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

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

Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

Chairman: KENNETH O. HENDERSON, Cannon Instrument Co., 2139 High Tech Road, State College, PA 16803, (814) 353-8000, Fax: (814) 353-8007, e-mail: kenohenderson@worldnet.att.net
First Vice-Chairman: BEN R. BONAZZA, TI Group Automotive Systems, Caro Research Center, 326 Green Street, Caro, MI, 48723 (989) 673-8181 ext. 227, Fax: (989) 673-3241, e-mail: bbonazza@us.tiauto.com
Second Vice-Chairman: JANET L. LANE, ExxonMobil Research & Engrg., 600 Billingsport Rd, Paulsboro, NJ 08066-0480 (856) 224-3302, Fax: (856) 224-3616, e-mail: janet.l.lane@exxonmobil.com
First Secretary: RALPH A. CHERRILLO, Shell Global Solutions (US) Inc., Westhollow Tech Ctr., 3333 Highway 6 South, Houston, TX 77082 (281) 544-8789, Fax: (281) 544-8150, e-mail: ralph.cherrillo@shell.com
Second Secretary : MICHAEL A. COLLIER, Petroleum Analyzer Co. LP, PO Box 206, Wilmington, IL 60481, (815) 458-0216, Fax: (815) 458-0217, e-mail: macvarlen@aol.com
Staff Manager: DAVID R. BRADLEY, (610) 832-9681, Fax: (610) 832-9668, e-mail: dbradley@astm.org

Originally Issued: May 26, 2010

Reply to: Jeff Clark
Test Monitoring Center
6555 Penn Avenue
Pittsburgh, PA 15206
412-365-1032
jac@astmtmc.cmu.edu

Unapproved Minutes of the May 12, 2010 Sequence III Surveillance Panel Meeting San Antonio, TX

The meeting was called to order at 1:10 pm by Chairman Dave Glaenzer. The attendance is show in **Attachment 1**. Motions and Actions resulting from this meeting are shown in **Attachment 2.**

Meeting Minutes

The minutes of the following meetings/teleconferences were approved unanimously: September 11, 2009; November 18, 2009; February 2, 2010; and April 8, 2010.

Action Item Review

Dave Glaenzer reviewed action items from previous meetings **(Attachment 3)**. The two open items were addressed and resulted in passed motions as follows:

AFR Measurement

Motion (Seman, Altman): Sequence III testing laboratories can choose to stop using gas analysis for AFR verification, and begin using real-time feedback systems such as those available from ECM and Horiba. If a lab chooses to do this, calibrations of the system / sensors will be carried out per the manufacturer's recommendation and done at least every 6 months. If a system allows for %O2 compensation, the calculation must be performed. This change would be effective after the next laboratory calibration with acceptable results. This motion passed 13-0-0.

Oil Filter Change

Greg Seman reintroduced a previously tabled motion to modify IIIF and IIIG test procedures to allow oil filter replacement if erratic pressure delta in noted; if this occurs, notify the TMC and submit a plot of the pressure differential. After discussion, the following motion (Seman, previously introduced) passed: If the oil pressure delta slowly climbs as test hours are accumulated and decreases by more than 10kPa in less than 1 minute, the filter may be changed. The vote was 11-0-2.

CPD Report

The CPD Report was given by Jason Bowden **(Attachment 4)**. The report was accepted unanimously.

GM Motorsports

Scott Stap gave the report for GM Motorsports **(Attachment 5)**. Scott reminded the labs to use their inventory on a FIFO basis. Bruce Matthews of GM presented the results of leak tests that were performed on scratched heads **(Attachment 6)**. Bruce stated that the results of the test were inconclusive.

Test Longevity

Dave Glaenzer led a discussion and made a presentation **(Attachment 7)** on test longevity and supply of key test components. In summary, test component supply is likely to get the test through 2015.

Fuel Supplier Report

Jim Carter gave the fuel supplier report **(Attachment 8)**. The report was approved unanimously.

TMC Report

Rich Grundza summarized current Seq. III reference test severity/precision status. The report is shown as **Attachment 9**.

ACLW Task Force Report

The report, presented by Dave Glaenzer, is shown in **Attachment 10**, additional comments from OH Technologies are included in **Attachment 10a**. After much discussion regarding the Shewhart severity lower limit for ACLW, a motion (Seman, Leverett) passed (10-0-4) which extended the suspension of the lower limit for an additional 60 days. The TMC commented that in its opinion, this needs to be the last extension given that at this point the mild trend seems to be ending. The panel chair committed to a conference call in late June to assess the issue prior to the suspension ending July 11, 2010.

NO_X Measurements

After discussion, a motion (Leverett, Seman) was made to make NO_X measurements optional for all Seq. III tests. This motion passed 7-2-5. With negatives attached, this procedure change cannot go into effect until it has cleared the ballot process. The TMC will draft the information letter and have it sent to ballot.

Reference Oil Issues

Rich Grundza updated the panel on the issues surrounding RO 435-1, which is currently not being assigned for the IIIG. ROBO test data demonstrated a shift in severity from RO 435 to 435-1. A pilot blend of 435-2 was produced and tested in ROBO and showed similar performance to the original blend RO 435. Necessary blend quantities have been communicated to the supplier for 435-2.

Potential GF5 Quality Reference Oils

The panel reviewed two potential GF5 reference oils **(Attachments 11 and 12)**. The panel felt either would be suitable for IIIG use, but the general preference was for the 5W-20 oil. The panel will continue the discussion on a future conference call.

IIIGA 168h Time Limit to Analyze Samples

Dave Glaenzer led a discussion on potentially extending the 168h time limit for analyze IIIGA samples for MRV viscosity. Both Dave and Rich Grundza presented data **(Attachments 13 and 14)**. Brief discussion yielded general consensus that perhaps 30 days would be a reasonable limit. Dave agreed to spearhead the effort to conduct experiments to verify moving to a 30 day limit.

Oil Consumption Limit for Candidate Interpretability

Charlie Leverett and Andy Ritchie brought to the panel concerns that the 4.65L oil consumption interpretability limit was overdue for examination since it hasn't been reviewed since the limit was set. Reference test data indicated passing results with oil consumption as high as 4.89L. After some further discussion, a motion (Leverett, Ritchie) to raise the limit to 4.89L for all tests completing on or after May 12, 2010 was passed (9-0-5).

Sunnen Honing Brushes

Charlie Leverett brought to the panel's attention that a change in the honing brushes has occurred **(Attachment 15)**. After conversations with Charlie, Sunnen has stated that they would be willing to manufacture brushes that were the same as had been produced in the past. With the support of the panel, Charlie committed to get a quote from Sunnen.

New LTMS

Todd Dvorak presented the IIIG version of the new LTMS **(Attachment 16)**. There was much discussion on mapping a path forward. A motion (Bowden, Leverett) for the panel to form a task force to develop an LTMS recommendation passed without objection. The task force was given a 4 week timeframe to develop the recommendation. The surveillance panel also requested a IIIF from the LTMS Task Force.

Scope & Objectives

The panel scope and objectives were reviewed and revised as shown in **Attachment 17**.

Agenda
The original meeting agenda is shown in Attachment 18.

The meeting adjourned at 5:15 p.m.

Attachment 1

ASTM Sequence III Surveillance Panel (17 Voting members) May____, 2010

Name/Address	Phone/Fax/Email		Signature
Ed Altman Afton Chemical Corporation P.O. Box 2158 Richmond, VA 23218-2158 USA	804-788-5279 804-788-6358 ed.altman@aftonchemical.com	Voting Member	Present
Zack Bishop Test Engineering, Inc. 12718 Cimarron Path San Antonio, TX 78249-3423 USA	210-877-0223 210-690-1959 zbishop@tei-net.com	Non-Voting Member	Present
Doyle Boese Infineum 1900 E. Linden Avenue Linden, NJ 07036 USA	908-474-3176 908-474-3637 doyle.boese@infineum.com	Non-Voting Member	Present
Adam Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 adbowden@ohtech.com	Non-Voting Member	Present
Jason Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 jhbowden@ohtech.com	Voting Member	Present
Dwight H. Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 dhbowden@ohtech.com	Non-Voting Member	Present
Bill Buscher III Southwest Research Institute 6220 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

ASTM Sequence III Surveillance Panel (17 Voting members) May____, 2010

Name/Address	Phone/Fax/Email		Signature
James Carter Haltermann Products 3520 Okemos Rd. Suite #6-176 Okemos, MI USA	517-347-3021 517-347-1024 jecarter@jhaltermann.com	Voting Member	Present
Chris Castanien The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2973 440-944-8112 cca@lubrizol.com	Non-Voting Member	Present
Timothy L. Caudill Ashland Oil Inc. 22nd & Front Streets Ashland, KY 41101 USA	606-329-1960 x5708 606-329-2044 tlcaudill@ashland.com	Voting Member	Present
Martin Chadwick Intertek Automotive Research 5404 Bandera Road San Antonio, TX 78238 USA	210-706-1543 210-684-6074 martin.chadwick@intertek.com	Non-Voting Member	Present
Jeff Clark Sequence III Secretary ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 USA	412-365-1032 412-365-1047 jac@atc-erc.org	Non-Voting Member	Present
Sid Clark Southwest Research 50481 Peggy Lane Chesterfiled, MI 48047 USA	586-873-1255 Sidney.L.Clark@sbcglobal.net	Non-Voting Member	Present
Johnny M De La Zerda Intertek Automotive Research 5404 Bandera Road San Antonio, TX 78238 USA	210-523-4621 210-523-4607 johnny.delazerda@intertek.com	Non-Voting Member	Present

ASTM Sequence III Surveillance Panel (17 Voting members) May____, 2010

Name/Address	Phone/Fax/Email		Signature
Todd Dvorak Afton Chemical Corporation P.O. Box 2158 Richmond, VA 23218-2158 USA	804-788- 6367 804-788- 6388 todd.dvorak@aftonchemical.com	Non-Voting Member	Present
Frank Farber ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 USA	412-365-1030 412-365-1047 fmf@astmtmc.cmu.edu	Non-Voting Member	Present
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
Joe Franklin Intertek Automotive Research 5404 Bandera Road San Antonio, TX 78238 USA	210-523-4671 210-523-4607 joe.franklin@intertek.com	Non-Voting Member	Present
David L. Glaenzer Afton Chemical Corporation 500 Spring Street P.O. Box 2158 Richmond, VA 23218-2158 USA	804-788-5214 804-788-6358 dave.glaenzer@aftonchemical.com **Surveillance Panel Chairman**	Non-Voting Member	Present
Richard Grundza ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 USA	412-365-1031 412-365-1047 reg@astmtmc.cmu.edu	Voting Member •	Present
Larry Hamilton The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2326 440-347-4096 ldha@lubrizol.com	Non-Voting Member	Present

ASTM Sequence III Surveillance Panel (17 Voting members) May____, 2010

Name/Address	Phone/Fax/Email		Signature
Tracey King Chrysler LLC 800 Chrysler Drive CIMS 482-00-13 Auburn Hills, MI 48326-2757 USA	248-576-7500 248-576-7490 tek1@chrysler.com	Voting Member	Present
Clayton Knight Test Engineering, Inc. 12718 Cimarron Path San Antonio, TX 78249-3423 USA	210-690-1958 210-690-1959 cknight@tei-net.com	Voting Member	Present
Patrick Lang Southwest Research Institute 6220 Culebra Road P.O. Box 28510 San Antonio, TX 78228 USA	210-522-2820 210-684-7523 plang@swri.edu	Voting Member	Present
Charlie Leverett Intertek Automotive Research 5404 Bandera Road San Antonio, TX 78238 USA	210-647-9422 210-523-4607 charlie.leverett@intertek.com	Voting Member	Present
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
Bruce Matthews GM Powertrain Mail Code 483-730-472 823 Jocyln Avenue Pontiac, MI 48340 USA	248-830-9197 248-857-4441 bruce.matthews@gm.com **Test Sponsor Representative**	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

ASTM Sequence III Surveillance Panel (17 Voting members) May____, 2010

Name/Address	Phone/Fax/Email		Signature
Mark Mosher ExxonMobil Technology Co. Billingsport Road Paulsboro, NJ 08066 USA	856-224-2132 856-224-3628 mark.r.mosher@exxonmobil.com	Voting Member -	Present
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	Voting Member ,	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 PHONE
Jim Rutherford Chevron Oronite Company LLC 100 Chevron Way Richmond, CA 94802 USA	510-242-3410 510-242-3173 jaru@chevrontexaco.com	Non-Voting Member	Present
Philip R. Scinto The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2161 440-347-9031 prs@lubrizol.com	Non-Voting Member	Present
Greg Seman The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2153 440-347-4096 greg.seman@lubrizol.com	Voting Member -	Present

MATTHEW BOWDEN
OH TECHNOLOGIES

mjbowden@OHTECH.com

AL LOPEZ
Intertek

al.lopez@INTERTEK.com

Art Andrews
non voting
ExxonMobil

arthur.t.andrews@exxonmobil.com

BILL MAXWELL
NON VOTING
EXXON MOBIL

bill.l.maxwell@exxonmobil.com

Attachment 2

Sequence IIIF/G Surveillance Panel
May 12, 2010
1:00PM – 5:00PM
Southwest Research Institute
San Antonio, TX

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

1. Motion – Sequence III testing laboratories can choose to stop using gas analysis for AFR verification, and begin using real-time feedback systems such as those available from ECM and Horiba. If a lab chooses to do this, calibrations of the system / sensors will be carried out per the manufacturer's recommendation and done at least every 6 months. If a system allows for %O2 compensation, the calculation must be performed. This change would be effective after the next laboratory calibration with acceptable results.

   Greg Seman / Ed Altman / Passed Unanimously 13-0-0

2. Motion – Modify IIIF and IIIG test procedures to allow oil filter replacement if erratic pressure delta in noted. If this occurs, notify the TMC and submit a plot of the pressure differential. **(Use Dave's revised wording; If the oil pressure delta slowly climbs as test hours are accumulated and decreases by more than 10kPa in less than 1 minute, the filter may be changed.)** Effective 5/12/10.

   Greg Seman / Ed Altman / Passed 11-0-2

3. Action Item – Chairman to research and report to the surveillance panel, the reasoning for quarterly analysis of fuel.

4. Motion – Extend current suspension of ACLW lower limit shewhart severity criteria for reference test acceptability for an additional 60 days, starting today. Continue ACLW SAs as currently implemented.

   Greg Seman / Charlie Leverett / Passed 10-0-4

5. Action Item – Surveillance panel conference call will be scheduled in late June 2010 to determine action prior to the end of the 60 day extension for ACLW lower limit shewhart severity criteria suspension.

6. Motion – Modify IIIF and IIIG test procedures to change NO_x measurements from required to optional.

   Charlie Leverett / Greg Seman / Passed 7-2-5 (will be letter balloted)

7. Action Item – Accept both potential reference oils as GF-5 category reference oils. Consider using oil # 2 (PVIS = 81%, WPD = 4.0, ACLW = 12µm) for the Sequence IIIG and replacing one of the outdated reference oils currently in use. Conduct a follow-up surveillance panel conference call to develop a plan for adopting one or both of these potential reference oils.

8. Motion – Modify IIIG test procedure to change oil consumption interpretability limit from 4.65L to 4.89L. Effective for tests completing on or after 5/12/10.

   Charlie Leverett / Andy Ritchie / Passed 9-0-5

9. Motion – Form a task force to develop a recommendation to the surveillance panel for adopting LTMS 2nd Edition to the Sequence IIIG. Task force to report to surveillance panel within four weeks of today's meeting.

   Jason Bowden/Charlie Leverett/ Passed 13-0-0

10. Action Item –Stats group to look at LTMS Version 2 system as applied to the Sequence IIIF.

Attachment 3

Sequence IIIF/G Surveillance Panel
November 18, 2009
1:00PM – 5:00PM
GM Technical Center
Warren, MI

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

1. Action Item – AFR task force to schedule a conference call to discuss action to put AFR measurement equipment into service. **OPEN**

2. Motion – Modify IIIF and IIIG test procedures to allow oil filter replacement if erratic pressure delta in noted. If this occurs, notify the TMC and submit a plot of the pressure differential. **(Use Greg's wording)** Effective 11/18/09.

   Greg Seman / Ed Altman / Tabled for further refinement and e-ballot
   OPEN

3. Motion – Modify IIIF and IIIG test procedures to allow the use of Teflon tape as a sealant, as long as it does not come in contact with the test oil. Effective 11/18/09. **DONE**

   Charlie Leverett / Pat Lang / Passed Unanimously

4. Motion – Modify IIIF and IIIG test procedures to allow the use of 1/16" thermocouples in addition to 1/8" thermocouples. All other thermocouple specifications will remain the same. Effective with the lab's next calibration test. **DONE**

   Mark Mosher / Andy Ritchie / Passed 4-0-7

5. Motion – Adjust the upper and lower control limits for calculating the (Blowby) Condenser Coolant Out Temperature Qi from 0.23 to 0.46. Effective with the lab's next calibration test. **DONE**

   Ed Altman / Pat Lang / Passed 3-0-8

Attachment 4

CENTRAL PARTS DISTRIBUTOR REPORT
OH Technologies, Inc.

Sequence III Surveillance Panel Meeting
SwRI, San Antonio, TX
May 12th, 2010

1) Technical Memos Issued

4/30/10

Seq. III CPD Technical Memo 18

OHT3F-053-1, Grade 12 Pistons, Batch Code 24. Pistons serial numbers may include the letter "A" after numerical serial number.

2) Batch Code Changes

IIIF	Batch Code	Date Introduced	IIIG	Batch Code	Date Introduced
Arm, Rocker	BC 15	4/09/10	Arm, Rocker	BC 15	3/19/10
IIIF Camshaft	PC 15	9/16/09	IIIG Camshaft	PC 15	12/11/09
IIIF Spring	BC 8	11/05/09	IIIG Springs	BC 9	1/15/10
Pushrods	BC 9	11/25/09	IIIG Springs	BC 10	4/13/10
			Pushrods	BC 9	11/25/09
Piston Grade 12	BC 24	4/22/10	Piston Grade 12	BC 24	4/22/10
Piston Grade 34	BC 24	4/22/10	Piston Grade 34	BC 24	4/27/10
Piston Grade 56	BC 24	11/19/09	Piston Grade 56	BC 24	11/25/09
Oil Cooler Plating	091118		Oil Cooler Plating	091118	
	091203			091203	
	091222			091222	
	100204			100204	
	100406			100406	

SEQUENCE III SURVEILLANCE PANEL

CRITICAL HARDWARE REJECTION REPORT
DATE PREPARED: 5/7/2010

REPORTING PERIOD: 11/17/2009-5/7/2010

ITEM	DESCRIPTION	REASON REJECTED	QTY	REPLACED	DATE REPLACED
OHT3F-008-6	CAMSHAFT, SPECIAL TEST, IIIF	SCRATCH/DAMAGE TO LOBE	1	YES	1/8/2010
OHT3F-008-6	CAMSHAFT, SPECIAL TEST, IIIF	THRUST DIMENSION	1	YES	1/8/2010
OHT3F-008-6	CAMSHAFT, SPECIAL TEST, IIIF	THREAD STRIPPED	1	YES	3/17/2010
OHT3F-008-8	CAMSHAFT, SPECIAL TEST, IIIG	THRUST DIMENSION	1	YES	1/12/2010
OHT3F-008-8	CAMSHAFT, SPECIAL TEST, IIIG	THRUST DIMENSION	1	YES	2/25/2010
OHT3F-008-8	CAMSHAFT, SPECIAL TEST, IIIG	RECALLED/THRUST DIMENSION	1	YES	3/1/2010
OHT3F-008-8	CAMSHAFT, SPECIAL TEST, IIIG	RECALLED/THRUST DIMENSION	3	YES	3/1/2010
OHT3F-008-8	CAMSHAFT, SPECIAL TEST, IIIG	RECALLED/THRUST DIMENSION	2	YES	3/17/2010
OHT3F-011-2	PLATE, CAMSHAFT THRUST	CRACKED UPON INSTALLATION	3	YES	3/18/2010
OHT3F-029-3	LIFTER, TEST, ACI W/ FLAT	PIT ON FOOT	2	1/4/2010	1/17/2010
OHT3F-029-3	LIFTER, TEST, ACI W/ FLAT	RUST	1	YES	1/17/2010
3F042-101	MAIN BEARING	BURR	1	YES	5/3/2010
3F051-TOP4	TOP RING (4TH RUN), IIIF	NICK	1	YES	2/9/2010
3F051-TOP4	TOP RING (4TH RUN), IIIF	SCRATCH	1	YES	3/18/2010

Attachment 5

GMR Oil Test Components

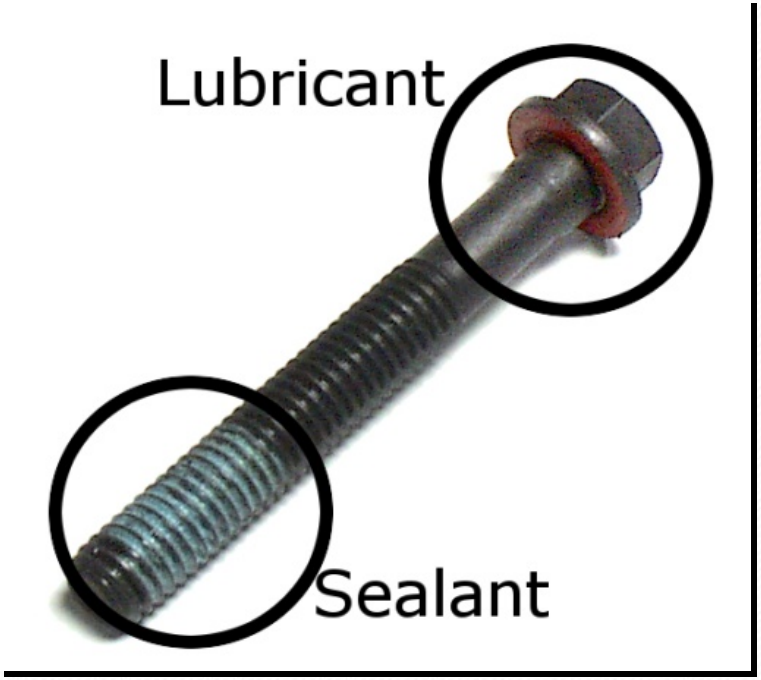
Compiled April 26th 2010

Current Inventory

		In Stock	At Storage	In Process	Total
12593374	Connecting Rods	294	21464	0	21758
24502168	Crankshaft	94	490	0	584
24502286	Cylinder Block	12	414	144	570
24502260B	Cylinder Heads	2	5958	240	6200

Head Bolts

- 25533811 Bolt, Head – Short 29,142 pcs in stock
- 25527831 Bolt, Head – Long 27,360 pcs in stock
- Head bolts in stock do not have sealant or lubricant on them



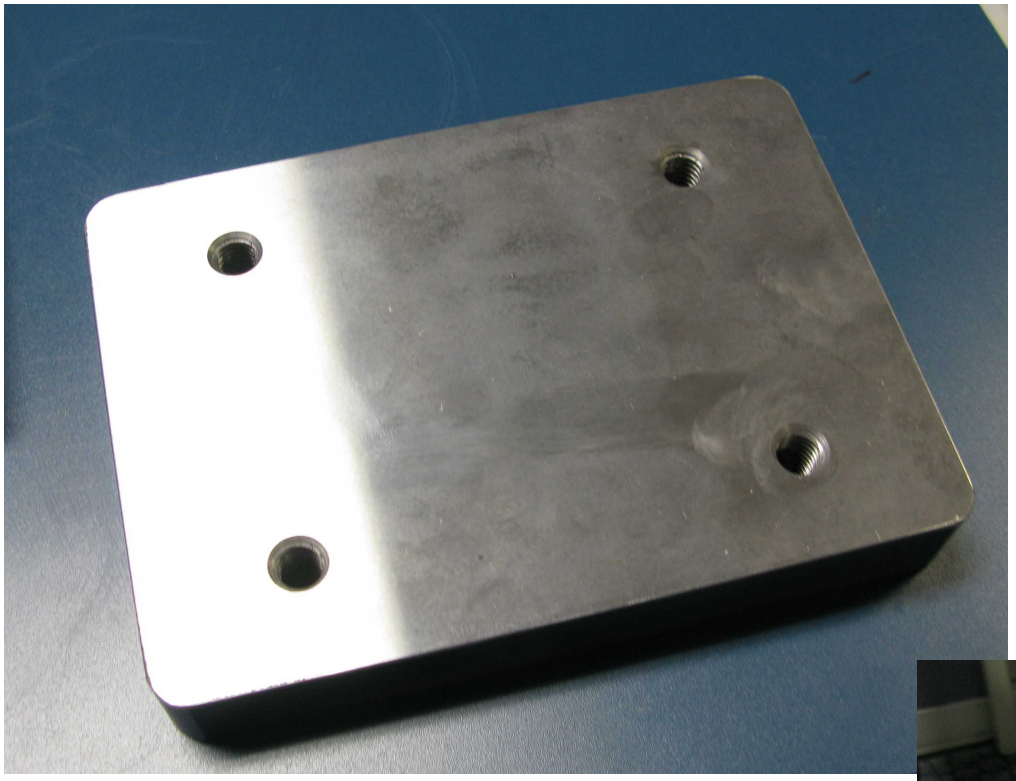
Head Porosity- issue

- One 3800 cylinder head has been discovered with porosity in the water jacket that leaked to the exterior.
- Appears to be an isolated incident as no other complaints at this time.
- Head Serial 24L9-022 was shipped Nov 2009.
- All heads from the same plant shipment or machining batch have already been shipped to labs.

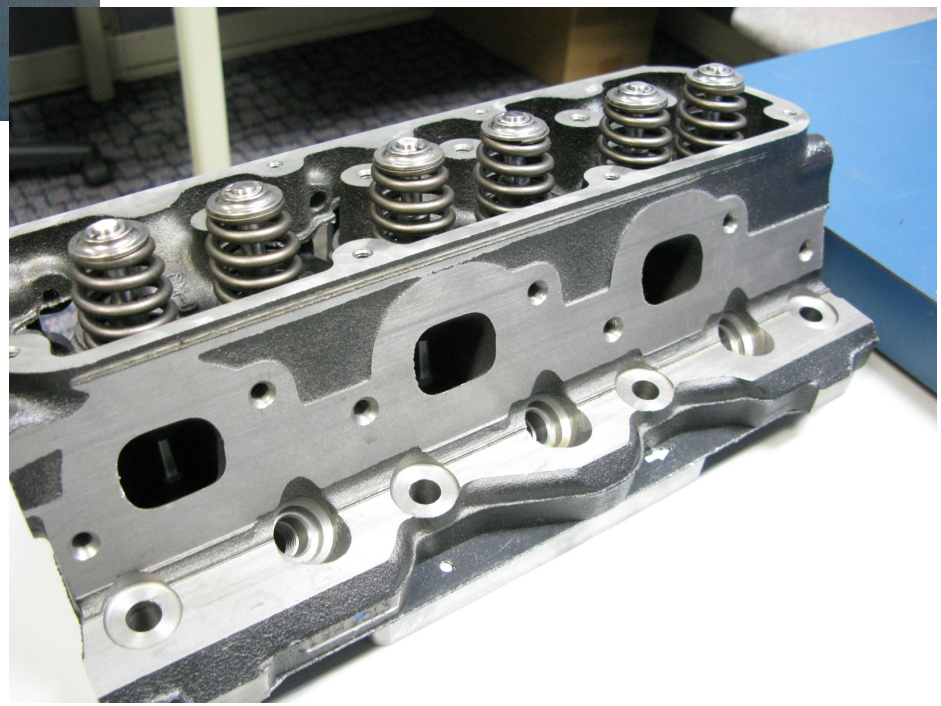
24502260B Heads

- Cylinder heads are the only part that has been in short supply.
- Currently receiving an average of 60 heads a week from the machine shop.
- Will continue receiving heads at this rate until inventory is restored to sufficient levels.

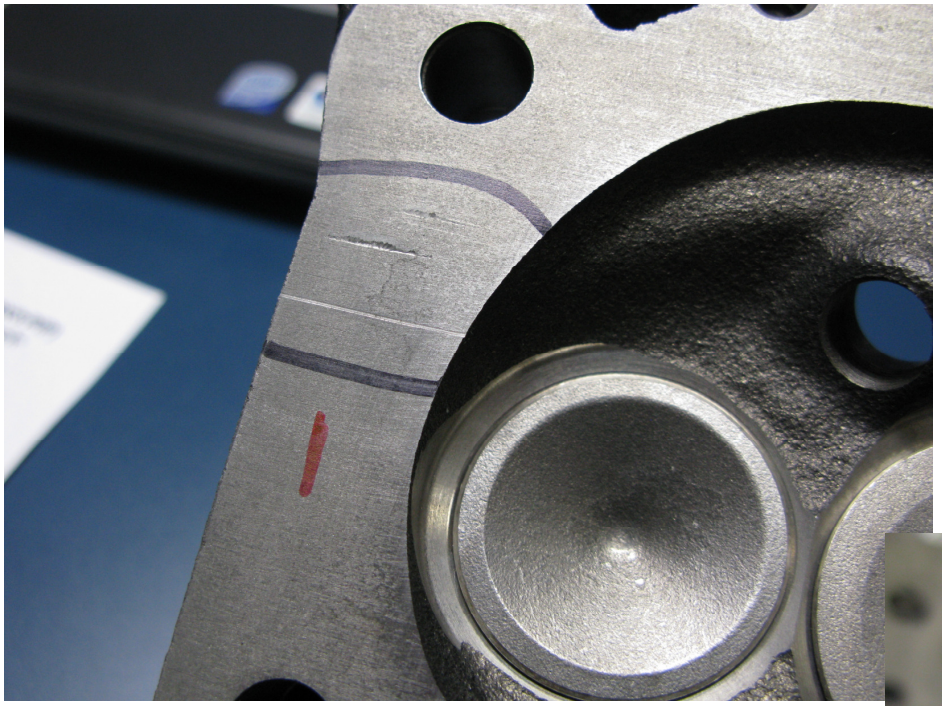
Attachment 6



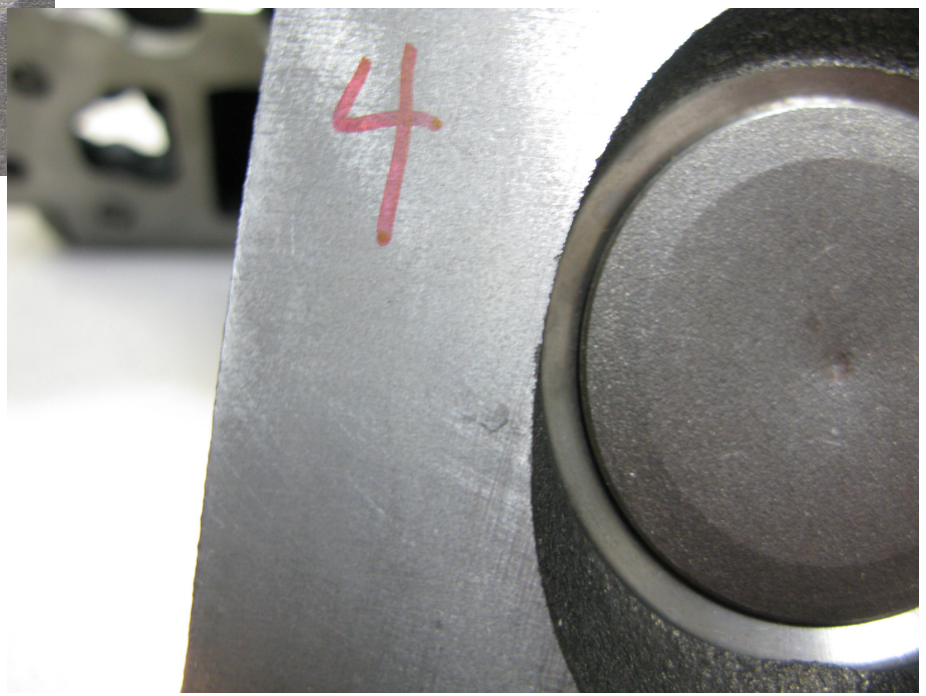
Ground Flat Fixture



Cylinder head and gasket situated on test fixture (for actual test; the assembly was bolted to the plate)

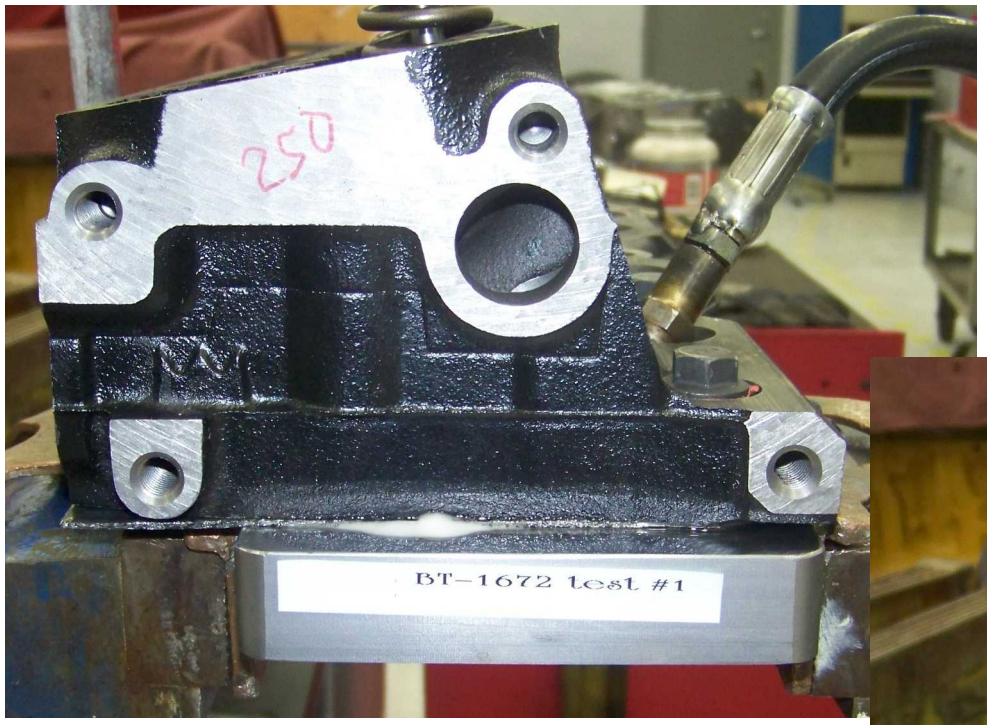


Test #1 – Sample with large scratch defect

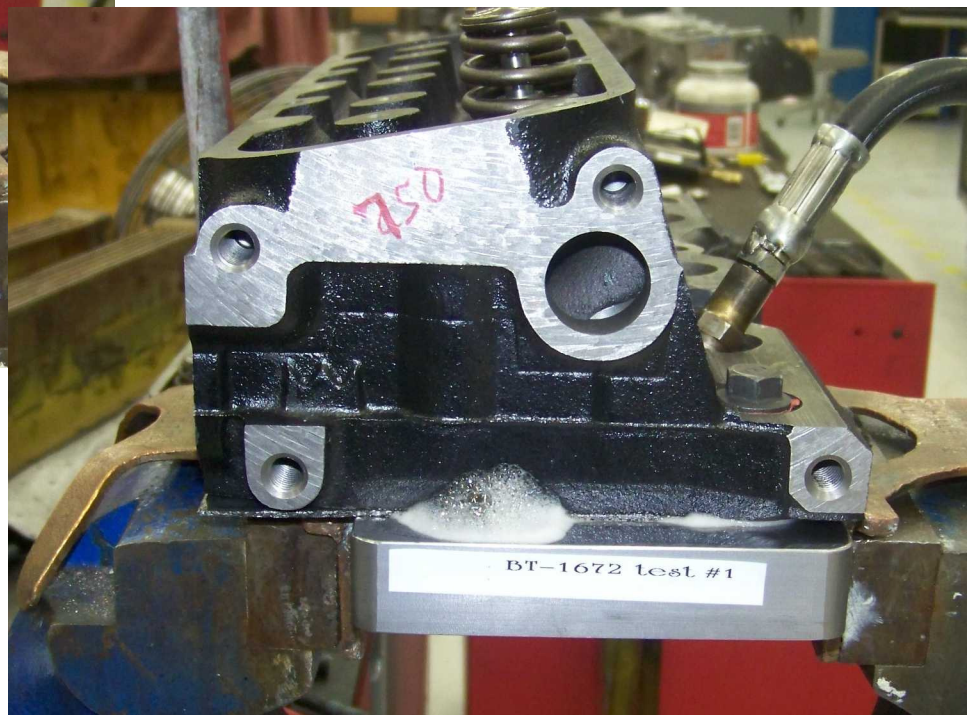


Test #4 – Base line with Smooth Surface

Test # 1 Leakage



Pressurized with 250psi static nitrogen



750 psi

Test # 4 Leakage

Pressurized with 500 psi static nitrogen

750 psi

Conclusions

- Unfortunately, both samples exhibited nitrogen leakage
- The test with the scratch did not leak worse than the smooth surface
- The test pressure was applied by static nitrogen pressure compared to an oscillation of engine Pmax during operation
- There was no heat applied to settle the gasket system.
- There is no block spring rate influence

Attachment 7

Summary of Key Test Component Inventory

Sequence III Surveillance Panel

San Antonio, Texas

May 12, 2010

D. Glaenzer, Sequence III SP Chairman

Key Test Components

- 12593374 Connecting Rods
- 24502168 Crankshaft
- 24502286 Cylinder Case (Block)
- 24502260B Cylinder Head

- Inventory at GM Racing and Test Labs

Component Inventory

- 12593374 Connecting Rods
  - GM Racing 21,758 pieces
  - Labs 1172 pieces
  - Total 22,930 pieces (**3821** runs)

    Based on 6 pieces per run

- 24502168 Crankshaft
  - GM Racing 584 pieces
  - Labs 50 pieces
  - Total 634 pieces (**3804** runs)

    Based on 6 runs per crankshaft

Component Inventory (cont.)

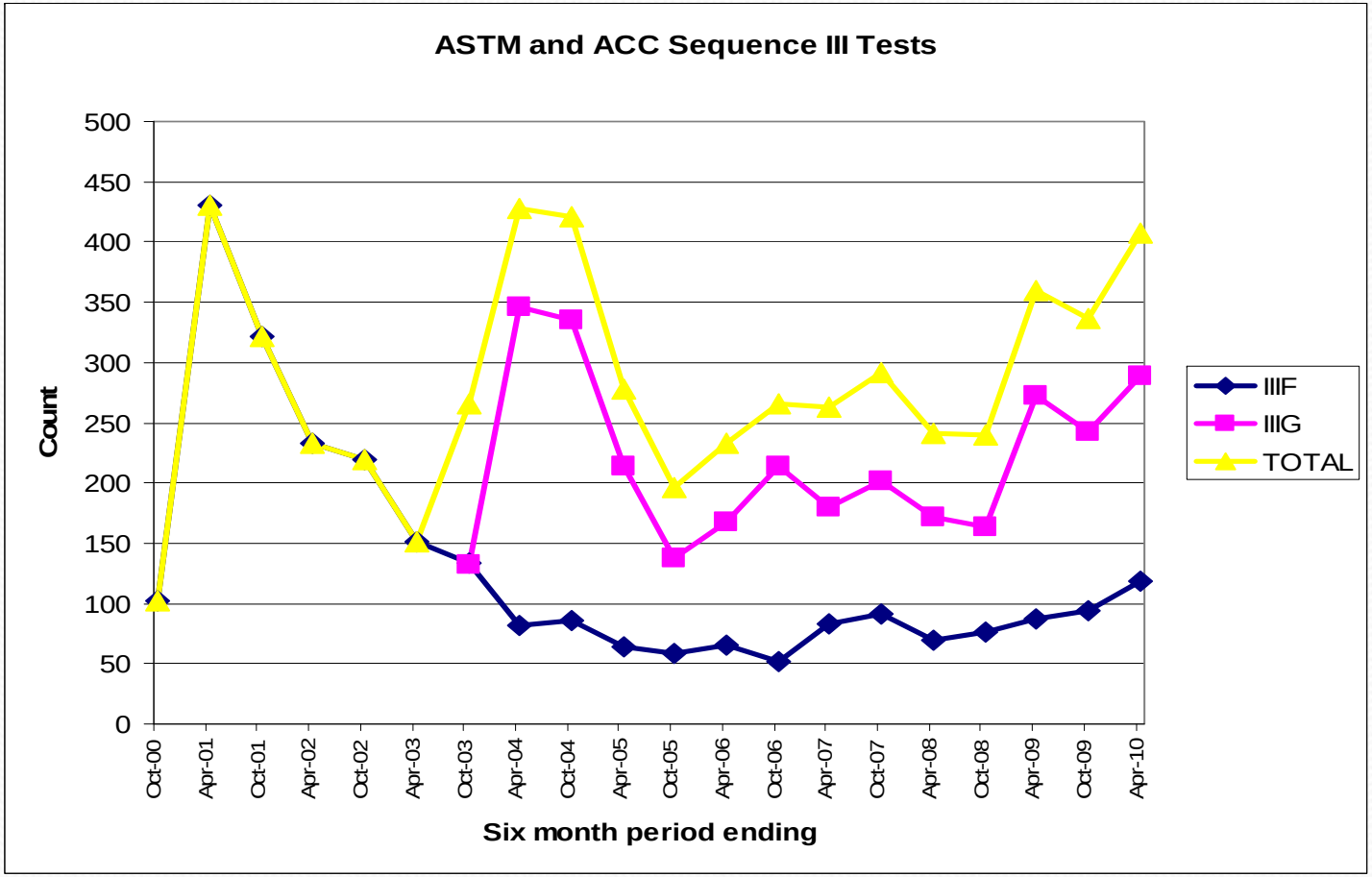
- 24502286 Cylinder Case (Block)
  - GM Racing 570 pieces
  - Labs 36 pieces
  - Total 606 pieces (**3636** runs)

    Based on 6 runs per block

- 24502260B Cylinder Head
  - GM Racing 6200 pieces
  - Labs 555 pieces
  - Total 6755 pieces (**3377** runs)

    Based on 2 heads per run

Sequence III Test Activity



Sequence III Test Longevity

With ~4000 runs available, we should be OK through 2015.

Estimates

2010	1000	consumed ~450 in 6 months
2011	800	
2012	600	
2013	500	
2014	500	
2015	400	
TOTAL	3800	

Attachment 8

PRODUCT INFORMATION

Haltermann PRODUCTS

T (281) 457-2768 F (281) 457-1469

PRODUCT: **EEE-Lube Cert Gasoline Seq. III & VI**

PRODUCT CODE: **HF0003**

Batch No.:	YB0821LT10	YB0821LT10	XL3121LT10	XL3121LT10	XL1421LT10	XL1421LT10	XK3021LT10	XK2421LT10	XH3121LT10
TMO No.:	MTS	MTS	MTS	MTS	MTS	MTS	MTS	MTS	MTS
Tank No.:	110	110	110	110	110	110	110	110	110
Analysis Date:	4/13/2010	3/22/2010	3/4/2010	2/12/2010	1/26/2010	12/24/2009	12/15/2009	11/25/2009	10/22/2009
Batch Size:	37,216	58,901	37,000	64,902	65,301	38,004	48,001	74,902	44,001

TEST	METHOD	UNITS	HALTERMANN Specs			RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS
			MIN	TARGET	MAX									
Distillation - IBP	ASTM D86	°C	23.9		35.0	30.5	30.5	31.1	31.1	30.3	30.3	31.4	31.4	31.5
5%		°C				44.0	44.0	44.8	44.8	43.3	43.3	44.1	44.1	45.3
10%		°C	48.9		57.2	51.9	51.9	52.0	52.0	51.0	51.0	51.3	51.3	53.1
20%		°C				64.0	64.0	63.6	63.6	63.0	63.0	62.8	62.8	64.6
30%		°C				77.1	77.1	76.8	76.8	76.3	76.3	76.0	76.0	77.5
40%		°C				92.9	92.9	92.8	92.8	93.1	93.1	92.6	92.6	92.8
50%		°C	93.3		110.0	104.9	104.9	105.3	105.3	105.9	105.9	104.9	104.9	104.9
60%		°C				111.7	111.7	112.1	112.1	112.4	112.4	111.7	111.7	112.7
70%		°C				117.9	117.9	118.8	118.8	119.0	119.0	118.2	118.2	119.7
80%		°C				129.2	129.2	130.2	130.2	130.5	130.5	130.8	130.8	131.8
90%		°C	151.7		162.8	157.8	157.8	158.9	158.9	158.4	158.4	160.2	160.2	159.1
95%		°C				170.3	170.3	168.7	168.7	167.6	167.6	169.6	169.6	167.2
Distillation - EP		°C			212.8	203.3	203.3	198.6	198.6	197.5	197.5	199.3	199.3	191.6
Recovery		vol %		Report		97.2	97.2	97.6	97.6	97.3	97.3	97.3	97.3	96.9
Residue		vol %		Report		1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0
Loss		vol %		Report		1.7	1.7	1.3	1.3	1.6	1.6	1.6	1.6	2.1
Gravity @ 60°F/60°F	ASTM D4052	°API	58.7		61.2	59.1	59.5	59.2	59.2	59.2	59.4	59.4	59.4	59.0
Density @ 15° C	ASTM D4052	kg/l	0.734		0.744	0.742	0.741	0.742	0.742	0.742	0.741	0.741	0.741	0.742
Reid Vapor Pressure	ASTM D323	psi	8.7		9.2									
Reid Vapor Pressure	ASTM D5191	kPa	60.1		63.4	63.0	63.4	62.8	63.4	62.5	62.4	60.3	60.8	63.2
Carbon	ASTM D3343	wt fraction		Report		0.8647	0.8647	0.8647	0.8647	0.8647	0.8645	0.8648	0.8648	0.8648
Carbon	ASTM E191	wt fraction		Report		0.8604	0.8604	0.8637	0.8637	0.8606	0.8606	0.8618	0.8618	0.8636
Hydrogen	ASTM E191	wt fraction		Report		0.1357	0.1357	0.1314	0.1314	0.1351	0.1351	0.1366	0.1366	0.1319
Hydrogen/Carbon ratio	ASTM E191	mole/mole		Report		1.879	1.879	1.813	1.813	1.870	1.870	1.888	1.888	1.819
Oxygen	ASTM D4815	wt %			0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sulfur	ASTM D5453	mg/kg	3		15	5	5	3	3	3	3	3	3	3
Sulfur	ASTM D2622	wt%		Report		0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Lead	ASTM D3237	mg/l			2.6	<1.0	<1.0	<1.0	<1.0	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorous	ASTM D3231	mg/l			1.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Composition, aromatics	ASTM D1319	vol %	26.0		32.5	27.7	27.7	27.8	27.8	27.7	27.7	28.3	28.3	27.8
Composition, olefins	ASTM D1319	vol %			10.0	1.1	1.1	1.1	1.1	0.5	0.5	0.5	0.5	1.0
Composition, saturates	ASTM D1319	vol %		Report		71.2	71.2	71.1	71.1	71.8	71.8	71.2	71.2	71.2
Particulate matter	ASTM D5452	mg/l			1	0.85	1	1	1	0.55	0.55	0.5	0.5	0.5
Oxidation Stability	ASTM D525	minutes	1000			1000+	1000+	1000+	1000+	1000+	1000+	1000+	1000+	1000+
Copper Corrosion	ASTM D130				1	1a	1a	1a	1a	1a	1a	1a	1a	1a
Gum content, washed	ASTM D381	mg/100mls			5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fuel Economy Numerator/C Density	ASTM E191		2401		2441	2422	2423	2433	2433	2423	2420	2417	2417	2434
C Factor	ASTM E191			Report		0.9975	0.9975	1.0054	1.0054	1.0012	1.0007	1.0008	1.0008	0.9969
Research Octane Number	ASTM D2699		96.0			96.8	96.8	97.4	97.4	97.2	97.2	96.5	96.5	96.9
Motor Octane Number	ASTM D2700			Report		88.5	88.5	88.9	88.9	88.5	88.5	88.2	88.2	88.0
Sensitivity			7.5			8.3	8.3	8.5	8.5	8.7	8.7	8.3	8.3	8.9
Net Heating Value, btu/lb	ASTM D3338	btu/lb		Report		18489	18497	18490	18490	18491	18494	18486	18486	18489
Net Heating Value, btu/lb	ASTM D240	btu/lb		Report		18439	18439	18311	18311	18329	18329	18372	18372	18577
Color	VISUAL	1.75 ptb		Red		Red	Red	Red	Red	Red	Red	Red	Red	Red

Attachment 9

Sequence IIIG Update

May 12, 2010

A Program of ASTM International

Test Monitoring Center

Carnegie Mellon University
6555 Penn Avenue, Pittsburgh, PA 15206, USA

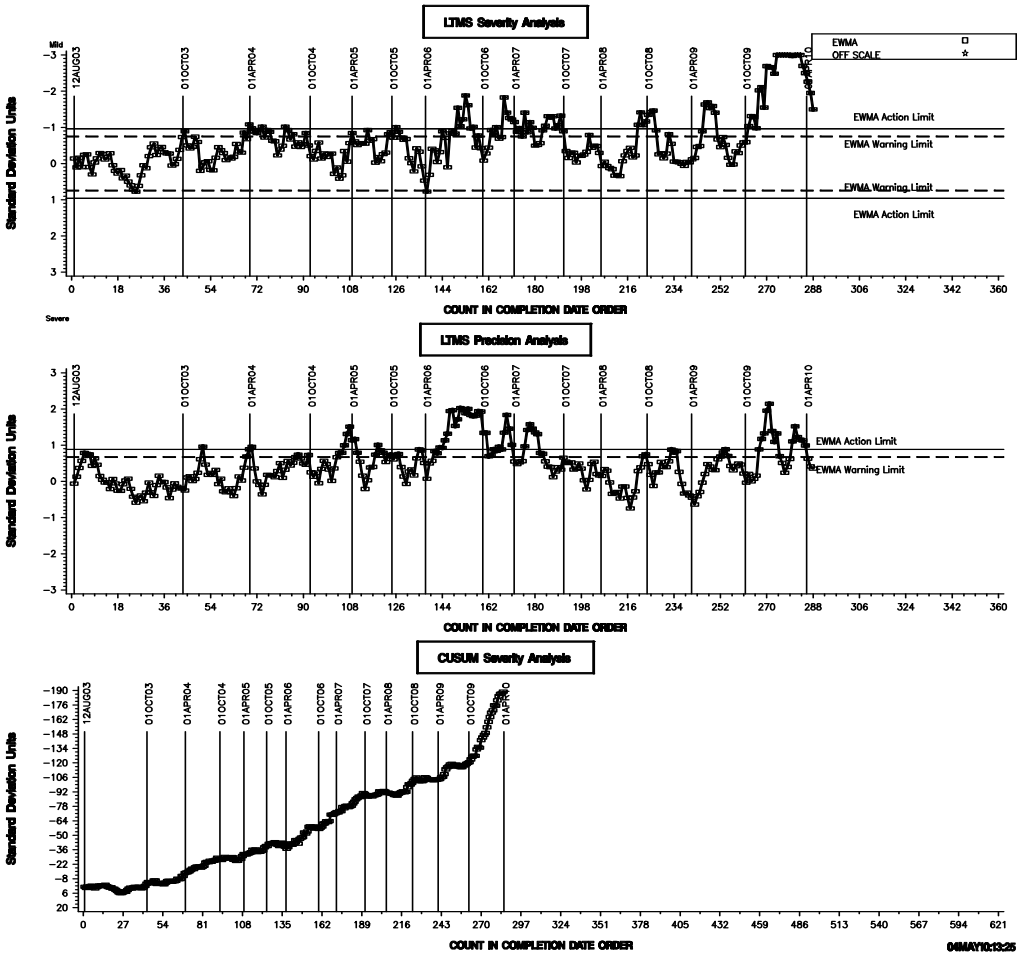
http://astmtmc.cmu.edu
412-365-1000

IIIG

- ACLW in severity action alarm (mild), in control for precision.
- PVIS on or near target and in control for severity and precision.
- WPD in control for severity and precision, trending severe.
- MRV (IIIGA) No significant trends
- Phos trending severe, in severe warning alarm

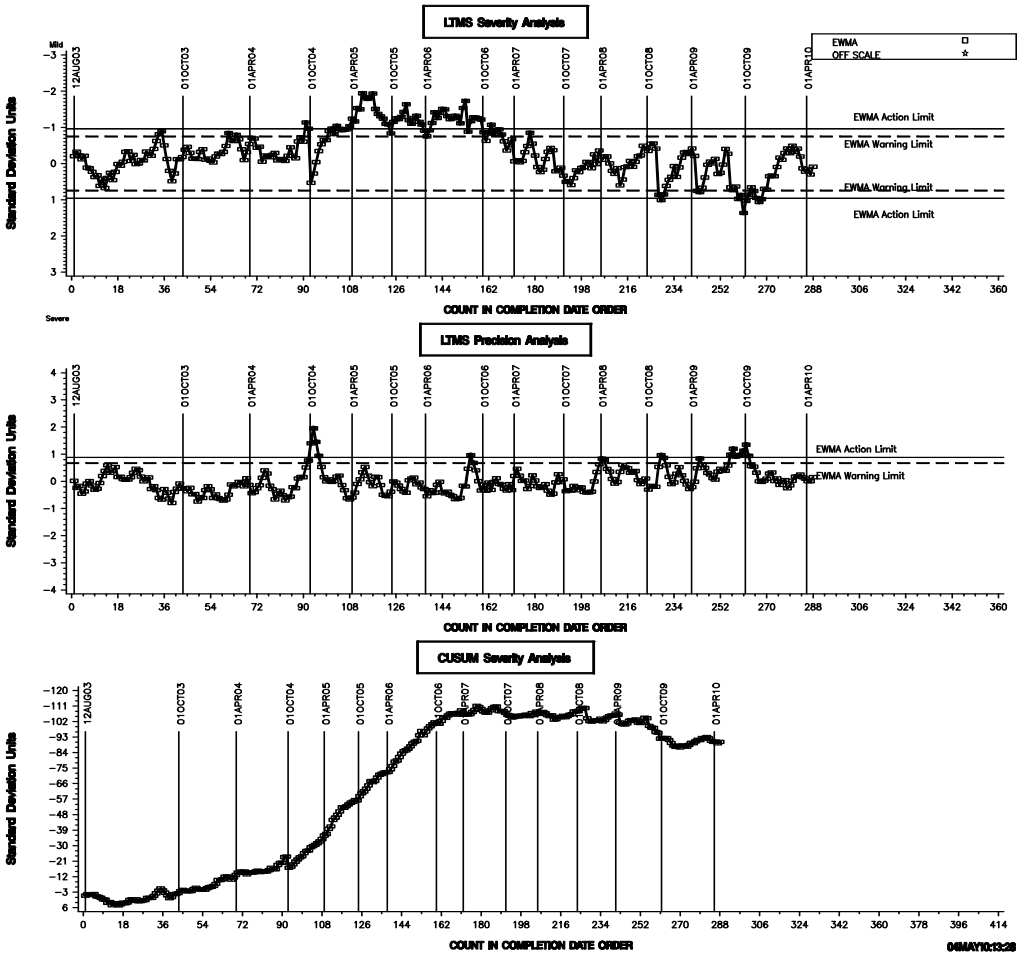
SEQUENCE IIIG INDUSTRY OPERATIONALLY VALID DATA

AVERAGE CAM + LIFTER WEAR



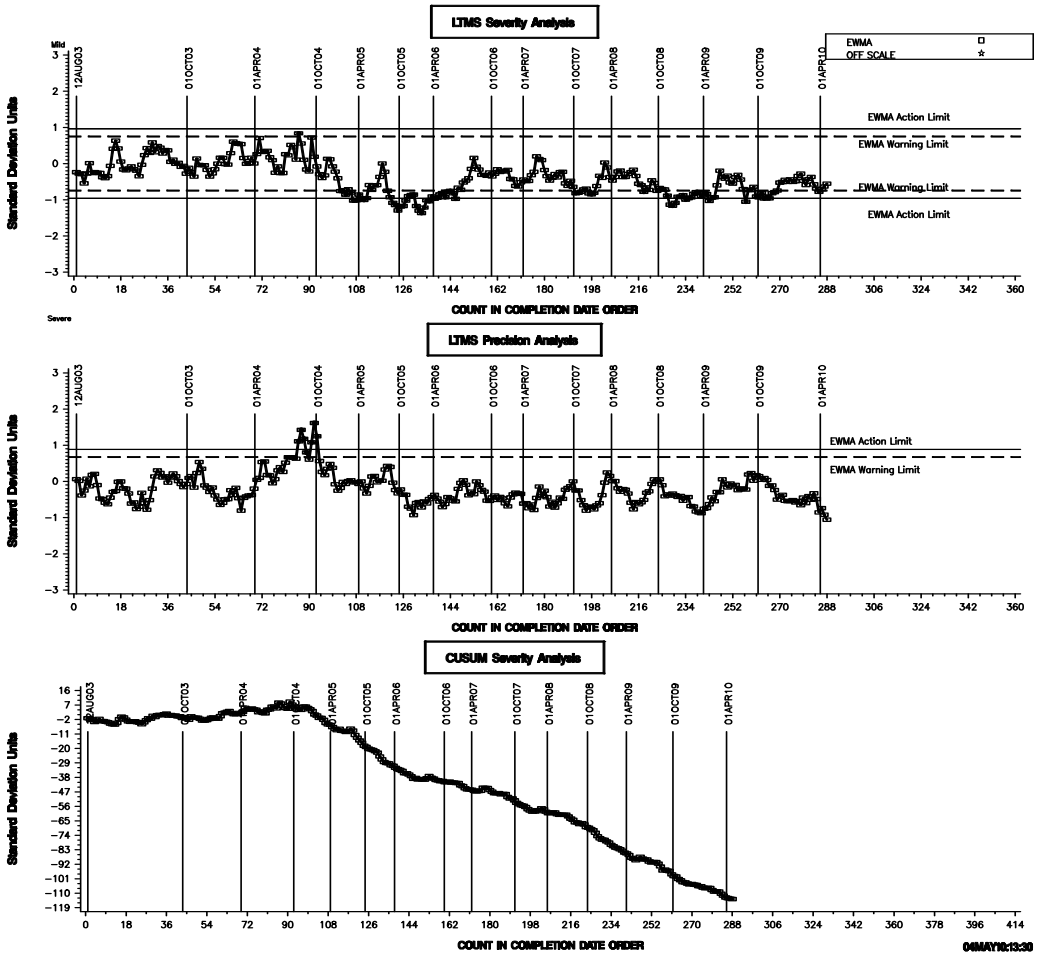
SEQUENCE IIIG INDUSTRY OPERATIONALLY VALID DATA

VISCOSITY INCREASE



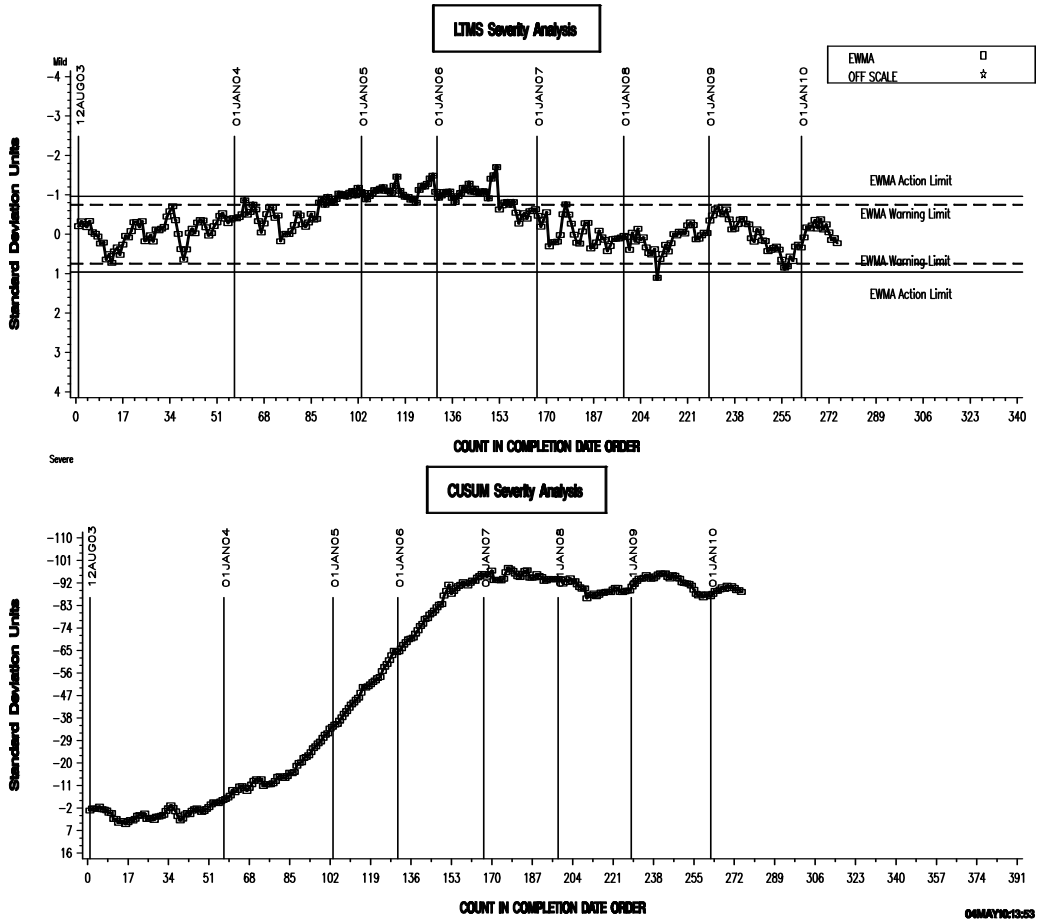
SEQUENCE IIIG INDUSTRY OPERATIONALLY VALID DATA

AVERAGE WEIGHTED PISTON DEPOSITS



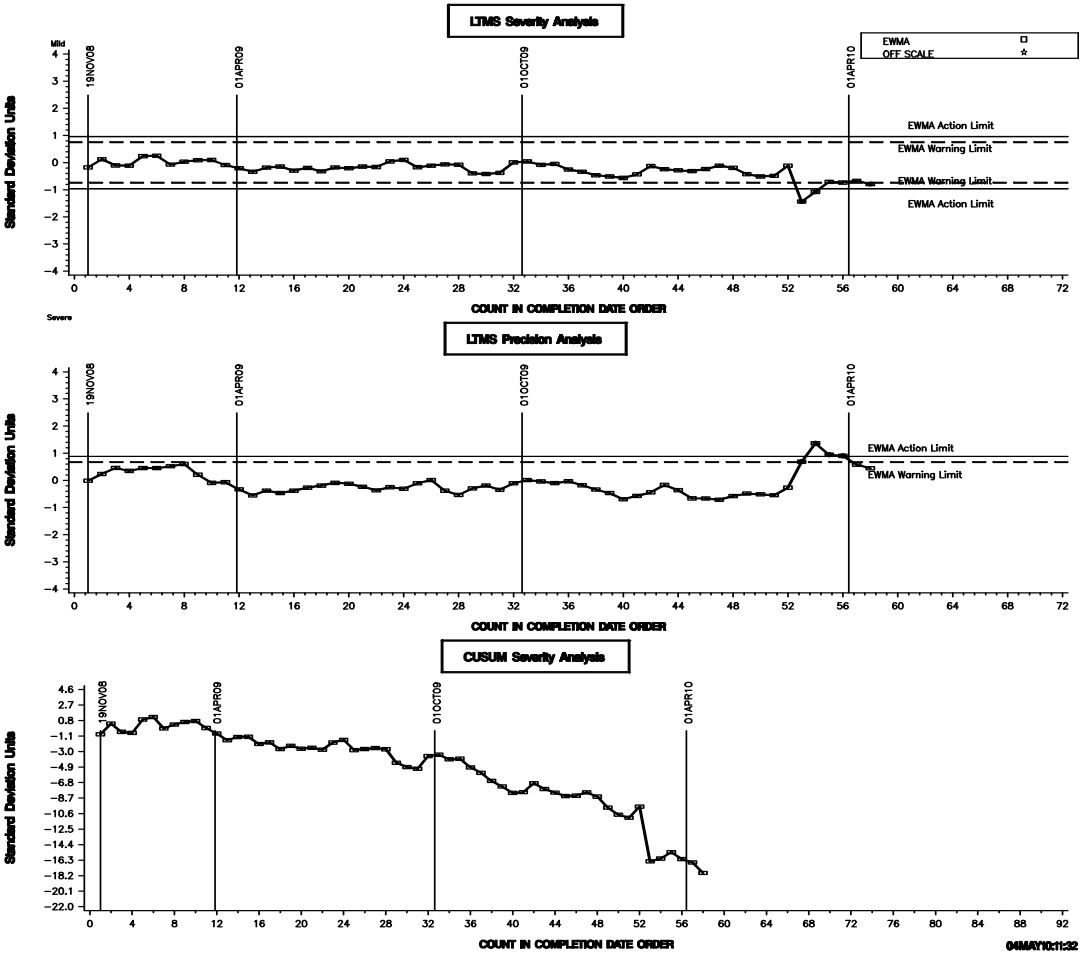
SEQUENCE IIIGA INDUSTRY OPERATIONALLY VALID DATA

MRV VISCOSITY RESULT



SEQUENCE IIIGB INDUSTRY OPERATIONALLY VALID DATA

PHOS RETENTION

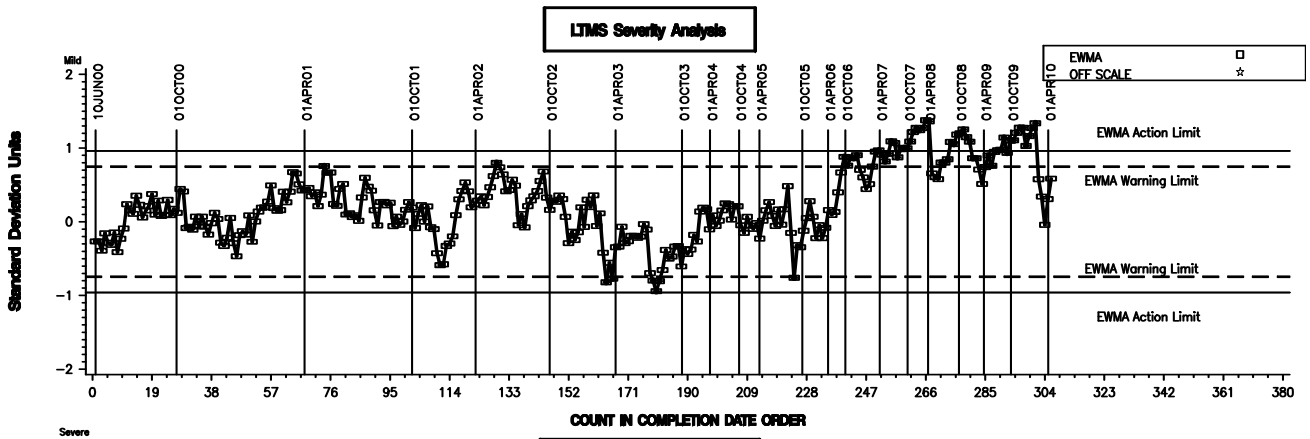


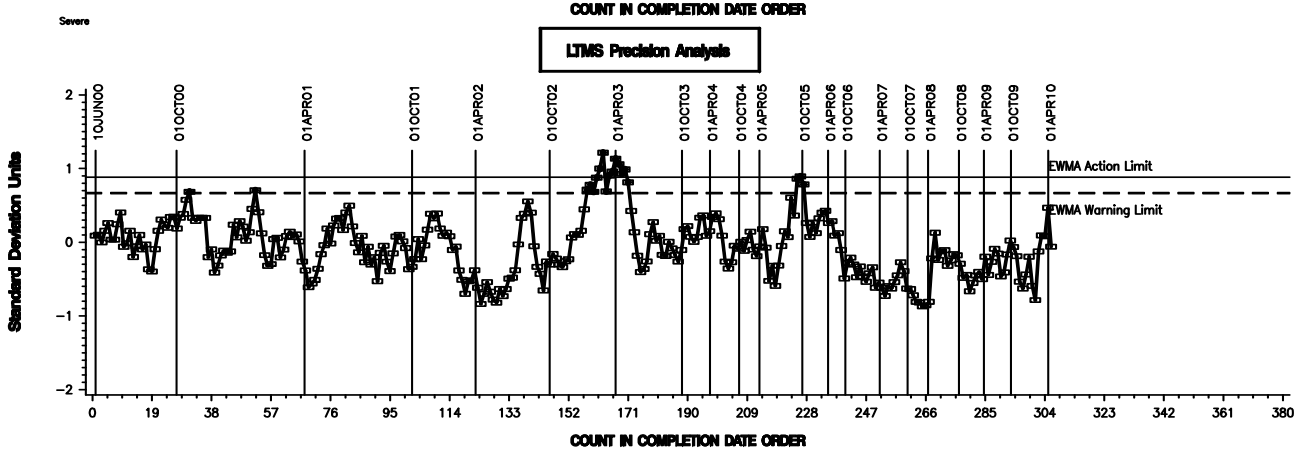
IIIF

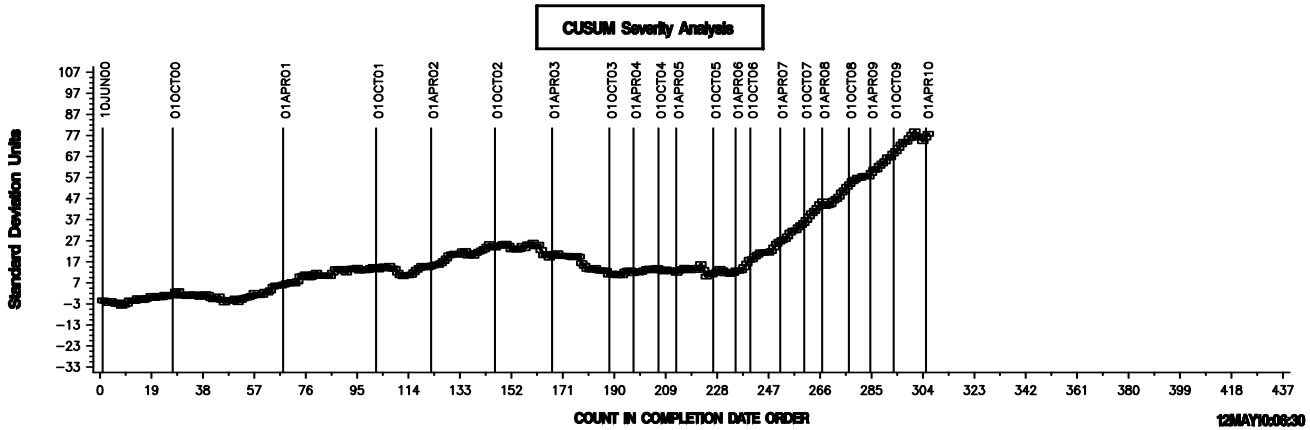
- APV in control severity and precision.
- Vis increase in control for severity and precision, trending severe
- WPD in control for severity and precision, trending severe
- Pvis@60 h in control for severity and precision

SEQUENCE IIIF INDUSTRY OPERATIONALLY VALID DATA

AVERAGE PISTON SKIRT VARNISH FINAL ORIG UNIT RES

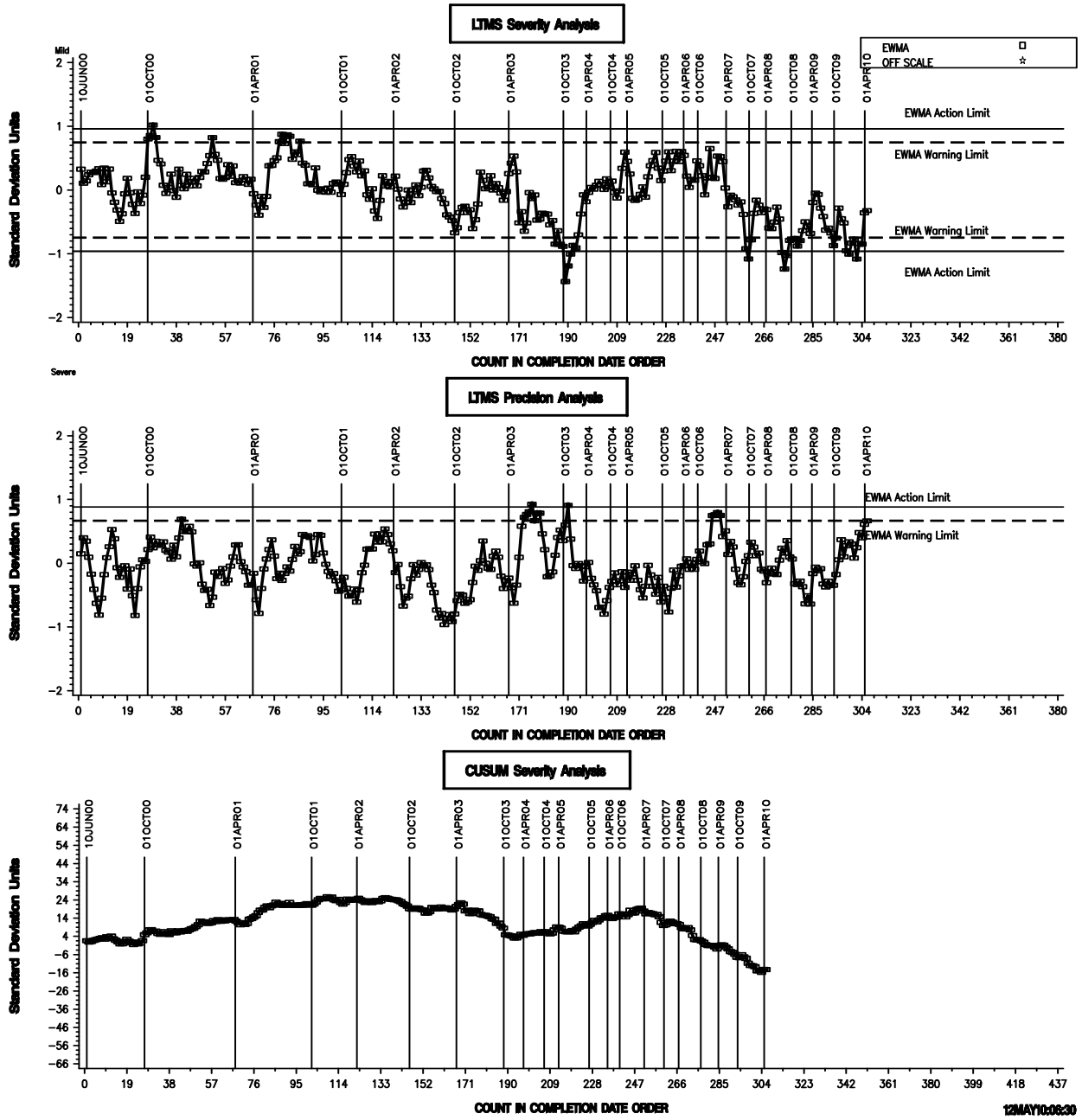






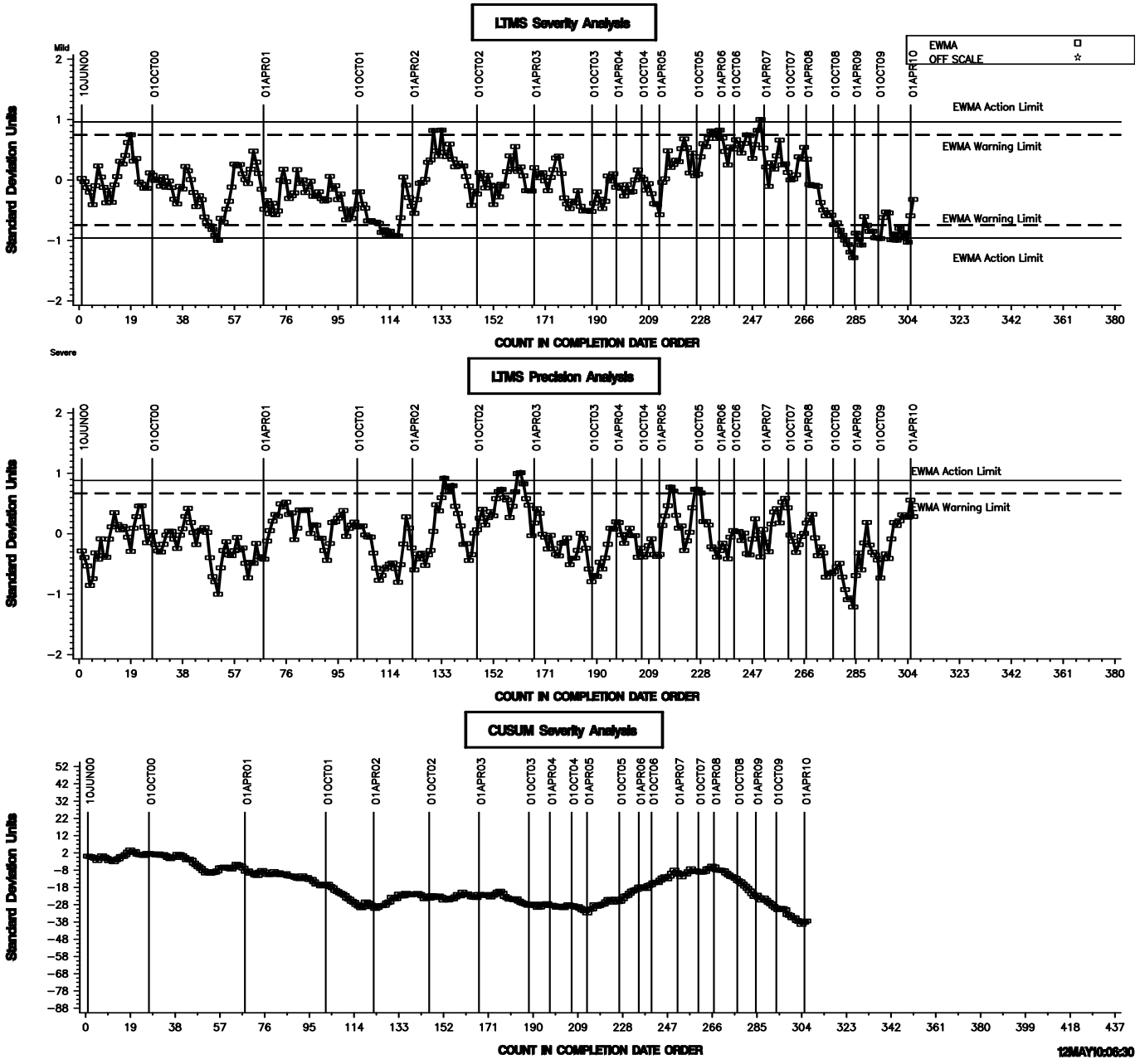
SEQUENCE IIIF INDUSTRY OPERATIONALLY VALID DATA

% VISCOSITY INCREASE



SEQUENCE IIIF INDUSTRY OPERATIONALLY VALID DATA

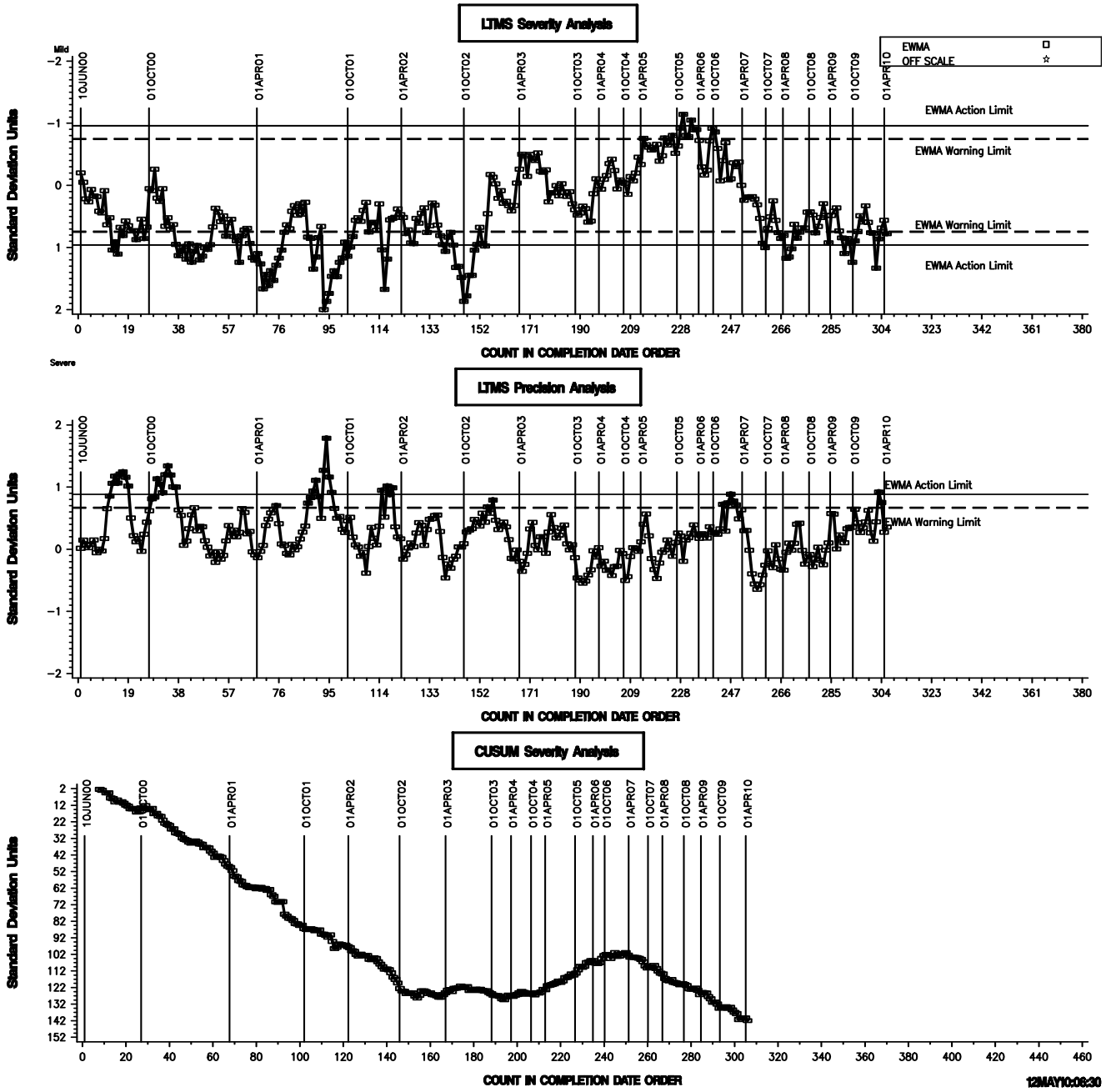
AVERAGE WEIGHTED PISTON DEPOSITS FNL ORIG UNIT RES



12MAY10:06:30

SEQUENCE IIIF INDUSTRY OPERATIONALLY VALID DATA

% VISCOSITY INCREASE @ 060 HOURS



Other Items

- Quarterly fuel analysis reported from all labs for 1st qtr of 09.
- One lab high RVP, low on gravity and RVP
- Two labs slightly low on RVP
- Reruns requested from labs (See IL 08-02)
- No other anomolies noted.

Attachment 10

Report of the Sequence III Cam and Lifter Wear Task Force

Background

The Sequence III Surveillance Panel held a teleconference February 5th to address the mild trend for ACLW. Prior to this call the industry statisticians held one and no firm solution was recommended. During the SP meeting the following motion was made:

Effective Feb. 5, 2010, suspend ACLW lower limit shewhart severity criteria for reference test acceptability, for reference tests completed after Jan. 1, 2010, continuing ACLW SAs as currently implemented. This will continue for a period of 60 days.

An item of discussion prior to the vote was :

Dwight Bowden asked what the action plan going forward would be. Dave Glaenzer will form a task force to continue investigating the mild trend. The 60 day sunset period was included to keep the panel's motivation at a high level. Once discussion concluded, the motion was called.

The motion passed 11-0-1. There was also unanimous consent to waive the two-week waiting period.

Charlie Leverett volunteered to chair the task force and the first conference call was held February 11th.

Task Force Scope & Objectives

Scope

The Sequence IIIG Surveillance Panel held a conference call February 5, 2010 to discuss the mild average cam and lifter wear (ACLW) trend occurring in this test type on reference oils. During this call a motion was made and passed to suspend ACLW lower limit criterion for reference test acceptability (Shewhart Severity Criteria) for reference tests, but continue ACLW severity adjustment (lab EWMA Severity) as currently implemented. This motion was determined to be a temporary measure for a time period no longer than 60 days to allow a Task Force to review the occurrence and try to establish a root cause and forward a recommendation to the Surveillance Panel to resolve the issue prior to April 6, 2010.

Objective

Review reference & candidate test data in an attempt to determine the root cause for the current mild ACLW trend in the Sequence IIIG.

Membership of this Tank Force included:

Bruce Matthews & Matt Snider GM
Dave Glaenzer & Ed Altman - Afton
Greg Seman & Jerry Brys - Lubrizol
Pat Lang & Sid Clark - SwRI
Dwight, Jason, Matthew & Adam Bowden - OHT
Rich Grundza - TMC
Bob Olree & Charlie Leverett (Task Force Leader) – Intertek
Mark Mosher & Bill Maxwell - ExxonMobil
Tim Caudill – Ashland

Action Items cover in this task force:

Action Item 1: Labs to review retained EOT camshafts for changes wear track location. **Conclusion: Most reported no change over time and one lab noted that they had seen an occurrence where the wear pattern was on the low side of the lobe**.

Action Item 2: OHT to determine availability of old lifter material for analysis of dimensions and hardness. **Conclusion: All material was in the specified range.**

Action Item 3: Lubrizol to check hardness of retained EOT lifters and review initial height measurements taken prior to use in engine testing. **Conclusion: the Lubrizol measurements showed the hardness to be out on the low side, OHT returned these parts to their vendor and they were in the specified range once measured in the same manner as normal done for quality control.**

Action Item 4: Bruce Matthews/GM to review block data for any shifts. **Conclusion: Bruce and Matt reviewed blocks produced in 2006 and compared to blocks produced in 2009 and did not find any deviations.**

Action Item 5: Labs to review camshaft end play data. **Conclusion: Range is 0.015-0.03 within the industry.**

Action Item 6: Labs to document camshaft handling procedures from time of receipt to installation into test engine. **Conclusion: Most were similar but the TF agreed we should come up with a better procedure.**

Action Item 7: TMC to review reference oil viscosity data for any shifts. **Conclusion: the viscosity on 434 and 434-1 differ by 1.83 cst @ 40 C and on 435 vis. 435-1 3.13 cst @ 40 C. *This difference is also being looked at by the ROBO panel. This difference needs further discussion at the SP level.***

Action Item 8: Determine when solvent change occurred **Conclusion: This was done in 2005 so it is not considered a possible cause.**

Action Item 9: Conduct a measurement round robin on one new IIIG test camshaft and a set of test lifters. Following the completion of this exercise this group decided it would also be a notable to do a post test measurement, Lubrizol agreed to run this hardware in their next reference. **Conclusion: There is a summary of the pre and post test measurements shown in Attachment #1. This group believes the results are within the repeatability of these measurements.**

Action Item 10: Labs to review candidate data. This exercise was setup for labs to determine their prospective of the cam severity by the batch code using reference and non reference test results. **Conclusion: Afton, Lubrizol and Intertek had similar results but these were not in and acceptable statistical analysis by the whole group.**

Action Item 11: Lifter radius was reviewed, OHT send an audit set to their vendor and once returned to Intertek. SwRI and Intertek also did some random samples. **Conclusion: All hardware measured by all the above parties was in the specified range.**

Action Item 12: Phosphate coating review **Conclusion: GM, Intertek and Afton reported on their findings in this review along with OHT. The OHT response was:**

Full analysis and review of process controls and camshaft sample material, including magnified images of material provided by General Motors, and was conducted at both the vendor and chemical supplier. These analyses confirmed the parts meet specifications. No change has occurred in either the phosphate process or materials. Visual differences of the phosphate coating do occur and are a function of the inherent variability in the process and underlying camshaft metallurgy

Conclusion of this task force is:

We believe we have done a detailed study of the current mild severity trend but have not determined a root cause, our recommendations going forward are shown below.

Recommendation from the Cam and Lifter Wear Task Force

1.) Continue with the current motion below until the May 2010 SP meeting, recent data indicated the trend is not as mild at this time;

Suspend ACLW lower limit shewhart severity criteria for reference test acceptability, for reference tests completed after Jan. 1, 2010, continuing ACLW SAs as currently implemented. This will continue until the May SP meeting at which time the SP can discuss.

2.) Camshaft handling procedures – TBD by this task force, we will present this at the May SP meeting.

3.) Request TMC to review cam and lifter measurements on their annual Lab visits to determine if anything being done is different within the Industry.

Attachment 10a

Re: Sequence III Surveillance Panel Meeting Minutes, ACLW Task Force Report

Jeff,

I wish to amend the minutes to reflect my comments with regards to materials, specifications and processes employed in the manufacture of camshafts and lifters. Specifically, none have changed prior to, during or after the mild severity trend. Therefore, it is OH Technologies position that the wear performance trend is independent of these components.

To support this position, Jason Bowden made reference to Test Numbers 73443, 74084, 74310, and 74311 generated significantly different wear results although the camshafts were of the same pour code and phosphate batch.

Attachment 11

Potential GF-5 Reference Oil Test Data

Test Method	Parameter	Unit	Limit			Test Result	
						5W-20	5W-30
Sequence VIII - D6709	10 h Stripped Viscosity	cSt	stay in grade			VGRA	9.7
	Total Bearing Weight Loss	mg	26 max.				20
Sequence IIIGB - D7320	Phosphorus Retention	%	79			VGRA	88
Sequence IVA - D6891	Average Cam Wear	µm	90 max.			VGRA	6
Sequence VID - D7589			XW20	XW30	10W30		
	FEI Sum	%	2.6	1.9	1.5 min	2.7	N/A
	FEI2	%	1.2	0.9	0.6 min	1.3	N/A
Sequence IIIG - D7320	Kinematic Viscosity Increase @40 °C	%	150 max.			VGRA	66
	Average Piston Skirt Varnish	merits	report				9.5
	Weighted Piston Deposits	merits	4.0 min				4.4
	Avg. Cam and Lifter Wear	µm	60 max.				24
	Hot Stuck Rings		None				none
	Oil Consumption	Liters	Report				3.5
Sequence VG - D6593	Average Engine Sludge	merits	8.0 min.			VGRA	9.1
	Rocker Cover Sludge	merits	8.3 min.				9.4
	Average Piston Skirt Varnish	merits	7.5 min.				8.1
	Average Engine Varnish	merits	8.9 min.				9.0
	Oil Screen Sludge	%	15 max.				2
	Hot Stuck Compression Rings		none				none
	Cold Stuck Rings		report				1
	Oil Screen Debris	%	report				20
	Oil Ring Clogging	%	report				0
	Average Follower Pin Wear	µm	30 max. (Ford spec)				3.9
	Average Ring Gap Increase	µm	225 max. (Ford spec)				76
Ball Rust Test - D6557	Average Gray Value		100 min.			VGRA	131

Attachment 12

Ford Motor Company
Ford Customer Service Division
Service Engineering Office

Diagnostic Service Center II
1800 Fairlane Drive
Allen Park, mi. 48101

May 6, 2010

Thom Smith
PCEOCP Chairman
The Valvoline Company
P.O. Box 14000 VL-2
Lexington, Ky. 40512-4001

Dear Thom,

At the last PCEOCP meeting the group requested the submission of a candidate for a GF-5 reference oil that met at least the Sequence VID and Sequence IIIG ILSAC GF-5 limits. I'd like to submit the attached data from a candidate oil for consideration. This is an SAE 5W-20 oil that passes both the Sequence IIIG and VID and most of the other GF-5 tests. This oil doesn't meet the emulsion retention requirements of ILSAC GF-5. The test data provided are single tests, but we're confident in the data as we've run a number of tests on this DI chemistry with passing results on the Sequence VID, IIIG, VG, IVA, etc. The additional data is proprietary and can not be shared.

Please circulate this information to the PCEOCP members and Surveillance Panel chairs for consideration and discussion at the next meeting.

If you have any question please contact me.

Sincerely

Ron Romano
Service Lubricants Technical Expert

SAE 5W-20 GF-5 Reference Oil Candidate

Performance Requirements	Specification	Test Results
ASTM Ball Rust (ASTM D6557)		
Average Gray Value	100 min	124
Sequence IIIG		
Viscosity Increase at 40 °C	150% max	81
Weighted Piston Deposits	4.0 min	4.0
Hot Stuck Piston Rings	0	0
Cam Plus Lifter Wear, Average	60 μm max	12
Sequence IIIGA		
Aged oil CCS Viscosity at -30°C	Report	7200
MRV TP-1, cP	1 grade up max	11400@ -30°C
Yield Stress, Pa	<35 max	<35
Sequence IIIB		
Phosphorus Retention, %	79 min	85
Sequence IVA (ASTM D6891)		
Average Cam Wear (7 position average)	90 μm, max	18
Sequence VG (ASTM D6593)		
Average Engine Sludge	8.0 min	9.5
Rocker Arm Cover Sludge	8.3 min	9.6
Average Engine Varnish	8.9 min	9.1
Piston Skirt Varnish	7.5 min	8.1
Oil Screen Clogging	15% max	1
Hot Stuck Compression Rings	0	0
Cold Stuck Rings	Report	0
Sequence VID (ASTM D7589)		
SAE 5W-20		
FEI SUM *	2.6% min	2.79
FEI 2 at 100 Hours	1.2% min	1.41
* FEI SUM = FEI at 16 hours + FEI at 100 hours		
Sequence VIII (ASTM D6709)		
Bearing Weight Loss	26 mg, max	1
TEOST MHT-4 (ASTM D7097)		
Deposit Weight	35 mg, max	35
TEOST 33C (ASTM D6335)		
Deposit Weight	30 mg, max	15

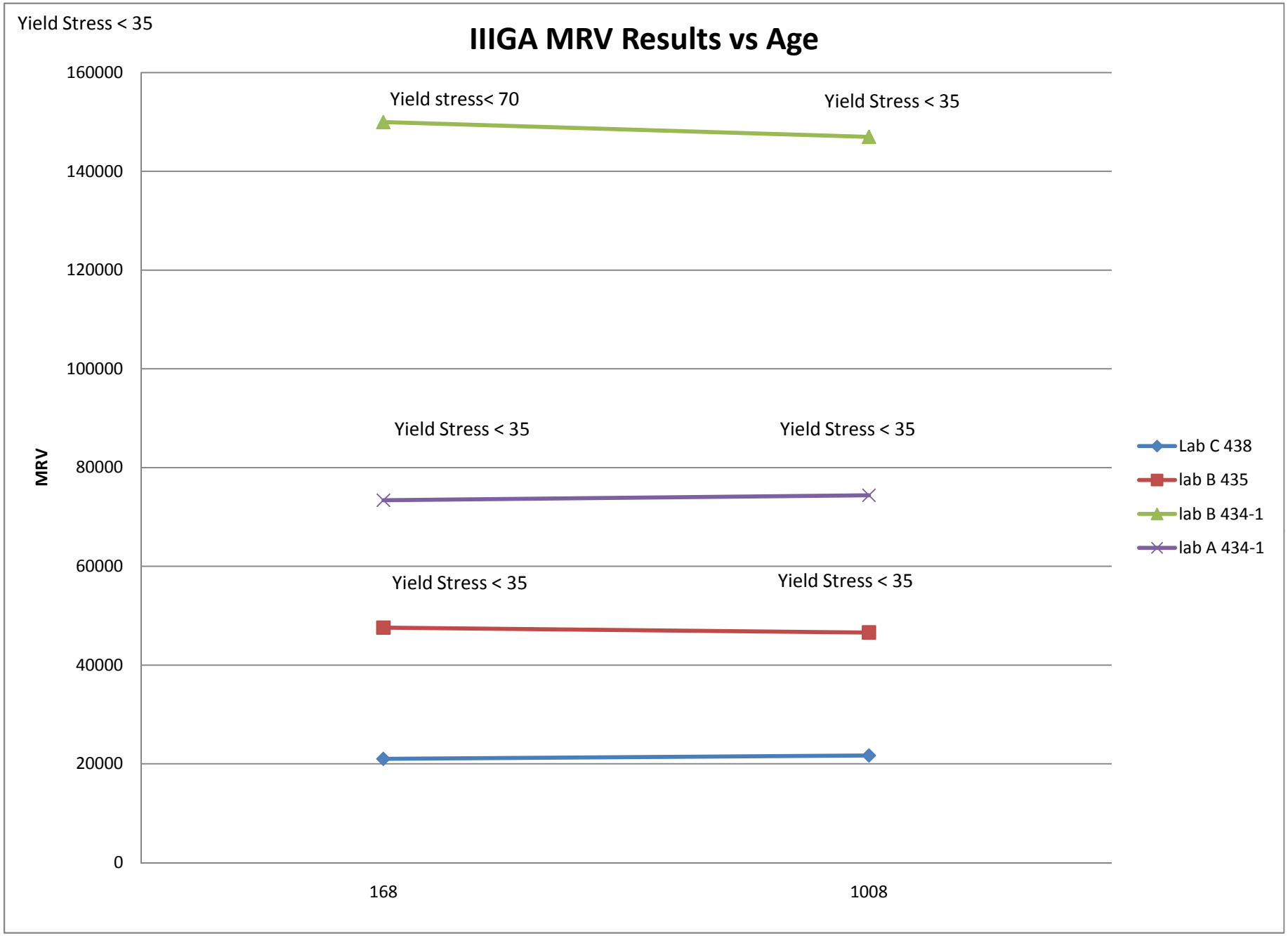
SAE 5W-20 GF-5 Reference Oil Candidate

Physical/Chemical Property Requirements	**Specification**	**Results**
Viscosity at 100 °C (ASTM D445), mm^2/s, 5W-20	5.6 - <9.3	8.3
Viscosity at -30 °C (ASTM D5293), mPa.s	6600 max	3500
Low Temp. Pumping Viscosity at -35°C, mPa.s	60,000 max	10,000
Volatility		
Evap. Loss, 1 hr at 250 °C (ASTM D5800), %	15.0 max	14
Dist. by GC at 371 °C (ASTM D6417), %	10.0 max	5
Gelation Index (ASTM D5133)	12.0 max	5
HTHS Viscosity, mPa-sec at 150 °C & 10^6 1/sec (ASTM D4741 or ASTM D4683)	2.6 min	2.6
Filterability with short heating (ASTM D6795), %	50 max	-26
Filterability with long heating (ASTM D6794), %	50 max	-10
Foaming (ASTM D892) (after 1 minute settling time for all foaming sequences)		
Sequence I, mL*	10/0 max	0/0
Sequence II, mL*	50/0 max	0/0
Sequence III, mL*	10/0 max	0/0
High Temperature Foaming (ASTM D6082), mL*	100/0 max	50/0
Phosphorus, (ASTM D4951), % mass	0.06 - 0.08	0.077
Sulfur, (ASTM D4951 or D5453), % mass	0.50 max	0.3
Emulsion Retention,(ASTM D7563)		
0°C, 24 hours	No water separation	Water separation
25°C, 24 hours	No water separation	Water separation
Homogeneity and Miscibility (ASTM D6922)	No Separation	No Separation
Elastomer Compatibility (ASTM D7216 ANNEX A2)		
a. Polyacrylate Rubber (ACM-1)		
Volume (ASTM D471), %Δ	-5, 9	0.51
Hardness (ASTM D2240), pts.	-10, 10	-2
Tensile Strength (D412), %Δ	-40, 40	-12.5
b. Hydrogenated Nitrile Rubber (HNBR-1)		
Volume (ASTM D471), %Δ	-5, 10	-1.79
Hardness (ASTM D2240), pts.	-10, 5	0
Tensile Strength (D412), %Δ	-20,15	10.1
c. Silicone Rubber (VMQ-1)		
Volume (ASTM D471), %Δ	-5, 40	22.98
Hardness (ASTM D2240), pts.	-30,10	-20
Tensile Strength (D412), %Δ	-50, 5	-45.5
d. Fluorocarbon Rubber (FKM-1)		
Volume (ASTM D471), %Δ	-2, 3	-0.52
Hardness (ASTM D2240), pts.	-6, 6	-1
Tensile Strength (D412), %Δ	-65, 10	-12.9
e. Ethylene Acrylic Rubber (AEM-1)		
Volume (ASTM D471), %Δ	-5, 30	14.47
Hardness (ASTM D2240), pts.	-20,10	-7
Tensile Strength (D412), %Δ	-30, 30	-4.4

Attachment 13

Sequence IIIGA (Test started within 168 hours after EOT)					Re-check					
Lab	IIIG Stand	EOT Date	(A) MRV @ -30°C	Yield Stress	(B) MRV @ -30°C	Yield Stress	Re-test Date	Days after EOT	Delta (B) - (A)	% Change
D	2		38905	< 35	36760	< 35	23-Feb-10	36	-2145	-5.5
D	1		36000	< 35	45138	< 35	26-Feb-10	73	9138	25.4
D	1		15933	< 35	15751	< 35	23-Feb-10	86	-182	-1.1
D	3		38281	< 35	40089	< 35	23-Feb-10	105	1808	4.7
D	2		20396	< 35	20609	< 35	23-Feb-10	114	213	1.0
D	1		51796	< 35	54264	< 35	23-Feb-10	164	2468	4.8

Attachment 14


Yield Stress < 35
IIIGA MRV Results vs Age
160000
140000
120000
100000
80000
60000
40000
20000
0
MRV
Yield stress< 70
Yield Stress < 35
Yield Stress < 35
Yield Stress < 35
Yield Stress < 35
Yield Stress < 35
168
1008
Lab C 438
lab B 435
lab B 434-1
lab A 434-1

Attachment 15

Attachment 16

IIIG LTMS V2 Review

LTMS V2 Review

- Data Summary:
  - Includes 285 Chartable reference oil results from all test laboratories
  - Most recent chartable reference oil result included in data set is March 22, 2010
  - Includes all ACLW data that is currently exhibiting a mild trend
  - All parameters (WPD, ACLW, & PVIS) are classified as “Primary”

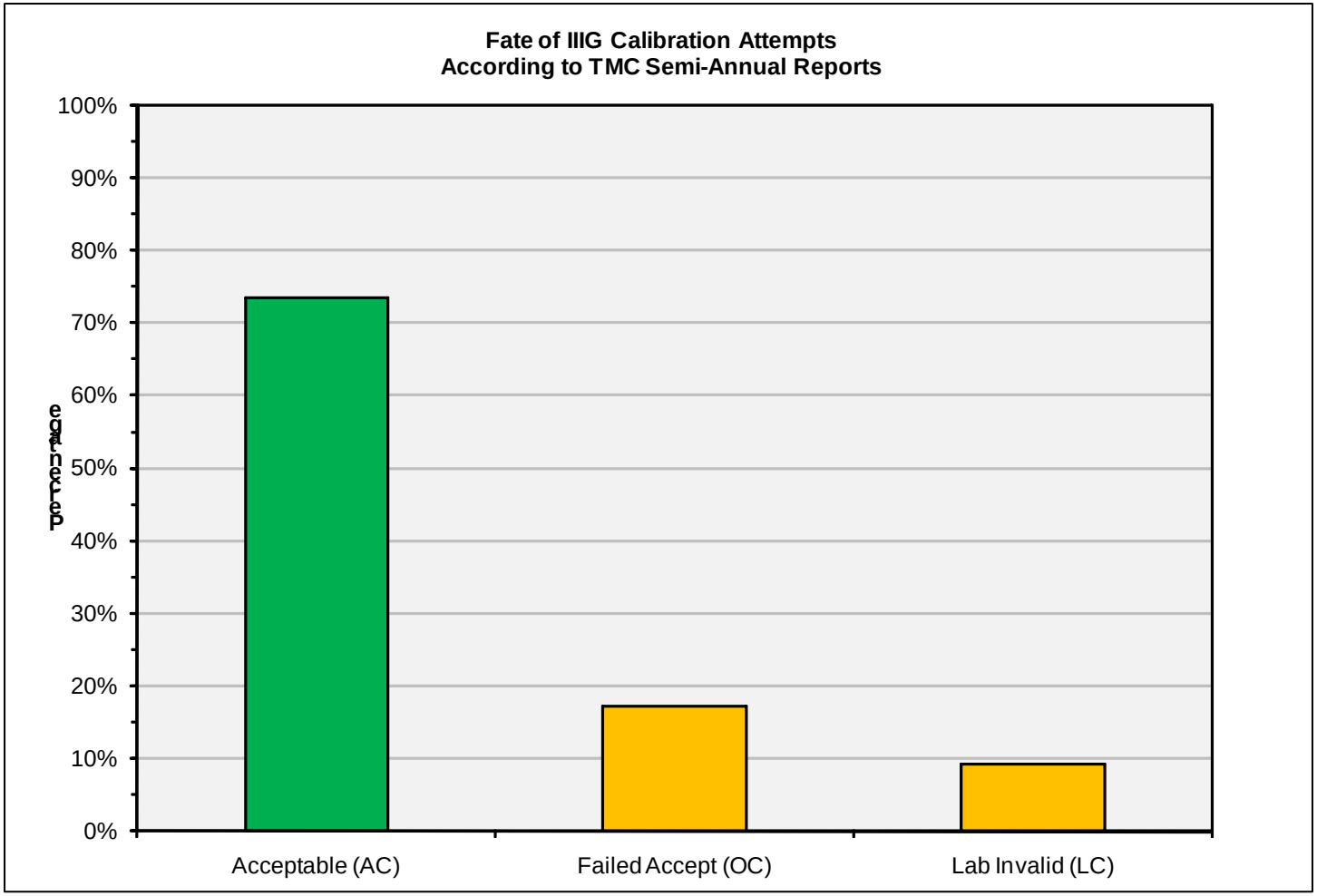
LTMS V2 Review

- Proposed Limits for IIIG LTMS v2 example:
  - Limits for e_i & z_i:

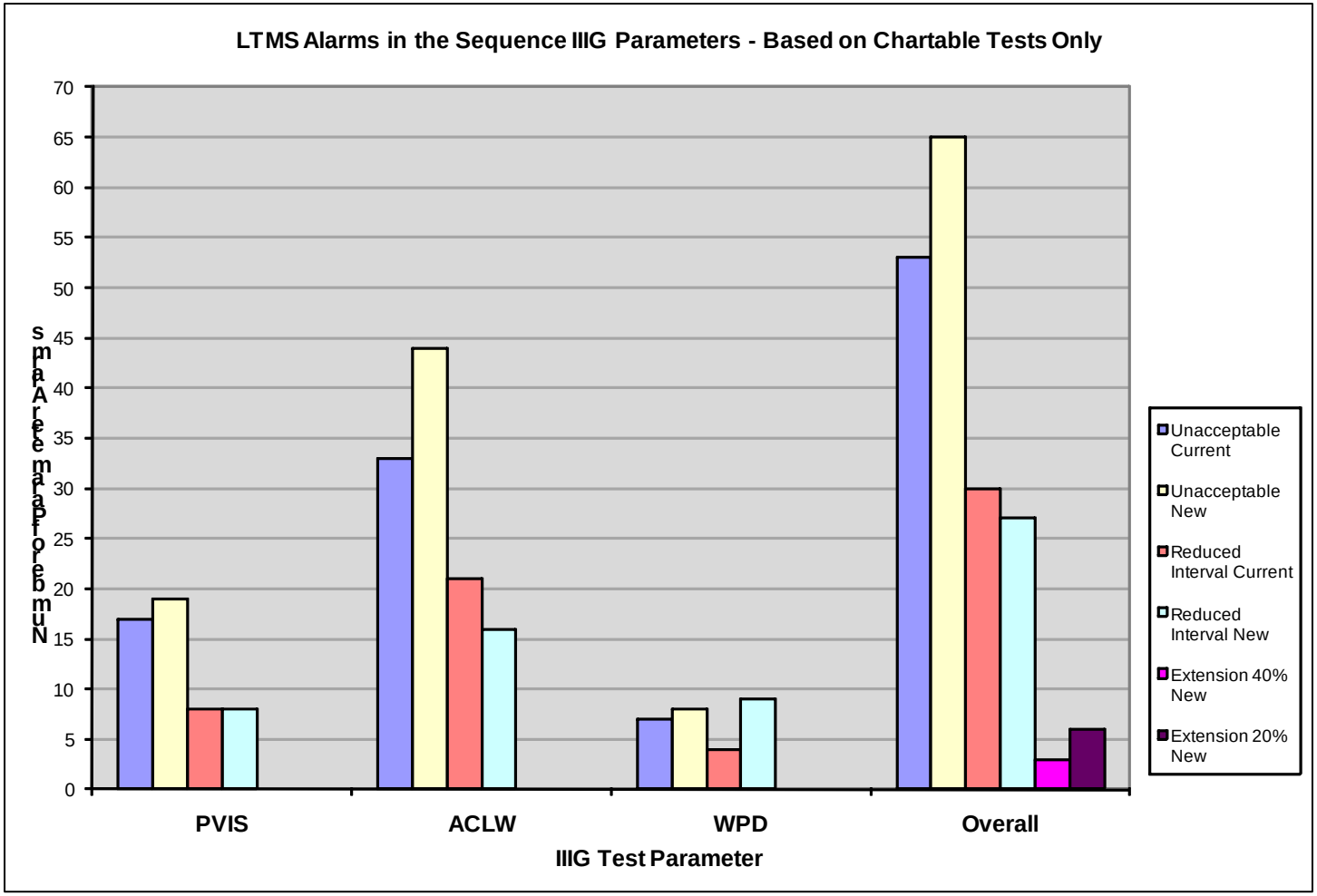
Shewhart Chart of Prediction Error $e_i = Y_i - Z_{i-1}$	
Limit Type	Limit*
Level 3	2.066
Level 2	1.734
Level 1	1.351

EWMA of Standardized Test Result $Z_i = \lambda(Y_i) + (1 - \lambda)Z_{i-1}$		
Limit Type	λ	Limit
Level 2 Upper Limit	0.2	TBD by SP Input
Level 2 Lower Limit	0.2	TBD by SP Input
Level 1	0.2	0

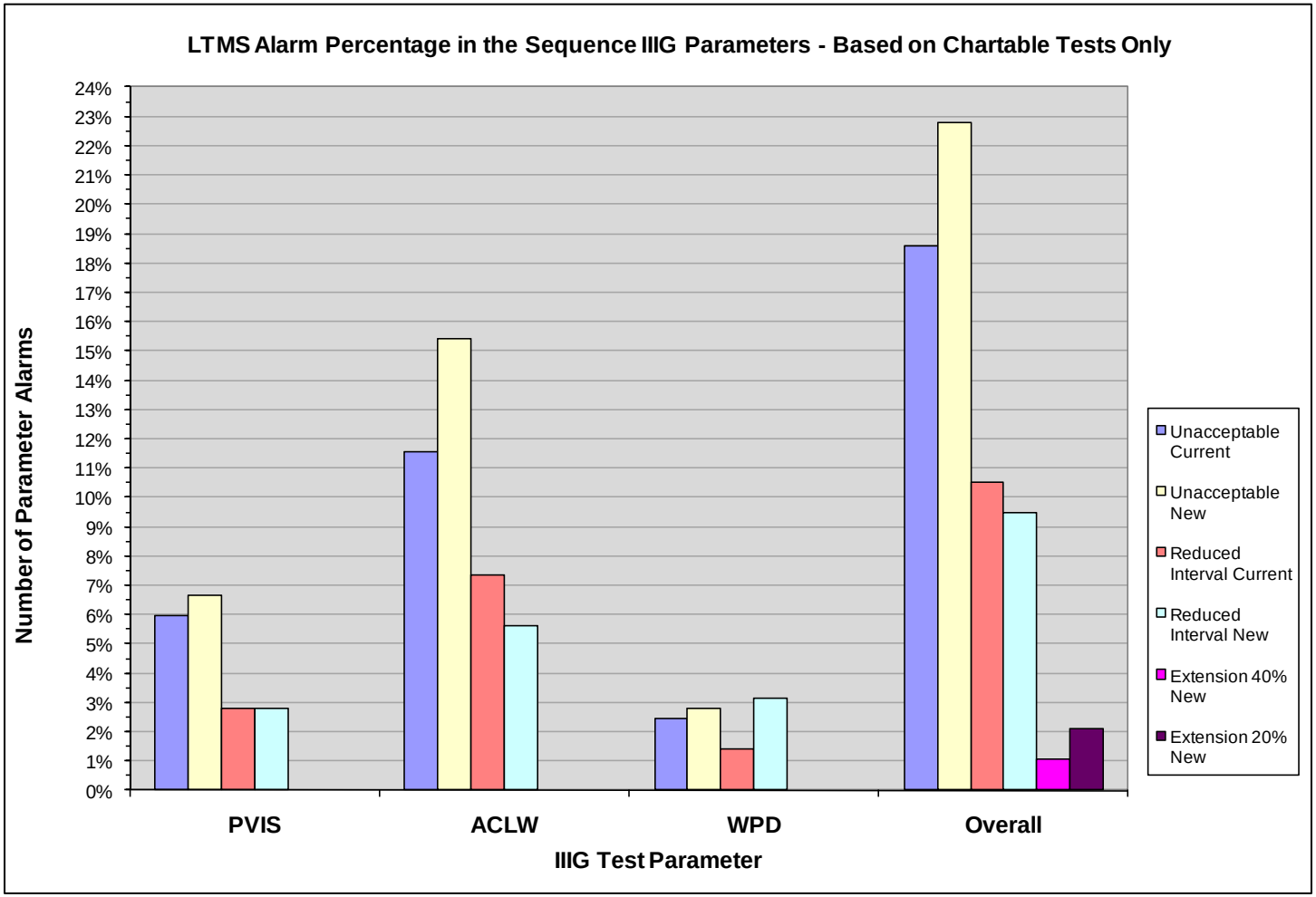
- IIIG calibration attempt summary:
  - Of the 289 total, 73.3% acceptable, 17.3% failed acceptance, and 9.4% were invalid



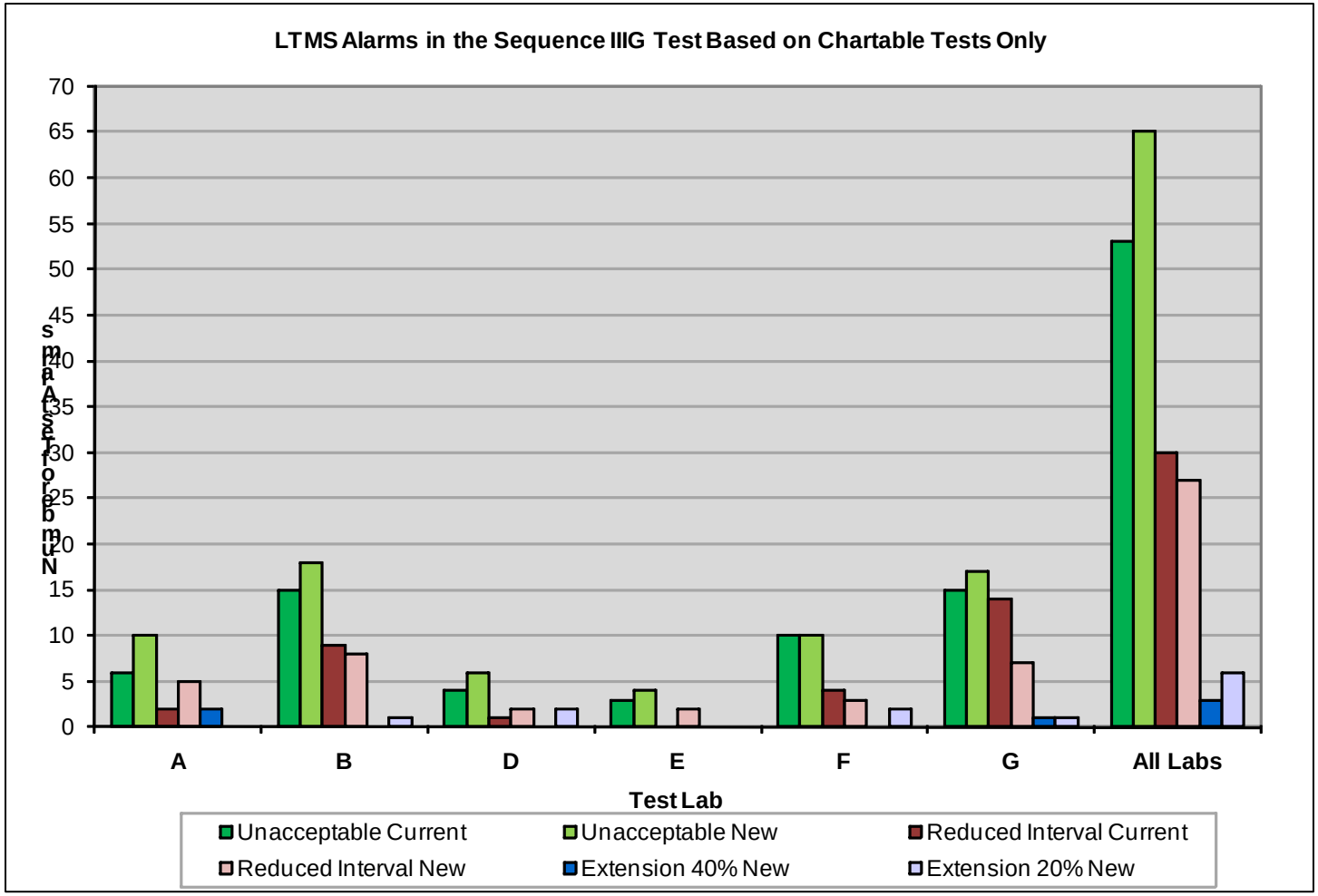
- IIIG Alarm Summary (all labs & chartable results):
  - Below summarizes the unacceptable, reduced, and extended reference interval count for LTMS v1 & v2.



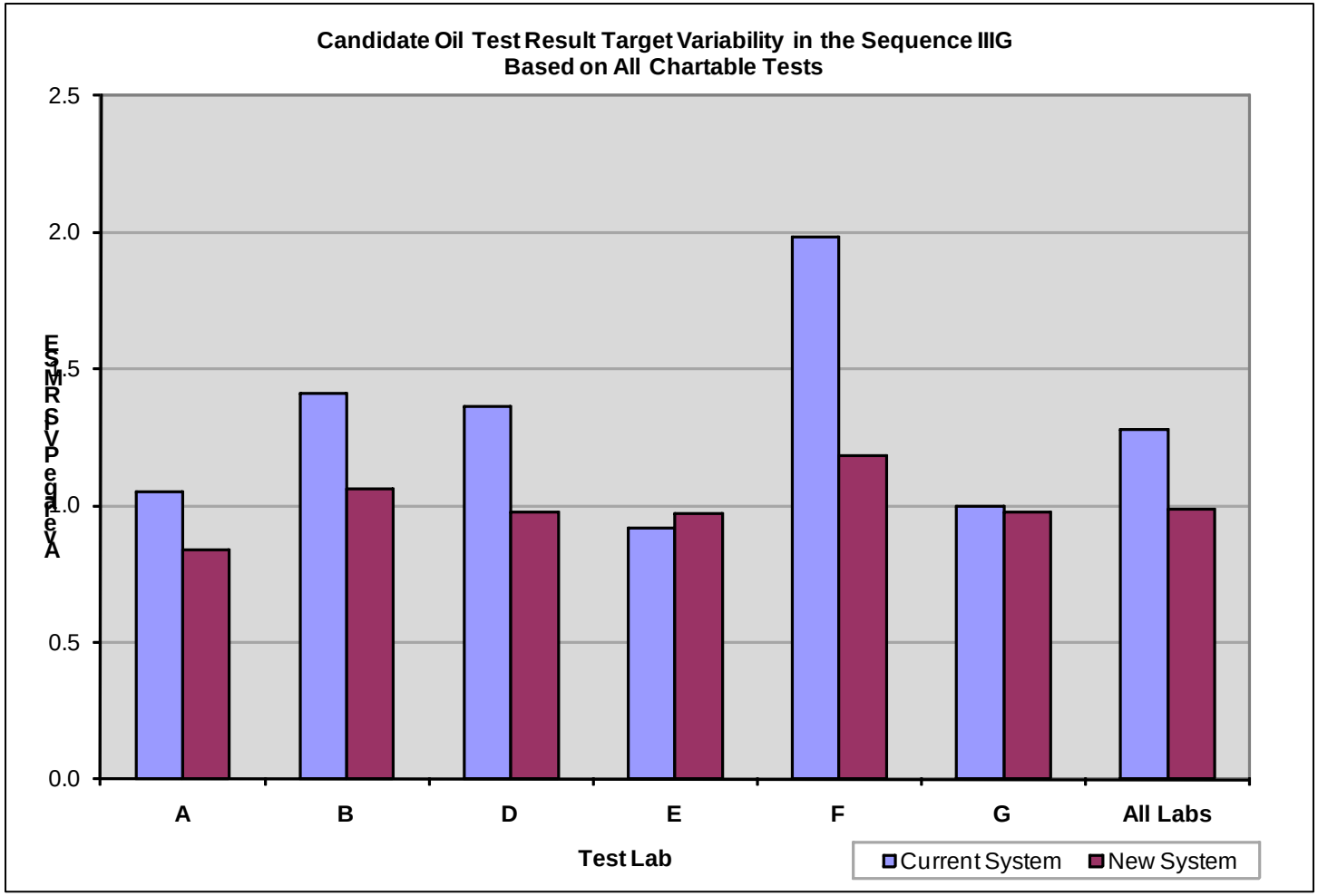
- IIIG Alarm Summary (all labs & chartable results):
  - Below summarizes the unacceptable, reduced, and extended reference interval percentage for LTMS v1 & v2.



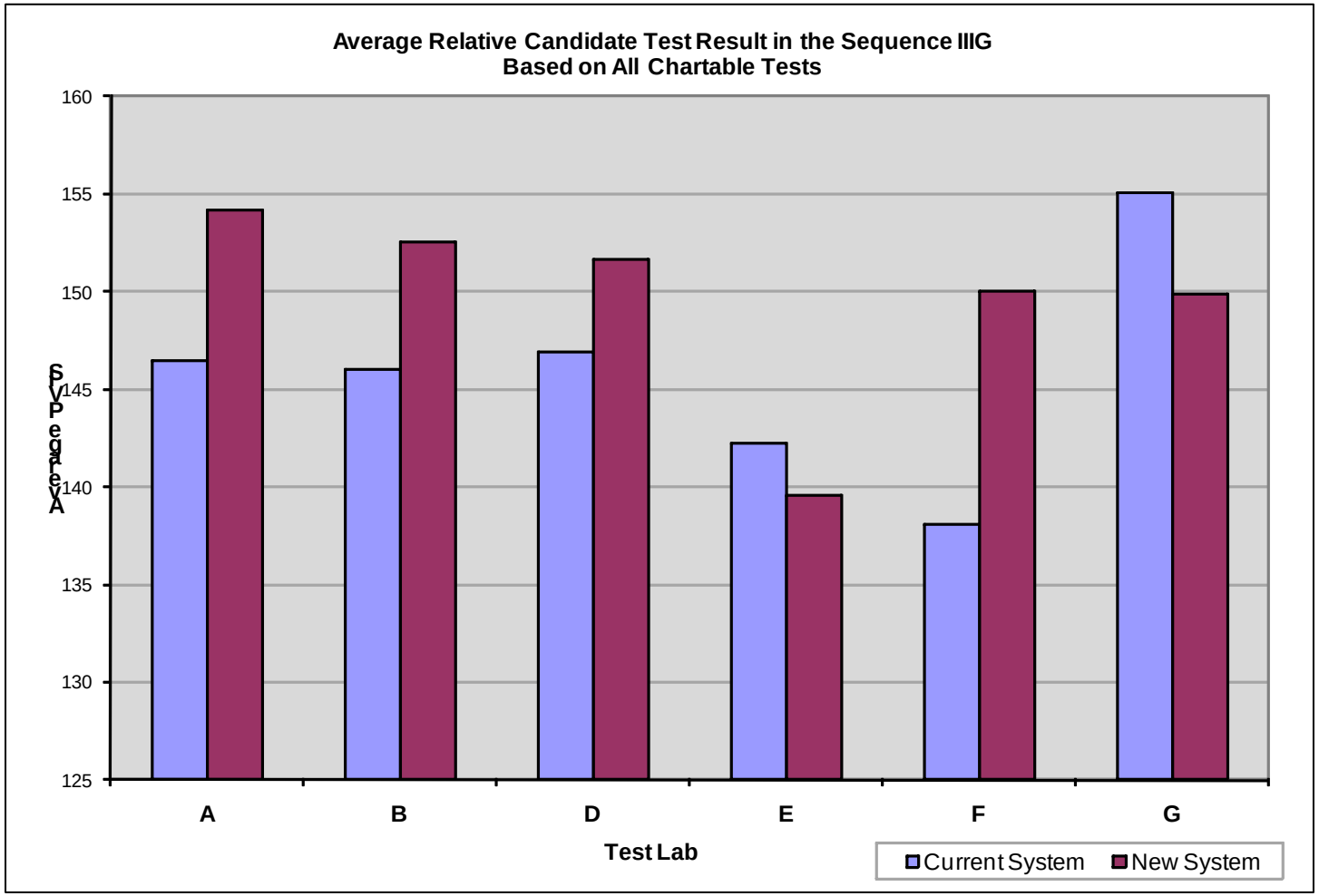
- IIIG Alarm Summary (by lab):
  - Below summarizes the unacceptable, reduced, and extended reference interval count for LTMS v1 & v2 by test lab (*285 Chartable test results*).



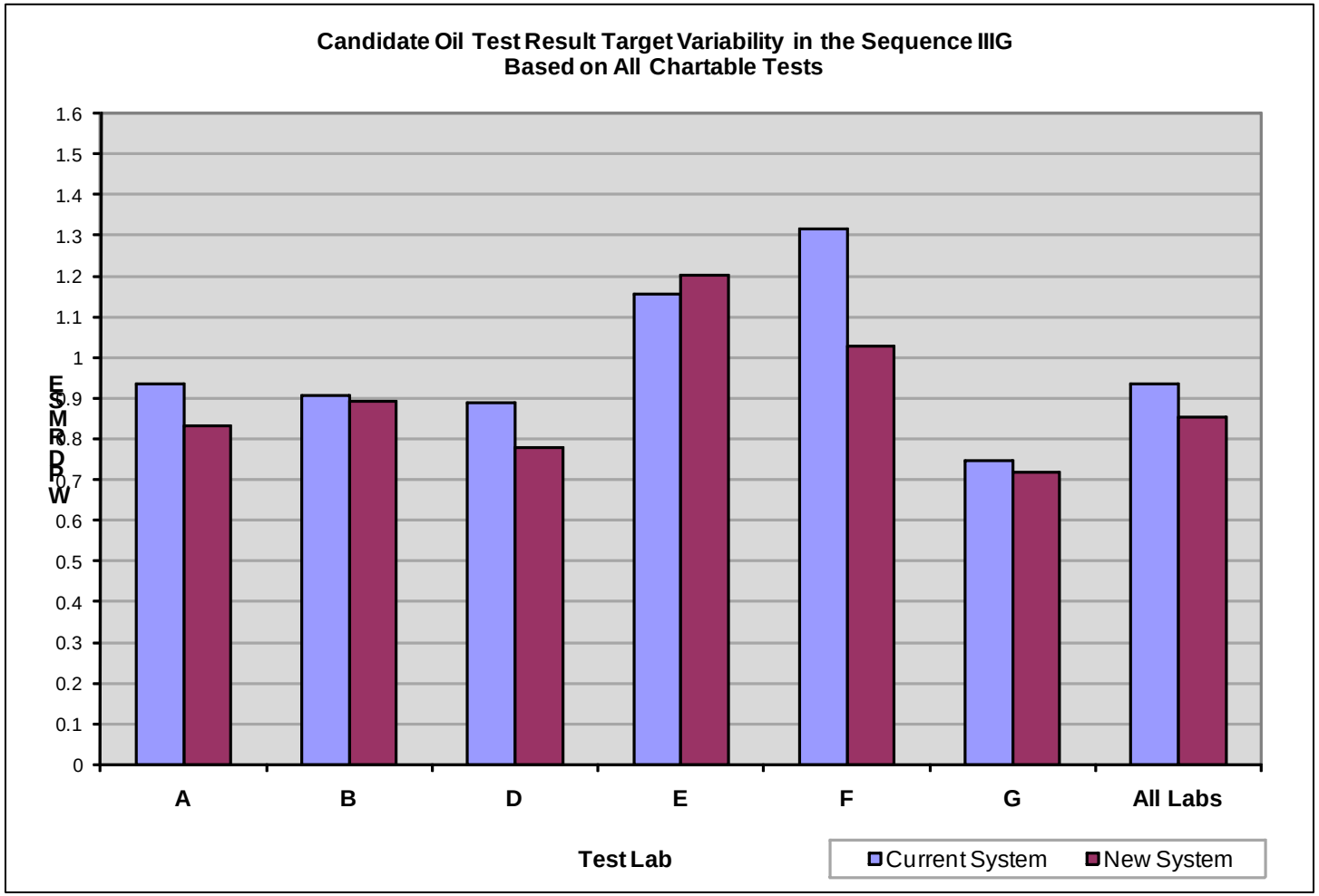
- IIIG RMSE for the PVIS parameter:
  - RMSE calculation is a function of the average deviation from the target and within lab variation.



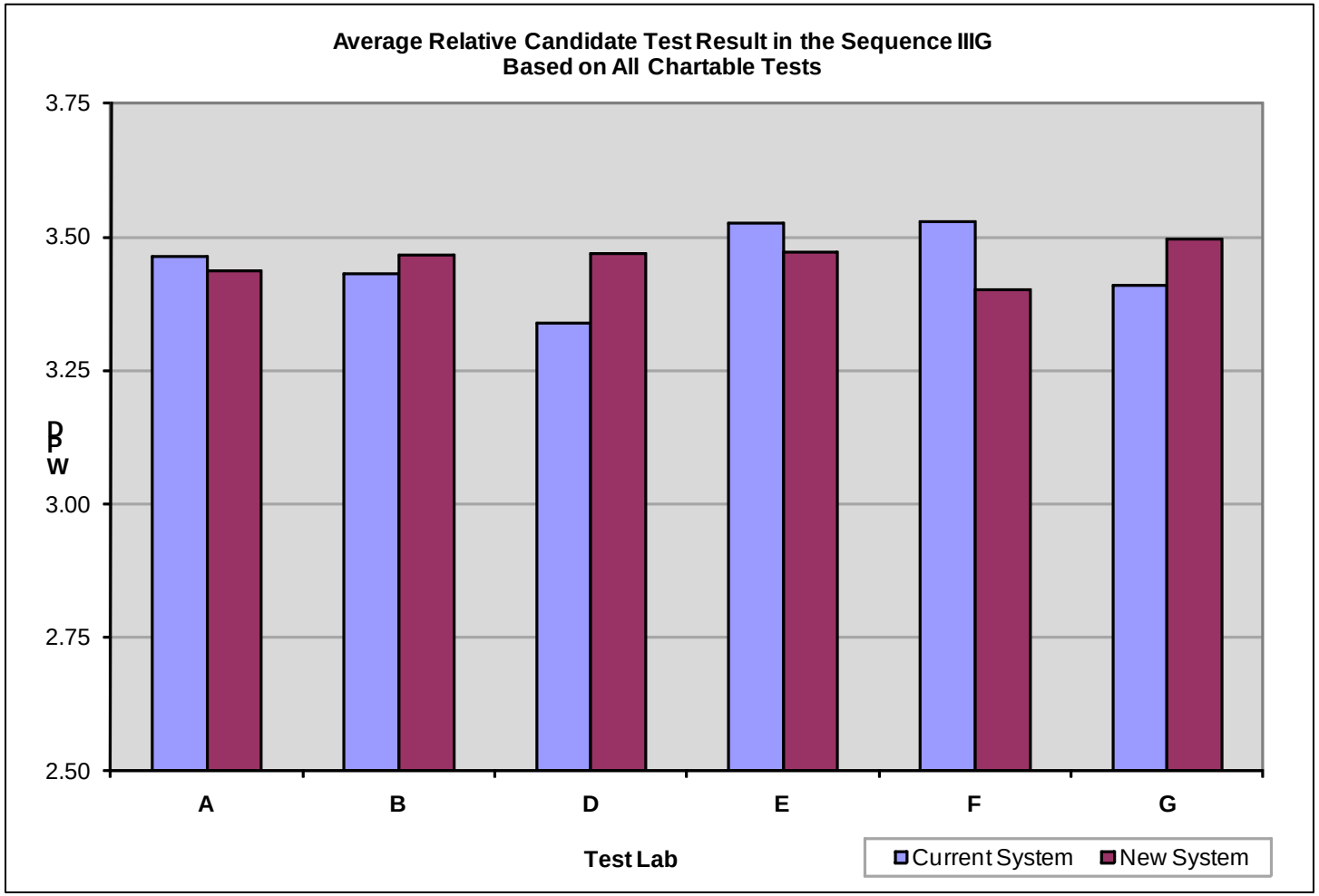
- IIIG Relative Pass limit of a Candidate test for the PVIS parameter:



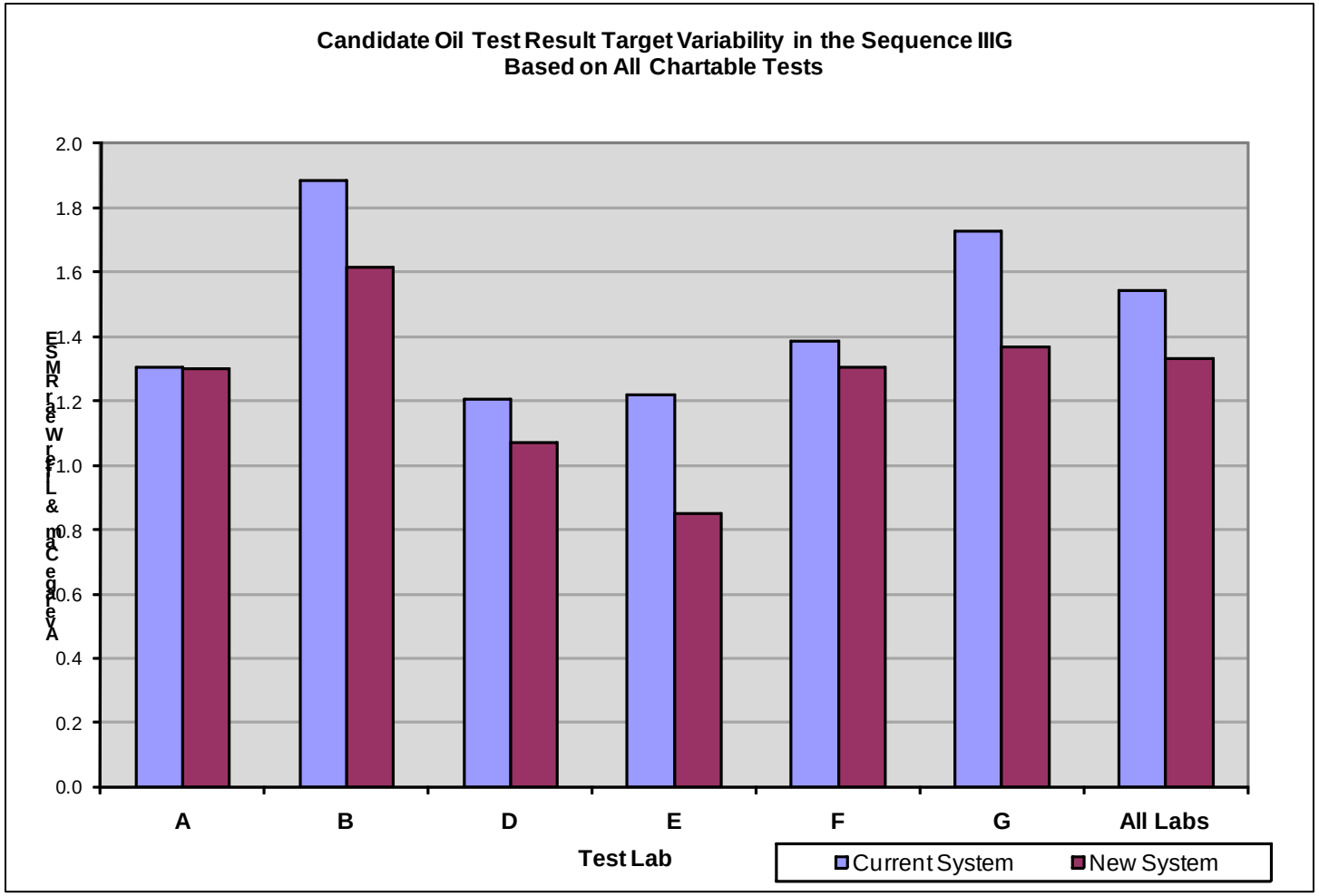
- IIIG RMSE for the WPD parameter:
  - RMSE calculation is a function of the average deviation from the target and within lab variation.



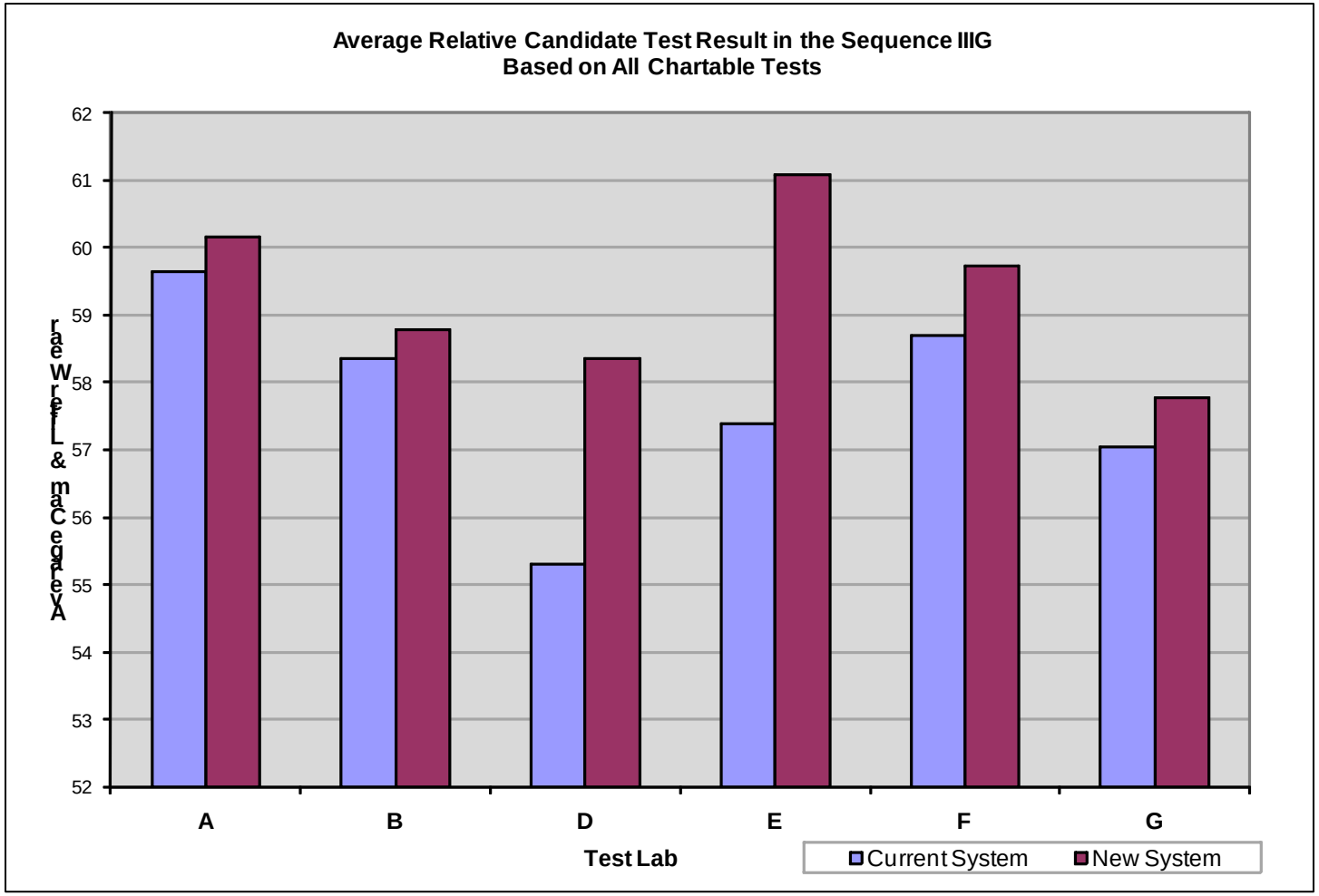
- IIIG Relative Pass limit of a Candidate test for the WPD parameter (with a [GF-4] 3.5 limit):



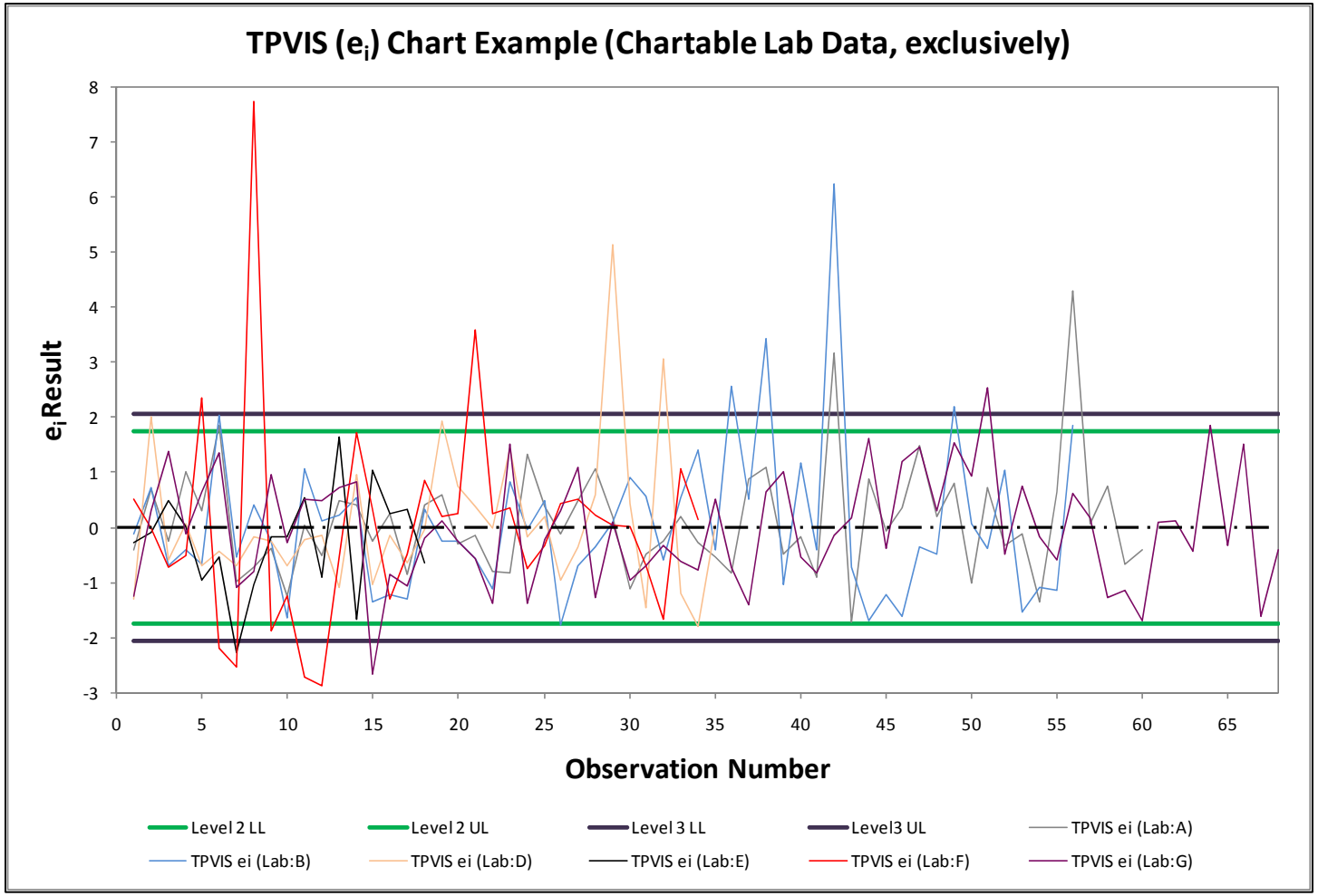
- IIIG RMSE for the ACLW parameter:
  - RMSE calculation is a function of the average deviation from target and within lab variation.



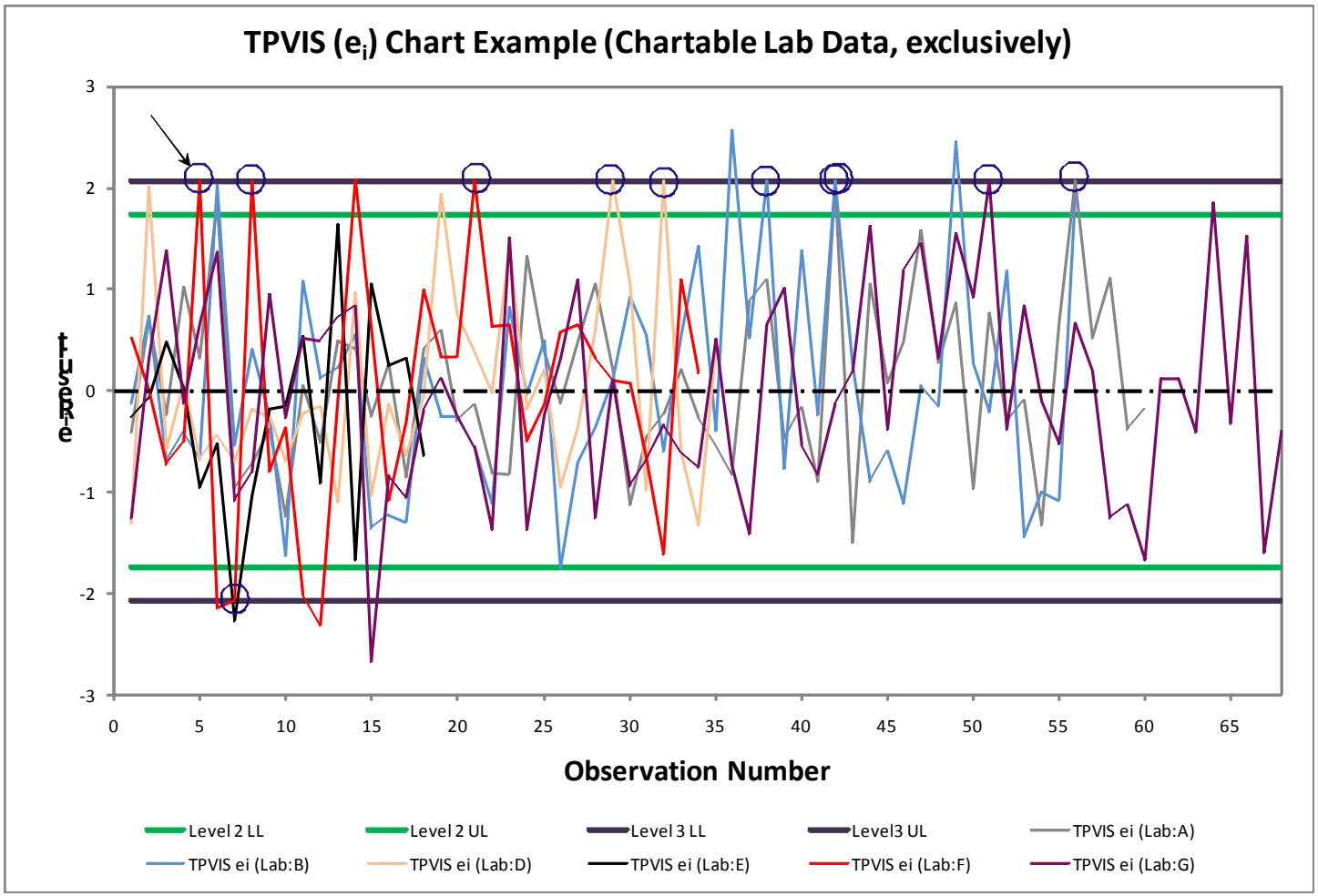
- IIIG Relative Pass limit of a Candidate test for the ACLW parameter:



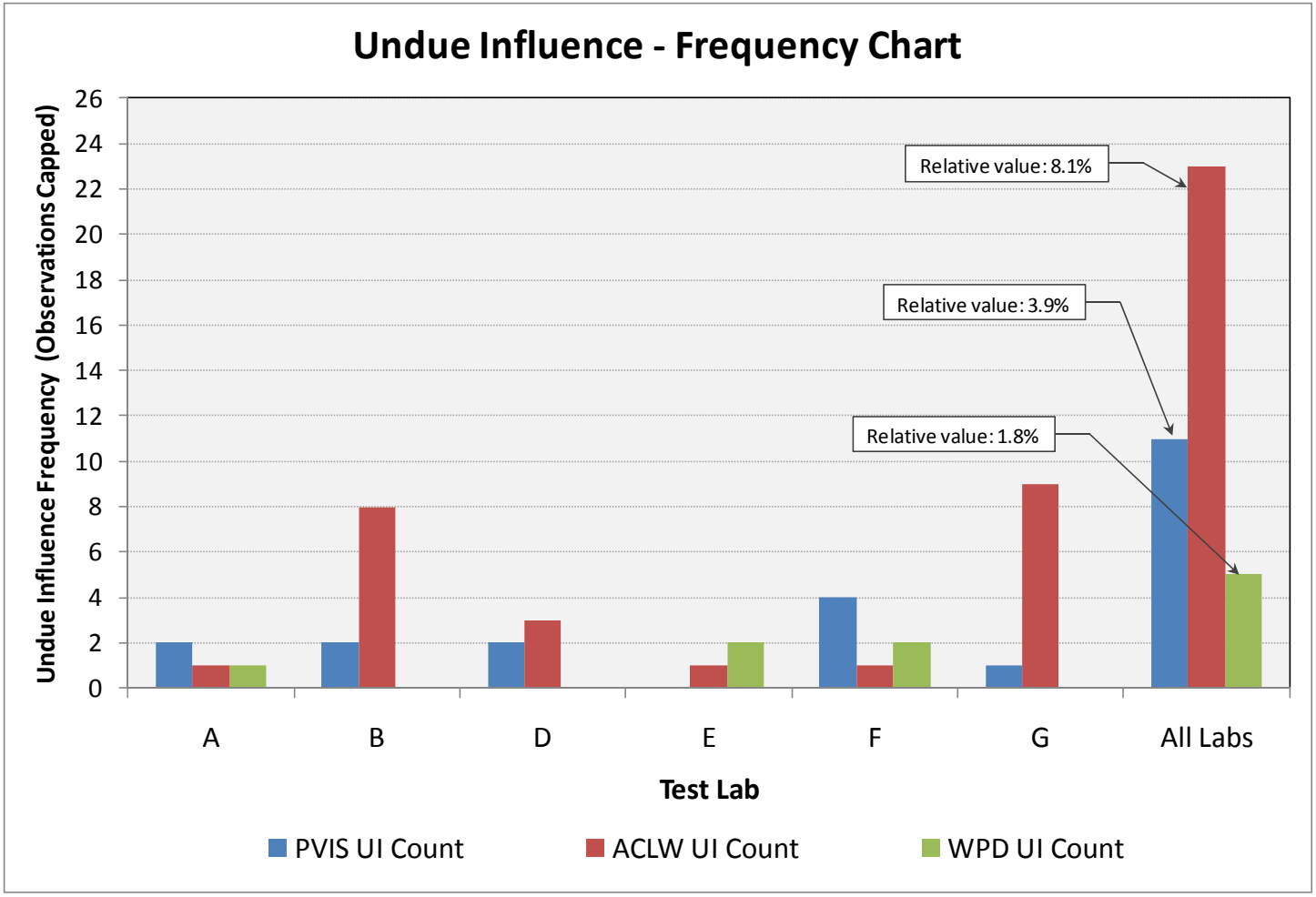
- Undue Influence example for TPVIS (e_i) data
  - Plot of e_i data with no Undue Influence adjustment



- Undue Influence example for TPVIS (e_i) data
  - Circled results with "capped" adjustment (at $\pm$2.066 limit)
    - *Result adjusted if* $|Y_i - Z_{i-1}| \geq 2.066$ *and* $|Y_i - Y_{i+1}| > 2.066$

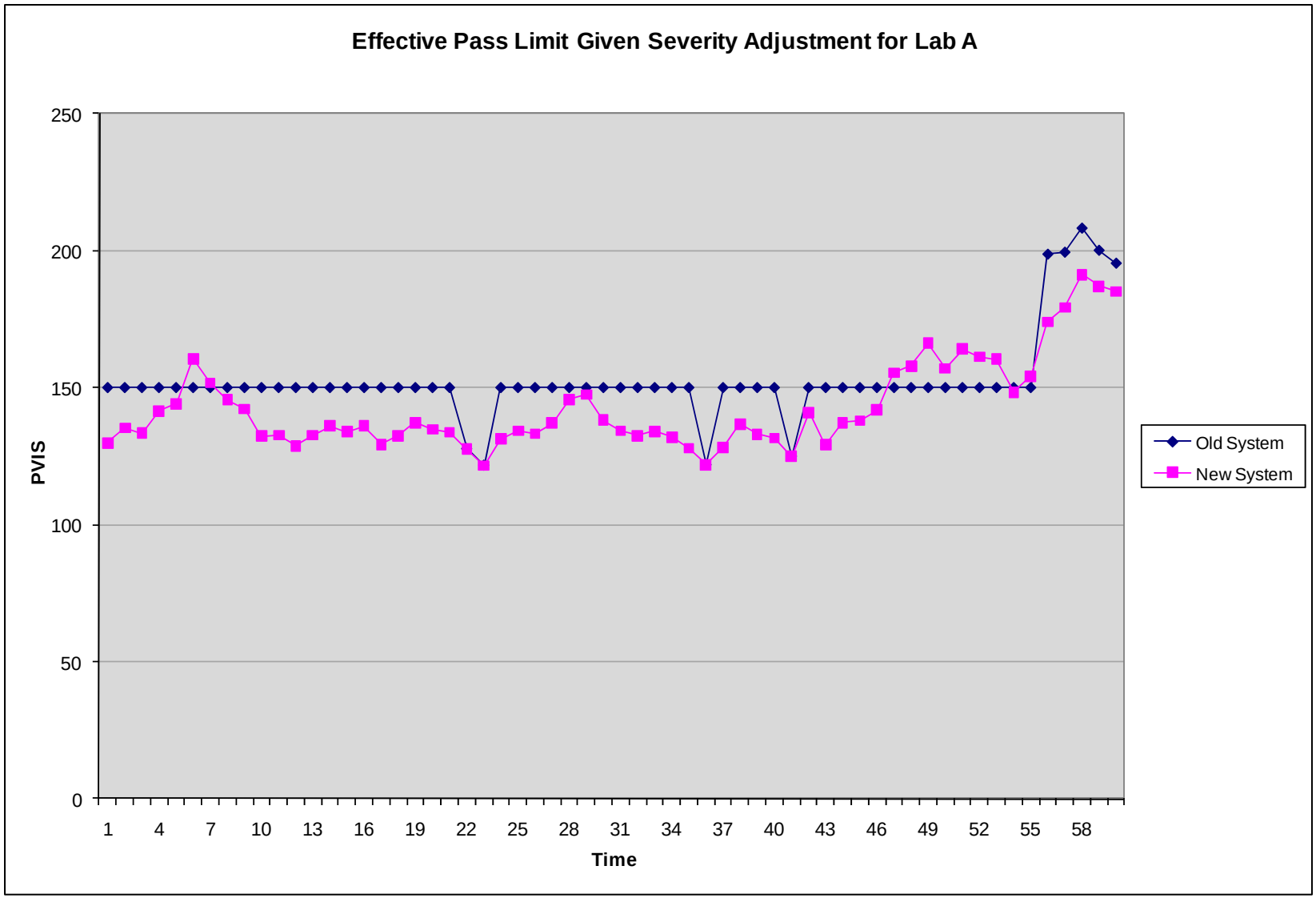


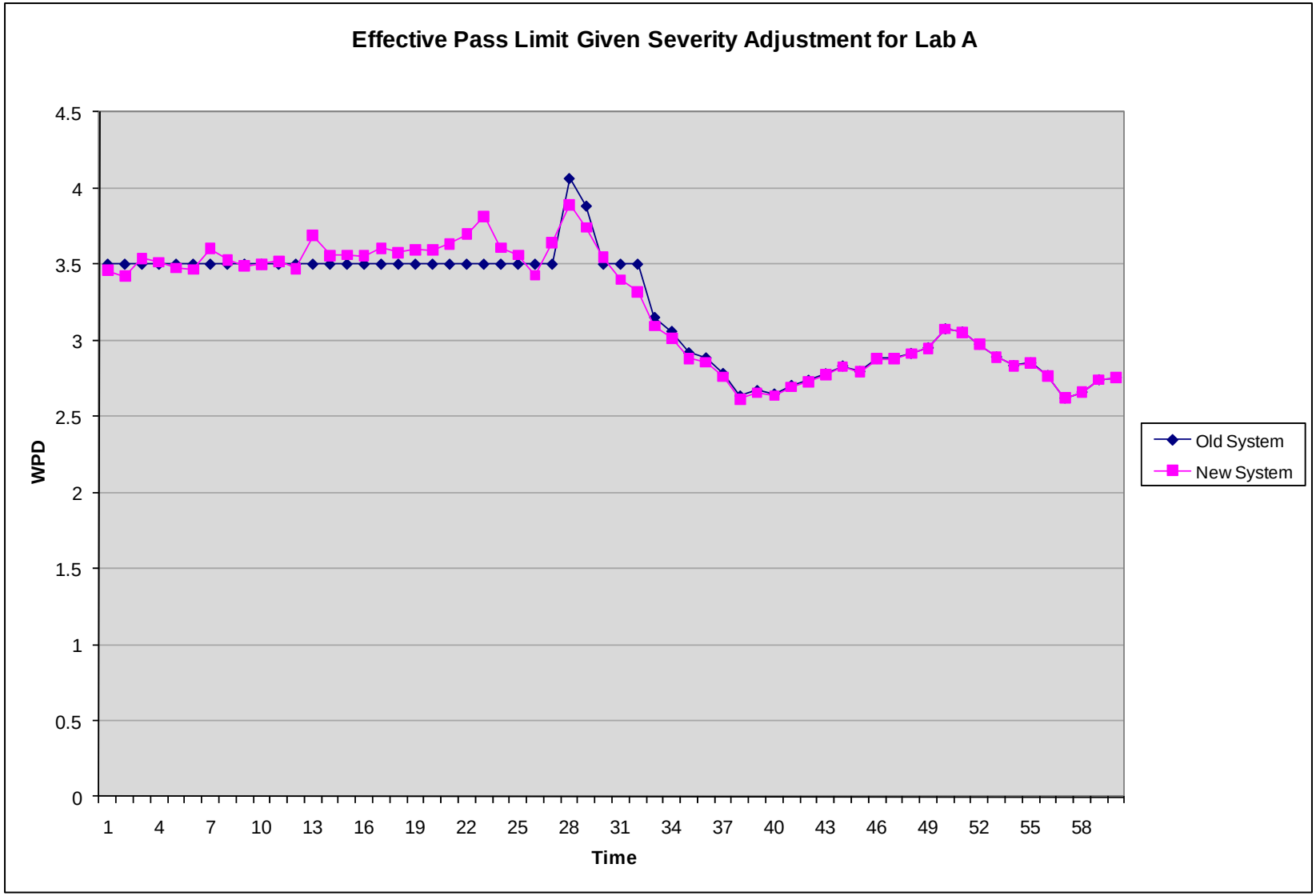
- Undue Influence “Capped” Result Summary:

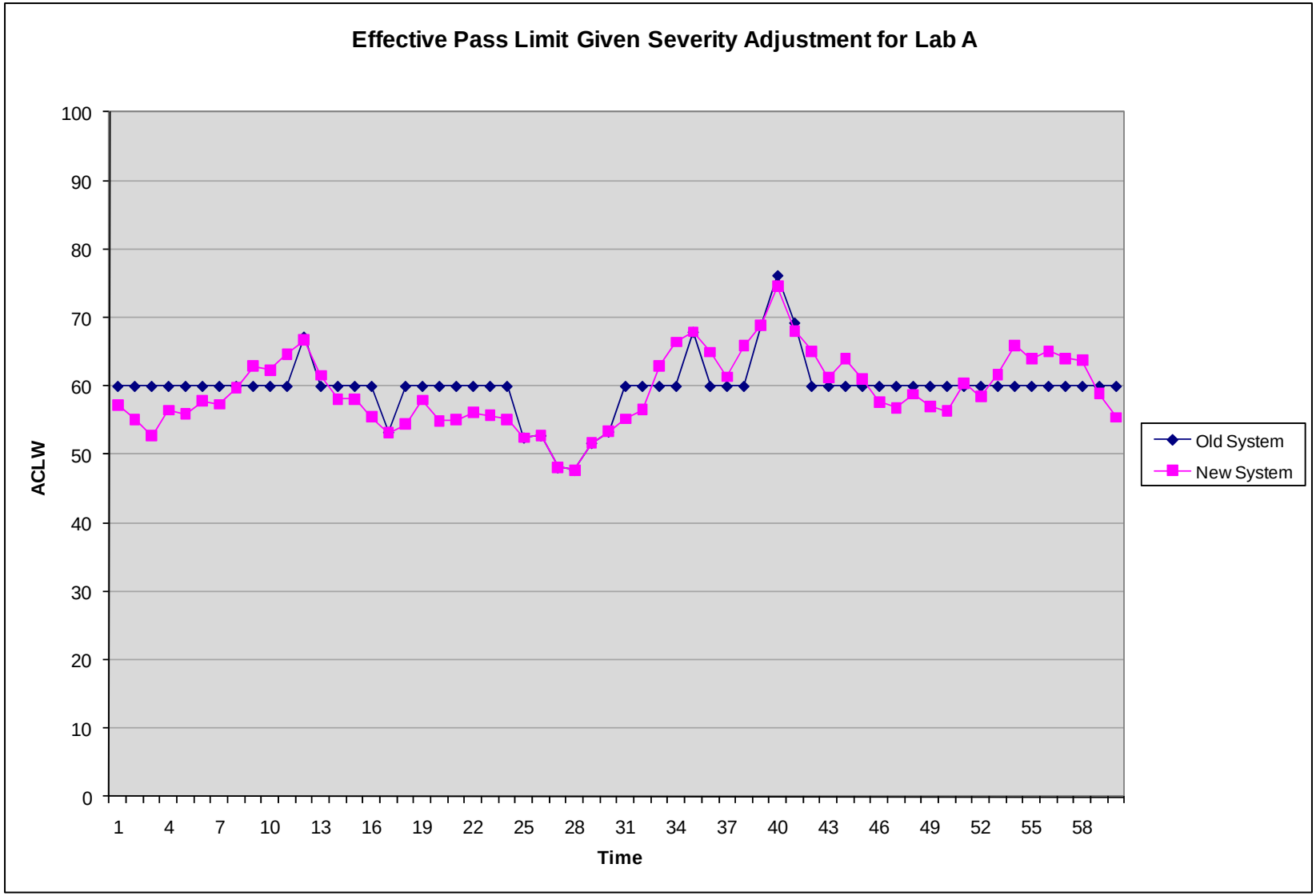


Appendix
LTMS V2 Charts By Test Lab

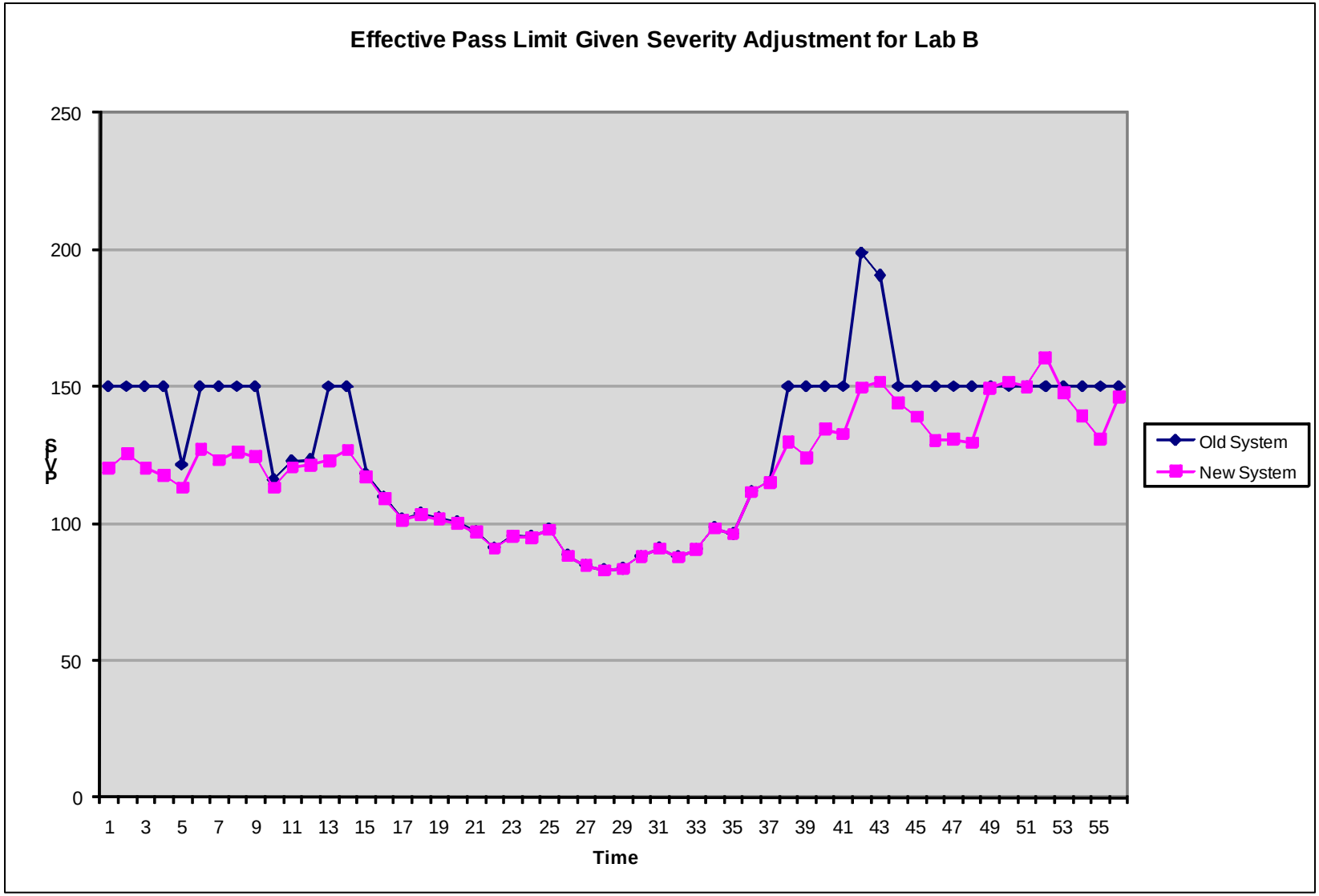
Lab A

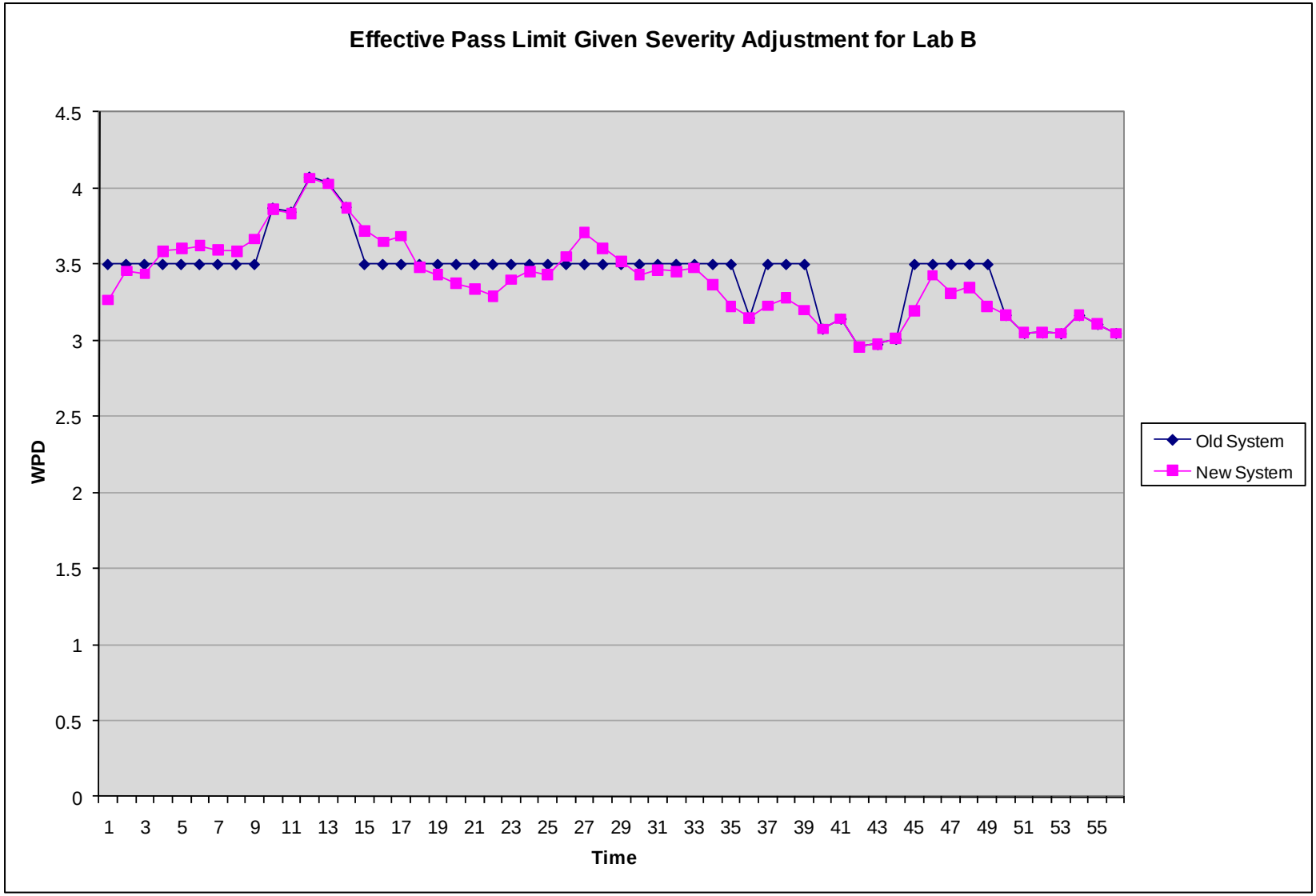

Effective Pass Limit Given Severity Adjustment for Lab A
250
200
150
100
50
0
PVIS
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
52
55
58
Time
Old System
New System

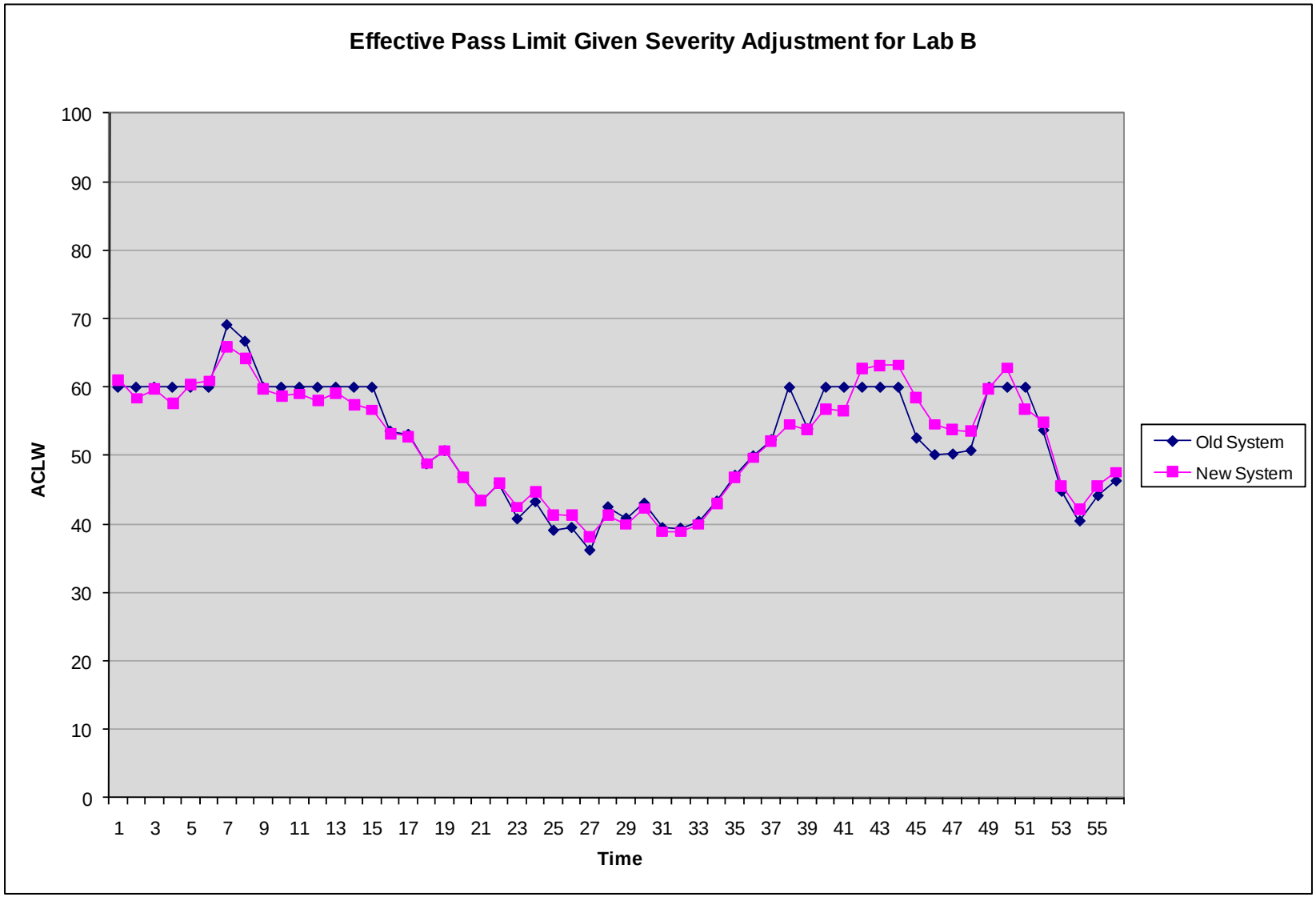

Effective Pass Limit Given Severity Adjustment for Lab A
WPD
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
52
55
58
Time
Old System
New System


Effective Pass Limit Given Severity Adjustment for Lab A
ACLW
100
90
80
70
60
50
40
30
20
10
0
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
52
55
58
Time
Old System
New System

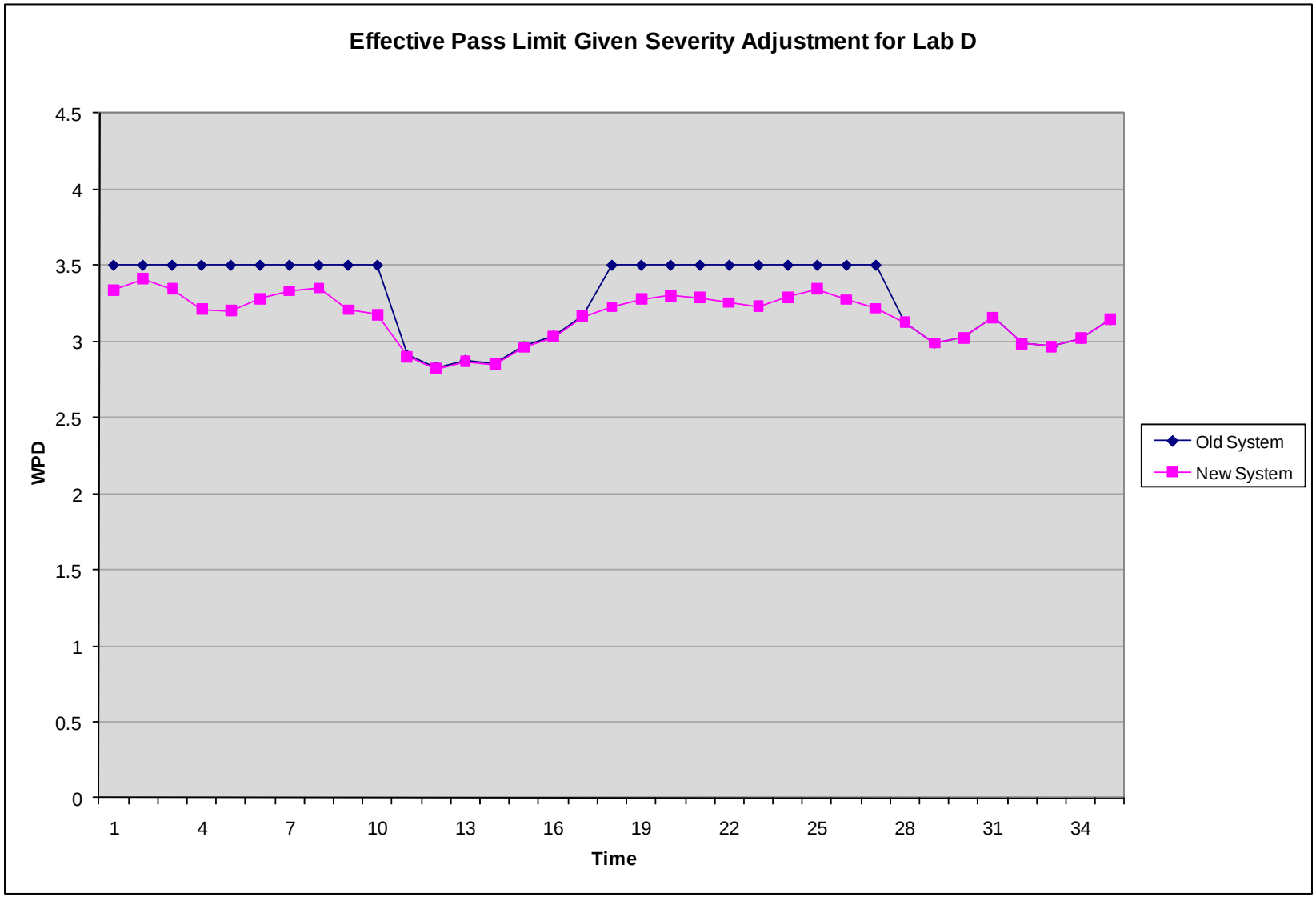
Lab B

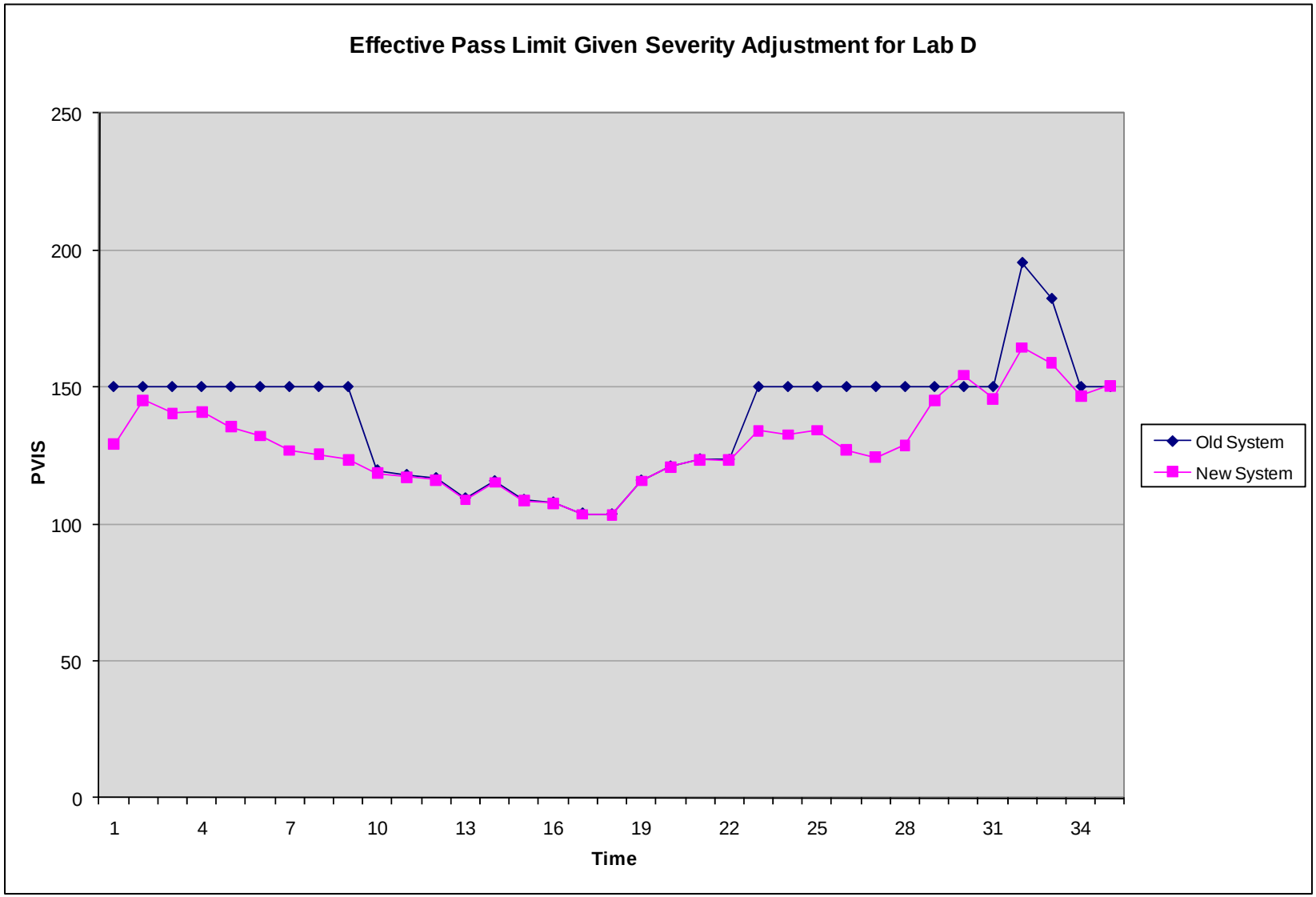

Effective Pass Limit Given Severity Adjustment for Lab B
250
200
150
100
50
0
SPV
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55
Time
Old System
New System

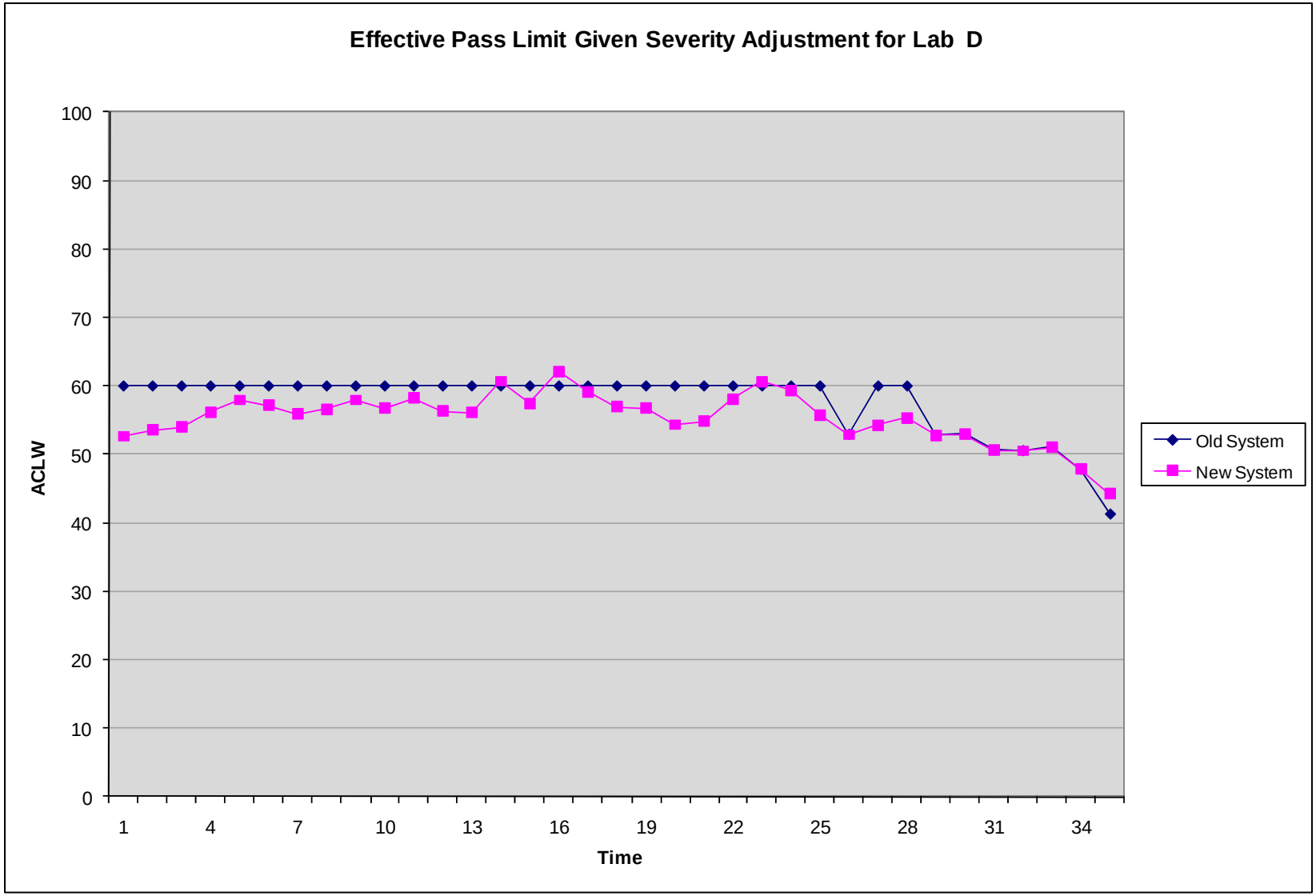

Effective Pass Limit Given Severity Adjustment for Lab B
WPD
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55
Time
Old System
New System


Effective Pass Limit Given Severity Adjustment for Lab B
ACLW
100
90
80
70
60
50
40
30
20
10
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55
Time
Old System
New System

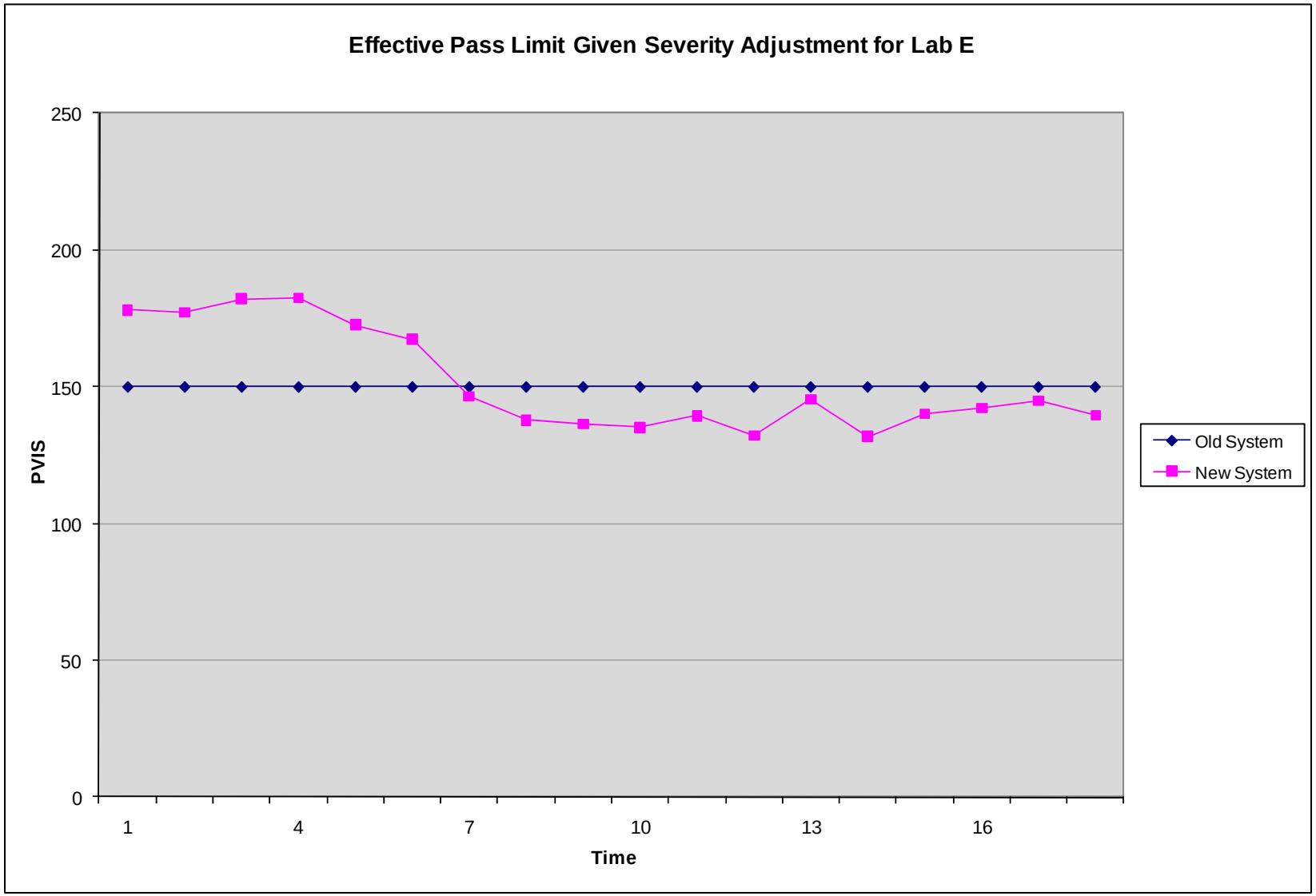
Lab D

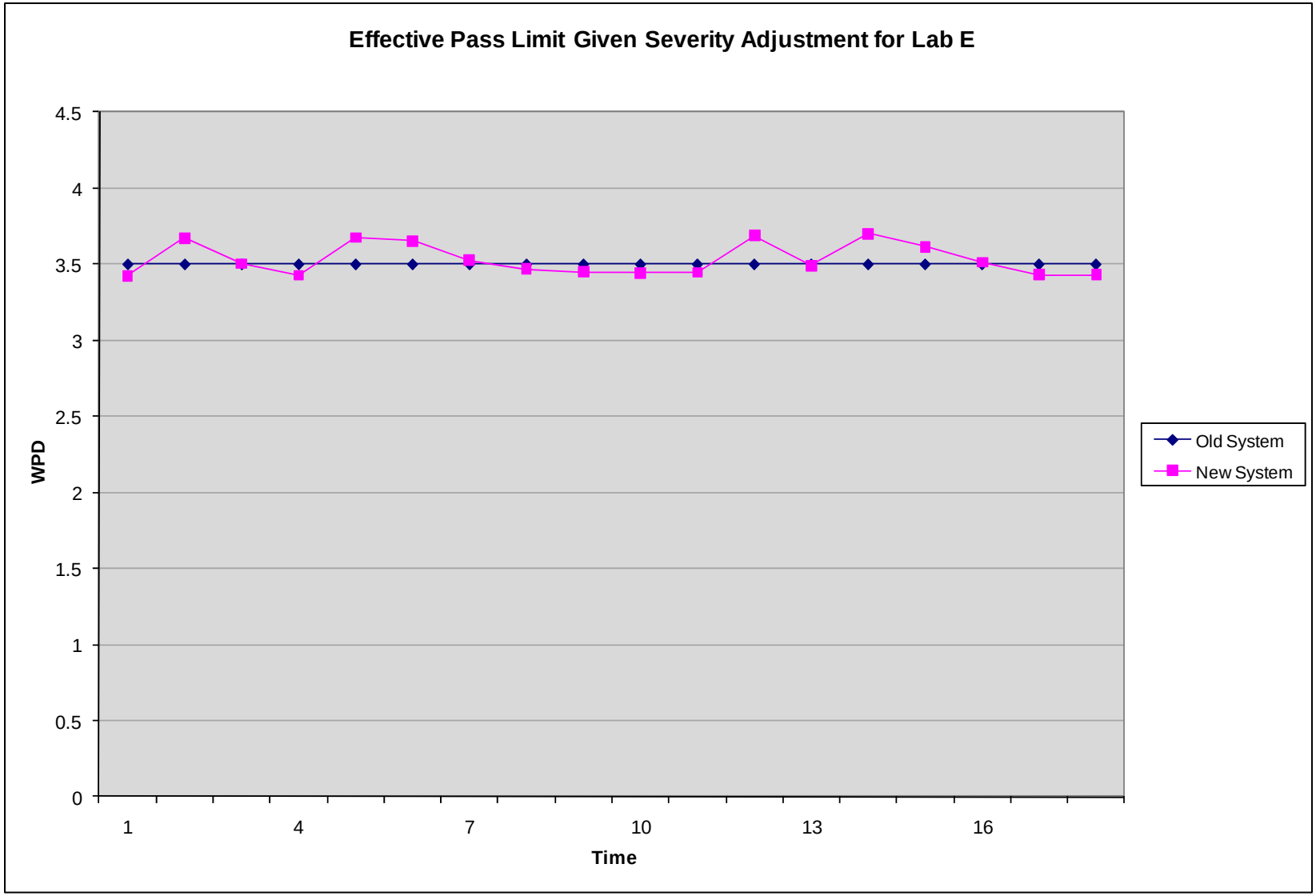

Effective Pass Limit Given Severity Adjustment for Lab D
WPD
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1
4
7
10
13
16
19
22
25
28
31
34
Time
Old System
New System

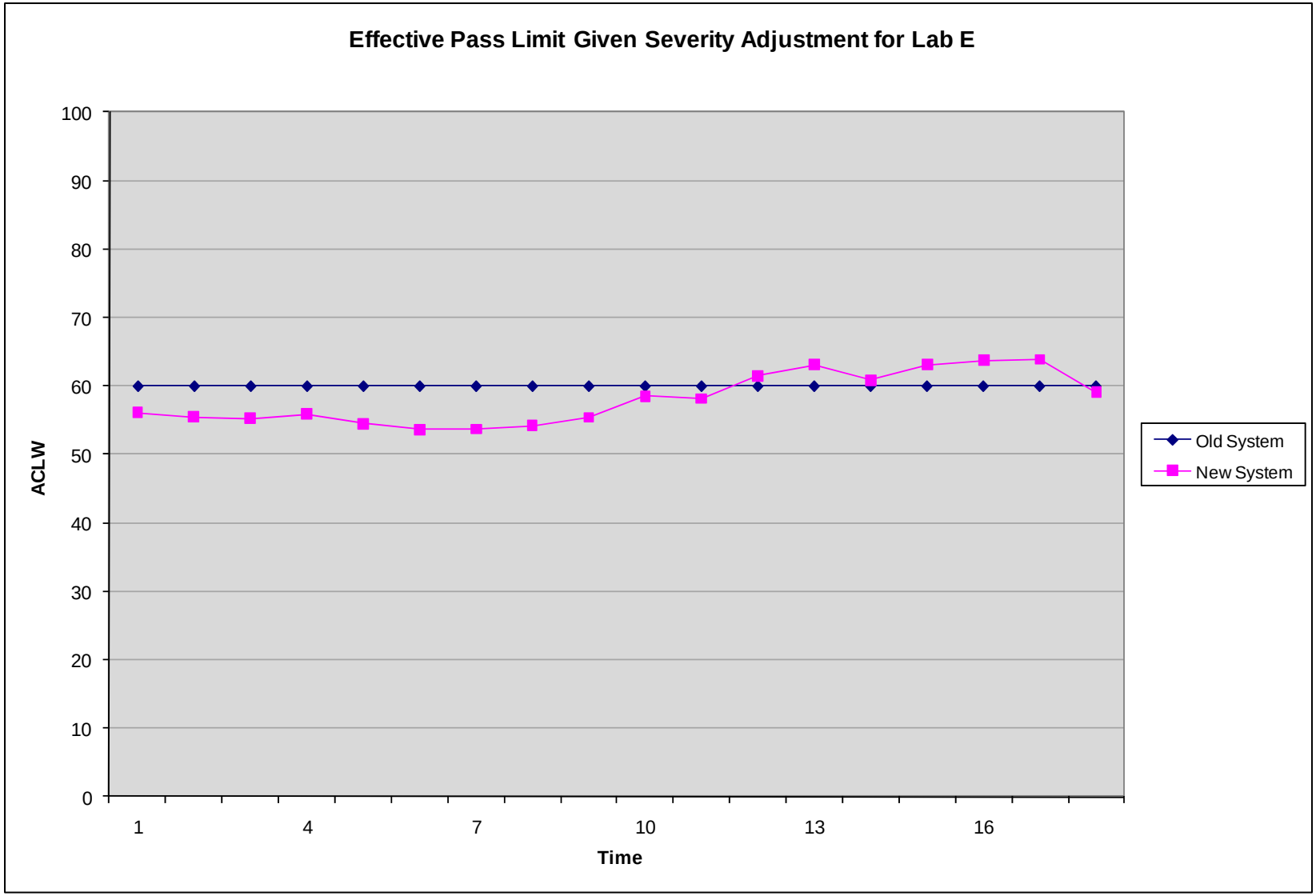

Effective Pass Limit Given Severity Adjustment for Lab D
250
200
150
100
50
0
PVIS
1
4
7
10
13
16
19
22
25
28
31
34
Time
Old System
New System


Effective Pass Limit Given Severity Adjustment for Lab D
ACLW
100
90
80
70
60
50
40
30
20
10
0
1
4
7
10
13
16
19
22
25
28
31
34
Time
Old System
New System

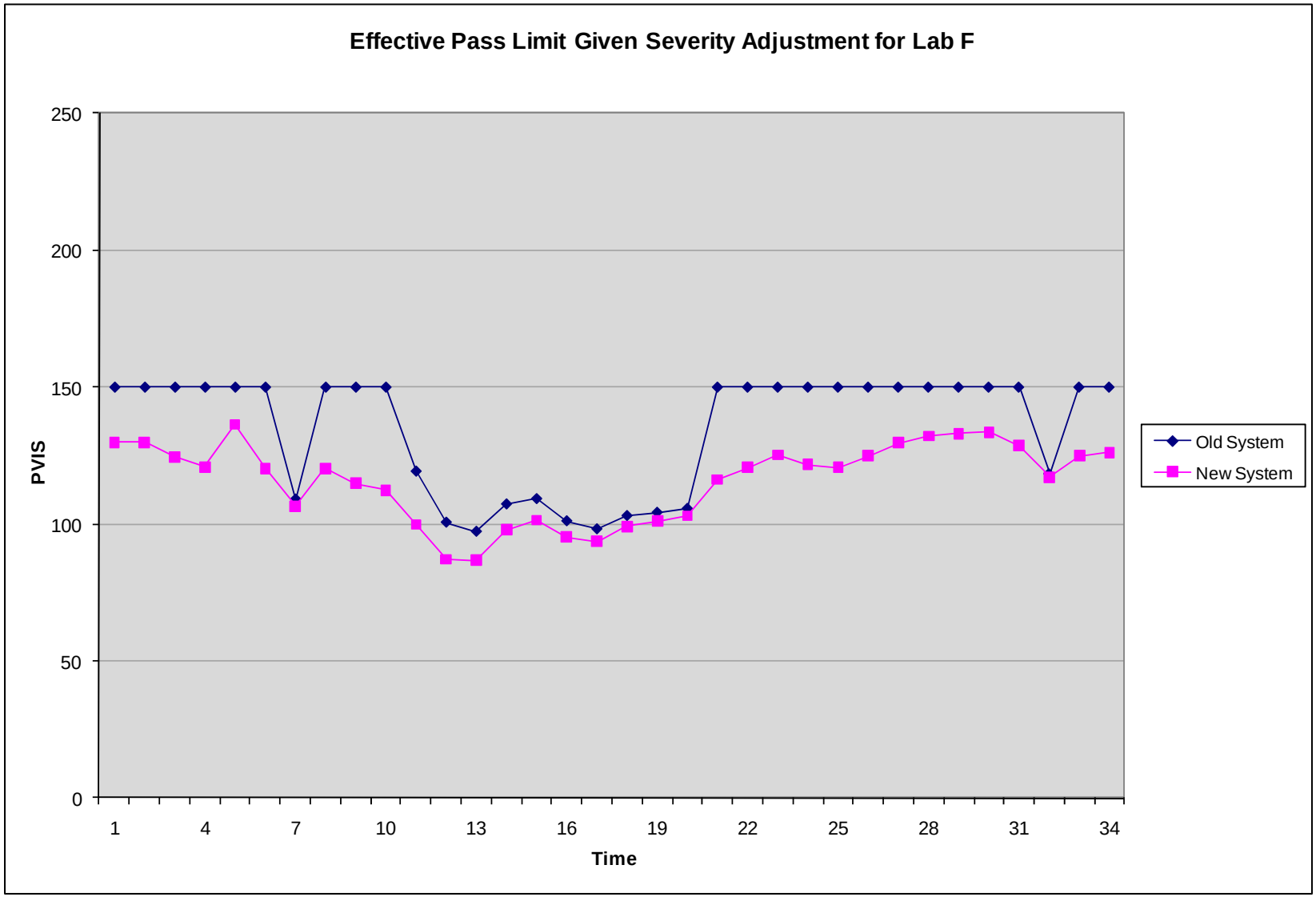
Lab E

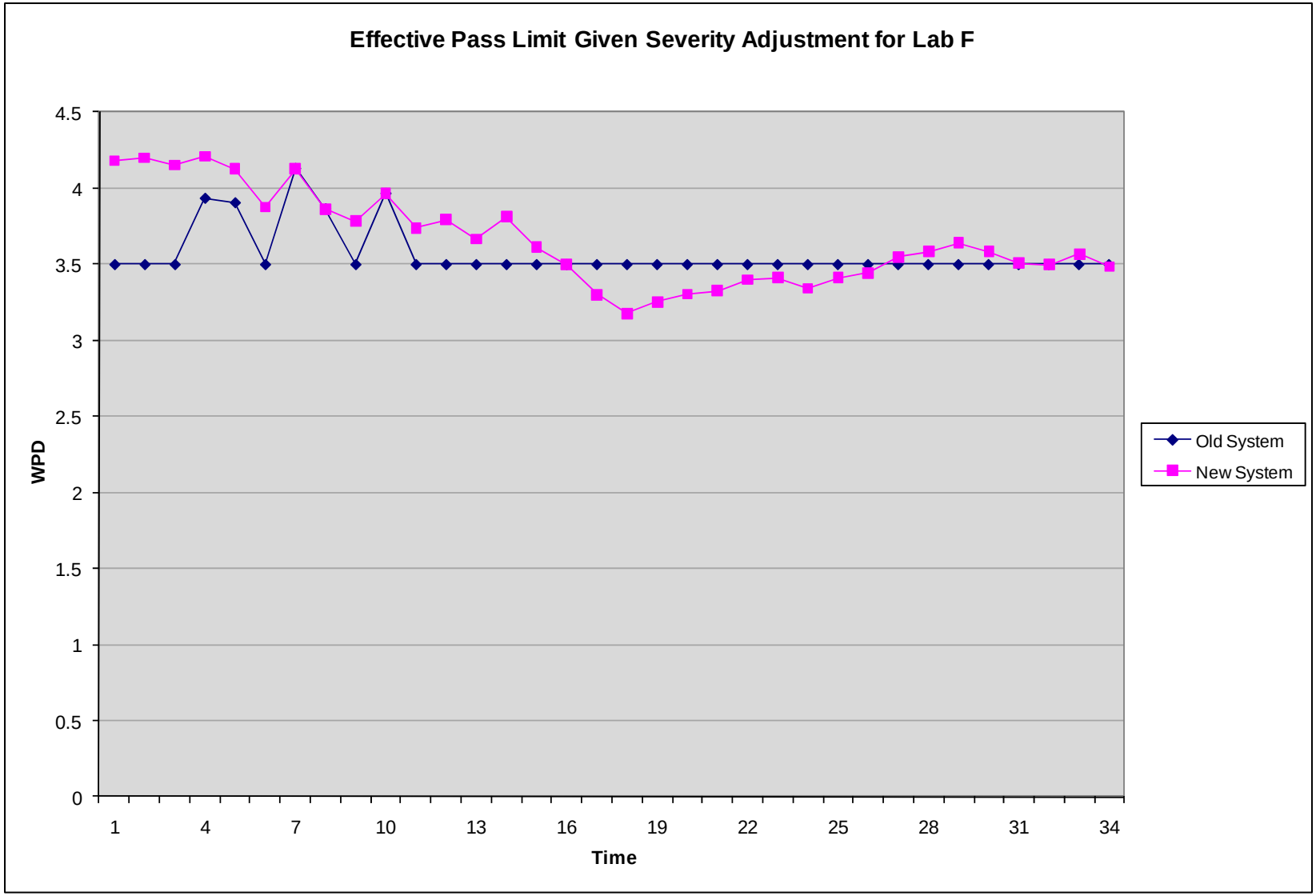

Effective Pass Limit Given Severity Adjustment for Lab E
250
200
150
100
50
0
PVIS
1
4
7
10
13
16
Time
Old System
New System

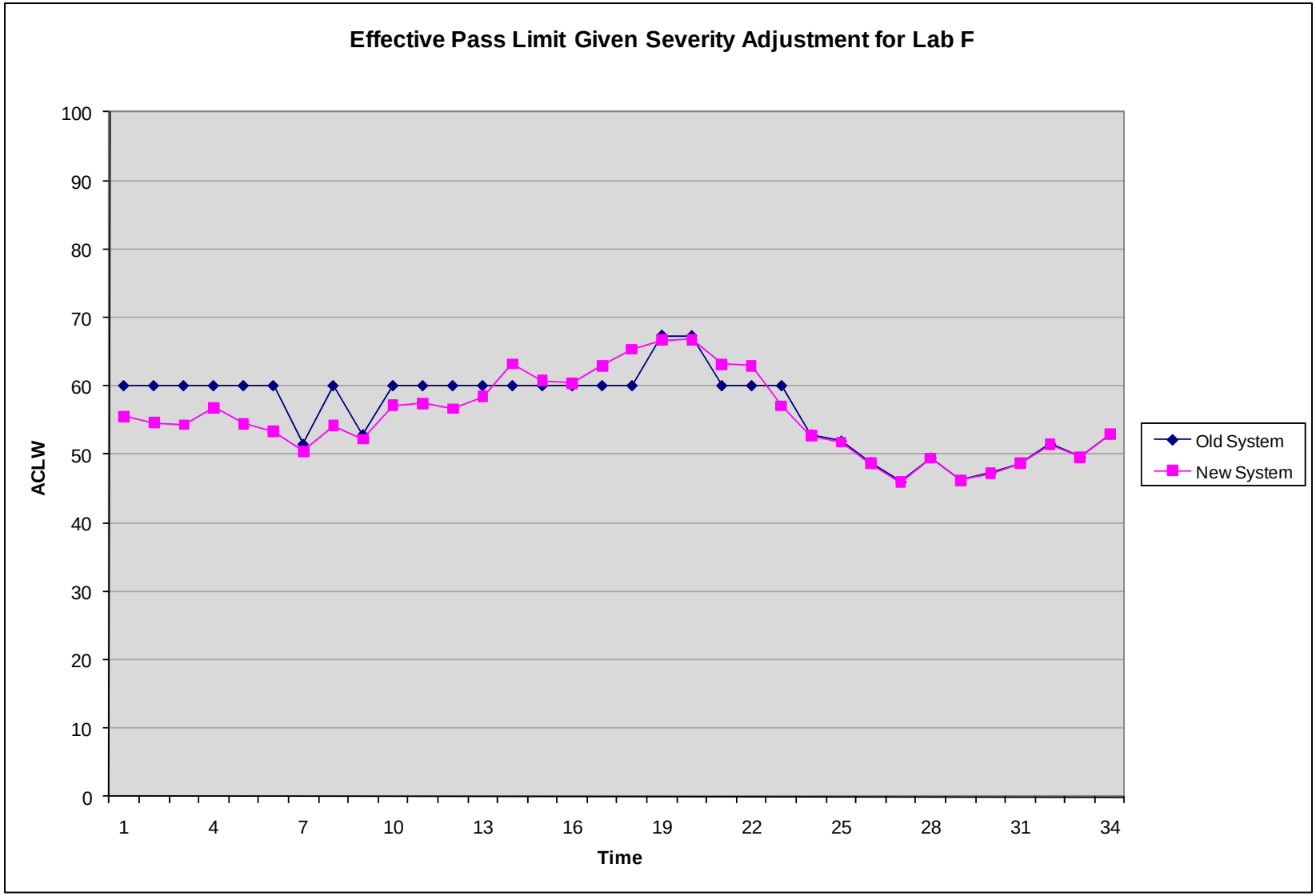

Effective Pass Limit Given Severity Adjustment for Lab E
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
WPD
1
4
7
10
13
16
Time
Old System
New System


Effective Pass Limit Given Severity Adjustment for Lab E
ACLW
100
90
80
70
60
50
40
30
20
10
0
1
4
7
10
13
16
Time
Old System
New System

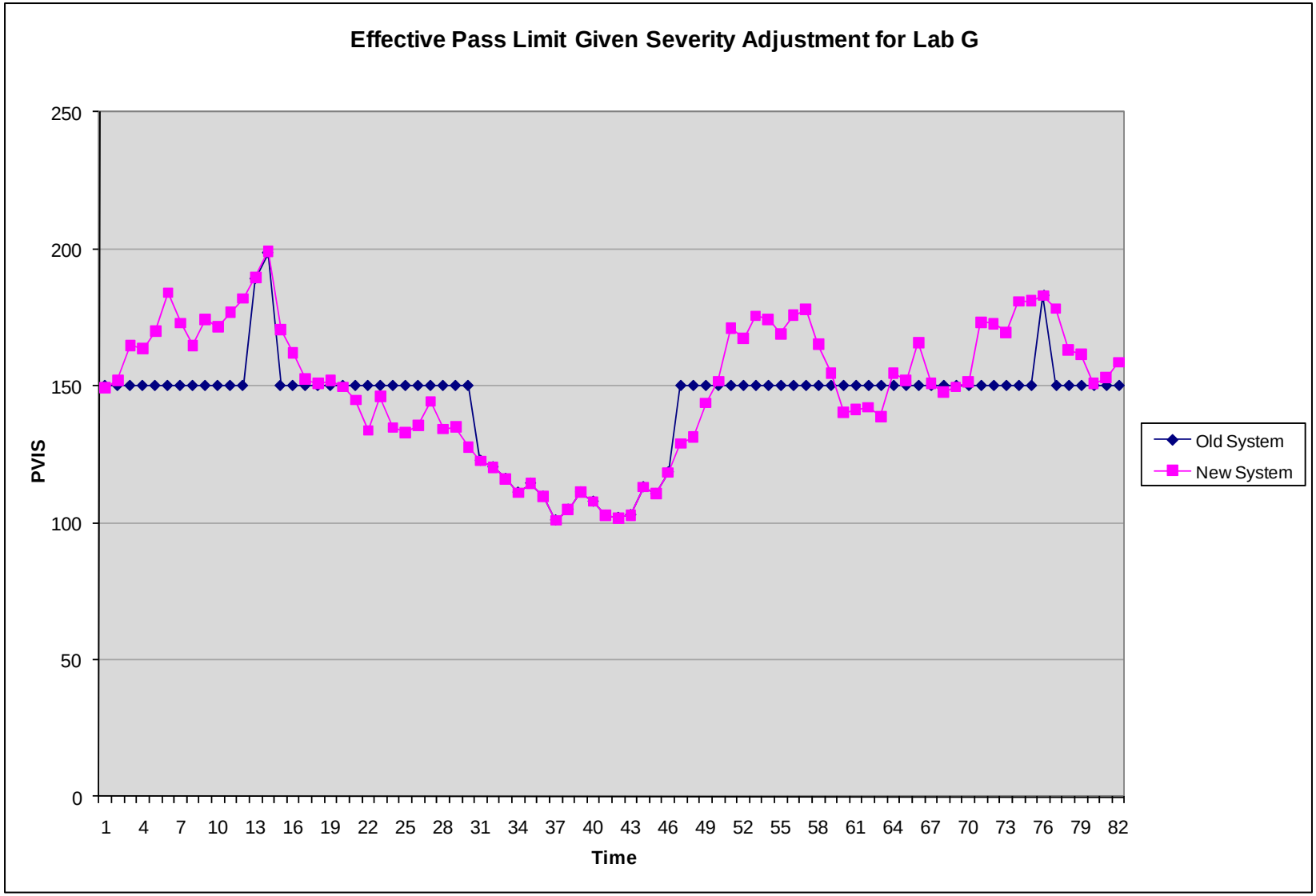
Lab F

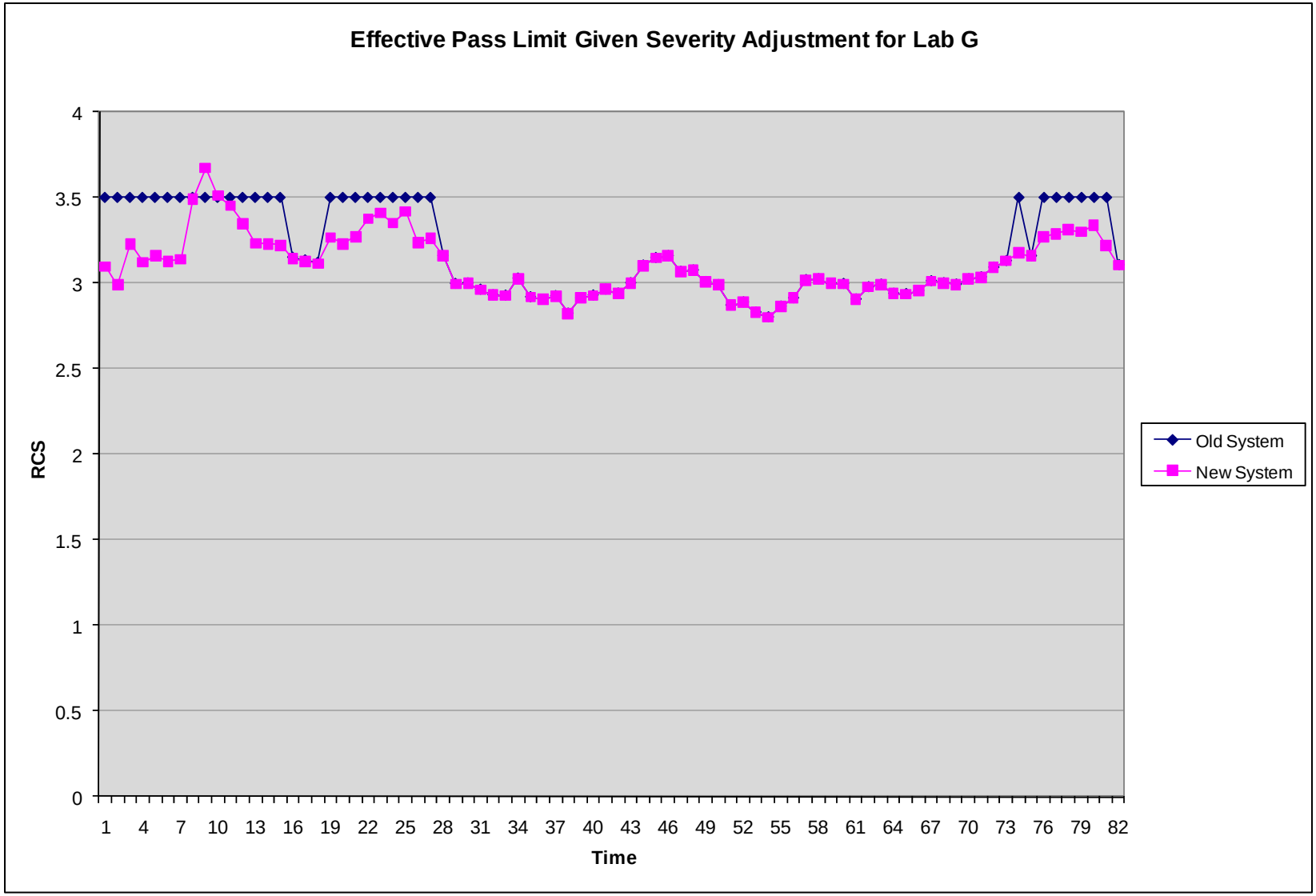

Effective Pass Limit Given Severity Adjustment for Lab F
250
200
150
100
50
0
PVIS
1
4
7
10
13
16
19
22
25
28
31
34
Time
Old System
New System

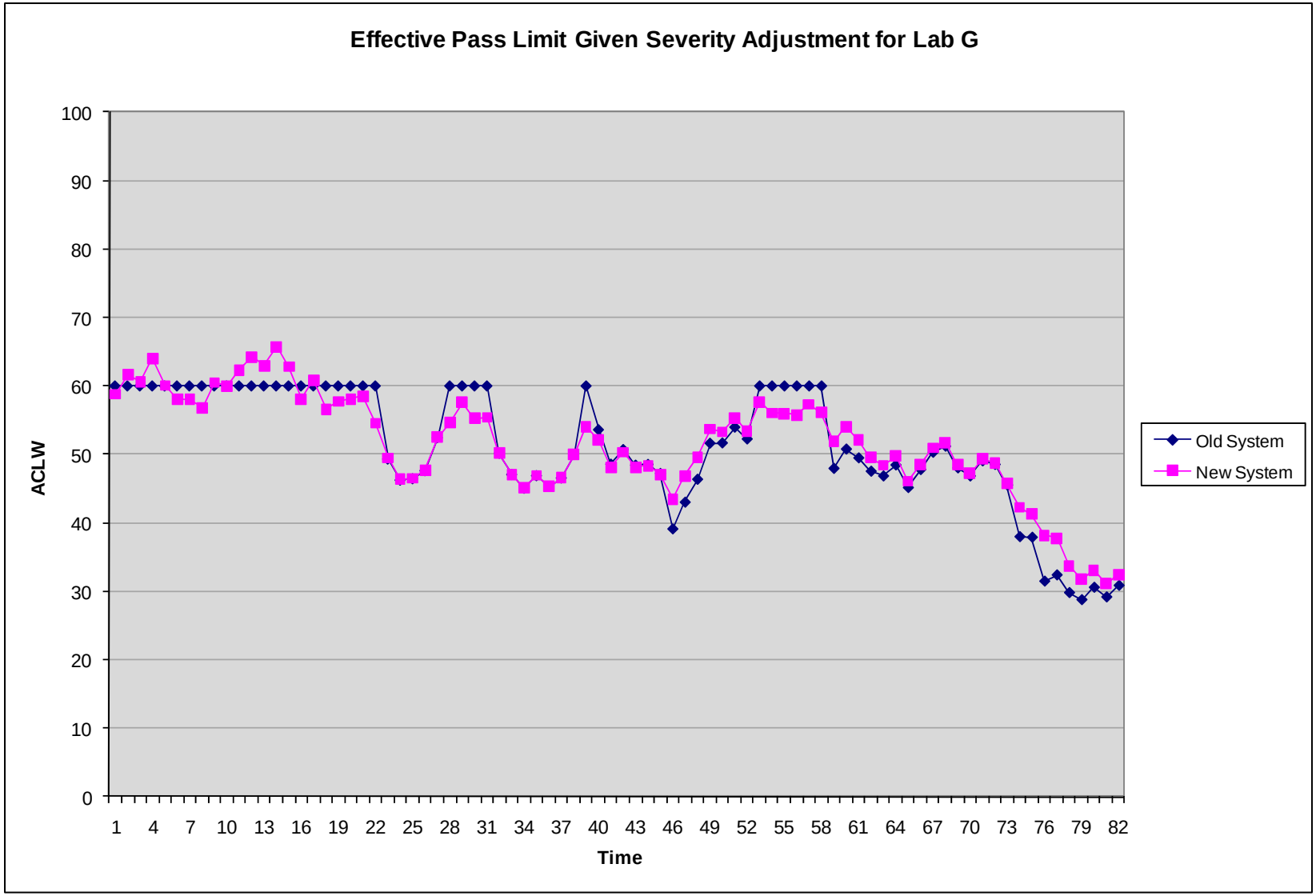

Effective Pass Limit Given Severity Adjustment for Lab F
WPD
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1
4
7
10
13
16
19
22
25
28
31
34
Time
Old System
New System


Effective Pass Limit Given Severity Adjustment for Lab F
ACLW
100
90
80
70
60
50
40
30
20
10
0
1
4
7
10
13
16
19
22
25
28
31
34
Time
Old System
New System

Lab G


Effective Pass Limit Given Severity Adjustment for Lab G
PVIS
250
200
150
100
50
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82
Time
Old System
New System


Effective Pass Limit Given Severity Adjustment for Lab G
RCS
4
3.5
3
2.5
2
1.5
1
0.5
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82
Time
Old System
New System


Effective Pass Limit Given Severity Adjustment for Lab G
ACLW
100
90
80
70
60
50
40
30
20
10
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82
Time
Old System
New System

Attachment 17

THE ASTM SEQUENCE III SURVEILLANCE PANEL

SCOPE & OBJECTIVES

SCOPE

The Sequence III Surveillance Panel is responsible for the surveillance and continual improvement of the Sequence IIIF and IIIFHD tests documented in ASTM Standard D6984 as update by the Information Letter System. The Sequence III Surveillance Panel is also responsible for the surveillance and continual improvement of the Sequence IIIG, IIIGA and IIIGB tests documented in ASTM Standard D7320 as updated by the Information Letter System. Data on test precision will be solicited and evaluated at least every six (6) months for Sequence III test procedures. The Surveillance Panel is to provide continual improvement of rating techniques, test operation, test monitoring and test validation through communication with the Test Sponsor, ASTM Test Monitoring Center, the Central Parts Distributor, Fuel Supplier, ASTM B0.01 Passenger Car Engine Oil Classification Panel, ASTM Committee B0.01, ACC Monitoring Agency and ASTM Deposit/Distress Workshop. Actions to improve the process will be recommended when appropriate based on input to the Surveillance Panel from one or more of the previously stated groups. This process will provide the best possible Sequence III Type Test Procedure for evaluating engine oil performance with respect to it's ability to prevent oil thickening, varnish formation, oil consumption and engine wear.

OBJECTIVES	TARGET DATE
Plan and conduct unified engine build	Open
Monitor industry hardware inventory	Ongoing
Develop new LTMS Version 2 recommendations	Ongoing

David L. Glaenzer, Chairman
Sequence III Surveillance Panel

Updated 05/12/2010
San Antonio, TX USA

ATTACHMENT 18

Sequence III Surveillance Panel

May 12, 2010
1:00 pm
Call-in Number is: 866-588-1857
Conference Code: 2105226802

Agenda

1) Roll Call

2) Approval of minutes

September 11, 2009 Teleconference
November 18, 2009 Surveillance Panel
February 2, 2010 Teleconference
April 8, 2010 Teleconference

3) Action Item Review

11/18/2009; Action needed to put AFR change in place
11/18/2009; Wording to allow oil filter with holes in media replacement

4) Semi-Annual Reports

Central Parts Distributor
GM Motorsports
Test Longevity
Fuel Supplier
ASTM Test Monitoring Center
ACC Monitoring Agency

5) Old Business

ACLW Task Force
- Follow-Up of open action items
- Re-instate ACLW lower limit Shewhart acceptance criteria ?

Discussion pertaining to need to measure NO_X

6) New Business

Reference oil issues
- RO 435-2
- GF-5 category oil

IIIGA time limit to analyze samples

Maximum limit of 4.65L for oil consumption interpretability
Sunnen Honing Brushes
New LTMS

7) Review Scope and Objectives

8) Review New Action Items

9) Next Meeting

10) Meeting Adjourned