

MUSINGS FROM THE OIL PATCH

February 24, 2015

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Managing Director

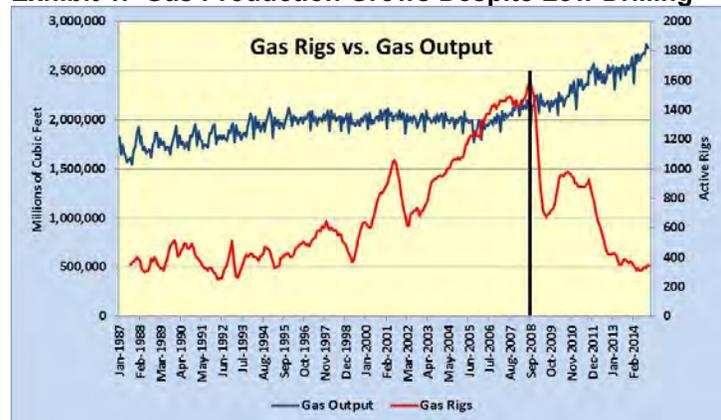
Note: *Musings from the Oil Patch* reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating and planning for the future. The newsletter is published every two weeks, but periodically events and travel may alter that schedule. As always, I welcome your comments and observations. Allen Brooks

Does Natural Gas History = \$10 A Barrel Oil In Our Future?

Remember the admonition to economists: forecast often but only give a price with no date, or a date with no price

The news is full of claims and predictions about where crude oil prices are headed, and how soon they will get there. Remember the admonition to economists: forecast often but only give a price with no date, or a date with no price. As oil prices have rebounded during the past two weeks, we continue to see forecasts claiming the U.S. is headed for oil prices somewhere between \$20 and \$10 a barrel. The analysis behind these forecasts relies on the recent history of domestic natural gas production as the precursor for future oil production. These forecasters rely on a single chart showing U.S. natural gas output and the number of rigs drilling gas wells.

Exhibit 1. Gas Production Grows Despite Low Drilling



Source: EIA, Baker Hughes, PPHB

Their charts, similar to Exhibit 1, show how the gas rig count began climbing in the early 1990s following the decontrol of natural gas prices. Gas drilling peaked in the late 1990s just prior to the 1997-1998 recession and its corresponding drop in gas demand. Drilling

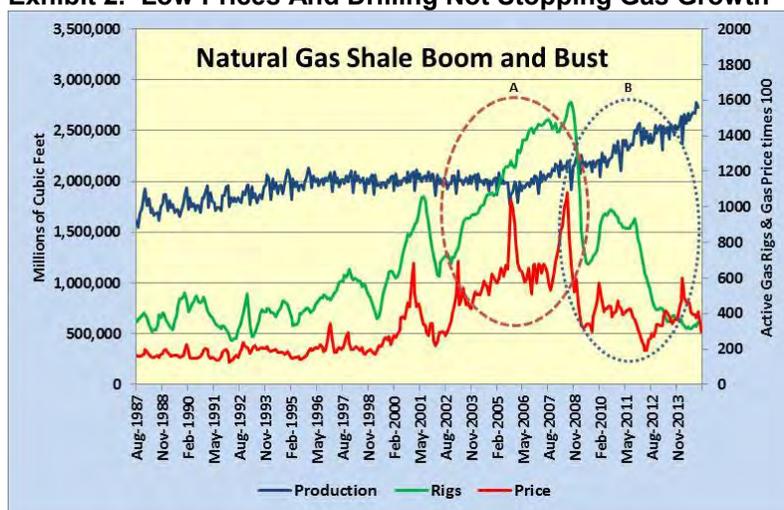
The initial flows from shale wells are huge, although they are accompanied by rapid production declines

Prospects of these high gas prices being sustained drove the number of active gas rigs to march higher with the byproduct being that the nearly decade-long natural gas output decline was arrested and production soon began growing

rebounded in 1999 and climbed steadily through 2001 up to the next recession, which followed the horrific events of 9/11. From that point forward, shrinking domestic gas supplies and rising demand propelled gas prices to double digits, rejuvenating gas drilling. It was at this time that the success of marrying horizontal drilling and hydraulic fracturing emerged as a way to tap the prolific gas supplies trapped in shale formations that underlays almost every oil and gas producing basin in the nation. The initial flows from shale wells are huge, although they are accompanied by rapid production declines. The magic of being able to tap these shale formations generated optimism that the country was on the cusp of a dramatic shift in the fortunes of the domestic gas business. The American Shale Revolution was born of this belief about a paradigm shift for both the physical and economic outlooks for natural gas.

To better understand the shale gas boom and its subsequent bust, consider the chart in Exhibit 2. In order to plot the gas price per thousand cubic feet (Mcf) on the same scale as the number of gas-directed drilling rigs, we multiplied the Mcf price by 100. Thus, a natural gas price of \$6/Mcf became 600 on the right-hand scale. The lure of huge gas flows coupled with high gas prices in 2004-2008 provided the incentives for producers to rush to lease up all the potential gas shale acreage in the United States, and launch the drilling boom. This was a drilling boom such as the industry had not been experienced since the late 1970's. When you examine the data within the circle labeled A on the chart, you see that other than for the two price spikes to double digit gas prices, they generally traded in a \$6 - \$7/Mcf range, substantially higher than any time in the previous 16 years. Prospects of these high gas prices being sustained drove the number of active gas rigs to march higher with the byproduct being that the nearly decade-long natural gas output decline was arrested and production soon began growing.

Exhibit 2. Low Prices And Drilling Not Stopping Gas Growth



Source: EIA, Baker Hughes, PPHB

The financial panic was essentially a global liquidity crisis that forced individuals and companies to operate as if the entire world's financial system would fail, making liquidity the primary operating rule

But is this truly a case of Mark Twain's "history doesn't repeat but it does rhyme a lot" claim coming true?

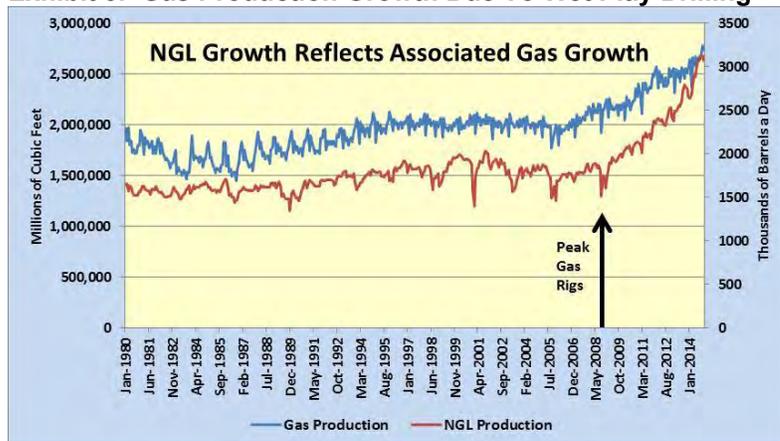
Natural gas had more resource options to exploit that have largely driven the continued gas output growth, whereas, in our view, crude oil lacks alternative resources to exploit

By the summer of 2008 the extent of the financial crisis became evident. It eventually exploded into a full panic by that fall as several prominent investment banks failed, questions were raised about the health of the world's financial system and governments mounted full-scale rescues of their financial institutions. The financial panic was essentially a global liquidity crisis that forced individuals and companies to operate as if the entire world's financial system would fail, making liquidity the primary operating rule. Energy demand fell, commodity prices, including crude oil and natural gas, collapsed and drilling and completing wells ceased as oil and gas producers conserved cash in order to sustain their financial and liquidity positions. As natural gas prices dropped by more than a third, or into the \$3-\$4/Mcf level, high-cost gas shale plays proved uneconomic forcing producers to revise their corporate strategies. About that time, some producers disclosed successes they had by drilling horizontal wells in oil shale formations and successfully fracking them with similar results as gas shale wells – high initial production flows but rapid decline rates. With global crude oil prices rebounding from the \$30's a barrel toward the \$70's, producers shifted their focus from gas to oil shales and tight oil formations. A new American shale revolution was launched. The data reflecting the gas shale bust is shown within the circle labeled B on the chart.

Seizing on this gas shale boom-to-bust history, the low-oil price forecasters point out that after the gas rig count peaked in 2008, natural gas production growth continued unabated. Forecasters made the leap to predicting a similar scenario for crude oil output. They contend that the gas output growth with fewer gas rigs working demonstrates the success of horizontal drilling and hydraulic fracturing technology, which they contend will also drive future oil shale and tight oil production. According to these forecasters, we are doomed to a scenario of continued oil output growth that overwhelms our demand needs and condemns us with low oil prices for years to come. But is this truly a case of Mark Twain's "history doesn't repeat but it does rhyme a lot" claim coming true?

We decided to examine the evolution of natural gas production and whether there were factors that explained its growth in the face of a falling rig count that may not exist in the oil arena. A key difference, in our view, is that the natural gas play shifted from dry gas to wet gas and gas associated with oil plays. In effect, natural gas had more resource options to exploit that have largely driven the continued gas output growth, whereas, in our view, crude oil lacks alternative resources to exploit. To test this theory we looked at gross natural gas withdrawals from wells against growth in the production of natural gas liquids (NGLs) from field plants, i.e., the installations in gas fields that strip out the heavier liquids in a natural gas stream. We believe this growth would reflect the shift in drilling from dry gas wells in favor of wet gas plays. The chart in Exhibit 3 shows this relationship. We marked the point in time when the number of natural gas-focused drilling rigs peaked in late 2008, because rigs drilling wet gas plays are classified as oil rigs.

Exhibit 3. Gas Production Growth Due To Wet Play Drilling



Source: EIA, PPHB

Demand for NGLs has also increased as America’s petrochemical industry demand has grown and more NGLs are being exported

We believe there are three important observations to be drawn from this chart. First, natural gas output was already rising when the natural gas rig count peaked. This suggests that dry gas production would continue to grow as dry gas wells were completed and brought into production. Second, NGL output began rising almost immediately after the gas rig count peaked and the oil rig count began rising. Third, the slope of the increase in NGL output has steepened in the past 18 months as the oil rig count climbed to its recent peak, driven by extraordinarily high oil prices that have boosted the price of NGLs. Demand for NGLs has also increased as America’s petrochemical industry demand has grown and more NGLs are being exported. This chart confirms part of our thesis as to why gas output has continued to grow despite the fall in gas rigs and continued low natural gas prices.

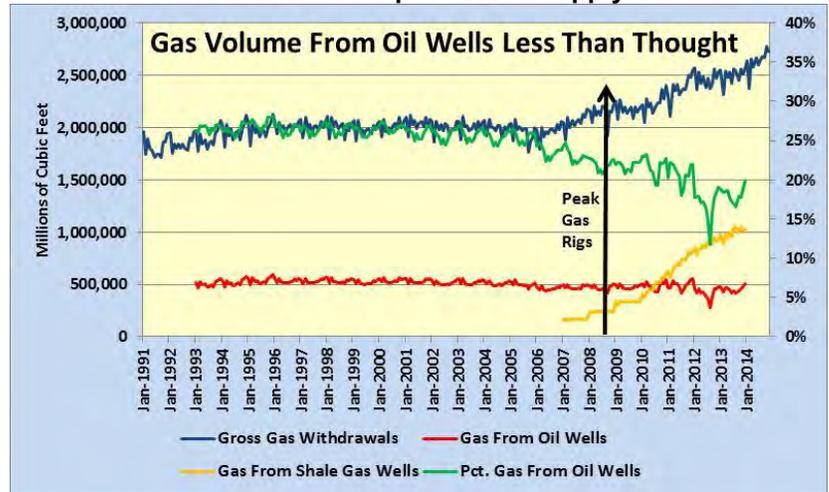
Left unanswered is the question of how much of the current natural gas output is associated with crude oil production. The Energy Information Administration (EIA) publishes estimates of monthly gross natural gas withdrawals from wells. That data has been published since 1980, and in more recent years the EIA has disassembled that flow. Starting in January 1991, the agency identified the amount of gas flowing from gas and oil wells. In 2003, the EIA started publishing natural gas volumes flowing from coalbed wells and in 2007, the flow from gas shale wells. Because this detail is published with a lag, 2014’s monthly data has yet to be released.

The volume of gas from oil wells has been essentially flat since 1993

Utilizing this data (Exhibit 4, next page), we were surprised to see that the volume of gas from oil wells has been essentially flat since 1993 with what appears to be seasonal ups and downs. In 2012 and 2013, it appears the flow of gas from oil wells has actually fallen slightly. When this volume is expressed as a percentage of total gas withdrawals, we see a dramatic decline in that ratio since the gas shale boom commenced in 2005, characterized by the beginning of the surge in total gas output. For reference, we plotted the volume

of gas attributed to gas shale wells in addition to the date when the natural gas rig count peaked.

Exhibit 4. Associated Gas Output Less A Supply Source

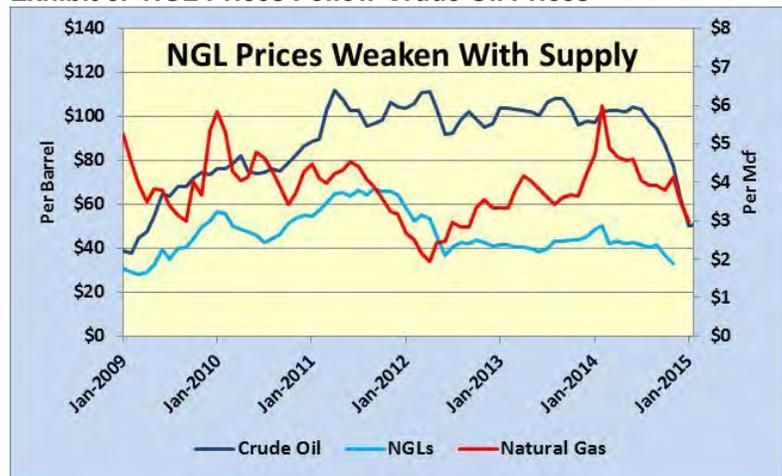


Source: EIA, PPHB

One of the telling developments with respect to the possibility for continued growth of both natural gas and crude oil is the impact of pricing in the liquids markets

One of the telling developments with respect to the possibility for continued growth of both natural gas and crude oil is the impact of pricing in the liquids markets. In Exhibit 5, we have plotted natural gas spot prices, the value of a barrel of NGLs and the refiner acquisition cost for domestic crude oil. The NGL price is a composite price per million British thermal units (Btu) based on daily spot prices as reported by *Bloomberg* for these products at the main trading hub of Mont Belvieu, Texas. We have converted the EIA estimate to a per-barrel-value based on the ratio that a barrel of NGLs contains 4.2 million Btus of energy as reported by

Exhibit 5. NGL Prices Follow Crude Oil Prices



Source: EIA, PPHB

The December 2014 NGL price should be somewhere in the mid \$20's a barrel, reflecting the further decline in crude oil prices

NGL production is above three million barrels per day, a 60% increase over the past decade

The incentive to continue drilling for NGL-rich natural gas may ease with sustained lower crude oil prices

Future crude oil production growth will depend on new well drilling and the productivity of those new wells

www.physics.uci.edu. The data shows that although NGLs are derived from natural gas, their high value as substitutes for crude oil-derived products means they trade more in-line with oil price movements than natural gas prices. That can be seen quite clearly in 2012 and 2013 when natural gas prices rebounded but crude oil and NGL prices remained steady.

For some reason the EIA has not posted a monthly average price for NGLs for December and January, although they have posted prices for natural gas and crude oil. We see that the October and November NGL price was reflecting a lower value in-line with the oil price decline. An early January article in *Wall Street Daily* states that between September 1 and mid-December 2014, NGL prices fell by at least 40%. If so, that means the December 2014 NGL price should be somewhere in the mid \$20's a barrel, reflecting the further decline in crude oil prices.

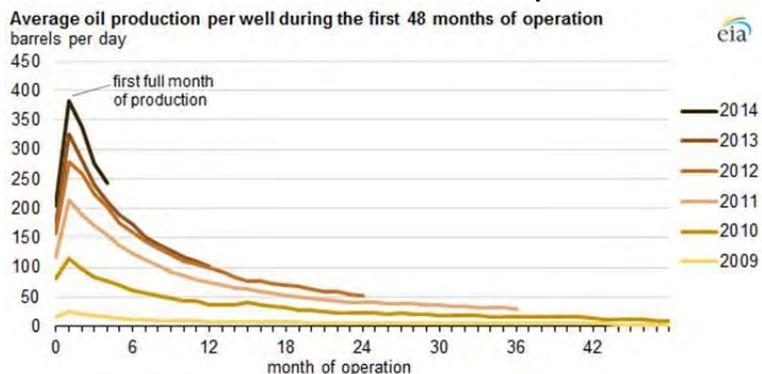
We note that NGL pricing during 2009-2014 was much closer to the oil price in the early years, with the spread widening beginning in the second half of 2011 and continuing until very recently. The easiest explanation for the widened price spread is the boom in NGL output observed in Exhibit 5. Again, as pointed out in the *Wall Street Daily* article, NGL production is above three million barrels per day, a 60% increase over the past decade. Both ethane and propane are now above one million barrels per day, due to strong pricing. The recent rapid decline in the crude oil price, as well as in the price of natural gas, is contributing to the narrowing of the spread between crude oil and NGL prices. If natural gas prices were to increase in response to the colder winter weather, some NGL production might not be stripped from the gas stream as some gas contracts pay the producer based on the heat content of the natural gas delivered, which is higher when the NGLs are left in the flow than without them.

Our conclusion is that the continued growth in natural gas output has largely been due to the rise in crude oil prices that have contributed to a dramatic increase in NGL output, which has encouraged producers to seek out those shale formations where liquid (NGL) content is the greatest. The incentive to continue drilling for NGL-rich natural gas may ease with sustained lower crude oil prices. On the other hand, mitigating that outlook is the possibility of higher NGL prices as a result of the startup of the new and expanded petrochemical plants coming on stream during 2015-2018.

The NGL factor has been an important driver for natural gas production growth. However, there is no equivalent secondary driver for crude oil production. Future crude oil production growth will depend on new well drilling and the productivity of those new wells, as well as the production performance of recently drilled and completed oil wells. All of that production will be measured against oil prices and if found profitable will continue. If uneconomic, it will stop. New and improved drilling and completion technology may

improve future well output, but it is impossible to forecast those developments. The record shows that initial well output has increased over time, and decline rates have become slightly less steep. That means new wells are producing greater oil volumes in the first four years of existence.

Exhibit 6. Shale Well Performance Has Improved Over Time



Source: EIA

We do not believe you can assume that oil production will grow for years following a peak in the oil rig count as has happened with natural gas because there is no alternative for producing more oil than drilling more wells

What we don't know yet is whether the ultimate recoverability of oil from these wells has increased or are we merely producing the same reserves at a faster pace? These are important questions, for which there are no answers, only thoughts and guesses. Are those variables at a peak such that future well performance will not improve, or might it even decline, especially as we drill up the sweet spots in the shale formations? Or maybe technology will allow us to recover significantly more from these shale formations, as we know current recovery represents only a small percentage. Short of positive developments in response to these issues, there is no other source of oil production growth on the horizon short of producers significantly reducing their breakeven well costs. This explains the quick cost-cutting response of oil and gas companies and the intense pressure being leveled at the oilfield service companies. Based on current conditions, we do not believe you can assume that oil production will grow for years following a peak in the oil rig count as has happened with natural gas because there is no alternative for producing more oil than drilling more wells.

Oil Price Collapse Raises Many Important Questions

Our view is that demand has been more responsible for the changing crude oil market dynamics than supply growth

The oil price collapse in recent months has raised many questions as to its cause. If we know why the price dropped then we should be able to fix the problem, or at least that's a belief within the energy industry. As we have written recently, our view is that demand has been more responsible for the changing crude oil market dynamics than supply growth. Even among friends this is proving to be a debatable view. Everyone acknowledges that North American oil output growth – largely the result of the shale boom – is the primary

This supply growth has left little room for OPEC output increases

culprit in causing the global oil supply/demand equation to become unbalanced. The point made by those believing that oil supply growth has been the primary culprit in causing the oil price collapse is that virtually all global demand growth in recent years has been met by increased North American, and primarily U.S., oil output. This supply growth has left little room for OPEC output increases, and as some of the global oil supply that was previously off the market due to violence and geopolitical issues came back online, the oil market rapidly became oversupplied contributing to the drop in global oil prices.

The price rally has been associated with the release of better U.S. economic news, in particular robust employment growth, along with an improving set of economic data for Europe

U.S. oil prices have recently rallied from the low \$40's a barrel to the low \$50's, with a very high degree of volatility. The price rally has been associated with the release of better U.S. economic news, in particular robust employment growth, along with an improving set of economic data for Europe, especially for the continent's largest economies – Germany and France. Recent statistics for Japan are showing it may be emerging from its 15-year long economic slumber, which is an additional economic positive. On the other side of the ledger is less encouraging economic news emanating from China and several of the other BRIC countries. Russia has fallen into a recession as a result of the collapse of oil prices and the imposition of sanctions in response to its belligerent actions in Crimea and Ukraine. Both Brazil and India are also struggling economically, partly due to poor economic policies, but also political scandals. On balance, it looks like the countries showing better economic performance should be contributing to a global energy demand growth, especially given the decline in global oil prices. That view is supported by the actions of all the oil market monitoring organizations that have recently increased their 2015 oil consumption forecasts.

Improving oil demand is a good thing. Limiting oil supply growth, and eventually shrinking it, becomes very important for a recovery in oil prices, although one has to wonder at what point on the upward price curve we can expect to see a resumption in new well drilling and a subsequent surge in oil output that would stop and possibly reverse the rise in oil prices.

Mr. al-Naimi reportedly asked, “Is there a Black Swan that we don’t know about which will come by 2050 and we will have no demand?”

A series of recent economic and energy industry analyses and data points suggests that possibly all of this good economic news won't be enough to drive energy prices higher on a sustained basis. An article by Liam Denning of *The Wall Street Journal* recently highlighted Black Swans and the oil industry. The thrust of the article picked up from a question asked by Saudi Arabian Oil Minister Ali al-Naimi at a recent conference. Mr. al-Naimi reportedly asked, “Is there a Black Swan that we don't know about which will come by 2050 and we will have no demand?” This is an interesting question for the oil industry (certainly a hope of the environmental community) and Saudi Arabia. Mr. Denning suggested that the Saudi oil minister was more than likely referring to potentially

All the five-year projected demand growth forecasts made by the IEA since 2010 are lower

disruptive trends such as new technologies and efforts to limit carbon emissions, but Mr. Denning suggested that there may be other Black Swan issues.

Mr. Denning thinks the critical issue for understanding what may be happening with the trend for oil demand is how it is shifting. He pointed to the history of the International Energy Agency's (IEA) medium-term oil demand growth forecasts. The recently released IEA report projects global oil demand will increase by 6.6 million barrels a day by 2020, a healthy growth. However, compared to the same report's forecast made in 2014, demand now will be one million barrels a day less than the earlier forecast. Generally, all the five-year projected demand growth forecasts made by the IEA since 2010 are lower. (See the left-hand chart in Exhibit 7 on page 11.) Mr. Denning also pointed to the change in the future oil demand estimate made by Exxon Mobil Corp. (XOM-NYSE) in its recent outlook. The company sees global oil demand reaching 117 million barrels a day by 2040, but in 2007 it projected this same level of demand would be reached in 2030!

The most recent forecast not only cut the demand growth estimate, but now it expects only 63% to come from the BRIC nations

Equally important is where that oil demand growth will be centered. According to Mr. Denning, three years ago the IEA projected demand would grow by 3.86 million barrels a day between 2015 and 2017, and they foresaw 79% of it arising from the BRIC nations. The most recent forecast not only cut the demand growth estimate, but now it expects only 63% to come from the BRIC nations.

It is difficult to expect the same driving response to lower oil prices as experienced in the 1980's and 1990's when our population was younger, the working population was growing and vehicles were less fuel-efficient

The IEA also sees a greater role for the U.S. as the agency now sees demand growing by 380,000 barrels a day by 2019 after abandoning its long-held view that U.S. demand growth was locked into a pattern of steady decline driven by aging population and more efficient use of oil in the economy. As the U.S. economy is recovering and vehicle driving is growing, oil demand is on the rise. However, it is difficult to expect the same driving response to lower oil prices as experienced in the 1980's and 1990's when our population was younger, the working population was growing and vehicles were less fuel-efficient. The slowing of China's economy and its improved oil-efficiency should also concern oil producers.

According to a study by two economists with Bank of America Merrill Lynch, the world's economy will shrink by \$2.3 trillion this year when measured in current dollars

This leads to a couple of other troubling forecasts reported on in Randall Forsyth's column in *Barron's*. His column dealt with the growing phenomenon of global currency wars, which are becoming a prime issue especially within the Eurozone. According to a study by two economists with Bank of America Merrill Lynch (BoAML), the world's economy will shrink by \$2.3 trillion this year when measured in current dollars. In real terms, the world's economy will grow by 3.5% in 2015, up from the 3.3% growth estimated for 2014. The shrinking of the economy is due to the strength of the U.S. dollar, which is a serious problem for many countries. As Mr. Forsythe puts it, "The rub is that we live in a nominal world, with debts and expenses fixed in nominal terms. So, the world needs nominal

The countries that were the first to engage in monetary easing, in this case the break with the gold standard, recovered the fastest

There have been some 514 monetary easing moves by central banks over the past three years

We are also seeing moves by the Chinese government to ease its monetary policy to help bolster its local and regional governments and their banks to offset the flow of currency out of the country

dollars to meet these nominal obligations.” In the BoAML forecast, only the United States and emerging Asia will show “growth this year in nominal-dollar terms.”

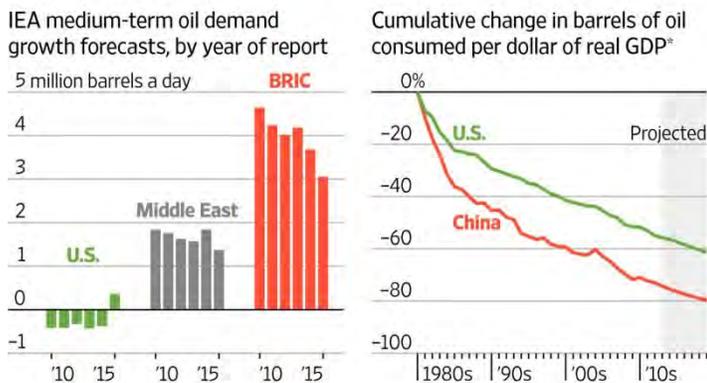
A contributing factor for the weak economic activity in recent years has been countries holding the line on their currencies. That attitude may be changing, which could be good news for energy demand as currency devaluations are designed to pump up economies. According to a study written by economic historian Barry Eichengreen of the University of California, Berkeley, the countries that were the first to engage in monetary easing, in this case the break with the gold standard, recovered the fastest. In 1931, it was Britain that broke from the gold standard first and the first nation to recover. Today, we are relearning this history.

Since the U.S. was the first country to engage in massive monetary easing in 2008, our economy was the first to recover. As counted by investment bank Evercore ISI, there have been some 514 monetary easing moves by central banks over the past three years. According to Morgan Stanley’s (MS-NYSE) global strategists, there are now 12 central banks around the globe that have recently moved to ease their monetary policies. As this was happening, U.S. monetary authorities are discussing increasing interest rates and in effect becoming the recipient of deflationary pressures driven out by those countries easing their monetary policies. Because China has tied its currency to that of the United States, it will also receive deflation.

The prospect of raising interest rates in the U.S. has led to a strengthening of the dollar, which has been a contributing factor to the fall in oil prices and other commodity prices. As pointed out by the Morgan Stanley analysts, not everyone can be a winner in the currency wars. Therefore, there will be one or more losers, with the U.S. and China on the short end of the stick right now. Given the recent weakening statistics in retail sales, home building and now certain regional manufacturing data in the U.S., one wonders whether the Federal Reserve will not hike interest rates this year as broadly expected. We are also seeing moves by the Chinese government to ease its monetary policy to help bolster its local and regional governments and their banks to offset the flow of currency out of the country. Being tied to the U.S. dollar, the renminbi has had an upward bias as the dollar has strengthened. That trend induced Chinese companies to borrow outside of the country expecting to be able to pay off the loans with cheaper local currency. Now, the renminbi continues to weaken within a very tight band in response to the currency outflows. China monetary authorities struggle with whether to weaken its currency and stimulate economic growth, but that move runs the risk of leading to an increase in corporate bankruptcies. Is it possible that we could soon see every country engaged in monetary easing trying to promote its own economic self-interest? What would that mean for future energy demand and oil prices?

Exhibit 7. IEA Forecasts Reflect Weakening Demand Outlook

Slow Burn



Sources: International Energy Agency; International Monetary Fund

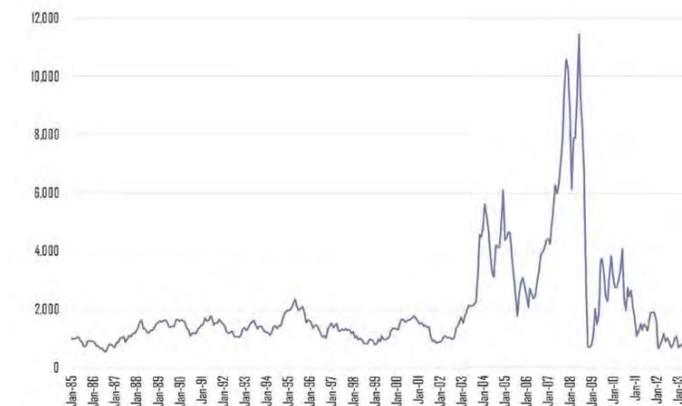
*Using current exchange rate.
THE WALL STREET JOURNAL

Source: **WSJ**

In our view, there is much to be gained from monitoring the BDI, but we do not believe it is necessarily a predictor of future economic activity

Two other disturbing trends about global economic activity are visible within the shipping world. The Baltic Dry Index (BDI), a measure of the cost for transporting raw materials around the world, fell last week to a new low, surpassing the index's historical low recorded in 1986. Some analysts have speculated that the new index low point, based on its long-term historic pattern, may be signaling an impending recession. In our view, there is much to be gained from monitoring the BDI, but we do not believe it is necessarily a predictor of future economic activity. It is, though, a reflection of current economic activity around the world.

Exhibit 8. History Of The Baltic Dry Index Shows Bust



Source: Bloomberg; BDIY:IND. Value as of first business day of the month.

Source: **Seeking Alpha**

The BDI was created in 1986 and replaced the Baltic Freight Index, which was a more broadly-based shipping index as it encompassed ships hauling commodities along with those moving finished goods,

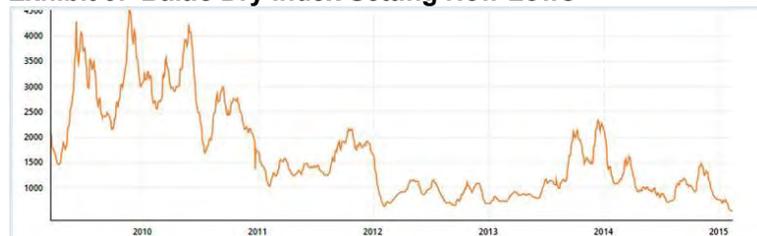
The BDI often tells us more about how optimistic or pessimistic shipowners were in the past about cargo demand in the present than anything else

In the case of China, its coal-cargo imports in 2014 were down 10%, at 238.8 million metric tons, from 2013's level, which in turn reflected a 16% increase over 2012

which often operate in very different cycles. The BDI measures the cost per day to charter a ship for moving dry cargoes such as iron ore. The index's value is heavily influenced by the size of the available fleet relative to current demand. As someone pointed out, the BDI often tells us more about how optimistic or pessimistic shipowners were in the past about cargo demand in the present than anything else. If they built too few or too many ships relative to current demand, shipping charter rates would be either higher or lower. While certainly a valid observation, it is important to note that shipping demand is captured broadly by the BDI so it does provide some information about current activity. Since the BDI deals with raw materials, which are the lifeblood of manufacturers, increases or decreases in the index may reflect optimism or pessimism among manufacturers about their future business.

Since the BDI replaced an older index, there are questions about how its determination may have changed over time. A Norwegian shipping analyst has calculated that if the current methodology for calculating the index had been used in 1986, the low would actually have been 433, or nearly 100 points below the current low reading. Regardless, the BDI's low level in recent years, despite the current oversupply of ships, shows a slowly growing global economy, which is certainly supported by many other economic statistics. The higher levels for the index in 2009 and 2010 shows the impact of the world's economies recovering from the global financial crisis of 2008 and the following recession in 2009. From the point of view of conveying a visual message about the world economy, the conclusion we take away is that economic activity has yet to really recover. What we also know is that in the case of China, its coal-cargo imports in 2014 were down 10%, at 238.8 million metric tons, from 2013's level, which in turn reflected a 16% increase over 2012. A slowing Chinese economy cannot be good news for either the dry bulk shipping business or global economic activity.

Exhibit 9. Baltic Dry Index Setting New Lows



Source: Seeking Alpha

Adding further to the question of the health of Asian economies is information showing how the liquefied natural gas (LNG) market has changed. At the start of 2014, spot LNG prices in Northeast Asia (NE Asia) were pegged at around \$19 per million BTUs (MMBtus). The combination of mild weather, well-supplied customers and plenty of spot LNG cargos took its toll on prices, sinking spot prices

to \$9.50-\$10/MMBtus. As 2015 opened, LNG spot prices were stable compared to late 2014, but long-term LNG prices had eased to \$15/MMBtus. With global oil prices continuing to fall, it takes about 4-5 months for that trend to influence the long-term LNG contracting market. Long-term LNG prices are likely headed lower.

Exhibit 10. NE Asia LNG Prices Falling With Oil Prices

MONTHLY NE ASIAN SPOT AND LONG TERM LNG PRICES



Source: METI, PAJ, TR



Source: *Thomson Reuters*

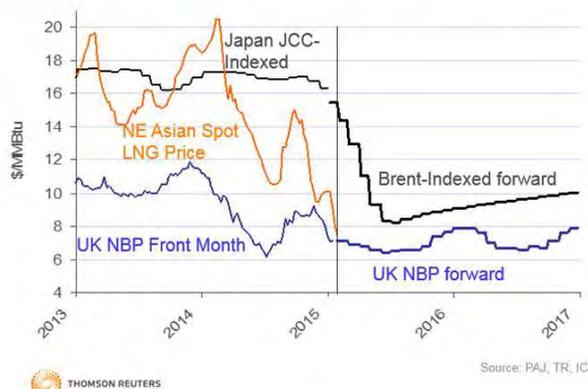
If global oil prices settle out at current levels, this will bring NE Asia LNG prices down closer to the spot LNG prices and in-line with the \$11/MMBtu gas price for Russian gas delivered in China

This convergence in global LNG prices will have significant implications for the constructors and planners of new LNG export terminals around the world

Additional LNG supplies came on the market in 2014, primarily from Papua New Guinea, along with additional volumes from Nigeria. Estimates are that total LNG supply in 2014 increased by approximately 7-8 billion cubic meters per year. Starting now, four new LNG export facilities in Australia will begin shipping, reaching their maximum capacity by the end of 2016. In total, these four terminals will add as much new capacity as South Korea’s LNG imports in 2013, the world’s second largest LNG importer. If global oil prices settle out at current levels, this will bring NE Asia LNG prices down closer to the spot LNG prices and in-line with the \$11/MMBtu gas price for Russian gas delivered in China, as agreed to in the two pipeline deals entered into by those two countries last summer.

As NE Asia LNG prices have come down, they are now much closer to the prices for gas delivered into the UK. This convergence in global LNG prices will have significant implications for the constructors and planners of new LNG export terminals around the world. This is particularly important for North American LNG export terminals that have been counting on the arbitrage between cheap gas on this continent and high landed-prices in Western Europe and NE Asia. If global crude oil prices stay around current levels, then natural gas prices in North America are probably capped at about \$4 per thousand cubic feet, after which they will become uneconomic as LNG exports. On the other hand, if oil prices jump back to the

Exhibit 11. Global Natural Gas Prices Approaching Parody UK & NE ASIA, NARROWING PRICE DIFFERENTIAL



Source: Thomson Reuters

\$80-\$100 price range and the oil-linkage in the pricing for LNG term contracts is not broken, North America may retain more LNG export opportunities, but they probably still will not be as great as planners thought even as late as last spring.

According to ship brokers, an estimated 10% of the 400 LNG tankers in the world are currently unused because of the slowing growth in Asia's largest economies

Compared to a year-ago, and partly due to the oil price decline, the Asian price premium over Europe has dropped from over \$10/MMBtus to a discount of greater than \$1.50/MMBtus

The most disturbing trend, however, is the news that over a dozen LNG tankers are parked, many idled for a long time, in and around Singapore. This is a reflection of a global slowdown in the world gas market. According to ship brokers, an estimated 10% of the 400 LNG tankers in the world are currently unused because of the slowing growth in Asia's largest economies. One ship broker identified 15 LNG tankers idled either in Singapore or in neighboring Malaysia, or off the island of Batam, Indonesia. These 15 ships have a combined capacity of 2.26 million cubic meters of LNG, or enough gas to satisfy two weeks' worth of Singapore gas demand.

Singapore occupies a unique location between producers in the Middle East, Australia and the Atlantic basin and large LNG consumers in Japan, South Korea and China. Therefore, most tankers stop in Singapore to take on fuel and undergo repair and maintenance work. The location may be playing a more strategic location since LNG pricing has changed over the past year, altering LNG shipping patterns. Compared to a year-ago, and partly due to the oil price decline, the Asian price premium over Europe has dropped from over \$10/MMBtus to a discount of greater than \$1.50/MMBtus. This premium reversal makes it unattractive to ship LNG between the two regions and has eroded LNG tanker demand. According to local LNG buyers, LNG spot prices are now down to \$6.90/MMBtus versus over \$20/MMBtus a year ago. At this point, the benchmark British LNG price is about \$8.50/MMBtus. With the expected startup of several Japanese nuclear power plants later this year, Asian LNG demand will suffer, as it also will with China's economy growing at the slowest rate in decades.

The “beggar-thy-neighbor” currency policies that helped deepen and extend the Great Depression of the 1930’s are now being relearned and replayed

Taken together, the data shows that the global economy continues to struggle with limited confidence it can accelerate. The “beggar-thy-neighbor” currency policies that helped deepen and extend the Great Depression of the 1930’s are now being relearned and replayed. This means that economic growth will be spotty and yield distorted results globally. We would not be surprised to see the IEA’s next five-year oil demand forecast to be released in early 2016 showing another reduction in global demand. Whether all of this fits Mr. al-Naimi’s vision of a Black Swan or not, we don’t know, but we believe the lack of robust oil demand growth is of prime concern for the Saudi government. This scenario suggests limited upside for oil prices other than sporadic spikes in response to geopolitical or industry accidents, unless we drive drilling and production much lower than most experts anticipate happening.

How Are Immigration And Offshore Regulation Similar?

The court decision put in place an injunction preventing the DHS from implementing DAPA and the three modifications to the DACA program outlined in the DAPA Memorandum issued by DHS Secretary Jeh Johnson

The nation is buzzing about the recent decision of U.S. District Judge Andrew Hansen in the federal district court in Brownsville, Texas, stopping the Obama administration’s Deferred Action for Parents of American and Lawful Permanent Residents (DAPA) program that would provide legal residence to over four million individuals who are currently in the country illegally, and would enable these individuals to obtain a variety of both state and federal benefits, in particular the right to work. This program is an extension of the 2012 Deferred Action for Childhood Arrivals (DACA) program that enabled teenagers and youths born outside of the United States, brought into the country by their parents and raised here, to apply for deferred action status (meaning they would not be deported) and be given employment authorization. The court decision put in place an injunction preventing the Department of Homeland Security (DHS) from implementing DAPA and the three modifications to the DACA program outlined in the DAPA Memorandum issued by DHS Secretary Jeh Johnson.

The people wanted the bureaucrats who controlled the implementation of the laws to be restricted from arbitrarily changing how the laws were implemented

The initial media reporting and commentary about the court ruling focused on the issue of the legality of President Barack Obama’s immigration action. It was not until the following day after legal reporters had read the 123 page decision that the commentary shifted to the legal point of the implementation of the policy violating the Administrative Procedure Act (APA) that governs the process under which agencies of the federal government must adhere to when making changes to their prior interpretations of legislation. The APA was enacted in 1946 when the public and Congress, reacting to the growth of government during the Depression and World War II, determined that the nation needed protection against the larger and more invasive government. The people wanted the bureaucrats who controlled the implementation of the laws to be restricted from arbitrarily changing how the laws were implemented.

If those individuals are not forced to leave the country, DAPA then requires that they be given certain tax and income benefits and rights, in particular the right to be employed legally

On the night the judge's ruling was issued, we were tipped off to its legal basis by an article posted on a web site. The article pointed to two key points in the decision: the question of the legal standing of the parties suing the federal government, and whether the implementation of DAPA violated the APA. The judge conducted an extensive analysis of the standing issue for the 26 states who had filed the suit. He determined that at least one state, Texas, had demonstrated that it had actually incurred harm and was likely to incur even greater harm in the future from the DACA and DAPA programs and therefore was entitled to take its case forward to trial. The judge also concluded that the workings of the DAPA plan mandated specific decisions and actions be taken by DHS employees implementing the Act's provisions, and thus they were not given the "discretion" set forth in the policy statement of the DAPA Memorandum. Given that conclusion, the question then became whether or not the issues are "substantive." On that point, the judge determined that the discretion afforded to DHS employees relates to the issue of them determining, on a "case-by-case" basis, whether the individuals are to be deported. If those individuals are not forced to leave the country, DAPA then requires that they be given certain tax and income benefits and rights, in particular the right to be employed legally. That mandate, the judge ruled, required that DAPA be subject to the APA process. That process is spelled out in section 553 of Title 5 of the United States Code. The relevant details are that:

"(b) General notice of proposed rule making shall be published in the *Federal Register*, unless persons subject thereto are named and either personally served or otherwise have actual notice thereof in accordance with law. The notice shall include -

"(1) a statement of the time, place, and nature of public rule making proceedings;

"(2) reference to the legal authority under which the rule is proposed; and

"(3) either the terms or substance of the proposed rule or a description of the subjects and issues involved."

The problem is that this nearly 70-year old law is what has maintained a level playing field for government agencies and the people impacted by its regulations

This legality is being dismissed by many liberal commentators as being an arcane law, or as Ruth Marcus, a political columnist with *The Washington Post*, described it a "Yawn." The problem is that this nearly 70-year old law is what has maintained a level playing field for government agencies and the people impacted by its regulations. APA prevents bureaucrats in federal agencies from changing decades-old rules and procedures at their whim, assuming they have a different agenda than the existing policy comports. Even if the Fifth Circuit Court of Appeals overturns Judge Hansen's ruling, the conflict virtually guarantees it will advance to the Supreme Court adding further delay to the implementation of DAPA. An

The government claimed that this regulatory right had always existed under the Outer Continental Shelf Lease Act

article in last Thursday's *New York Times* highlighted the problem the Obama administration was having in deciding whether to appeal the ruling or to comply with it and go through the APA steps. In either case, there is risk of delay and possibly even the rejection of DAPA entirely. Late Friday afternoon, the government announced it planned to ask for an emergency restraining order that would overturn the injunction and enable the government to immediately begin implementing their immigration plan.

So what does this have to do with offshore regulation? Some may remember that in 2011, a year after the BP Macondo oil spill in the Gulf of Mexico, the Department of the Interior moved to extend its regulation of offshore oil and gas companies' operations to the service companies working for them. The government claimed that this regulatory right had always existed under the Outer Continental Shelf Lease Act (OCSLA), although for the past 50 years it has never exercised the right.

That legislative history suggests that the idea of regulating service companies had been considered and was rejected by Congress

A debate developed about the legality of the government's action with some lawyers arguing that the right was embedded in the law. Other lawyers argued that this power did not exist because the legislative history of OCSLA showed that in its drafting, the term offshore contractors had been removed from the final draft of the bill that ultimately became law. That legislative history suggests that the idea of regulating service companies had been considered and was rejected by Congress. Therefore, the government's extension of regulation to the offshore service industry could legally be considered over-reach. These lawyers argued that the offshore service industry should challenge the Interior Department over its ruling. In the least, however, the offshore service industry should demand that the Department of the Interior comply with the APA procedure so that the offshore service companies could provide input into what would be regulated and how the regulations would be implemented. We were a proponent of the latter position, not because we were sure about the legal right for extension of the regulation, but because offshore service company managements should help shape the rules they will be forced to comply with.

By having failed to push back at the time, the offshore service industry now lacks the ability to realistically modify those rules, which at the moment remain undefined

There were a few industry/lawyer meetings dealing with the issue of appealing or forcing the agency to comply with APA. We wrote a series of articles discussing the risk for the industry in not challenging this regulatory extension, which failed to stir up much positive response. As a result, by having failed to push back at the time, the offshore service industry now lacks the ability to realistically modify those rules, which at the moment remain undefined. Offshore service companies remain at risk of being charged with violations of offshore regulatory practices that they did not know they were violating at the time because the existence of the regulations is unknown. When might this regulation become a problem for an offshore service company? Who knows when it will happen, but hopefully it will never happen. What we do know, however, is that

when that day does arrive, management will express sincere regret for not challenging the government.

The offshore service industry needs to fight its own battles in order to ensure that its interests are fairly represented

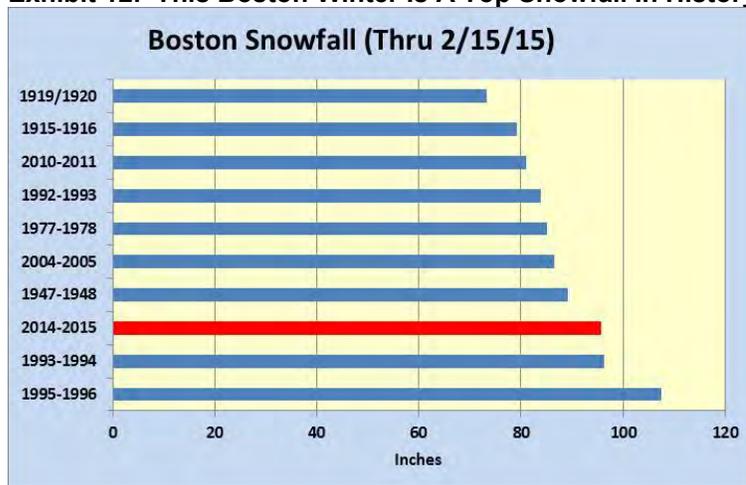
The derailing of the highly-political battle over the current and future U.S. immigration policy by the administration’s failure to comply with the provisions of the APA should be a lesson to offshore service company managements that they should not rely on the beneficence of their oil company customers when it comes to dealing with government regulation. The offshore service industry needs to fight its own battles in order to ensure that its interests are fairly represented.

New England Snowmageddon: Better To Laugh Than Cry

This winter marks the third snowiest for Boston since records began to be kept in 1872

Since late January, the northeast region of the country has been hammered with virtually constant winter storms and now bitter cold temperatures. While the intensity of the storms has differed in parts of the region, the Boston area and southern New Hampshire, Vermont and Maine have been particularly hard hit. Valentine’s Day weekend marked the third weekly storm to hit the region. A chart posted on Facebook on February 8th showed that prior to January 23rd, Boston had experienced 5.5-inches of snow this winter. Between then and February 8th, the total was 53.3-inches, meaning that for the winter up until then, Boston saw 58.8-inches of snow. Since the start of February and through President’s Day, the city experienced several major snow storms making this the snowiest month on record with 45.5-inches, surpassing the old record of 43.3-inches set in January 2005. This winter marks the third snowiest for Boston since records began to be kept in 1872.

Exhibit 12. This Boston Winter Is A Top Snowfall In History



Source: *Weather.com*

Until last week’s storm, Boston’s snowfall accumulation put this winter in the middle of the list of the top 10 winter snowfall

If one looks at the list of top 10 snowfall totals for Boston, it looks like seven of the 10 would have been within the memory of Mayor Walsh

accumulations in history. Now, Boston's winter snowfall total is the third snowiest on record. We must admit that we laughed when, at the time of the previous snowstorm, we read comments by the Boston mayor. On February 9th, Boston Mayor Marty Walsh told reporters, "We've never seen this type of snow in the city of Boston at any other time in the history of our city." Oh really? If one looks at the list of top 10 snowfall totals for Boston, it looks like seven of the 10 would have been within the memory of Mayor Walsh. At the time he made his statement, the city was breaking the record for the most snow in a 30-day period with 62.5-inches, but it was only just passing the previous record established in 1978. Wasn't the 1970's when scientists were concerned about global cooling?

Exhibit 13. Clearing Snow At Boston's Logan Airport



Source: wsocvtv.com

To hopefully defuse the tension, the police department posted on its Facebook page that a warrant had been issued for the arrest of Punxsutawney Phil, depicted as the gopher from the 1980 film *Caddyshack*

As people further north of Boston began digging out following the February 9th snowstorm, tempers began flaring out of frustration with the winter and the recurring snowstorms. There were reports in the small town of Merrimack, New Hampshire (population 25,000) of disputes among neighbors that necessitated police response over the use of snowblowers to clean driveways and sidewalks. To hopefully defuse the tension, the police department posted on its Facebook page that a warrant had been issued for the arrest of Punxsutawney Phil, depicted as the gopher from the 1980 film *Caddyshack*. Gophers and groundhogs, while not the same animal, do resemble each other.

The Merrimack Police said they have never issued a warrant for an animal

Phil is wanted on the charge of "deception." The claim relates to Phil's recent forecast of another six weeks of winter, but people are upset that he failed to warn them about the amount of snow they would receive. The Merrimack Police said they have never issued a warrant for an animal, but they are determined to bring him to justice even if it means crossing state lines. Lt. Denise Roy of the

Exhibit 14. The Facebook Posting Of Phil’s Arrest Warrant



Merrimack Police Department
February 10 at 3:28pm · 🌐

We know we are a day early, however we here at Merrimack Police felt compelled to let the public know that there is a warrant for Punxsutawney Phil! We have received several complaints from the public that this little varmint is held up in a hole, warm and toasty. He told several people that Winter would last 6 more weeks, however he failed to disclose that it would consist of mountains of snow! If you see him, do not approach him as he is armed and dangerous. Call Merrimack Police, we will certainly take him into custody!



Source: mynews13.com

She hoped he would be found in Florida or Arizona – at least someplace warm

Merrimack Police Department told *Boston.com* that while Phil is known to reside in a burrow in Pennsylvania, she hoped he would be found in Florida or Arizona – at least someplace warm. The warrant prompted Pennsylvania Governor Tom Wolf (D) to tell the Merrimack Police Department to drop its “cold hearted plan to arrest Phil.”

Exhibit 15. Merrimack Police Need A Better Sketch Artist



Source: abcnews.go.com

"If I've learned one thing over the course of the past two weeks, it's (that) Mother Nature makes the rules."

A week ago, the employees at Gunstock Mountain Resort in New Hampshire offered Phil asylum in recognition of the great snow conditions he has predicted. According to their Facebook posting, the resort is prepared to work with the Belknap County Sheriff's office to provide safe passage to the county-owned 2,000 acres of fun. They pointed out that "Spring will be here before you know it....but now it's time to enjoy some of the best snow New Hampshire has seen in years!" While all of this was a humorous attempt to ease the frustration of a difficult winter in that part of the country, we thought Massachusetts Governor Charlie Baker (R) made one of the most astute observations when he said, "If I've learned one thing over the course of the past two weeks, it's (that) Mother Nature makes the rules." There are scientific reasons why this weather pattern has developed, but that's for another article.

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