EPA SmartWay Truck Emissions
Test Protocol Workshop

SmartWay Testing: Initial Truck Testing

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SmartWay Testing: Past

- **Purpose: Research investigation on relation between vehicle fuel efficiency and NOx, Fuel economy determined as part of procedure.**
  - **Phase I (2004-2005):**
    - Conducted by U.S. Army at Aberdeen Proving Ground, MD
    - One truck model, three drive cycles, SAE J1321 test
  - **Phase 2 (2005-2006)**
    - Conducted by Southwest Research Institute, at track in Uvalde, TX
    - Two truck models, four drive cycles, SAEJ1321 test
  - **Track test – fuel consumption measured using gravimetric method and carbon-balance method with PEMS**

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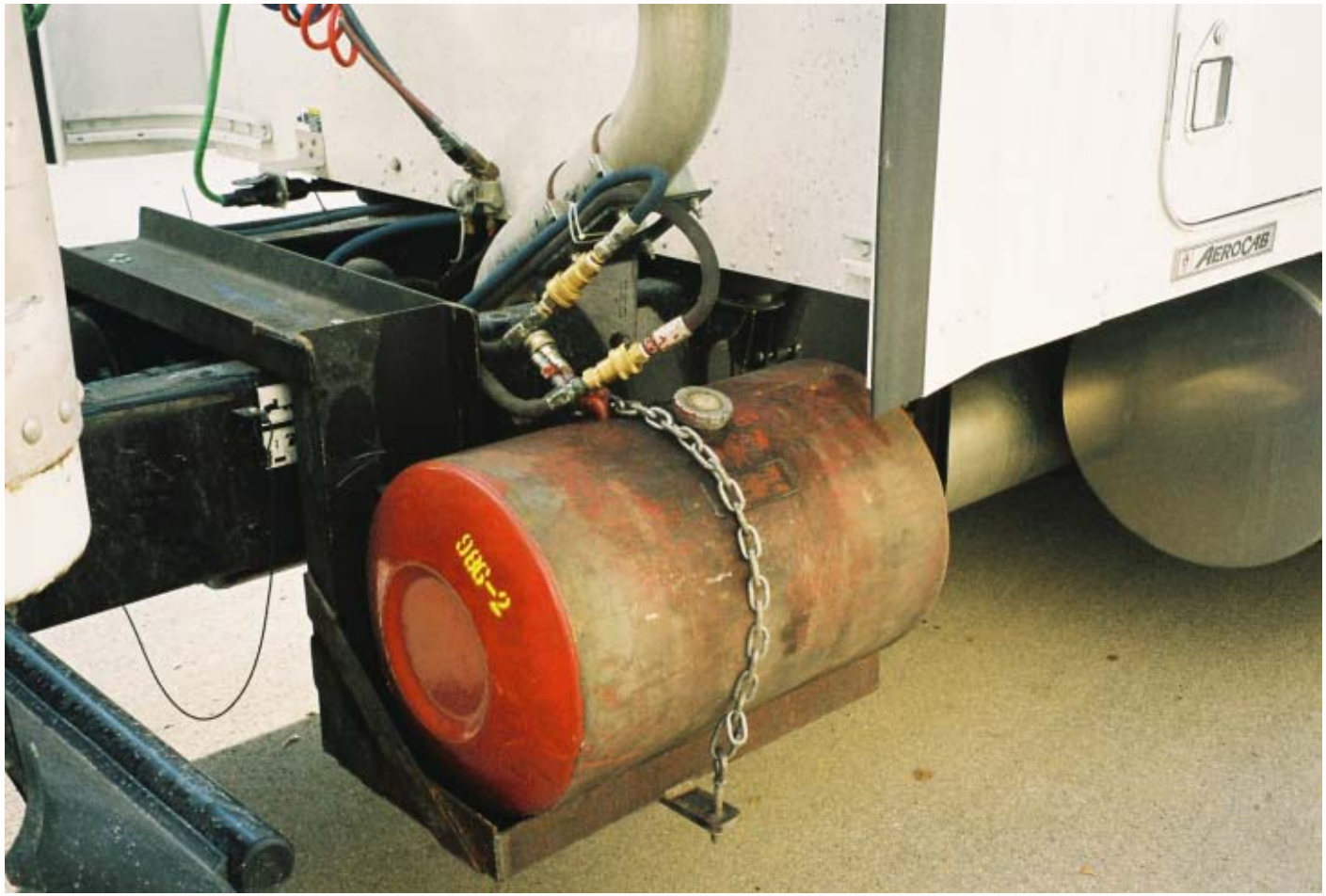
Removable Fuel Tank – Gravimetric Measurement



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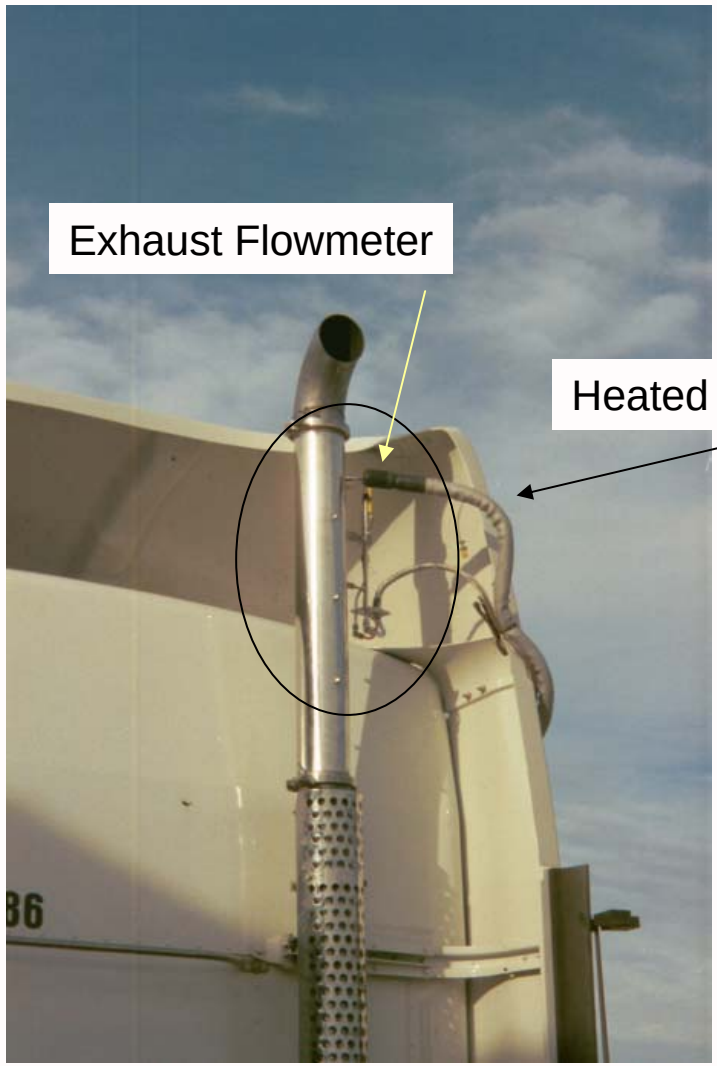
PEMS installation – Carbon Balance Measurement



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PEMS Instrument Inside Truck Cab
Carbon-Balance Measurement

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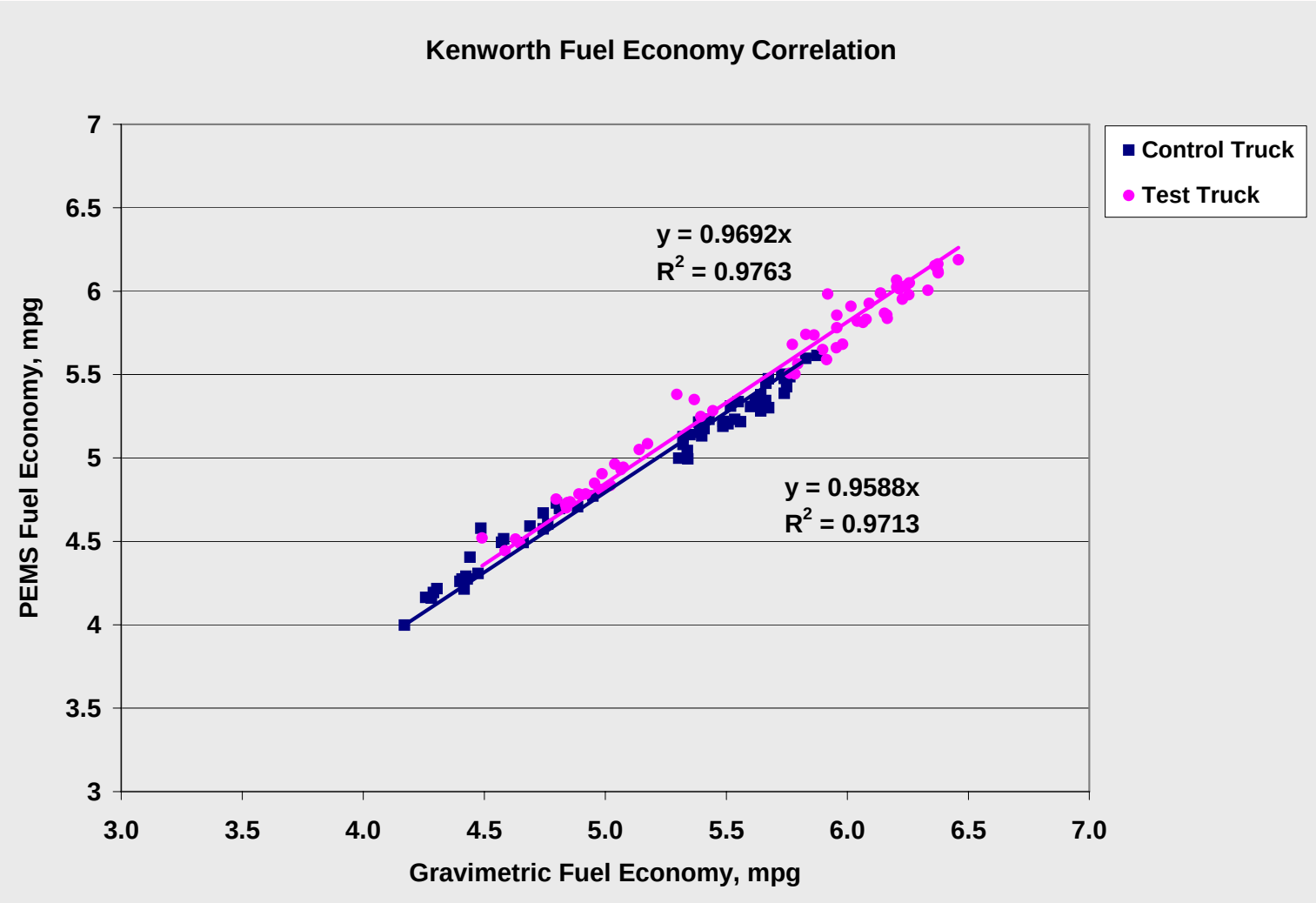
PEMS Results in Good Agreement With Gravimetric



(From Ensfield, et. al, 2006)

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Sources of Track-Test Variability

- Operating Conditions
  - Temperature
  - Wind speed and direction
  - Moisture/ice/snow on track
- Vehicle condition and changes in vehicle condition during test duration
- Driver's ability to repeat cycle
- Average coefficient of variation (COV) of PEMS fuel economy for test laps for control truck is 3.4%; (COV for gravimetric was ~3.1%)
  - Tests not conducted under best of conditions
- PEMS results vs. laboratory test cell results
  - EPA comparison testing with laboratory test cells for in-use testing measurement allowances
  - Results were found to be comparable

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SmartWay Testing:Future

- Purpose: To obtain information on test protocol's
  - Practicability
  - Precision, and
  - Accuracy
- Compare chassis dynamometer -- test track -- In use results
- Compare precision of test by multiple replicates
- Compare accuracy using interlaboratory comparisons
- Test alternatives to coast-down testing to determine rolling resistance and aerodynamic drag

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SmartWay Testing: Current Plans

- EPA Test contract in preparation
  - Chassis dynamometer and track test comparison
  - Class 8 tractor-trailer
  - Current resources permit only limited replicates, drive cycles
- Collaboration opportunities:
  - More truck models, replicates, drive cycles
  - Ability to test at different labs, tracks
  - Comparison of track and chassis tests with in-use data
  - Tests of other truck types (delivery, refuse, utility, etc.)
  - Feasibility tests for alternative methods of determining aerodynamic drag (wind tunnels, etc.)
  - Testing for calibration and verification of vehicle models

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