Hurricane Ike, Shut-In Production and Energy Infrastructure (Updated 9/9 10:00 EDT)

Posted by Nate Hagens on September 9, 2008 - 10:12am
Topic: Supply/Production
Tags: chuck watson, energy infrastructure, hurricane ike, kac/ucf, methaz, original, shut-in production [list all tags]

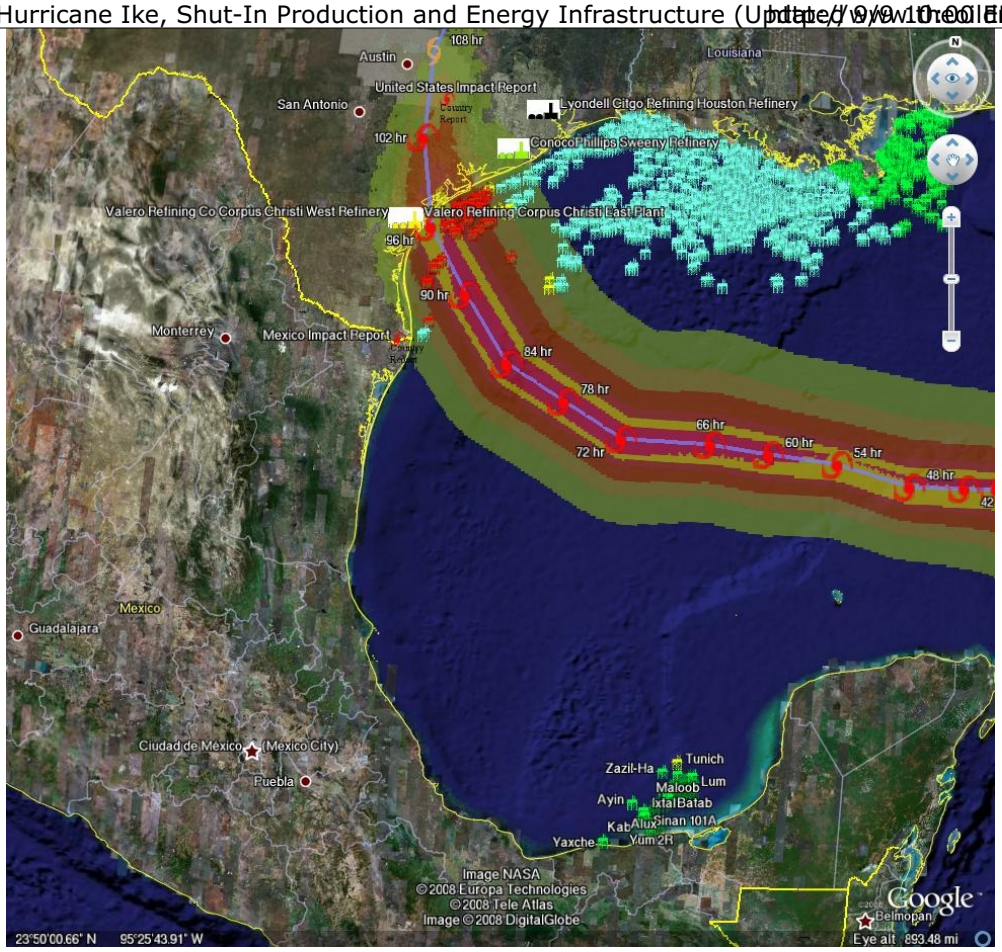
Hurricane Ike has crossed Cuba and entered the Gulf of Mexico, less than 2 weeks after Hurricane Gustav moved ashore in Louisiana, shutting in oil and gas production and causing damage to transmission lines. (As of Sep6, the LOOP came back up on one of the three mooring points, (8 days down time) - The 5 pm NHC forecast is for a late Fri pm central TX landfall - each of the last 3 NHC updates have shifted the track north and are forecasting Ike to be a 'major' hurricane. (e.g. Cat 3+). Any further model tracks north bring it close to large refining areas.

NHC Forecast for Hurricane Ike - click to go to Wunderground

New maps and new discussions as of 9/9 10:00 EDT.

Here is the latest update from Chuck Watson at KAC/UCF 09Sep 10:00 EDT:

> Ike is moving over western Cuba, and we'll have a better picture this afternoon and evening as to what it will hold for the GoM oil/gas infrastructure. Currently the models are trending towards the southern Texas Coast. But there is a big question as to what happens as it approaches the coast. The HWRF (shown below) is showing a right hook into the Corpus Christi area. Obviously, if this happens a few hours earlier it would take the storm in to Houston (bad). But anything causing such a sharp turn would probably hurt the left side of the storm and kill off the intensity a lot (good).
>
> The further south, obviously, the better for US GOM, but recall PEMEX offshore facilities - if it edges any further south, they will be impacted. Note the current runs are already showing wave impacts on their operations.



Initial path estimates for Hurricane Ike (Methaz HWRF Sep 9 12Z)-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

We will be posting periodic updates of track and damage forecasts here, because one never knows if one of these events will be seminal. We're not hurricane experts at theoildrum.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 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.

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, as well as post another story on why Hurricane Ike or any exogenous supply event is potentially critical in a world with little slack in supply of high quality oil.

> A note on our 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.

Just to give you a rough idea of where things are, the map above is a probability swath for Katrina (OLD TRACK MAP!) with the Thunder Horse platform as the red dot, and the other purple dot represents the Mad Dog development (100,000 bd); the Holstein development that produces at peak, around 100,000 bd of oil; and the Atlantis field that may have ramped up to around 200,000 bd in all. Put together these projects have the potential of around 650,000 bd, but as can be seen, they were sitting in an uncomfortable spot relative to the track of the Katrina.The white dot is where Port Fourchon is. This is where the Louisiana Offshore Oil Port, or LOOP, is located. Rigzone pointed out that this is where the foreign tankers offload, Google and Terraserve maps you can see that the area is very low-lying. One of the big concerns is that there will be sub-sea landslides or other ground movement that might affect the LOOP. Were this to be disrupted, then foreign tankers would need to be diverted elsewhere, with the likely port being Houston.

Here is a really good link/map (from "Rod and Reel" no less) of the LA southern coastline showing all of the Submersible and Floater Gulf rigs.

We have accumulated resources from previous hurricans below, but we'd like to find updated materials if you know of them. Recent refinery maps, recent rig maps in the gulf, recent gas fields, SPR facilities, the Intercoastal Canal, pipeline stations and transfer points, etc., etc. Leave links in the comments please.

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 another good resource for infrastructure maps and such. (scroll down a bit)

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 was kind enough to send us this map. The map below captures only deepwater infrastructure. For a complete list of deepwater development systems (includes operator, depth, location): http://www.gomr.mms.gov/homepg/offshore/deepwatr/dpstruct.html

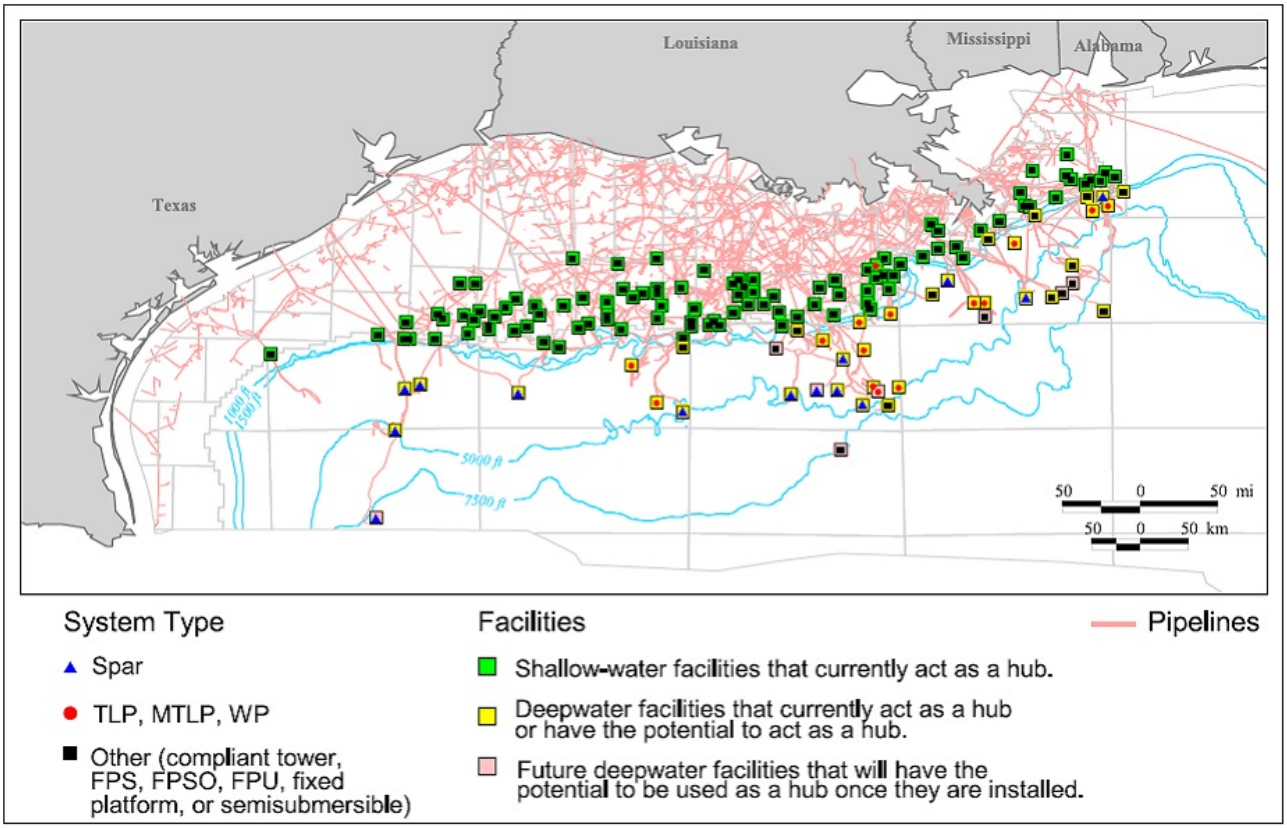


Figure 10. Current, potential, and future hub facilities.

(*Please deposit new relevant links, graphs, and comments in this new thread...we have updated the resources part of this post with new maps and some more old maps and articles from Katrina on the LOOP and Port Fourchon--important parts of the infrastructure, as we learned about three years ago. Please leave personal anecdotes and themes unrelated to hurricane for the other upcoming 'bigger picture' posts, as some of these larger images are difficult to upload for those on dial-up*)

We appreciate your help accumulating resources, stories, and newstips in the comment thread

below!