

Sequence IVB Sub-Groups | MINUTES

REVISION DATE: 5/21/2018 11:33:00 AM

Relevant Test:	Sequence IVB
Note Taker:	Chris Mileti
Meeting Date:	05-15-2018
Comments:	This was a back-to-back conference call with the two Sequence IVB Sub-Groups – IVB Procedure Review Sub-Group and IVB Precision/Operations Sub-Group .

1. IVB PRECISION/OPERATIONS SUB-GROUP:

1.1. Opening Comments from Chairman:

1.1.1. **AOAP Motion:**

- 1.1.1.1. The AOAP Panel met in Detroit, Michigan.
- 1.1.1.2. The Lubes Group made a 3rd attempt at a Sequence IVB motion.
- 1.1.1.3. This 3rd attempt was successful, and the Sequence IVB test has been accepted into GF-6.

1.1.2. **Buscher's Update to AOAP:**

- 1.1.2.1. Buscher gave the AOAP an update on the latest Surveillance Panel activities.
- 1.1.2.2. He informed them that the Surveillance Panel approved an LTMS system that includes AVLI but not iron.
- 1.1.2.3. He also informed them that the Surveillance Panel created two sub-groups.
 - 1.1.2.3.1. The purpose of the first sub-group is to improve test precision, which includes engine and blowby related issues.
 - 1.1.2.3.2. The purpose of the second sub-group is to update the procedure so that it can be balloted as an ASTM draft.

1.1.3. **Appendix K:**

- 1.1.3.1. The AOAP requested that the Surveillance Panel review Appendix K as soon as possible.
- 1.1.3.2. The Surveillance Panel will need to make a recommendation to PAPTG to accept the IVB into the ACC Code of Practice so that registration can be initiated.

1.1.4. **TCR's:**

- 1.1.4.1. TMC has issued corrected TCR's to all the labs.
- 1.1.4.2. Lubrizol received provisional TCR's from the TMC.
 - 1.1.4.2.1. Lubrizol needs to correct some problems with its test reporting before its calibration can be finalized.

1.1.5. **Next Steps for the Test:**

- 1.1.5.1. Accept the test into the ACC Code of Practice.
- 1.1.5.2. Finalize ACC registration.
- 1.1.5.3. The Surveillance Panel needs to make a recommendation regarding the start date for retroactive registration.

1.2. Registration and Calibration:

1.2.1. **Comments from TMC:**

1.2.1.1. Lab B1 was the first lab to have a stand achieve calibration (November 27, 2017).

1.2.1.2. This stand had the earliest end-of-test date of any Precision Matrix stand.

1.2.2. Comments from Intertek:

1.2.2.1. All the Precision Matrix labs followed a "first in" and "first out" protocol.

1.2.2.2. The Precision Matrix was run using Batch-D camshafts.

1.2.2.3. Candidate tests conducted after the Precision Matrix used Batch-C camshafts.

1.2.2.4. The Surveillance Panel will need to approve registration on both camshaft batches.

1.2.2.5. Prove-out data indicated equivalence between camshaft batches.

1.2.3. Comments from Lubrizol:

1.2.3.1. It is unusual for the Surveillance Panel to make a recommendation regarding the start date for retroactive registration.

1.2.3.2. Typically, Surveillance Panels only make recommendations regarding retroactive calibration.

1.2.3.3. *Why is the AOAP asking the Panel for a start date for retroactive registration?*

1.3. Appendix K:

1.3.1. Lubrizol stressed that it is important for this sub-group to review Appendix K before it is reviewed by the full Surveillance Panel.

1.3.2. Afton would like the Surveillance Panel to hold a face-to-face meeting soon (1-2 months) to review and finalize all outstanding items such as Appendix K.

1.3.2.1. Intertek agreed that a face-to-face meeting is needed.

1.3.2.2. They will schedule conference calls over the next few weeks to address the more urgent issues.

1.3.3. MAD Survey:

1.3.3.1. MAD is an acronym for Maximum Acceptable Differences.

1.3.3.2. The MAD Survey is a poll that is issued by the ACC to the eventual users of the test.

1.3.3.3. The survey focuses on the following question, "*If a test sponsor were to run the same fluid twice, what would be tolerated as the maximum allowable difference in results?*"

1.3.3.4. *E_P Parameter:*

1.3.3.4.1. The ACC calculates mean values based on the survey results.

1.3.3.4.2. These mean values are then compared to the precision of the Precision Matrix results.

1.3.3.4.3. *E_P* is the parameter that compares the real precision of the test against what the users hope the precision will be.

1.3.3.4.4. *E_P* is greater or less than one.

1.3.3.5. The sub-group agreed that iron should be included in the MAD Survey.

1.3.4. Retroactive Registration:

1.3.4.1. The sub-group agreed that there are three questions that need to be asked when determining the proposed retroactive registration date:

1.3.4.1.1. *At what time were there no further procedural changes to the test?*

1.3.4.1.2. *When was the test ready to go?*

1.3.4.1.3. *What hardware batches are acceptable for testing?*

1.3.5. Section B:

1.3.5.1. The sub-group agreed to gather more data on the proposed iron pass/fail parameter.

1.3.5.2. Toyota still plans to include an iron pass/fail parameter in the final version of the test.

1.3.6. Section A.1:

- 1.3.6.1. REO1012 was originally called REO3 during test development.
- 1.3.6.2. REO1011 was added prior to the first Precision Matrix.
- 1.3.6.3. Two unusually high results with REO300 are driving the discrimination between oils.

1.3.7. Section A.2:

- 1.3.7.1. Lubrizol noted that the E_p parameter will change based on the MAD Survey results.

1.3.8. Section A.3:

- 1.3.8.1. The correlation plots shown in this section are based on Precision Matrix data.

1.3.9. Section D.4:

- 1.3.9.1. The draft documentation for GF-6 includes both AVL and iron as pass/fail parameters for the Sequence IVB.
- 1.3.9.2. Therefore, both AVL and iron are listed in Section D.4.

1.3.10. Section B.1:

- 1.3.10.1. The attendees made the decision to leave B.1 as "B In-Progress" because the iron parameter is still being reviewed.

1.3.11. Section C.1:

- 1.3.11.1. MRS uses a merit based approach.
- 1.3.11.2. TLM uses tiered limits.
- 1.3.11.3. Comments from Lubrizol:
 - 1.3.11.3.1. There are rules in place for MTAC.
 - 1.3.11.3.2. This is probably not a decision that is made by the Surveillance Panel.
- 1.3.11.4. Afton and Lubrizol agreed that this item should probably be decided by the AOAP.

1.3.12. Section C.2:

- 1.3.12.1. It is not clear what this item means.
- 1.3.12.2. Intertek will follow-up on this item before the next meeting.

1.3.13. Section D:

- 1.3.13.1. All current reference oils represent GF-5 technology.
- 1.3.13.2. A new reference oil is needed that reflects GF-6 technology.
 - 1.3.13.2.1. One option may be REO436, which is a Sequence IIIH reference oil.
- 1.3.13.3. The TMC is not sure if any company is offering a GF-6 reference oil.
- 1.3.13.4. Afton recommended changing D.1 to "B In-Progress".
- 1.3.13.5. Comments from Toyota:
 - 1.3.13.5.1. This sub-group needs to clarify the meaning of "current" technology.
 - 1.3.13.5.2. *Does current technology mean SN, SN+, GF-5 or GF-6?*
 - 1.3.13.5.3. They agree that the test needs at least one reference oil that is compliant with SN+ or GF-6.
- 1.3.13.6. Intertek noted that the upcoming BOI/VGRA Matrix can be used to identify a potential SN+/GF-6 reference oil.

1.3.14. Section D1.5:

- 1.3.14.1. A re-bend of REO300 is in progress.

1.3.15. Sections D2.8 Through D2.10:

- 1.3.15.1. This should not be an issue because both TEI and OHT are very active within the Surveillance Panel.
- 1.3.15.2. OHT and TEI will both be listed as Central Parts Distributors in the comments section.

1.3.16. Section D3.4:

- 1.3.16.1. The TGC recently formed a Fuel Task Force to address these issues.
- 1.3.16.2. Comments from Lubrizol:

1.3.16.2.1. D3.4 needs to be changed to "C Planned" because the procedure has not yet been updated with instructions on how to switch from one batch of fuel to another.

1.3.17. Section D4.3:

1.3.17.1. The oil consumption parameter still needs a validity limit.

1.3.18. Section D4.5:

1.3.18.1. Intertek stated that there were a couple of presentations made to the AOAP regarding Sequence IVB field correlation.

1.3.19. Section D4.6:

1.3.19.1. Several Engine Build Workshops have been held over the last three years.

1.3.20. Section D4.7:

1.3.20.1. Afton suggested changing D4.7 to "B In-Progress" until the iron parameter is finalized.

1.3.21. Section D5.2:

1.3.21.1. The sub-group agreed that D5.2 should be modified to identify metrology instead of raters.

1.3.21.2. Several Metrology Workshops and conference calls have been held.

1.3.21.2.1. The minutes from these meetings are available.

1.3.21.3. Intertek believes that this test would benefit from yearly Metrology Workshops.

1.3.21.3.1. These workshops would serve the purpose of the yearly calibration conferences that are used by the raters.

1.3.22. Section D6.2:

1.3.22.1. D6.2 was changed to "B In-Progress" until a final decision can be made regarding the iron parameter.

2. TEST PROCEDURE SUB-GROUP:

2.1. Procedural Revisions Suggested by Southwest:

2.1.1. These proposed revisions are captured in the "IVB Suggested Procedure Revisions 2018-05-14" document.

2.1.2. Extended Shutdowns:

2.1.2.1. Purge Oil:

2.1.2.1.1. Lubrizol asked if the procedure should be updated with instructions to pour purge oil over the valvetrain hardware to wash away emulsion.

2.1.2.1.2. Intertek agrees that this will help prevent corrosion, but they noted that the engine needs to be running to remove oil from the sample port.

2.1.2.1.3. So, they recommended removing the purge oil from the heat exchanger.

2.1.2.1.4. Afton cautioned that removing oil from the heat exchanger increases the risk of a dry re-start.

2.1.2.1.5. The sub-group agreed to remove the purge oil from the oil pan.

2.1.2.1.5.1. Intertek will create instructions for doing this.

2.1.2.1.6. Purge oil should be poured over the test hardware as soon as the rocker arm cover is removed.

2.1.2.2. Downtime Limit:

2.1.2.2.1. Southwest originally recommended removing the rocker arm cover if the downtime exceeds 30-minutes.

2.1.2.2.2. Lubrizol and Intertek both feel that this time limit is too short.

2.1.2.2.3. The sub-group agreed to increase this time limit to 2-hours.

2.1.3. Break-In Details:

2.1.3.1. The sub-group agreed with the revisions proposed by Southwest without discussion.

2.1.4. Maximum Number of Missing Readings without Calculating a Weighted QI:

2.1.4.1. The sub-group agreed with the revisions proposed by Southwest.

2.1.4.2. Comments from TMC:

2.1.4.2.1. They cautioned that any missing data needs to be accounted for.

2.1.4.2.2. Otherwise, it will throw off the software that they use to calculate QI's.

2.1.4.2.3. This problem will mainly impact the speed parameter.

2.2. New Fuel Batch:

2.2.1. The procedure needs to be updated with instructions for transitioning from one fuel batch to another.

2.2.2. Southwest agreed to take this as an action item.

2.2.3. Lubrizol recommended using the Sequence VG/VH procedure as a starting point.

2.3. Proposed Stand Audit Form:

2.3.1. Lubrizol reviewed its proposed Sequence IVB audit document (LZ's Proposed IVB Audit Form.doc).

2.3.2. The first section of the form contains administrative fields.

Title GOLDEN STAND AUDIT	
REVISION DATE: 5/15/2018 9:05 AM	
Test Name:	Sequence IVB
Engineer:	Christopher Milet
Laboratory:	Lubrizol
Stand	#347
Procedure/Revision:	Draft IVB Procedure 20170807
Date Started:	MM/DD/YYYY
Date Finalized:	MM/DD/YYYY

2.3.3. The second section of the form contains blank fields that can be used to capture general comments or observations made during the audit.

General Comments or Observations from Audit		
Comment	Initials	Date Added
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

2.3.4. The third section of the form contains a line-by-line review of the procedure.

2.3.4.1. Lubrizol will need to update this section after the procedure is finalized.

Procedure Review				
Item to Audit	Section	Figure	Compliant (Y/N)	Results/Comment
1. Confirm that the AAAA-BBBB-CCCC test numbering scheme is being used. a. AAAA = Stand number b. BBBB = Number of tests since last calibration test on that stand c. CCCC = Total number of Sequence IVB tests conducted on the stand	4.1			•
2. Engine installation angles: a. 4.5° side-to-side angle down towards exhaust manifold b. 0° front-to-back angle	4.3			•

2.3.5. The TMC will use this form as a starting point for the audit documentation that they use internally.

2.3.6. The Sequence IVB may be included in the ACEA specification.

2.3.6.1. If so, this audit document can be given to any European lab that plans to install a Golden Stand.

2.4. Proposed Blowby Meter Cleaning:

2.4.1. Intertek reviewed its proposed blowby meter cleaning procedure (*Sierra flow meter cleaning.pptx*).

2.4.2. The Intertek proposal does not include instructions for removing the blowby meter from the test stand.

2.4.2.1. The labs should already know how to do this.

2.4.3. Slide #3:

Choose a cleaner that will not harm the ceramic element inside the Sierra flow meter. Sierra instruments recommended Electrical contact cleaner or Brake cleaner for light cleaning and CRC for heavier cleaning.



2.4.3.1. Sierra recommends electrical contact cleaner or brake cleaner to clean light deposits.

2.4.3.2. Sierra recommends CRC Mass Air Flow cleaner for heavier deposits.

2.4.4. Slide #5:

Gently clean the bore of the Sierra flow meter. It may be necessary to manually clean some of the sludge using a scraper made of a soft material. Ensure you do not contact any of the probes inside the bore. Rinse the Meter liberally until clean. **Always keep the electronics portion up while cleaning to prevent damaging the electronic portion of the meter.**



- 2.4.4.1. Use a soft scraper to remove heavy deposits.
- 2.4.4.2. The sensor must always be oriented with the electronics box pointed up.
 - 2.4.4.2.1. This minimizes the risk of fluids draining into the electronics box and damaging the device.
- 2.4.4.3. Care must be taken to not touch the probe that is pointed down into the sampling port.

2.4.5. Slide #7:

Typical rocker cover gas flow rates at Intertek

Stage 1	Stage 1-2	Stage 2	Stage 2-1
9 to 13 SLPM	9 to 8.5 spiking from 17 -18 SLPM	11 to 7.5 SLPM	10 to 0.5 SLPM Spiking from 10 to 15 SLPM

- 2.4.5.1. Intertek included a table with data from a "cleaned" Sierra blowby meter.
- 2.4.6. The sub-group agreed that the sensor should be cleaned during every cylinder head change.

2.5. Review of Action Items for Next Week:

- 2.5.1. Southwest will draft a procedure for switching between fuel batches.
- 2.5.2. Lubrizol will draft a procedure for selecting lifter grades based on lifter clearances.
- 2.5.3. Intertek will start work on the following two action items:
 - 2.5.3.1. Oil consumption validity limit.
 - 2.5.3.2. Rebuild procedure for engines that have experienced a camshaft lobe failure.

2.5.4. The TMC will draft a procedure to adjust iron based on phosphorous retention.

2.5.4.1. They will use the Sequence IIIGB procedure as a starting point.

2.5.5. OHT noted that the action item to etch "IN" and "OUT" into the engine's coolant adaptor plates is complete.

2.5.6. OHT Action Item to Design and Supply a Timing Chain Wedge:

2.5.6.1. OHT has requested information from each lab regarding the dimensions of the timing chain wedge that they currently use.

2.5.6.2. The current plan is to supply nylon wedges that have a knurled edge.

Action Items	Person responsible	Completion Date

Follow-up Notes/Updates	Initials	Date Added

Attendees	Organization	Contact Information

Sequence IVB Task Force Action Items

ID	Task Name	Start	Resource Names	Finish	Category	General Comments
1	Establish oil consumption limit for test.	Fri 5/11/18			Procedure	Introduced on 07/26/2017.
2	Make recommendation to Task Force.	Tue 5/15/18	Intertek		Procedure	
3	Compile a "lessons learned" report to the ACC regarding Precision Matrix #1.				Documentation	Introduced on 07/26/2017.
4	TBD					
5	Decide on the Metrology data that will be included in IVB Data Dictionary.				Metrology	Introduced on 08/15/2017.
6	TBD					
7	Update procedure with guidance regarding how lifter grades are to be selected based on valve clearance.	Fri 5/11/18			Procedure	Introduced on 08/15/2017.
8	Make recommendation to Task Force.	Fri 5/11/18	Lubrizol		Procedure	
9	Update procedure with instructions for adding a new fuel batch over an existing fuel batch.	Fri 5/11/18			Procedure	Introduced on 10/03/2017.
10	Make recommendation to Task Force.	Tue 5/15/18	Southwest		Procedure	
11	Update procedure with instructions for dealing with camshaft lobe failures.	Fri 5/11/18			Procedure	Introduced on 10/03/2017.
12	Make recommendation to Task Force regarding engine rebuild procedure.	Fri 5/11/18	Intertek		Procedure	
13	Make recommendation to Task Force regarding how to identify lobe failures.	Fri 5/11/18	Intertek		Procedure	
14	Finalize Keyence G2 software settings.				Metrology	Introduced on 07/20/2017.
15	Document the pros and cons of each setting change in the G2 software.				Metrology	
16	Develop a DOE to evaluate each setting in the G2 software using all (5) labs.				Metrology	
17	Develop a procedure to use the G2 software to screen lifters based on crown.				Metrology	
18	Determine whether the Keyence instruments should be monitored in LTMS.				Metrology	
19	Identify an insulation or coating that can be applied to the front cover and oil pan.	Fri 5/11/18	OHT		Hardware	Introduced on 08/08/2017.
20	Make recommendation to Task Force.	Fri 5/11/18	OHT		Hardware	
21	Revisit the chamfered intake camshaft lobes as a possible solution to lobe failures.				Hardware	Introduced on 08/29/2017.
22	TBD					
23	OHT to design and supply a clutch alignment tool.	Fri 5/11/18	OHT		Hardware	Introduced on 08/08/2017.
24	Supply hardware to test labs.	Fri 5/11/18	OHT		Hardware	
25	OHT to design and supply a timing chain wedge.	Fri 5/11/18	OHT		Hardware	Introduced on 10/03/2017.
26	Intertek to provide information on material and dimensions of current wedges.	Fri 5/11/18	Intertek		Hardware	
27	Southwest to provide information on material and dimensions of current wedges.	Tue 5/8/18	Southwest		Hardware	

Sequence IVB Task Force Action Items

ID	Task Name	Start	Resource Names	Finish	Category	General Comments
28	Lubrizol to provide information on material and dimensions of current wedges.	Tue 5/8/18	Lubrizol		Hardware	
29	Afton to provide information on material and dimensions of current wedges.	Tue 5/8/18	Afton		Hardware	
30	Exxon to provide information on material and dimensions of current wedges.	Tue 5/8/18	Exxon		Hardware	
31	Supply hardware to test labs.		OHT			
32	OHT to stamp coolant adaptor plates with "in" and "out".	Fri 5/11/18	OHT	Tue 5/15/18	Hardware	Introduced on 10/03/2017.
33	Supply hardware to test labs.	Fri 5/11/18	OHT	Tue 5/15/18	Hardware	
34	Intertek and Southwest to swap E.O.T. oil drains so that they can compare analysis results.	Fri 5/11/18	Intertek,Southwest		Operational	Introduced on 10/03/2017.
35	Report data to Task Force.	Fri 5/11/18	Intertek,Southwest		Operational	
36	All labs to supply iron curves for engines that they have run so that the data can be used to establish acceptable engine life.				Operational	Introduced on 10/03/2017.
37	Decide on how this data will be supplied by the labs.		Task Force		Operational	
38	Intertek to report data.		Intertek		Operational	
39	Southwest to report data.		Southwest		Operational	
40	Lubrizol to report data.		Lubrizol		Operational	
41	Exxon ro report data.		Exxon		Operational	
42	Afton to report data.		Afton		Operational	
43	Explore (3) potential options to increase discrimination between REO300 and REO1012.				Operational	Introduced on 10/03/2017.
44	Evaluate harder surface finish for camshaft.				Operational	
45	Increase fuel sulfur level.				Operational	
46	Increase test length by 25HRS.				Operational	
47	Compare lifter wear vs. lifter position inside of the engine.				Statistics	Introduced on 10/03/2017. Is it appropriate to apply
48	Present statistical analysis to Task Force.		Statisticians		Statistics	
49	Determine whether baffle on blowby heat exchanger should be added to procedure.				Procedure	Introduced on 10/25/2017.
50	Make recommendation to Task Force.				Procedure	
51	Finalize IVB report form.		TMC,Task Force		Documentation	Introduced on 10/25/2017.
52	TBD					
53	Compile a "lessons learned" report (and corresponding data table) that summarizes the impact of procedural/operational changes on test severity.				Documentation	Introduced on 11/07/2017.
54	TBD					
55	Compile a historical timeline for the overall IVB test development effort.				Documentation	Introduced on 11/07/2017.
56	TBD					
57	Compare oil temperature curves at different labs using a histogram instead of x-y charts.		Lubrizol,Statisticians		Statistics	Introduced on 11/07/2017.
58	TBD					

Sequence IVB Task Force Action Items

ID	Task Name	Start	Resource Names	Finish	Category	General Comments
59	Confirm that all (5) labs are reading the same OBD-II parameters.				Operational	Introduced on 11/07/2017.
60	Provide directory for relevant OBD-II channels.		Toyota		Operational	
61	Task Force to finalize list of mandatory OBD-II channels to be monitored by labs.		Task Force		Operational	
62	Establish procedure for cleaning blowby flow meter.	Fri 5/11/18			Procedure	Introduced on 11/07/2017.
63	Make recommendation to Task Force.	Fri 5/11/18	Intertek	Tue 5/15/18	Procedure	
64	Update Golden Stands to automatically control coolant pressure.				Operational	Introduced on 11/07/2017.
65	TBD					
66	All labs to provide 200HR E.O.T. oil samples to Intertek for analysis.	Fri 5/11/18			Operational	
67	Southwest to provide 200HR E.O.T. samples from Precision Matrix #2.	Fri 5/11/18	Southwest	Fri 5/11/18	Operational	
68	Lubrizol to provide 200HR E.O.T. samples from Precision Matrix #2.	Fri 5/11/18	Lubrizol	Fri 5/11/18	Operational	
69	Exxon to provide 200HR E.O.T. samples from Precision Matrix #2.	Fri 5/11/18	Exxon	Fri 5/11/18	Operational	
70	Afton to provide 200HR E.O.T. samples from prove-out testing.	Fri 5/11/18	Afton	Fri 5/11/18	Operational	
71	Intertek to conduct analysis on all E.O.T. samples to eliminate laboratory bias.	Fri 5/11/18	Intertek		Operational	
72	Re-evaluate QI for oil gallery temperature.				Operational	
73	TBD					
74	TMC to work with labs to complete Precision Matrix #2 test reports.	Fri 5/11/18	TMC		Documentation	
75	Southwest to complete test reports.		Southwest		Documentation	
76	Intertek to complete test reports.		Intertek		Documentation	
77	Lubrizol to complete test reports.		Lubrizol		Documentation	
78	Exxon to complete test reports.		Exxon		Documentation	
79	Compare 200HR operational data plots for Precision Matrix #2 tests.				Operational	
80	TBD					
81	Compile all notes from January 2018 IVB Engine Build Workshop into a single document.				Documentation	
82	TBD					
83	Develop a plan to address the significant lab-to-lab differences with (1) exhaust gas temperature, (2) crankcase pressure/blowby flow, (3) intake manifold pressure and (4) AFR.				Operational	
84	TBD					
85	Complete Appendix K.		Task Force		Appendix K	
86	TBD					

Sequence IVB Task Force Action Items

ID	Task Name	Start	Resource Names	Finish	Category	General Comments
87	TMC to issue an information letter that summarizes all procedural and process changes that accompany new LTMS system.		TMC		Documentation	
88	Issue information letter.		TMC		Documentation	
89	Create an engine "health" checklist that is to be used to inspect hardware between tests.				Hardware	
90	TBD					
91	Generate additional data that will allow the statisticians to evaluate a potential engine hour effect for iron.				Statistics	
92	TBD				Statistics	
93	Compare break-in and aging data from all labs.				Operational	
94	TBD					
95	Assess the impact of camshaft lobe failures (and the subsequent rebuild) on engine severity.				Operational	
96	Determine whether the IVB test report should identify when a candidate test follows a lobe failure.				Documentation	
97	TBD					
98	Solicit and obtain a IVB "high wear" oil to replace REO300.				Operational	The inventory of REO300 is low, although a reblend is
99	TBD					
100	Investigate why coolant pressure becomes noisier as the Intertek stands enter Stage 2 conditions.		Intertek		Operational	
101	TBD					
102	Measure time constants of all Golden Stands.				Operational	
103	Intertek to measure and supply time constants.		Intertek		Operational	
104	Southwest to measure and supply time constants.		Southwest		Operational	
105	Lubrizol to measure and supply time constants.		Lubrizol		Operational	
106	Exxon to measure and supply time constants.		Exxon		Operational	
107	Afton to measure and supply time constants.		Afton		Operational	
108	Standardize the fuel dilution measurement technique at all labs.				Operational	
109	TBD					
110	Develop a standardized test stand audit checklist.	Fri 5/11/18	Lubrizol	Tue 5/15/18	Documentation	
111	Make a recommendation to the Task Force.	Fri 5/11/18	Lubrizol	Tue 5/15/18	Documentation	
112	Update procedure with instructions for dealing with extended periods of downtime.	Fri 5/11/18	Southwest		Procedure	
113	Make a recommendation to the Task Force.	Fri 5/11/18	Southwest	Tue 5/15/18	Procedure	
114	Update Southwest's proposed procedural changes with instructions to pull purge oil from the pan.	Tue 5/15/18	Intertek			
115	Develop a procedure for applying a calcium (or other detergent) adjustment to iron.				Procedure	
116	TBD					
117	Clarify instructions for changing cylinder heads and running the break-in/aging cycle.	Fri 5/11/18	Southwest	Tue 5/15/18	Procedure	
118	Make a recommendation to the Task Force.	Fri 5/11/18	Southwest	Tue 5/15/18	Procedure	

Sequence IVB Task Force Action Items

ID	Task Name	Start	Resource Names	Finish	Category	General Comments
119	Identify the minimum number of acceptable data points in a test file.	Fri 5/11/18	Southwest	Tue 5/15/18	Procedure	
120	Make a recommendation to the Task Force.	Fri 5/11/18	Southwest	Tue 5/15/18	Procedure	
121	Determine whether candidate data from the Tech Demo period will be used in a future analysis of iron parameter.				Statistics	Introduced on 04/26/2018.
122	The Surveillance Panel should compile a list of parameters to be captured from these candidate tests.				Statistics	
123	The Surveillance Panel will need to approve whether retroactive ACC registration can be granted to candidate tests that used Batch-C and Batch-D camshafts.				Registration	Introduced on 05/08/2018.
124	TBD					
125	The Surveillance Panel needs to finalize the BOI/VGRA matrix.				BOI/VGRA	Introduced on 05/08/2018.
126	TBD					
127	Determine whether NOX is a useful parameter to introduce with the IVB test.	Fri 5/11/18			Operational	Introduced on 05/08/2018.
128	Intertek to report on their NOX trial on IAR165.	Fri 5/11/18				
129	Analyze blowby gas using GC/MS.				Operational	Introduced on 05/08/2018.
130	Determine how to sample this material.					
131	Determine if the gas and/or liquid will be analyzed.					
132	Investigate whether silicone is leaching from new spark plug tube seals installed in the OHT rocker arm cover.				Hardware	Introduced on 05/08/2018.
133	TBD					
134	Develop cumulative iron curves for each engine over its full life cycle.				Hardware	Introduced on 05/08/2018.
135	Correlate these curves to oil consumption and oil viscosity.					
136	Include the iron parameter in MAD Survey.	Tue 5/15/18	Task Force		Appendix K	
137	TBD					
138	Identify a GF-6 reference oil to satisfy Section D of Appendix K.	Tue 5/15/18	Task Force		Appendix K	
139	TBD					