PREPARING FOR THE WORST:
TEN RELATIVELY EASY AND INEXPENSIVE THINGS THAT
MOST WASTEWATER SYSTEM MANAGERS CAN STILL DO
TO IMPROVE THEIR DISASTER PREPAREDNESS

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ABSTRACT

Hurricane Katrina in 2005 served as an emergency preparedness wake-up call for many agencies, including wastewater systems. That event provided some new lessons in utility disaster preparedness, but primarily provided reminders of previously-known lessons. Hurricane Katrina and other events have dramatized the potential impact of natural and man-made disasters on utility infrastructure, including wastewater systems. Although much of the subsequent focus has been on water systems and other infrastructure, wastewater systems have also proven to be very vulnerable, with significant service and environmental consequences when they fail. Although many emergency preparedness improvements have been made in recent years, there are a number of additional opportunities for improvement.

KEYWORDS

Wastewater, emergency, disaster, preparedness

INTRODUCTION

Following 9-11-2001, 100% of the water agencies in the U. S. serving populations of 50,000 or more, and most of the remainder of the approximately 8,000 water systems serving populations of 3,300 or more, have completed their EPA-required Vulnerability Assessments (VA) and Emergency Response Plans (ERP). Most water agencies have begun or completed the implementation of the recommendations of their VAs. Many of these agencies have also applied some of their post-VA improvements to their wastewater systems, as well.

Some wastewater utilities have voluntarily conducted separate VAs on their wastewater systems. There are currently three bills in the US Congress that would mandate VAs for wastewater treatment plants / systems.

Hurricane Katrina and other recent disaster events have provided new and refresher lessons on many disaster preparedness needs for wastewater agencies and others. Those events have dramatized the potential impact of natural and man-made disasters on utility infrastructure. Among the potential direct impacts on wastewater systems are:

- Damage to treatment plants and pump stations from wind, flooding, down trees, etc.
- Damage to aerial sewer mains from those causes, as well as erosion
- Loss of electrical power to treatment plants and pump stations
- Damage to gravity and force mains by wash-outs and up-rooted trees
- Accumulated silt and debris washed into manholes and mains
- Sanitary sewer overflows (SSO) resulting from those conditions and sometimes causing additional damage.

Although systems of different sizes and in different areas of the US and world are subject to different types of disasters, the basics of preparedness and response are the same, whether the vulnerability is hurricanes, floods, earthquakes, tornados, acts of terrorism or others.

Although many preparedness improvements have been made since 2001, there are many additional opportunities for improvement. This paper will focus on ten relatively easy and inexpensive things that most wastewater system managers can still do to prepare for these disaster events. Although most or all of these preparedness activities also apply to infrastructure other than wastewater systems, this paper will focus primarily on the wastewater systems perspective. These ten opportunities for improvement are:

- Promote Awareness and Address Employee Concerns in Security Incidents and Disasters
- Develop Emergency Response Plan Details and Conduct Associated Training
- Provide for Emergency Electrical Power
- Protect Critical Assets
- Foster Inter-agency Relationships
- Establish Mutual Aid Networks
- Invest in Reliable Communications Systems
- Prepare a Crisis Communications Plan for Communicating with the Media and the Public
- Utilize Initial Damage Assessment Teams
- Practice, Practice, Practice
PROMOTE AWARENESS AND ADDRESS EMPLOYEE CONCERNS IN DISASTERS

The first fundamental step is developing and promoting an awareness of what can happen in a system during and after a disaster. The preparedness process should include a worst case scenario thought process. As Hurricane Katrina demonstrated, the worst case scenario planning should be pushed to the most extreme scenario imaginable. Utility managers should be careful not to overlook wastewater systems in their preparedness process. Utility agencies should foster a security / disaster awareness culture among employees, providing training and reinforcement in various forms and at all levels.

Employees are a wastewater agency manager’s most valuable and sometimes most vulnerable asset in a disaster. Preparing them for disasters includes:

- Educating them in the agency’s plan
- Apprising them of the role that will be expected of them
- Providing them with the necessary training, tools and safety equipment
- Providing shelter for employees with food, water, provisions for sleeping, and back-up electrical power
- Providing similar facilities for their families
- Providing them guidance for preparations at home
- Assistance in dealing with insurance and related issues associated with damage to their personal property
- Follow-up counseling services.

Many utility agencies have learned that employee concerns can be significant issues in the response to a security incident or other disaster. Addressing these issues can be very important in the success of the incident response and in long-term employee relations.

DEVELOP EMERGENCY RESPONSE DETAILS AND CONDUCT ASSOCIATED TRAINING

Wastewater utilities need to develop Emergency Response Plans (ERP) that incorporate all the details necessary for the effectiveness of those plans. This includes the necessary internal and external contact information and information on the system infrastructure. That information needs to be maintained where it is accessible at all times.

Disaster preparedness requires detailed planning for all potential disaster events that involves all employees and provides the level of detail necessary in a real event, including the availability of information on the system infrastructure. Operational staff members need to be involved in
assembling the details of those plans to ensure that they are effective in the hands of operational personnel when they need them.

Employees, representatives of other local agencies and potential mutual aid providers are only as valuable as a wastewater agency manager’s ability to contact them during or following a disaster. Contact information can be the weak link in the disaster response chain. Managers must maintain this information in a form that is current, accessible and durable in a non-electronic form.

As Hurricane Katrina demonstrated, all local agencies must be prepared to provide for their own needs for at least three days following a disaster, before aid may be available from other agencies.

All personnel need to be trained in the details of their agency’s ERP. Emergency plans are not static documents and wastewater system managers must continue to monitor their vulnerabilities and refine and adjust their response plans, as needed.

**PROVIDE FOR EMERGENCY ELECTRICAL POWER**

Hurricane Katrina and a number of other recent incidents have accentuated the dependency of wastewater systems, particularly treatment plants and pump stations, on electrical power. Wastewater system managers should work toward having permanent, mobile, rental and / or borrowed emergency electrical generators available to keep treatment plants and pump stations operational. Experiences in Hurricane Katrina demonstrated that trailer-mounted generators are much more valuable for sewer pump stations than skid-mounted units, as those that are trailer-mounted are more versatile for moving from one pump station to another.

Generators also require appropriate switchgear or generator connections and provisions for maintenance and fueling capabilities. Although the opportunities in this paper have been introduced as relatively inexpensive, the acquisition of emergency electrical generators and associated switchgear, is not inexpensive. Nonetheless, wastewater utilities should address this need through provisions to borrow generators or other arrangements. The need for emergency electrical generators is a lesson that has been demonstrated repeatedly in disasters.

**PROTECT CRITICAL ASSETS**

Wastewater system managers must protect their critical assets, both fixed and moveable. Jet / vac trucks, for instance, are substantial investments for wastewater systems and are particularly valuable in the recovery from many disasters. System managers should do whatever is possible to put those and other critical pieces of equipment where they will be safe and available after the incident.

Stationary assets should also be protected as much as possible. This includes permanent improvements, such as raising electrical equipment above the potential flood elevation, and temporary improvements, such as sandbagging critical system components, like electrical components at treatment plants and pump stations.
System managers should also have on hand other resources identified as necessary in follow-up to potential disaster events in their system. This may include replacement electrical components and pipe, portable pumps, repair parts, heavy equipment, sand bags and other items. It is also critical to protect these assets from damage or loss in a disaster.

FOSTER INTER-AGENCY RELATIONSHIPS

Wastewater agency managers need to continue to get to know the representatives of other local agencies. They need to develop or obtain training materials to better detail the roles of and advance coordination needed among internal personnel and with other agencies at all levels. This particularly includes:

- Other sectors of the local water and wastewater systems
- Local government management
- Local emergency responders and emergency management agencies
- Local public health agencies and healthcare providers
- Other local utilities, particularly electrical
- State water and wastewater primacy agencies.

Related to the need to develop relationships with other local agencies is the need for water and wastewater agency managers to become familiar with the National Incident Management System (NIMS) and the Incident Command System (ICS), which is a key component of NIMS. NIMS includes, among other components, standards for communications and command of different governmental agencies in a disaster incident. NIMS compliance is required by the Department of Homeland Security (DHS) for eligibility for future DHS and FEMA funds.

ESTABLISH MUTUAL AID NETWORKS

Water and wastewater agencies need to continue to establish and develop mutual aid networks, both within and between states. Water and wastewater agencies in a number of states have been working to form such networks under the Water / Wastewater Agencies Response Network (WARN) and other models. Following Hurricane Fran in 1996 and Floyd in 1999 in North Carolina, local agency mutual aid has been significantly enhanced in that state through the following:

- Development and execution by many local governmental agencies of the Statewide Mutual Aid Agreement

- Establishment of a Mutual Aid Coordinator’s position in the state Emergency Operations Center (EOC)
• Use of a web-posting of mutual aid needs at ncmutualaid.org

• Development of the MADIRT (Mutual Aid Disaster Intervention Response Teams) resource-typing model


There is currently a significant effort underway by a number of water and wastewater organizations and agencies to develop an interstate mutual aid framework in response to frustrations in providing aid following the Florida hurricanes in 2004 and the Gulf Coast hurricanes in 2005. A pilot project in the southeastern US is under consideration.

Recent disasters have also demonstrated that local agencies need to work to coordinate with and embrace aid from partners with whom they have worked relatively little in the past. This includes non-governmental organizations (NGO), such as the Red Cross, and faith-based organizations (FBO). While these relationships with NGOs and FBOs will likely be more significant for other sectors of local government than wastewater system, system managers should be familiar with the increased involvement of these organizations.

INVEST IN RELIABLE COMMUNICATIONS SYSTEMS

Utility managers should maintain their investment in traditional two-way radio communications systems that are not dependent upon the resources of others or subject to excessive communications traffic caused by the general public. Recent advances in cellular technologies have led utilities to become increasingly reliant upon those technologies. However, those technologies have proven to be very vulnerable in disasters. Traditional radio systems may require provisions for emergency electrical power to keep them operational in a disaster. Utility agencies should consider the investment in some satellite phones and possible participation in emergency phone systems, such as the Government Emergency Telecommunications Service (GETS).

It should be noted that this recommendation does not necessarily involve the conversion to interoperable communications systems and the substantial investment associated with those systems. While radio systems that provide communications interoperability have been widely promoted since 9-11-2001, it is much more critical that personnel within agencies, such as wastewater systems, be able to communicate by radio within their agency, than with persons in other agencies.

PREPARE A CRISIS COMMUNICATIONS PLAN FOR COMMUNICATING WITH THE MEDIA AND THE PUBLIC

Wastewater agency managers need to prepare Crisis Communications Plans (CCP) for critical communications with the public and the media. They need to develop draft news releases for
various scenarios within their systems. Statements that may be needed should be anticipated and internally practiced. Core components of a CCP process include:

- Develop the Message
- Prepare for Dealing with the Media
- Educate Employees and Other Key Stakeholders
- Put a Face on the Organization

Over the past year, EPA has been developing guidance on this task under the name of “Message Mapping”. Although this is a more critical need for water agencies than for wastewater agencies, critical wastewater messages should be prepared, as well.

**UTILIZE INITIAL DAMAGE ASSESSMENT TEAMS**

Past disasters have demonstrated the need to make an initial assessment of the damage to a system before attempting to begin repairs. While this is a task in which mutual aid providers and others can assist, this initial assessment should be made before efforts are made to mobilize aid resources. In this phase of response, it is also important to determine the level of housing and logistical support that will be available to aid providers and to communicate that to potential aid responders. In North Carolina, the Mutual Aid Responders’ Accommodations Checklist has been developed for this purpose. Key needs and conditions to address include:

- Housing and sanitation
- Food and water
- Employee work safety conditions
- Communications systems
- First aid and emergency medical services available
- Current inoculations required for responders
- Expected temperature range and weather conditions
- Vehicular and equipment needs
- Psychological conditions anticipated
- Financial services
- Laundry services available
PRACTICE, PRACTICE, PRACTICE

Finally, wastewater agencies should practice their disaster response plans. One of the best ways to practice is through relatively easy and inexpensive tabletop exercises. Wastewater agency managers need to conduct tabletop exercises with increasingly broad interagency involvement, both vertically and horizontally.

A tabletop exercise involves a simulated response to a hypothetical disaster, either natural or man-made. Unlike other types of exercises, such as full-scale exercises and drills, which often involve the mobilization of resources to a remote location and may even involve the use of actors as victims, tabletop exercises involve working through the disaster and response activities in one or more meeting rooms. Other than personnel, presentation materials and associated support materials, no resources are mobilized. Advantages of tabletop exercises over full-scale exercises include lower cost, faster planning / scheduling and organization, less vulnerability to the weather, etc. Tabletop exercises are also sometimes called “sandbox” or “desktop” exercises. Most tabletop exercises are conducted in six hours or less.

Tabletop exercises lend themselves particularly well to many utility system incidents because those incidents often do not involve a well-defined incident scene and involve relatively abstract incident components, such as water and wastewater contaminants.

CLOSING

Wastewater agency managers who implement the ten steps above will be much better prepared to keep their systems in operation following disasters.

The four key principles that are gaining recognition regarding disaster preparedness in water and wastewater systems and elsewhere are PLAN, PARTNER, COMMUNICATE and PRACTICE.