

**November 6, 2018**

**Caterpillar Surveillance Panel COAT Teleconference Minutes**

Conference Attendees:

Mark Jarrett – Caterpillar

Jim Gutzwiller (Chairman), Elisa Santos – Infineum

Tim Griffin, Jim Moritz – Intertek

Demetrius Lytle- Lubrizol

Jim Carroll (Secretary), - SwRI

Christian Porter - Afton

Sean Moyer – TMC

**Agenda items**

Discuss SwRI 833-1 tests and how the IVA Rail Pressure may have impacted results.

Update from Caterpillar and SwRI on troubleshooting and what was done to fix/prevent pressure drop.

Monitor IVA Rail Pressure, should a lower limit be specified?

Other suggestions

Discussion

Carroll went over results of IVA work done at SwRI.

At 17 hours of operation there was a significant drop in IVA oil pressure during the first test with 833-1 oil at SwRI. In addition, final aeration values were much lower with 833-1 oil at SwRI than at the the other two labs. After the test was over, it was restarted with the same oil to perform diagnoses. The engine ran a further 17 hours upon restart before there was a drop in IVA pressure. With input from Caterpillar a new check valve, IVA control solenoid, rocker box IVA channel O-ring and IVA actuator O-rings (at the same time), and IVA pressure sensor were installed sequentially until the IVA pressure remained stable. Thereafter, IVA pressure was stable for 45 hours. Throughout all operations there were no codes set in the ECM SwRI and Caterpillar made an effort to get CAT's ECM control software but the interrogation file required was not available.

Carroll showed a graph of IVA pressure and ECM battery voltage during the first SwRI test with 833-1 oil. They correlated and they theorized that a solenoid was being energized causing the drop in IVA pressure. This also changed the oil flow path in the engine which could change aeration.

SwRI also showed a graph of the second test on 833-1 oil with IVA pressure and ECM voltage. There were issues with coolant temperature and control during the early part of this second test which required a number of shut downs to resolve.

It is SwRI's contention that the IVA pressure sensor was giving erroneous readings and the ECM was activating something which affected IVA pressure.

It was for this reason that SwRI requested a re-run on 833-1 oil and the re-run aeration value was 12.36% as opposed to the first test's final aeration value of 11.09%.

During the presentation of the graphs there was discussion between the participants of the way forward.

Carroll: IVA and ECM voltage must be monitored by all the labs.

Moyer: Is there a way to turn off this activation?

Jarrett stated there was not.

Moyer: Sean if IVA drop is unacceptable then the test would be invalid.

There was general consensus on Moyer's statement.

Griffin was concerned that only clues and symptoms were found and stated: I would like to know what caused this. No one knows what could do this? Do we need to monitor this?

Carroll: There could be a scenario where this could happen during referencing or candidate testing resulting in low results. IVA pressure monitoring should be part of the procedure and a validation criterion.

Moritz and Gutzwiller: We can figure out criteria down the road for the IVA once the data set is sent to Elisa.

The engineering group requested that SwRI invalidate the first test on 833-1 oil with the drop in IVA oil pressure, and run another test with 833-1 oil.

SwRI agreed to do so.

Moyer: If the IVA pressure drops during the first 30 hours then you should stop the test and investigate.

Griffin: There should be a limit on number of shutdowns.

Carroll. Also, how much data can you lose before the test is invalidated needs to be addressed.

Gutzwiller: These questions all need to be discussed.