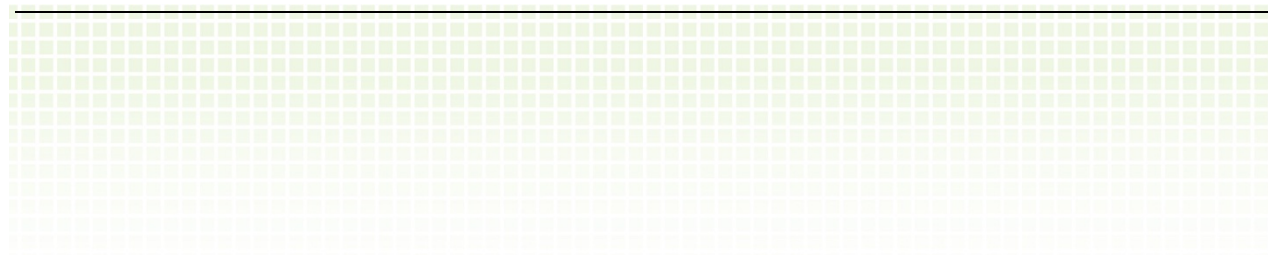


Summary of San Francisco Peninsula Extreme Event Reliability Assessment



California ISO
Shaping a Renewed Future

June 6, 2013

Version: Draft

Prepared by: Infrastructure Development

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1. Introduction

The San Francisco-Peninsula transmission system is in the center of PG&E's service territory, serving urban load centers across a unique geographic landscape. In the ISO's 2012-2013 Transmission Planning Process (TPP), the reliability assessment for the Greater Bay Area-San Francisco identified Category-D contingencies, extreme events, which result in potential impacts for the majority of San Francisco and the northern San Francisco Peninsula.

The potential consequences of such an extreme event could pose a significant risk to providing safe and reliable energy to customers in the densely populated City and County San Francisco and the San Francisco Peninsula. The purpose of this study is to:

- identify the system performance after extreme events;
- identify the risk and impacts of extreme events in the San Francisco Peninsula area; and
- based upon the system performance, risks and impacts, identify potential alternatives to mitigate for the extreme events

The ISO conducted a detailed assessment and held a stakeholder meeting on May 29, 2013. The reliability assessment and presentations from the stakeholder meeting are being handled on a confidential basis and therefore are being made available for stakeholder reference through the Market Participant Portal at <https://portal.aiso.com/tp/Pages/default.aspx> under the transmission planning section. The non-disclosure agreement and criteria for accessing the site are available at <http://www.aiso.com/planning/Pages/TransmissionPlanning/Default.aspx> under the "Accessing Transmission Data" heading.

2. Background

The San Francisco Peninsula Area is composed of cities in two counties which are San Francisco and San Mateo County. The major cities in the area are San Francisco, San Bruno, San Mateo, Redwood City, and Palo Alto. The risks associated to supplying the loads in the San Francisco Peninsula are unique within the ISO controlled grid because the area:

- lies within one of the most seismically active areas in the United States amongst large urban areas;
- is entirely dependent on electric imports¹; and
- is geographically isolated given that it is surrounded by water on three sides.

¹ Hunter's Point Power Plant retired in 2006, Potrero Units 3, 4, 5, and 6 retired on February 28, 2011 and closure of United Co-gen in the Peninsula occurred on January 27, 2012

3. Study Assumptions

Unless otherwise specified here, this assessment of the San Francisco Peninsula system was conducted with similar assumptions described in the 2012-2013 TPP study plan. The base cases, demand forecast and transmission system project assumptions are consistent with the base cases created for the 2012-2013 TPP. All CAISO approved projects with a planned in-service date prior to the summer of the year that the base case represents were included. In addition, relevant projects approved in the CAISO's 2012-2013 Transmission Plan have been included.

3.1. Reliability Standards

The reliability standards applicable to this assessment are consistent with Section 2.2 of the ISO 2012-2013 Transmission Plan. The studies conducted within the ISO 2012-2013 Transmission Planning Process (TPP) assessed the study area in detail for Category A, B and C contingencies with mitigation plans to address the reliability requirements. The ISO 2012-2013 TPP assessed the impact of critical Category D contingencies. The requirements of NERC TPL-004 requires Category D contingencies to be assessed but they do not require mitigation plans to be developed for these extreme events. This study assessed the NERC Category D as well as and other credible contingencies to analyze system performance in the San Francisco Peninsula area following extreme events resulting in the loss of two or more bulk electric system elements.

3.2. Types of Events

The types of events assessed include seismic, co-located facility failures, and third party actions.

The San Francisco Bay Area lies within one of the most seismically active areas in the United States. Seismic issues can affect substations, above ground cables, and below ground cables, and transmission system impact scenarios are well documented due to the history of prior seismicity in the Bay Area. This assessment looked at the likelihood that an event will affect various types of facilities on the San Francisco Peninsula, as well as the duration of service outages resulting from such an event.

Vandalism and Third Party Action impacting substations were also evaluated in this assessment, and refer to man-made accidents, or acts of vandalism and terrorism on critical substation infrastructure. This assessment looked at the likelihood and impact of such events on the same set of facilities within the area, and evaluated the duration of service outages arising from such an event and the alternatives or complementary action that can be taken as preventative measures.

Co-located Facility Failure is another component of the risk assessment. This component looked at the frequency of cable or substation equipment failure due to Co-located infrastructure asset failures such as gas pipelines or water mains, the impact of such a failure of service to the City and peninsula, and contingency planning for such events.

4. Need Assessment

The ISO has conducted an assessment of the extreme events. The assessment considered the system performance following the extreme event as well as the risks and impacts of potential extreme events.

While the risk of extreme events that would result in the contingencies to the electric system could be considered low, the impacts of such events would be significant. Accordingly, the ISO will need to develop potential mitigation plans to address the system performance concerns identified for the extreme events.

5. Potential Mitigation

The need assessment concluded that mitigation plans should be developed to address the system performance concerns identified for the extreme events. The following are mitigation alternatives to be considered in developing the mitigation plan for the extreme event in the peninsula area. The intention of this document and the more detailed report posted on the secure website is not to analyze the alternatives; this will be done separately and provided in a subsequent report.

- No mitigation (*not acceptable based upon Assessment*)
- Expanded mobile and spare equipment contingency plans and strategy
- Modifications or upgrades to 230 kV system
- Upgrades to 115 kV system
- New 230 kV supply into North Peninsula area:
 - Moraga
 - Pittsburg
 - East Shore
 - San Mateo

6. Next Steps

The process for assessing extreme events in the San Francisco Peninsula has been divided into two stages:

- Reliability Assessment; and
- Alternatives Assessment and Recommended Mitigation Plan

The ISO, with support from PG&E on the risks and impacts, has conducted the reliability assessment of extreme events in the San Francisco Peninsula area discussed herein and in the more detailed report posted on the secure website. The ISO held a stakeholder meeting on May 29, 2013, on the reliability assessment and potential mitigation alternatives to be assessed in detail. Consistent with the schedule below stakeholder may provide comments on the reliability assessment and the identified potential mitigation alternatives or suggest other alternatives to be considered in the evaluation of mitigation alternatives.

The ISO will assess the alternatives to mitigate the reliability concerns identified and will recommend a mitigation plan. The ISO will provide stakeholders an opportunity to review and comment on the alternative assessment and recommendation prior to completing its recommendation. The recommended mitigation plan will then be brought to the ISO's Board of Governors for approval.

Table 8-1 provides the milestone schedule for the for the stakeholder consultation on the Reliability Assessment and the Alternative Assessment and Recommended Mitigation Plan.

Table 8-1: Milestone Schedule

Date	Action Item
May 10, 2013	Issue Market Reliability Assessment for Stakeholder Session
May 29, 2013	Stakeholder Meeting on Reliability Assessment
June 6, 2013	Issue Reliability Assessment, accessible on the ISO Market Participant Portal
June 19, 2013	Stakeholder comments due on Reliability Assessment
July 8, 2013	Finalize Reliability Assessment
July 15, 2013	Issue Market Notice on Alternative Assessment and Recommended Mitigation Plan for the Stakeholder Session
July 30, 2013	Issue Alternative Assessment and Recommended Mitigation Plan to Stakeholders
August 6, 2013	Stakeholder Meeting on Alternative Assessment and Recommended Mitigation Plan
August 20, 2013	Stakeholder Comments due on Alternative Assessment and Recommended Mitigation Plan
September 5, 2013	Final Recommended Mitigation Plan issued
September 12 & 13, 2013	ISO Board Meeting for Approval of Recommended Mitigation Plan