

CRS Report for Congress

Received through the CRS Web

Oil and Gas: Supply Issues After Katrina and Rita

Robert L. Bamberger and Lawrence Kumins
Resources, Science, and Industry Division

Summary

In anticipation of Hurricane Rita, which made landfall early September 24, U.S. refining operations totaling 4.8 million barrels daily (mbd) along or near the Texas coast were shut down. At the end of September, 2.2 mbd remained shut. An additional 900,000 mbd of refining capacity remains shut owing to Hurricane Katrina, which made landfall on August 29, 2005. Some refineries could restart if electric power were restored; other refineries will require repairs to damaged facilities. The hurricanes have also affected oil and natural gas production. By early October, roughly 94% of oil production and 75% of natural gas production in the Gulf of Mexico remained shut-in. Operating platforms in the path of the storms, which number 2,900, were evacuated. Some offshore production is expected to resume during the week of October 3. Some of the pipelines that transport crude oil, gasoline, and other products to the East and Midwest have resumed operation, but the several days' loss of oil and natural gas production, along with oil refining and transportation of both oil and gas, have made for tight supply and sustained high prices. These conditions will likely grow significantly worse if refineries along the Texas coast cannot be restarted quickly, and concern grows about the price of winter fuels. This report will be updated. Most of the information cited in this report is from the trade press, the Minerals Management Service, and the Energy Information Administration.

Hurricanes Katrina and Rita shut down oil and gas production from the Outer Continental Shelf in the Gulf of Mexico, the source for 25% of U.S. crude oil production and 20% of natural gas output. In anticipation of Hurricane Rita, roughly 4.7 million barrels per day (mbd) of refining capacity was shut in the Houston/Texas City, and Port Arthur/Lake Charles areas of Texas and Louisiana. By the beginning of October, 2.2 mbd of refining shuttered by Hurricane Rita remained shut. Additionally, four oil refineries in Louisiana and Mississippi that provide 900,000 barrels per day of petroleum products were seriously damaged by Hurricane Katrina, and will not restart for several more weeks. This means that, at one time, roughly one-third of U.S. refining capacity was shut down. Damage to refineries caused by Rita in the Port Arthur/Lake Charles region continues to be assessed; however, a lack of electric power is in some instances the major impediment.

As of early October, 2.2 mbd of refining capacity in this region remains closed owing either to physical damage, lack of power, or both.

On September 29, the Coast Guard invited a *Platts Oilgram News* reporter on a reconnaissance flight to observe the damage from Rita.¹ They flew over the ExxonMobil 348,500 barrel refinery at Beaumont, which had been flooded by the storm. The refinery flared black smoke from several towers and other refinery infrastructure appeared downed. A complete assessment of the facility is underway, and Entergy, the electric utility provider, indicated that service would be restored to this refinery shortly, noting that the ExxonMobil refinery is the only one of the seven knocked off line in its service territory that is ready to accept electric power.

Transportation facilities, including the Colonial and Capline pipelines in Louisiana, were also shut in anticipation of Hurricane Rita. Much of the product from Gulf refineries is transported by pipeline for the East Coast and Midwest — these pipelines are not operating at full capacity, because of lack of input or problems with electric supply. Crude oil is transported to the Midwest via the Capline pipeline. The Colonial Pipeline is operating at 66% of capacity. In some instances, capacity is constrained by inadequate supply to transport, reflecting the production and refining capacity in the Gulf that remains offline. Spot shortages of gasoline along pipeline routes are possible, and shortages could be prolonged if refinery runs along the Texas coast cannot be restarted quickly. Owing to tight supplies of gasoline, the price of gasoline is no longer directly linked to changes in crude oil prices.

On August 31, Secretary of Energy Bodman announced that the Bush Administration was authorizing releases of Strategic Petroleum Reserve (SPR) crude oil. Seven refiners have requested loans of crude oil totaling more than 13 million barrels. The release of SPR oil and the announcement on September 2 from the International Energy Agency (IEA) of a coordinated drawdown of 60 million barrels of crude and refined products calmed markets by early in the week of September 5. This supply apparently has begun to arrive, and is reflected in increasing gasoline inventories. Prices fell as low as \$2.75/gallon in the middle of September; most recently they stood at \$2.82. There have been predictions that gasoline could spike over \$4/gallon.²

However, as noted earlier, recovery from the hurricanes' effects will depend upon resumption of production and refining operations in the Gulf, and the ability to transport petroleum products.³ At the end of September, roughly 900,000 barrels of refining capacity at four plants in the Gulf remained completely shut down after Hurricane Katrina; another 2.2 mbd remained down because of Hurricane Rita.

¹ Platts Oilgram News, *Fly-Over of Gulf Oil Infrastructure Shows Long Road to Recovery*, September 30, 2005, p 5.

² Global Insight, *At Risk: Oil and Gas Supplies and Economic Performance*, September 23.

³ For additional information, see CRS Issue Brief IB87050, *The Strategic Petroleum Reserve*, by Robert L. Bamberger.

Factors Affecting Oil and Natural Gas Supply

- *Outer Continental Shelf (OCS) Production.* Natural gas and petroleum production in the Gulf has been slow to come back. Roughly 94% of oil production (7% of U.S. oil consumption) was offline as of the beginning of October, as was 75% of gas output (6% of U.S. gas consumption).⁴ Many of the 2,900 operating platforms in the hurricanes' paths were evacuated and shut down; 35 were destroyed and 16 badly damaged. Some production is expected to resume the week of October 3.
- *Lack of Alternative Gas Supplies.* OCS natural gas supply losses are not easily made up by imports because additional supply possibilities from Canada and from liquefied natural gas (LNG) are limited. There is no Strategic Petroleum Reserve (SPR) for gas.
- *Crude Oil Imports.* About 2.5 mbd of crude oil imports — including 0.9 mbd by way of the Louisiana Offshore Port (LOOP) — flow through impacted ports in Louisiana, Mississippi and Alabama. This constitutes more than 12% of petroleum consumption.⁵ LOOP was operating at full capacity when it was shut down again as a precautionary measure in anticipation of Hurricane Rita. It is reportedly operating at 100% capacity, having escaped more damage from Rita. Other Gulf Coast ports through which oil imports flow have resumed operation, except for Port Arthur, which can accept barge traffic only during daylight hours. The Mississippi River is open with some restrictions.
- *Pipeline Transport of Crude Oil and Refined Products.* Pipelines from the Gulf to the Midwest and East Coast have been affected. The Colonial and Plantation Pipelines — serving the whole East Coast with refined products — resumed operation not long after Hurricane Katrina. However, they were shut down again by Hurricane Rita. By early October, the Capline pipeline, which supplies crude oil to the Mid-continent, was operating at 80% of capacity. The Colonial pipeline, which supplied refined product, was operating at 66% of capacity. Lack of inputs may, in part, be limiting shipments.
- *Damage to Offshore Natural Gas Pipelines.* The extent of damage to underwater gas pipelines and gathering systems is still being assessed. Analysts following storm recovery have been unable to develop a clear picture of pipeline damage, noting that lack of information likely indicates problems. One report notes that MMS continues to decline to provide details about offshore pipelines and platforms, noting that one pipeline had confirmed a line which had been severed and displaced and another gathering platform and associated piping had significant damage. Other facilities surveyed revealed “the majority of the measurement and

⁴ Energy Information Administration, *Special Report — Hurricane Katrina's Impact on U.S. Energy*, at [http://tonto.eia.doe.gov/oog/special/eia1_katrina.html], frequently updated.

⁵ Ibid.

electronic equipment in the area had been damaged or destroyed.”⁶ Spot prices at Henry Hub rose from a \$9.00 average⁷ in August to \$11.34 on September 15. They surged further, closing September at \$13.92, having traded in all time record territory, briefly exceeding the \$14.00 mark. Prices could rise even more if pipeline outages continue into the heating season.

- *Product Imports and International Energy Agency (IEA) Response.* On September 2, the IEA initiated a coordinated stock drawdown of 60 million barrels of crude and refined product stocks from Europe and Asia. Two million barrels were to be released daily.⁸ Gasoline imports have begun to reach the United States,⁹ reflected in rising gasoline inventories and lower pump prices, now well under the all-time high of \$3.06 set September 5.

Refineries

Four facilities having total capacity of about 900,000 barrels per day remain closed in the wake of Hurricane Katrina. These plants have been assessed and DOE has said they are expected to be down for an extended period. These four plants represent over 5% of the nation’s refining capacity and will be out of service for an indeterminate period. The facilities are:

- ExxonMobil/PDVSA’s 187,000 b/d plant at Chalmette, LA
- ConnocoPhillips’ 250,000 b/d plant at Belle Chasse, LA
- Murphy Oil’s 125,000 b/d plant at Meraux, LA
- Chevron’s 325,000 b/d plant at Pascagoula, MS

About 2.2 mbd of additional refining capacity in the Gulf remains shut owing to damage to refineries, and/or the electric utility infrastructure that supplies them with power. The major refineries include:

- Citgo’s 324,000 b/d plant at Lake Charles, LA
- Conoco Phillips’ 239,000 b/d plant at West Lake, LA
- ExxonMobil’s 349,000 b/d plant at Beaumont, TX
- Shell’s (Motiva) 285,000 b/d plant at Port Arthur, TX
- Total’s 234,000 b/d plant at Port Arthur, TX
- Valero’s 255,000 b/d plant at Port Arthur, TX
- BP’s 437,000 b./d plant in Texas City, TX.

⁶ Platts Oilgram News, *Numbers Belie Norton’s Optimism on US Gulf Damage*, September 14, 2005, p. 1.

⁷ Energy Information Administration, Short Term Energy Outlook. September 7, 2005.

⁸ Of that total, 30 million barrels was to be crude oil from the U.S. Strategic Petroleum Reserve. On September 14, DOE accepted bids on purchase of only 11 million barrels of the 30 million barrels that had been offered.

⁹ *IEA Releases Emergency Crude, Gasoline*, Oil Daily, Tuesday, September 6, 2005.

The shut-down of this much capacity for about a month will have a protracted impact on refined product inventories.

Electric Power¹⁰

At the end of September, more than 340,000 customers remained without power in Louisiana — more than 190,000 from Hurricane Katrina, and an additional 149,000 from Hurricane Rita. In Texas, 316,000 remained without electricity. Entergy expected to complete its assessment of its transmission system by early October, noting that nearly 250 transmission lines and a comparable number of substations remain out of service. Entergy reported in the first days after the storm that a major obstacle initially to restoring service was lack of food and water for its repair crews, many of whom were sleeping in their trucks. Priorities for crews have included restoring service for pumping, sanitation, medical, and housing facilities.¹¹ Entergy is reporting that it will be able to provide limited transmission service to the Port Arthur area during the week of October 3.

Relaxation of Motor Fuel Standards¹²

On August 31, 2005, Environmental Protection Agency (EPA) Administrator Stephen Johnson announced that EPA would temporarily waive certain gasoline and diesel fuel standards through September 15, 2005, in order to help increase available fuel supplies. For gasoline, EPA is waiving volatility standards that would otherwise prohibit the sale of gasoline produced for northern states in the South, or the sale of “winter” gasoline in the summer months. This waiver — which was extended until early October — was intended to make it possible for gasoline normally prohibited in certain areas to be transported to those areas in response to supply limitations. EPA has also waived sulfur standards for diesel fuel, so that fuel produced for non-road uses may be legally used in highway vehicles. This waiver was intended to help mitigate some of the disruption in diesel fuel supplies. Extensions of certain waivers into October are being granted in some instances on a state-by-state basis.¹³

Gasoline and Distillate Inventories

As of September 23, the Energy Information Administration reported that U.S. commercial gasoline inventories were 200 million barrels, an increase of 4 million barrels from the previous week’s level. This level approaches the middle of the normal range for gasoline inventories at this time of year. The minimum operating level for gasoline is 170 million barrels, representing the point at which localized shortages occur because the distribution system cannot be drawn down further without hindering operations. At current consumption rates, this amounts to about three days of available supply.

¹⁰ Prepared by Larry Parker. For daily bulletins on Katrina’s energy impacts, see [<http://www.ea.doe.gov/hurricanes.html>].

¹¹ For more information on Entergy’s efforts, see [<http://www.entergy.com/corp/>].

¹² Prepared by Brent Yacobucci.

¹³ Remarks by Administrator Stephen L. Johnson, United States Environmental Protection Agency, August 31, 2005 [<http://www.epa.gov/katrina/activities.html>]. The most recent information is posted at [<http://www.epa.gov/compliance/katrina/waiver/index.html>].

The situation with middle distillates (heating oil and diesel fuel) is somewhat similar, reflecting the normal seasonal build of stocks, standing at 134 million barrels by September 23. This represents the equivalent of nearly nine days of available supplies.

As a result of Katrina, wholesale gasoline prices on the New York Mercantile Exchange surged almost immediately, in anticipation of a shortage. At the beginning of September, wholesale gasoline traded on the NYMEX briefly surged to \$2.40 before settling to \$1.87/gallon on September 16. Pump prices also reached a new high of \$3.06 nationwide, but subsequently declined to \$2.75. As of September 30, gasoline was trading on the NYMEX at about \$2.10/gallon. Distillate prices have followed a course paralleling that of gasoline.

Commercial Inventories of Crude Oil

Crude stocks were 321 million barrels on August 26, up from 285 million barrels during the same period last year. They fell to 305 million barrels by September 23. Minimum operating level for crude is 270 million barrels, suggesting that nearly 35 million barrels (the equivalent of two days of normal refinery runs) might be available from existing inventories. This can be used to offset the shortfall of OCS production and imports, if the crude is located where it can be accessed by refiners seeking replacement crude. But it is not clear that logistics would support this, nor is it clear how rapidly refining capacity to utilize these inventories will be restored.¹⁴

Strategic Petroleum Reserve

On August 31, Secretary of Energy Bodman announced that the Administration was authorizing loans of crude oil from the Strategic Petroleum Reserve. By September 6, loans had been granted to seven companies totaling roughly 13.2 million barrels.¹⁵ A few days later, on September 2, as part of an international 60 million barrel crude and product stock drawdown co-ordinated by the International Energy Agency (IEA), the U.S. offered 30 million barrels of SPR crude for sale. On September 14, DOE announced the sale of 10.8 million barrels of sweet crude and 200,000 barrels of sour at prices ranging from \$59.76 to \$66.46. Bids for an additional 8.2 million barrels were rejected.

Industry analysts interpret the results of the sale, including the rejected bids, as an indication that the fundamental problem in markets is product rather than crude supply. Additionally, some of the companies awarded loans may not borrow the full volume of crude for which they asked. As noted above, SPR oil can contribute to more product in markets if there is insufficient refining capacity to turn its stocks of crude oil into gasoline or diesel fuel.

¹⁴ For weekly updates on inventories, as well as spot prices, see Energy Information Administration, *Weekly Petroleum Status Report* [<http://tonto.eia.doe.gov/oog/info/twip/twip.asp>].

¹⁵ Department of Energy. Office of Fossil Energy. See [http://www.fe.doe.gov/news/techlines/2005/tl_sprexchange_totalpetro.htm].