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**Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS**

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Reply to:

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December 10, 2004

To: Single Cylinder Diesel Surveillance Panel

Enclosed are the minutes of the SCOTE Surveillance panel teleconference held December 3, 2004. Please forward any corrections or additions to my attention.

Scott Parke  
Secretary SCOTE Surveillance Panel

Attachments

cc: <ftp://ftp.astmtmc.cmu.edu/docs/diesel/scote/minutes/TELECONFERENCE%202004-12-03.pdf>

distribution: Email

## TELECONFERENCE MINUTES

### SINGLE CYLINDER DIESEL SURVEILLANCE PANEL

HELD DECEMBER 3, 2004

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#### **13:00cst CALL TO ORDER**

The teleconference began at 13:00 cst; the participants are listed in attachment 1. The agenda was to discuss the updated 1N liner data analysis, 1P fuel data analysis, and the future of 1P and 1M-PC liner availability.

#### **13:03cst UPDATED 1Y3998 LINER ANALYSIS (TGF)**

Prior to the call, Scott Parke (TMC/secretary) distributed an update of the 1Y3998 data analysis with the three recent tests (attachment 2). As in previous analyses, this analysis indicates a statistically significant shift (95% confidence level) for TLHC. With the addition of the new data, the shift in TGF and BSOC have become significant as well.

Jim McCord (Southwest Research/chairman) asked whether or not any of the 1Y3998 results have failed for TGF (they have not) and whether or not an acceptable approach would be to allow lab severity adjustments to handle the shifts.

Phil Scinto (Lubrizol) expressed concern that the analysis might possibly be flawed as a result of the standard deviation of the 1Y3998 runs being so small. He does not feel that future testing will hold to that level of precision. The panel agreed with that prediction. Phil did, however, acknowledge that there does seem to be an undeniable shift in TGF results. In fact, further investigation showed that the standard deviation would have to climb to around 12% before the significance of the shift disappears.

Before continuing, the panel asked Chuck Dutart (Caterpillar) for an assessment of what future prospects were for 1N testing. Chuck was unable to make a prediction with any confidence.

Dan Domonkos (Lubrizol) asked if anyone knew if RSI has seen a shift in candidate testing. No one knew for sure though several anecdotal comments were made regarding candidate results.

Jim Rutherford (ChevronTexaco) described the distribution of the data in several different ways the crux of which was that the TGF data is somewhat skewed.

Phil Scinto suggested the possibility that a transform might be appropriate for TGF. Jim Rutherford also thought that might be a worthwhile approach. As discussion continued, Jim took a quick stab at calculating what transforming might result in. He estimated a correction factor that would back-transform to around 7% TGF. Both Jim and Phil agreed that more thorough investigation of transforming the TGF data would be prudent before implementing any correction.

Scott Parke agreed that continued investigation was a good idea but pointed out that, in the interim, there was candidate testing waiting to be done.

Stacy Bond (PerkinElmer) returned again to candidate results on 1Y3998 and expressed his view that looking at this data has been of little help so far. Ten candidate tests have been run on 1Y3998 liners to date.

Bob Campbell's (Afton) opinion was that fully correcting for the TGF shift with an 11% correction factor was simply too extreme. Jim McCord concurred. Dan Domonkos said he thought that while 11% is high, it looks like it may well be correct and his results so far would remain passing if it were to be implemented.

In order to move the discussion along, Jim McCord asked for a panel pronouncement on an 11% correction factor in the form of a motion to approve it. The motion was defeated 0-6-2 (for-against-waive).

Chuck Dutart asked for some explanation of how a transformation was determined. Jim Rutherford gave a brief, broad and simplified description of how transformations are typically derived.

Phil Scinto suggested that while he and Jim Rutherford continue to investigate the data, the panel adopt a transform for TGF and use the correction factor resulting from that approach. Scott Parke pointed out that if the motivation for going with that approach was expediency (and it was) then any gain is immediately lost by virtue of the fact that implementing a transformation would involve report form and data dictionary changes that would require lead time at least as long as it was likely to take to complete the further data analysis. The panel (and Phil) concurred with Scott's assessment.

Again, to move things along, Jim McCord suggested that while the statistical analysis continues, the panel adopt an interim TGF correction factor of 7% (the original-unit equivalent of the transformed correction Jim Rutherford quickly worked out earlier) and charge Phil Scinto and Jim Rutherford with reporting their findings back to the panel by January 10, 2005. Jim McCord's subsequent motion to that effect passed unanimously (8-0-0). This correction factor is effective for any 1Y3998 1N run completing on or after November 17, 2004.

#### **14:20est 1N TLHC DISCUSSION**

Scott Parke reported that the additional 3 tests received have not altered the analysis sufficiently to necessitate changing the TLHC correction currently in place. That said, he pointed out to the panel that, using that correction factor, one of the 3 new tests is caused to fail mild on TLHC. That test produced 0% TLHC and is the only 1Y3998 test to do so thus far. Scott suspected that, if the past is any guide, the future is likely to bring more results of 0%. Jerry Brys (Lubrizol) said that he had heard of instances where tests producing alarms were nonetheless calibrated. Scott explained that those were likely cases where LTMS Deviations were written. LTMS Deviations are written when extenuating circumstances cause control charting not to give an accurate depiction of the current performance of a lab or stand. Scott and the panel all agreed that this test would be an instance for the appropriate application of an LTMS Deviation.

#### **14:27est 1N BSOC DISCUSSION**

To wrap up the 1Y3998 data analysis, Scott Parke pointed out that BSOC also has a small but significant shift. By consensus, the panel agreed to implement a correction factor of -0.06 g/kWh for BSOC runs on 1Y3998 liners beginning with runs completing November 17, 2004 or later.

#### **14:29est 1P FUEL – PC-9 FUEL**

Five 1P tests have now been run using PC-9 fuel. Data analysis of these tests is complete (attachment 3). None of the test parameters shows a statistically significant shift in performance.

Jerry Brys moved to require that PC-9 fuel be used in all 1P tests starting on or after September 8, 2004. The motion passed unanimously (8-0-0).

#### **14:40cst EDITORIAL BOARD-APPROVED SOLVENT SPECIFICATION**

Scott Parke explained the controversy over the not long ago-adopted solvent specification (ASTM D235). Labs have not been able to document that the solvent they use meets D235 in all its details. Consequently, the gear surveillance panels all have changed their solvent requirement. Solvent used in those tests will be required to meet D235 type II class C specifications only for flash point, aromatic content, and color. The panel voted unanimously (8-0-0) to adopt the same requirement.

#### **14:45cst 1P NEW LINER STATUS**

In light of the severity shifts that the new (plateau-honed) 1N liners have caused, Chuck Dutart asked for confirmation that the panel was still interested in moving forward with the introduction of plateau-honed liners for 1P. The panel confirmed. Chuck reported that the latest projection for availability of the new 1P liners is mid- to late-February.

#### **14:50cst 1M-PC LINER STATUS**

Dan Domonkos reported that Lubrizol is out of 1M-PC liners. Jim McCord has done some investigating and found that there are approximately 100 old stock liners in Cat inventory (of approximately 1987 vintage). These liners are not 1Y3590 but are the production equivalent that either did not receive or failed 3L inspection.

Jim suggested the possibility that these liners could be bought by the labs and scrapped in order to trigger renewed production by Cat. Dan wondered if, instead of being scrapped, these liners might be inspected by Cat and approved for use. Chuck Dutart was reluctant to commit to inspecting all the liners. Someone suggested that perhaps the labs could perform their own screening of those liners. Scott Parke was apprehensive about using liners that may well have been rejects from earlier 3L screening. Stacy Bond's view was that it would be a mistake to use those liners.

Chuck was asked if he could publish the criteria Cat uses for 3L inspection so that the labs could independently do the same. Chuck doubted that was possible but he attempted to enumerate the parameters that Cat checked in the inspection. He said that the only inspection the labs likely wouldn't be able to reproduce is the optical inspection. Dan Domonkos offered to buy 5 of the liners and send them to Chuck for inspection to see how they fair. Chuck agreed.

#### **15:14cst NEXT TELECONFERENCE**

The panel is scheduled to meet the week of January 10, 2005 to review further 1N data analysis.

The teleconference ended at 15:14cst.

## Attendance:

Representative	Organization
Chuck Dutart	Caterpillar
Dan Domonkos	Lubrizol
Jerry Brys	Lubrizol
Phil Scinto	Lubrizol
Jim Rutherford	ChevronTexaco
Jim Carter	Dow/Haltermann
Jim McCord	Southwest Research
Bob Campbell	Afton Chemical
Stacy Bond	PerkinElmer
Chris Mazuca	PerkinElmer
Jim Gutzwiller	Infineum
Scott Parke	Test Monitoring Center

## Updated Summary of New 1N Liner Performance

Parameter		units	N	MIN	MAX	MEAN	STD	Significant?
TGF	1004-3 Target	%	16	9	58	23.9	14.6	
TGF	1Y3998	%	8	11	16	13.0	2.0	
TGFyi	1Y3555	yi	236	-1.320	2.826	0.050	1.004	
TGFyi	1Y3998	yi	8	-0.888	-0.545	-0.751	0.137	
TGF	Shift	%				-11		p=0.0252
WDN	1004-3 Target	demerits	16	159.8	246.4	190.68	24.69	
WDN	1Y3998	demerits	8	138.6	201.1	183.39	21.53	
WDNyiyi	1Y3555	yi	236	-2.217	2.848	-0.134	1.022	
WDNyiyi	1Y3998	yi	8	-2.109	0.422	-0.295	0.872	
WDN	Shift	demerits				-8.0		p=0.6601
TLHC	1004-3 Target	%	16	0	2	0.3	0.7	
TLHC	1Y3998	%	8	0	5	2.1	1.7	
TLHCCyi	1Y3555	yi	236	-0.724	4.985	-0.073	0.930	
TLHCCyi	1Y3998	yi	8	-0.444	6.657	2.574	2.452	
TLHC %	Shift	%				10		p<0.0001
BSOC	1004-3 Target	g/kWh	16	0.09	0.25	0.148	0.038	
BSOC	1Y3998	g/kWh	8	0.08	0.32	0.200	0.072	
BSOCyiyi	1Y3555	yi	236	-2.682	4.616	-0.088	1.141	
BSOCyiyi	1Y3998	yi	8	-1.791	4.578	1.393	1.908	
BSOC	Shift	g/kWh				0.06		p=0.0005

### Discussion:

The table above is similar to that used before. The first row shows the targets for 1004-3; the second shows stats from the 1Y3998 runs. As per prior Surveillance Panel request, the transformation has been removed from all TLHC data.

The two rows following show the yi statistics for the two liner types. Since not all 1N testing is conducted on 1004-3 oil, these are the values used for all statistical analyses.

The final row shows the “shift” or difference between the yi results of the two liner types converted back to measured unit values by using the standard deviation value used to compute severity adjustments (TGF=14.6, WDN=27.1, TLHC=4.012, and BSOC=0.045). Statistically significant shifts are circled in red. All shifts but that for WDN are significant.

Correcting for the shift of the untransformed parameters is simply a matter of subtracting the shift from the test result. For TLHC, recall, things are a bit more complicated. Using the same methods as before (see minutes for April 12 and May 26, 2004 teleconferences), the TLHC yi shift is 2.574. Using the untransformed equivalent of the TLHC SA standard deviation (4.012) to convert to a  $\Delta$  yields 10.3269%. Thus, a candidate pass limit result of 3% would now be expected to produce  $3\% + 10.3269\% = 13.3269\%$ . The desired effective pass limit would be 13% (i.e. 13% passes; 14% fails). This is unchanged from prior circumstances using the method used previously to account for decimal length reporting. Accounting for the TLHC shift would require adding -1.135 to the transformed test result.

## Summary of PC-9 Fuel Performance in 1P

Parameter		units	N	MIN	MAX	MEAN	STD	Significant?
TGC	1004-3, LSRD4	demerits	37	18.00	50.50	31.73	8.02	
TGC	PC-9	demerits	5	27.50	34.00	30.75	2.55	
TGCyi	LSRD4	yi	117	-1.804	4.470	0.304	1.033	
TGCyi	PC-9	yi	5	-0.256	0.584	0.164	0.329	
TGC	Shift	demerits				1.27		p=0.7631
WD	1004-3, LSRD4	demerits	37	240.50	386.70	303.74	38.40	
WD	PC-9	demerits	5	280.20	312.70	295.50	15.29	
WDyi	LSRD4	yi	117	-1.703	3.618	0.237	0.901	
WDyi	PC-9	yi	5	-0.684	-0.120	-0.418	0.265	
WD	Shift	demerits				-24.10		p=0.1086
TLC	1004-3, LSRD4	demerits	37	16.00	53.50	31.16	9.28	
TLC	PC-9	demerits	5	16.50	50.75	30.05	12.91	
TLCyi	LSRD4	yi	117	-1.446	2.290	0.194	0.748	
TLCyi	PC-9	yi	5	-0.884	1.721	0.147	0.981	
TLC	Shift	demerits				1.93		p=0.8912
OC	1004-3, LSRD4	g/h	37	3.40	11.10	7.66	1.82	
OC	PC-9	g/h	5	7.40	9.20	8.20	0.87	
OCyi	LSRD4	yi	117	-3.094	2.055	0.316	1.008	
OCyi	PC-9	yi	5	0.523	1.196	0.826	0.325	
OC	Shift	g/h				1.31		p=0.2625
ETOC	1004-3, LSRD4	g/h	37	3.20	21.30	8.39	3.45	
ETOC	PC-9	g/h	5	8.30	10.20	9.36	0.82	
ETOCyi	LSRD4	yi	117	-2.804	3.329	0.374	1.054	
ETOCyi	PC-9	yi	5	0.130	0.528	0.356	0.171	
ETOC	Shift	g/h				1.20		p=0.9696

### Discussion:

In the table above, the first row for each parameter shows statistics from the 37 1P runs on oil 1004-3 using LSRD4 fuel. The second row shows stats from the recent PC-9 fuel runs.

The two rows following show the yi statistics for the two fuels irrespective of oil. Since not all 1P testing is conducted on 1004-3 oil, these are the values used for all statistical analyses.

The final row shows the “shift” or difference between the yi results of the two fuel types converted back to measured unit values by using the standard deviation value used to compute severity adjustments (TGC=7.74, WD=57.6, TLC=13.15, OC=0.3238, and ETOC=0.5177). In the case of OC and ETOC the shift values are also then converted from transformed units to measured units. Statistically significant shifts are circled in red. None of the shifts are significant.