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## *Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS*

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*Second Secretary :* MICHAEL A. COLLIER, Petroleum Analyzer Co. LP, PO Box 206, Wilmington, IL 60481, (815) 458-0216, Fax: (815) 458-0217, e-mail: macvarlen@aol.com
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Issued: September 02, 2015

Reply to: Dan Worcester
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6220 Culebra Rd.
San Antonio, TX 78238
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These are the unapproved minutes of the 09.01.2015 Sequence VI Surveillance Panel call.



The meeting was called to order at 8:00 AM Central Time by Chairman 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 08.25.2015 meeting.

MOTION: Approve the minutes from the 08.25.2015 conference call.
[Nathan Moles, Rich Grundza, second] Approved unanimous.

## 3.0 Action Item Review

3.1 OHT to provide update on current VIE inventory and service engine order. –OHT
It has been reported that only 144 VIE engines will be available for purchase. Need to investigate option to prolong usable life of the available engines. There are 59 of the original order of engines remaining, and 144 service engines.

3.2 Labs reported VID engine inventory and expected depletion date of VID engines.
*-Expected life of engines range from 2016 Q1 to 2018*
*Lab1: 2 engines*
*Lab2: 2 engines*
*Lab3: 3 engines*
*Lab4: 1 engines* This will be an on-going effort.

3.3 SP chair and test sponsor to investigate what is needed to establish VID equivalent limits for VIE. This will be an on-going effort.

## 4.0 Old Business

4.1 List of items to be reviewed after the Precision Matrix
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.
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. This will be an on-going effort.

4.2 Update on progress of 5W-30 Tech1 in VIE testing. –Labs
*-FEI1/2 = 1.09/1.05 @ 349 hours This test exceeded the procedure limit of -0.2 to 0.4 BLB Delta.*
*- FEI1/2 = 0.29/0.37 @ 2059 hours This test was later declared invalid.*
*Lubrizol will run this oil and SwRI will repeat a run on a new engine with the same hours.*
Lubrizol is running this oil.

4.3 Engine hours needs to be addressed in the precision matrix and there is concern in the industry that the current design does not adequately address this. Two design approaches were selected for the stats group to investigate further. –Jo Martinez
There are several versions that were considered. See Attachment 3. Engine hours and where to run the BOI/VGRA oils were discussed. Version 2.5 B would have about 2350

hours maximum. Version 2.5 A would have about 2550 hours on a couple of the engines, and the longest would be 2950 hours for Version 2.5. There will be a BOI/VGRA meeting the week of 09.07.2015 and the panel will wait for their response although they will not select which version to run. There was also discussion on reference oils and blends. 542-2 will be a re-blend and an option would be to run the Precision and VIF matrices on that blend. There are about 600 gallons of 542-2 remaining that would run the tests discussed.

4.4 Discussion on third reference oil for precision matrix (replacement for 1011). 5W-30 version of Tech1 was recommended by SP. This will be an on-going effort.

4.5 Update from task force, to investigate alternative Sequence VIE procedures that would improve 0W-16 response in the Sequence VIE test. – Dan Worcester/Satoshi Hirano
There is a matrix design. The final design will be selected at the Task Force meeting on 09.02.2015. The Stat Group will send an update for that meeting.

4.6 Update from task force to investigate option to prolong usable life of the available VIE engines. –Adrian Alfonso/Bill Buscher This will be an on-going effort.

## 5.0 New Business

5.1 The most up-to-date version of the Sequence VIE Draft procedure is available at the TMC site.
ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/procedure_and_ils/VIE/DRAFT%20VIE%20150824.pdf

6.0 **Next Meeting will be at the Chair notification.**

The meeting adjourned at 9:05 AM.

# Sequence VI Surveillance Panel Conference Call Agenda
# September 1 @ 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 August 25, 2015 Sequence VI Surveillance Panel.
ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/minutes/VIMinutes20150825%20Conference%20call.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 life of engines range from 2016 Q1*
*Lab1: 2 engines*
*Lab2: 2 engines*
*Lab3: 3 engines*
*Lab4: 1 engines*

3.3 SP chair and test sponsor to investigate what is needed to establish VID equivalent limits for VIE

**4.) Old Business**

4.1 List of items to be reviewed after the Precision Matrix

-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.
-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.

4.2 Update on progress of 5W-30 Tech1 in VIE testing. –Labs

*-FEI1/2 = 1.09/1.05 @ 349 hours This test exceeded the procedure limit of -0.2 to 0.4 BLB Delta.*
*- FEI1/2 = 0.29/0.37 @ 2059 hours This test was later declared invalid.*
*Lubrizol will run this oil and SwRI will repeat a run on a new engine with the same hours.*

4.3 Engine hours needs to be addressed in the precision matrix and there is concern in the industry that the current design does not adequately address this. Two design approaches were selected for the stats group to investigate further (presentation). –Jo Martinez

4.4 Discussion on third reference oil for precision matrix (replacement for 1011). 5W-30 version of Tech1 was recommended by SP.

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

4.6 Update from task force to investigate option to prolong usable life of the available VIE engines. –Adrian Alfonso/Bill Buscher

**5.) New Business**

5.1 The most up-to-date version of the Sequence VIE Draft procedure is available at the TMC site.
ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/procedure_and_ils/VIE/DRAFT%20VIE%2020150824.pdf

**6.) Next Meeting**

Call of the chairman

**7.) Meeting Adjourned**

**ASTM SEQUENCE VI**

| Name | Address | Phone/Fax/Email | Attendance |
|---|---|---|---|
| Jason Bowden<br>Voting Member | OH Technologies | Phone: (440) 354-7007<br>jhbowden@ohtech.com | ATTEND |
| Timothy Caudill<br>Voting Member | Ashland | Phone: (606) 329-5708<br>Tlcaudill@ashland.com | ATTEND |
| David Glaenzer<br>Voting Member | Afton | Phone: (804) 788-5214<br>Dave.Glaenzer@aftonchemical.com | ATTEND |
| Rich Grundza<br>Voting Member | ASTM TMC | Phone: (412) 365-1034<br>reg@astmtmc.cmu.edu | ATTEND |
| Jeff Hsu<br>Voting Member | Shell | Phone: (832) 419-3482<br>j.hsu@shell.com | ATTEND |
| Tracey King<br>Voting Member | Haltermann | Phone:<br>tking@jhaltermann.com | ATTEND |
| Charlie Leverett<br>Voting Member | Intertek Automotive Research | Phone: (210) 647-9422<br>charlie.leverett@intertek.com | |
| Teri Kowalski<br>Voting Member | Toyota | Phone: (734) 995-4032<br>teri.kowalski@tema.toyota.com | ATTEND |
| Tim Cushing<br>Voting Member | General Motors | Phone: (248) 881 3518<br>timothy.cushing@gm.com | ATTEND |
| Timothy Miranda<br>Voting Member | BP Castrol | Phone: (973) 305-3334<br>Timothy.Miranda@bp.com | |
| Nathaniel Moles<br>Voting Member | Lubrizol | Phone: (440) 347-4472<br>Nathaniel.Moles@Lubrizol.com | ATTEND |
| Mark Mosher<br>Voting Member | ExxonMobil | Phone: (856) 224-2132<br>mark_r_mosher@exxonmobil.com | ATTEND |
| Andy Ritchie<br>Voting Member | Infineum | Phone: (908) 474-2097<br>Andrew.Ritchie@infineum.com | ATTEND |
| Ron Romano<br>Voting Member | Ford Motor | Phone: (313) 845-4068<br>rromano@ford.com | |
| Kaustav Sinha<br>Voting Member | Chevron Oronite | Phone: (713) 432-6642<br>LFNQ@chevron.com | ATTEND |
| Mark Sutherland<br>Voting Member | TEI | Phone: 123-456-7890<br>msutherland@tei-net.com | |
| Haiying Tang<br>Voting Member | Chrysler | Phone: (248) 512-0593<br>HT146@Chrysler.com | |
| Dan Worcester<br>Voting Member | Southwest Research Institute | Phone: (210) 522-2405<br>dan.worcester@swri.org | ATTEND |

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| Terry Hoffman | Terry.Hoffman@aftonchemical.com | Afton | |
| Jeremy Styer | Jeremy.styer@aftonchemical.com | Afton | |
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| Doyle Boese | Doyle.boese@infineum.com<br>Phone: (908) 474-3176 | Infineum | ATTEND |
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| Bob Olree | olree@netzero.net | Intertek | |
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| Jessica Buchanan | Jessica.Buchanan@Lubrizol.com | Lubrizol | |
| Michael Conrad | Michael.Conrad@Lubrizol.com | Lubrizol | ATTEND |
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**ASTM SEQUENCE VI**

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| Dwight Bowden | dhbowden@ohtech.com | OHT | |
| Matt Bowden | mjbowden@ohtech.com | OHT | ATTEND |
| Robert Stockwell | rsto@chevron.com | Oronite | |
| Jo Martinez | jogm@chevron.com | Oronite | ATTEND |
| Valeriu Lieu | ValerieLieu@chevron.com<br>Phone: (510) 242-3717 | Oronite | ATTEND |
| Ricardo Affinito | affinito@chevron.com<br>Phone: (510) 242-4625 | Oronite | |
| Guy Stubbs | Guy.Stubbs@swri.org | SwRI | ATTEND |
| Patrick Lang | Patrick.lang@swir.org<br>Phone: (210) 522-2820 | SwRI | ATTEND |
| Michael Lochte | mlochte@swri.org | SwRI | |
| Scott Stap | Scott.stap@tgdirect.com | TG Direct | |
| Clayton Knight | cknight@tei-net.com | TEI | |
| Dan Lanctot | dlanctot@tei-net.com | TEI | ATTEND |
| Zack Bishop | zbishop@tei-net.com<br>Phone: (210) 877-0223 | TEI | |
| Jeff Clark | jac@astmtmc.cmu.edu | TMC | |
| Hirano Satoshi | satoshi_hirano_aa@mail.toyota.co.jp | Toyota | ATTEND |
| Jim Linden | lindenjim@jlindenconsulting.com<br>Phone: (248) 321-5343 | Toyota | ATTEND |
| Mark Adams | mark@tribologytesting.com | Tribology Testing | |
| Tom Smith | | Valvoline | |
| Hap Thompson | Hapjthom@aol.com | VIE Facilitator | ATTEND |
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## ASTM SEQUENCE VI

| Name | Address | Phone/Fax/Email | Attendance |
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# GF-6 VIE PRECISION MATRIX

Statisticians Task Force

August 26, 2015

# GF-6 PM Design Statisticians Task Force

- Doyle Boese, Infineum
- Kevin O'Malley, Lubrizol
- Todd Dvorak, Afton Chemical
- Jo Martinez, Chevron Oronite
- Ricardo Affinito, Chevron Oronite
- Arthur Andrews, Exxon Mobil
- Martin Chadwick, Intertek
- Eric Liu, SwRI
- Rich Grundza, TMC

# Objective:

- Modify Approach 2.5 design presented on 8/25/2015 in such a way that maximum engine hours will be between 2000 to 2500.

- Matrix Oils
  - 542-2; 0w20
  - 1010-1; 5w20
  - Tech 1; 5w30 (pending ILSAC's approval)

# Design Assumptions:

- 8 stands; 6 labs
- Funding for 53 matrix tests (Most likely 50 tests per MOA)
- Funding for 12 BOI/VGRA matrix tests (Design still applicable without BOI/VGRA runs)
- BOI/VGRA oils can be interspersed within the PM oils if the BOI/VGRA oils have the same DI as the PM oils or proof is provided that there's no carry over from BOI/VGRA oils
- Step 1 Run Order will be finalized when we know more about the BOI/VGRA oils
- Step 2 Run Order will be determined once the health of the engines are identified after Step 1 tests

| | Planned Test Stands | | | | | | | | GF-6 Precision Matrix ONLY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Afton | LZ | XOM | Ashland | IAR | SwRI | Stands | TEST Cost | Total Runs | Cal Runs | Cal $'s | Total $'s |
| Chrysler Oxid. (Seq. IIIH Rep) | 1 | 1 | None | 1 | 2 | 2 | 7 | $57,250 | 28 | 14 | $801,500 | $1,603,000 |
| Sequence IVB (Toyota) | None | 1 | None | None | 2 | 2 | 5 | $49,250 | 20 | 10 | $492,500 | $985,000 |
| Sequence V-V8 | 1 | 1 | None | 1 | 2 | 2 | 7 | $63,000 | 28 | 14 | $882,000 | $1,764,000 |
| LSPI (Ford) | None | 1 | None | None | 2 | 2 | 5 | $14,250 | 20 | 10 | $142,500 | $285,000 |
| Chain Wear Test (Ford) | 1 | None | None | 1 | 2 | 2 | 6 | $45,750 | 24 | 12 | $549,000 | $1,098,000 |
| Sequence VIE | 1 | 1 | 1 | 1 | 2 | 2 | 8 | $32,750 | 53 | 24 | $786,000 | $1,735,750 |
| | | | | | | | | | | | $3,653,500 | $7,470,750 |

IAR and SwRI have 2 Stands for Each Test

Seq, IIIH, Seq. IVB, Seq. V, LSPI, Chain Wear are 4 Tests per Stand

Seq. VIE, 7 tests per stand for the first stand + 4 test per stand for the second.

Seq, IIIH, Seq. IVB, Seq. V, LSPI, Chain Wear have 2 Calibration Tests/Stand

Seq. VIE has 3 Calibration Tests/Stand

| | |
|---|---|
| Test Funding - Total | $7,470,750 |
| Donated Tests - Total | $3,653,500 |
| Industry Funding MOA - Total | $3,817,500 |
| Actual Matrix Cost | $3,817,250 |
| Extra Funding | $250 |

# VIE Approach 2.5

- BOI/VGRA interspersed within matrix
- 2 engines run longer; 6 end earlier
- Maximum engine hours: 2750 (2950 if additional funding is available)
- Average engine hours: 1200

Run Order to be finalized:

| Step | Run Order | SW1 | SW2 | IAR1 | IAR2 | LZ | Afton | Ashland | XOM | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SOT Engine Hours | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | Engine Hrs |
| 1 | 1 | 542-2 | 1010-1 | 5w30T1 | 542-2 | 5w30T1 | 1010-1 | 5w30T1 | 1010-1 | 350 |
| | 2 | 5w30T1 | 542-2 | 1010-1 | 1010-1 | 1010-1 | 542-2 | 542-2 | 5w30T1 | 550 |
| | 3 | 1010-1 | 5w30T1 | 542-2 | 5w30T1 | 542-2 | 5w30T1 | 1010-1 | 542-2 | 750 |
| | 4 | BOI/VGRA | 5w30T1 | BOI/VGRA | 5w30T1 | BOI/VGRA | BOI/VGRA | BOI/VGRA | BOI/VGRA | 950 |
| | 5 | BOI/VGRA | 1010-1 | BOI/VGRA | 542-2 | BOI/VGRA | BOI/VGRA | BOI/VGRA | BOI/VGRA | 1150 |
| | 6 | 1010-1 | 542-2 | 542-2 | 1010-1 | 542-2 | 5w30T1 | 1010-1 | 542-2 | 1350 |
| 2 | 7 | | 5w30T1 | | 1010-1 | | | | | 1550 |
| | 8 | | 542-2 | | 5w30T1 | | | | | 1750 |
| | 9 | | 542-2 | | 5w30T1 | | | | | 1950 |
| | 10 | | 1010-1 | | 542-2 | | | | | 2150 |
| | 11 | | 5w30T1 | | 5w30T1 | | | | | 2350 |
| | 12 | | 542-2 | | 5w30T1 | | | | | 2550 |
| | 13 | | 1010-1 | | 1010-1 | | | | | 2750 |
| | 14 | | 5w30T1 | | 1010-1 | | | | | 2950 |
| | EOT Engine Hours | 1350 | 2950 | 1350 | 2950 | 1350 | 1350 | 1350 | 1350 | Total Runs |
| | Runs/Engine | 6 | 14 | 6 | 14 | 6 | 6 | 6 | 6 | 64 |

# VIE Approach 2.5a

- BOI/VGRA interspersed within matrix
- 3 engines run longer; 5 end earlier
- Maximum engine hours: 2350 (2550 if additional funding is available)
- Average engine hours: 1150

Run Order to be finalized:

| Step | Run Order | SW1 | SW2 | IAR1 | IAR2 | LZ | Afton | Ashland | XOM | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SOT Engine Hours | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | Engine Hrs |
| 1 | 1 | 542-2 | 1010-1 | 5w30T1 | 542-2 | 5w30T1 | 1010-1 | 5w30T1 | 1010-1 | 350 |
| | 2 | 5w30T1 | 542-2 | 1010-1 | 1010-1 | 1010-1 | 542-2 | 542-2 | 5w30T1 | 550 |
| | 3 | 1010-1 | 5w30T1 | 542-2 | 5w30T1 | 542-2 | 5w30T1 | 1010-1 | 542-2 | 750 |
| | 4 | BOI/VGRA | 5w30T1 | BOI/VGRA | 5w30T1 | BOI/VGRA | BOI/VGRA | BOI/VGRA | BOI/VGRA | 950 |
| | 5 | BOI/VGRA | 1010-1 | BOI/VGRA | 542-2 | BOI/VGRA | BOI/VGRA | BOI/VGRA | BOI/VGRA | 1150 |
| | 6 | 1010-1 | 542-2 | 542-2 | 1010-1 | 542-2 | 5w30T1 | 1010-1 | 542-2 | 1350 |
| 2 | 7 | | 5w30T1 | | 1010-1 | 1010-1 | | | | 1550 |
| | 8 | | 542-2 | | 5w30T1 | 5w30T1 | | | | 1750 |
| | 9 | | 542-2 | | 5w30T1 | 1010-1 | | | | 1950 |
| | 10 | | 1010-1 | | 542-2 | 542-2 | | | | 2150 |
| | 11 | | 5w30T1 | | 5w30T1 | 1010-1 | | | | 2350 |
| | 12 | | 542-2 | | 1010-1 | | | | | 2550 |
| | EOT Engine Hours | 1350 | 2550 | 1350 | 2550 | 2350 | 1350 | 1350 | 1350 | Total Runs |
| | Runs/Engine | 6 | 12 | 6 | 12 | 11 | 6 | 6 | 6 | 65 |

# VIE Approach 2.5b

- BOI/VGRA interspersed within matrix
- 4 engines run longer; 4 end earlier
- Maximum engine hours: 2150 (2350 if additional funding is available)
- Average engine hours: 1100

Run Order to be finalized:

| Step | Run Order | SW1 | SW2 | IAR1 | IAR2 | LZ | Afton | Ashland | XOM | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SOT Engine Hours | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | Engine Hrs |
| 1 | 1 | 542-2 | 1010-1 | 5w30T1 | 542-2 | 5w30T1 | 1010-1 | 5w30T1 | 1010-1 | 350 |
| | 2 | 5w30T1 | 542-2 | 1010-1 | 1010-1 | 1010-1 | 542-2 | 542-2 | 5w30T1 | 550 |
| | 3 | 1010-1 | 5w30T1 | 542-2 | 5w30T1 | 542-2 | 5w30T1 | 1010-1 | 542-2 | 750 |
| | 4 | BOI/VGRA | 5w30T1 | BOI/VGRA | 5w30T1 | BOI/VGRA | BOI/VGRA | BOI/VGRA | BOI/VGRA | 950 |
| | 5 | BOI/VGRA | 1010-1 | BOI/VGRA | 542-2 | BOI/VGRA | BOI/VGRA | BOI/VGRA | BOI/VGRA | 1150 |
| | 6 | 1010-1 | 542-2 | 542-2 | 1010-1 | 542-2 | 5w30T1 | 1010-1 | 542-2 | 1350 |
| 2 | 7 | | 5w30T1 | | 1010-1 | 1010-1 | 5w30T1 | | | 1550 |
| | 8 | | 542-2 | | 5w30T1 | 5w30T1 | 5w30T1 | | | 1750 |
| | 9 | | 542-2 | | 5w30T1 | 1010-1 | 542-2 | | | 1950 |
| | 10 | | 1010-1 | | 542-2 | | | | | 2150 |
| | 11 | | 542-2 | | 1010-1 | | | | | 2350 |
| | EOT Engine Hours | 1350 | 2350 | 1350 | 2350 | 1950 | 1950 | 1350 | 1350 | Total Runs |
| | Runs/Engine | 6 | 11 | 6 | 11 | 9 | 9 | 6 | 6 | 64 |

# Guidelines on Running the PM

1. If engine fails before the matrix finishes, move remaining tests to another matrix engine.

2. After all labs run the first 5-6 tests, reassess engine “health” at the labs to determine the engines that will run additional tests to reach higher engine hours.