average



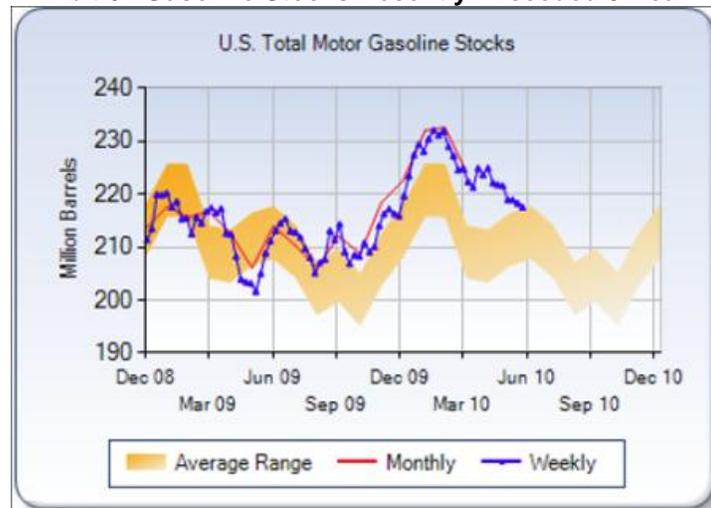
Source: EIA

Oil use is not expanding strongly contributing to the increase in crude oil and refined petroleum product inventories

drilling, too. But a New Orleans-based federal court overturned the moratorium. The federal government announced immediately that it would appeal (the hearing is set for July 8th), and Interior Secretary Ken Salazar announced that regardless of the court outcome, he would implement a more focused moratorium that would overcome the judge's objections to the original moratorium. So, today, we are left awaiting the court hearing and the new moratorium announcement.

The weak U.S. economic statistics are suggesting that energy demand growth will not be robust. The weather recently has been warmer than normal, which has contributed to a rebound in natural gas and coal prices that fuel our electricity generation. Oil use is not expanding strongly contributing to the increase in crude oil and refined petroleum product inventories. Crude oil prices have been bouncing around in the \$70s per barrel range depending upon weather (Gulf of Mexico hurricane fears), the daily strength or weakness in the value of the U.S. dollar and speculation about the pace of global economic growth.

Exhibit 6. Gasoline Stocks Recently Exceeded 5-Year Average



Source: EIA

One might ask: What does OPEC know that our government doesn't?

With crude oil prices in the sweet spot as suggested by Saudi Arabia's oil minister earlier this year, it was interesting that the Organization of Petroleum Exporting Countries (OPEC) issued a statement admonishing the U.S. federal government over its deepwater drilling moratorium and urged it to lift the ban due to the potential impact on future global oil supplies. One might ask: What does OPEC know that our government doesn't? Maybe it is that OPEC knows how hard it will be in the future to grow global oil supplies since deepwater areas around the world are expected to contribute 10% of the world's oil production over 2008-2015 according to Deutsche Bank. The bank estimates that over the past 15 years deepwater drilling has accounted for 60 billion barrels of P2 reserves – those that oil companies are 50% confident can be

A number of recent data points have emerged that suggest the Middle East may become a focal point of political and possibly military action before the end of the year

Sec. Gates disclosed that the U.S. had overhauled its NATO missile defense plans following intelligence that Iran could fire “scores or hundreds” of missiles against Europe in salvos rather than one or two at a time

CIA head Leon Panetta testified that his organization believes Iran has sufficient upgraded uranium to build two nuclear bombs within two years

produced economically. According to Deutsche Bank, deepwater drilling and deepwater reserves are central to the oil industry’s ability to meet global oil demand growth, something OPEC must also understand.

Black swans are, by definition, events that are unforeseen and not anticipated based on conventional wisdom. The possibility of a major military conflict in the Middle East may not qualify as a true black swan, but more likely an ignored developing trend. A number of recent data points have emerged that suggest the Middle East may become a focal point of political and possibly military action before the end of the year, or maybe even earlier. These data points come as President Obama has been dealing with our military leadership role in the Afghanistan conflict and after he supposedly secured European and UN support for tightened sanctions against Iran. While conventional thought is that neither the U.S. nor its sanction-allies want to escalate tensions with Iran and its goal of building a nuclear weapon, the various data points suggest possibly the opposite is underway.

Playing a role in all this geopolitical tension is Israel and its recent conflict with Turkey and other Arab countries attempting to break the blockade of the Gaza Strip. The attack by Israeli commandos against a Turkish ship, supposedly carrying relief supplies for the Palestinians living in Gaza, and the worldwide condemnation of the action has further isolated Israel among the community of nations. The challenge to Israel’s security and possible continued existence was the focus of information disclosed by Defense Secretary Robert Gates in testimony before a Senate panel on June 17th. In that testimony, Sec. Gates disclosed that the U.S. had overhauled its NATO missile defense plans following intelligence that Iran could fire “scores or hundreds” of missiles against Europe in salvos rather than one or two at a time. Sec. Gates did not mention Israel in his testimony, but that ally is much closer to the Iranian missiles than Europe. In addition, it is much closer to the 800 Scud D missiles, which Syria has been able to position close to the Lebanese border and the 1,000 Iranian and Syrian medium-range missiles transferred to Hizballah in Lebanon. In the past the U.S. military has downplayed the Iranian missile capability claiming it consisted of no more than a few score ballistic missiles and far less launchers.

Also during his testimony, Sec. Gates was questioned about his assessment of when Iran might develop a nuclear weapon. He responded that it would likely be within 1-3 years. The week before last, CIA head Leon Panetta testified that his organization believes Iran has sufficient upgraded uranium to build two nuclear bombs within two years, shortening Sec. Gates outside timeline. So with the timetable for a nuclear Iran growing shorter and the country having not reacted to the increased economic sanctions, one has to wonder whether Sec. Gates’ testimony was designed to try to diffuse an Iranian missile attack against Israel as retaliation for the sanctions.

Arab media reports have said that Saudi Arabia has permitted Israel Air Force (IAF) helicopters to land in its country

At the same time, a number of Arab media reports have said that Saudi Arabia has permitted Israel Air Force (IAF) helicopters to land in its country. The reports go on to claim that Saudi leaders have offered the IAF a base in the northwest part of the kingdom that could act as a staging point for an aerial assault against Iran. *The Times of London* reported several weeks ago that the Saudi Royal Family has agreed to allow IAF jets access to the country's airspace. Saudi has supposedly allowed Israeli jets a narrow corridor of its airspace in the north of the country that would shorten the distance between Israel and Iran. The report further states that Saudi Arabia has conducted tests to prevent its own jets from scrambling and its missile defense systems from reacting, thus enabling Israeli jets to make a bombing raid on Iran's nuclear facilities unobstructed. As expected, both the Saudis and the IAF have denied the reports. Saudi Arabia does not recognize the State of Israel, and still officially regards the country as an enemy.

In recent days the media has reported that Syria has received new radar from Iran that would be used to track the actions of Israeli jets much earlier than before. This would suggest that Iran believes the reports about the arrangements between Saudi Arabia and Israel. As President Obama recently met with Saudi Arabia King Abdullah, one has to think the strategy of how to deal with Iran was a prime topic of discussion.

Saudi Arabia is concerned about the growing threat to its security from a more militant Iran

Saudi Arabia is concerned about the growing threat to its security from a more militant Iran. The battle between those countries is essentially a religious one. Iran is predominantly populated by people from the Shia sect of Islam versus the Sunni sect that dominates Saudi Arabia. This religious divide was part of the historical tensions between Iraq and Iran and contributed to periodic wars involving those two countries. As shown in the nearby chart, the Shia has small pockets of presence in Turkey, Syria, Pakistan and Afghanistan.

Exhibit 7. The Deadly Sunni-Shia Divide – 2010-2011



Source: Agora Finance

There is also a pocket of Shia representation in Yemen on Saudi Arabia's southern border that has become of concern to the Royal Family. There have been numerous skirmishes between Saudi forces and Yemeni Shia rebels. These military conflicts could form the first step in a more significant attack against Saudi Arabia.

Exhibit 8. The Shia Revolution's Next New Front...



Source: Agora Finance

One scenario envisions Iran's first move in broadening the Shia effort to overpower the Saudi Arabian royal family will be to attack Iraq.

Exhibit 9. Iran's First Move...



Source: Agora Finance

An overthrow of the Sunni-sponsored government in Iraq could lead to a united Shia-sponsored attack on Saudi Arabia.

Exhibit 10. The Final Battleground – Saudi Arabia!



Source: Agora Finance

The U.S. Navy has just moved additional ships to the region, including a number of nuclear submarines

Attempting to counter this potential scenario is what appears to be a concerted effort by the U.S. and its allies in the Middle East to isolate Iran. The U.S. Navy has just moved additional ships to the region, including a number of nuclear submarines. When the armada went through the Suez Canal on its way to the Arabian Gulf, an Israeli ship also joined, which supports the view that Israel will be the military force that will take out the Iranian nuclear weapon-making facilities.

Exhibit 11. U.S. Troops Surround Iran – A Source of Tension?



Source: Agora Finance

The nearby chart shows the presence of U.S. forces in the Middle

The risk in this scenario for energy markets is that the nearly 35% of the world's crude oil supply traverses the Strait of Hormuz between Iran and Oman

East region as of June 22nd. As the circles on the map demonstrate, U.S. military forces are located in nearly every country that borders Iran. The risk in this scenario for energy markets is that the nearly 35% of the world's crude oil supply traverses the Strait of Hormuz between Iran and Oman. According to the estimates in BP's 2009 Statistical Review, there was approximately 20 million barrels per day of oil exported from the Middle East region. That represented 37% of all global oil exports, but since not all this oil moves through the Strait, our guess of 35% seems about right. The Strait of Hormuz represents probably the leading global oil chokepoint and risk to the energy industry and global economies.

Exhibit 12. Strait of Hormuz Is Key Oil Bottleneck

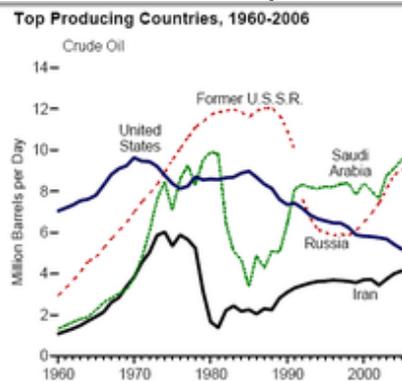


Source: EIA

While Iran represents a potential black swan, we have lived through this scenario once before – in the late 1970s

While Iran represents a potential black swan, we have lived through this scenario once before – in the late 1970s. At that time, Iran was a significant supplier of oil to the global market and a hotbed of exploration and development activity benefitting the oilfield service industry. All of that was upended with the overthrow of the Shah of Iran in 1979 and the creation of an Islamic Republic in Iran headed by the religious leader Ayatollah Khomeini.

Exhibit 13. Iran's Output Fell 75%



Source: US DOE, Energy Information Administration Annual Energy Review 2006

Source: EIA

This chapter in oil industry history witnessed the destruction of hundreds of companies, the loss of hundreds of thousands of jobs and eventually the total restructuring of the energy business

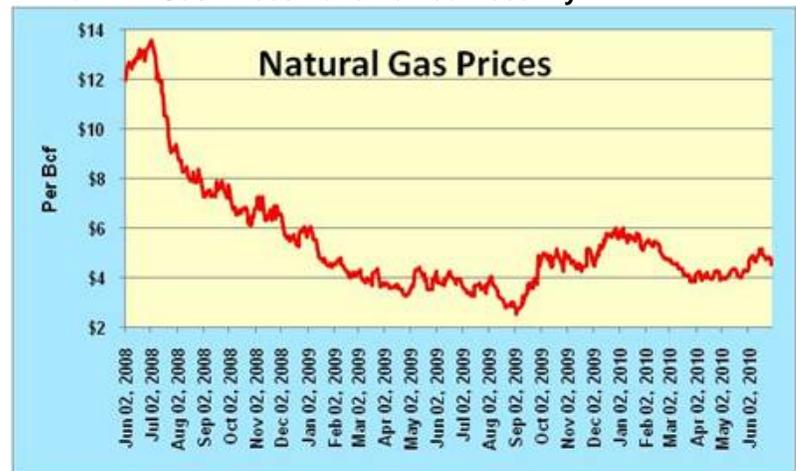
That transformation of Iran contributed to a war between Iran and Iraq, which cut off 4.5 million barrels of oil supply, or over 7%, to the global market and also led to the seizing of 52 American hostages who were held captive for 444 days. Crude oil prices soared from \$15.85 in the spring of 1979 to \$39.50 one year later. The price spike contributed to the last great economic recession that cut global oil consumption for four consecutive years. Global oil consumption did not exceed its pre-recession level for a full decade. This chapter in oil industry history witnessed the destruction of hundreds of companies, the loss of hundreds of thousands of jobs and eventually the total restructuring of the energy business. Could it happen again? We doubt it has a high probability, but there has to be some likelihood assigned. Anyone have a guess how much?

Natural Gas Price Rebound Heat Driven; Supply Still Grows

Gas prices began to move higher in response to hotter than normal temperatures finally reaching a near-term peak at \$5.19/Mcf in mid June

After peaking at \$6.01 per thousand cubic feet (Mcf) on January 6th, natural gas futures prices steadily fell until they bottomed at \$3.84 on March 29. From that point gas prices rebounded to above \$4/Mcf and traded in the low \$4 range for the next month. Gas prices began to move higher in response to hotter than normal temperatures finally reaching a near-term peak at \$5.19/Mcf in mid June. Since then, gas prices have fluctuated wildly but generally have remained in the upper \$4/Mcf range as continued supply growth battled hotter weather and hurricane supply-disruption concerns. The weak U.S. economic figures recently reported have begun to weigh more heavily on gas prices.

Exhibit 14. Gas Prices Have Rallied Recently

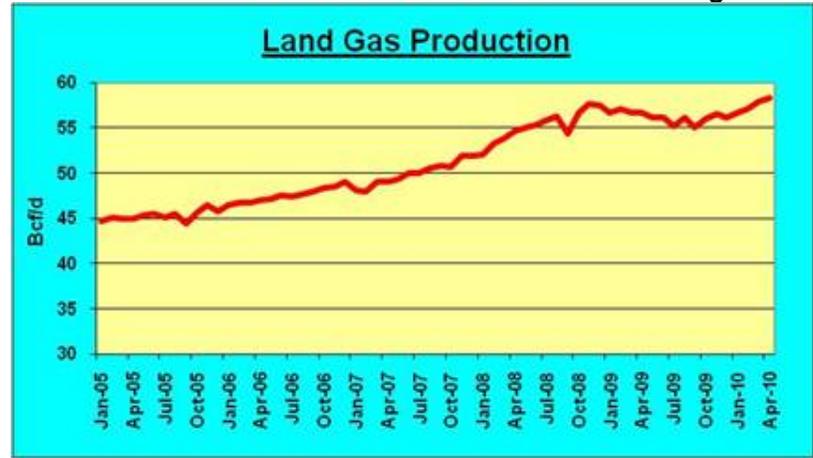


Source: EIA, PPHB

Last week the Energy Information Administration (EIA) reported their April monthly natural gas production data taken from its monthly form 914 survey of producers. Earlier this year, the EIA revised its data collection and analysis procedures related to this information designed to improve the accuracy of its estimate. Despite a hoped-

for major data revision to support those with bullish natural gas price expectations, the new gas production estimates were barely changed. As a result, the bullish gas price case that rested on falling production due to a decline in working gas rigs since the fall of 2008 was undercut by the lack of any meaningful revision in the supply data.

Exhibit 15. Gas Production Onshore Continues Growing



Source: EIA, PPHB

Analysts looking for a supply response due to fewer rigs drilling were encouraged by the lower production growth

The April 914 survey showed that there was about a 0.3 billion cubic feet per day (Bcf/d) increase over the March production estimate, a mere 0.5% increase, for total Lower 48 land gas production. Year over year the growth in natural gas production was 2.0 Bcf/d, or a 3.5% increase. Analysts looking for a supply response due to fewer rigs drilling were encouraged by the lower production growth. For most of this year, the monthly production increase has averaged about 0.8 Bcf/d per month, so the April gain was encouraging. While natural gas production on land has continued to grow, the amount of supply coming from the Gulf of Mexico has declined.

Exhibit 16. GoM Production Continues Trending Lower

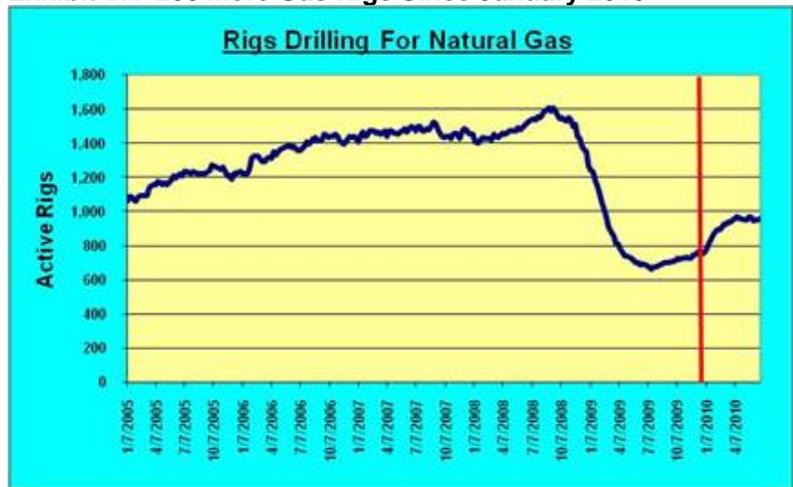


Source: EIA, PPHB

The number of rigs drilling for natural gas in the U.S. has increased by about 200 since the start of the year

The problem is that natural gas drilling activity has not declined in response to weaker gas prices this spring. The number of rigs drilling for natural gas in the U.S. has increased by about 200 since the start of the year, marked by the red line in Exhibit 17. There are about 275 more gas-oriented rigs drilling today than a year ago, so there has been some moderation in the pace of increase in response to low gas prices. An even more important positive for gas drilling is that the gas-oriented drilling rig count has remained essentially flat for the past three months. The problem for production and gas drilling is that capital continues to flow aggressively into natural gas shale basins as new producers clamor to establish initial acreage positions in the hottest production trend in North America and established producers try to expand their lease holdings. Lease exploration timetables have become the controlling factor for gas drilling activity as producers are reluctant to lose the money they have paid for the right to drill, even though current gas prices are nowhere close to supporting the economics of current drilling projects.

Exhibit 17. 200 More Gas Rigs Since January 2010



Source: EIA, PPHB

Drilling decisions should be based on the net present value of the production versus the cost of drilling the well

A recent posting on the web site, *The Oil Drum*, discussed the views of B. J. Doyle, the vice president of operations for a small Houston oil and gas producer. He discussed the importance of reserves over production as the driving force for company actions. Since Wall Street tends to value oil and gas producer stocks on the basis of the worth of their reserves, producers should be doing the same with their prospects. Drilling decisions should be based on the net present value of the production versus the cost of drilling the well. A key ingredient in that determination is establishing the discount interest rate for valuing future revenues. For the oil and gas industry, that interest rate will range somewhere between 10% and 15%. That number can significantly impact the present value of the reserves. Mr. Doyle pointed out that his company usually doesn't consider pursuing a prospect unless the present value ratio relative to the cost of drilling the well is six or more. He said in periods when

There have been strong efforts by natural gas producers to convince politicians both in Congress and state and local governments to increase incentives for building and using more natural gas-powered vehicles

For the average driver who drives 12,000 miles per year, it will take roughly 12 years to breakeven on a CNG vehicle purchase unless the buyer is provided significant subsidies

competition for prospects is high, the net present value ratio will often drop to as low as three or four. Recently, he has seen public companies drill when the ratio has fallen to one.

The BP oil spill in the Gulf of Mexico has boosted prospects of the government increasing its backing for more natural gas consumption at the expense of petroleum. Unfortunately, the federal government is also strongly backing other renewable fuels and electric vehicles. There have been strong efforts by natural gas producers to convince politicians both in Congress and state and local governments to increase incentives for building and using more natural gas-powered vehicles. The need for new natural gas supply infrastructure to boost its use as a transportation fuel will require significant investment and time. According to the International Association for Natural Gas Vehicles, at the end of 2009 the U.S. had 110,000 natural gas vehicles out of a total vehicle fleet of 234 million units. For natural gas vehicles to impact gas consumption in any meaningful way will require many years.

The recent MIT study on the future of natural gas in its chapter on demand discusses demand for natural gas vehicles. As the study points out, there is only one factory-produced compressed natural gas (CNG) vehicle, the Honda GX, available in the U.S. That model has an incremental cost relative to its gasoline powered equivalent of \$5,500. Converting a gasoline engine to a CNG one costs about \$10,000 but a significant portion of that cost is subsidized by state governments. These figures suggest that the incremental cost of a CNG vehicle is closer to the \$7,000 figure in Exhibit 18. As the information associated with that exhibit shows, the current spread between CNG and gasoline on a per gallon basis is \$1.30, putting it close to the \$1.50 figure. Together, for the average driver who drives 12,000 miles per year, it will take roughly 12 years to breakeven on a CNG vehicle purchase unless the buyer is provided significant subsidies. For fleet vehicles that drive 35,000 or more miles per year, the breakeven period is closer to four years that could be reduced further with tax breaks.

Exhibit 18. Nat Gas Vehicle Cost Keyed To Miles And Fuel Cost

Table 4.2 Payback times in years for CNG light-duty vehicle for low- and high-incremental costs and U.S. fuel price spreads over the last 10 years. Fuel price spreads between gasoline and CNG are on a gallon of gasoline equivalent (gge) basis. The present fuel price spread, assuming \$2.75 per gallon for gasoline and residential gas at the consumer level of \$12 per Mcf, is around \$1.30/gge. Payback periods are provided for average and high-mileage cases. The table assumes 30 miles per gallon.

		12,000 miles per year		35,000 miles per year	
Fuel Price Spread	Incremental Cost	\$3,000	\$7,000	\$3,000	\$7,000
	\$0.50	15	35	5.2	12
	\$1.50	5	11.7	1.8	4

Source: MIT Study On The Future Of Natural Gas

The more likely policy to be enacted will be a severance tax on gas production as Pennsylvania needs tax revenues

Natural gas is also being pushed as the preferred backup fuel for wind-powered electricity production. While that is an attractive use, it does not assure steady demand growth as gas consumption will be more volatile as it substitutes for highly volatile wind energy.

Outside of pricing, the greatest challenge for natural gas supply growth is the potential for restrictions on drilling and completing wells in natural gas shales. In the Barnett gas shale area in central Texas, citizens have been protesting deterioration in air quality due to leaking natural gas-powered compressors and possible releases associated with gas wells. On the other hand, in the Northeast – principally Pennsylvania and New York – citizens are raising concerns about possible water pollution due to gas well drilling and completion activity. A bill was recently proposed to the Pennsylvania legislature to institute a moratorium against natural gas drilling in the Marcellus gas shale formation. The sponsor suggested that the idea of a drilling moratorium was unlikely to be successful, but the effort was designed to address the concerns and frustration among citizens about the dangers of gas shale drilling and the inability of the Pennsylvania government to oversee all the activity. The more likely policy to be enacted will be a severance tax on gas production as Pennsylvania needs tax revenues. That desire has been included in the state budget recently approved, although the severance tax needs to be written later this summer. Steps to restrict fracturing of gas shale wells in the state because of fear over potential drinking water pollution are not likely to happen. Politicians recognize the potential adverse impact on employment in the state and the risk of lost tax revenues from this action and have determined that it is too great a price to pay. It is almost a given, however, that there will be increased regulation of fracturing activity, well drilling and waste water disposal, all of which will boost operator costs. Operators probably can live with these increased costs and regulations, although it should not be seen as a given that gas prices will rise to offset the higher costs. The operators will accept the increased regulation and costs in anticipation that the gas shale bonanza will eventually mean much higher natural gas prices. We're not so sure.

Rhode Island Wind Farm Moving Forward

But under an “open books” agreement, the costs to build the project, estimated at \$205 million, will be audited by a third party

Deepwater Wind and National Grid (NGG-NYSE) have filed a new power purchase agreement (PPA) with the Rhode Island Public Utilities Commission (PUC) for electricity to be produced from the 8-turbine demonstration wind farm to be located offshore Block Island. This is a new contract following the one rejected by the PUC earlier this spring. The initial power price remains the same at 24.4¢ per kilowatt-hour (kWh) in 2013. But under an “open books” agreement, the costs to build the project, estimated at \$205 million, will be audited by a third party. Those costs and an agreed-to return on investment rate between 10.5% and 12.0% will be used to establish the base-year pricing. Deepwater Wind officials have suggested that the 2013 starting price could be as much as 10% lower

Deepwater Wind needs to get PUC approval of the contract to enable the company to secure financing for the Block Island project

assuming the cost to build the wind farm is lower, possibly bringing the rate down to 22¢/kWh. This price is closer to the 20.7¢/kWh price recently negotiated between National Grid and Cape Wind in Massachusetts.

The starting electricity price will be escalated at 3.5% for each year of the 20-year life of the Deepwater Wind contract. Deepwater Wind needs to get PUC approval of the contract to enable the company to secure financing for the Block Island project. Deepwater Wind needs the financing so it can commence construction before the end of 2010 in order to secure federal investment tax credits of 30% of the project's cost. Given these requirements, the timetable to be the first offshore wind project under construction will be tight. The approval process has been helped by the new renewable power approval process law enacted last month in Rhode Island that we wrote about in the last issue of the *Musings*.

As Paul Rich, Deepwater Wind's chief development officer put it in a comment to a reporter for *The Providence Journal*, "I think that within the context of the statute they were given last time, they had the latitude to reach the decision they did," he said. "In this new statute, they are given the right context to make another decision." His comment relates to the new law's mandate that the PUC consider any benefit for the Rhode Island economy from the project and ignore lower prices for alternative power supplies available with respect to this 8-turbine offshore wind demonstration project. The PUC has virtually no room to reject the PPA. This one more example of desperate politicians doing whatever it takes to get their pet project approved, especially if it means the public has to subsidize it.

Skimmers, Jones Act Point Up Bumbling US Clean-up Job

On the third day of the Deepwater Horizon disaster, the Dutch government contacted the U.S. government with an offer to provide heavy-duty skimmers to assist in the oil spill clean-up. As Geert Visser, consul general for the Netherlands located in Houston, told Loran Steffy, business columnist for *The Houston Chronicle*, the federal government's response was "Thanks, but no thanks." The disclosure of that response has set off a firestorm of criticism of the federal government's and BP's bumbling efforts in managing the Gulf oil spill clean-up.

The contentious issue has been whether there are legal restrictions preventing foreign-flag vessels from working in the clean-up

The contentious issue has been whether there are legal restrictions preventing foreign-flag vessels from working in the clean-up. The focus of the restriction is whether and how the Jones Act might be limiting foreign oil skimming vessels from working here. This law is probably less of a problem than envisioned by critics of the government's clean-up efforts, but the lack of clarity about who does what and who makes which decisions in this whole spill management process has made the Jones Act an easy target. From the beginning, the government has relied upon the concept of a

Organizing and directing armies of people and vessels involves specific skills – command and control and logistics management

These two governmental organizations should have an easier time assessing where and when waivers of existing laws are needed to help speed up the clean-up process

working partnership between the federal government and the responsible party, in this case BP plc (BP-NYSE), the operator of the Macondo well that blew out and is spilling oil. While this concept is embodied within the Oil Pollution Act of 1990, there needed to be a higher authority to analyze the spill needs and parcel out tasks. In our view, the biggest mistake made was not recognizing that each of the responsible parties for managing the clean-up have different skill sets that should have been capitalized upon.

Managing the thousands of small vessels and people needed to sweep up crude oil either offshore or on the beach is not a core competency of an oil company. Yes, they can do it, but probably not as efficiently as the military. The process requires logistical management skills on a huge scale. It is best handled by the government, and the military, specifically. Organizing and directing armies of people and vessels involves specific skills – command and control and logistics management. Dealing with stopping the well flow, however, is a core competency of an oil company. They know how to drill relief wells, how to manipulate subsea well equipment and how to control blowouts. Thus, in our view, the spill and clean-up project should have been split into two, with the Coast Guard overseeing the clean-up effort and BP managing capping the well. An early decision to split the process would have made clear who was responsible for what. That should have improved the speed of the response effort, made it more efficient in determining what needed to be done, and prevented the finger-pointing that has been going on since the early days of the disaster.

Under the law, the clean-up effort is to be managed by the Coast Guard and the Environmental Protection Agency in conjunction with the responsible party. These two governmental organizations should have an easier time assessing where and when waivers of existing laws are needed to help speed up the clean-up process. There is no question about who has the responsibility for paying for the clean-up – the responsible party. That party has been clear from day one. Should BP have some say in what actions are undertaken in the clean-up effort since it has to pay the bills? Maybe. The need for speed in the response effort might override that nicety.

The issue with the Jones Act restriction on foreign-flag vessels is pretty clear. Within state waters, foreign-flag skimmers can work only if there is no U.S.-flag skimmer available. Presumably a waiver of the Jones Act is required, but that can be obtained quickly with proof of a lack of comparable American vessels. Another complicating factor in this case may have been the existence of some 2,000 American oil skimming vessels in other parts of the country that are not allowed to move in order to maintain spill response capability at all times. Again, the government should have been able to deal with that situation if it was a problem.

Outside of the three-mile state water limit, foreign-flag vessels can work in the clean-up effort. The issue becomes one of whether these vessels ever have to go to shore to deposit cargos of skimmed

crude oil. In that case, the issue of whether their offshore location can be construed as a U.S. port for regulatory purposes needs to be addressed and clarified. If it is a port, then the ships would be in violation of the Jones Act when they take their skimmed oil cargo to shore, having moved cargo from one American port to another. Can offloading their skimmed oil cargo into a U.S.-flagged vessel solve that problem?

From an historical perspective, a well drilled offshore Alaska in the late 1970s necessitated the use of ice-breaker supply vessels. At the time there were no U.S.-flagged ice-breaker supply vessels. The oil company was planning to load all the necessary drilling supplies on a large U.S.-flagged freighter that would be stationed near the drilling rig. This created two American ports and the foreign flagged ice-breaker supply vessels would be in violation of the Jones Act by moving supplies. Instead of the government granting a waiver, the solution was for the freighter to stay in motion sailing a circular route with the foreign-flag supply vessels pulling alongside and loading up before delivering the supplies to the drilling rig. In this way, there was only one American port. As they say, there is more than one way to skin a cat.

The bigger issue with the skimmers may have been their oil-cleaning technology and U.S. environmental laws

The bigger issue with the skimmers may have been their oil-cleaning technology and U.S. environmental laws. The large foreign skimmers suck in thousands of barrels of water, separate the oil from the water and then dump the cleaned water overboard. The problem is that the cleaned water is not 100% pure, so dumping it overboard can be a violation of U.S. environmental laws. The current rules prevent dumping water that has more than 15 parts per million of oil in the water. As a result of the less than 100% cleaning technology of the European ships, the EPA has been the agency restricting the use of foreign-flagged skimmers.

The U.S. government is now accepting offers of help from 12 countries and international agencies

It appears from the latest news that the U.S. government is now accepting offers of help from 12 countries and international agencies. The latest list of offers and their status is contained in the nearby table and was posted on the U.S. Department of State's web site as of late on June 29th. What we have found out, based on comments from Lt. Erik Halvorson, a Coast Guard spokesman, is that "These offers are not typically offers of aid. Normally, they are offers to sell resources to BP or the U.S. government." So while the U.S. government picks up the tab for foreign aid in international disaster support, when it involves the United States, foreign governments want to be paid. An interesting double standard.

Arizona Senator John McCain has introduced legislation (S. 3525) designed to repeal the Jones Act. His press release brought out figures contained in presentations to Congress in the past as to the cost to the American economy from the restrictive provisions of the law. A quick response came from the Maritime Cabotage Task Force pointing out how its industry supports nearly 500,000 U.S. jobs. It also pointed out that the Jones Act was not limiting the use of foreign-flagged vessels and that waivers were not deemed

necessary by the Coast Guard or the National Incident Command. The biggest problem seems to be American vessels waiting for supplies such as skimmers and booms.

Exhibit 19. Status of International Offers In Gulf Clean-up

U.S. Department of State Chart on Deepwater Horizon Oil Spill Response:
International Offers of Assistance from Governments and International Bodies
June 29, 2010 4:12 PM

Country/Entity	Date of Offer	Resources Offered	Status of Offer	Reimbursement Required?
Belgium	15 June 2010	Facilitation of private offers of skimmers, vessels and expertise	Under consideration	Yes
	14 June 2010	Fire Boom	Under consideration	
Canada		Dispersant	Under consideration	Yes
		Containment and Fire Boom	Accepted 9,843 ft containment boom accepted June 4. Arrived on scene and now in the field for staging. *More boom offered 14 June, under consideration.	
	30 April 2010	People/technical	Unknown. This offer was made directly from British Columbia to the Gulf Coast States.	
	23 June 2010	Skimmers	Under consideration	
China via IMO	14 June 2010	Containment and Fire Boom	Under consideration.	Yes
Croatia	5 May 2010	People/technical – proposed solution	Proposed solution has been shown to engineers and technical experts, will be incorporated into response as needed.	Yes
Denmark		Containment Boom	Under consideration	Yes
El Salvador	23 June 2010	Skimmers	Under consideration	Yes
European Maritime Safety Agency	13 May 2010	Containment Boom	Under consideration	Yes
		Skimmers	Under consideration.	
		Vessels	Under consideration. Only the USCG can accept this vessel offer.	
		Sweeping arms	Under consideration	
France		Dispersant	Declined. These chemicals are	Yes

U.S. Department of State Chart on Deepwater Horizon Oil Spill Response:
International Offers of Assistance from Governments and International Bodies
June 29, 2010 4:12 PM

			not approved for use in the U.S.	
	19 May 2010	Containment and Fire Boom	Under consideration. *More boom offered 14 June, Under consideration.	
	18 May 2010	People/technical	Under consideration	
		Bird rehabilitation equipment	Under consideration	
Germany	12 May 2010	Containment and Fire Boom	Under consideration *More boom offered 15 June, under consideration.	Yes
		People/technical	Under consideration	
International Maritime Organization (IMO)	05 May 2010	People/technical	Accepted. Requested IMO to send communication to all 169 Member States and the maritime community generally regarding use of websites provided by the U.S. to assist in safe navigation in the Gulf of Mexico	n/a
Ireland	30 April 2010	General offer of assistance	Under consideration	Yes
Israel (via IMO)	14 June 2010	Containment Boom	Under consideration.	Yes
Italy	17 June 2010	Facilitation - private companies offering vessels, people/technical	Under consideration	
Japan	12 May 2010	Containment Boom	Under consideration	Yes
	22 June 2010	Boom	Under consideration	
	22 June 2010	Skimmers	Under Consideration	Yes
Joint UNEP OCHA Environment Unit	29 April 2010	People/technical – technical and resource facilitation	Under consideration	Yes
Kenya (via IMO)	14 June 2010	Fire Boom	Under consideration.	Yes

U.S. Department of State Chart on Deepwater Horizon Oil Spill Response:
International Offers of Assistance from Governments and International Bodies
June 29, 2010 4:12 PM

Mexico	03 May 2010	Dispersant	Under consideration	Boom was offered gratis, other materials and equipment were purchased
		Containment Boom	BP purchased 13,780 feet of boom and two skimmers in early May. Arrived in field and now on scene.	
		Skimmers		
Monitoring and Information Center (EU MIC)	30 Apr 2010	People/technical – coordination of offers among member states	Accepted	n/a
Netherlands	30 April 2010	Vessel w/ storage capacity	Under consideration	Yes
		Skimmers	Accepted on May 23. BP purchased three rigid Koseq sweeping arms accepted May 23.	
Norway	30 April 2010	People/technical	Under consideration	Yes
		Dispersant	Under consideration	
		Containment and Fire Boom	Purchased by BP directly	
		Skimmers	Eight skimming systems accepted in early May	
		People/technical	Under consideration	
Portugal	21 Jun 2010	high-capacity skimmers/collectors (Model: TRANSREC 250)	Under Consideration	Yes
Romania	30 April 2010	General offer of support	Under Consideration	Yes
Russia	7 May 2010	Containment Boom	Under consideration	Yes
		Vessels		
		Oil storage containers		
Republic of Korea	2 May 2010	People/technical	Under consideration	Yes
		Dispersant	Under consideration	
		Containment Boom	Under consideration	
		Skimmers	Under consideration	
		People/technical	Under consideration	
Spain	30 April	Containment and Fire Boom	Under consideration	Yes

U.S. Department of State Chart on Deepwater Horizon Oil Spill Response:
International Offers of Assistance from Governments and International Bodies
June 29, 2010 4:12 PM

	2010		*More boom offered 14 June, under consideration.	
Sweden	30 April 2010	Sweeping arms	Under consideration	Yes
		Containment and Fire Boom	Under consideration	
		Skimmers – Three total	*More skimmers offered 15 June, under consideration.	
		Vessels – One Combination vessel, three small recovery boats	Under consideration *Another vessel offered 15 June, under consideration	
		People/technical	Under consideration	
Tunisia (via IMO)	14 June 2010	Fire Boom	Under consideration	Yes
Turkey	23 June 2010	Skimmers	Under consideration	Yes
Qatar	14 June 2010	Containment boom	Under consideration	Yes
UAE	10 May 2010	Skimmers	Under consideration	Yes
		Dispersant	Under consideration	
		Containment Boom	Under consideration	
		Skimmers	Under consideration	
		People/technical	Under consideration	
United Kingdom	30 April 2010	Dispersant	Under consideration. Only 11 tons of chemicals offered are licensed for use in the U.S.	Yes
		Containment Boom	Under consideration	
		Vessel/ skimming arm	Under consideration	
Vietnam	05 May 2010	Vessel w/ sweeping arms	Under consideration	Yes

Source: U.S. State Department web site

We believe the lack of coordination has been a bigger problem

There is clearly a rationale for maintaining the Jones Act as it assures support for the domestic maritime industry. This is particularly appropriate for our navigable rivers and coastal waterways. Does it inflate the cost of shipping goods? Yes, but we doubt that the higher cost exceeds that which might come with a weakening of our maritime industry. It is probably fair that this issue should be re-examined, but we don't think it has had much impact on the Gulf oil spill clean-up. We believe the lack of coordination has been a bigger problem, unfortunately to the detriment of the Gulf Coast.

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