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Expanded EPACT Program

<u>An Update</u>

January 15, 2008

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Base EPAct Program Design

- Tier 2 fuel effects (RVP,T50,T90, Aromatics, EtOH)
- "RFS 2 Pilot" to precede main program
  - Three additional, in-use E0, E10, E15 fuels tested in all 19 vehicles at 75°F and 50°F
  - RFS 2 testing from early April till end of June, 2008
- 16 fuels, 19 vehicles in main program
- Estimated cost (Dec. 20, 2007): $3.95M vs. previous EPA estimate of $3.45M
  - Discussions underway with SWRI to reduce program cost
- Base Program Timeline, w/o safety margin
  - Jan. 2008 – March 2008: Fuel blending, vehicle recruiting
  - April 2008 – December 2008: Emissions testing
  - December 2008 – February 2009: Reporting
- The Base Program is already moving forward

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Expanded EPAct Program

- Met with NREL in Ann Arbor on January 9 to discuss the design of the Expanded EPAct Program
- $0.9M has been made available to NREL from DOE's Biomass Program for use in expanding the EPAct Study
  - NREL has already received a funding letter from DOE for this amount
- Additional $1.1M is expected to become available shortly from DOE's Vehicle Technology Program
  - Funding letter expected in March
- Expanded fuel matrix includes 29 fuels
- 22 vehicles used in Phases 1 & 2, 19 vehicles in Phase 3
- DOE would also like to fund limited PM speciation work
- The add-on cost of the expanded program is estimated at $2.0M
- Lubrizol has committed to provide lubricant support for this program

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Expanded Fuel Matrix

	Fuel #	T50 °F	T90 °F	ETOH %	RVP psi	ARO %
Base Program (1-16)	1	235	300	10	7	15
	2	235	350	0	9	15
	3	195	350	10	9	15
	4	195	350	0	7	40
	5	195	300	10	7	40
	6	235	300	0	7	40
	7	215	350	10	7	15
	8	215	300	10	9	15
	9	215	350	0	9	40
	10	215	300	0	7	15
	11	215	300	10	9	40
	12	215	350	10	7	40
	13	195	350	0	7	15
	14	195	300	0	9	15
	15	235	350	10	9	40
	16	195	300	0	9	40
RFS 2 Subset (17-19)	17	215	325	0	9	30
	18	202	325	10	9	25
	19	195	325	15	9	23
DOE Fuels (20-29)	20	160	300	20	7	15
	21	168	300	15	7	15
	22	160	350	20	7	40
	23	160	300	20	9	40
	24	160	350	20	9	15
	25	195	300	15	7	15
	26	168	350	15	9	40
	27	195	350	15	9	40
	28	160	350	20	9	40
E85	29	TBD	TBD	85	TBD	TBD

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Timeline

Phase	# of Tests	# of Weeks	Duration	
			From	To
Fuel blending	-	22	2-Jan	31-May
Phase 1 (75°F)	135	5	1-Apr	6-May
50°F Switchover	-	2	7-May	20-May
Phase 2 (50°F)	135	7.5	21-May	11-Jul
Phase 3 (75°F)	1243	46	14-Jul	29-May-09
Reporting	-	12	1-Jun-09	31-Aug-09

No margin of safety

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Program Cost

Base EPAct Program (19 fuels, 19 vehicles)

Phase	# of Fuels	# of Vehicles	# of Emission Tests	Cost per Test	Total Cost
1	3	19	117	Ex. 4 - CBI	
2	3	19	117		
3	16	19	623		
			857		

Expanded EPAct Program (29 fuels, 19 + 3 vehicles)

Phase	# of Fuels	# of Vehicles	# of Emission Tests	Cost per Test, $	Total Cost, $
1	3	22	135	Ex. 4 - CBI	
2	3	22	135		
3	25+E85	19	982		
			1252		

Note: Calculations assume 2.05 replicates per each fuel/vehicle combination

- Both cost estimates based on SWRI proposal received on Dec. 20
- Program cost negotiations with SWRI are in progress
- Cost reduction of Base EPAct Program by Ex. 4 - CBI is likely

Most Pressing Issues

- Make sure EPAct Program is launched and completed on time
  - Alert SWRI management to the needs of EPAct Program
    - Jeff White; Director; Light-Duty and Unregulated Emissions Section?
    - Nigel Gale; Vice President; Engine, Emissions and Vehicle Research?
  - Alert Haltermann (fuel supplier) management to the needs of EPAct Program
    - Wayne Peterson, Commercial Director
    - If blending of fuels 17-19 is not accelerated in Haltermann's work schedule, Phase 1 testing will not start on April 1, 2008
    - E15 T50 issue must be resolved ASAP
  - Meet w/Wayne Peterson of Haltermann in Ann Arbor the wk of January 28 to drive home the message
  - Maintain close contacts with SWRI and Haltermann to make sure that time-critical issues are immediately resolved
- Finalize the design of the expanded EPAct Program in collaboration with NREL,

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Most Pressing Issues (Cont'd)

- Incorporate selected components of the expanded program in EPA SOW
  - Waiting for DOE to sign the sole source contract with SWRI would delay the whole program
  - In exchange, DOE will later fund selected components of the base program
  - Need approval to proceed

Component	Estimated Cost, $
Additional quantities of fuels 17-19 for use in testing of 3 high emitter/mileage vehicles in Phases 1 and 2 of the program	
Recruiting of 3 high emitter/mileage vehicles for use in Phases 1 and 2 of the program	
Conditioning of engine oil in 3 high emitter/mileage vehicles	
Generation of composite PM samples in Phases 1 and 2 of the Program	
Purchase of fuels 20-29 for use in Phase 3	
Total	

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Back-up Slides

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Test Program Design

- Design similar to Base EPAct Program
  - Phase 1: RFS 2 Pilot at 75°F
    - 3 fuels (E0, E10, E15) as in base program
    - 19 vehicles as in base program + 3 high emitter/mileage vehicles
  - Phase 2: RFS 2 Pilot at 50°F
    - 3 fuels (E0, E10, E15) as in base program
    - 19 vehicles as in base program + 3 high emitter/mileage vehicles
  - Phase 3: Main Program
    - 26 fuels
      - 16 fuels as in base program + 9 additional fuels + E85
    - 19 vehicles as in base program
  - Same parameters measured as in base program
    - Exception: Limited PM speciation in Phases 1 and 2

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