



A Program of ASTM International

Test Monitoring Center

<https://www.astmtmc.org>

ASTM D02.B1 Semiannual Report Passenger Car Reference Oil Testing

October 2025

Table of Contents

Section	Topic
Executive Summary	
	<u>Summary Items</u>
	<u>Calibrated Labs and Stands</u>
Test Area Status Summaries	
	<u>Seq. IIH</u>
	<u>Seq. IVA</u>
	<u>Seq. IVB</u>
	<u>Seq. VH</u>

Table of Contents

Section	Topic
Test Area Status Summaries	(cont.)
	<u>Seq. VIE</u>
	<u>Seq. VIF</u>
	<u>Seq. VIII</u>
	<u>Seq. IX</u>
	<u>Seq. IXAGED</u>
	<u>Seq. X</u>

Table of Contents

Section	Topic
Additional Information	
	<u>Information Letters</u>
	<u>Reference Oil Inventory</u>
	<u>LTMS Deviations</u>
	<u>Quality Index Deviations</u>
	<u>TMC Laboratory Visits</u>
	<u>Test Area Time Lines</u>
	<u>Rating Workshop Data</u>
	<u>Misc. Information</u>

Passenger Car Engine Oil Testing

Executive Summary

- ▶ Reblends of oils 224-2, 221-1, 544-1
 - The Sequence IX panel has introduced RO 224-2 & RO 221-1 as acceptable re-blends.
 - The Sequence VIE panel has introduced RO 544-1 as an acceptable re-blend.

[Return to Table of Contents](#)

Passenger Car Engine Oil Testing Executive Summary

- ▶ IIH Batch 9 hardware
 - Batch 9 pistons and rings were successfully introduced this report period. All test labs are currently using batch 9 hardware for testing.

[Return to Table of Contents](#)

Passenger Car Engine Oil Testing

Executive Summary (cont.)

▶ Sequence VH

- Industry is currently in action alarm for AES and RAC. The panel approved a new fuel batch in October 2025. With this approval the Z_0 for each lab will be reset with the first 3 runs on the M-3 fuel batch. This is to adjust for the shift in severity from the N-batch to the M-3 batch.

[Return to Table of Contents](#)

Calibrated Labs and Stands*

Test	Labs	Stands
IIIH/A/B	5	12
IVA	1	1
IVB	3	6
VH	3	8
VIE	5	17
VIF	3	6
VIII	2	4
IX	4	7
IXAGED	2	3
X	3	4

*As of 9/30/2025

[Return to Table of Contents](#)

Test Monitoring Center
<https://www.astmtmc.org>



Sequence IIIH/A/B

➡➡ October 2025

Sequence IIH/A/B Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	15
Operationally Invalid Calibration Attempt	LC	1
Aborted Calibration Attempt	XC	1
Total		17

Sequence IIH – Failing Tests

Test Status	#
No failing tests this period	
Total	0

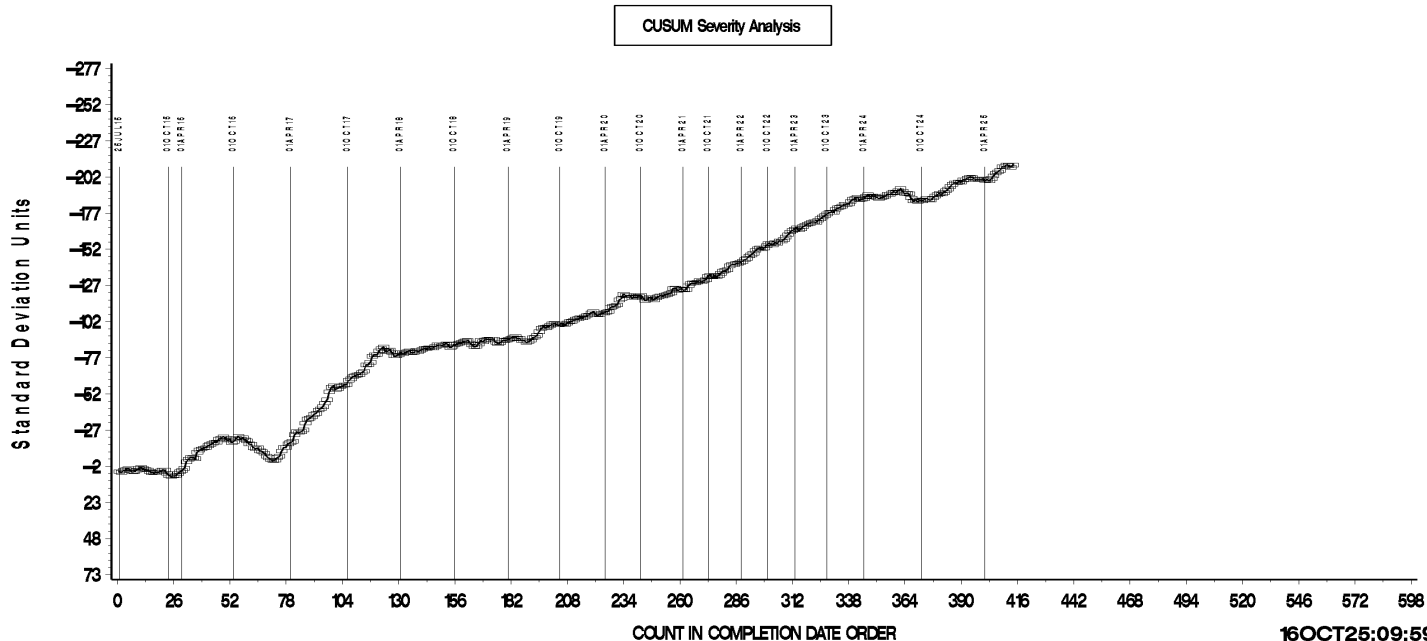
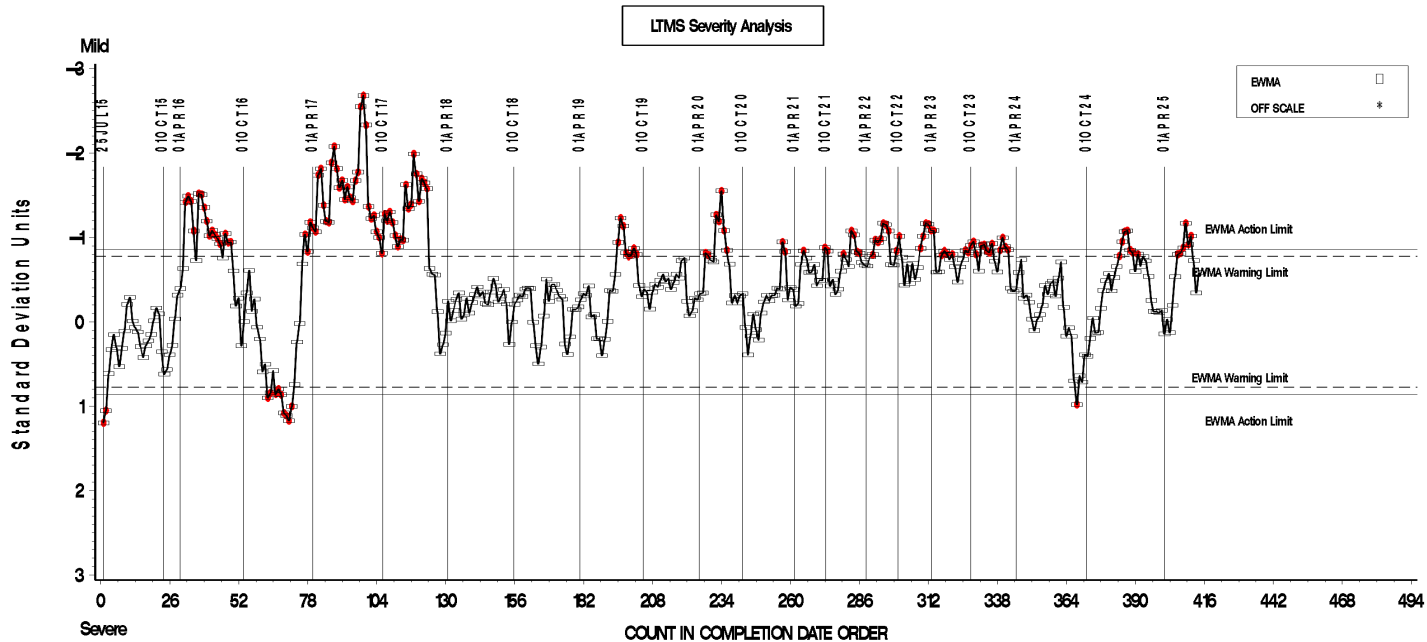
Sequence IIH – Lost Tests

Test Status	Cause	#
XC	Excessive oil loss	1
LC	Coolant tempt out of spec	1
Totals		2

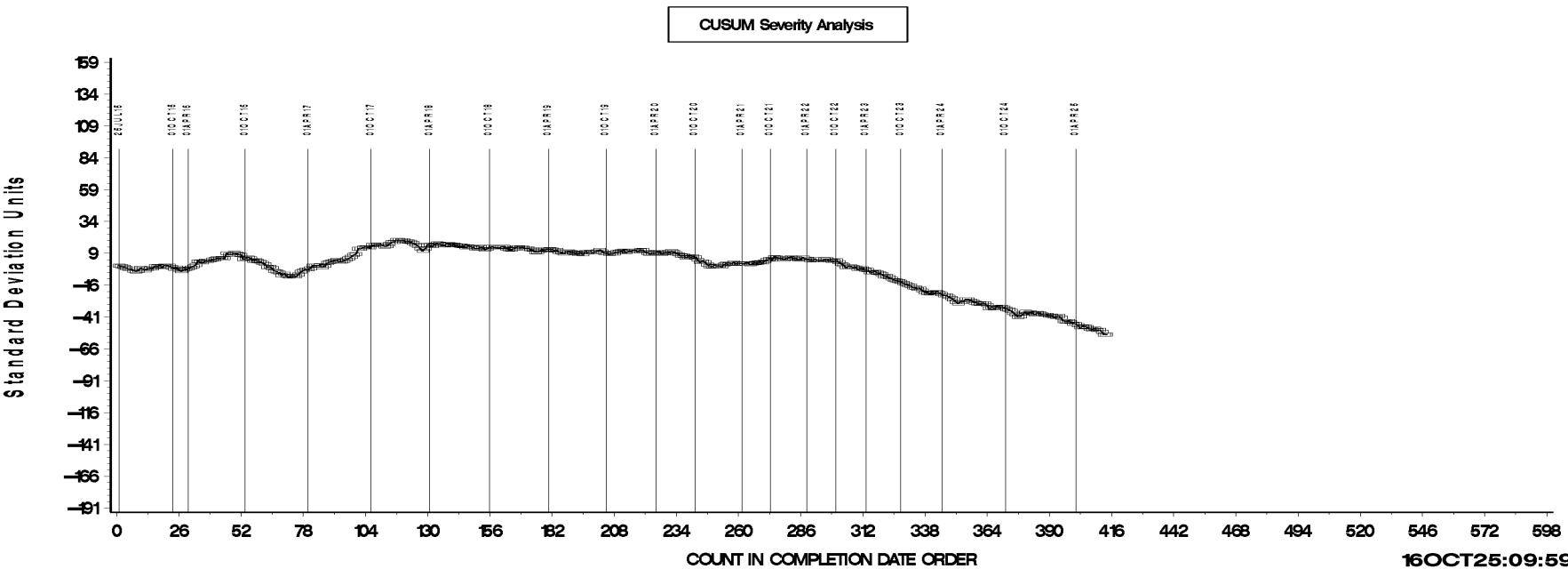
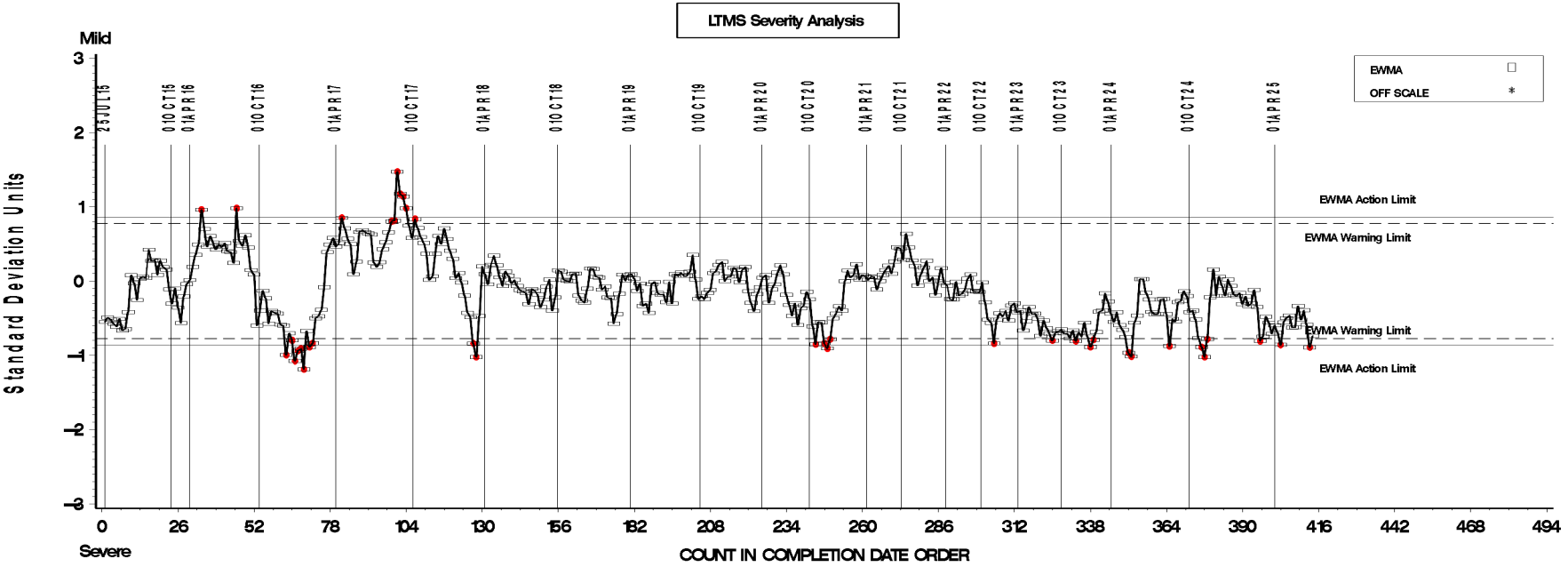
Sequence IIH Test Severity

- VISI, APV, and MRP all exceeded the action alarm (mild direction) this period, now within limits.
- WPD exceeded the action limit with one test this period (severe direction), now within limits
- All other parameters are in control.

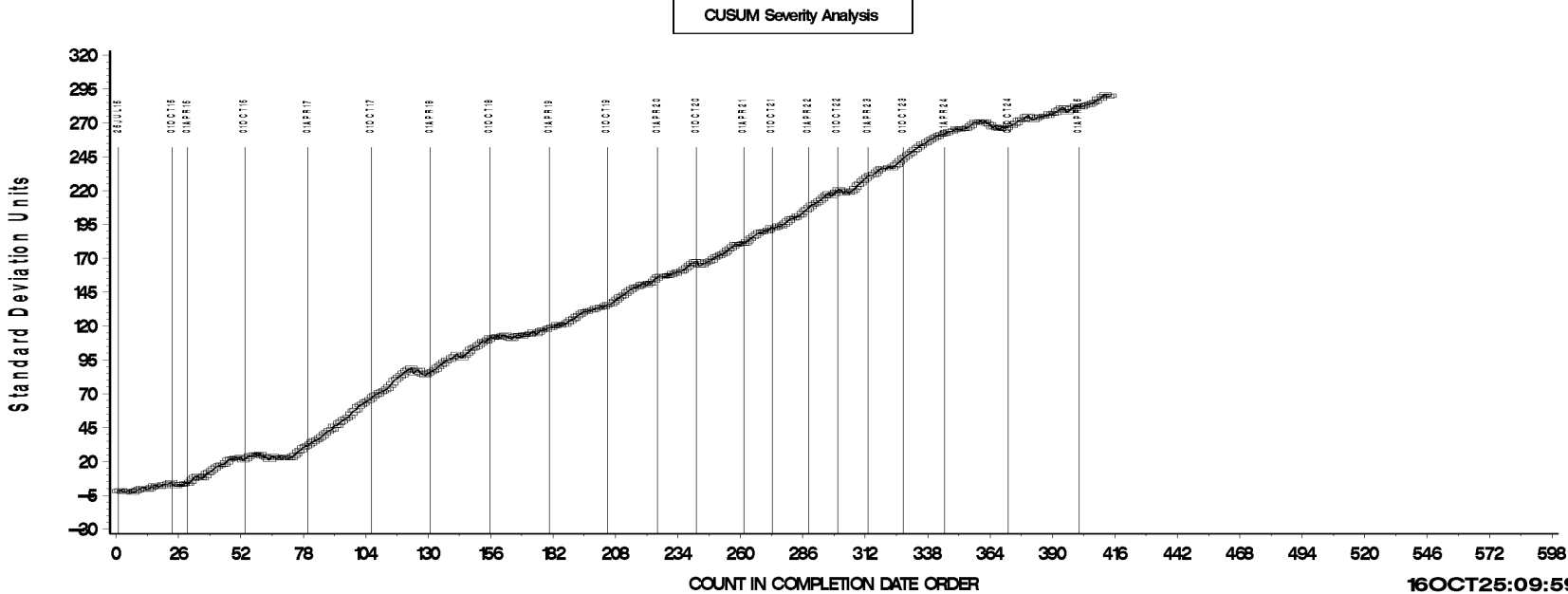
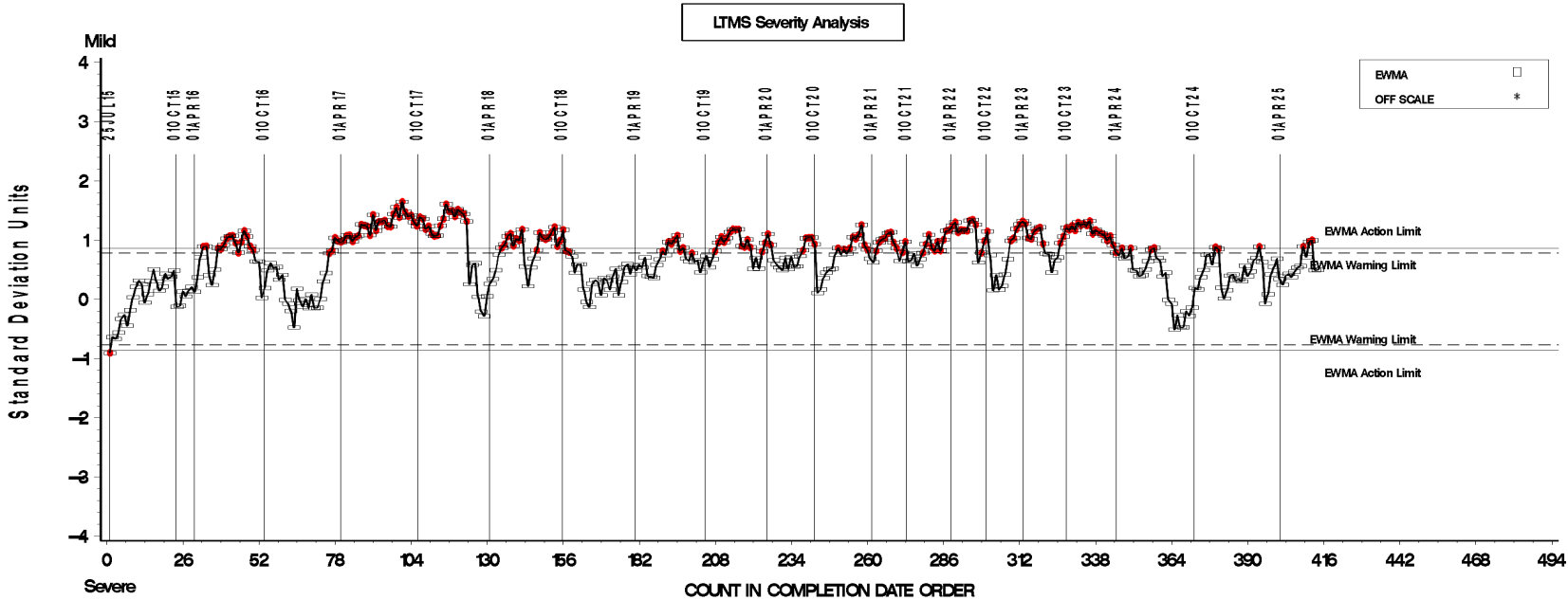
VISCOSITY INCREASE FINAL ORIG UNIT RES



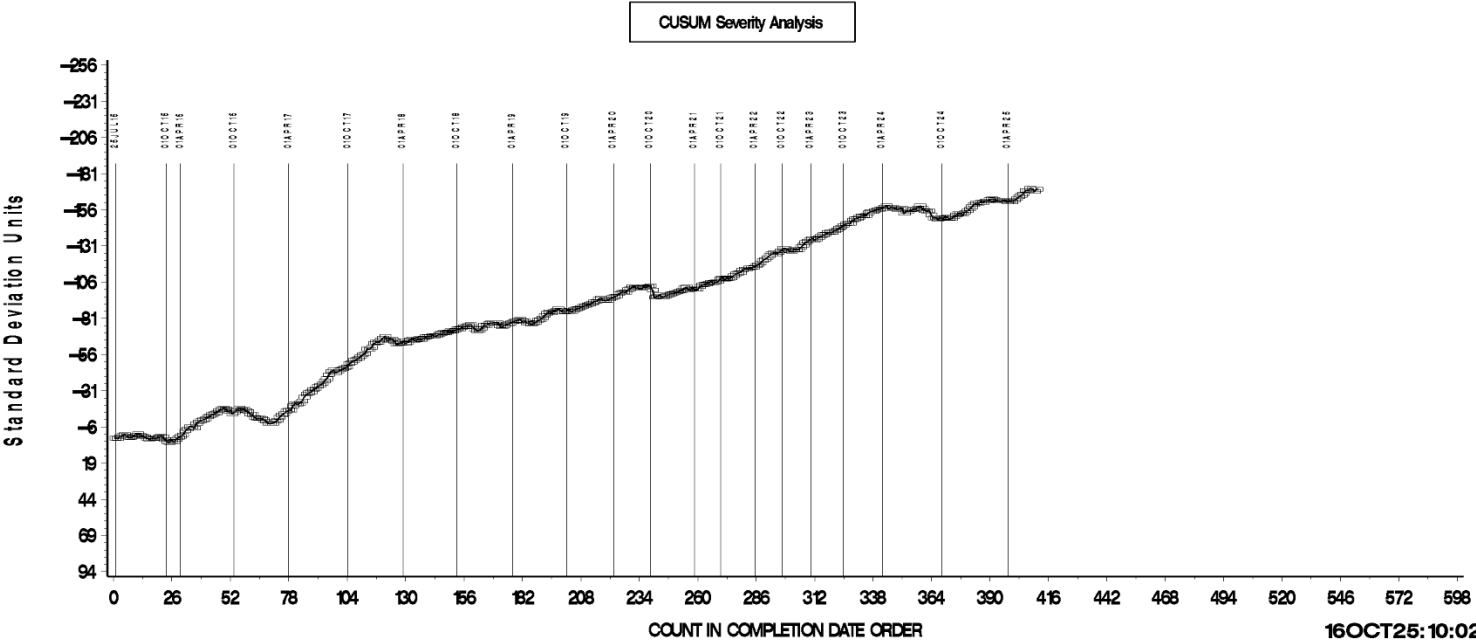
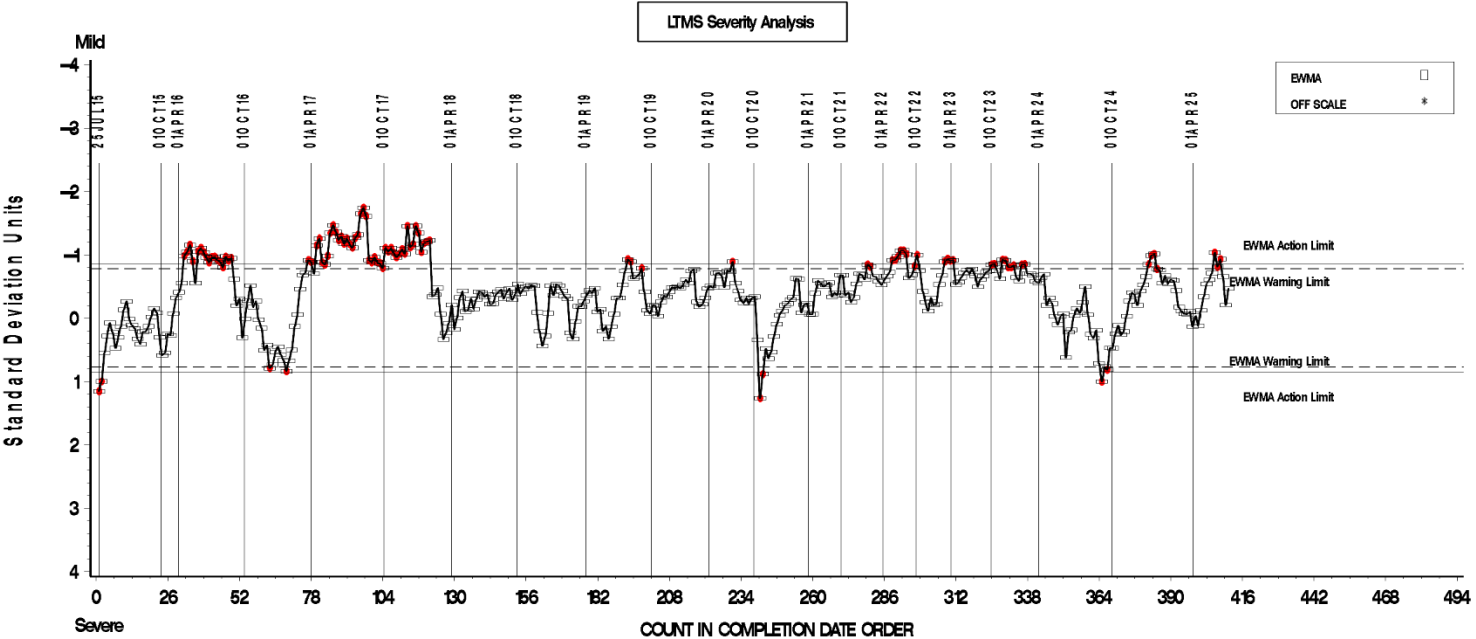
AVERAGE WEIGHTED PISTON DEPOSITS FNL ORIG U



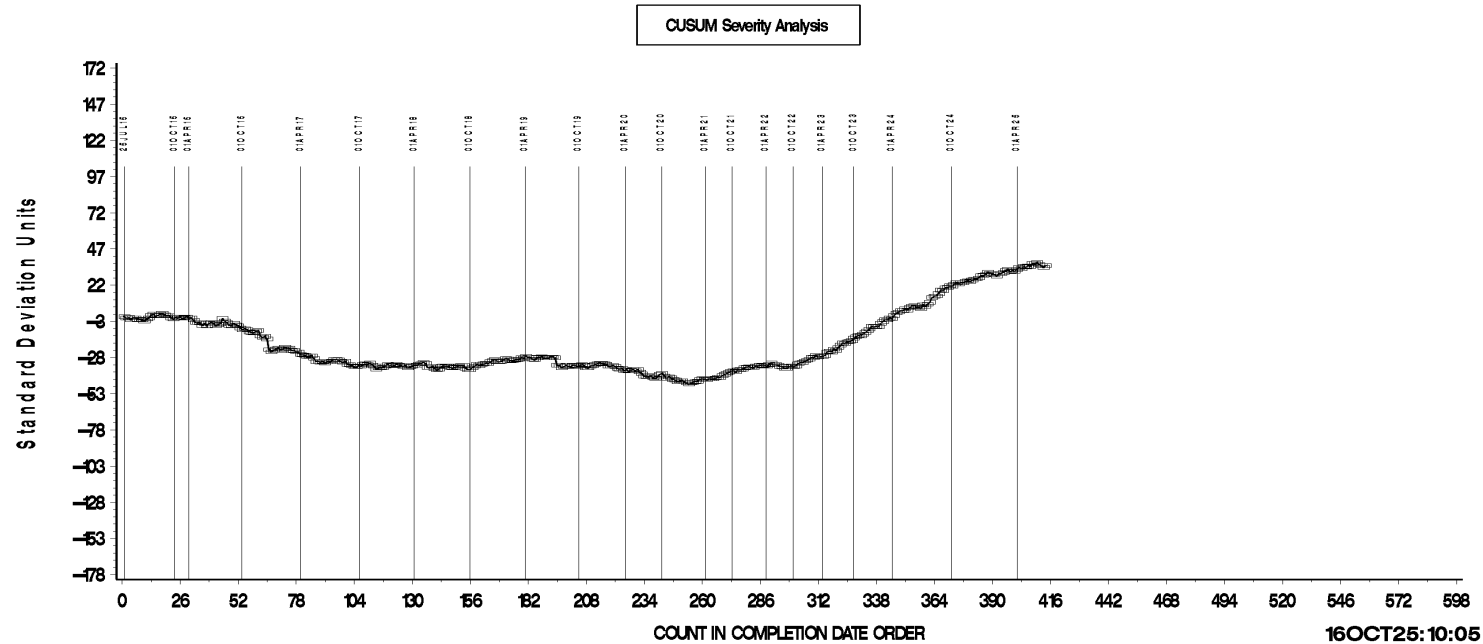
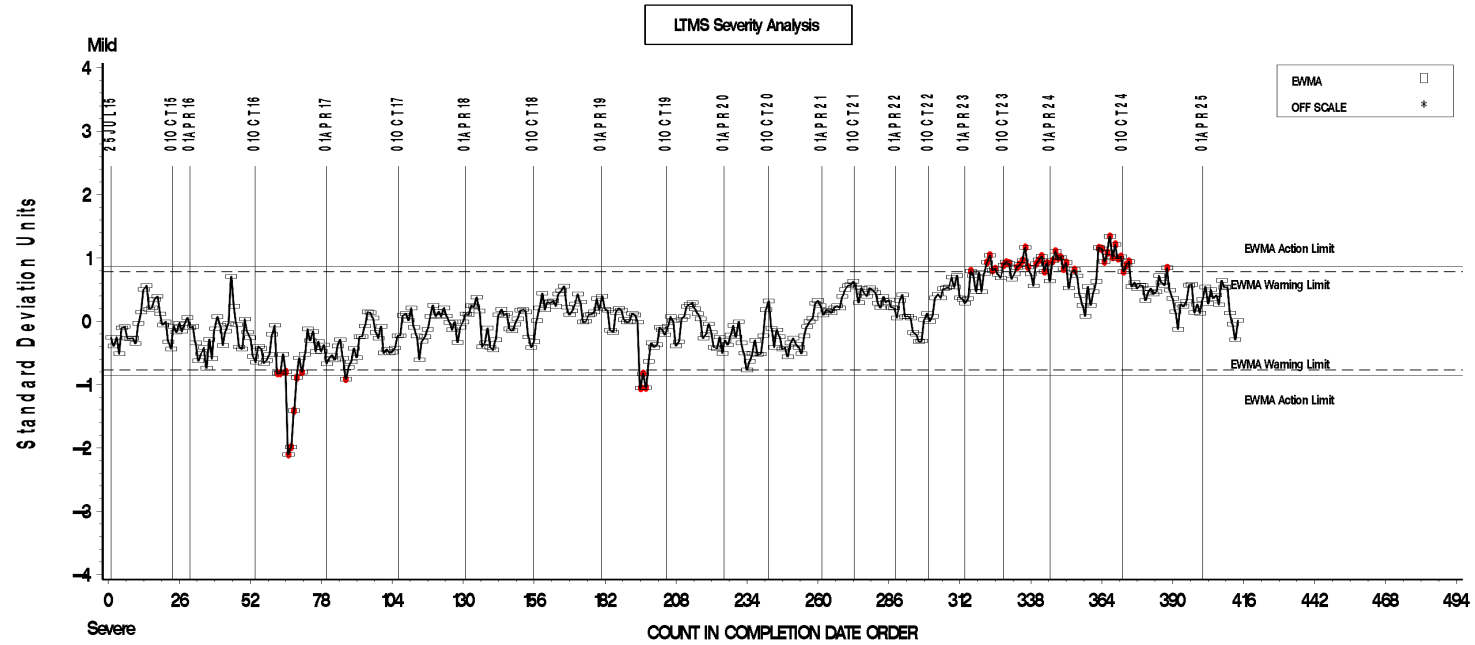
AVERAGE PISTON SKIRT VARNISH



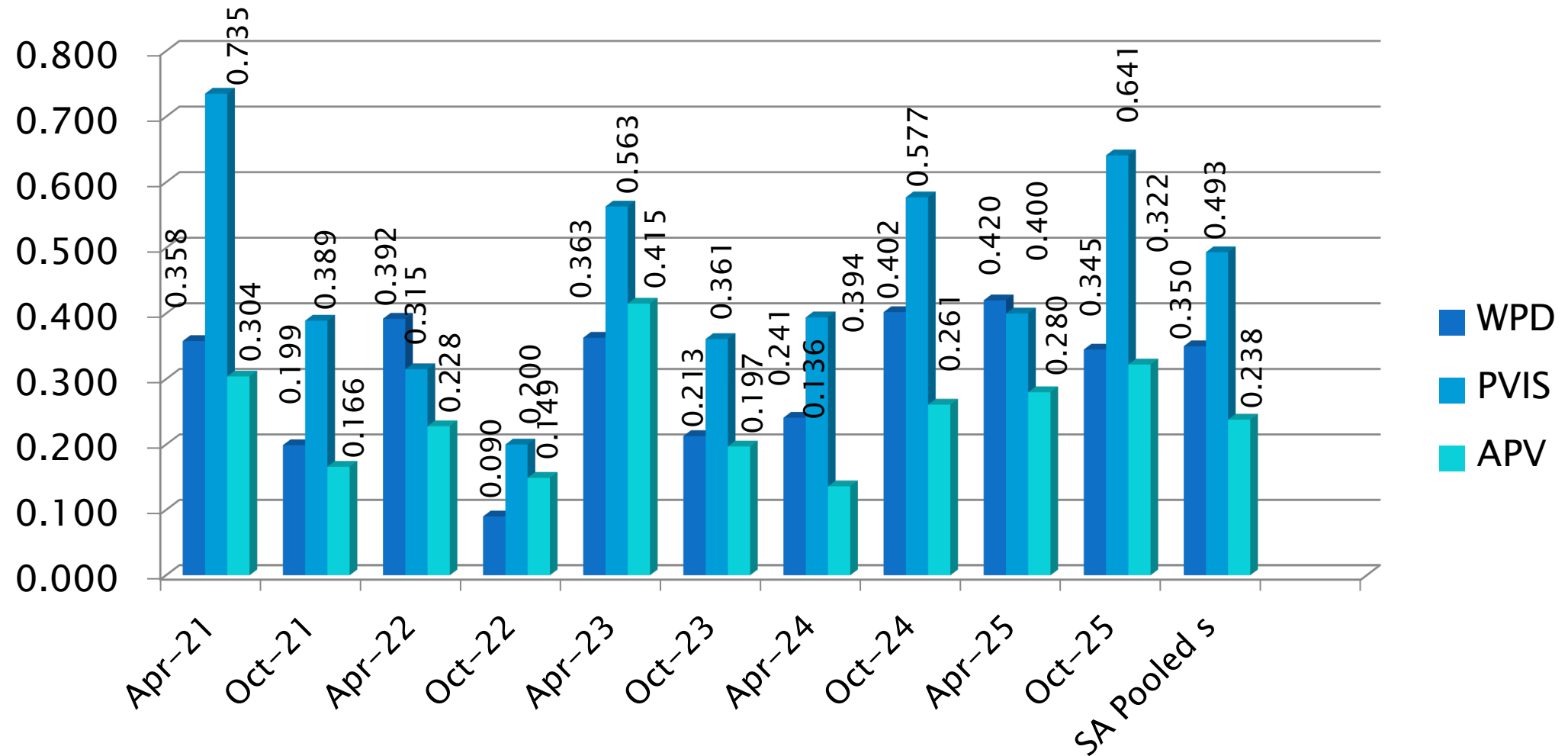
MRV FINAL ORIG UNIT RES [NM, FROZEN, SOLID]



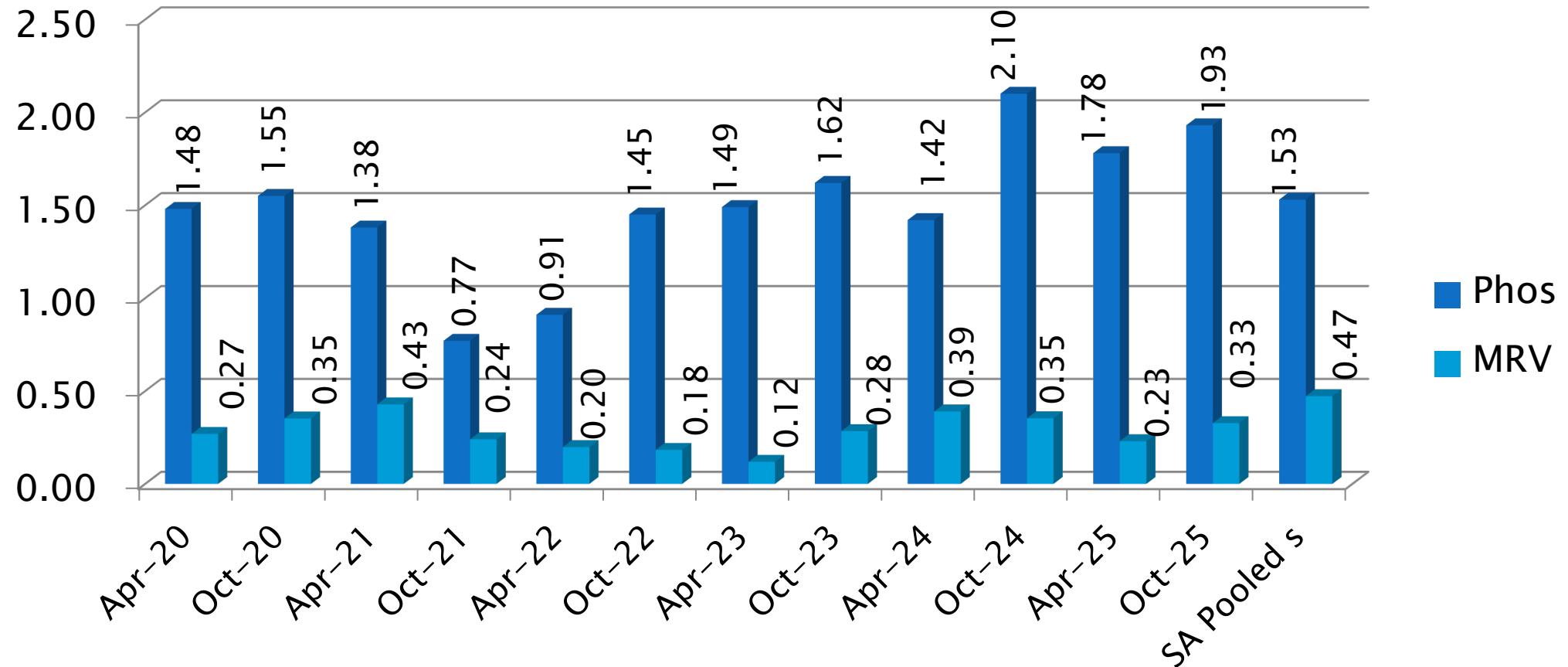
PHOSPHORUS RETENTION, FINAL RESULT



IIH Precision Estimates



Sequence IIIHA/B Precision Estimates



[Return to Table of Contents](#)

Sequence IVA

➡➡ October 2025

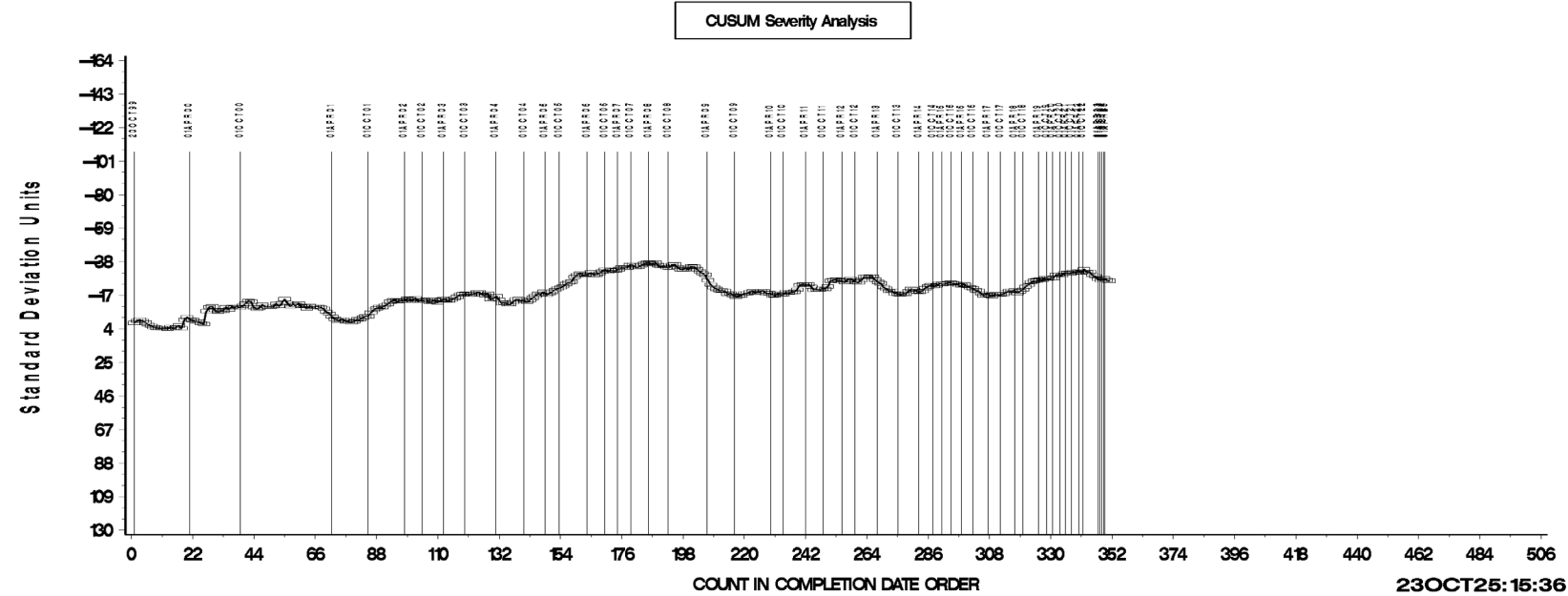
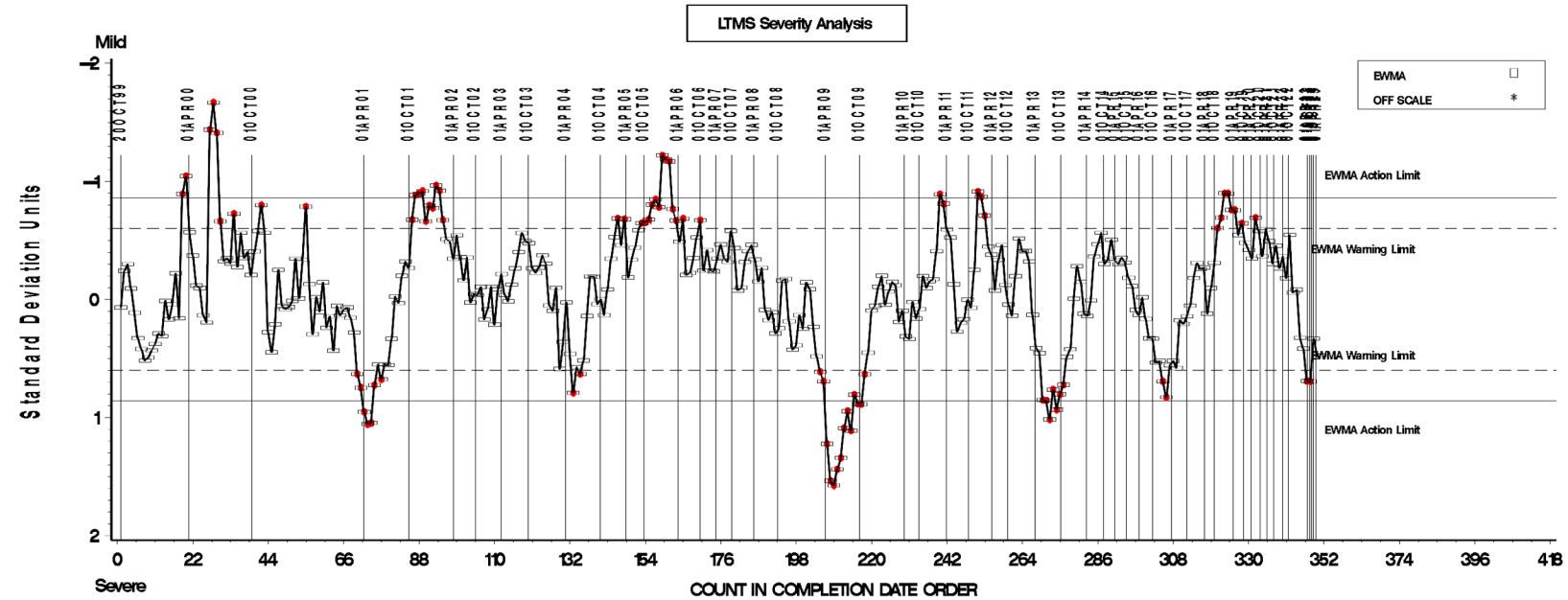
Sequence IVA Activity

Test Status	Validity Code	#
Acceptable calibration attempt	AC	1
Total		1

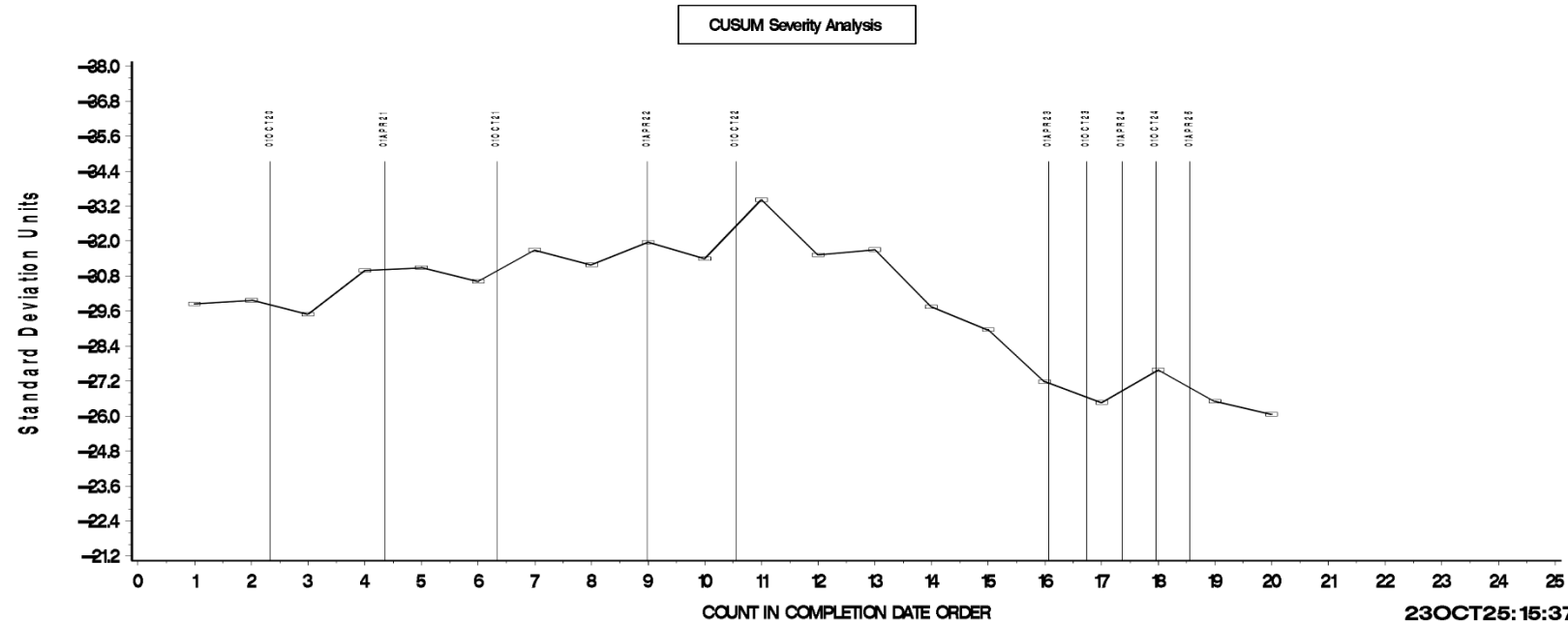
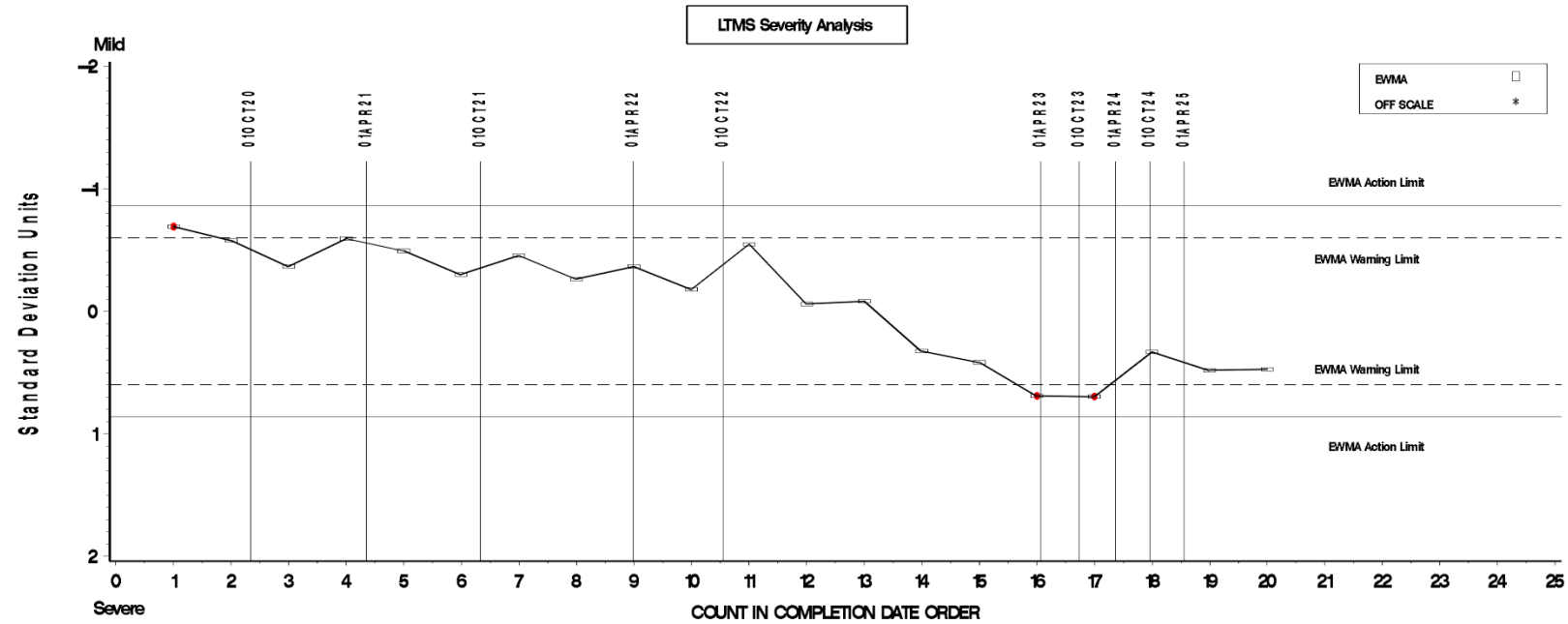
Sequence IVA Test Severity

- Severity started the period exceeding the warning limits but are now within the limits.

AVERAGE CAM WEAR

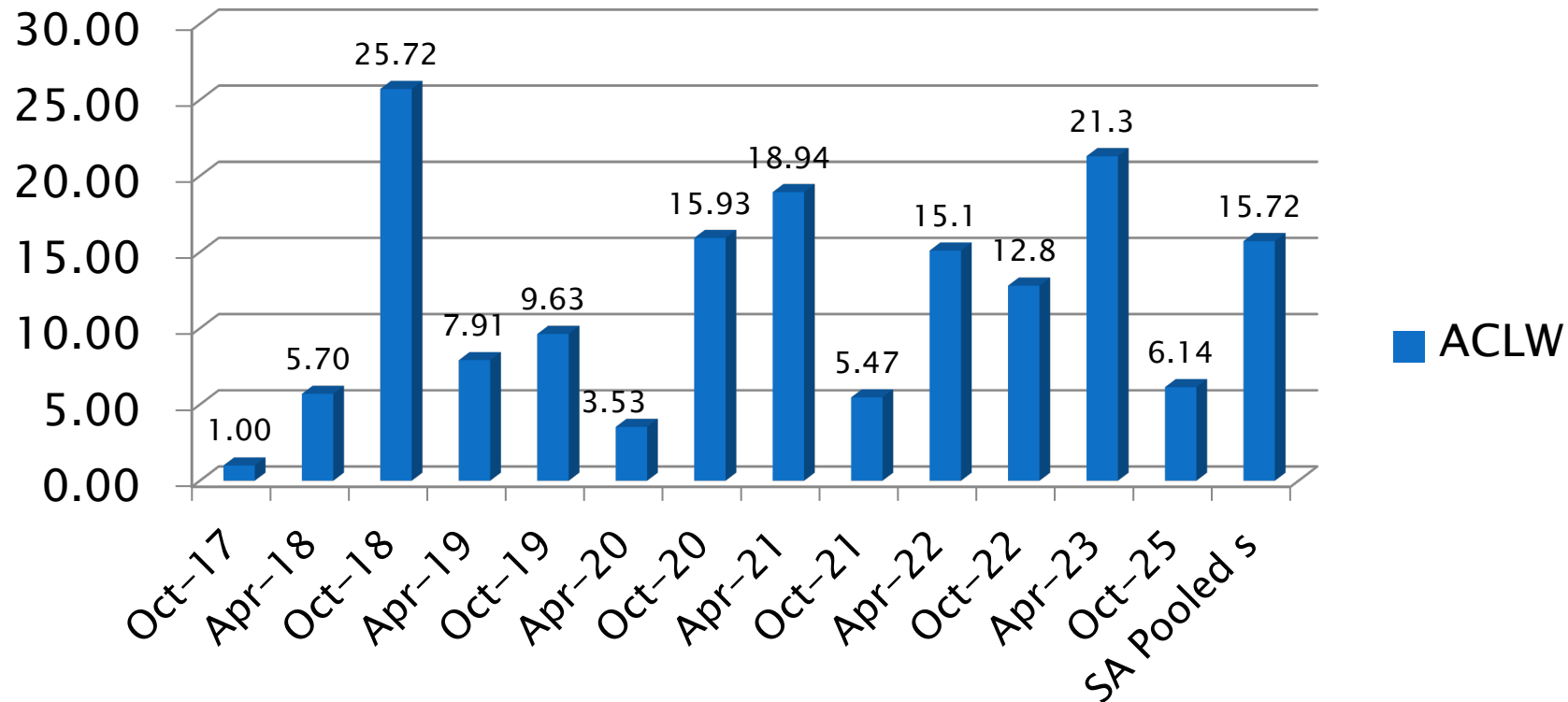


AVERAGE CAM WEAR



Sequence IVA Precision Estimates

ACW



[Return to Table of Contents](#)

Test Monitoring Center
<https://www.astmtmc.org>



Sequence IVB

➡➡ October 2025

Sequence IVB Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	6
Failed Calibration Test	OC	0
Aborted Calibration Test	XC	0
Total		6

Sequence – Failing Tests

Test Status	Validity Code	#
Failed Calibration Test, end of test Iron (mild)	OC	0
Failed Calibration Test, end of test Iron (severe)	OC	0
Total		0

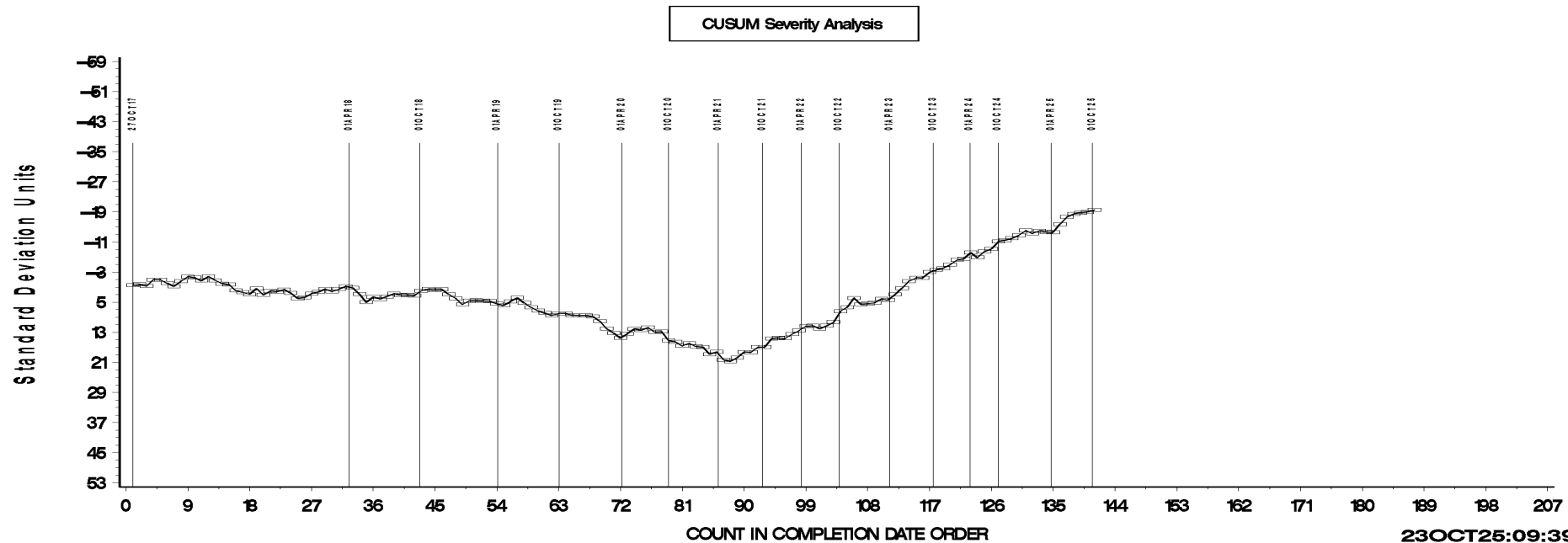
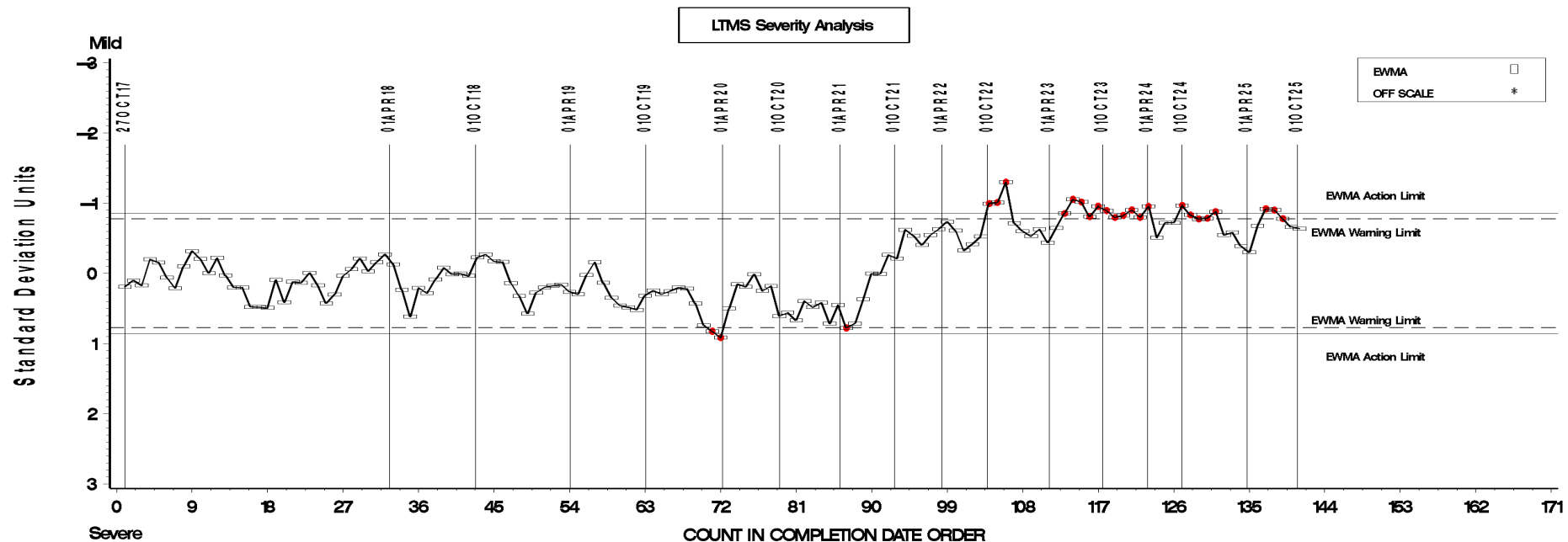
Sequence – Lost Tests

Test Status	Cause	#
XC	No Lost Tests This Reporting Period	0
Totals		0

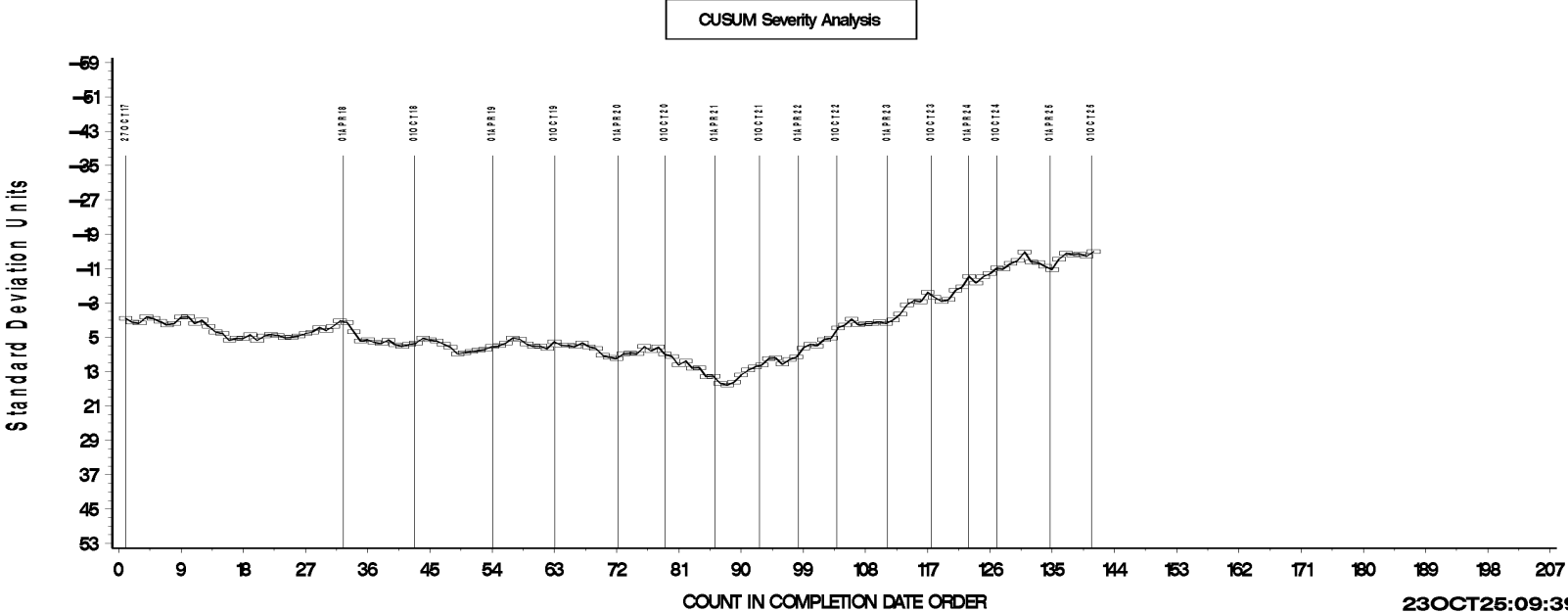
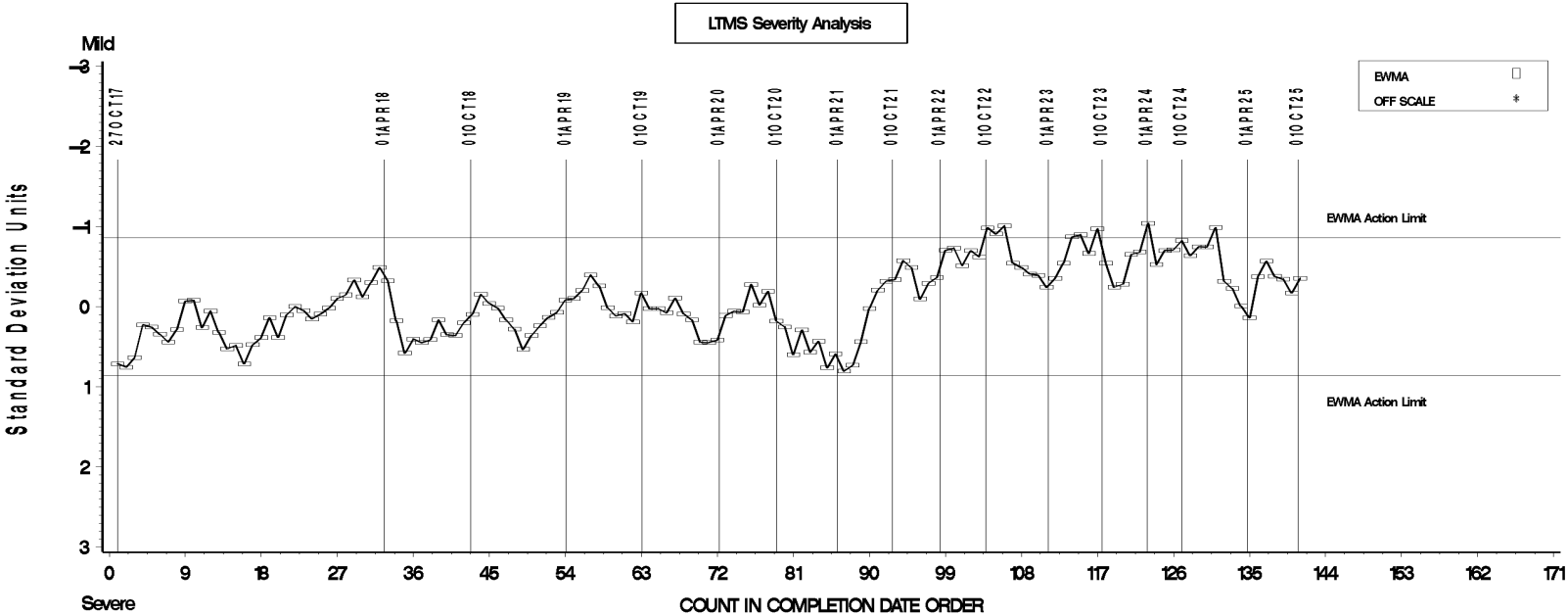
Sequence IVB Test Severity

- AVL started the reporting period exceeding the action limit in the mild direction and ended the period within limits.

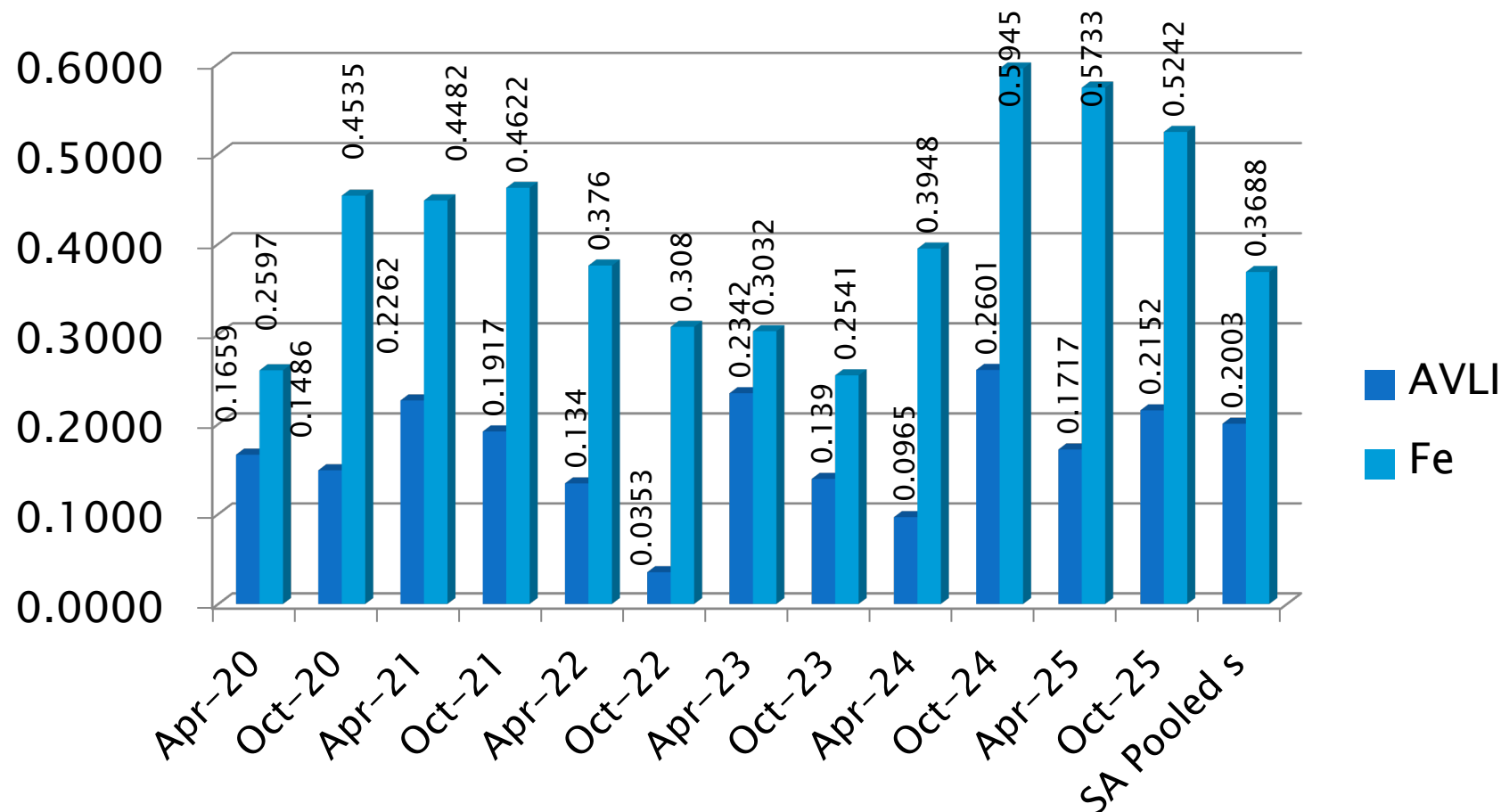
AVERAGE VOLUME LOSS BY KEYENCE INTAKE Final



END OF TEST FE FINAL Severity Adjusted RESULT



Sequence IVB Precision Estimates



[Return to Table of Contents](#)

Sequence VH



October 2025

Sequence VH Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	4
Statistically Unacceptable Calibration Test	OC	3
Fuel Approval Test	PF	11
Aborted Calibration Test	XC	1
Total		19

Sequence VH – Failing Tests

Test Status	#
Ei Level 3 varnish, severe direction	1
Ei Level 3 varnish and sludge, severe direction	1
Zi Level 3 varnish, severe direction	1
Total	3

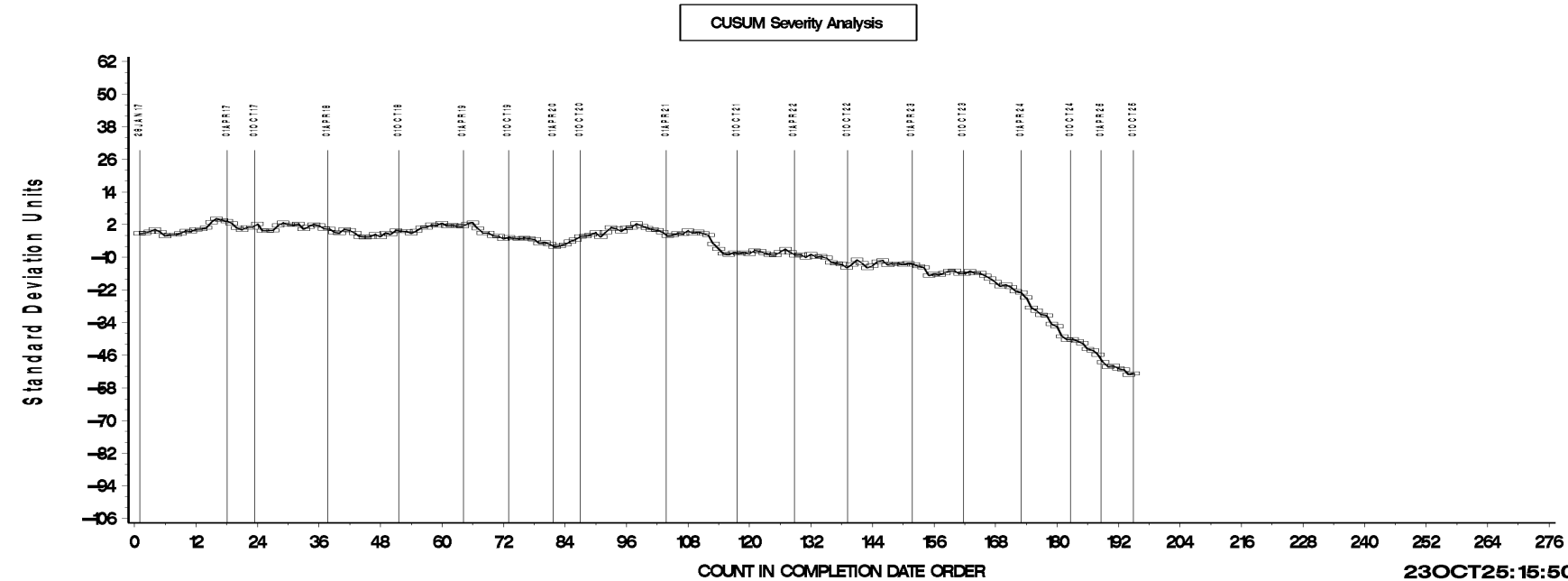
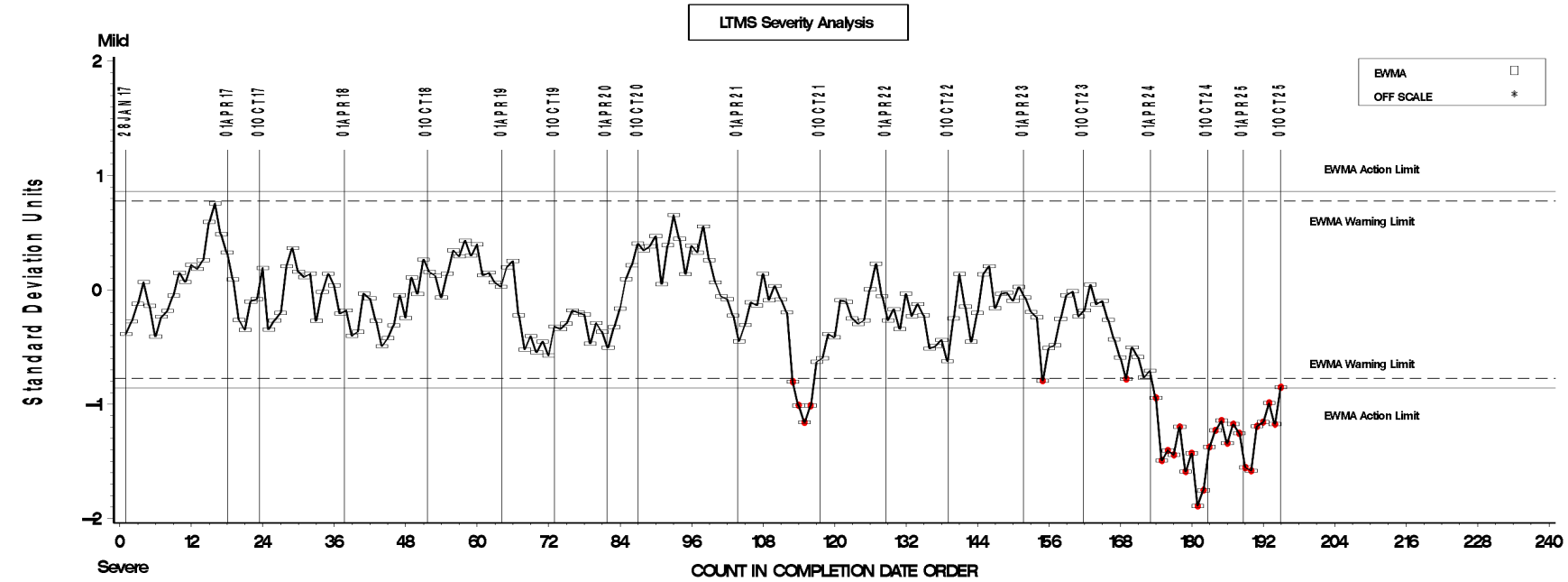
Sequence VH – Lost Tests

Test Status	Cause	#
XC	Oil addition error	1
Totals		1

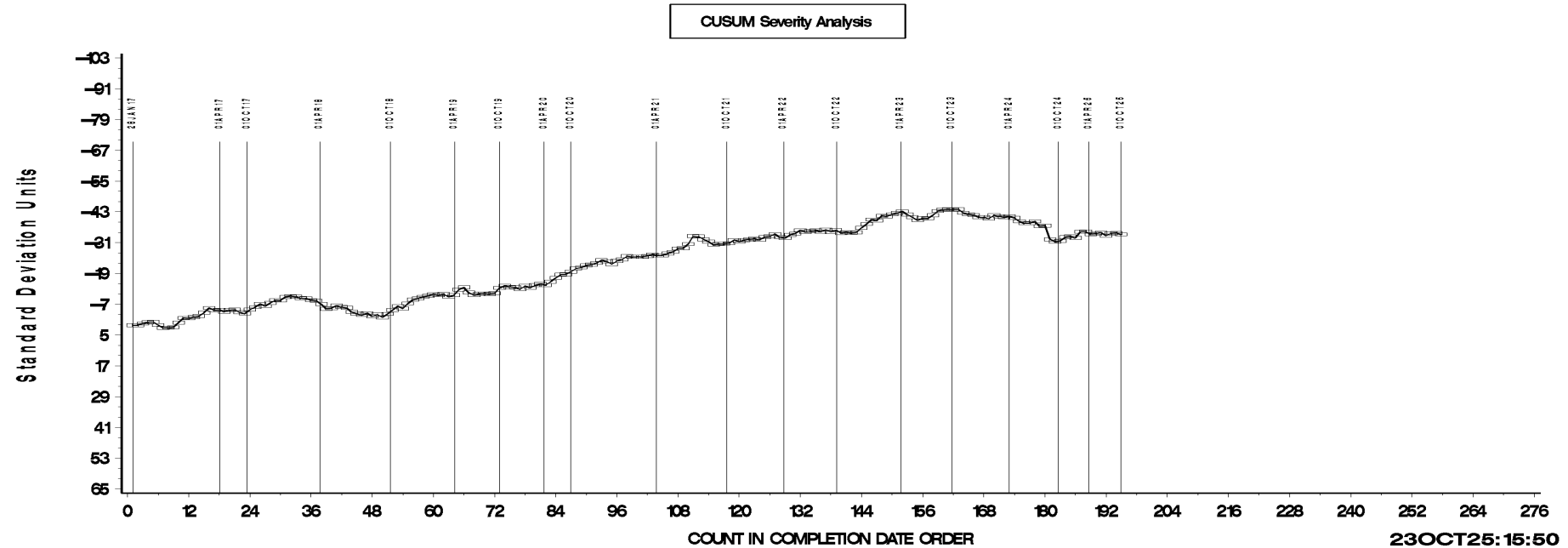
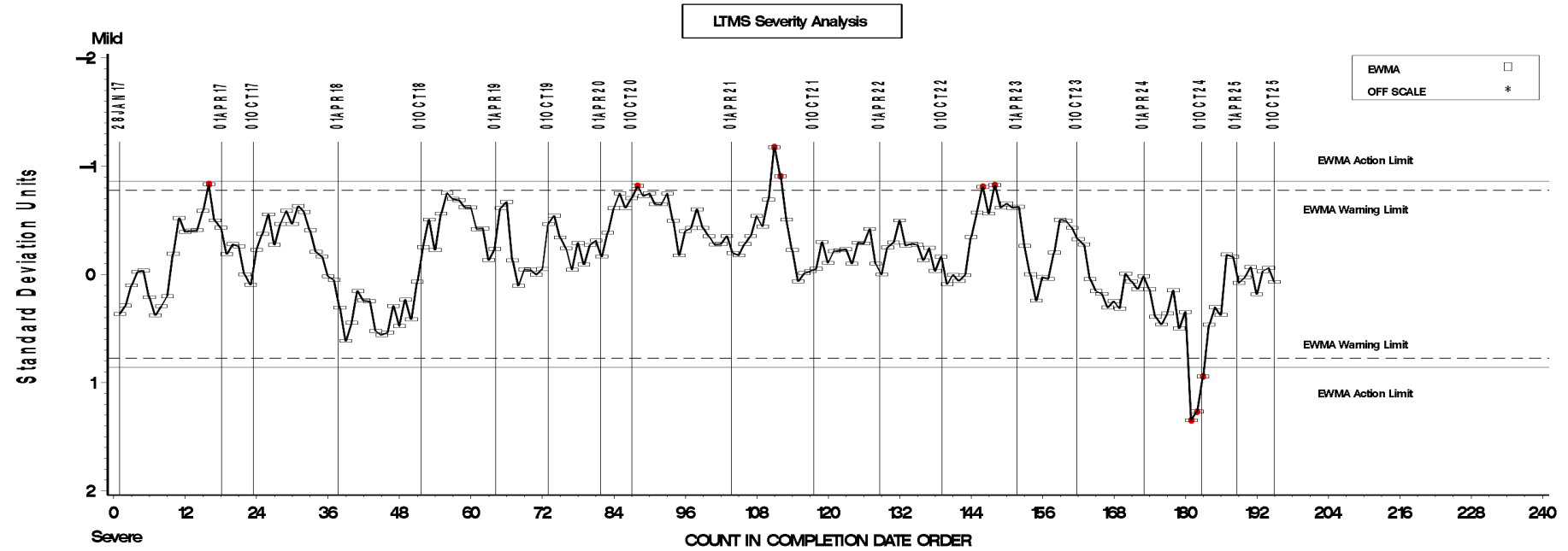
Sequence VH Test Severity

- AES, AE50 and AP50 parameters are all in action alarm (severe direction)
- RAC is in control

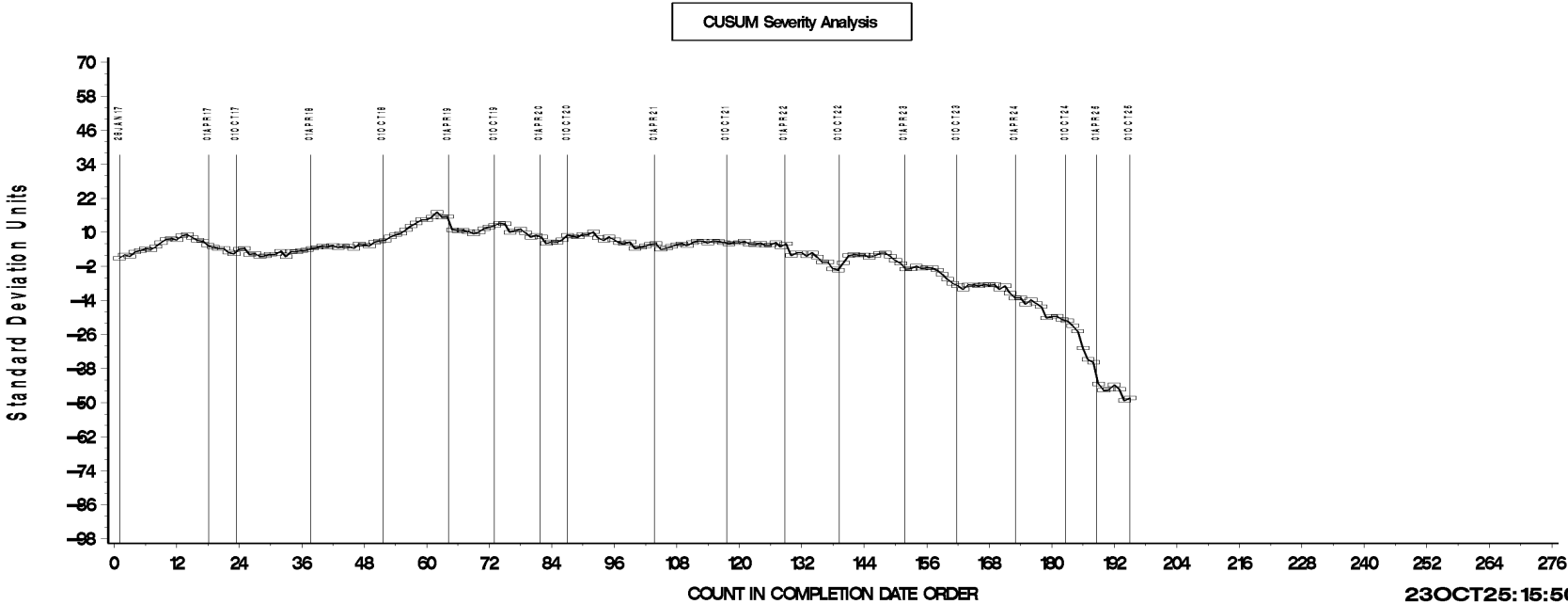
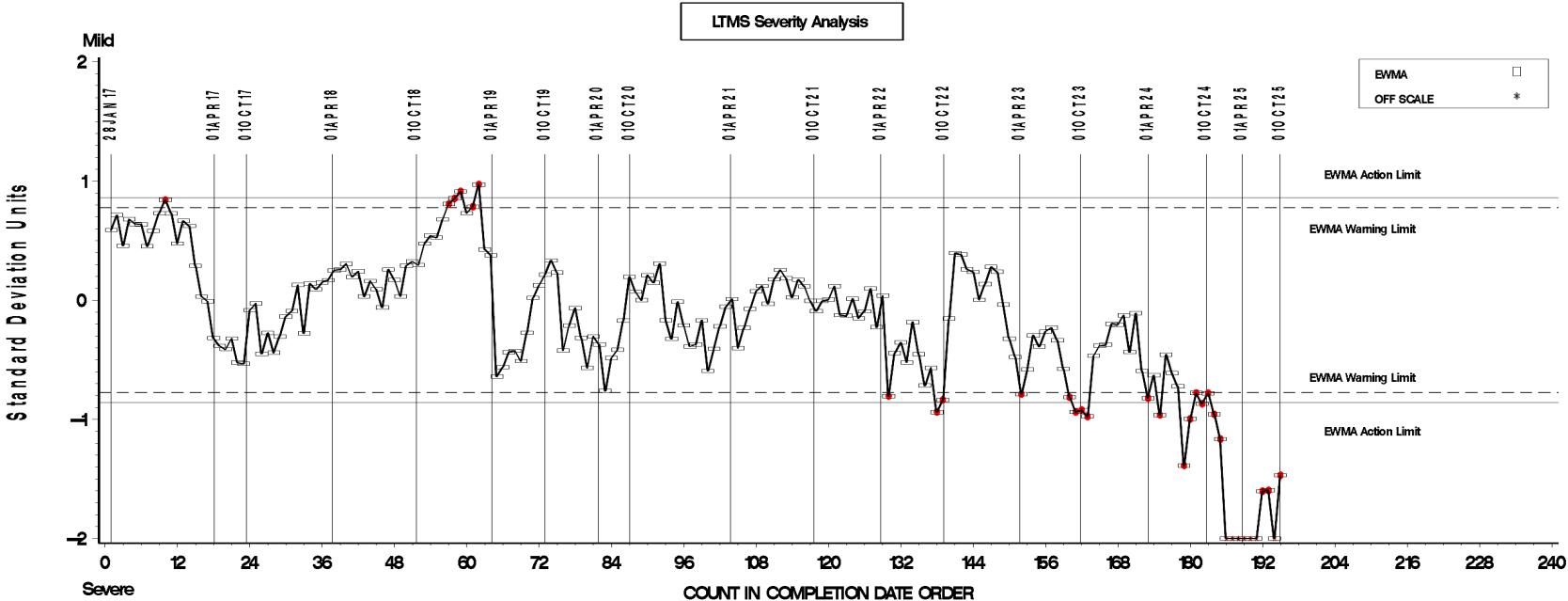
AVERAGE ENGINE SLUDGE



AVERAGE ROCKER COVER SLUDGE



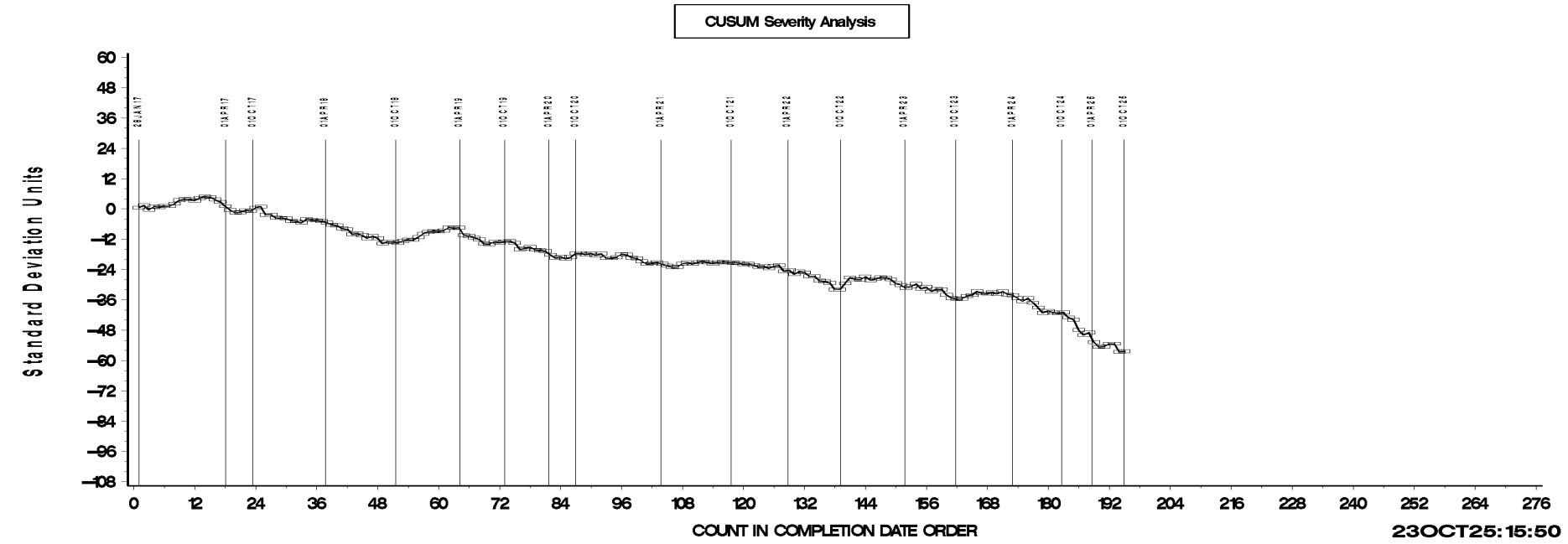
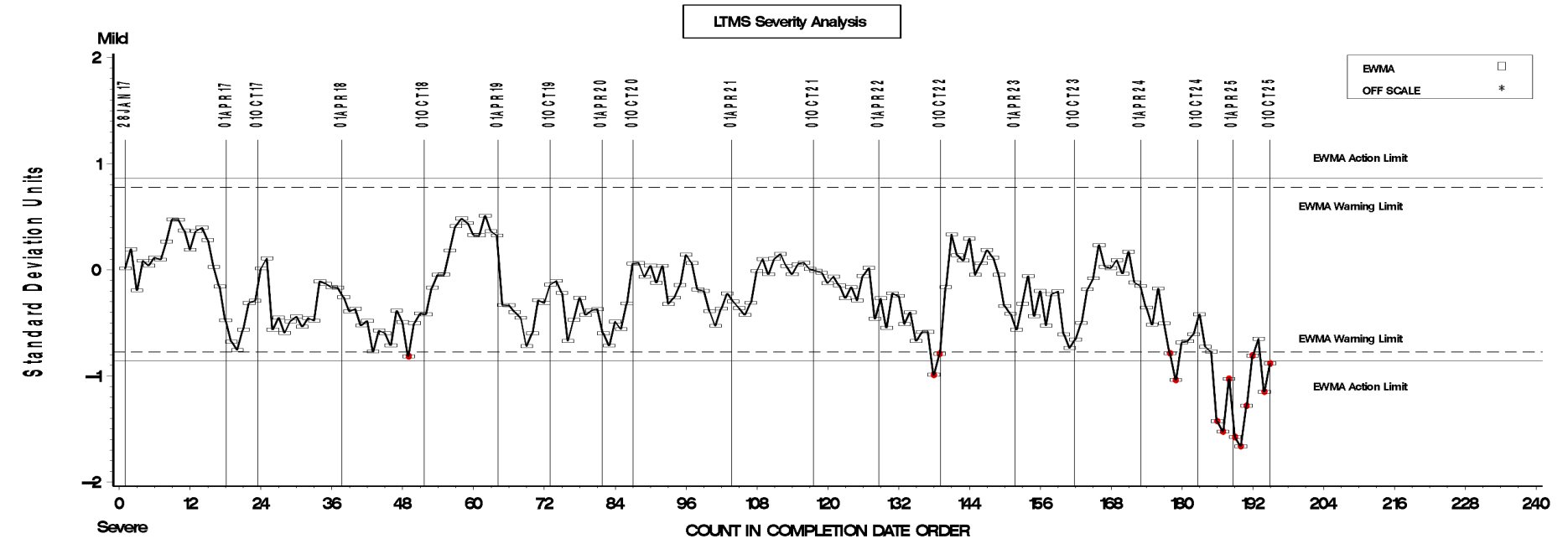
AVG. ENG. VARN. 50% RATING



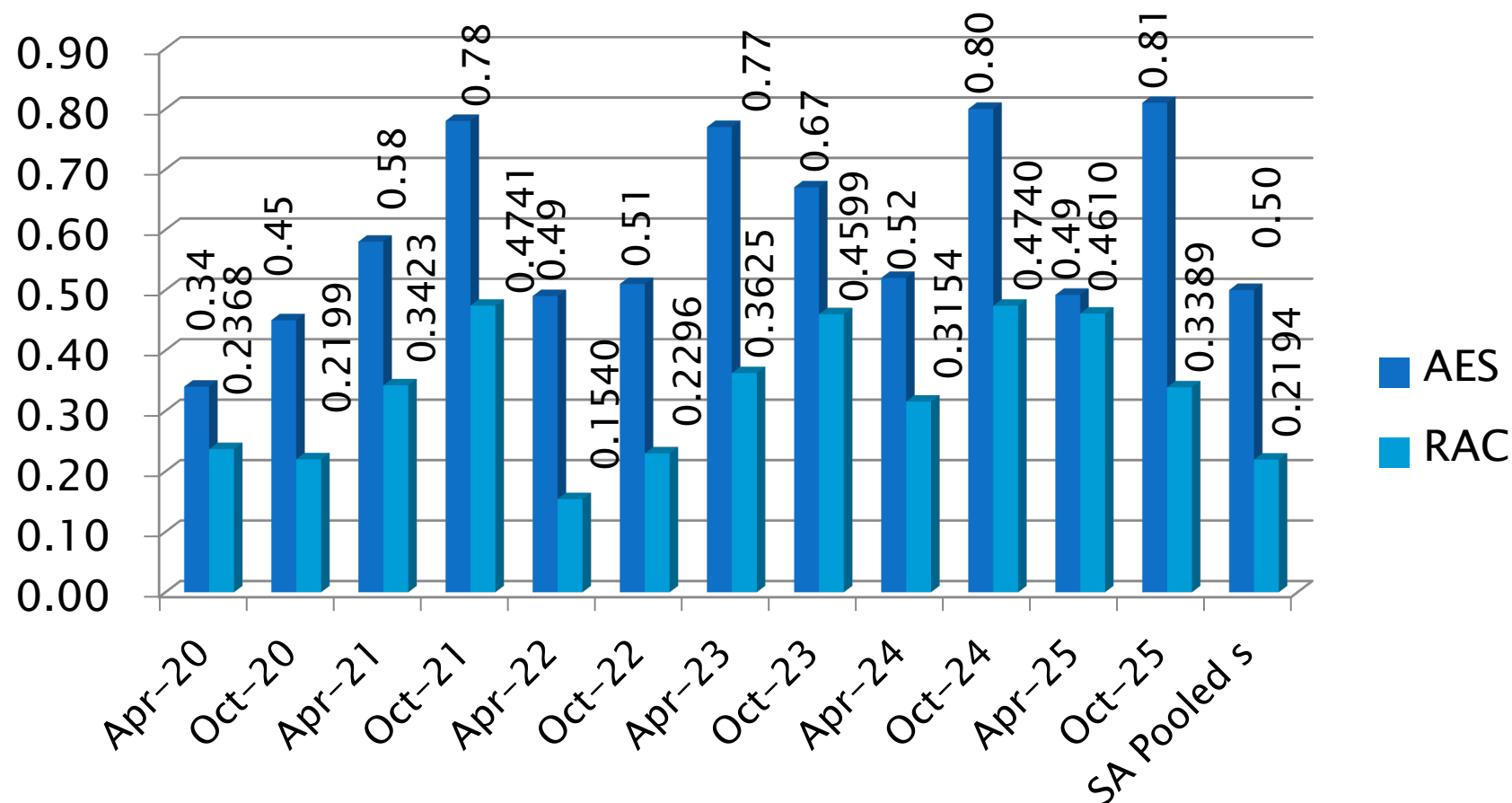
SEQUENCE VH INDUSTRY OPERATIONALLY VALID DATA



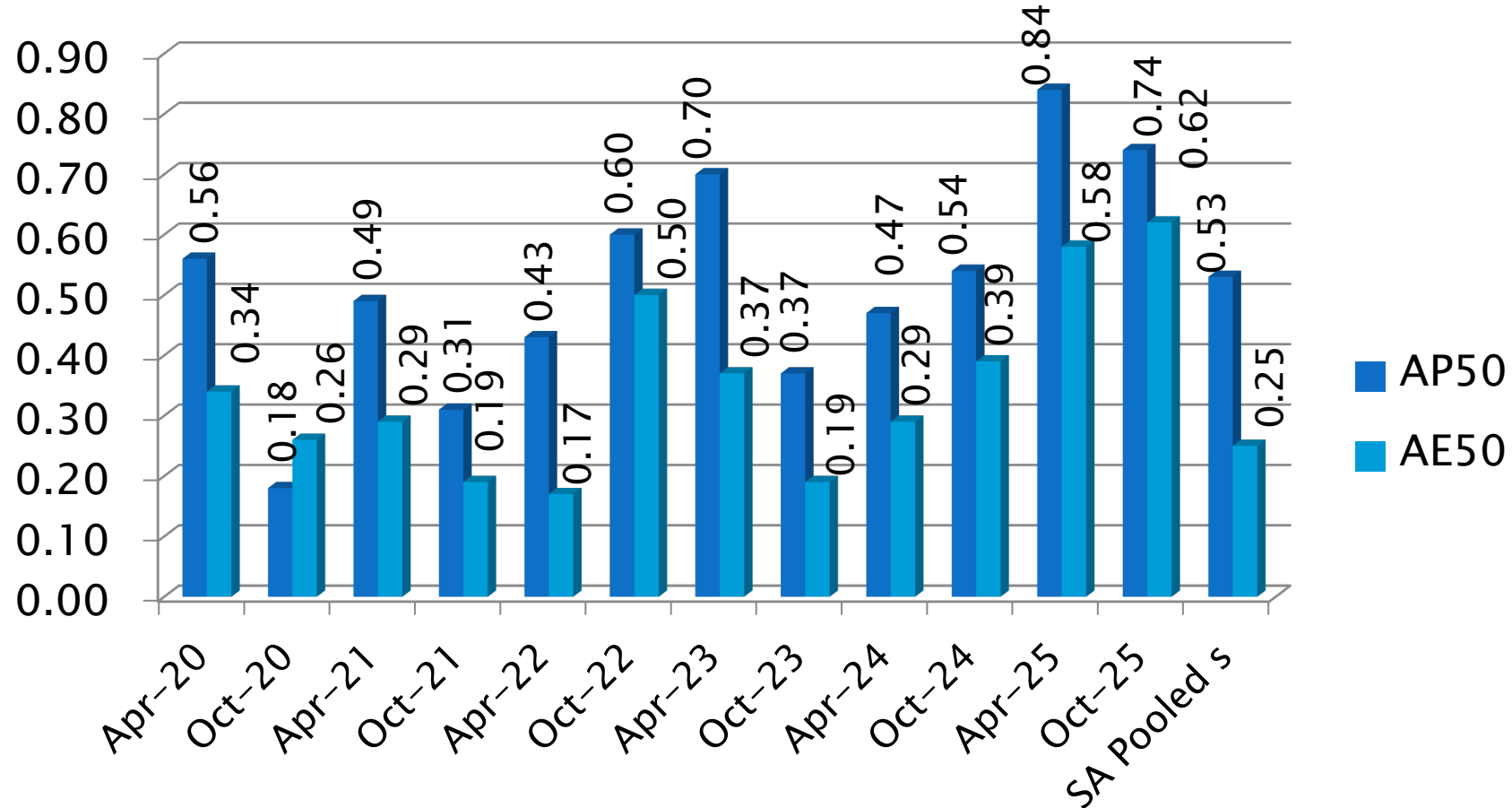
AVG PISTON SKIRT 50% RATING



Sequence VH Precision Estimates



Sequence VH Precision Estimates



[Return to Table of Contents](#)

Sequence VIE

➡➡ October 2025

Sequence VIE Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	32
Engine Abandoned	MC	1
Statistically Unacceptable Calibration Test	OC	3
Aborted Calibration Test	XC	2
Invalid Test	LC	4
Acceptable Non-blind Information Run (VIG development)	NN	1
Invalid Non-blind Information Run (VIG development)	LN	2
Total		45

Sequence VIE – Failing Tests

Test Status		Cause	#
OC	FEI1 mild		1
OC	FEI1 mild & FEI2 severe		1
OC	FEI2 severe		1
Total			3

Sequence VIE – Lost Tests*

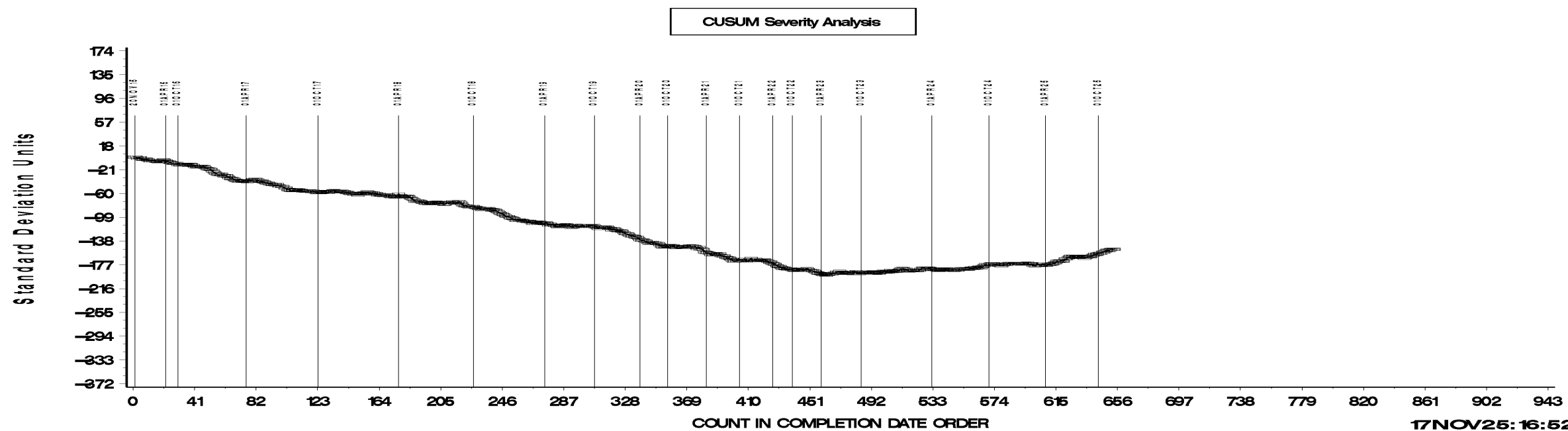
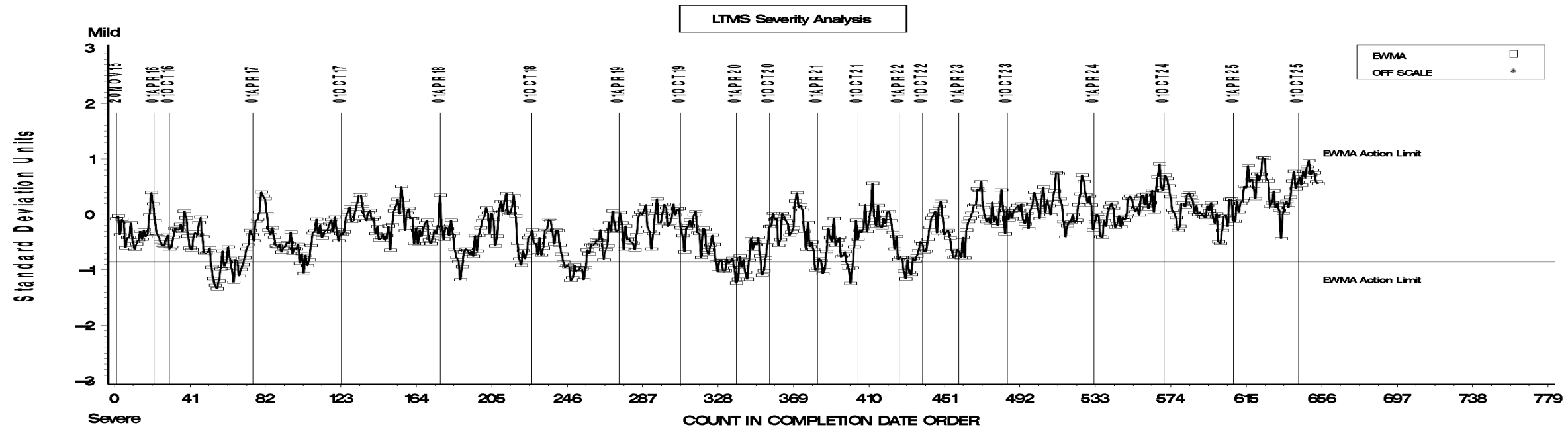
Test Status	Cause	#
LC	Fuel supply disruption	1
LC	Incorrect engine install	1
LC	DAC issues	1
XC	High oil consumption	1
XC	Abnormal fuel consumption	1
LC	Dyno failure	1
Total		6

*Invalid and aborted tests

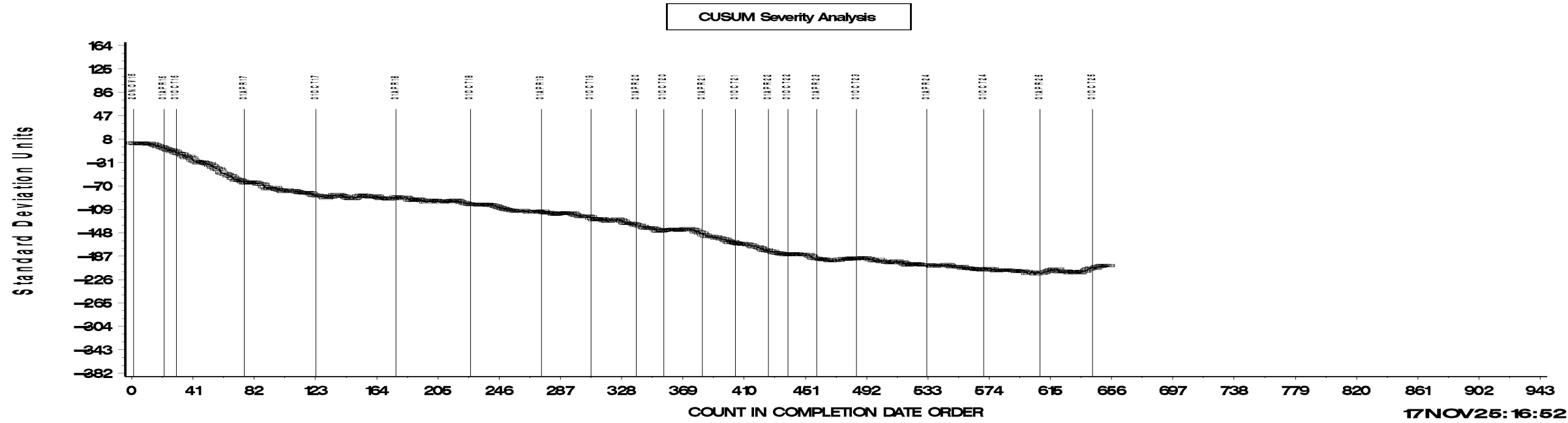
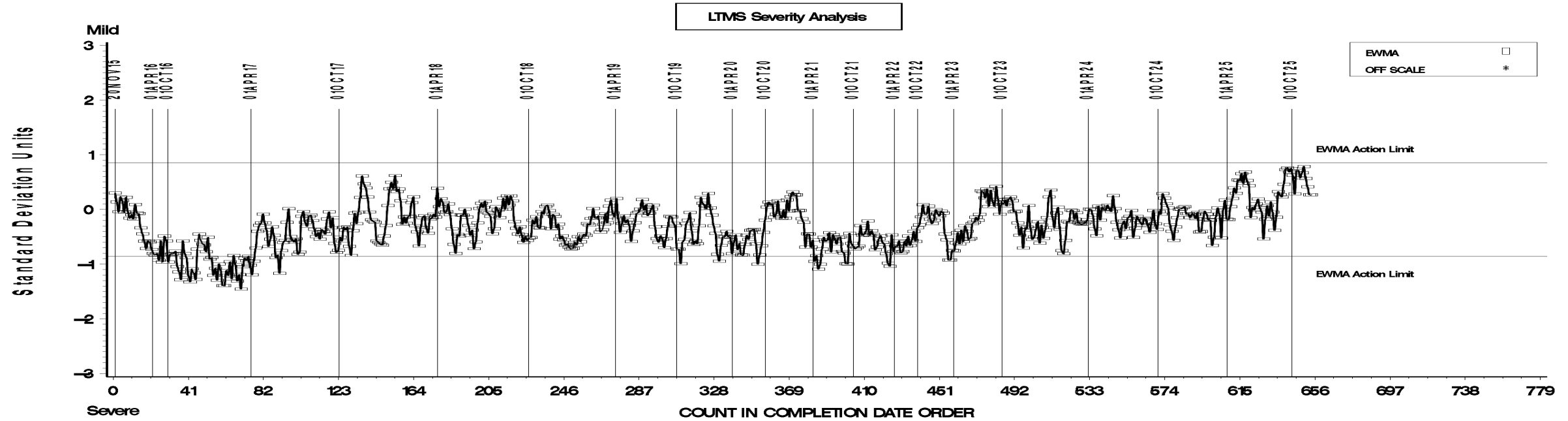
Sequence VIE Test Severity

- FEI1 & FEI2 are in control.

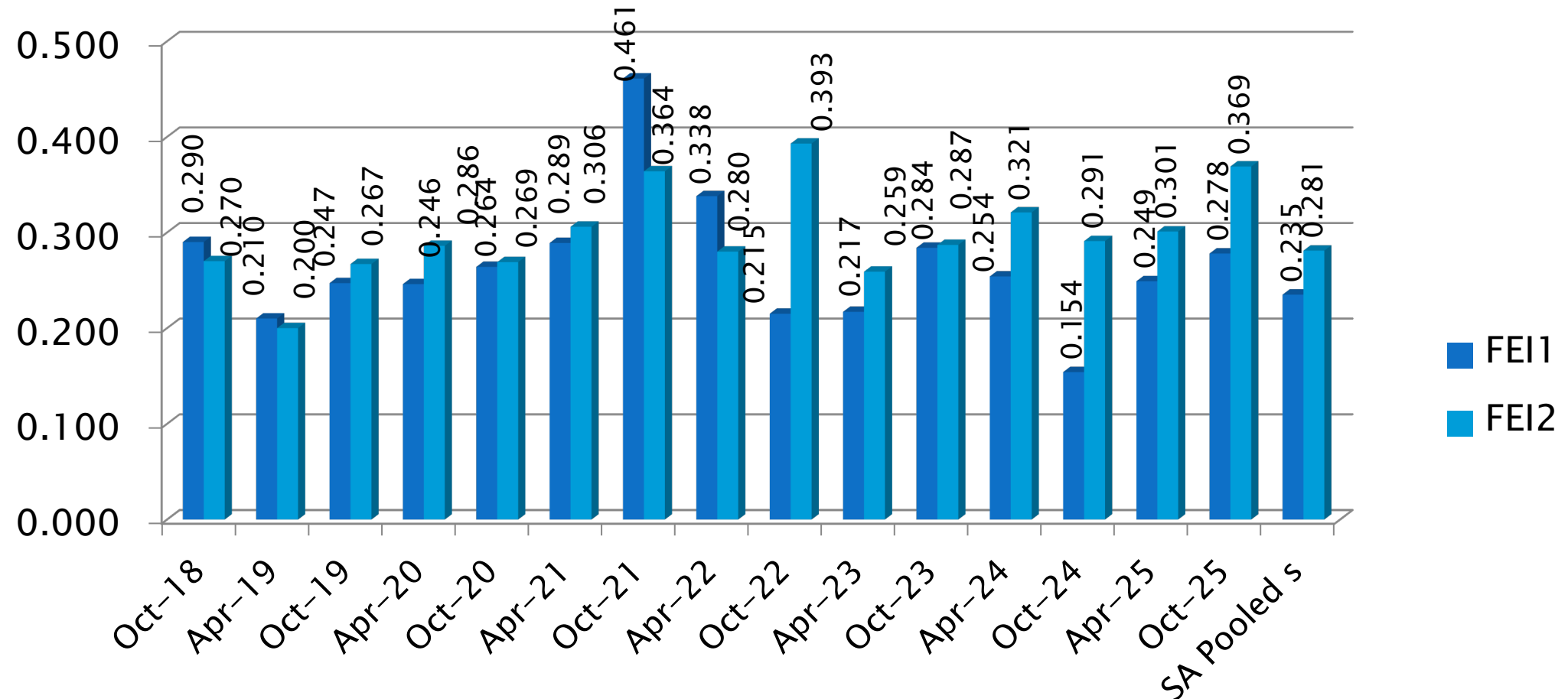
FEI FINAL RESULT PHASE I



FEI FINAL RESULT PHASE II



Sequence VIE Precision Estimates



[Return to Table of Contents](#)

Sequence VIF

➡➡ October 2025

Sequence VIF Activity

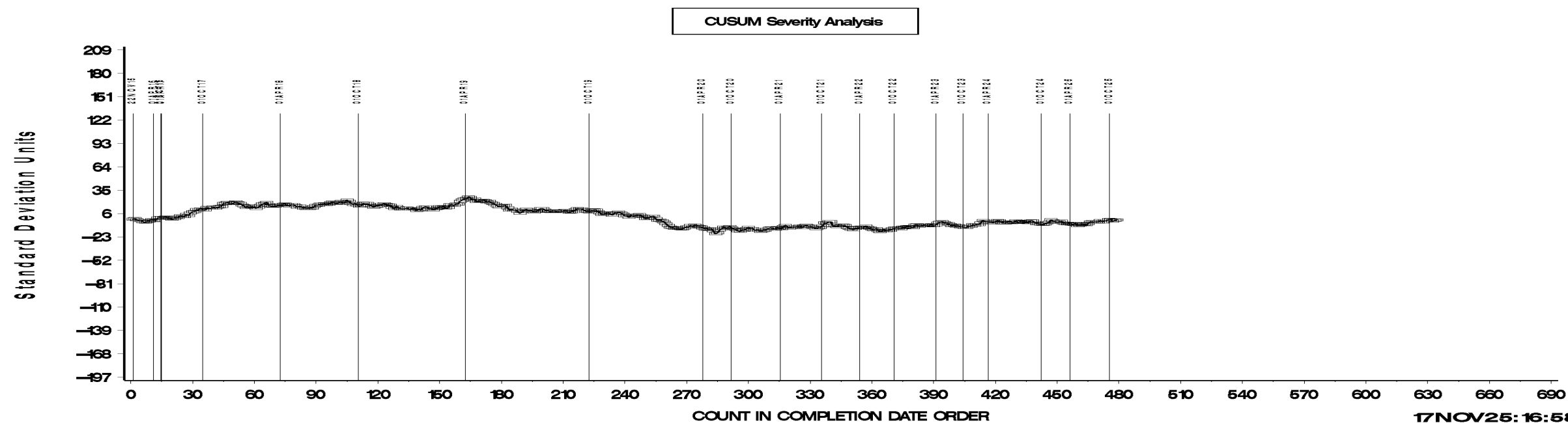
Test Status	Validity Code	#
Acceptable Calibration Test	AC	18
Statistically Unacceptable Calibration Test	OC	1
Total		19

Sequence VIF – Failing Tests

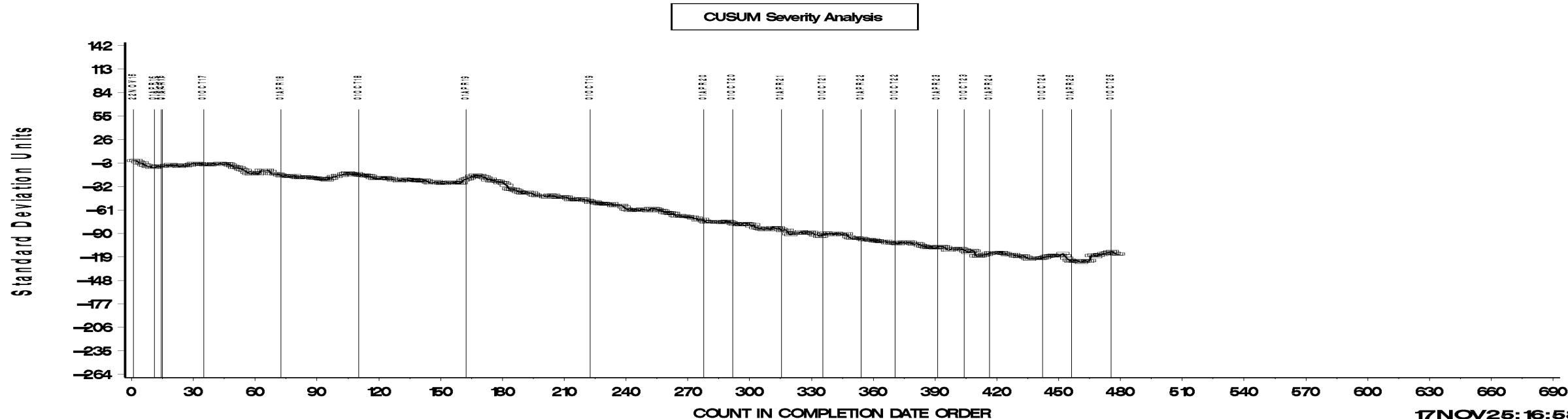
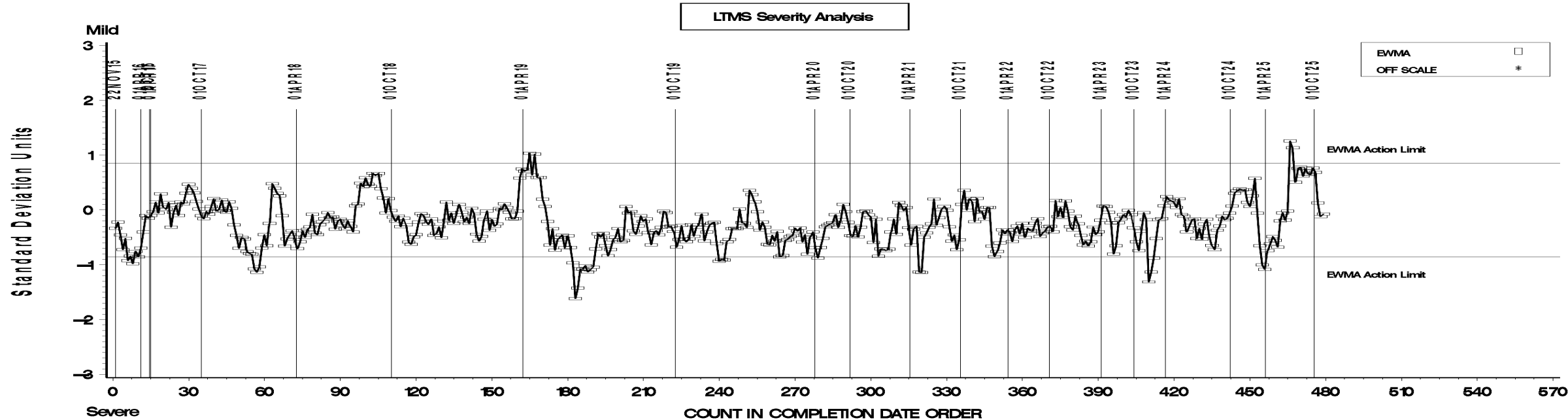
Test Status		Cause	#
OC	FEI1 & FEI2 mild		1
Total			1

Sequence VIF Test Severity

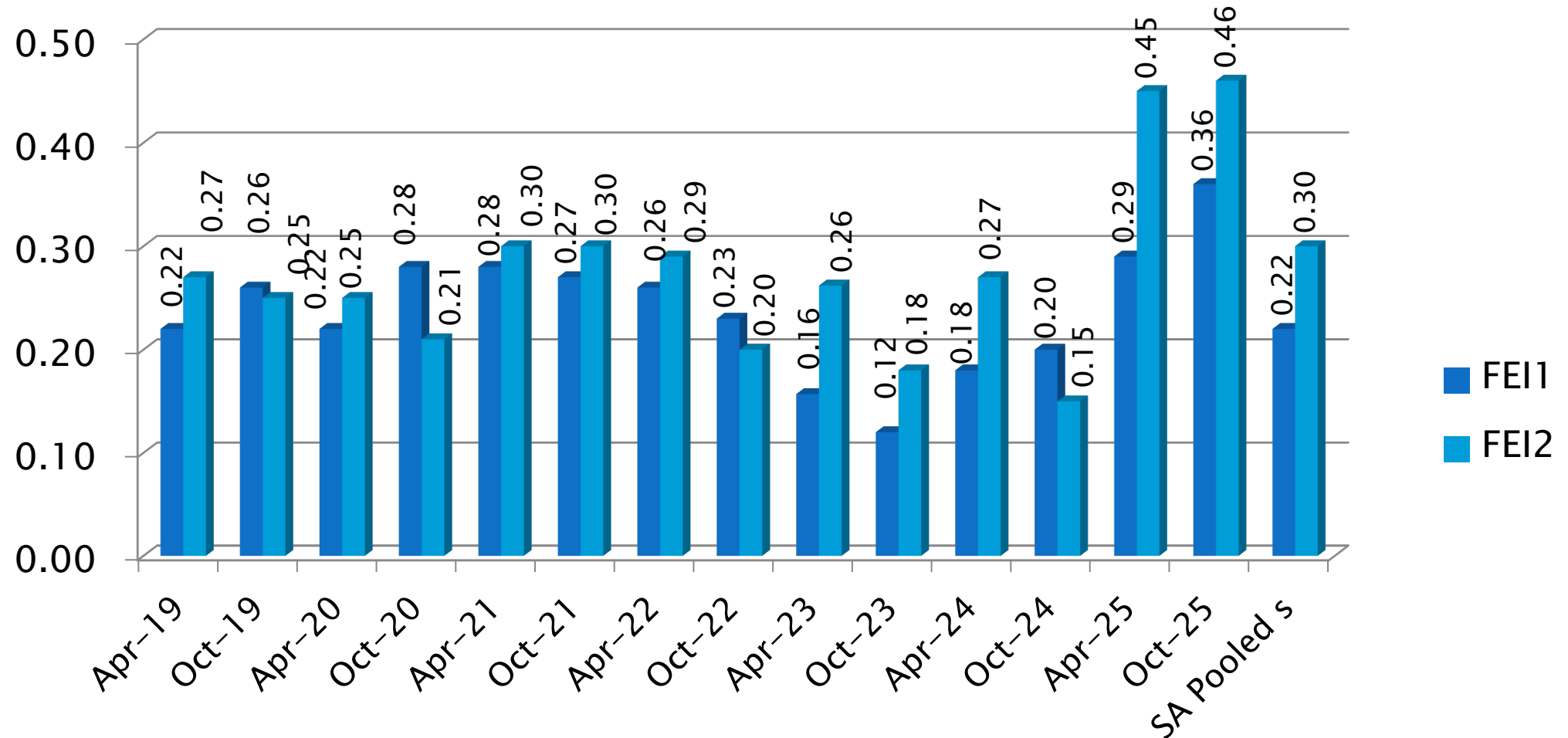
- FEI1 & FEI2 are in control.



FEI FINAL RESULT PHASE II



Sequence VIF Precision Estimates



[Return to Table of Contents](#)

Sequence VIII



October 2025

Sequence VIII Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	4
Operationally Invalid Calibration Test	LC	2
Total		6

Sequence VIII – Lost Tests*

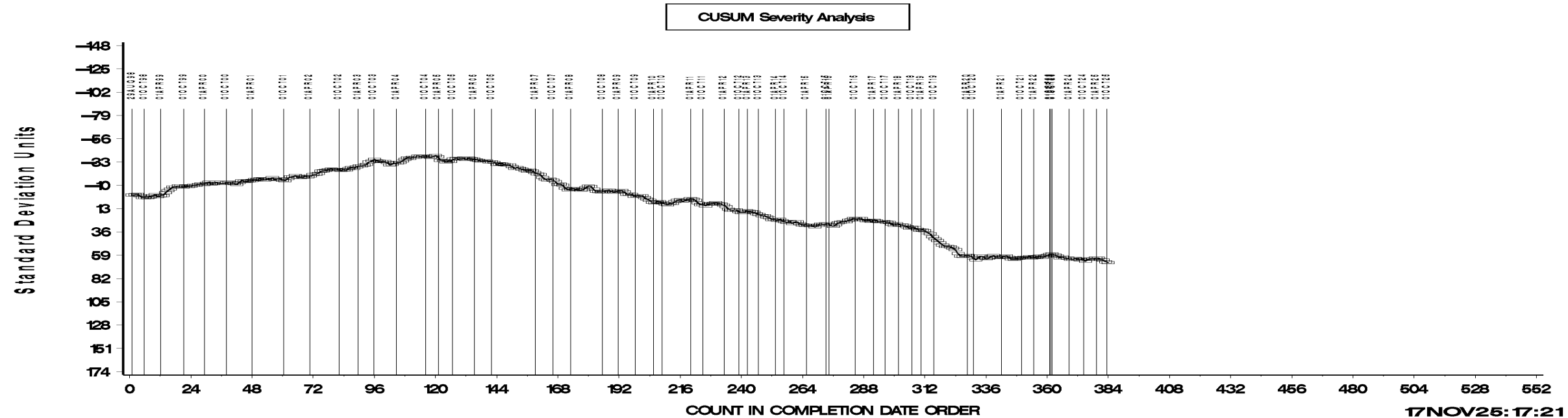
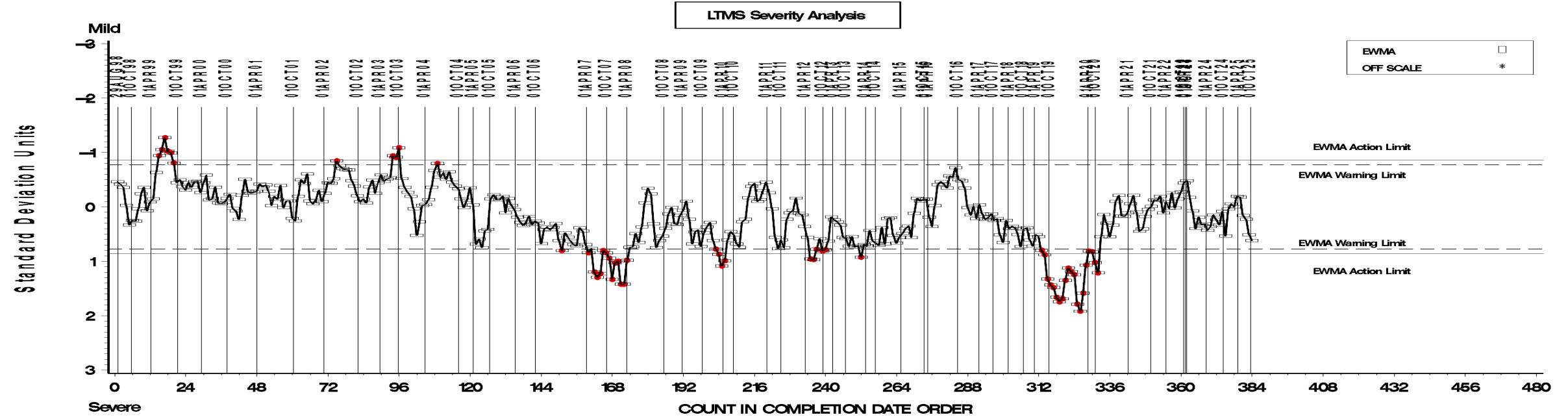
Test Status	Cause	#
Invalid	High Mechanical Wear	1
Invalid	Crankcase Vacuum Deviation > 5%	1
Totals		2

*Invalid and aborted tests

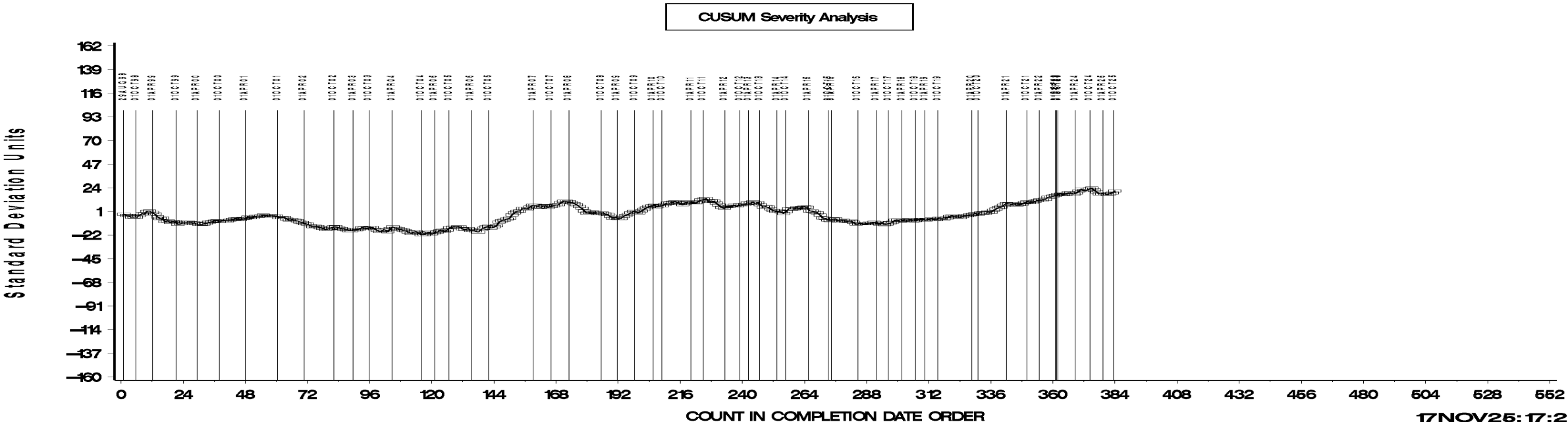
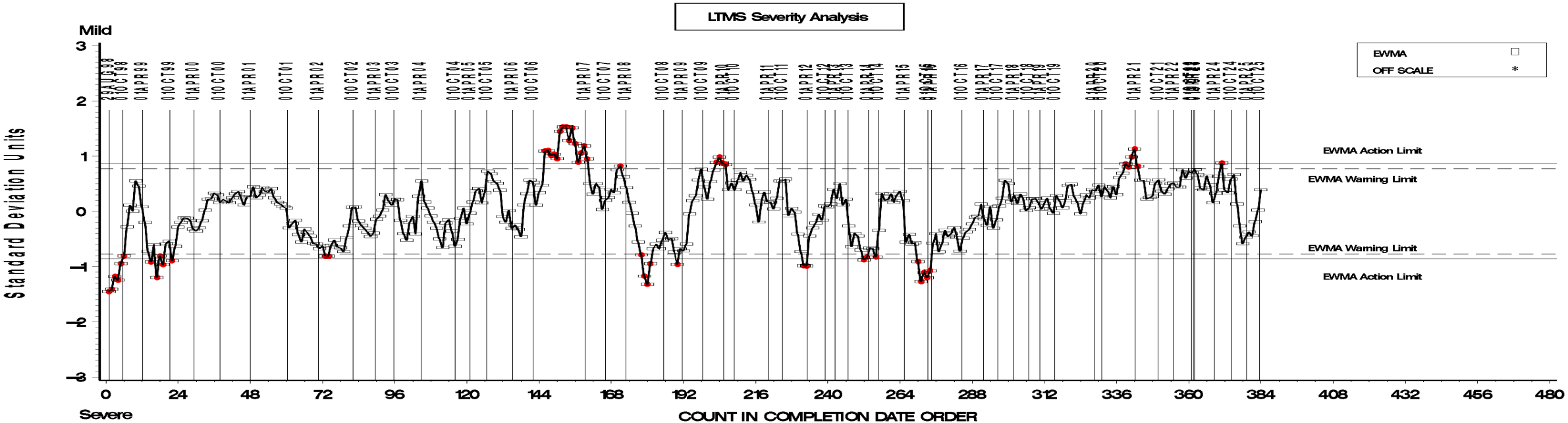
Sequence VIII Test Severity

- BWLS & SVIS are in control

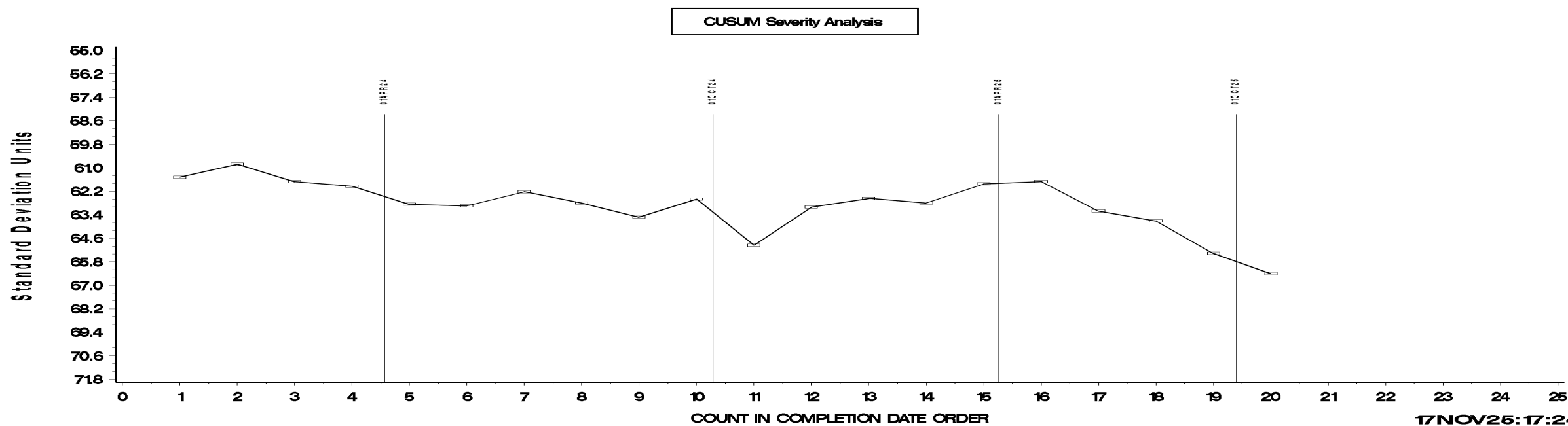
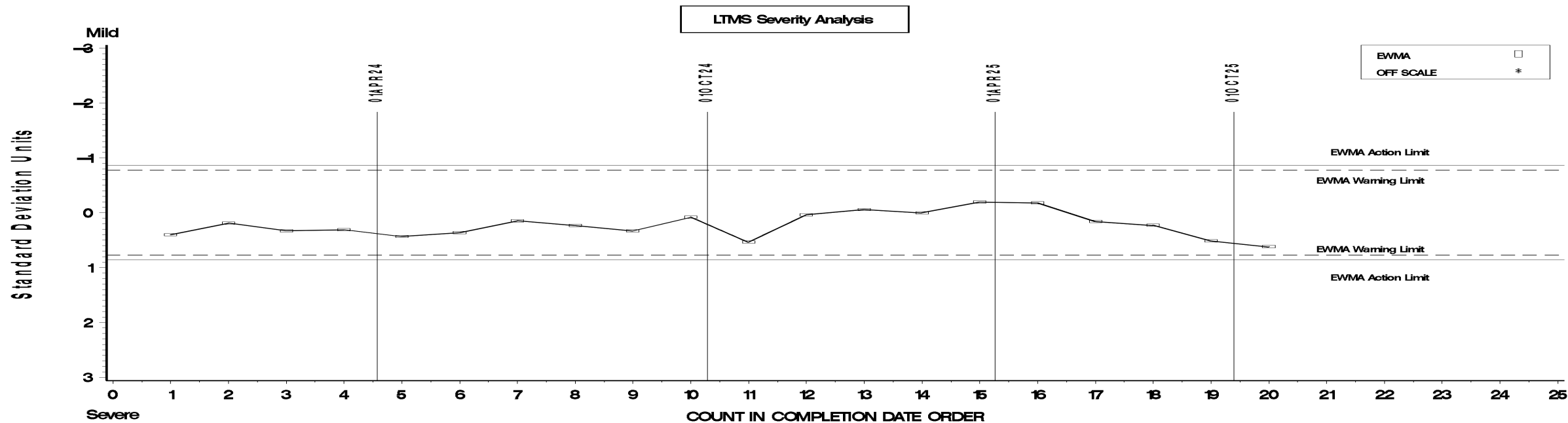
FINAL BEARING WEIGHT LOSS



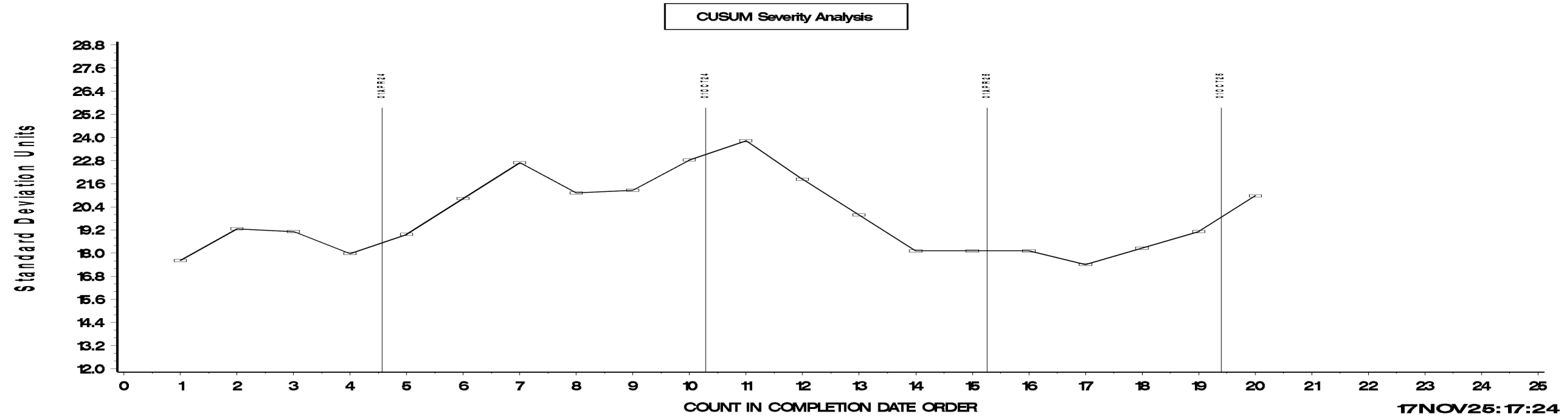
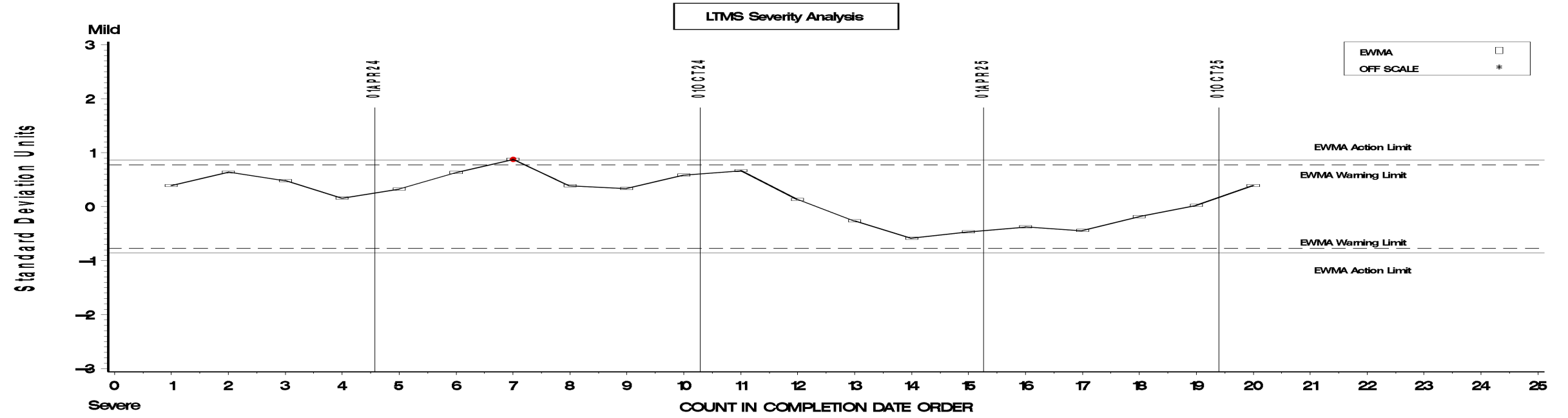
STRIPPED VIS. @ 100 DEG C



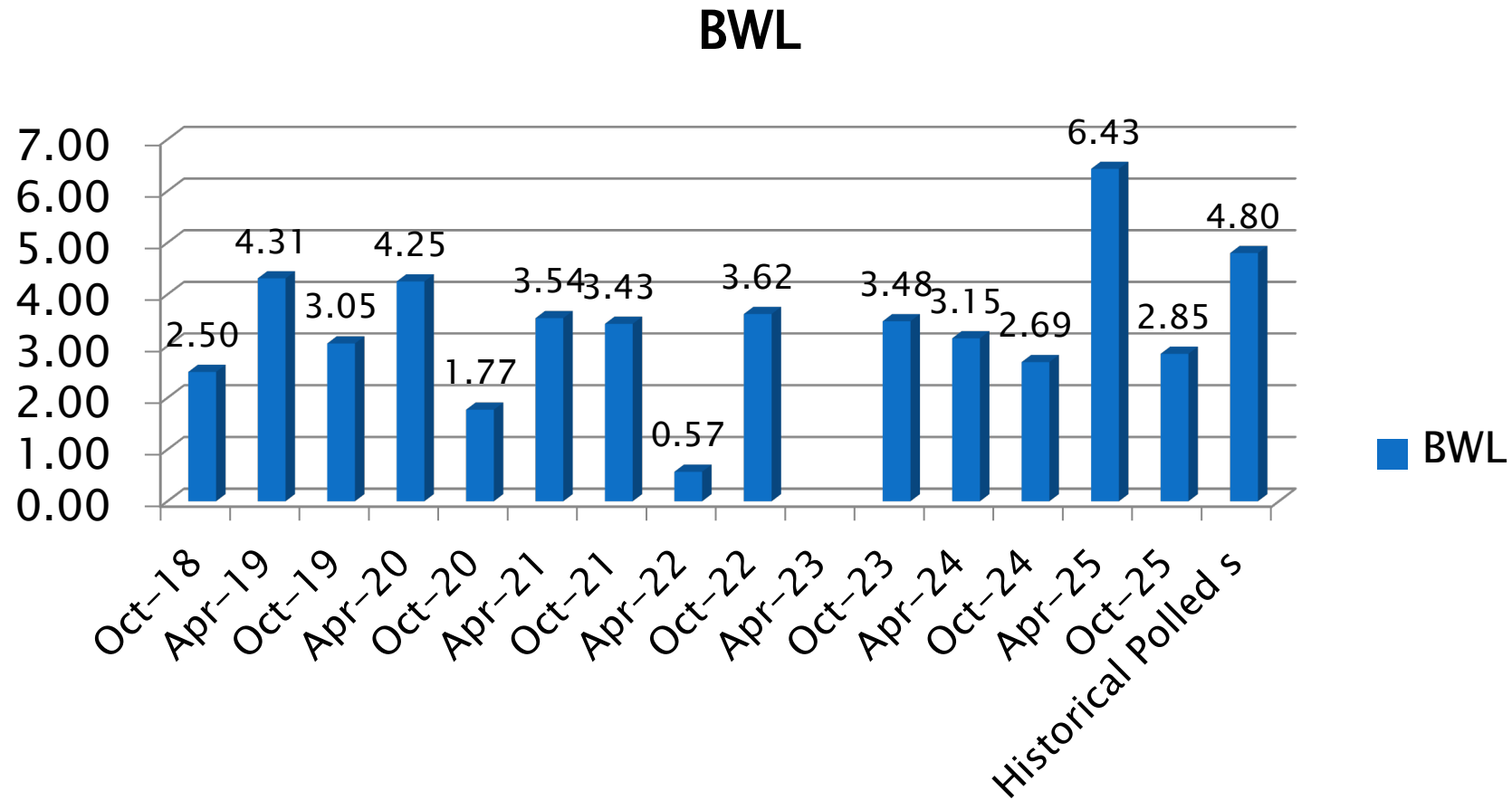
FINAL BEARING WEIGHT LOSS



STRIPPED VIS. @ 100 DEG C



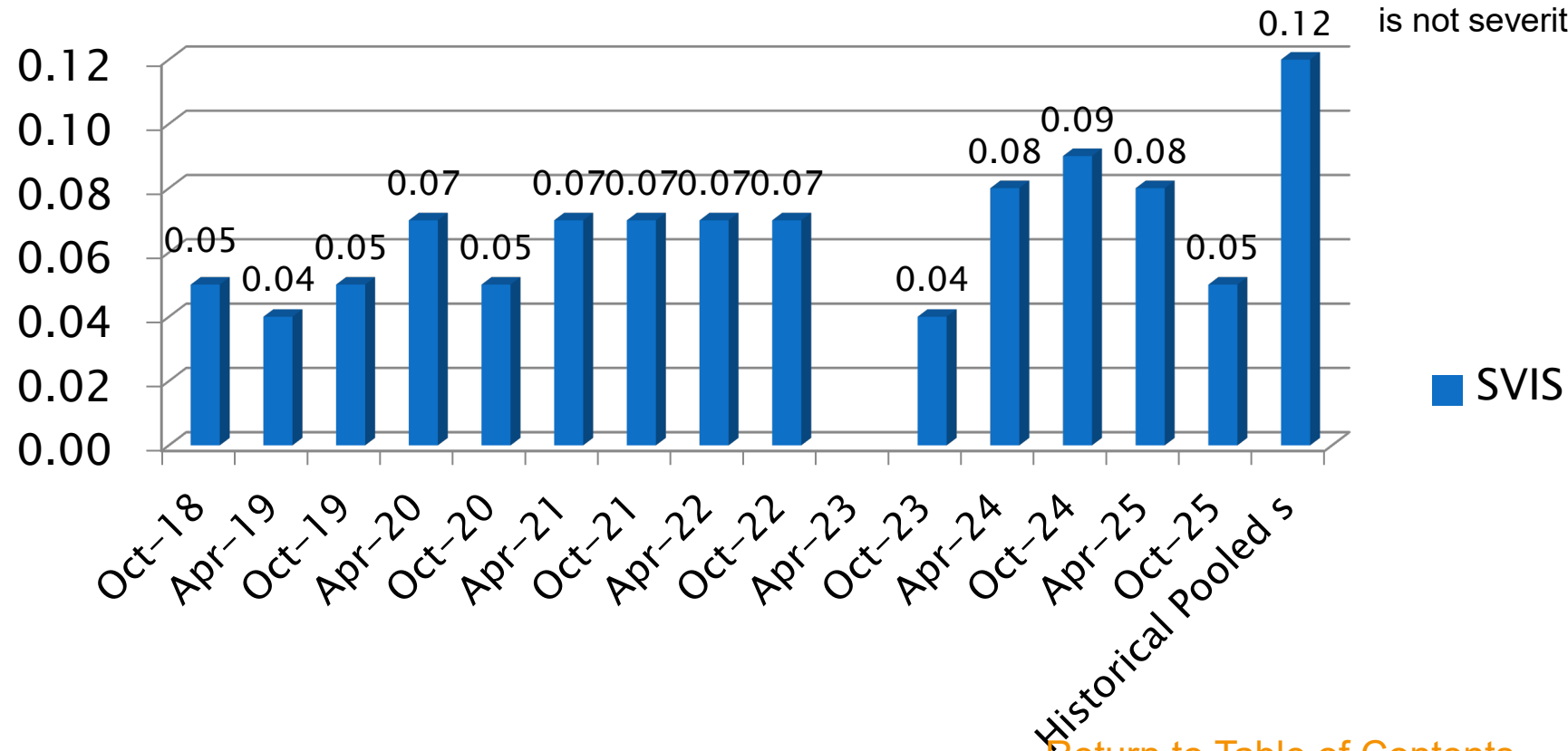
Sequence VIII Precision Estimates



Sequence VIII Precision Estimates

SVIS

Historical Pooled s used for comparison purposes, parameter is not severity adjusted.



[Return to Table of Contents](#)

Sequence IX

➡➡ October 2025

Sequence IX Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	43
Statistically Unacceptable Calibration Test	OC	5
Operationally Invalid Calibration Test (lab judgement)	LC	2
Engine Break-in	AN	5
Aborted Calibration Test	XC	2
Total		57

Sequence IX – Failed Tests

Test Status	Number of Tests
Ei Level 0 alarm (mild)	1
Zi Level 2 alarm (mild)	1
Zi Level 2 alarm (severe)	1
Zi Level 2, Ei Level 3 (mild)	1
Zi Level 2, Ei Level 3 (severe)	1
Total	5

Sequence IX – Lost Tests*

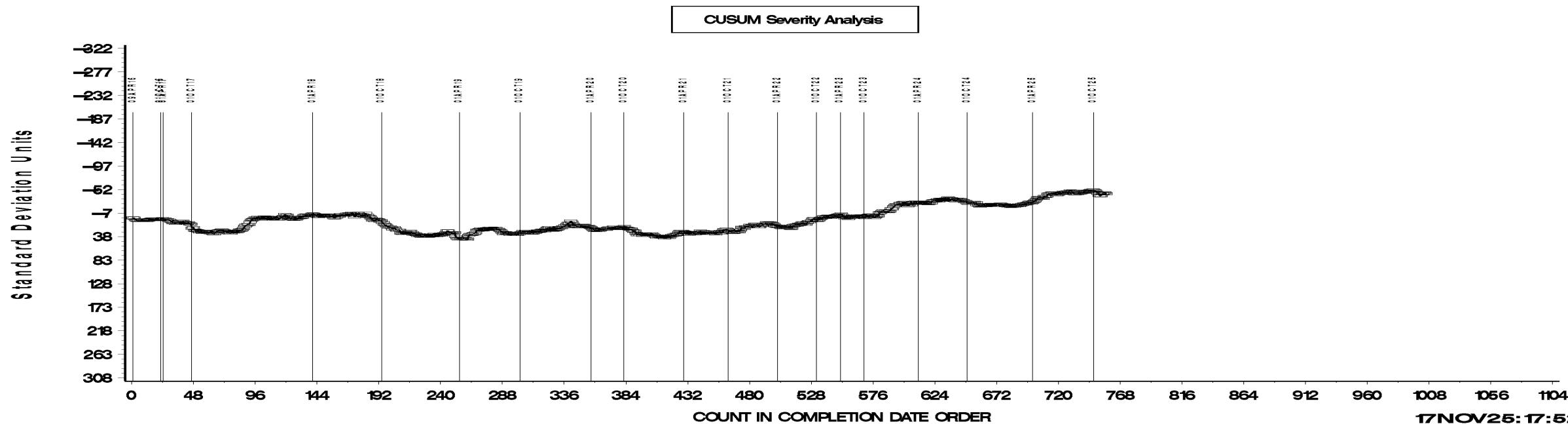
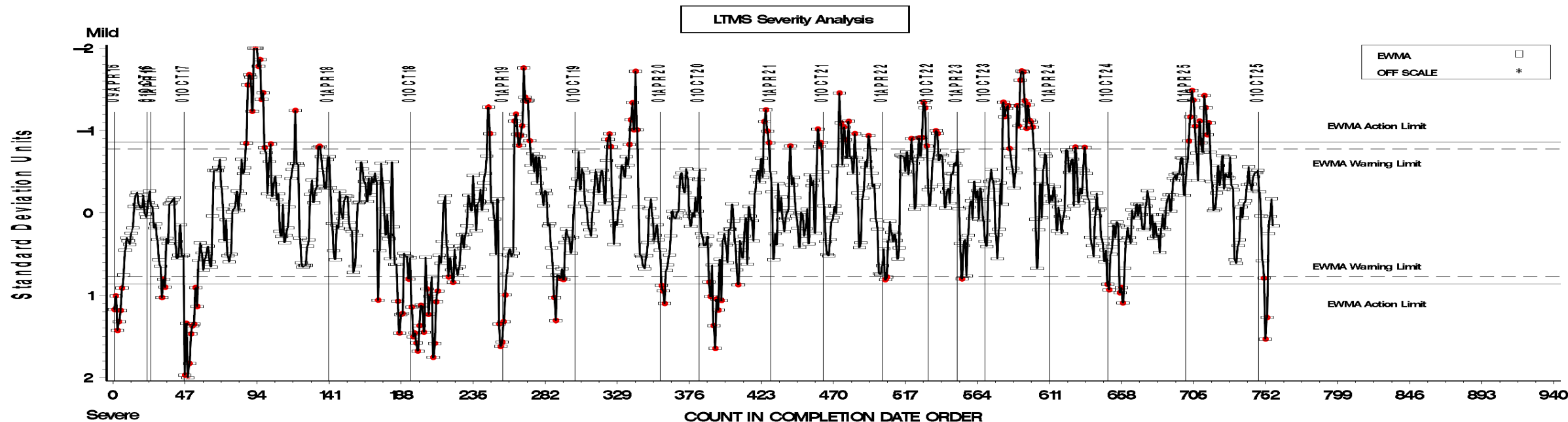
Test Status	Cause	#
Invalid	Fuel Temp Deviation	1
Invalid	Coolant Temp –QI	1
Aborted	Exhaust Leak Into Coolant System	1
Aborted	Engine Damage	1
Totals		4

*Invalid and aborted tests

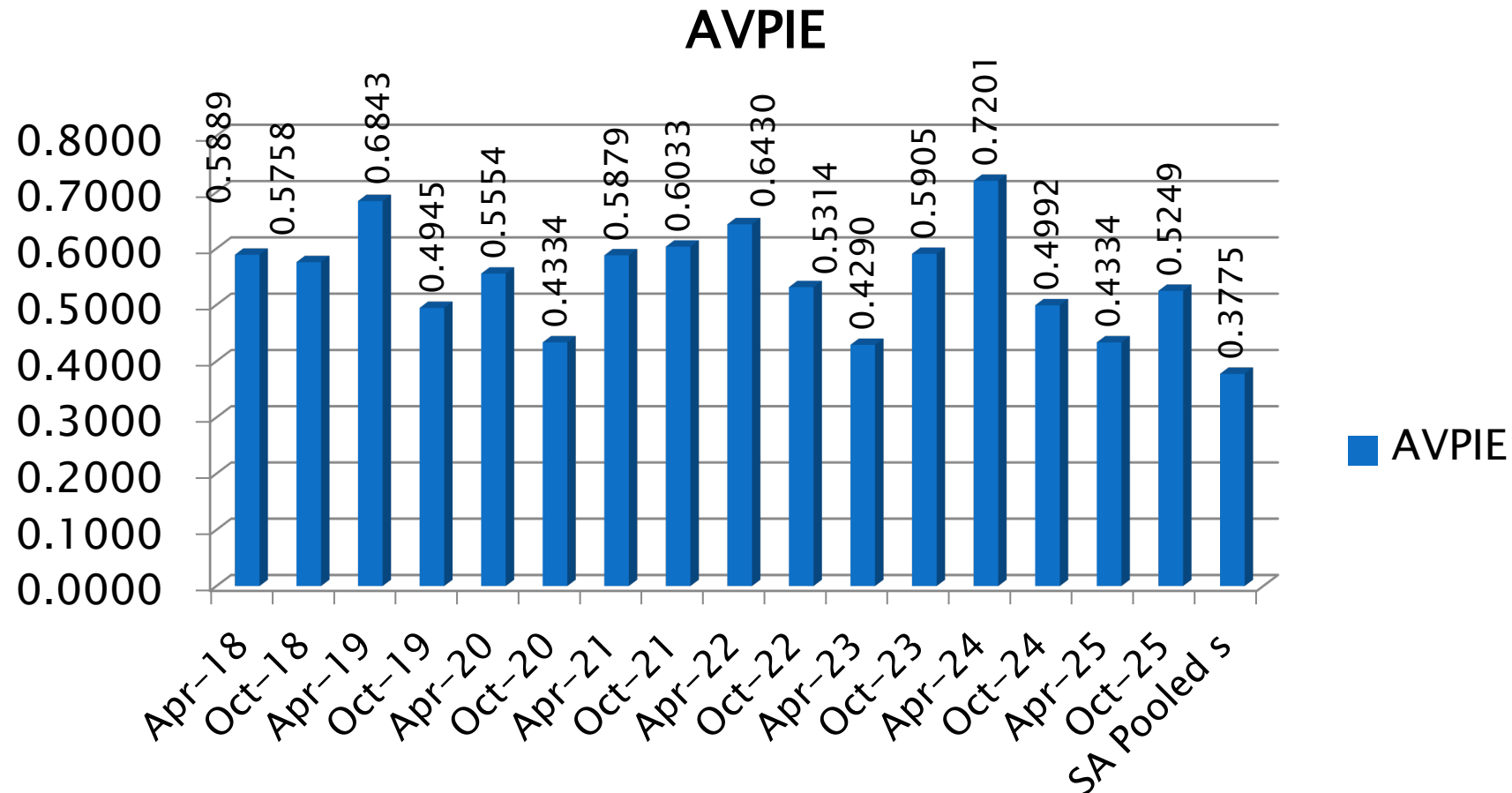
Sequence IX Test Severity

- Average number of pre-ignitions is currently in control.

AVERAGE NUMBER OF PREIGNITIONS FROM VALID ITERATIONS



Sequence IX Precision Estimates



[Return to Table of Contents](#)

Sequence IXAGED

➤➤ October 2025

Test Monitoring Center
<https://www.astmtmc.org>



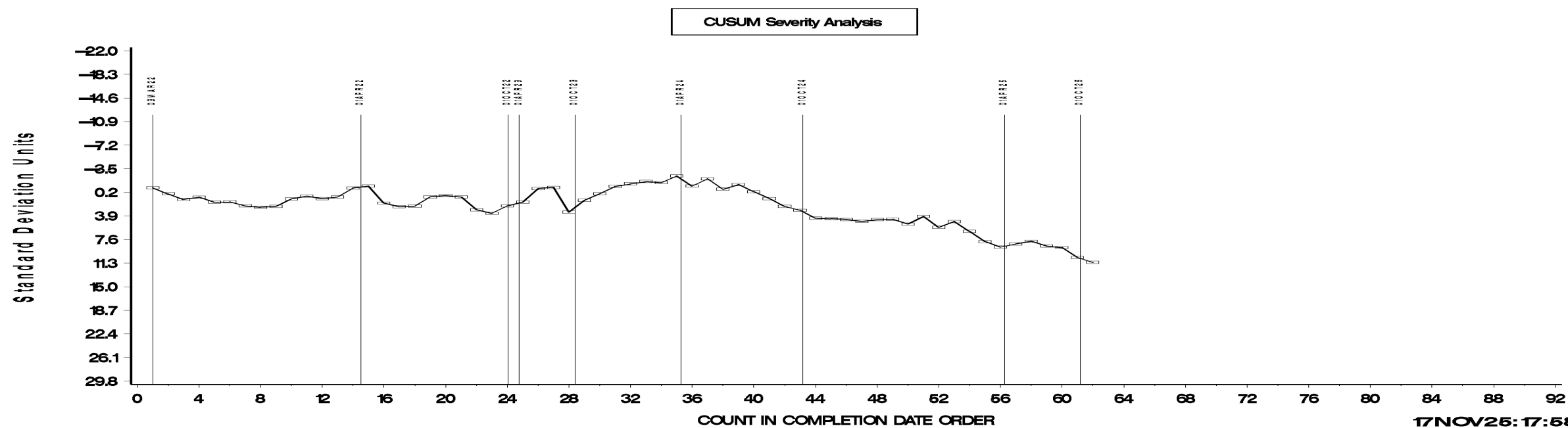
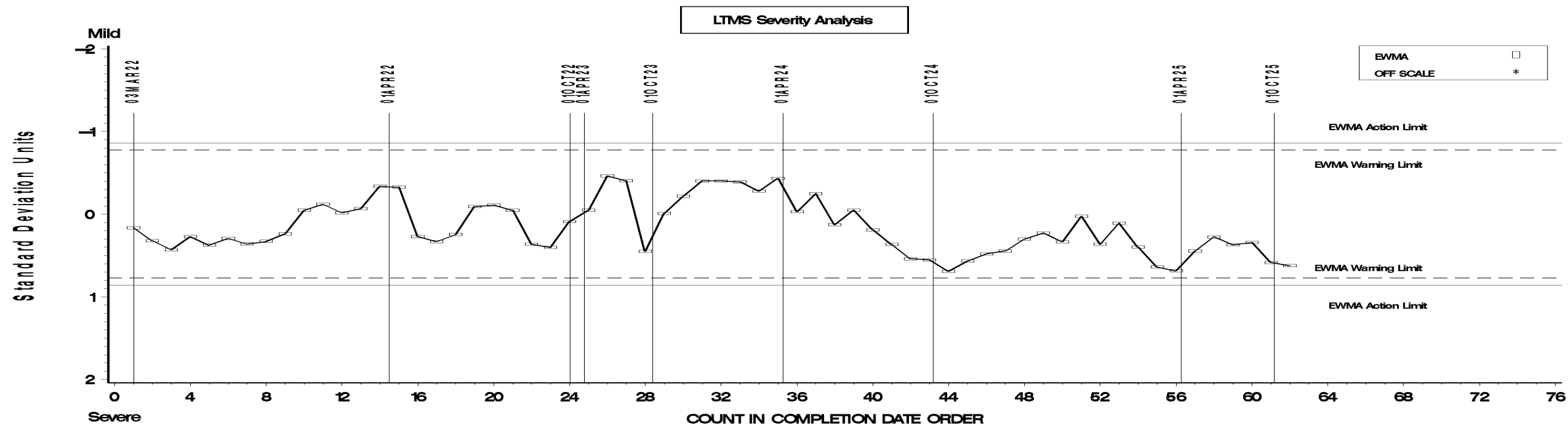
Sequence IXAGED Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	5
Total		5

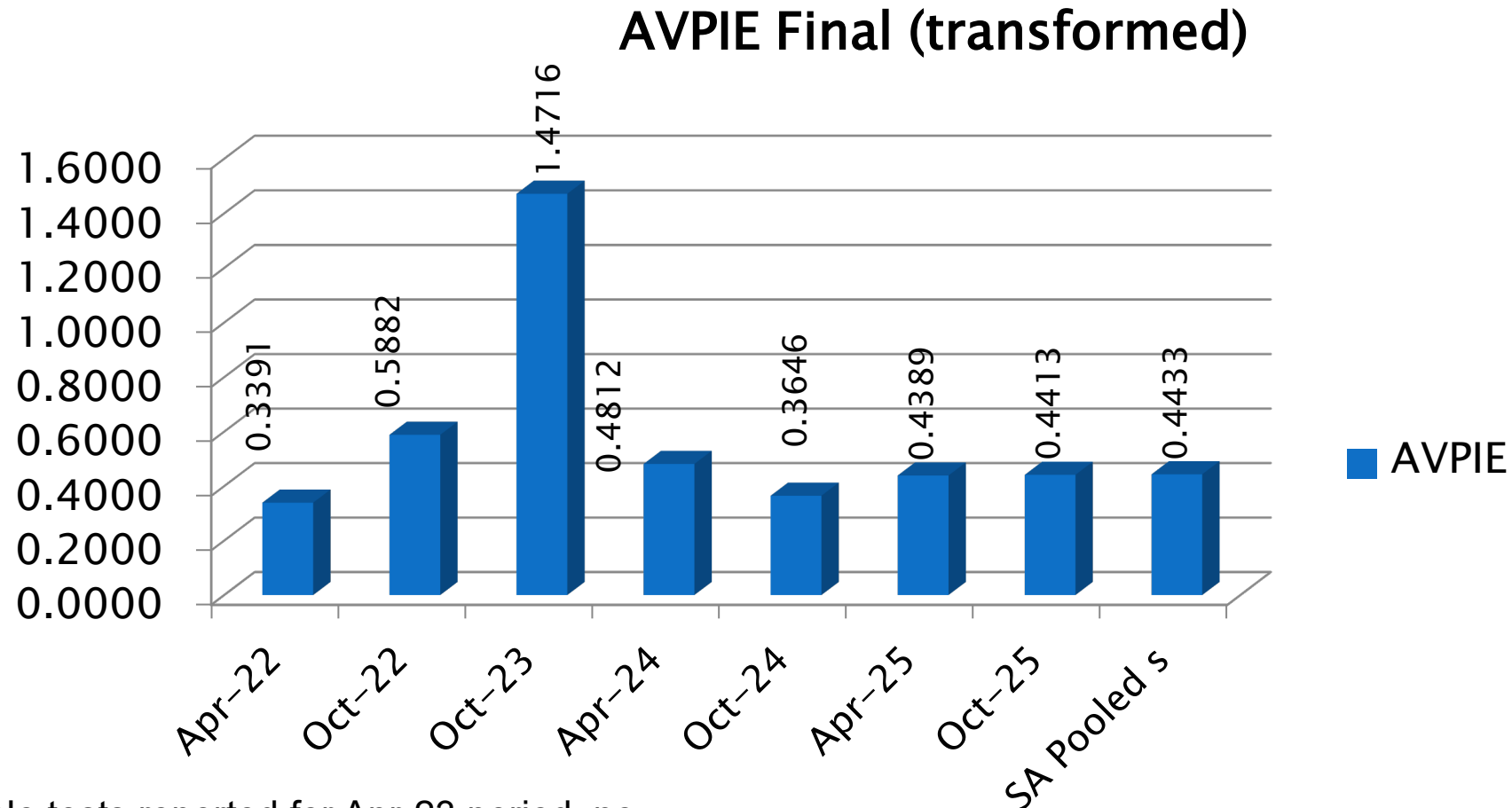
Sequence IXAGED Test Severity

- Average number of Pre-ignitions in control but trending severe.

AVG # of Preignitions, original units



Sequence IXAGED Precision Estimates



No tests reported for Apr-23 period, no precision estimate is available

[Return to Table of Contents](#)

Test Monitoring Center
<https://www.astmtmc.org>



Sequence X



October 2025

Sequence X Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	4
Acceptable Discrimination Test	AS	5
Operationally Invalid Calibration Test	LC	1
Total Number of Tests		10

Sequence X – Lost Tests*

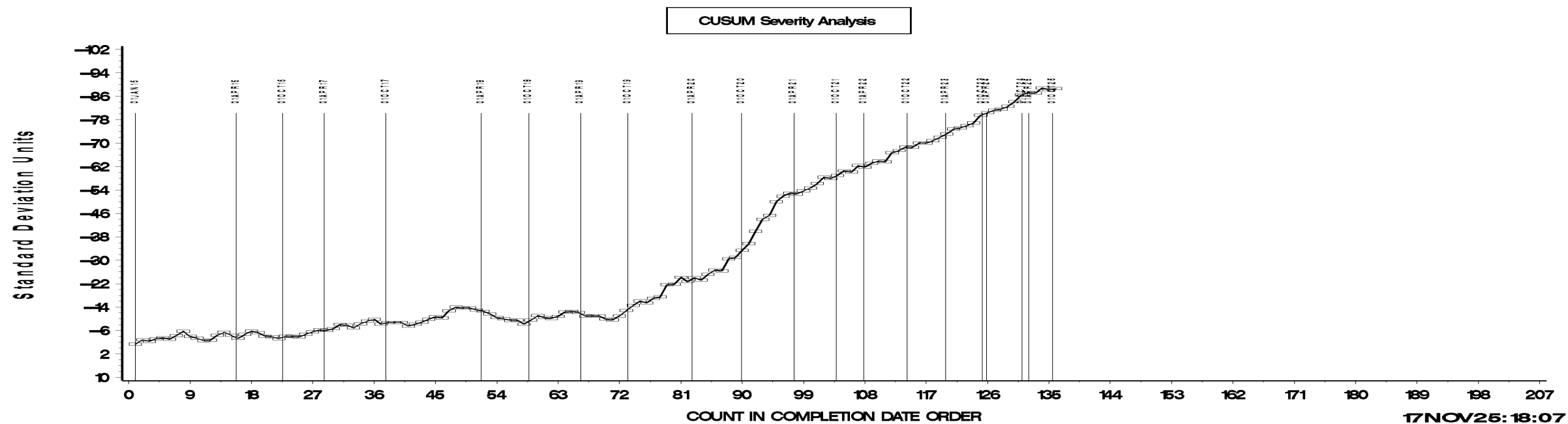
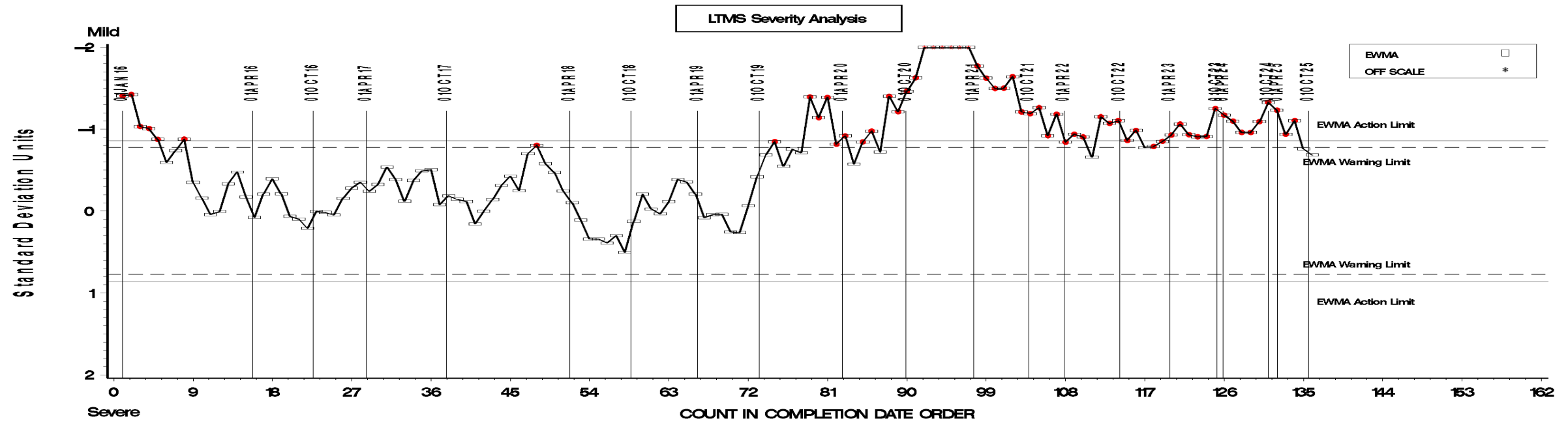
Test Status	Cause	#
Invalid	Low Blowby Average	1
Totals		1

*Invalid and aborted tests

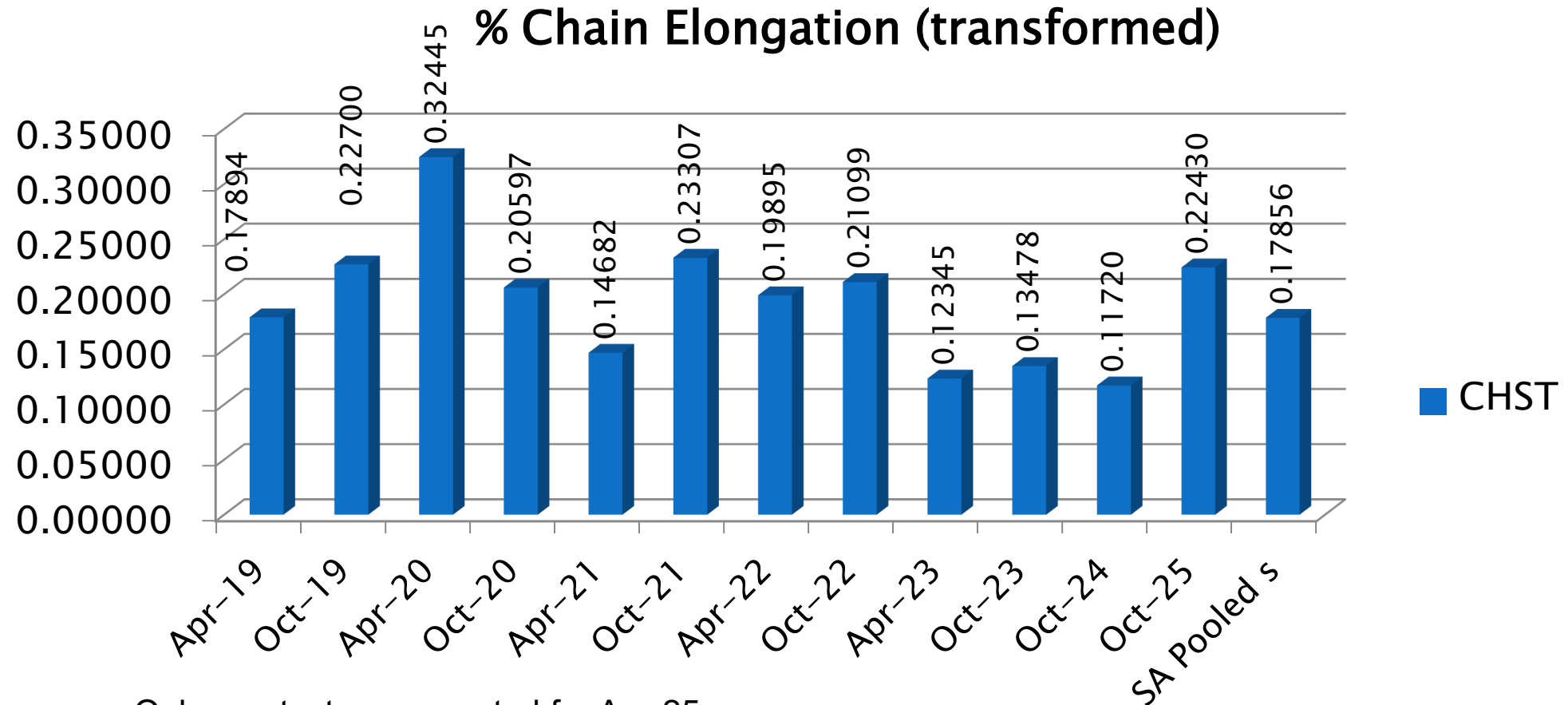
Sequence X Test Severity

- End of test chain wear is currently in control but had been in action alarm in the mild direction for quite some time; currently in control. Remains unknown if the mild trend has ceased.

END OF TEST CHAIN WEAR FINAL RESULT



Sequence X Precision Estimates



Only one test was reported for Apr-25
period, no precision estimate is available

[Return to Table of Contents](#)

Test Monitoring Center
<https://www.astmtmc.org>



Information Letters



October 2025

Information Letters*

Test	Date	IL	Topic
IIIH	**	**	Update engine build manual to add new model honing machine and ultra sonic cleaner.
IVB			No information letters this period
VH	May 1, 2025	25-1	Surface finish analyzer settings added to the test method
VIE			No information letters this period
VIF			No information letters this period
VIII			No information letters this period
IX			No information letters this period
X			No information letters this period

* Available from TMC Website

** New contact information needed from Stellantis

[Return to Table of Contents](#)

Test Monitoring Center
<https://www.astmtmc.org>



Reference Oil Inventory



Actions, Re-blends, Inventories
and Estimated Life

Reference Oil Re-blends

➤TMC 940

- A limited quantity remains of reference oil 940. A reblend of this oil, 940-1 has been obtained by the TMC. The panel agreed to suspend the use of this oil until additional results on the other two oils with the new fuel batch could be evaluated.

Reference Oil Re-blends

➤ TMC 1006-2

- Less than 12 gallons remain at TMC. The Sequence VIII has dropped this oil because of age concerns and replaced it with 1009-1. The Sequence IVA will continue to use this oil for the foreseeable future.

➤ TMC 544-1

- Introduced by panel as an acceptable re-blend for calibration purposes. This oil is used for referencing 20% of the time.

Reference Oil Inventory Estimated Life

<u>Oil</u>	<u>Tests</u>	<u>Year</u>	<u>Blend Quantity</u>	<u>TMC Inventory</u>	<u>Estimated Life</u>	<u>Comment</u>
220-1	IX	2022	1060	888	>5	Break-In oil only
221-1	IX	2015	992	771	5	
224-2	IX	2022	780	267	<1	
270	X	2015	1100	431	>5	
271	X	2015	980	552	>5	
300-1	IVB	2017	378	129	3	
434-3	IIIH, GMOD	2017	980	438	4	
436	IIIH	2014	1100	480	3.5	
438-2	IIIH	2017	540	360	5	Suspended by panel
542-5	VIE, VIF	2021	1060	276	1	
543-1	VIF	2020	1000	760	> 5	
544	VIE	2015	1003	0	<1	544-1 is an available reblend.
544-1	VIE	2025	542	400	5	
931	VH	2020	912	660	> 5	
940-1	VH	2018	485	467	> 5	
1006-2	IVA, VIII	2000	5500	10	3	"Beyond useful life"
1009-1	VIII	2017	1000	803	> 5	
1010-2	VIE	2022	555	53.5	<1	
1010-3	VIE	2025	650	595	3	
1011-1	IVB, VH, VF, X	2019	1395	569	<2	
1012	IVB	2017	2145	914	4	
API01-1	IXAGED	2024	480	313	4	
API02-1	IXAGED	2024	473	289	3.5	

LTMS Deviations



April 1, 2025 – September 30, 2025

LTMS Deviations

- An LTMS deviation was issued for the IVA test this reporting period.
 - This deviation was issued to allow the test lab to bypass the two tests requirements for a new stand. With only one stand in the industry this was done in an effort to conserve hardware. The most recent test used to calibrated the stand was also within the Y(i) limits.

LTMS Deviations

Historical Count of PCEO LTMS Deviations

Test	LTMS Deviations
IIIH	0
IVA	8
IVB	0
VH	0
VIE	0
VIF	0
VIII	3
IX	0
X	0

[Return to Table of Contents](#)

Quality Index Deviations



April 1, 2025 – September 30, 2025

Quality Index Deviations

- Sequence VH

- Process water issues caused the oil inlet temperature to produce a negative QI. After engineering review, it was determined that the oil temperature deviation does not impact the test results.

- Sequence IVB

- A faulty RAC pump was used for the first 5 minutes of test time causing the QI to be negative. A review of the data did not conclude that there was enough evidence to invalidate the test.

Quality Index Deviations

Historical Count of PCEO Quality Index Deviations

Test	Quality Index Deviations
IIIH	10
IVA	33
IVB	2
VH	13
IX	3
X	3

[Return to Table of Contents](#)

Test Monitoring Center
<https://www.astmtmc.org>



TMC Laboratory Visits



April 1, 2025 – September 30, 2025

TMC Lab Visits

Test	Number of Labs Visited
IIIH	1
IVB	0
IX	0
VH	0
VIE/VIF	0
VIII	0
X	0

Lab Visit Issues

- ▶ Sequence IIIH
 - No issues discovered during lab visit

Test Area Timelines



April 1, 2025 – September 30, 2025

Test Area Timeline Additions*

Test	Date	Topic	IL
VI	June, 10, 2025	Reference oil 544-1 approved	TMC Memo 25-014
IIIH	**	Update engine build manual to add new model honing machine and ultra sonic cleaner.	**
VH	May 1, 2025	Surface finish analyzer settings added to the test method	25-1

*As of 09/30/2025

** New contact information needed from Stellantis before release

Miscellaneous Information

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

- ▶ <https://www.astmtmc.org>

[Return to Table of Contents](#)

Test Monitoring Center
<https://www.astmtmc.org>





A Program of ASTM International