Seattle Public Utilities

Water System Seismic Vulnerability Study

General Information

Any project inquiries should be in writing and directed to:

Bill Heubach, Project Manager
Seattle Public Utilities
700 Fifth Avenue, Suite 4900
P.O. Box 34018
Seattle, WA 98124-4018

Email: bill.heubach@seattle.gov

Background

The Seattle Public Utilities water system provides potable water to 1.3 million residents in the Puget Sound area. Seattle Public Utilities water sources include two major watersheds that drain to the Chester Morse and the Tolt reservoirs. Water treatment is provided at the Tolt River and Cedar River water treatment facilities. The regional and sub-regional water transmission systems include approximately 193 miles of pipeline, seven covered reservoirs, 15 pump stations, six elevated tanks and standpipes, and 129 wholesale customer taps with meters. The distribution system contains more than 1,680 miles of watermains, two open reservoirs, six covered reservoirs, 16 pump stations, and six elevated tanks and standpipes that serve individual residential and non-residential properties in the retail service area.

A comprehensive seismic vulnerability assessment was completed in 1990 by Cygna Energy Services. This assessment evaluated the seismic vulnerability of most SPU facilities to 100-year return interval and 500-year return interval earthquake ground motions. There have also been a few studies that used hydraulic models to estimate overall SPU system response to seismic events. Since these studies were completed, the understanding of the seismicity of crustal faults in the Puget Sound area has dramatically changed, lessons have been learned on water system performance from recent earthquakes and seismic codes and standards have evolved. The purpose of this project will be to re-evaluate the seismic vulnerability of SPU water system facilities and the overall system response and then develop mitigation alternatives that are consistent with performance goals that are being established by SPU concurrently with the project.

Project Scope

The anticipated project tasks are to:

1. Define earthquake hazards for two earthquake scenario events: a M9.0 Cascadia subduction earthquake and M6.5 to M7.0 Seattle Fault earthquake.
2. Make seismic vulnerability assessments for all water transmission and distribution system facilities, including distribution pipelines.

    a. Defined earthquake scenarios
    b. ASCE/SEI 7-10

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3. Estimate current water transmission and distribution system performance for two representative earthquake scenarios (hydraulic modeling is anticipated to be done by SPU staff).
4. Identify which facilities need further analysis and/or upgrade in order to meet the performance goals or meet current seismic standards. Identify emergency preparedness and response procedures that can be used to mitigate seismic effects. Develop planning level cost estimates to upgrade facilities or implement emergency preparedness and response procedures to meet performance level goals. Provide a recommended plan and timeframe for the Seismic Capital Improvement Program. The investments will be prioritized by risk/criticality and will consider SPU budget constraints.
5. Develop seismic design standards for new SPU water transmission and distribution facilities with an emphasis on pipelines.

Contracting Opportunities

Schedule of Events	Target Date
RFQPA Release	March 2015
Pre-Proposal Conference	Approximately One Week After RFQPA release