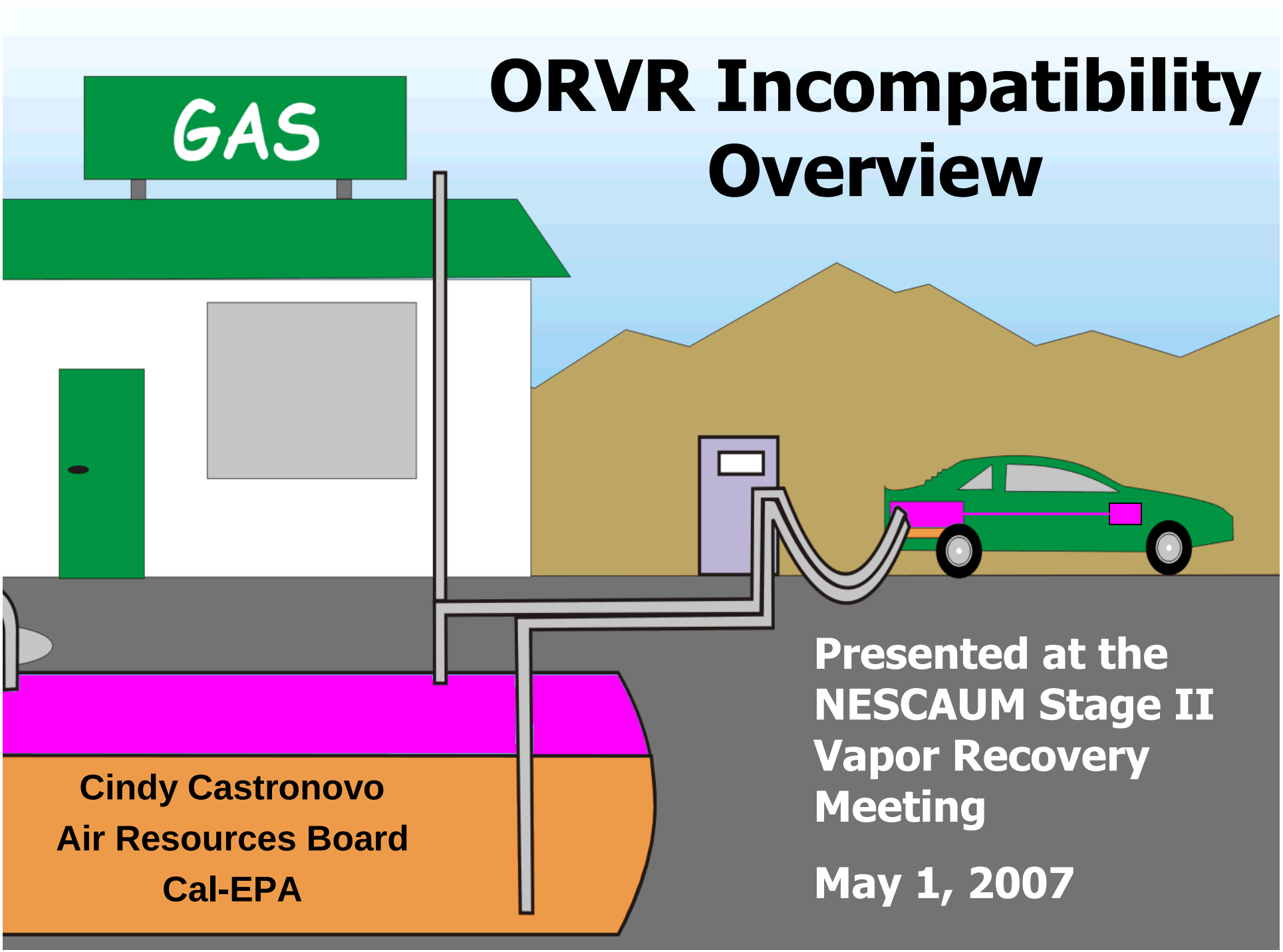
ORVR Incompatibility Overview



Cindy Castronovo
Air Resources Board
Cal-EPA

Presented at the NESCAUM Stage II Vapor Recovery Meeting

May 1, 2007

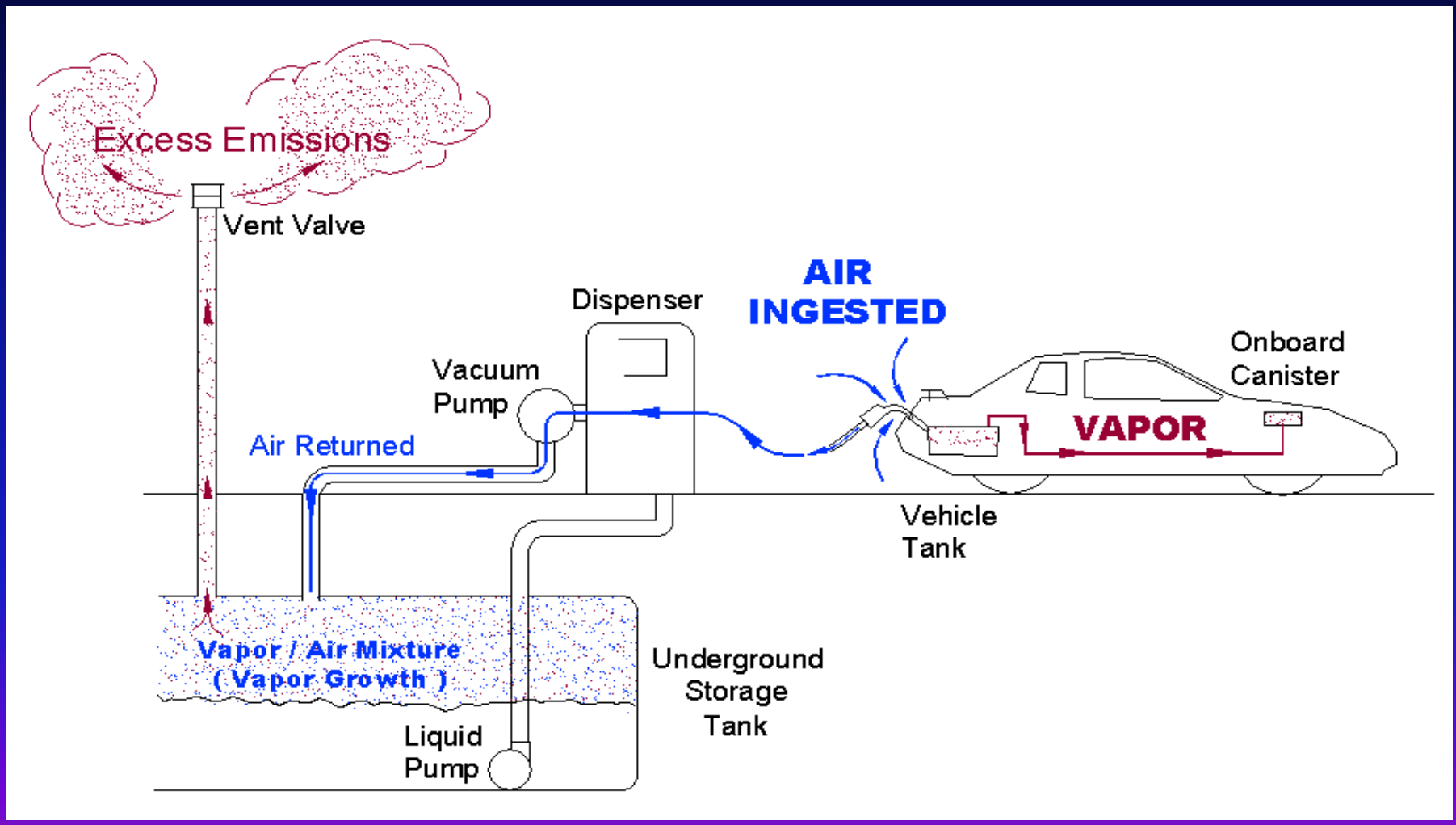
CARB Comment on Proposed ORVR Regulation in the 1980s

" If [ORVR] development is pursued it should be compatible with Phase II systems so that our California program will not be adversely affected and progress in other states will not be retarded."

CARB May 1994 Memo

- ARB considering waiver to opt out of ORVR requirement
- May 1994 memo predicts more than 30% efficiency loss for certain assist systems when fueling ORVR vehicles
- www.arb.ca.gov/vapor/p2orvrhydro.pdf

ORVR - Phase II Incompatibility



1998 Field Tests

- ARB contractor and ARB field staff simulate ORVR fueling at operating stations and measure emissions to investigate May 1994 memo predictions
- Contractor tested Gilbarco VaporVac system, ARB staff test VaporVac and WayneVac.
- ARB draft test report (never finalized) at www.arb.ca.gov/vapor/orvr_report.pdf

ARB 1998 Field Test Results used to Justify EVR Module 3 in 2000

- Measured vent emissions and calculated fugitives from pressure profile for both “baseline” and 45% ORVR simulation
- Extrapolated results to other ORVR penetrations to calculate emissions for multiple years
- Appendix D of EVR Feb 2000 staff report: 6.3 tons/day excess emissions for 2010

ORVR Excess Emissions Modified in 2002 EVR Tech Review

- Change in WayneVac emission factor reduces excess emissions to 4.5 tons/day
- 4.3 (95%) for Gilbarco VaporVac
- Difference in certified A/L range leads to greater air ingestion for Gilbarco system
- Gilbarco EO modified in July 2000 to require replacement nozzles use lower A/L range and be equipped with mini-boots

American Petroleum Institute Tests

- Studied Phase II/ORVR interaction using real ORVR vehicles
- February 2004 report support findings that lower A/L range and mini-boots for Gilbarco systems significantly reduce excess emissions

Excess Emissions from ORVR Compatible Systems without Processors?

- Tested balance sites under worst case conditions (warm climate, winter fuel, overnight shutdown)
- “Balance Challenge” October 2006 test report showed significant vent emissions
- www.arb.ca.gov/vapor/bcmreport102506.pdf

Questions?