HEAVY-DUTY ENGINE OIL CLASSIFICATION PANEL

OF

ASTM D02.B0.02

June 19, 2007

Loews Miami Beach Hotel, Miami Beach, FL

ACTION ITEMS

1. **Set up a conference call to discuss allowing a C13 in place of a 1P**
2. **ChevronPhillips supply a list of fuel supply issues to the HDEOCP**

MINUTES

1.0 Call to order

1.1 The Heavy Duty Engine Oil Classification Panel (HDEOCP) was called to order by Chairman Jim McGeehan at 1:30 p.m. on Tuesday, June 19, 2007, in the Poinciana 4 Room of the Loews Miami Beach Hotel, Miami Beach, FL.

1.2 There were 13 members present and 53 guests present. The attendance list is shown as Attachment **2.**

2.0 Agenda

2.1 The agenda was modified to include an API update for CF-4 and a fuel supply issue. The modified version is included as Attachment **1**.

3.0 Minutes

3.1 The minutes from the December 6, 2006 meeting the May 10, 2007 conference call were approved as issued.

4.0 Membership

4.1 There was one mailing list change. Brent Calcut replaces Scott Zechiel for Detroit Diesel.

5.0 API Recommendation

5.1 API Lubes Committee Decision on API CF-4. The HDEOCP was not able to resolve the T-12 test to the T-6 test equivalent limits. The Lubes committee met to discuss the issue of CF-4 tests not being available. The API decision is that no more CF-4 licenses will be issued. Existing CF-4 licenses will expire at the end of June 2008. CG-4 remains in place. A recommendation will be issued to marketers to upgrade from CG-4 to CH-4 but CG-4 tests are available.

6.0 Status of Ballots

6.1 Secretary Moritz presented a summary of ballots issued. See Attachment **3**. Someone asked about the previous discussion relating to a passing C13 test result being allowed in

place of a 1P or 1R. CAT will look into it, but might be OK with it. The January 26, 2007 meeting minutes reflect the previous discussion.

7.0 Exit Criteria Ballot

7.1 Cathy Devlin discussed Afton's negative on the ISM to M11 limits. See Attachment **4**. The Cummins Surveillance Panel saw the presentation the previous day. Differences between the tests and some test data were shown. Afton has agreed to run one test on 1005 and the Surveillance Panel agreed to recommend to the HDEOCP that this be allowed to happen. Also, a request was made to obtain other data. Cummins is willing to wait and see what the 1005 test run shows. The run and data review would be complete by September 2007. Chairman McGeehan showed the results of the exit criteria ballot. See Attachment **5**. Cummins clearly wants this resolved and some limits will be agreed upon during the September time frame. There was no disagreement in the HDEOCP to wait and see what the data shows.

8.0 Sequence III in D4485

8.1 Steve Kennedy presented some improved wording for the Sequence III in D4485. See Attachment **6**. The alternate use of the IIIG is at a different performance limit and should be stated that way. A proposed footnote indicates that Sequence IIIG limits are more restrictive and are not intended to indicate equivalence and that results meeting the IIIG criteria stated can be used in lieu of the Sequence IIIF. Longer term, alternate limits for the IIIG should be developed to correspond to the IIIF. **Steve Kennedy moved to amend D4485 to include the footnote shown. Pat Fetterman seconded. The motion carried on a unanimous voice vote.**

9.0 Mack T-11 to T-8

9.1 Mark Cooper discussed the Mack Surveillance Panel recommendation that a passing T-11 be allowed in place of a passing T-8 or T-8E for the applicable category. The Mack Surveillance Panel recommends that the HDEOCP modify D4485 to allow a passing T-11 at CI-4 plus level in place of a T-8 or T-8E in the applicable categories. **Pat Fetterman moved that a footnote be included in D4485 that a passing T-11 at CI-4+ level can be used in place of either a T-8 or a T-8E in the applicable categories. Cathy Devlin seconded. This is not intended to indicate equivalence, but allow a CH-4 claim on a CI-4 oil. The motion carried on a unanimous voice vote.**

10.0 Category Process

10.1 Lew Williams presented a report on an improvement process. See Attachment **7.** Greg Shank, Steve Kennedy, and Lew worked on this. The HDEOCP and other stakeholders were asked to provide feedback on HD category development and deployment. Fourteen responses were received. The highest priority from each trade association and the next highest 3 were summarized. A table of questions and responses was shown. The lowest score is a more favorable response or desire, thus a higher rating. The goal is to form teams to develop recommendations to improve the process. By 2012, European emissions limits will be very similar to those in the U.S. and as such, the oil requirements could be very similar and a common specification could exist for those two markets. The EMA would like to focus on using the same tests. A starting point would be to use common tests possibly at different limits. Initiatives exist to continue the globalization of engine platforms.

10.2 Lew Williams will be on a team to work on #8: Jim McGeehan and Greg Shank signed up for #12. Steve Kennedy pointed out that #1, 5, 4 are very similar and volunteered the DEOAP to work on those. Item #11 was not chaired at this time. This is a good start and was much work.

11.0 API CJ-4

11.1 EMA update on 2007 rollout of product is confidential, but there was a huge pre-buy.

12.0 EMA Biodiesel Status Report

12.1 Greg Shank presented an EMA report on B20. See Attachment **8, page 1**. The EMA is concerned about oxidation, deposits, corrosion, fuel dilution (which is a huge concern), and oil drain intervals. Customers will not accept a reduced oil drain interval. The National Bio-Diesel Board will co-sponsor engine tests with the EMA. The tests to be run will be the C13, ISB, and T12 with the reference oil for that test. The tests will include additional oil analysis and hardware inspection. What happens if all the tests fail? It is too early to tell. Everyone is gaining experience with B20 in the field. The B20 will be blended with B100 that meets D6751 and that the EMA believes is representative and will be soy based. These tests will not adequately screen for fuel dilution. A suggestion was made to include the low temp MRV from the T12 oil. What about emissions with bio? EPA and ARB have plans (ARB has money) to evaluate emissions changes with B20, B50, and B100. NOx increases 3-6% with B20.

13.0 2010 Lubricant Requirements

13.1 Greg Shank presented, for the EMA, some feedback on CJ-4 oil field performance. See Attachment **8, page 2**. Limited data looks good, but there could be possible loss of TBN retention. The EMA requests industry data be submitted to Roger Gault to be coded and distributed. The EMA has identified some possible, future additional performance requirements. Among these are increased oxidation protection; the IIIG oxidation requirement might not be enough. Engine oil operating temps could increase 30F. The ROBO might work. The EMA is requesting ROBO data on heavy duty oils. Turbo deposits are still a need and a group in Europe is working on that. Fuel economy is huge and some gains are needed. EMA is willing to discuss formulation changes to get some fuel economy. Take HTHS down to a 3 and try it in a T12. None of these are related to 2010. Chemical limits are TBD. And the EMA is open to test redundancy. Heather DeBaun will look at that again. Today, the EMA is not saying they need PC-11 in 2010, but performance concerns have been listed.

14.0 New Business

14.1 Fuel supply issues. All of the diesel Surveillance Panels had comments that all the labs have had times where fuel delivery had long delays. A question was asked about going back to the fuel specification and to allow labs to select from other suppliers rather than have a sole source. The original specification was developed to allow multiple fuel suppliers, then a task force was created to select a sole supplier. Scott Cobb of ChevronPhillips was in the room and spoke up. Don Burnett has moved into a different position. This is the first meeting for Scott. He offered some reasons for the supply issues. Loading tank cars is the most recent issue; there has not been enough fuel in a batch to fill a tank car which might short other labs using trucks. Also, feedstock supplies have been in short supply. Higher sulfur feedstocks for PC-9 could become an issue and be in short supply. They should be able to supply fuel in rail cars again soon. Scott was asked to provide a list of major issues the HDEOCP needs to know about. A question was asked about the supply contract. Ben Weber explained that the supply was put out for bid and the price was tied to a commodity price of fuel. Scott asked whether the HDEOCP wants an update on PC-9 fuel and the panel said yes.

15.0 The meeting was adjourned at 3:10 pm.

Final Agenda
ASTMSECTION D.02.BO.02

HEAVY-DUTY ENGINE OIL CLASSIFICATION PANELS

Loews Miami Beach Hotel
June 19th 2007
1:30 pm-5:00 pm

Chairman/ Secretary: **Jim Mc Geehan/Jim Moritz**
Purpose: **Support API HDMO categories**

Desired Outcomes: **Resolve negative ballot on Cummins ISM to Cummins MII HST**

TOPIC	PROCESS	WHO	TIME
Agenda Review	• Desired Outcomes & Agenda	Group	1:30-1:35
Minutes Approval	• December 6th , 2006 • May 10th 2007	Group	1:35-1:40
Membership	• Changes: Additions	Jim Mc Geehan	1:40-1:45
API Recommendation	• Lubricants committee decision on API CF-4	Steve Kennedy	1:45-2:00
Status of ballots	• Review of status of all recent successful ballots recommend by HDEOCP to B • Cat IP to IR; Mack T-12 to T-9; Mack T-12 to T-10; Cummins ISM to M11 EGR.	Jim Moritz Joe Franklin	2:00-2:30
Exit-Criteria Ballot Results and actions	• Ballot results of Mack T-6 to Mack T-12. Letter to API CF-4 • Ballot results on Cummins ISM to M11 HST. One negative to be resolved • Afton proposal on ISM to M11 HST • Vote and recommendation to B	Jim McGeehan Cathy Devlin	2:30-3:00
Sequence III in D4485	• Wording in D4485 for IIIF and IIIG	Steve Kennedy	3:00-3:15
Mack T-11 to Mack T-8	• Up-date	Mark Cooper	3:15-3:30
Category Process	• Report on improvements survey	Lew Williams	3:30-4:00
API CJ-4	• EMA up-date about 2007 rollout	Greg Shank	4:00-4:15
EMA Biodiesel status report	• Report	Greg Shank	4:15-4:30
2010 Lubricant requirements	• EMA position	Greg Shank	4:30-4:45
New and old business	• API CJ-4 fuel supply issues	Group	4:45-5:00

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Summary of HDEOCP Ballots

June 19, 2007

- Ballot D02.B0 06-05 Item 5 Closing date:10/10/06
  - Ballot for the CJ-4 category.
  - Passed with 86 affirmative votes and 296 abstainsions.

- Ballot D02.B0 07-01 Item 7 Closing date: 04/03/07
  - Ballot to allow alternative tests.
    - Allows the T12 in place of the T9 for CH-4.
    - Allows the 1P in place of the 1R for CI-4.
    - Allows the T12 in place of the T10 for CI-4.
    - Corrected the OFDP limits for the ISM used for CI-4.
  - Passed with 82 affirmative votes and 287 abstainsions.

- Ballot D02.B0 07-04 Closing date: 06/04/07
  - Ballot to allow ISM in place of M11 for CH-4.
  - Balloted in error and removed.

Backward Compatibility of ISM to M11 for API CH-4

Do they correlate?

Test Comparison

	M11 HST	ISM
% Soot	5.0%	6.5%
EGR	No	Yes
Oil Filter Media	Microglass media Remay polyester and nylon overlay	Stratapore polyester media Remay polyester overlay
OFDP Hours	200	150
Bypass in Oil Filter Head	Open	Blocked

TMC 1004 Test Comparison

	M11 HST		ISM	
	TMC 1004	CH-4 Limit	TMC 1004	Proposed Limit
Xhd Wt. Loss	20.5 mgs	6.5 mgs	8.6 mgs	7.5 mgs
OFDP	83 kPa	79 kPa	56 kPa	79 kPa
Sludge	8.75	8.7	8.97	8.1
n size	4		3	

- OFDP performance changes from borderline fail to solid pass
  - 2 of 3 ISM results less than half of pass limit (24, 35, 110)
- Sludge performance changes from borderline pass to solid pass

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Oil A Test Comparison

	M11 HST		ISM	
	Oil A	CH-4 Limit	Oil A	Proposed Limit
Xhd Wt. Loss	6.5 mgs	6.5 mgs	5.8 mgs	7.5 mgs
OFDP	42 kPa	79 kPa	265 kPa	79 kPa
Sludge	8.8	8.7	8.2	8.1

- OFDP performance changes from solid pass to very high fail
- Other parameters compare favorably to limits

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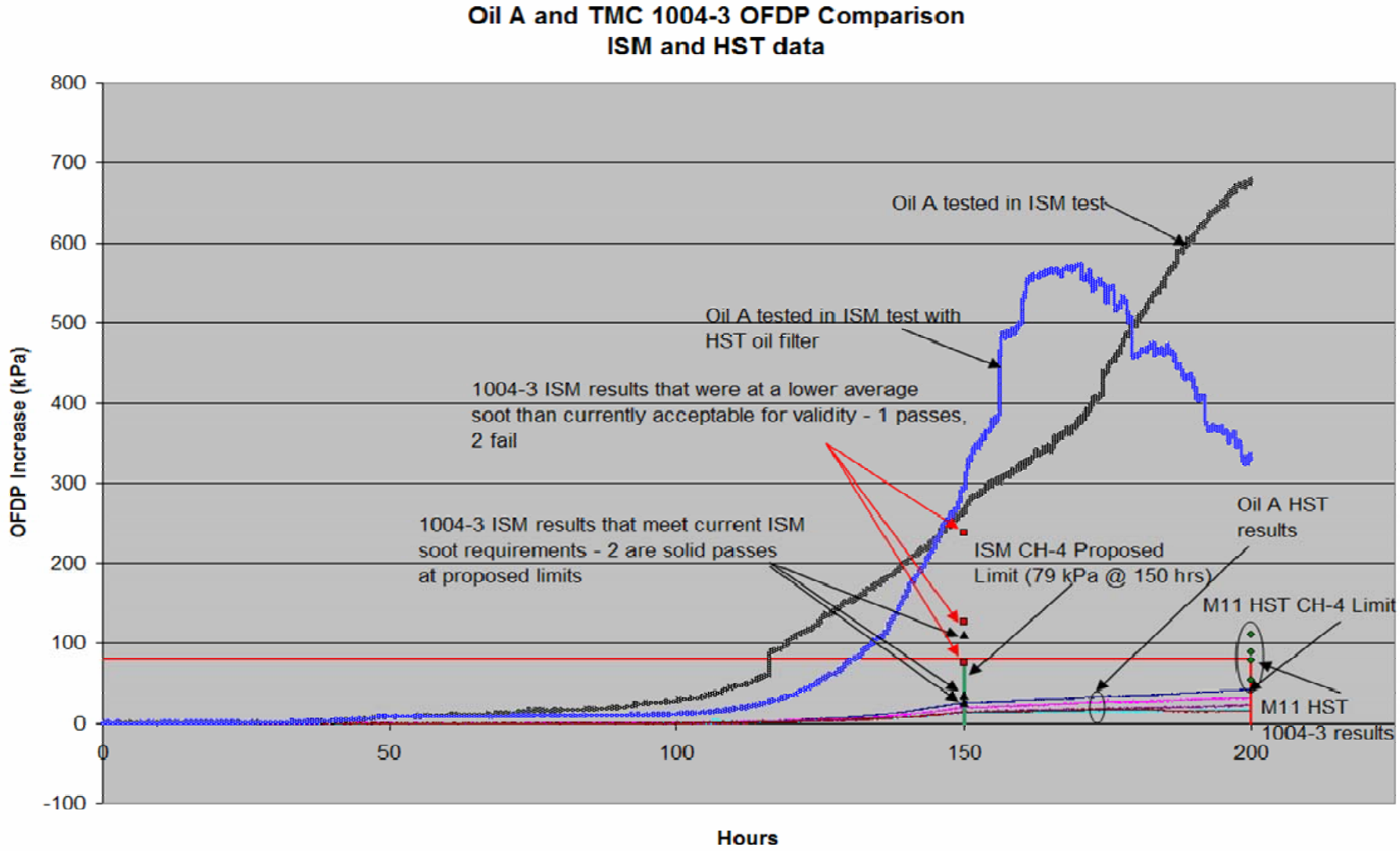
Oil A and TMC 1004-3 OFDP Comparison
ISM and HST data
OFDP Increase (kPa)
800
700
600
500
400
300
200
100
0
-100
0
50
100
150
200
Hours
Oil A tested in ISM test
Oil A tested in ISM test with HST oil filter
1004-3 ISM results that were at a lower average soot than currently acceptable for validity - 1 passes, 2 fail
1004-3 ISM results that meet current ISM soot requirements - 2 are solid passes at proposed limits
ISM CH-4 Proposed Limit (79 kPa @ 150 hrs)
Oil A HST results
M11 HST CH-4 Limit
M11 HST 1004-3 results

TMC 1005 Test Comparison

TMC 1005 is M11 HST Reference Oil

	M11 HST		ISM	
	TMC 1005	CH-4 Limit	TMC 1005	Proposed Limit
Xhd Wt. Loss	4.53 mgs	6.5 mgs	?	7.5 mgs
OFDP	122 kPa	79 kPa	?	79 kPa
Sludge	8.4	8.7	?	8.1
n size	Ref Oil Targets			

Qualitative Summary

	1004		Oil A		1005	
	HST	ISM	HST	ISM	HST	ISM
Xhd Wear	Solid Fail	Fail	Borderline Pass	Pass	Solid Pass	?
OFDP	Borderline Fail	Solid Pass	Solid Pass	Solid Fail	Solid Fail	?
Sludge	Borderline Pass	Solid Pass	Borderline Pass	Borderline Pass	Solid Fail	?

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Conclusion

- Comparison of TMC 1004 and Oil A data suggest ISM and M11 HST do NOT correlate on sludge and OFDP parameters.
  - Limits appropriate for one are not appropriate for the other
- CH-4 oils were designed for 4.5% - 5% fuel soot, not 6.5%. Perhaps this data suggests that when subjected to higher soot levels, or different types of soot (EGR vs non-EGR), oil performance may vary.
- When defining replacement tests, the integrity of the category must remain unchanged…ie. no decrease or increase in performance.

Proposed Path Forward

- Afton has agreed to run one ISM test on TMC 1005 (M11 HST reference oil) to generate data from a 3rd oil.
  - All data should be used by Cummins SP to either generate appropriate targets (if they exist) or deem the tests (or specific parameters) non-comparable.
  - If proposed limits are correct, 1005 should have clearly failing OFDP, clearly passing Xhd wear and failing sludge.
- Cummins SP recommends (6-0-2) that HDEOCP hold off on exit ballot limits until Afton runs 1005 and the SP reviews all data to propose limits (estimated completion ~ end of September 2007). Technical goal is to maintain backward compatibility without changing category performance.

EXIT CRITERIA BALLOT
Cummins ISM Limits for API CH-4

ASTM-HDEOCP BALLOT FOR VOTING MEMBERS ONLY Reference: Jim Mc Geehan, Chairman	Issue Date: December 18, 2006 Receipt Deadline: January 26, 2007

RETURN BALLOT TO:
Pat Connelly via email (preferred):
patconnelly@chevrontexaco.com
or via Fax: 510-242-3758

Name: _____
Organization: _____
Date: _____
Phone No.: _____

	1 Test	2 Test	3 Test
Cross-Head Wear, mg, Max. CH-4 (CI-4 Established Limits)	 7.5 (7.5)	 7.8 (7.8)	 7.9 (7.9)
Oil Filter Delta Pressure @ 150 Hours, kPa, Max. CH-4 (CI-4 Established Limits)	 79 (55)	 95 (67)	 103 (74)
Sludge Rating, Merits, Min. CH-4 (CI-4 Established Limits)	 8.1 (8.1)	 8.0 (8.0)	 8.0 (8.0)

Votes HDEOCP: 15 for, 1 against, 0 waives

Motion	Affirmative	Negative
Send the proposed limits for Cummins ISM for HST for exit criteria ballot.	☐	☐

Comments:

Sequence III in HD Categories

Steve Kennedy
ASTM HDEOCP Meeting
June 19, 2007

Use of Seq. IIIG in HD Categories in D4485

Issue / Concern

- **Oil oxidation requirements for CG-4, CH-4, CI-4, and CJ-4 are defined by 4 different performance levels in the Sequence IIIF test**
- **The Sequence IIIG at SM viscosity increase limits is listed as an alternate the Sequence IIIF in all 4 categories**
- **Concern that the current format does not recognize the difference in performance between the Seq. IIIF & IIIG tests**
- **Propose clarification to reduce potential confusion**
  - **At a minimum, add a footnote indicating that the 2 Sequence III requirements in a given CX-4 category are not equivalent**
  - **For the longer term, consider alternate limits in the Seq. IIIG to match intended performance level**

Use of Seq IIIG in HD Categories in D4485

Proposal – add new footnote

Category	Test Method	Rated or Measured Parameter	Primary Performance Criteria		
			One-Test	Two-Test	Three-Test
CG-4					
	D 6984 (Sequence IIIF)	60 h viscosity (at 40°C) increase from 10 min sample, %, max	325	349	360
	or Sequence IIIG[AE]	Kinematic viscosity, % increase at 40°C max	150	173	184
CH-4					
	D 6984 (Sequence IIIF)	60 h Viscosity at 40°C, increase from 10 min sample, % max	295	275 (MTAC)[U]	275 (MTAC)[U]
	or Sequence IIIG[AE]	Kinematic viscosity, % increase at 40°C max	150	150 (MTAC)	150 (MTAC)
CI-4					
	D 6984 (Sequence IIIF)[X]	Kinematic viscosity (at 40°C), % increase, max	275	275 (MTAC)	275 (MTAC)
	or Sequence IIIG[AE]	Kinematic viscosity, % increase at 40°C max	150	150 (MTAC)	150 (MTAC)
CJ-4					
	D 6984 (Seq. IIIF)	Kinematic viscosity (at 40°C), % increase, max	275	275 (MTAC)	275 (MTAC)
	or, alternately, Sequence IIIG[AE]	Kinematic viscosity (at 40°C), % increase, max	150	150 (MTAC)	150 (MTAC)

[AE] The Sequence IIIG limits shown are more restrictive than the corresponding limits in the Sequence IIIF, and are not intended to indicate equivalence. Results meeting the Sequence IIIG criteria stated can be used in lieu of the Sequence IIIF.

Survey on HD Category Development Process

ASTM HDEOCP Meeting

June 19, 2007

PC-10 Look-Back Survey

Overview

- **HDEOCP membership & other stakeholders asked to provide feedback on HD category development & deployment**
  - **Issues specific to PC-10**
  - **General process**
- **Fourteen responses received**
  - **ACC -- 4**
  - **API -- 4**
  - **EMA -- 6**
- **Preliminary recommendation to assign working groups to address 6 issues from the survey**
  - **The highest priority issue for each trade association -- ACC, API, & EMA**
  - **Three issues with the highest overall level of interest**

PC-10 Look-Back Survey

Rating Summary

			ACC					API					EMA						
		Avg. By Group	Afton	Infineum	Lubrizol	RohMax	Grp. Avg.	BP	Chevron	ExxonMobil	Shell	Grp. Avg.	Caterpillar	Cummins	EMA	John Deere	Navistar	Volvo	Grp. Avg.
1	What are the advantages of more closely aligning API C category and OEM specs in future HD categories? How do we maximize the utilization of a new HD category?	2.08	2	1	5	3	2.75	1	1	1	1	1	3	1	3	3	2	3	2.5
2	What are the advantages of expanding the API AMAP program for API C category oils? Do you feel the API AMAP program can replace the OEM spec audit process?	2.64	3	4	2	3	3	3	2	1	3	2.25	3	2	4	3	3	1	2.667
3	How can we extend the life of future HD categories to a minimum of 5 years?	2.28	3	1	1	3	2	3	1	3	3	2.5	2	3	2	2	2	3	2.333
4	How can we improve the timing of reaching consensus on key spec development issues in future HD categories?	1.94	2	3	1	2	2	2	1	2	3	2	1	2	3	1	3	1	1.833
5	How can we plan as an Industry for the successful roll out of future HD categories?	1.92	1	4	1	3	2.25	2	1	2	1	1.5	1	1	3	3	3	1	2
6	How do we improve the communications through out the specification development process in future HD categories?	2.67	3	4	5	3	3.75	2	2	2	3	2.25	1	3	2	2	2	2	2
7	How do we improve the estimate of timing at all stages of the specification development process in future HD categories?	2.22	3	3	1	3	2.5	2	1	2	1	1.5	2	3	3	3	3	2	2.667
8	How do we generate the data needed in a timely way to correlate old to new tests so we have fewer active tests?	2.08	1	1	1	3	1.5	2	2	1	4	2.25	1	2	4	3	3	2	2.5
9	What are the options for greater industry participation in engine and bench test development? Is the Seq VID model an option?	2.91	4	3	5	4	4	2	3	2		2.333	1	2	2	3	4		2.4
10	Is there a better way to generate BOI/VGRA and old test correlation data at the end of the test development cycle?	2.17	1	1	1	3	1.5	4	1	1		2	3	3	4	2	4	2	3
11	How do we better determine industry needs for engines that are not yet commercial?	2.03	2	2	1	3	2	1	3	2	1	1.75	1	2	5	2	2	2	2.333
12	Should we consider combining future API HD specs as part of a global spec?	2.36	1	5	5	3	3.5	5	1	2	1	2.25	1	2	1	1	1	2	1.333

PC-10 Look-Back Survey

Ranked Ratings

			ACC					API					EMA						
		Avg. By Group	Afton	Infineum	Lubrizol	RohMax	Grp. Avg.	BP	Chevron	ExxonMobil	Shell	Grp. Avg.	Caterpillar	Cummins	EMA	John Deere	Navistar	Volvo	Grp. Avg.
5	How can we plan as an Industry for the successful roll out of future HD categories?	1.92	1	4	1	3	2.25	2	1	2	1	1.5	1	1	3	3	3	1	2
4	How can we improve the timing of reaching consensus on key spec development issues in future HD categories?	1.94	2	3	1	2	2	2	1	2	3	2	1	2	3	1	3	1	1.833
11	How do we better determine industry needs for engines that are not yet commercial?	2.03	2	2	1	3	2	1	3	2	1	1.75	1	2	5	2	2	2	2.333
1	What are the advantages of more closely aligning API C category and OEM specs in future HD categories? How do we maximize the utilization of a new HD category?	2.08	2	1	5	3	2.75	1	1	1	1	1	3	1	3	3	2	3	2.5
8	How do we generate the data needed in a timely way to correlate old to new tests so we have fewer active tests?	2.08	1	1	1	3	1.5	2	2	1	4	2.25	1	2	4	3	3	2	2.5
10	Is there a better way to generate BOI/VGRA and old test correlation data at the end of the test development cycle?	2.17	1	1	1	3	1.5	4	1	1		2	3	3	4	2	4	2	3
7	How do we improve the estimate of timing at all stages of the specification development process in future HD categories?	2.22	3	3	1	3	2.5	2	1	2	1	1.5	2	3	3	3	3	2	2.667
3	How can we extend the life of future HD categories to a minimum of 5 years?	2.28	3	1	1	3	2	3	1	3	3	2.5	2	3	2	2	2	3	2.333
12	Should we consider combining future API HD specs as part of a global spec?	2.36	1	5	5	3	3.5	5	1	2	1	2.25	1	2	1	1	1	2	1.333
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6	How do we improve the communications through out the specification development process in future HD categories?	2.67	3	4	5	3	3.75	2	2	2	3	2.25	1	3	2	2	2	2	2
9	What are the options for greater industry participation in engine and bench test development? Is the Seq VID model an option?	2.91	4	3	5	4	4	2	3	2		2.333	1	2	2	3	4		2.4

PC-10 Look-Back Survey

Top Priorities

			ACC					API					EMA						
		Avg. By Group	Afton	Infineum	Lubrizol	RohMax	Grp. Avg.	BP	Chevron	ExxonMobil	Shell	Grp. Avg.	Caterpillar	Cummins	EMA	John Deere	Navistar	Volvo	Grp. Avg.
ACC top priority																			
8	How do we generate the data needed in a timely way to correlate old to new tests so we have fewer active tests?	2.08	1	1	1	3	1.5	2	2	1	4	2.25	1	2	4	3	3	2	2.5
API top priority																			
1	What are the advantages of more closely aligning API C category and OEM specs in future HD categories? How do we maximize the utilization of a new HD category?	2.08	2	1	5	3	2.75	1	1	1	1	1	3	1	3	3	2	3	2.5
EMA top priority																			
12	Should we consider combining future API HD specs as part of a global spec?	2.36	1	5	5	3	3.5	5	1	2	1	2.25	1	2	1	1	1	2	1.333
5	How can we plan as an Industry for the successful roll out of future HD categories?	1.92	1	4	1	3	2.25	2	1	2	1	1.5	1	1	3	3	3	1	2
4	How can we improve the timing of reaching consensus on key spec development issues in future HD categories?	1.94	2	3	1	2	2	2	1	2	3	2	1	2	3	1	3	1	1.833
11	How do we better determine industry needs for engines that are not yet commercial?	2.03	2	2	1	3	2	1	3	2	1	1.75	1	2	5	2	2	2	2.333

- **Discussion**
- **Next steps**

EMA – Biodiesel Status

- **B20 Effects on Engine Oil**
- **Performance Concerns**
  - **Oxidation**
  - **Deposits**
  - **Corrosion**
  - **Fuel Dilution**
  - **Oil Drain Interval**
- **NBB / EMA Engine Oil Test**
  - **C13**
  - **ISB**
  - **T12**
  - **Test Run with Reference Oil**
  - **Test to Include Additional Oil Analysis & Hardware Insp.**
  - **EMA Report to HDEOCP in 4th qtr**

Engine Manufacturers Association

EMA CJ-4 / 2010 Status

- **CJ-4 Oil Field Performance**
  Limited Data Looks Good
  Possible Less TBN Retention

  Request Industry Data to be Submitted to EMA for Report & Discussion at December HDEOCP Meeting

- **Additional Performance Requirements**
  Oxidation – IIIF-IIIG Robo?
  Turbo Deposits
  Fuel Economy

- **Chemical Limits - tbd**

- **Review Test Redundancy**

Engine Manufacturers Association