

**April 26, 2017**

**Caterpillar Surveillance Panel Teleconference Minutes**

Teleconference Attendees:

Jim Gutzwiller (Chairman), Elisa Santos, Bob Salgueiro– Infineum  
Jim McCord, Jim Carroll (Secretary) – SwRI  
Hind Abi-Akar, Mark Jarrett – Caterpillar  
Kevin O'Malley, Alex Ebner, Andrew Stevens, Greg Miranda – Lubrizol  
Sean Moyer – TMC  
Jim Moritz, Tim Griffin – Intertek  
Christian Porter – Afton  
Jim Rutherford, Mark Cooper – Chevron-Oronite  
Jason Bowden – OH Technology  
Dan Lanctot – TEI  
Greg shank

**AGENDA**

Review COAT reference oil results run on the Batch-A oil filters and new MicroMotion density calibration procedure

Update on C13 Cylinder Liners

**COAT Reference Oil on Batch-A Filters Results**

Elisa Santos gave a presentation on her statistical analyses of all matrix, reference, and the latest six tests performed at the three labs. See attached presentation.

Elisa: Are we going to run another test?

McCord noted that there was stronger discrimination of 832 and 833 final aeration results at Intertek and SwRI than at Lubrizol.

Q? What is causing the inconsistencies of repeat tests at certain labs.

Comment: The assumption going in was that both oils would show lower aeration with the batch A filters.

McCord: Lubrizol and SwRI are using new Micromotion sensors which may cause some changes to their results. There may be a mild shift but whether it is the filter or the sensor is unknown.

Jim C: Elisa, should a correction factor be applied now based on the results?

Elisa: I have not completely set up a model yet. But at this point a 0.3–0.4 CF might be appropriate. I am not convinced the model I am using is the best.

Hind: We expected the new filters to trend milder.

McCord: Engine to engine differences could be causing different results at the labs. Severity adjustments would compensate.

Kevin O'Malley plotted 833 and 832 results over time, separated by lab, and presented it to the conferees. It is not clear that all are trending the same. He thought that some earlier tests may have had the same filter as the latest tests. But, it is not really known, we only have shallow vs steep profiles to differentiate earlier tests. Need to reconcile whether all the changes are driving us mild or not. And, do we have all the data we need, if not what else do we need?

There was a very long pause.

Hind: We only have one test on each oil with the new filter. We do not have confirmation of repeatability.

A discussion of the Micromotion sensor's internal RTD temperature began.

Matching all sensor temperatures (oil in, oil out, and sensor RTD) will remove one cause of differences between labs.

The Micromotion RTD reads ~85C at Intertek and SwRI. RTD reads ~88C at Lubrizol.

McCord: We can run the engine with oil and RTD the same (i.e. 90C). This would enhance repeatability. Emerson stated that the oil temperature is more proper to use. Currently, each reference will remove and add insulation which could cause differences for each reference period.

Q? Is that why the new cal procedure matches D4052?

A: Yes.

McCord: Now that all the labs can run everything at 90C we could do it. Options: Raise temperature around the sensor, use the labs oil temperature readings to adjust the Micromotion, or force the sensor to use 90C all the time. This will shift the final aeration number.

Q? Will this change the last six tests?

A: Yes. We could recalculate using the current run's offset at each lab.

Greg Miranda: We found that the newer MM systems don't utilize the internal MM RTD for corrections.

McCord: Our tests were misleading. We can't adjust the new sensors like we did the old ones. The new sensor still uses its RTD to compensate for the effect on steel's modulus.

McCord: Your delta oil temperature in and out goes to 0. Which is also an advantage.

Hind: Should we decide now on where to set the RTD temp?

McCord: If your sensor RTD is running the same between tests the results will repeat. Starts that are negative could be alleviated with running the RTD at 90C.

Comment: It is clear that we need to run more tests.

Comment: The original plan was to see if after two filter tests we all set Level 2 alarms.

Moritz: If we change the RTD don't we need another matrix?

McCord: I would run two tests.

Tim: Pressure transducers could become a problem at 90C.

McCord: Our sensor is inside a second box. Only the meter is inside the inner box. You (Intertek) may need another box.

Q? Should we get the RTD data from all the runs?

McCord: All the labs are not the same.

Comment: We should focus on the data we have and decide if we can bring this test back, or not.

McCord: If there is consistency of temperatures between labs than the SAs can handle it.

Jim G: Are the 6 data points enough?

Sean: If everyone had level 2 alarms in the same direction we would calculate a CF.

McCord: Statisticians, is it appropriate to run a third test?

Elisa: We have the next oil chosen.

Hind: If we are going to run the third oil then go for it. And, not explore the temperature correction issue now.

Sean: All labs did set level 2 alarms.

McCord: Is it better to run all the third tests with the same oil?

Elisa: We should have data for both oils during the third test if we are to use all the data.

Hind: Do we have a timeline for this?

Tim: Doesn't my test in January count? Is that what is causing my alarms?

Sean: Yes. The January test was 2 standard deviations off of target then reversed and came back.

Jim G: Each lab will run one more test. And they will be reported early next week. Statisticians need more time, so cancel next week's Tuesday call.

McCord: Do we need to run another sensor cal?

Tim: We are all re-running the same oil as our last run so there is no need.

Comment: All labs did not need to adjust their calibration coefficients when they ran their second reference test.

Jim G: Then run without doing the calibration again.

Hind: Do we need to inform API?

A: We are still within the plan presented earlier.

### **C13 Liners**

Hind: Liners are in production. But, they will go through additional inspection before release. How will we coordinate testing with the labs having different re-reference points?

Moritz: If all labs run correlation tests once the liners are available, then TMC can extend the new reference periods and number of candidates within the reference periods for each laboratory to compensate.

Hind: I will get confirmation as to when the liners will be available.

Moritz: Do we get a new PN?

Hind: Yes, but I need to get the inspections and new PNs set up.

McCord: The 1R crown is out of stock at our supplier. We got the last 3. When can we expect more to be available?

Hind: I will look into it.

Hind: I sent a questionnaire out to the labs regarding the changes to the fuel system. If there are any concerns of changing the fuel system please tell me.

McCord: Can't tell before testing.

Moritz: We have no concerns about impacting the test.

Hind: Sean, do I need to do anything with the procedure for new part numbers?

Sean: Not if they are not specifically called out in the procedure.

### **Next meeting**

Tuesday May 9, 3-5 pm EDT.