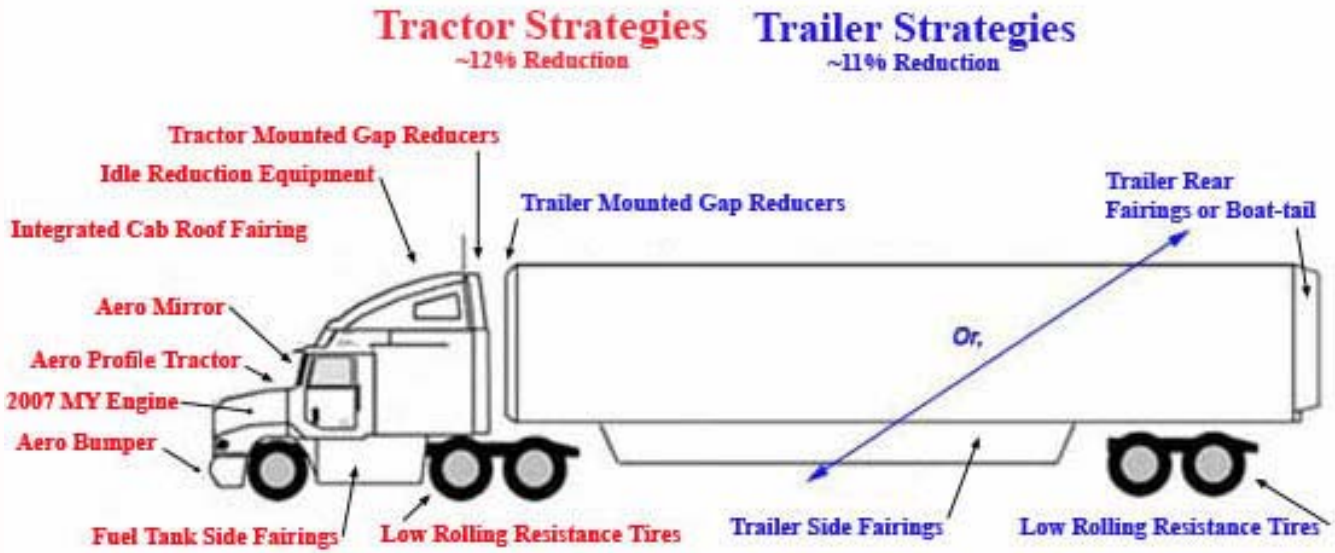
EPA SmartWay Truck Emissions
Test Protocol Workshop

Summary of Draft Test Protocol

Test Purpose: SmartWay Truck Designation



- Current designation is an equipment specification, based upon EPA tests of one truck type (line-haul tractor-trailer)
- A performance-based approach offers these benefits:
  - Greater flexibility to assess a wide range of truck types and applications (day cabs, vocational trucks, delivery trucks)
  - Technology-neutral, can assess innovative designs as they emerge
  - Performance data can populate vehicle models, which in turn could be used to supplement testing

Why a (New) Test Protocol?

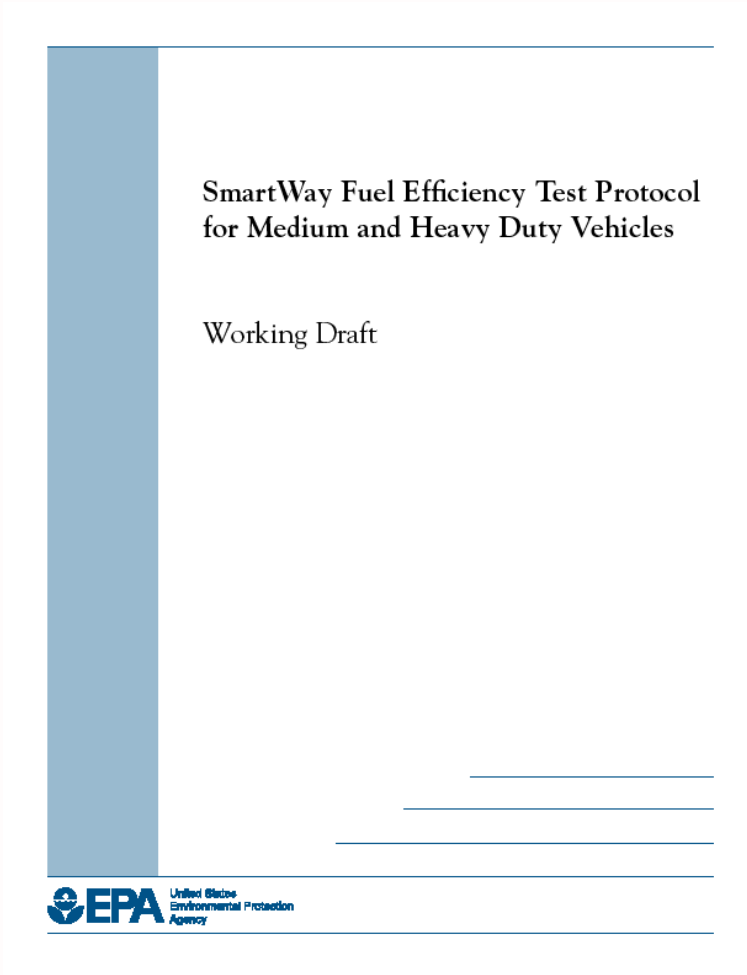
- SAE and TMC tests are excellent methods to evaluate fleet-specific and in-use performance
  - However, without specified and uniform test conditions, more difficult to use results to compare truck performance
- EPA certification tests are uniform and very specific, but not intended for heavy vehicles
  - HDE certification tests are engine-based and don't take into account different truck body types and operations
  - Passenger vehicle-based certification tests are not representative of commercial, heavier vehicles

Draft of Test Protocol

- Draft document developed over two-year period with numerous stakeholders
- Posted on EPA SmartWay web site November, 2007:

http://www.epa.gov/smartway/documents/420p07003.pdf

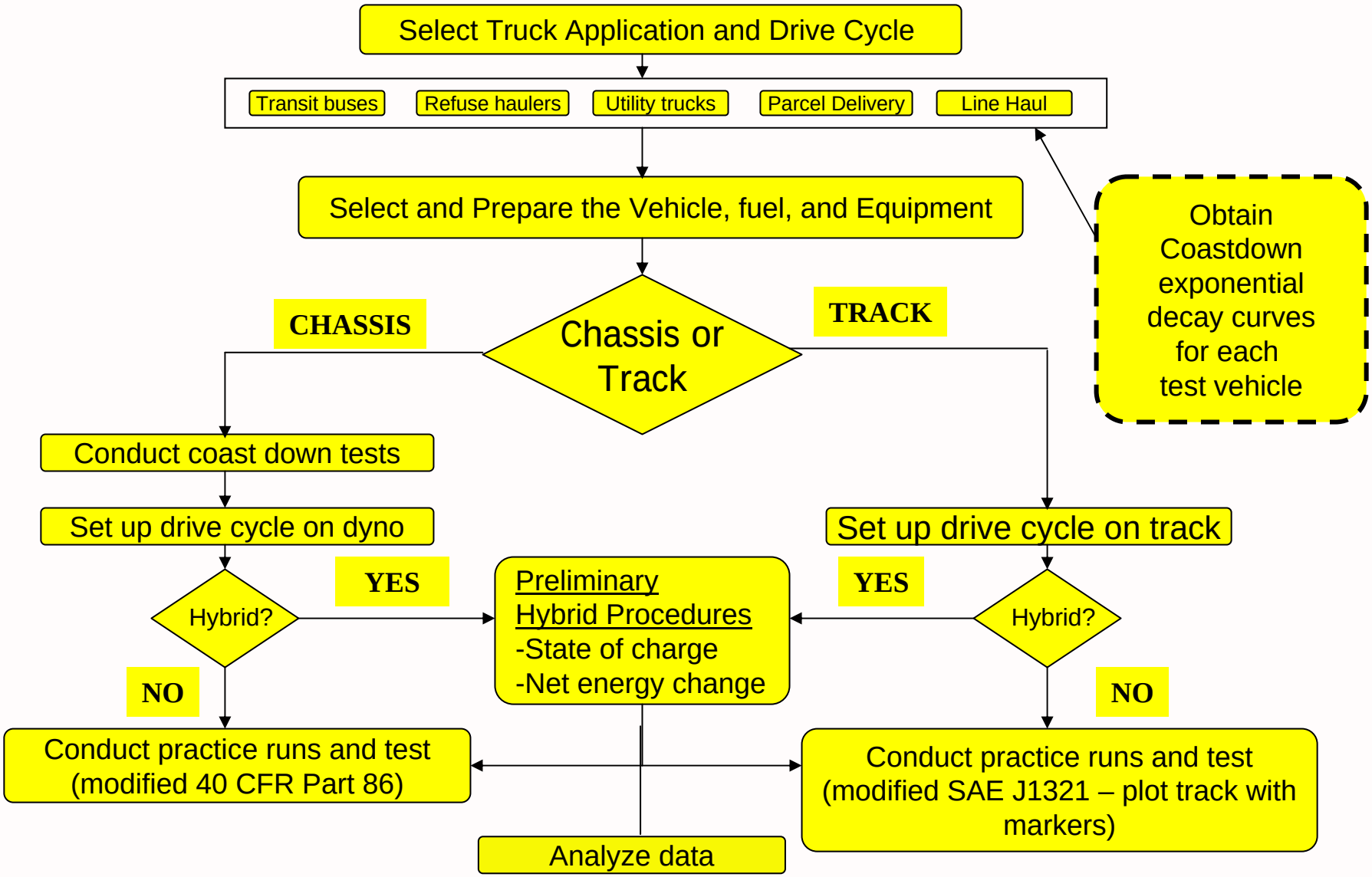
- February, 2007, EPA invited written comment and announced plans to hold a public workshop



Scope

- Single truck test
  - Measures absolute vehicle fuel efficiency
  - Engine must continue to meet EPA emission certification requirements
- Conduct on test track or heavy duty chassis dynamometer
  - Track test modifies SAE J1321, “Joint TMC/SAE Fuel Consumption Test Procedure Type II,” for commercial trucks
  - Chassis test modifies EPA Optional Chassis Certification Test Procedure for diesel vehicles
- Can be used for all types of heavy duty trucks including hybrid
  - Added requirements for hybrid trucks

Flowchart of Test Procedure



Areas Covered By Draft Protocol

- Vehicle selection and pre-conditioning
  - Mechanical and physical condition meet OEM specifications
  - Equipment & settings appropriate to application (gear shift points, rear axle ratio, power train size & type)
- Fuel selection and analysis
  - Fuel must meet EPA requirements for diesel test fuel as outlined in CFR 40
- Test track specifications and requirements
  - Requirements for shape, length, neutral steering speed, surface, grade, altitude
  - Capacity for weather monitoring, weight scales, fuel measurement equipment, speed and distance equipment
- Track environmental conditions
  - Establishes conditions for precipitation, temperature, wind velocity, humidity so environmental factors match more closely the controlled conditions of chassis dynamometer procedures

Areas Covered By Draft Protocol

- Chassis dynamometer specifications and requirements
  - Establishes dynamometer capacity rating and specifications for > 14,000 GVWR vehicles
  - Follows 40 CFR Part 1065 (or 86) requirements for exhaust gas sampling and analysis system
- Chassis dynamometer environmental conditions
  - Follows 40 CFR 40 Part 86
- Emissions and fuel consumption measurement system requirements
  - PEMS and laboratory emissions equipment follow 40 CFR
  - Gravimetric method follows requirements in SAE J1321
- Coastdown to calculate road load
  - Stipulates accessory and payload conditions for each selected drive cycle

Areas Covered By Draft Protocol

- Drive cycle selection
  - Cycles are application-based, for more “real world” test results
  - Draft proposes cycle options for several common applications
  - Draft calls for defined load requirements (cargo, accessory, and where appropriate, PTO) for each drive cycle
- Test Set Up
  - Extrapolates test equivalent weight from 40 CFR
  - Provides requirements for payload over-axle distribution, tire pressure, mechanical preparation of test vehicle

Areas Covered By Draft Protocol

- Track equipment requirements
  - Tank weight scales must be calibrated as specified in SAE J1321
  - Portable emission measuring system must meet specifications found in 40 CFR
  - Truck weight scales must be calibrated as in SAE J1321
  - Drive cycle must be mapped onto track with markers
- Chassis dynamometer requirements
  - SAE Recommended Practice J2263 and J2264 to convert test track coast down data to dynamometer settings
  - Follow 40 CFR for vehicle conditioning
  - Download drive cycle into chassis dynamometer VDA
- Driver requirements
  - Drivers practice until they meet required time and speed parameters for that drive cycle

Areas Covered By Draft Protocol

- Additional vehicle conditioning for hybrid vehicles
  - Requires stabilized state of charge so energy change in RESS during test is within +/- 1% total energy consumed during test
  - Procedures provided to determine state of charge and net energy change for different RESS
- Conduct test
  - Perform a warm-up run of at least 1 hour
  - Conduct test runs according to 40 CFR 40 for chassis dynamometer, and SAE J1321 for test track
- Measure fuel use

Areas Covered By Draft Protocol

- Test review
  - Check records to ensure test was properly conducted
- Calculate results
  - According to method as outlined in 40 CFR and SAE J1321
- Check records to ensure test was properly conducted
  - Repeat test runs as needed, if results are outside statistical requirements

Contact

Cheryl Bynum

Bynum.Cheryl@epa.gov

(734) 214-4844