



The Sewerage & Water Board

OF NEW ORLEANS

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Hurricane Zeta After-Action Report – November 3, 2020

Dear Mayor Cantrell, Honorable Members of the New Orleans City Council, and Orleans Parish Delegation:

This report is delivered in accordance which Revised Statute 33:4091, Section F, which states: *“In addition to the other requirements of this Section, the board shall send a report, by electronic mail, to the members of the Orleans Parish legislative delegation and the members of the governing authority of Orleans Parish detailing the pumping and electrical power of its facilities and the available manpower no later than twenty-four hours prior to a hurricane entering the Gulf of Mexico as determined by the National Weather Service and no later than forty eight hours after a flood watch or warning or thunderstorm watch or warning is issued by the National Weather Service for any area of Orleans Parish.”*

The Sewerage and Water Board of New Orleans (SWBNO) provided the following equipment status report on Monday, October 26, as Hurricane Zeta prepared to enter the Gulf of Mexico:

Drainage Equipment Status:

- 99/99 drainage pumps currently available for service
- One underpass pump out of service at Press Drive

Power Equipment Status:

- Turbines 1, 3 and 6 are available.
- 5/5 EMD generators and all frequency changers are available
- T3 designated for emergency use only
- **T4 tripped yesterday during routine use and currently is under repair. It will not be available for this weather event.**

- With the equipment available, we can generate approximately 45MW of power – enough to drain routine/moderate rainfall.
- Areas that normally flood could take longer to drain, depending on rain intensity.
- We will work closely with NolaReady to monitor street flooding reports.

Hurricane Zeta made landfall on the Louisiana coast at approximately 4:25 p.m. on Wednesday, October 28. Below is an after-action summary on the performance of SWBNO's power and pumping equipment during the event, as well as the impact of citywide loss of power on our water and sewer systems.

As with any significant weather event, SWBNO's operations team will undertake a full after-action analysis in the coming weeks. We will provide further updates if necessary.

Power and Pumping

Rainfall totals for Hurricane Zeta ranged between 1.03 and 2.59 inches throughout Orleans Parish, with most areas experiencing around 2 inches over the course of the event. Rain arrived in intermittent bands; despite some intervals of high intensity, the drainage system kept pace and there were very few incidents of street flooding, all brief and minor.

As predicted, wind posed the greatest risk to SWBNO's systems during this event. Windspeeds reached up to 110 mph at landfall, causing widespread Entergy outages across the city. The SWBNO operations team planned for this contingency in advance by taking the following precautions:

- Transferred the primary power source for the Carrollton Plant (hub of emergency and power operations) from Entergy power to Turbine 6 power in advance of the storm. As a result, the plant – as well as the 60MW pumps and feeders that T6 powers – never lost power during the storm.
- Created multiple scenarios for routing power to each drainage pump in the system in the event of outages caused by the loss of aerial feeders or other Entergy power sources. This proactive planning allowed the team to make good and fast decisions during the height of the storm when, as expected, multiple feeders tripped or lost power.
- Prepared all supplemental power sources, including emergency generators, for use during forecasted height of the event.

Based on these actions, the operations team was able to manage the power-related issues that developed over the course of the storm without significant impact to the drainage, water, or sewer systems. As with any major event, SWBNO experienced challenges. Below is a summary of those challenges and how each was, or will be, resolved.

- Issue: Inconsistent performance by Electro-Motive Diesel generators (EMDs)

SWBNO has five EMDs, capable of generating 2.5MW each. These generators are a relic of the post-2017 emergency response, were rebuilt for the agency's short-term use, and are not intended as a long-term power solution. While all five EMDs were tested and in working condition at the outset of the event, each one tripped at some point during the storm. One identified cause for the trips was moisture in the connection boxes.

Resolution: SWBNO mechanics addressed the electrical issues and re-started the EMDs during the storm. EMDs 1 and 3 were taken offline and not available for service for the remainder of the storm after they tripped at approximately 4:30 p.m. The EMDs routinely experience similar issues; while EMDs 1 and 3 remain offline as of today, SWBNO will inspect them and make any necessary repairs prior to the next potential rain event.

- Issue: Turbine 3 has limited operational capacity.

Turbine 3 is used for emergencies only because, due to age, it is no longer able to carry a significant power load for an extended period of time. Knowing this, the operations team brings it online only when necessary. With Turbines 4 and 5 unavailable for this event, Turbine 3 became a critical power source at the height of the storm:

- 4:35 – T3 warming up
- Approx. 5:00 – T3 online
- 5:20 – T3 generating 8.4 MW of 25Hz power (enough to replace the 5 MW lost from EMDs 1 and 3)
- 5:34 – T3 offline

Resolution: T3 performed as expected for this event and produced the power needed to operate pumps during the heaviest rain bands. It was not damaged and, once T4 is brought back online, will continue to be used for emergencies only.

- Issue: Aerial feeder vulnerability.

SWBNO uses both underground and aerial SWBNO and Entergy feeders, to get power to its drainage pumps. Aerial feeders carry 25 Hz power from the Frequency Changers, which had to play a prominent part in the power generation/distribution plan for Hurricane Zeta since Turbine 4 was unavailable. Aerial feeders are particularly vulnerable during wind events due to brief contact with vegetation or windblown debris, causing circuit breakers to open, or due to broken wires, downed poles or broken support crossarms. Most of the aerial feeders tripped at least once during the period of heaviest winds, but in some cases were able to be re-energized after circuit breakers were reset.

Feeders and poles that are damaged in tropical events cannot be returned to service until winds subside and it is safe for SWBNO personnel to work in the field. Consequently, the operations team must re-route power to the station or pump affected via another feeder or, in some cases, bring an alternative pump online using a different power source and feeder.

Resolution: The SWBNO team utilized its power contingency scenarios to re-route power to pumps or bring additional pumps online as necessary. Fortunately, the rainfall amounts were manageable enough that these outages did not cause a significant impact to the drainage system during the storm. Based on limited power post-storm, it did take longer to drain the water from the subsurface drainage infrastructure and open canals (although that did not impact our customers). As of Saturday, October 31, all feeders and the equipment they power were back online.

Water Treatment & Distribution System

There was no impact to the water treatment or distribution system during or after Hurricane Zeta.

At approximately 12:00 a.m. on Thursday, October 29, SWBNO's emergency generator at Hamilton Station went down, which impacted power to the East Bank water treatment plant. SWBNO and Entergy worked together overnight to prioritize the response and were able to restore power before operations were impacted. Water

pressure remained above 20 psi at all times, negating the need for a boil water advisory.

Wastewater Treatment System

SWBNO lost Entergy power at 73 of the 84 sewer pumping stations across the city during or after the storm. To keep the system stabilized, the SWBNO operations team utilized available emergency mobile generators and diesel driven bypass pumps to keep the sanitary sewer system pumped down as Entergy worked to bring commercial power back online. SWBNO also sought additional generators from GOHSEP to assist in the effort. Out of an abundance of caution, SWBNO asked customers to conserve water use to limit the impact of power loss on the station.

The SWBNO and Entergy teams worked throughout the weekend to continuously monitor and restore power at each station. As of Monday, November 2, all stations were operational with either Entergy, generator power or bypass pumps.

Personnel

SWBNO adopted the Mayor's emergency declaration and activated its EOC and essential personnel at noon on Wednesday, October 28. Essential personnel were on duty for the duration of the storm. All drainage pumping stations, even those typically unmanned, were staffed and backup personnel were on notice. SWBNO also had personnel staffing the Mayor's EOC for optimum coordination. Essential staff continued to work through the weekend to ensure full recovery of all systems. There was no shortage of manpower in connection with this event.