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Cc:	Kostan, Travis G. (travis.kostan@swri.org)
Subject:	Mack Surveillance Panel Meeting Minutes - September 12, 2016
Date:	Monday, September 12, 2016 2:21:25 PM

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Everyone,

The following are the unconfirmed minutes of the Mack Surveillance Panel Meeting held on September 12, 2016. The meeting was conducted by WebEx. Please feel free to let me know if there are any changes or revisions needed. Thanks.

Call Participants:

Afton - Bob Campbell ExxonMobil - Cliff Salvesen Infineum - Bob Salgueiro (Secretary), Elisa Santos, Jim Gutzwiller Intertek - Jim Moritz, Luiz Garcia, Juan Vega Lubrizol - Nick Secue, Jon Ahlborn, Kevin O'Malley Oronite - Mark Cooper (Chairman), Jim Rutherford SwRI – Robert Warden, Jim McCord TEI - Mark Sutherland TMC - Sean Moyer Volvo/Mack - Greg Shank

Mack Surveillance Panel Meeting

The Mack Surveillance Panel meeting was called to order at 11:00 AM Eastern, by Mark Cooper, Chairman of the Surveillance Panel. The agenda topics are listed below, with discussions and actions following.

Agenda Topics:

• SwRI T-12 reference on "W" batch rings

SwRI T-12 reference completed with reasonably good oil consumption (final OC of 74 g/hr). However, iron (Fe) levels were very low throughout test (144 ppm at EOT while typically 225 ppm). Ring weight loss was low at 35 mg, with only 2.7 um average cylinder liner wear. These results raised concern that the new "W" batch of rings may be too mild to be useable. Afton's T-12 reference completes tomorrow but an iron of 110 ppm measured at 200 hrs suggests it may also have low wear results. Oil consumption was noted as a bit on the high side with 30's for stage 1, and stage 2 is looking typical of current oil consumption at 80s-90s g/hr. Intertek's T-12 reference is still in Stage 1 with 31-32 g/hr oil consumption. Lubrizol expected to start their reference at the beginning of next week, but suggestions were made by some panel members for Lubrizol to consider holding off their reference start if results from other reference tests were significantly low on wear. Afton will send out their T-12 results around Thursday 9/15 of this week. TEI shared that the "W" batch ring is from same supplier as before. What was supposed to have been the only changes was a move from the Mack part number to the Volvo part number and switching from ordering individual rings to buying them in sets.

One suggestion made was to use this opportunity to consider relooking at using a T-13 liner wear measurement instead of the T-12. Volvo will recycle internally to ensure nothing else changed along with the ring part number change. Volvo want to see a batch "U" to "W" comparison based on T-12 reference test parameter results. The panel was reminded that "V" batch rings were from another supplier but were also found to be mild and not used. A presentation will be put together, shared with the Surveillance Panel and for Volvo to use with the current ring supplier to make clear the performance differences of these two batches of rings. Lubrizol agreed to check internally on if they could do an analysis of the rings for Volvo to use with their ring supplier.

 T-8E mild reference results (T-8E timing, Parts Batches, and Fuel) Fuel Supplier ChevronPhillips (CPChem) acknowledged that recent fuel batches have seen greater variability in the below excerpt of an email shared with Mark Cooper.

"We dug up some old notes of Tom's and found the old calculation for this and updated it with the recent batches, see attached. Looking at it we having been bouncing around a bit over the past couple of years. I would suggest considering adding this as an official spec with a proposed minimum that you think would be appropriate (90?) that we would report on the COA for each batch so we know it is a critical specification we need to make the fuel to and is maintained correctly. On our end we will do some research to see what may be causing the differences, it is definitely something deeper than just the current specs and recipes. I am confident we can figure that out." A graph of the Fuel Severity Factor vs fuel lot number is provided as attachment 01.

The values used in the graph are provided in the e-mail attachment 02.

It was also suggested the panel may want to consider an appropriate maximum as well so the fuel did not shift the test overly severe either. CPChem will investigate what is causing the recent shifts. Mark Cooper will communicate back to them that the Surveillance Panel would like to proceed with adding a specification for "Fuel Severity Factor" but want to first understand a little better to what they can control to.

Jim Rutherford shared his analysis of the T-8E reference data. Lab J shifted back up on severe side with the most recent runs. Lab G results were still mild. Switching LTMS to continuous adjustment might be been better able to cope with the recent results better than the current LTMS system in place.

Hardware batch codes indicate that Intertek and SwRI are on batch TU parts since mid-2012. No known batch changes in power cylinder batch parts.

Timing changes being allowed do not appear to be the cause of the mild shift.

TMC seemed to remember that the latest batch of reference oil TMC1005-5 was the same based on the chem analysis but will verify. TMC will follow up with the supplier to confirm the TMC1005-5 is an exact reblend of TMC1005-4 or if there were any differences.

Bob Warden shared data looking at the T-11 soot4yi parameter and showed that they too might have gone down around the same time as the T-8E went mild and maybe we want to consider if we make a correction for the T-8E we may want to make a correction for T-11 as well.

Jim Rutherford will investigate if PC-9HS "Fuel Severity Factor" correlates to the recently mild results and share the results with the panel before the next telecom.

Update from T-13 Humidity Control Task Force

Not much difference between the labs that have reported their data. Just waiting on ExxonMobil. Cliff shared their recent humidity values were around 20C, ExxonMobil will provide a full report next week. The humidity task force will meet again and make an assessment on the results.

Old/New Business

None

Other Business

• None

Next Meeting

• T-8E & T-11 Fuel Severity Factor Impact Discussion and T-12 Reference data Update Tuesday September 20, 10:30 AM Eastern

The Mack Surveillance Panel adjourned at 12:37 PM Eastern.

Respectfully submitted, **Bob Salgueiro**

Industry Liaison Advisor

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