



## **Hurricane Ike, Energy Infrastructure, Refineries and Damage Models Landfall Thread (Updated 9/13 18:00 EDT)**

Posted by [Prof. Goose](#) on September 14, 2008 - 10:30am

Topic: [Supply/Production](#)

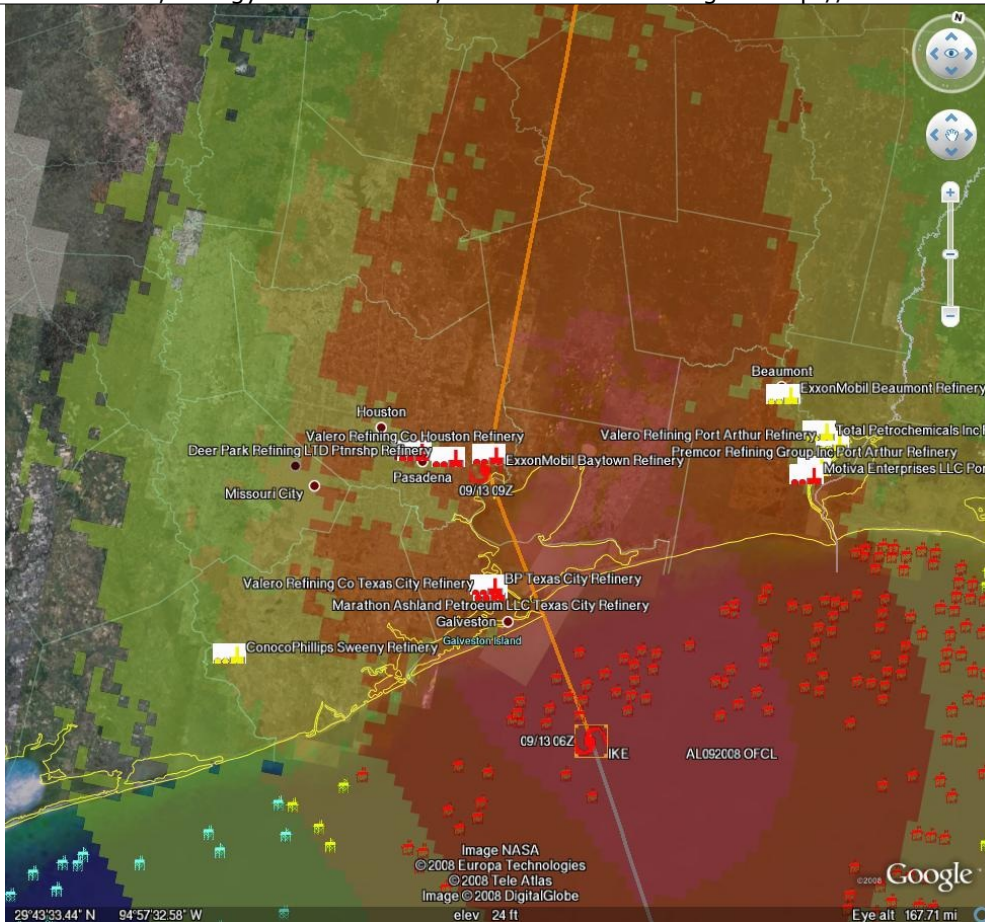
Tags: [baytown](#), [chuck watson](#), [galveston](#), [henry hub](#), [hurricane gustav](#), [hurricane ike](#), [loop](#), [louisiana offshore oil port](#), [methaz](#), [oil](#), [oil infrastructure](#), [original](#), [peak oil](#), [refineries](#), [refining](#), [shut-in production](#), [storm surge](#), [texas city](#) [[list all tags](#)]

*Updated 9/14 900 EDT.* Hurricane Ike made landfall in Galveston in an area with extensive oil infrastructure, namely over 5 million bpd of US petroleum refining capacity. (5 MMBBL is about 30% of US capacity (about 15 MMBBL), and a bit less than 6% of global capacity (~85 MMBBL)).

Our thoughts and prayers go out to those affected by this storm. We would ask that you please keep this thread on point with *Hurricane Ike and energy-related* articles, stories, maps, data, and links in the comments.

*(Graphics and damage forecasts moved below the fold for bandwidth and spacing...it's all still there...this continues to be the thread to accumulate resources as of 9/14.)*

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*Path observations and damage estimates for Hurricane Ike--Methaz NHC official track Sep 13 (7:00 EDT)-click twice to enlarge*

For all graphics: Rigs/Platforms: Blue: evacuated only; Yellow will require inspection before restart; Red: damage requiring repair; Refineries: Black: operational impact (partial shutdown) Green: Operational impact (full shutdown) Red: Damage likely; Ports: standard hurricane flags for wind

**Here is the latest update from [Chuck Watson at KAC/UCF](#) updating at 9/13 700 EDT:**

Intensity: folks have questioned my landfall estimate, but the data supports it. Examples: Buoy 42035 broke loose from it's mooring, but apparently it passed through the eye and reported valid data. See attached plot (note: it's below the fold) - peak winds 55 kts/gusts to 75 kts. RLOT2 failed at 4z, last report was 50kts/65kts, water level 11ft above normal. The station near Texas City, in the left eye wall, peaked at 60 knots. Surge peaked about 12 feet. All of the data indicates landfall wind speeds were no more than 85 knots 2min average winds. The NHC estimated 110mph/95knts "sustained" (whatever that is; nothing measures a "sustained" wind), which would be about 92 knots 2 min average, but as noted earlier they always err on the high side.

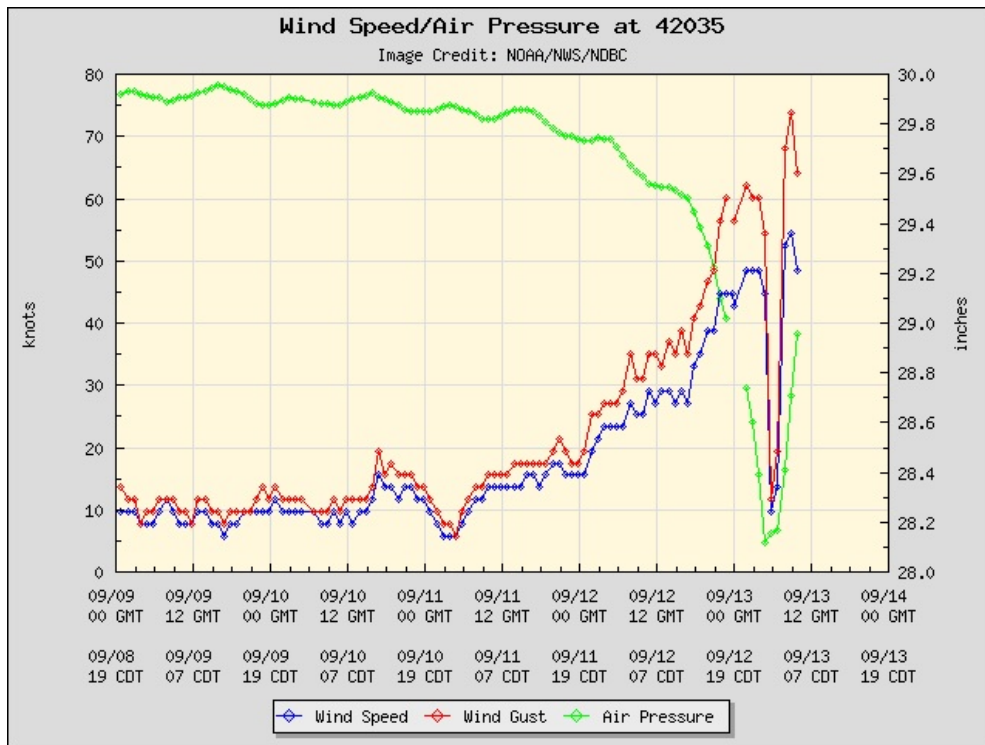
Inland areas do NOT seem to be experiencing significant two minute average winds above hurricane force. Don't be misled by the media reports of "hurricane force wind

"gusts". Gusts don't count. Scientific definitions matter. I get "hurricane force wind gusts" in thunderstorms here in Savannah all the time.

Impacts: I think the most severe impacts will be confined to the barrier islands. Galveston probably got whacked hard. But I don't think any of the refineries will suffer major damage, unless something broke that shouldn't have. It looks like Baytown never caught the peak surge. Texas City might have seen some flooding, but I doubt it was severe.

Don't get me wrong, there will be a lot of damage from this event - insured losses in the \$15 to \$20 Billion range, storm total impacts in excess of \$60 Billion (if you include evacuation costs, etc.). But with what I see right now, my guess would be that the petrochemical industry recovers fairly quickly, with refinery down times in the days to 2 week time frame, not months. I think the biggest problem is going to be staffing and debris cleanup. The infrastructure was probably OK, but power and crews with damaged homes and cleanup issues will be a big problem.

Harder numbers later today, but my estimates from yesterday are probably pretty close on outage probabilities.



*Buoy 42035 reports through Hurricane Ike-click twice to enlarge*

[MMS reported yesterday](#) that:

97.5% of the oil production and 94.4% of the natural gas production in the Gulf has been shut-in; Personnel have been evacuated from a total of 596 production platforms, equivalent to 83.1% of the 717 manned platforms in the Gulf of Mexico; Personnel from 101 rigs have also been evacuated--this is equivalent to 83.5% of the 121 rigs currently

operating in the Gulf; that staff has been evacuated from 452 production platforms (63.0%) and 81 rigs (66.9%) – (95.9% of the oil production and 73.1% of the natural gas production has been shut-in as a precautionary measure for Hurricane Ike.)

Here is a map of the critical pipeline structure expanding outward nationwide from the Houston/Port Arthur area:



[Here](#) are depictions of various Texas cities storm surge maps under different Hurricane scenarios from Weather Underground.

Chuck Watson has put together a dynamically updating page that will reflect the latest damage models/forecasts at this link: [KAC/UCF models](#). We will be updating this thread with damage estimate and breaking news as this story unfolds.

A note on Chuck's modeling process: we take the official NHC track, the raw computer model tracks like GFDL, HWRF, LBAR, etc, and even run our own in-house fast cycle track/intensity models. These track and intensity estimates are feed to our main hurricane model (TAOS), which computes the wind, waves, storm surge, currents, etc. at each point in our database of over 50,000 elements in the GoM like rigs, platforms, pipelines, pumping stations, refineries, etc. We then have engineering models for each type of infrastructure that calculates the damage and estimated down time for that element, as well as downstream impacts (eg if a pipeline is down, the upstream elements can't pump and the downstream elements don't get product).

## PRODUCTION/INFRASTRUCTURE MAPS AND REFINERY INFORMATION

[Here's a link to a really good map of oil refining/SPR storage facilities in respect to the path of Katrina.](#) (NB: OLD TRACK MAP!) and [here is a listing of production and refining capability for the state of LA.](#)

Also, here's the EIA's [Alabama](#), [Louisiana](#), [Mississippi](#), and [Texas](#) Resources pages. They will also likely come in handy. Also, here's a [link to the national page](#).

[Here's a map from CNN with large and small refineries laid out.](#) (though it is an old storm track)

[Very detailed piece by RIGZONE on rigs and other infrastructure in the area.](#) (thanks mw)

[Here's a flash graphic of the oil refineries and rig maps from Hurricane Rita, it emphasizes Beaumont and Galveston's importance.](#) Click on oil production in the tab. Note the many rigs on the east side of the storm that will get the brunt of the damage from the NE quad of the storm...hence the high long-term GOMEX oil production damage estimates below.

[Here's a link to Rigzone's coverage of Ike.](#)

You want a detailed map? Well [here's the probably the best MMS map I could find. Very detailed and lots of interesting stuff. \(VERY big .pdf warning\)](#)

Also, Scott Wilmoth at [Simmons & Co](#) sent us this map on deepwater infrastructure. For a complete list of deepwater development systems (includes operator, depth, location): <http://www.gomr.mms.gov/homepg/offshore/deepwatr/dpstruct.html>

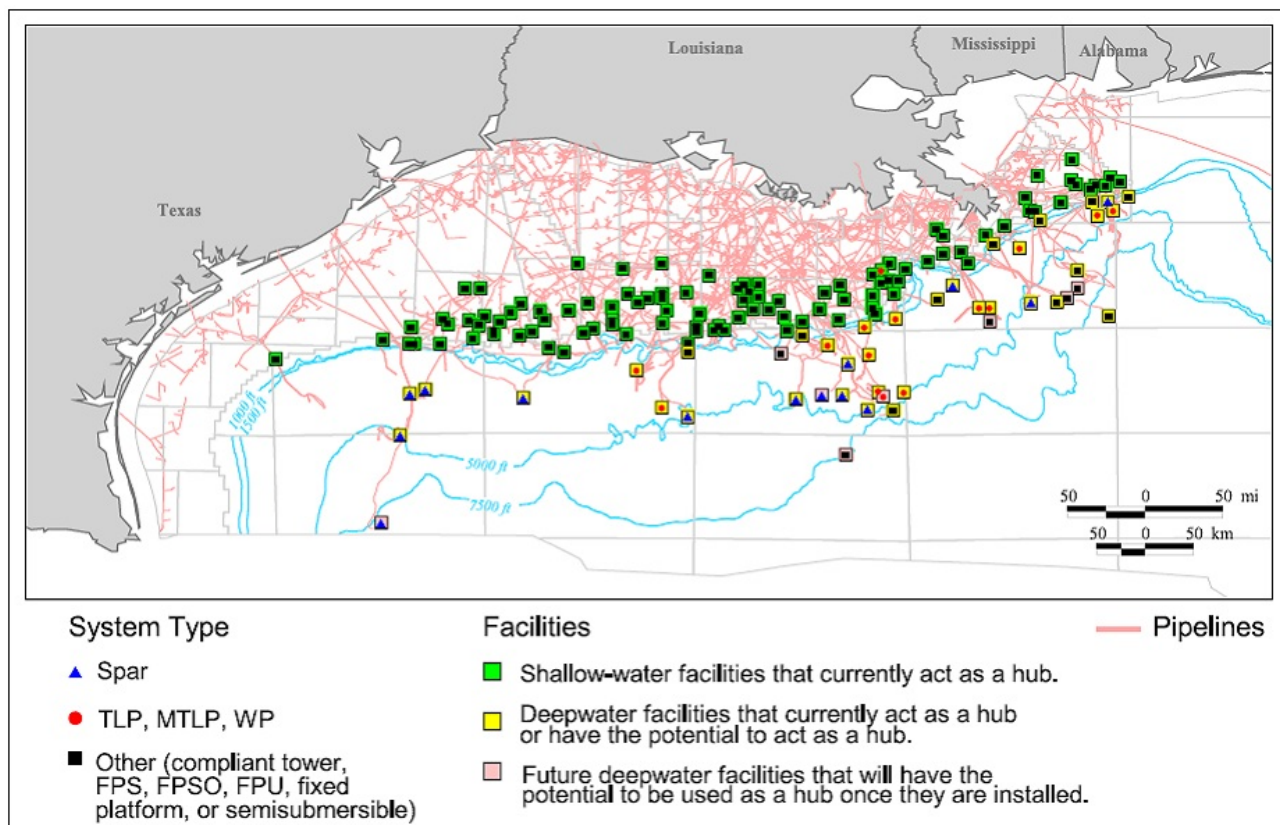


Figure 10. Current, potential, and future hub facilities.

*(Please deposit new relevant links, graphs, and comments in this new thread...please leave long personal anecdotes and themes unrelated to the storm for the other upcoming 'bigger picture' posts, as some of the larger images are difficult to upload for those on dial-up)*

*We will be posting continued updates of track and damage forecasts here, because one never knows when one of these events may have more than just local impacts. We're not hurricane experts at theoil drum.com. Thankfully we have an expert meteorologist who sends us track and damage forecasts relevant to oil and gas infrastructure. What we try to do on this site, (and have been doing for over 3 years), is articulate the fragility and urgency of our nation's, and our world's, energy situation. As Hurricane Ike moves nearer, and professional analysts gauge the impact it may have on our energy infrastructure, feel free to browse our archives of*

The Oil Drum | Hurricane Ike, Energy Infrastructure, Refineries and Damage Models / Law of the Forest (Updated 09/14/08)  
*empirically based analyses and perspectives on the many aspects of our energy situation that form the backdrop not only for this hurricane, but for any exogenous event that disrupts the increasingly uneasy balance between energy supply and demand.*



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