



State Of California
SEISMIC SAFETY COMMISSION
GOVERNOR EDMUND G. BROWN, JR.

**Comments on the Significance of Changes in the
San Francisco Public Utilities Commission's
Water System Improvement Program (WSIP)
With Respect to Seismic Hazards**

August 31th Draft
September 8, 2016 Pending Commission Action

Introduction

The SFPUC's water transmission system serves 26 wholesale customers in addition to delivering water to the San Francisco City Distribution Division's retail system to benefit approximately 2.6 million users. In 2002 the state enacted the Wholesale Regional Water System Security and Reliability Act (AB 1823, Chapter 841, 2002, Section 73502 of the State Water Code). The Act:

- Requires the City and County of San Francisco to adopt a "program of capital improvement projects designed to restore and improve the Bay Area regional water system that are described in the capital improvement program report prepared by the San Francisco Public Utilities Commission (SFPUC) dated February 25, 2002"; and,
- Lists nine key improvement projects for the regional water system commonly known as the "Hetch Hetchy" system; and,
- States: "If the city adopts a change in the program that deletes one or more projects from the program, or postpones the scheduled completion dates, the city shall promptly furnish a copy of that change and the reasons for that change to the State Department of Health Services (now the California Department of Public Health) and the California Seismic Safety Commission;" and,
- Requires the SFPUC to produce a Program schedule by 2003 showing that "...projects representing 100 percent of the total program cost be completed on or before 2015." The Act specifically allows the SFPUC to modify the schedule if necessary; and,
- Requires the California Seismic Safety Commission (CSSC) to "submit written comments with regard to the significance of that change with respect to public health and safety" within 90 days of receiving a notice of changes to the scope or schedule of the previously proposed 2002 SFPUC Capital Improvement Program (CIP) and subsequent changes. The purpose of the CSSC's review is to assess the level of risk to the public health and safety associated with potential interruption of the water supply from seismic events that any such delays may present.

On July 1, 2016, the CSSC received another notice of changes from the SFPUC dated June 30, 2016. This is the CSSC's ninth review of changes to the Water System Improvement Program. Prior CSSC reviews occurred in 2006, 2008, 2010, 2011, 2012, May and September 2013, and 2014 in response to changes in the Program in late 2005, 2007, 2009, 2011, 2012, February and September 2013, and 2014.

Scope and Limitations of these Comments

The CSSC considered changes to the WSIP that the SFPUC made between June 2014 and June 2016 when generating the comments below. Appendix A lists the planned seismic safety projects and their schedule changes from the 2002 CIP to the 2016 WSIP including the nine key projects identified in the Act. In addition, the CSSC considered construction progress to date.

CSSC Commissioner Michael Gardner and staff prepared this report and made a presentation to the CSSC at its September 8, 2016, meeting. Appendices B and C list the sources of information that CSSC used during this review.

As required by the Act, the CSSC has prepared comments that address schedule delays in the regional WSIP. The Act's comment period only allows for limited review and comments by CSSC staff and commissioners. In addition, although some Commissioners and staff are licensed professionals who are familiar with certain technical aspects of the seismic design of water systems, in their roles of serving the public as Commissioners and staff, they do not perform engineering or other licensed work. Rather, the CSSC's primary mandate is to provide policy advice to the Governor, the Legislature, and the public. Consequently, this effort does not constitute work by licensed professionals on the Commission or its staff. In generating the comments below, the CSSC does not assume responsibility for the integrity or reliability of any aspect of the WSIP. The Commission also does not regulate, certify, approve or disapprove of the WSIP or any of its changes.

Notwithstanding the foregoing, in the interest of assisting the SFPUC and serving the public, the CSSC has included additional comments and recommendations that it believes are relevant to public health and safety.

The Original Capital Improvement Program in 2002 and Major Changes in 2005

In 2002, the seismic upgrade component of the CIP was composed of a collection of projects intended to limit the loss of service to the SFPUC's wholesale customers following major earthquakes. The 2002 CIP was prepared and evaluated in an intuitive manner without the benefit of specific seismic performance objectives, quantitative analysis of alternatives, or a schedule that allowed for a programmatic environmental impact review (PEIR). The CIP was renamed the Water System Improvement Program and the SFPUC adopted more specific Levels of Service Goals and significant changes to the scope of the program in 2005.

Progress in the Water System Improvement Program as of March 2016

Reportedly 89 percent of construction and design has been completed for the 52 regional projects currently in the Program. The most significant changes from the April 2014 to the March 2016 schedules were various delays to six projects as well as a delay to the program's overall completion of an additional seven months which is a cumulative delay of 45 months compared to the initial schedule in 2002. The program budget is currently \$4.8 billion. Of the nine key seismic safety projects listed in State Water Code, all have been delayed significantly with respect to the 2002 schedule:

**Seismic Safety Projects
Referenced in the Water Code**

**Scheduled Delay (Months) Constr.
Relative to 2002 Schedule Status***

New Irvington Tunnel*	88	In Progress
Crystal Springs to San Andreas Reservoir Transmission Upgrade	47	Completed
Bay Division Pipelines 1 and 2 Repairs See BDPL Reliability Upgrade		
Bay Division Pipeline (BDPL) Reliability Upgrade Tunnel	42	Completed
BDPL Reliability Upgrade Pipeline	37	Completed
Seismic Upgrade Bay Division Pipelines 3 and 4	76	In Progress
Alameda Siphon #4 Upgrade	46	Completed
New Crystal Springs Bypass Tunnel	39	Completed
Bay Division Pipelines 3 and 4 Crossover/Isolation Valves	10	Completed
Calaveras Dam Projects*	127	In Progress

*Projects that the SFPUC indicates have secondary roles in providing the system with seismic reliability

**Other Seismic Safety Projects with
Primary Roles in the System’s Seismic Reliability**

Standby Power Facilities	35	Completed
Bay Division Pipeline Nos. 3 and 4 – Crossovers	17	Completed
Harry Tracy Water Treatment Plant Short Term Improvements	-28(Early)	Completed
Harry Tracy Water Treatment Plant Long Term Improvements	+9	In Progress
Crystal Springs/San Andreas Transmission Upgrade	47	Completed
Crystal Springs Pipelines No. 2 Replacement	-11(Early)	Completed
San Andreas Pipeline No. 3 Installation	-27(Early)	Completed
Baden & San Pedro Valve Lots Improvements	17	Completed
Peninsula Pipelines Seismic Upgrade (**Started 2009, includes Phase 3) 42**		In Progress

The State Water Code provides that the SFPUC may change projects and schedules in the Water System Improvement Program without the State’s permission, but that if San Francisco deletes or delays projects, the CSSC must be informed. Appendix A presents the adopted changes to the Water System Improvement Program schedule since its original adoption by San Francisco in 2002.

Comments within the Scope of the Act

1. **Schedule Changes.** The latest delays affect compliance with the seismic reliability Level of Service goals for the WSIP including the goal of meeting average-day demands of up to 300 million gallons per day within thirty (30) days after major earthquakes occur in the San Francisco Bay Region.

Revised estimates of completion dates for the projects originally identified as key for seismic safety are expecting cumulative delays at worst ranging from under one to over six years compared to the 2002 schedule. The effect of cumulative delays is a forestalling of seismic safety reliability for the regional water system that increased the window of vulnerability in which major earthquakes could have occurred before critical seismic safety portions of the upgrade were completed. However, the most recent delays do not adversely affect the seismic safety levels of service for the Program since the major seismic projects that experienced additional delays are now in service. So the latest additional delays will not materially increase the window of vulnerability in which major earthquakes occur before critical seismic safety portions of the upgrade are completed. The additional seven month delay for the overall program affects only components that are not critical to seismic safety.

The CSSC notes that the SFPUC has incrementally reported delays in 2005, 2007, 2009, 2011, 2012, February and September 2013 and 2014 in addition to this latest set of delays.

2. **Project Scope Changes.** There were no projects deleted.

Conclusions and Recommendations

The SFPUC continues to make progress and refinements to its Water System Improvement Program. However, it is behind the SFPUC's original 2002 program schedule submitted to the State in 2003 that showed 100 percent completion of the seismic portions of the projects by 2015. The CSSC recognizes that the SFPUC has the authority to delay progress that projects have been added, and the scope of the Program has evolved since then. Major schedule delays reported since 2002 continue to adversely impact the Program with respect to public health and safety should major earthquakes occur before completion of the Program.

Appendix A

Water System Improvement Program

Seismic Reliability Projects and Schedule Comparisons

The San Francisco Public Utilities Commission is undertaking a Water System Improvement Program to enhance the Hetch Hetchy water transmission system with an anticipated 2019 completion of seismic projects. The table below summarizes the major seismic reliability projects and compares schedules between the 2002 Program and subsequent changes in 2005, 2011, April 2014, and March 2016. Changes in 2007, 2009, 2012, and 2013 are not shown. Please refer to prior Commission reports for those changes.

Water System Improvement Program Seismic Projects	Project Closeout Dates Estimated					2002 to March 2016 Variance (Months)
	2002	2005	2011	April 2014	March 2016	
Standby Power Facilities	Nov 2013	Dec 2010	Dec 2010	Dec 2010	Dec 2010	-35
New Irvington Tunnel	Aug 2009	Sep 2013	Oct 2014	Mar 2016	Dec 2016	+88
Alameda Siphon #4 Upgrade**	**	Apr 2011	Jun 2012	June 2013	June 2013	+46
Pipeline Repair & Readiness	Sep 2004	Mar 2007	Apr 2009	Apr 2009	Apr 2009	+55
Calaveras Dam Projects	May2009	June 2012	Jul 2016	May 2019	Dec 2019	+127
Bay Division Pipelines 3&4 Crossover/ Isolation Valves	N/A	Sep 2008	Jul 2009	July 2009	July 2009	+10
Seismic Upgrade Bay Div. Pipelines 3&4	Aug 2010	Oct 2012	Apr 2015	Dec 2015	Dec 2016	+76
Bay Division Pipeline (BDPL) Reliability Upgrade Tunnel	Feb 2013	Jan 2014	Nov 2015	Mar 2016	Aug 2016	+42
BDPL Reliability Upgrade Pipeline	Feb 2013	Jan 2014	Mar 2013	Apr 2015	Mar 2016	+37
Bay Division Pipelines (BDPL) Nos. 3 & 4 Crossovers***	Jan 2013	N/A	May 2013	June 2014	June 2014	+17
New Crystal Springs Bypass Tunnel	May2009	Oct 2010	Mar 2012	Aug 2012	Aug 2012	+39
Harry Tracy Water Treatment Plant Short Term Improvements	Nov 2012	Sep 2010	Jul 2010	July 2010	July 2010	-28
Harry Tracy Water Treatment Plant Long Term Improvements	Mar 2016	Apr 2014	Dec 2015	Jan 2016	Dec 2016	+9
Capuchino Valve Lot Improvements	Mar 2016	Jul 2009	Aug 2008	Aug 2008	Aug 2008	-91
Crystal Springs/San Andreas Transmission Upgrade	Jul 2011	Apr 2014	Apr 2014	June 2015	June 2015	+47
Crystal Springs Pipeline No.2 Replacement	Nov 2015	Apr 2012	Sep 2013	July 2014	Dec 2014	-11
San Andreas No.3 Pipeline Installation	Nov 2014	June 2011	Nov 2011	Aug 2012	Aug 2012	-27
Baden & San Pedro Valve Lots Improvements	^	Oct 2011	Aug 2012	Mar 2013	Mar 2013	+17^
Sunset Reservoir North Basin	Oct 2014	May 2009	Sep 2010	Sept 2010	Sept 2010	-49
Peninsula Pipelines Seismic Upgrade (Including Phases 1,2, and later 3)	^^	Dec 2014^^	Jul 2016	July 2016 (Ph1&2) June 2018 (Ph 3)	July 2016	+19^^ 42^^
Bay Div Pipelines (BDPL) 1 & 2 Repairs***	Jan 2013	N/A	N/A	N/A		N/A
Overall WSIP Completion	Mar 2016	Jun 2014	July 2016	May 2019	Dec 2019	45

Footnotes: For delays in 2007 and 2009 please refer to the Seismic Safety Commission's prior reviews in 2008, 2010, or 2011.

Projects in bold are listed in CA Water Code Section 73502(b) added by AB 1823 (Chapter 841, Statutes of 2002).

** The Alameda Siphon Upgrade is now a separate project that was previously combined with the New Irvington Tunnel.

*** The SFPUC removed these projects from the WSIP since they are not required to achieve the new Levels of Service Goals. Refer to the Bay Division Pipeline Reliability Upgrade Project for BDPL 1 and 2 Repairs.

^ Completion date established in 2005; ^^ in 2009, and note that Phase 3 of the PPSU has been removed from the WSIP

Appendix B

List of Documents Received/Reviewed/Generated

Notice of Changes to Water System Improvement Program by the San Francisco Public Utilities Commission (SFPUC), June 30, 2016, received July 1, 2016.

Prior CSSC reviews since 2006.

Appendix C

September 8, 2016 CSSC Hearing, minutes available at www.seismic.ca.gov