ED_000545OneDrive_00009362

EPAct Light Duty Fuel Effects Test Program

Oil-PM Pilot Study
And
PM Speciation Program

January 15, 2008

EPAct Oil-PM Pilot Study

- Objective 1: Define duration of engine oil conditioning needed to stabilize the effect of oil volatility on PM emissions
- Objective 2: Define the impact of lubricant interaction with fuel ethanol on PM emissions
- Results to impact Phase 3 of EPAct study at SwRI (July)
- Fuels: E0, E10, E20
- Test vehicles: 2006 Ford F-150 (Bin 8) and 2007 Toyota Camry (Bin 5) from EG&G fleet
  - 4,000-20,000 miles on the odometer
- Lubrizol Corp. will provide oil and oil analysis

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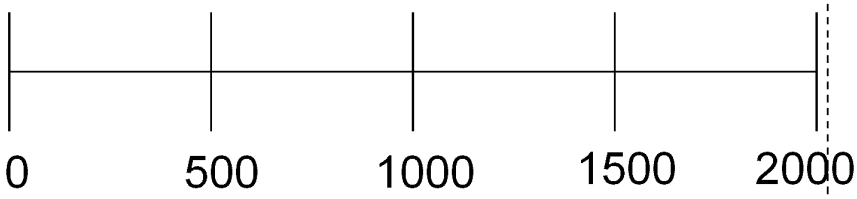
Test Plan

Phase 1: Mileage accumulation | Phase 2: Ethanol Test



E0

- At each 500 mile interval:
  - 5 Cold start LA92 tests conducted
  - Oil sample collected for analysis

E10

(5 LA92 tests)
(Oil sampled)

E20

(5 LA92 tests)
(Oil sampled)

2 Tier 2 vehicles tested
Total # of tests = 50
Phase 1 Timing: Feb - May

2 Tier 2 vehicles teste
Total # of tests = 20
Phase 2 Timing: May

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EPAct Oil-PM Pilot Study (Cont'd)

- Same driver used for all tests on a given vehicle
- Measured parameters: THC, NMHC, NOx, CO, CO_2, PM, EC/OC and engine oil temp. in sump
- Oil analyzed for volatility and ethanol content
- Total number of LA92 tests: 70
- Mileage accumulation on dynamometer
- Estimated duration of pilot: 15 weeks (May 11)

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Ex. 4 - CBI

Use of LOD vs. Contract Lab

Pros	Cons
• Lowest cost • Highest degree of control • High data quality • Earliest start date for pilot program	• No binding contract • Only one work shift

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Larger PM Speciation Study

- Fuel effects on PM mass, size and composition
  - Speciate semi-volatile VOC, metals and ions
- Same 3 RFS 2 fuels (E0, E10, E20) from phases 1 and 2 of main program
- 6 vehicles (+/-) similar to SwRI vehicles but not necessarily identical
- Timing: late 2008

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Challenges with PM Speciation

- Concerned that SwRI standard methods may only be qualitative
- We'd like to sample raw exhaust using a proportional flow system
  - Need to upgrade our AVL Toxic sampler for transient operation (SVOC)
  - Second sampler needed for PM filters (mass, metals and ions)
- Could be done at NVFEL or Contract lab

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Ex. 4 - CBI