Sequence III Surveillance Panel
Meeting Minutes

April 13, 2016
11:00 – 12:30 EDT

1.0) Attendance

The attendance is shown in Attachment 1.

2.0) Chairman Comments

The main purpose of the call was to address IIIH items.

3.0) Approval of minutes

3.1) Minutes from 03/29/2016 Meeting in San Antonio, TX were approved without objection.

4.0) Action Item Review

4.1) Review change implemented to IIIG LTMS at March 09, 2016 meeting. Review after four months. Due 07/23/2016. **Glaenzer**

4.2) Review Sequence IIIH data for honing and cylinder size parameters that were temporarily suspended at 03/29/2016 meeting. Due approximately 11/01/2016.

5.0) Old Business

5.1) Review LTMS documents for Sequence IIIH, IIIHA & IIIHB following review by ASTM-Test Monitoring Center. Richard Grundza noted that these will be included in the next LTMS publication update.

5.2) Quality Index limits, monitoring of ECU parameters, oil pump operation and oil pressure. **Szappanos**
George Szappanos reported that the task force has been working on this. Addison Schweitzer moved, George Szappanos second the following motion:

> Based on CMIR-106763 (ranked worst on fuel temperature control and inlet air pressure), I would propose the following revisions to the respected IIIH QI limits:
>
> Inlet Air Pressure: +/- 0.02 kPa
> Fuel Temperature: +/- ~~2.0°C~~ revised after discussion to 1.0°C

Some concerns were expressed that the originally proposed fuel temp bands may be too wide. A productive debate ensued – the result of which is that Addison and George agreed to modify the motion for the fuel temp QI +/- to be 1.0 (instead of proposed 2.0) – the change is shown in the motion above. The motion passed without dissent and is effective 4/13/16.

6.0) **New Business**

6.1) IIIG Equivalent Limit in IIIH. Information pertaining to IIIG Equivalent Limit in IIIH test that has been presented to CLOG group. Does the SP have any insight that we may want to provide? **Martinez**
Jo Martinez reviewed the different approaches used in the presentation she provided (Attachment 2).

6.2) Appendix K Update. **Martinez**
Jo Martinez reviewed the status of Appendix K (Attachment 3).

6.3) Surveillance Panel recommendation regarding test readiness for the category. **All**
Motion (Glaenzer, Stockwell) was put forth:

> The Sequence III Surveillance Panel, having established Severity and Precision Control Charting via an LTMS system, having established test stand calibration and reference periods, having secure sources of test parts, fuel and reference oils, having identified parameters that may be used for pass-fail criteria, having up-to-date test procedures and engine assembly manuals and having established continuous surveillance as noted in the Scope and Objectives of the Sequence III Surveillance Panel, herby wishes to inform the Passenger Car Engine Oil Classification Panel, the Auto Oil Advisory Panel and the American Chemistry Council Petroleum PAPTG that the Sequence IIIH, IIIHA & IIIHB tests are ready for inclusion in ILSAC oil category GF-6.

After a spirited discussion, the motion passed 15-0-1. Dave Glaenzer will notify the appropriate industry stakeholders.

7.0) **Work Remaining**

7.1) Publish Research Report **TBD**
Karin Haumann will be leading this effort.

8.0) **Review Scope and Objectives**

No changes.

9.0) **Next Meeting**

The next meeting will be at the call of the chair.

10.0) **Meeting Adjourned:** 12:15 p.m.

ATTACHMENT 1

ASTM Sequence III Surveillance Panel (22 Voting members) date: 04/13/2016

Name	Email		Signature
Ed Altman	ed.altman@aftonchemical.com	Voting Member	Present ✓
Jeff Betz	jeff.betz@fcagroup.com	Voting Member	Present ✓
Jason Bowden	jhbowden@ohtech.com	Voting Member	Present ✓
Timothy L. Caudill	tlcaudill@ashland.com	Voting Member	Present ✓ AMOL
Richard Grundza	reg@astmtmc.cmu.edu	Voting Member	Present ✓
Jeff Hsu, PE	j.hsu@shell.com	Voting Member	Present ✓
Teri Kowalski	teri.kowalski@tema.toyota.com	Voting Member	Present ✓
Dan Lanctot	dlanctot@tei-net.com	Voting Member	Present ✓
Patrick Lang	plang@swri.org	Voting Member	Present ✓
~~Bruce Matthews~~ Member change	TIM BUSHING GM ~~bruce.matthews@gm.com~~	Voting Member	Present ✓
Mark Overaker	mhoveraker@jhaltermann.com	Voting Member	Present ✓
Andrew Ritchie	andrew.ritchie@infineum.com	Voting Member	Present ✓
Ron Romano	rromano@ford.com	Voting Member	Present ✓
Cliff Salvesen	clifford.r.salvesen@exxonmobil.com	Voting Member	Present ✓
Addison Schweitzer	addison.schweitzer@intertek.com	Voting Member	Present ✓
Greg Shank	greg.shank@volvo.com	Voting Member	Present
Kaustav Sinha, Ph.D.	LFNQ@chevron.com	Voting Member	Present
Thomas Smith	trsmith@ashland.com	Voting Member	Present
Scott Stap	scott.stap@tgidirect.com	Voting Member	Present ✓
George Szappanos	george.szappanos@lubrizol.com	Voting Member	Present ✓
Haiying Tang	haiying.tang@fcagroup.com	Voting Member	Present
David Tsui	david.tsui@bp.com	Voting Member	Present

ASTM Sequence III Surveillance Panel (22 Voting members) date: 04/13/2016

Name	Email		Signature
Ricardo Affinito	affinito@chevron.com	N-V Member	Present_____
Art Andrews	arthur.t.andrews@exxonmobil.com	N-V Member	Present_____
Robert Bacchi	robert.bacchi@basf.com	N-V Member	Present_____
Terry Bates	batesterryw@aol.com	N-V Member	Present_____
Doyle Boese	doyle.boese@infineum.com	N-V Member	Present_____
Adam Bowden	adbowden@ohtech.com	N-V Member	Present_____
Dwight H. Bowden	dhbowden@ohtech.com	N-V Member	Present_____
Matt Bowden	mjbowden@ohtech.com	N-V Member	Present_____
Jerome A. Brys	jerome.brys@lubrizol.com	N-V Member	Present_____
Jessica Buchanan	jessica.buchanan@lubrizol.com	N-V Member	Present_____
Bill Buscher III	william.buscher@intertek.com	N-V Member	Present_____
Bob Campbell	bob.campbell@aftonchemical.com	N-V Member	Present_____
Chris Castanien	chris.castanien@nesteoil.com	N-V Member	Present_____
Martin Chadwick	martin.chadwick@intertek.com	N-V Member	Present_____
Ankit Chaudhry	ankit.chaudhry@swri.org	N-V Member	Present_____
Jeff Clark	jac@astmtmc.cmu.edu	N-V Member	Present_____
Sid Clark	sidney.clark@swri.org	N-V Member	Present_____
Phil Davies	daviesjp@bp.com	N-V Member	Present_____
Todd Dvorak	todd.dvorak@aftonchemical.com	N-V Member	Present_____
Frank Farber	fmf@astmtmc.cmu.edu	N-V Member	Present_____
Joe Franklin	joe.franklin@intertek.com	N-V Member	Present_____
Gordon Farnsworth	gordon.farnsworth@infineum.com	N-V Member	Present_____
David L. Glaenzer	dave.glaenzer@aftonchemical.com	N-V Member	Present_____
Karin E. Haumann	karin.haumann@shell.com	N-V Member	Present_____
Martin Heimrich	martin.heimrich@swri.org	N-V Member	Present_____
Jason Holmes	jason.holmes@basf.com	N-V Member	Present_____
Walter Lerche	walt.lerche@gm.com	N-V Member	Present_____
Jim Linden	lindenjim@jlindenconsulting.com	N-V Member	Present_____

ASTM Sequence III Surveillance Panel (22 Voting members) date: 04/13/2016

Name	Email		Signature
Scott Lindholm	scott.lindholm@shell.com	N-V Member	Present____
Jo Martinez	jogm@chevrontexaco.com	N-V Member	Present ✓
James Matasic	james.matasic@lubrizol.com	N-V Member	Present____
Mike McMillan	mmcmillan123@comcast.net	N-V Member	Present ✓
Bob Olree	olree@netzero.net	N-V Member	Present____
Kevin O'Malley	kevin.omalley@lubrizol.com	N-V Member	Present____
Dave Passmore	dpassmore@imtsind.com	N-V Member	Present ✓
Christian Porter	christian.porter@aftonchemical.com	N-V Member	Present____
Phil Rabbat	phil.rabbit@basf.com	N-V Member	Present____
Allison Rajakumar	allison.rajakumar@lubrizol.com	N-V Member	Present____
Scott Rajala	srajala@ilacorp.com	N-V Member	Present____
Jim Rutherford	jaru@chevrontexaco.com	N-V Member	Present____
Bob Salgueiro	bob.salgueiro@infineum.net	N-V Member	Present____
Elisa Santos	elisa.santos@infineum.com	N-V Member	Present____
Hirano Satoshi	satoshi_hirano_aa@mail.toyota.co.jp	N-V Member	Present____
Amol Savant	acsavant@ashland.com	N-V Member	Present ✓
Philip R. Scinto	prs@lubrizol.com	N-V Member	Present____
Robert Stockwell	robert.stockwell@chevron.com	N-V Member	Present ✓
Chris Taylor	chris.taylor@vpracingfuels.com	N-V Member	Present____
Ben Weber	bweber1@sat.rr.com	N-V Member	Present____
Angela Willis	angela.p.willis@gm.com	N-V Member	Present____
Tom Wingfield	wingftm@cpchem.com	N-V Member	Present____
Mike Reaney	GM		✓
Ankit	SW		✓
Andrew Baczynsky			✓

ATTACHMENT 2

IIIG Equivalent Limit in IIIH

Statistics Group

March 14, 2016

Statistics Group

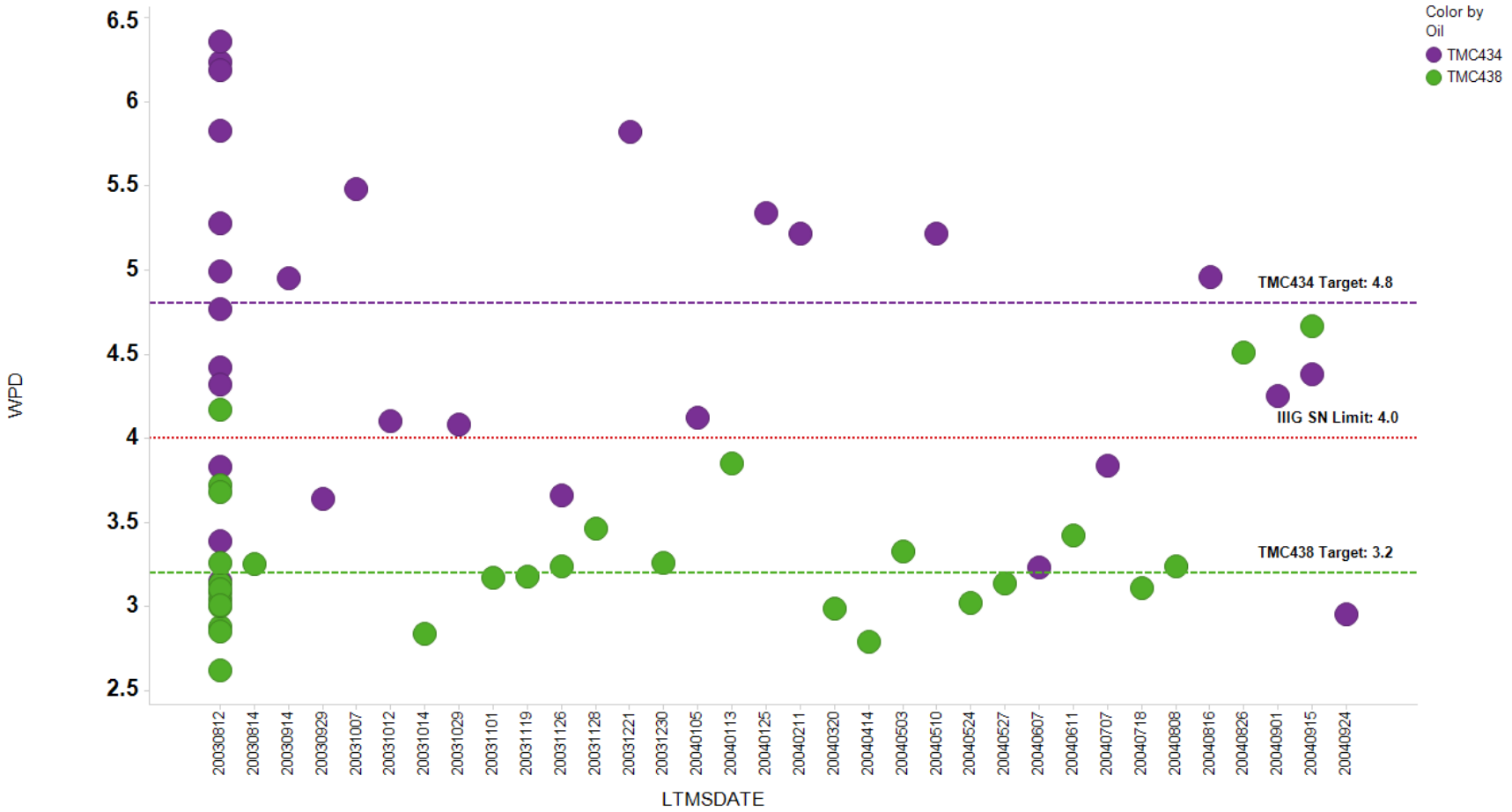
- Art Andrews, Exxon Mobil
- Martin Chadwick, Intertek
- Jo Martinez, Chevron Oronite
- Richard Grundza, TMC
- Travis Kostan, SwRI
- Lisa Dingwell, Afton Chemical
- Todd Dvorak, Afton Chemical
- Doyle Boese, Infineum
- Kevin O'Malley, Lubrizol

Summary

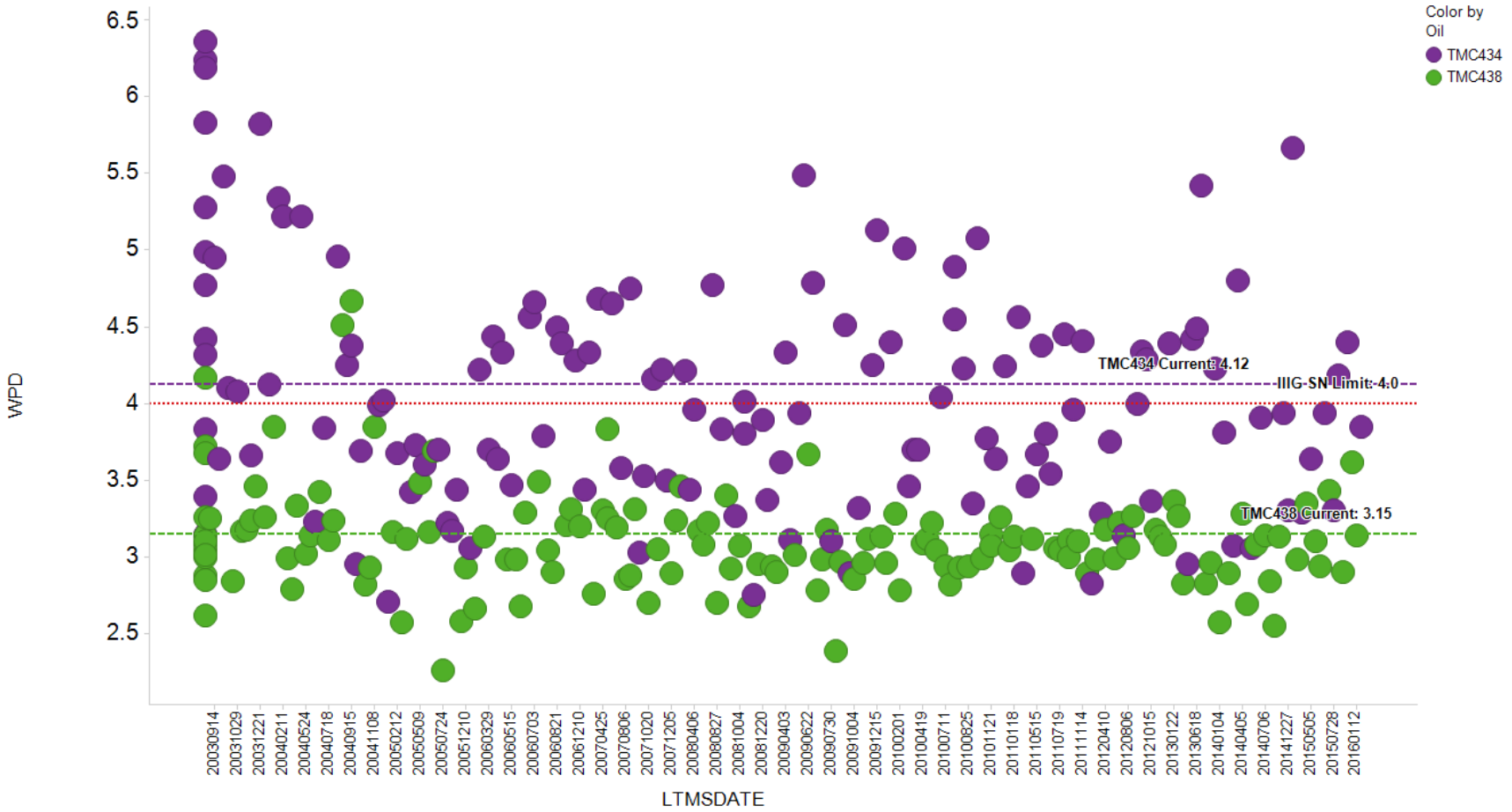
	IIIG Period	WPD	PVIS
IIIG SN Limit	2009-present	4.0	150
IIIG Effective Limit		3.7	154
IIIG SN Limit in IIIH			
Based on 434-2 only	20141220 to 20150728	3.7	73
Based on 434 blends	20030812 to 20160119	3.7	126
Based on 434 and 438 blends	20030812 to 20160119	4.0	150
Probability of Pass (TMC434)	2003-2004	3.8	151

WPD

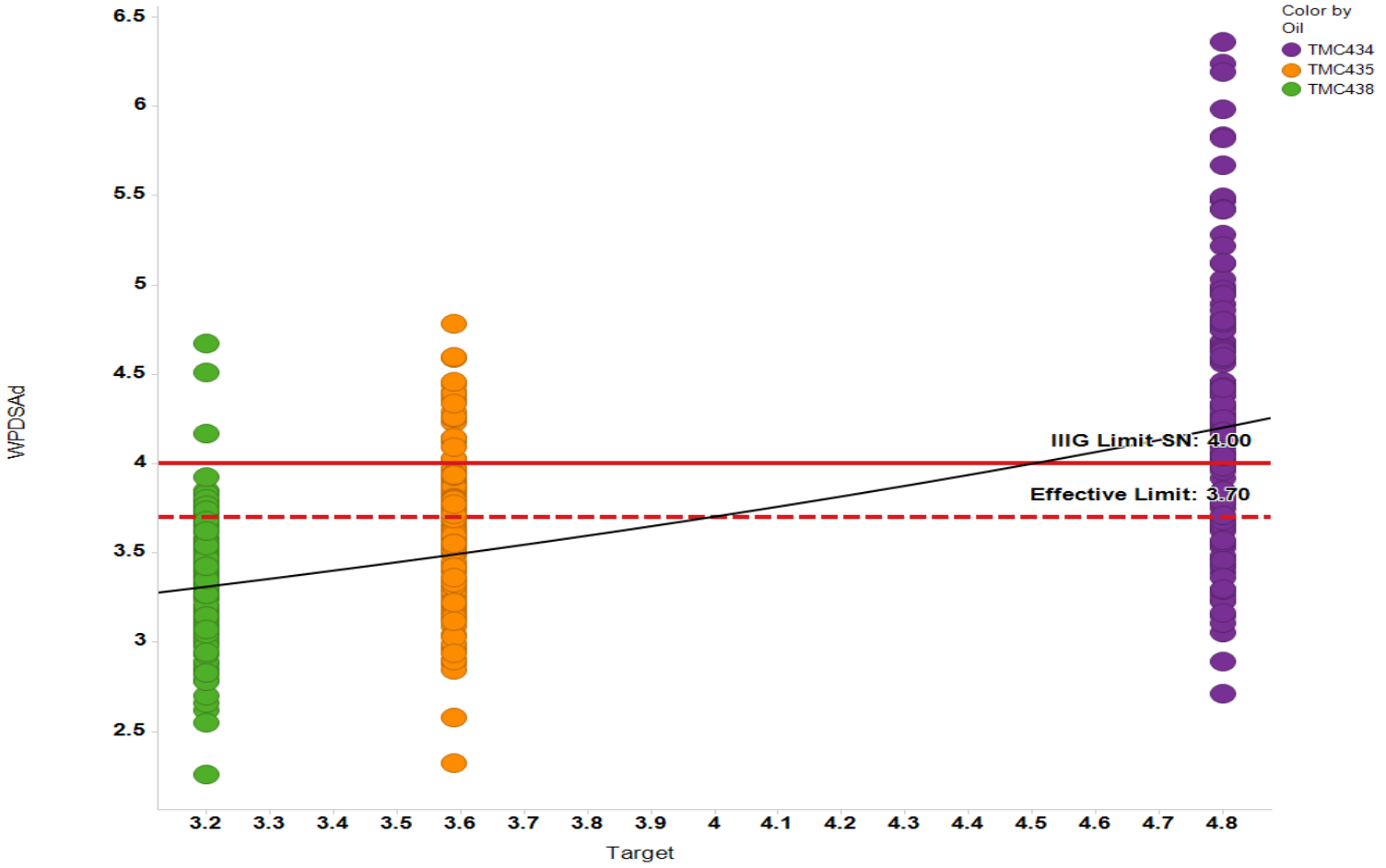
IIIG WPD Original Target Setting (2003-2004)



IIIG WPD (20030812 to 20160119)

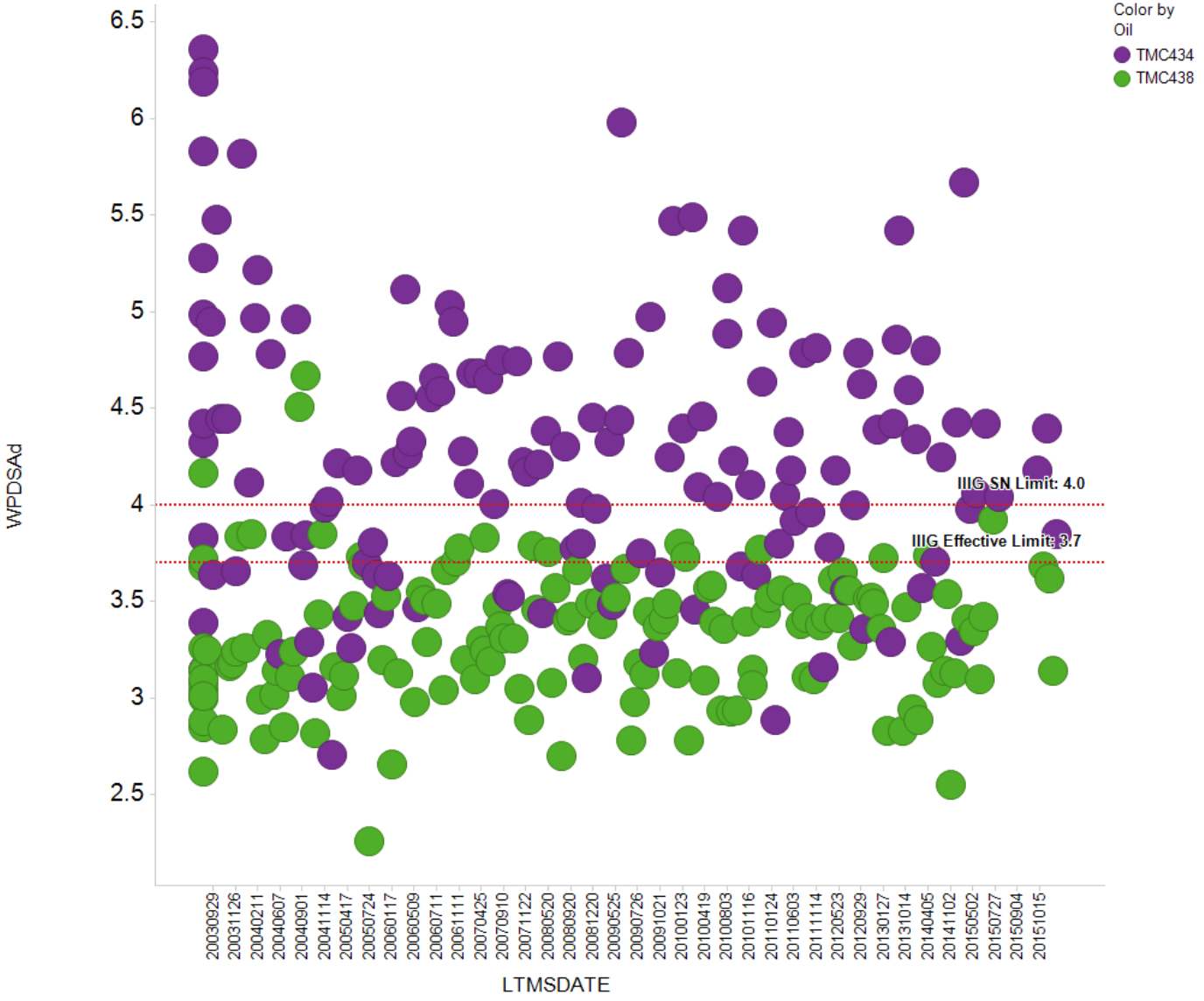


WPD Effective SN Limit

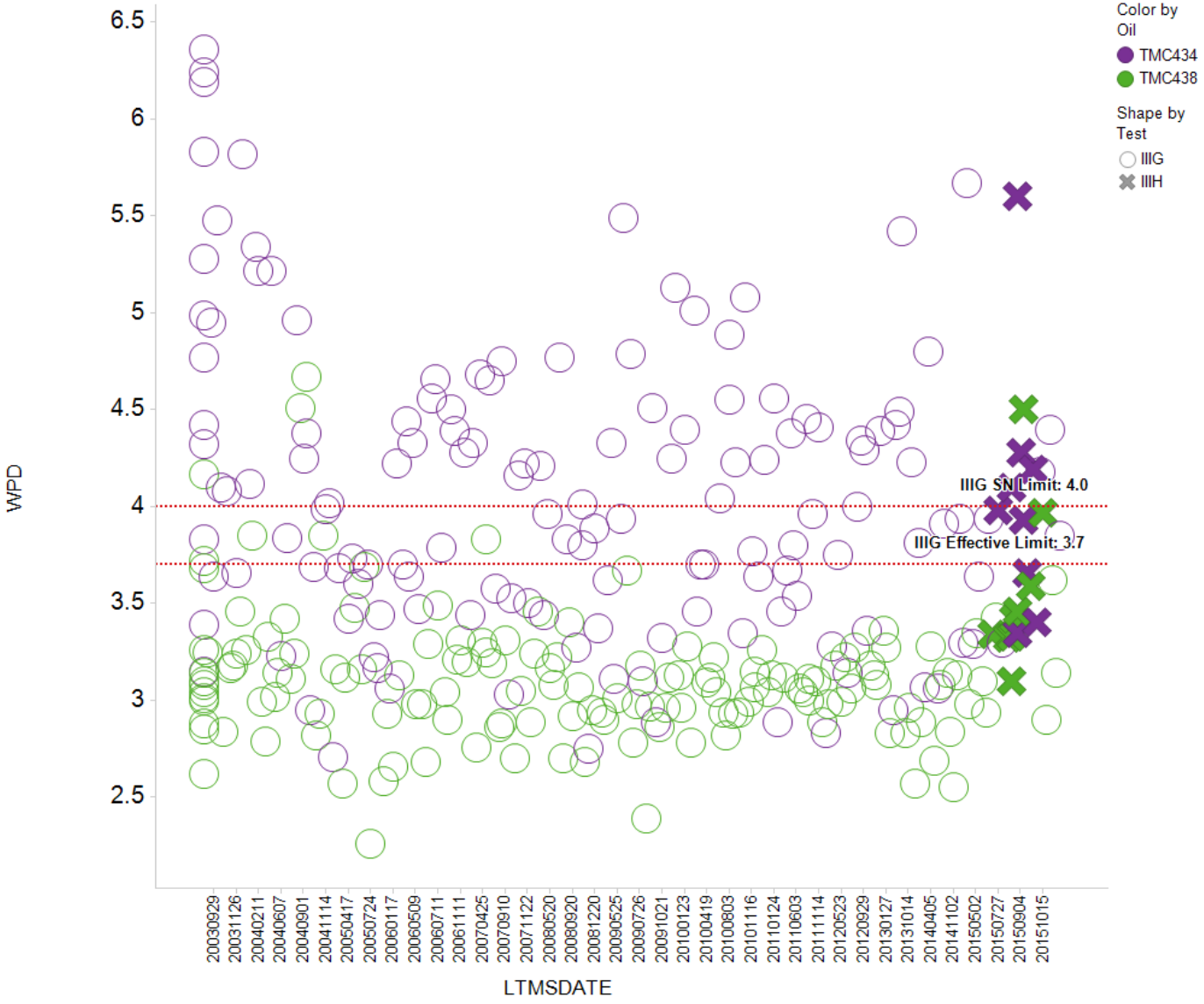


- Data used in analysis includes all chartable data from Aug. 2003 to Jan. 2016.
- By regressing WPD Severity Adjusted results against LTMS targets, determine the corresponding result for a WPD of 4.0, the IIIG SN Limit.
- Effective Limit – An oil that gives 4.0 in 2003 will give 3.7 on average over the life of the test.

IIIG WPD Effective Limit



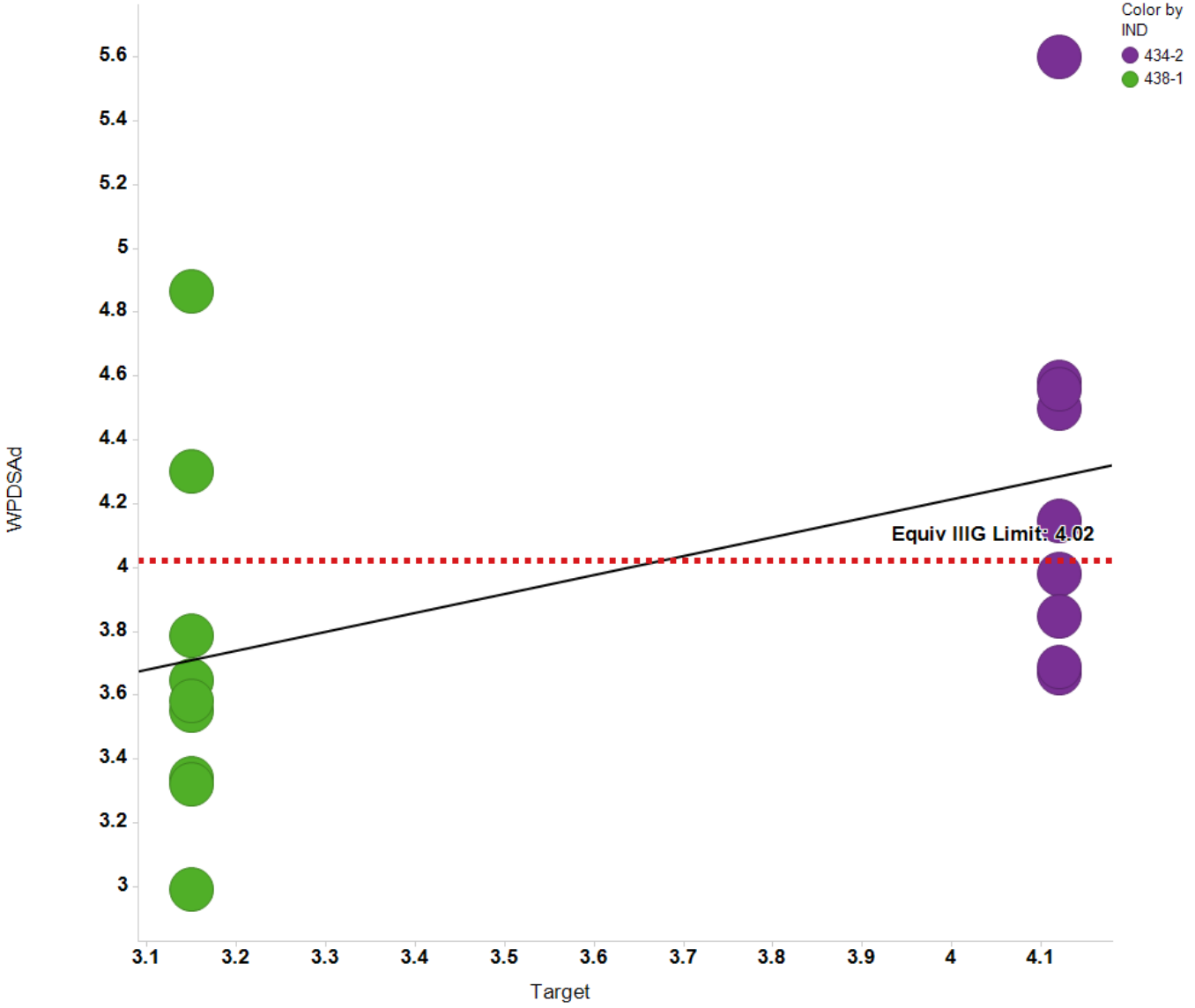
IIIG WPD (20030812 to 20160119) with IIIH



Using 434-2 only, the means are the same for IIIG and IIIH so the IIIG Equivalent SN Limit in IIIH is 3.7

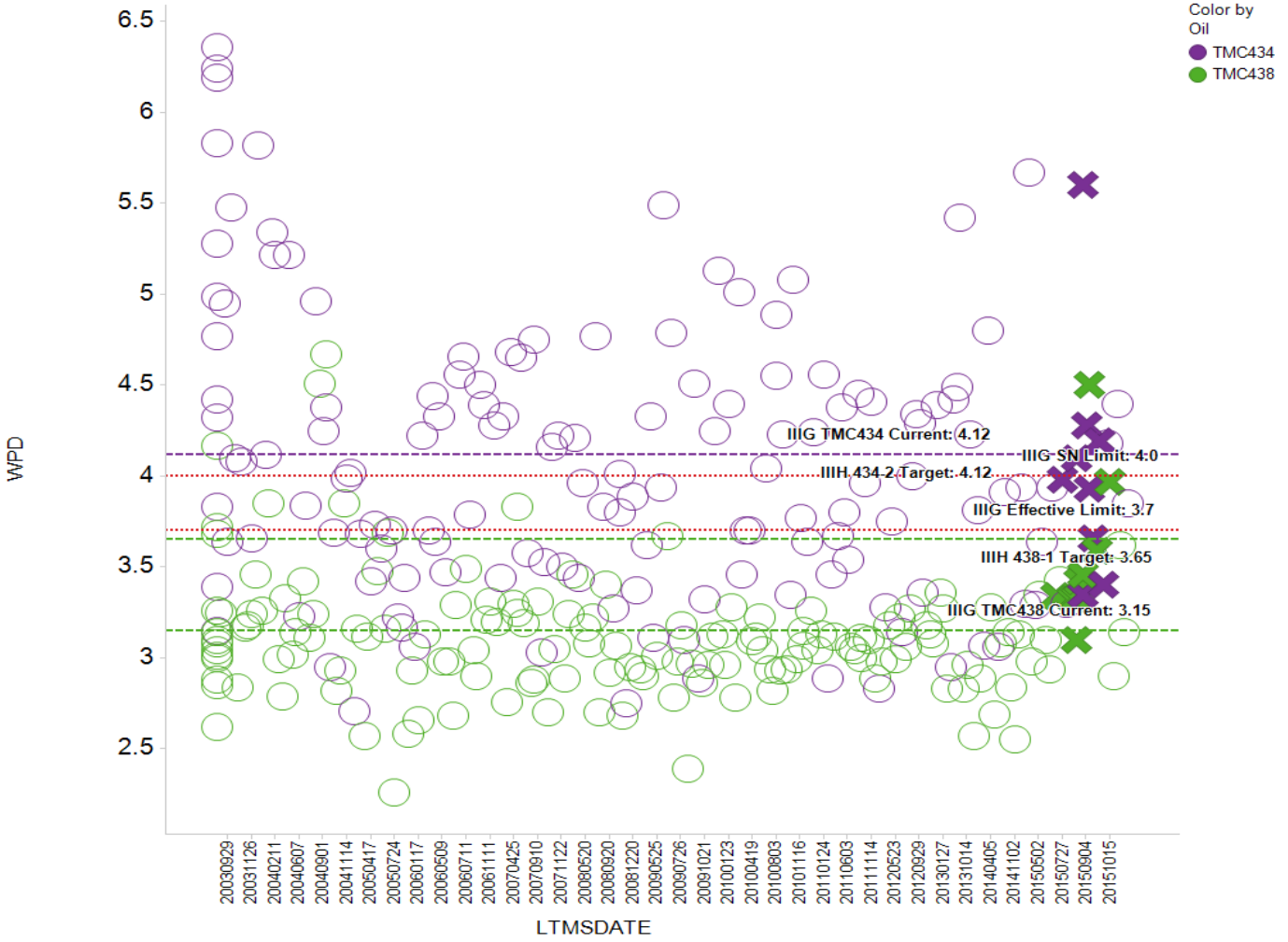
Using 434 blends, the means are the same for IIIG and IIIH so the IIIG Equivalent SN Limit in IIIH is 3.7

IIIG WPD Equivalent Limit in IIIH using 434-2 and 438-1



By regressing IIIH WPD Severity Adjusted results against IIIG current targets, determine the corresponding result for a WPD of 3.7, the IIIG Effective SN Limit.

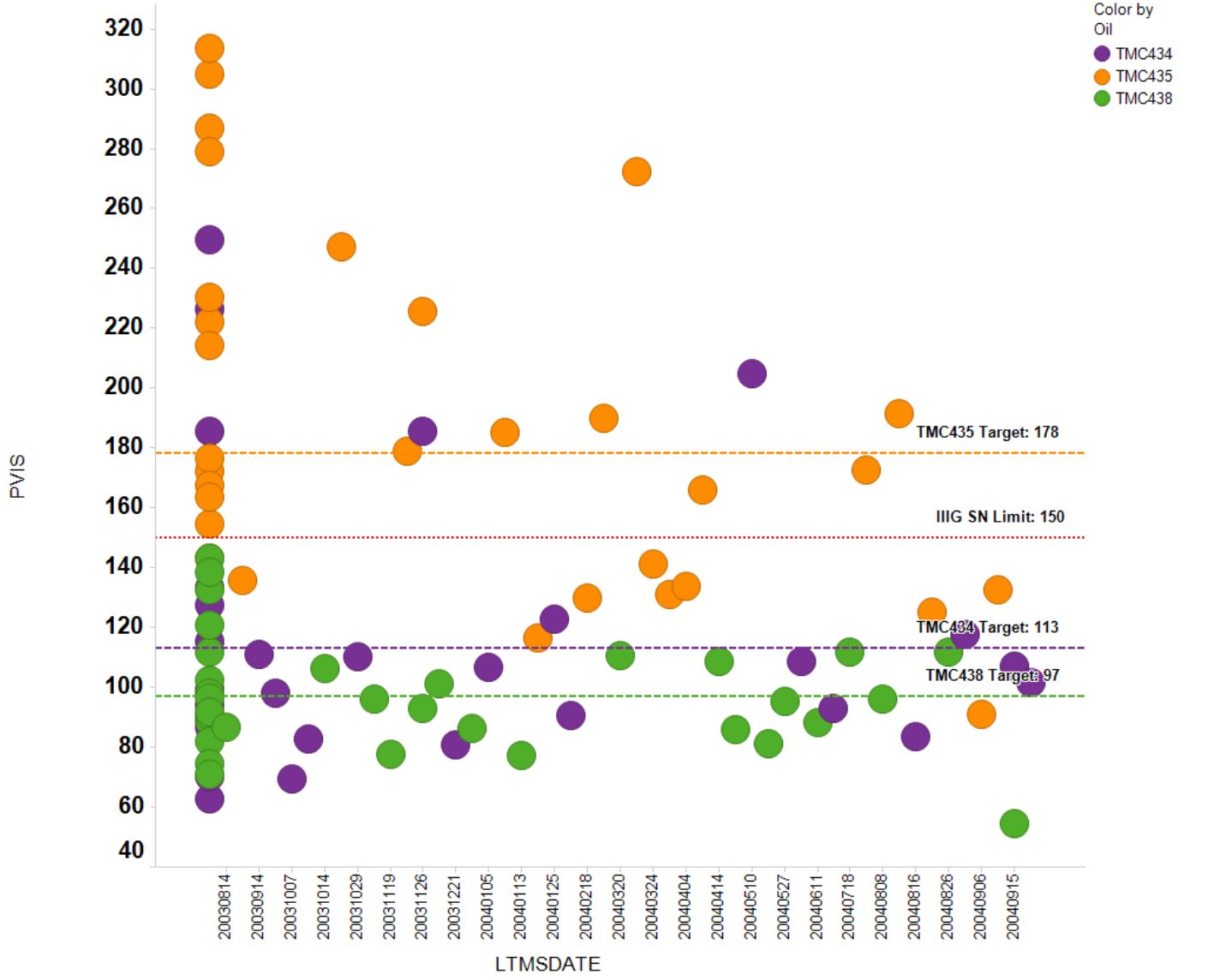
Using 434 and 438 blends, interpolation from linear equation suggests IIIG Equivalent SN Limit in IIIH is 4.0



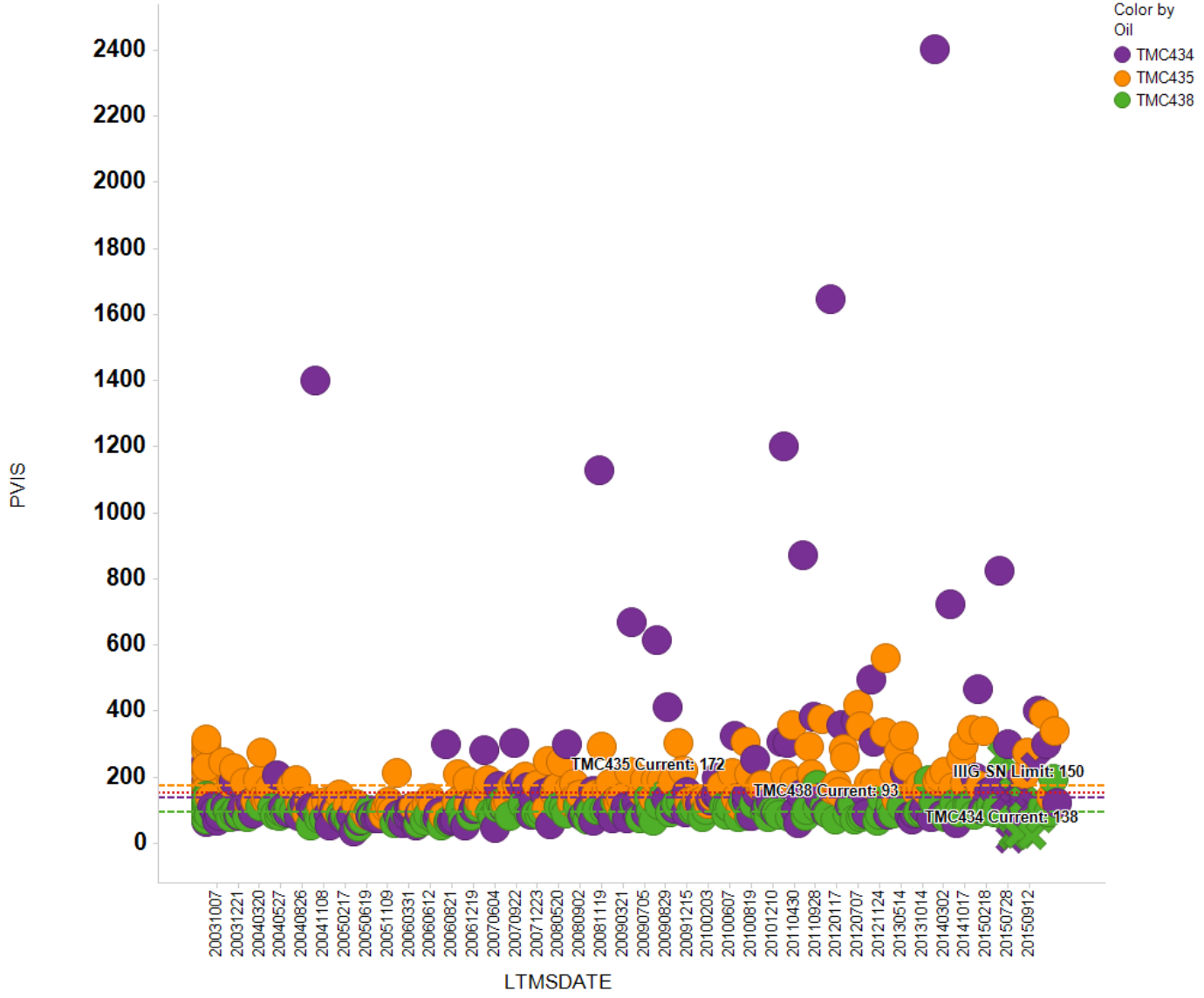
Although no 438-1 results in the IIIG, assume 438 and 438-1 blends are equivalent

PVIS

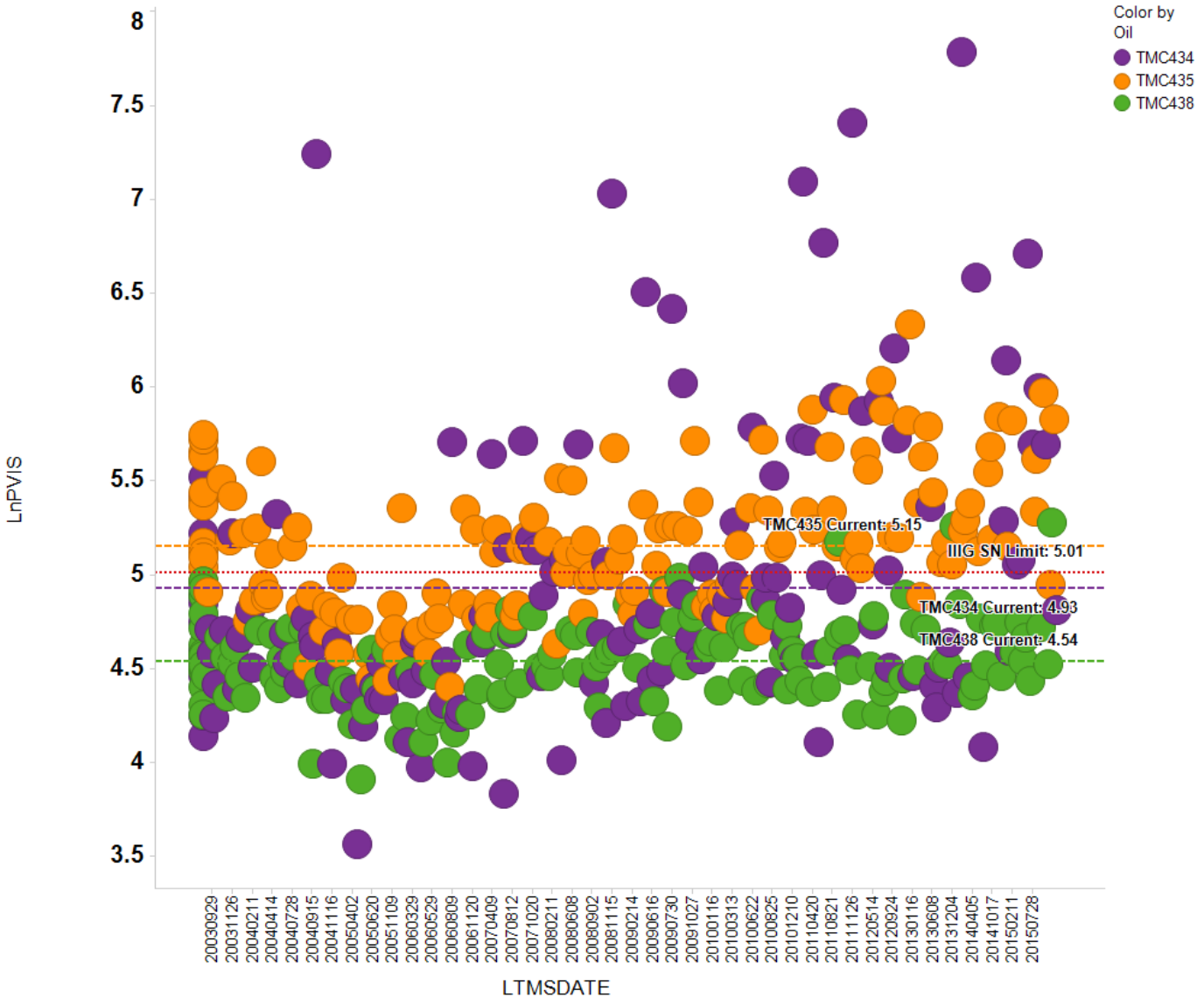
IIIG PVIS Original Target Setting (2003-2004)



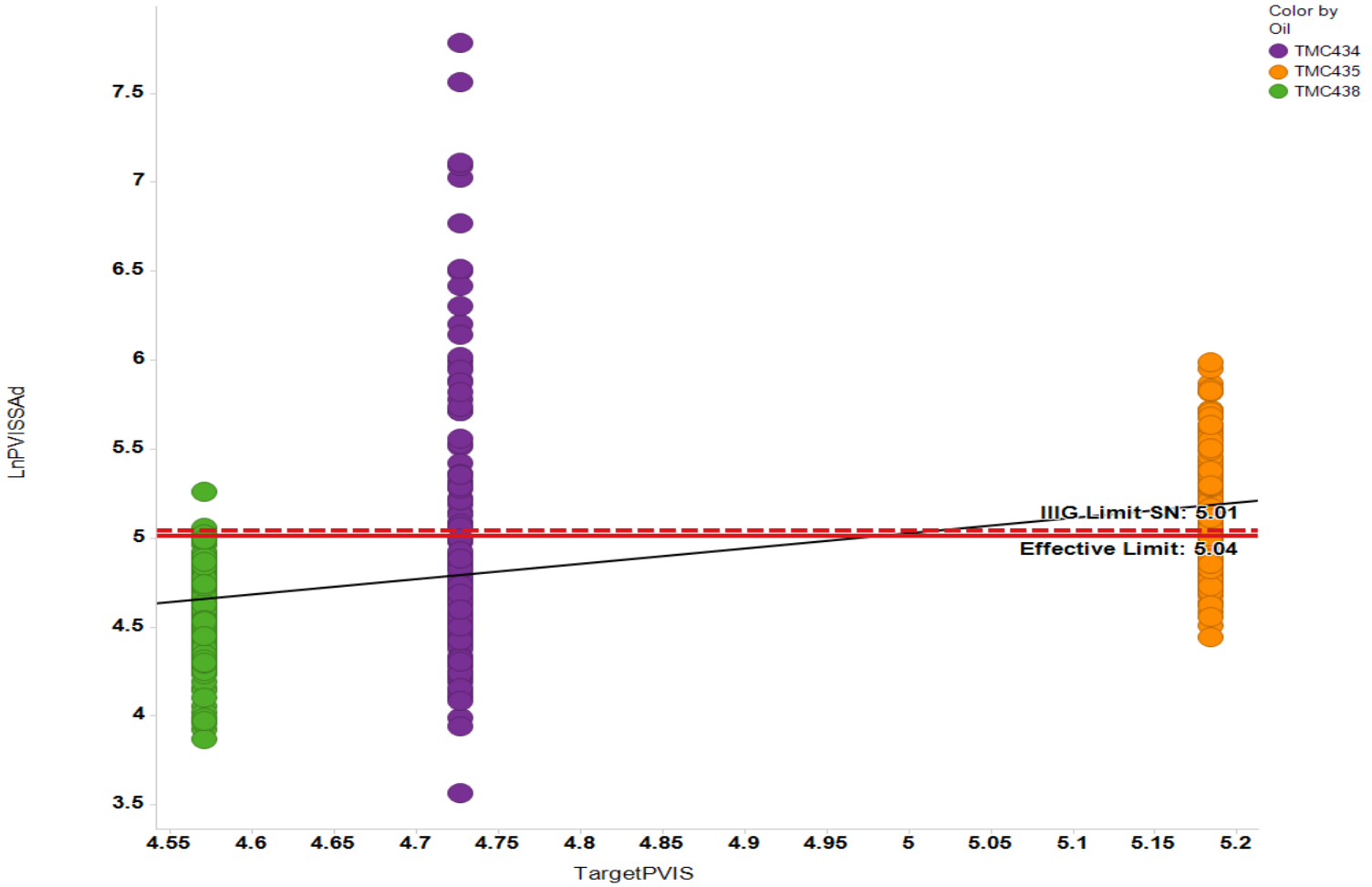
IIIG PVIS (20030812 to 20160119)



IIIG LnPVIS (20030812 to 20160119)

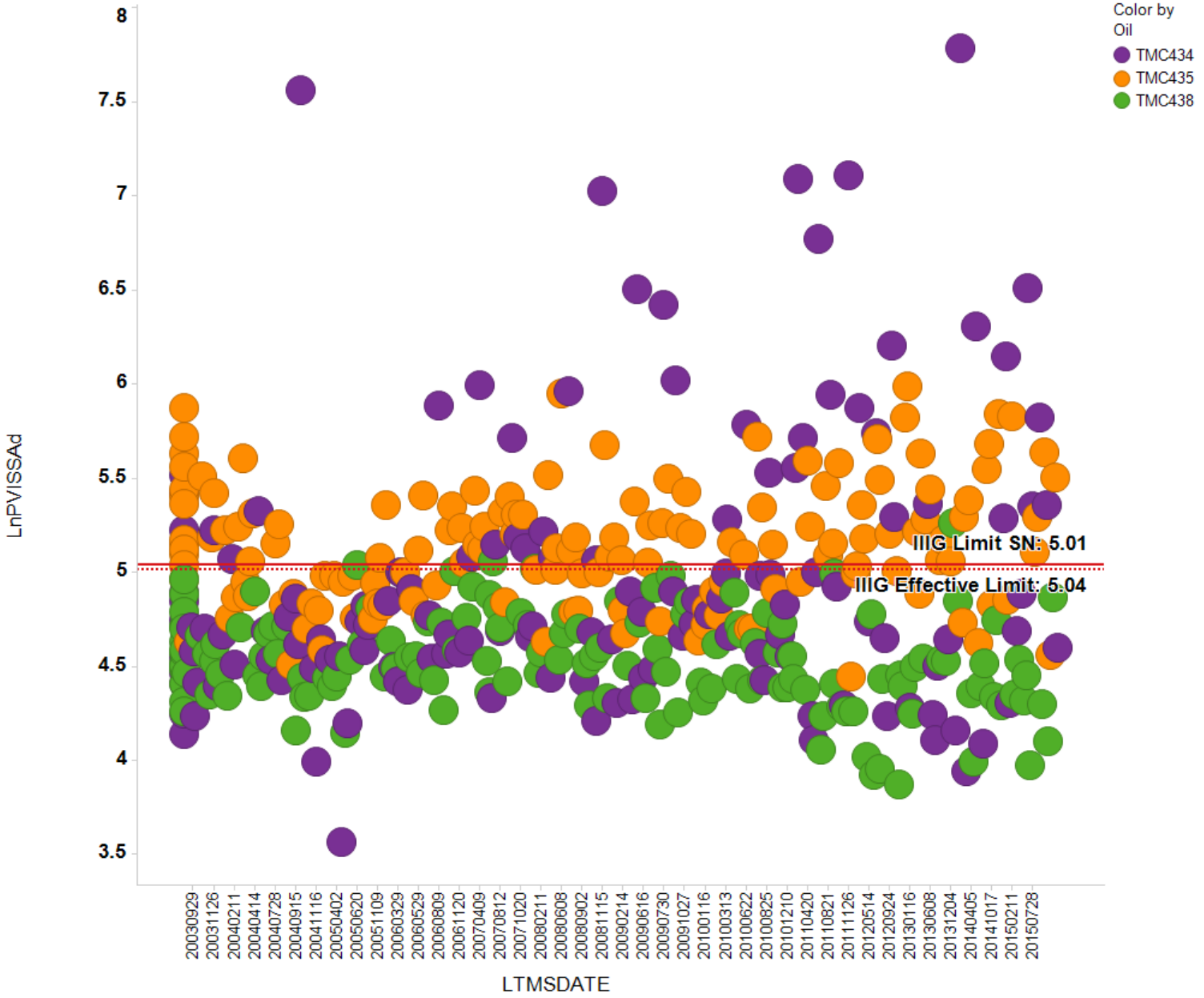


LnPVIS Effective SN Limit

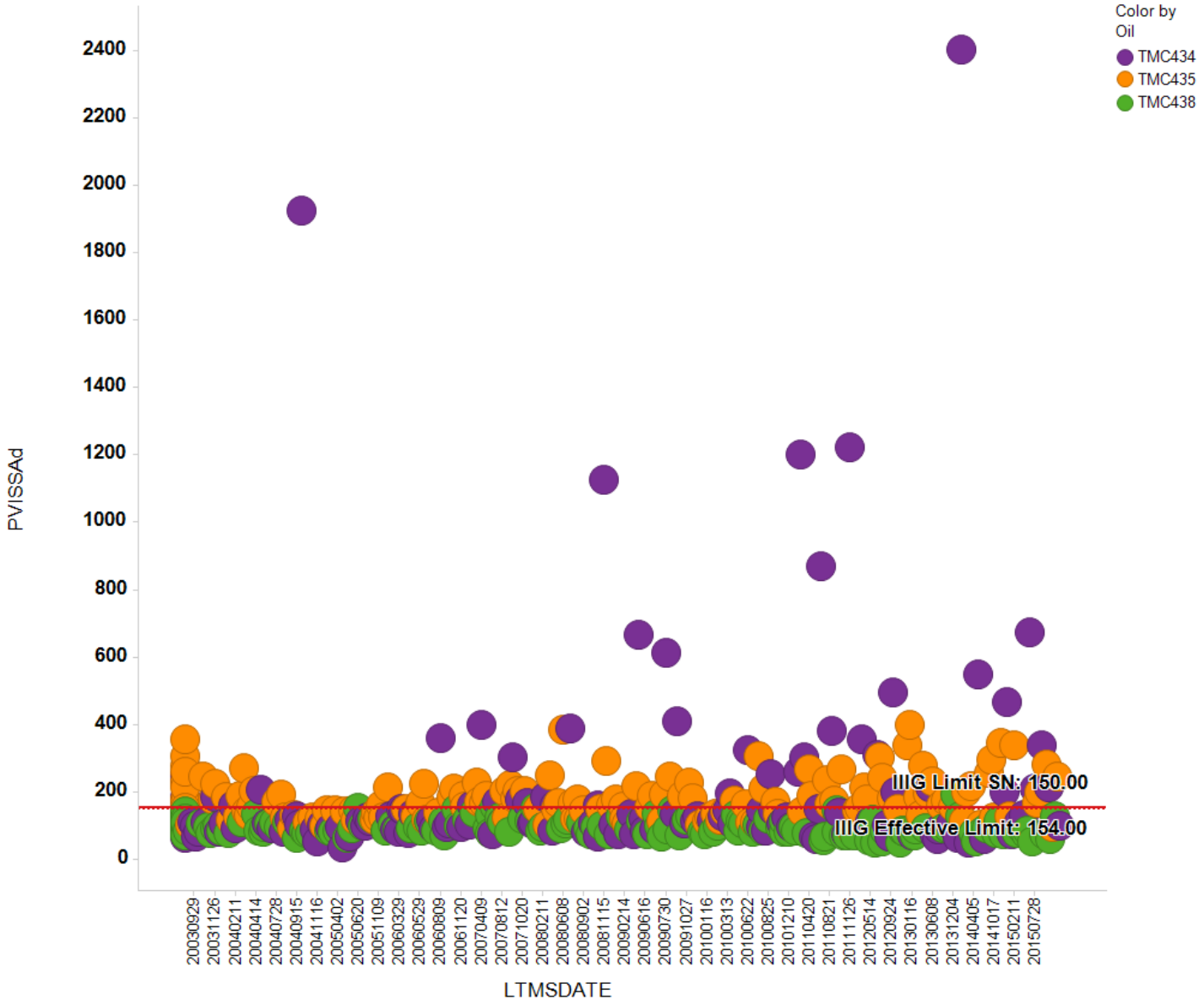


- Data used in analysis includes all chartable data from Aug. 2003 to Jan. 2016.
- By regressing LnPVIS Severity Adjusted results against limit setting targets, determine the corresponding result for a LnPVIS of 5.01, the IIIG SN Limit.
- Effective Limit – An oil that gives 5.01 (150%) in 2003 will give 5.04 (154%) on average over the life of the test.

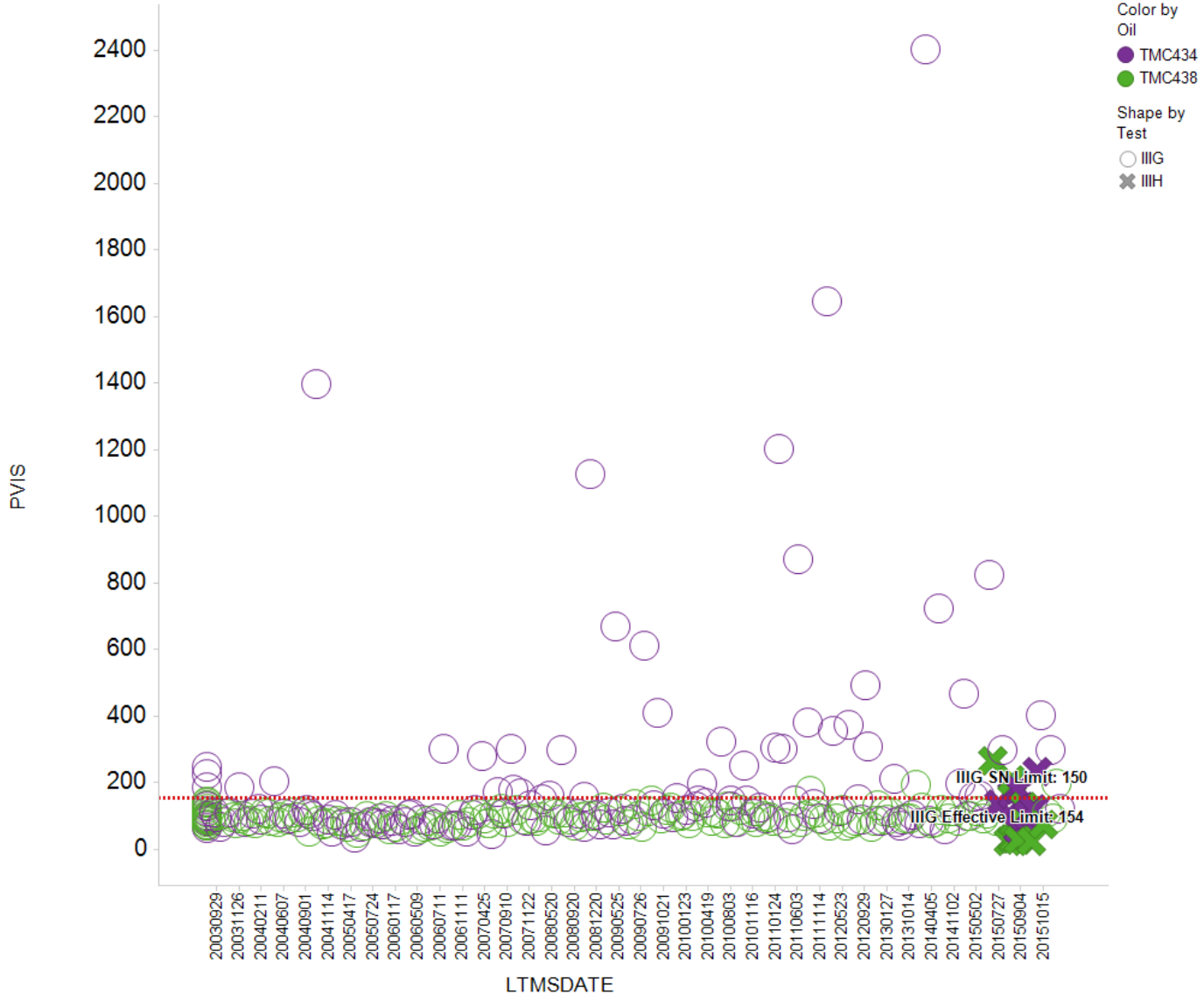
IIIG LnPVIS Effective SN Limit



IIIG PVIS Effective SN Limit

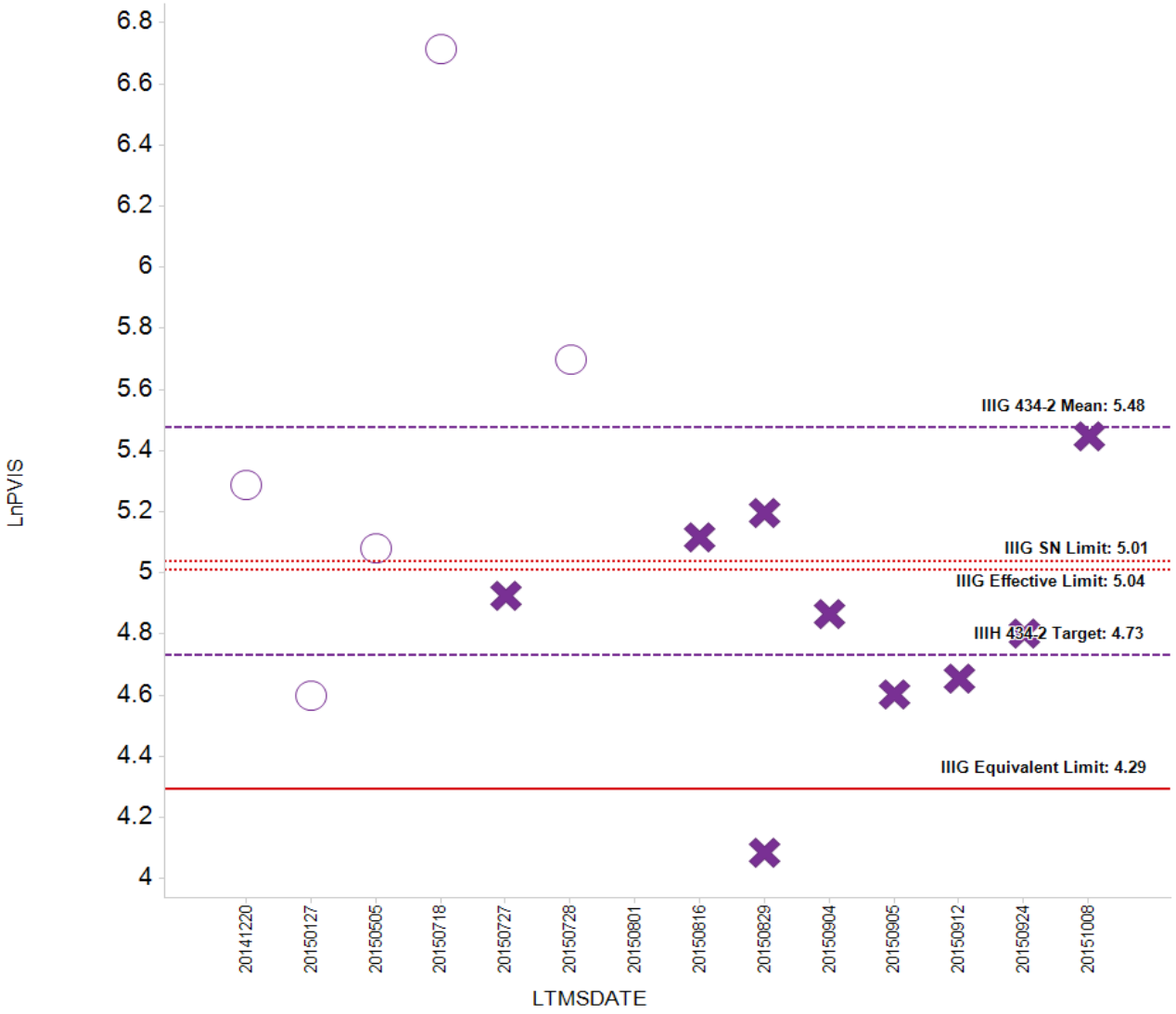


IIIG PVIS (20030812 to 20160119) with IIIH

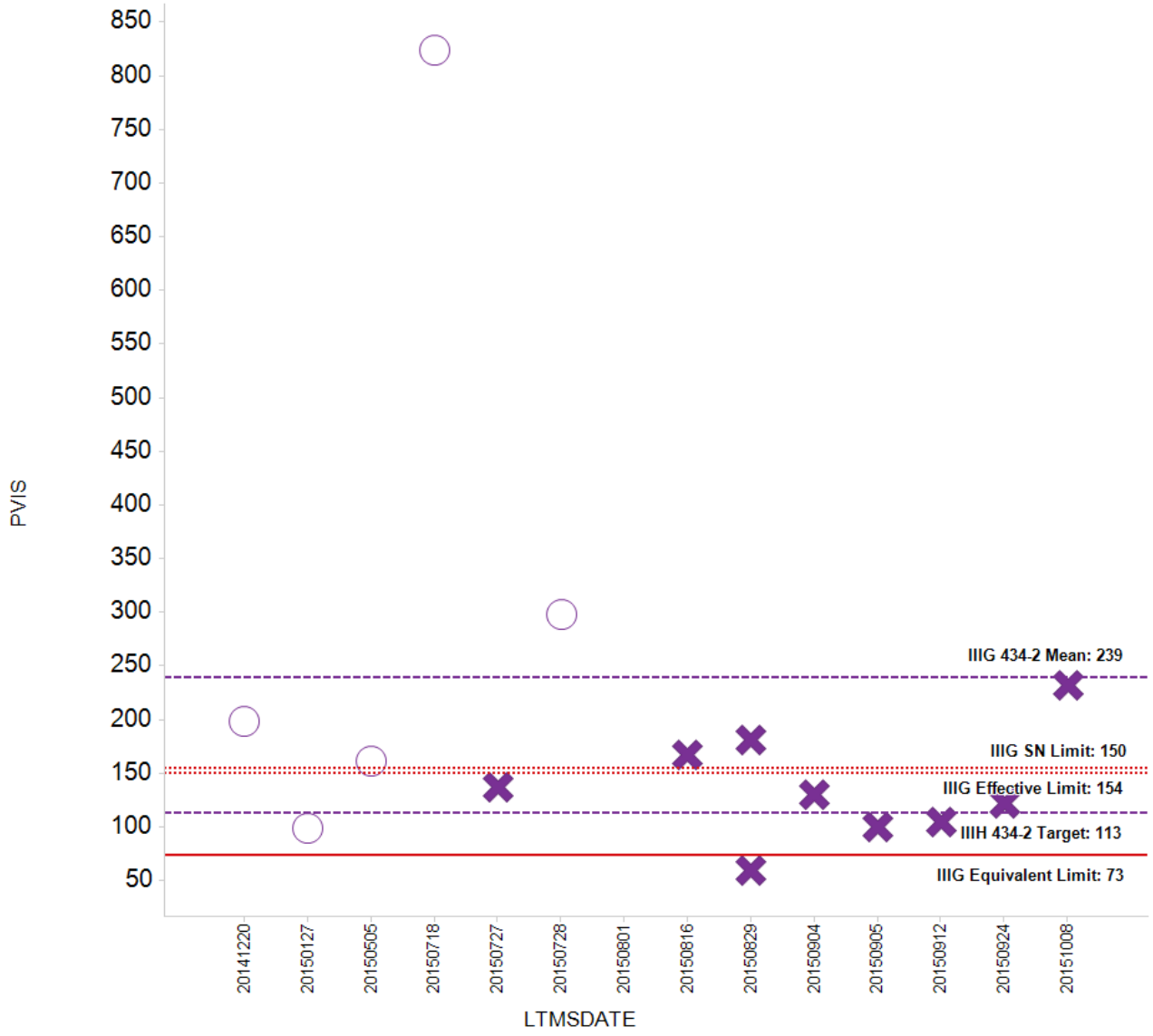


IIIG LnPVIS (20030812 to 20160119) with IIIH

Using 434-2 only, the mean for IIIG is higher than the IIIG Effective Limit by 0.44. Using the same distance from the IIIH mean, IIIG LnPVIS Equivalent Limit in IIIH is 4.29.

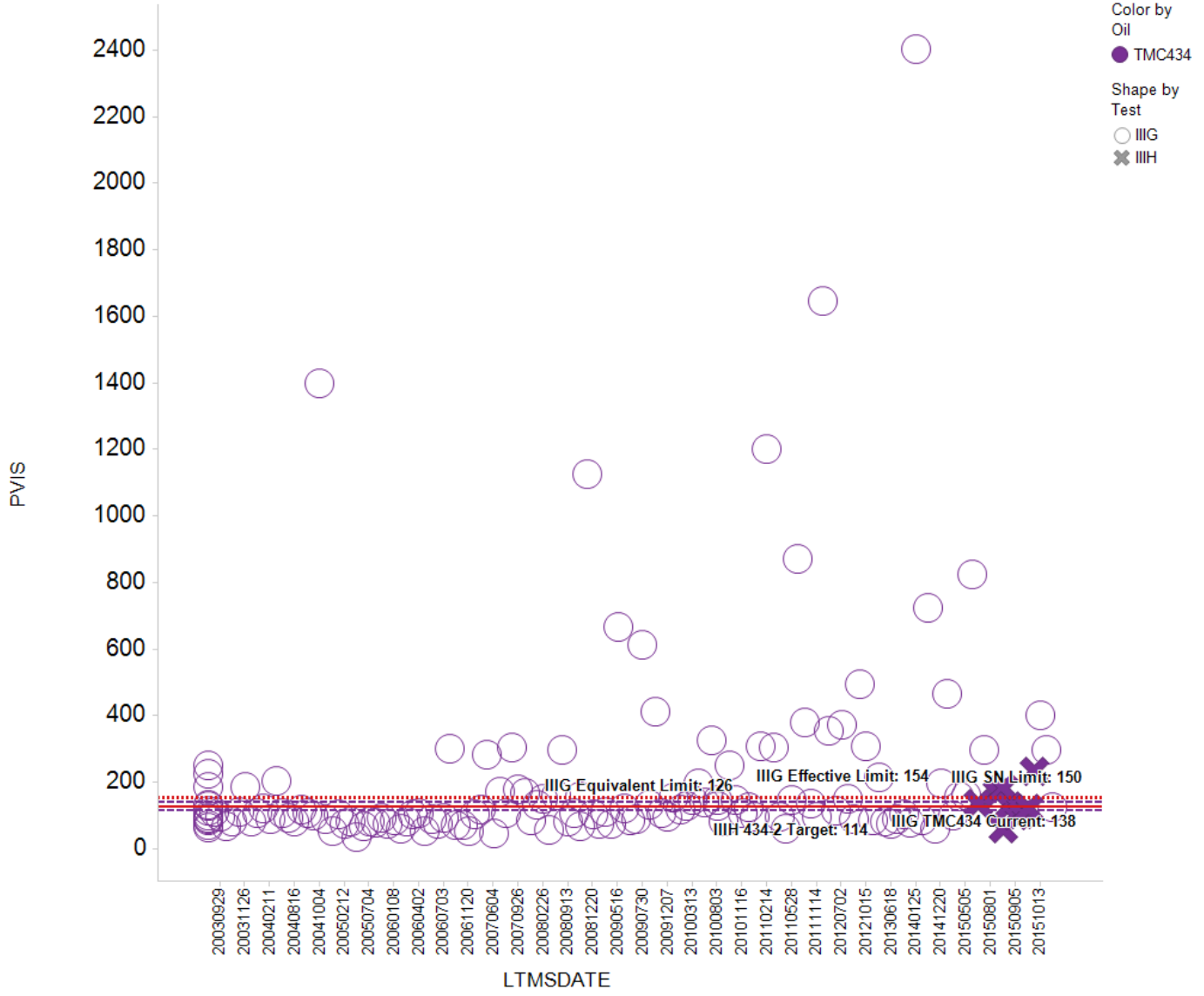


Using 434-2 only, IIIG PVIS Equivalent Limit in IIIH is 73

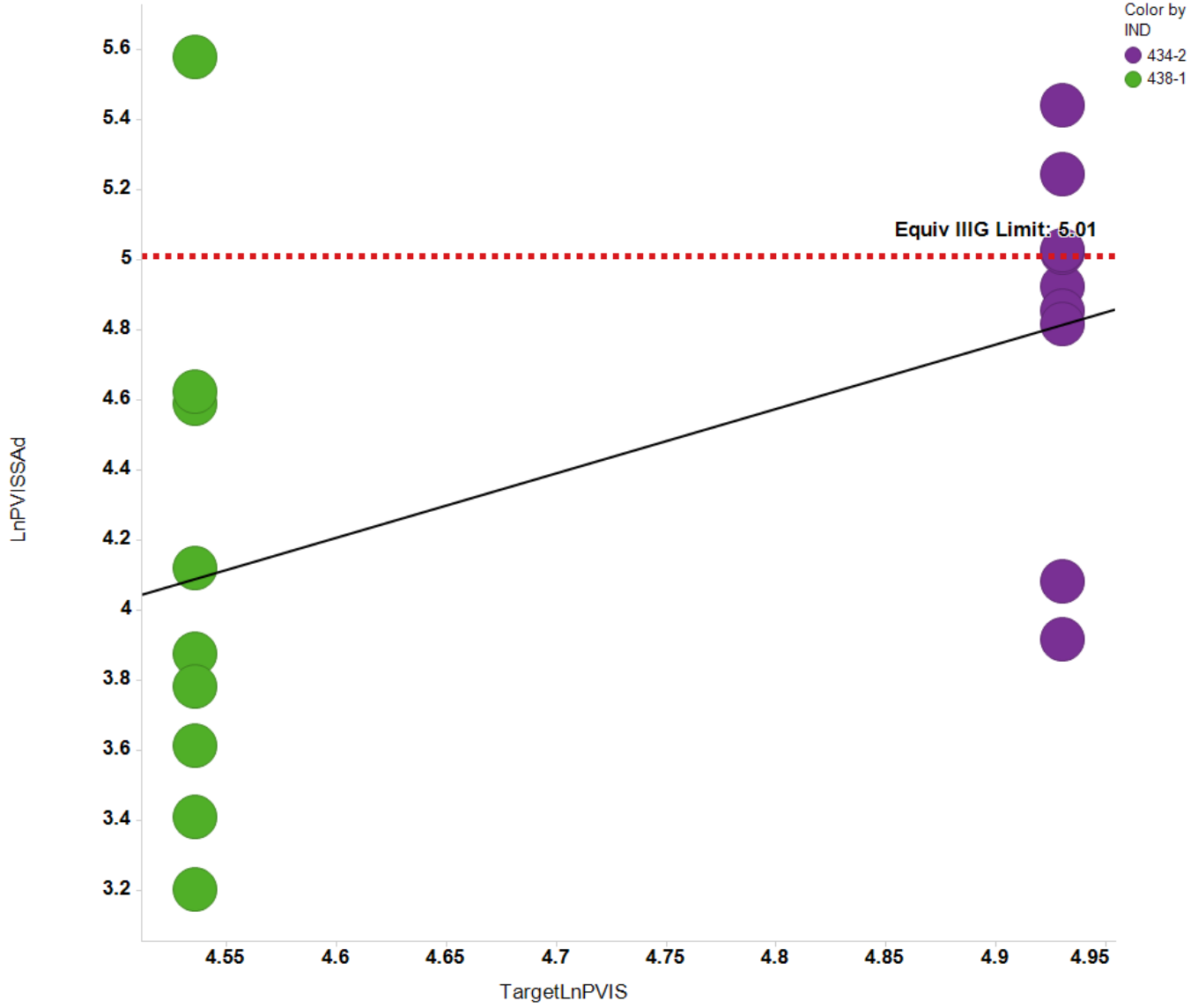


Using 434-2 blends, the mean for IIIG is lower than the IIIG Effective Limit by 0.11. Using the same distance from the IIIH mean, IIIG LnPVIS Equivalent Limit in IIIH is 4.84.

Using 434-2 blends, IIIG PVIS Equivalent Limit in IIIH is 126

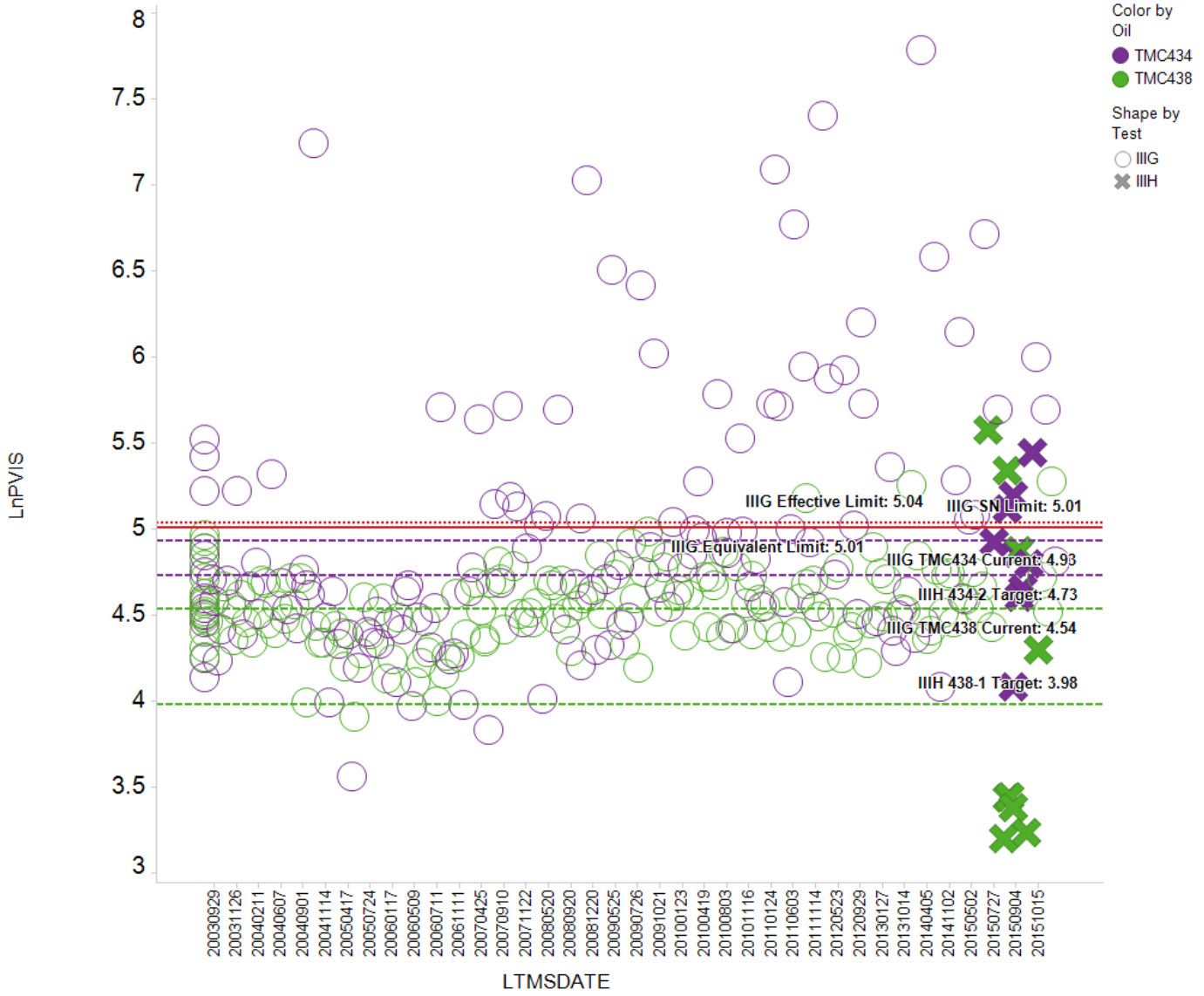


IIIG LnPVIS Equivalent Limit in IIIH using 434-2 and 438-1

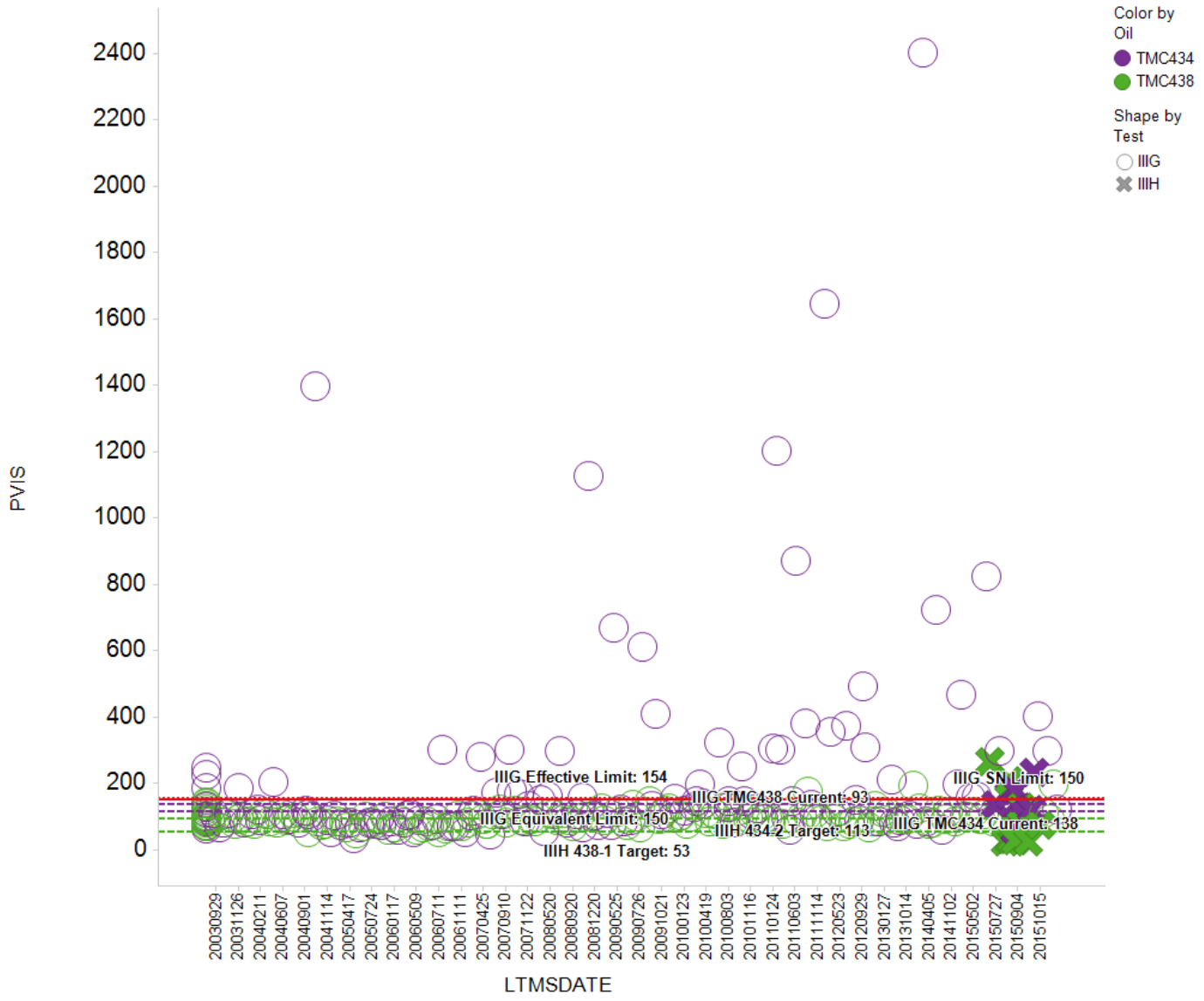


By regressing IIIH LnPVIS Severity Adjusted results against IIIG current targets, determine the corresponding result for a LnPVIS of 5.04, the IIIG Effective SN Limit.

Using 434 and 438 blends, extrapolation from linear equation suggests IIIG LnPVIS Equivalent Limit in IIIH is 5.01

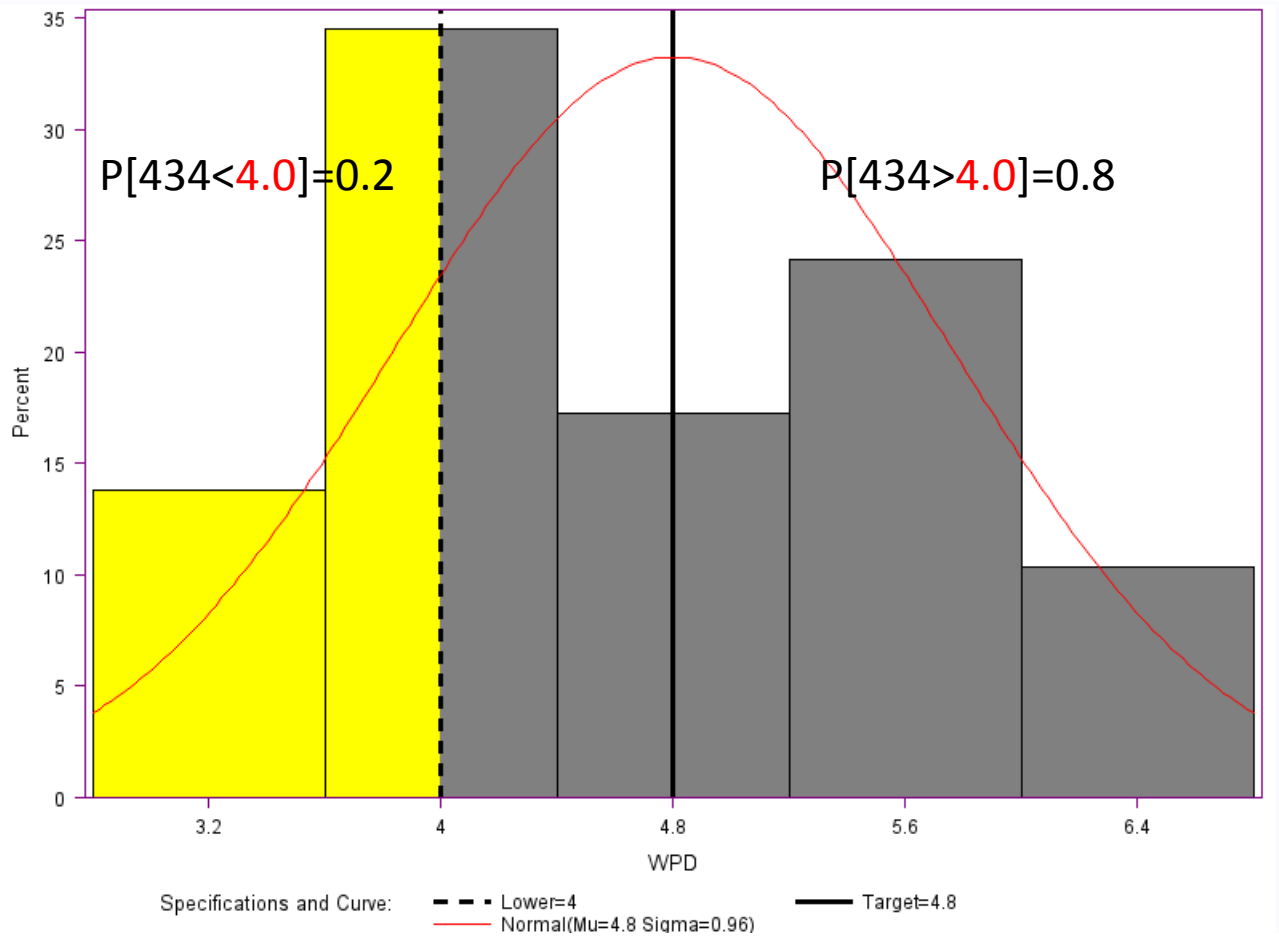


Using 434 and 438 blends, IIIG LnPVIS Equivalent Limit in IIIH is 150



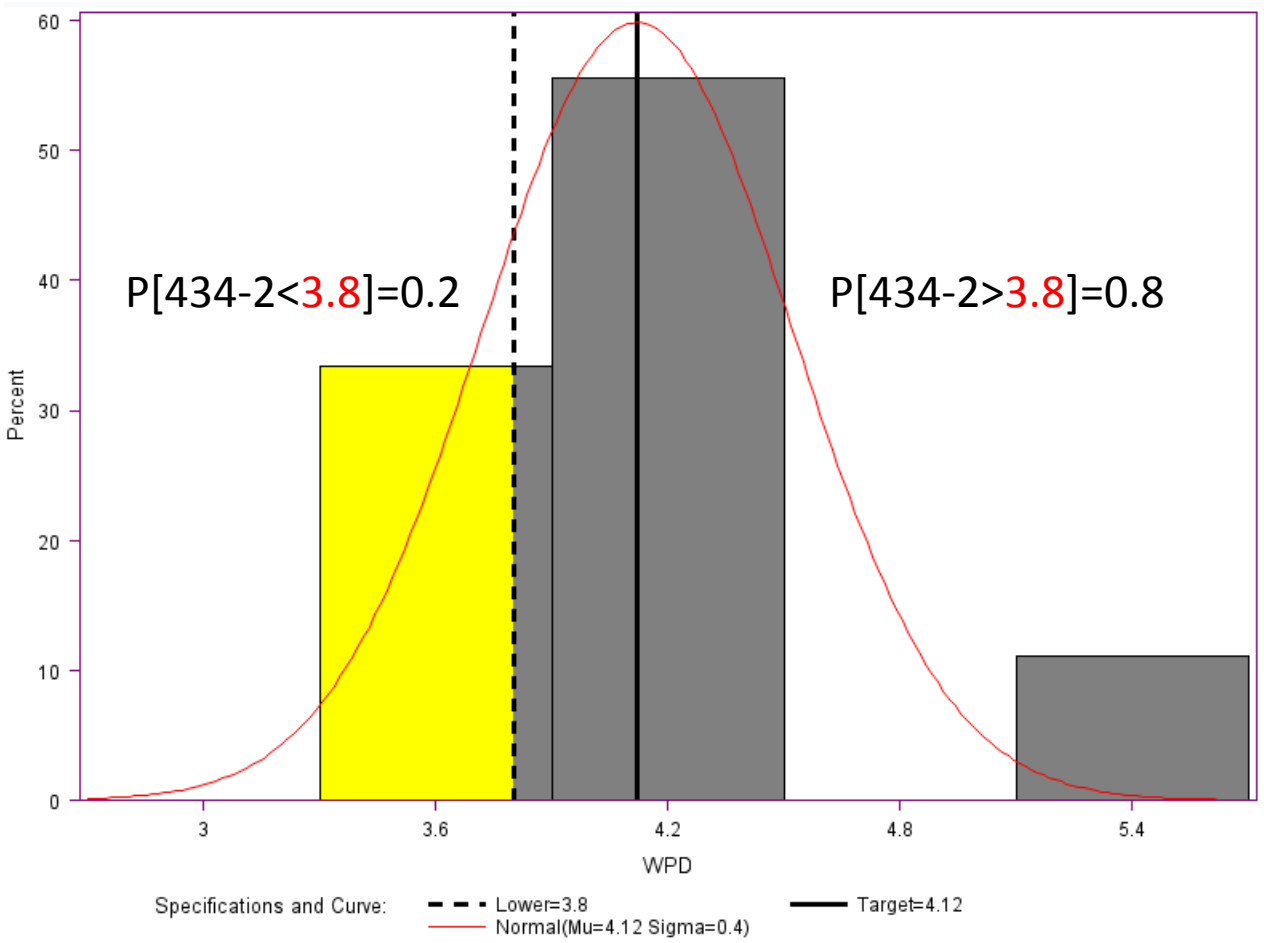
PROBABILITY OF PASS APPROACH

IIIG WPD Oil 434



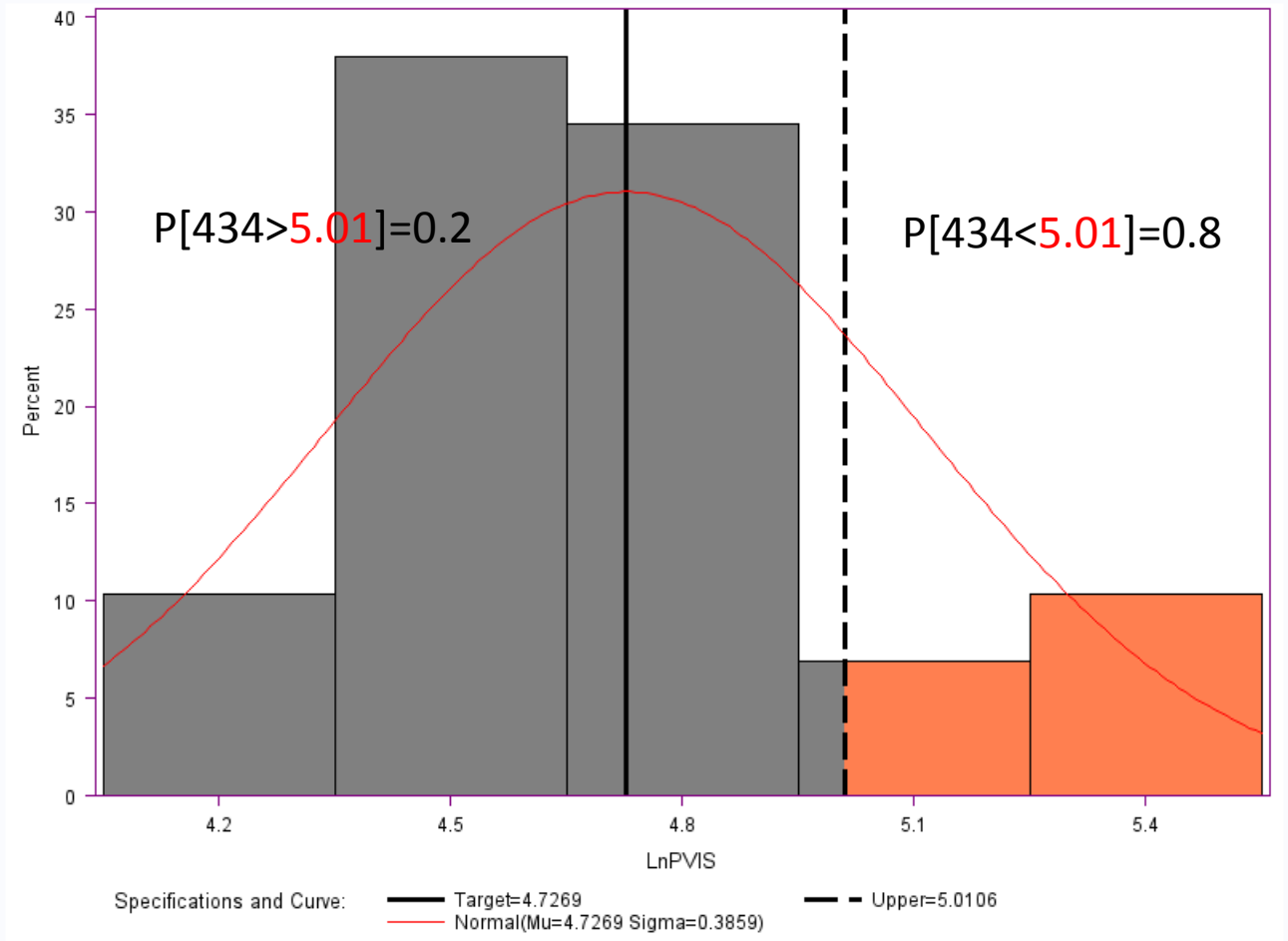
Given the IIIG SN WPD limit of 4.0, the probability of oil 434 passing is 0.80.

IIIH WPD Oil 434-2



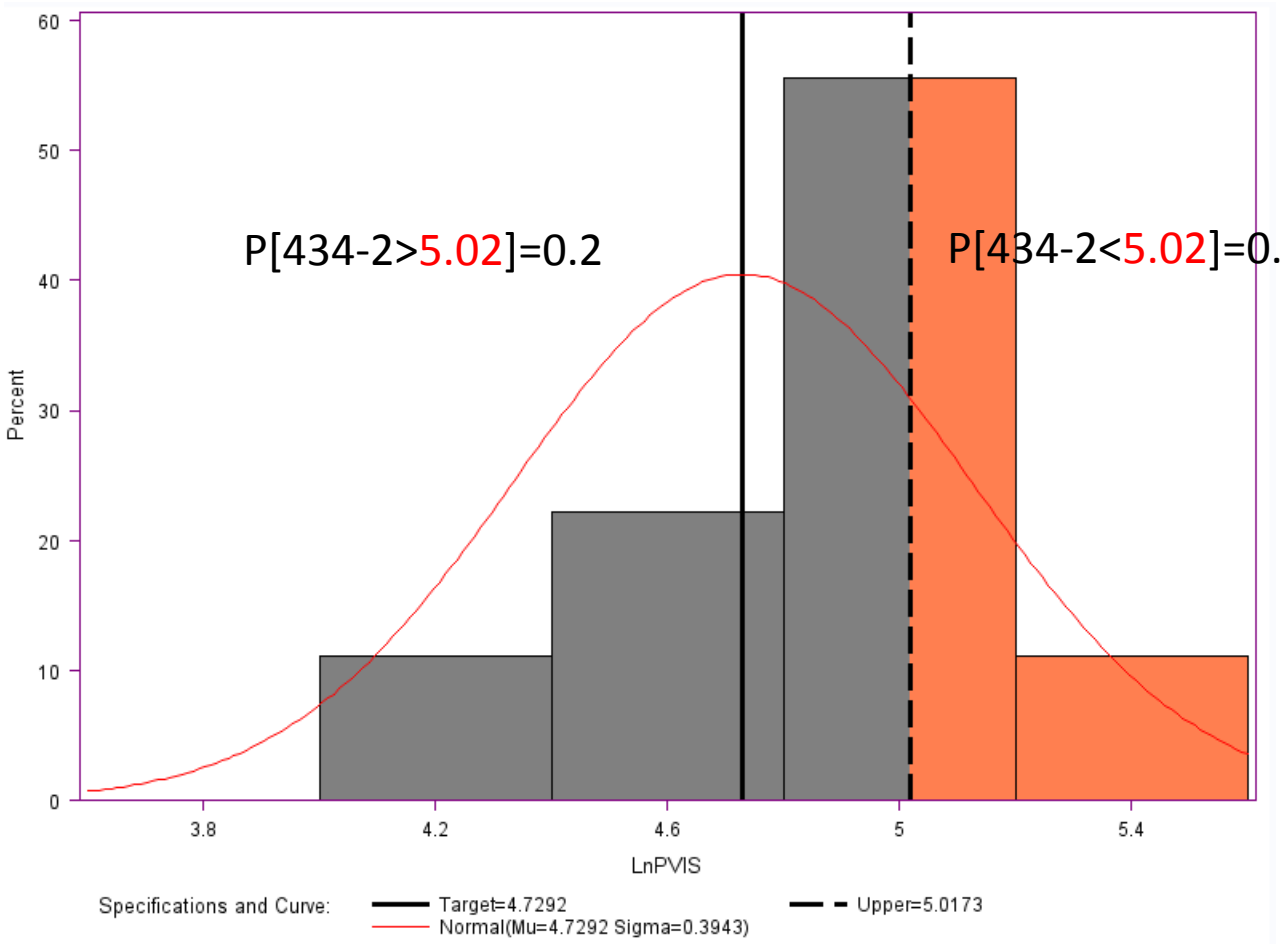
To allow 434-2 to pass 80% of the time, the IIIG Equivalent Limit in the IIIH should be 3.8.

IIIG LnPVIS Oil 434



Given the IIIG SN PVIS limit of 150, the probability of oil 434 passing is 0.80.

IIIH LnPVIS Oil 434-2



To allow 434-2 to pass 80% of the time, the IIIG Equivalent Limit in the IIIH should be 151.

Other analytical approaches could include:

1. Utilizing reference oil data from the time period corresponding to when SN limits were established

2. Incorporating continuous severity adjustments to correct reference results over time

3. Using an exponentially weighted average of the adjusted reference results

ATTACHMENT 3

ADDENDUM K1

TEMPLATE CHECKLIST

Purpose

The Checklist for Comparing Tests to the Template is used to assess progress in new engine test development against the Code Acceptance Criteria and Action Plans. The checklist is updated periodically during the course of test development and is provided to, and discussed with, the appropriate ASTM test development task force.

The rating scale for comparing test development to the Template is as follows:
A - Completed
B - In Progress
C - Planned
D - No Action

Summary: Precision Matrix has been completed and data has been analyzed and discussed in industry groups. The Sequence IIIH has been voted as suitable to measure PVIS, WPD, MRV and Phos Retention. The test shows oil discrimination and good precision.

A. **Precision and Discrimination** – PM analysis complete, need d_p from MAD Survey
B. **Severity and Precision Control Charting** – SP agreed on details of LTMS. TMC to draft LTMS document and should be balloted for implementation after two-week waiting period.
C. **Interpretation of Multiple Tests** – Planned to use current system
D1. **Reference Oils –** 436, 434-2 and 438-1 were chosen as matrix oils and reference oils. Oil 436 is blended to 1100 gallons.
D2. **Test Parts** - Engines, cylinder heads, pistons and rings are the critical parts. The plan is to supply 3800 complete engines and have them preserved and stored by the end of 2016. Engines are also currently available through dealer network by simply ordering the engine at the dealer. OHT will supply the pistons and rings, IMTS will supply the heads and Mopar will supply the engines. Heads and engines are serialized. Pistons and rings are batch controlled. All will be reported in the test forms.
D3. **Test Fuel** - HF003 EEE will be used and supplied by Haltermann. There are no special fuel requirements.
D4. **Test Procedure** – Oil 436 field correlation has been established and test development report is being finalized. Procedure is in draft form and in the editing process with an ASTM facilitator. All labs participated in an engine build workshop in August 2015 and Feb. 2016.
D5. **Rating and Reporting Results** – WPD and PVIS are pass/fail parameters. MRV and Phos Retention are secondary parameters.
D6. **Calibration, Monitoring and Surveillance** – TMC will monitor and SP has defined the details of LTMS, TMC to draft document and will be balloted for implementation

Test Name Sequence IIIH Assessment Date April 13, 2016

Appendix K - Template for Acceptance of New Tests

Checklist for Comparing Tests to the Template

A. Precision and Discrimination

A.1 Precision

$E_p = d_p/Spp$, $E_p \geq 1.0$ for all pass/fail parameters
d_p = Smallest difference of practical importance
Spp = Pooled standard deviation at target level of performance

Parameter	dp	Spp	Ep	Ep≥1.0
LnPVIS		0.4641		
WPD		0.47		
LnMRV		0.4725		
PHOS		1.53		

Comments:

A.2 Discrimination

Oil 436 has significantly better LnPVIS, WPD and Phos Retention than 438-1.
Oil 436 has significantly better LnPVIS, LnMRV and Phos Retention than 434-2.
Oil 438-1 has significantly better LnPVIS and LnMRV than 434-2.
The direction of the difference is in accordance to expectation.

Parameter: LnPVIS

			p-value for t-test of equal means (Tukey)		
Oil	Least-Square Mean	95% Confidence Interval for Mean	Vs 434-2	Vs 436	vs 438-1
434-2	4.7191	4.4041 to 5.0340		0.00	0.01
436	3.3289	2.9933 to 3.6645	0.00		0.03
438-1	3.9754	3.6317 to 4.3192	0.01	0.03	

Parameter: WPD

			p-value for t-test of equal means (Tukey)		
Oil	Least-Square Mean	95% Confidence Interval for Mean	Vs 434-2	Vs 436	vs 438-1
434-2	4.16	3.84 to 4.48		0.12	0.09
436	4.63	4.28 to 4.97	0.12		0.00
438-1	3.66	3.31 to 4.01	0.09	0.00	

Parameter: LnMRV

Oil	Least-Square Mean	95% Confidence Interval for Mean	p-value for t-test of equal means (Tukey) Vs 434-2	Vs 436	vs 438-1
434-2	11.1107	10.7900 to 11.4313		0.00	0.00
436	9.7854	9.4437 to 10.1270	0.00		0.36
438-1	9.8189	9.4690 to 10.1689	0.00	0.36	

Parameter: Phosphorus Retention

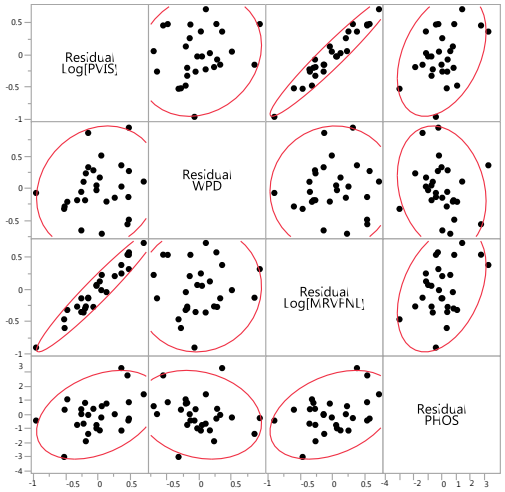
Oil	Least-Square Mean	95% Confidence Interval for Mean	p-value for t-test of equal means (Tukey) Vs 434-2	Vs 436	vs 438-1
434-2	79.95	78.91 to 80.99		0.00	0.35
436	94.15	93.04 to 95.26	0.00		0.00
438-1	78.92	77.78 to 80.05	0.35	0.00	

Comments:

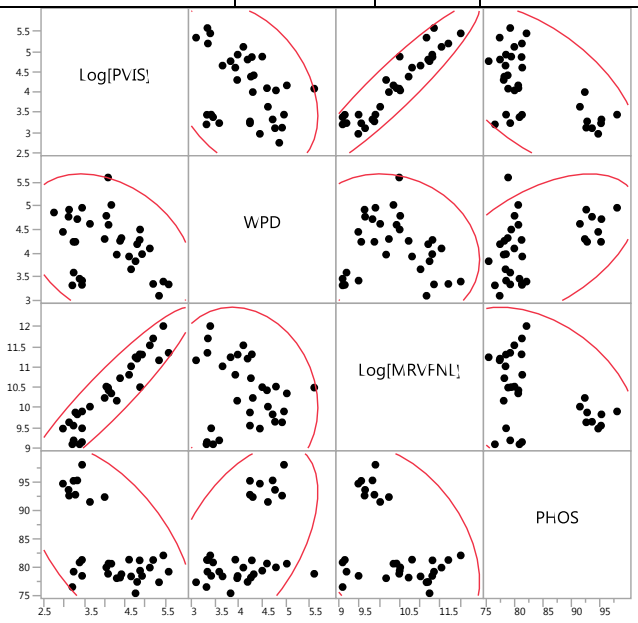
A.3 Parameter Redundancy

There's a high positive correlation between LnPVIS and LnMRV with correlation coefficient of 0.97. Parameter redundancy is concluded if a correlation coefficient is 0.85 or greater.

Correlation Coefficients	Residual Log[PVIS]	Residual WPD	Residual Log[MRVFNL]	Residual PHOS
Residual Log[PVIS]	1	0.16	0.97	0.38
Residual WPD	0.16	1	0.05	-0.20
Residual Log[MRVFNL]	0.97	0.05	1	0.38
Residual PHOS	0.38	-0.20	0.38	1



Correlation Coefficients	Log[PVIS]	WPD	Log[MRVFNL]	PHOS
Log[PVIS]	1	-0.33	0.94	-0.59
WPD	-0.33	1	-0.15	0.52
Log[MRVFNL]	0.94	-0.15	1	-0.38
PHOS	-0.59	0.52	-0.38	1



B. Severity and Precision Control Charting

Requirements

B.1 Is an LTMS for reference oil tests in place which is consistent with the ACC Code Appendix A? __B___

B.2 Are appropriate data transforms applied to test results? __A___

Comments: SP agreed on details of LTMS. TMC to draft LTMS document and should be balloted for implementation after two-week waiting period.

C. Interpretation of Multiple Tests

Requirements

C.1 Is a suitable system in place to handle repeat tests on a candidate oil? __C___

Type: MTAC Tiered Limits Other

C.2 Has a method for the determination and handling of outlier results been defined? __C___

A. **Comments:** Planned to use current system

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

D.Action Plan

D.1 Reference Oils

Do the majority of reference oils represent current technology? __A___

Are the majority of reference oils of passing or borderline pass/fail performance? __A___

Recommended Approaches

D.1.1 Is reference oil supply and distribution handled through an independent organization? __A___

D.1.2 Is a quality control plan defined and in place? __A___

D.1.3 Is a turnover plan defined/in place to ensure uninterrupted supply of reference oil and an orderly transition to reblends? __A___

D.1.4 Is a process for introducing replacement reference oils defined and in place? __A___

D.1.5 Are oils blended in a homogeneous quantity to last 5 years? __A___

Comments: 436, 434-2 and 438-1 were chosen as matrix oils and reference oils. Oil 436 is blended to 1100 gallons. TMC and Seq III SP handle all of the above.

D.2 Test Parts

Are all critical parts identified? __A___

Is a system defined/in place to maintain uniform hardware? __A___

Is there a system for engineering support and test parts supply? __A___

Recommended Approaches

D.2.1 Are critical parts distributed through a Central Parts Distributor (CPD)? __A___

D.2.2 Are critical parts serialized, and their use documented in test report? __A___

D.2.3 Are all parts used on a first in/first out basis? __A___

D.2.4 Are all rejected critical parts accounted for and returned to the CPD? __A___

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

D.2.5 Does the CPD make status reports to the test surveillance body at least semi-annually? __C___

D.2.6 Is there a quality control and turnover plan in place for critical test parts, including identification and measurement of key part attributes, a system for parts quality accountability, a turnover plan in place for simultaneous industry-wide use of new parts or supply sources? __A___

D.2.7 Is the CPD active in industry surveillance panel/group, and in industry sponsored test matrices? __A___

Comments: Engines, cylinder heads, pistons and rings are the critical parts. The plan is to supply 3800 complete engines and have them preserved and stored by the end of 2016. Engines are also currently available through dealer network by simply ordering the engine at the dealer. OHT will supply the pistons and rings, IMTS will supply the heads and Mopar will supply the engines. Heads and engines are serialized. Pistons and rings are batch controlled. All will be reported in the test forms.

D.3 Test Fuel

Recommended Approaches

D.3.1 Is the fuel specified and the supplier(s) identified? __A___

Is a process in place to monitor fuel stability over time? __A___

Are approval guidelines in place for fuel certification? __A___

D.3.2 If the test fuel is treated as a critical part of the test procedure: Is an approval plan and severity monitoring plan for each fuel batch in place? __A___

Is a quality control plan defined and in place to assure long term quality of the fuel? __A___

Is a turnover plan defined, in place and demonstrated to ensure uninterrupted supply of fuel? __A___

Comments: HF003 EEE will be used and supplied by Haltermann. There are no special fuel requirements.

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

D.4 Test Procedure

Recommended Approaches

D.4.1 Is a technical report published documenting, per ASTM Flow Plan:
Test precision for reference oils? __C___

Field correlation? __A___

Test development history? __C___

D.4.2 Are test preparation and operation clearly documented in a standard format, e.g., ASTM, CEC? __B___

D.4.3 Are test stand configuration requirements documented and standardized? __A___

D.4.4 Are milestones for precision improvements established? __C___

D.4.5 Are routine engine builder workshops planned/conducted? __A___

Comments: Oil 436 field correlation has been established. Test development report is planned. Procedure is in draft form and in the editing process with an ASTM facilitator. All labs participated in an engine build workshop in August 2015 and Feb. 2016.

D.5 Rating and Reporting of Results

Recommended Approaches

D.5.1 Are the reported ratings from single raters (i.e. not averages from various raters)? __A___

D.5.2 Is a suitable severity adjustment system in place? __B___

D.5.3 Is each pass/fail parameter unique and have a significant purpose for judging engine oil performance? __A___

D.5.4 Do all rate and report parameters judge operational validity, help in test interpretation or judge engine oil performance? __A___

D.5.5 Are routine rater workshops conducted/planned? __A___

Comments: WPD and PVIS are pass/fail parameters. MRV and Phos Retention are secondary parameters.

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

D.6 Calibration, Monitoring and Surveillance

Recommended Approaches

D.6.1 Is a process in place for independent monitoring of severity and precision with an action plan for maintaining calibration of all laboratories? __A___

D.6.2 Are stand, lab, and industry reference oil control charts of all pass/fail criteria parameters used to judge calibration status? __B___

D.6.3 Does the specified calibration test interval allow no more than 15 non-reference oil tests between successful calibration tests? __A___

D.6.4 Is an industry surveillance panel in place? __A___

Comments: TMC will monitor and SP has defined the details of LTMS, TMC to draft document and will be balloted for implementation

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action