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COMMITTEE D02 ON PETROLEUM PRODUCTS, LIQUID FUELS, AND LUBRICANTS

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Originally Issued: December 20, 2016

Reply to: Richard Grundza
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Unapproved Minutes of the November 16, 2016
Sequence IV Surveillance Panel Meeting.

The meeting was called to order by Chairman Buscher at 9:00 AM Central Time.

A list of attendees is included as attachment 1. Bob Campbell will be the voting member for Afton. Khaled Rais replaces Eric Liu as the voting member for Southwest Research.

A copy of the agenda is included as attachment 2.

Minutes from the 3/30/2016 Meeting were not available and therefore, no vote taken. An action item was assigned to Bill Buscher and Rich Grundza to publish the 3/30/16 minutes.

Action Items from Previous Meeting

A review of the status of action items from the previous meeting was under taken. The action items and their disposition are included as attachment 3. An action item was assigned to Bill Buscher to include negative comments from the negative voters on motion #5 from the previous meeting. Another action item was assigned to obtain OBD addresses for a number of ECM parameters from Toyota.

TMC Report

The panel reviewed IVA monitoring status for October 2016. A copy of the TMC report can be accessed via the following link:
ftp://ftp.astmtmc.cmu.edu/docs/gas/B01SemiAnnualReports/semiannualreports/B01%20SemiAnnualReport%20-%20OCT%202016.pdf

Fuel Supplier Report

Mark Overaker discussed batching strategies and current fuel is blended as needed. Considerable discussion took place regarding procuring larger batch sizes, primarily due to the higher fuel consumption of the IVB test. An action item was assigned to direct Haltermann to blend larger batches of green fuel, a minimum of 50,000 gallons for IVA, IVB and other test types.

IVA Status

Testing levels were discussed and there is a several year supply of hardware. Reference oil 1006-2 may become short in supply, but the TMC has segregated 6 drums for IVA use. Engines and heads with runs available may have to be redistributed and two batches of reground cams remain available. There are currently 3 labs running IVA tests. 1 lab indicated they will exit IVA testing sometime next year. Sufficient hardware, fuel and capacity appears to be available for the foreseeable future.

IVB Status

The panel reviewed the revisions taken place over the past few months to test conditions regarding the IVB. A presentation summarizing these changes is included in attachment 4. Test results with some of these changes were also reviewed. As a result of these reviews and considerable discussions motions 5 through 10 in attachment 6 were approved by the panel. Motion 5 had one negative and the negative voter agreed to put his comments in writing. These comments are included as Attachment 7. Since the panel agreed that oil 1006-2 was not appropriate for use in prove out and matrix testing, the panel also moved to have the TMC obtain a blend of REO3 in 5W-20 vis grade for the matrix and subsequent reference testing, which is motion 11 in attachment 6. The panel also moved that all matrix testing and the subsequent reference period be conducted on the same batch of fuel. This motion is motion 12 in attachment 6 and also exempts labs under legal restraint.

Scope and Objectives

A review of the scope and objectives was conducted and these are included as attachment 5.

The meeting was adjourned at 4:30 PM.

A listing of the motions and action items from this meeting is included as attachment 6.

MEMBERSHIP
SEQUENCE IV SURVEILLANCE PANEL

November 16, 2016

NAME	COMPANY-ADDRESS-PHONE-FAX-EMAIL	SIGNATURE
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Caudill, Timothy	Ashland Inc. 22nd & Front Streets Ashland, KY 41114 Phone No.: 606-329-1960 x5708 Fax No.: 606-329-2044 Email: tlcaudill@ashland.com	Proxy by Amal Savant
Glaenzer, Dave AFTON VOTING MEMBERSHIP TO B.B CAMPBELL	Afton Chemical Corporation 500 Spring Street P.O. Box 2158 Richmond, VA 23217-2158 Phone No.: 804-788-5214 Fax No.: 804-788-6358 Email: dave.glaenzer@aftonchemical.com	Bob Campbell becomes Voting Member
Grundza, Rich	ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 Phone No.: 412-365-1031 Fax No.: 412-365-1047 Email: reg@astmtmc.cmu.edu	
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MEMBERSHIP
SEQUENCE IV SURVEILLANCE PANEL

November 16, 2016

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Matthews, Bruce Bennet, Kim	GM Powertrain Mail Code 483-730-322 823 Joslyn Rd. Pontiac, MI 48340-2920 Phone No.: ~~248-830-9197~~ 248 6708193 Fax No.: ~~248-857-4425~~ Email: bruce.matthews@gm.com	Kim is new GM voting member Cushing proxy 11/16/16 kimberly.bennet@gm.com
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MEMBERSHIP
SEQUENCE IV SURVEILLANCE PANEL

November 16, 2016

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November 16, 2016

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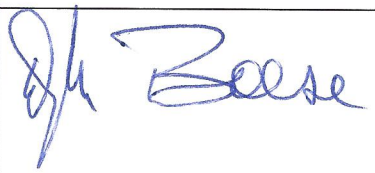
Boese, Doyle	Infineum USA L.P. 1900 E. Linden Avenue Linden, NJ 07036-0536 Phone No.: 908-474-3176 Fax No.: 908-474-3637 Email: doyle.boese@infineum.com	
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November 16, 2016

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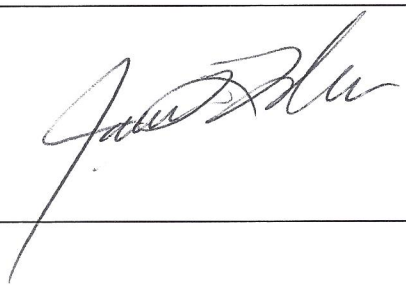
Linden, Jim	Linden Consulting LLC 673 Campus Road Rochester Hills, MI 48309 Phone No.: 248-321-5343 Fax No.: Email: lindenjim@jlindenconsulting.com	
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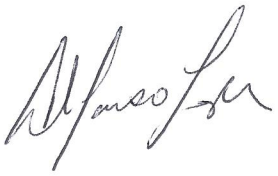
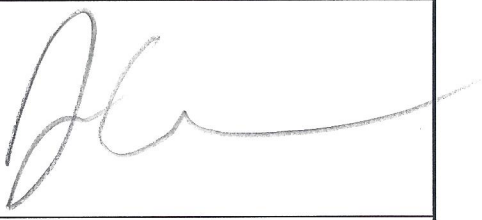
Lopez, Al	Intertek Automotive Research 5404 Bandera Road San Antonio, TX 78238-1993 Phone No.: 210-647-9465 or 210-862-7935 cell Fax No.: 210-523-4607 Email: al.lopez@intertek.com	
Matasic, James	Lubrizol Corporation 29400 Lakeland Blvd. Wickliffe, OH 44092 Phone No.: 440-347-2487 Fax No.: Email: James.Matasic@Lubrizol.com	
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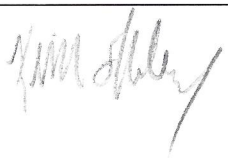
O'Malley, Kevin	Lubrizol Corporation 29400 Lakeland Blvd. Wickliffe, OH 44092 Phone No.: 440-347-4141 Fax No.: Email: Kevin.OMalley@lubrizol.com	

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SEQUENCE IV SURVEILLANCE PANEL

November 16, 2016

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November 16, 2016

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Attachment 2

Sequence IV Surveillance Panel

San Antonio, TX
Southwest Research Institute
November 16, 2016
9:00 a.m. - 3:00 p.m.

A G E N D A

1. Chairman comments
2. Attendance sign-in sheet distribution
3. Membership changes
4. Motion and action recorder
5. Approval of minutes for 3/30/2016
6. Action item review
7. TMC report
8. Fuel supplier report – KA24E Green fuel
9. Sequence IVA update
10. Sequence IVB update
11. Review scope & objectives
12. Old business
13. New business
14. Motion and action item review
15. Next meeting
16. Adjourn

Attachment 3

Sequence IVB Task Force
and
Sequence IV Surveillance Panel
March 30, 2016
10:00AM – 6:00PM
Southwest Research Institute
San Antonio, TX

Motions and Action Items
As Recorded at the Meeting by Bill Buscher

1. Action Item – OHT to work with Toyota to provide the manufacturing specifications (i.e. stiffness and manufacturing tolerances) for the three Toyota OEM motor mounts used on the Sequence IVB Golden Stand.
   Incomplete. Hirano-san talking to Toyota engineers and supplier and attempting to obtain information.

2. Action Item – Intertek to create a calibration curve for the OHT dipstick and modified oil pan.
   Completed. Created dipstick calibration curves for stands 102 and 165. Information distributed on April 18, 2016.

3. Action Item – Add rocker cover coolant flow rate control (control valve, PID controller and set point) to the Sequence IVB test. Labs to obtain flow rate data to define a set point. SwRI will take the lead in creating the set up for this Golden Stand addition.
   Completed. SwRI, Intertek and Lubrizol worked together to design the initial set up and SwRI designed the final set up to eventually be incorporated into all Golden Stands. Controlling rocker cover coolant flow rate to 120 lpm for both Stage 1 and Stage 2.

4. Action Item – Lubrizol to add the OBD2 data to the Sequence IVB operational data Excel template previously created for prove-out data review. This will allow for review of this data during and after the precision matrix.
   Completed. OBD2 parameters from initial list added. Will revisit when final list is established.

5. Motion – The Sequence IVB Task Force and Sequence IV Surveillance Panel approves the inclusion the following procedural process improvements into the precision matrix tests:
    - Each precision matrix stand will start the precision matrix with a new engine assembly, a new clutch assembly and new motor mounts. Prior to the start of the precision matrix the only runtime that this engine and these components will experience is the break-in and aging for Si pacification.
    - Will use the OHT modified oil pan, which will improve the oil drain effectiveness for the flushes and end of test drain.
    - Will add a 5th flush, which will be an oil pan flush without the engine running. This flush will be conducted prior to the 4 flushes with the engine running. For the precision matrix this flush will use EF-411.
    - ifm SM8000 magnetic-inductive flow meters will be added to the Sequence IVB Golden Stand for engine and rocker cover coolant flow rate measurement.
    - Will change from engine coolant delta temperature control (2°C for Stage 1 and 5°C for Stage 2) to engine coolant flow rate control (75 lpm for Stage 1 and 45 lpm for Stage 2). This will include a linear 8 second ramp from 45 to 75 lpm between stages 1 and 2.
    - Will add rocker cover coolant flow rate control (set-point to be defined).
    - Will add data acquisition of a predefined set of OBD2 parameters, at a 1 Hz logging rate.

    Bill Buscher / Eric Liu / Passed 14 – 0 – 1
    Completed. Some changes have occurred since this motion and precision matrix has not yet started.

6. Action Item – SwRI to provide the labs the coolant flow operational data so that all three precision matrix labs can mimic SwRI's coolant flow ramps during transitions.
    Completed. Information distributed on April 5, 2016.

7. Action Item – Sequence IVB Test Development Team to finalize the procedure for the 5th flush, as indicated in the passing motion above.
    Completed. Implemented on all development / prove-out tests conducted since the 5th flush procedure was finalized.

8. Action Item – Sequence IV Surveillance Panel chair to request to Toyota that Afton and ExxonMobil be added to the Sequence IVB Test Development Team as of 3/30/16, since those companies are contemplating the purchase of Sequence IVB Golden Stands. The chair will also ask Toyota for feedback on when they believe the test development team will be disbanded and the surveillance panel will assume full control of the Sequence IVB test.
   Completed. Toyota approved on March 31, 2016.

9. Action Item – SwRI will complete a scoping test currently running on stand 19 with engine coolant flow control, Intertek will conduct a scoping test on stand 102 with engine coolant flow control, and Lubrizol will conduct a scoping test on stand 347 with engine coolant flow control prior to the start of the precision matrix. SwRI will also conduct a repeat test on stand 17 with engine coolant flow control and Intertek will conduct a test on stand 165 with engine coolant flow control. All tests will be conducted on ASTM REO 1006-2. All tests will be conducted with engine coolant flow rate set points of 75 lpm for Stage 1 and 45 lpm for Stage 2 and engine coolant flow rate ramping defined from SwRI's operational data from test 17-0-10.
   Completed. All tests were conducted and completed, and additional testing was conducted based on the results from these tests.

10. Action Item – Eric Liu to provide his Qi Excel spreadsheet to the precision matrix labs to evaluate their operational data for Qi performance.
    Completed. Information distributed on April 5, 2016.

11. Action Item – Precision matrix labs to review the "variable upper and lower QI limits concept" with their computer data acquisition staff to evaluate whether or not it is possible or realistic to incorporate this concept for Sequence IVB operational data validity determination. If it is possible, determine what the lead time to incorporate this will be. Labs to have this evaluation completed by Wednesday, 4/6/16.
    Completed. Implemented with the latest report packet revision, that became effective November 7, 2016.

12. Motion – The Sequence IVB Task Force and Sequence IV Surveillance Panel approves the Sequence IVB test as ready for precision matrix testing and recommends proceeding with the precision matrix, including the original three matrix labs, Intertek

(stands 100 and 101), SwRI (stands 19 and 20) and Lubrizol (stand 347), the original precision matrix design and the procedural process improvements approved in motion # 5 from today's meeting.
Teri Kowalski / Bill Buscher / Passed 6 – 5 – 4
Completed, but this motion will be superseded with a new motion.

13. Action Item – Negative voters on motion # 12 from today's meeting to provide comments on their negative votes to the Sequence IV Surveillance Panel chair, for distribution, by the end of business on Friday, 4/1/16.
Completed. Received comments from two or three negative voters.

Intertek

Valued Quality. Delivered.

Sequence IVB Update

Prepared by: William Buscher

11/16/16

Sequence IVB Late Test Development Revisions

Intertek
Valued Quality. Delivered.

- Adopted OHT modified oil pan, which improves the oil drain effectiveness for the flushes and end of test drain, and allows for oil level measurement with a calibrated dipstick
- Added a 5th flush, which is an oil pan flush without the engine running
  - This flush is conducted prior to the 4 flushes with the engine running
- Added magnetic-inductive flow meters for engine and rocker cover coolant flow rate measurement and control
- Upgraded from 1 HP to 1 ½ HP coolant flow pumps to allow enough headroom for flow rate set points

Sequence IVB Late Test Development Revisions

Intertek
Valued Quality. Delivered.

- Added data acquisition of a predefined set of OBD2/CAN parameters
- Control engine coolant flow rate to **80** lpm for Stage 1 and **20** lpm for Stage 2
- Control rocker cover coolant flow rate to 120 lpm
- Added blowby condenser with cooling and heating circuit, oil separator and blowby collection tank w/ one-way valve to the crankcase ventilation system
- Control blowby gas temperature to **32**ºC
- Changed intake air pressure from 0.07 kPa to 0.25 kPa
- Changed oil gallery temperature from 53ºC to 54ºC for Stage 1 and from 55ºC to 54ºC for Stage 2
- Changed exhaust backpressure from 103.5 kPa to approximately barometric pressure for Stage 1, by locking the control valve at the controller's output value at the end of Stage 2

Sequence IVB Then and Now

Intertek
Valued Quality. Delivered.

Operational Conditions	Units	Then		Now	
		1	2	1	2
Engine Speed	rpm	800	4300	800	4300
Engine Torque	N-m	25	25	25	25
Oil Gallery Temperature	**°C**	**53**	**55**	**54**	**54**
Load Cell Temperature	°C	45	45	45	45
Engine Coolant In Temperature	°C	49	49	49	49
Engine Coolant Delta Temperature	**°C**	**2**	**5**	**Not Controlled**	
Engine Coolant Flow	**lpm**	**Not Controlled**		**80**	**20**
Rocker Cover Flow	**lpm**	**Not Controlled**		**120**	**120**
Intake Air Temperature	°C	32	32	32	32
Fuel Temperature	°C	24	24	24	24
Blowby Gas Temperature	**°C**	**Not Controlled**		**32**	**32**
Exhaust Backpressure	**kPa-A**	**103.5**	104.5	**≈ baro**	104.5
Intake Air Pressure	**kPa**	**0.07**	**0.07**	**0.25**	**0.25**
Rocker Cover Coolant Out Temperature	°C	20	20	20	20
Intake Air Humidity	g/kg	11.5	11.5	11.5	11.5
Engine Coolant Pressure	kPa	70	70	70	70
Fuel Pressure	kPa	335	335	335	335

Parameters in red still subject to change.

Sequence IVB Observations

Intertek
Valued Quality. Delivered.

- Controlling engine coolant delta temperature, and not controlling engine coolant flow rate, led to poor lab reproducibility
- Switching the control strategy from controlling engine coolant delta temperature to controlling engine coolant flow rate resolved the lab reproducibility issue between Lubrizol and the two independent labs
  - This change also resolved the stand reproducibility issue between stand 17 and the 3 DOE matrix stands (18, 19 and 20) at SwRI
  - This change DID NOT resolve the stand reproducibility issue between stand 165 and the 3 DOE matrix stands (100, 101 and 102) at Intertek
- Ambient cell temperature effects blowby gas temperature, both inside and outside of the test engine
  - The effect is much greater on the blowby gas once it exits the water cooled rocker cover

Sequence IVB Observations

Intertek
Valued Quality. Delivered.

- Blowby gas temperature outside the test engine swings 10ºC or more from day to night
- It has not been measured, but the swing from summer to winter could be greater than 10ºC

- An effect is also present on the blowby gas temperature while it is inside the test engine
  - Blowby gas temperature inside the test engine swings 3-5ºC from day to night
  - Speculate that an oil pan insulator could reduce this temperature swing
    - Recommend that we direct OHT to develop, manufacture and supply an oil pan insulator for the Sequence IVB, in similar fashion to the Sequence VG/VH oil pan insulator

- Added a blowby condenser / heat exchanger with a cooling and heating circuit, an oil separator and a blowby collection tank with a one-way valve to the crankcase ventilation system, and controlling blowby gas temperature outside of the test engine eliminated the ambient cell temperature effect on blowby gas temperature outside the test engine and has significantly stabilized water content in the crankcase oil

Sequence IVB Observations

Intertek
Valued Quality. Delivered.

- This change resolved the stand reproducibility issue between stand 165 and the 3 DOE matrix stands (100, 101 and 102) at Intertek

- A correlation of engine coolant flow rate to intake lifter wear severity exists
  - Higher engine coolant flow rate equals higher intake lifter wear
  - But when controlling to max engine coolant flow rate, test severity is still mild compared to controlling engine coolant delta temperature
  - ASTM REO 300 had significantly more severity response to changing engine coolant flow rate than did ASTM REO 1006-2
  - The effect of higher coolant flow rate on ASTM REO 1006-2 was minimal
- A strong correlation of blowby gas temperature to intake lifter wear severity, Fe content, H2O content and white emulsion formation exists
  - Lower blowby gas temperature equals higher intake lifter wear

Sequence IVB Observations

Intertek
Valued Quality. Delivered.

- Lower blowby gas temperature equals higher Fe content
- Lower blowby gas temperature equals higher water content
- Lower blowby gas temperature equals higher white emulsion formation
- When controlling to blowby gas temperature below 26ºC, exhaust lifter wear and wear of non-evaluated internal engine components, has significantly increased
- ASTM REO 300 has significant severity response to changing blowby gas temperature
- ASTM REO 1006-2 has significant severity response to changing blowby gas temperature
- Even though severity response of both reference oils responded well, severity response to changing blowby gas temperature is much higher for ASTM REO 1006-2
  - The test conditions producing intake lifter wear severity comparable to the DOE matrix for ASTM REO 300, produce intake lifter wear severity much more severe than the DOE matrix for ASTM REO 1006-2

Sequence IVB Observations

- This might be attributed to the vintage, base oil quality and additive package of ASTM REO 1006-2
  - According to the supplier of ASTM REO 1006-2, it is a GF-2 quality oil, the base oil is a Group 1 base oil, which is no longer available, it is a high volatility oil and it has a drastically different additive technology than today's oils (GF-5 oils)

- Controlling blowby gas temperature to 24ºC and 28ºC produced similar wear severity and Fe content
- Controlling blowby gas temperature to 32ºC shifted wear severity significantly mild and significantly decreased Fe content through the entire test

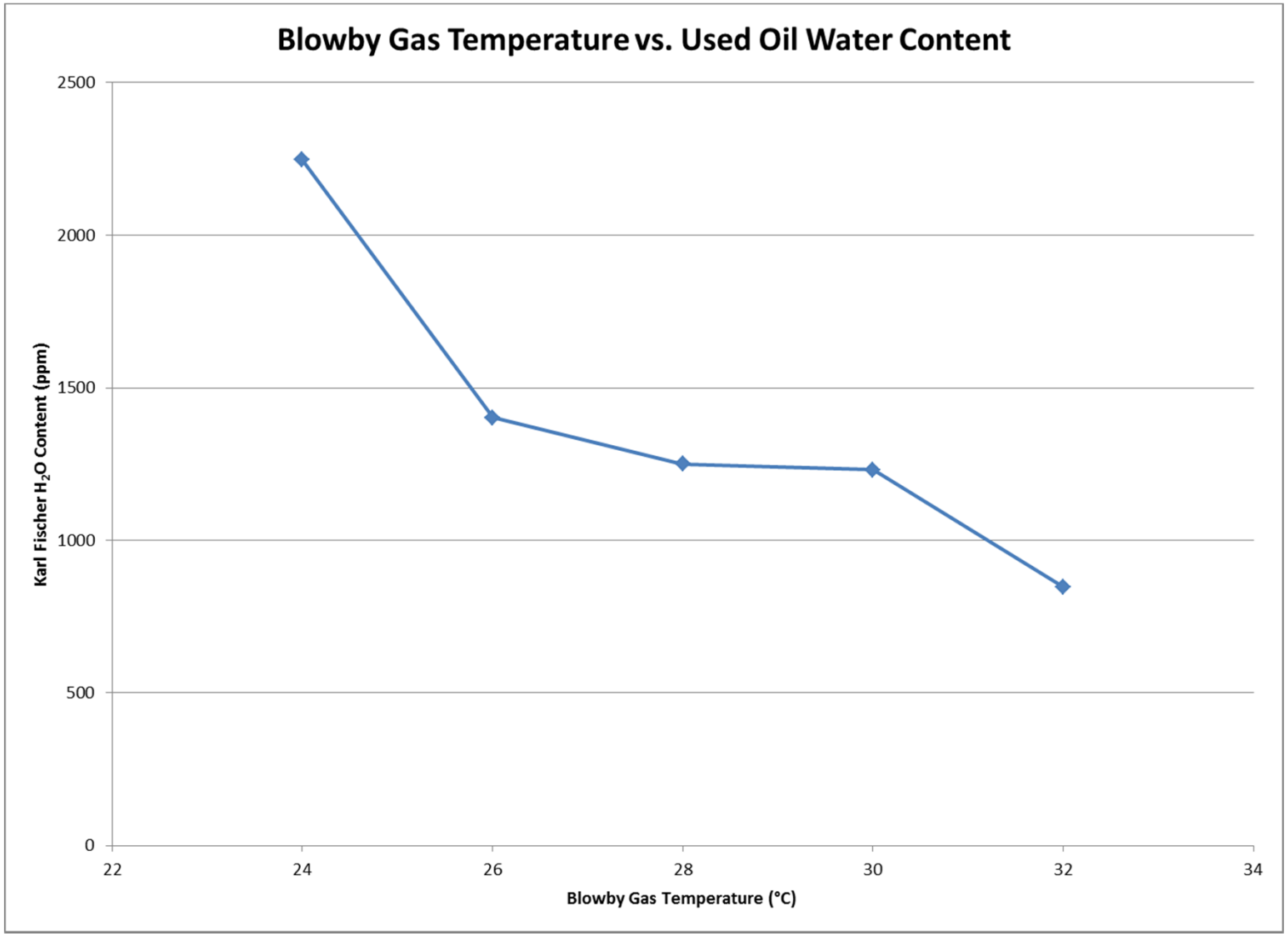
- The majority of the tests conducted with engine coolant flow rate control, have been conducted with a single set-point
  - A speculation existed that ramping the engine coolant flow rate between stages, with a large swing in the flow rate, which will create a large swing in the engine coolant delta temperature, would increase intake lifter wear severity

Sequence IVB Observations

Intertek
Valued Quality. Delivered.

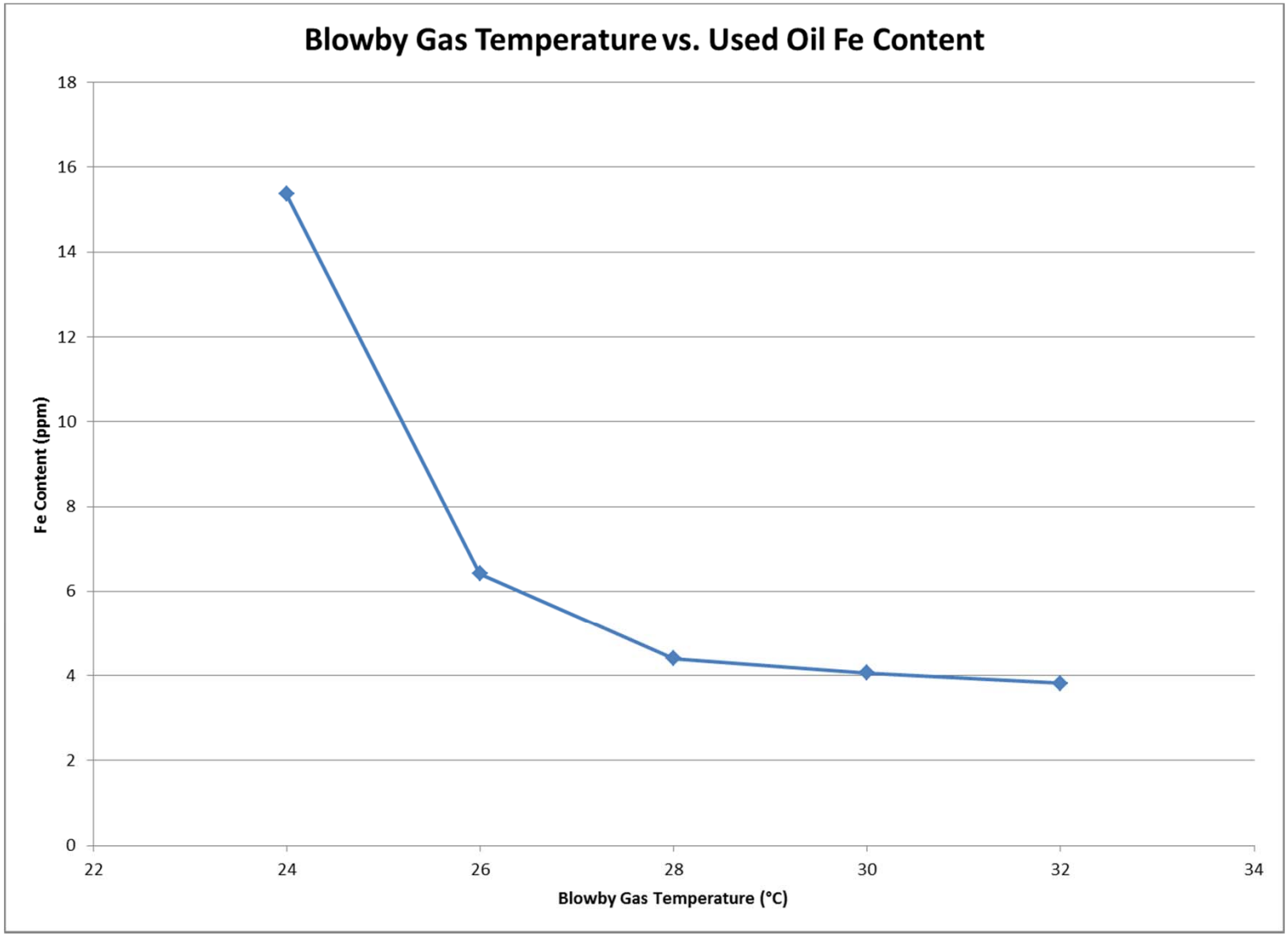
- The last round of testing, with engine coolant flow rate control set at 80 lpm for Stage 1 and 20 lpm for Stage 2, produced significantly milder wear results than with engine coolant flow rate control set at 80 lpm for both Stage 1 and 2, disproving this speculation
  - Varying engine coolant flow rate decreased Fe content
  - Varying engine coolant flow rate decreased oil degradation
  - Varying engine coolant flow rate decreased intake lifter wear severity
  - Varying engine coolant flow rate decreased exhaust lifter wear severity
  - Varying engine coolant flow rate did not influence water content or camshaft wear severity

Sequence IVB Correlation Study – 25 hours



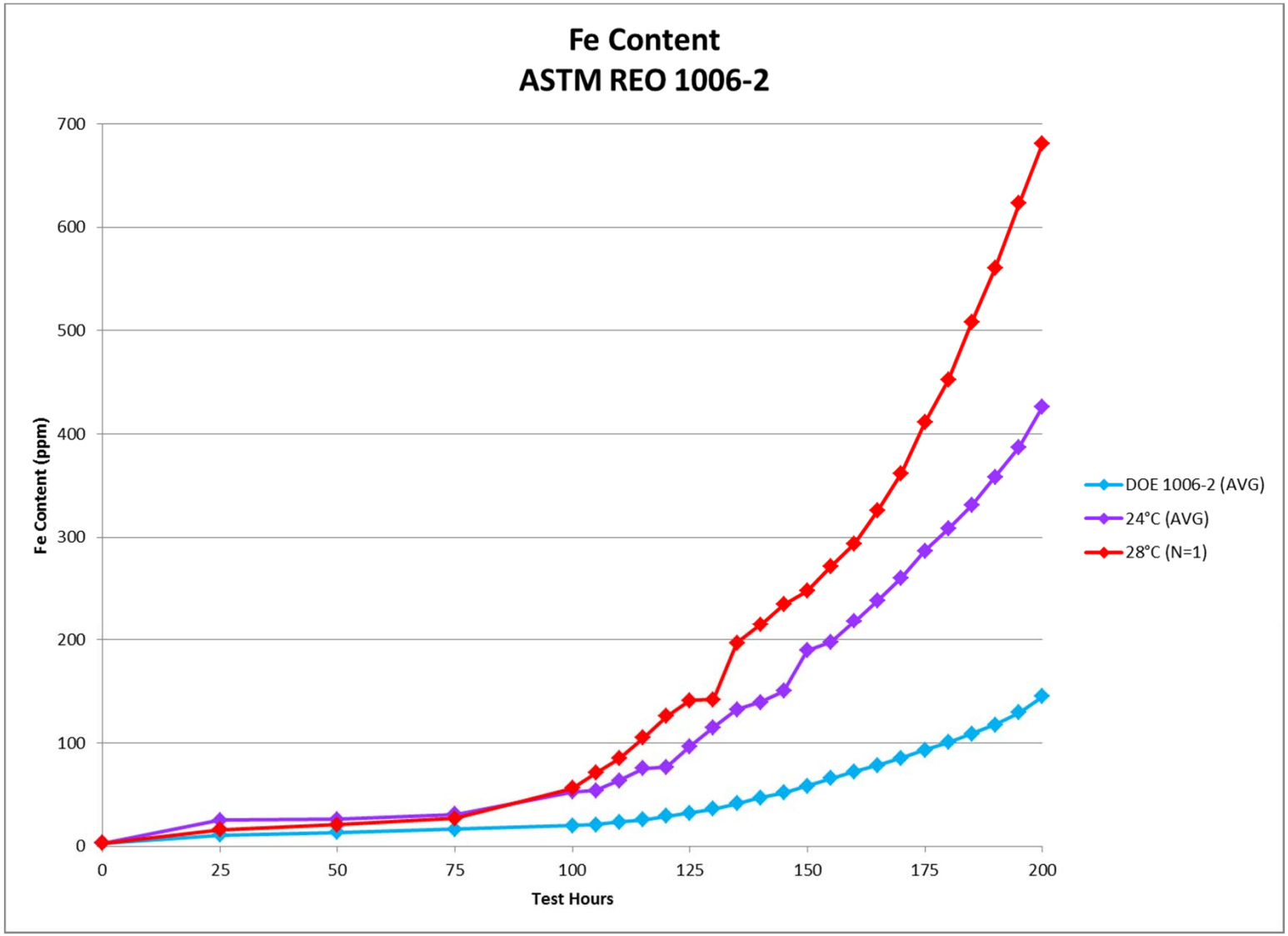
Sequence IVB Correlation Study – 25 hours

Intertek
Valued Quality. Delivered.



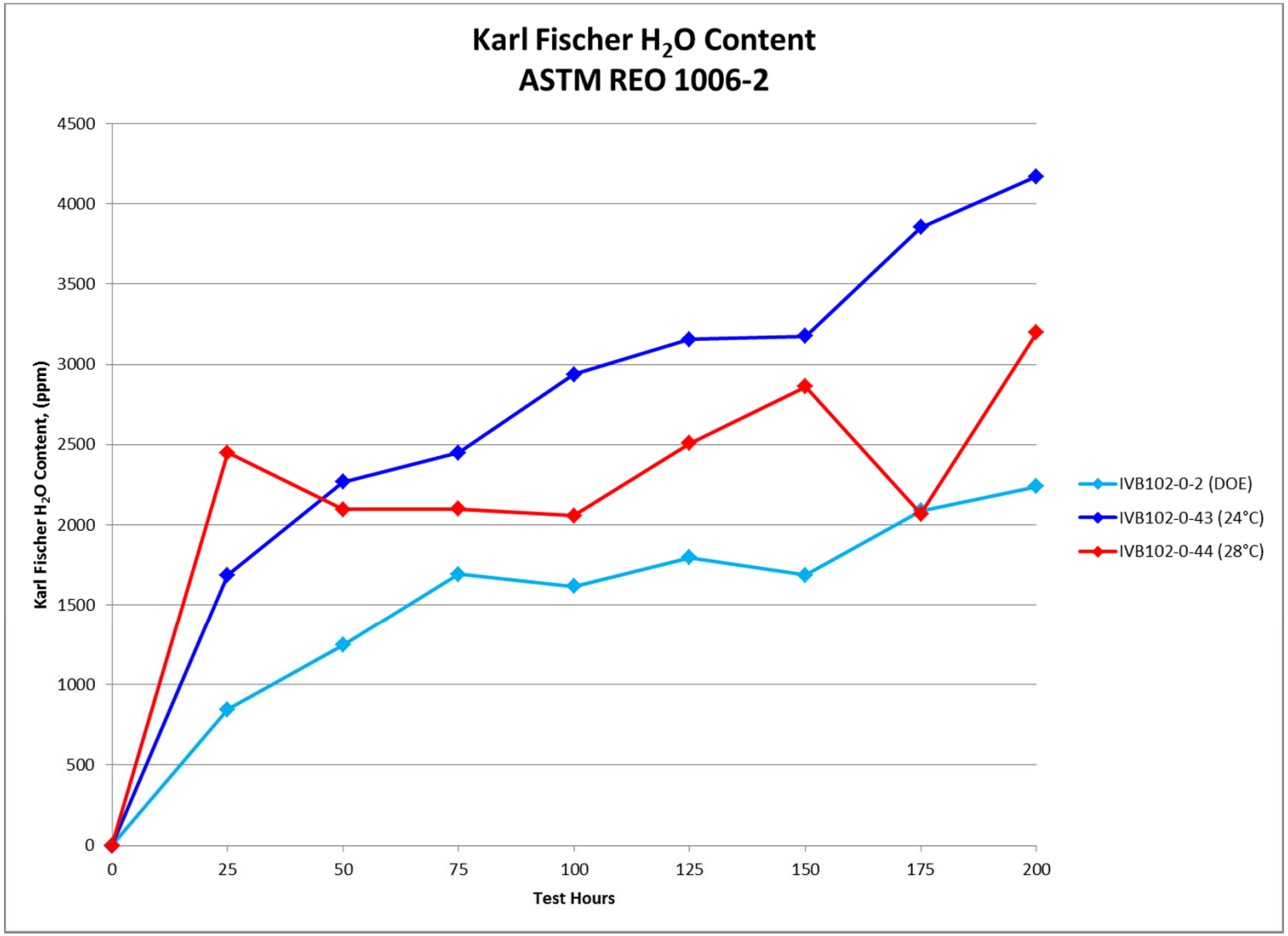
Sequence IVB Oil Analysis Comparison

Intertek
Valued Quality. Delivered.



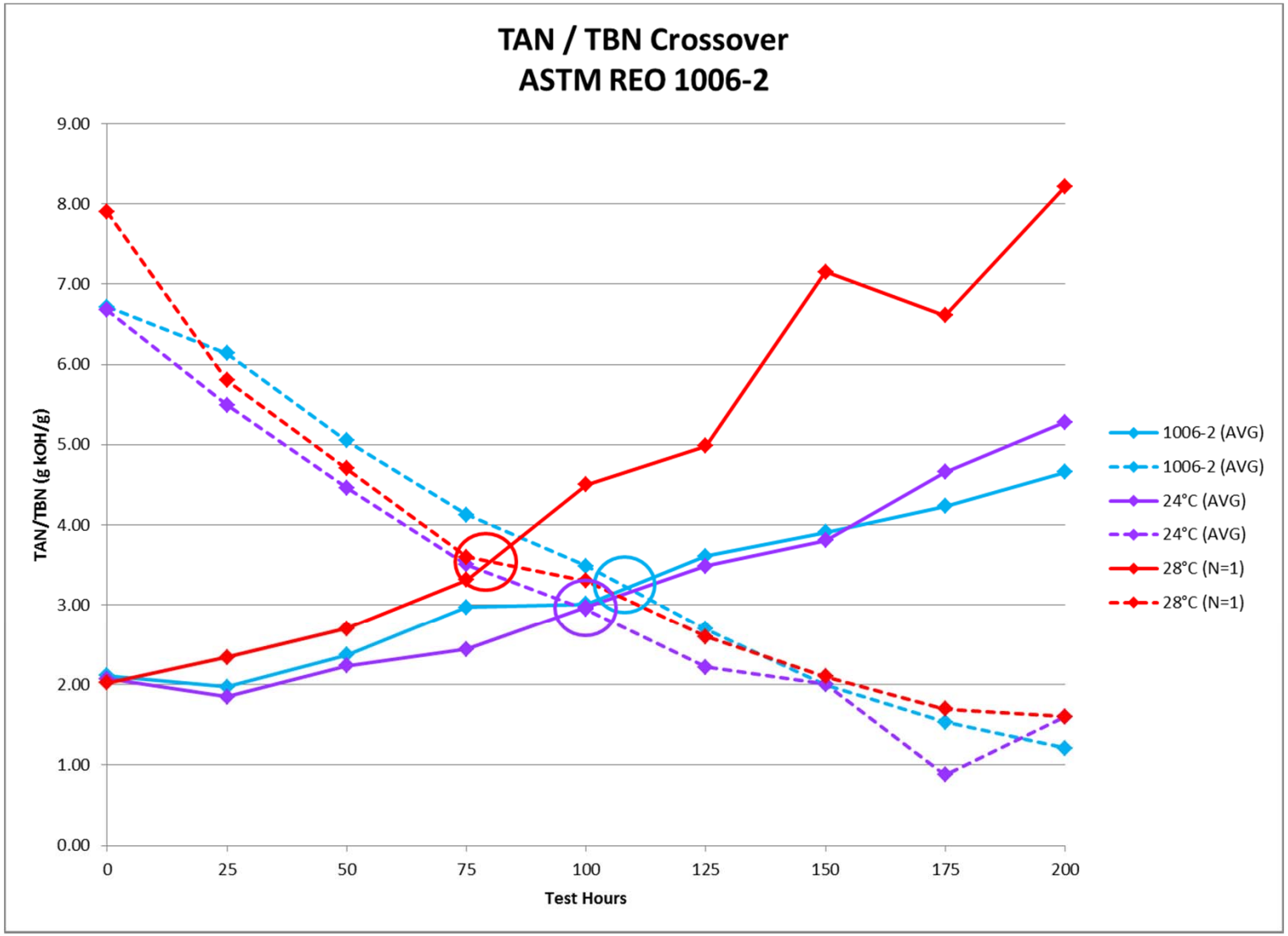
Sequence IVB Oil Analysis Comparison

Intertek
Valued Quality. Delivered.



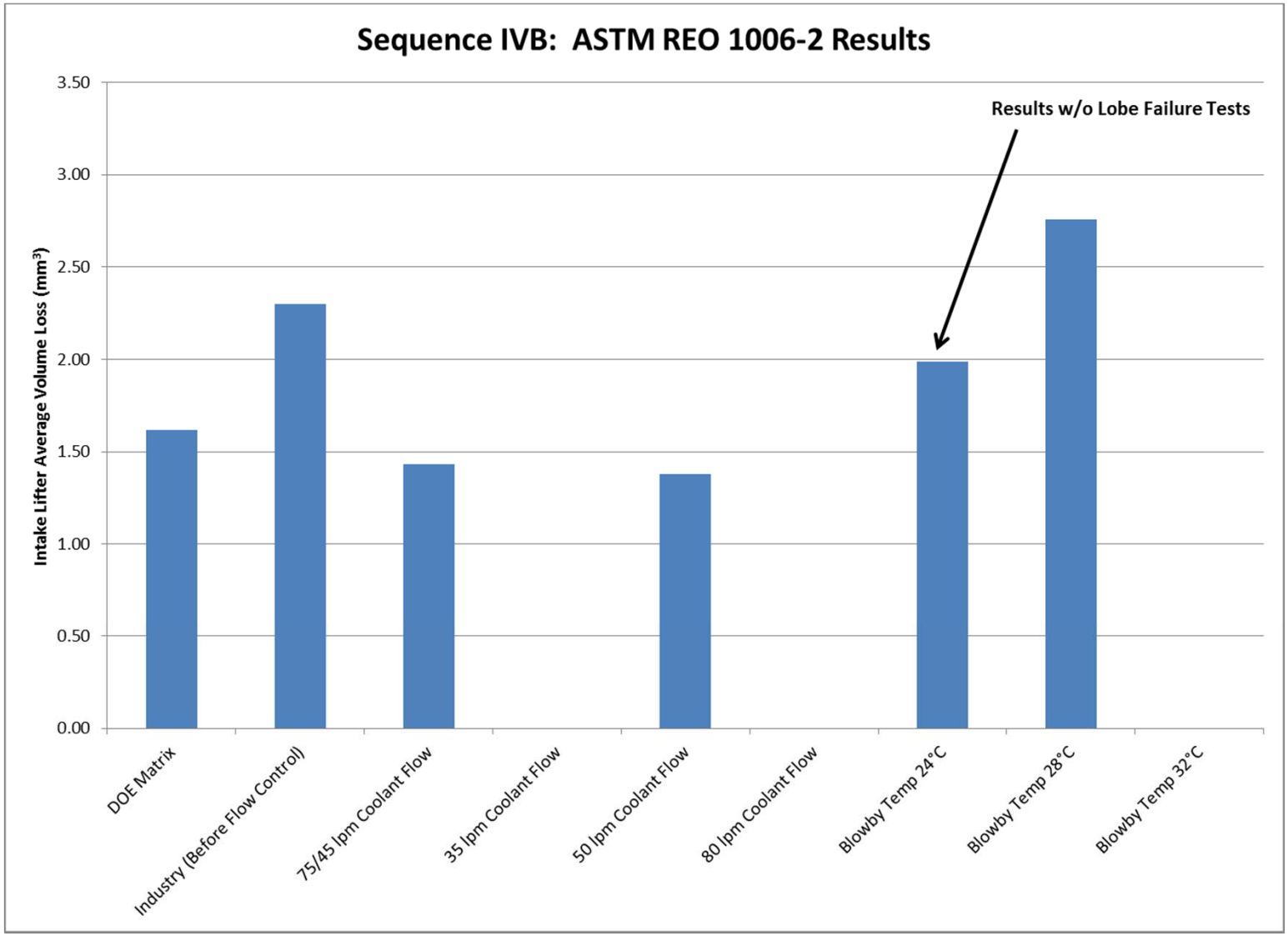
Sequence IVB Oil Analysis Comparison

Intertek
Valued Quality. Delivered.



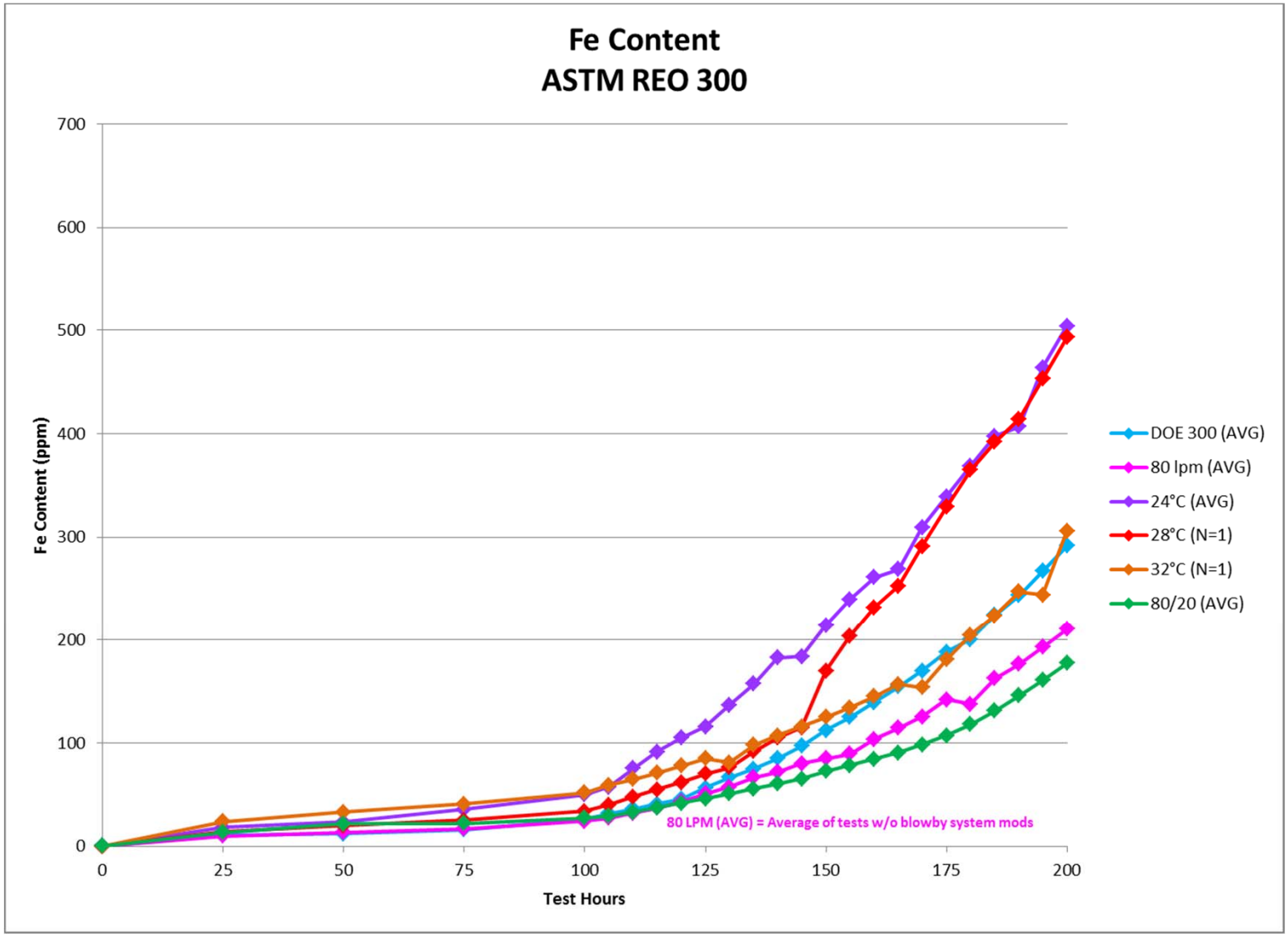
Sequence IVB Volume Loss Data Comparison

Intertek
Valued Quality. Delivered.

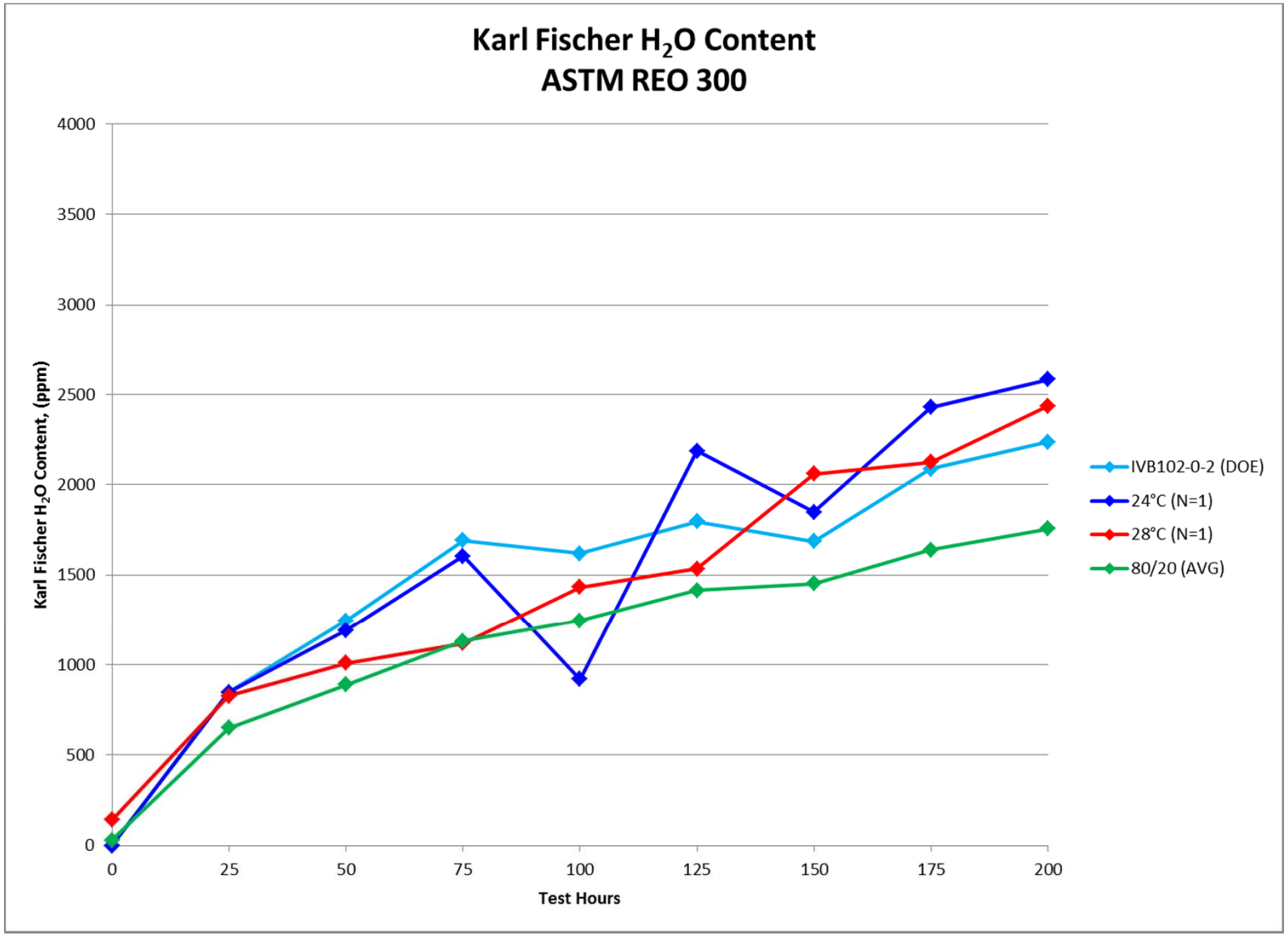


Sequence IVB Oil Analysis Comparison

Intertek
Valued Quality. Delivered.

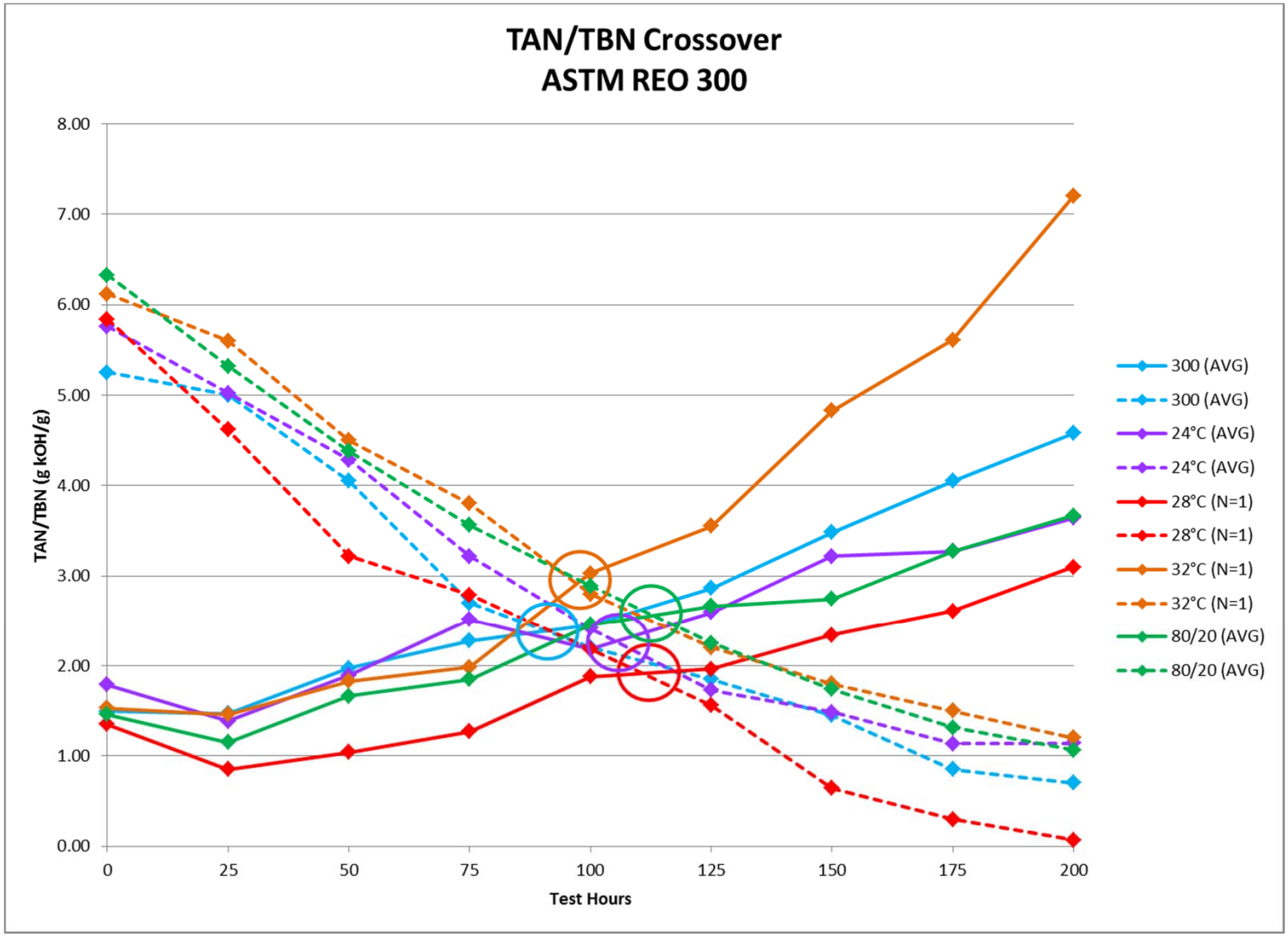


Sequence IVB Oil Analysis Comparison



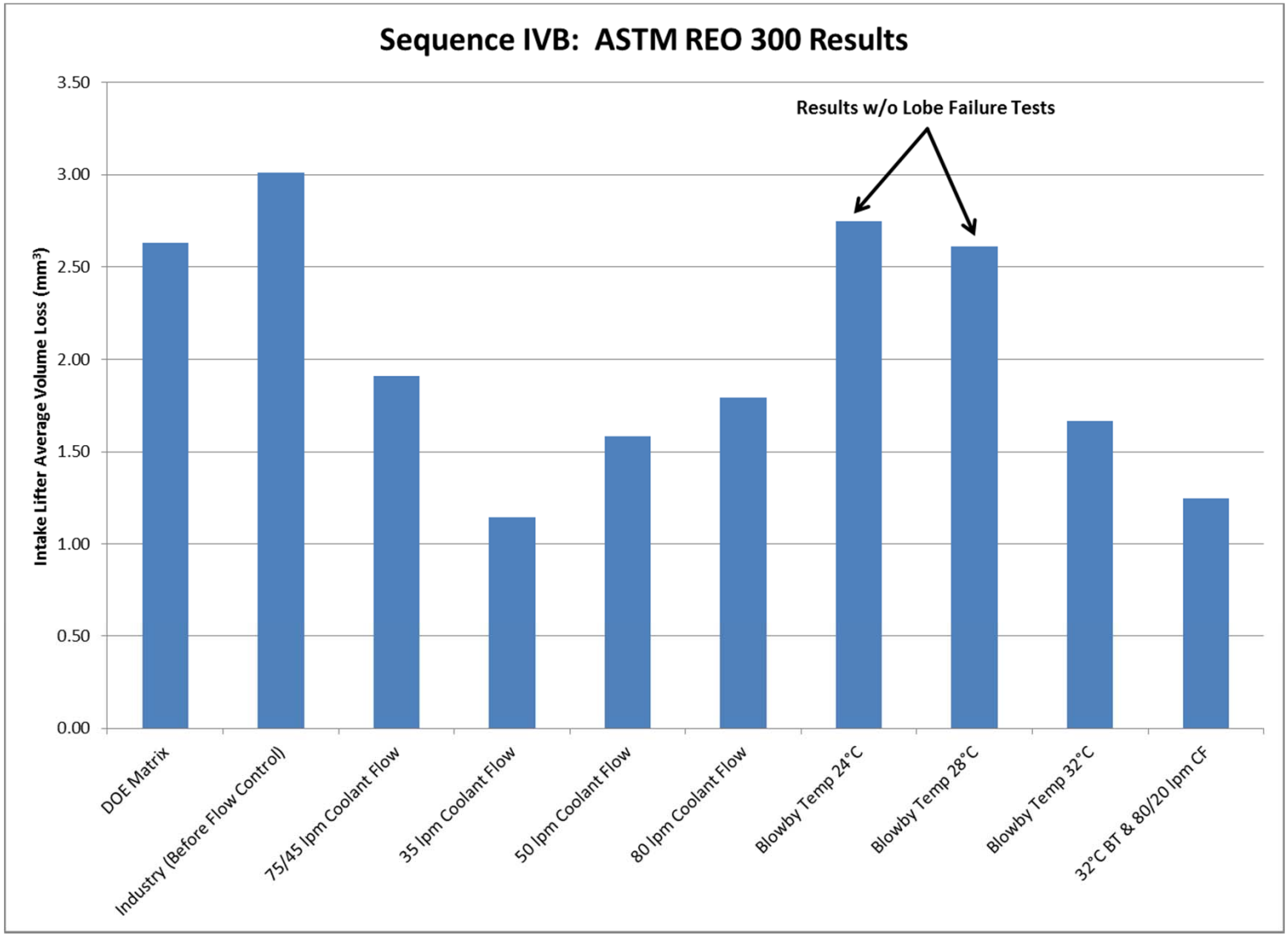
Sequence IVB Oil Analysis Comparison

Intertek
Valued Quality. Delivered.



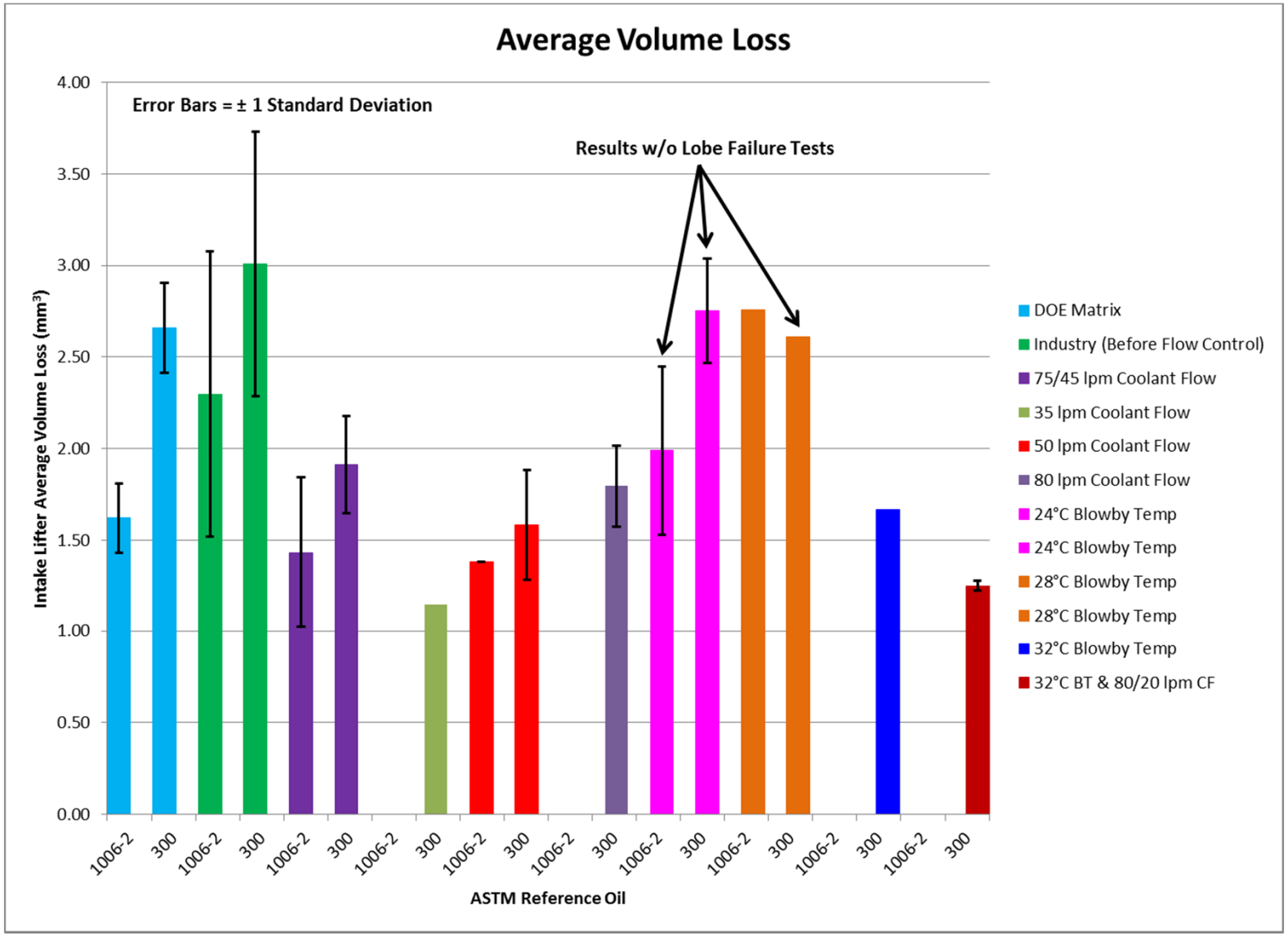
Sequence IVB Volume Loss Data Comparison

Intertek
Valued Quality. Delivered.



Sequence IVB Volume Loss Data Comparison (Discrimination)

Intertek
Valued Quality. Delivered.



Sequence IVB Proposal

- Control engine coolant flow rate to 80 lpm for both Stage 1 and Stage 2
- Control rocker cover coolant flow rate to 120 lpm for both Stage 1 and Stage 2
- Add blowby condenser with cooling and heating circuit, oil separator and blowby collection tank w/ one-way valve to the crankcase ventilation system
- Control blowby gas temperature to 29ºC
- Change intake air pressure from 0.07 kPa to 0.25 kPa
- Change oil gallery temperature from 53ºC to 54ºC for Stage 1 and from 55ºC to 54ºC for Stage 2
- Control exhaust backpressure to 104.5 kPa for Stage 2 and lock the control valve at the controller's output value at the end of Stage 2 for Stage 1

Sequence IVB Proposal

- Relocate the stock Toyota knock sensor to be remote from the test engine
  - Exact location to be determined
- Add coolant in and out temperature measurement for the blowby condenser
- Use Batch C intake camshafts
- Keep all other new changes implemented as is
- Conduct the following additional tests at these conditions and in this order:
  - 1. Intertek stand 102, REO3 (5W-20), Batch C intake camshaft
  - 1. SwRI stand 18, REO3 (5W-20), Batch C intake camshaft
  - 1. Lubrizol Stand 347, REO3 (5W-20), Batch C intake camshaft

Sequence IVB Proposal

Intertek
Valued Quality. Delivered.

- 2. Intertek stand 102, ASTM REO 300, Batch C intake camshaft
- 2. SwRI stand 18, ASTM REO 300, Batch C intake camshaft
- 2. Lubrizol Stand 347, ASTM REO 300, Batch C intake camshaft
- This will provide 3 results each, on REO3 (5W-20) and ASTM REO 300, to show discrimination and reproducibility
- This will provide the necessary prove-out tests from each precision matrix lab

- Solicit the supplier of REO3 (5W-20) to provide this oil as a Sequence IVB precision matrix and reference oil
- Solicit the ASTM TMC to start the procurement process of REO3 (5W-20) as an ASTM reference oil
- Solicit the PCEOCP to have ASTM REO 1006-2 replaced with REO3 (5W-20) in the precision matrix

Sequence IVB Next Steps and Timeline

Intertek
Valued Quality. Delivered.

- Next Steps
  - Conduct additional development / prove-out tests
  - Start precision matrix
- Timeline
  - Present – 12/16/16: Wrap-up test development and prove-out testing
  - 12/19/16 – 2/10/17: Conduct precision matrix
  - 2/13/17 – 3/10/17: Conduct statistical analysis of precision matrix

ASTM Sequence IV Surveillance Panel

Scope and Objectives

Scope

The Sequence IV Surveillance Panel is responsible for the surveillance and continued improvement of the Sequence IVA test documented in Test Method D 6891 as updated by the Information Letter system. Data on test precision and laboratory versus field correlation will be solicited and evaluated at least every six months. Improvements in wear measurement technique, test operation, test monitoring and test validation will be accomplished through continual communication with the Test Sponsor and Parts Distributor, ASTM Test Monitoring Center, ASTM Committee D02.B0.01 and the ASTM Passenger Car Engine Oil Classification Panel. Actions to improve the process will be recommended when deemed appropriate based on input from the proceeding. The Panel will review development and correlation of updated test procedures with previous test procedures. This process will provide a suitable test procedure for evaluating an automotive lubricant's effect on controlling cam lobe wear for overhead valvetrain equipped engines with sliding cam followers.

Objectives	**Target Date**
1. Pursue engine mounting and driveline identification, optimization and maintenance procedure and interval.	*On-going*

William A. Buscher III, Chairman
Sequence IV Surveillance Panel

Updated: Nov. 2016

Attachment 6

Sequence IV Surveillance Panel
November 16, 2016
9:00AM – 3:00PM
Southwest Research Institute
San Antonio, TX

Motions and Action Items
As Recorded at the Meeting by Bill Buscher

1. Action Item – Complete and distribute minutes for the 3/30/2016 surveillance panel meeting.

2. Action Item – Revisit OBD2 data acquisition, following up with Toyota to obtain callout information for the Toyota specific OBD2 parameters, and address knock sensor signal concerns.

3. Action Item – Distribute all comments received from the negative voters on their negative votes on motion # 5 from 3/30/2016 surveillance panel meeting.

4. Motion – Sequence IV surveillance panel chair to instruct Haltermann to change their blending protocol for the KA24E Green test fuel from blending small batches on demand to blending large batches (size to be determined, but to be at least 50,000 gallons), as they currently do for the EEE and SVGM2 test fuels.
   Bill Buscher / Bob Campbell / Passed Unanimously 15 – 0 – 0

5. Motion – Set the blowby gas temperature to 29ºC for both Stage 1 and Stage 2, for the upcoming test development / prove-out tests. Drop ASTM REO 1006-2, replace it with REO3 (5W-20) and conduct a minimum of six (6) test development / prove-out tests, using Intertek stand 102, SwRI stand 18 and Lubrizol stand 347. One test on each oil will be conducted on each stand. The first row of testing will be conducted on REO3 (5W-20) and the second row of testing will be conducted on ASTM REO 300.
   Teri Kowalski / Kaustav Sinha / Passed 14 – 1 – 0

6. Motion – The Sequence IV Surveillance Panel approves the inclusion the following procedural process improvements into the next six (6) test development / prove-out tests:
   - Will set the engine coolant flow rate control to 80 lpm for both Stage 1 and Stage 2.

- Will set the rocker cover coolant flow rate control to 120 lpm for both Stage 1 and Stage 2.
- Will add blowby condenser with cooling and heating circuit, oil separator and blowby collection tank w/ one-way valve to the crankcase ventilation system.
- Will set the blowby gas temperature to 29ºC for both Stage 1 and Stage 2.
- Will change intake air pressure from 0.07 kPa to 0.25 kPa.
- Will change oil gallery temperature from 53ºC to 54ºC for Stage 1 and from 55ºC to 54ºC for Stage 2.
- Will control exhaust backpressure to 104.5 kPa for Stage 2 and lock the control valve at the controller's output value at the end of Stage 2 for Stage 1.
- Will relocate the stock Toyota knock sensor to be remote from the test engine. Exact location to be determined.
- Will add coolant in and out temperature measurement for the blowby condenser.
- Will use Batch C intake camshafts.

Bill Buscher / Khaled Rais / Passed Unanimously 15 – 0 – 0

7. Action Item – Relocate the stock Toyota knock sensor to be remote from the test engine. Exact location to be determined by the precision matrix labs.

8. Action Item – Add coolant in and out temperature measurement for the blowby condenser.

9. Action Item – OHT to donate engine test kits, p/n OHTIVB-102-1, with Batch C intake camshafts for the next six test development / prove-out tests.

10. Action Item – Intertek to distribute quantities of REO3 (5W-20) to SwRI and Lubrizol for their test development / prove-out tests.

11. Action Item – The ASTM TMC to start the procurement process of REO3 (5W-20).

12. Motion – The Sequence IVB precision matrix will be conducted on a single batch of KA24E Green test fuel. The intention will be to conduct the first calibration period post precision matrix on the same batch of KA24E Green test fuel, with the exception of any test lab that is under specific legal constraints. A test lab that meets the exception can calibrate on a different fuel batch if they conduct statistically acceptable calibration tests on that fuel batch. A batch size of a minimum of 40,000 gallons will be required.

    Bob Campbell / Mark Overaker / Passed 14 – 0 – 1

Rich Grundza

From: Angela P. Willis <angela.p.willis@gm.com>
Sent: Friday, December 02, 2016 12:21 PM
To: Bill Buscher Intertek; Timothy Cushing; Rich Grundza
Cc: Eric R Johnson; Michael P. Raney
Subject: RE: IVB Negative Vote comments

Bill,

Just to clarify our issue….this does not get to the crux on what has changed in the test. We understand that 1006-2 needs to be dropped due to unavailability, however, that does not get around the issue that the IVB at one point in time was properly ranking this oil – and now it does not, after changes to the test.

Until the Task Force/Surveillance Panel addresses this issue, GM will continue to vote "no" on motions like this, or any other motion that progresses this test forward. The Task Force/Surveillance Panel has time to get this test right versus the dire situations the industry is in regarding Sequence VID and Sequence IIIG.

From: Bill Buscher Intertek [mailto:william.buscher@intertek.com]
Sent: Friday, December 02, 2016 10:28 AM
To: Timothy Cushing <timothy.cushing@gm.com>; Rich Grundza <reg@astmtmc.cmu.edu>
Cc: Angela P. Willis <angela.p.willis@gm.com>
Subject: [EXTERNAL] RE: IVB Negative Vote comments

Tim,

Thank you for providing these comments to further explain GM's negative vote on the following motion:

Motion – Set the blowby gas temperature to 29ºC for both Stage 1 and Stage 2, for the upcoming test development / prove-out tests. Drop ASTM REO 1006-2, replace it with REO3 (5W-20) and conduct a minimum of six (6) test development / prove-out tests, using Intertek stand 102, SwRI stand 18 and Lubrizol stand 347. One test on each oil will be conducted on each stand. The first row of testing will be conducted on REO3 (5W-20) and the second row of testing will be conducted on ASTM REO 300.

We will include these comments in the meeting minutes and I will forward them to Toyota.

Regards,

William A. Buscher III

Principal Engineer
Intertek Automotive Research
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http://www.intertek.com/automotive/san-antonio/

From: Timothy Cushing [mailto:timothy.cushing@gm.com]
Sent: Friday, December 02, 2016 8:40 AM
To: Bill Buscher Intertek; Rich Grundza
Cc: Angela P. Willis
Subject: IVB Negative Vote comments

Bill,
Below are the comments pertaining to the negative vote on the motion at the November 16, 2016 sequence IV surveillance panel meeting.

The negative vote on the motion to proceed with IVB prove-out testing on oils REO 300 and REO3 while dropping test oil REO 1006-2 was based on the following:
Changes to the operational procedure did not result in step changes in the results with respect to test oils.
Instead of a step change the severity of REO 1006-2 increased and exceeded that of REO 300 while it had historically been significantly below REO 300.
It was suggested at a previous AOAP meeting to determine whether or not the test procedural changes which resulted in the changing of oil ranking were directly related to the base oil chemistry by testing oils blended by varying the base oil and holding the additive package constant.
Testing to rule out base oil effect was not conducted.
Camshaft lobe failure rate at 20% has not been reduced.
Without consistent repeatable separation of test oils a meaningful test is not possible.

Best regards,

Tim Cushing
GM GPS Engine Oil
248 881 3518

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