Audit and Ethics Committee
Item 4c

Subject: Operations Risk Assessment

Purpose: To provide an overview of Metropolitan's approach to manage operational risk.

Audit and Ethics Committee
Item 4c
Summary

This presentation provides an overview of the District's approach to operational risk management. The major operational risks include earthquake, treatment process upset, chemical release, and pipeline rupture. Metropolitan systematically manages these risks.

Operations Risk Assessment

Audit and Ethics Committee
Item 4c
April 27, 2010

Risk

- Risk: the effect of uncertain or unlikely events on objectives
- Areas of risk to Metropolitan
  - Water supply
  - Operations
  - Business
  - Financial

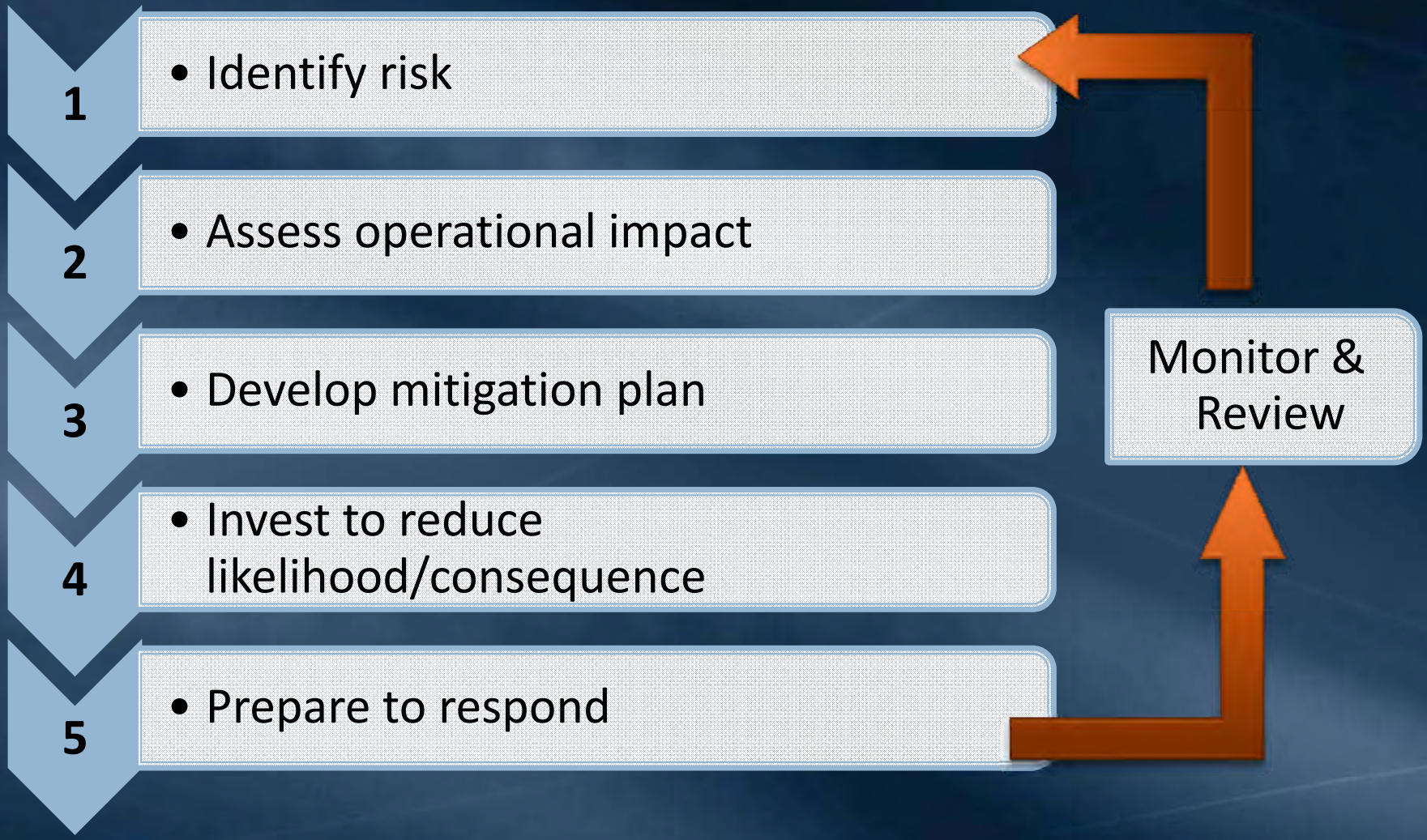
Operational Objectives

- Public health
- Employee safety
- Water delivery
- Emergency response & recovery
- Regulatory compliance
- Consumer confidence

Operational Risks

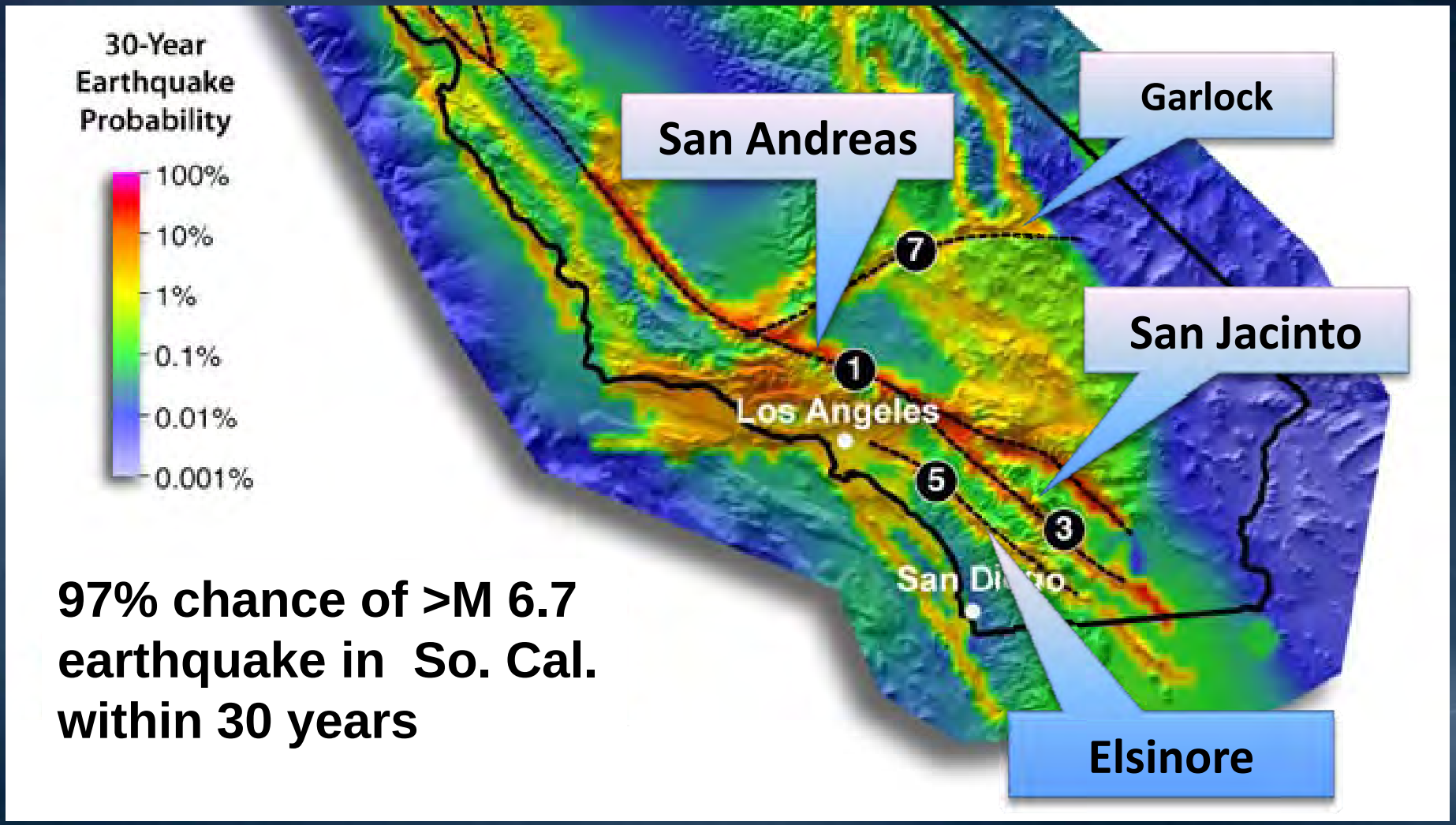
- Focused effort on four major operational risks *(What keeps us up at night)*
  - Earthquake
  - Treatment process upset
  - Chemical release
  - Pipeline rupture

Steps to Manage Risk



Reducing Effects of Earthquake

Identify risk: Public health, water delivery, response & recovery

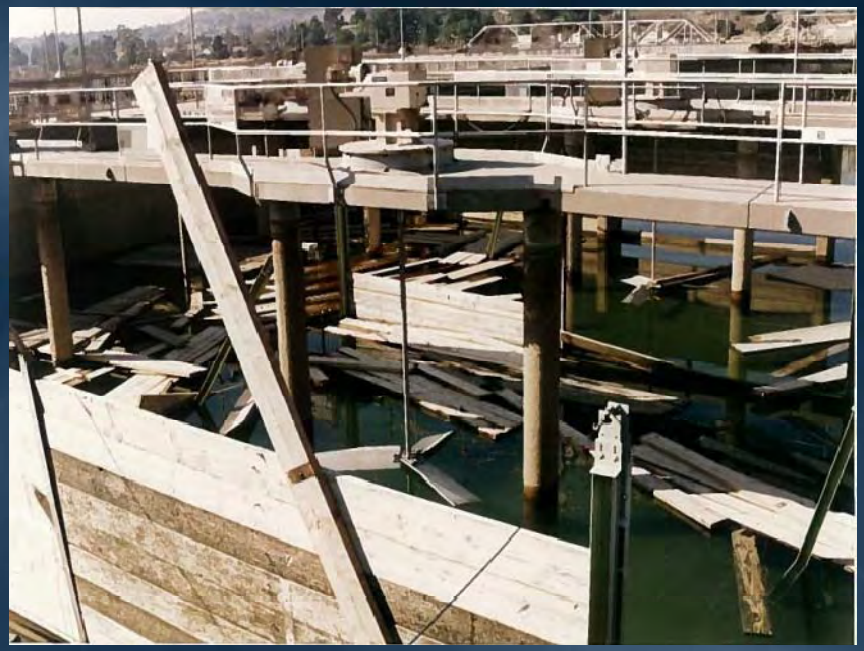


97% chance of >M 6.7 earthquake in So. Cal. within 30 years

Reducing Effects of Earthquake

Identify risk

Jensen
(1971 Sylmar earthquake)



Jensen
(1994 Northridge earthquake)

Reducing Effects of Earthquake

Assess operational impact; develop mitigation

- Identify faults & earthquake scenarios
- Estimate damage
  - Fault rupture
  - Shaking
  - Others (liquefaction, landslide, hydraulic surge)
- Predict effect on operations or life safety
- Prioritize seismic risks
- Propose and complete capital projects
  - Seismic retrofit
  - System redundancy or storage

Reducing Effects of Earthquake

Invest to reduce impact

Aqueduct pumping plants

During construction

Completed (1996)

Reducing Effects of Earthquake

Invest to reduce impact

Slope stabilization at Diemer

Reducing Effects of Earthquake

Invest to reduce impact

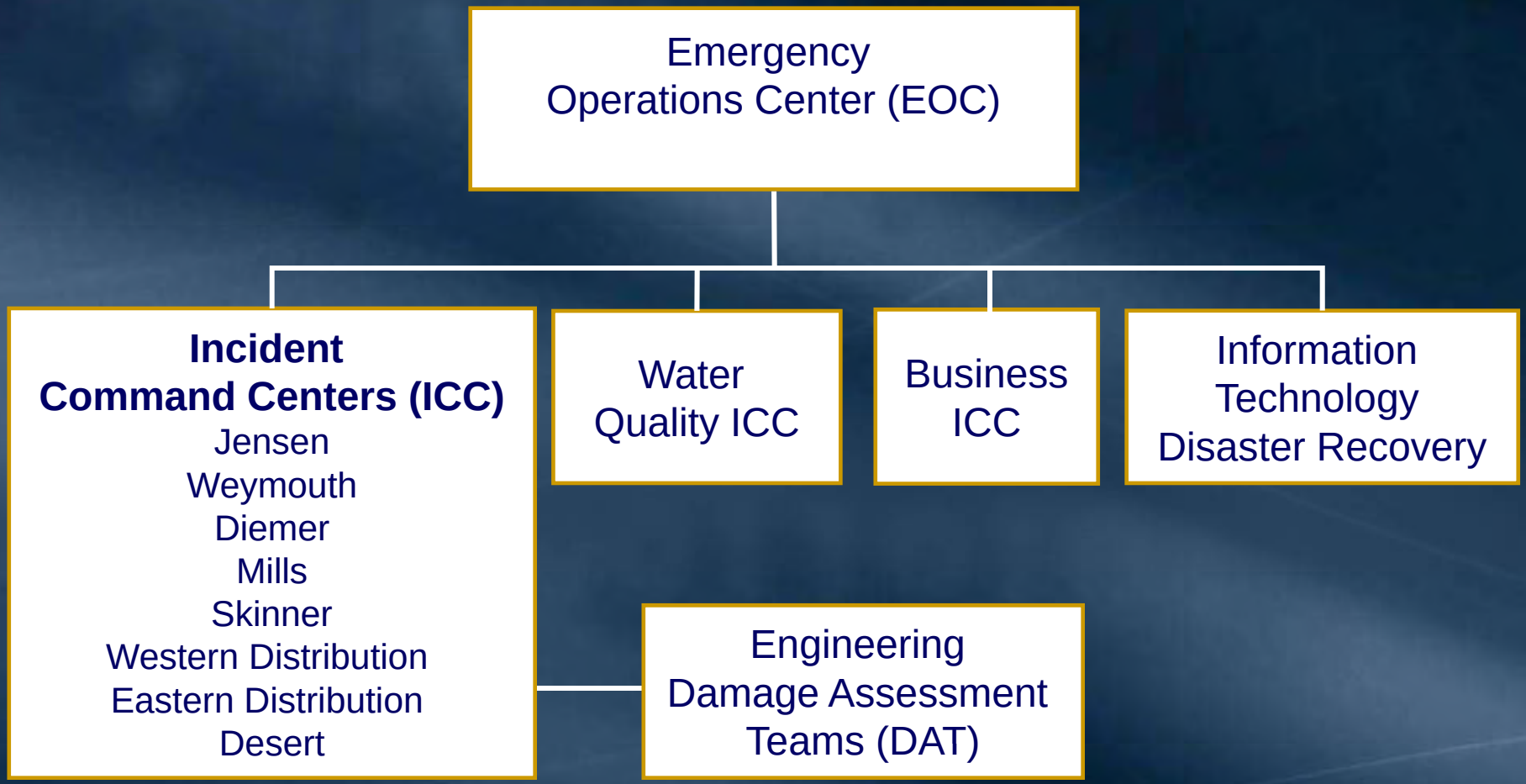
Emergency water storage

Reducing Effects of Earthquake

Prepare to respond

- Establish response and recovery goals
  - “Water in the pipe” is first objective
  - “Chlorine in the water” is second objective
  - Ability to repair two pipeline breaks with internal forces
  - On-call agreements with construction contractors
  - Mutual aid agreements

Reducing Effects of Earthquake
Prepare to respond



Preventing Treatment Process Upset

Identify risk: public health; regulatory compliance; consumer confidence

'Boil water notice' in place for parts of Portland

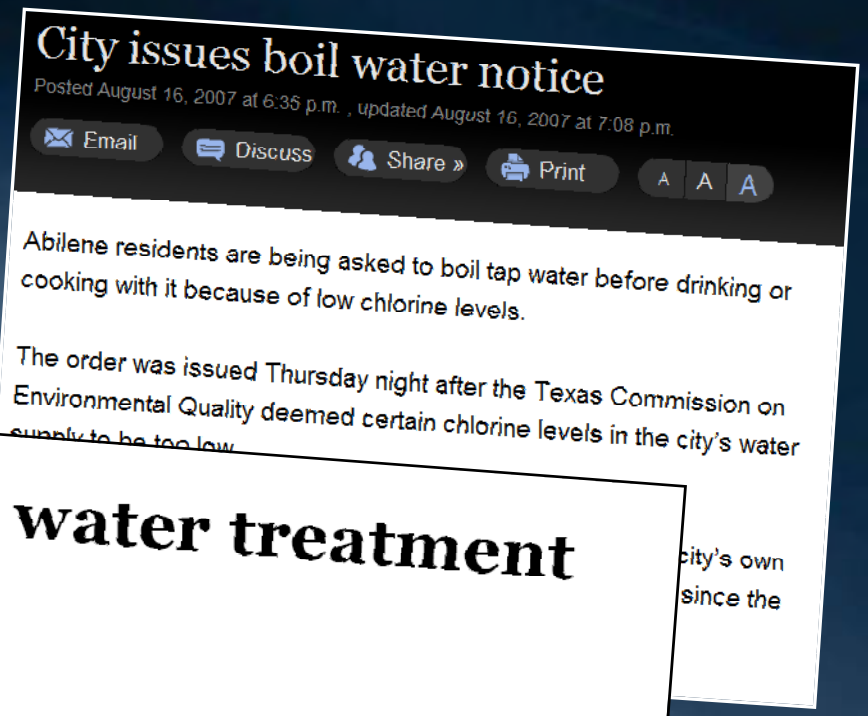
By KATU.com Staff and News Wires

SHARE

STORY VIDEO

Story Published: Nov

Story Updated: Nov 29, 2009 at 2:43 PM PDT


City issues boil water notice

Posted August 16, 2007 at 6:35 p.m. , updated August 16, 2007 at 7:08 p.m.

Email Discuss Share » Print A A A

Abilene residents are being asked to boil tap water before drinking or cooking with it because of low chlorine levels.

The order was issued Thursday night after the Texas Commission on Environmental Quality deemed certain chlorine levels in the city's water

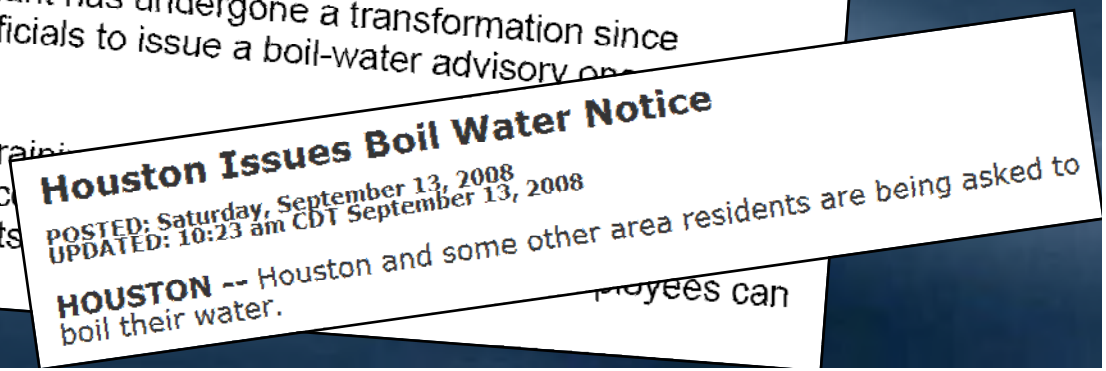
city's own since the

Phoenix gets grip on water treatment

Monica Alonzo-Dunsmoor
The Arizona Republic
Jan. 25, 2006 12:00 AM

The Val Vista Water Treatment Plant has undergone a transformation since problems there forced Phoenix officials to issue a boil-water advisory

Employees are getting extensive trai
officials installed equipment that ac
chemicals and replaced instruments
get reliable readings.


Houston Issues Boil Water Notice

POSTED: Saturday, September 13, 2008
UPDATED: 10:23 am CDT September 13, 2008

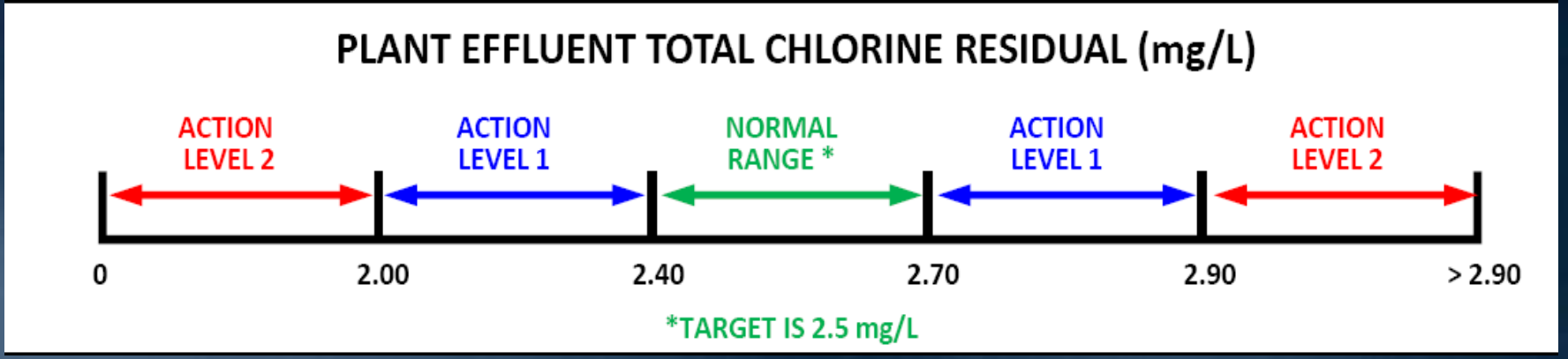
HOUSTON -- Houston and some other area residents are being asked to boil their water.

loyees can

Preventing Treatment Process Upset

- Invest to reduce likelihood
  - Robust treatment process supported by testing facilities
  - Redundant mechanical equipment and spare parts inventory
  - Adequate chemical storage
- Prepare to respond
  - Extensive monitoring of source water, treatment effectiveness and effluent quality
  - Predetermined response to adverse monitoring results or events
  - Available staff resources (on-call personnel, coordinated manager leaves)

Preventing Treatment Process Upset
Prepare to respond



ITEM	ACTION LEVEL 1	ACTION LEVEL 2
TOTAL CHLORINE	Take corrective action immediately; resample at least hourly until the residual is re-established within the NORMAL RANGE; verify the online instrument with the laboratory instrument; notify the Water Quality Operations Compliance Team at 65300.	Investigate the operational conditions; continue corrective action; notify plant management and the Water Quality Operations Compliance Team immediately, either directly or via the OCC. Re-sample at least every 30 minutes.

Preventing Chemical Release

Identify risk: public health, employee safety

HAZMAT ALERT *- Hazmat teams were called to the scene of a chlorine Thursday morning at the Palma District plant on Avenue S. Liq mistakenly unloaded into a tank sodium hypochlorite. When the combined, it caused a release o into the air. The white 5,000-ga center hold th*

Denver News

Workers Exposed In Chemical Explosion

Chemical Reaction Causes Blast At Carter Lake Water Filter Plant

POSTED: 7:33 am MDT July 20, 2007
UPDATED: 7:18 pm MDT July 20, 2007

BERTHOUD, Colo. -- Four workers were expo
chemical explosion Friday morning at the Carter L
Filter Plant, located just southeast of Carter Lake
County.

A Berthoud Fire spokeswoman said it appears
truck was unloading chemicals into the water t
there was a chemical leak of some kind, causi
buckled the roof and and blew out the window

Four workers who were exposed were deco

Chemical Spill Injures Water Treatment Worker

By R. STICKNEY

Updated 6:00 PM PDT, Thu, May 7, 2009

PRINT EMAIL SHARE BUZZ UP! TWITTER FACEBOOK

Crews respond to chemical leak at Hamilton water plant

By Steve Landwehr

HAMILTON — A chemical leak inside the Hamilton water treatment plant triggered a hazmat response yesterday that brought emergency crews from around the region but did not threaten the drinking water supply or nearby residents, the fire chief said.

The cause of the leak was still under investigation yesterday afternoon.

Fire Chief Phil Stevens said the leak was confined to a chemical room inside the plant. The electric and gas supplies to the building were shut off as a safety precaution.

Preventing Chemical Release

Develop mitigation plan

- Chemical delivery protocols
  - Security
  - Safety
  - Quality assurance
  - Environmental compliance

Preventing Chemical Release

Invest to reduce likelihood or impact

- Containing chlorine
  - Improves community safety
  - Additional security barrier
  - Allows backup in event of leak
- ~$100 million capital program

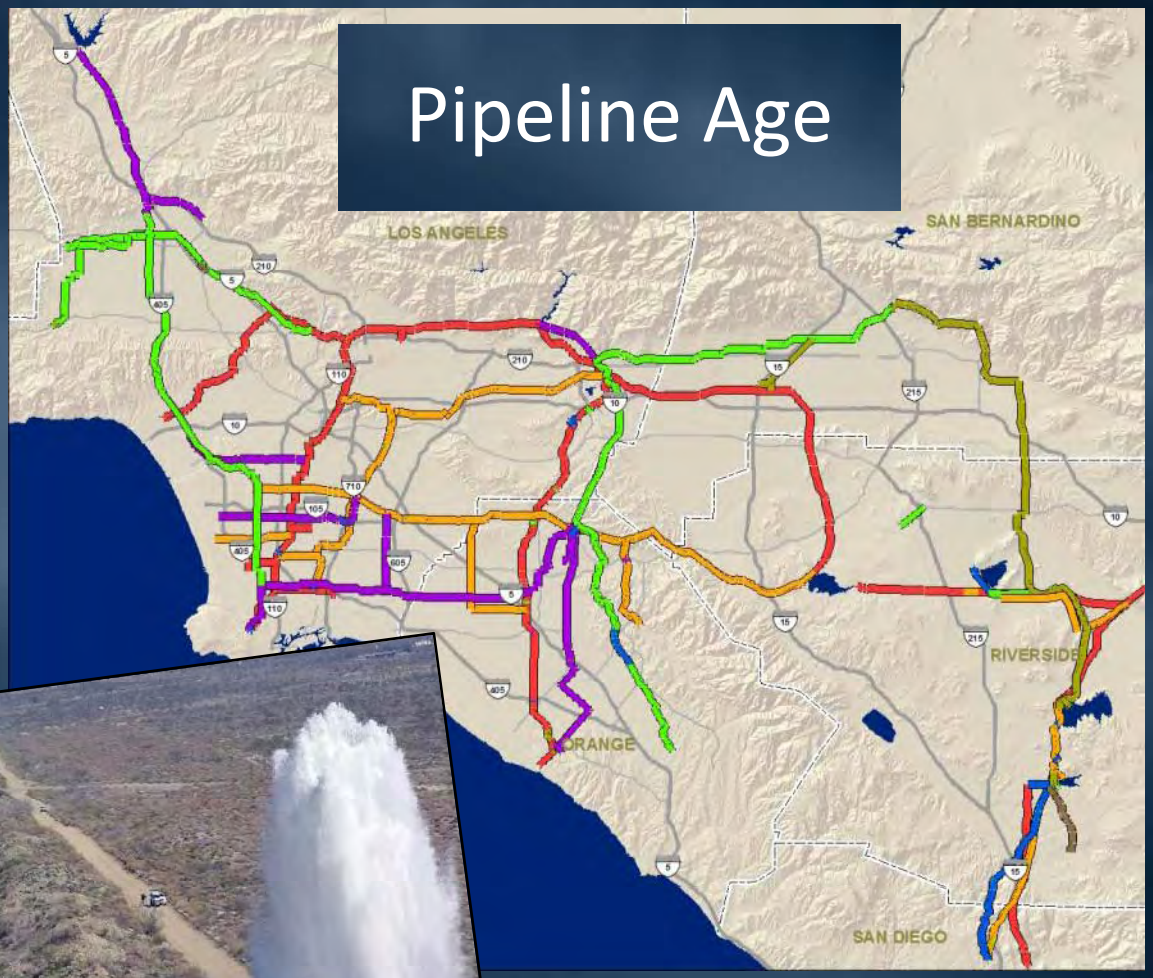
Preventing Chemical Release

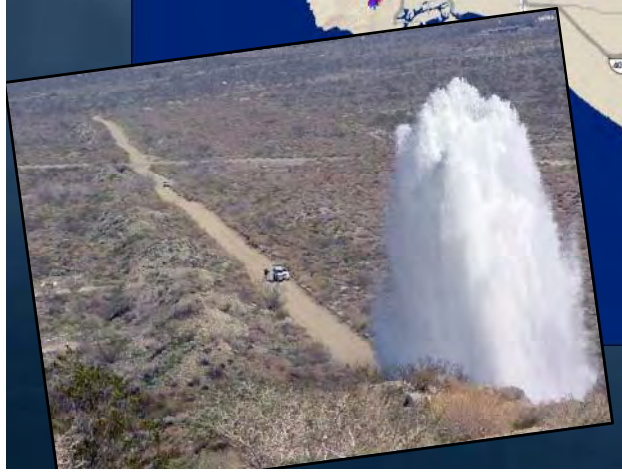
Prepare to respond

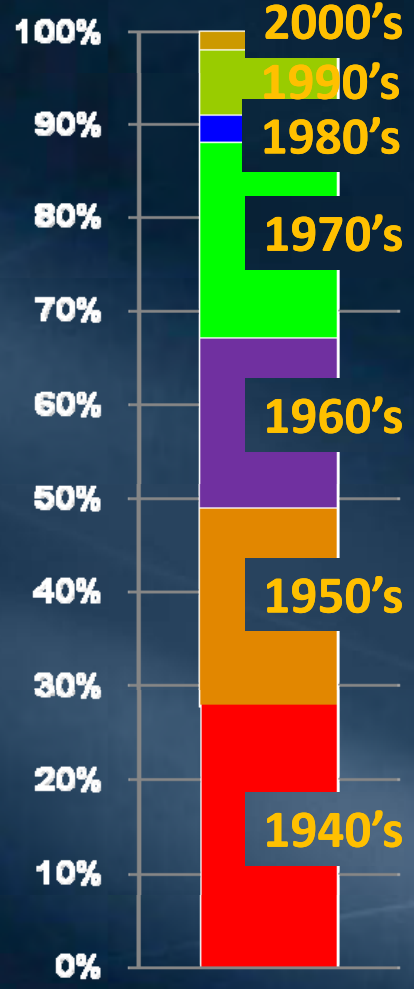
- Chemical response procedure
- Staff training
- Emergency response drills with fire departments

Preventing Pipeline Rupture

Identify risks: water delivery

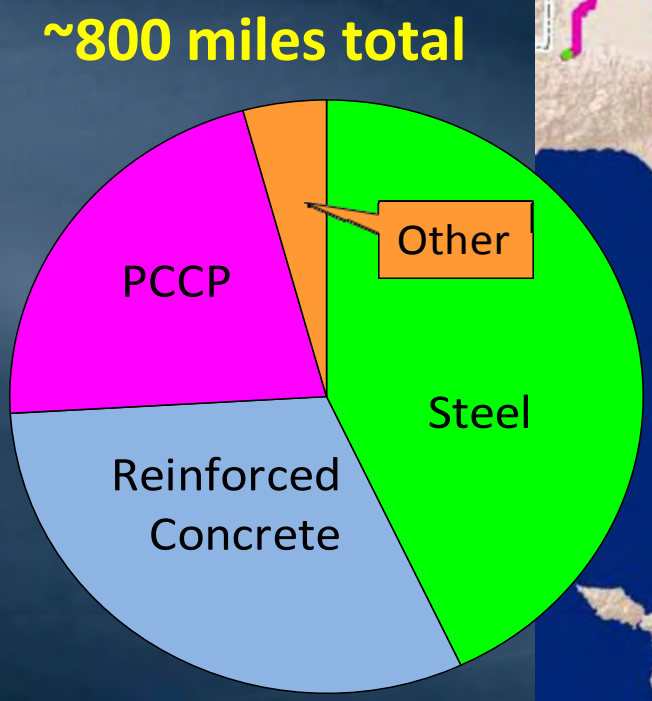


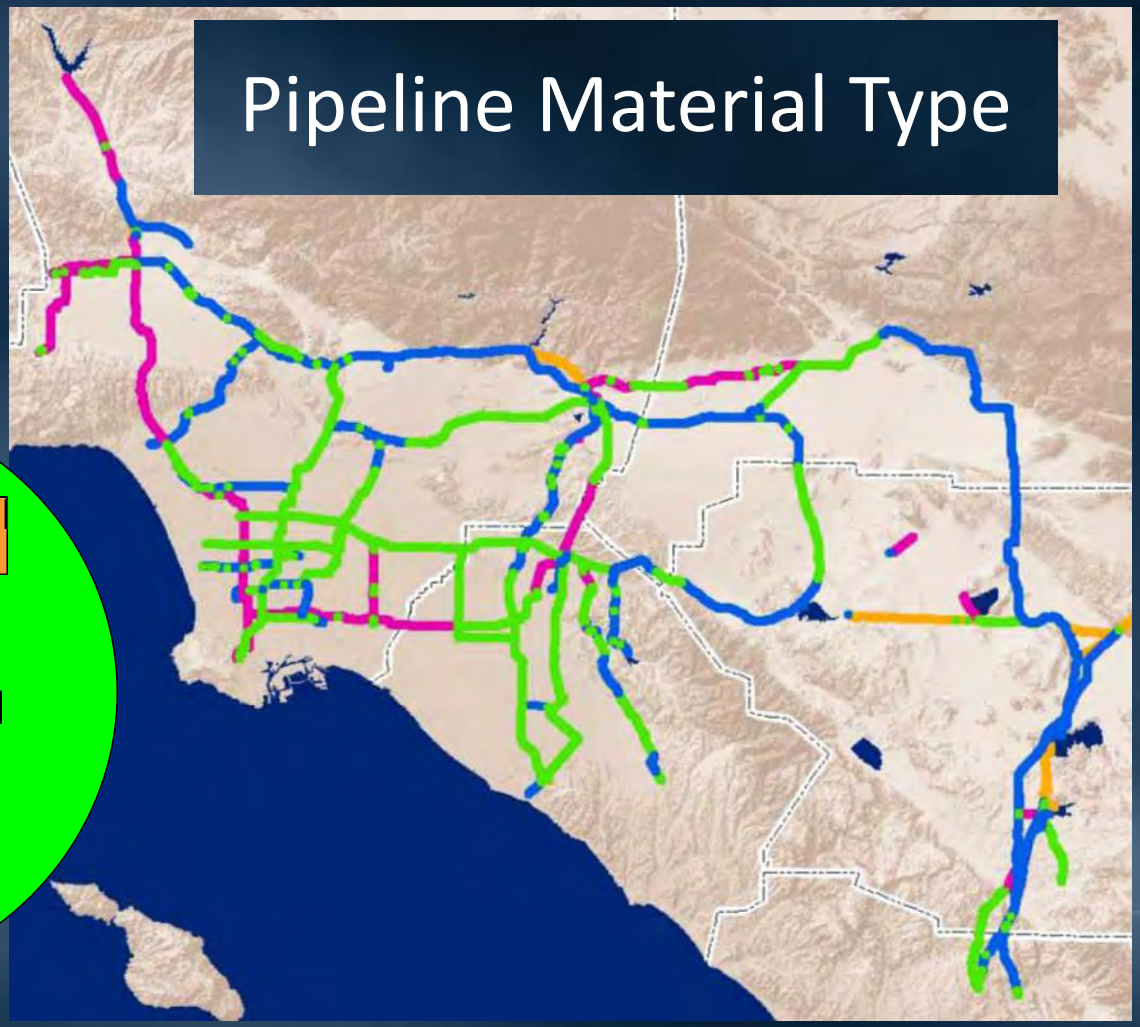




Preventing Pipeline Rupture

Identify risks: water delivery

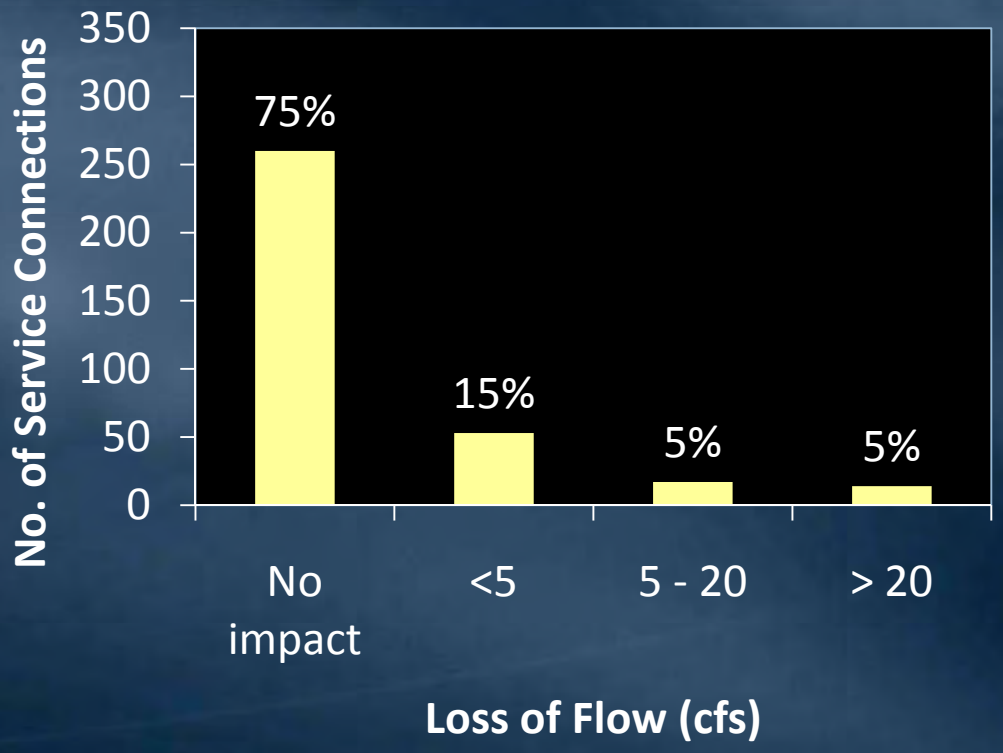


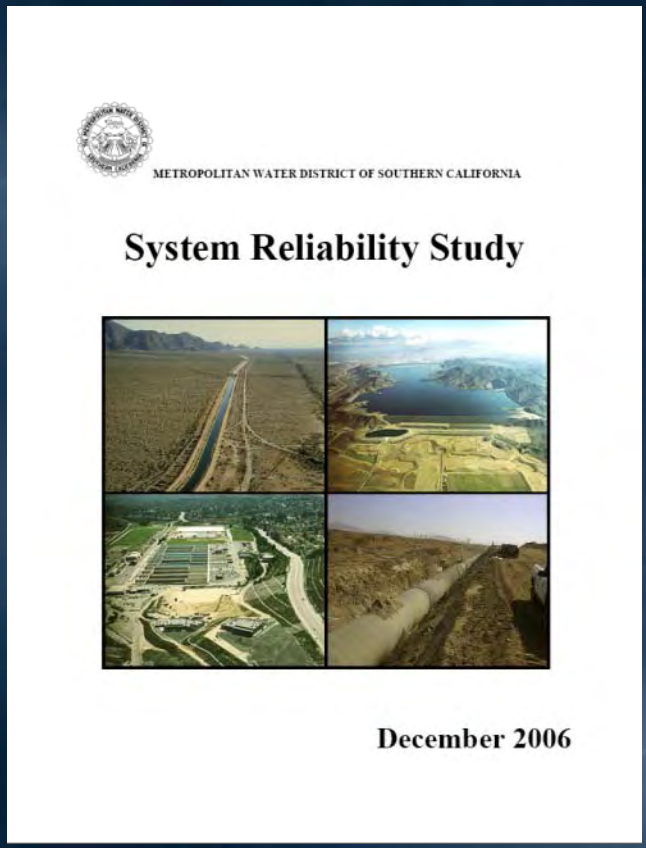


Preventing Pipeline Rupture

Assess operational impact

- Evaluated all possible single-pipeline outages (143) on service connections (344)

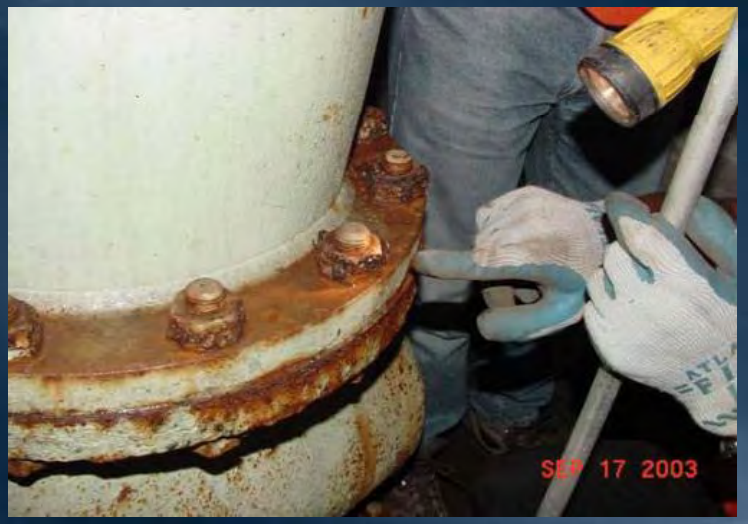




Preventing Pipeline Rupture
Develop mitigation plan

- Continuous monitoring (pressure, flow)
- Patrolled weekly
- Internal inspections at least every 5 years

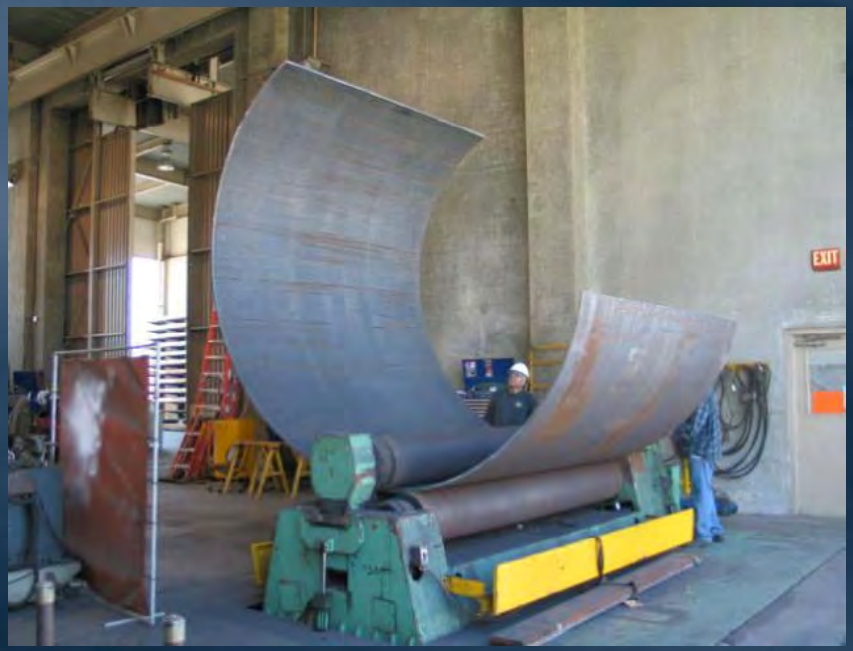
Eddy current inspection of precast concrete cylinder pipe

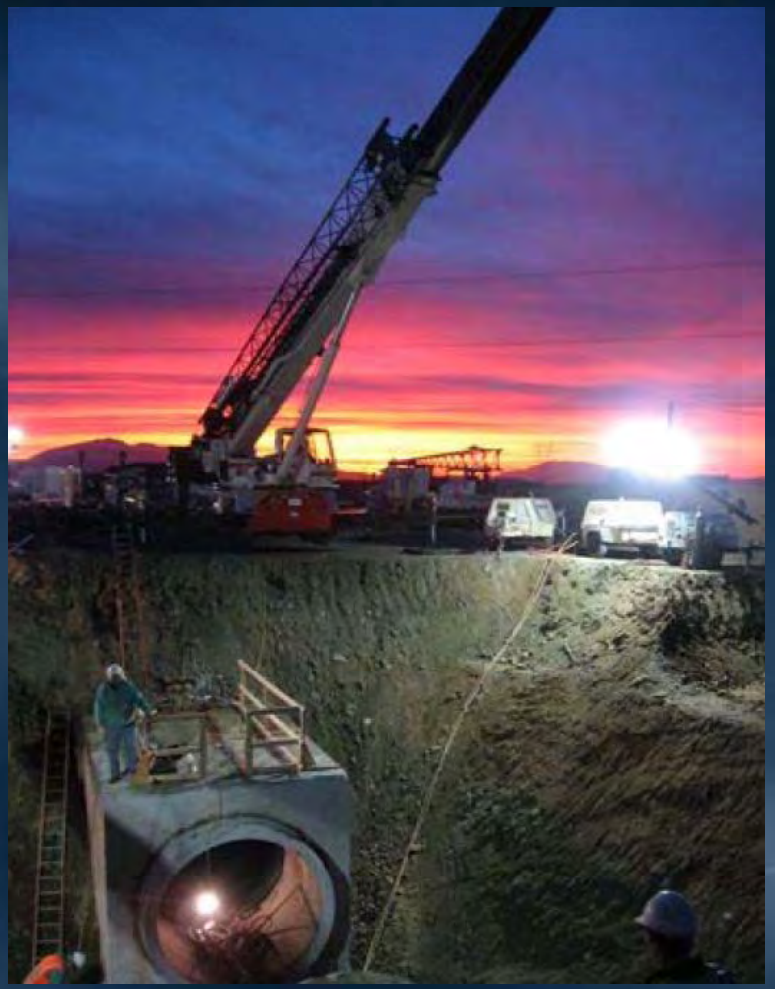


Corrosion inspection of all structures

Preventing Pipeline Rupture
Prepare to respond

- Rapid recovery capacity
  - Heavy construction
  - Shops (fabrication)





Successful Risk Management

Example (type)	Policies & procedures	Engineering Studies	Plan(s) to mitigate	Staff & Training to Respond	3rd Party Review	Key Metrics
Earthquake	✓	✓	✓	✓	✓	✓
Treatment process upset	✓	✓	✓	✓	✓	✓
Chemical release	✓	✓	✓	✓	✓	✓
Pipeline rupture	✓	✓	✓	✓	✓	✓