

ESCIT Meeting Minutes – 8/8/06

Chairman Engel called the meeting to order on 8/8/06 at 10:10 am in Ann Arbor at Toyota Technical Center. Sign in sheet was circulated. See attachment 1.

1. Chairman Engel's comments:

Chairman Engel reviewed the GF-5 current time line and reminded the ESCIT group that by the end of 1Q 07 we have committed to give the ILSAC/Oil group our recommendation. See attachment 2 for the current timeline.

Chairman Engel reviewed the potential tests ESCIT could consider for GF-5; PEI, SWRi catalyst durability test, and phos retention from a GF-5 Seq test. Each ESCIT member needs to be thinking of what potential test(s) we can live with in GF-5. See attachment 12.

Chairman Engel reviewed today's meeting agenda and the agenda was approved with the addition of one item; next meeting date, time and location. See attachment 3 for the agenda.

The focus for this meeting of ESCIT should be on:

- a. Determine the most promising volatility test.
 - b. Align research efforts to work toward a volatility test in GF-5.
 - c. Create a test development timeline to be completed by 3/31/07.
 - d. Assign tasks related to test development timeline.
2. Meeting minutes from the 5/4/06 meeting were approved as posted.
3. SWRI, Ben Weber, gave an oral report on the status of their catalyst durability test which is under development at SWRI. Ben thought that by 1Q 2007 SWRI may have a potential procedure but not before then. Ben questioned if the GF-5 timeline was still on target for first licensing of 7/2009. Ben mentioned that the Seq VID test development consortium may be up to 5 months behind in their work and that the GF-5 timeline may have to be adjusted. The adjustment to the GF-5 timeline will be taken up by ILSAC/OIL on 9/28/06. [SWRI is working to develop an engine test that will be a meaningful option to use in GF-5. Weber inquired as to whether or not all task groups will have an additional 5 months for test development? Additional time would be valuable to SWRI for completion of their test development.](#)
4. Lubrizol, Ewa Bardasz, gave a report on the Ford/LZ work on low impact ZDDP compared to conventional ZDDP. See attachment 4.

- a. Several questions were asked on Phosphorus mass balance; has Lubrizol accounted for all the Phosphorus? What % of P is accounted for?
 - b. Ford and LZ will consider ways to publish this work in more detail.
5. Infineum presentation to ESCIT on 8/8/06. See attachment 5 for details.
- a. Keep P at 0.08% max for GF-5.
 - b. If a formulation impact test is needed Infineum prefers to use P retention based on elemental P at the start and end of a GF-5 Seq test.
 - c. Infineum prefers the Seq VIB over the Seq IIIG for measuring % P retention.
6. Lubrizol presented a proposal for a P retention equation and which non-volatile detergent metal to use in the calculation. The group accepts the % P retention equation as presented. See attachment 6. Lew Williams agreed to work with the 4 package additive companies on a procedure describing how to use the % retention equations, what detergent metal to use when there is more than one detergent metal, and how to handle bulk oil consumption.
7. Lubrizol to determine reproducibility and repeatability of the Seq tests in GF-4 for P loss. Specifically look at the oils used in the Ford/LZ work. Other additive companies to look at r and R for their oils. Report at next meeting on results.
8. Toyota/JAMA Update. See attachment 7.
- a. JAMA emissions compatibility work report by Hannah Murray.
 - b. JAMA looking at engine out Phosphorus emissions from a 4 cylinder fired engine test.
 - c. Significant P emissions differences among oils tested.
 - d. P emissions increase with high temperatures.
 - e. Correlation exists between estimated Seq test P volatility and engine out P emissions.
 - f. Sequence test is current best option for volatility measure.
9. Oronite Testing Update. See attachment 11.
- a. Oronite reported that the Seq VIB shows reasonable scale for measuring P volatility.
 - b. Oronite commented that factors that reduce P volatility tend to compromise anti-wear performance. [Others commented that trade offs are understood but objections were raised to Oronite's blanket statement.](#)
 - c. P retention is impacted by many formulating variables including detergent, dispersant, FM, AO and chemistry and level of ZDDP.
 - d. More data is needed on % P retention on ref oils from the Seq IIIG/IIIH and Seq VIB/VID tests to understand test variability.

10. Afton Testing Update. See attachment 8 and 8A.

- a. Greg Guinther of Afton presented an update on their ACT (Afton Catalyst Test) catalyst durability fired engine test.
- b. Afton is willing to test a limited number of oils in their ACT test that have field correlation data.
- c. Afton feels that a field test or a Seq test is giving the best results on Phos impact on catalyst durability but that we should be able to develop a bench test as a surrogate for an engine test.
- d. Afton reported on P retention in Seq VG and Seq III G.
- e. Afton prefers to leave GF-5 at 0.08% wt max and perhaps add a test for formulation impact of ZDDP.
- f. Afton gave a second report on P retention from sequence tests. See attachment 8A. The conclusion of that report is:
 - Phosphorus volatility and retention is related to viscosity grade and factors which influence oil consumption
 - Base stock group
 - Base stock volatility
 - Viscosity Grade
 - Overall DI package

11. Ciba Testing Update. See attachment 9.

- a. Ciba is willing to run P volatility ref oils in their bench test to determine correlation to the field.
- b. Ciba is interested in developing a bench test for emissions system durability that correlates to the field.
- c. Afton and Lubrizol will consider sending samples of their control oils to Ciba for testing. Ciba should be able to perform testing prior to our next meeting on 9/28/06.

12. Savant Testing Update. See attachment 10.

- a. Ted Selby reported on the most recent work on PEI at 165 and 120 C. Work continues on trying to demonstrate correlation between PEI and field/dyno testing.

b. Ted will add data to support that the addition of a solvent in his test has no impact on the PEI results.

c. Ted explained that he is running PEI at 120 C and 165 C since these temperatures are representative of engine operations, normal and highly stressed.

13. Next meeting will be 11:30 to 4:30 PM on 9/28/06 in Detroit after the ILSAC/OIL meeting which is on 9/28/06 from 8 to 11.

Attachments: see the TMC web site, www.astmtmc.cmu.edu for the presentations.

Attachment1	Sign in Sheets
Attachment 2	GF-5 Timeline as of 8/8/06
Attachment 3	Agenda
Attachment 4	Ford/LZ Presentation
Attachment 5	Infineum Testing Update
Attachment 6	Phosphorus Retention Equation
Attachment 7	JAMA Testing Update
Attachment 8	Afton Testing Update on ACT.
Attachment 8A	Afton Testing Update on P retention is Seq Tests
Attachment 9	CIBA Testing Update
Attachment 10	Savant Testing Update
Attachment 11	Oronite Testing Update
Attachment 12	Chairman Engel's Comments