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Originally Issued: April 3, 2012

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Unapproved Minutes of the March 29, 2012
Sequence IV Surveillance Panel Meeting
held in Corpus Christi TX

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A copy of the Agenda is included as Attachment 1

The signed attendance sheet is included as Attachment 2.

Eric Liu replaces Bill Buscher as voting member for Southwest Research.

Bill Buscher agreed to be the motion and action item recorder for the meeting.

Minutes from February 2 and February 9, 2012 Surveillance panel conference calls were approved with no changes.

Action Item Review

Review of the action items from the June 1, 2011 meeting was conducted and the status of those items is listed below.

Motions and Action Items

As Recorded at the Meeting by Bill Buscher

1. Action Item – Labs to report engine mount and driveline configuration, including photos, and harmonic balancer information for each test stand to the TMC by 7/1/11. **Photos and other documentation forwarded to the TMC, Complete**
2. Action Item – Schedule a conference call between the test labs and the TMC in early July to review and discuss the maintenance procedure and interval for engine mounts and driveline. **Open, to be discussed today.**
3. Action Item – Labs to finalize a maintenance procedure and interval for engine mounts and driveline. Submit a recommendation to the surveillance panel for eballot by 8/1/11. **Not done, to be discussed today**
4. Motion – Reintroduce RO 1006-2 for calibration purposes in the Sequence IVA, treating it as a new reference oil for setting targets. Surveillance panel to review and set initial targets with 5 donated tests; 1 conducted at Lubrizol and 2 conducted at SwRI and Intertek each on different calibrated test stands within each lab. Tests will be started after completion of Action Items # 1-3. Bill Buscher / Al Lopez / Passed 12-0-0 **Tests completed, targets generated, addressed during 2/2/12 and 2/9/12 conference calls.**
5. Motion – Suspend RO 1009 for calibration purposes in the Sequence IVA and reevaluate its appropriateness for use after RO 1006-2 is successfully back into use for calibration purposes. Al Lopez / Greg Seman / Passed 12-0-0 **To be discussed at this meeting**
6. Motion – RO 1010 will not be used for calibration purposes in the Sequence IVA, due to its high performance level. Dwight Bowden / Andy Ritchie / Passed 11-0-1 **Complete**
7. Action Item – Surveillance panel members to provide input for the TGC Best Practices in Lubricant Test Development document by 8/1/11 to the panel chairman and the TMC. The chairman will distribute material as it comes in to the panel members for review. A face-to-face meeting for all interested will be scheduled prior to the next panel meeting and input for the document will be compiled for review at the next panel meeting. **Complete, no input from panel members**

Fuel Suppliers Report.

Batches continue to be blended when ever orders are placed by lab(s). No other significant items were reported.

TMC Report

Rich Grundza reviewed sections of his report for the panel. There were no questions or comments. A copy of Rich's report is included as attachment 3.

ACC Report.

Since the meeting was held before the closing date for the ACC report, no report was available

Test Hardware Report

Bill Buscher reviewed the hardware status to date. Bill reviewed recent performance on the latest cam batches in his lab. He has had to abandon one cam batch because of mild performance. This may impact availability of the test in his lab, as these cams were taken into account when doing his projections. Other

March 29, 2012 IV Minutes
Corpus Christi, TX

labs felt they may have sufficient hardware, but if an attempt is made to obtain additional cams, Intertek and Lubrizol may wish to purchase additional cams. Bill mentioned that the 1999 batch was abandoned for mild performance and some work had been done to try and restore severity with this batch. Bill intends to continue to look at ways to restore severity with the mild cam batch as a way to continue to maintain viability of this test through the end of the category. In reviewing the data, Al Lopez noted that the unmarked 2009 hardware at lab B was identified as NK9X230. Al noted that it should be identified as 2009 data. Corrections will be sent to reflect the correct hardware designation. Bill also noted that the current hardware is now "Service parts" and was not sure how that affected the current hardware. Labs were questioned on the amount of heads and blocks that were in storage and labs indicated a large number of heads and blocks with tests left on them are available.

Reference Oil Review

Rich Grundza presented data on the results reported to date on reference oil 1006-2. Eight have been reported and the means calculated with laboratory severity adjustments applied are shown in attachment 4. A ninth test was being reported the day of the meeting, but was not available for the presentation. The TMC will work with the industry statisticians to develop the targets when ten tests are reported. The TMC was questioned about 1007 and at least two tests worth are available at each lab. There are only one or two cans of 1007 available for the Sequence V in various labs. The panel requested the TMC move any 1009 shipped as IVA to VG. Bill will also solicit suppliers for a reference oil in the 50 to 90 μm range.

Scope and objectives were reviewed.

Considerable discussion was undertaken regarding the changes laboratories have made to address severity. Driveline changes and engine mounting was discussed and several labs expressed that driveline and mounting can have a dramatic influence on severity. Several labs relayed their experience with severity shifts and after some more discussion, the panel decided to form a Task Force to further investigate driveline dynamics and the effect on camshaft wear. Eric Liu agreed to chair the task force, with the following members: Al Lopez, Jerry Brys, Mark Mosher, Rich Grundza, Tim Caudill, Christian Porter and Bill Buscher.

The panel also reviewed the status of 1009 and agreed to remove this oil from the LTMS document.

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Attachment 5 is a listing of the motions and action items from this meeting.

The meeting was adjourned at 11:00 am.

Sequence IVA Surveillance Panel

Corpus Christi, TX

Omni Corpus Christi Hotel, Bayfront Tower

March 29, 2012


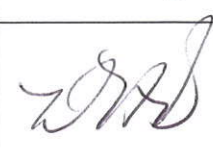
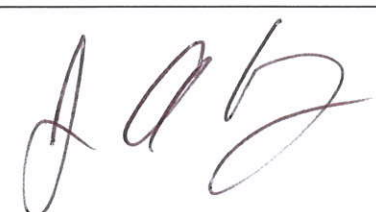

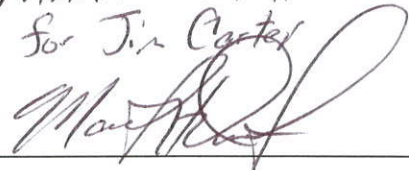

9:00 a.m. - 12:00 p.m.

A G E N D A

1. Chairman comments
2. Attendance sign-in sheet distribution
3. Membership changes
4. Motion and Action recorders
5. Approval of minutes for 2/9/2012 All
6. Review action items from last meeting Buscher
7. Fuel supplier report – KA24E Green Fuel Carter
8. TMC report (*Any questions?*) Grundza
9. ACC report (*Any questions?*) Clark
10. Test hardware report Buscher
11. Reference Oil Review All
 - RO 1006-2 target update
 - RO 1007 status
12. Review Scope & Objectives All
13. Old business
14. New business
15. Next meeting
16. Adjourn



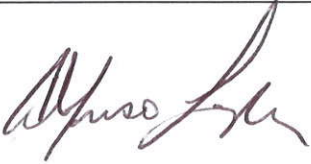


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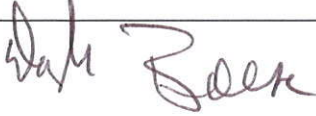


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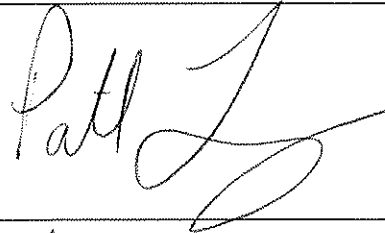

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ASTM D02.B1 Semi-Annual Report Passenger Car Reference Oil Testing

April 2012

Passenger Car Engine Oil Testing Executive Summary

- ▶ **IIIF**
 - No significant monitoring issues.
- ▶ **IIIG/A/B**
 - Ten tests obtained on reference oil 435-2. Potential target update to be discussed at March meeting.
- ▶ **IVA**
 - Reference oil 1006-2 reintroduced February 2, 2012. Calibration periods with 1006-2 reduced to generate additional data for targets.

Calibrated Labs and Stands*

Test	Labs	Stands
IIIF	4	4
IIIG/A/B	6	16
IVA	3)
VG	4	8
VIB	0	0
VID	6	12
VIII	2	3

*As of 3/23/2012

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Test Activity Levels

»» October 1, 2011 –
March 31, 2012

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Sequence Tests

Test Status	Validity Code	IIIF	IIIG	IVA
Acceptable Calibration Test	AC	7	11	7
Failed Calibration Test	OC	1	2	1
Operationally Invalid	LC	0	0	1
Aborted	XC	1	1	0
Abandon Stand/Eng	MC	0	0	3
Decoded/Donated	NN/AG	0	0	7
Assigned, not reported		1	1	1
Total		10	15	21

Failed Tests

Test Status	Test	Number of Tests
Screened ACLW >20µm	IIIF	1
Severe Viscosity Increase	IIIG	1
Severe Viscosity Increase and WPD	IIIG	1
Mild Average Cam Wear	IVA	%
Stand EWMA Precision Alarm, FEI2	VID	1
Severe Stripped Viscosity Result	VIII	2
Severe Stripped Viscosity, BWL Precision Alarm	VIII	1
Total		10

Lost Tests*

*Invalid and aborted tests

Test Status	Cause	IIIF	IIIG	IVA	VG	VID	VIII
Aborted	Oil Temperature Control	1	0	0	0	0	0
Aborted	Blown Head Gasket	0	1	0	0	0	0
Invalid	Engine Oil Thermocouple Failed	0	0	1	0	0	0
Invalid	Knock Sensor Wiring Issue	0	0	0	0	1	0
Total		1	1	1	0	1	0

Test Severity

»» October 1, 2011 –
March 31, 2012

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Test Severity (cont)

▶ IVA

- ACW in mild action alarm
- Trending mild for most of the report period

- Charts shown in [Appendix 1.c.](#)

▶ VG

- RAC, AEV, APV and OSCAR are in control.
- AES in warning alarm, mild direction.
 - Milder this period than previous periods.

- Charts shown in [Appendix 1.d.](#)

Test Precision

»» October 1, 2011 –
March 31, 2012

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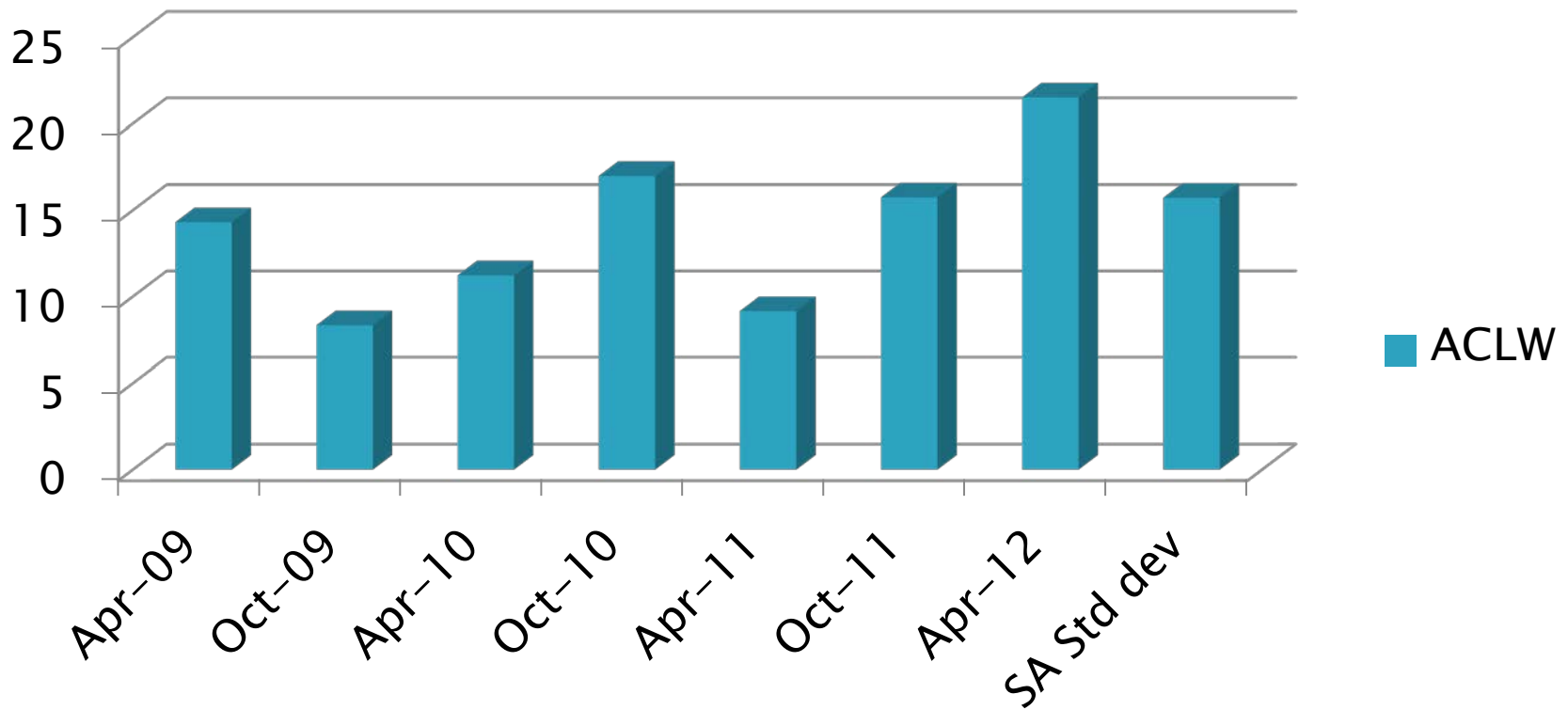
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Test Precision Estimates

- ▶ Presented on an six month basis.
- ▶ Data presented for past four years.

Sequence IVA Precision Estimates

ACW



Reference Oil Inventory

»» Actions, Re-blends, Inventories
and Estimated Life

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Reference Oil Re-blends

- Oils with ~ 2 years or less supply
 - Re-blends no longer available
 - Oils Affected
 - 925-3 and 1007
 - A replacement oil for 925-3 is being pursued and will be addressed during next meeting
 - 1007 to be replaced with 1006-2 in IVA

Reference Oil Inventory Estimated Life

Oil	Tests	Original Blend Amount	Quantity Shipped in last 6 months	TMC Inventory	Lab Inventory	Estimated Life
541-1	VID	550	25	515	20	5+ years
542	VID	1100	85	358	65	5+ years
704-1	VIII	897	12	206	10	5+ years
925-3	VG	975	0	10	6	<1 year
1006-2	IVA, VG, VIII	5500	91	3772	63	5+ years
1007	IVA, VG	1968	40	21	41	<1 year
1009	IVA, VG	1100	34	379	33	5+ years
1010	IIIG, VID	1100	55	712	60	5+ years

LTMS Deviations

»» October 1, 2011 –
March 31, 2012

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LTMS Deviations

- One IVA LTMS Deviation in Current Period
 - Test sounded a stand precision EWMA Alarm, cleared after one test
 - Alarm due to change in hardware and oil selection
 - Stand calibrated with out additional tests

Historical Count of PCEO LTMS Deviations

Test	LTMS Deviations
IIIF	5
IIIG	5
IVA	6
VG	8
VID	1
VIII	3

Quality Index Deviations

»» October 1, 2011 –
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Quality Index Deviations

- Two PCEO Quality Index Deviations this period
III G Deviation issued for EBP and Load Control problem.
IVA Deviation issued for EBP.

Historical Count of PCEO Quality Index Deviations

Test	Quality Index Deviations
IIIF	25
IIIG	11
IVA	28
VG	38

TMC Laboratory Visits

»» October 1, 2011 –
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Test Area Timelines

»» October 1, 2011 –
March 31, 2012

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Test Area Timeline Additions

Test	Date	Topic	IL
IIIG	20111129	Added provisions for strainers in coolant system Updated tolerances for cam and lifter measurement devices	11-3
IIIG	20111212	Added First-in, First-out criteria for specific hardware and corrected harmonic balancer p/n	11-4
VID	20120111	Clarified procedure for oil additions during new engine break-in	12-1
IVA	20120204	Reintroduced reference oil 1006-2, targets with N = 4	
IVA	20120209	Updated standard deviation for severity adjustments	

*As of 3/31/2012

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Additional Information

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Additional Information

- ▶ Available on TMC Website:
 - Live Reference Test Data Bases
 - Surveillance Panel Meeting Minutes
 - Test Area Alarm Logs
 - Complete Test Area Timelines
 - LTMS Manual

- ▶ www.astmtmc.cmu.edu



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Appendix 1 PCMO Reference Oil Testing Control Charts

April 2012

Appendix 1.c

Sequence IVA Control Charts

» Severity, Precision, and CuSum

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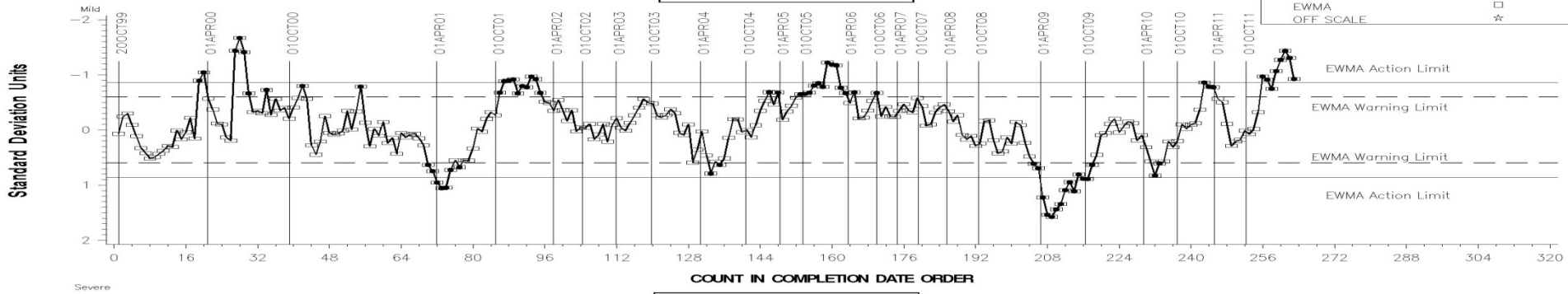
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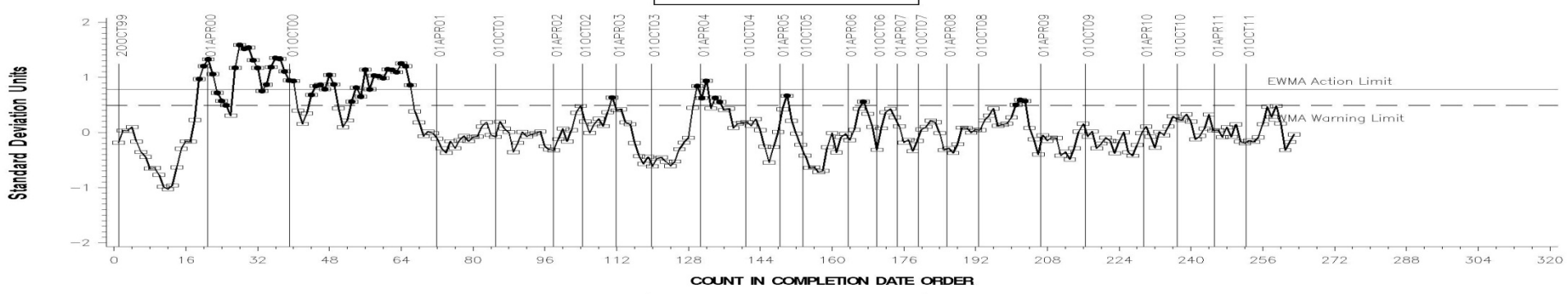
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AVERAGE CAM WEAR

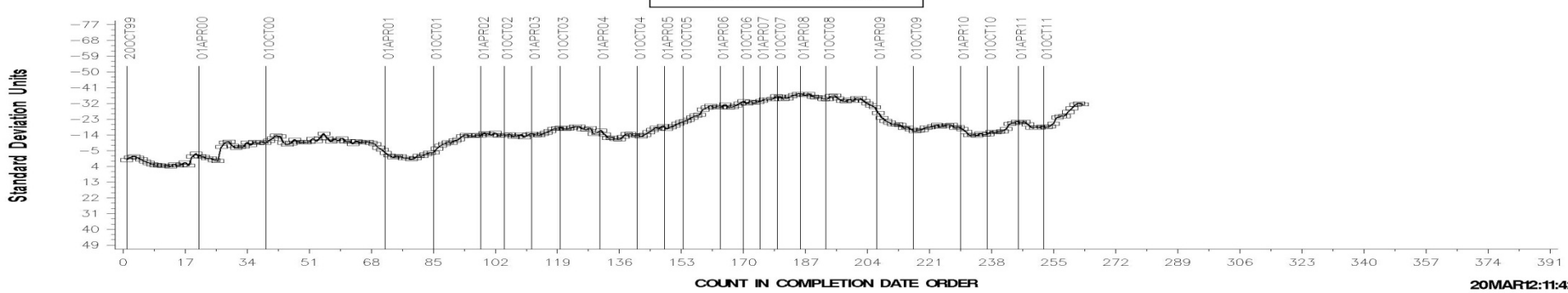
LTMS Severity Analysis



LTMS Precision Analysis



CUSUM Severity Analysis





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<http://astmtmc.cmu.edu>

Sequence IVA 1006-2 Results

Sequence IV Surveillance Panel

March 29, 2012

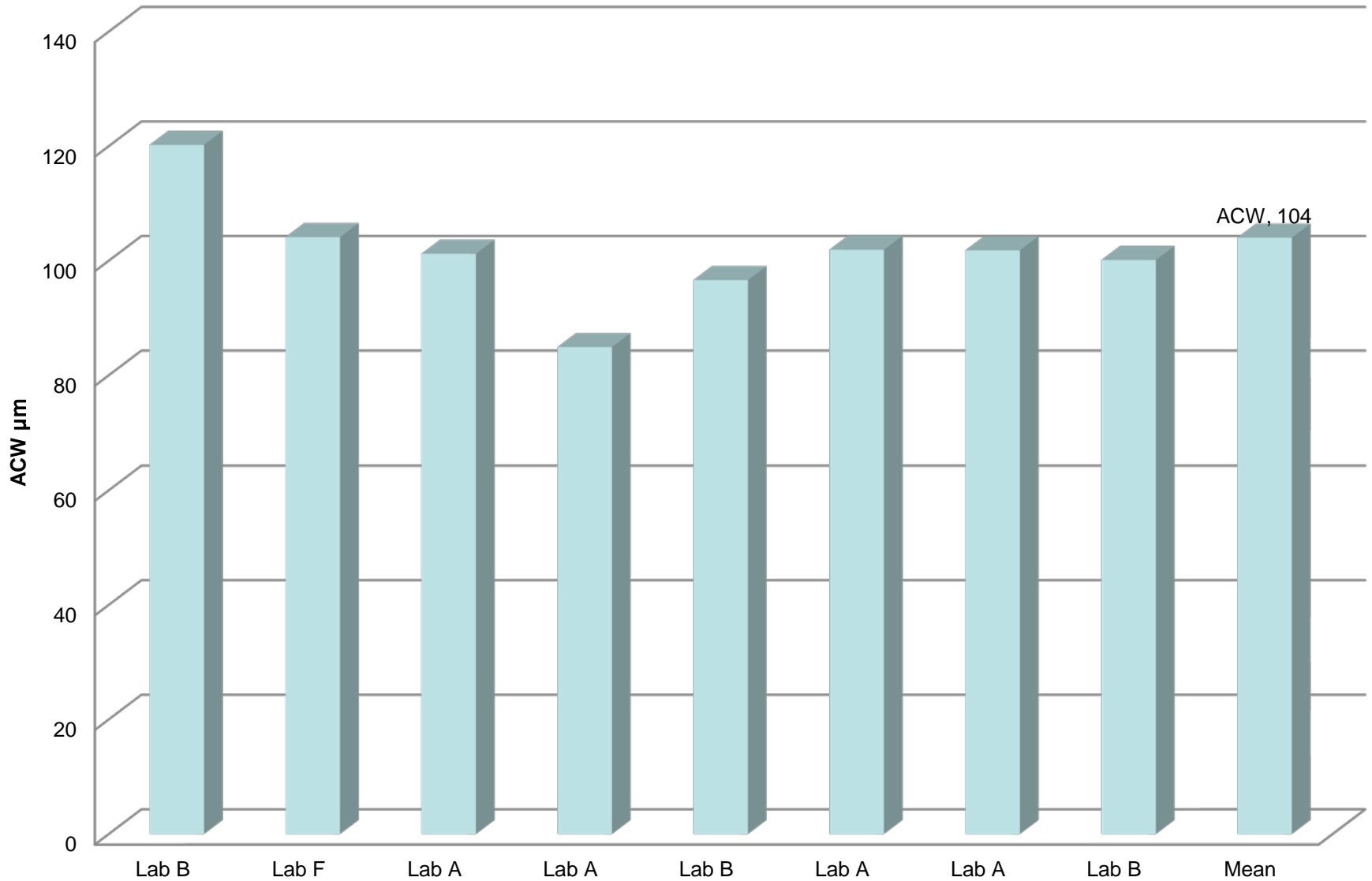
Summary of Results

- 8 tests reported from six labs
- Summary in next few slides

Summary of Results

Lab	ACW	SA	Corrected Result
Lab B	120.24	0	120.24
Lab F	104.06	0	104.06
Lab A	101.24	0	101.24
Lab A	75.19	9.657	84.847
Lab B	96.55	0	96.55
Lab A	85.31	16.568	101.878
Lab B	111.47	0	111.47
Lab A	85.481	14.621	100.101

Plot of ACW Results and Mean (n= 8) for 1006-2





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Sequence IVA Surveillance Panel
March 29, 2012
9:00AM – 12:00PM
Omni Corpus Christi Hotel, Bayfront Tower
Corpus Christi, TX

Motions and Action Items

As Recorded at the Meeting by Pat Lang

1. Action Item – Surveillance panel chair to contact Nissan to inquire about the potential for Nissan to make an additional test kits.
2. Action Item – SwRI to investigate solution to mild cam batch situation to determine if the mild cams can be brought to an acceptable severity level.
3. Action Item – Surveillance panel chair to solicit suppliers for a GF-5 technology reference oil with ACW performance in the 50 to 90 μm range.
4. Action Item – TMC to reassign RO 1009 assignments that are for the IVA to the VG.
5. Action Item – Form a task force to further investigate driveline dynamics and the effect on camshaft wear. The task force will be lead by Eric Liu with the following members: Al Lopez, Jerry Brys, Mark Mosher, Rich Grundza, Tim Claudill Christian Porter and Bill Buscher.
6. Motion – Remove RO 1009 from the IVA LTMS.

Al Lopez / Eric Liu / Passed Unanimously 11-0-0