Unapproved Minutes of the June 21, 2013
Sequence VG Surveillance Panel
Conference Call

The meeting was called to order by Chairman Andy Ritchie at 10:30 AM EST.

Dwight and Matthew Bowden agreed to take minutes for the meeting.

A list of attendees on the call is included as Attachment 1.

Chairman Ritchie listed the agenda items he would like to cover in this call:
1) Review and Approval of minutes, June 19, 2013 call.
2) Fuel Batch Distribution & Allocation / Afton / Ed Altman
3) Statistical Group Presentation, Review of Attachment 2
4) Next Meeting

Chairman Ritchie stated that the minutes from the June 19, 2013 VG Panel conference call would be placed on the agenda for approval at the next meeting.

During the last meeting Ed Altman questioned the manner in which the current VG fuel batch had been allocated and distributed to the users of the test method. The Chairman acknowledged that a mistake occurred and that Afton should have been offered fuel. The Chairman apologized for the mistake.

Ron Romano stated that there was 4600 gallons of fuel available which is no longer required for VH test development. He offered the fuel back to Haltermann for redistribution.

Ed Altman expressed his appreciation for the Ford offer but stressed the need for open communications with the Surveillance Panel on these types of issues. In addition, he stated that in his opinion, Haltermann is the responsible "gate keeper" on the distribution of fuel and proposed a panel approved policy on the distribution of test material going forward. This topic will be placed on the next meeting agenda.

The Chairman directed the panel to the Statistics Group VG Fuel Batch Follow Up Analysis, Dated June 21, 2013 and shown as Attachment 2.

The Chair stated that it was he did not anticipate a favorable response to Questions 2 & 3 of the report. Specifically, it was his opinion that the alternative presented in

Question 2 appeared attractive; however the elimination of varnish as a test parameter would be considered unacceptable. The panel concurred with his assessment and there was no further discussion of these items.

The panel then received a summary of the report from Doyle Boese of the Statistical Group. First Doyle discussed his observations from the Statistical Group's analysis of the items in question 1.

- Only a small number of tests meet TMC calibration requirements due to the larger than historic scatter in the varnish ratings (especially 925-3) and the fact that oil 925-3 is mild on target while oils 1009 and 1006-2 are severe of target for sludge.
- Tests did not consistently fail for the same reason but various combinations of sludge and or varnish severity and precision issues.
- And acceptable severity correction factor was not found due to the disparate shift in average severity of the three oils.

Since oil 925-3 is formulated with old technology this was considered as a possible reason why its severity shift from target relative was divergent from the other two oils. Question 4 was asked to address this possibility since oil 940 is now the failing reference oil used in the VG LTMS. Doyle indicated that in order to have data that would allow for a workable severity correction factor with the new fuel batch, oil 940 would need to produce a severity shift (Y_i) similar to oils 1009 and 2006-3 plus the standard deviation of the results would need to be similar to or better than the current LTMS standard deviation for oil 940.

Ed Altman asked what the typical reference test rejection rate was for previous fuel batches and Rich Grundza indicated it was about 20%. Doyle stated that based on the number of requirements he would expect a normal rejection rate of about 30% for severity. The fuel matrix data was much worse than this.

After a lengthy review and detailed discussion of the report, the Chair requested the views of the panel as a path forward.

There was no support to approve the fuel batch from within the panel. Ron Romano concurred with this position. In his opinion the fuel is severe, provided unexpected results for RO 925-3 and should be rejected based on test data.

The panel concluded that there were two options available going forward; 1.) reject the fuel batch or 2.) to run tests and obtain data on RO 940 to determine the impact of the fuel batch, if any, on expected 940 sludge test results.

Mark Overraker and Wayne Petersen of Haltermann stated that they have no explanations or understanding as to the apparent fuel impact on test performance. Specifically, the same processes and streams were used in the formulation of the new batch and the material is consistent with previous fuel batches.

Gordon Farnsworth questioned if there was a change to components "A" and "B" which he understood were historically stored for VG fuel formulations. Haltermann stated that currently there are no stored components and the feed streams are consistent from batch to batch.

Ron Romano questioned if there were differences between the small sample batch and the large production fuel. Haltermann stated there were none. This was also the position of the Statistical Group.

The discussion returned to developing a plan going forward. Haltermann stated that if the fuel batch were to be rejected, they would repeat the same process in the development of a replacement fuel batch.

Ed Altman noted that there are considerable performance differences between laboratories and suggested a round robin of lab visits. Rich Grundza noted the differences between labs on baffle varnish results. Al Lopez stated he did not object to the concept of lab visits however he noted that hardware differences also exist. Bob Campbell suggested a review of the laboratories operational data was in order. Ron Romano agreed.

Due to the inability of laboratories to furnish personnel for round robin visits, Dwight Bowden suggested a unified engine build may be a means of minimizing hardware/build variability to better understand the impact of the fuel on test results.

After considerable discussion, it was agreed that to reject the fuel batch would be undesirable and, at the suggestion of Haltermann, RO 940 test data should be obtained to gain a better understanding of test performance using the new fuel.

The following action plan was agreed to by the panel:

1) SwRI / Intertek will assist Haltermann in the funding of tests required to obtain RO 940 data.
2.) Rich Grundza will assist in providing RO 940 to SwRI & Intertek.
3.) Haltermann will arrange to supply fuel.
4.) Test results are expected to have sludge ratings of about 6.0 merits based on the severity experienced with oils 1006-2 and 1009.
5.) Ed Altman to travel to SAT and review SwRI/Intertek stands.

In closing, the Chairman will forward his report to ASTM summarizing the aforementioned plan to the panel on 6/22/13.

Next Meeting: 07/08/2013 at 2:00 PM ET

Adjournment

Attachment 1

Attendees during 6/21/2013 Sequence VG Surveillance Panel Call

Afton – Ed Altman, Bob Campbell, Christian Porter

Ford - Ron Romano

GM – Bruce Matthews

Haltermann – Wayne Petersen, Tracey King, Mark Overraker

Infineum – Andy Ritchie, Doyle Boese, Gordon Fransworth

Intertek – Al Lopez

Lubrizol – Chris Mileti, Jessica Buchanan, Chris Castanien

OHT – Dwight Bowden, Matthew Bowden

Oronite– Jo Martinez

SwRI – Raham Kirkwood, Janet Buckingham

TEI – Clayton Knight

TMC – Rich Grundza

VG Fuel Batch Follow Up Analysis

Statistics Group

June 21, 2013

Statistics Group

- D. Boese – Infineum
- J. Buckingham – SwRI
- M. Chadwick – Intertek
- J. Martinez - Oronite

Questions

1. What was the impact of RO 925-3 results having same average y_i as RO 1009?
   – Case A: Modify RO 925-3 to have same average y_i as RO 1009
     - Could not adjust OSCR (would result in greater than 100%).
   – Case B: Case A and AEV of 925-3 has proportionally same increase in standard deviation relative to LTMS standard deviation.
     - Standard deviation of RO 925-3 AEV for test is 0.62 whereas LTMS standard deviation is 0.25.
2. What is the estimate of calibration rates for matrix oils if varnish parameters are excluded?

Questions (Continued)

3. Which data points appear to be suspect? (Case C)
   - Not based on rigorous statistical analysis
   - Test Key 80732, RO 1009, Lab A, Stand 9A
     - AES (severe) well outside of the range of other RO 1009
     - OSCR of 95% versus target of 8% (though there were other 1009 results of 71% and 98%).
     - Early fuel dilution concern.
   - Test Key 91531, RO 1006-2, Lab A, Stand 9A
     - y_is greater than 1.5 for 4 of 5 parameters (Only OSCR is severe)
     - Note, same stand as above.
   - Test Key 91342, RO 925-3, Lab G, Stand 7A
     - y_is greater than 1.5 for 4 of 5 parameters (all mild)
     - AES and RAC are well outside of range of other 925-3 results

Questions (Continued)

4. For RO 940, how many tests and of what form must the results have for acceptable fuel adjustments?

   – At least 5 tests

   – Offset of y_i consistent with other RO results (excluding RO 925-3)

   – Standard deviation equivalent or less than LTMS standard deviation for RO 940

Number of VG Fuel Batch Matrix Results Meeting Calibration Severity Criteria ($|y_i| \leq 1.8$)

Adjustment	Oil [1]	AES	RAC	AEV	APV	OSCR	All	All ex AEV [2]	All ex AEV & APV [2]
No Adjustments	925-3 (8)	7	3	5	6	6	1	3	3
	1006-2 (3)	3	2	1	1	1	0	1	1
	1009 (6)	5	6	5	6	3	3	1	2
	Total (17)	15	11	11	13	10	4	5	6
No Adjustments (yi only change)	925-3 (8)	6	8	3	7	5	2	3	3
	1006-2 (3)	3	2	1	1	1	0	1	1
	1009 (6)	5	6	5	6	3	3	4	4
	Total (17)	14	16	9	14	9	5	8	8
Adjustments (yi only change) Case A	925-3 (8)	7	8	3	7	7	1	6	6
	1006-2 (3)	2	2	1	1	2	0	1	1
	1009 (6)	6	6	5	6	6	5	5	6
	Total (17)	15	16	9	14	15	6	12	13
Adjustments (yi and s change) Case B	925-3 (8)	7	8	7	7	7	4	6	6
	1006-2 (3)	2	2	1	1	2	0	1	1
	1009 (6)	6	6	5	6	6	5	5	6
	Total (17)	15	16	13	14	15	9	12	13
Adjustments (yi and s change and omit 3) Case C	925-3 (7)	7	7	6	5	6	3	3	3
	1006-2 (2)	2	1	1	1	1	0	1	1
	1009 (5)	5	5	4	5	3	3	4	6
	Total (14)	14	13	11	11	10	6	8	10

1. Number in parenthesis is sample size.

2. Task 2

Number of VG Fuel Batch Matrix Results Meeting Calibration Shewhart Precision Criteria

Adjustment	Oil [1]	AES	RAC	AEV	APV	OSCR	All	All ex AEV [2]	All ex AEV & APV [2]
No Adjustments	925-3 (8)								
	1006-2 (3)								
	1009 (6)								
	Total (17)								
No Adjustments (yi only change)	925-3 (8)								
	1006-2 (3)								
	1009 (6)								
	Total (17)								
Adjustments (yi only change) Case A	925-3 (8)	7	8	5	7	7	4	6	7
	1006-2 (3)	2	3	1	3	3	1	2	2
	1009 (6)	6	6	5	6	5	4	5	5
	Total (17)	15	17	11	16	15	9	13	14
Adjustments (yi and s change) Case B	925-3 (8)	7	8	7	7	7	5	6	7
	1006-2 (3)	2	3	1	3	3	1	2	2
	1009 (6)	6	6	6	6	5	5	5	5
	Total (17)	15	17	14	16	15	11	13	14
Adjustments (yi and s change and omit 3) Case C	925-3 (7)	7	7	6	6	7	5	6	7
	1006-2 (2)	2	2	1	2	2	1	2	2
	1009 (5)	5	5	5	5	5	5	5	5
	Total (14)	14	14	12	13	14	11	13	14

1. Number in parenthesis is sample size.

2. Task 2

Number of VG Fuel Batch Matrix Results Meeting Calibration EWMA Precision (Warning) Criteria

Adjustment	Oil [1]	AES	RAC	AEV	APV	OSCR	All	All ex AEV [2]	All ex AEV & APV [2]
No Adjustments	925-3 (8)								
	1006-2 (3)								
	1009 (6)								
	Total (17)								
No Adjustments (yi only change)	925-3 (8)								
	1006-2 (3)								
	1009 (6)								
	Total (17)								
Adjustments (yi only change) Case A	925-3 (8)	7	8	3	6	6	2	5	6
	1006-2 (3)	2	3	1	1	2	0	1	2
	1009 (6)	5	6	3	4	4	2	3	4
	Total (17)	14	17	7	11	12	4	9	12
Adjustments (yi and s change) Case B	925-3 (8)	7	8	5	6	6	3	5	6
	1006-2 (3)	2	3	1	1	2	0	1	2
	1009 (6)	5	6	3	4	4	2	3	4
	Total (17)	14	17	9	11	12	5	9	12
Adjustments (yi and s change and omit 3) Case C	925-3 (7)	7	7	6	6	7	5	6	7
	1006-2 (2)	2	2	2	1	2	1	1	2
	1009 (5)	5	5	4	4	5	3	4	5
	Total (14)	14	14	12	11	14	9	11	14

1. Number in parenthesis is sample size.

2. Task 2

Number of Matrix Oils Meeting Severity and Precision Criteria

Adjustment	Oil [1]	All Parameters	All ex AEV [2]	All ex AEV & APV [2]
No Adjustments	925-3 (8)			
	1006-2 (3)			
	1009 (6)			
	Total (17)			
No Adjustments (yi only change)	925-3 (8)			
	1006-2 (3)			
	1009 (6)			
	Total (17)			
Adjustments (yi only change) Case A	925-3 (8)	0	4	5
	1006-2 (3)	0	1	1
	1009 (6)	2	3	4
	Total (17)	2	8	10
Adjustments (yi and s change) Case B	925-3 (8)	2	4	5
	1006-2 (3)	0	1	1
	1009 (6)	2	3	4
	Total (17)	4	8	10
Adjustments (yi and s change and omit 3) Case C	925-3 (7)	3	4	6
	1006-2 (2)	0	1	1
	1009 (5)	3	3	3
	Total (14)	6	8	10

1. Number in parenthesis is sample size.
2. Task 2