Aboveground Storage Tank Enhanced Vapor Recovery

Board Hearing

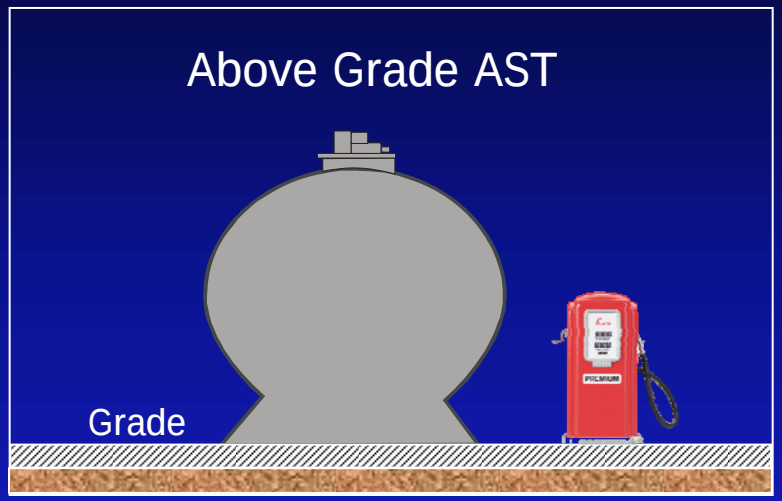
June 21-22, 2007

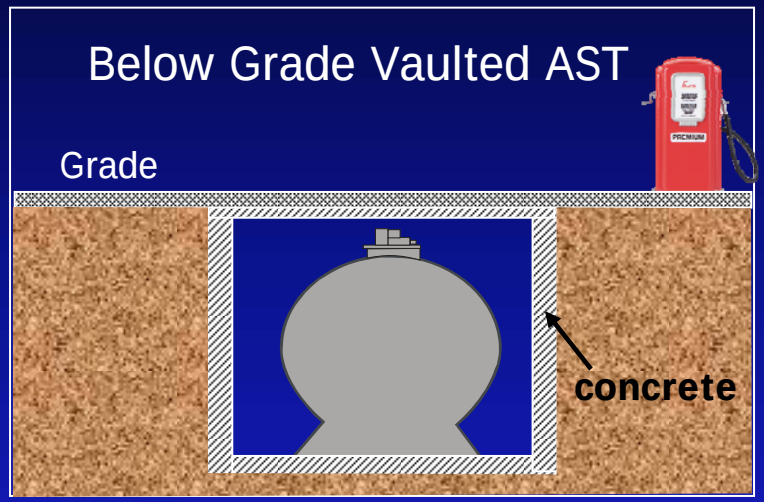
Outline

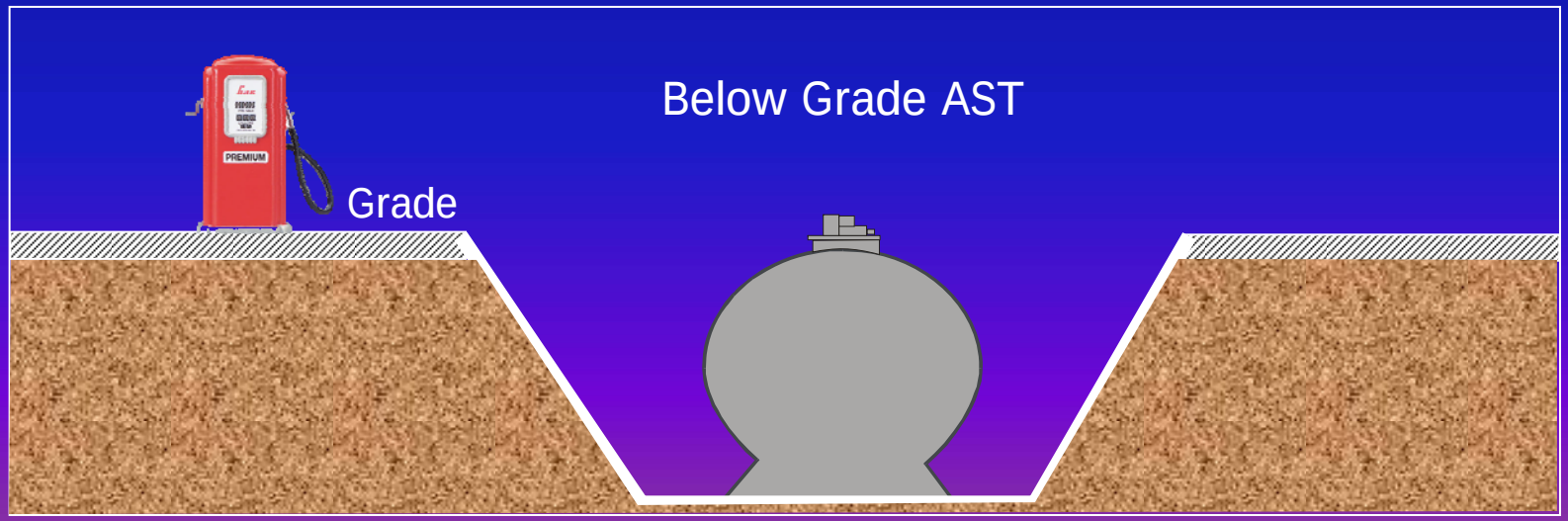
- Background
- Objectives
- ARB and District Roles
- Field Study
- Technical Proposal
- Environmental Impacts
- Economic Impacts
- Public Outreach
- Conclusion and Recommendations

Background

Aboveground Storage Tanks





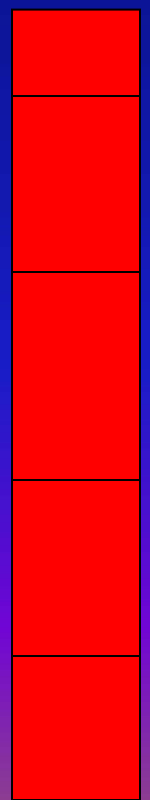


Background

Standing Loss Emissions

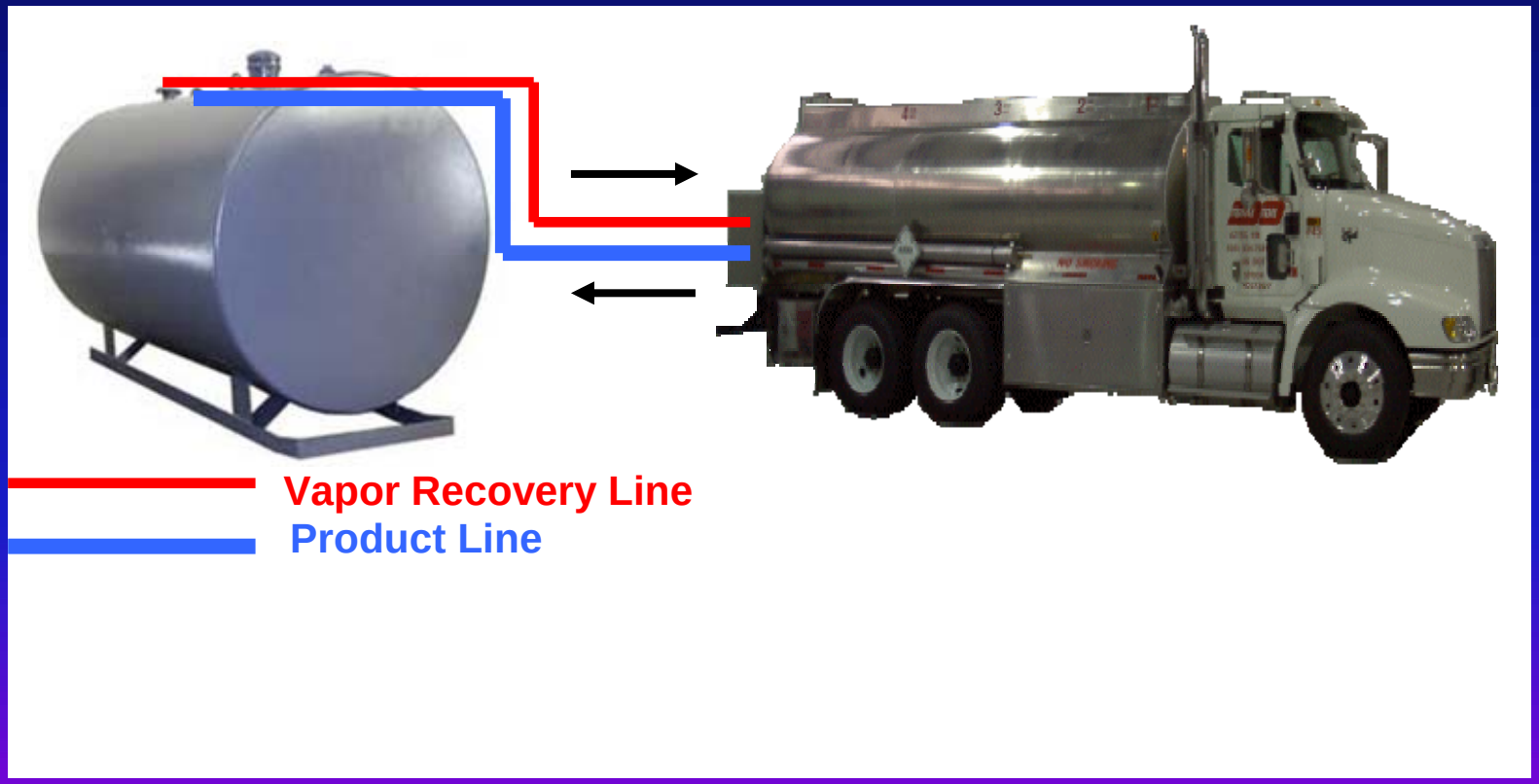
Vent Pipe Emissions

Tank Temp.



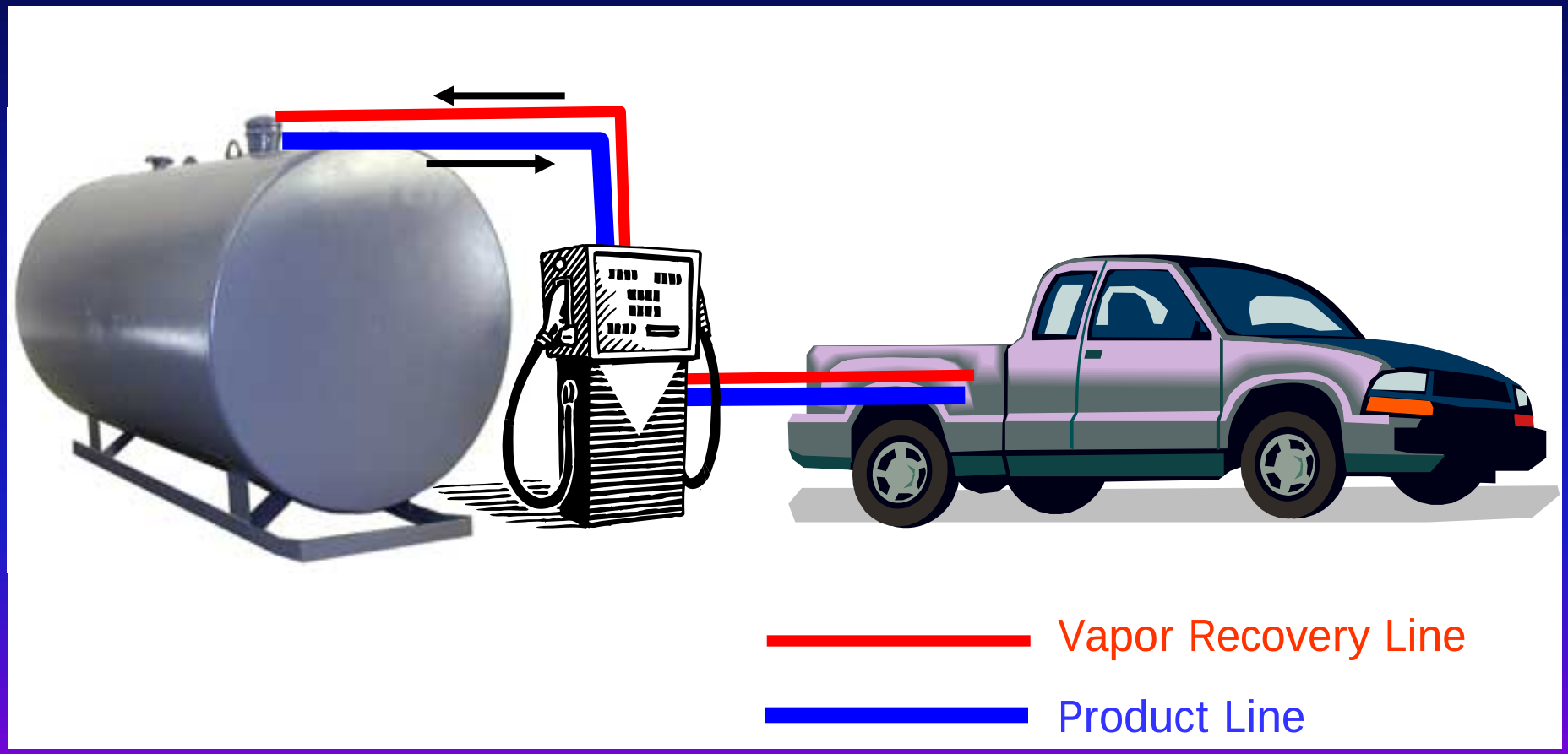
Background

Phase I Transfer



Background

Phase II Transfer



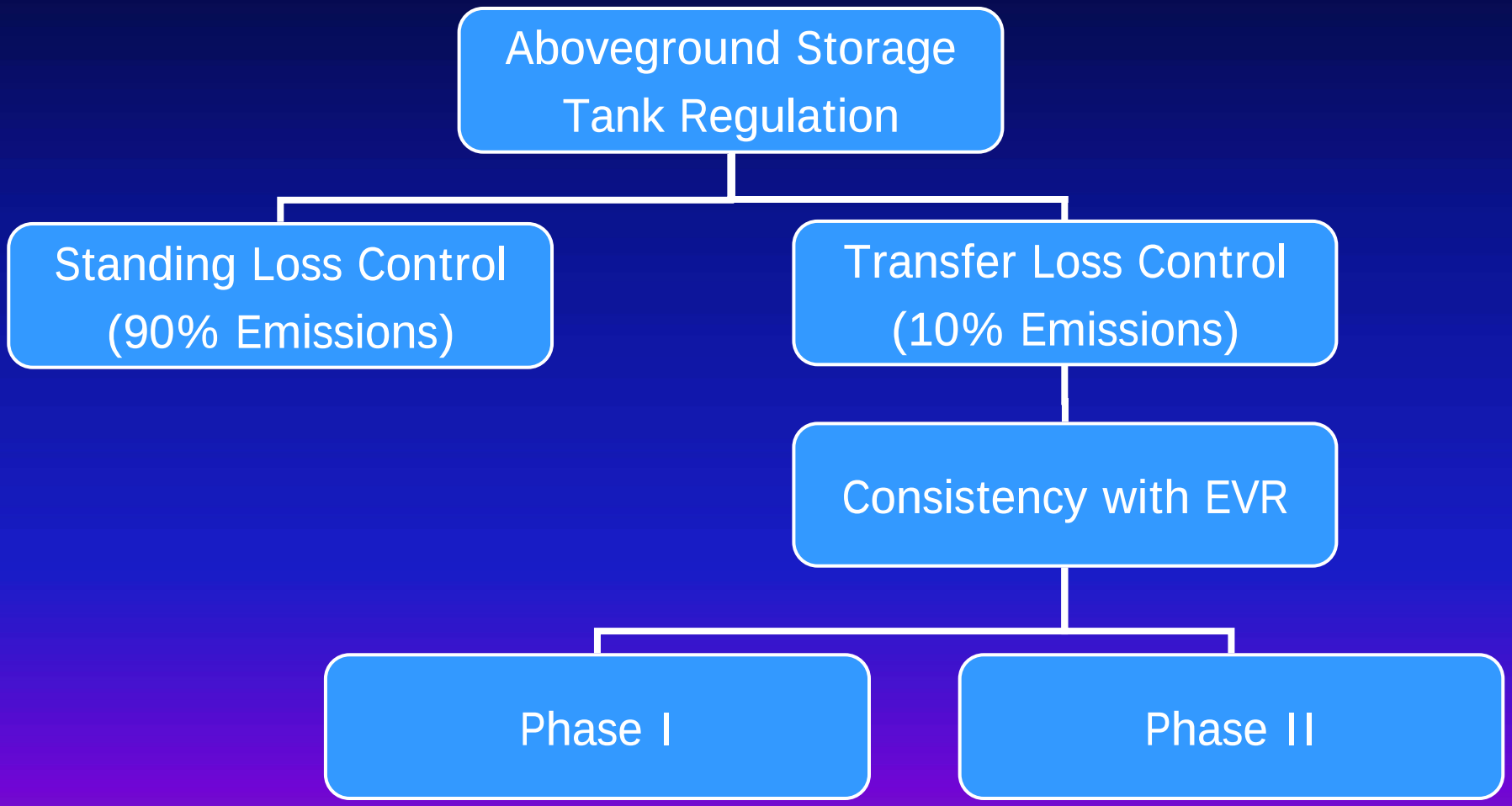
AST Population

- 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

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


Aboveground Storage Tank Regulation
Standing Loss Control (90% Emissions)
Transfer Loss Control (10% Emissions)
Consistency with EVR
Phase I
Phase II

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

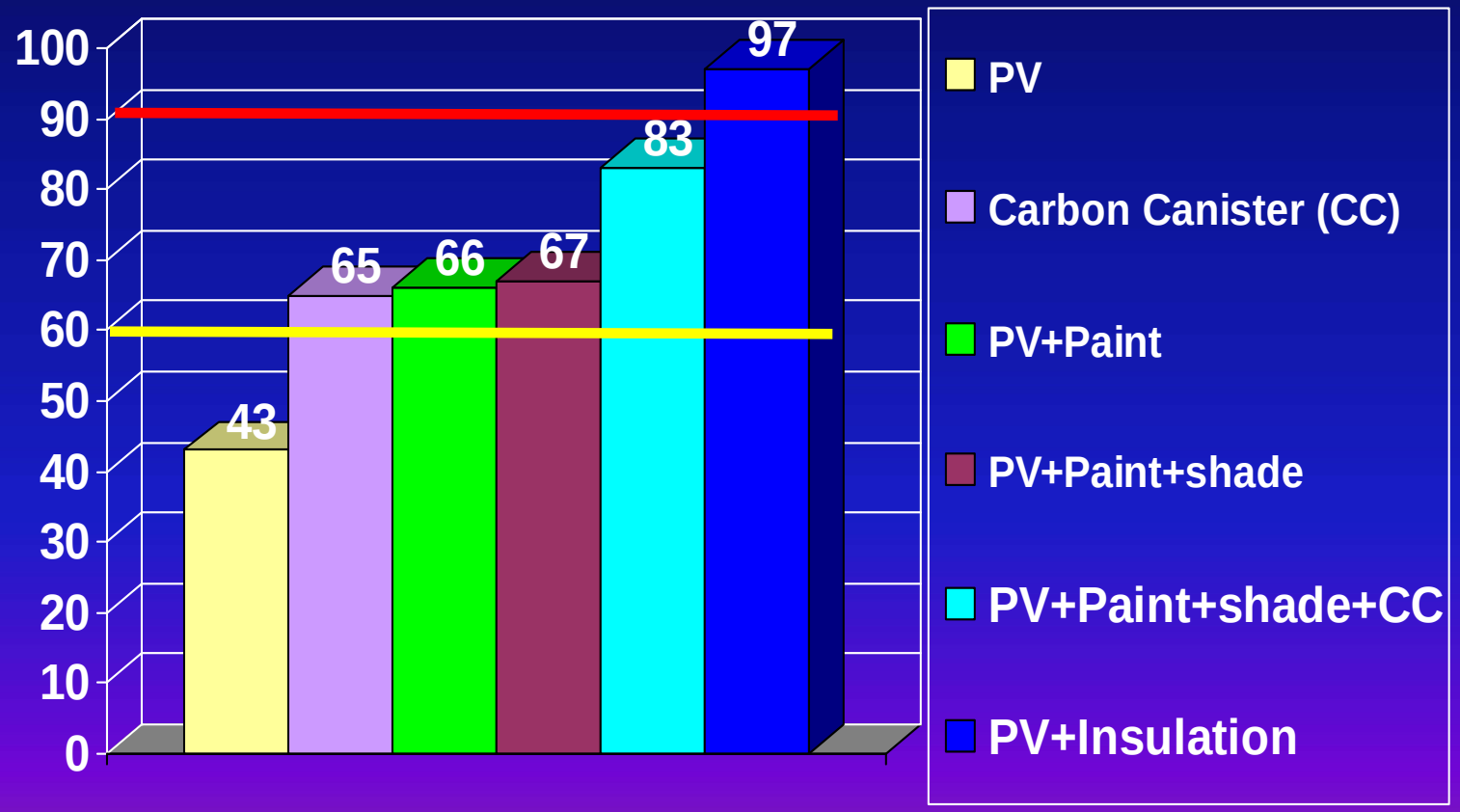
White Paint

Field Study

Spray-on Polyurethane Foam Insulation

Field Study

Control Technology Effectiveness



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

Phase I Transfers

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

Phase II Transfers

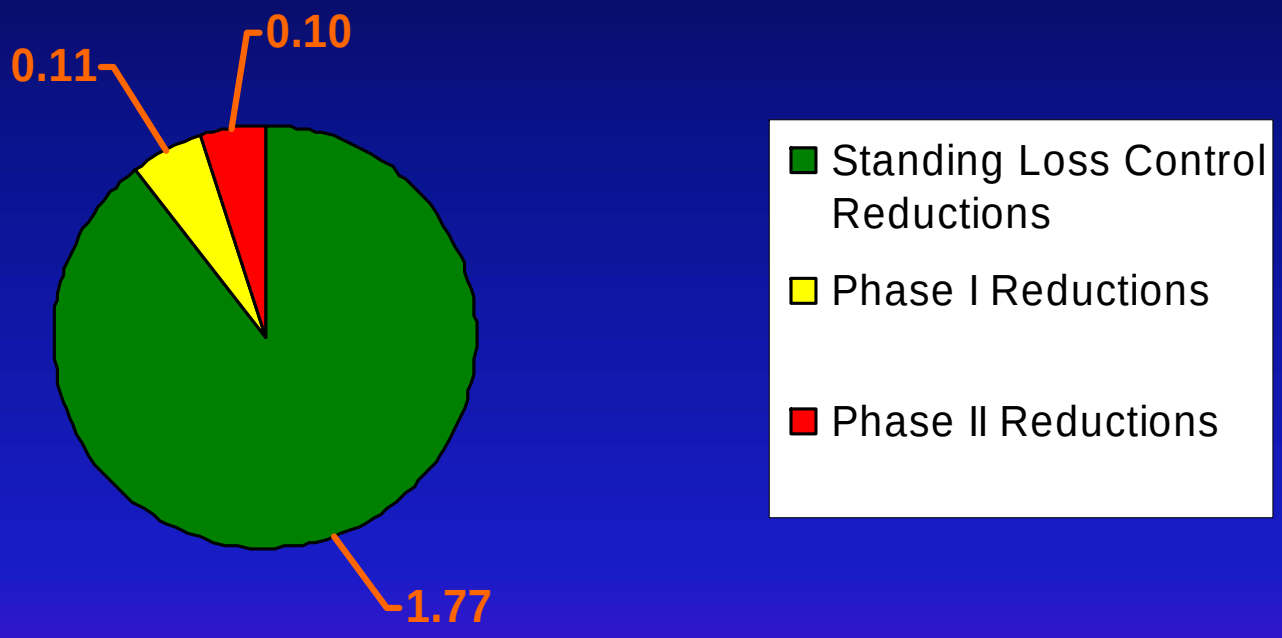
- Transfer from AST to Motor Vehicle
- Performance Standard
  - Current: 90 percent efficiency
  - EVR Proposal: 95 percent efficiency

Effective Dates

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

Environmental Impacts

Annual Emission Reductions (tons per day)



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	

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