

Sequence IV Surveillance Panel | MINUTES

REVISION DATE: 6/4/2018 4:51:00 PM

Relevant Test:	Sequence IVB
Note Taker:	Chris Mileti
Meeting Date:	05-24-2018
Comments:	Sequence IV Surveillance Panel conference call to discuss Appendix K and retroactive registration.

1. OPENING DISCUSSION:

1.1. Opening Comments from Chairman:

1.1.1. Most of the labs are running candidate tests.

1.1.2. **Pass/Fail Parameters:**

- 1.1.2.1. The Sequence IVB has been approved by the AOAP Panel for inclusion in GF-6.
- 1.1.2.2. The end-of-test iron content is in the GF-6 specification as a pass/fail parameter.
- 1.1.2.3. On 04-26-2018, the Surveillance Panel approved an LTMS system for the Sequence IVB that only includes the AVLI parameter.
 - 1.1.2.3.1. End-of-test iron was not included as a pass/fail parameter.
- 1.1.2.4. The test sponsor and ILSAC select the pass/fail parameters and not the Surveillance Panel.
 - 1.1.2.4.1. The Surveillance Panel is responsible for doing the technical work necessary to implement the pass/fail parameters.

1.1.3. **Sub-Groups:**

- 1.1.3.1. Two sub-groups were formed to continue to refine the test.
 - 1.1.3.1.1. One sub-group is focused on improving test precision, and the other sub-group is focused on completing the test procedure.
- 1.1.3.2. Both sub-groups are currently focused on implementing iron as a pass/fail parameter.
- 1.1.3.3. Iron Pass/Fail Parameter:
 - 1.1.3.3.1. The TMC has drafted a proposed procedure for using calcium to adjust iron.
 - 1.1.3.3.2. This draft has been provided to Intertek for review.
 - 1.1.3.3.3. This draft is based on the phosphorous retention procedure used for the Sequence IIIIGB.
 - 1.1.3.3.4. The sub-groups are currently studying whether engine life and oil consumption can impact iron generation.
- 1.1.3.4. Engine Life Study:
 - 1.1.3.4.1. One of the sub-groups has an action item to gather data for this study.
 - 1.1.3.4.2. The five labs are trying to obtain approval from their customers to supply data from candidate tests.
 - 1.1.3.4.3. The sub-groups will need statistical support for this study.
 - 1.1.3.4.4. Intertek provided templates that the other labs will use to compile this data.
- 1.1.3.5. Procedure Review:

- 1.1.3.5.1. The sub-groups are reviewing the break-in and aging procedure to identify improvements to stabilize iron generation prior to the first test.
- 1.1.3.5.2. The engine assembly manual is being updated with instructions for rebuilding an engine after a camshaft lobe failure (Section 4).
- 1.1.3.5.3. The procedure will also include an explicit definition for a lobe failure.
- 1.1.3.5.4. A procedure has been finalized for cleaning the blowby flow meter on the stands.
- 1.1.3.5.5. The TMC website has a version of the Sequence IVB draft procedure that is from September 2017.
 - 1.1.3.5.5.1. The ACC may not have known that this draft procedure was available.
- 1.1.3.6. Action Item List:
 - 1.1.3.6.1. Lubrizol is maintaining the action item list for both sub-groups.
 - 1.1.3.6.2. The list was compiled in Microsoft Project.
 - 1.1.3.6.3. Each action item is categorized.
 - 1.1.3.6.4. This list is posted on the TMC website.
 - 1.1.3.6.5. The ACC has a revision of this list that was released on 05-11-2018 (it has since been updated).

1.2. Stand Calibration:

- 1.2.1. The TMC confirmed that all (7) Precision Matrix stands have been calibrated.
 - 1.2.1.1. Two additional test stands have gained calibration status since the Precision Matrix ended.
 - 1.2.1.2. In summary, there are (9) calibrated test stands in the Industry.
- 1.2.2. The Precision Matrix test stands will be nearing the end of their 6-month calibration windows very soon.
 - 1.2.2.1. For example, Intertek's first Precision Matrix test stand will lose its calibration next week.
- 1.2.3. Some of the labs have agreed to run reference tests on engines that have more than (4) runs on them.
 - 1.2.3.1. This will provide additional data that can be used for the engine life study.

1.3. BOI/VGRA Task Force:

- 1.3.1. Intertek stated that there is a push to replace REO1011 and REO436 in the BOI/VGRA matrix with LSPI-capable oils.
- 1.3.2. This could allow the Surveillance Panel to use the BOI/VGRA matrix as an avenue to identify a potential SN+ or GF-6 reference oil.
 - 1.3.2.1. Any new reference oil would replace REO1011 (because this oil has the lowest supply).

1.4. Appendix K:

- 1.4.1. The two sub-groups reviewed Appendix K last week and made some changes to the document (which are detailed in the sub-group meeting minutes).
- 1.4.2. Section B:**
 - 1.4.2.1. The MAD survey is in-progress.
- 1.4.3. Section C:**
 - 1.4.3.1. MTAC has been selected to handle repeat tests on a candidate oil.
- 1.4.4. Section D:**
 - 1.4.4.1. LTMS became active on May 10th.
- 1.4.5. Section A.2:**
 - 1.4.5.1. Intertek stated that E_P is complete for AVLI, but is still in-progress for iron.

1.4.5.2. Afton noted that the MAD survey is still in-progress, so is not complete for either parameter.

1.4.6. Section A.3:

1.4.6.1. The Precision Matrix data indicated a close correlation between sqrt(AVLI) and Log(FEWMEOT).

1.4.7. Section B.1:

1.4.7.1. An LTMS system is in place for AVLI but not for iron.

1.4.7.2. The plan is to collect more data on iron and then include this parameter into LTMS when it is ready.

1.4.8. Section C.1:

1.4.8.1. The current plan is to use MTAC.

1.4.9. Section C.2:

1.4.9.1. No action has yet been taken on this item.

1.4.10. Section D.1.1:

1.4.10.1. The Surveillance Panel is trying to identify a reference oil that represents current technology.

1.4.10.2. There is some confusion as to whether "current" technology means oils that are in the market now (i.e. GF-5), or oils that are in development for GF-6.

1.4.10.3. All current reference oils are from GF-5.

1.4.11. Section D.1.2:

1.4.11.1. This item cannot be finalized until pass/fail limits are established.

1.4.11.2. All current reference oils perform better than the proposed pass/fail limit of 2.5mm³.

1.4.12. Section D.1.7:

1.4.12.1. Afton and Infineum both asked if there is a 5-year supply of reference oils.

1.4.12.2. Response from TMC:

1.4.12.2.1. The intent is to maintain 5-year inventories.

1.4.12.2.2. REO300 has recently been re-blended.

1.4.12.2.3. The re-blend will be designated REO300-1.

1.4.12.2.4. There are (7) drums of REO300-1 available, which should be enough for (96) tests.

1.4.12.2.5. A strategy for introducing REO300-1 needs to be made an action item for the sub-groups.

1.4.12.2.6. There are (36) drums of REO1012 available, and this oil is only used for the Sequence IVB.

1.4.12.2.7. REO1011 will need to be re-blended soon.

1.4.12.2.8. Approximately (25) drums of REO1011 were originally procured, and about half of this remains in TMC's inventory.

1.4.12.3. The current plan is to distribute all three reference oils equally among reference tests.

1.4.13. LTMS Document:

1.4.13.1. Lubrizol asked if the LTMS document has been issued for this test.

1.4.13.1.1. The LTMS system was approved almost a month earlier.

1.4.13.2. Intertek responded that a PowerPoint file was distributed on 04-26-2018.

1.4.13.2.1. This presentation summarized what the Surveillance Panel voted on.

1.4.13.2.2. This information still needs to be incorporated into the LTMS manual.

1.4.14. Section D.2:

1.4.14.1. Critical Parts:

1.4.14.1.1. Lubrizol asked if critical parts will need to be re-evaluated if iron is approved as a pass/fail parameter.

1.4.14.1.1.1. The current critical hardware was identified when AVLI was the only pass/fail parameter under consideration.

- 1.4.14.1.2. Infineum asked whether critical parts are identified in the procedure.
- 1.4.14.1.3. Intertek stated that critical parts should be specified in the procedure, but this needs to be confirmed.
 - 1.4.14.1.3.1. The lifters were not batched for the Precision Matrix.
 - 1.4.14.1.3.2. Batching lifters is problematic because different lifter grades are consumed at different rates.
 - 1.4.14.1.3.3. The Precision Matrix did use batched engines, cylinder heads and camshafts.
- 1.4.14.2. Semi-Annual Hardware Report:
 - 1.4.14.2.1. Afton asked when the Surveillance Panel will start seeing semi-annual hardware reports.
 - 1.4.14.2.2. OHT recently gave an update to the AOAP.
 - 1.4.14.2.3. OHT is willing to give an update to the Surveillance Panel if needed.
 - 1.4.14.2.3.1. They have a (4) year supply of hardware.
 - 1.4.14.2.3.2. They plan to provide their hardware reports in terms of supply time and not actual unit counts.
 - 1.4.14.2.4. Afton stressed that the Surveillance Panel should have access to actual unit counts.
 - 1.4.14.2.4.1. This will help the Panel plan accordingly.
 - 1.4.14.2.4.2. A similar hardware audit was done by the Sequence III Surveillance Panel.
 - 1.4.14.2.5. Intertek has not seen any evidence to suggest significant batch-to-batch differences with camshafts.
 - 1.4.14.2.5.1. But they still agreed with Afton that it would be useful to know specific hardware quantities.
 - 1.4.14.2.5.2. It is the responsibility of the Surveillance Panel to closely monitor the inventory of critical hardware.
 - 1.4.14.2.6. OHT always notifies the Surveillance Panel of upcoming batch changes, and they will continue to do so in the future.
 - 1.4.14.2.6.1. They will provide the Panel with a 2-month warning on batch changes.
 - 1.4.14.2.7. Toyota reiterated Intertek's statement that there have never been significant batch-to-batch differences identified with camshafts.
 - 1.4.14.2.7.1. They also believe that OHT is capable of monitoring batch quantities.

1.4.15. Section D.3.4:

- 1.4.15.1. This section was originally labeled a "C".
- 1.4.15.2. However, this will probably be changed to "B In-Progress".
- 1.4.15.3. Southwest has presented a proposal for transitioning between fuel batches and monitoring fuel quality.
 - 1.4.15.3.1. The sub-groups are refining this proposal now.

1.4.16. Section D.3.5:

- 1.4.16.1. Haltermann is limited to blending 1-year supplies of KA24E fuel.
- 1.4.16.2. This means that fuel will not be stored for extended periods of time.
- 1.4.16.3. Haltermann has the next batch of fuel available.

1.4.17. Section D.4:

- 1.4.17.1. A lot of work is underway to finish the test procedure.
- 1.4.17.2. It is in draft format now.
- 1.4.17.3. One of the sub-groups is working on finalizing the operational validity criteria for each parameter (especially oil consumption).
- 1.4.17.4. Section D.4.5 is not applicable for this test.

- 1.4.17.5. Some rate-and-report parameters (i.e. PDI measurements) have already been discontinued.
- 1.4.17.6. Additional rate-and-report parameters (i.e. mass loss) may be discontinued in the future.

1.4.18. Section D.5:

- 1.4.18.1. The Sequence IVB test has no rated parameters.
- 1.4.18.2. Metrology measurements are used extensively for this test.

1.4.19. Forward Action Plan for Appendix K (Buscher):

- 1.4.19.1. The two sub-groups have made a lot of changes to Appendix K during the last two weeks.
- 1.4.19.2. Buscher will update the document with these changes and distribute it to the Surveillance Panel for review.
- 1.4.19.3. This document will eventually be submitted to the ACC once all the "B's" and "C's" have been converted to "A's".

1.5. Mass Loss Parameter:

1.5.1. Comments from Toyota:

- 1.5.1.1. A comparison of AVLl to the mass loss parameter can provide insight into how much wear is coming from the surface of the tappet and how much is coming from the button.
- 1.5.1.2. The mass loss parameter should remain in place through the Tech Demo period because it can help understand the impact of engine wear on this test.

1.5.2. Comments from Intertek:

- 1.5.2.1. They provide their customers with a correlation between volume loss and mass loss.
- 1.5.2.2. This provides an indication of how much wear is occurring on the lifter button.
- 1.5.2.3. Sometimes the correlation between these two parameters is low.

2. ACC RETROACTIVE REGISTRATION:

2.1. Comments from Chairman:

- 2.1.1. The Surveillance Panel needs to make a recommendation to the ACC regarding a date for retroactive registration.
- 2.1.2. The Surveillance Panel also needs to decide which hardware batches are acceptable for this retroactive registration.

2.1.3. Retroactive Registration Date:

- 2.1.3.1. The ACC wants a single date for the entire Industry (and not an individual date for each test stand).
- 2.1.3.2. The TMC confirmed that the calibration date for the first stand that completed its Precision Matrix testing was 11-27-2017.
- 2.1.3.3. Afton and TMC both suggested addressing the hardware and the retroactive registration date as separate motions.
- 2.1.3.4. Comments from Afton and the TMC:
 - 2.1.3.4.1. Surveillance Panels do not establish retroactive registration dates.
 - 2.1.3.4.2. Therefore, the motion needs to be worded so that it specifies the earliest date at which the ACC can establish retroactive registration.
 - 2.1.3.4.3. This "earliest date" is the date at which there have been no further procedural changes that would impact severity.
- 2.1.3.5. Comments from Lubrizol and Afton:

- 2.1.3.5.1. This issue could become muddled if certain procedural changes are implemented soon to improve the iron parameter.
- 2.1.3.5.2. Both sub-groups are considering ways to improve the precision of iron – so a future procedural change is possible.
- 2.1.3.6. Chevron questioned how the Surveillance Panel can issue a retroactive registration date if it does not even know how it will calibrate one of the pass/fail parameters (i.e. iron).
- 2.1.3.7. Afton and Lubrizol stressed that the motion must clearly state that this date is recommended based on the current understanding of the test.
- 2.1.3.8. Comments from Intertek:
 - 2.1.3.8.1. The labs may need to revisit the iron parameter for all completed tests once this parameter is finalized.
 - 2.1.3.8.2. It is possible that the ICP tests will need to be repeated so that they are compliant with the final version of the procedure.
 - 2.1.3.8.3. Even the data from the Precision Matrix tests may need to be reevaluated.
- 2.1.3.9. Comments from Ford:
 - 2.1.3.9.1. They want this motion to be specific.
 - 2.1.3.9.2. It needs to state that the Surveillance Panel is continuing to gather data related to iron so that it can develop a revised procedure that will be retroactively applied to completed tests.
 - 2.1.3.9.3. Test requestors will want to know this information.
- 2.1.3.10. Comments from Lubrizol:
 - 2.1.3.10.1. The motion should only specify AVLI.
 - 2.1.3.10.2. A separate motion for iron can be voted on later.
 - 2.1.3.10.3. Ford did not agree with Lubrizol's suggestion.
 - 2.1.3.10.3.1. Additive companies will not want to run testing if only AVLI is mentioned.
 - 2.1.3.10.3.2. Iron needs to be mentioned so that companies know that this parameter will be revisited.
- 2.1.3.11. Comments from Afton:
 - 2.1.3.11.1. The motion needs to state that no operational changes will be made to the test after the retroactive registration date.
 - 2.1.3.11.1.1. However, the way that the data is processed can still change.
 - 2.1.3.11.1.2. They would remove any mention of the iron parameter from the motion.
- 2.1.3.12. Chevron again questioned whether it is premature to hold a vote on retroactive registration if the iron parameter is not finalized.
- 2.1.3.13. Comments from the TMC:
 - 2.1.3.13.1. They do not understand the concern regarding this motion.
 - 2.1.3.13.2. It is common for tests to encounter changes to their pass/fail parameters.
- 2.1.3.14. Comments from Ford:
 - 2.1.3.14.1. Ford does understand the concern because this situation is different.
 - 2.1.3.14.2. It is very unusual to add a new parameter after LTMS is finalized.
- 2.1.3.15. Comments from Intertek and Lubrizol:
 - 2.1.3.15.1. There is a risk that the Surveillance Panel could implement a change [regarding iron] that could retroactively impact the validity of previous tests or the calibration of stands.
- 2.1.3.16. Comments from Afton:
 - 2.1.3.16.1. The Surveillance Panel needs to commit to communicating any test changes to the ACC (especially regarding iron).

2.2. Camshaft Lobe Failures:

- 2.2.1. Infineum asked whether the Panel has decided on a definition for lobe failures.
 - 2.2.1.1. Are all the labs following the same rebuild procedure after a lobe failure?
 - 2.2.1.2. Would not following the rebuild procedure impact the lab's calibration?
- 2.2.2. Comments from Intertek:
 - 2.2.2.1. A camshaft lobe failure would only impact calibration if it happened on a reference test.
 - 2.2.2.2. The rebuild procedure is being documented now.
 - 2.2.2.3. Two of the labs are following the same rebuild procedure for camshaft lobe failures.
 - 2.2.2.4. The third lab has chosen to decommission engines instead of rebuilding them.
 - 2.2.2.5. Afton has not yet had a camshaft lobe failure.

2.3. Two Motions:

- 2.3.1.1. The conference call ran out of time before the attendees could vote on the two motions regarding retroactive registration.
- 2.3.1.2. As a result, the decision was made to conduct both votes via e-Ballot.
- 2.3.1.3. Motion #1:**

Motion:	<p>The Sequence IV Surveillance Panel has identified 11/27/17 as the earliest date for ACC retroactive registration, based on no major operational changes being made to the Sequence IVB test procedure and the LTMS calibration date for the first precision matrix test stand to complete the precision matrix.</p> <p>A message will be relayed to the ACC PAPTG, indicating the outcome of this motion, and including the following comments:</p> <ul style="list-style-type: none"> • The FEWMEOT parameter, which is still under development, will have to be retroactively evaluated for each retro-actively registered test, once the FEWMEOT procedures are finalized. • Definition of, engine reconditioning requirement for, stand component cleaning for, and test interpretability and/or test validity criteria for camshaft lobe failures, which all are still under development, will have to be retroactively evaluated for each retro-actively registered test, once the camshaft lobe failure definition, procedures and criteria are finalized. • Test interpretability and/or test validity criteria for oil consumption, which is still under development, will have to be retroactively evaluated for each retro-actively registered test, once the oil consumption criteria is finalized. • Activities and objectives of the Sequence IVB precision improvement and procedure review sub-groups include requesting labs to provide data from all tests from the precision matrix forward, to develop an FEWMEOT procedure to address Fe content on tests run after 11//27/17. The sub-groups' present plan is to have this completed by September 2018. • Should any procedural changes develop, the surveillance panel will notify the ACC, providing effective dates.
Motion by:	Teri Kowalski, Toyota
Seconded by:	Bill Buscher, Intertek

2.3.1.4. Motion #2:

Motion:	<p>The Sequence IV Surveillance Panel approves use of the following hardware batches for all candidate oil testing that will be considered for ACC retroactive registration or registered at the start of ACC registration:</p> <ul style="list-style-type: none"> • Engine Assembly (p/n OHTIVB-16000-1), Batch 1 and 2 • Cylinder Head Assembly (p/n OHTIVB-11101-1), Batch 1 and 2 • Intake Camshaft (p/n OHTIVB-13501-1), Batch C and D • Exhaust Camshaft (p/n OHTIVB-13502-1), Batch C, D and E • Lifters (Grades 12 – 60, p/n OHTIVB-23030-1 – OHTIVB-23270-1), all batches, including Batch A, B and C
Motion by:	Charlie Leverett, Infineum
Seconded by:	Bill Buscher, Intertek

Action Items	Person responsible	Completion Date

Follow-up Notes/Updates	Initials	Date Added

Attendees	Organization	Contact Information