AFTER THE STORM

The executive director of the New Orleans water utility shares what the city faces in dealing with FEMA, U.S. EPA, and contractors

Christy Cooper

Hurricane Katrina socked the U.S. Gulf Coast with a storm surge that reached at least 8 m (25 ft) above high tide in some areas. The storm surge, commonly defined as a "dome of water" that builds up in association with a hurricane, stretched across an estimated 400 km (250 mi) of coastline. Housing, utilities, businesses, and industry were devastated in three states, but damage was most extensive in New Orleans, the most heavily populated area hit by the hurricane.

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The Sewerage and Water Board of New Orleans has three primary responsibilities: maintaining the city's wastewater collection and treatment, drinking water treatment and distribution, and drainage systems. Even before Katrina, this was a daunting task. The below-sea-level city relies on an intricate web of pump stations, pipes, and open and covered canals to keep it dry.

As with many other cities, New Orleans was subject to the complex equation of aging infrastructure and a dwindling population. The board was receiving limited federal funding to meet the terms of a consent decree with the U.S. Justice Department and U.S. Environmental Protection Agency for its separated sewer overflows. Yet even with the additional funding, an increase in sewer rates, and a proposed increase in water rates, the city could not afford the billions needed to significantly upgrade its water, drainage, and wastewater infrastructure. Instead, the city decided to do what many U.S. utilities are forced to do: maintain the existing infrastructure. Water losses were high, even for an older city. The board maintained (and continues to maintain) its own machine shop, because parts for its aging pumps were no longer available for purchase. The system was outdated but functioning; assets had useful remaining lives.

On the morning of Aug. 29, 2005, New Orleans' aging infrastructure was immersed in brackish water and saltwater. The flooding lasted for 3 weeks, severely damaging much of the existing infrastructure and dramatically reducing its useful life. But the true impact of Hurricane Katrina is only now coming to light. One year after the storm, Marcia St. Martin, executive director of

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After Hurricane Katrina, New Orleans' East Bank Sewer Treatment Plant was submerged in saltwater.

the Sewerage and Water Board, shared the many challenges facing a utility after one of the worst natural disasters in U.S. history:

What is the current status of your system?

Our utility is working overtime to restore the system, but the damage is severe. Given our reduced population, we estimate about 80% water losses in our distribution system, and our treatment plants were at one time working near capacity to maintain minimum pressures.

In spite of the drought that we are now in, our wastewater collection system is experiencing high inflow and infiltration, possibly from the distribution system leaks. Our 122-mgd [462,000-m^3/d] East Bank Sewer Treatment Plant is treating 70 mgd [265,000 m^3/d]. However, with our reduced population, we should be treating about half as much.

We are now seeing high failure rates and expect nearly all pumps and motors to fail within 2 years of Hurricane Katrina, requiring significant restoration. Our fire protection has been affected as well — fire hydrants are failing due to rusted parts and valves, and water pressure rates have at times been too low to service some high-rise buildings.

After Katrina, most of our pumping stations were under water — a mix of brackish water and saltwater. We had no choice but to bring them back on-line as soon as possible. We are now seeing high failure rates and expect nearly all pumps and motors to fail within 2 years of Hurricane Katrina, requiring significant restoration. Our fire protection has been affected as well — fire hydrants are failing due to rusted parts and valves, and water pressure rates have at times been too low to service some high-rise buildings.

Fortunately, water pressure is greatly improved and the treatment plant is no longer working at capacity. The wastewater treatment plants are completely compliant as well. Within the collection system, we do not have all pumping stations operational but are still able to meet customer needs and permit requirements to move product.

The dedication of our employees is amazing. We had about 1200 employees before the storm. Today, we have just over 900. While the city's population and the board's revenues have decreased significantly, the work to be done has not. If anything, we have more work than before the storm. Overtime is commonplace, as we are still dealing with a high number of failures throughout the system. Adding to the pressure, we are under a consent decree that requires us to present and negotiate a new plan with EPA [the U.S. Environmental Protection Agency] by November 2006. And the FEMA [U.S. Federal Emergency Management Agency] process has put an inordinate degree of pressure on the utility.

Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, under which FEMA is authorized, federal aid is intended to supplement and not replace state and local resources. For Louisiana, the federal government has elected to cover 90% of eligible Katrina-related damages. How is this meeting your needs?

FEMA is basically empowered to replace in kind what was destroyed by the hurricane. There are statutory limitations that may prevent FEMA

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from funding legitimate and necessary repairs and replacements. Many issues surrounding water and wastewater utility assets are not adequately addressed under the statutes and thus are subject to limitations or interpretation.

One example is related to power. Prior to Katrina, we had three separate power feeds to the East Bank Sewer Treatment Plant. The board thought this was a sufficient level of redundancy, but after Hurricane Katrina, we had no power. Our staff, along with a FEMA team and our contract operator, Veolia [Veolia Water North America (Houston)], helped us quickly procure an emergency generator. The generator was critical to providing wastewater services to the city, including the area served by relief workers immediately after the storm. But because it did not replace existing equipment, the generator may not be eligible for FEMA reimbursement.

Another issue we are facing is that not all of our equipment failed immediately after the hurricane but is now beginning to fail as a result of the corrosive impact of the flooding. Some of our underground infrastructure lost cathodic protection. Pumps and motors have suffered from corrosion. The remaining useful life of much of our asset base declined due to the hurricane, but it is difficult to estimate that impact.

As we understand it, FEMA does not pay for studies. We had just finished a $30 million sewer system evaluation study. This study is a $30 million asset, but it's not covered under FEMA, and it now probably needs to be redone. On the plus side, we are fortunate to have this information to help us prove what damage existed before the storm. Our challenge is to now determine the current status of the system and work to get FEMA funding for the Katrina-related damage. A major limitation of FEMA funding is that the agency needs damages to be proven; that is, specific, identifiable, and visible. Unfortunately, it is not possible to prove with 100% certainty that specific damages to underground infrastructure were caused by Katrina.

There are a number of policy issues here. One is regarding funding of equipment or technology that was not a part of the asset base prior to the hurricane but has become necessary as a result of the hurricane. Another is how we define assets. And then there is the issue of proving damage to invisible assets and to assets for which the disaster-to-failure time period is extended over 1 or 2 years. FEMA is accustomed to immediate failures and certainty surrounding damage estimates.

How does the FEMA grant process work? How does it affect your staff and resource availability?

First, I want to be clear that FEMA staff and subcontractors have worked very hard to help us. The issues we have are policy and interpretive issues in an area that is understandably difficult to define. We are asking FEMA to approve large sums in areas where the agency has little knowledge or ability to assess value. But just because the damage is difficult to assess does not mean that it is not real.

Even for clearly destroyed assets, the process is cumbersome, to say the least. FEMA policy officers identify and approve each lost asset. We work with FEMA to develop project worksheets

Since the hurricane, the East Bank Sewer Treatment Plant has experienced a high rate of pump and motor failure.

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Workers at the treatment plant were rescued by helicopter after the storm.

for lost assets, then FEMA "obligates" the project worksheet [approves the grant request]. As part of this process, board employees must take FEMA staff to visit each lift station, each circuit panel, each asset that has been lost, and educate the FEMA officer on the value of that asset. This has proved extremely time-consuming, as FEMA officers have limited terms on the project, and each new officer has to be reinitiated. We have taken FEMA officers to visit every lift station numerous times.

FEMA also has strict guidelines regarding procurement; thus, we elected early on to request FEMA's assistance in the procurement decision-making process to ensure that our bid process and specifications were acceptable. FEMA has been very helpful in this regard.

Interestingly, while the board fills out the project worksheets, procures the projects, and signs the contracts, FEMA considers the State of Louisiana to be the grant applicant. Under the Stafford Act, the state must audit the "need" and the procurement process. This could mean that we have to go through the entire process again with the state.

Every one of our senior managers is working on project worksheets and FEMA funding. It is a part of everyone's vocabulary. Almost every asset was damaged to some extent, and every recovery task must be done with an understanding of how it will affect FEMA grant requests. Even with all that, [at] the 1-year anniversary of Katrina, [we] have received only about 10% of our requested funding.

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The Emergency Management Assistance Compact (EMAC) program is a federally mandated, state-run program whereby state-to-state aid can be requested after disasters. Was this program successful for you?

Yes and no. Soon after the storm, Portland, Oregon's Bureau of Water sent volunteers who had experience with FEMA, and they helped educate both the board and FEMA subcontractors on how to work through the FEMA grant process. Portland also led a national effort to bring us needed resources. Their assistance was arranged under EMAC. Portland stayed more than 60 days after the disaster, and that time is now ineligible for EMAC funding. We feel terrible, because their help was invaluable at a time when we were in dire need.

What would you recommend other utilities do to prepare for such a disaster?

A number of things have been written on the subject, but one area that has received little attention is the importance of understanding the current status of your system. The more detail available regarding system issues, the better. You will need it to build a case for damages that existed before and after the disaster.

This interview with St. Martin focused heavily on immediate infrastructure funding needs; what has not been addressed is the long-term funding need for utilities facing a shrinking ratepayer base. For most of the 20th century, the U.S. populace enjoyed protection from diseases caused by inadequate water and wastewater services. Without significant additional federal funding, that may not long continue.

Christy Cooper *is director of planning and research for B&V Water, the water business of Black & Veatch Corp. (Overland Park, Kan.). She is also a primary author of the Water Environment Federation (Alexandria, Va.) report* Assessment of Reconstruction Costs and Debt Management for Wastewater Utilities Affected by Hurricane Katrina.

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