

PORTLAND'S WATER DISTRIBUTION SYSTEM: *Maintenance Program Needs Improvement*

AUDIT SUMMARY FROM THE CITY AUDITOR
August 2004

The objective of this audit was to evaluate the methods used by the Bureau of Water Works to maintain major components of the water distribution system, including mains, valves, hydrants, meters, and service lines to customers. We analyzed (1) the quality, reliability, and accessibility of the Bureau's asset records, (2) the organization and scheduling of personnel resources, (3) the inventory of parts, supplies, and vehicles used to carry out maintenance work, and (4) the Bureau's application of automated information systems to facilitate planning and tracking of maintenance activities. We also reviewed the impact of major issues and challenges the Bureau is currently facing. We conducted our work in accordance with generally accepted government auditing standards.



Photo by David Kling

BACKGROUND

The Bureau of Water Works constructs, maintains, and operates the City of Portland's water system to ensure sufficient quantities of water are available for fire suppression and for distribution to water customers. For years, the Bureau has provided reliable, high quality, and reasonably priced water to residential and wholesale customers in the Portland region. The Bureau's financial and operational results have compared favorably to water utilities in the region and around the country. Recently, however, several events have threatened the Bureau's ability to fund and operate a high quality water system. Specifically,

- New federal and state regulatory demands may require significant capital funding in the future

- Declines in retail and wholesale water sales due to conservation and the use of alternative water sources could place upward pressure on water rates
- Failure of the customer service billing system tarnished the Bureau's reputation for good management and required shifting of resources from maintenance activities to customer service

These challenges are occurring at a time when the Bureau must begin addressing an aging infrastructure that will require significant resources over a number of years to replace and rehabilitate.

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OFFICE OF THE PORTLAND CITY AUDITOR

Gary Blackmer, City Auditor • Richard Tracy, Director of Audits

AUDIT RESULTS

Our review of the water distribution system indicates that Bureau maintenance efforts are not at levels viewed as adequate by Bureau managers and fall short of industry standards in several areas. Water mains are flushed and replaced infrequently; valves receive minimal exercising and maintenance; and meters are repaired and replaced slowly. In addition, the backlog of needed repairs has grown. Although water quality and reliability have not yet been adversely affected, we believe that a continued decline in the maintenance of water distribution system assets could negatively affect water service performance in the future.

We have concluded that the decline in maintenance service levels has been affected by several factors, including reductions in resources devoted to maintenance and a surge in retirement of experienced personnel. While addressing staffing and funding issues is essential, long-term solutions to distribution maintenance also must include making improvements in the Bureau's maintenance management systems. First, the Bureau lacks a clear and comprehensive maintenance plan that establishes overall maintenance goals, standards for the amount and frequency of work, and work priorities. It also lacks an adequate policies and procedures manual for maintenance personnel to follow.

Second, the Bureau lacks complete and reliable information on the nature and condition of water system assets. The Bureau has worked for eight years to develop an automated Geographic

DECLINE IN WATER MAIN REPLACEMENT

FY 1998-99 through FY 2002-03

Fiscal Year	Feet of mains replaced	Expenditures* (millions)
FY 1998-99	46,500	\$8.6
FY 1999-00	46,000	\$5.4
FY 2000-01	12,900	\$4.1
FY 2001-02	15,600	\$2.7
FY 2002-03	9,800	\$4.0
5-year change	-79%	-53%

SOURCE: Water Bureau records.

* Adjusted to FY 2002-03 dollars

Information System (GIS) to provide needed asset information. Progress has been slow and costly, and a substantial effort is needed to eliminate multiple databases, reduce backlogs, and correct data errors.

Finally, the Bureau lacks adequate methods for organizing and scheduling maintenance work. While the Bureau recently implemented a work order system for one of its maintenance work groups, we believe a centralized maintenance management system is needed to schedule and track the work of all Bureau maintenance personnel. The Bureau needs to eliminate duplicative work order procedures in various maintenance work groups and establish methods for tracking the time and costs of maintenance activities.

RECOMMENDATIONS

Our review indicates the Bureau has taken a number of steps to address distribution system maintenance weaknesses, including the creation of special maintenance teams and implementation of a new work order system. However, we believe the Bureau needs to take a more comprehensive approach to improving its maintenance management program. Specifically, we recommend that the Bureau:

- Prepare a comprehensive maintenance master plan to guide the maintenance of the distribution system.
- Better plan and coordinate efforts to improve the reliability and accessibility of water system asset information.
- Improve systems for organizing, scheduling, and tracking maintenance work.
- Develop and report improved performance measures to track the efforts and accomplishments of water system maintenance activities.

RESPONSES TO THE AUDIT

The Commissioner's Office supports the audit recommendations and states that the audit will be a useful tool in determining priorities for the water distribution system. The Commissioner agrees with the auditors' conclusion that a lack of resources and recent staff disruptions caused by the billing system problems have contributed to inconsistencies found in distribution system maintenance.

The Administrator of the Bureau of Water Works also agrees with the report's recommendations and proposes detailed actions for addressing them. The Bureau plans to establish a new Asset Management Group within the Engineering Division that will be responsible for developing a distribution system master plan. The plan will identify and describe deficiencies in the distribution system and establish priorities for addressing the deficiencies.

The Bureau hopes to expedite the implementation of its Geographic Information System (GIS) by changing its approach and adding staff. The Bureau is in the process of installing a link between the GIS and the Synergen Maintenance Management System (MMS) so the two systems can share information directly. The Bureau also hopes to increase the staffing of the Distribution Maintenance Team (DMT) to allow more rapid condition assessment of distribution system assets.

The Water Bureau Administrator also indicates that the Bureau is in the midst of an organization-wide development process to establish relevant performance measures. In March 2004, the Bureau adopted a revised mission, vision, and values statement and is committed to the development of "The Balanced Scorecard" as a means of tying organizational strategies to performance measures.

For the **complete** *Portland's Water Distribution System: Maintenance Program Needs Improvement* report (#299, issued August 2004):

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