



Highlights of [GAO-07-480](#), a report to the Chairman, Committee on Environment and Public Works, U.S. Senate

## Why GAO Did This Study

Wastewater facilities provide the essential service of collecting and treating wastewater, and discharging treated effluent into receiving waters. Since September 11, 2001, the nation's water infrastructure has received greater attention, including the risk of terrorist attacks at wastewater facilities that store hazardous chlorine gas for disinfection.

In 2006, GAO reported that many large wastewater facilities have responded to this risk by voluntarily conducting vulnerability assessments and converting from chlorine gas to other disinfection methods. The Clean Air Act requires all wastewater facilities that use threshold quantities of chlorine gas to prepare and implement risk management plans to prevent accidental releases and reduce the severity of any releases.

In this study, GAO was asked to provide information on (1) the range of costs large wastewater treatment facilities incurred in preparing vulnerability assessments and risk management plans, and (2) the costs large wastewater treatment facilities incurred in converting from chlorine gas to alternative disinfection processes. To answer these questions, GAO conducted structured telephone interviews with a number of facilities surveyed for the 2006 report. The Environmental Protection Agency (EPA) agreed with the report and provided several technical changes and clarifications.

[www.gao.gov/cgi-bin/getrpt?GAO-07-480](http://www.gao.gov/cgi-bin/getrpt?GAO-07-480).

To view the full product, including the scope and methodology, click on the link above. For more information, contact John Stephenson at (202) 512-3841 or [stephensonj@gao.gov](mailto:stephensonj@gao.gov).

# SECURING WASTEWATER FACILITIES

## Costs of Vulnerability Assessments, Risk Management Plans, and Alternative Disinfection Methods Vary Widely

### What GAO Found

Among the large wastewater facilities GAO examined, the costs reported to prepare vulnerability assessments ranged from \$1,000 to \$175,000, while costs to prepare risk management plans ranged from less than \$1,000 to over \$31,000. Whether the documents were prepared in-house or contracted to third parties such as engineering firms was a factor in cost differences. Despite higher costs, some facilities preferred to use contractors due to their expertise and independence. According to one wastewater security official, these attributes can give contractor findings and recommendations greater credibility with utility governing boards that determine spending priorities. One facility that used a contractor to complete a vulnerability assessment in 2002 did so because, at the time, vulnerability assessment software and training were not widely available. Since that time, EPA has increased funding for the development and dissemination of risk assessment software and related training. Overall, cost estimates for vulnerability assessments and risk management plans did not relate to facility size, as measured by millions of gallons of wastewater treated per day.

For the large wastewater facilities GAO examined, reports of actual and projected capital costs to convert from chlorine gas to alternative disinfection methods range from about \$650,000 to just over \$13 million. Most facilities converted, or planned to convert, to delivered sodium hypochlorite (essentially a concentrated form of household bleach shipped in bulk to the facility). Managers of these facilities told GAO they considered other options, but chose delivered sodium hypochlorite because its capital conversion costs were lower than those associated with other alternatives, such as generating sodium hypochlorite on-site or using ultraviolet light. Overall, the primary factors associated with facilities' conversion costs included the type of alternative disinfection method chosen and the size of the facility. Other cost factors facility managers cited included (1) whether existing buildings and related infrastructure could be used in the conversion, (2) labor and building supply costs, which varied considerably among locations, (3) the cost of sodium hypochlorite relative to chlorine gas, and (4) the extent to which training, labor, and regulatory compliance costs were reduced for utilities that no longer had to rely on chlorine gas.