Natural Gas System Performance

Hector Madariaga, Director of Emergency Services
Southern California Gas Company

January 16-17, 2014 - University of California, Los Angeles
Topics

» Overview of Southern California Gas Company
» Northridge Earthquake Experiences
  ▪ Gas System
  ▪ Customers/Behind the Meter
  ▪ Recovery Efforts
» Advancements Resulting from Northridge
» Ongoing Efforts to Further Reduce Risks
» Summary
Southern California Gas Company

- Nation’s largest natural gas distribution utility
- 21.1 million consumers
- 5.8 million gas meters
- 136 Bcf of gas storage capacity - 4 fields
- 3,750 miles of transmission pipeline
- ~99,000 miles of main and services

- In business for 140 years
- 20,000 square miles of service territory
- 12 counties served
- 500+ communities served
Gas System Performance
Northridge Earthquake

» 35 transmission leaks/failures (25 in one line- girth welds) - 3 fires
» 154 Distribution steel (80 mains, 74 services)
» 27 plastic distribution - socket fusion joints
» 6,461 Meter set assembly leaks
» 15,021 leaks beyond meter
» 536 additional distribution leaks found that were corrosion related

» Overall supply disruption not an issue due to system flexibility and multiple receipt points
Major Weld Failure - 22” Pre-1930
No damage to 2 – 30” Late 1950 vintage lines in same street

Photograph by M. Rymer

Photos by Gene Blevins, C.F.P.A.
Customer Related
Northridge Earthquake

» 51 natural gas related fires (non-mobile home)
  ▪ 20 water heater related

» Leak breakdown
  ▪ 6,994 appliance connectors (2,526 non-strapped water heaters)
  ▪ 3,602 appliances
  ▪ 2,460 house lines
  ▪ 1,004 yard lines

» 172 mobile homes destroyed by fire
  ▪ Lack of seismic bracing damaged pipe and MSA (up to 3’)

» Customer Orders to restore service - 151,000
  ▪ 88% shut off their own service - no damage

» EQ Valves - 841 triggered, 162 had damage
Recovery Effort
Northridge Earthquake

» 3,400 involved in recovery efforts (maximum level for 5 days)
  ▪ Support from PG&E, SDG&E, SW Gas, Long Beach Gas and contractors (~460)
» Transmission lines recovered in 4 days
» 82% of customers restored in 2-3 weeks
  ▪ Safety and unrepaired damage limited access
» 15 Staging sites
» Major Logistic Challenge
  ▪ Food, housing, order generation, toilets, materials, other
» Total cost ~$40 million
Steps Taken from Lessons Learned

» Significant system studies, and implementation of new seismic design criteria- including above ground facilities

» Began replacing smaller/older supply lines which weren’t a priority

» Supported Legislation requiring water heater straps, and encourage manufacturers to remove legs

» Trailer MSAs now placed 4’ away
  ▪ New seismic requirements

» Assistance Agreements put in place
  ▪ Inter-utility and key contracts

» Emergency Material on hand - strategically placed

» Emergency Exercises - some with other groups
Other Ongoing Efforts

» Some Cities including LA have mandated use of earthquake valves
» Since 2009 Excess Flow Valves are required by federal law for all new single fed residences
» Due to San Bruno incident, CA establishing more stringent safety requirements to
  ▪ More effectively assess and replace higher pressure lines (internal inspection)
  ▪ Ensure proper safety design across faults
  ▪ Put in place more automatic and remote shut off valves
  ▪ Overall focus on safety and risk management
  ▪ Better Deal with third party excavators
A Preventative Measure: Excess Flow Valves (EFV)
Inspection Pig - Magnetic Flux Leakage
General Public Recommendations

» Customers should know how to turn off their gas in case of emergency
  ▪ Turn off only if signs of leaks and it is safe to do so
  ▪ Information on www.socalgas.com/safety
  ▪ Call us if there is a suspected gas emergency
  ▪ Be aware that in normal yard work you can damage a line

» Excavators must notify us before excavating/digging
  ▪ Undetected damage could cause failures in the future due to earthquake or normal operation
Closing Remarks

» Many improvements better prepare us for a major earthquake - we can withstand a major event without major supply disruption

» Some gas facilities will be damaged, and service outages will result
   ▪ Communication system is critical

» Continual Training and Learning from real and simulated events are critical
   ▪ No major event in 20 years - how to get focus
   ▪ Turnover always a concern

» The speed of communication requires us to be much better prepared to deal with media, agencies inquiries, etc.