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COMMITTEE D02 on PETROLEUM PRODUCTS, LIQUID FUELS, AND LUBRICANTS

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**Sequence VIII Surveillance Panel Meeting Minutes
Wednesday March 1, 2023
Teams Meeting (Virtual)
9:00 - 10:00 AM CST**

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 November 15, 2022, meeting held in San Antonio were posted to the TMC website and that approval of the minutes will be deferred to the next meeting to allow more time for review.

Sequence VIII Unavailable:

Pat advised the panel that the Sequence VIII test is unavailable, and that API has officially released a letter informing the industry that provisional licensing has been implemented.

TMC Report:

Rich Grundza provided the latest industry LTMS plot for Sequence VIII bearing weight loss (BWL). The plot can be found as attachment #3. The BWL severity plot shows that the last three calibration tests are approx. 2.5 sigma severe and have now driven the industry into an EWMA action alarm. Rich also showed a delta/s plot with lines showing where there were fuel batch changes. The plot shows a change in direction to the severe side prior to the introduction of the fuel batch denoted as S-000156 but later showed a change toward the mild direction with the introduction of S-0000156. However, the current trend is in the severe direction again. Pat advised that there were some incorrectly reported fuel batches with the recent references due to receiving the incorrect fuel batch certificate of analysis at the time of delivery to the labs.

Action: SwRI and IAR to review and correct the fuel batch information on recent reference tests so the plot can be redone for further assessment.

Summary of Severe Tests Results:

Attachment #4 is a summary of the testing that SwRI and IAR conducted in attempts to understand the severity. In summary between the two labs the following items were tested, and all yielded the same severe and failing results:

- 1) Failing tests at two independent labs
- 2) Two test stands at both labs (total of four test stands)
- 3) Multiple crankshaft and connecting rod combinations at both labs
- 4) Current bearing batch (06-16) and the new bearing batch (03-22)
- 5) Older supply of oil 1006-2 (retains from an earlier receipt date at one SwRI)
- 6) Test conducted on oil 704 retains at IAR and result was severe
- 7) Tests run at IAR on fuel batch S-000156 and S-000309
- 8) One test conducted at higher ambient temperature to simulate summer labs conditions

Pat Lang pointed out that the bottom bearing is losing more than the top bearing in terms of weight loss which is not normal; typically, the top loses more. This is happening at both labs. He further stated that the additional weight loss does not appear to be the result of mechanical wear based on the visual appearance of the bearing. This suggests that the loss has to be due to corrosion.

Rich Grundza commented that he has never seen this degree of consistency of severe results between labs, stands and the number of tests conducted. Pat agreed and stated that this is why all of the testing that was done to date supports that fact that it is something common between labs like fuel, reference oil or parts.

A question was asked as to whether or not it could be something like a gasket material change.

George Szappanos questioned the cleaning procedure. Adrian commented that at his lab, there have been not changes in the process or the fluids used to clean the engine parts; Pat confirmed the same was true for SwRI.

William Hairston of Haltermann stated that he will have his team take a close look at the fuel to see if they can find anything and report back to the group.

Action Item: Haltermann to provide the group with any findings from the fuel analysis.

Pat Lang advised that he would like to run a test on a fuel batch other than the S-000309 (current green fuel batch). Adrian stated that he has some of the S-000156 batch he would be willing to provide. Since this S-000156 batch was already tested by IAR, Pat would prefer an alternate source of the fuel. George Szappanos of Lubrizol advised that he has some of the S-000156 batch that he would be willing to provide to run a test.

Action Item: Pat to work with George to get the S-000156 fuel to SwRI to conduct a test.

Action Item: The TMC will take another look at the analytical form oil 1006-2 to see if there is anything that may have changed.

Adjournment:

The meeting was adjourned at 10:05:00 AM CST.








Next meeting planned tentatively in about two weeks, chair to advise on the date.

Attachment #1

Attendance List

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

3-1-23
Teams Call

Name	Address	Attendance
Alfanso, Adrian	Intertek 5404 Bandera Road San Antonio, TX 78238 Phone: 210-647-9429 adrian.alfonso@intertek.com	
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@valvoline.com	
Campbell, Bob	Afton Chemical 500 Spring Street P.O. Box 2158 Richmond, VA 23218 Bob.Campbell@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 J.Hsu@shell.com	
Hairston, William	Haltermann Solutions 15600 W. Hardy Road Houston, TX 77060 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**



3-1-23

Teams Call

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	Chevron Oronite Company LLC 4502 Centerview Drive Suite 210 San Antonio, TX 78228 Phone: 210-232-3188 Robert.stockwell@chevron.com	✓
Marks, Brian	BP Lubricants USA 1500 Valley Rd Wayne, NJ 07470 Phone: Brian.Marks@BP.com	

ASTM SEQUENCE VIII SURVEILLANCE PANEL
VOTING MEMBERSHIP ATTENDANCE RECORD

3-1-23
Teams Call

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	

Attachment #2

Agenda

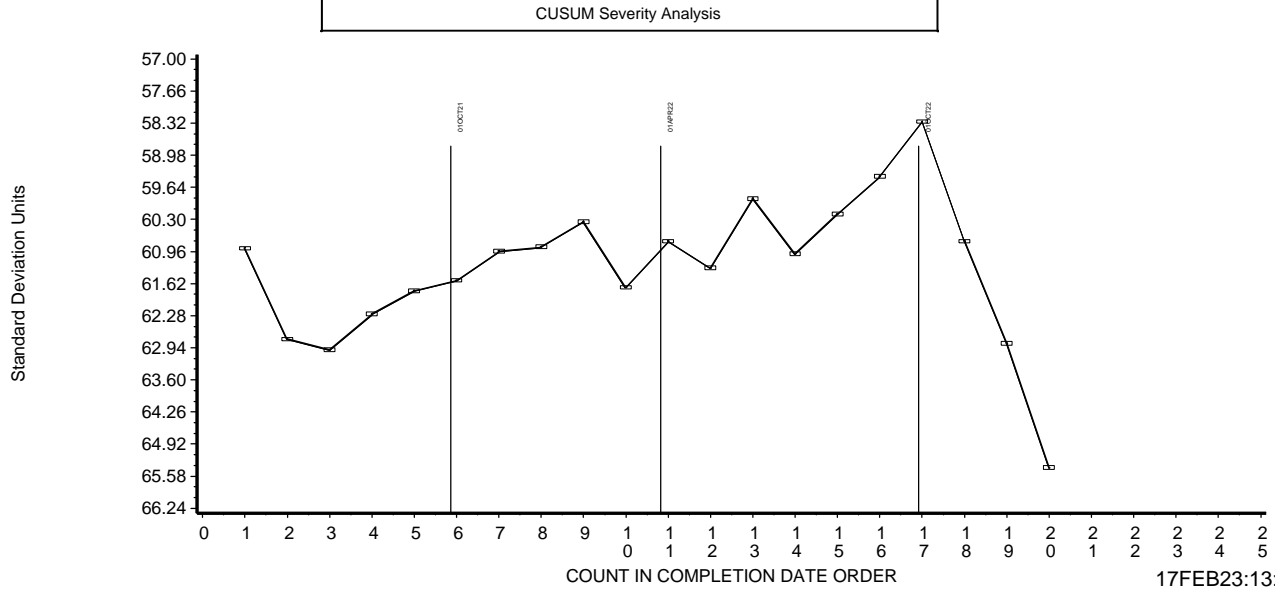
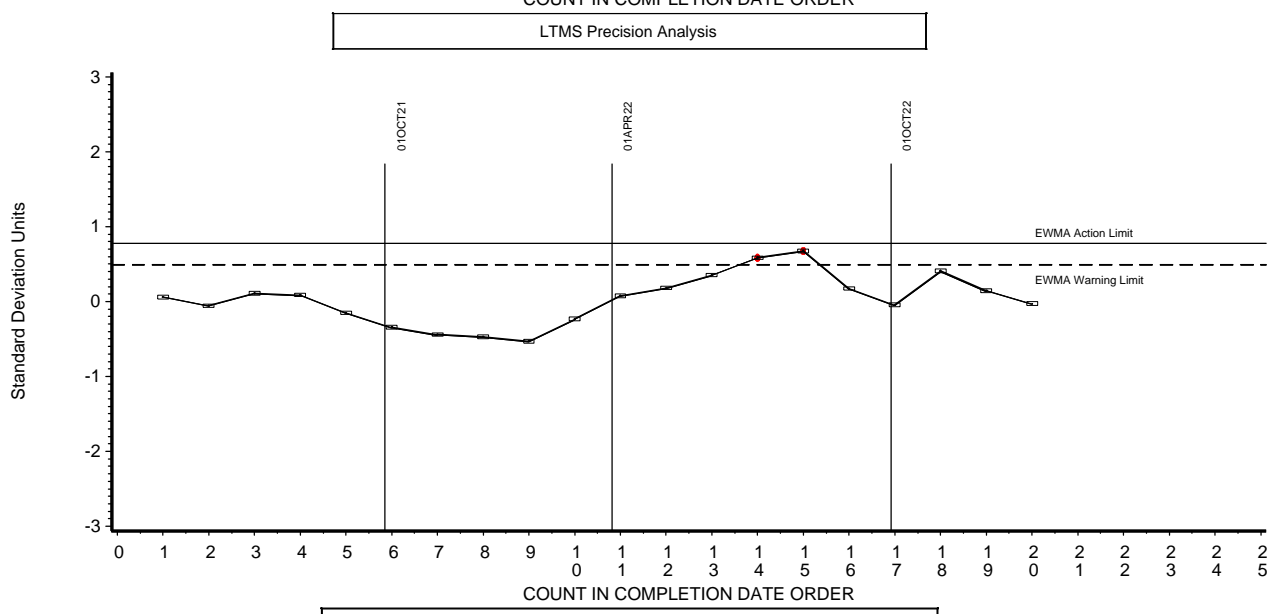
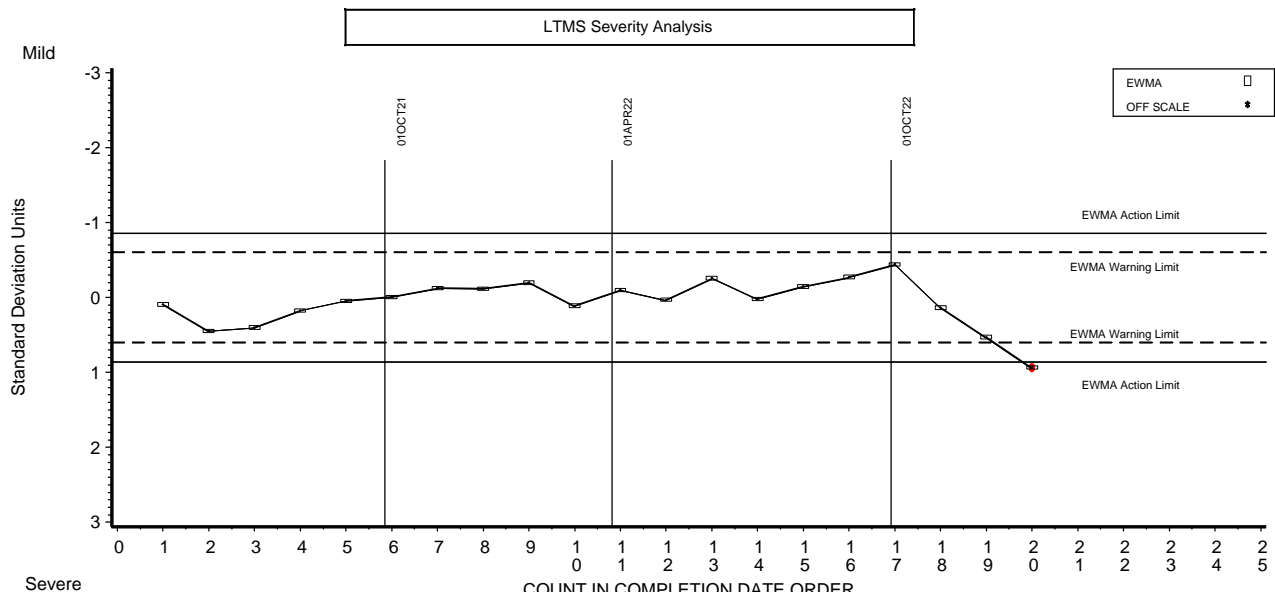
1. Welcome
2. Membership Changes
3. Minutes from the November 15, 2022 have been posted to TMC website.
Will defer approval until next meeting.
4. Sequence VIII Test Declared Unavailable
 - a. Test officially declared unavailable due to labs being unable to calibrate. No stands in industry are calibrated at this time.
 - b. API issued notice allowing provisional licensing.
5. TMC Report (Rich Grundza)
 - a. Industry Chart Status on valid tests
6. Testing Results to Date (Pat Lang/ Adrian Alfonso)
 - a. Chronology of recent severe and failing tests conducted at both San Antonio labs.
 - b. Summary of items that were changed in attempt to understand the severity issue.
7. Fuel Report (William Hairston)
 - a. Current fuel inventory level of green fuel
 - b. Any concerns with the current batch
 - c. Timing for a new batch of fuel
8. Next Meeting
9. Adjournment

Attachment #3

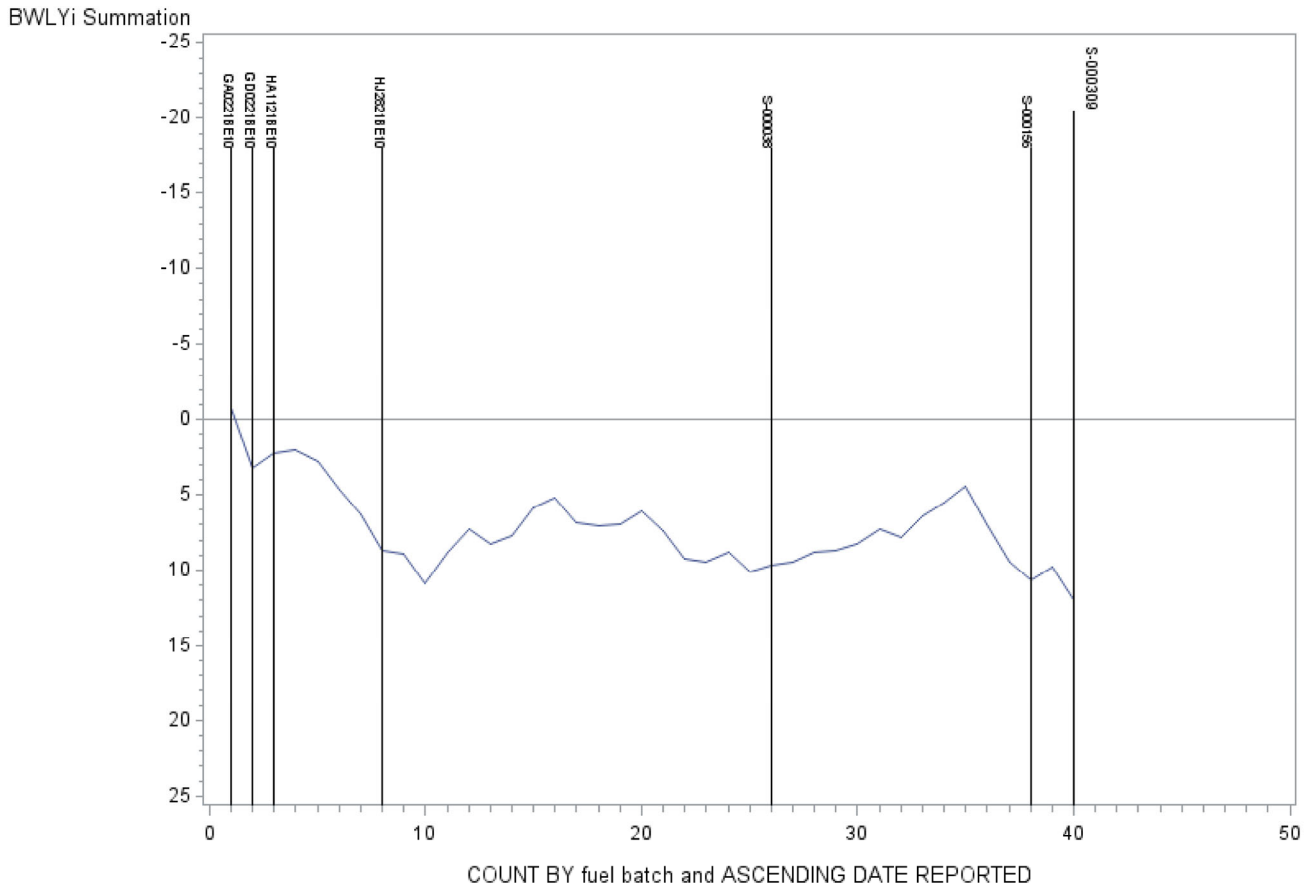
Sequence VIII Industry BWL Control Chart

SEQUENCE VIII INDUSTRY OPERATIONALLY VALID DATA

Most recent 20 tests
FINAL BEARING WEIGHT LOSS



Sequence VIII Summation Delta/s by Fuel Batch



Attachment #4

SwRI and IAR Testing Summary

Testing Done at SwRI

Stand	Test #	EOT Date	Bearing Batch	Fuel Batch	Oil	BWL Top (mg)	BWL Bottom (mg)	BWL Total (mg)	Comments
52	52-S186-0-134	15-Dec-22	06-16	S-000309	1006-2	13.5	14.8	28.3	Found oil filter bypass valve assembly out of position, Invalidated test
52	52-S186-0-134A	22-Dec-22	06-16	S-000309	1006-2	19.2	23.6	42.8	Installed new Racor Oil Filter Assembly, Bearings showed heavy mechanical wear pattern at EOT.
52	52-S186-0-134B	1-Jan-23	06-16	S-000309	1006-2	15.8	20.7	36.5	Changed Connecting rod, and crankshaft, bearings showed heavy mechanical wear at EOT.
52	52-S186-0-134C	8-Jan-23	06-16	S-000309	1006-2	12.8	15.1	27.9	Tried different connecting rod, same crankshaft as 134B, Wear pattern ok
51	51-152A-0-573	14-Jan-23	06-16	S-000309	1006-2	12.8	15.5	28.3	Test on different stand, First failed reference on Stand 51
51	51-152A-SWRI1	23-Jan-23	06-16	S-000309	1006-2	16.1	16.9	33.0	Research run, tried an older blend of 1006-2 using retains on stand 51
52	52-S186-0-134D	29-Jan-23	06-16	S-000309	1006-2	13.6	18.9	32.5	Switched back to original crankshaft and rod
51	51-152A-0-574	3-Feb-23	03-22	S-000309	1006-2	17.5	20.2	37.7	Tried new 03-22 bearing batch on stand 51

Testing Done at Intertek

Stand	Test #	Date Comp	Bearing Batch	Fuel Batch	Oil	BWL (mg)	Comments
2	2-238-0-206	12/29/2022	16-Jun	S-000156	1006-2	27.6	1st reference attempt in stand 2.
2	2-238-0-206A	1/11/2023	16-Jun	S-000156/S-000309	1006-2	26.7	2nd reference attempt in stand 2. fuel changed at mid test.
2	2-238-0-206SHKDWN	1/20/2023	16-Jun	S-000309	1006-2	31.5	Stand and engine inspection. Then, tried the first shakedown.
2	2-238-0-206ASHKDWN	1/26/2023	16-Jun	S-000309	704-1	12.5	IAR and SwRI collaborated and shared retains of 704 to make enough volume for 1 test. About doubled the severity of historical data on 704.
1	1-252-0-579SHKDWN	2/5/2023	16-Jun	S-000309	1006-2	29.2	First shakedown in stand 1. Confirmed the severity shift on both stands.
2	2-238-0-206BSHKDWN	2/8/2023	16-Jun	S-000156	1006-2	34.9	Replaced a few non-critical internal components. Observed mechanical wear, likely not caused by the parts replaced.
2	2-238-0-206CSHKDWN	2/11/2023	16-Jun	S-000156	1006-2	36.9	Another run on same engine/stand since last had mechanical wear. Produced the most severe result so far.
1	1-252-0-579ASHKDWN	2/23/2023	16-Jun	S-000156	1006-2	29.5	Kept the stand ambient temp hot, attempted to simulate summer temps.

Critical Components that we have checked	Comments
Crankshafts	SWRI has changed Crankshafts on stand 52, then reverted to the first crankshaft
Connecting Rods	SWRI has changed connecting rods on stand 52 three times.
Fuel	Intertek's first failed reference was on the old fuel batch, and the next reference, the fuel was changed to the new batch midway through.
Bearing Batch	SWRI has run all tests on the 06-16 bearing batch until the last reference, where the 03-22 batch was used.
Test stands	Between Intertek and SWRI all four test stands are failing severe with similar magnitude
Labs	Both SwRI and Intertek are seeing similar severe results between the two labs
Reference Oils	SWRI has tried using an old blend of 1006-2 from retains, and Intertek has tried using an old batch of 704-1 from retains
Ambient Temperature	Intertek has tried keeping the stand ambient temperature hot, to mimic summer conditions, since the last successful reference was in the summer.