



## ***Impact of Hurricane Katrina On the U.S Petrochemicals - A CMR Inc. Analysis***

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### **EXECUTIVE SUMMARY**

On Monday, 29<sup>th</sup> August Hurricane Katrina made landfall pounding the US Gulf Coast with heavy rains and winds. Even though, the hurricane narrowly missed New Orleans coastal area, the subsequent events leading to levee breakage and the resultant flooding made the problems worse.

Most of the chemical & petrochemicals organizations have programs in place to address such an event. The normal preparations however, did not foresee the levee breakage, subsequent flooding and its impact on the two major ports serving the industry for raw materials and finished goods shipping. In addition, the events also disrupted the employees and the infrastructure of the organization.

The overall impact could last much longer than an average hurricane disruption, especially the facilities in and around New Orleans city which houses two ports and several oil refineries and chemical companies. As of the writing this article most of the organizations are assessing the damage and getting ready to get back to production. No one is sure about the logistics and infrastructure issues that could impact most of the United States.

Overall, the damage to the chemical industry is incidental and minimal compared to the overall impact on the people, infrastructure, the future economy of the Gulf Coast region covering from outskirts of Baton Rouge, LA up to Gulf Port, MS and some parts of Alabama.

### **OBJECTIVES**

The major objective of this analysis is to present: (1) an overview of the petrochemical facilities of the affected areas, (2) status of current plants – as they are available and (3) possible ramifications.

### **HURRICANE KATRINA TIME LINE/IMPACTS**

On August 24<sup>th</sup>, Katrina became the 11th named storm of the turbulent 2005 Atlantic hurricane season and by 4 pm Katrina officially becomes a Category 1 hurricane, according to the National Hurricane Center. After crossing the Florida coast, Katrina regained hurricane status on the Gulf of Mexico. In anticipation of a possible landfall, Mississippi Gov. Haley Barbour and Louisiana Gov. Kathleen Blanco declared states of

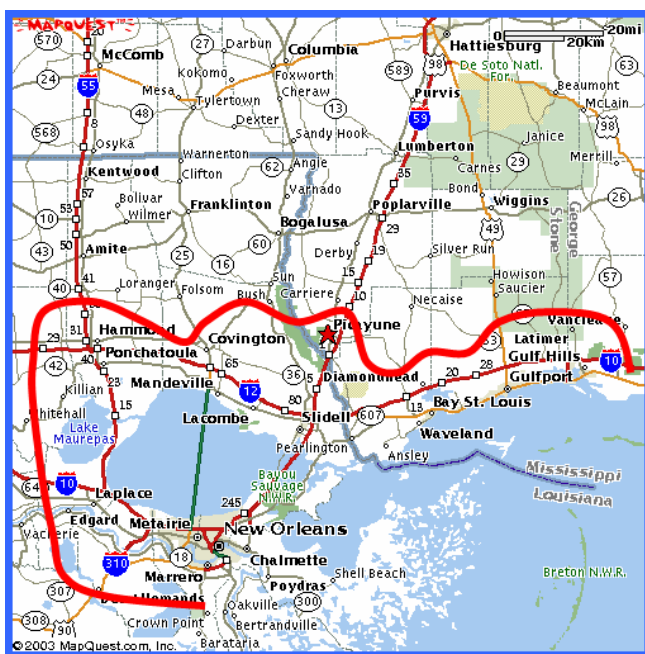
emergency on August 27<sup>th</sup>. Katrina, upgraded to category 5 narrowly missed central New Orleans district on August 30<sup>th</sup>, pounding the coast of Mississippi and causing extensive damage.

Two major levees break in New Orleans on August 28<sup>th</sup> caused New Orleans and the surrounding suburbs to flood, resulting in power failures and major disruptions to the day-to-day activities of unprecedented proportions. The entire region is declared a public health emergency amid fears of diseases that could spread because of the contaminated, stagnant water. Due to confusions in the rescue plans between the state and federal agencies, the region was left unattended for more than 72 hours exasperating the situation.

The petrochemical chemical industry was impacted initially due to hurricane strength winds and the mandatory shutdowns. The subsequent flooding impacted the facilities and people, thus complicating the situation. As of today, September 6, 2005, the situation is being brought under control by the federal agencies. With search and rescue

missions taking priority, the people related issues will dominate for the next few days. Most of the petrochemical industry is assessing the damage and preparing the plans for revamping the capacities.

Exhibit 1  
Regions Affected by Hurricane Katrina



## U.S GULF COAST – IMPACTED AREA

Exhibit 1 presents the map of the U.S Gulf Coast area highlighting the impacted areas. The impacted areas range from New Orleans to Mississippi and Alabama. The Hurricane did not severely impact Baton Rouge, Plaquemine areas; however the two major ports Gulf port and New Orleans port were severely impacted. The major industry impacted

will be rubber chemicals, polyolefins and additives and other chemicals.

## U.S GULF COAST PETROCHEMICALS

The United States Gulf Coast (USGC) encompasses the sea coast of Texas, Louisiana, Mississippi and Florida, and has long been a production center for oil, energy and petrochemicals. The major resources, oil, natural gas, salt/sea water, and coal have made the USGC a major production center of United States. The United States

population/consumption centers are disproportionately distributed in the North East and depend on USGC's production capabilities, making USGC a critical contributor to the U.S economy.

USGC is the leading domestic and international center for virtually every segment of the oil and gas industry - exploration, production, transmission, marketing, service, supply, offshore drilling, and technology. Approximately 39% of all U.S. jobs in crude petroleum and natural gas extraction (40,000 of 148,600); 18.6% of all U.S. jobs in oil and gas field services (25,400 of 163,000) are located in USGC.

The US Gulf Coast has a crude operable capacity of 4.347 million barrels of refined petroleum products per calendar day and 26.7% of the U.S. total. The USGC in 2002 had 496 chemical plants with aggregate employment exceeding 57,100. The USGC region has more than 45% of the nation's base petrochemicals manufacturing capacity - better than triple that of its nearest US competitor.

The oil, petrochemical companies in the US Gulf coast bring approximately \$14.4 billion annually to the local economy via taxes, payrolls, purchases and capital expenditures. Based on the above analysis, it is safe to assume that the U.S Gulf Coast petrochemical industry represents a significant portion of the overall U.S petrochemical industry.

## **OIL AND NATURAL GAS**

As of August 31, Gulf of Mexico oil production was reduced by over 1.371 million barrels per day as a result of Hurricane Katrina, equivalent to about 91.45 percent of daily Gulf of Mexico oil production. The Minerals Management Service (MMS) also reported that 8.345 billion cubic feet per day of natural gas production was shut in, equivalent to 83.46 percent of daily Gulf of Mexico natural gas production (which is 10 billion cubic feet per day).

The major refineries located along the Mississippi river between Baton Rouge and New Orleans include: (1) Shell, (2) ExxonMobil, (3) Valero Energy, (4) ConocoPhillips, (5) Murphy Oil, and (6) Citgo. These refineries were either shut or operating at extremely reduced rates. Louisiana also has 30 major gas plants with a combined capacity of 18 bcf/d. Damage to the electric power grid (generating plants, transmission lines, and substations) was the major source of damage to consider in evaluation of the impact of Hurricane Katrina.

**Exhibit 2** lists the impact of Hurricane Katrina on some of the selected plastics and chemicals. It represents the capacity that may have been impacted as a percentage of total US manufacturing capacity as well as global manufacturing capacity.

**Exhibit 2**  
**Selected Plastics & Chemicals Capacities**  
**Impacted by Hurricane Katrina**

	Total US KT	Total World KT	Capacity Affected KT	% US	% World
Chlorine	12,389	54,485	3,525	28.5%	6.5%
Ethylene	28,535	113,155	5,465	19.2%	4.8%
Propylene	17,714	67,739	3,385	19.1%	5.0%
Styrene	5,879	25,859	565	9.6%	2.2%
HDPE	6,960	31,133	870	12.5%	2.8%
LDPE	3,612	19,905	573	15.9%	2.9%
LLDPE	4,342	19,466	930	21.4%	4.8%
PVC	7,130	35,820	2,010	28.2%	5.6%
PP	8,513	41,257	887	10.4%	2.1%
EG	3,061	15,964	1,210	39.5%	7.6%
PS	3,059	14,837	1,910	62.4%	12.9%
PET	2,626	14,119	260	9.9%	1.8%
<b>TOTAL</b>	<b>103,820</b>	<b>453,739</b>	<b>21,590</b>	<b>20.8%</b>	<b>4.8%</b>

Source: Chemical Market Resources, Inc

**Basic 6**

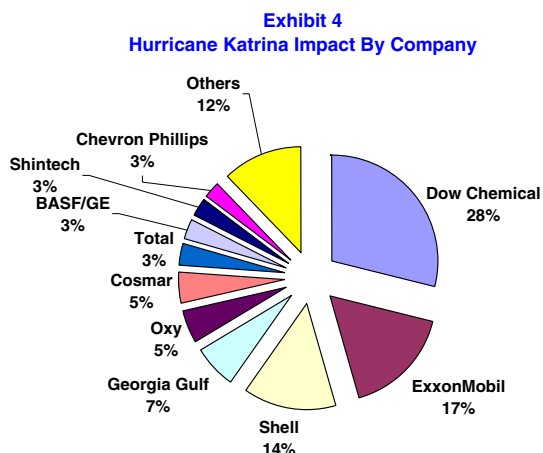
About 19% of the total US ethylene and propylene capacity is located in the regions affected by Hurricane Katrina. Three benzene plants and one butadiene plant were also affected.

**Polyolefins**

About 16% and 10% of the total US polyethylene

and polypropylene capacity is located in the regions affected by Hurricane Katrina. This capacity could be impacted in terms of either shutdowns or reduced operating rates. Dow and ExxonMobil have their polyethylene assets located in the impacted Gulf coast region. The PP producers include: Dow, ExxonMobil, and Pinnacle Polymers. Since most of these organizations are global in nature with multiple manufacturing facilities located around the world, the impact of Hurricane Katrina should be manageable. **Exhibit 3** lists the plants in the Gulf Coast that may have been impacted by Hurricane Katrina.

**Chemical Companies affected by Hurricane Katrina**



Total US Gulf Coast Capacity Impacted by Hurricane Katrina = 21,590

Source: Chemical Market Resources, Inc.

**Exhibit 4** shows the impact of Hurricane Katrina on several companies for the selected plastics and chemicals.

Some of the other companies whose plant operations were disrupted by Hurricane Katrina include:

Hercules Inc's pulp and paper division supply

chain due to impact on its Hattiesburg, MS, manufacturing operations  
DuPont declared "force majeure" for two Mississippi plants, the titanium dioxide plant at DeLisle and the First Chemical Corp. aniline plant at Pascagoula, flooded by Hurricane Katrina.

GE Plastics ABS plant in Bay St. Louis

ExxonMobil's EPDM plant in Baton Rouge

Heritage Plastics compounding plant in Picayune, MS

Tetra Technologies Venice fluids facility sustained significant damage

Cytec Industries two manufacturing facilities including Building Block Chemicals' Fortier plant and Cytec Performance Specialties in Mobile, AL were impacted due to winds

Barge deliveries to the customers of chemicals & petrochemicals in the Pittsburgh area are also getting delayed due to Hurricane Katrina. Some of the companies such as Nova Chemicals that rely on the river system for raw material shipments are also getting impacted by the Hurricane.

Overall the damages in several plants have been due to one of the following reasons including: power outages, lack of employees, mandatory shutdowns, raw material availability and transportation difficulties.

There has been force majeure declared on several products including PP, acrylonitrile, sulfuric acid, ethyleneamines and other chemicals produced in the Gulf Coast by several companies. Companies are assessing in detail the impacts of Hurricane Katrina on their overall operations.

**Exhibit 5** shows the capacities located in different regions of US gulf coast. Plaquemine, Baton Rouge and Taft were among the most impacted regions in the US Gulf Coast. The indirect effects of Hurricane Katrina due to disruptions in plants in the Gulf Coast were felt all over the nation.

Exhibit 3

Capacities Affected by Hurricane Katrina for Selected Products

Company	Location	Plant Capacity		Product
		KT	MM Lbs	
Dow Chemical	Plaquemine, LA	1,320	2,910	Chlorine
GE Plastics	Burkville, LA	24	53	Chlorine
Georgia Gulf	Plaquemine, LA	427	942	Chlorine
Oxy	Convent, LA	336	741	Chlorine
Oxy	Muscle Shoals, AL	144	318	Chlorine
Oxy	Taft, LA	650	1,433	Chlorine
Pioneer Chlor	St. Gabriel, LA	179	395	Chlorine
Vulcan	Geismar, LA	445	981	Chlorine
	<b>TOTAL</b>	<b>3,525</b>	<b>7,772</b>	
Chevron Phillip	Pascagoula, MS	25	55	Ethylene
Dow Chemical	Plaquemine, LA	1,240	2,734	Ethylene
Dow Chemical	Taft, LA	1,000	2,205	Ethylene
ExxonMobil	Baton Rouge, LA	970	2,139	Ethylene
Gulf Liquids	Geismar, LA	90	198	Ethylene
Shell	Norco, LA	1,520	3,352	Ethylene
BASF/GE	Geismar, LA	620	1,367	Ethylene
	<b>TOTAL</b>	<b>5,465</b>	<b>12,050</b>	
Dow Chemical	Plaquemine, LA	375	827	Propylene
Dow Chemical	Taft, LA	420	926	Propylene
ExxonMobil	Baton Rouge, LA	320	706	Propylene
ExxonMobil/EP	Baton Rouge, LA	680	1,499	Propylene
Gulf Liquids	Geismar, LA	290	639	Propylene
Marathon Ashl	Garyville, LA	410	904	Propylene
Shell	Norco, LA	850	1,874	Propylene
BASF/GE	Geismar, LA	40	88	Propylene
	<b>TOTAL</b>	<b>3,385</b>	<b>7,464</b>	
Shell	Norco, LA	261	575	Butadiene
	<b>TOTAL</b>	<b>261</b>	<b>575</b>	
Chevron Phillip	Donaldsonville, LA	565	1,246	Styrene
	<b>TOTAL</b>	<b>565</b>	<b>1,246</b>	

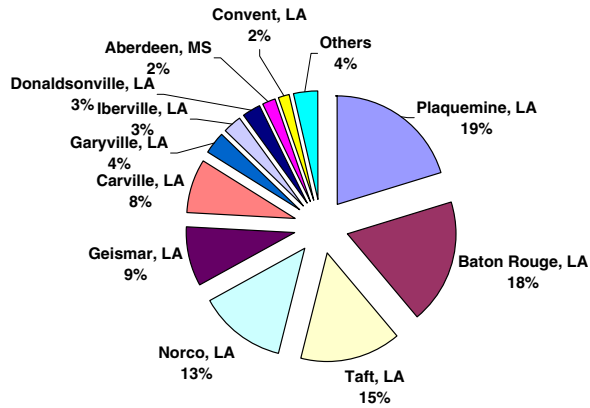
Source: Chemical Market Resources, Inc

Exhibit 3 (Cont'd)

Capacities Affected by Hurricane Katrina for Selected Products

Company	Location	Plant Capacity		Product
		KT	MM Lbs	
ExxonMobil	Baton Rouge, LA	870	1,918	HDPE
	<b>TOTAL</b>	<b>870</b>	<b>1,918</b>	
Dow Chemical	Plaquemine, LA	188	415	LDPE
ExxonMobil	Baton Rouge, LA	385	849	LDPE
	<b>TOTAL</b>	<b>573</b>	<b>1,263</b>	
Dow Chemical	Plaquemine, LA	330	728	LLDPE
Dow Chemical	Taft, LA	480	1,058	LLDPE
ExxonMobil	Baton Rouge, LA	120	265	LLDPE
	<b>TOTAL</b>	<b>930</b>	<b>2,051</b>	
Dow Chemical	Norco, LA	227	501	PP
Pinnacle	Garyville, LA	360	794	PP
ExxonMobil	Baton Rouge, LA	300	662	PP
	<b>TOTAL</b>	<b>887</b>	<b>1,956</b>	
Formosa	Baton Rouge, LA	415	915	PVC
Georgia Gulf	Aberdeen, MS	455	1,003	PVC
Georgia Gulf	Plaquemine, LA	540	1,191	PVC
Shintech	Iberville, LA	600	1,323	PVC
	<b>TOTAL</b>	<b>2,010</b>	<b>4,432</b>	
Wellman	Port Bienville, MS	260	573	PET
	<b>TOTAL</b>	<b>260</b>	<b>573</b>	
Cosmar	Carville, LA	1,020	2,249	PS
Total Petroche	Carville, LA	710	1,566	PS
Nova	Decatur, AL	180	397	PS
	<b>TOTAL</b>	<b>1,910</b>	<b>4,212</b>	
Dow Chemical	Taft, LA	720	1,588	EG
Shell	Geismar, LA	490	1,080	EG
	<b>TOTAL</b>	<b>1,210</b>	<b>2,668</b>	

**Exhibit 5**  
**Hurricane Katrina Impact By Region**



Total US Gulf Coast Capacity Impacted by Hurricane Katrina = 21,590

## CONCLUSIONS

On Monday, 29<sup>th</sup> August Hurricane Katrina made landfall pounding the US Gulf Coast with heavy rains and winds. Even though, the hurricane narrowly missed New Orleans coastal area, the subsequent events leading to levee breakage and the resultant flooding made the problems worse.

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For more information regarding this article or to discuss other matters pertaining to market research in the plastics and chemicals industries, please contact **Dr. Balaji B. Singh at (281) 557-3320 or [Bsingh@CMRHouTex.com](mailto:Bsingh@CMRHouTex.com)**  
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