

Aboveground Storage Tank Enhanced Vapor Recovery



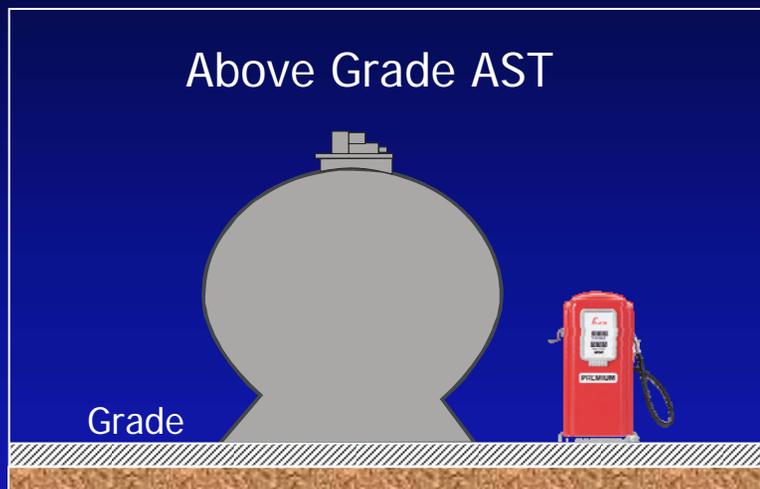
Board Hearing
June 21-22, 2007

Outline

- Background
- Objectives
- ARB and District Roles
- Field Study
- Technical Proposal
- Environmental Impacts
- Economic Impacts
- Public Outreach
- Conclusion and Recommendations

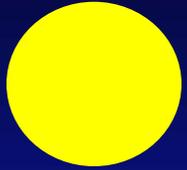
Background

Aboveground Storage Tanks



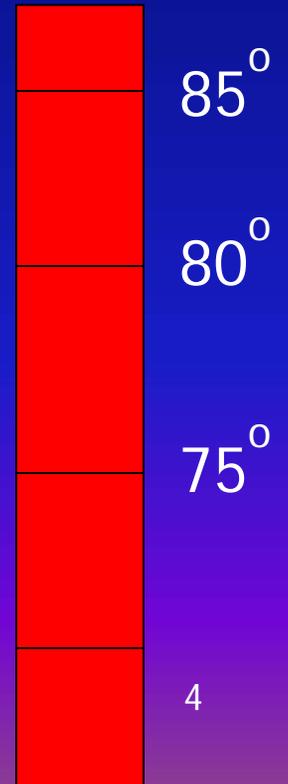
Background

Standing Loss Emissions



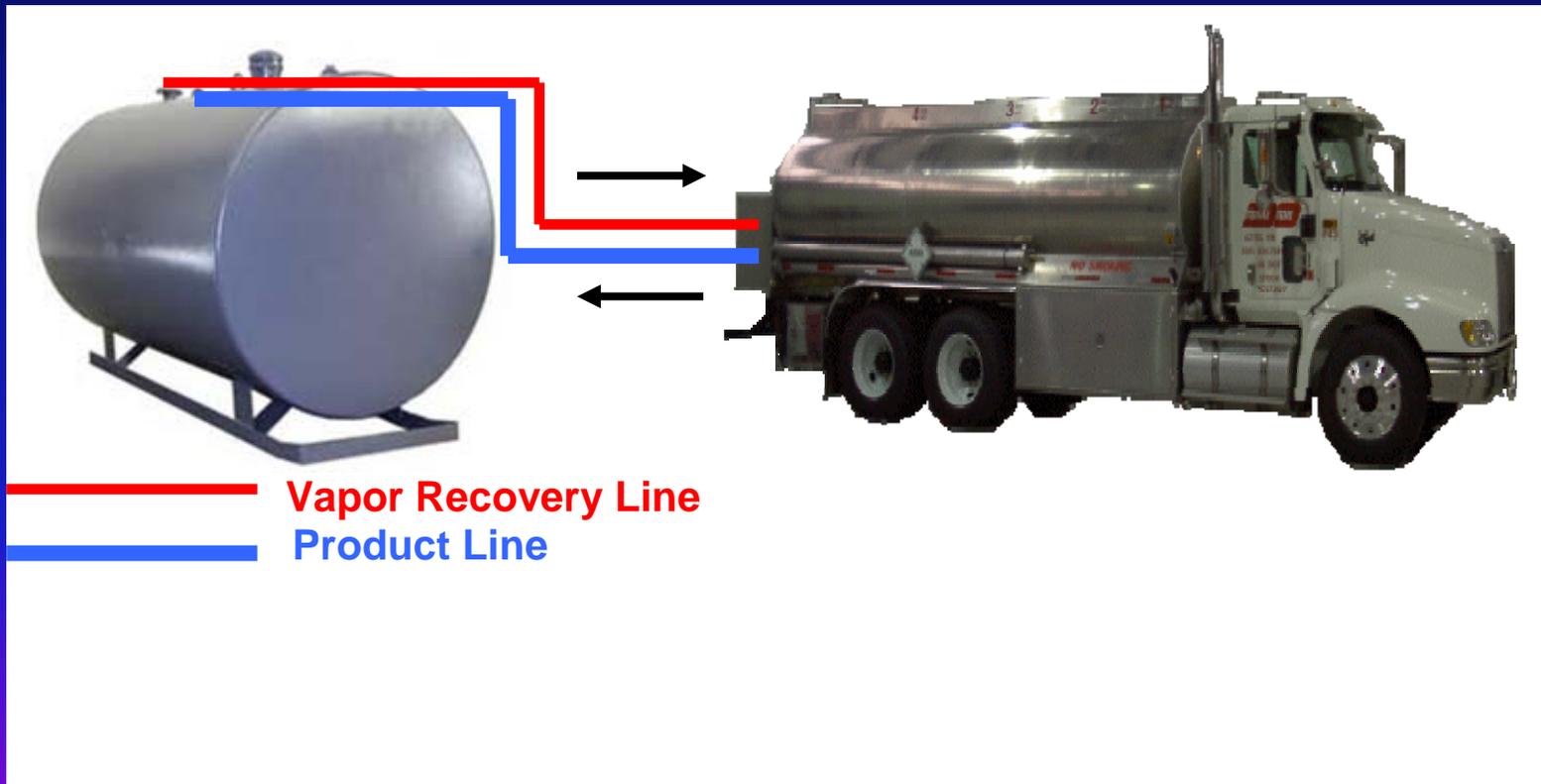
Vent Pipe Emissions

Tank Temp.



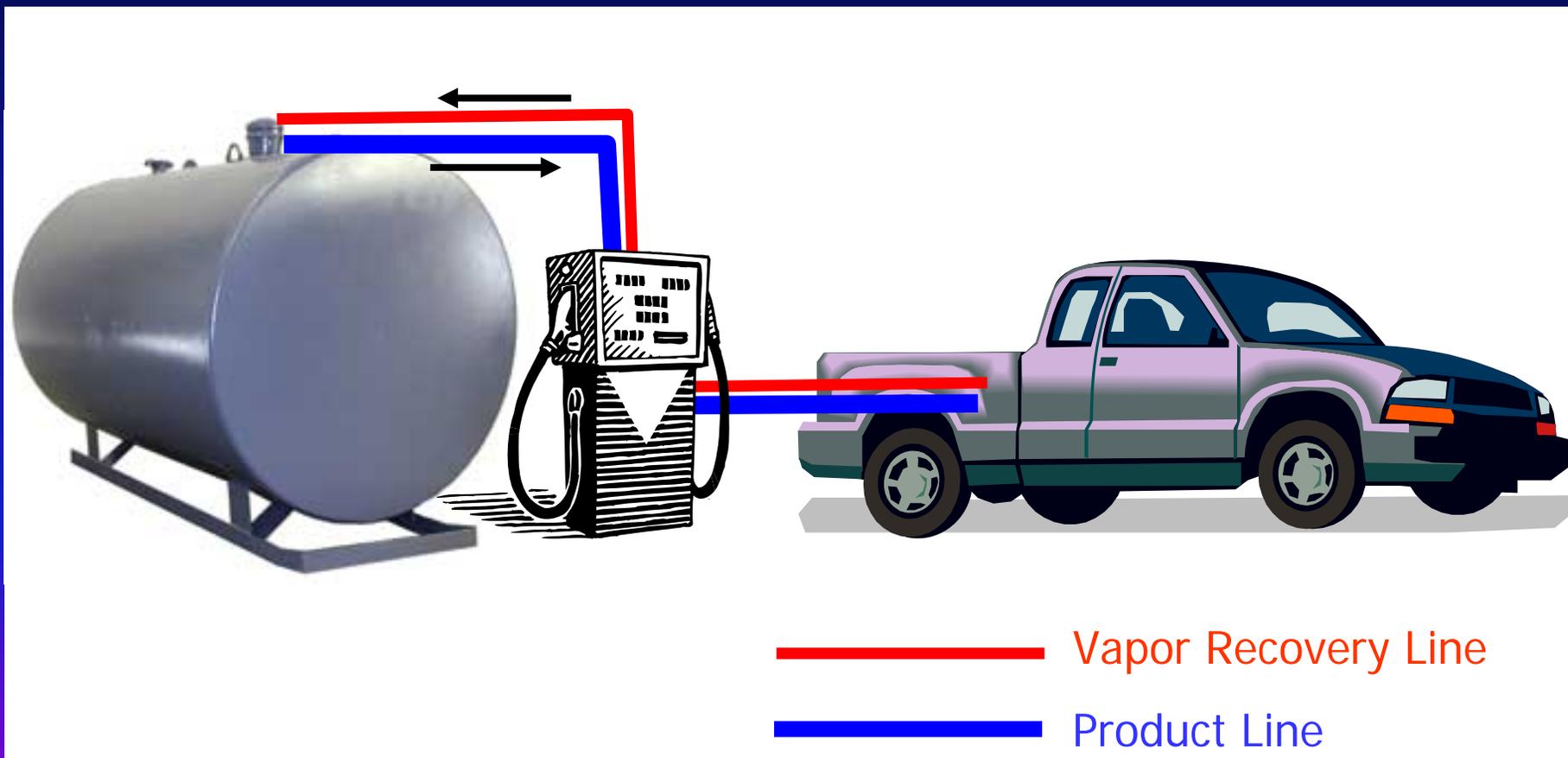
Background

Phase I Transfer



Background

Phase II Transfer



Background

AST Population

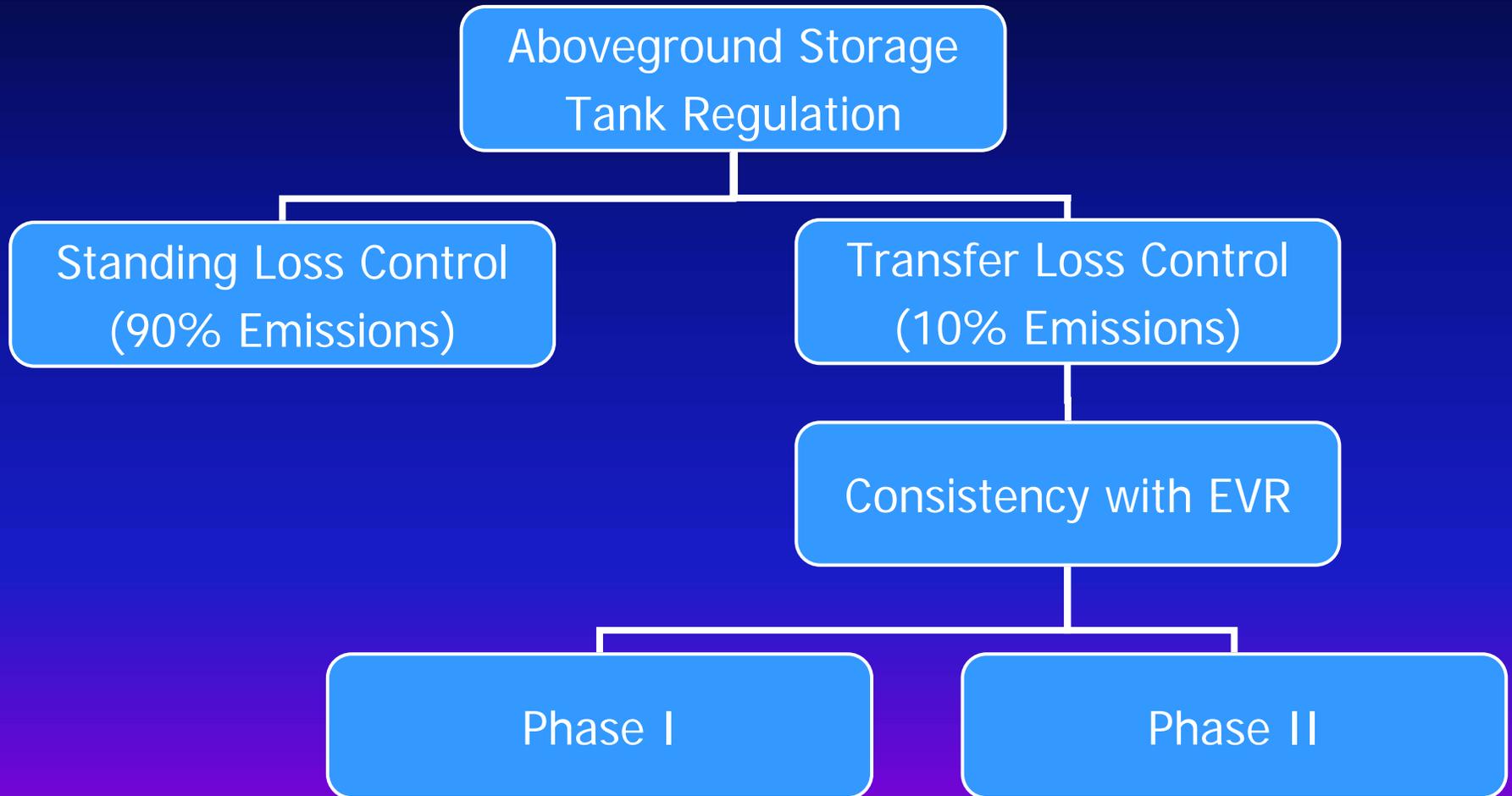
- 9,600 Aboveground Storage Tanks (AST)
 - 67 Percent Agricultural Operations
 - 33 Percent Marinas, Fleet Operations, Municipalities, and Service Stations
- AST Size and Classification
 - 250 to 12,000 gallon storage capacities
 - Single Wall
 - Protected Tanks

Background

Emissions

- 3.31 tons per day of Reactive Organic Gas (ROG) Emissions from 9600 ASTs
 - 2.95 tons per day ROG (Standing losses)
 - 0.36 tons per day ROG (Transfer losses)

Objectives



ARB and District Roles

- Air Resources Board
 - Adopt Certification and Testing Procedures for Vapor Recovery Systems
 - Establish Performance Standards and Specifications
 - Certify Vapor Recovery Systems

ARB and District Roles

- Districts
 - Regulate emissions from stationary sources
 - Adopt rules for gasoline storage/transfer
 - ARB certified vapor recovery systems
 - Compliance testing to ARB adopted performance standards
 - May adopt rules to include standing loss controls

Field Study

Standing Loss Emissions



Field Study

Carbon Canister Processor



Field Study

Shade



Field Study

White Paint



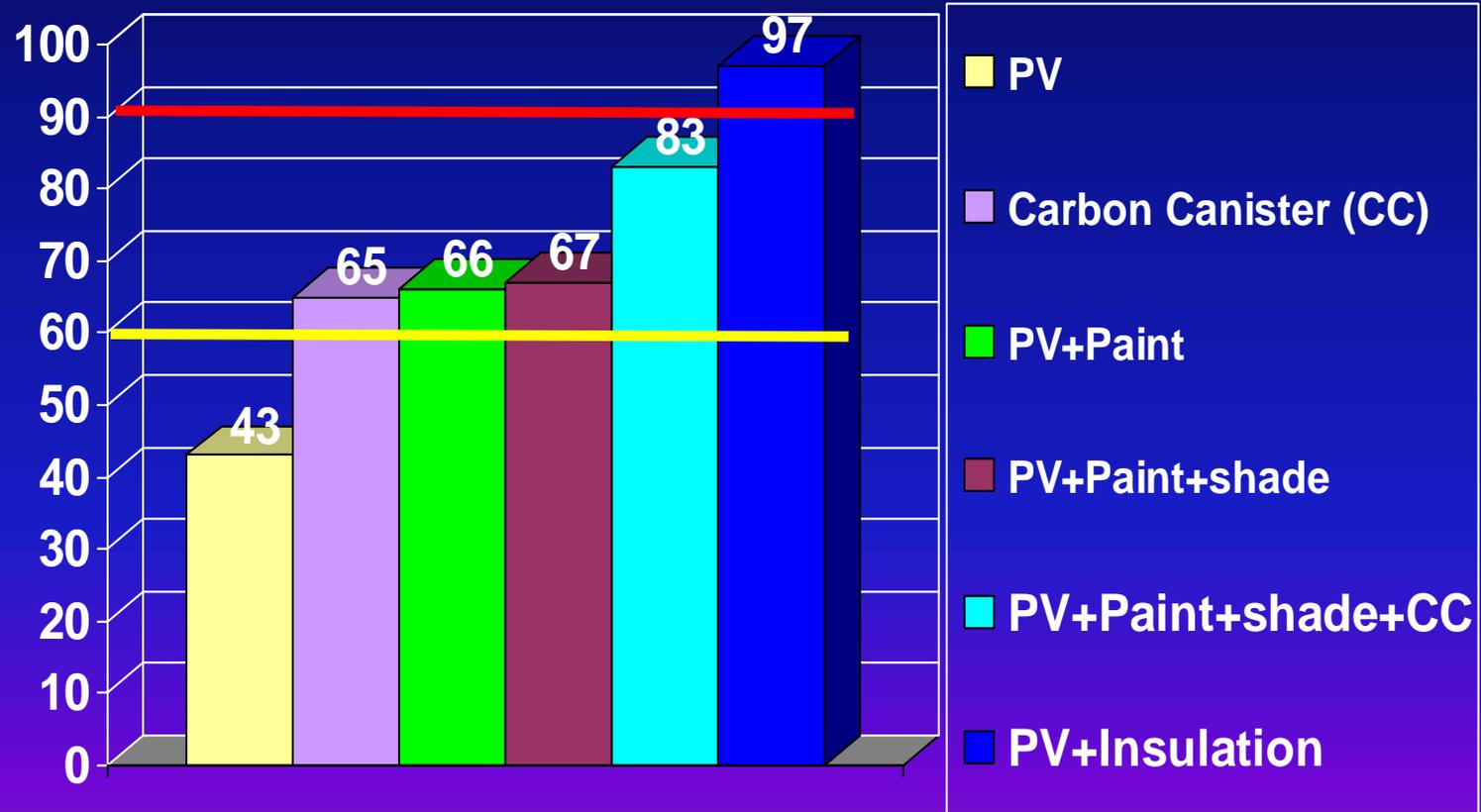
Field Study

Spray-on Polyurethane Foam Insulation



Field Study

Control Technology Effectiveness



Technical Proposal

Standing Loss Control – Performance Standards

AST	Performance Standard (lbs./1,000 gallon ullage/day)	Emission Reduction (%)
New tanks and Major Modifications	0.57	90
Existing Tanks	2.26	60

Technical Proposal

Example retrofit to 60 Percent



Standing Loss Control Option

- Optional Performance Standard for Existing ASTs
 - 76 percent emission reduction
 - 90 percent emission reduction
- Benefits
 - Opportunity for Emission Credits by certifying to a higher performance level
 - Fuel savings

Technical Proposal

Phase I Transfers

- Transfer from Cargo Tank Truck to AST
- Performance Standard
 - Current: 90 percent efficiency
 - EVR Proposal: 98 percent efficiency

Technical Proposal

Phase II Transfers

- Transfer from AST to Motor Vehicle
- Performance Standard
 - Current: 90 percent efficiency
 - EVR Proposal: 95 percent efficiency

Technical Proposal

Effective Dates

- New Tanks: January 1, 2009
- Existing tanks: January 1, 2013

Environmental Impacts

Annual Emission Reductions (tons per day)



- Standing Loss Control Reductions
- Phase I Reductions
- Phase II Reductions

Economic Impacts

Cost Analysis - Retrofits

Tanks	Proposed Configuration	% of Tanks Affected	Incremental Cost per Tank (\$)
Protected	Standing Loss Control (SLC) only	3	\$0
	SLC + Phase I EVR	4	\$40
	SLC + Phase I EVR + Phase II EVR	14	\$161
Single Wall	SLC only	60	\$433
	SLC + Phase I EVR	17	\$473
	SLC + Phase I EVR + Phase II EVR	2	\$594
		100	

Economic Impacts

Cost Effectiveness

Cost Eff.: \$2.17/pound emission reductions

Savings.: \$0.40/pound emission reductions

Net Eff.: **\$1.77/pound emission reductions**

Public Outreach

- Public Workshops
- District Workgroups
- Agricultural Groups and Associations
- Industry Stakeholders
- Vapor Recovery Websites
- Vapor Recovery List serve
- Direct Mailings

Conclusion and Recommendation

- Developed with Extensive Outreach
- Significant Emission Reductions
 - 2.0 tons per day
- Cost Effective
 - \$1.77 per pound ROG
- Contributes to Ozone Attainment Goals
 - Reduces hydrocarbon precursors