# Transforming Petroleum Cleanups in California

International Petroleum Environmental Conference
November 12, 2013

# Outline of the Presentation

- Objectives of petroleum UST cleanups in California
- Regulatory framework for petroleum releases
- Reasons for a new policy
- Overview of the Low-Threat UST Closure Policy
- Core element: setback distance
- Timeline for the new policy
- Future application to other petroleum sites

# Objectives of Corrective Actions in California

- Adequate site characterization
- Removal of primary sources
- Remediation to achieve a stable or receding plume
- Prevent current/future public health hazards
- Prevent current/future ecological hazards
- Prevent current/future water resources impairment
- Public participation
- Post remediation risk management plan in place

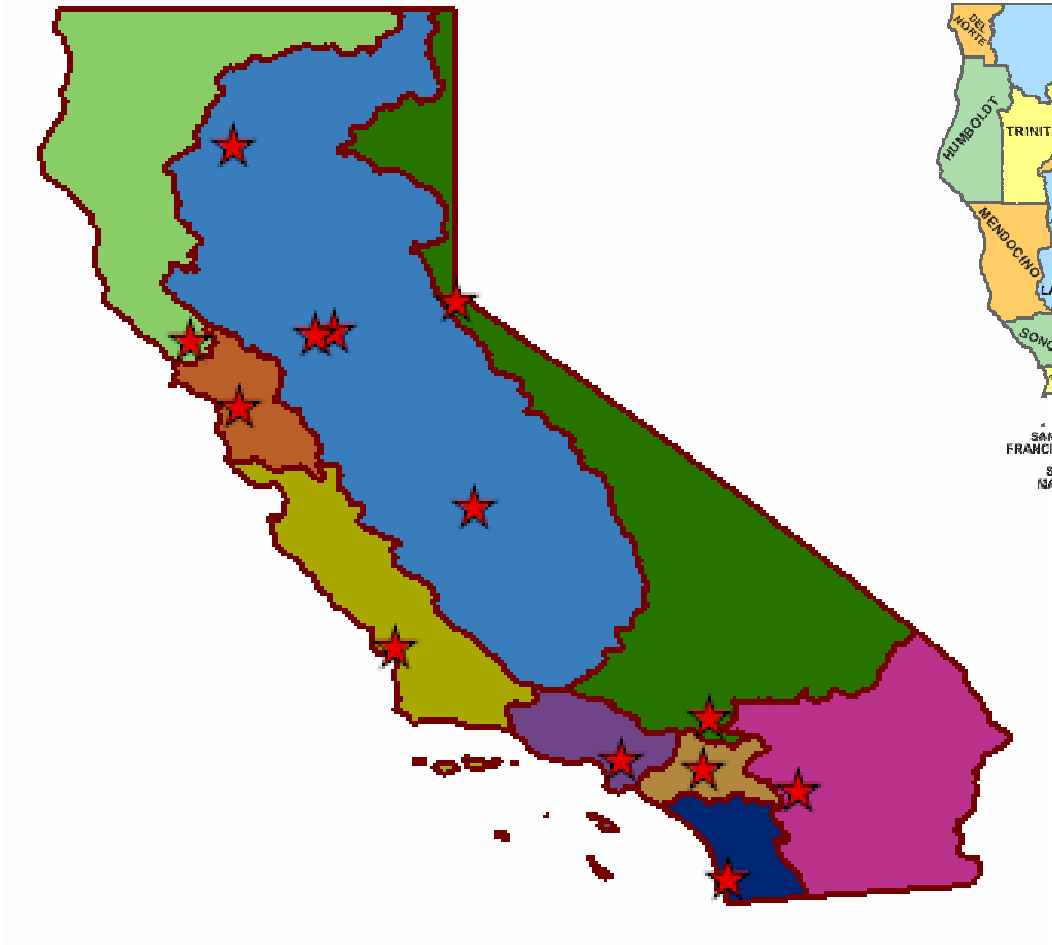
Arulanantham, SFBR-RWQCB, 2002

Resolution 92-49

Cleanup goals and objectives (typically drinking water standards) will be met within a reasonable time frame.

# Primary Agencies Implementing Petroleum Cleanups in California

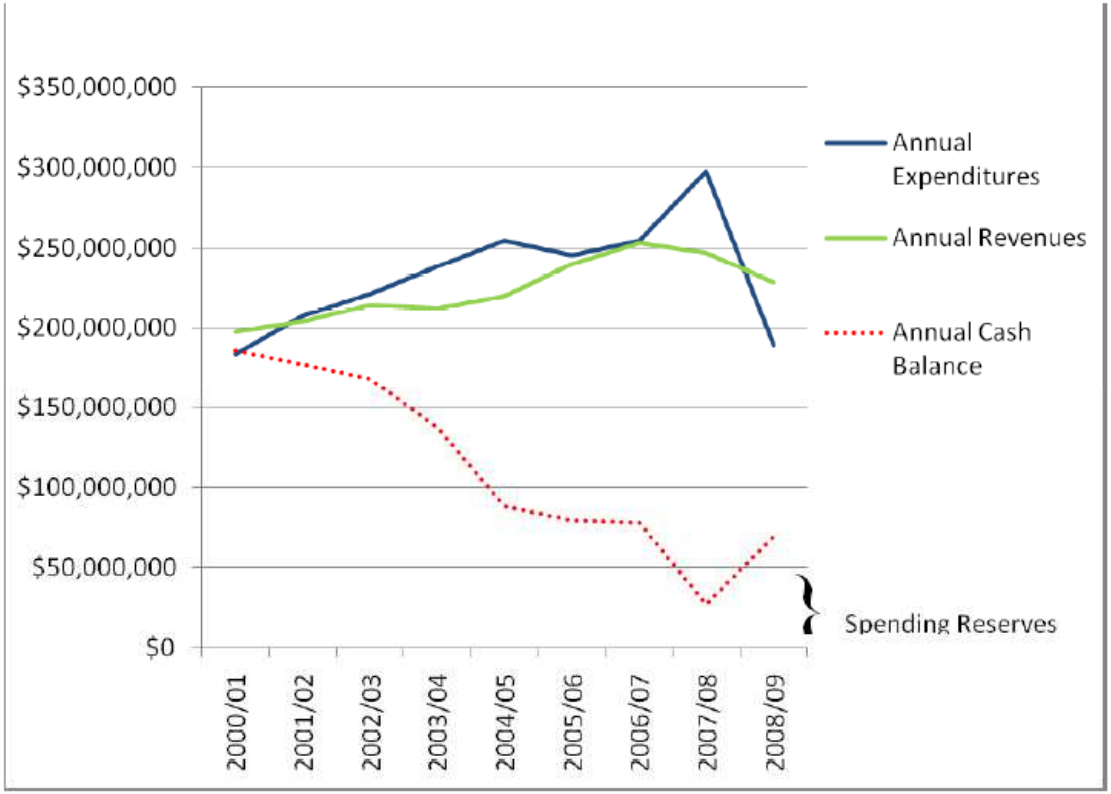
## Nine Regional Water Boards



## 21 LOPs and >100 LIAs

# Immediate Catalyst for Change…?

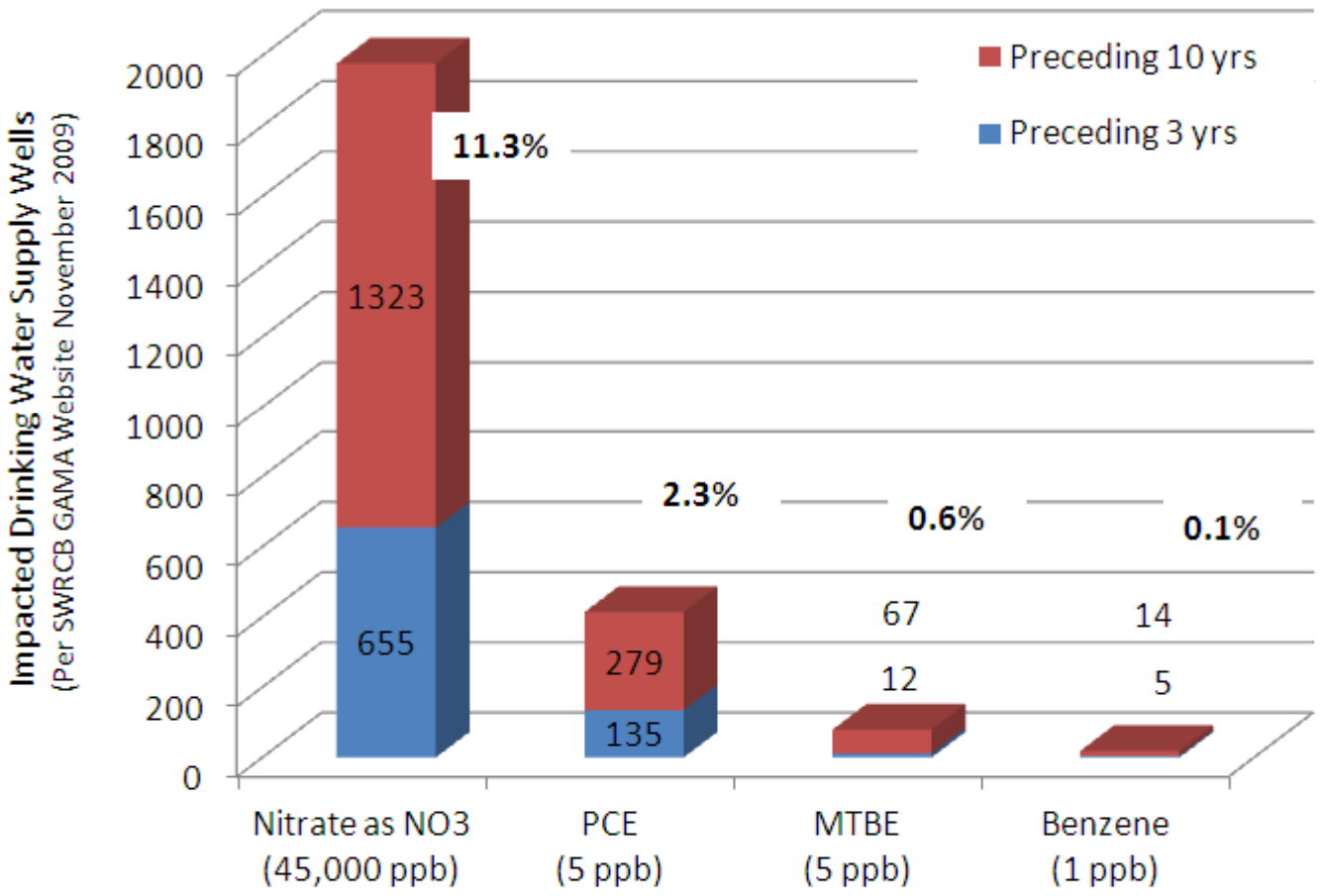
**Figure 4. Annual Expenditures, Revenues, and Cash Balance from Fiscal Year 2000-2001 through Fiscal Year 2008-2009.**




As a direct result, the Fund's cash balances (including reserves) of nearly $185.5 million as of the end of Fiscal Year 2000-2001, plummeted to just over $27 million by Fiscal Year 2007-2008—more than a 85 percent drop in just seven years—which resulted in the Fund running out of available cash to reimburse eligible claimants and its $50 million in reserve requirement to be short by nearly half, approximately $23 million, as shown in Figure 5.

- $250MM/year revenue into the Fund
- $200MM/year to reimburse claimants for cleanup costs
- 2008 cash reserve below required $50MM

# Other Priorities Demanding Attention




ppb = part per billion
MCL = maximum contaminant level
Percentage assumes 12,000 drinking-water supply wells

# The Previous Program Was Broken

- The average UST case was open 17 years
- Backlog of closure appeals
- State resources diverted from other programs

# Summary of the New Closure Policy

- General criteria
  - 8 basic requirements
  - Draft policy offers improved definition
- Media-specific criteria
  - Groundwater
  - Soil Vapor
  - Soil
- Sets plume size and concentration limits
- Specifies setback distances
- Maintains option of regulatory discretion
- Places onus on agency to justify keeping a case open

*"Leave-In-Place Option"*

# General Criteria for Qualification as a Low-Threat Site

- Municipal/public water supply is available
- Petroleum only
- Release from the UST system has been stopped
- Free product has been removed to maximum extent practicable

*(Continued on next slide)*

# General Criteria (cont.)

- Conceptual site model has been developed
- Secondary source removal has been addressed (1 year or less)
- Soil or groundwater has been tested for MTBE
- Site does not pose a public nuisance

# Petroleum Definition

- Crude oil, or any fraction thereof
- Motor fuels
- Jet fuels
- Distillate fuel oils
- Residual fuel oils
- Lubricants
- Petroleum solvents
- Used oils
- Any additives and blending agents such as oxygenates contained in formulation of these substances

# Media-Specific Criteria

Risk-based concentrations for each media:

- Groundwater
  - ingestion
  - vapor source
  - ecological
- Soil vapor
  - vapor intrusion
- Soil
  - dermal
  - outdoor air
  - utility worker

# Setback Distances Are Key Element

Setback distances for groundwater and soil vapor:

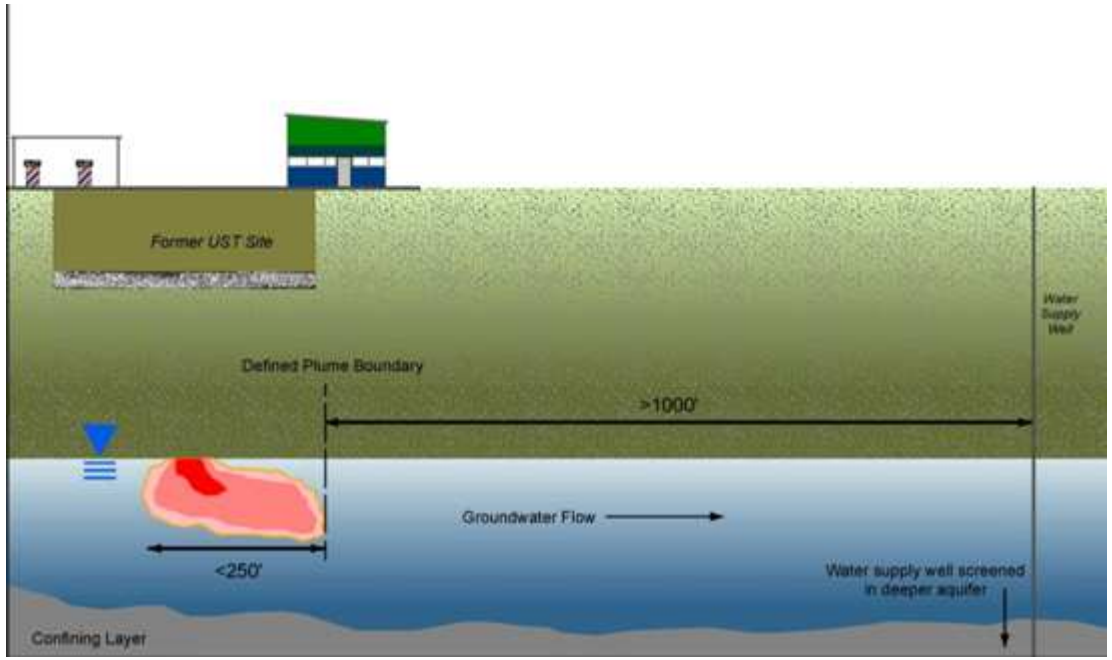
- Groundwater receptors: 1,000 feet (lateral)
- Vapor receptors: 30 feet (radial)

Options for reducing setbacks:

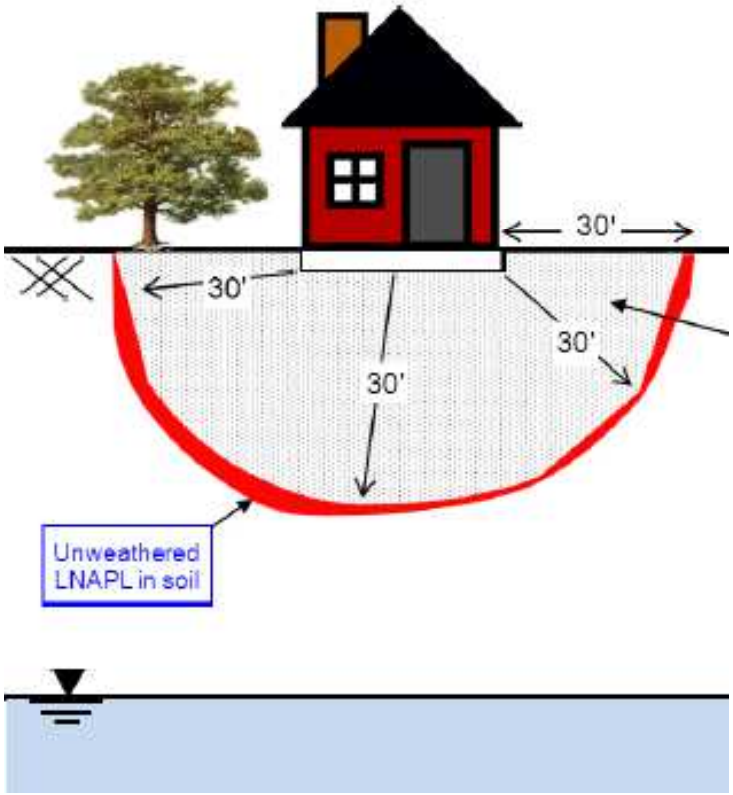
- Groundwater: 250 feet for very small plumes (<100 feet long) and below concentrations limits
- Soil vapor: 5 feet when bioattenuation zone is present

# Setback Examples

- Groundwater




- Soil Vapor



# Groundwater

Your site can be closed as low-threat if:

| Plume Length | Free Product | Benzene and MTBE Concentrations | Distance to Supply Well or Surface Water Body | Deed Restriction |
|---|---|---|---|---|
| <100 ft | No | No limit | >250 ft | None |
| <250 ft | No | <3,000 ug/L Benzene and <1,000 ug/L MTBE | >1,000 ft | None |
| <250 ft | On site only | No limit | >1,000 ft | If required by agency |
| <1,000 ft | No | <1,000 µg/L | >1,000 ft | None |
| >1,000 ft | Site specific | Site specific | Site specific | Site specific |

# Soil Vapor

| Soil Gas Criteria (µg/m$^3$) | | |
|---|---|---|
| | With Bioattenuation Zone** | |
| | Residential | Commercial |
| Constituent | Soil Gas Concentration (µg/m$^3$) | |
| Benzene | < 85,000 | < 280,000 |
| Ethylbenzene | <1,100,000 | <3,600,000 |
| Naphthalene | < 93,000 | < 310,000 |

**A 1000-fold bioattenuation of petroleum vapors is assumed for the bioattenuation zone.

# Soil Vapor – Opt Out

No vapor sampling is needed if:

- 30 foot setback
- Low benzene concentrations in groundwater (e.g.,<1,000 ppb)
- Bioattenuation zone is present

# Soil

**Table 1**
Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health

| Chemical | Residential | | Commercial/ Industrial | | Utility Worker |
|---|---|---|---|---|---|
| | 0 to 5 feet bgs<br>mg/kg | Volatilization to outdoor air (5 to 10 feet bgs)<br>mg/kg | 0 to 5 feet bgs<br>mg/kg | Volatilization to outdoor air (5 to 10 feet bgs)<br>mg/kg | 0 to 10 feet bgs<br>mg/kg |
| **Benzene** | 1.9 | 2.8 | 8.2 | 12 | 14 |
| **Ethylbenzene** | 21 | 32 | 89 | 134 | 314 |
| **Naphthalene** | 9.7 | 9.7 | 45 | 45 | 219 |
| **PAH**[1] | 0.063 | NA | 0.68 | NA | 4.5 |

Notes:
1. Based on the seven carcinogenic poly-aromatic hydrocarbons (PAHs) as benzo(a)pyrene toxicity equivalent [BaPe]. Sampling and analysis for PAH is only necessary where soil as affected by either waste oil or Bunker C fuel.
2. The area of impacted soil where a particular exposure occurs is 25 by 25 meters (approximately 82 by 82 feet) or less.
3. NA = not applicable
4. mg/kg = milligrams per kilogram

# Timeline for the New Policy

- 2009:  Conceptualization of a new closure policy
- 2010-2011:  Negotiation
- 2012:  Low Threat UST Closure Policy adopted
- 2013:  Closure reviews
- 2014:  Resolve impediments to closure
- 2016:  UST Reimbursement Fund to sunset

# Future Application

- Consider the LTCP criteria when establishing remedial goals
- Close other sites
  - Power plants
  - Bulk terminals
  - Pipelines
  - Oil fields
- Consider the LTCP setback distances when siting new facilities

**End of Presentation**

**Thank you.**

**robert.schultz@amec.com**