

The Impact of Katrina on the Offshore Oil and Gas Industry

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Introduction

Before Hurricane Katrina slammed into Louisiana, Mississippi, and Alabama, it ripped through the heart of the Gulf of Mexico producing area, one of the great oil and gas production regions of the world. For the past six days most of the wells and platforms in that region have been shut in. At the nadir of this production stoppage, approximately 95% and 85% of the oil and gas production, respectively, representing approximately 1.4 million barrels of oil per day (mbpd) and 8.0 billion cubic feet of natural gas per day (bcfpd) were shut in. Cumulative deferred production through September 1 due to Katrina is on the order of 7.5 million barrels and 40 billion cubic feet.

Now, as the industry begins to resume operations, questions naturally arise as to how long it will take to return to normal operations and to what extent the ramp-up may be limited by long-term damage or other factors. To help address these questions, we have prepared a preliminary assessment to provide our clients with a snapshot of the situation for the offshore Gulf of Mexico environment. Undoubtedly, as new information becomes available, we will have to update our views and plan to do so next week, but the following analysis reflects the best information currently available. Highlights include:

The US Gulf of Mexico offshore fleet has suffered number of losses

According to the American Petroleum Institute (API), companies have reported approximately 58 platforms and drilling rigs destroyed or heavily damaged. As one would expect most of the damage is concentrated close to the path taken by the eye of the hurricane just south and east of New Orleans. However, with the significant exceptions of the Mars and West Delta 143 platforms, the affected installations produced or handled relatively small volumes of oil and gas. Also note that some operators are unofficially reporting platform attrition, but have yet to specify names and production volumes, so there could yet be some surprises as they release this information.

More uncertain is the condition of pipelines and oil and gas processing facilities

Oil and gas producers depend upon key support infrastructure to move their product out of oil and gas fields and to condition the commodities to sale quality. It was mainly damage to such infrastructure that slowed resumption of full production after Hurricane Ivan delivered its blow last year. This also appears to be the case with Katrina, with many platform operators reporting their ramp-up being ahead of the readiness of the support facilities to accept product. In turn, many operators of support infrastructure indicate that it may be weeks before they are fully back to normal. That said, some gathering system and pipeline operators are reporting damage less than they experienced during Hurricane Ivan, providing some optimism about the pace with which they can accept production.

Disappearing Platforms

There are approximately 4000 producing structures in the Gulf of Mexico, ranging from single well caissons to large, multi-well installations. Approximately 25% of these structures were exposed to hurricane-force winds due to Katrina, as illustrated in Figure 1. Operators are reporting 25 to 30 platforms were lost to the fury of the storm. Figure 1 also shows the locations of some of the platforms that had been reported as lost. Not shown on the map are the seven platforms that BP has reported missing. They have not specified locations or specific production volumes, though they have indicated that these platforms in total contributed less than 1000 bopd of production. These volumes are consistent with those reported lost by other operators for their platforms.

Operators have also been reporting success in restarting production. However, they are experiencing some difficulty either because personnel may not be available or because pipelines

and processing facilities are not yet ready to resume full operations, as discussed below. As of 1 September, some operators were reporting as much as half of their production capacity was back on line, but further gains were dependent upon the readiness of the support infrastructure. Along these lines, there are also unconfirmed reports that several of the damaged platforms were processing/transportation hubs, which would be serious if true. However, to date, we have been able to confirm only one such apparent casualty, the West Delta 143, which is serving Shell's deepwater fleet in the Mississippi Canyon region.

High Volume, Deep Water Fields

Figure 2 shows those fields reported by the Minerals Management Service (MMS) as being in the top-twenty producing fields between 2002 through 2004 and near Katrina's path. Interestingly, these are all deep-water installations. We also show newer, high-volume fields, most of which are also deep-water installations that have either recently entered service or are expected to do so shortly. This map clearly shows that the highest winds of Katrina missed most of these important installations, with the exception of the fields circled in red:

- the southern circle includes the Shell-operated Mars, Ursa, Princess, and Crosby fields and the large, BP-operated Thunder Horse development. For the period between 2002–04, Mars and Ursa were listed by the MMS as the number-one and number-two highest producing oil installations in the Gulf of Mexico, with Crosby and Princess ranking 10th and 18th, respectively. For the first five months of 2005, these fields produced at a rate of 250 mbopd and 340 mmcfd.
- the northern circle encompasses West Delta 143, which serves as a transportation hub for the oil and gas produced from Mars, Ursa, Crosby, and Princess.

As we noted in the introduction, Shell has reported that the WD 143 has been impacted. They have not yet provided a time frame for returning this key hub to service. Until that time, the entire 250 mbopd and 340 mmcfd from the Shell fields in the southern red zone will be offline. This represents nearly 17% of the Gulf of Mexico's oil output. Shell has announced they already have crews working to return the hub to service, but since they have provided neither a time frame nor identified what work is being performed, we cannot at this time provide an estimate for the resumption of normal operations.

Even if WD 143 is returned to service relatively soon, full flows will not resume until Shell repairs the severe damage that the Mars platform sustained. Pictures of Mars indicate that the tower of its drilling rig, the H&P 201, fell across the platform onto the power module. Visual inspection indicates substantial damage to this module, which will likely take months to repair. This installation produces and/or processes 160 – 170 mbopd of oil and 240 to 250 mmcfd of gas.

On the positive side of the ledger, BP is reporting that the giant Thunder Horse installation did not experience significant damage. However, it is unclear whether the dislocations to BP and contractor personnel may have impacted the early 2006 production (which was revised from late 2005 after Hurricane Dennis earlier this year) start scheduled for the development.

This raises the larger question, which we are not addressing in this update, of what impact the storm will have on the timing of ongoing developments and associated production.

Personnel Challenges and Infrastructure

As companies move to return their non-damaged platforms to production, they are confronted with the reality that many of their employees have either suffered deep personal losses of family or property or have evacuated with their families and are no longer in the region. By some estimates, as many as 65% of the Gulf of Mexico workers were impacted by the storm. It is unclear at this time, the extent personnel shortages or personal distractions will have upon operations. However, industry concern is apparent in that several companies have established

hotlines, are building tent cities, or are setting up temporary offices away from the zone of dislocation, and bringing in personnel from other regions.

Infrastructure

Oil and gas operations are dependent upon a wide range of supporting services and facilities. In the case of the Gulf of Mexico, the most immediate concerns deal with the status of gathering and transportation pipelines, processing facilities, and availability of power.

Transportation pipeline operators have reported most of their systems have suffered minimal damage. One major disruption has been reported to date. The operator of the Mississippi Canyon Pipeline, a gas transportation line capable of handling 800 mmcf/d (though its likely throughput prior to the hurricane was probably on the order of 250–350 mmcf/d.) is reporting it is down indefinitely. However, it is not clear at this time whether this problem is related to the damage done to the West Delta 143, where the line originates and will therefore be addressed by the ongoing restart efforts, or if it is separate from those problems. Other transportation concerns include the lack of power to run pump and compressor stations and possible damage done to some pipeline installations south and west of New Orleans. To date, such damage has not been described as crippling, but full assessments are still ongoing.

Reports are disjointed and fragmented on gathering system status, so a complete picture has yet to emerge, but El Paso has reported that their gas-gathering systems have not experienced the same kind of damage suffered when Hurricane Ivan triggered subsea mudslides last year. This is encouraging, because damage to gathering systems was a principle cause for the significant production disruption triggered by Ivan.

Notwithstanding the somewhat positive, albeit early assessments regarding transportation pipelines and gathering systems, problems with gas-processing facilities may still pose a serious road block to reviving production, especially for gas. Several firms are reporting processing facilities that are either inoperable due to flooding or storm damage, or suffering from lack of power. The Energy Information Agency (EIA) is reporting that as many as five gas-processing units, capable of handling approximately 5.5 bcf/d of capacity, are idle. For some of these important installations, firms are projecting repairs may take weeks to complete. However, the other installations, which appear to have suffered minimal damage, may be capable of receiving gas as soon as power is restored, which could be within the next one-to-two weeks.

Please note that not all facilities or pipelines have been visited or tested. This is due to a combination of personnel not being able to visit sites due to flooding or travel restrictions, or insufficient personnel. Firms are projecting that they will have visited all installations and will have tested most of them by the end of this weekend. Until this work has been performed, the industry will not have a complete picture as to the time it will take to return to normal operations.

Other infrastructure issues, such as damage to roads, railroads, and ports, have also been raised as concerns and will be addressed in detail in future updates.

Conclusion

Hurricane Katrina appears to have inflicted substantial damage on the medium-to-long-term output of the Gulf of Mexico, especially to oil production, with as much as 17% of the oil output halted pending repair of West Delta 143 and the Mars platforms. However, other potential impacts are likely due as the industry awaits repairs to key off-take infrastructures such as pipelines and process facilities. At this time, the best estimates suggest it will take as long as five weeks to complete this process. That said, there is a positive tone to the comments by many pipeline and facility operators that there has been less damage to the infrastructure than they would have expected, given the severity of the storm and past experience. Therefore, it appears likely that the majority of the production restoration is poised to take place over the next few days, with the balance taking place in the following weeks.

Figure 1: Impact of Katrina

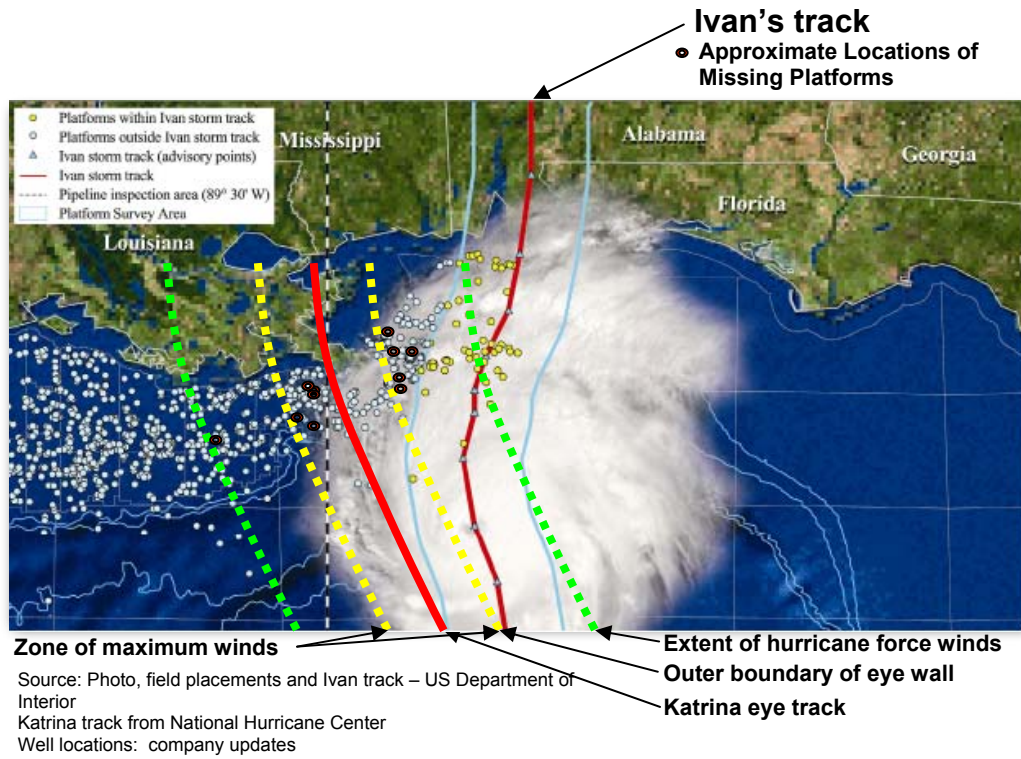


Figure 2: Location of Deep Water Platforms

