2009 Tulane Engineering Forum

Colonial Pipeline Company — One Pipeline Company’s Response to Hurricanes Gustav and Ike

April 2, 2009, New Orleans, LA
HOW FUEL GETS TO YOU

COLONIAL’S ROLE IN THE SUPPLY STREAM

- Domestic Crude from Drilling
- Imported Crude via Tanker
- Crude Oil Pipeline
- Refinery Storage
- Refinery
- Bulk Terminal Storage
- Refined Products
- Refined Products Pipeline
- Pipeline Storage
- Local Gas Station
- Tanker Truck

CRUDE

Refined Products

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Refined Products
Who is Colonial Pipeline?

The World’s Largest Refined Liquid Products Pipeline

• 700 Employees
• Headquarters – Atlanta, GA
• Company formed in early 60s
• 15% of US refined products go through our lines
Who is Colonial Pipeline?

• 5,500 miles of pipeline
• 2 mainlines, 40 Stub-lines
Who is Colonial Pipeline?

- 15 Tank Farms
- Hold 28 Million barrels (1.1 Billion gallons of Fuel)
Who is Colonial Pipeline?

• In 2008 Colonial Delivered 800MM Barrels of Fuel. That’s 33 Billion gallons of fuel.
• We delivered 200 MM less than in 2007.
• Why??
  • Two Hurricanes (Gustav/Ike)
  • Recession
  • Gas spiked to $4/gallon
• Despite this, pipelines in general are the safest, most economical way to transfer these fuels
Colonial’s Service Area

- Colonial carries refined petroleum products
- Primary Service Area – Southeast/East Coast
- Deliver to more than 260 customers in 80 locations
- Mainlines stretch from Houston to New York
Large Volume Pipeline System Design

Pipeline systems are designed similar to our highway system

- The Interstates - Large diameter, high flow rate

Main lines

- Line 01 40” diameter – 53,000 BPH
- Line 02 36” diameter – 43,000 BPH
- Line 03 36”/30” diameter – 32,000 BPH
- Line 04 32” diameter – 24,000 BPH
The Parking Lot – **Breakout tank farms**

- Tank farms are located at strategic locations and are used to buffer between main line rates and rates to terminal facilities (shippers)
- Product leaving the main lines can not be directly delivered to shippers or smaller pipelines due to the high rate
State Highways – Smaller diameter, lower flow rate “Stub Lines” that originate at a tank farm and fan out towards the shippers. Stub Lines are 8” - 16” in diameter and run at reduced flow rates (2,000-10,000 bph)

Side Streets – Smaller diameter lower flow rate “Delivery Lines” are lines that come off the Stub lines and go directly into our customers facilities (terminals). Delivery Lines are 8”-16” in diameter and run at a reduced flow rates (2,000-10,000 bph)
Supply System & Colonial
Preparing for Hurricanes

• Control Center & Scheduling
  • In June of each year, we start looking at weather patterns
  • Begin reviewing emergency procedures, including automatic shutdowns
  • Begin communicating with customers
  • We start to ramp up hurricane preparedness group

• Field Considerations
  • Field personnel review Hurricane Preparedness manual
  • Look at putting “bottoms” in tanks

• Making People Safe
  • Review Evacuation plans
  • Review Hurricane Relief logistics

• Preparing Portable Generators
  • Make sure maintenance and testing are complete to ensure generators are road worthy
What Happens During a Hurricane

- Control Center & Scheduling
  - Implement hurricane response plan
  - Communicating with customers
    - Who’s evacuating?
  - Communicating with government
- Field Considerations
  - Start shutting down affected facilities
- Making People Safe
  - Start evacuating employees
- Preparing and Deploying Generators
  - Get generators ready to roll/stand-by
  - Get contractors ready to roll
  - Deploy Generators
What Happens After a Hurricane

- Control Center & Scheduling
  - Continue communicating with customers
    - Who’s has product? Power?
    - How bad is the damage?
  - Communicating with government

- Field Considerations
  - Go back into facilities assess damage/ get them back up and running

- Making People Safe
  - Set up Hurricane Relief Warehouses

- Generator Deployment
  - Run Generators if necessary
Hurricanes 2005 vs. 2008

Katrina-Rita
- Louisiana-Texas
- One month apart
- Time to recover
- Power lost 55 hours, 48 hours; generators located
- Most refineries continued producing
- Short term supply issues

Gustav-Ike
- Louisiana-Texas
- 11 days apart
- No time to recover
- CP generators deployed
- Most refineries impacted and forced to shutdown or slow down production
- Long term reduced supply resulted in market shortages
Katrina-Rita Impact

2005 Barrels Delivered per Day

Delivery Impacts Sept. 1 - Oct. 6
Gustav-Ike Impact

Delivery Impacts Sept. 1 - Oct. 6
Colonial’s Response To Gustav/Ike

Safely return operational capability
  • No significant equipment/pipeline damage
  • Significant electricity outages (deployed generators)
  • Support impacted personnel

Communication
  • Customers
  • Assess product availability (short and long term)
  • Update our schedules to reflect supply
  • Accommodate change requests

  • Government
  • DOE/DOT on system capability and throughput
  • EPA communications on supply
  • State queries on supply
After Hurricane Rita and Katrina back in 2005, Colonial Leadership decided to purchase large portable generators so that we would have our own portable power in case of an emergency.
What did CPC purchase?

- 12 – 2,000 kw Generators
- 7 – Transformers
- Associated Cabling
- Generators include Mitsubishi diesel engines, Leroy Somer generators, Woodward controllers
What do they look like?
Genset Staging Area

Kola, MS Station
In August 2008, CPC/contractors conducting routine Genset maintenance/testing at Kola

On 08/25/08, I get a call from my boss who says a hurricane is coming and we don’t know where it’s gonna land, we don’t know when it’s gonna land but we do know this, we want the generators ready to go.

I said, Okay we are on it.
Hurricane Gustav’s Path

Gustav Hits Louisiana 09/01/08
Entergy lost service to more than 1.3 million customers (> 50% of Louisiana)

Baton Rouge Tank Farm, after tornado touch-down early Sept. 3
Colonial expertise directed at multiple challenges
The six-generator solution; a 48-hour implementation

09/03-09/05
Each Genset has 30 cables going from the generator to the transformer (480v). A total of 180, 140’ cables.

Each transformer has six cables going from the transformer to the main bus (4160v). A total of 18 - 300’ cables.

Needless to say, it’s a whole bunch of cable and it’s being laid in a wet spongy area.
More than 100 employees and contractors worked together with a single focus... SAFETY
Generator Set up At Baton Rouge

Lot’s of cable to run
Logistical Support:
Served >2,000 meals and provided bedding for >100 responders per day
Humanitarian Assistance gave relief at home so employees could focus on work.
Hurricane Ike - A Little Background

- Week of September 8\textsuperscript{th}, we are in the process of tearing down all the Genset equipment at Baton Rouge to move back to Kola
  - I get a call from my boss, who says a hurricane is coming and we kind of know where it’s gonna land, we kind of know when it’s gonna land so therefore, we want the generators ready to go.
  - I said, Okay we are on it.
Hurricane Ike’s Path

Hurricane Ike makes landfall on 09/13/08
Hurricane Ike - Damage
Hurricane Ike

- Damaged Tank Near Port Arthur
- Tank Damage Near Hebert Station
Colonial’s Orange Station After Ike
Okay, Hurricane Ike hit, a bunch of flooding occurred what happened next

- Prior to the hurricane, all CPC Texas employees had been evacuated (50 total)
- After storm hit on 09/13, key employees went back in and assessed the damage.
- Houston, Beaumont, Shiloh and Hebert affected
- Not as much damage as anticipated
- Power was out at all Texas facilities
- Humanitarian efforts started, equipment, food, etc. brought in from Baton Rouge
GENSETS – On the Road Again

09/14 – What we Moved From Baton Rouge To Hebert Station & Port Arthur

• 8 generators
• 2 trailers of remote coolers
• 1 trailer of light plants
• 2 trailers of transformers
• 2 container trailers holding cable
• 2 tire repairman (They saved us)

Generator Convoy Going to Hebert
Genset Deployment – Hebert Station

We also sent two generators to our Port Arthur facility.
Hurricanes & electrical equip don’t mix well.
The Gensets at Hebert and Port Arthur ran on and off from 09/15-09/21 only stopping when we had no product to pump.

Over 100 CPC personnel and contractors were involved in the genset deployment to Texas.

All gensets and auxiliary equipment have been trucked back to Kola where they sit ready to be deployed again. Shoot me if we have another hurricane.
The End