Roseville Rail Yard
Progress Report

Mitigation Plan, Grant Program, Monitoring Project

PCAPCD Board of Directors
December 8, 2005

Presentation Speakers & Topics

- Tom Christofk-APCO
  - Provide short background on PCAPCD/UPRR Agreement Elements and why it was developed
- Lanny Schmid & Mike Iden-UPRR Representatives
  - Discuss progress in implementing the idling and fuel mitigation measures
  - Will also provide update on the Gen-Set Switcher program
- Don Duffy-PCAPCD Engineer and Hood Project Lead
  - Provide status of the Hood Demonstration Project and discuss the project objectives and resource obligations
- Dr. Chang-PCAPCD Senior Planner and Monitoring Lead
  - Provide update on year 1 of the project and year 2 plans and schedule
- Tom Christofk-APCO
  - Provide update on the Grant Program element and summarize the progress overall

Agreement
Between UP and PCAPCD

Signed One Year Ago…12/9/04 by the Chairman and UPRR contained three elements

- **Mitigation Plan**

  -reducing additional 10% of Diesel Particulate Matter (DPM) emissions from rail yard over three years (2005~2007)

  -UPRR indicates they have reduced emissions by 15% since the initiation of the Risk Assessment in 2000

- **Grant Program**

  -providing grants at least $150,000 over next three years to achieve one ton DPM emissions reduction from other sources of background emissions in Roseville area

- **Monitoring Project**

  -providing at least $100,000 to monitor DPM emissions from the rail yard

Agreement Progress Reports

- Agreement contains language for an annual progress report to the Board and community towards achieving the emissions reductions targeted by the mitigation plan (§2A(iv))
- Staff is including information on the Grant and Monitoring elements so as to provide a comprehensive yearly status report

Since our Agreement was signed, the ARB has negotiated a Statewide Agreement with the two Class I railroads (UPRR & BNSF) to conduct risk assessments and implement measures to reduce emissions around rail facilities statewide which they estimate will produce an overall 20% reduction in emissions by mid 2008.

District Objectives

For Requesting the Air Resources Board to Conduct a Risk Assessment in early 2000

1. **What is the risk to the public being exposed to the emissions from this facility?**
2. **What does it mean, in comparable terms, to other source of diesel emissions?**
3. **What can be done to reduce the emissions, and thereby reduce the risk?**

Findings

ARB Study results as presented to the PCAPCD Board in October 2004

- **Year 2000 diesel PM emissions: 25 tons**

  -moving locomotives account for about 50% of emissions, idling locomotive about 45% and testing accounts for about 5%

Note that rail traffic has increased in the period since the baseline 1999-2000 timeframe and the rail industry is a major factor in statewide and nationwide Goods Movement actions (marine vessels, trains, trucks).

- **Large region impacted by the diesel PM emissions from the Yard**

  -potential cancer risks greater than 500 in a million occur

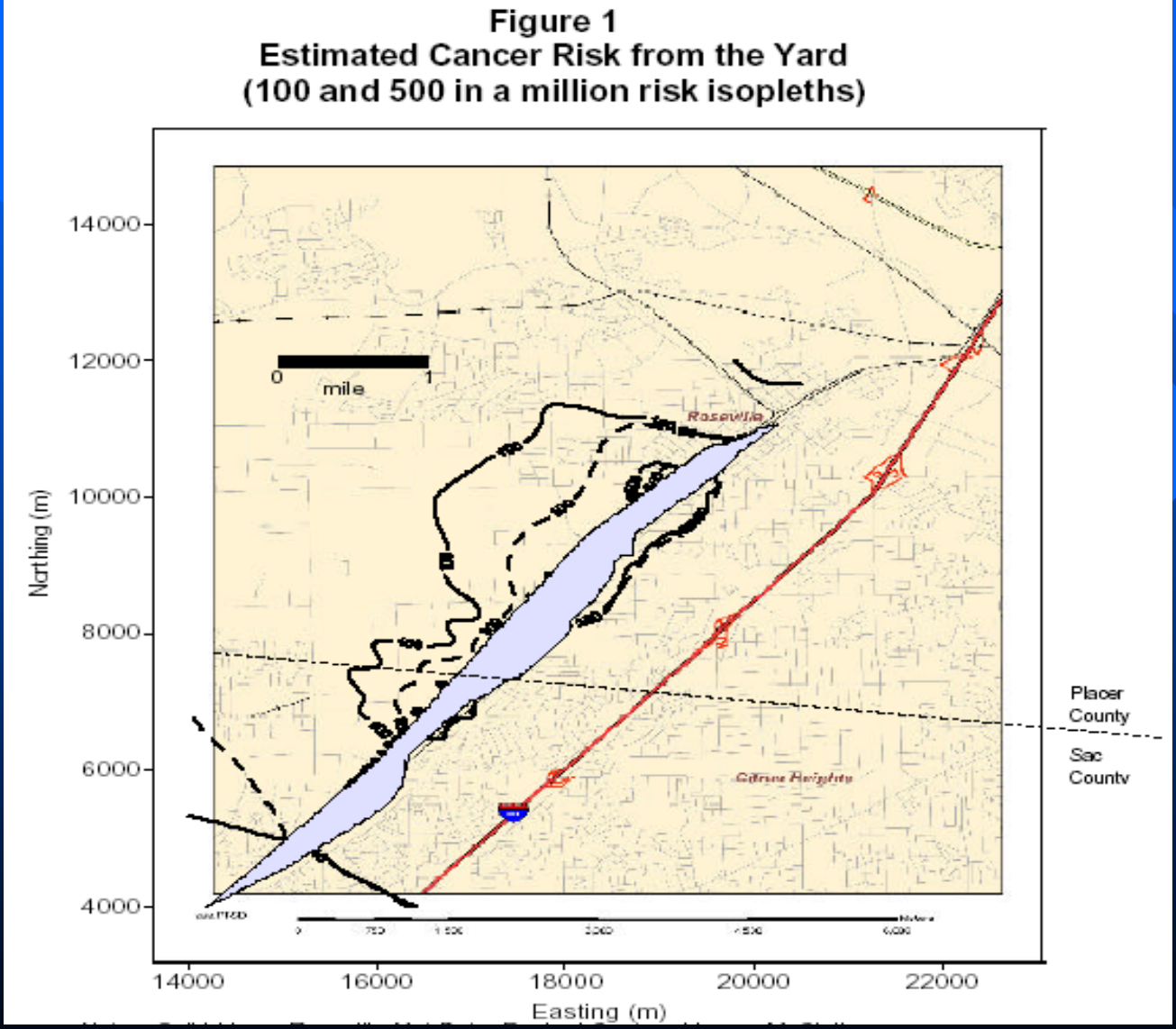
  -northwest of the Service Track area and Hump and Trim (10~40acres)

  -potential cancer risks greater than 100 in a million occur over a 700~1600 acres

  -potential cancer risk greater than 10 in a million occur over

  -46,000~56,000 acres impacted between 140,000 and 155,000 people

CARB Modeling Results



Mitigation Plan Focus

The first two measures will effect reductions from the entire facility, while the last two target the areas of the facility that produce DPM concentrations that produce risk "peaks"

- **Unnecessary idling reductions ***

  -Hardware

  -Operations/policy

- **Use of low-sulfur diesel fuel for intrastate switchers and locomotives***

  -State regulation 1/1/2007 15ppm sulfur & 10% aromatic limit on diesel

  -Use will yield 14% PM and 6% N0x reductions

- **Hump and trim switcher fleet replacement/upgrades**
- **Emission control from service test & repair area (aka the "hood")**

**** Also a major element of the ARB Statewide Agreement***

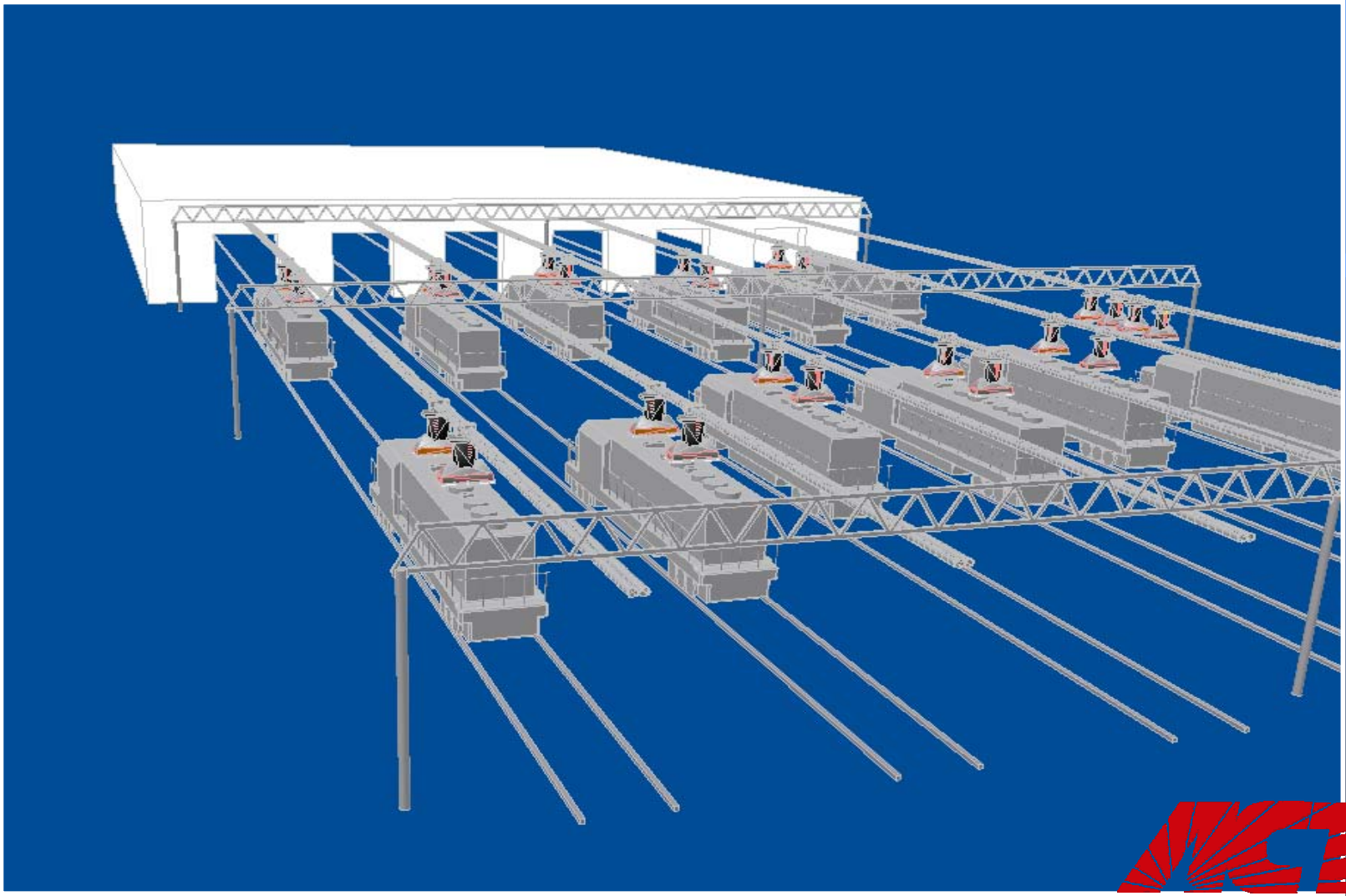
UPRR Representatives Presentation

Switcher Fleet Replacements

Staff from both PCAPCD & SMAQMD support the use of public incentive funds to accelerate switcher fleet modernization

- **$500K from ARB Moyer set aside and $350K local districts Moyer funds to be applied to GSS switcher**
  -Total cost is ~$1.3 million (UPRR to contribute $450K)
- **Contract expected to be signed and approved in January with delivery to Roseville service in fall 2006**
- **Plan is to upgrade at least 6 units of the switcher fleet (4 for the hump operations and 2 for trim…and perhaps 2 backup units) sequentially over time**

Advanced Locomotive Emission Control System (Hood Project)

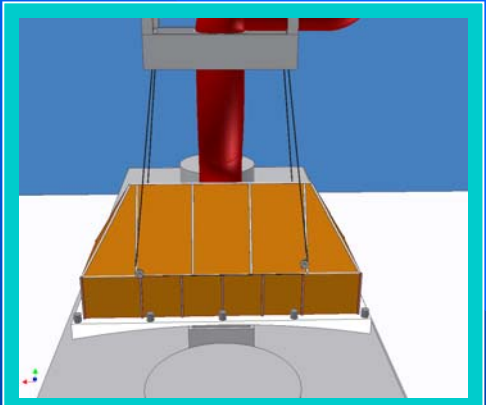


Locomotive and Rail Sector

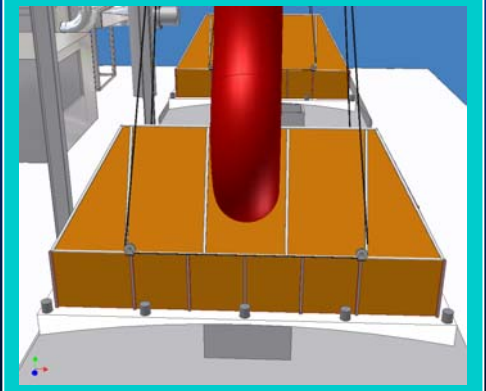
WEST COAST COLLABORATIVE

Public-private partnership to reduce diesel emissions

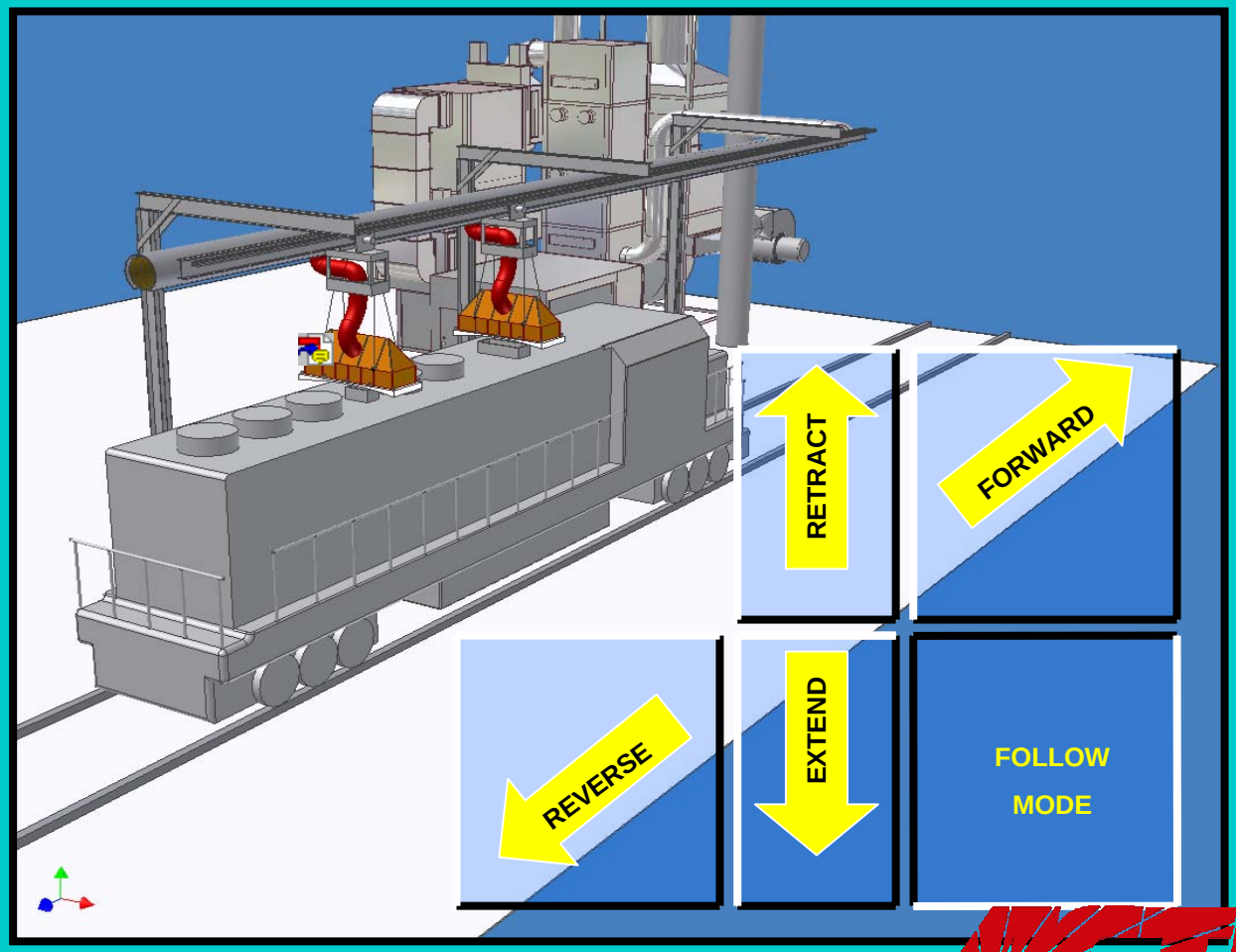
Demonstration Project Configuration



FRONT CAMERA



REAR CAMERA



ALECS PROJECT TEAM

MEMBER	CONTRIBUTION	TYPE
Placer County APCD	$50,000	Dollars & Staff Hours
Sacramento AQMD	$25,000	Dollars
Union Pacific Railroad	$200,000+	Staff Hours Locomotives Test Site + Utilities
Advanced Cleanup Technologies	$1,000,000	Interface Design Loan of ALECS Operation

ALECS PROJECT TEAM

Continued….

MEMBER	CONTRIBUTION	TYPE
California Air Resources Board	Technical Review	Staff Resources
South Coast AQMD	$50,000	Dollars
US EPA Region 9	$39,000	Dollars

ALECS PROJECT OBJECTIVES

Objective 1: Demonstrate the effectiveness of stationary control equipment on locomotive exhaust.

Objective 2: Demonstrate the attachment scheme between the locomotive and the stationary control equipment.

Objective 3: Demonstrate the capability of some locomotive movement while connected to the control equipment.

Objective 4: Develop improved information on capital cost, operating procedures, and operating costs.

Objective 5: Document test results and project findings in a final report.

ALECS SCHEDULE MILESTONES

➢ Project Start	September 2005
➢ Ship ALECS to Roseville	May 2006
➢ Complete Testing	July 2006
➢ Final Report	November 2006

Roseville Railyard Air Monitoring Project (RRAMP) Status

This will be a short update on the year end status of the air monitoring project and is not intended to be a comprehensive project briefing

Overview

- Brief background
- Summary of data completeness
- CARB audit of monitors
- Data analysis and RFP
- UC Davis DRUM sampler results
- Filter sample results
- Next steps

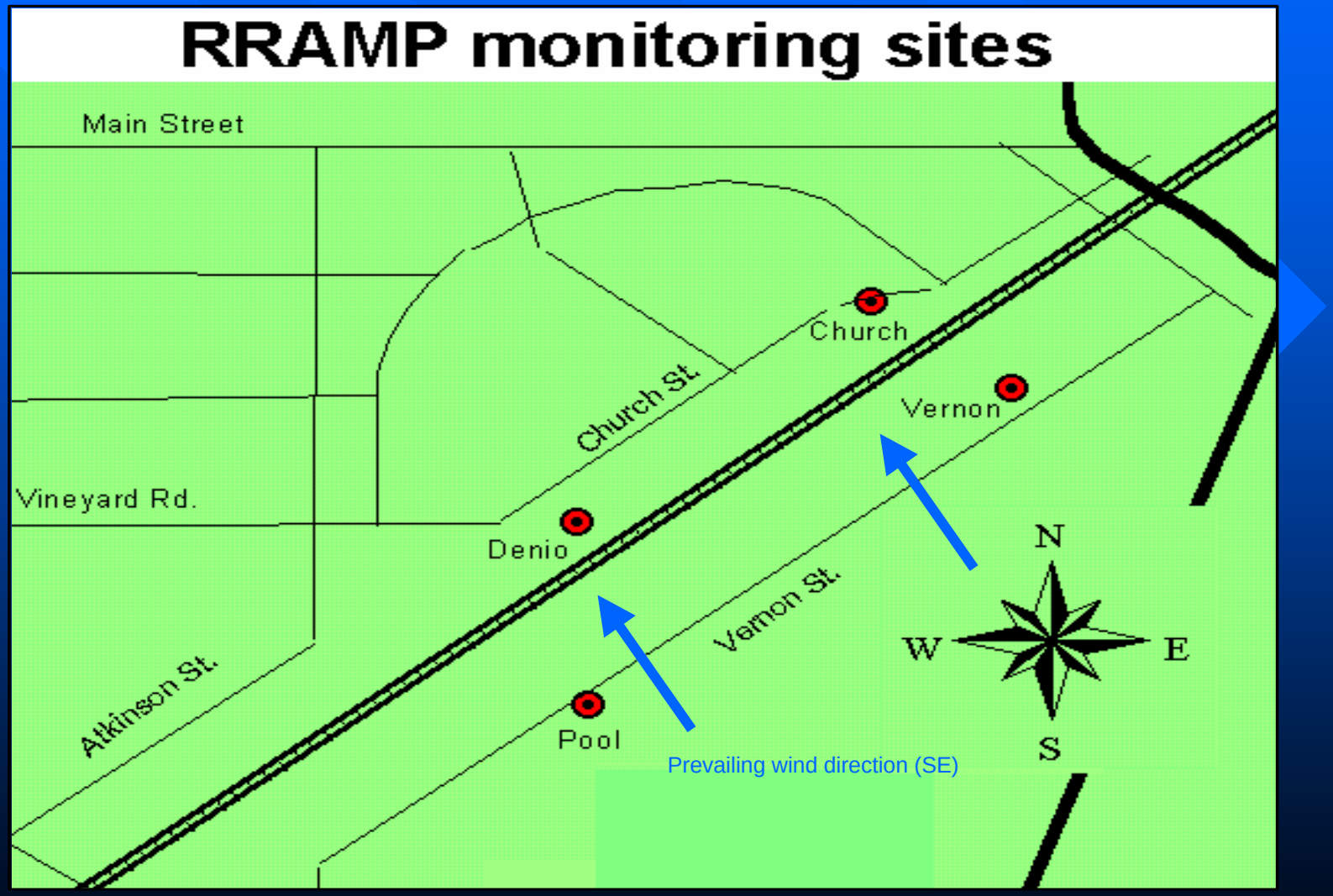
Air Monitoring Project Objectives

- Determine, through monitoring localized air pollutant impacts from the UPRR facility
- Verify effectiveness of mitigation measures over time
- Improve accuracy of future modeling analysis
- Provide feedback to the public

Monitoring Strategy

- Utilize two pairs of upwind/downwind site locations
- Minimize non-UPRR emissions sources between each pair
- Optimize pair orientation to the prevailing wind direction
- Optimize time of year with the predominance of the prevailing wind; summer months

Background: Upwind and Downwind Sites



Background: Sampling Period

- Denio-Pool sites:
  - Jul 15 – Oct 15, 2005
- Church St-Vernon St sites:
  - Sep 7 – Oct 15, 2005

Data Completeness

	Denio Site							
	Wind Spd	Wind Dir	NO	NOx	Aeth	EBAM	Teflon Filter	Quartz Filter
monitoring period	7/15~10/15	7/15~10/15	7/21~10/15	7/21~10/15	7/15~10/15	7/15~10/15	7/21~10/10	7/15~10/13
total hours	2232	2232	2087	2087	2232	2232	10	21
count	2228	2228	1978	1978	2225	2226	9	20
%	99.8%	99.8%	94.8%	94.8%	99.7%	99.7%	90%	95%
reading avg.			76.87	112.38	1.80	13.14		

	Pool Site							
	Wind Spd	Wind Dir	NO	NOx	Aeth	EBAM	Teflon Filter	Quartz Filter
monitoring period	7/15~10/15	7/15~10/15	7/24~10/15	7/24~10/15	7/15~10/15	7/15~10/15	7/21~10/10	7/15~10/13
total hours	2232	2232	2015	2015	2232	2232	10	21
count	2232	2232	1930	1930	2105	2232	9	20
%	100%	100%	95.8%	95.8%	94.3%	100%	90%	95%
reading avg.			9.48	26.62	0.76	9.95		

Data Completeness (cont.)

	Church St. Site							
	Wind Spd	Wind Dir	NO	NOx	Aeth	BAM	Teflon Filter	Quartz Filter
monitoring period	9/7~10/15	9/7~10/15	8/9~10/15	8/9~10/15	9/9~10/15	9/7~10/15	9/22~10/10	9/16~10/13
total hours	925	925	1621	1621	875	925	3	7
count	780	780	1573	1573	875	780	3	7
%	84.3%	84.3%	97.0%	97.0%	100%	84.3%	100%	100%
reading avg.			70.68	102.87	1.86	16.74		

	Vernon St. Site							
	Wind Spd	Wind Dir	NO	NOx	Aeth	BAM	Teflon Filter	Quartz Filter
monitoring period	9/7~10/15	9/7~10/15	9/13~10/15	9/13~10/15	9/9~10/15	9/7~10/15	9/22~10/10	9/25~10/13
total hours	925	925	781	781	875	925	3	5
count	925	925	781	781	839	925	3	5
%	100%	100%	100%	100%	95.9%	100%	100%	100%
reading avg.			18.99	36.70	1.06	11.69		

Data Completeness (cont.)

	Met Tower								
	Wind Spd (m/s)	Wind Dir (Deg)	Std Dev. Of Wind Dir	Temp. @10 m (F^0)	Temp. @ 2m (F^0)	Delta of Temp. (F^0)	RH (%)	SR (W/m2)	Pressure (in/Hg)
monitoring period	7/15~10/15	7/15~10/15	7/15~10/15	7/15~10/15	7/15~10/15	7/15~10/15	7/15~10/15	7/15~10/15	7/15~10/15
total hours	2232	2232	2232	2232	2232	2232	2232	2232	2232
count	2232	2232	2232	2232	2232	2232	2232	2232	2232
%	100%	100%	100%	100%	100%	100%	100%	100%	100%

- Lab result completeness

  quartz filters: 52/54 = 96%

  Teflon filters: 24/26 = 92%

ARB Audit

- Audit date: September 8, 2005
- Site of audit: Denio and Pool site
- Instruments audited:
  - NOx analyzer
  - PM2.5 continuous monitor (EBAM)
  - PM2.5 FRM filter-based sampler (BGI-200)
- Audit parameters:
  - 3 levels (low, mid, and high) of NO2
  - flow rate
  - leak test

Audit Results

- Instruments performing very well (3%).
- Inlet leak to one NOx analyzer found.
- Problem was immediately corrected.

Data Analysis

- **Scope of Work:**

  Data review and screening

  Upwind/downwind difference analysis

  Correlation analysis

  Pollutant ratio

  Estimate of Diesel Particulate Matter (DPM)

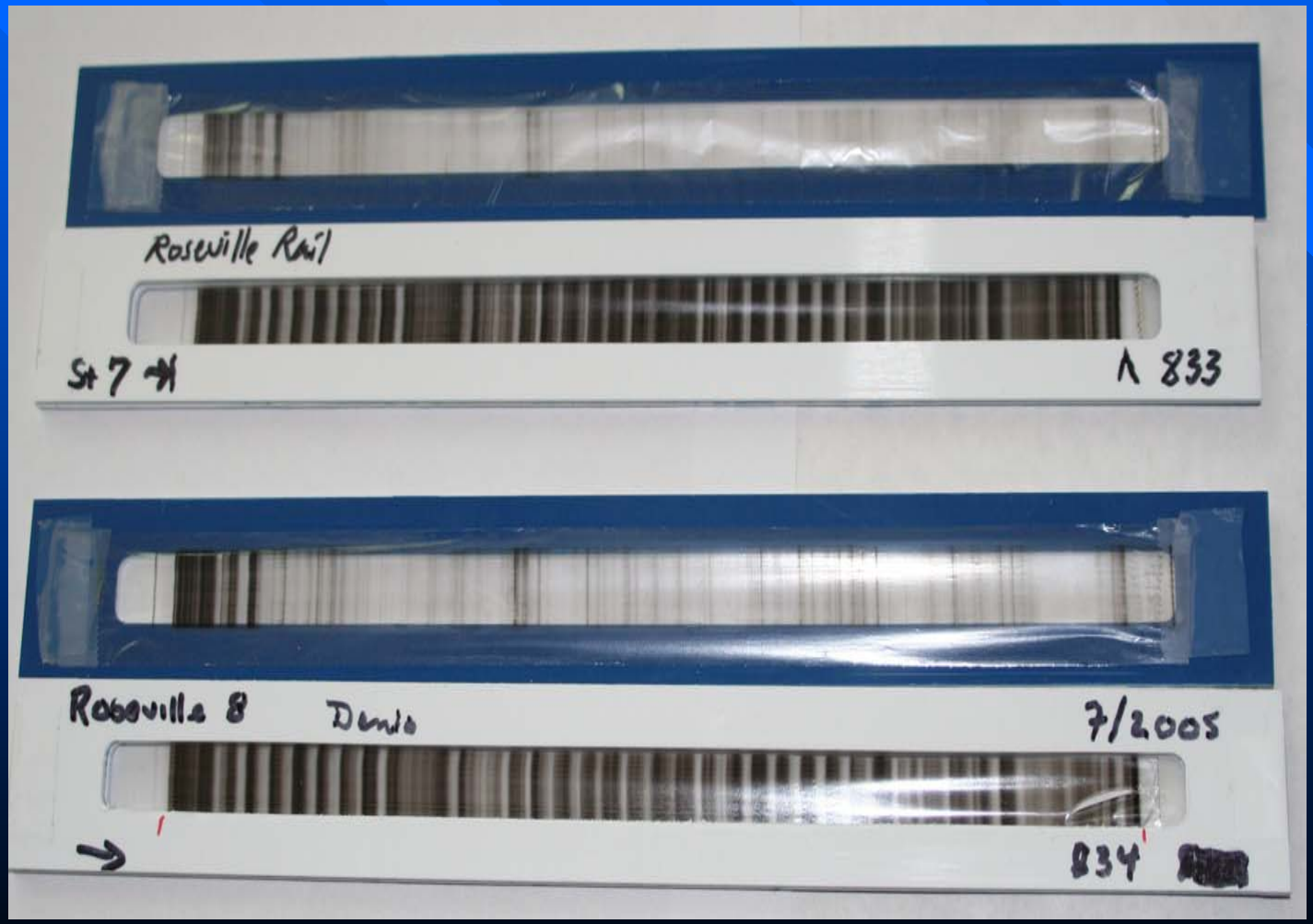
  Trend analysis

  Reports

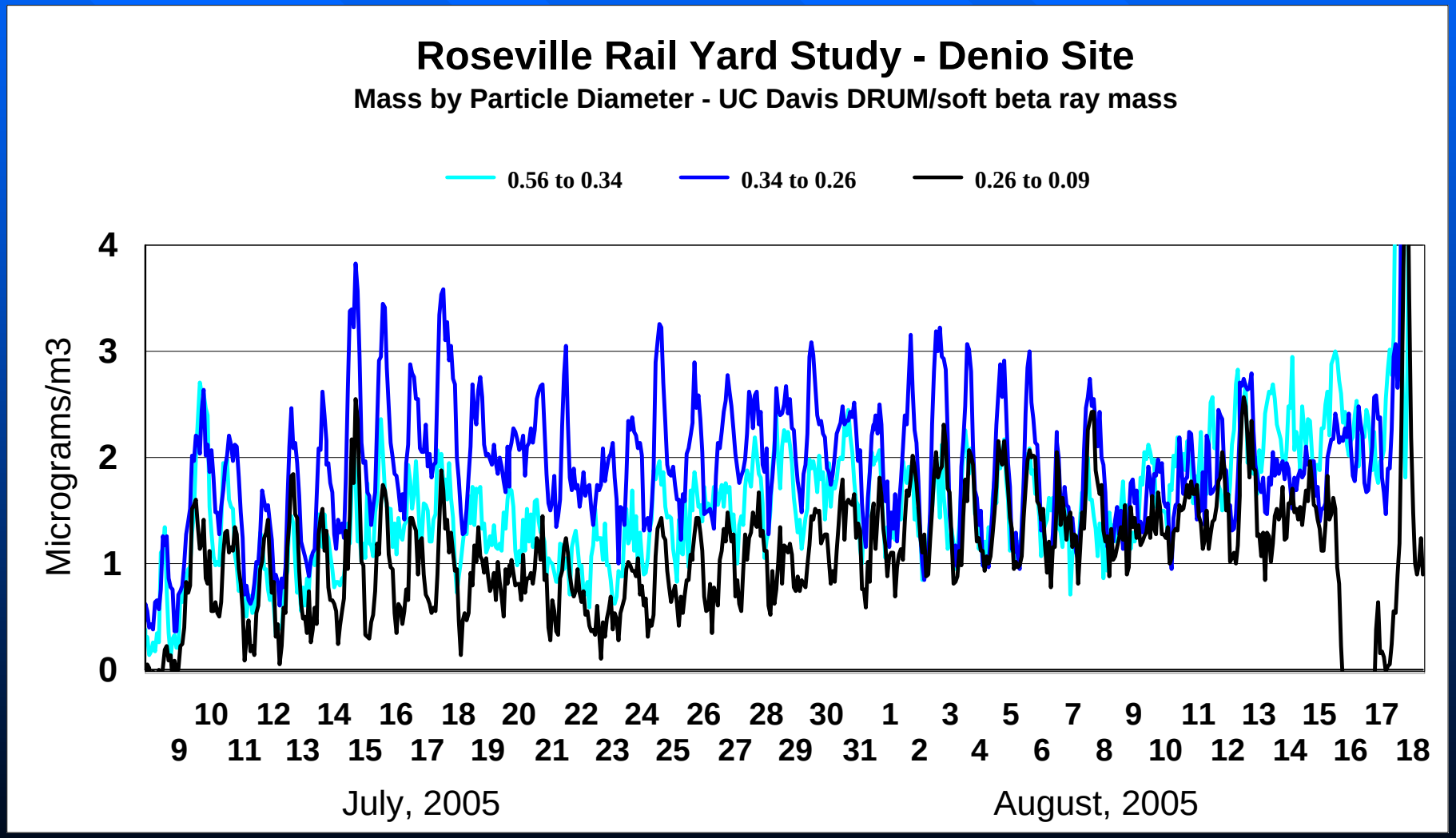
Data Analysis (cont.)

- RFP was released on September 1
- 3 bids received
- Review panel was comprised of a subset of TAC
- Desert Research Institute (DRI) was awarded the contract
- First-year draft of data analysis report will be delivered to TAC in February 2006
- First-year final report will be submitted to the Board in April 2006

UC-Davis DRUM Sampler



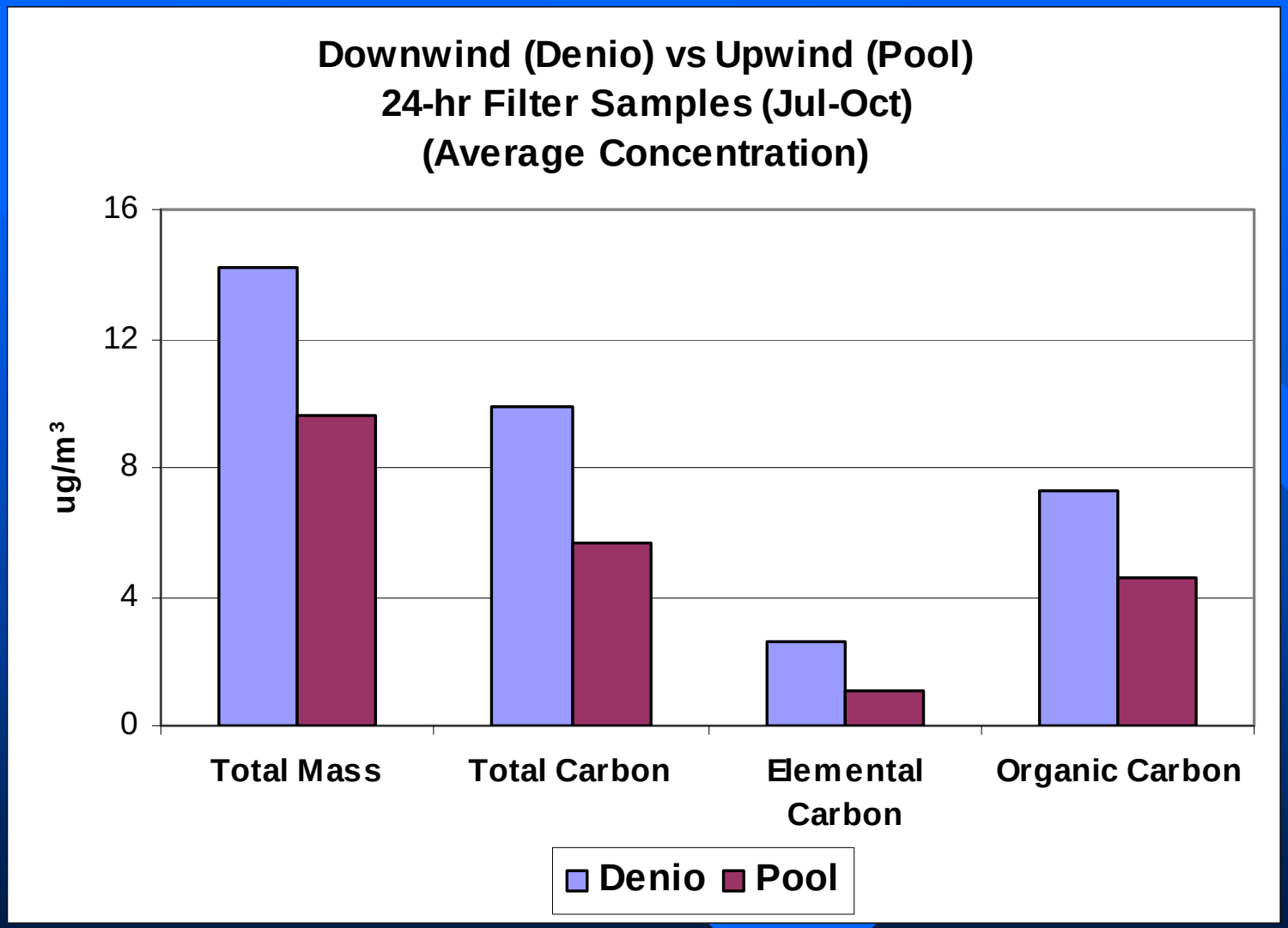
Sampler Results

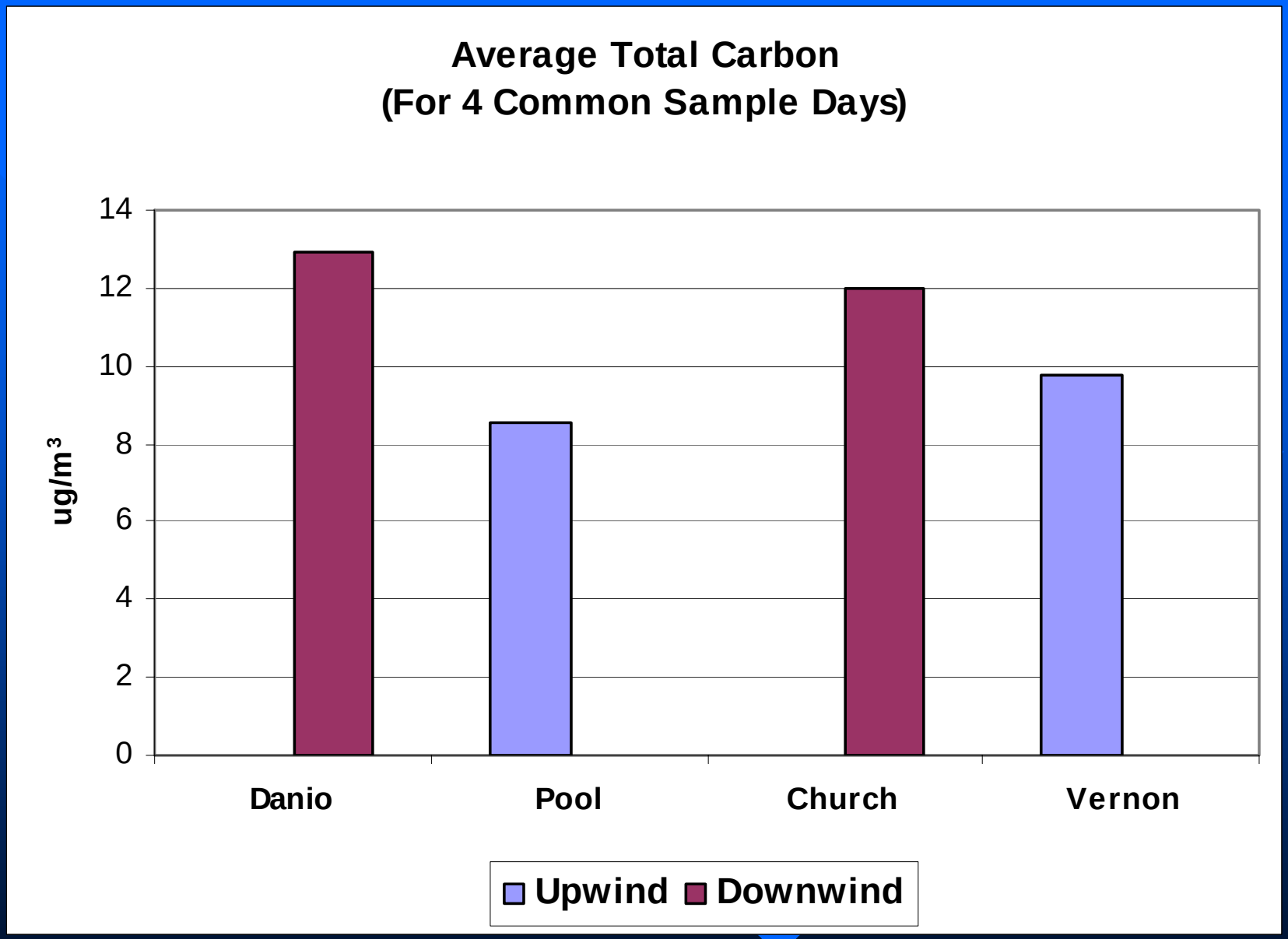


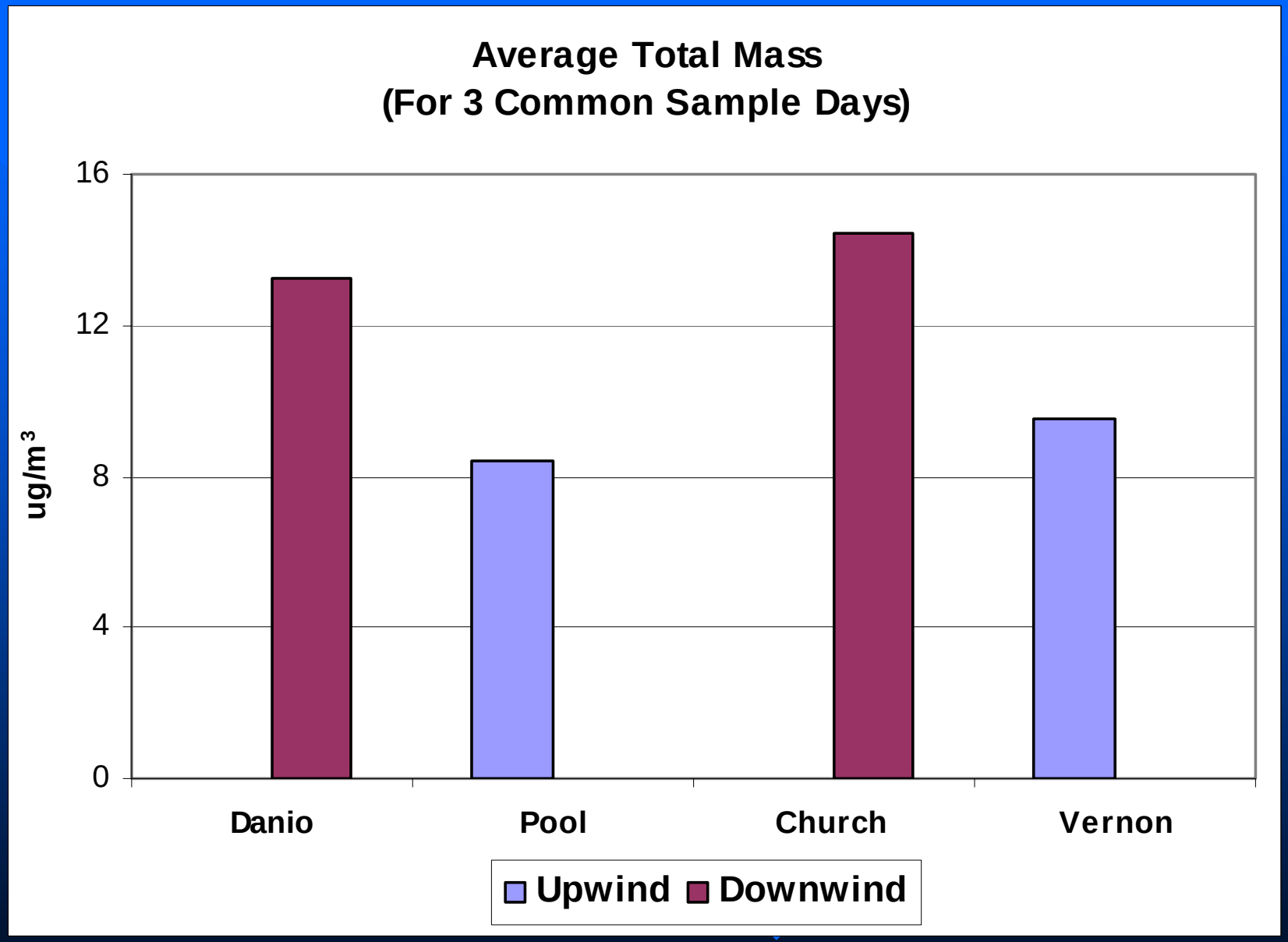
Findings from UC-Davis DRUM Sampler

- Definitive aerosol plumes from the rail yard confirms the upwind/downwind design of the RRAMP.
- The mean nighttime mass excess at Denio was 6 $\mu g/m^3$ in the very fine size mode (where one would expect to find diesel particulates).
- Other results show that train diesel emissions have slightly larger sizes than is found in roadway truck diesel emissions.

Preliminary Data Results
(From Filter Samples)


Downwind (Denio) vs Upwind (Pool)
24-hr Filter Samples (Jul-Oct)
(Average Concentration)
16
12
8
4
0
ug/m3
Total Mass
Total Carbon
Elemental Carbon
Organic Carbon
Denio
Pool


Average Total Carbon
(For 4 Common Sample Days)
ug/m3
14
12
10
8
6
4
2
0
Danio
Pool
Church
Vernon
Upwind
Downwind


Average Total Mass
(For 3 Common Sample Days)
16
12
8
4
0
ug/m3
Danio
Pool
Church
Vernon
Upwind
Downwind

Summary from Filter Samples

- Notable differences exist between upwind and downwind locations.
- Almost all of the mass difference appears to be due to excess carbon, indicative of diesel emissions.
- Results appear consistent at both sets of upwind/downwind pairs
- Results appear consistent with UC Davis findings.

Next Steps

- February 2006
  - Data analysis from Year 1 becomes available
  - Next TAC meeting
- April-June 2006
  - Preparations for Year 2 intensive sampling
- June-September 2006
  - Year 2 intensive sampling

Grant Program Status

The purpose of the Grant Program is to achieve a one ton DPM reduction in the "background" air through at least $150K from UPRR

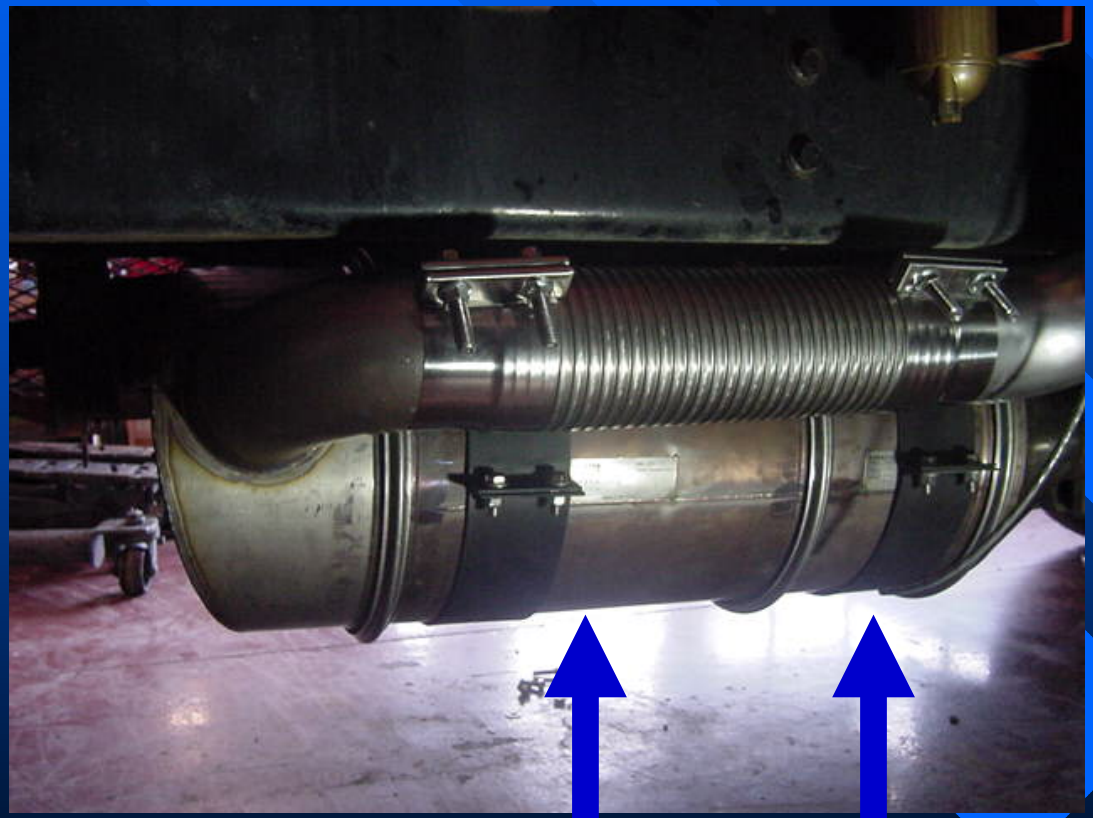
(recognizes that risks are cumulative: facility + background=total)

2005 Grant Application

- First year $50K applied through 2005 Clean Air Grants towards retrofitting 4 Roseville City refuse trucks with Cleaire Longview exhaust system devices (N0x reducing catalyst and a catalyzed DPM filter)
- Trucks estimated to have a 7 year service life, and total DPM reductions from this grant are expected to be .2 tons
- UPRR invoiced for both year 2 & 3 contributions ($100K) in December
- Staff will again utilize the annual Clean Air Grant process to find eligible projects in Roseville for application of these funds

Cost of DPM reduction is high compared to N0x (~20X) and unless higher yield or more cost effective projects can be found for the remaining funds there will be a shortfall in the 1 ton target

Horizontal Side-Out Installation



Exhaust out

Exhaust in

PM filter

NOx catalyst

WARNING
KEEP AWAY FROM GEAR WHEN POWER IS APPLIED TO LIFT MECHANISM

LONGVIEW Controls
CAUTION

DANGER
DANGER
CITY OF

Non-road Installations

200kw Genset - San Francisco

600kw Genset – San Francisco

Water Pump - Bakersfield

Agricultural Tractor - Fresno

Longview Installed

Summary

- Staff feels there has been significant progress on all elements of our Agreement in 2005
  - Cannot at this time "bank" reductions and claim a percentage towards the goal
  - Mitigation measures just now phasing in
  - Monitoring may help quantify trends after year 2006
  - The ARB Statewide MOU, depending upon it's outcome, has elements that are synergistic with our Agreement
    - ARB Staff estimates the MOU will result in a 20% reduction overall by mid 2008
    - The MOU process, terms, and program elements has drawn criticism, and ARB staff has been directed to clarify some of it's provisions
- District staff will provide a similar progress report to the community next month and again to your Board in December 2006