

Internal Monitoring Report

Policy #: O-2C Reliability
Frequency: Annual

Date: November 26, 2013

I certify that the following information is true.

Signed  _____, General Manager

Policy Language:

The Water Utility General Manager shall not cause or allow conditions, procedures, or decisions that prevent the Madison Water Utility from meeting its obligation to provide current and future generations of customers within the City of Madison and its authorized service areas with reliable water service that is consistent in its availability and quality.

Accordingly, the General Manager shall not cause or allow conditions, procedures, or decisions that:

1. Assure that residents experience only minimal unplanned service interruptions.
2. Provide residents with adequate notice of planned service interruptions.
3. Provide residents with adequate notice in the case of planned maintenance work that would significantly reduce water flow or pressure, and/or cause water discoloration.

General Manager's interpretation and its justification:

The Utility shall budget for, fund, prioritize, plan for, and construct the necessary system improvements to replace and sustain the Utility's infrastructure both now and into the future. The Utility shall build in the necessary system redundancy, shall maintain all components of the system, and shall develop operational procedures to ensure a reliable water service to all points in the system. To achieve this objective, the Utility will develop, routinely update, and implement long term facility and system comprehensive and master plans to identify system needs and funding opportunities. The Utility's maintenance program will be proactive and preventative to maximize component reliability, efficiency, and life cycle costs within the system. The Utility shall also establish work scheduling protocols and notification procedures that will minimize the impact to consumers during maintenance and repair work.

Data directly addressing the General Manager's interpretation:

1. *Assure that residents experience only minimal unplanned service interruptions.*

Using standard utility engineering practices and standards through the decades, a system of redundant pumping stations, standby power generators, and gravity storage reservoirs has been developed and implemented for Madison Water Utility. Using over 850 miles of pipe, twenty two wells are linked throughout the water distribution system to feed the ten pressure zones. Pressure zones are established and defined using isolation valves in the system piping.

In the event of an emergency, these zone isolation valves could be opened to move water from zone to zone and maintain service. Pumping redundancy is designed and constructed into the system. If a pump in the system has a mechanical failure and is removed from service, pumping systems still have the capacity to meet anticipated system demands. With the exception of Pressure Zone 11, all zones have a minimum of one gravity reservoir that provides emergency water supply. Storage reservoirs are designed and sized to provide up to 12 hours of supply based on the annual average demand. Reservoirs are also sized to provide fire fighting capacity and peak demand supply.

The Utility currently has access to 12 standby power generators, 9 owned by MGE and 3 owned by the Utility. A fourth Utility owned generator is being designed for Unit Well 26 and will be installed in 2014. A fifth Utility owned standby generator will be added to the Well 7 facility in 2014/2015. MWU also is developing a project with Madison Gas and Electric to connect Well 24 booster pumping station to the existing generator located at Well 24. Two wells and a pumping station are equipped with electric transfer switches that will allow the connection of a portable generator if necessary. The Utility does not currently own a portable standby generator and intends to rent or lease a unit if needed.

The standard design criterion for pumping stations and wells is to provide emergency standby generators at the facility. At the facilities that do not have stationary generators, transfer switches and connection points are provided to allow the use of portable generators. This will ensure reliable water supply throughout the system.

Wells, booster pumping stations, and reservoirs are routinely inspected, serviced, and maintained. System operation is monitored and recorded by the Utility SCADA system and routine daily inspections by Utility Rounders. Well pumps are scheduled for removal, inspection, and rebuilding or replacing every 10 years. System reservoirs are inspected and cleaned every 5 to 10 years. The Utility budgeted \$950,000 in 2014 and \$1,045,000 in 2015 for existing facility maintenance projects, and upgrades/additions.

The adopted annual capital budget is in the \$25 to \$30 million range and covers all anticipated projects for the next 6 years. This capital budget indicates the Utility's commitment to maintaining and upgrading the system. It is the Utility's intent to continue to increase the annual capital budget to ensure long term system reliability and to build in redundancy and reliability.

Historically, water main breaks within the Madison system occur at an average rate of 240 per year. The aging pipe system, pipe material type, weather, and other unknown factors all contribute to main breaks. Water main breaks are difficult to control and impossible to predict. While no comprehensive nationwide standard for water main breaks exists, a break rate of 20 breaks per 100 miles of pipe per year is a widely accepted goal. For Madison's 850 miles of main, the goal would be to have less than 170 main breaks per year in the system. Between October 1, 2012 and October 1, 2013 there were 294 breaks in the Madison system. For the approximate 850 miles of main in service, the calculated rate for this period is 34.6 breaks per 100 miles of pipe.

Each year the Utility invests over 8 million dollars in pipe replacement. The capital budget dedicated to pipe replacement is increased 4 to 6 percent per year as the replacement program

continually grows. Due to major projects on East Johnson and Verona Road, the 2014 pipe replacement budget was increased to \$10,000,000. The goal is to replace between 8 and 10 miles of pipe each year. It is estimated that a total of 400 miles of pipe is in need of replacement or relining.

In an effort to repair decaying pipe at lower cost and thus extend the impact of the annual capital budget, a pipe lining program is being developed and implemented by the Utility. Working closely with Wisconsin DNR engineers, the Utility successfully piloted and constructed the first water main lining project in the State of Wisconsin lining over 1,200 feet of 8-inch pipe in late 2011. A second project was completed during the fall of 2012 with the successful lining of over 2,000 feet of six inch main. During 2013, approximately 4,000 feet of main was relined. The cost of this operation, which rehabilitates the main to full pressure and structural capacity, is approximately 2/3 the cost of full replacement. As the process becomes more common and competition increases, it is expected that this cost will decrease. The Utility has budgeted \$1,000,000 in 2014 for pipe lining projects. This budget will be increased at a rate of 10% per year as the program ramps up. This budget will allow the Utility to reline over 8,000 feet of pipe in 2014.

Utility Engineers work closely with City Engineering to coordinate water main replacement projects with ongoing street projects. Pipe segments are selected for replacement based on their break history, hydraulic capacity, age, and material. Over 400 miles of pipe are slated for replacement throughout the system over the next 40 years.

In the event of unplanned service outages due to water main breaks, either Utility repair crews or contractors working for the Utility notify impacted customers in person and inform them of the situation and the expected length of the outage. Utility employees work with impacted customers to the greatest extent possible to minimize the service disruption and will modify the work as needed. When water service is restored, Utility crews check with area residents to make sure that there are no further complications resulting from the water outage.

I report compliance.

2. Provide residents with adequate notice of planned service interruptions.

Prior to starting any planned work that will require an interruption of service, customers are individually notified. A Water Utility employee contacts all impacted residents and explains the need for the work and the expected duration of the water outage. Planned service interruptions are typically less than 4 hours. If the resident is unnecessarily inconvenienced by the planned outage, the work crew will modify the work plan to accommodate the customer to the greatest extent possible. When the work is completed, a Water Utility employee notifies the customers.

The Utility takes all reasonable steps to minimize the number of service interruptions due to maintenance of wells, pump stations, and reservoirs. These situations are rare and are localized in nature. If an interruption of service is unavoidable, those impacted customers are notified by post card or door hanger a minimum of 7 to 10 days in advance of the planned interruption. The Utility's electronic listserv is also used to notify area residents. Planned service interruptions are kept to no more than 4 to 8 hours in these instances. During the past year there were no planned service interruptions due to work at a well, pump station or reservoir.

Contractors working on the system are required to provide residents 48 hour notice of any planned service interruptions. This work is monitored and controlled by Utility construction inspection staff.

Consumers generally accept the inconvenience of water service interruption when proper notification is provided. Complaints resulting from planned service interruptions are generally caused by delays in re-establishing water service. Utility field personnel are diligent in minimizing the impacts of such delays.

I report compliance.

- 3. Provide residents with adequate notice in the case of planned maintenance work that would significantly reduce water flow or pressure, and/or cause water discoloration.*

When a facility is taken out of service for planned maintenance work, the operation of other Water Utility facilities is modified to ensure that water service is not interrupted and pressures are stable. The water distribution system is interconnected and allows operating wells to provide service to all parts of the system.

In the event that the removal of a facility from service has the potential of reducing water capacity and/or pressure and poses the risk of water discoloration, those impacted customers are notified by post card a minimum of 7 to 10 days in advance of the planned interruption. The Utility may also use its electronic listserv to notify area residents of an anticipated reduction in service. During the past year there were no planned reductions in the level of service due to work at a well, pump station or reservoir.

Routine unidirectional flushing and cleaning of the distribution system does cause a temporary reduction in water pressure and flow. Flushing operations also include the risk of causing water discoloration. Residents are notified of routine flushing operations in their neighborhood by newspaper advertisements, yard signs, phone calls and an electronic listserv. Annual flushing schedules are published and posted on the Utility web page in the spring and a detailed schedule is maintained throughout the flushing work. Complaints during the flushing operation are minimal.

I report compliance.

References

2014 Water Utility Capital Budget