Address *100 Barr Harbor Drive*
PO Box C700
W. Conshohocken, PA
19428-2959 | USA

Phone *610.832.9500*
Fax *610.832.9666*
Web *www.astm.org*

Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

Chairman: KENNETH O. HENDERSON, Cannon Instrument Co., 2139 High Tech Road, State College, PA 16803, (814) 353-8000, Fax: (814) 353-8007, e-mail: kenohenderson@worldnet.att.net
First Vice-Chairman: BEN R. BONAZZA, TI Group Automotive Systems, Caro Research Center, 326 Green Street, Caro, MI, 48723 (989) 673-8181 ext. 227, Fax: (989) 673-3241, e-mail: bbonazza@us.tiauto.com
Second Vice-Chairman: JANET L. LANE, ExxonMobil Research & Engrg., 600 Billingsport Rd, Paulsboro, NJ 08066-0480 (856) 224-3302, Fax: (856) 224-3616, e-mail: janet.l.lane@exxonmobil.com
First Secretary: RALPH A. CHERRILLO, Shell Global Solutions (US) Inc., Westhollow Tech Ctr., 3333 Highway 6 South, Houston, TX 77082 (281) 544-8789, Fax: (281) 544-8150, e-mail: ralph.cherrillo@shell.com
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
Staff Manager: DAVID R. BRADLEY, (610) 832-9681, Fax: (610) 832-9668, e-mail: dbradley@astm.org

Issued: February 06, 2015

Reply to: Dan Worcester
Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78238
Phone: 210.522.2405
Fax: 210.684.7523
Email: dworcester@swri.org

These are the unapproved minutes of the 02.05.2015 Sequence VI Surveillance Panel call.

The meeting was called to order at 9: AM Central Time by Chairman Nathan Moles.

Agenda

The Agenda is the included as Attachment 1.

1.0 Roll Call

The Attendance list Attachment 2.

2.0 Approval of minutes

2.1 Approval of the minutes of the 01.08.2015 conference call.

Motion – Accept the minutes of the 01.08.2015 VI SP Conference Call. Charlie Leverett, Dan Worcester, second. This received unanimous approval.

3.0 Action Item Review

3.1 OHT to report VIE engine usage and depletion date of VID engines. There are 12 VID and 86 VIE engines in inventory.

3.2 Update on supplemental service engines. This order is on hold pending a decision on engine life. One lab has requested a time extension while they review their needs. If the order quantity goes well above the current level of 300, GM will need to be notified to ensure the desired build dates and quantities for the engine are met. All engines should be 2012 builds.

3.3 Update on Tech 1 new reference oil donated runs. Two runs have been completed. The oil has been shipped to other labs. There should be 4-6 donated runs total.

3.4 SP chair and test sponsor to investigate what is needed to establish VID equivalent limits for VIE. This will require further work.

3.5 Lab survey to identify used engines available for the precision matrix. A new survey will be completed before the next meeting.

4.0 Old Business

4.1 Discussion regarding Sequence VIE test ready to proceed with precision matrix. Chair to report results of vote at joint AOAP and PCEOCP meeting January 15th in Detroit.
AOAP and PCEOCP vote delayed until March 19th

4.2 Review Lubrizol presentation regarding negative vote for matrix readiness. Their presentation will be part of new business.

4.3 Discussion to consider allowing the oil be changed at 75 hours during the break-in for Seq. VIE. There will be samples taken for DIR analysis for comparison. The concern is oil degrades during break in period. This will be an action item later.

4.4 Questions from the statisticians in regards to the precision matrix. See Attachment 3. This will be discussed in New Business.

5.0 New Business

5.1 Discussion to consider allowing the oil to be changed at 75 hours during the break-in for Seq. VIE. There will be additional 75 hour samples taken for analysis. All work will be done at IAR for consistent method.

5.2 Review industry statisticians Sequence VIE data analysis and answers to questions from January 14th call (Attached) – Jo Martinez Answers to most questions are included in the presentation. TMC will contact reference oil suppliers for details on friction modifier packages. If an engine with prior hours is installed it will run 16-32 hours of break in before running first matrix oil. All 6 labs will participate in the matrix. Oils will be 542-2, 1010-1 and Tech 1. Labs may achieve stand calibration at the completion of the matrix. There will be a list maintained of available engines for the matrix. There will be two stands at SwRI and IAR and one each at 4 other labs. There will be 64 runs in the Precision Matrix data set. See Attachment 4 for matrix details. OHT will supply engines at a discounted price for the matrix.

5.3 Do we really need to run three RO tests to establish the new engine for LTMS? – Dave Glaenzer There was discussion of reducing the new reference requirement to two oils, then a third oil run after a defined number of candidates. There was also discussion of using FEI 2 and FEI Sum for references to match candidate pass/fail criteria. See Attachment 5. This will be reviewed after the Precision Matrix along with the current method of using 80/20 ratio of BL before to after for FEI 1 and 10/90 for FEI 2.

5.4 Review Lubrizol presentation regarding results of the FM carry over removal experiment (Attached) – Nathan Moles See Attachment 6. Lubrizol did changes to flush oils with calcium plus a detergent, a break in rpm level during flushes and a fuel with more additive to minimize deposits. Lubrizol will continue to study these areas but should not delay the Precision Matrix for this effort.

ACTION: Create a group to review friction modifier effects or possible changes on a regular basis.

5.5 Discussion regarding Sequence VIE test ready to proceed with precision matrix. Chair to report results of vote at joint AOAP and PCEOCP meeting March 19th in Detroit. There will be further discussion and another meeting prior to the March 19th vote. There is interest in an email pre-ballot prior to the next meeting.

5.6 Discussion about dropping monitoring of the VIB test from the LTMS. – Rich Grundza

MOTION: Drop monitoring of the VIB test.
Charlie Leverett, Rich Grundza second. Approved unanimous.

5.7 Review survey of labs with regards to status of current BL/FO batch (Attached). Discussion about BL and FO quantities and potential for next blend. – Rich Grundza See Attachment 7. One lab has about one year of FO remaining, but other labs have a surplus. TMC will act as a clearing house to evenly distribute BL and FO quantities. New batches will take about a year, so this process will begin in 2015.

5.8 Review targets for Sequence VID RO 542-2 – Dave Glaenzer See Attachment 8. The new batch targets appear different. This will receive further review.

6.0 Next Meeting or Conference Call will be 02.18.2015

Meeting Adjourned

The meeting adjourned at 10:30 AM.

Sequence VI Surveillance Panel Conference Call Agenda
February 5 @ 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 January 8, 2015 Sequence VI Surveillance Panel.

3.0) Action Item Review

3.1 OHT to report VID & VIE engine usage and expected depletion date of VID engines. – OHT

3.2 Update on supplemental service engines

3.3 Update on "Tech 1" donated runs. – Oil is available at TMC

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

3.5 Lab survey to identify used engines available for the precision matrix

4.) Old Business

4.1 Discussion regarding Sequence VIE test ready to proceed with precision matrix. Chair to report results of vote at joint AOAP and PCEOCP meeting January 15th in Detroit.

- AOAP and PCEOCP vote delayed until March 19th

4.2 Review Lubrizol presentation regarding negative vote for matrix readiness

4.3 Discussion to consider allowing the oil be changed at 75 hours during the break-in for Seq. VIE

-This will be ongoing as we were limited on time during last call.

4.4 Questions from the statisticians in regards to the precision matrix

-Labs will discuss these results in a future meeting on January 14th

5.) New Business

5.1 Discussion to consider allowing the oil be changed at 75 hours during the break-in for Seq. VIE

5.2 Review industry statisticians Sequence VIE data analysis and answers to questions from January 14th call (Attached) – Jo Martinez

5.3 Do we really need to run three RO tests to establish the new engine for LTMS? – Dave Glaenzer

5.4 Review Lubrizol presentation regarding results of the FM carry over removal experiment (Attached) – Nathan Moles

5.5 Discussion regarding Sequence VIE test ready to proceed with precision matrix. Chair to report results of vote at joint AOAP and PCEOCP meeting March 19th in Detroit.

5.6 Discussion about dropping monitoring of the VIB test from the LTMS. – Rich Grundza

5.7 Review survey of labs with regards to status of current BL/FO batch (Attached). Discussion about BL and FO quantities and potential for next blend. – Rich Grundza

5.8 Review targets for Sequence VID RO 542-2 – Dave Glaenzer

I believe the chart below is a reasonably accurate depiction of Sequence VID Operationally Valid, chartable tests.
The Yi values are my calculation as I believe there are errors in the ASTM-TMC database for those fields.

IND	Average FEI1	Average FEI2	Target FEI 1	Target FEI 2	N	Average FEI1yi	Average FEI2yi
540	1.287	0.984	1.32	1.04	102	-0.275	-0.400
541	0.885	0.676	0.87	0.71	60	0.125	-0.243

541-1	0.933	0.660	0.87	0.71	38	0.525	-0.357
542	1.513	0.834	1.49	0.80	134	0.192	0.243
542-1	1.487	0.845	1.49	0.80	11	-0.025	0.321
542-2	1.686	0.900	1.49	0.80	5	1.633	0.714
1010	1.354	1.060	1.34	1.10	77	0.117	-0.222

6.) Next Meeting

Call of the chairman

7.) Meeting Adjourned

ASTM SEQUENCE VI

Name	Address	Phone/Fax/Email	Attendance
Jason Bowden Voting Member	OH Technologies, Inc.	Phone: 440-354-7007 jhbowden@ohtech.com	Attended
Timothy Caudill Voting Member	Ashland, Inc.	Phone: 606-329-5708 Tlcaudill@ashland.com	Attended
David Glaenzer Voting Member	Afton Research Center	Phone: 804-788-5214 Dave.Glaenzer@aftonchemical.com	Attended
Rich Grundza Voting Member	ASTM TMC	Phone: 412-365-1034 reg@astmtmc.cmu.edu	Attended
Tracey King Voting Member	Haltermann	Phone: tking@jhaltermann.com	Attended
Charlie Leverett Voting Member	Intertek Automotive Research	Phone: 210-647-9422 charlie.leverett@intertek.com	Attended
Terry Kowalski Voting Member	Toyota	teri.kowalski@tema.toyota.com	
Bruce Matthews Voting Member	GM Powertrain Engine Oil Group	Phone: 248-830-9197 bruce.matthews@gm.com	Attended
~~Timothy Miranda~~ Irwin Goldblatt Voting Member	BP Castrol Lubricants USA	~~Phone: 973-305-3334~~ ~~Timothy.Miranda@bp.com~~	Attended
Nathaniel Moles Voting Member	Lubrizol	Phone: (440) 347-4472 Nathaniel.Moles@Lubrizol.com	Attended
Mark Mosher Voting Member	ExxonMobil	Phone: 856-224-2132 mark_r_mosher@exxonmobil.com	Attended
Andy Ritchie Voting Member	Infineum	Phone: 908-474-2097 Andrew.Ritchie@infineum.com	Attended
Ron Romano Voting Member	Ford Motor Company	Phone: 313-845-4068 rromano@ford.com	
Kaustav Sinha Voting Member	Chevron Oronite Company LLC	Phone: 713.432.6642 LFNQ@chevron.com	
Mark Sutherland Voting Member	TEI	Phone: 123.456.7890 msutherland@tei-net.com	
Haiying Tang Voting Member	Chrysler	Phone: 248-512-0593 HT146@Chrysler.com	
Dan Worcester Voting Member	Southwest Research Institute	Phone: 210.522.2405 dan.worcester@swri.org	Attended

ASTM SEQUENCE VI

Name	Address	Phone/Fax/Email	Attendance

Guests

Ed Altman	ed.altman@aftonchemical.com	Afton	
Bob Campbell	Bob.Campbell@aftonchemical.com	Afton	
Todd Dvorak	todd.dvorak@aftonchemical.com	Afton	Attended
Christian Porter	Christian.porter@aftonchemical.com	Afton	
Terry Hoffman	Terry.Hoffman@aftonchemical.com	Afton	
Jeremy Styer	Jeremy.styer@aftonchemical.com	Afton	
Greg Guinther	greg.guinther@aftonchemical.com	Afton	
Don Smolenski	donald.j.smolenski@gm.com	Evonik	
Doyle Boese	Doyle.boese@infineum.com	Infineum	
Mike McMillan	mmcmillan123@comcast.net	Infineum	Attended
Bob Olree	olree@netzero.net	Intertek	
Addison Schweitzer	addison.schweitzer@intertek.com	Intertek	
Angela Willis	angela.p.willis@gm.com	GM	
Robert Stockwell	Robert.Stockwell@GM.com 210.563.0785	GM	Attended
Jeff Kettman	Jeff.kettman@gm.com	GM	
Jerry Brys	Jerome.brys@lubrizol.com	Lubrizol	
Jessica Buchanan	Jessica.Buchanan@Lubrizol.com	Lubrizol	
Michael Conrad	Michael.Conrad@Lubrizol.com	Lubrizol	
Dwight Bowden	dhbowden@ohtech.com	OHT	
Matt Bowden	mjbowden@ohtech.com	OHT	Attended
Guy Stubbs	Guy.Stubbs@swri.org	SwRI	
William Buscher	william.buscher@intertek.com	Intertek	
Scott Stap	Scott.stap@tgdirect.com	TG Direct	
Robert Stockwell		Oronite	
Clayton Knight	cknight@tei-net.com	TEI	
Jeff Clark	jac@astmtmc.cmu.edu	TMC	
Hap Thompson	Hapjthom@aol.com	ASTM VIE Facilitator	
Tom Smith		Valvoline	
Mark Adams	mark@tribologytesting.com		
Dan Lanctot	dlanctot@tei-net.com	TEI	
Adrian Alfonso	adrian.alfonso@intertek.com 210.838.0431	Intertek	
Ricardo Affinito	affinito@chevron.com 510.242.4625	Oronite	
Zack Bishop	zbishop@tei-net.com 210.877.0223	TEI	
Patrick Lang	Patrick.lang@swir.org 210.522.2820	SwRI	

ASTM SEQUENCE VI

Name	Address	Phone/Fax/Email	Attendance
Mike Warholic	Michael.warholic@Infineum.com 908.474.2065	Infineum	
Jordan Pastor	Jordan.pastor@Infineum.com 313.348.3120	Infineum	
Jim Linden	lindenjim@jlindenconsulting.com 248.321.5343	J Linden Consulting	
Jo Martinez		Chevron	Attended
Timothy Cushing		GM	Attended
Gordon Farnsworth		Infineum	Attended
Amol C Savant		Ashland	Attended
Mark Overaker		Haltermann	Attended
Jeff Hsu		Shell	Attended
Chris Castanien			Attended
Ricardo Gordon			Attended
Janet Buckingham		SwRI	Attended
Pat Lang		SwRI	Attended
Michael Sanchez		SwRI	Attended

ASTM SEQUENCE VI

Name	Address	Phone/Fax/Email	Attendance

Questions re VIE Precision Matrix

1. Can engines that currently have hours on them be set aside, now, for matrix testing? These could be engines currently on stands or sitting in inventory. In either case, no more tests would be run on these engines prior to the matrix. Can we know why engines are sitting in inventory?
   a) If not, can the engine availability spreadsheet be updated on a routine basis and sent to the statisticians' task force, with comments on why engines are sitting in inventory.

   - Engines currently in use **can't** be set aside for matrix testing. List of available engines will be updated regularly with comments on why engines are sitting in inventory. List will also be updated based on the labs' willingness to offer engines with a lot of hours on it.

2. If needed, can labs install new engines for matrix testing? YES

3. If the precision matrix requires more than one engine on a stand and the second engine is sitting in inventory with hours on it, will that second engine need some sort of "re-break in"? YES If so, what will this entail? Run "16-32 hours" aging.

4. If an engine has >3100 hours after the last matrix test finishes and no other engine was used on the same stand, will the calibration/donated tests still count?
   - Based on MOA, 3 calibration tests can be counted for all engines. Labs will decide whether they're willing to offer an older engine in the matrix (SW is willing, LZ might, IAR is not willing). Will know for sure before the start of the matrix.

5. The statisticians' task force is currently trying to put a precision matrix together to assess stand/engine, oil, and engine hour effects. Are there other potential effects/factors we should be aware of when designing the matrix? NO

6. Do the matrix oils (RO542-2, RO1010-1, Tech1) contain friction modifier? Ask TMC

VIE Data Analyses Conclusions

January 30, 2015

The current VIE data indicates statistical discrimination among the oils tested for FEI1 and FEI2.

Based on several analyses, the ranges of standard deviation for FEI1 and FEI2 are (0.14-0.19) and (0.14-0.17), respectively. VID standard deviation is 0.12 and 0.14 for FEI1 and FEI2, respectively.

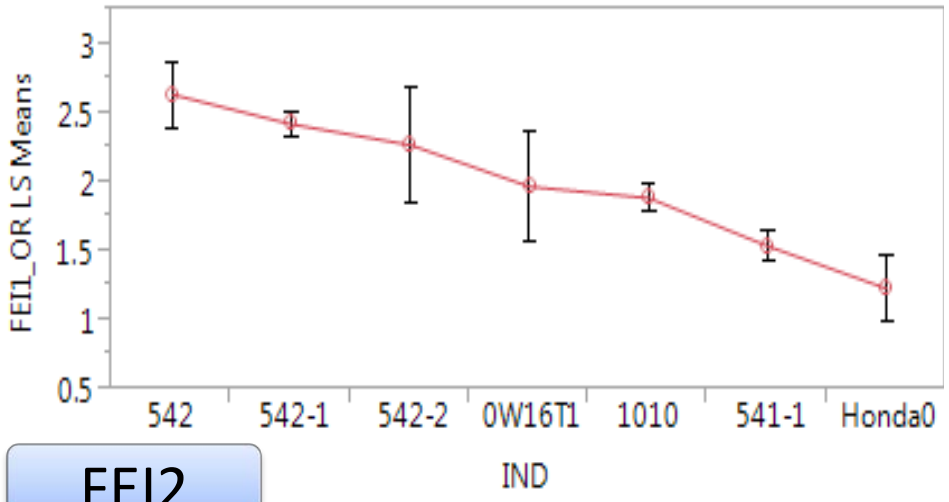
The standard deviations above were based on inclusion of statistically significant engine hour effect.

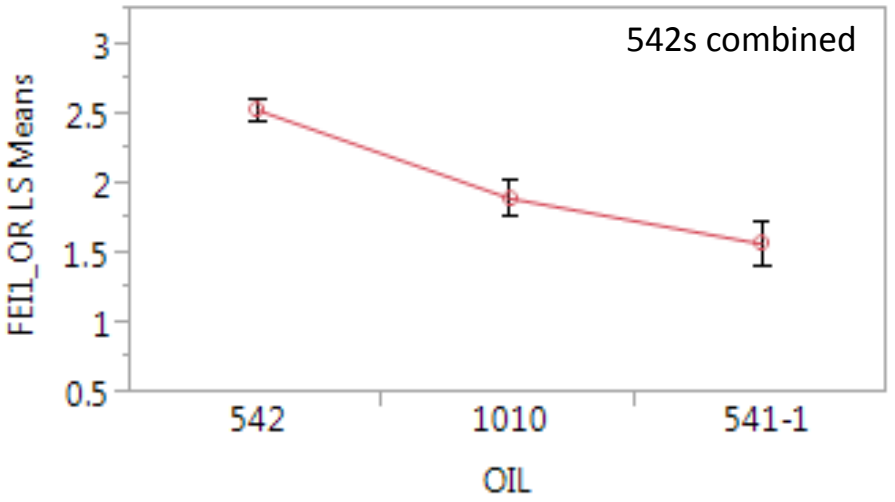
Engine Hours should be included in the precision matrix design.

In some of the analyses, lab and engine within lab effects are statistically significant.

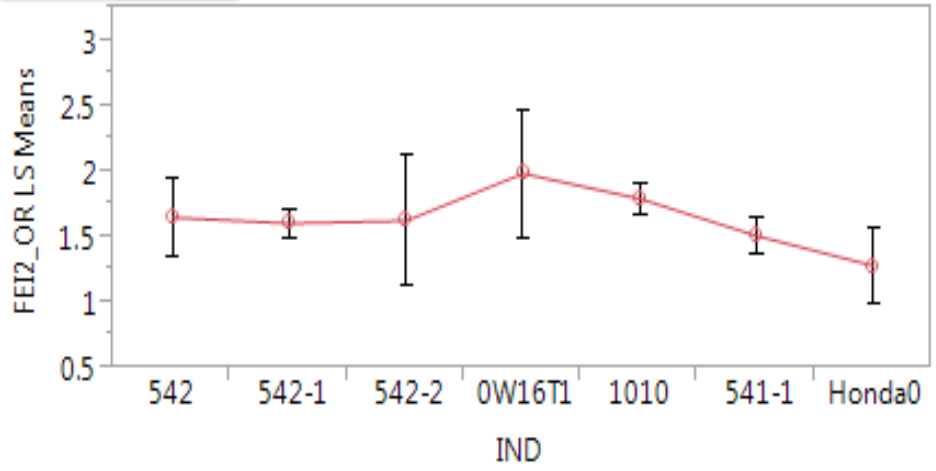
Oil Discrimination Determined from Various Analyses

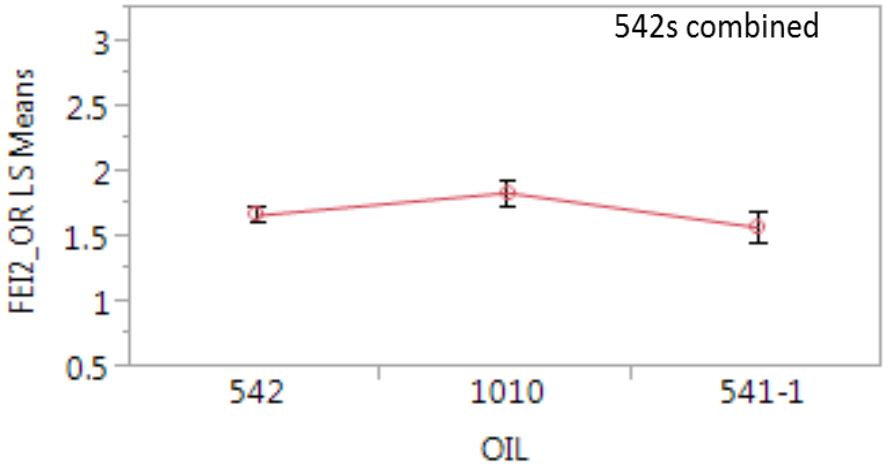
FEI1





FEI2





Note: 95% Confidence Intervals for the LSMeans are NOT comparison intervals

Colleagues,

Expanding on Rich's comments, I have a few additional questions/comments.

I too am wondering if we are doing the right thing by requiring a set order of three oils to calibrate a new engine.
Very little data is generated on RO 542 and its re-blends beyond the initial test point. The same can be said for RO 541 & RO 1010.
Do we really need to run three RO tests to establish the new engine for LTMS?
Perhaps we run two ROs, a few candidates and then another RO.
Candidate tests are judged by FEI 2 & FEI Sum performance, yet we judge RO tests by FEI 1 & FEI 2.
We have a pooled s that is used for all three ROs. Why not have individual s values for each oil as other test areas?
I can understand the use of pools s for the application of Severity Adjustments.

I welcome comments; now is the time to question our practices and determine if we have the best practices for the Sequence VIE.
Changes can be made much easier now than later.
Some of my concerns can come from analysis of precision matrix data, but cannot unless we ask to see it considered.

David L. Glaenzer
R & D Manager
Mechanical Lab Testing
Afton Chemical Corporation
500 Spring Street
Richmond, VA 23219
(804) 788-5214
dave.glaenzer@aftonchemical.com

Sequence VI FM Carry Over Removal Update

Attempts at Fixing the Problem

SUCCESS TOGETHER

- To date, attempted to make incremental changes to remove the carry over effect for ease of gaining approval for updating in the procedure
  - Additional BL Flushes
  - Lower Viscosity HDFO
  - High Speed & Extended Run Time of HDFO
  - Alternate Formulation of HDFO

Lubrizol

High Speed & Flush Formulation Flushing Test Procedure

SUCCESS TOGETHER

1. Triple Flush to BLB1 Oil
   - 6 stage evaluation
2. Triple Flush to BLB2 Oil
   - 6 stage evaluation
3. Triple Flush to Test Oil
   - 16 hour aging
   - 6 stage evaluation
   - 84 hour aging
   - 6 stage evaluation
4. Double Flush to HDFO
5. Triple Flush to BLA
   - 6 stage evaluation
6. Double Flush to HDFO
7. Run 10 hours at 3500 rpm Break-in condition
8. Double-Triple Flush to BLA2
   - 6 stage evaluation
9. Double Flush to HDFO
   - Using alternate flush oil formulation
10. Double-Triple Flush to BLA3
    - 6 stage evaluation

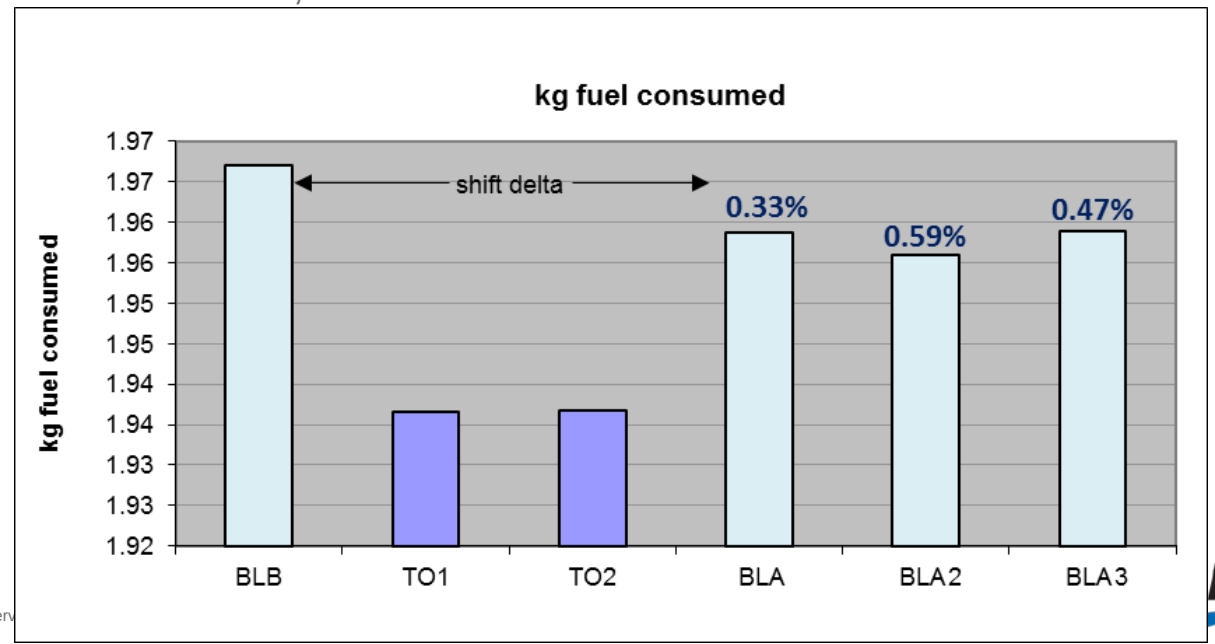
Addition to VID Procedure

Lubrizol

Test Results

SUCCESS TOGETHER

- Due to a human error, the experiment had to be repeated and this was the second run on the high FM carry over candidate oil resulting in suppressed BLB and lower than normal BLA shift
- The high speed condition preceding BLA2 appears to have resulted in “breaking in” effect
  - This may be due to the fact that the experiment was ran on a new engine
  - This may have removed the friction modifier; however, it shifted the BSFC lower
- The impact of the specially formulated flush oil was marginal
  - Due to the break in effect, it is unclear if this flush oil is effective



High Fuel Treat Rate Testing Update

Test Results of First Reference Oil Runs

SUCCESS TOGETHER

- Using 3x's the current treat rate of fuel additive for the Sequence VIE to prolong engine life and improve the responsiveness over the course of the engine life
- The higher treat rate does not appear to have significant impact on the test results to date
- Plan to rerun the same reference oils after several tests have ran to evaluate impact on responsiveness

FEI - 1	FEI - 2	FEI sum	Eng Hours	RO
2.03	1.3	3.33	354	542-2
1.75	1.57	3.32	549	1010-1

Lubrizol

VIDBL and FO Survey

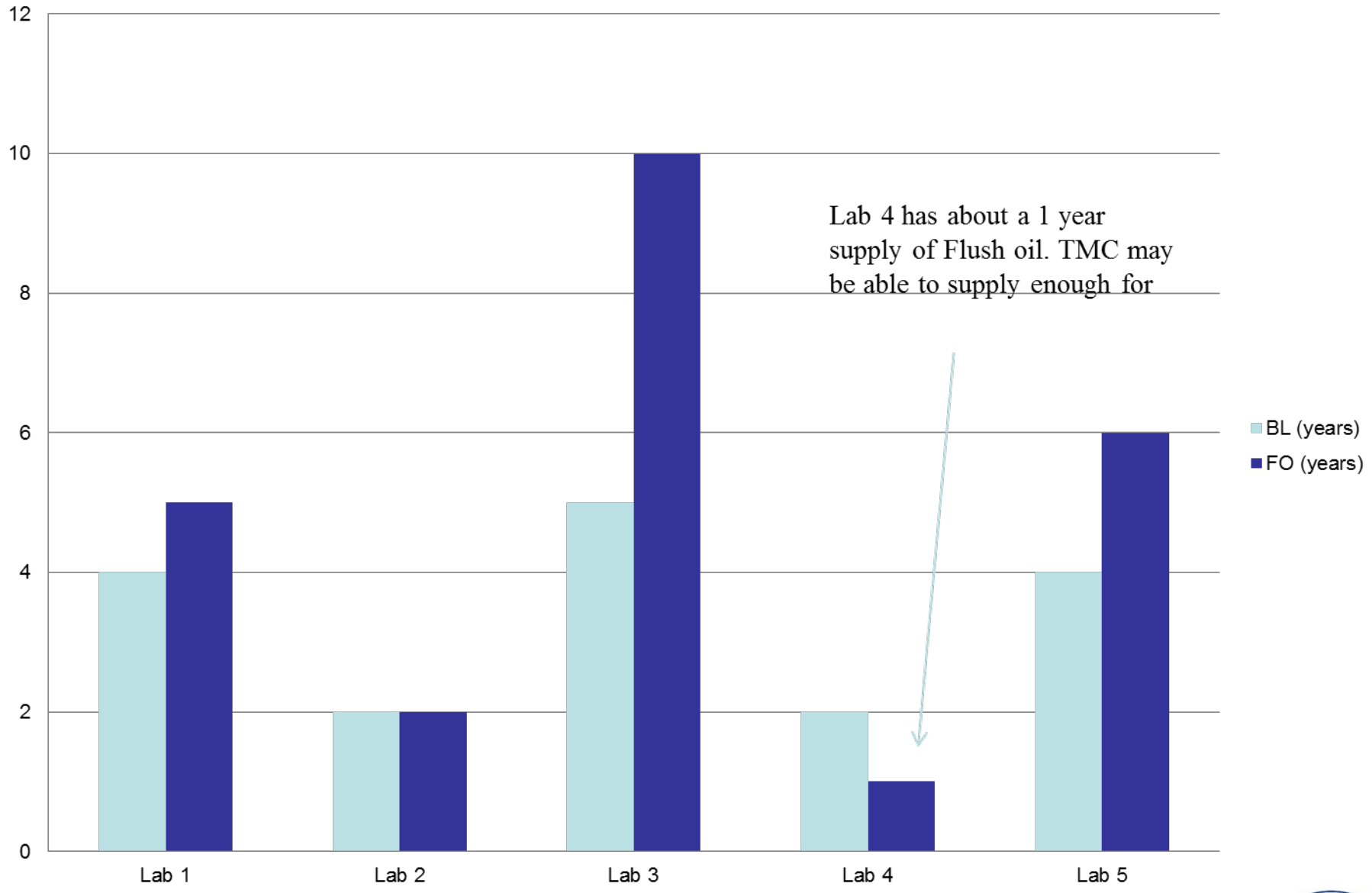
February 5, 2015 Conference Call

VIDBL and FO Survey

Survey conducted to establish need for new blend

Attached graph shows quantities and use of BL and FO for 5 of 6 laboratories.

Estimated BL4 & FO4 Life By Lab



Test Monitoring Center
http://astmtmc.cmu.edu

A Program of ASTM International

VIDBL and FO Survey

One lab will run out of FO within a year, based on quantities available and current consumption levels.

This lab may be able to go another year using what remains at TMC

At least one other lab may be out of BL and FO in two years.

A Program of ASTM International

542-2 Review

February 5, 2015

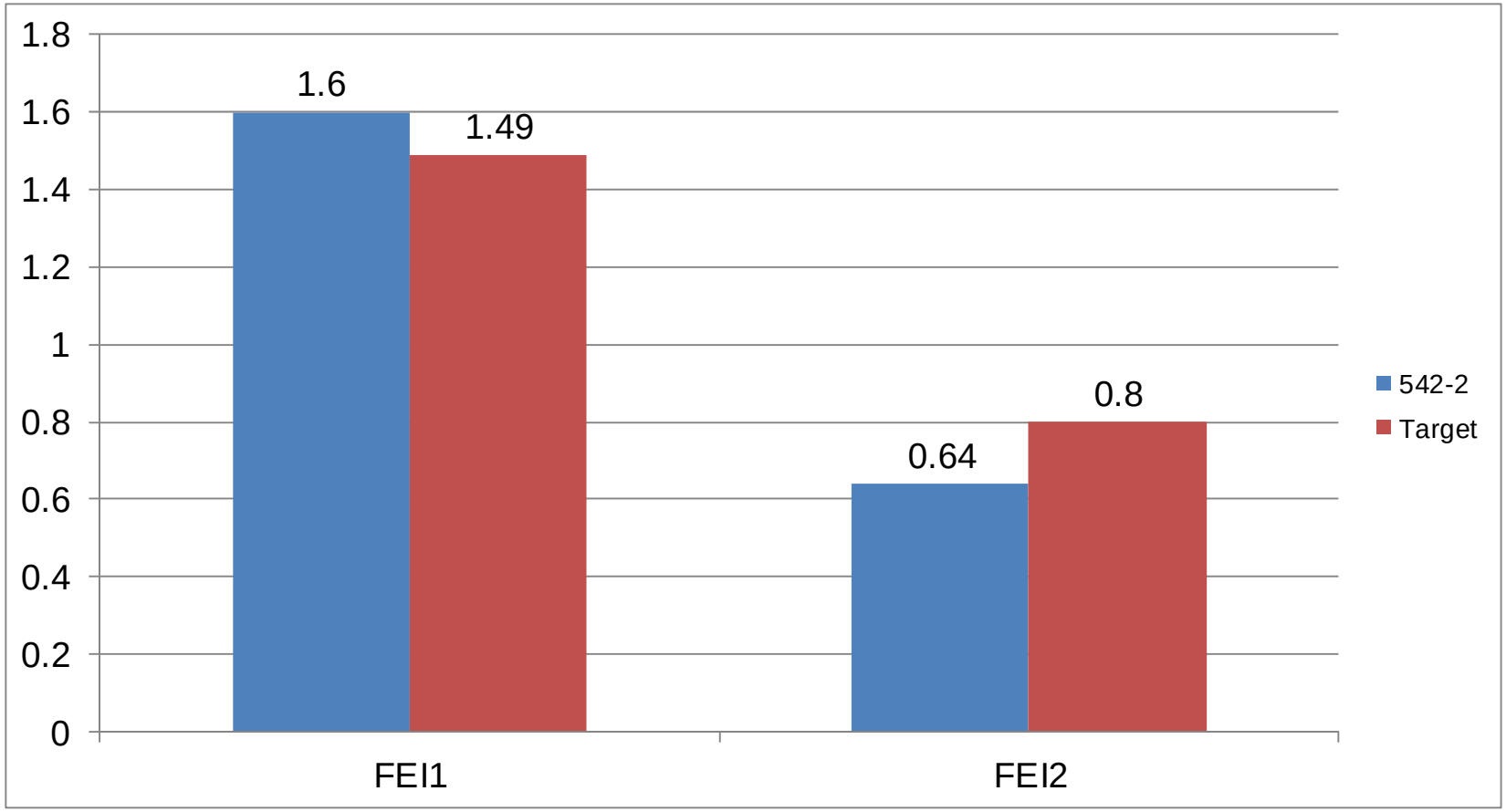
Results to Date

- 6 operationally valid results as of today
- 2 acceptable statistically
- 4 rejected statistically, Mild on FEI1 or FEI2 or Both
- No 542 or 542-1 remains in inventory at TMC
- Some labs have no 542 or 542-1 in VID or VIE inventory
- Results to date summarized in the following slides

Results to Date

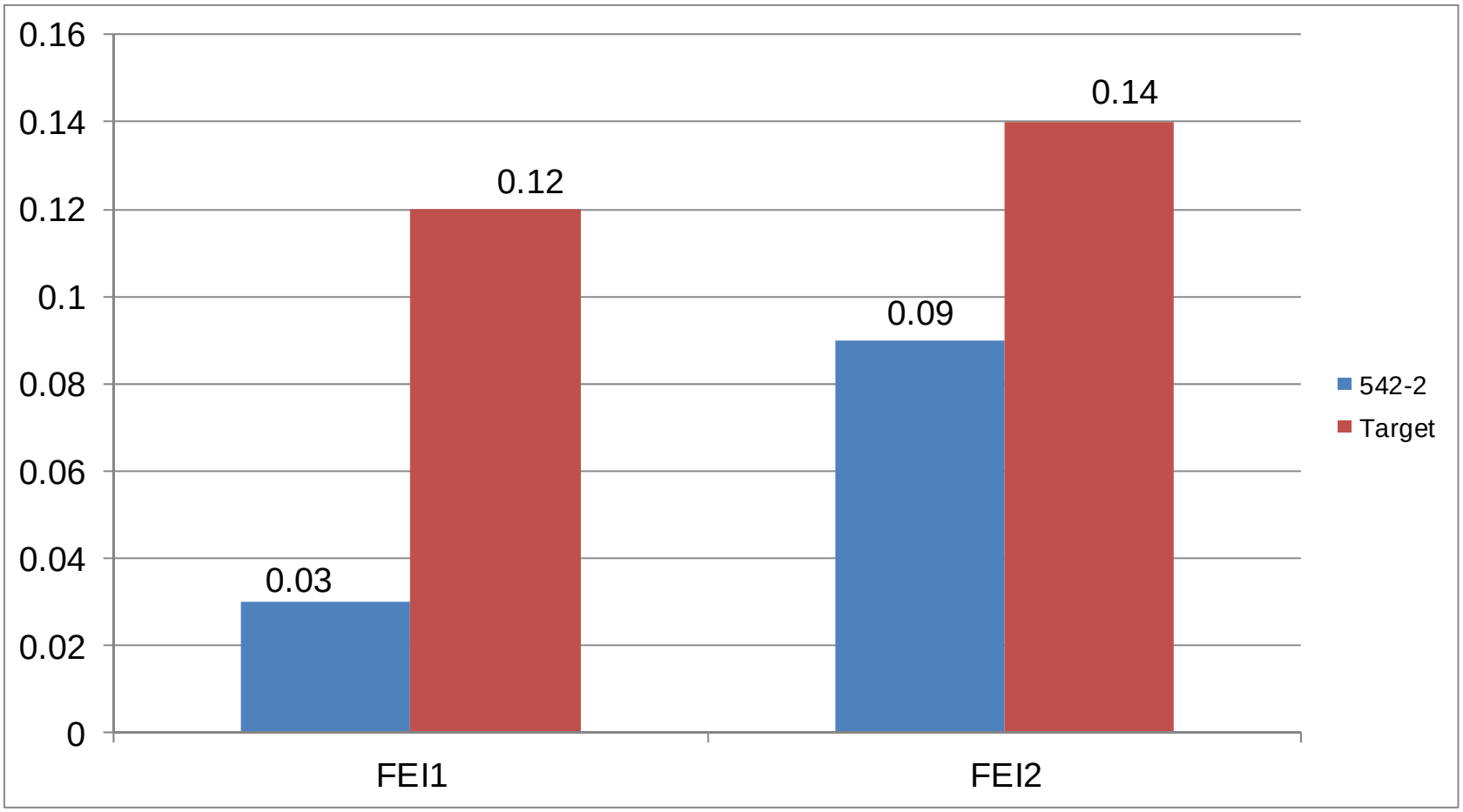
TESTKEY	LTMSLAB	IND	VAL	FEI1	FEI1yi	FEI2	FEI2yi
105703-VID	G	542-2	MC	1.74	2.0833	1.04	1.7143
105712-VID	B	542-2	AC	1.63	1.1667	0.7	-0.7143
105715-VID	A	542-2	AC	1.58	0.75	0.57	-1.6429
106082-VID	G	542-2	MC	1.7	1.75	1.11	2.2143
106141-VID	D	542-2	MC	1.84	2.9167	1.13	2.3571
106083-VID	G	542-2	MC	1.78	2.4167	1.08	2

Comparison of 542-2 Results with 542 Targets



Targets based on 2 tests

Comparison of 542-2 Results Standard Deviations with 542 Targets



Targets based on two tests

Summary

- FEI1 is mild relative to the target, approximately 1 standard deviation milder, but is less variable than target, based on limited data.
- FEI2 is severe of target, with less variability, again based on limited data.
- 542 and 542-1 inventory depleted at TMC.
- Results to date have been on new engines.
- Two of those engines have been abandoned.

A Program of ASTM International