

## ***Katrina Will Likely Impact the Oil and Gas Industry for Years***

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It is increasingly apparent that damage to downstream infrastructure, such as subsea pipelines and onshore processing facilities, as well as personnel constraints, especially engineering and other skilled labor, are impeding the ability of the Gulf of Mexico's offshore industry to recover as quickly as it has from past hurricanes, such as last year's Hurricane Ivan. The result will likely be more production shut-in for a longer period of time, and a further suppression of the Gulf of Mexico's output for the next one to two years, as the start-up of new projects currently in the pipeline is slowed by resource diversions. This has several implications for not only levels of Gulf of Mexico output, but also for the broader oil and gas industry.

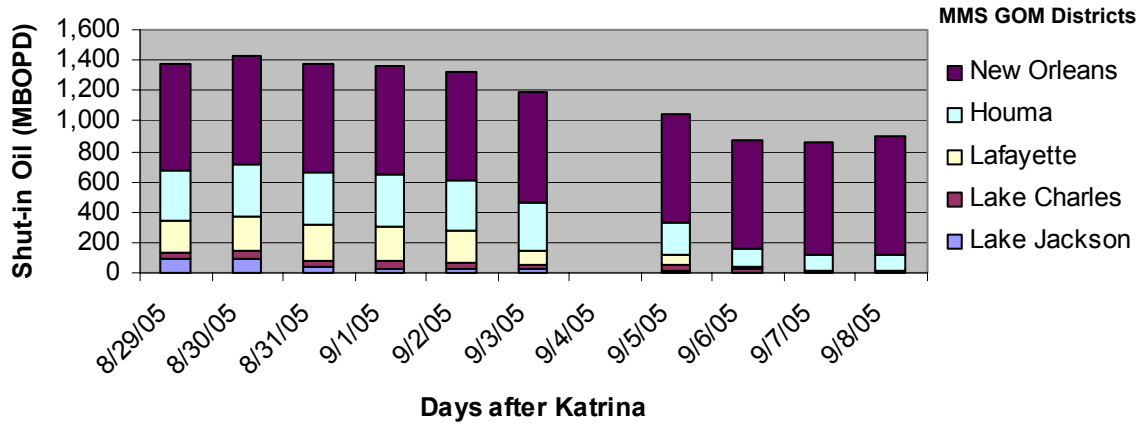
- We now project that restoration of pre-Katrina production volumes could take as long as six months, and perhaps longer, depending on the specifics of the damage to the off-take infrastructure as well as to key facilities such as Shell's deep-water assets. We believe it is increasingly likely that 2.0 bcf/d of gas and several hundred thousand barrels of oil per day will still be shut-in 30 days after Hurricane Katrina roared through the Gulf of Mexico.
- One of the broader implications of this relatively slow return of production is that it will reduce to close to zero the growth of non-OPEC oil production this year, removing whatever spare production capacity existed in the global oil industry as we go into the peak demand period.
- This leaves the global oil markets vulnerable to other unexpected natural or manmade events. There are many scenarios by which another shock could be introduced and relatively few where unexpected large additional volumes of oil could enter the market to offset the Gulf of Mexico shortfall.

### **The Uphill Climb is Getting Steeper**

As of yesterday, 8 September, the Minerals Management Service (MMS) reported that four billion cubic feet of daily gas production and 900 thousand barrels per day of oil remain shut-in in the Gulf of Mexico as a result of Katrina.

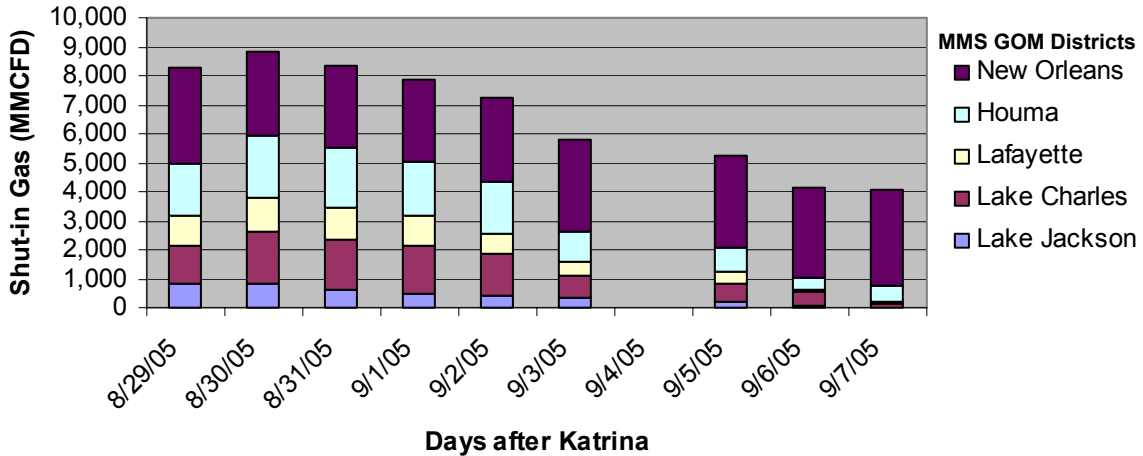
These losses are concentrated in the New Orleans district and, as illustrated in Figures 1 and 2, have not changed significantly for days. Indeed, if anything, the industry is losing ground. As illustrated in Figure 3, the reported oil volumes reported shut-in for the New Orleans district have actually increased by over 10% since the day after the hurricane. Similarly, the volume of gas reported shut-in has climbed over the last week by approximately 10% (Figure 4). While there may be some question about the quality of numbers due to these unexpected and unexplained jumps in shut-in volumes, it is still apparent that more production remains shut-in than after other hurricanes.

**Figure 1**  
**Gulf of Mexico Oil Shut-in Statistics after Hurricane Katrina**



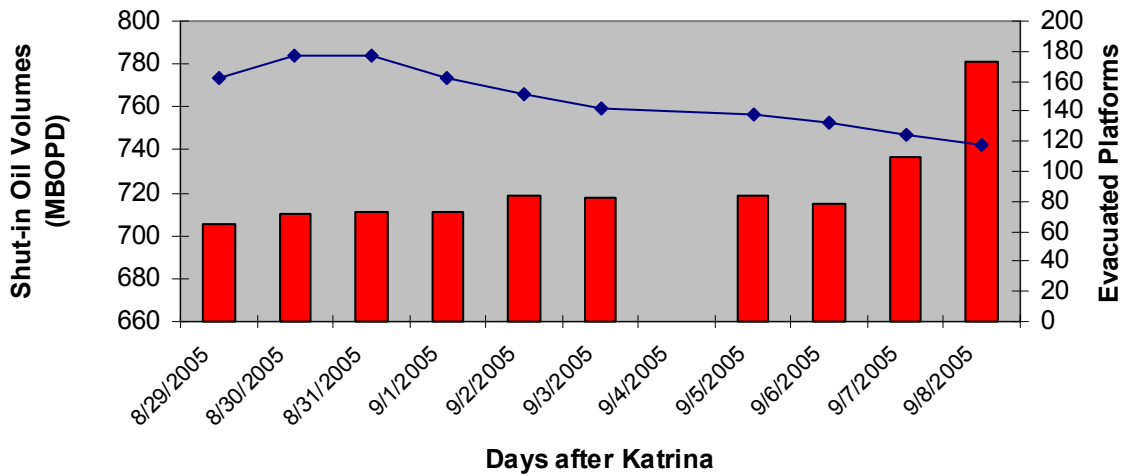
Source: Minerals Management Service

**Figure 2**  
**Gulf of Mexico Natural Gas Shut-in Statistics after Hurricane Katrina**



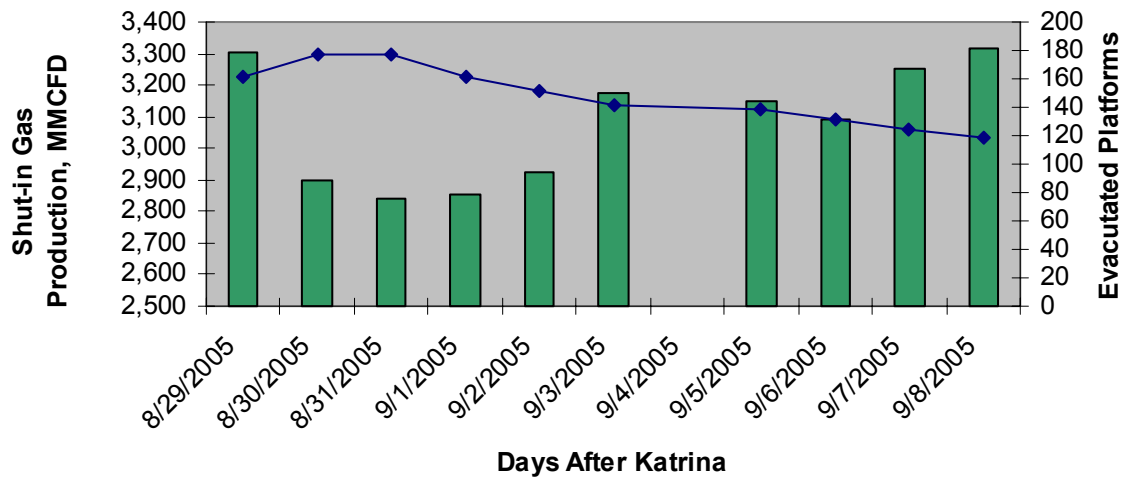
Source: Minerals Management Service

**Figure 3**  
**New Orleans District: Oil Production**  
**Shut-in After Hurricane Katrina**



Source: Minerals Management Service

**Figure 4**  
**New Orleans District: Natural Gas**  
**Shut-in After Hurricane Katrina**



Source: Minerals Management Service

Since this stall in the return of production is taking place in the face of a 33% decline in the number of evacuated platforms in New Orleans' MMS district, it suggests that that majority of the shut-in production is because of damage to oil and gas gathering systems, transportation lines, and processing facilities. Given the nature of these types of problems, the recovery process will likely take days or even weeks, and is reflected in our estimates on the pace of recovery in Table 1.

**Table 1**  
**Projected Shut-in Production for the Gulf of Mexico due to Katrina**

| Time Frame from Katrina (days) | Gas Shut-in (BCFD) | Percent of peak shut-in (%) | Oil Shut-in MMBOPD) | Percent of peak shut-in (%) |
|--------------------------------|--------------------|-----------------------------|---------------------|-----------------------------|
| Peak Shut-in                   | 8.8                |                             | 1428                |                             |
| 7                              | 5.22               | 59%                         | 1034                | <b>72%</b>                  |
| 14                             | 3.5                | 40%                         | 850                 | <b>60%</b>                  |
| 30                             | 2.0                | 23%                         | 600                 | <b>42%</b>                  |
| 60                             | 1.1                | 12%                         | 400                 | <b>28%</b>                  |
| 90                             | .6                 | <b>7%</b>                   | <b>300</b>          | <b>21%</b>                  |

**Table 2**  
**Shut-in Production for the Gulf of Mexico due to Ivan**

| Time Frame from Katrina (days) | Gas Shut-in (BCFD) | Percent of peak shut-in (%) | Oil Shut-in MMBOPD) | Percent of peak shut-in (%) |
|--------------------------------|--------------------|-----------------------------|---------------------|-----------------------------|
| Peak Shut-in                   | 6.5                |                             | 1410                |                             |
| 7                              | 2.8                | 43%                         | 666                 | <b>47%</b>                  |
| 14                             | 2.34               | 36%                         | 490                 | <b>35%</b>                  |
| 30                             | 1.7                | 26%                         | 462                 | <b>33%</b>                  |
| 60                             | .68                | 10%                         | 196                 | <b>14%</b>                  |
| 90                             | .6                 | <b>9%</b>                   | <b>152</b>          | <b>11%</b>                  |

We have also provided, for comparison purposes, the shut-in numbers after Hurricane Ivan, which heavily impacted the industry last year. Comparing the two cases illustrates our view that the industry will be able to restore gas production relatively faster than oil, due to our expectation that it will take several months to repair Shell's Mississippi Canyon assets of Mars, West Delta 143, etc. We base this on the time it took to repair Petronius after Ivan. This estimate is subject to revision as more details of the specifics of the damage to the industry become available.

**Katrina is Not Just a Short-Term Phenomena**

There is a significant chance that the efforts to restore production from existing fields could potentially divert needed resources from new field developments, resulting in less visible, but nonetheless significant, Katrina-related production shortfalls from the Gulf of Mexico over the next one to two years. The longer and deeper the outages from the existing production base, the more likely this will occur, as more resources are tasked to restoring production. Resources likely to be in greatest short supply are skilled labor and engineering talent.

Modern exploration, development, and production operations require the latest application of breakthroughs in computing, automation, robotics, nanotechnology, metallurgy, etc. It takes years for a work force to develop the right skill sets and experience to be successful. The Gulf of Mexico workforce is perhaps the penultimate example of this mix. The region, in conjunction with the North Sea, is the technology leader for the global upstream industry. As the older production provinces on the shelf offer fewer opportunities, firms are increasingly charging into the Gulf of Mexico's deeper waters—in some cases working in water depths in excess of 10,000—in a quest

to find reserves in ever more challenging geological settings. There are only so many of the right people who can work in such an environment. So, diversion of these people to help resolve the immediate crisis will almost inevitably impact future developments.

This resource conflict is perhaps being amplified by the reported shortages of skilled personnel that have been cropping up across the industry in the past year or two, as the bulk of engineers hired in the late 1970s and early 1980s begin to retire.

It is still too early to quantify the specific impact of these resource diversions, but as we go forward, we will track the number of new projects that announce schedule slippages to give us an idea of the ultimate impact, and the implications for oil and gas prices.

Another possible bottleneck may be a diminished capacity to drill wells. Prior to Katrina, the Gulf of Mexico drilling fleet numbered approximately 95 rigs. This storm destroyed 5–6 of those rigs and damaged a similar number (Table 3).

**Table 3**  
**Summary of Drilling Rig Losses Due to Katrina**

| <b>Company</b>      | <b>Rig Name</b>       | <b>Rig Type</b> | <b>Condition</b>   |
|---------------------|-----------------------|-----------------|--------------------|
| Diamond Offshore    | Ocean Warwick         | Jack-up         | Likely lost        |
| Enesco              | Enesco 29             | Jack-up         | Lost               |
| Enesco              | Enesco 7500           | Semi-sub        | Listing            |
| Global Sante Fe     | Arctic I              | Semi-sub        | Damaged?           |
| Global Sante Fe     | Celtic Sea            | Semi-sub        | Listing            |
| Global Sante Fe     | Development Driller 1 | Semi-sub        | Listing            |
| Helmerich & Payne   | H&P 201               | Platform rig    | Lost               |
| Herculaes Offshore  | Hercules 25           | Jack-up         | damaged            |
| Nabors Offshore     | Super Sundowner XII   | Platform rig    | Lost               |
| Noble Drilling      | Noble Jim Thompson    | Semi-sub        | Damaged?           |
| Pride International | Pride 210             | Platform rig    | Damaged – lost rig |
| Rowan               | Rowan New Orleans     | Jack-up         | Total Loss         |
| Transocean          | Deepwater Nautilus    | Semi-sub        | Damaged            |

Source: Company reports, Baker-Hughes, and RigZone

Given that the utilization rates for such equipment is as high as it has ever been, the loss of even a few rigs will likely impact the medium- to long-term production in much the same way as resource shortages, i.e. reduction of medium- to long-term output.

### **Conclusion**

Recent numbers are dampening some of the early optimism that Katrina’s impact on the oil industry would be on par with other Hurricanes, such as Ivan. Given the story that is starting to emerge, it appears increasingly likely that Katrina’s impact is going to be much greater than any prior storm and as a result, its influence will likely be felt by the oil markets for some time to come.

### **For additional information or to answer questions regarding this analysis please contact:**

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