



NISAC

NATIONAL INFRASTRUCTURE SIMULATION & ANALYSIS CENTER

RFI: Projected POL Impacts Due to the Combined Effects of Hurricanes Gustav and Ike

9 September 2008
0300 EDT





Summary

- Suspended Gulf natural gas production of 5 Bcf/day for three to five weeks is not expected to lead to shortages or significant price impacts
- Potential impacts to petrochemical production in Gulf may affect national supply chains
- Suspended Gulf oil production of 1 million bbl/day for three to five weeks is not expected to have significant impact on petroleum product supply
- Refinery outages of the magnitude and duration projected for this scenario would result in product shortfalls large enough to cause temporary price increases



Situational Awareness: Oil

- Gulf oil and gas production as of 2pm EDT on 9/8:
 - 1.0 million bbl/day of oil production and 4.7 billion cubic feet (Bcf)/day of natural gas production in the Gulf remained off-line due to Hurricane Gustav (equivalent to 80% of oil production and 65% of natural gas production in the U.S. Gulf of Mexico)
- Gulf Coast refineries with a combined capacity of 617,000 bbl/day remain shut down due to Gustav as of 10am EDT on 9/8:
 - Refineries with a combined capacity of 2 million bbl/day had restarted as of 10am EDT on 9/8
- Shell's crude oil Capline Pipeline was operating a key segment in Louisiana at reduced flow rates after restoration of power on 9/7
- DOE planned release of 250,000 bbl of Strategic Petroleum Reserve (SPR) oil on 9/8 to Marathon Oil for refineries in Illinois and Kentucky
 - All SPR sites are now operational and drawdown ready

**Most Gulf production is off-line;
most Gulf refining capacity is on-line**



Situational Awareness: Natural Gas

- Back-up generators continue to supply power and compression for Henry Hub; gas flow was restored on 9/5
 - Henry Hub is a key point for natural gas transfer, and is used for spot and futures gas trading
- 12 natural gas processing plants remain shut down since Hurricane Gustav (10 Bcf of processing capacity in total)
 - 7 ready to operate once power is restored and/or upstream gas is provided
 - 4 shut down with no timetable to resume operation
 - 1 shut down due to scheduled maintenance



Scenario Impacts of Hurricane Ike to POL

- Refining:
 - Due to the uncertainty of the storm path, refineries all along the Texas coast (representing ~25% of U.S. refining capacity) will suspend operations ahead of Hurricane Ike, and, depending upon damage, will begin to resume operations approximately a week after landfall
- Production:
 - Lost oil and natural gas production begins to resume approximately a week after landfall (due to required inspections of platforms and undersea pipelines)
 - NISAC does not project widespread, severe damage to oil and gas production in the Gulf



Analysis: Oil

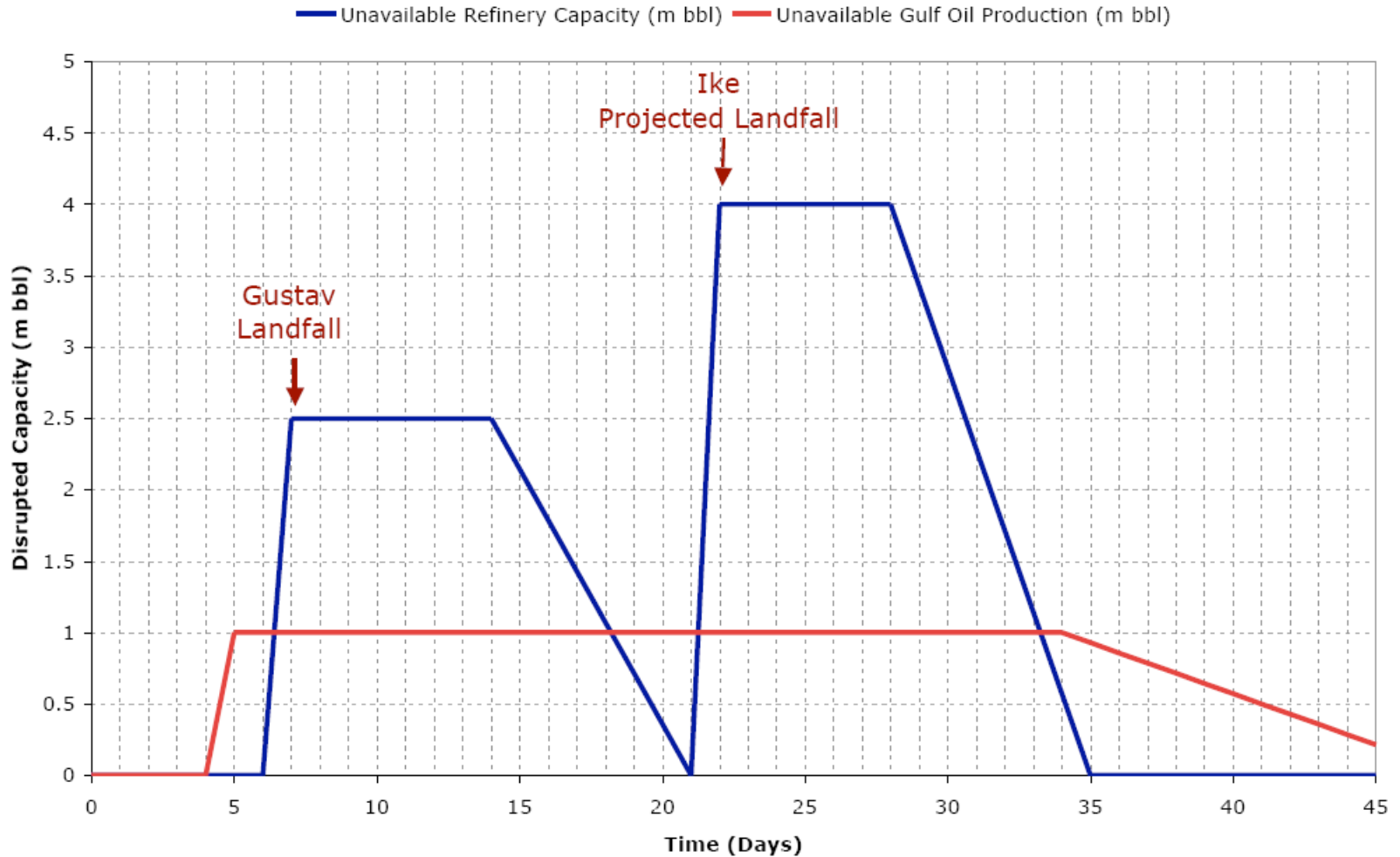
- Although 80% of the Gulf's oil output will be suspended, this 1m bbl/day represents only 5% of total daily U.S. petroleum product consumption
- Crude oil supply required by refineries can be provided by the SPR
 - Refineries that receive oil from wells in the Gulf are generally capable of receiving oil from the SPR through pipelines
- Without sufficient refining capacity, the level of crude production in the Gulf is irrelevant
- Lack of refining capacity could potentially impact petrochemical production in the Gulf region

**Refining capacity, not production,
is the limiting factor for national
fuel supply**



Comparison of Suspended Gulf Oil Production to Suspended Refining Capacity

Disrupted Capacity In the Gulf Region





Analysis: Natural Gas

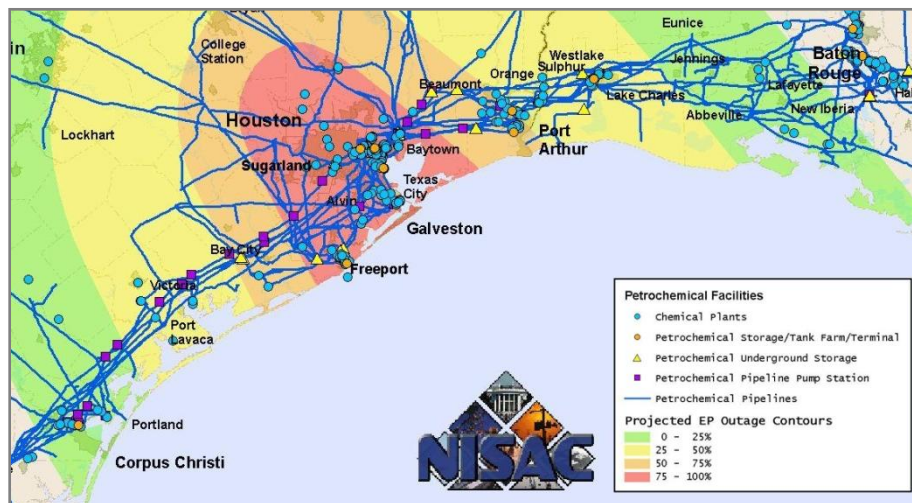
- The 4.7 Bcf/day of natural gas production currently suspended represents ~7% of U.S. daily natural gas demand
- Natural gas consumption is very low in August / September
- U.S. natural gas production has increased and diversified since the 2005 hurricane season

At this time of year, 5 Bcf/day of natural gas production could be suspended for up to two months without leading to shortages or significant price impacts



Chemical Sector Facilities Relative to Electric Power Outage Projections

- An estimated 303 chemical plants within the scenario area are expected to shutdown production prior to hurricane landfall
- A number of large petrochemical plants in the affected area primarily produce plastics, resins, and rubber for a wide use in consumer goods
- Due to their percentage of U.S. production, the shut down of production of affected chemicals would cascade down the supply chain but may not affect the final consumer due to inventories along the chain and the availability of oversea supplies



- Some of these facilities represent 50-70% of total U.S. capacity for a given chemical, such as:
 - Methyl Isobutyl Carbinol (MIBC) used in surface coating and lubricants
 - Vinylidene Chloride used to produce thin-film plastics
 - Vinyl Acetate: used in paints, adhesives, textiles, and safety glass
 - Acetic Acid: used in plastics, resins, and textiles
 - Crude Acrylic Acid: used in textiles, adhesives, coatings, plastics, inks, and detergents
 - Ethylene Glycol: used in antifreeze, fibers, resins and pesticides
 - Polybutadiene Rubber: used in tires