Hydrostatic Pipeline Testing Implications on Electric System and Pipeline Integrity

KCAMMEE VREMAN

STRENGTH TESTS/ DIGS

WORKSTREAM PROGRAM MANAGER

Natural Gas Stakeholders Working Group

California Energy Commission

Wednesday April 16, 2014

Sacramento, CA

Agenda

- Hydrostatic Pipeline Testing
- Strength Test Results
- Strength Testing and Power Plants
- Strategy for Testing Lines Feeding Power Plants
- Photos
- Q&A

Hydrostatic Pipeline Testing

The testing involves pressurizing a section of pipe with water to a level above the pipes Maximum Allowable Operating Pressure (MAOP). PG&E typically tests to a pressure of 1.7 x MAOP which validates the safe operation of the pipeline.

Hydrostatic Pressure Testing Overview

- PG&E obtains all required work permits and coordinates activities with local agencies.
- When possible, gas is temporarily provided to customers from an alternate source.
- The section of pipeline to be tested is removed from service and safely vented of all natural gas.
- The inside is mechanically cleaned prior to testing.
- The section is sealed on both ends and filled completely with water.
- The pipeline is pressurized to a specified pressure greater than MAOP.
- The test pressure is held and monitored for a set period of time, typically 8 hours.
- Any pipe sections that do not pass the test will be replaced with new pre-tested pipe.
- Following a successful test, the section of pipe is emptied of water, dried thoroughly and placed back into service.

Strength Test Results Through December 31, 2013

	2011 Miles Complete	2012 Miles Complete	2013 Miles Complete	Total Miles since 2011
Total Miles Strength Tested	163.6	174.6	198.7	536.9
Total Mileage Records Verified	50.9	27.8	39.7	118.4
Total Miles Addressed	214.5	202.4	238.4	655.3
Total Miles Proposed in PSEP	236	185	204	625
Count of Hydrostatic Tests	97	96	80	273
Count of Ruptures / Leaks	2 / 1	0 / 3	5/6	7/10

Customer Outreach is Critical

- In 2013 PG&E reached out to customers with:
  - 222,155 customer letters
  - 368,275 automated phone messages
  - 39 open houses
- Customer Satisfaction with PSEP Project Communication?
  - 91% favorable
  - Customers feel safer following pressure testing?
  - 85% favorable

Strength Testing and Power Plants

Power Plants that have been affected by Hydrotests

- 2011
  - Algonquin Power – Sanger, CA
- 2012
  - Roseville Energy Park– Roseville, CA
  - Modesto Irrigation District – Modesto, CA
  - Kings River Cogeneration – Fresno, CA
- 2013
  - Turlock Irrigation District – Ceres, CA
  - Calpine Gilroy Energy Center, Gilroy, CA
  - Mirant Pittsburg Power Plant, Pittsburg, CA
- 2014
  - Gateway/Delta Energy/Marsh Landing, Antioch , CA

Strength Testing and Power Plants

Power Plants that will be affected by Hydrotests in 2014

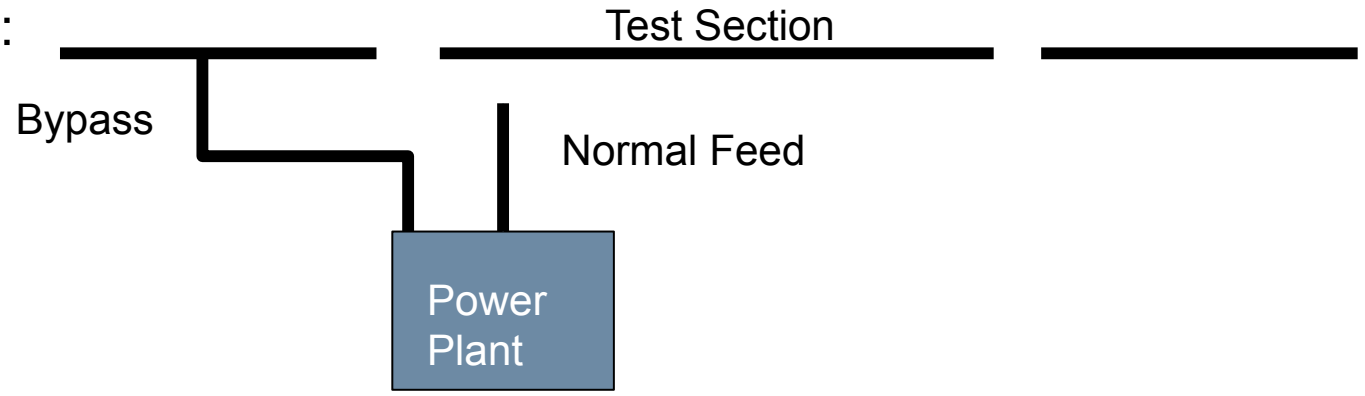
- 2014
  - Humboldt Bay Generating Station, Eureka, CA
  - U C Santa Cruz Cogeneration, Santa Cruz, CA
  - Greenleaf Power (Biomass/Gas Fired), Tracy, CA

Strategy for Testing Lines Feeding Power Plants

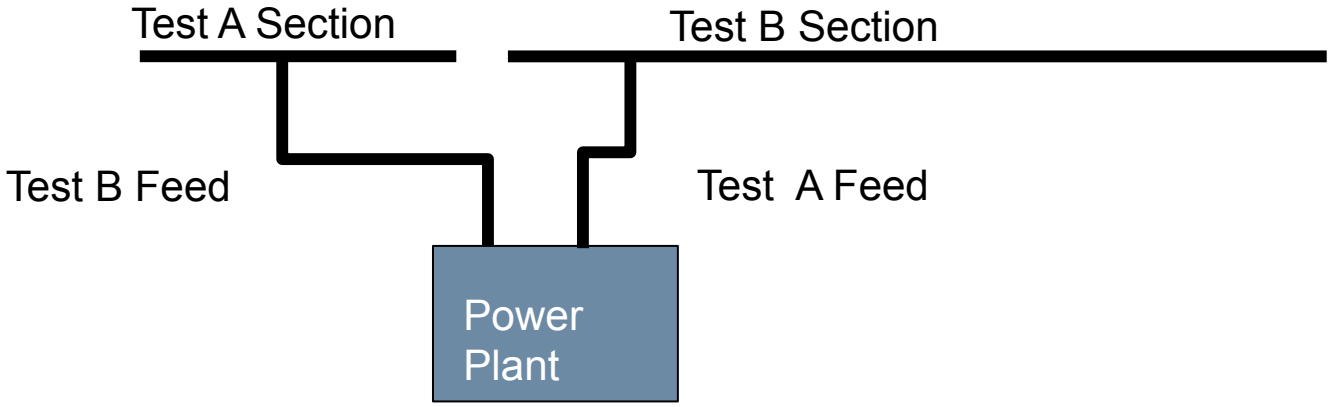
- Independent System Operator (ISO) and PG&E Gas System Operations (GSO) coordination and planning
- Schedule tests during planned shut down for maintenance
- Schedule when the demand is low, between November and April
- Build bypass
- Split Test into two segments
- Use LNG
  - Most Plants gas consumption is too high to be supported by LNG

Power Plant Bypass and Split Test

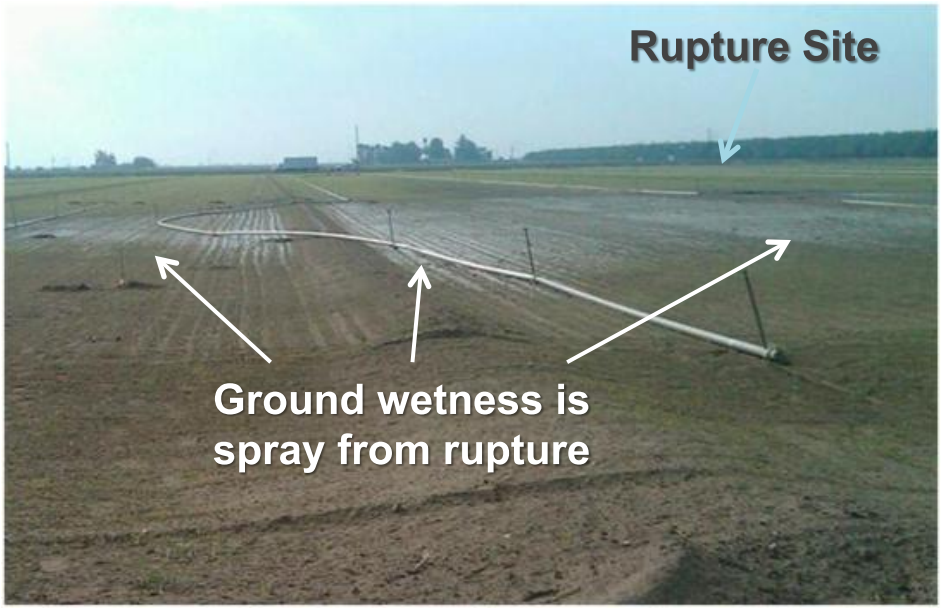
Bypass:



Split Test:



Line 300B Rupture in Bakersfield (2011)



Cause: Seam Failure – Hot crack and incomplete seam weld

Action: Replaced with 84’ of new pipe

Line 132 Rupture in Woodside (2011)

Cause: Mechanical damage from equipment

Action: Replaced with 60' of new pipe

Line 187 Rupture near Soledad (2013)

Cause: Mechanical damage from farm equipment caused seam failure (13 strikes total found from farm equipment)

Action: Replaced with 250’ of new deeper pipe

Line 1615-01 Rupture in Modesto (2013)

Cause: Seam failure
Action: Section of pipe cut out and replaced