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**Sequence VIII Surveillance Panel Meeting Minutes
Wednesday May 24, 2023
Teams Meeting (Virtual)
1:30 - 2:30 PM CDT**

Minutes recorded by Patrick Lang

Direct any comments or corrections to: patrick.lang@swri.org

The attendance list can be found as Attachment #1.

There were no attendance changes brought to the attention of the panel.

Agenda:

The agenda can be found as Attachment #2.

Minutes Approval:

Pat Lang advised that the minutes from the May 3, 2023, in-person meeting held in San Antonio were posted to the TMC website. A motion was made for approval of the minutes by Rich Grundza and seconded by Andy Ritchie. The minutes were approved with no objections or changes.

Fuel Supplier Report:

William Hairston from Haltermann advised the group that they have been looking into the source of the various components for the last several batches of fuel as a result of the request made earlier by the surveillance panel. Haltermann feels that the fuel component that is most likely to affect test severity is the aromatics. Haltermann

has talked to their aromatics supplier and determined that their supplier may pull from different locations to obtain the aromatics when going from batch-to-batch.

William asked if we had a particular batch that the panel “liked” meaning it was performing as expected. If so, Haltermann could try to go back and obtain the aromatic stream that was used for that particular batch and make some quantity with that stream.

Pat Lang asked if they could make a small quantity for running a couple of prove-out tests. William stated that it is generally more expensive to make smaller quantities, but he would consider something in the order of 1000 gallons.

Travis asked if we could get the aromatic source information to do some correlation work to test severity before we made another batch and run additional testing. William stated that he is having trouble getting that information from his suppliers so he is not sure that he can provide it but will if he gets it.

Rich commented that the test was in a good and stable two fuel batches ago.

Action:

The Surveillance Panel to provide Haltermann with the batch code that aligns with the Sequence VIII test being at the proper severity level. Haltermann will work to see if they can get the same aromatic stream used in that batch to potentially make a small batch for experimentation.

Agenda Item 4a:

Rich advised the panel that samples of oil 1006-2 from the TMC inventory have been sent to the supplier for analysis. There is no results information available at this time, but this item is being addressed.

Agenda Item 4b:

Travis Kostan presented the presentation that can be found as attachment #3. This presentation was a potential recommendation for moving forward in understanding the current bearing weight loss severity level.

Travis advised that the panel needs to understand three items to determine a path forward for the test:

- 1) Current severity level of the test
- 2) Impact of reblend of 1009, 1009-1
- 3) Performance of the new bearing batch (03-22)

He showed an example of a matrix that would address all three items (see page two of attachment #3). Travis noted that the proposed testing matrix was just his suggestion and is not a consensus of the stats group. In the event the panel endorses moving forward, this will be reviewed by the stats group.

Pat added that the panel needs to determine if 1009-1 should be a reference oil in the Sequence VIII. He reminded the panel that we have been looking for a reference oil for many years and have not been successful. Pursuing oil 1009 is really the only option right now considering the current circumstances. The proposed matrix will afford us the opportunity to gauge the current performance of 1009 to the historic performance and then to 1009-1. This brings a newer oil into the system and will help us understand if there is an aging (degradation) issue with oil 1006-2.

Andy Ritche agreed that pursuing 1009 is an option even though it may not be ideal. He feels that there is no way out of this situation using oils 1006-2 and 704-1. Oil 1009 has a history with previously established targets and that historic target is reasonable relative to evaluating candidate oils (not a failing oil with a target of approximately 14 mg).

Rich mentioned that there is one other option and that would be oil SL-107 which was formulated to be a replacement for oil 1006 for the seals tests. However, there is no indication how this oil would perform in the Sequence VIII test since there is no data at this point.

Andy remembers that oil 1009 went severe in the Sequence VIII test 15 years ago and the panel stopped using it. The performance of the oil moved right on top of oil 1006-2 (approximately 17 mg TBWL) and the panel didn't think it needed two oils that performed at the same level of severity, so they discontinued use without determining the reason for the shift in performance.

Shifting back to the matrix proposal in attachment #3, Travis pointed out that using oil 704-1 in the proposed matrix is another oil that will provide a connection to the past. Pat commented that 704-1 had not been used in the recent scoping tests because it is in very limited supply and was being reserved for the prove-out testing of the new bearing batch. The way it is placed in the proposed matrix will help serve the purpose of providing a connection to the past performance and to be used with bringing in the new bearings.

Travis pointed out that in the proposed matrix that there are some tests that were already run during the scoping testing done at the labs as we were trying to initially understand the severity problem. The panel could consider using those results. As an example, two tests were already run on oil 1009-1, one at each lab. Rich Grundza cautioned that this is a sensitive item and may need to be discussed further before any decisions are made. Since they were not "official" tests, the validity could come into question.

One detail that Travis wanted to point out is that the first two rows of the matrix would be on the current bearing batch (06-16) with the last row on the new batch (03-22).

On slide three of Attachment 3, there is an outline of the potential outcomes of the testing. The first proposed option would be for both labs to run a test on oil 1009. Pat asked the panel if they thought running 1009 made sense. A discussion took place regarding the potential outcomes of this option. Andy Ritchie commented that if we run 1009 and get around 17, then that would send us down the path of generating a correction since we would then have three oils showing the severity shift. Throwing numbers around, Andy stated that if we hit at 17mg on 1009 we would end up with a correction factor of around 4 mg.

Pat reminded the group that the outcome of the last meeting was that we didn't want to rush into using a correction factor. Pat asked Mike Deegan if he would reconsider a correction factor moving forward since, he was opposed to it at the last meeting. Mike stated that if we end up with a reasonable correction that was something like 4 mg, he would be okay with it. His concern in the last meeting was that we discussed a much larger value for the correction since it was based on the data we had from 1006-2.

Travis agreed that if we calculated the correction factor off of the 1009, 1009-1 and 704-1 results in the proposed matrix, we would end up with a more reasonable correction factor number like 4 mg.

Rich commented that labs reported that candidate performance prior to the recently failed reference attempts were coming in in the below 10 mg total weight loss. Pat Lang confirmed that this was accurate for both labs as Adrian from Intertek reported that at the last meeting. The point in mention this is that although there is a bigger severity shift with oil 1006-2, candidates at the time were not seeing severe to failing (26 mg) test results.

Action Item:

SwRI and Intertek will conduct one test each on oil 1009 using the 06-16 bearing batch. Once the data is available, the surveillance panel will be reconvened to discuss the results and determine the next step.

Action Item:

Rich Grundza will send oil 1009-1 to both labs for potential use in the next phase of the matrix.

Adjournment:

The meeting was adjourned at 2:30 PM CDT.

Attachment #1

Attendance List

✓ = present

**ASTM SEQUENCE VIII SURVEILLANCE PANEL
VOTING MEMBERSHIP ATTENDANCE RECORD**

5/24/23
TEAMS Meeting

Name	Address	Attendance
Alfonso, Adrian	Intertek 5404 Bandera Road San Antonio, TX 78238 Phone: 210-647-9429 adrian.alfonso@intertek.com	not present
Bowden, Jason	OH Technologies, Inc. P.O. Box 5039 Mentor, OH 44061-5039 Phone: 440-354-7007 dhbowden@ohtech.com	✓
Savant, Amol	Valvoline 21st and Front Streets Ashland, KY 41101 Phone: 606-585-8982 acsavant@valvolineglobal.com	
Maddock, Ben	Afton Chemical 500 Spring Street P.O. Box 2158 Richmond, VA 23218 Ben.Maddock@aftonchemical.com	✓
Grundza, Rich	ASTM/TMC Phone: 412-365-1031 reg@astmtmc.org	✓
Hsu, Jeff	Shell Projects and Technology-USA 3333 Hwy 6 Houston, TX 77082 Phone: 281-544-8619 <u>J.Hsu@shell.com</u>	✓
Hairston, William	Haltermann Solutions 15600 W. Hardy Road Houston, TX 77060	✓
<i>Ed Hennessy</i>	Phone No: 832-647-9264 whhairston@haltermann.com	✓
Riou, Joseph	Southwest Research Institute 6220 Culebra Road P.O. Box 28510 San Antonio, TX 78228-0510 Phone: 210-522-6266 jriou@swri.org	✓

**ASTM SEQUENCE VIII SURVEILLANCE PANEL
VOTING MEMBERSHIP ATTENDANCE RECORD**

Name	Address	Attendance
Lanctot, Dan	Test Engineering Inc. 12718 Cimarron Path San Antonio, TX 78249-3423 Phone: 210-690-1958 dlanctot@tei-net.com	✓
Kowalski, Teri	Toyota Motor North America, Inc. 1555 Woodridge Ann Arbor, Mi 48105 Phone: 734-995-4032 Cell: 734-355-8082 teri.kowalski@tema.toyota.com	
Cosgrove, Bradley	GM Global Propulsion Systems Phone: 313-590-2186 Bradley.Cosgrove@gm.com	✓
Rubas, Paul	ExxonMobil Research and Engineering Company 600 Billingsport Rd. Paulsboro, NJ 08066 Email: paul.j.rubas@exxonmobil.com	
Tang, Haiying	Stellantis Phone: 248-512-0593 haiying.tang@stellantis.com	
Stockwell, Robert <i>Jo Martinez for -</i>	Chevron Oronite Company LLC 4502 Centerview Drive Suite 210 San Antonio, TX 78228 Phone: 210-232-3188 Robert.stockwell@chevron.com	✓
Agudelo, Jorge	BP Lubricants USA 1500 Valley Rd Wayne, NJ 07470 Jorge.Agudelo@BP.com	✓

**ASTM SEQUENCE VIII SURVEILLANCE PANEL
VOTING MEMBERSHIP ATTENDANCE RECORD**

Name	Address	Attendance
Deegan, Mike	Ford Motor Company 17228 Federal Drive Allen Park, MI 48101 Phone: 313-805-8942 mdeegan@ford.com	✓
Ritchie, Andy	Infineum P.O. Box 735 1900 East Linden Ave. Linden, NJ 07036-0735 Phone: 908-474-2097 andrew.ritchie@infineum.com	✓
Szappanos, George	Lubrizol Corporation 29400 Lakeland Blvd. Wickliffe, OH 44092 Phone: 440-347-2631 George.szappanos@lubrizol.com	✓

**ASTM SEQUENCE VIII SURVEILLANCE PANEL
NON- VOTING MEMBERSHIP and GUESTS ATTENDANCE RECORD**

Name	Address	Phone/Fax/Email	Attendance
Amanda Stone	Alfon		✓
Todd Dvorak	Infineum		✓
Jo Martinez	Oronite		✓
Riccardo Affinito	Oronite		✓

Attachment #2

Agenda

1. Welcome
2. Take Attendance
3. Approval of the minutes from the May 3, 2023, in-person meeting held in San Antonio. Minutes posted to TMC website on May 12, 2023.
4. Next step to address the bearing weight loss severity situation:
 - a. Status of supplier review of oil 1006-2 (Rich Grundza)
 - b. Potential proposal for moving forward (Travis Kostan)
5. Next Meeting will be at call of the chair
6. Adjournment

Attachment # 3

SwRI Proposal on Moving Forward with Oil 1009/1009-1

Sequence VIII Next Steps

The Sequence VIII Currently needs to understand three items to determine a path forward for the test:

1. Current Severity Level of the test
 - There is concern that current severity levels may be due to oil degradation of I006-2. Need to understand current performance of 704-1 and I009 (original blend), both of which have target bearing weight loss < 15 mg.
2. Impact of Re-blend of I009, I009-1
 - Only 2 tests remaining of I009.
3. Limited number of tests remaining of 06-16 bearings. Need to ensure 03-22 bearings will perform similarly.

Potential Matrix for Path Forward

The matrix below is a potential solution which can help answer all three questions stated on the previous slide. Is it recommended to begin with the two 1009 tests and to follow the stage-gate process described on the next slide.

A1	A2	G1	G2
1009	704-1	1009	1009-1
704-1	1009-1	1009-1	704-1
1009-1	704-1	704-1	1009-1

- Yellow highlighted = 06-16 (current) bearing batch
- Green highlighted = 03-22 (new) bearing batch

Decision for SP after Initial I009 Runs

A1	A2	G1	G2
1009	704-1	1009	1009-1
704-1	1009-1	1009-1	704-1
1009-1	704-1	704-1	1009-1

Potential Outcome #1: I009 Testing is similar to initial I009-1 testing around 17-18mg weight loss.

- This provides further evidence that the test has experienced a severity shift across the range of test results.
 - Potential Solution #1 – Complete matrix, develop correction factor.
 - Potential Solution #2 – Continue to work towards determining root cause of severity shift.

Potential Outcome #2: I009 Testing results are on-target target, around 14 mg. weight loss.

- Severity shift may be specific to Oil I006-2.
 - Potential Solution– Seek out additional data on 704-1 or candidate testing to help determine if testing can resume as is. A different matrix could be recommended for introducing I009-1 and the 03-22 bearings.

Potential Outcome #3: I009 Testing is inconclusive, around 15-16 mg. weight loss.

- Potential Solution #1 – Complete matrix, determine if there is a need for a correction factor.
- Potential Solution #2 – Continue to work towards determining root cause of severity shift.