

HEAVY-DUTY ENGINE OIL CLASSIFICATION PANEL OF

ASTM D02.B0.02

June 17, 2003

Marriott Norfolk Waterside Hotel – Norfolk Virginia.

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ACTION ITEMS

1. Issue "Exit" ballot on Noack volatility.

Jim McGeehan

MINUTES

1.0 Call to Order

1.1 Chairman Jim McGeehan called the meeting to order at 2:05 p.m. on June 17, 2003, in the Marriott IV conference room of the Marriott Norfolk Waterside Hotel in Norfolk, Virginia. There were 14 members present or represented and approximately 56 guests present. The attendance list is shown as Attachment 2.

2.0 Agenda

2.1 Reviewed the published agenda (Attachment 1) and noted the request for time by the Mack Surveillance Panel chairman.

3.0 Previous Meeting Minutes

3.1 The minutes from the April 2, 2003 meeting were approved as distributed.

4.0 Membership

4.1 Chairman McGeehan displayed a membership list (Attachment 3) with the names of new applicants for membership added. He then solicited any additional persons desiring membership and Mary Graham, representing ConocoPhillips, indicated she would like to be added to the group. With the addition of Mary, there will now be 12 oil/additive company representatives and 7 original equipment manufacturers making up the panel.

5.0 NCDT Report

5.1 Bill Runkle presented the NCDT update (Attachment 4) and noted there would be a need for ISB and ISM task forces.

6.0 PC-10 Funding

6.1 Steve Kennedy reported on the matrix funding efforts so far and the estimates of need. See Attachment 5.

7.0 80/20 Fuel Rule

- 7.1 Jim McGeehan raised the issue of how is fuel sulfur going to be accommodated in 2007 when only 80% of the fuel in the marketplace will be required to be less than 15 ppm S. See Attachment 6. He also raised the question of whether a "new" category is needed for CI-4 plus all the OEM specifications. Greg Shank responded that EMA has sent a letter to the DEOAP, requesting modification to CI-4. Jim pointed out the additional tests (T-11, C-12, ISM) all use 300 – 500 ppm S fuel. Charlie Passut suggested using CI-4 and the OEM additions plus the yet to be defined chemical limits as PC-10. Then, put the new tests (T-12, C-13, ISB) in PC-11 with <15 ppm S fuel. Closure was not reached on this issue.

8.0 Task Force Reports

8.1 Chemical Limits

- 8.11 Rick Finn reported on the chemical limits task force activities (see Attachment 7) and reviewed what they feel is their charter. They plan to solicit and gather existing data on aftertreatment / lube oil effects and try to have it ready for a mid-September meeting.

8.2 Shear Stability

- 8.21 Bill Kleiser reported (see Attachment 8) that his task force had completed their work and moved that a stay-in-grade 90 pass Kurt-Orbahn test (D-6278) be accepted as means for meeting the new shear stability requirement. Frank Bondarowicz seconded the motion which passed by unanimous voice vote. During discussion on the motion, Ken Chao asked if the HTHS issue had been addressed and Bill responded that HTHS data was included with the shear data already presented.

8.3 Closed Crankcase / Turbo Coking

- 8.31 Jim McGeehan reported this task force had addressed the volatility issue passed to it, by recommending exemption for the 10W-30 grade. Pat Fetterman moved and Steve Kennedy seconded that 13% Noack volatility be "exit" balloted for all viscosity grades except 10W-30 which would remain at 15% Noack. The motion passed by unanimous voice vote.
- 8.32 The MTU glassware test was discussed, but since approvals are only granted by MTU for oils they test with their equipment, there is little support for the test except from DDC. It seems most of the OEM's are not headed toward closed crankcase.

8.4 Low Sulfur Fuel

- 8.41 Pat Fetterman presented his task force's recommendation for the less than 15 ppm sulfur fuel specification to be used for PC-10 tests (see Attachment 9) and moved that it be accepted. Greg Shank seconded the motion which passed by unanimous voice vote. Pat then requested the task force be disbanded...and it was so.

8.5 Matrix Design

- 8.51 Jim McGeehan pleaded for a volunteer to head the matrix design effort...and deathly silence ensued.

9.0 New Business / Old Business / Any Other Business

- 9.1 Wim VanDam, chairman of the Mack Surveillance Panel, raised the issue of continued monitoring by the TMC of the Mack T-9 test. There is only one stand in the industry. During the discussion, it was agreed to continue monitoring. Wim also asked if there was any interest in developing T-10 to T-9 correlation. No interest was expressed.
- 9.2 Warren Totten, chairman of the Cummins Surveillance Panel, came seeking guidance in regard to a ring wear severity shift with the M-11 EGR test. Warren proposed that a switch be made to production ring hardware and the TRWL pass/fail parameter be suspended until sufficient data could be developed with the new rings to generate a correlation. Greg Shank seconded the proposal. During discussion it was observed that you can't have a partial "out-of-control" test. The motion was withdrawn. Eventually, Warren proposed and Bill Kleiser seconded that the HDEOCP recommend to the surveillance panel that current M-11EGR reference periods be shortened to encourage generating reference oil data with the new rings. The reference interval for stands with the new rings would be suitably extended to compensate for any foreshortened prior interval. This motion passed with 14 for, 0 against, 0 abstain.
- 9.3 Steve Kennedy, reporting for the T-11 Task Force, recommended that both 30 pass and 90 pass D-6278 shear data be collected for T-11 tests.

10.0 Next Meeting

- 10.1 The next HDEOCP meeting will probably be held in late October or early November.
- 10.2 The next NCDT meeting will be held on August 4, in Chicago.

11.0 Adjournment

- 11.1 The meeting was adjourned at 4:25 p.m.

Submitted by:

Jim Wells
Secretary to the HDEOCP

Agenda
ASTM
SECTION D.02.BO.02
HEAVY-DUTY ENGINE OIL CLASSIFICATION PANELS

Norfolk Waterside Convention Center
Marriott 4
June 17th 2003
2:00-5:30 PM

Chairman/ Secretary: Jim Mc Geehan/Jim Wells
Purpose: PC-10
Desired Outcomes: PC-10 Tests, Funding and Time-line

Note all presentations will be made from the computer to Focus projector. Bring discs or CD's for minutes.
 Also need money for the rooms and other room items

TOPIC	PROCESS	WHO	TIME
Agenda Review	<ul style="list-style-type: none"> Desired Outcomes & Agenda 	Group	2:00-2:05
Minutes Approval	<ul style="list-style-type: none"> April 2nd 2003 	Group	2:05-2:10
Membership	<ul style="list-style-type: none"> Changes: Additions Chairman's comments 	Jim Mc Geehan	2:10-2:30
NCDT report	<ul style="list-style-type: none"> PC-10 Up-date 	Bill Runkle	2:30-3:00
PC-10 Funding	<ul style="list-style-type: none"> Status and timing Discussion 	Steve Kennedy	3:00-3:30
80/20 Fuel Rule	<ul style="list-style-type: none"> Maintaining engine durability on 500 ppm and 15 ppm fuel sulfur--tests required. 	Jim Mc Geehan	3:30-3:45
Task-Force Reports	<ul style="list-style-type: none"> Chemical Box Shear-Stability Turbo-Coking: closed-crankcase Low Sulfur Fuel 	Rick Finn Bill Kleiser Jim Mc Geehan Pat Fetterman	3:45-5:00
Matrix Task-Force Chairman	<ul style="list-style-type: none"> Volunteer? Discussion on fuel (500-15 ppm) 	Jim Mc Geehan	5:00-5:15
New or Old business	<ul style="list-style-type: none"> Mack Surveillance Panel: Mack T-9 referencing 		5:15-5:30

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ATTACHMENT 2, 1 OF 7

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Voting Members of ASTM HDEOCP

	Oil and Additive Companies	OEMs
1	J. A. Mc Geehan – ChevronTexaco	G Shank - Mack Trucks
2	S. Kennedy - ExxonMobil	W Totten - Cummins Inc.
3	M. Urbanak - Shell	M. Belay - Detroit Diesel Corporation
4	M. Lynskey - Castrol	A. Cassim - Caterpillar Inc.
5	W. Wrunkle - Ashland	F. Bondarowicz - International
6	G. Mazzamaro - CIBA	K. Chao - John Deere
7	S. Herzog - RohMax	R.T. Stockwell - GM Powertrain
8	C. Passut - Ethyl	
9	W. Kleiser - Oronite	
10	L. Williams - Lubrizol	
11	P. Fetterman - Infineum U.S.A.	
12		
13		
14		



PC-10 New Category Development Team (NCDT)

Initial Meeting - June 3, 2003

Embassy Suites Hotel -
O'Hare/Rosemont

PC-10 NCDT Membership

W. Runkle – Chairman	Valvoline	API
M. Urbanek	Shell	API
L. Williams	Lubrizol	ACC
R. Klein	Oronite	ACC
D. Stehouwer	Cummins	EMA
A. Cassim	Caterpillar	EMA
S. Kennedy/G. Shank	ExxonMobil/Mack	DEOAP Co-Chairs

PC-10 NCDT Liaison Members

To be invited	TBD	ASTM
To be invited	TBD	SAE
To be invited	TBD	JAMA
To be invited	TBD	ACEA
To be invited	TBD	ILMA

PC-10 Test Updates

- Caterpillar C-12 (Cycle & Availability)
- Caterpillar 1S (1P + AL Piston)
- Mack T-12
- Cummins ISM (Availability)
- Cummins ISB (Availability)

PC-10 Funding Group

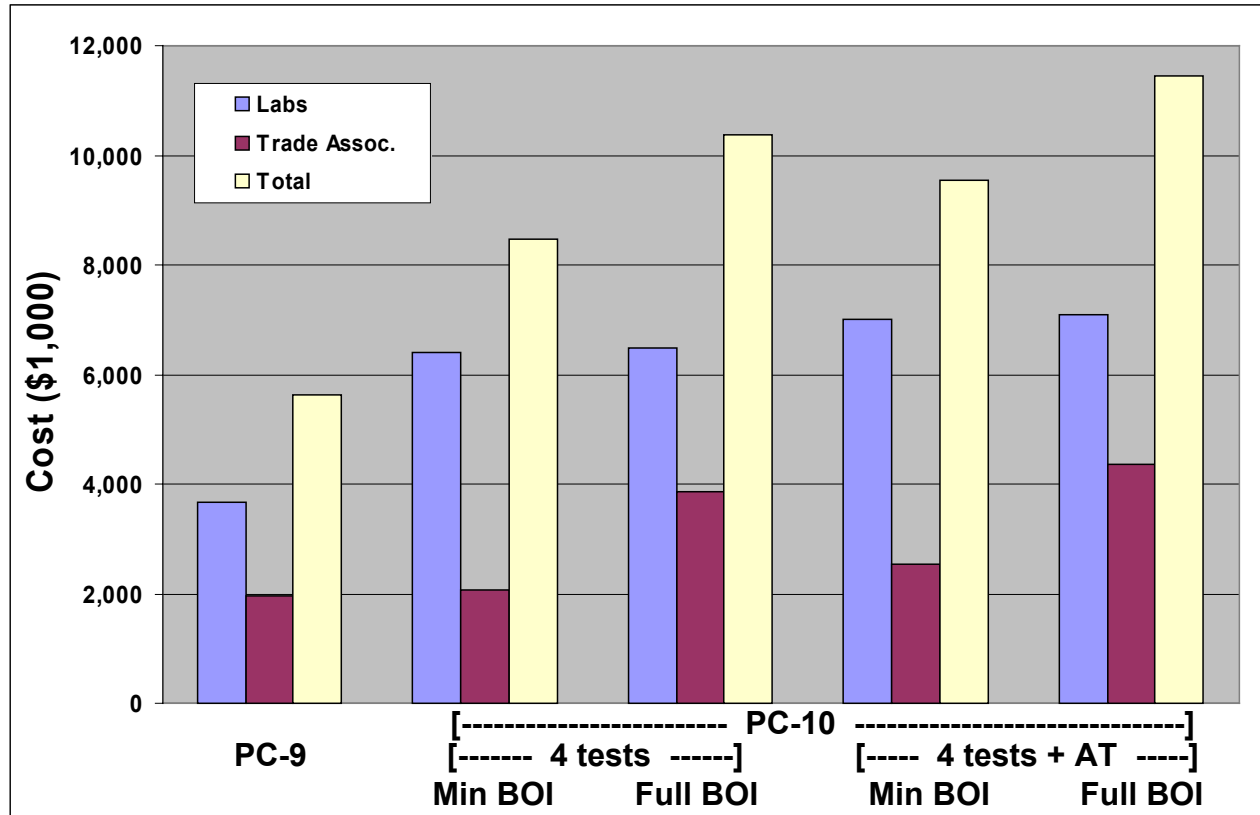
Status

- Initial PC-10 funding discussion held on April 24
- Participating stakeholders
 - ❖ *Trade Associations -- ACC, API, and EMA*
 - ❖ *Independent Test Labs -- PerkinElmer and Southwest Research*
 - ❖ *Dependent Test Labs -- Ethyl, ExxonMobil, and Lubrizol*
- Discussion topics
 - ❖ *Estimate of funds required*
 - ❖ *Preliminary positions of stake-holders*
 - ❖ *Funding mechanisms, potential alternate options*
 - ❖ *Timeline for decision process*
 - ❖ *ACC proposal for Shear Task Force cost sharing*

PC-10 Funding Group

Status

- Estimated cost of PC-10 matrix assuming PC-9 funding model



- Cost to test labs will be significantly higher than PC-9; potential trade association costs range from ~PC-9 to more than 2X

PC-10 Funding Group

Preliminary Position of Industry Stakeholders

- Both independent and dependent test interested in providing stand calibration runs
 - ❖ *All need to evaluate each new test individually*
- ACC supports funding the matrix; initial recommendations
 - ❖ *No more than 3 new tests*
 - ❖ *Equal cost sharing by ACC, API, and EMA*
- EMA not likely to provide one-third contribution
- API LC endorsed use of licensing funds to support the matrix
 - ❖ *Level of available funds similar to that contributed for PC-9 matrix testing*
 - ❖ *Special assessment to increase funds will not supported by LC*
 - ❖ *One-third funding of shear program approved; will be considered as part of the overall API contribution to PC-10*

PC-10 Funding Group

Status

- **Funding Mechanism**
 - ❖ *All stake-holders generally comfortable with current method*
 - ❖ *Potential alternate sources to be considered*
 - *US Department of Energy (API LC do not support)*
 - *Increased contribution from fuel supplier(s)*
 - *After-treatment suppliers (MECA)*
- **Timeline for funding decisions**
 - ❖ *PC-10 matrices are estimated to begin 2-3Q 2004*
 - ❖ *ACC & EMA need to prepare 2004 budgets this year*
 - ❖ *Funding group targeting to have final recommendation / plan by Sept - Oct, 2003*
 - ❖ *Next funding discussion in mid to late June*

Leave Behind a Robust Category for 500 ppm Sulfur: API CI-4 2004

Existing Engines On and Off Highway



Test on 500 ppm Fuel Sulfur

EMA Proposal: Changes to API CI-4 Require New Oil Category

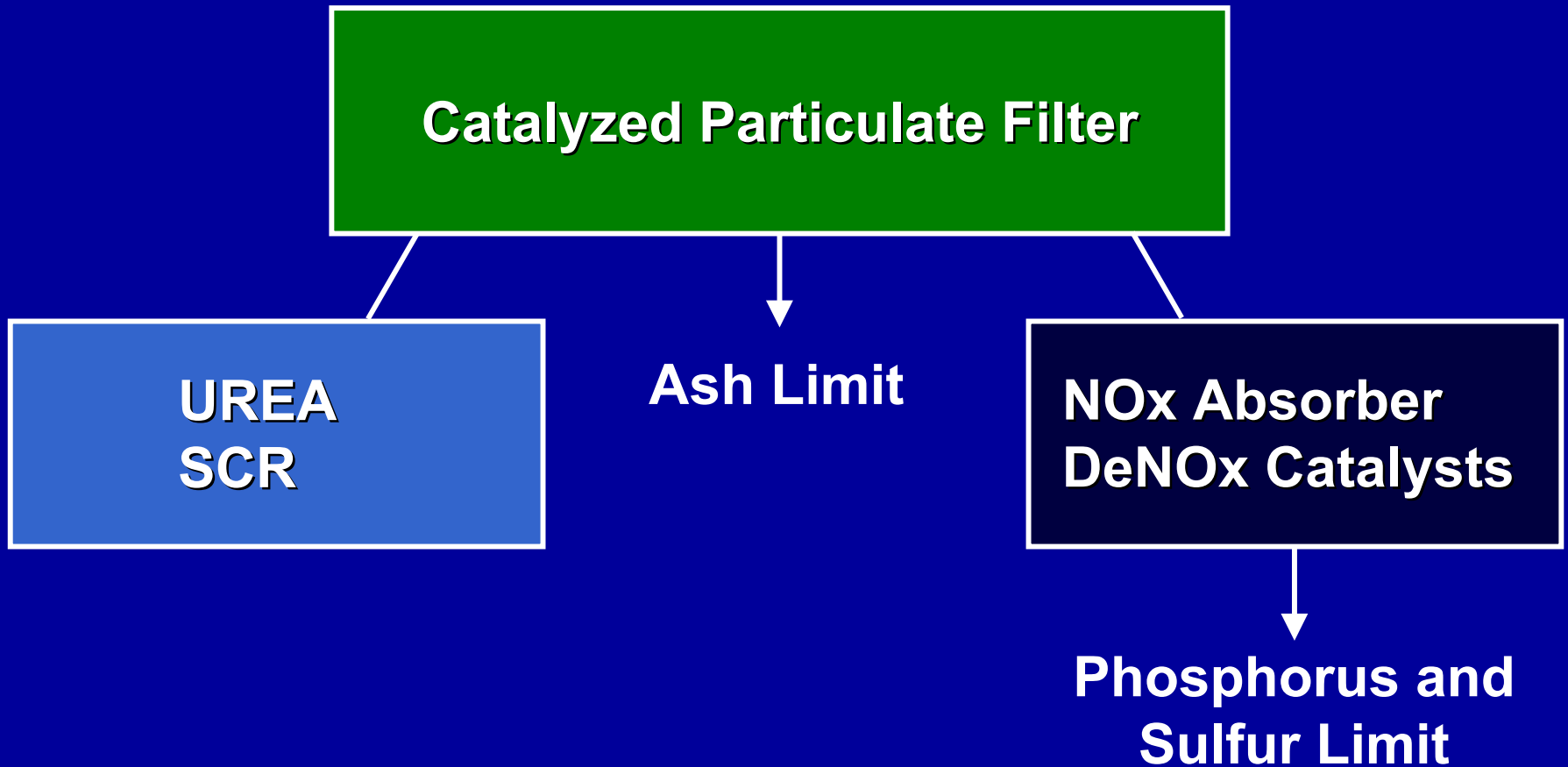
Mack T-8E →	Mack T-11	Task Force in Place
Caterpillar 1R →	Caterpillar C-12	
Cummins M11 EGR →	Cummins ISM	Surveillance Panel Hardware Change
Kurt Crbahn → 30 Cycles	Kurt Crbahn 90 Cycles	Task Force in Place



80/20 EPA Fuel Rule for 2006

- **80% Market on 15 ppm Maximum**
- **20% Market on 500 ppm Maximum**

Chemical Limits Required for PC-10



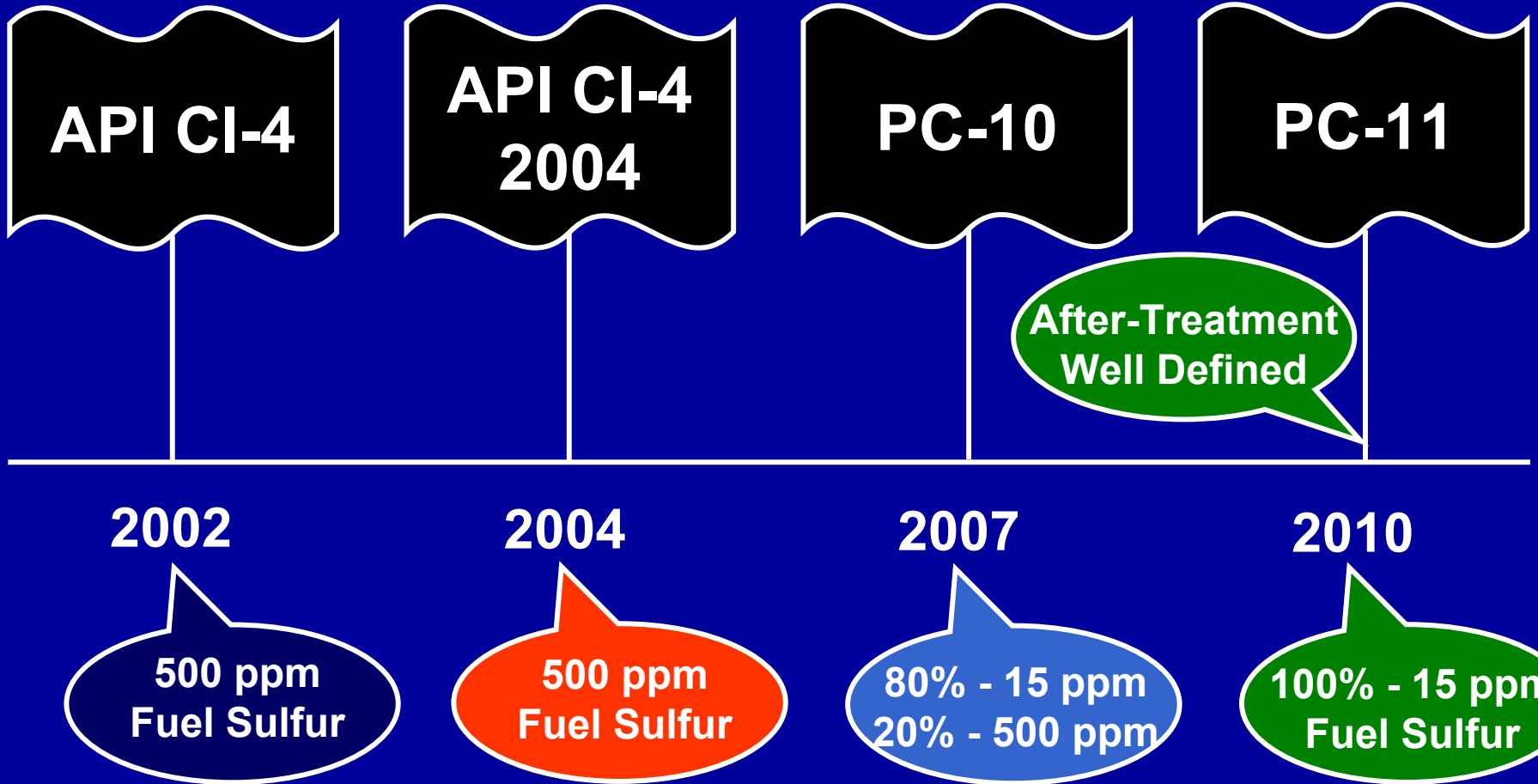
Tests on 15 ppm Fuel Sulfur

Matrix Required for PC-10 Multicylinder Chemical Limits

• Caterpillar C-13	Oil Consumption/Blow-By
• Cummins ISB	VTW
• Mack T-12	Power-Cylinder Wear/ Oxidation

Acceptable Funding With BOI-VGRA

Possible Timeline for U.S. Lubricants



PC-10 Chemical Limits Task Force

Status

June 17, 2003

PC-10 Chemical Limits Task Force Charter

Our task is to make a recommendation to the ASTM HDEOCP on PC-10 chemical limits for lubricant sulfated ash, phosphorus and sulfur that best balance three parameters, engine durability, exhaust after-treatment system durability and oil drain interval. As compromises and trade-offs emerge in the decision process, our priority among the three parameters is in the order listed, i.e. our first concern is to engine durability, then to exhaust after-treatment durability, then to drain interval. Our intent is to develop chemical limits which:

- Apply broadly to all engines
- Allow backward compatibility of PC-10 lubricants
- Are based on best judgment from analysis of data supplied by Industry
- Will focus on the needs of 2007 emissions controlled engines

PC-10 Chemical Limits Task Force Charter

We will accomplish our task by a process of soliciting, then analyzing data from the Industry related to:

- Engine durability at lower constitutional amounts of sulfated ash, phosphorus and sulfur
- Exhaust system durability as a function of constitutional amounts of sulfated ash, phosphorus and sulfur
- Engine durability as a function of oil drain interval at lower constitutional amounts of sulfated ash, phosphorus and sulfur

PC-10 Chemical Limits Task Force Charter

We will not fund or sponsor any new data development, but will rely fully on the data provided by Industry, with Industry defined as the catalyst manufacturers, the engine builders, the lubricant marketers, the additive industry, the test labs and industry consortia.

PC-10 Chemical Limits Task Force Charter

The key timing driver for our work product is to serve as input to the design of the reference oils that will be used in the PC-10 engine test matrix. Our recommendation needs to be in place about 3 months ahead of the start of the matrix, which is currently scheduled for late 1Q04. This dictates a completion date of December, 2003 for our work. This will be our target, which we will adjust if the PC-10 test matrix timing slips.

Chemical Limits Task Force

Key Activities and Dates

Activity	Timing
Charter	Complete
Content of Data Request Developed	June, 2003
Data Request Sent Out	June 30, then periodic reminders
Data Submission Deadline	September 23
Data Analysis	October, 2003
Clarifications and Interactions with Data Providers, as Necessary	November, 2003
Consensus on Chemical Limits within Task Force	November, 2003
Recommendation to HDEOCP	December, 2003

Shear Stability and HTHS Viscosity Task Group

June 16, 2003

Meetings

- June 11th Teleconference
 - Agreed to test oil matrix
 - Agreed process for June 16 meeting
 - Reviewed funding status
- June 16th
 - Agreed recommendation to HDEOCP

Recommendation to HDEOCP

- Task group recommends the use of a 90 cycle Kurt Orbahn test to determine shear stability characteristics of diesel engine oils.
 - Supported by data already presented to task group by various members
- Task group recommends that Subcommittee 7 develop a method and precision statement for the 90 cycle test

PC-10 Ultra Low Sulfur Test Fuel Task Force

Reviewed with the
ASTM HDEOCP Meeting
June 17, 2003

Task Force Membership

- Pat Fetterman – Infineum, Chairman
- Frank Bondarowicz – International
- Don Burnett – Chevron Phillips Chemical
- Jim Carter – Haltermann
- David Venhaus – Ethyl
- Tom Franklin – PerkinElmer, Secretary
- Greg Shank – Mack Volvo Powertrain
- Jim Wells – SwRI
- Lew Williams - Lubrizol

Proposed Fuel Task Force Mission Statement

- To develop an ultra low sulfur diesel fuel specification which can be used to define fuels for test engines for bid purchase for Heavy Duty engine oil categories after PC-9. This specification will be sufficiently detailed that fuels purchased against it will produce consistent results with regard to engine deposits, soot generation, wear and exhaust gas composition.

Task Force Status

- A Task Force teleconference were held on 2/17/03, 2/26/03 and 3/21/03.
- Issues reviewed:
 - Mission statement
 - PC-9 fuel bid specification as a core for a PC-10 Test Fuel Specification
 - A proposed PC-10 Test Fuel Specification was agreed to by all participants during the 3/21/03 teleconference

Proposed PC-10 Test Fuel Specification

Property	Specification	Test Method
Addition of additives	None allowed <u>except</u> lubricity additive	
Distillation Range, °F		ASTM D 86
10%		
50%		
90%	560 – 630	
Endpoint		
Specific Gravity	0.840 – 0.855	ASTM D 4052
API Gravity	34 – 37	ASTM D 4052
Corrosion, 3 h at 50 °C	1 max	ASTM D 130
Sulfur, ppm	7 – 15	ASTM D 5453
Flash Point, °F	130 min	ASTM D 93
Pour Point, °F	0 max	ASTM D 97
Cloud Point, °F	Report	ASTM D 2500
Viscosity at 40 °C, cSt	2.0 – 2.6	ASTM D 445
Ash, wt %	0.005 max	ASTM D 482
Carbon Residue on 10% Bottoms	0.35 max	ASTM D 524
Net Heat of Combustion	Report	ASTM D 3338
Water and Sediment, vol %	0.05 max	ASTM D 2709
Total Acid Number	0.05 max	ASTM D 664
Strong Acid Number	0 max	ASTM D 664
Cetane Index	Report	ASTM D 976
Cetane Number	43 – 47	ASTM D 613
Accelerated Stability, mg/100 mL	1.5 max	ASTM D 2274
Composition		
Aromatics, wt%	28 – 33.5	ASTM D 5186
Olefins, vol%	Report	ASTM D 1319
Saturates, vol %	Report	ASTM D 1319
*SLBOCLE, g	*3100 min	*ASTM D 6078

* May be altered to be consistent with soon to be released CARB or ASTM diesel fuel specifications.

Task Force Requests to HDEOCP

- Review proposed PC-10 Test Fuel Specification
- Endorse recommended specification for use in developing PC-10 engine tests (as required)
- Disband the PC-10 Test Fuel Task Force