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**COMMITTEE D02 on PETROLEUM PRODUCTS, LIQUID FUELS, AND LUBRICANTS**

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# Unapproved Meeting Minutes of the Technical Guidance Committee Meeting

DoubleTree by Hilton, Pittsburgh, PA

October 18, 2022

8:00 AM – 4:00 PM EDT

**Reply to:** Patrick Lang

Southwest Research Institute, 6220 Culebra Road San Antonio, TX 78228

Phone: 210-522-2820, patrick.lang@swri.org

The meeting was called to order at 8:00 AM by Chairman Lang.

**Agenda**:

The meeting agenda can be found as Attachment # 1.

**Membership Review:**

The attendance list can be found as Attachment #2. Pat asked the group to review of the attendance list for accuracy as this attendance list has been updated to contain all of the current surveillance panel chairs.

**Review and Acceptance of Minutes**:

Pat stated that the minutes from the June 27, 2022, meeting in Seattle were posted to the TMC website. Approval of the minutes was not requested at this meeting and will be deferred to the next meeting.

**Chairmans Comments:**

Pat took a few minutes to go over a brief document (Attachment #3) on the structure and purpose of the TGC. He reminded the group that the membership list for the TGC is comprised of the surveillance panel chairs of the TMC monitored tests and test developers/sponsors.

He went on to explain that this face-to-face meeting was scheduled outside of the normal meeting held during ASTM week to allow for more time to go over some critical issues that have arose in the engine testing areas. He further advised that stronger efforts have been made to include testing areas outside of engine testing such as gears and bench since some of the issues that are being discussed may apply to other areas.

At this point there was a bit of an open forum for comments from the group.

Andy Ritchie took the opportunity to advise that bringing this TGC group together was consistent with the TGC's charter and a great opportunity to review how things are handled by the Surveillance Panels across all test types – Light Duty, Heavy Duty, Gear and Bench test and within the ASTM committees. Specifically, concerns have been raised recently with the process of setting reference oil targets and how their updates that my affect the LTMS charts associated with any given test. Additionally, there was an issue with a negative vote on an information letter that caused some uncertainty for the VH panel in that it suspended the proposed action until it could be reviewed by Subcommittee B many months later. The question was then raised on whether the current information letter system needs improvement. Rich Grundza pointed out that the information letter system is unique to Subcommittee B, in that Surveillance Panels are more like a Task Force and that they actually don't have the ultimate decision-making authority. Others commented that the issues cover a range of tests, and that the information letter system works well most of the time.

There have been recent concerns around lack of action taken by SP chairs when the severity level of a test goes off track. Andrew Stevens commented that there are many times where the Surveillance Panel chairs just don't know what to do when certain problems arise in their panels. He suggested that a handbook for Surveillance Panel chairs should be created to document best practices and document test monitoring knowledge so that it can be used when need by existing chairs and to train new chairs.

Pat closed out this section of the meeting stating that the aforementioned items are the reason that this meeting was being held. There are lots of items that need attention and that the TGC will work towards addressing them. For the next part of the meeting, he advised that Travis Kostan from SwRI was going to

present an overview of the topics outlined in the agenda. Travis presented on behalf of himself but noted that there had been a number of very productive sessions preparing the material with the Statisticians group. He read out a disclaimer at the start of the presentation, that stated it was not a consensus presentation. No specific formal objections or alternative approaches to the material in the slides were raised. His presentation focused on how to interpret CUSUM and EWMA charts correctly. He included a brief overview of the target setting process, target updating and introduction of reference oil reblends. The approach here would be to go through this presentation and better understand the challenges and then circle back to each item for further discussion.

At this point Travis Kostan went through his presentation which can be found as Attachment #4.

CUMSUM plots

Travis advised that charts can easily be misinterpreted. Slides were shown (see slides 10 to 15 in Attachment #4) demonstrating various versions of a CUSUM plot and how the scale used on the plot can cause the slope of the CUSUM line to be misleading. Jeff Clark mentioned that if 30 tests are on one side of the line and not necessarily in an alarm situation, the EWMA doesn't really scream at you that there is a problem; the CUSUM will show you that. Jeff stated that typically the CUSUM plot axis scale should be 1:1 to keep it consistent between test types so there isn't such an influence from the scale on the plot.

Andy Ritchie asked if we really need to continue to use the CUSUM charts if they can be so "dangerous". Some felt that we shouldn't get rid of them as they do offer another very visual way to look at trends. Travis stated that there can be a lot learned from them if people really know how to interpret them properly.

Rich commented that as soon as you set targets, the test changes. Moving forward a lab's severity is very likely to change and that affects the charts, i.e., their performance is different after the precision matrix.

It was brought to the attention of the group that a lot of the bench tests have just the CUSUM plot for assessment. The NOACK test is currently the only test that utilizes a full LTMS system like the engine tests.

Perhaps the bench area needs to look at this further. Jeff Clark stated that using an LTMS system in the bench area has been considered before but it has been met with a lot of opposition. There are reservations due to the concern of potentially making it harder to pass a reference test.

The discussion switched over to EWMA charts (slides 16 to 26):

Travis explained that there are a lot of alarms that take place and alarms are not unique to one particular test type. He showed examples of some charts that are troublesome. He stated that if alarms are this common, we really must ask ourselves if we have the correct approach for monitoring our tests.

Some of the reasons that alarms are common could be:

- Precision matrix data testing is often less than recommended and some amount of target inaccuracy is to be expected.

- Precision matrix test logistics often do not represent test conditions over the life of the test. Standard deviations increase with introduction of new labs, stands, parts, reference oil age, raters, time, etc.
- Monitoring methodology may not match target setting methodology.
- Significant lab differences may exist in the precision matrix which can contribute to the appearance of off-target performance post-precision matrix.

Precision matrix design and target setting:

Travis prefaced the discussion that repeatability degrees of freedom is an important aspect of target setting and that he was going to explain it to the group so further discussion could be built upon it. See slides 29 through 35. It is desired to have as many degrees of freedom as possible.

Travis advised that ASTM D6300 outlines some of the requirements for a precision matrix but some of these requirements are too much for engine testing. We are always moving forward without enough data from the precision matrix, but this is just something that we accept as a compromise due to the expense associated with gathering more data from engine tests.

Travis went through a series of slides that showed how the means of a reference oil can be influenced by labs not included in the precision matrix that eventually start providing chartable reference data. This can cause a EWMA chart to shift after the matrix and it is not necessarily the result of a change in the test performance but a lab influence.

Another scenario could be that multiple labs participate in the precision matrix and are included in the target setting data pool. Post precision matrix, one of the labs that participated in the precision matrix that had a severity bias stops contributing reference test data. In this case the EWMA could shift if the remaining labs continue to produce results consistent with their precision matrix performance.

Travis showed the example of the LS means vs simple means and how the above-mentioned scenarios could be address with these different methods of determining the means. It is important that we consider the volume of testing from all labs into the future, i.e., will they produce the same ratio of testing as done when the targets were set.

Andy commented about oils that are a quick check to make sure that there is strong discrimination, i.e., run them to make sure that they perform a certain way, typically really bad. Oils should have different performance. Maybe we should not have as many chartable reference oils in the system to help mitigate this?

Jo Martinez commented that LTMS II System takes into account that labs are rarely the same after the precision matrix.

Amol commented that it is important to have the proper depth of comprehension of these variables when the targets are being set.

With some of the specific scenarios that were discussed in Travis' presentation, there is a hint that we may not have chosen the best path with some of the target setting options. There is no blame here, just opportunities to do better.

Rich further added that this is a lesson learned exercise. We know now that we need consider more items when setting targets.

Jo Martinez commented that we always start without enough data, and we have to accept that this is a compromise once we move forward.

Bob Campbell advised that we have to have the correct discussions at the start, but we also need to do the maintenance on the test monitoring once it is in play.

David Brass stated that if data is wrong from the start and you now trip alarms, you start to ignore the alarm warnings because it is always occurring. If it is wrong from the start, the charts are not properly assessing the process.

Amol commented that we should consider moving (shifting) the bands (warning/action limits) on the LTMS charts to compensate for some of these problems. Travis stated that this could cause a number of problems.

Post Precision Matrix Process Options:

In the LTMS document, Travis showed the statement about updating targets at 10, 20 and 30 tests.

Rich commented on the 10, 20 and 30 test updates to the target predates the LTMS system; things were very different back then with more testing and more labs.

Bob Campbell asked who owned the Appendices in the LTMS documents. The LTMS system was created in 1992. Andy suggested that we go back to the minutes from that time and see if there is any information on the ownership.

**Action:** Determine who "owns" the LTMS Appendix document.

Travis showed the Sequence VI example on FEI2 (slide 52). He explained that there were two labs that contributed PM data but didn't contribute data thereafter. This was likely a partial cause for the dip in the EWMA that that was present right after the precision matrix.

An example was shown of how updating targets at the 10, 20 and 30 test intervals would not have fixed the Sequence VIE situation. The dip in the EWMA plot was associated more with a lab bias associated with one test from two different labs in the precision matrix and limited data from them post-precision matrix (see slide 55). This is just one example of showing how a method of updating targets may not help but there are other scenarios where it could help. This is supporting the notion that many options should be considered before taking the final action on the method. This conflicts with the LTMS appendix approach of suggesting that the targets should be updated at 10, 20 and 30 automatically. This may need to be rethought.

How updating targets affect candidate pass/fail

Travis explained that if there is a shift in test performance, we expect the same shift with candidate oils as with the reference oils. Slides 59 through 62 provide an explanation on how updating test targets can affect a candidate pass/fail probability. Updated targets would result in severity adjustments not capturing the full extent of the change, changing the probability of pass for the candidate. However, Correction factors can bring a test back on target, and are not expected to change the probability of pass if the candidate result has moved similarly to the reference oil(s).

Robert Stockwell mentioned that when labs start failing references, this is when it is brought to the attention of the panel.

Phil Scinto (not present) provided the information on slide 64 and 65. This was not discussed in detail due to the depth of the material.

Jeff asked if there was guidance to determine if a reference oil reblend is different or the test has moved. Travis stated that the supplier is typically asked. Andy Ritchie commented that the supplier of a reference oil gives it their best shot at blending it the same and they can never be sure that the oil's performance will be the same particularly if a long period – can be over 10 years - has passed between reblends perform different.

The question arose on the potential to eliminate reblends by ensuring that there is enough oil on hand to last the life of the category. The ACC code of practice advises that the TMC should have a five-year supply of oil on hand. Andy commented that this would be a tremendous volume of oil for some test types.

Bill Buscher mentioned that reblends can be different across test types, i.e., perform ok in one test type but not another.

The performance of reblended reference oils needs to be assessed back to the precision matrix level of performance, not the current performance level.

It was brought up that the bench tests do not have severity adjustments. Some of the SP Chairs in areas outside of engine testing don't know that these solutions exist.

Pat Lang asked Amy Ross about how the NOACK test ended up with an LTMS system when other bench tests typically don't have them. Amy explained that the NOACK test did get an LTMS system due to one particular rig being out of control. Josh Fredrick (engine test background) advised that group during the severity issues for them to consider the use of severity adjustments. They investigated and applied them to the test, and it is working well.

Control chart methodology ideas (slides 70 through 75):

The group entertained the thought of looking at severity on a per lab basis. Rich mentioned that this is doable and has been done before. Some feel that there needs to be more granularity by lab to understand trends better.

Some thoughts on the lab weighting process during the precision matrix were entertained. Most think it is good to capture the more labs in the precision matrix if those labs will be running tests in the future. If you want to give equal weighting to labs in the PM, perhaps we can modify the charting method to compensate the lab difference in the charts. Maybe there is a way to weight it based on post-matrix test count from each lab.

Travis showed the VIF FEI1 plots on where one oil is mild, one is severe, so they balance out and thus show an EWMA that is on target (slide74). This is a good example of the current system not detecting what is actually happening with the test.

At this point Travis had completed his presentation and the following comments were made:

Robert Stockwell mentioned that sometimes you have to leave well enough alone, i.e., the severity level is a little off, but the test is consistent and stable.

Sean Moyer from the TMC advised that he sends out notices to the SP chairs even if there are in a warning situation and have not reached an alarm level yet. Rich advised that he does the same.

Andy Ritchie asked if we live on the EWMA warning/alarm line, what should we do? He feels we need to do something. Bob Campbell supported this comment.

ISM/C-13 don't have severity adjustments. Why don't these tests have severity adjustments. Bob commented that there isn't enough data and not sure where you are really at so just leave it alone.

Travis: one size doesn't fit all. Come up with a checklist when targets are set for a new test type to make sure that everything is being considered. This idea is well received.

Pat mentioned that the TGC is considering adding a Stats Leg to the TGC. It was brought to the group's attention that the LTMS II Task Force reported to the TGC so there is already a precedent set for this.

Travis mentioned that there could be a vote at normal TGC meeting to pick stats topics.

YongLi asked: Who do I reach out to getting something on the stats group list? It was mentioned that there is an email list that goes to the stats group.

Jeff Clark advised that the Stat group is an Ad hoc group; we are not 100% sure who actually manages them.

Matt Schlaff advised that he ran a mini matrix which include 11 data points on a new reference oil. He is wondering what he should now do with the data since he has increased knowledge as a result of this meeting on different option on analyzing it.

**Action**: Make sure that the analyst email list on the TMC website is up to date.

Andy Ritchie commented that some of the TGC topics are very specific to the particular areas, i.e., bench vs. engine testing. He thinks that the TGC should split HD/PCMO/Bench. Bob Campbell countered that by stating that it is best that it stays under one so that there is consistency.

The topic of a surveillance panel chairman handbook was discussed again.

> **Action**: Create a Surveillance Panel Chairman Handbook to document the responsibilities associated with the chairmanship positions.
>
> Andrew Stevens and YongLi volunteered to work on this task. They will first create an outline of the major topics and solicit additional input from others

Mike Deegan advised that he has upcoming ILSAC and EMA meetings and plans to advise these groups with a high-level summary of the discussions from this meeting.

Andy Ritchie suggest that we look to gather the LD SP chairs in November during Surveillance Panel Week to spend a little time further discussing some of the issues outlined in this meeting.

**Next Meeting:**

The next meeting is planned to be during ASTM week December 2022 in Orlando, Florida.

The meeting adjourned at 3:50 EDT.

# Attachment #1

## Agenda

## October 18, 2022

# Attachment #2

## Attendance List

## October 18, 2022

# Attachment #3

## TGC Charter Document

## October 18, 2022

# Attachment #4

## TGC Review of Lubricant Test Target Setting and Monitoring Presentation

## October 18, 2022