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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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Originally Issued: July 2, 2015

Reply to: Richard Grundza
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Unapproved Minutes of the June 3, 2015
Sequence VG Surveillance Panel Meeting
held in San Antonio, TX

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The meeting was called to order at 8:15 am by Andy Ritchie.

A list of attendees is included as attachment 1

Agenda Review

Bill Buscher is Action & Motion recorder.

The Agenda was accepted as shown on Attachment 2.

Minutes from the May 5, 2015 Conference call were approved unanimously.

Test Monitoring Center Report

A copy of the TMC report can be obtained from the TMC website. Rich Grundza presented highlights from his report. There were no questions or comments regarding the TMC report.

Fuel Update and VG/VH Status

Chairman Ritchie offered that the main items were to review the status of the VG parts, the VH development and the situation with the current VG fuel batch and the approval of a new fuel batch. He commented that this would be a communal ASTM effort to collect these data and agree the work needed to implement the proposed plan in the coming months.

- 1) The attached PowerPoint presentation was made by Ford/Romano at the SP meeting (attachment 3). Charman Ritchie confirmed that the semi-annual Sequence V report to B will incorporate this material and that he will ask for it to be included as a presentation and discussion agenda item for the Fort Lauderdale PCEOCP meeting on June 23rd.
- 2) The labs and Haltermann collected their information on the AK fuel batch and VG parts and it appears that enough approved VG fuel remains to run approximately 160 VG tests and approximately 260 VG test part. Based on the assumptions of the use of the current 7 calibrated VG stands the best guess we can presently provide is that the VG fuel will run out first around February to March 2016. The parts would run out a few months later. The reintroduction of calibrated VG stands would probably bring forward these projections.
- 3) Chairman Ritchie summarized the situation as follows. The VH test development is still proceeding but given the present difficulties we face it is necessary for us to develop a contingency plan to extend the life of the VG beyond the 2016 GF-6 Technology Demonstration period and into 2017. To do this the SP Task Force will develop a plan to run a matrix of VG tests to approve a new VG fuel batch using the new un-plated VH pistons. It is expected that the parts will be available to start to execute this plan sometime in October. In the meantime the VH development work will continue allowing a further review of the situation before a final decision is made to proceed with the rehabilitation of the VG.
- 4) Discussions turned to parts needed to keep VG going. An action item was assigned to solicit fabrication of oil separators, labs will continue to reuse existing hardware as long as they are able. The VH bearings need to be evaluated to see if they will be usable in the VG. Ron also instructed labs not to dispose of fuel injectors, as there may be a way to remanufacture or reuse them.

Old and New Business

A number of parts are no longer available. OHT has obtained a flywheel that is comparable to the original Ford part which is no longer available and this OHT part will be added to the procedure. Cole Hudson of SwRI presented a listed of parts which are no longer available. Both intake and exhaust valves are no longer available and an aftermarket supplier has been located. The current Ford water pump is no longer available and a replacement pump from Ford has been identified. A source for wiring harnesses has also been identified. Members of the panel expressed concerns about valve recession with the new valves and after considerable discussion an action item was assigned to develop a procedure to measure valve recession. There was also considerable discussion about introducing the valves with a reference, but SwRI was out of hardware and they would need to implement this as soon as possible. Some attendees felt that it was not a good precedent to introduce the valves without a reference test, but the Test Sponsor felt the change would not affect severity. Also discussed was allowing the use of an ultrasound cleaner for use in VG. Jerry Brys moved to allow the use of ultrasound cleaner for all parts in VG. Because of the large amount of parts to be addressed, it was decided to withdraw the motion and address the use of the

Sequence VG Meeting Minutes
June 3, 2015

ultrasound during the next conference call. The panel approved the use of alternate valves, water pump and wiring harness by a vote of 6 approves, 0 negatives and 6 waives. Rich Grundza asked if this vote was controversial, because of the number of waives, but none of the panel members indicated that there were potential negatives at the Subcommittee vote, so Rich indicated he would continue with an information letter through normal channels.

A listing of Motions and Action items recorded during the meeting is included as attachment 4.

The meeting was adjourned at 4:15 pm.


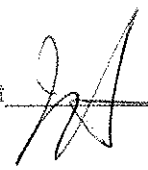


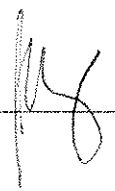
ASTM Sequence V Surveillance Panel

date: 06/20/2015

Name/Address	Phone/Fax/Email		Signature
Matt Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 mjbowden@ohitech.com	Non-Voting Member	Present _____
Jerome A. Brys Lubrizol Corp. 29400 Lakeland Blvd. Wickliffe, Ohio 44092 USA	440-347-2631 jerome.brys@lubrizol.com	Non-Voting Member	Present <u>JB</u>
Bill Buscher III Southwest Research Institute 8220 Culebra Road P.O. Box 28510 San Antonio, TX 78228 USA	210-522-6802 210-684-7523 william.buscher@swri.org	Non-Voting Member	Present _____
Bob Campbell Afton Chemical Corporation 600 Spring Street Richmond, VA 23219 USA	804-788-6340 804-788-6358 bob.campbell@aftonchemical.com	Non-Voting Member	Present <u>BC</u>
Timothy L. Caudill Ashland Oil Inc. 22 nd & Front Streets Ashland, KY 41101 USA	606-329-1960 x5708 606-329-2044 tlcaudill@ashland.com	Voting Member Non-Voting Member	Present _____ Represented by Amol Savant for Voting
Jeff Clark Sequence III Secretary ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 USA	412-365-1032 412-365-1047 jac@atc-enc.org	Non-Voting member	Present _____
Sid Clark Southwest Research 50481 Peggy Lane Chesterfield, MI 48047 USA	686-873-1255 Sidney.L.Clark@swri.org	Non-Voting Member	Present _____
Todd Dvorak Afton Chemical Corporation P.O. Box 2158 Richmond, VA 23218-2158 USA	804-788- 8367 804-788- 8328 todd.dvorak@aftonchemical.com	Non-Voting Member	Present <u>TODD</u>

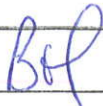

ASTM Sequence V Surveillance Panel

date: 10/22/14

Name/Address	Phone/Fax/Email		Signature
Gordon R. Farnsworth Infineum RR # 5 Box 211 Montrose, PA 18801 USA	570-934-2776 570-934-0141 gordon.farnsworth@infineum.com	Non-Voting Member	Present _____
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Jeffrey Hsu Shell 3333 Hwy 6 South Mail Drop L107C Houston, TX 77082 USA	281-544-8619 281-544-8150 j.hsu@shell.com	Voting Member	Present  _____
Tracey King Haltermann Solutions Mi USA	947-517-4107 tking@jhaltermann.com	Voting Member	Present  _____
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Josephine G. Martinez Chevron Oronite Company LLC 100 Chevron Way Richmond, CA 94802 USA	510-242-5563 510-242-3173 jogm@chevrontexaco.com	Non Voting Member	Present  _____

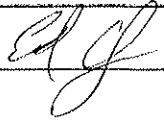


ASTM Sequence V Surveillance Panel

date: 10/22/14

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Bruce Matthews GM Powertrain Mail Code 483-730-472 823 Jocyn Avenue Pontiac, MI 48340 USA	248-830-9197 248-857-4441 bruce.matthews@gm.com Test Sponsor Representative	Voting Member	Present <u></u>
Mike McMillan	mmcmillan123@comcast.net	Non-Voting Member	Present _____
Christopher Mileti The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2352 440-347-4096 greg.seman@lubrizol.com	Voting Member	Present _____
Timothy Miranda BP Castrol Lubricants USA 1500 Valley Road Wayne, NJ 07470 USA	973-305-3334 973-686-4039 Timothy.Miranda@bp.com	Voting Member	Present _____
Christian Porter Afton Chemical Corp. 500 Spring Street Richmond, VA 23219 USA	804-788-5837 804-788-6358 christian.porter@aftonchemical.com	Non-Voting Member	Present <u></u>
Allison Rajakumar The Lubrizol Corporation Drop 152A 29400 Lakeland Blvd. Wickliffe, OH 44092 USA	440-347-4679 440-347-2014 Allison.Rajakumar@Lubrizol.com	Non-Voting Member	Present _____
Andrew Ritchie Infineum 1900 East Linden Avenue P.O. Box 735 Linden, NJ 07036 USA	908-474-2097 908-474-3637 Andrew.Ritchie@Infineum.com Surveillance Panel Chairman	Sequence V Chair	Present _____
Ron Romano Ford Motor Company Diagnostic Service Center II Room 410. 1800 Fairlane Drive Allen Park, MI 48101 USA	313-845-4068 313-32-38042 rromano@ford.com	Voting Member	Present <u><i>on phone</i></u>

ASTM Sequence V Surveillance Panel

6/3/15
date: ~~10/22/14~~

Name/Address	Phone/Fax/Email		Signature
Ed Altman Afton Chemical Corporation 500 Spring Street Richmond, VA 23219 USA	804-788-5279 804-788-6358 ed.altman@aftonchemical.com	Voting Member	Present 
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Dwight H. Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 dwbowden@ohtech.com	Non-Voting Member	Present _____

6/3/15
~~10/22/14~~

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Michael Locher (SWRI) MR
Cole Hudson Matt Co

Patrick LANG (SWRI) Pat Ly

ROBERT STOCKWELL RTS

CLIFFORD SALVESEN EXXONMOBIL [Signature]

Mark Mosher ExxonMobil [Signature]

DAVID GLAENZER AFTON CHEMICAL [Signature]

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Kevin O'Malley Lubrizol kvom@lubrizol.com [Signature]

JOE GLEASON LZ jogl@lubrizol.com [Signature]

Page 5 of 5 CHRIS TAYLOR VPRACINGFUELS CHRISTAYLOR VPRACINGFUELS.COM [Signature]

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248-321-5343

Sequence VG/VH Surveillance Panel

June 03, 2015

08:00 CDT

San Antonio, TX

Call-in Number: 888-272-5498

Participant Passcode: 1938246

Agenda

- 1) Attendance.
- 2) Chairman's comments.
- 3) Approval of minutes from panel call May 5th 2015.
- 4) TMC report (REG).
- 5) Assessment of future VG usage rates in 2015 and 2016.
- 6) Sequence VG Fuel Update (Haltermann).
 - When is the fuel projected to run out? Number of tests remaining.
- 7) Review of VG Parts Inventories.
 - a) Current VG parts inventory. Number of remaining tests.
 - b) Discussion and motion to allow use of aftermarket intake and exhaust valves.
 - b) Motion(s) for parts and procedure modifications (attached)
 - b) Pistons and rings availability and options
- 8) Review of New Sequence VH Test Data (All).
- 9) Plan of action for sustaining the VG. (All)
- 10) Old Business.
- 11) New Business.
- 12) Review Scope and Objectives.
- 13) Next Meeting
- 14) Meeting Adjourned

Status of Sequence VH Test Attachment 3

- Recent VH tests with latest hardware and new fuel batch showed mild sludge results.
- Investigating procedure changes and VG/VH operating differences in attempts to increase severity.
- Fuel supplier may blend small batch of more severe fuel for testing.
- **Announced at 5/14/2015 AOAP/PCEOCP meeting that VH test development was basically starting over!**

Next Steps in VH Test Development

- Continue testing at SwRI and IAR on final hardware with new fuel batch (DA0120NX10).
 - Objective is to correlate with VG
 - Investigating hardware changes (piston rings, oil separator, Zeus calibration) to increase test severity
 - Modified new fuel batch blended if more severity is needed
- Complete fuel approval Matrix testing on new or modified new fuel batch.
- Get Afton, Ashland and Lubrizol up and running.
- Run prove out testing at all 5 labs on final hardware.
 - All final hardware at labs except piston rings
- Secure AOAP/PCEOCP approval to begin Precision Matrix.
- Precision Matrix should take about 2 months without any invalid tests.
- Unlikely to complete Precision Matrix by end of 2015.

Plan to Keep GF-6 on Track if Precision Matrix Not Completed by End of 2015

- Extend life of VG test into 2017.
- Run VG tests during technology demonstration period.
- Continue VG for 1 year after tech demo period is over.
- Bring in VH 6 months before VG hardware runs out.
- VH still needed as VG parts will not last throughout life of GF-6.
- Other steps to accomplish:
 - Evaluate un-plated piston for VG
 - Determine availability of less critical parts
 - Find source for equivalent oil separator

Plans for Sequence V Fuels

- Should run out of existing fuel batch (AK2821NX10) using existing VG hardware.
- Run new fuel batch (DA0121NX10) approval matrix on the VG with updated hardware, un-plated pistons, and next batch of rings.
- Plan to start new fuel batch approval matrix by October 2015.

Sequence V Surveillance Panel
June 3, 2015
8:00am – 12:00pm
Southwest Research Institute
San Antonio, TX

Motions and Action Items

As Recorded at the Meeting by Al Lopez

1. Action Item – SWRI to ship Zeus and harness to Afton and Lubrizol. One each for stand set-up. Final programing in progress.
2. Ask Cunningham and Bishop if used VG blocks are still available.
3. Solicit fabrication of VG oil separators.
4. Check on use of crank main bearings. Ron to check prints. Labs to check fit of VH bearings in VG block.
5. Ford to flow aftermarket fuel injectors. Goal to replace OEM injectors. Experiment with cleaning failed injectors. SWRI
6. Formulate action plan for introduction of unplated pistons in the fuel matrix. VH Task Force
7. OHT to supply flywheel part number. Jason Bowden.
8. Lubrizol to provide a procedure for ultrasonic cleaning of VG parts.
9. Begin measurement of valve seat recession and tip height. Ron and Cole to draft a procedure.

Motion

Accept the following list of parts to the Sequence VG Test procedure:

Proposed - Cole Hudson

Second – Al Lopez

6 Approve

0 Opposed

6 Wave

Motion Carries

Table A5.1, Item #23 Intake Valve (without a reference)

SB International #01698

E&E Machine and Parts
1602 S Flores St
San Antonio, TX 78204

Table A5.1, Item #24 Exhaust Valve (without a reference)

SB International #01699

E&E Machine and Parts
1602 S Flores St
San Antonio, TX 78204

Table A5.3, Item #10 Water Pump (will be brought in with a reference)

Motorcraft PW470

Table A5.6, Item #6 Engine Wire Harness (will be brought in with a reference)

FT-93 Ford Harness, 4.6 less EM connectors

Ron Francis Wiring
200Keystone Road, Suite #1
Chester PA 19013
800.292.1940

Motion: Accept the following procedural modification to the Sequence VG Test procedure.

Proposed: Cole Hudson Second: Al Lopez

Section 7.8.4 Block Preparations

Allow the use of additional cleaning processes, specifically the use of ultrasonic cleaners in pre-honing cleaning.

For 10

Against 0

Waive 2

Motion Carries