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Hurricane Rita: An unwelcome visitor to PPG industries in Lake Charles, Louisiana

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Abstract

This paper intends to provide a glimpse of the within-the-fence activity of a major chlorine, caustic soda and chlorinated hydrocarbons manufacturing complex, immediately before and during the 2 weeks following Hurricane Rita.

The paper touches on the basics, covering "preparation," "perseverance" and "powering up again" as this chemical complex began to return to normal. There are expected and unexpected things that a significant hurricane can impact, and you may wonder how your organization would fare.

Keywords: Hurricane preparations; Hurricanes and chemical plants; Chemical plant emergencies

1. Introduction

Hurricane Rita's devastating eye passed just east of the Louisiana/Texas border about 2:30 a.m. on Saturday, 24 September 2005. At the time of landfall the storm was a Category 3 hurricane with winds of 120 mph and a storm surge of 20 ft. PPG's Lake Charles chemicals complex is approximately 35 miles to the northeast of where the storm's center came ashore. The complex received Rita's punishing winds and a measure of her storm surge.

At Rita's worst, some of PPG Lake Charles' parking lots were seen as white-capped lakes. This destructive storm snapped and splintered large trees, blew cooling tower fan shrouds apart, ripped siding from cooling towers, damaged roofs, smashed windows, crippled electrical service and destroyed normal communications for the 650 acre complex.

The nearby Port of Lake Charles reported that the winds reached 105 mph for 5–6 h. The chemicals complex additionally endured a storm surge that was about 8 ft above normal, as evidenced by the debris fields after the flood waters receded.

Windows of the main administration building facing the wrath of Hurricane Rita were shattered by gravel lifted from an adjacent roof as if it were ammunition in a shooting gallery. Broken glass lay in piles at this structure.

"Most important, no one was hurt, and the facility surprisingly sustained little overall damage," according to Lake Charles works manager Jon Manns.

2. Overview

This paper intends to provide a glimpse of the within-the-fence activity of a major chlorine, caustic soda and chlorinated hydrocarbons manufacturing complex, immediately before and during the 2 weeks following Hurricane Rita.

The paper touches on the basics, covering "preparation," "perseverance" and "powering up again" as this chemical complex began to return to normal. There are expected and unexpected things that a significant hurricane can impact, and you may wonder how your organization would fare.

Many of the issues that were handled well will be mentioned along with those things that could have been executed better. No manufacturing plant is an island, but instead is a part of larger fabric of the community and world. The plant must understand interactions and limitations with suppliers, customers and the community, when they have been threatened or struck by a hurricane.

An appreciation of the level of Rita's damage to the chemical plant, the infrastructure and the community is indicated by the

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time it took to return to production. Restoration was methodical and the approximate timeline is:

- *22nd September*: plant shutdown begins as a precaution;
- *24th September*: Hurricane Rita makes landfall;
- *7th October*: first unit back online;
- *14th November*: plant returns to 80% capacity;
- *30th November*: all units up and running.

3. Preparation

PPG Lake Charles has had hurricane procedures for years. The PPG Emergency Planning Committee met daily after Hurricane Rita entered the Gulf of Mexico, several days before she struck our area. During the first couple of meetings the primary thrust was to be sure that any unnecessary scaffolding or loose materials were removed. At later meetings, the size and skill requirements of a "hurricane ride-out crew" were determined. As planning progressed the Crisis Response Unit at our General Office became more and more involved.

The plans included a timetable to shut down the entire complex and clear pipelines within the plant in time for our employees to evacuate with their families. Other planning was centered on identifying ride-out shelters (often control rooms and major buildings) capable of withstanding a Category 5 hurricane within the 650 acre site. The shelters for the ride-out crews would require a second story in the event of a large scale, area-wide, flooding storm surge. The Lake Charles plant then procured adequate supplies of water, batteries, food, and volunteers to weather the storm, which was initially predicted to travel much further to the west and strike the Houston area.

All units were shutdown by 11:30 a.m., on Thursday, 22 September 2005. By that time, PPG had a volunteer ride-out crew of 162 including 36 Emergency Squad members. All the critical inter-unit transfer lines were cleared by 4:30 a.m. on Friday.

As gale force winds approached the complex just before sundown on Friday, all ride-out crew members were instructed to shelter-in-place. We stayed in those buildings until mid-morning Saturday when the winds finally subsided. Early Friday evening was a social time. There were gumbos and jambalayas and other meals prepared by the crews at different places throughout the complex.

At about 11 p.m., the winds were howling as Hurricane Rita bore down on the area. Rita's 100 mph winds muffled the sound of the glass breaking to a "tinkling" in the administration building. Torrential rains blew horizontally.

At 12:41 a.m. on Saturday morning, the power grid failed and, as a result PPG, Lake Charles and much of the southwestern corner of Louisiana were in the dark. Plant employees viewed a frightening scene from the north-facing windows of the administration building. By the glow of a flare from a nearby refinery they observed numerous torn sheets of tar paper flying off a warehouse located about 100 yd away. One seasoned PPG employee recalled that when he saw sheet after sheet of tar paper fly off the warehouse, ". . . it was like something out of a Steven Spielberg movie."

4. Perseverance

When the winds dropped below gale force about mid-day on Saturday, employees began assessing the damage. Some areas were flooded. Tar paper scraps littered many areas. Wind-damaged cooling towers, sheds and shops were seen throughout the complex. The storm surge from the Calcasieu River had deposited tonnes of debris, primarily Roseau cane (a very common bamboo-like plant in area marshes), driftwood and even some water craft on plant property as the waters receded.

Chemicals in certain containment vessels needed electrical power to remain refrigerated. Tanks containing other chemicals needed a reliable supply of compressed air to help keep their seals functional. More than 50 diesel-fueled generators and air compressors were spotted at critical locations to fulfill various needs.

Works manager, Jon Manns stated, "We were fighting time, Mother Nature and the laws of supply and demand. It was a fight we were devoted to winning."

The next series of days were especially punishing. PPG Lake Charles employees were battling the sweltering Louisiana heat, extremely high humidity, and countless mosquitoes. There was no running water, no electrical power, and no normal communications. Parish officials asked residents not to try to return home. Most cell phone systems worked erratically if at all. One PPG team leader reported to a newsman that the Lake Charles complex became "a dark, spooky place."

As local authorities permitted employees to visit and assess damages at their homes, employees returned to the chemical complex with bags of food that would have spoiled in their powerless freezers. Shrimp boils, barbeques and jambalayas became part of the scene as the best cooks we had took advantage of the opportunities.

The number one question on everyone's mind was, "When will the electricity be back on?" Fallen trees had ripped through electrical transmission and distribution lines throughout the parish, debris clogged the plant's power grid and that same team leader stated a "zillion short circuits had to be fixed." We were not used to having an extended loss of power, telephone and computer communications.

With unity of purpose, Hurricane Rita brought about unparalleled teamwork and leadership. Regardless of job titles, department or background, employees pulled together in an extraordinary way to get the Lake Charles complex back on its feet.

Something magical happened. There were no real complaints despite not having any electricity, nor running water, and sleeping on the floor. We bonded like never before, joked and had fun.

The team worked long hours. Most of the group had to sleep in the heat and humidity for that 1st week. They had the added pressure of the effect of the hurricane on their own families and homes. Commodities such as ice, cots and a caterer came later and were well-appreciated.

5. Powering up again

About 1 week after the storm, highway commerce returned. A steady stream of supplies began flowing into the complex including 225 cots along with bedding, wash clothes and towels.

A caterer was located, set up shop and provided tasty meals for up to more than 225 people.

After a string of unfulfilled promises, the Lake Charles Complex finally received electrical power from the local utility company about 6 days after Rita hit the area. This allowed a limited number of activities, including re-starting well water pumps. Now toilets would flush and the comforts of the world began to return. We could see that air conditioning and computer service would be coming soon.

Once the purchased power was received, PPG could start its own significant power generating equipment. The methodical task of inspecting all critical equipment and systems began.

Plywood sheets replaced blown out windows in the main administration building. This allowed restoration of the air conditioners which then permitted startup of the main computer.

The rest is history!

6. Things that went well

The chemical complex was shut down and secured in time.

We had the plant in the optimum fail-safe mode.

All critical safety and environmental systems performed as designed.

We had employees with the proper skill sets in the plant as part of the ride-out crew.

Communications of all types were very limited in the 1st week or so. PPG has a Crisis Response Unit at the General Office that was able to use its resources to contact suppliers, caterers, employees, and other critical needs.

The Crisis Response Unit provided a website, to distribute information to the media and employees—most of whom had left the area to live temporarily elsewhere.

The response unit provided a great help with a toll-free hotline for employees. Many specific requests were made for individual employees that were displaced by the storm and scattered over the region.

The team of hurricane ride-out volunteers had a great attitude. We included Union representatives in decisions.

The environmental systems/procedures and staffing were appropriate to the task.

7. Opportunities to do better

No doubt we could have had a better food supply. Perhaps we should have thought of MRE's and water for 5 days. We could have had a food service set up in advance (Remember this storm was initially supposed to hit the Houston Area and far from us.).

We could have developed a better plan for obtaining and distributing portable generators.

We might have looked at locating and procuring a larger captive diesel fuel supply.

Is there a better way to prepare to recover from damaged cooling towers, when the entire region is experiencing similar problems? Is there a better way to be prepared?

Everyone needs to think about the community recovery—what happens when community cannot support the existing and returning workforce? (Employees were ordered to evacuate by local governments, later there were curfews, some employee's homes were uninhabitable, there were security road blocks, most areas did not have fuel, food and other services in the community.).

Plan for backup on ancillary support systems (nitrogen supply, water supply, etc.).

Have an up-to-date cell phone number lists for key employees who moved from the path of the hurricane.

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