

Sequence V Surveillance Panel Meeting August 4th, 2022 2 PM EST, via Webex

Roll Call:

Afton: B. Campbell, B. Maddock
BP: J. Agudelo
ExxonMobil: P. Rubas
Ford: M. Deegan
General Motors: B. Cosgrove, M. Hopp, N. Siebert
Haltermann: W. Hairston, E. Hennessy, I. Mathur
Infineum: D. Boese, C. Laufer, A. Ritchie (Chair)
Intertek: J. Franklin, A. Lopez
Lubrizol: A. Stevens
OHT: J. Bowden
Oronite: J. Martinez
SwRI: D. Engstrom, T. Kostan, M. Lochte
TEI: D. Grosch
TMC: R. Grundza
Valvoline: A. Savant

Meeting Summary:

- The Chair announced that as many of the SP members know, Prasad Tumati is no longer going to join the panel meetings. On behalf of the panel, the Chair would like to record our thanks for his participation in the work of the panel. Always cheerful and connected, Prasad worked with us for many years and we very much appreciate his efforts.
- After the two 940 results from IAR and SwRI were reviewed, the group agreed that it would best for Afton to run 940 to better understand the performance of the new fuel batch.

Open Actions:

1. From [March 26th, 2021 meeting](#): **Lab engineers** to meet to investigate severity shifts (share operational data, build data, ratings, etc.). The TF has been productive and meeting frequently.
2. From [Sept 9th, 2021 meeting](#): **Statisticians Group** led by Doyle Boese (Infineum) to provide update around potential ways to improve current lab-based system. Interim recommendation is to not adopt a stand-based system.
3. From [Sept 9th, 2021 meeting](#): **Haltermann** to report monthly inventory via email to V SP. Monthly updates are being provided.
4. From [Nov 29th, 2021 meeting](#): **Haltermann** to include extra column in fuels data to indicate which fuel goes with which test.
5. From [February 10th, 2022 meeting](#): **The VH Task Force** to assess number of parts remaining as it relates to the life of the test.
6. From [February 10th, 2022 meeting](#): **Haltermann** to report average time it takes for them to respond back to the labs with RVP data.
7. From [February 10th, 2022 meeting](#): **The VH Task Force** to discuss the lab responsibility to measure the fuel parameters as received (section 8.2) vs the use of the CoA.

8. From [May 16th, 2022 meeting](#) and [June 2nd, 2022 meeting](#): **Bob Campbell** and **Andrew Stevens** to consider if their labs, Afton and Lubrizol respectively, would be willing to participate in helping Angela come up with a more realistic forecast number for the VH.
9. From [May 23rd, 2022 meeting](#): **Haltermann** to coordinate with the labs to collect RVP data of the new fuel.
10. From [June 2nd, 2022 meeting](#): **Fuel contract team** to discuss the fuel matrix changes and send back to the panel for review by June 13th, the expected date the CoA for the new fuel batch would be ready.
11. From [June 22nd, 2022 meeting](#): **Afton lab** to share stand selection when available / ready for their fuel matrix test.
12. From [July 18th, 2022 meeting](#): **SwRI** and **IAR** to send interim chem analysis of the first 940 tests. ← Updates are being provided to the SP. ← **COMPLETED**
13. From [July 26th, 2022 meeting](#): **Ben Maddock (Afton)** and **Prasad Tumati (Haltermann)** to coordinate timely shipment of the new batch of fuel to the Afton lab. ← **COMPLETED**
14. From [July 26th, 2022 meeting](#): **Haltermann** to schedule a meeting with the labs to discuss options for shipping the remaining fuel of the current batch.
15. From [July 26th, 2022 meeting](#): **The V Chair, with adco support**, to raise RAC issue (see page 6) to PAPTAG. ← **COMPLETED, on PAPTAG agenda for August 16th**
16. From, August 4th, 2022 meeting: **Afton** to send interim progress updates of their 940 test.

Next call: August 30th, 2022 at 2 PM EST via Webex

Meeting Details:

The meeting started with the Chair announcing that as many of the SP members know, Prasad Tumati is no longer going to join the panel meetings. On behalf of the panel, the Chair would like to record our thanks for his participation in the work of the panel. Always cheerful and connected, Prasad worked with us for many years and we very much appreciate his efforts. Ed Hennessy (Haltermann) thanked the Chair and said he would relay the message to Prasad.

The Chair shared that he and other ACC members will be on the next PAPTAG call, scheduled for August 16th to discuss the RAC issue and implications for candidate tests and limits for the API specification.

As the results of the 940 testing with the new fuel batch came in recently, the Chair drew together a quick meeting just prior to the SP call with the labs participating in the fuel matrix (IAR, SwRI, and Afton) to provide a summary and update for the rest of the SP group on the new fuel testing (batch N-00010):

- To recap, the group formally last discussed the matrix on May 23rd. The key notes from that meeting's minutes are captured below. We have now tested 940 at SwRI and 940 at IAR. Those 2 results have been recently reported and circulated. Thanks to Haltermann, the fuel is being expedited for Afton to receive. We have 2 outstanding items: 1) selection of oils other than 940 in row 1 needs to be confirmed and 2) composition of rows 2 and 3 need to be confirmed. But the main issue for this meeting is to discuss the 2 results that have been reported.

From May 23rd minutes:

Al Lopez (Intertek) shared the test matrix below from the fuel contract. He pointed out that the run order would be determined by the statisticians. Also not set in stone is what we test after the first row. He recommended that after the first row and ensuring the test can generate sludge and clean engines with 940 and 1011 respectively, we hand over to the statisticians to make recommendations on the next testing.

Table 3 – Test Matrix

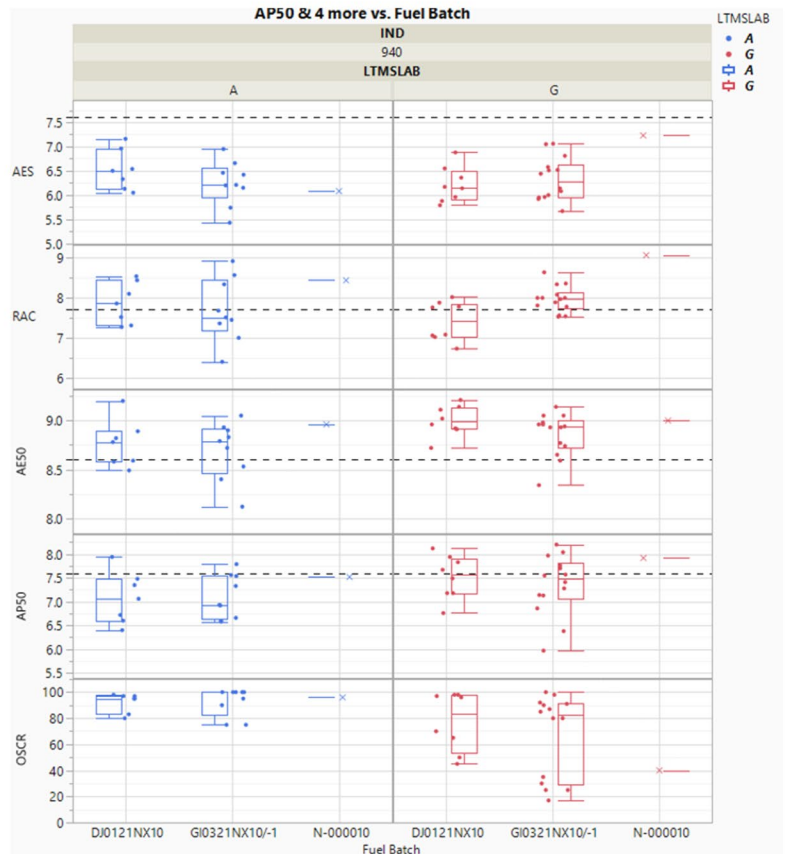
Lab	Southwest		Intertek		Afton
	1	2	1	2	1
Stand	1	2	1	2	1
Run 1	1011	940	940	931	940
Run 2	940	940	931	931	931
Run 3	931	931	1011	940	1011

Note: Reference oil run order will be determined by statistical group.

- In recent days, SwRI and IAR both reported 940 results
- Afton fuel delivery is being expedited
- Selection of oils other than 940 in row 1 need to be confirmed
- Composition of rows 2 and 3 also needs to be confirmed

- The following plot shows the 940 data from LTMS, using only validity codes AC, AF, AO, OC, and PF. X-axis shows the different fuel batches, where DJ is the previous fuel batch, GI is the current fuel batch, and the N is the new batch. The Xs mark the new data points that have come in from Lab A (blue) and Lab G (red). The dashed lines are the GF-6 limits. The top panel shows the AES data and the Chair remarked that 940 has never been seen to pass the GF-6 limit which is still the case with the new data. However, the Lab G data is the highest reported result, not far under the GF-6 limit. The 940 target for AES is 6.47. The new data shows mild results for RAC and AE50, and to some degree the AP50 as well, which is of concern. The oil screen clogging (OSCR) results are quite different between the two labs but we know this to be a vary variable parameter.

- Where((IND = 940) and (VAL = AC, AF, AO, OC, PF) and (LTMSLAB = A, G)).
- X's mark the recent results.
- Dashed lines are GF-6 limits where they apply.



The Chair summarized that this data does not provide clear direction on the next steps. The Chair solicited for views on these results:

- Al Lopez (Intertek) reported their test ran very well with no shutdowns, no Qi problems. He verified that the transitions were within procedural limits. He commented that it seems the red flag is RAC for both labs. He agreed that IAR's AES result is milder and would like to see the Afton lab running asap to get more data to see where the fuel is.
- Dan Engstrom (SwRI) agreed that RAC is most concerning. Even though AES was severe, RAC was 2 sigma mild vs the 940 target. There were zero shutdowns during the test. He concurred that Afton's result should give us a better indication of which result is more representative of the fuel.
- Mike Deegan (Ford) was not only concerned about running mild on RAC, but also about the mild AES result from Lab G. He remarked that even when the Afton result comes in, we still have at least one lab running mild with this fuel.
- Doyle Boese (Infineum) observed that 7 out of the 8 parameters came in mild and they're in the upper 70-80% percentile for each of their parameters at each lab. It would be surprising if we found that the long run 940 average is not mild. He noted that we do not know how the other oils would perform with the new fuel batch.
- Re: fuel dilution, Al reported that IAR was at 11.07% (average across all 24 hour samples) and Dan reported that SwRI was around 14%.

- The Chair pointed out that we wanted to confirm we can make sludge and the new fuel met that criterion albeit without clear distinction and that an adjustment to the fuel might be required.
- The Chair laid out the options for proceeding:

Options for proceeding

- Option 1: Reject the fuel. Too mild.
- Option 2: Accept the fuel. Both tests generated sludge.
- Option 3: Proceed with haste to run Afton row 1 test in the spirit of resolving which of the two tests is most representative of the fuel.
 - Afton is targeting VH start date of 8/15

For Options 1 and 3, Haltermann needs to be ready to adjust the fuel.

- Ed Hennessy (Haltermann) believed there was not enough data to change the fuel now. Mike Deegan (Ford) agreed and expressed need to get at least one more test to give us direction on where the fuel sits. He asked what we would need to do if Afton's result is mild. Ed asked what would happen if Afton's result is in between the results from IAR and SwRI?
- Doyle Boese (Infineum) questioned if we want to see 1011 too to see how fuel does on different oil. Mike Deegan (Ford) agreed the group should think about that but still move forward with the Afton test. Ben Maddock (Afton) thought it would be worthwhile for the other labs to run 1011 to see if there is discrimination. Rich Grundza (TMC) offered perhaps we run 1011 only at SwRI because they made sludge. Travis Kostan (SwRI) agreed discrimination is important but the priority is to understand the severity of the fuel and the 940 results. He offered the idea of running another 940 because if IAR repeated their result, then we would know that the fuel would need to be adjusted. Amol Savant (Valvoline) asked if the IAR and SwRI should stay idle until Afton runs their test. The Chair answered yes as it's unfortunately a consequence of where we are; it would be wise to not burn more of the new fuel. Doyle asked if there was much risk that this fuel is mild on 940 but on target for 1011. The Chair acknowledged it's a possibility; the biggest concern is that the fuel is mild, and we lose discrimination.
- Al Lopez (Intertek) reminded the group there's a contractual agreement that needs to be considered. The Chair stated that rows 2 and 3 need to be confirmed. Mike Lochte (SwRI) reported that the table from the fuel contract was removed and that the panel can decide the 15 tests. The Chair replied that there's flexibility in the contract and for now, we will reconvene when the Afton 940 test result is in to decide next steps.

After discussion, the Chair summarized that Option 3 is favored by the group as the extra data point would help. Ben Maddock (Afton) stated his lab can meet the Aug 15th start. EOT would

be Aug 24th. Ratings would be expected by Aug 25th. Ed Hennessy (Haltermann) confirmed they would be ready to adjust the fuel.

Indresh Mathur (Haltermann) commented that the CoA for DI and for DJ batches are similar and asked if they make an adjustment, some parameters could go higher. Example: if Haltermann shifts the aromatics, octane number could be out of range. Al Lopez (Intertek) reminded the group that this has happened before; in 2013, the AK batch was rejected and 2 months later, another batch was made. Al Lopez (Intertek) reminded the group that this has happened before; in 2013, the AK batch was rejected and 2 months later, another batch was made. The Chair asked Haltermann to be prepared with options if the SP agrees the fuel cannot be accepted. Indresh confirmed that lab work is already being conducted. It would be a minor change so as to not make the fuel too severe.

The Chair requested that Afton keeps the SP informed of the test progress. He also thanked Haltermann for moving quickly to ship the fuel to Afton. The group will reconvene after the Afton results come in.

Meeting adjourned at 3:04 PM EST.