Mobile Source Inventory Improvement

Drayage Vehicle Emissions and Activity Study

SETPMTC, April 7, 2010

Mary McGarryBarber
Texas Commission on Environmental Quality
Air Quality Division
Mobile Source Programs Team

Project Inventory Improvement Process

- Project background
  - Methods
  - Target vehicles
- Purpose
  - Uses for the results
  - Contracted partners
- Project scope
  - Data collection only
  - Two phase project
  - Next steps to complete analysis

Mobile Emissions Models – Data Sources

- Laboratory data sources
  - Chassis tests
  - Engine tests
- In-use data sources
  - Portable emissions measurement system (PEMS)
  - Portable activity monitoring system (PAMS)
- Other data sources
  - Remote sensing measurements
  - Inspection & maintenance measurements

Drayage Trucks

- Drayage operations include inter-modal haulage between shipping and rail operators and their warehouses and customers
- Trips are characteristically short, less than 30 miles in length
- Trips include long periods of stop-and-creep, idling, and short bursts on the highways
- Average age for drayage trucks may be higher than the average age of regional trucks

Contracted Partners

- TCEQ: Drayage operations at Texas marine and locomotive terminals may be significant sources of emissions of the nitrogen oxides (NO_X)
  - Improved emission and activity estimates
  - Air modeling
  - SIP planning
- EPA: New source type for MOVES
  - Transition from MOBILE6 to MOVES
  - Modal based model
  - In-use drayage vehicle activity and emissions data
- HGAC: Local control initiatives

Drayage Vehicle Emissions and Activity Study

- Drayage trucks operating at the Port of Houston
- In-use activity data collection using PAMS
- In-use emissions data collection using PEMS
- National quality data
- Follow on data analysis project
  - Inventory development of drayage fleets operating at all Texas ports
  - Add a new source type to MOVES

Project Overview

- Phase 1 – Vehicle selection and recruitment
  - Need data to establish
    - Test matrix
    - Contact information
  - PHA gate database
  - Remote sensing data collection
  - TxDOT registration database
  - Completed August 2009
- Phase 2 - In-use testing – Fiscal Year 2010

Port Security Gate

Port Gate Data

- Gate database information
  - Date
  - Time in/time out
  - Weight
  - License plate
  - Full or empty
  - Truck company
- Used to determine
  - Truck volumes
  - Truck frequency
  - Truck weight distributions
  - Age distributions

Why Do Remote Sensing

Remote sensing used to:

- Establish emissions bins
- Determine vehicle visit frequency
- Assess types of trucks
- Photograph truck license plate

Remote Sensing Subcontractors

- Experience with heavy-duty diesel remote sensing
- Contract schedule and requirements
- University of Denver
  - Gary A. Bishop and Donald H. Stedman
  - Department of Chemistry and Biochemistry

Remote Sensing Equipment

- Remote sensors measure the ratios of pollutants to carbon dioxide in elevated stack diesel vehicle exhaust
- Calculate the mass emissions for each pollutant per mass or volume of fuel
- Two remote sensing device (RSD) systems used for this study
  - University of Denver equipment FEAT 3002 equipped with dual ultraviolet spectrometers
    - Emissions: CO, HC, NO, NO_2, SO_2, NH_3, and opacity
  - RSD 4600 made by Environmental Systems Products (ESP),
    - Emissions: CO, HC, NO, and UV smoke

Remote Sensing Data Collection

- Two weeks in August 2009
- Emissions: CO, HC, NO, NO_2, SO_2, NH_3, and opacity
- Speed and acceleration
- Photograph of license plate
- Photograph of truck

Test at Single File Location

Scaffolding Used to Set Height

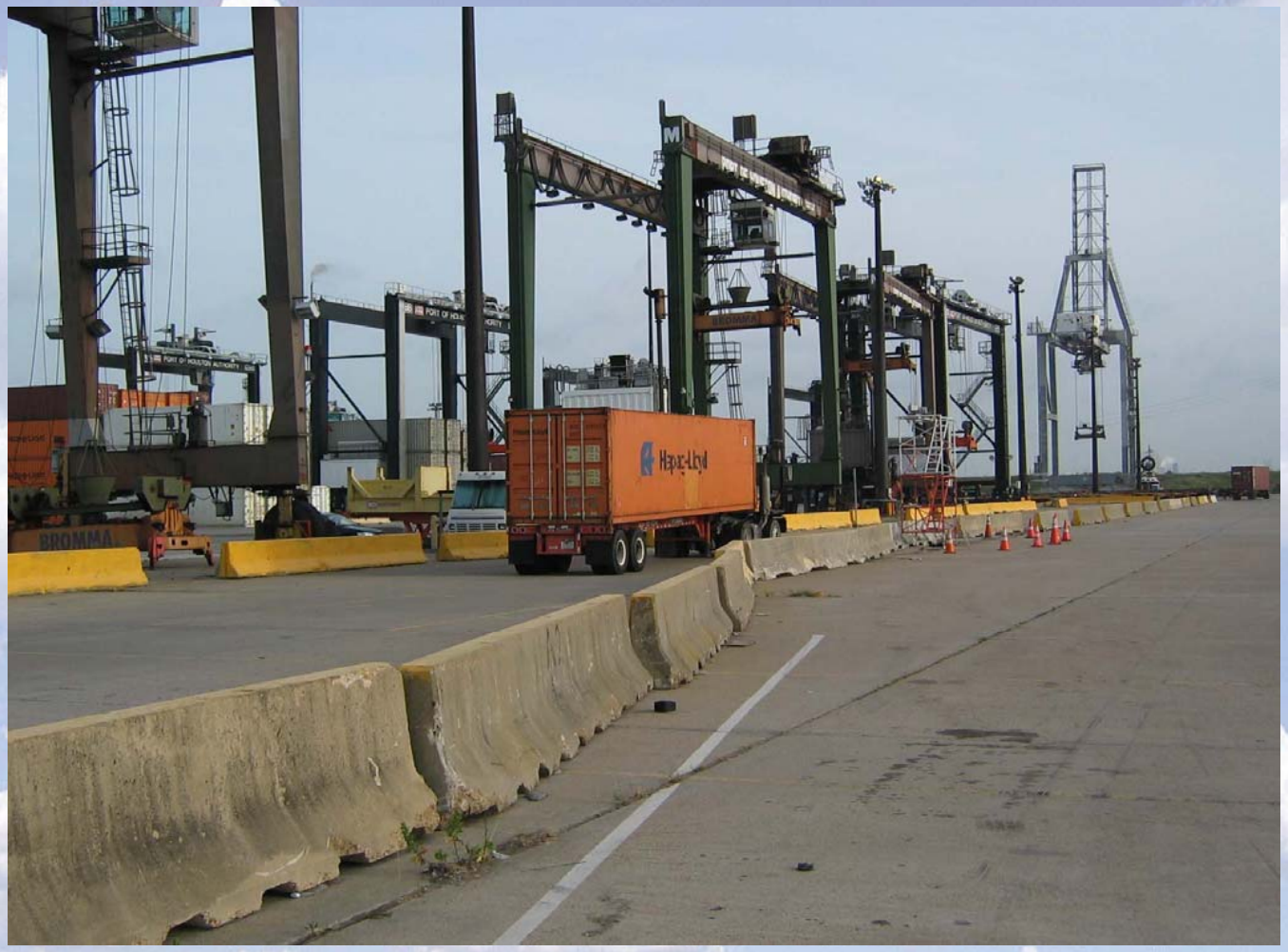
Mobile Laboratory

Truck Passing Thru Test Site

Sample Truck 2

Sample Truck 3

Wide View of Test Site



Remote Sensing Data Summary

Raw RSD observations	11,140
RSD Observations with valid CO flag	5,849
RSD Observations with valid CO flag and available plate	4,808
RSD Observations with valid CO flag and available Texas plate	4,442
RSD Observations with valid CO flag and available UNIQUE Texas plate	1,980
RSD Observations with valid CO flag and available UNIQUE Texas plate that match with TXDOT Registration Data	1,950

Phase 1 Results

- 25 test bins established
- TxDOT registration data used to establish contact information
- Obtained all information needed to identify and recruit vehicles for Phase 2

Data Collection Phase 2 and Next Steps

- Phase 2 of data collection
  - PEMS and PAMS in-use vehicle emissions and activity data collection
  - December 2009, two weeks completed
  - January, February, March 2010, four more weeks
  - Data processed and report – June 2010
- Next steps data analysis – FY2011
  - Activity estimates
  - Emissions estimates
  - New MOVES source type

Mobile Source Inventory Improvement

Drayage Vehicle Emissions and Activity Study

- **Questions**

- **Contact Information:**

Mary McGarryBarber
Mobile Source Programs Team
(512) 239-1987
mmcgarry@tceq.state.tx.us