



Off-Road Demonstration Projects

IN USE RETROFIT SECTION

JOHN KARIM



PRESENTATION
OUTLINE

SHOWCASE
PROJECT

SUPLMENTAL
ENVIRONMENTAL
PROEJCT
(SEP I,II,III)

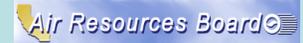
SNOWCATS
PROJECTS

Retrofit
Evaluation
(PEMS)





California Environmental Protection Agency



SHOWCASE PROGRAM





Objectives

- **Reduce Diesel Emission from Off-Road Equipment (Level III Systems)**
- **Demonstrate Durability and Effectiveness of DPFs on Off-Road Construction Equipment**
- **Demonstrate New Emission Control Systems**
- **Increase Number of Verified Retrofit Devices**
- **Fill Gaps in Vehicle Matrix**
- **Update Board Meeting in December**



Role of the fleet owner

- Ensure Vehicles Meet OEM Specifications
- Make Vehicle(s) Available for Retrofitting
- Approve Retrofit Designs and Locations
- Submit Forms - Certification, Confirmation, EQ Information.
- Inform ARB of Any Issues
- Allow Access for Periodic Monitoring
- Allow On-site Emission Testing



18 Fleets

5 Public Fleets

13 Private Fleets

204 Total Vehicles

Private	Public
Community Recycling & Resource Recovery Inc.	CALTRANS Division of Equipment
Albert W. Davies, Inc.	City of Burbank Public Works Department
Recycled Materials Company of CA	City of Los Angeles, General Services Department
Dan Copp Crushing	County Sanitation Districts of L.A. County
ECCO Equipment Corp.	City of Culver City Transportation Department
Griffith Company	
PEED Equipment Company	
Altfillisch Contractors, Inc.	
Reed Thomas Company, Inc.	
Shimmick Construction Co.	
Skanska USA Civil West California District Inc.	
Tiger 4 Equipment Leasing	
Sukut Equipment Inc	

A joint program of:

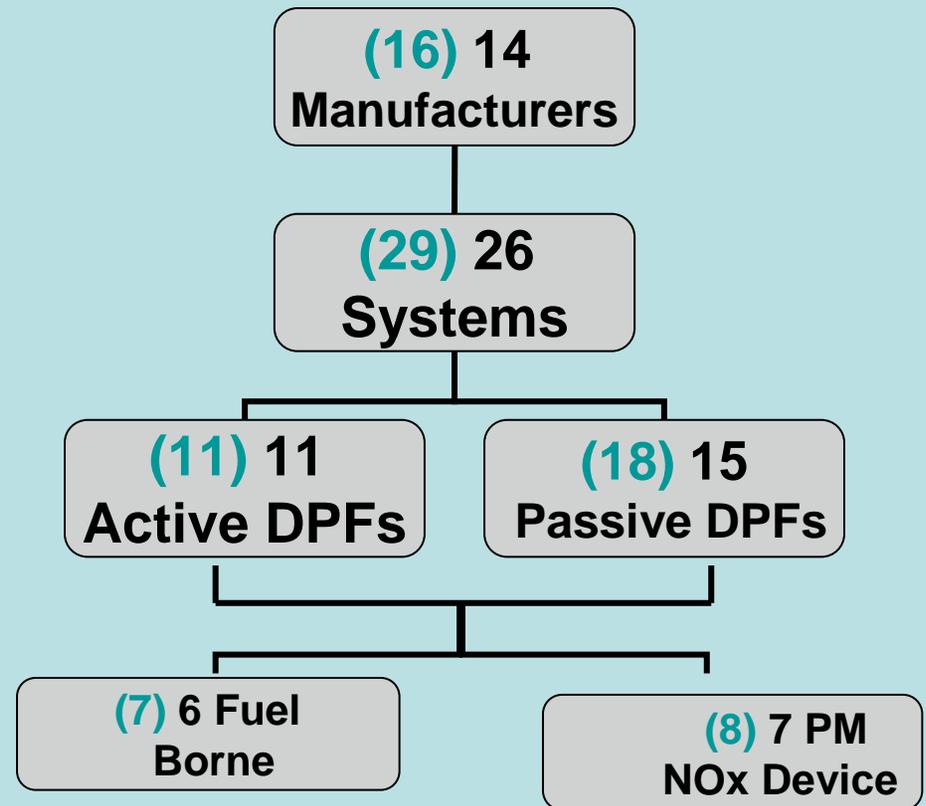


Role of Device Manufacturers

- Submit Proposal (s)
- Submit Designs and Location of Device to Fleet Owners and ARB
- Install DPF
- Install ARB Approved Data Loggers
- Respond within 24 hrs.
- Implement Warranty and Maintenance Agreement (2707)
- Provide Technical Support
 - 1 YR Fuel Additive Supply
- Obtain Experimental Permit

(626) 575-6848 rcastror@arb.ca.gov

EMISSION CONTROL MANUFACTURER PARTICIPANT LIST



Catalyst Systems

(16) 13 Tier 0
 (22) 18 Tier 1
 (27) 24 Tier 2
 (23) 21 Tier 3

Vehicles

Tier 0 (87)
 Tier 1 (67)
 Tier 2 (36)
 Tier 3 (14)



Showcase Project Issues

Drop Out

- Device Manufacturer
 - Aaqius
 - Purem

Economic Effects

- Reduction in Job Availability
 - Vehicles Out-of-Service
 - Urea Availability (Rentals)

Pricing

- Submitted Prices Differ from Actual Cost

Others

- **Payment Concerns: Fleet**
 - Manufacturers Awaiting PO from Fleet
 - ARB: Awaiting Response from Manufacturers
- **Contracts**
 - Fleets / Manufacturers/ MSRC
- **Rematch**
 - Vehicles Retired/Replaced
 - Vehicle's Temp Profile: Not Enough Data
 - Rental Issues: Preference for Passive DPF



Showcase Project Status

Contracts:

- Most of the Contracts Between MSRC and Fleet Owners Have Been Completed
- Communication Issues (Manufacturers/ Fleets)

74 Vehicles Data Logged

- Fleet Owners and Device Manufacturers are Determining Proper Location for DPF Installation
- Devices are Currently in Design Phase

Vehicles to be Retrofitted

–204 Vehicles are Participating

CDT: 1 Engine Retrofit by End of Oct

DCL: 5 Engines Retrofit by End of Oct

Dinex: 5 Engines Retrofit by End of Oct

Donadlson: 3 Engines Retrofit by End of Oct

Mann Hummel: 4 Engines Retrofit by End of Oct. 2 Engines Retrofit by End of Nov

Nett Tech: 4 Engines Retrofit by End of Sept. 5 Engines Retrofit by End of Oct. 1 Engine Retrofit by End of Nov.

Expected Retrofits: 28 Vehicles



Vehicle Information 83N0670 Skanska	
Year	1995
Horsepower	275
Description	Rubber Tired Loaders
Hrs/Yr	1100
Proposed Device	CAT/EUG DPF

Retrofitted Vehicles



Vehicle Information 37006 Shimick	
Year	2004
Horsepower	95
Description	Tractors/Loaders/Backhoes
Hrs/Yr	880
Proposed Device	JM CRT



Vehicle Information 325B Community recycling	
Year	1994
Horsepower	168
Description	CAT 325B Excavator
Hrs/Yr	1953/per yr
Proposed Device	Sud Chemie ENVICAT

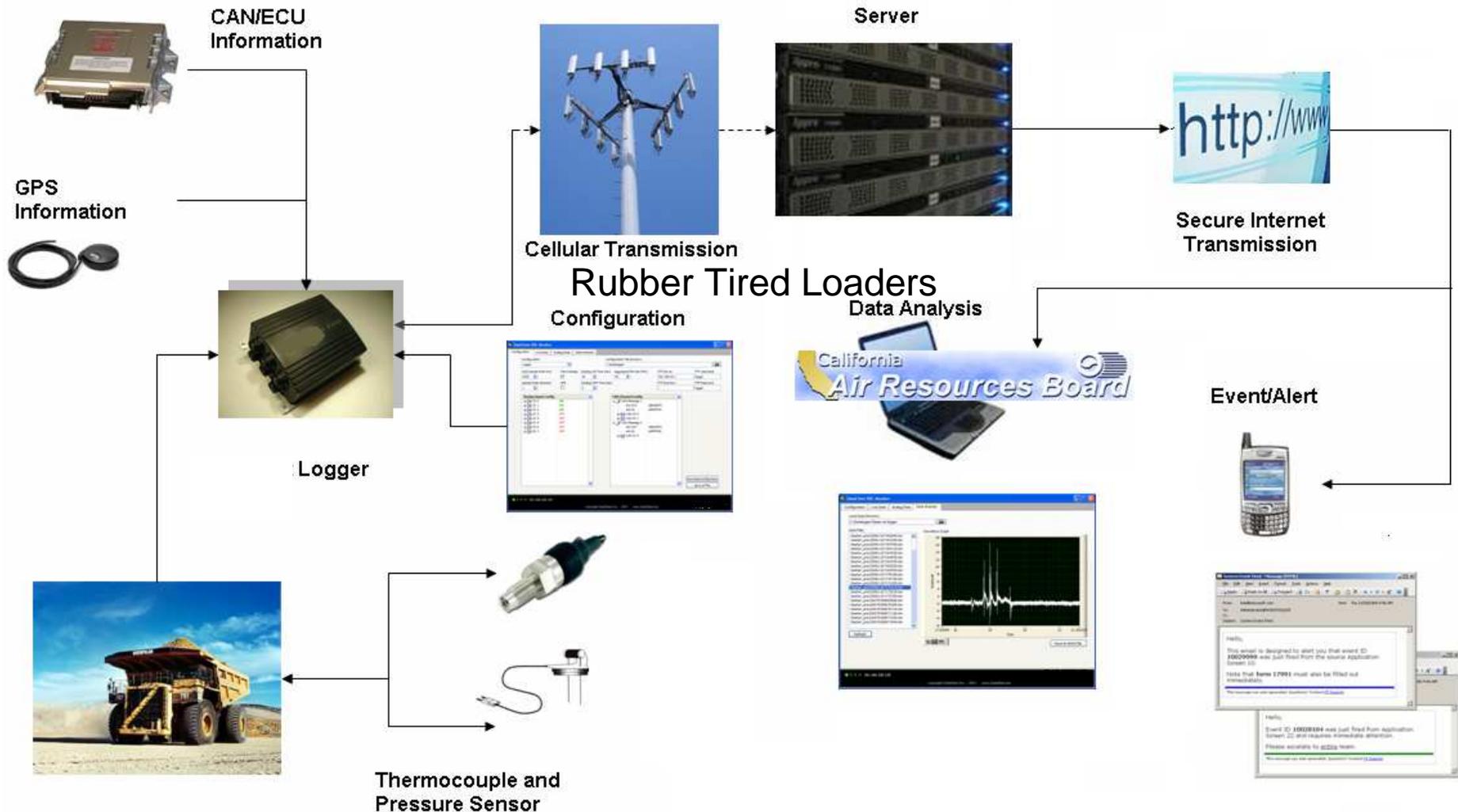
Retrofitted Vehicles



Vehicle Information 330D Community Recycling	
Year	1999
Horsepower	222
Description	CAT 330B Excavator
Hrs/Yr	3200/per yr
Proposed Device	Sud Chemie ENVICAT



DATA LOGGER





FEATURES SUMMARY

California Environmental Protection Agency



Logger Pricing	ServoTech	Data Fleet TOTAL	Data Taker TOTAL	RM TOTAL	CPK TOTAL
Scenario 1 Single Unit Temp/BP/RPM (sensor & Freq)	Single Unit Temp/BP/RPM (sensor & Freq)	Remote Data Logger (DF-RDL)	DT80 With extended memory 0-2.5 PSIG	CAN logger	Logger Available
Scenario 2 Single Unit Temp/BP/RPM/GPS	Single Unit Temp/BP/RPM/GPS	GPS Antenna (US GlobalSat MR-350P):	Same as quote 1 Garmin GPS18 GPS receiver	GSM/GPS antenna- Hirschmann:	NA
Scenario 3 Single Unit Temp/BP/RPM/GPS / CAN	Single Unit Temp/BP/RPM/GPS/ CAN	Remote Data Logger (DF- RDL)	Same as Quote 2 Data Taker CANgate	Same as Quote 2	NA
Scenario 4 Single Unit Temp/BP/RPM/GPS / CAN/ wireless	Single Unit Temp/BP/RPM/GPS/ CAN/ wireless TBD	Capability to add cellular modem specific to the models supported by Data Fleet	Same as quote 3 plus: CDMA cellular modem (require separate Verizon activation)	Same as quote 3	CAN J 1939 CAN J 1939 & NOx
Scenario 5 Ongoing additional costs i.e.	Ongoing additional costs i.e. monthly hosting fees etc NA	Data Hosting /Access (per unit/per mth):	NA	Proemnion Monthly hosting fee- 50MB (unlimited):	SIM Card inclusive data transmission over the I-Net



California Environmental Protection Agency

Air Resources Board

**SUPPLEMENTAL
ENVIRONMENTAL
PROJECT I,II,III
PROGRAM**



SEP Objectives

- Reduce Diesel Emission from Off-Road Equipment (Level III Systems)
- Demonstrate Durability and Effectiveness of DPFs on Off-Road Construction Equipment
- **Demonstrate New Emission Control Systems**
- Increase Number of Verified Retrofit Devices
- Fill Gaps in Vehicle Matrix
- Update Board Meeting in December
- Spend \$200,000 in Valero Wilmington Refinery Area (25-mile radius)+

Role of Fleet Owner

- Same As Showcase

Role of Device Manufacturers

- Same As Showcase



SEP I RETROFITS





Vehicle Information 6727	
Year	2003
Horsepower	550
Tier	2
Description	657E Scrapper
Hrs/Yr	1700
Active/Passive/Nox	Passive
Proposed Device	DCL MINE-X



Vehicle Information 26701	
Year	1999
Horsepower	230
Tier	1
Description	EXCAVATOR, MAT, HANDLING
Hrs/Yr	1800
Active/Passive/Nox	Active
Proposed Device	Rypos HDPF/C



Vehicle Information 6768	
Year	1998
Horsepower	105
Tier	1
Description	Wheel loader
Hrs/Yr	2000
Active/Passive/Nox	Passive, Nox Control
Proposed Device	Nett Tech Passive SCR



Vehicle Information 61619	
Year	2007
Horsepower	125
Tier	3
Description	John Deere 7520
Hrs/Yr	1400
Active/Passive/Nox	Active
Proposed Device	ECS Assisted Purifilter



Vehicle Information 61620	
Year	2007
Horsepower	125
Tier	3
Description	John Deere 7520
Hrs/Yr	1400
Active/Passive/Nox	Active
Proposed Device	ECS Assisted Purifier



Vehicle Information 47121	
Year	2000
Horsepower	185
Tier	1
Description	MotorGrader
Hrs/Yr	620
Active/Passive/Nox	Active
Proposed Device	Recat ESE DC-100



Vehicle Information 60656	
Year	2006
Horsepower	125
Tier	2
Description	Tractor
Hrs/Yr	1200
Active/Passive/Nox	Active
Proposed Device	Recat-ESW Therma Cat System ETI DC-202



Vehicle Information 60654	
Year	2006
Horsepower	125
Tier	2
Description	Tractor
Hrs/Yr	2100
Active/Passive/Nox	Passive
Proposed Device	Sud Chemie ENVICAT



Vehicle Information 69060	
Year	1999
Horsepower	80
Tier	1
Description	Wheel Loader/ Backhoe
Hrs/Yr	500
Active/Passive/Nox	Active
Proposed Device	Mann Hummel SMF-AR



Vehicle Information 69061	
Year	2000
Horsepower	89
Tier	1
Description	Wheel Loader
Hrs/Yr	677
Active/Passive/Nox	Active
Proposed Device	Mann Hummel SMF-AR



Vehicle Information 072204	
Year	1995
Horsepower	105
Tier	0
Description	Wheel Loader
Hrs/Yr	400
Active/Passive/Nox	Active
Proposed Device	Huss FS-MD



Vehicle Information 61621	
Year	2007
Horsepower	125
Tier	3
Description	John Deere Tractor
Hrs/Yr	1200
Active/Passive/Nox	Passive
Proposed Device	SUD CHEMIE



http://www.arb.ca.gov/diesel/showcase/sep2.php




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SEP II

Thursday, August 7, 2008
This Page Last Reviewed: July 30, 2008

UP LINKS

- ARB Programs
 - Diesel Programs
 - Mobile Vehicles and Equipment
 - **Showcase Off-Road Diesel Retrofit**

LOCAL LINKS

- Announcements
- Application Information
- Background
- Contacts
- Equipment Temperature Profiles
- FAQs
- Fleet List
- Join Email List
- Snowcat Reports
- SEP II
- Verification Strategies

ShowCase / SEP Fleet

- Login
 - Change Password
- Fleet Vehicle List

SEPII UPDATE:

SEP II is currently underway. The matching process is completed and 12 vehicles have been selected. A list of the vehicles broken down by fleet can be seen below. More information about these vehicles can be obtained on the [Fleet List Page](#).

A meeting is scheduled for Thursday August 7th at the Air Resources Board located at 9852 Telstar Ave. in El Monte from 10:00AM until 12:30PM. The 2 days prior to the meeting August 5th and 6th have been scheduled for fleet visits. Device manufactures are encouraged to attend these visits as it will allow them to evaluate the vehicles and determine the feasibility of retrofitting these vehicles with their device. Fleet Owners will be present during the visits to answer any question. More details for both events can be found in the agenda available below.

- [Meeting Agenda](#)
- [SEP II Individual Equipment Info](#)

Fleet	Participating Equipment (by ID#)
City of Long Beach	14267, 14336, 14337, 14339
City of Los Angeles	44021, 44480, 44560, 44780
Fast Lane	385, 637, 844, 876

Background:

In an ongoing effort to improve air quality and reduce airborne pollution the Air Resources Board instituted Supplemental Environment Project II (SEP II). SEP II is targeted particularly at reducing emissions from off road diesel equipment. The project will take place inside a 25-mile radius of the Valero's Wilmington refinery area, which has provided \$200,000 in funding to the project. Objectives of the project include:

- reduction of emissions from off-road diesel equipment (level III) within a 25 mile radius of the Valero Wilmington refinery area
- demonstration of new emissions control systems
- ARB verification of retrofit devices



http://www.arb.ca.gov/diesel/showcase/publicfleetlists.php



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FLEET VEHICLE LIST

Tuesday, August 5, 2008

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ShowCase / SEP Fleet

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This page last reviewed: August 5, 2008

Showcase:

SEP:

SEP II:

FLEET/BUSINESS: CITY OF LONG BEACH

SEP II Vehicles

Equipment ID	Year	HP	Tier	Engine Family/ID	Description	Serial Number	HRs/month
14267	2000	86	1	7BJ16643	BACKHOE	4ZN21522	29.9
14336	2005	224	0	4DXL07.1032	Wheel Loader	L120EV64620	106.0
14337	2007	150	3	PE6068L02	TRACTOR	RW7630R008124	123.0
14339	2007	150	3	PE6068L02	TRACTOR	RW7630R008160	104.5



http://www.arb.ca.gov/diesel/showcase/sep2.php



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SEP II

Thursday, August 7, 2008

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- Meeting Agenda
- SEP II Individual Equipment Info

Contact Info City of Long Beach

Vernon Helbig, Acting Superintendent of Maintenance

- Phone:(562) 570-5426
- Email:Vernon_helbig@longbeach.gov

Ray Ontiveros, Certified Master Technician

- Phone:(562) 254-6478
- Email:Ray_Ontiveros@longeach.gov

Background:

In an effort to reduce emissions from off road diesel equipment, the Air Resources Board instituted Supplemental Emissions from off road diesel equipment. The project will take place inside a 25-mile radius of the Valero's Wilmington refinery area, which has provided \$200,000 in funding to the project. Objectives of the project include:

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Vehicle Information Page



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SEP II VEHICLE INFORMATION

Tuesday, August 5, 2008

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View More Pictures

Equipment ID: 14267

Year: 2000

HP: 86

Tier: 1

Engine Family/ID: 7BJ16643

Description: BACKHOE

Serial Number: 4ZN21522

HRs/Month: 29.9

Temperature Profiles For Equipment -- 14267

Temperature Profile	Profile Date	Date Posted

Current Equipment Log Information

This Equipment Has No Log Entries At This Time



Equipment Image Gallery

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EQUIPMENT IMAGE GALLERY

Thursday, August 7, 2008

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Image_4



SNOWCATS PROJECT

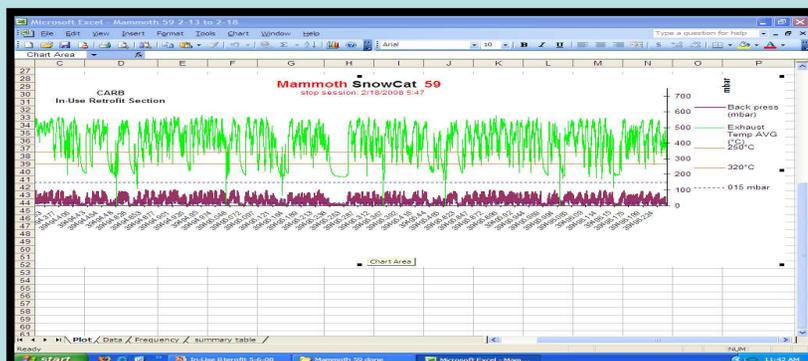




Snowcat Project

- **Three locations:**
 - Northstar : 5 vehicles
 - Mammoth: 5 vehicles
 - Sugarbowl: 2 vehicles
- **Temperature Profiles**
 - Generated, analyzed and posted on the ARB website for all vehicles
- **Preliminary results** of the temperature profile analysis indicate that vehicles were operating at 400°C or above for 40% of the time regardless of vehicle type.

<http://www.arb.ca.gov/diesel/showcase/showcase.htm>



- **Recommendation:** All vehicles be retrofitted with passive DPFs.
- **Outcome:** Northstar is already retrofitting its vehicles with passive



Portable Emissions Monitoring System



PEMS



PEMS Description

Purpose:

- To Evaluate Performance of DPF On Off-Road / On-Road Equipment.
- To Compare On Road Measurement with Engine Dyno Measurements
- To Evaluate Possibility of Measuring PM Using Low Cost Instruments
- To Evaluate Different Techniques of Particulate Measurements
- To Establish a Test Cycle in Order to Evaluate Retrofit Device Performance

Parameters:

- Temperature, backpressure, RPM, throttle position, manifold pressure, EGR, atmospheric conditions
- Monitor engine parameters using the vehicles ECM (When applicable)

Measurement:

- Accurately Measures Vehicle Exhaust flow rate from either the engine electronic control module and/or the vehicle exhaust tail pipe
- NO, NO₂, CO, CO₂, THC, PM

Data:

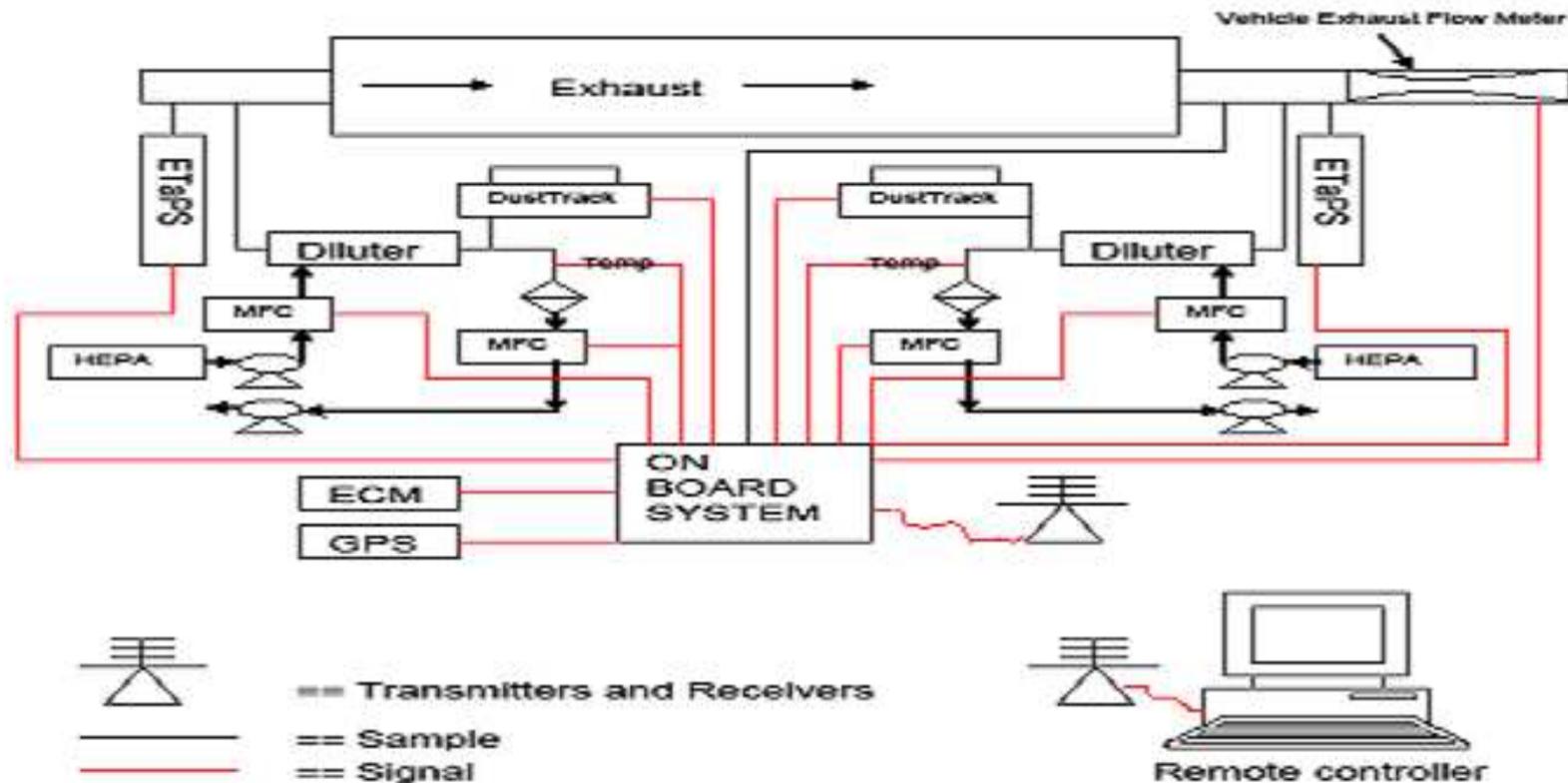
- Real time vehicle emission data in engineering units
- Report vehicle trap efficiency before/after measurement of ETaPS and Dust Track,





PEMS Diagram Overview

ON BOARD SYSTEM CONCEPT





PEMS System



Gaseous Emissions:
THC, NO_x,
NO, NO₂,
CO, CO₂
Exhaust Flow Measurement
CFV, ECU
PM by:
Mass
Soot
Electric
Mobility
QCM
Received Aug, 2008.



ARB staff Training: Sept 2008





PEMS Training





Contacts

Johnny Karim, Manager

- **In-Use Retrofit Section**
- **(626) 459-4303, jkarim@arb.ca.gov**
- **Website:**
- **<http://www.arb.ca.gov/diesel/showcase/showcase.htm>**