



Seismic Mitigation of Public Water System

Full Mitigation Best Practice Story

Shelby County, Tennessee

Shelby County, TN - Shelby County is located within the impact area of the New Madrid fault system. At the University of Memphis' Center for Earthquake Research and Information, they have reported a 40 to 60 percent probability of a New Madrid Seismic Zone earthquake in the magnitude of 6.0 to 6.3 within the next 15 years. Memphis Light, Gas and Water (MLGW) own and operate the water supply system for Shelby County, excluding the incorporated towns other than Memphis and certain private wells. The need to protect and maintain stability of the water supply system for the entire Shelby County area was significant.



The MLGW has initiated a seismic retrofit project to protect its Davis Water Pumping Station (located in southeast Memphis), and to enhance the survivability of the connections between the water distribution lines in 55 (one-third) of the city's production wells. MLGW withdraws water from aquifers of approximately 170 independent wells.

Retrofit plans included reinforcing and anchoring masonry walls; strengthening steel frames; improving the connection of concrete wall and roof, securing anchorage of pipes and valves, and bracing of pipelines; bracing of treatment and control equipment; and protecting an overhead crane.

The estimated cost to replace the pumping station in the event of a large earthquake is over \$17 million. Additionally, each day the station is not in service costs \$1.4 million. The total projected savings is \$112 million. Increasing the capability of water well connectors to withstand a 6.5 to 7.5 magnitude earthquake, at a cost of \$9,280 per connector, prevents an estimated loss of \$188,000 per day for each connector damaged.

Activity/Project Location

Geographical Area: **Single County (County-wide)**

FEMA Region: **Region IV**

State: **Tennessee**

County: **Shelby County**

Key Activity/Project Information

Sector: **Public**
Hazard Type: **Earthquake**
Activity/Project Type: **Retrofitting, Structural**
Activity/Project Start Date: **11/1996**
Activity/Project End Date: **Ongoing**
Funding Source: **Hazard Mitigation Grant Program (HMGP); Local Sources**
Funding Recipient: **Lifelines - Water/Sewer**
Funding Recipient Name: **memphis Light, Gas, and Water**

Activity/Project Economic Analysis

Cost: **\$968,800.00 (Actual)**

Activity/Project Disaster Information

Mitigation Resulted From Federal
Disaster? **Yes**
Federal Disaster #: **910 , 06/21/1991**
Value Tested By Disaster? **No**
Repetitive Loss Property? **Unknown**

Reference URLs

Reference URL 1: <http://www.fema.gov/>
Reference URL 2: <http://neic.usgs.gov/>

Main Points

- The MLGW has initiated a seismic retrofit project to protect its Davis Water Pumping Station (located in southeast Memphis), and to enhance the survivability of the connections between the water distribution lines in 55 (one-third) of the city's production wells.
- Retrofit plans included reinforcing and anchoring masonry walls; strengthening steel frames; improving the connection of concrete wall and roof, securing anchorage of pipes and valves, and bracing of pipelines; bracing of treatment and control equipment; and protecting an overhead crane.
- The estimated cost to replace the pumping station in the event of a large earthquake is over \$17 million.