Sequence IV Surveillance Panel | MINUTES

REVISION DATE: 11/5/2018 9:23:00 AM

Relevant Test:	Sequence IVA and IVB
Note Taker:	Chris Mileti
Meeting Date:	10-25-2018
Comments:	This conference call was scheduled a week after the face-to-face meeting. There were two main agenda items: (1) Address the negative votes from the motion to approve FEWMEOT for LTMS and (2) Discuss the ongoing communication between the ACC and the Surveillance Panel regarding IVB registration.

1. NEGATIVE VOTES ON LTMS MOTION:

1.1. Opening Comments from Chairman (B. Buscher):

1.1.1. Four motions were voted upon during last week's face-to-face meeting in San Antonio.
1.1.2. The Surveillance Panel concluded that meeting with three action items.
1.1.3. ***Action Item #1:*** Inform the BOI/VGRA Task Force about the revised break-in procedure.
  1.1.3.1. *Comments from J. Martinez:*
    1.1.3.1.1. This was discussed at a BOI/VGRA meeting earlier in the week.
    1.1.3.1.2. The Task Force agreed to provide Intertek and Southwest with instructions regarding how to proceed.
  1.1.3.2. Southwest confirmed that they have already been contacted by the Task Force.
1.1.4. ***Action Item #2:*** Address the negative votes from the motion to approve FEWMEOT for LTMS.
  1.1.4.1. Lubrizol and Afton both voted negatively.
  1.1.4.2. Both companies have submitted and distributed documentation that explains their votes.
1.1.5. ***Action Item #3:***
  1.1.5.1. The Surveillance Panel needs to review the latest communication with the ACC PAPTG regarding Sequence IVB registration.

1.2. Afton Explains its Negative Vote on the LTMS Motion:

1.2.1. The Surveillance Panel was not given enough time to discuss the proposed limits.
  1.2.1.1. Also, the limits were established using a truncated dataset.
1.2.2. There is the potential to have severity adjustments of a very high magnitude.
  1.2.2.1. *Are the Panel members comfortable with this?*

1.3. Lubrizol Explains its Negative Vote on the LTMS Motion:

1.3.1. Lubrizol has three major concerns about the motion.
1.3.2. ***Concern #1:*** The statisticians were instructed to use a truncated dataset in their analysis.
  1.3.2.1. The intention of the Surveillance Panel was always to have the Statistics Group review the full dataset as they saw fit.
1.3.3. ***Concern #2:*** The Surveillance Panel decided to use a revised break-in procedure in lieu of a statistical engine hour correction.
  1.3.3.1. There is no data available on the effectiveness of the new break-in procedure.

1.3.3.2. As a result, Lubrizol is not confident that the highly variable iron results on a 1st run engine are being adequately addressed.

1.3.4. ***Concern #3:*** There is the potential that both the old and new break-in procedures can still be used.

1.4. New vs. Old Break-In Procedure:

1.4.1. ***Comments from Ford:***

1.4.1.1. Lubrizol is not correct; the decision was made to exclusively use the new break-in procedure from this point onward.

1.4.2. ***BOI/VGRA Task Force:***

1.4.2.1. Lubrizol and other members countered that the BOI/VGRA Task Force has not yet decided on which break-in procedure to use for the matrix engines.

1.4.2.2. The statisticians clarified that this issue has, in fact, been resolved.

1.4.2.3. The BOI/VGRA Task Force decided yesterday to use the new break-in procedure.

1.4.2.4. As a result, the legacy break-in procedure will no longer be used.

1.4.2.5. Lubrizol admitted that it was not aware of these developments, and its concern regarding the use of both break-in procedures is no longer valid.

1.4.3. Lubrizol, the TMC and Ford all expressed concern that there is a lot of confusion regarding what transpired during the last hour of the face-to-face Surveillance Panel meeting.

1.4.4. ***Introducing New Engines with a Reference Test:***

1.4.4.1. Lubrizol wants all new engines [that use the new break-in procedure] to be introduced with a reference test until the Surveillance Panel has enough data to adequately assess the situation.

1.4.4.2. The TMC added that the proposed reference test could be used for severity adjustment purposes.

1.4.4.3. Ford recommended changing the motion from last week to specify a reference test after each new engine break-in.

1.4.4.4. Oronite agrees and stressed that this was their position during the face-to-face meeting.

1.4.4.4.1. Intertek objected to their recommendation.

1.4.4.5. Lubrizol and Afton added that the objections to Oronite's recommendation were made for financial reasons.

1.4.5. ***Potential for Bias:***

1.4.5.1. M. Chadwick asked if there is a risk of building a bias into the laboratory's severity adjustment by running reference tests on a 1st run engine.

1.4.5.2. Several members replied that this is possible.

1.4.5.2.1. It depends on whether the new break-in procedure is effective.

1.4.5.3. Ford and Afton added that the only way to determine if the new procedure is effective is by collecting reference data.

1.4.6. ***Number of Reference Tests:***

1.4.6.1. Toyota asked the Panel to specify the number of reference tests that are needed.

1.4.6.2. Toyota expressed concern that the amount of iron variability on a 1st run engine may not justify these additional tests.

1.4.6.3. *Comments from Intertek:*

1.4.6.3.1. The 1st run on an engine may have an end-of-test iron that is 50-60ppm higher than an equivalent run on a 4th or 5th run engine.

1.4.6.3.2. The 2nd run on an engine may have an end-of-test iron that is 20-30ppm lower than an equivalent run on a 4th or 5th run engine.

1.4.6.4. Afton stressed that the magnitudes are not as important as the fact that the differences are present.

1.4.6.4.1. The iron parameter is not very well balanced.

1.5. Review of Natural Log Graph (M. Chadwick):

1.5.1. Each solid line on the graph represents a different oil.
1.5.2. The target for each oil occurs where the line passes through the zero-point.
1.5.3. There is not a lot of evidence regarding how each oil behaves at high iron levels.
1.5.3.1. The chart is extrapolating data.
1.5.4. LTMS already has functionality to adjust severity adjustment sizes.
1.5.5. The magnitude of the severity adjustment only gets large at high iron levels.
1.5.5.1. For example, the severity adjustment is relatively small at an iron level of 200ppm.
1.5.6. ***There are two options moving forward:***
1.5.6.1. One option is to adjust the Z_i Limit to make a small reduction in the severity adjustment.
1.5.6.2. Another option is to leave the severity adjustments as they are and instead use conditional statements.
1.5.6.2.1. These conditional statements would need to be arbitrarily selected based on engineering judgement.
1.5.7. Toyota agrees that there is a need to discuss how to deal with severity adjustments if there is an overcorrection.
1.5.8. ***Comments from Afton:***
1.5.8.1. Chadwick's explanation of the situation helps to resolve Afton's concerns.
1.5.8.2. This situation would not be as complicated if the test used reference oils that performed near the pass/fail limits.
1.5.8.3. Capping the size of the severity adjustment makes sense.
1.5.8.4. Both ends (severe and mild) need to be capped.
1.5.9. Intertek is worried that there is not enough data available to cap the mild stands.
1.5.10. ***Comments from Toyota:***
1.5.10.1. *Is a natural log really the best fit for the behavior of this parameter?*
1.5.10.2. A natural log may be more appropriate with phenomenon that "break" quickly like oxidation and sludge.
1.5.11. ***Follow-Up Comments from M. Chadwick:***
1.5.11.1. The size of the severity adjustment correction would be smaller if the pass/fail limit were at 200ppm.
1.5.11.2. Engineering decisions should take precedence over statistical decisions in situations such as this.

1.6. Cap on Severity Adjustment:

1.6.1. ***Comments from Afton:***
1.6.1.1. Cap the severity adjustment at ±100ppm.
1.6.1.2. This cap can be revised as more data is collected.
1.6.2. ***Comments from Ford:***
1.6.2.1. *Is the standard deviation due to the high iron from the 1st run on an engine?*
1.6.2.2. *If so, will the standard deviation tighten with the new break-in procedure?*
1.6.2.2.1. Intertek believes that the new break-in will reduce the standard deviation for each run on an engine.
1.6.2.3. The labs need to generate reference data [on each new engine] relatively quickly.
1.6.2.4. Ford agrees that a cap on the severity adjustment is appropriate.
1.6.3. ***Comments from Intertek:***
1.6.3.1. Cap the severity adjustment at ±150ppm.
1.6.3.2. A cap of 150ppm is more appropriate than a cap of 100ppm – especially on mild stands.

1.6.3.3. The Panel also needs to consider that this cap will only affect the severity adjustment for iron levels that approach 400ppm.
1.6.3.3.1. Only a small percentage of runs have an iron level that is this high.
1.6.4. ***Comments from Toyota:***
1.6.4.1. They are comfortable with either proposed severity adjustment cap (100ppm or 150ppm).
1.6.4.2. This situation comes down to comfort.
1.6.4.3. Tightening the limits will provide more comfort that poor-performing oils will not make it into the field.

1.7. The Next New Engine at Each Lab:

1.7.1. The next new engine at each lab will be released with a reference test.
1.7.2. ***Comments from Ford:***
1.7.2.1. *Should all new engines be released with a reference test (and not just the next new engine)?*
1.7.2.2. *How soon can enough data be generated for a statistical analysis?*
1.7.3. ***Comments from Southwest:***
1.7.3.1. Two of their stands are committed to the BOI/VGRA matrix.
1.7.3.2. The other two stands are committed to projects.
1.7.3.3. They previously broke-in one of their BOI/VGRA matrix engines using the old procedure.
1.7.3.3.1. They will have to break-in another engine with the new procedure.
1.7.3.3.2. *Will they get a reference extension?*
1.7.3.4. They need time to assess their situation before they can provide a projection on when they will have reference data available.
1.7.4. ***Comments from Intertek:***
1.7.4.1. All four of their stands are running candidate oils.
1.7.4.2. They have not yet decided when they will reference their BOI/VGRA stands.
1.7.5. ***Camshaft Inventory for BOI/VGRA Matrix:***
1.7.5.1. Each of the San Antonio labs has (15) intake camshafts.
1.7.5.2. Southwest already consumed one of these camshafts with the reference test that used the old break-in.
1.7.5.3. Each lab will run (9) BOI/VGRA tests, so there is enough hardware available (even at Southwest).
1.7.5.4. Four of the camshafts are being held in the event of a lobe failure.

1.8. Repeat Break-In at Southwest for BOI/VGRA Matrix:

1.8.1. Southwest would like the Surveillance Panel to endorse their request for an extended reference period.
1.8.1.1. They had previously broken-in a BOI/VGRA matrix engine using the old procedure.
1.8.2. ***Comments from the TMC:***
1.8.2.1. The TMC will need an endorsement from the Surveillance Panel if they are to move forward with Southwest's request.
1.8.2.2. Southwest has asked for a full period extension, but the TMC is not sure that this is appropriate.
1.8.2.3. Similar situations happened during previous BOI/VGRA matrices, but the labs did not get an extension.
1.8.2.4. However, the Southwest issue is a special case.
1.8.3. ***Comments from Intertek:***
1.8.3.1. They feel that Southwest should get an extension.
1.8.4. ***Follow-Up Comments from Southwest:***

1.8.4.1. They proceeded with the previously agreed upon protocol, and the break-in was changed late in the process.
1.8.4.2. Pre-matrix reference tests are not funded by the Industry.

1.8.5. ***Follow-Up Comments from the TMC:***
1.8.5.1. *How should the new engine break-ins be implemented?*
1.8.5.2. The previous motion requires the first reference test after each new break-in to be done with REO1012.
1.8.5.3. This is not the same oil that will be used for the BOI/VGRA reference tests.

1.8.6. ***Follow-Up Comments from Intertek:***
1.8.6.1. REO1012 was chosen [for the first reference test after a new engine break-in] for a very specific reason.
1.8.6.2. REO300 is depleted, and the Industry is currently switching to another blend (REO300-1).
1.8.6.3. REO1011 cannot be used because it does not show the 1st run anomaly.
1.8.6.4. The reference tests for the BOI/VGRA matrix will be used to supplement the reference tests conducted after the engine break-in.

1.9. Revisit Original LTMS Motion for FEWMEOT:

1.9.1. The Panel agreed that the next new engine at each lab should be broken-in with the new procedure.
1.9.2. The engine should then be introduced with a reference test on REO1012.
1.9.3. ***This will provide the Panel with the following data within the next 1.5-months:***
1.9.3.1. Four reference tests on REO1012.
1.9.3.2. Four reference tests in advance of the BOI/VGRA matrix.
1.9.4. The group decided to reconvene once these (8) test are complete to review the data and formulate a forward action plan.
1.9.4.1. Afton suggested meeting after the four BOI/VGRA matrix tests are complete.
1.9.4.2. Four data points is enough for an initial look at the effectiveness of the new break-in.
1.9.4.3. OHT agreed.

2. NEW MOTIONS:

2.1. Motion #1:

2.1.1. ***Motion:*** *"Sequence IV surveillance panel approves capping the severity adjustments for FEWMEOT at ± 100ppm at the introduction of the Sequence IVB FEWMEOT LTMS. Once an adequate amount of data is deemed to be available, this surveillance panel will re-evaluate FEWMEOT severity adjustments."*
2.1.2. Lubrizol and Afton both stated that this motion addresses their concerns about the iron severity adjustment.
2.1.2.1. In fact, Afton made the motion and Lubrizol seconded the motion.

2.1.3. ***Comments from the TMC:***
2.1.3.1. The TCR will be used to generate the severity adjustment (and not LTMS).
2.1.3.2. The cap will need to be made in transformational space.
2.1.3.3. The cap will be communicated through a technical memo.
2.1.3.4. The TMC will instruct the ACC how to apply the cap for candidate tests.

2.1.4. Toyota suggested canceling the November AOAP meeting if the Panel is still collecting data.
2.1.5. Intertek does not believe that this is necessary because this vote will "release" the LTMS system.

2.1.6. Ford asked that the official minutes clearly state that the motion from last week is separate from the BOI/VGRA matrix.
2.1.7. This motion passed with 20 approves, 0 negatives and 0 waives.
2.1.8. ***LTMS "Clock":***
2.1.8.1. The TMC confirmed that the Surveillance Panel is now in the middle of the 2-week implementation clock for LTMS.
2.1.8.2. The clock remained running because this motion makes no changes to LTMS.
2.1.8.3. The severity adjustment cap is procedural and not statistical.
2.1.8.4. The labs will soon start seeing TCR's with iron severity adjustments.

2.2. Motion #2:

2.2.1. The Surveillance Panel discussed the outstanding issue of how long an engine should remain in service.
2.2.2. Afton originally suggested running an engine for 8-9 runs without a cylinder head swap.
2.2.3. The other four labs confirmed that they have already discontinued cylinder head swaps.
2.2.3.1. They run an engine block for a maximum of six runs.
2.2.4. ***Motion:*** *"Sequence IV surveillance panel approves revising Section 11.2.6 of the Sequence IVB ASTM draft procedure to allow a maximum of 6 tests per engine block assembly and a maximum of 6 tests per cylinder head assembly. Effective for all Sequence IVB candidate and reference oil tests started on or after 10/25/18."*
2.2.5. A cylinder head swap can still be made within the engine block's service life if needed.
2.2.6. Many of Intertek's customers believe that a reduction in engine life is appropriate.
2.2.7. Chadwick requested confirmation that LTMS will not be changed because of this motion.
2.2.7.1. There was consensus among the Panel members that this motion will not impact LTMS.
2.2.8. The TMC stated that this motion will not impact previous candidate or reference tests.
2.2.9. Intertek made the motion and it was seconded by Afton.
2.2.10. The motion passed unanimously with 20 approves, 0 negatives and 0 waives.

2.3. Motion #3:

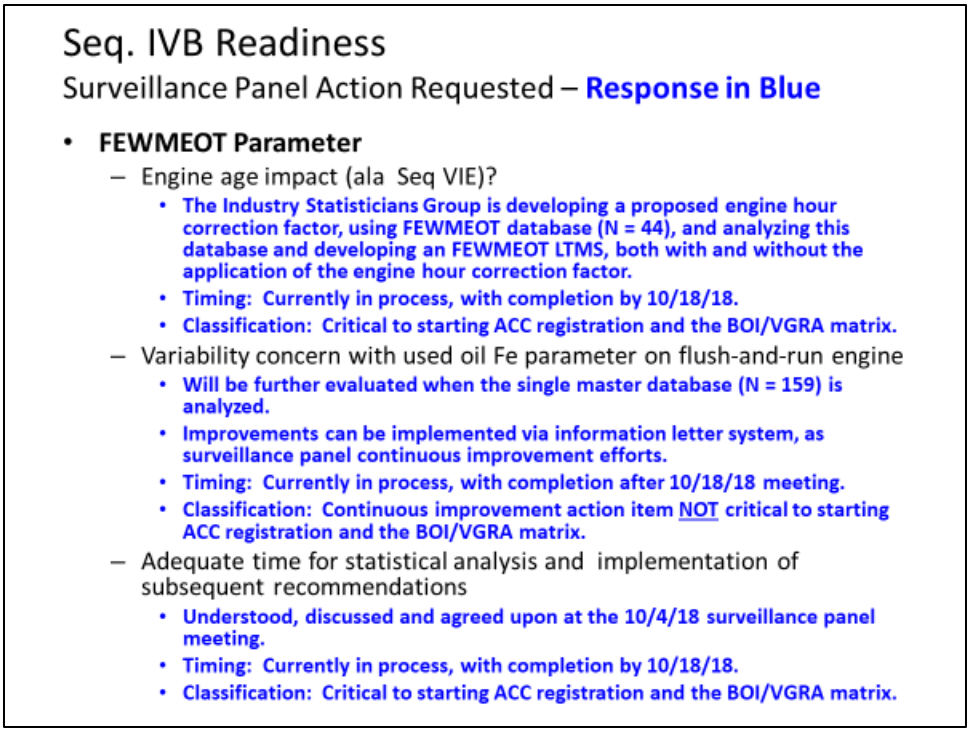
2.3.1. ***Motion:*** *"Sequence IV surveillance panel approves granting the ASTM Test Monitoring Center the latitude to adjust stand calibration periods due to the surveillance panel requirement to introduce new engines with the new break-in/aging procedure, followed by a calibration test, conducted on ASTM REO 1012, and due to early stand calibration for the BOI/VGRA matrix."*
2.3.2. Afton made the motion and it was seconded by Total.
2.3.3. The motion passed unanimously with 20 approves, 0 negatives and 0 waives.

3. REVIEW ACC PAPTG RESPONSE:

3.1. Background:

3.1.1. The following file was reviewed: ***Sequence IV Surveillance Panel Response to ACC PAPTG 20181012.pptx***.

3.2. Slide #3:



3.2.1. ***Engine Age Impact:***

3.2.1.1. This bullet needs to be updated based on today's discussion.

3.2.1.2. The "timing" sub-bullet can be changed to today's date.

3.2.1.3. The details of the new motion also need to be added.

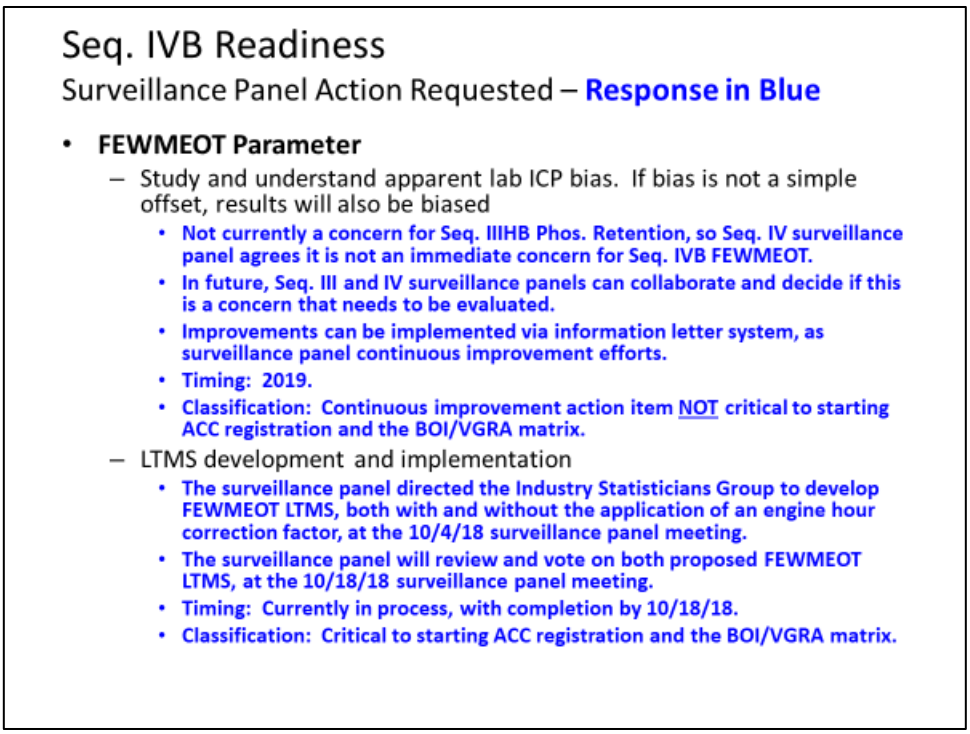
3.2.1.4. *Comments from Ford:*

3.2.1.4.1. Clearly state that the statisticians did make specific recommendations such as an engine hour correction, but the Panel decided upon a slightly different course of action.

3.2.2. ***Variability Concern with Using an Iron Parameter with a Flush-and-Run Engine:***

3.2.2.1. Afton suggested adding a comment that the break-in procedure has been changed, and a plan is in place to collect reference data to evaluate its effectiveness.

3.3. Slide #4:



3.3.1. ***Comments from Lubrizol:***
- 3.3.1.1. *Is the ICP bias really an issue that specifically effects the Sequence IVB?*
- 3.3.1.2. The same ICP procedure is used for about a dozen gasoline and diesel tests.

3.3.2. ***Comments from Afton:***
- 3.3.2.1. This problem did specifically impact the Sequence IVB.
- 3.3.2.2. However, this is no longer a major problem because the calcium adjustment is not being used.

3.3.3. Total asked if a similar problem is seen with the Sequence III.
- 3.3.3.1. *Reply from Afton:*
  - 3.3.3.1.1. It may be a problem with the Sequence III.
  - 3.3.3.1.2. The problem may not be apparent because there probably has never been a lab-by-lab comparison of Sequence III ICP data.
  - 3.3.3.1.3. The Sequence III Surveillance Panel recently made a motion about ICP dilution ratios.
  - 3.3.3.1.4. Dilution ratios may be contributing to the bias with the IVB.

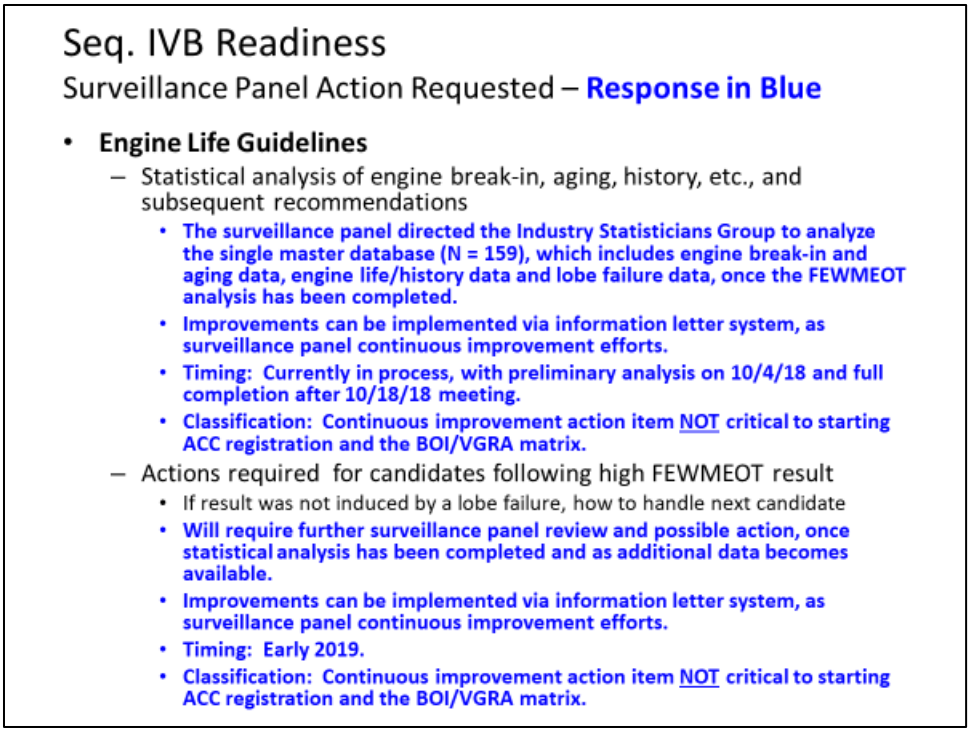
3.3.4. ***Comments from Oronite:***
- 3.3.4.1. The labs need to audit how they are currently running ICP tests.
- 3.3.4.2. There is a lot of incorrect procedural paperwork in the Industry.

3.3.5. The Panel agreed to add a comment to this slide that there is no longer a calcium adjustment.

3.3.6. The Panel also agreed to collaborate with the Bench Test Surveillance Panel to investigate the issue of ICP bias.

3.3.7. ***LTMS Implementation:***
- 3.3.7.1. This item was finalized today.

3.4. Slide #5:



3.4.1. ***Engine Life Guidelines:***

3.4.1.1. Inform the ACC that the statisticians are continuing to analyze the master database.

3.4.1.1.1. Ford and Lubrizol both agreed that the statisticians should be given enough time to complete the analysis as they see fit.

3.4.1.2. Lubrizol noted that the minutes from a recent Precision Sub-Group meeting contain a high-level list of objectives for the statistical analysis.

3.4.1.3. *Comments from Chadwick:*

3.4.1.3.1. The Statistics Group met to discuss this list yesterday.

3.4.1.3.2. They are still working on their analysis strategy.

3.4.1.3.3. Some objectives on the list will be difficult to complete with the parameters that are currently available.

3.4.1.3.4. It would be useful if an additional column can be added to the dataset to identify each test as valid or invalid.

3.4.2. ***Classifying Items as Critical vs. Continuous Improvement:***

3.4.2.1. Chadwick suggested letting the ACC decide which item is critical and which item is continuous improvement.

3.4.2.2. *Comments from Infineum:*

3.4.2.2.1. The Panel needs to reclassify continuous improvement items as critical.

3.4.2.2.2. There will be too much debate between the two groups otherwise.

3.4.2.3. *Comments from Afton:*

3.4.2.3.1. Let the ACC focus on the registration issue.

3.4.2.3.2. The Panel needs to focus exclusively on completing critical action items.

3.4.2.4. *Comments from Lubrizol:*

3.4.2.4.1. Afton is correct, the Surveillance Panel only needs to worry about the current technical problems.

3.4.2.4.2. Lubrizol has continuously requested that the Panel ask the ACC what they require to feel comfortable with starting registration.

3.4.2.5. *Comments from OHT:*

3.4.2.5.1. Make the Panel's response to the ACC simple.

3.4.2.5.2. List what has been done thus far.

3.4.2.5.3. And list the open action items with expected completion dates.

3.4.3. ***Actions for Candidate Oils that Follow a High FEWMEOT Result:***

3.4.3.1. Lubrizol reminded the Surveillance Panel that none of the sub-groups have addressed this issue.

3.4.3.2. Afton stressed that this is one of the most critical action items.

3.4.3.3. Ford asked if this issue will be part of the ongoing statistical analysis.

3.4.3.4. *Comments from Chadwick:*

3.4.3.4.1. There are not a lot of tests in the master database that have high end-of-test iron.

3.4.3.4.2. The oil consumption limit may also prevent high iron tests in the future.

3.4.3.5. Ford followed-up by asking if the Engine Health Checklist is a solution to this issue.

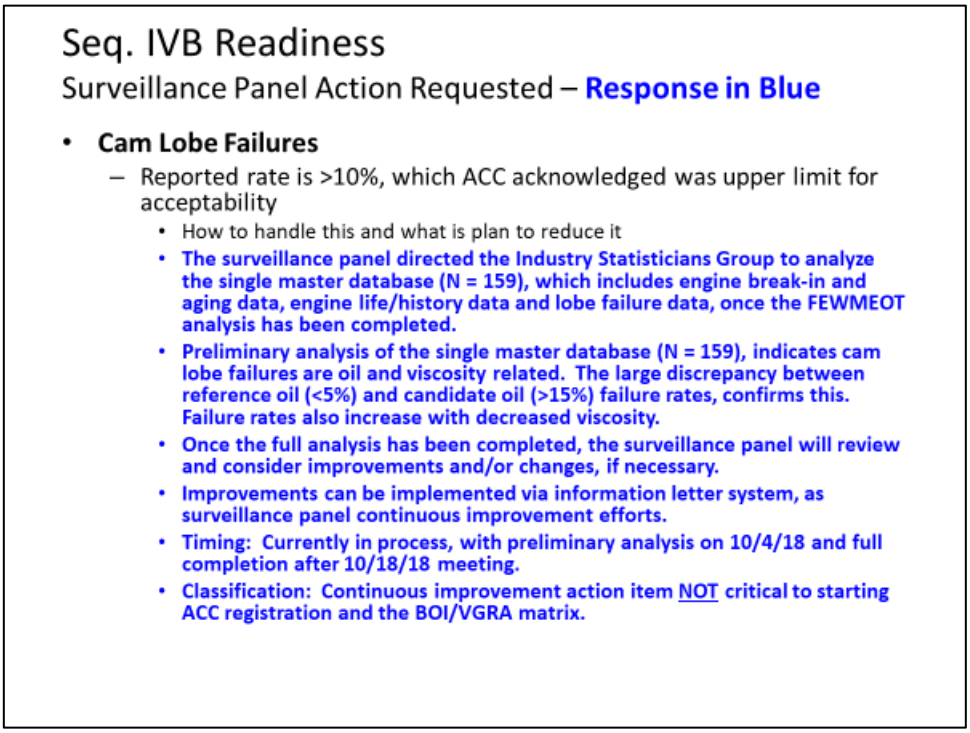
3.4.3.6. *Comments from Afton:*

3.4.3.6.1. The resolution to this issue may be simple.

3.4.3.6.2. *Do we remove an engine from service if a test reaches some high iron limit?*

3.4.3.7. Chadwick said that the Panel will need to decide on this high iron limit.

3.5. Slide #7:



3.5.1. Camshaft lobe failures are part of the ongoing statistical analysis.

3.5.2. ***Comments from Afton:***

3.5.2.1. There appears to be a viscometric effect on lobe failures.

3.5.2.2. *Should the Surveillance Panel address this effect?*

3.5.2.3. One option would be to segregate engines into two groups.

3.5.2.4. One group of engines would only be used for oil viscosities of 0W12 and lower.

3.5.2.5. The other group of engines would only be used for oil viscosities of 0W16 and higher.

3.5.3. Intertek noted that there is a 0W16 reference oil that does not experience lobe failures.

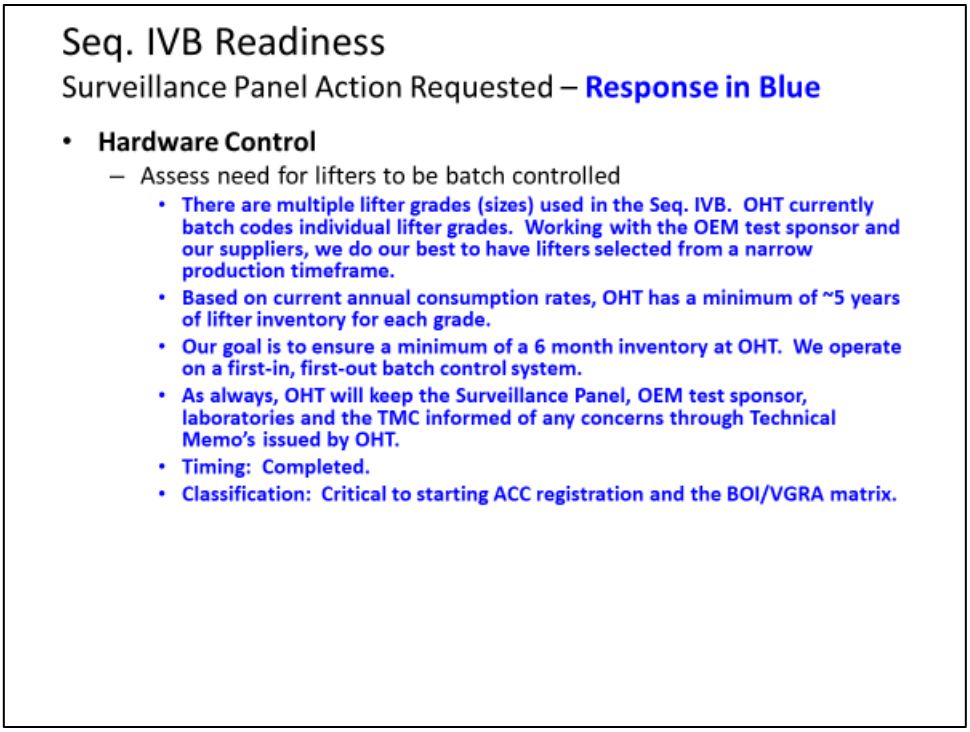
3.5.4. Ford supports the idea of segregating engines.

3.5.5. ***Comments from Lubrizol:***

3.5.5.1. Lubrizol reminded the Panel that it needs clarity on the ACC's acceptability limit of 10%.

3.5.5.2. *What does this mean?*
3.5.5.3. *Will they stop registering the test if the camshaft lobe failure rate exceeds 10%.*
3.5.5.4. If so, that is a problem because the current failure rate is around 20%.
3.5.6. ***Comments from Total:***
3.5.6.1. The viscosity impact needs to be outlined in the Panel's response to the ACC.
3.5.7. The statistical analysis of the master database may add clarity to this issue.

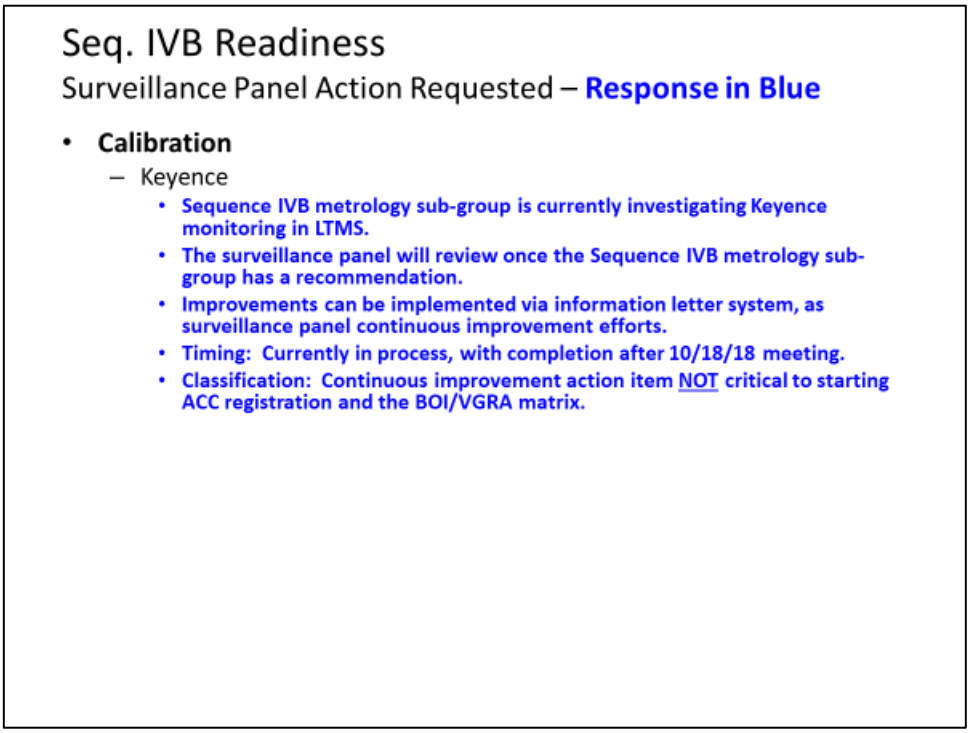
3.6. Slide #9:



3.6.1. Intertek added comments provided by OHT that explain how hardware is controlled.
3.6.2. ***Lifters (OHT):***
3.6.2.1. They restock lifters at a frequency that allows them to maintain a 6-month supply.
3.6.2.2. They currently have a significant inventory.
3.6.3. ***Camshaft Batches:***
3.6.3.1. Afton asked if camshaft batches should be introduced with reference tests.
3.6.3.1.1. This is how the Sequence III releases piston batches.
3.6.3.2. Intertek noted that the Statistics Group is reviewing the master database to determine if camshaft batch effects severity.
3.6.3.2.1. Chadwick warned that there may not be enough data to complete this review.
3.6.3.3. Southwest is concerned that labs would need to know about camshaft batch changes well in advance if they were to be released with reference tests.
3.6.3.4. The statisticians noted that LTMS already has functionality to track hardware batch changes.
3.6.3.4.1. The Panel will need to decide of this functionality is to be used.
3.6.3.5. *Comments from Toyota:*
3.6.3.5.1. The profile of the intake camshaft is different than that of the production camshaft.
3.6.3.5.2. Every intake camshaft is machined and hardened in a careful manner.
3.6.3.5.3. The material for new camshafts is poured within the same time.
3.6.3.5.4. From a quality assurance standpoint, the test camshafts may be produced in a more controlled manner than the production camshafts.

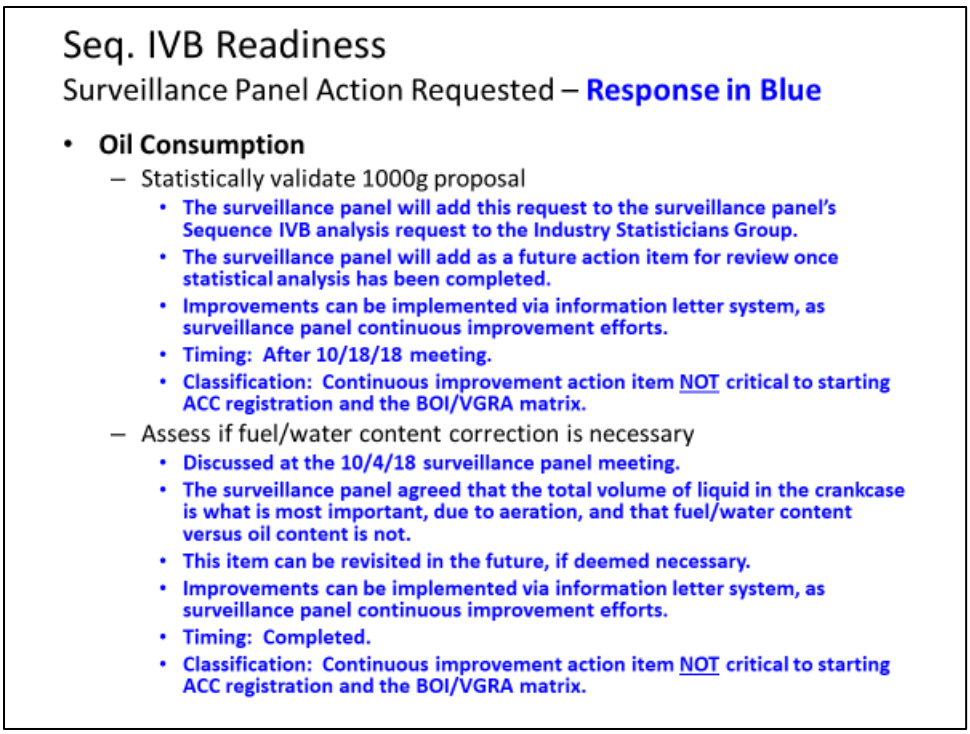
3.6.3.5.5. Intake camshafts are machined on a single piece of manufacturing equipment.
3.6.3.5.6. This machining is done daily, so there are not necessarily individual batches.
3.6.3.6. *Comments from Intertek:*
3.6.3.6.1. Intertek just transitioned their candidate tests to a new camshaft batch.
3.6.3.6.2. Batch-D camshafts have been sequestered for the BOI/VGRA matrix.
3.6.3.7. *Comments from OHT:*
3.6.3.7.1. Batches are going to change at different times for all critical components.
3.6.3.7.2. It will be impossible to align all these tests.
3.6.4. Ford noted that other tests introduce critical parts with reference tests.
3.6.5. Intertek and Southwest both feel that there is no evidence that camshaft batches have impacted test severity.
3.6.5.1. However, the Statistics Group needs to continue their investigation into this issue.

3.7. Slide #13:



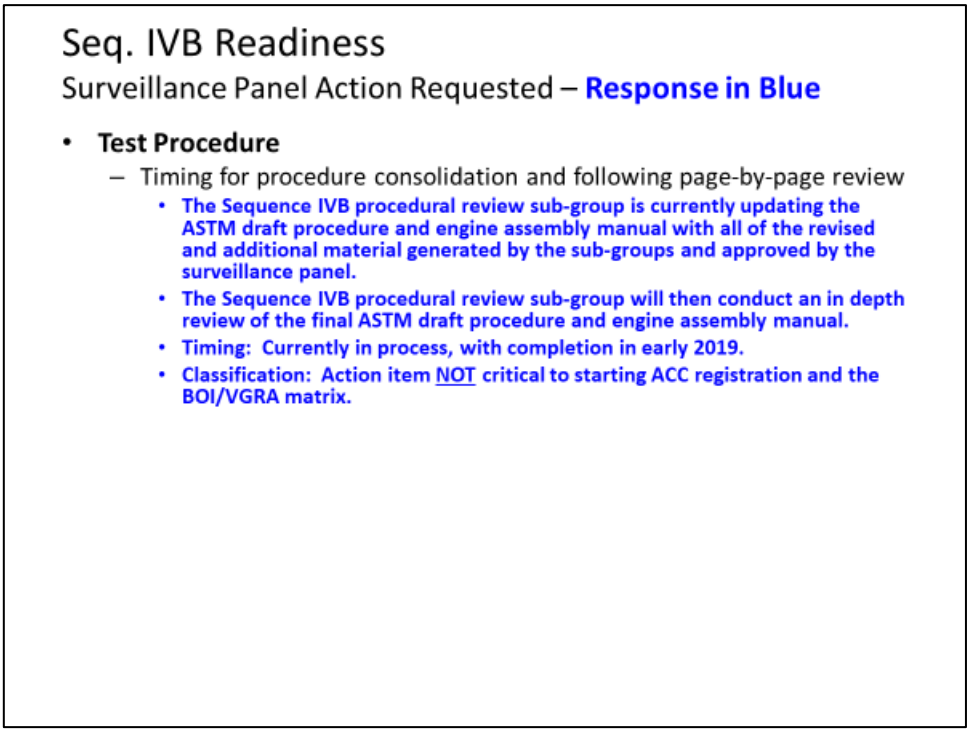
3.7.1. Afton asked why the Keyence needs to be separately monitored in LTMS if LTMS is already monitoring the entire test.
3.7.2. ***Response from Lubrizol:***
3.7.2.1. Monitoring the Keyence separately in LTMS will help a lab identify the root cause of an unexplained severity shift.
3.7.2.2. There have already been documented shifts and offsets in the performance of individual Keyence units at Sequence IVB labs.
3.7.2.3. LTMS is ideally suited to track these performance and calibration changes.
3.7.2.3.1. The calibration verification block that is supplied by Keyence may not be sufficient.
3.7.2.4. The round-robin dataset is not expected to be completed until the middle of November.

3.8. Slide #14:



3.8.1. The Surveillance Panel asked the Statistics Group to "validate" the 1000g oil consumption limit during their master dataset analysis.

3.9. Slide #15:



3.9.1. The TMC and Southwest will work together to update the IVB draft procedure with the additional documentation that was developed in 2018.

Action Items	Person responsible	Completion Date

Follow-up Notes/Updates	Initials	Date Added

Attendees	Organization	Contact Information