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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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Issued: September 15, 2015

Reply to: Dan Worcester
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San Antonio, TX 78238
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Email: dworcester@swri.org

These are the unapproved minutes of the 09.15.2015 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 09.01.2015 meeting.

MOTION: Approve the minutes from the 09.01.2015 conference call.
[Dan Worcester, Nathan Moles, second] Approved unanimous.

3.0 Action Item Review

3.1 OHT to provide update on current VIE inventory and service engine order. –OHT
There are 58 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.

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

4.2 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.
-FEI1/2 = 0.79/1.25 @ 592 hours This was a Lubrizol run.

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. There were more slides for matrix variations. AOAP has approved the VIE Precision Matrix. The BOI/VGRA will not be in the initial matrix design. There were 3 options considered without BOI/VGRA. There were concerns of engine response with as much as 2900 hours on a test engine. There do need to be two engines at SwRI and IAR to help detect engine differences. One of each of those engines will have high hours.

MOTION: Proceed with the Precision Matrix using version 2.5ai.
[Dave Glaenzer, William Buscher, second] 13 yes, 0 no, 2 waive.

4.4 Discussion on third reference oil for precision matrix (replacement for 1011). 5W-30 version of Tech1 was recommended by SP.
ILSAC discussed Tech 1 oil in 5W-30 viscosity as a reference oil for the Seq VIE precision matrix and ILSAC agreed it's the best replacement for the 0W-16 Tech 1. We recommend the VIE SP include 5W-30 Tech 1 in the PM.
There was discussion on whether to use reference oil blend 542-2 or wait for 542-3. There is enough 542-2 for both the VIE and VIF matrices and the resultant reference period after stand calibrations. It will be about a month before the 5W-30 Tech 1 is available.

4.5 Discussion, what batch of 542 should be used for PM and VIF tests?
Current TMC inventory of 542-2 (~550 gallons, 90 - tests)

MOTION: Use reference oil blend 542-2 for the VIE Precision Matrix.
[Dave Glaenzer, Rich Grundza, second] 13 yes, 0 no, 2 waive.

NOTE: Hirano-san agrees that 542-2 will be used for the VIF Matrix as well.

4.6 Request that the Sequence VI Surveillance Panel update Section 6.6.5.5 of ASTM D7589, the Sequence VID procedure as well as Sections 6.6.5.5 of the August 24, 2015 Draft of the Sequence VIE procedure to include the alternate part number (attachments). –Dave Glaenzer See Attachments 4 and 5. The difference in the parts is a mounting bracket on the recommended change part number.

MOTION: Update Section 6.6.5.5 of ASTM D7589, the Sequence VID procedure as well as Sections 6.6.5.5 of the August 24, 2015 Draft of the Sequence VIE procedure with the new heat exchanger part number. 5-694-10-020-002 is an acceptable alternate to 5-686-04-020-002.
[Dave Glaenzer, Nathan Moles, second] 14 yes, 0 no, 2 waive.

4.5 Update from task force, to investigate alternative test procedure Sequence "VIF" that would improve 0W-16. – Dan Worcester/Satoshi Hirano Nathan did the Task Force presentation at the AOAP meeting. There was clear direction to continue with a VIF version of the fuel economy test from AOAP and PCEOCP.

4.6 Update from task force to investigate option to prolong usable life of the available VIE engines. –Adrian Alfonso/Bill Buscher There will be a kick off meeting the Thursday morning, 09.17.2015. An agenda with Scope and Objectives will be available. The meeting will be at 8:00 AM so Hirano-san can attend.

5.0 New Business

5.1 None

6.0 Next Meeting

These meeting will now occur weekly to develop and run the Precision Matrix. Each Tuesday at 9:00 AM Eastern, 8:00 AM Central times.

The meeting adjourned at 8:42 AM.

Sequence VI Surveillance Panel Conference Call Agenda
September 15 @ 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 September 1, 2015 Sequence VI Surveillance Panel.
ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/minutes/VIMinutes20150901%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

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

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

4.8 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 None

6.) Next Meeting

Next Tuesday (reoccurring weekly meeting)

7.) Meeting Adjourned

ASTM SEQUENCE VI

Name	Address	Phone/Fax/Email	Attendance
Adrian Alfonso Voting Member	Intertek Automotive Research	Phone: (210) 838-0431 adrian.alfonso@intertek.com	ATTEND
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David Glaenzer Voting Member	Afton	Phone: (804) 788-5214 Dave.Glaenzer@aftonchemical.com	ATTEND
Rich Grundza Voting Member	ASTM TMC	Phone: (412) 365-1034 reg@astmtmc.cmu.edu	ATTEND
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Dan Worcester Voting Member	Southwest Research Institute	Phone: (210) 522-2405 dan.worcester@swri.org	ATTEND

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Tom Smith		Valvoline	
Hap Thompson	Hapjthom@aol.com	VIE Facilitator	

ASTM SEQUENCE VI

Name	Address	Phone/Fax/Email	Attendance

GF-6 VIE PRECISION MATRIX

Statisticians Task Force

Sep. 10, 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

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

VIE Approach 2.5i

- 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	1010-1	5w30T1	542-2	5w30T1	542-2	5w30T1	1010-1	542-2	950
2	5		1010-1		542-2					1150
	6		542-2		1010-1					1350
	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	950	2950	950	2950	950	950	950	950	Total Runs
	Runs/Engine	4	14	4	14	4	4	4	4	52

VIE Approach 2.5ai

- 3 engines run longer; 5 end earlier
- Maximum engine hours: 2150 (2350 if additional funding is available)
- Average engine hours: 1000

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	1010-1	5w30T1	542-2	5w30T1	542-2	5w30T1	1010-1	542-2	950
2	5		1010-1		542-2	1010-1				1150
	6		542-2		1010-1	5w30T1				1350
	7		5w30T1		1010-1	1010-1				1550
	8		542-2		5w30T1	542-2				1750
	9		542-2		5w30T1	1010-1				1950
	10		5w30T1		542-2	5w30T1				2150
	11		542-2		1010-1					2350
	EOT Engine Hours	950	2350	950	2350	2150	950	950	950	Total Runs
	Runs/Engine	4	11	4	11	10	4	4	4	52

VIE Approach 2.5bi

- 4 engines run longer; 4 end earlier
- Maximum engine hours: 1950 (2150 if additional funding is available)
- Average engine hours: 1000

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	1010-1	5w30T1	542-2	5w30T1	542-2	5w30T1	1010-1	542-2	950
2	5		1010-1		542-2	1010-1	5w30T1			1150
	6		542-2		1010-1	5w30T1	5w30T1			1350
	7		5w30T1		1010-1	1010-1	542-2			1550
	8		542-2		5w30T1	542-2	5w30T1			1750
	9		1010-1		542-2					1950
	10		542-2		1010-1					2150
	EOT Engine Hours	950	2150	950	2150	1750	1750	950	950	Total Runs
	Runs/Engine	4	10	4	10	8	8	4	4	52

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.

Southgate Process Equipment, Inc.
87 Hickory Springs Industrial Drive
Canton, GA 30115
Phone: (770) 345-0010
Fax: (770) 345-4299
Email: sales@southgateprocess.com

Part # 5-686-04-020-002,
Model BP410-20, Non ASME Code

Xylem, Standard Xchange (Formally ITT Standard / American Standard)
Units have stainless steel plates with copper brazing.
2.8 - 22.5 sq. ft. of surface area.
Connection size 1" MPT's
Max 50 GPM
Greater Pressure Drop=Greater Performance
ASME Code, Low Cost ASME Code and Non Code Units
Units ship within 1-2 weeks after order is received.
Please contact us for better delivery.

Specifications −

Model	BP410-20
Non Code/Code	Non ASME Code Stamped
Surface Area	5.6 ft²
Max. GPM	50
Connections	1 Inch MPT
Min. Design Temp	-310 ºF
Max. Design Temp	450 ºF
Design Pressure	435 psig

Southgate Process Equipment, Inc.
87 Hickory Springs Industrial Drive
Canton, GA 30115
Phone: (770) 345-0010
Fax: (770) 345-4299
Email: sales@southgateprocess.com

Part # 5-694-10-020-002, ITT / Xylem Standard Xchange
Hydronic Brazed Plate Heat Exchanger Model BP410-MT

Xylem, Standard Xchange (Formally ITT Standard / American Standard)
Units have stainless steel plates with copper brazing.
2.8 - 22.5 sq. ft. of surface area.
Connection size 1" MPT's
Max 50 GPM
Greater Pressure Drop=Greater Performance
Units have mounting tabs
ASME Code, Low Cost ASME Code and Non Code Units
Units ship within 1-2 weeks after order is received.
Please contact us for better delivery.

Specifications −

Model	BP410-20 MT
Non Code/Code	Non ASME Code Stamped
Surface Area	5.6 ft²
Max. GPM	50
Connections	1 Inch MPT
Min. Design Temp	-310 ºF
Max. Design Temp	450 ºF
Design Pressure	435 psig