

**CAT Surveillance Panel**  
**Teleconference Meeting Minutes**  
**December 12, 2013**  
**10:00 a.m. EST**

**Attendance**

Bob Campbell - Afton  
Bob Salguero - Infineum  
Chris Castanien, Kevin O'Malley, Andrew Stevens - Lubrizol  
Beth Sebright, Hind Abi-Akar - Caterpillar  
Jim Mortiz, Adam Roig - Intertek  
Gary Hammer, Jim McCord - Southwest Research  
Mike Wendling - Haltermann  
Sean Moyer, Jeff Clark - TMC

**Pre-test cleaning of piston rings ( C13 )**

The are concerns that all the rust preventative is not being removed from the piston rings. The procedure does not specify a cleaning method. Intertek is using Ensolv and finishing with pentane; SwRI is using pentane. CAT's supplier stated that the rings are nitrited and then wrapped in VCI paper; no changes have occurred to their process. SwRI's metrology group noted that about a year ago it became more difficult to clean the rings pre-test. Jim McCord stated he felt this is the best clue they've found relating to the mild trend. Hind Abi-Akar noted the powder material needs to be properly cleaned from the ring pre-test. CAT distributed a pre-test cleaning method that was used on a set of 1Y test rings they provided to SwRI. The panel reviewed and discussed the cleaning process. ***Jim McCord moved, Jim Moritz seconded, to accept CAT's cleaning procedure, as revised during the meeting(attached), for second rings, effective immediately. The procedure will reside on as a referenced document on the TMC website and the TMC will issue an information letter covering this issue.*** The motion passed without objection (TMC waived).

**Parts changes**

Beth Sebright of CAT reviewed the following parts changes:

- 1Y-3822:  
This is the fuel injector for the 1P,1R platform. The valve change we are talking about was just in the way we heat treat 2 parts, CCV Body and CCV Poppet valve. There was no form fit or function change, geometry was the same and during validation we discovered no performance change. This was done to help extend life of the component. We have already done this for production, and making this change will help with parts availability.
- 1Y-3746:  
This is a fuel pump and valve group (1P, 1R). The pin that holds together the rocker arm is currently made from brass. In an effort to lengthen the life of the component, the product group is replacing this pin with steel. There are no dimensional changes, and this should not affect any performance data for oil testing. We recommend making this change as the brass pin is going to become difficult to procure.

- 104-3560:  
This liner seal for the C-13 is being replaced with 437-1409. Production engines were seeing intermittent issues with fit and function of the current seal. Production usage needs to have tighter control (CpK) on the dimensions of this seal and have updated their print accordingly. Currently, we have pulled a part number to keep the seal as it has been used for years. However, it may be better to stay with the production part as it has better process control.
- 1R-0716:  
Oil filter for the C-13. This is the original filter that was used for the C-13 oil test. However, in March 05 it was replaced with 1R-1808. We are not sure why this change was made. This is basically a switch from a 40 micron to a 20 micron filter. As it is still readily available, should we go back to the original filter or does it make more sense to stay with the replacement filter since it has been used for the past 8 years or so?

Jim Gutzwiller commented that, in general, it is preferred to issue new part numbers rather than change the part and keep the same number -- this provides some traceability for the test. Beth stated she will be able to issue new numbers that are kept under her design control.

***Jim Moritz, moved and Jim McCord seconded accepting the oil filter part number update to 1R-1808. This motion passed unanimously. The TMC will update via information letter.***

***After review, Jim Gutzwiller moved and Jim McCord seconded, for the panel to accept the other three changes shown above. The motion passed unanimously. Once Beth has part numbers, the TMC will issue information letters and/or change the parts list(s) as appropriate or if necessary CAT will change any CAT documentation.***

### **Haltermann Fuel SDTF2**

For the most recent batch (23,000 gallons, expected to last about 4 months – see attached fuel certification sheet and table below) the ASTM D664 acid number is out of spec. This is a repeated issue with the feedstock being used and it is expected that this will be the case indefinitely. The CAT S.P. has previously approved two batches similarly situated, most recently, the current batch of fuel on August 27, 2013. Given that this may be an on-going concern, additive companies were asked to review this issue with their fuels groups for the possibility of devising a new spec for TAN that may resolve this issue and what if any concerns there are with doing so. ***After discussion, it was moved and seconded (Moritz, Stevens) to accept this current fuel batch. This motion passed without objection (TMC waive).***

Fuel Batch	ASTM D664 TAN RESULTS	ASTM D664 TAN Spec. – MAXIMUM
Approved 08-27-2013	0.32	0.15 max.
New Batch – December 2013	0.25	0.15 max.

### **1P/1R Engine Position Sensor**

This has been an on-going item. Lubrizol had previously distributed their method for modifying sensors. Other labs have not yet made progress on this issue. CAT stated that the Lubrizol solution will be quicker than a new part to fix the issue. ***It was moved and seconded (Gutzwiller, Stevens) to use the 2668576 p/n timing sensor with the Lubrizol modification (described below) as a replacement for the 1Y-3859 which is no longer available.*** The old sensors can still be used as long as they are functioning.

This motion passed without objection (TMC waive). The TMC will issue an information letter and/or change documentation as appropriate.

Lubrizon Modification to Timing Sensor:

"The old part number was 1Y3859. The new part number is 266-8576. With this new sensor 2 other parts are going to be required. The first part number is 8T-8730 and I need 3 for each sensor. The next number is 155-2260. It is a plug. The pins and plug are needed to fit the 1P wiring harness.

We cut the lock nut in half to allow for proper insertion of the sensor into the bore. Otherwise the sensor is too far from the gear train to pick up a signal. The sensor is threaded into the bore with the gear at its high point until it slightly makes contact. Then it is backed out one revolution and locked with the nut."

The teleconference concluded at 11:45 am.

***\*\*This document covers the cleaning of the C13 piston second rings. Do not use this procedure for the top and oil rings.\*\****

**Cleaning of C13 piston second rings:**

- 1- Place the rings in an unheated ultrasonic bath and cover with pentane. All six can be done in one batch. RP on the machined surfaces will be dissolved in the solvent.
- 2- Run the ultrasonic bath for 20 min. It is preferred that the bath is covered to reduce the evaporation of the solvent.
- 3- Once 20 min have elapsed, remove the rings one at a time and clean per steps 4 through 6 below.
- 4- Place the ring on a clean lab towel/tissue. Wet another clean tissue with pentane and wipe the ID and OD of the ring. The loose black powder surface layer should be mostly clean. Repeat this step as needed until the amount of black powder is reduced significantly.
- 5- Wet a clean lab tissue with pentane and wipe the top and bottom surfaces of the ring. Repeat the process until the tissue comes out clean.
- 6- Repeat step 5 one more time by wiping the surface with pentane soaked tissue without touching the surface with bare hands.



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Johann Haltermann Ltd.

PRODUCT: SDTF2

Batch No.: BJ3121HW10

PRODUCT CODE: HF0001

Tank No.: 43

Analysis Date: 12/4/2013

Sample Date:

TEST	METHOD	UNITS	SPECIFICATIONS			RESULTS
			MIN	TARGET	MAX	
Distillation - IBP	ASTM D86	°F		Report		393.7
5%						430.5
10%		°F		Report		448.2
20%						469.0
30%						490.5
40%						510.4
50%		°F	500		530	527.0
60%						543.2
70%						560.7
80%						582.2
90%		°F	590		620	613.1
95%					639.3	
Distillation - EP		°F	640		690	650.8
Gravity	ASTM D4052	°API	33.0		36.0	33.9
Density	ASTM D4052	kg/m <sup>3</sup>		Report		855.2
Pour Point	ASTM D97	°F			20	-5.8
Cloud Point	ASTM D2500	°F		Report		15.8
Flash Point	ASTM D93	°F	140			187
Viscosity, 40°C	ASTM D445	cSt	2.0		4.0	3.005
Natural Sulfur	ASTM D4294	wt %	0.38		0.42	0.386
Natural Sulfur	ASTM D2622	wt %		Report		0.394
Composition, aromatics	ASTM D1319	vol %		Report		24.2
Composition, olefins	ASTM D1319	vol %		Report		4.6
Composition, saturates	ASTM D1319	vol %		Report		71.2
Cracked stocks				None		None
Basic Sediment & Water	ASTM D1796	vol %			0.1	0.00
Ramsbottom carbon, 10% residue	ASTM D524	wt %			0.20	0.08
Ash content	ASTM D482	wt %			0.01	<0.001
Acid Number	ASTM D664	mg KOH/g			0.15	0.25
Copper Corrosion	ASTM D130				2	1a
Cetane Number	ASTM D613		47.0		53.0	49.1
Aliphatic paraffins	ASTM D2425	wt %		Report		28.7
Monocycloparaffins	ASTM D2425	wt %		Report		15.4
Dicycloparaffins	ASTM D2425	wt %		Report		19.7
Tricycloparaffins	ASTM D2425	wt %		Report		7.6
Alkylbenzenes	ASTM D2425	wt %		Report		11.9
Indanes/Tetralins	ASTM D2425	wt %		Report		2.5
Indenes	ASTM D2425	wt %		Report		1.3
Naphthalene	ASTM D2425	wt %		Report		2.8
Naphthalenes	ASTM D2425	wt %		Report		7.0
Acenaphthenes	ASTM D2425	wt %		Report		2.0
Acenaphthylenes aka Acenaphthalene	ASTM D2425	wt %		Report		0.6
Tricyclic aromatics	ASTM D2425	wt %		Report		0.5