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Issued: June 7, 2016
Reply to: Dan Worcester
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These are the unapproved minutes of the 06.07.2016 Sequence VI Conference Call.

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The meeting was called to order at 8:02 AM Central Time by Nathan Moles.

Agenda

The Agenda is the included as **Attachment 1**.

1.0 Roll Call

The Attendance list is **Attachment 2**.

2.0 Approval of minutes

- 2.1 Approval of the minutes of the 05.24-25.2016 meetings.

<ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/minutes/VIMinutes201600524ConferenceCall.pdf>

MOTION: Approve the minutes from the 05.24-25 2016 meetings in Cleveland.

This was placed on hold for further review.

ACTION: Nathan will notify the Surveillance Panel distribution list when meeting minutes are posted on the TMC web site.

3.0 Action Item Review

- 3.1 OHT to provide update on current VIE inventory and service engine order. –OHT
There is an open purchase order for the remainder of the -001 engines. There will be a conference call with the labs to develop a method for all labs to move to both the -002 and GM build engines concurrently.
- 3.2 Update of VID engine inventory and expected depletion date of VID engines.
-Expected depletion of VID engines 2016 Q3
~70 test starts at independent labs remain
- 3.3 Chairman to send out engine cleaning presentation. This was done. See Attachment 3.
- 3.4 Chairman to contact Frank Farber regarding VID severity shift. Rich provided 3 versions that compare VID results. See below. This will be provided on a 6 month interval.

Below is a link to the VID specific semi annual report.

http://acc-ma.org/ftpoot/docs/PCMO/VID/SemiannualReports/2016APR_VIDxW30.pdf

http://acc-ma.org/ftpoot/docs/PCMO/VID/SemiannualReports/2016APR_VIDother.pdf

http://acc-ma.org/ftpoot/docs/PCMO/VID/SemiannualReports/2016APR_VIDxW20.pdf

4.0 Old Business

- 4.1 Update on precision matrix analysis. –Stats Group
~~Do we really need to run three RO tests to establish the new engine for LTMS?~~
~~Discussion of reducing the new reference requirement to two oils, then a third oil run after a defined number of candidates.~~
~~Discussion of using FEI 2 and FEI Sum for references to match candidate pass/fail criteria.~~

- ~~-Discussion of evaluating 80/20 ratio of BL before to after for FEI 1 and 10/90 for FEI 2. Consider evaluating FEI 1 vs 100% BLB2 (or 3) and evaluating FEI 2 vs 100% BLA.~~
- ~~-Discussion of changing BLB1 to BLB2 delta acceptable limits.~~
- ~~-Determine engine calibration status of matrix engines and date of calibration~~
- Review impact of variable oil pressure of FEI (review prove out data to determine if it is stand or engine related)
- Should the acceptance bands value of 1.96 be rounded up? Due to the rounding on FEI 1 and 2 the actual pass limit is 1.91 and 1.92.
- Investigate what is needed to establish VID equivalent limits for VIE
- Review and Finalize LTMS Requirements

The lined through items were consensus agreements at the Face to Face meeting in Cleveland. There is still a question on whether oil pressure affects results. This will be added to the list.

ACTION: Take a look at the statistics review data for oil pressure and FEI response. LTMS limits are still in process. The statistics group is meeting for this effort with CLOG. There will be a conference call 06.21. The BLB and BLA response will also be considered and added to above list.

- 4.2 Update from task force, to investigate alternative test procedure Sequence “VIF” that would improve 0W-16. – Dan Worcester/Satoshi Hirano SwRI has completed their portion of the VIF matrix. The last run at IAR will EOT 06.09.2016 and be reported this week. There is discussion of the VIF and VIE meetings face to face in July.
- 4.3 Update from task force to investigate option to use short blocks to supplement engine inventory. –Adrian Alfonso/Bill Buscher The kits are still being assembled and are 95% complete.
- 4.4 Update from task force, to investigate engine cleaning procedure. –Dan Worcester SwRI has put together a version of the engine rebuild and ultra sonic cleaning procedure. Adrian, Bill and Dave will be added to the Task Force. There would be some level of matrix testing on the cleaned engines. SwRI has selected the first engine to develop the procedure. It has 970 hours.
- 4.5 Appendix K Template review –Todd Dvorak This will be discussed later.

5.0 New Business

5.1 TBD

6.0 Next Meetings.

The meeting on 06.14 is cancelled. The next meeting will be a review of the Stat analysis on 06.21. There will be extended [2-3 hours] meetings on 07.12 and 07.19. There will be a Face to Face meeting in Cleveland 07.25 for LTMS review for the VIE and VIF.

The meetings adjourned at 8:45 AM.

Sequence VI Surveillance Panel Conference Call Agenda June @ 9:00-10:00AM EST

Call-in information is included below:

Call-in Number: 866-528-2256
Conference Code: 3744024

1.0) Roll Call

Do we have any membership changes or additions?

2.0) Approval of minutes

2.1 Approve the minutes from the May 24 & 25, 2016 Sequence VI Surveillance Panel.

<ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/minutes/VIMinutes20160524ConferenceCall.pdf>

3.0) Action Item Review

3.1 OHT to provide update on current VIE inventory and service engine order. –OHT

3.2 Update of VID engine inventory and expected depletion date of VID engines.

*-Expected depletion of VID engines 2016 Q3
~70 test starts at independent labs remain*

3.3 Chairman to send out engine cleaning presentation

3.4 Chairman to contact Frank Farber regarding

4.) Old Business

4.1 Update on precision matrix analysis. –Stats Group

~~-Do we really need to run three RO tests to establish the new engine for LTMS?~~

~~-Discussion of reducing the new reference requirement to two oils, then a third oil run after a defined number of candidates.~~

~~-Discussion of using FEI 2 and FEI Sum for references to match candidate pass/fail criteria.~~

- ~~-Discussion of evaluating 80/20 ratio of BL before to after for FEI 1 and 10/90 for FEI 2. Consider evaluating FEI 1 vs 100% BLB2 (or 3) and evaluating FEI 2 vs 100% BLA.~~
- ~~-Discussion of changing BLB1 to BLB2 delta acceptable limits.~~
- ~~-Determine engine calibration status of matrix engines and date of calibration~~
- Review impact of variable oil pressure of FEI (review prove out data to determine if it is stand or engine related)
- Should the acceptance bands value of 1.96 be rounded up? Due to the rounding on FEI 1 and 2 the actual pass limit is 1.91 and 1.92.
- Investigate what is needed to establish VID equivalent limits for VIE
- Review and Finalize LTMS Requirements

4.2 Update from task force, to investigate alternative test procedure Sequence "VIF" that would improve 0W-16. – Dan Worcester/Satoshi Hirano

4.3 Update from task force to investigate option to use short blocks to supplement engine inventory. –Adrian Alfonso/Bill Buscher

4.4 Update from task force, to investigate engine cleaning procedure. – Dan Worcester

4.5 Appendix K Template review –Todd Dvorak

5.) New Business

5.1 TBD

6.) Next Meeting

TBD

7.) Meeting Adjourned

ASTM SEQUENCE VI

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Sequence VIE Ultra Sonic Cleaning

August 2015

NAML

Cleaning VIE Engine



- The intent of this experiment was to prove out the working theory that the build up of deposits was resulting in increased oil consumption and loss of response
- Engine #129 removed with 1740 hours with oil consumption 2000ml
 - Engine was losing responsiveness and had exceeded oil consumption limits
- Engine was run through ultrasonic cleaner and reassembled
 - All original parts were cleaned and reused
 - Valves, bearings and rings were removed and hand cleaned
 - Only new parts used were head gaskets and yield bolts

Cleaning VIE Engine



- LZ 0W-20 Results:
 - FEI1/FEI2/Sum = 1.81/1.21/3.02 Cleaned engine with 2039 hours
 - FEI1/FEI2/Sum = 1.79/1.48/3.27 Original run with 361 hours
- RO 542-1 Results:
 - FEI1/FEI2/Sum = 2.01/1.26/3.27 Cleaned engine with 2240 hours
 - FEI1/FEI2/Sum = 2.17/1.48/3.65 Original run with 558 hours
- Cleaning the engine brought the response back within ranges of the new engine and OC back down to 1200ml

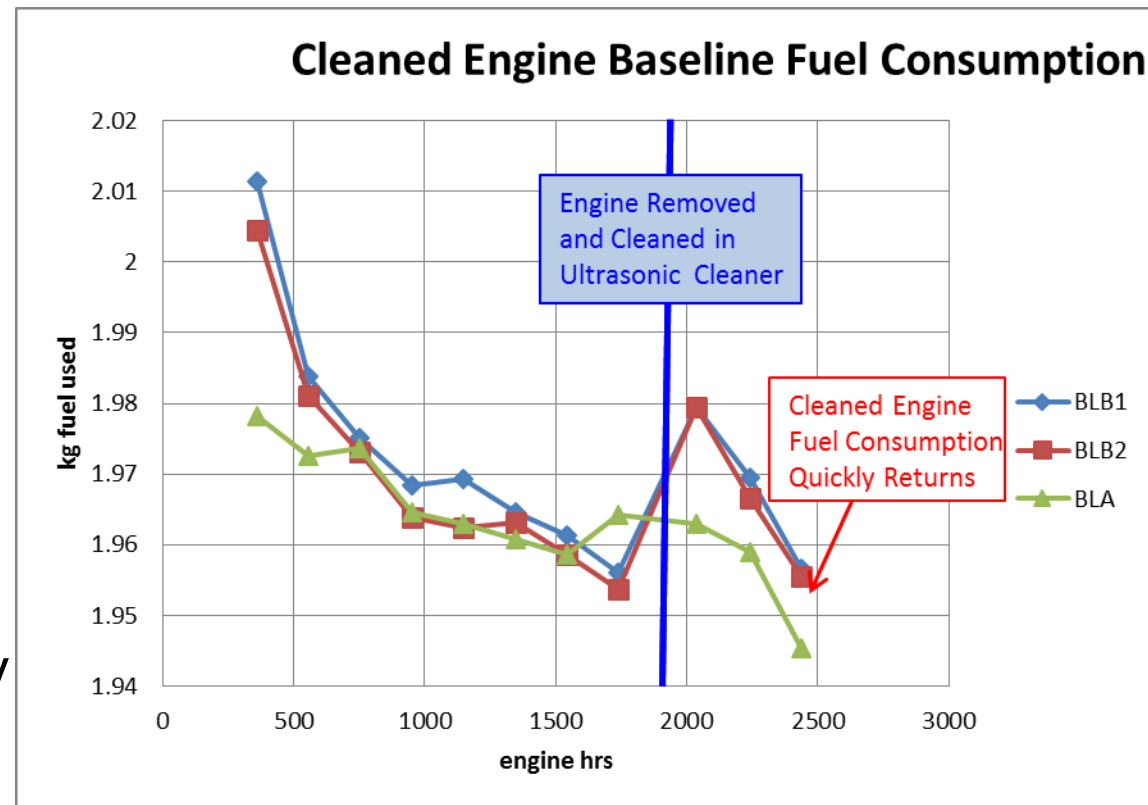
Cleaning VIE Engine



- What do the results look like on a older engine run per the current test procedure?
- LZ 0W-20 Results:
 - FEI1/FEI2/Sum = 1.42/0.72/2.14 Alternate engine with 2415 hours
- RO 542-1 Results:
 - FEI1/FEI2/Sum = 1.68/0.96/2.64 Alternate engine with 2220 hours
- LZ 0W-20 Results:
 - FEI1/FEI2/Sum = 1.81/1.21/3.02 Cleaned engine with 2039 hours
 - FEI1/FEI2/Sum = 1.79/1.48/3.27 Original run with 361 hours
- RO 542-1 Results:
 - FEI1/FEI2/Sum = 2.01/1.26/3.27 Cleaned engine with 2240 hours
 - FEI1/FEI2/Sum = 2.17/1.48/3.65 Original run with 558 hours

How Long Does it Last?

- As the engine ages the total fuel consumption of the baseline oils decrease, as does the relative response to friction modifiers
- Cleaning the engine resulted in the response to friction modifiers to be on par with a new engine as did the baseline oil's total fuel consumption
- This trend declined rapidly and returned to “pre-clean” levels within three tests



1st Candidate on Cleaned Engine was a Repeated Run:

FEI1/FEI2/Sum = 1.49/0.77/2.26 Cleaned engine with 2437 hours, OC 1400ml

FEI1/FEI2/Sum = 1.58/1.18/2.76 Original run with 1150 hours

- Appears cleaning only, does not extend engine life significantly
- Cleaning accompanied with new rings and pistons could have significant/lasting impact
 - Are new rings and pistons available?
 - Timing of parts availability?