



A Program of ASTM International

Test Monitoring Center

<https://www.astmtmc.org>

ASTM D02.B1 Semiannual Report Passenger Car Reference Oil Testing

April 2026

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Passenger Car Engine Oil Testing Executive Summary

- ▶ Reblend of oil 1010-2
 - The Sequence VIE panel introduced RO 1010-3 as an acceptable re-blend in October 2025.
- ▶ Sequence VH
 - M-3 Fuel batch was approved for test use in October 2025

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Calibrated Labs and Stands*

Test	Labs	Stands
IIIH/A/B	4	14
IVA	1	1
IVB	4	7
VH	3	10
VIE	5	18
VIF	3	7
VIII	2	4
IX	4	7
IXAGED	4	5
X	3	4

*As of 3/31/2026

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Sequence IIIH/A/B

»» April 2026

Sequence IIIH/A/B Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	15
Unacceptable Calibration Test	OC	4
Operationally Invalid Calibration Attempt	LC	0
Aborted Donated Test	XI	1
Total		20

Sequence IIIH – Failing Tests

Test Status	#
PVIS Ei Level 3 Limits Exceeded	4
Total	4

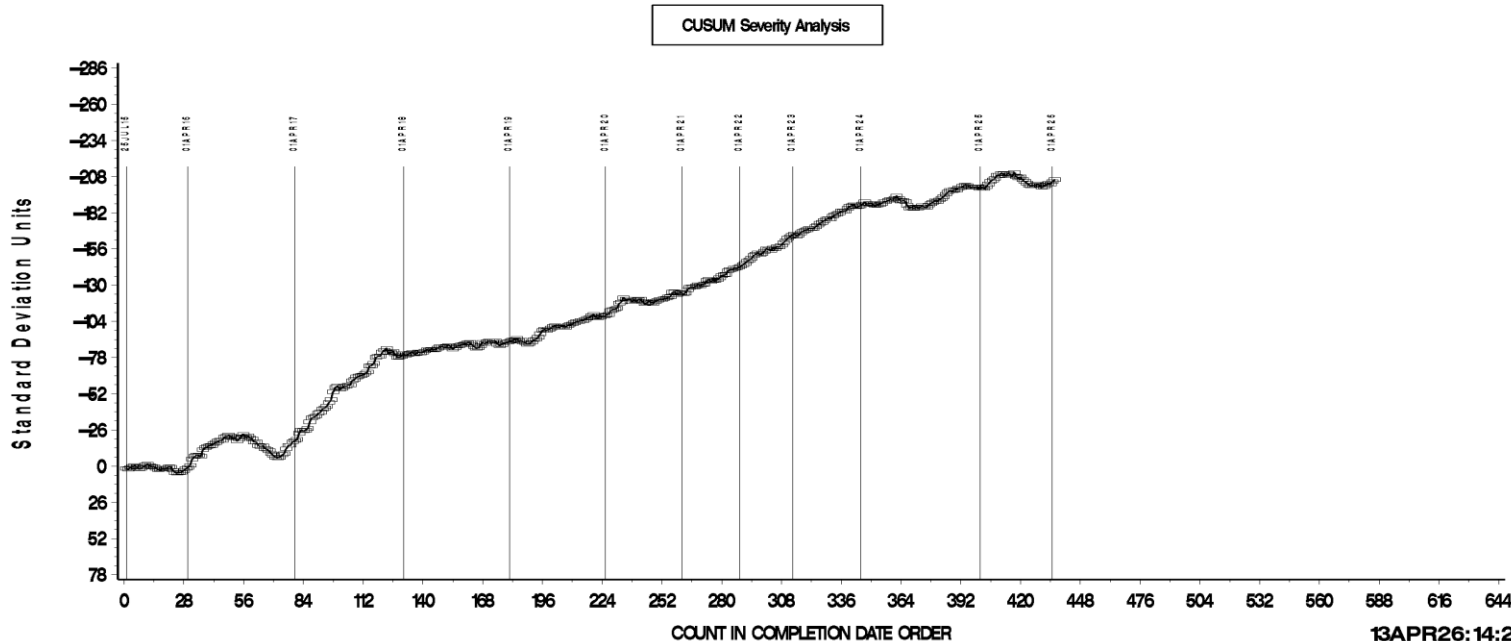
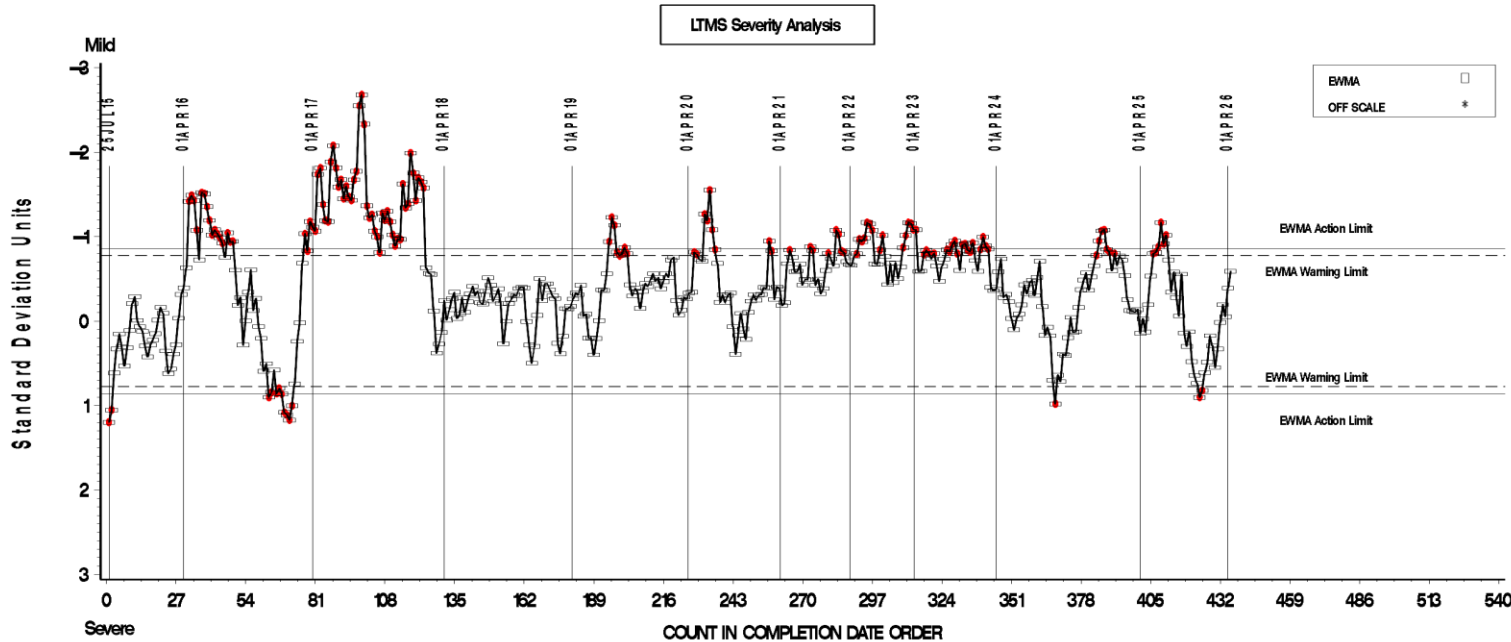
Sequence IIIH - Lost Tests

Test Status	Cause	#
XI	Excessive oil loss	1
Totals		1

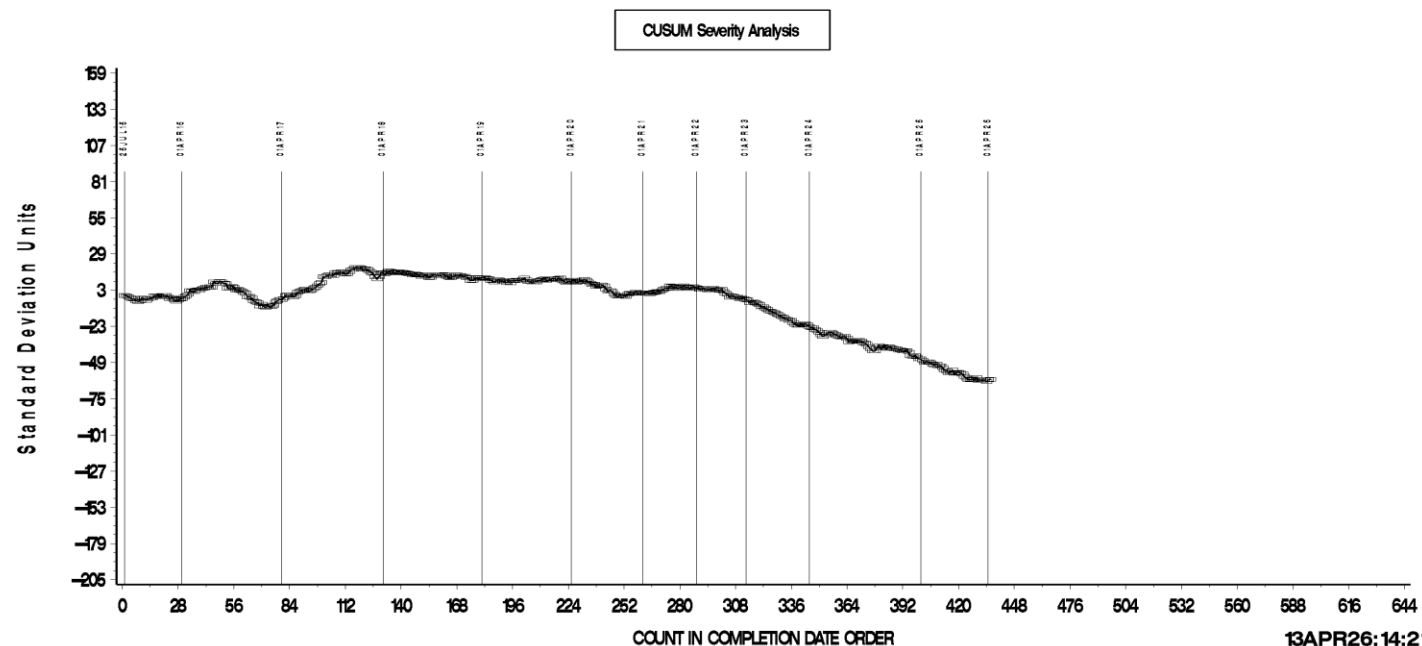
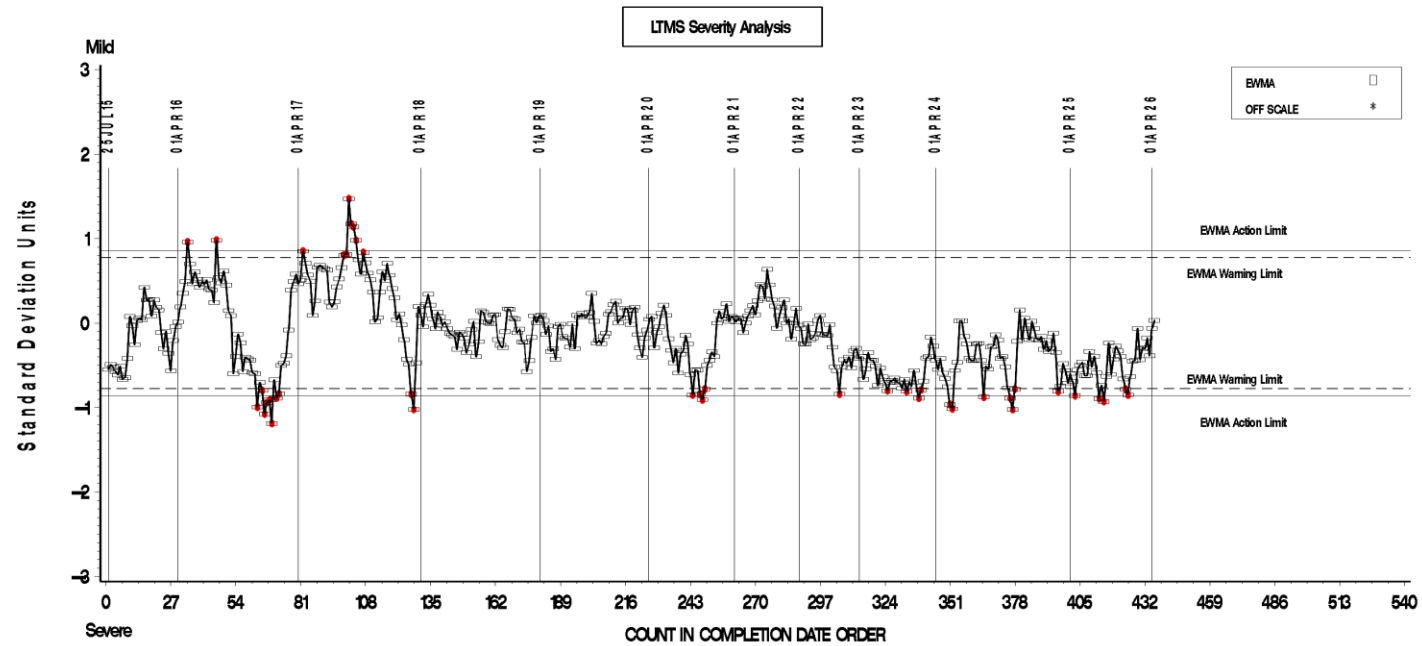
Sequence IIIH Test Severity

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

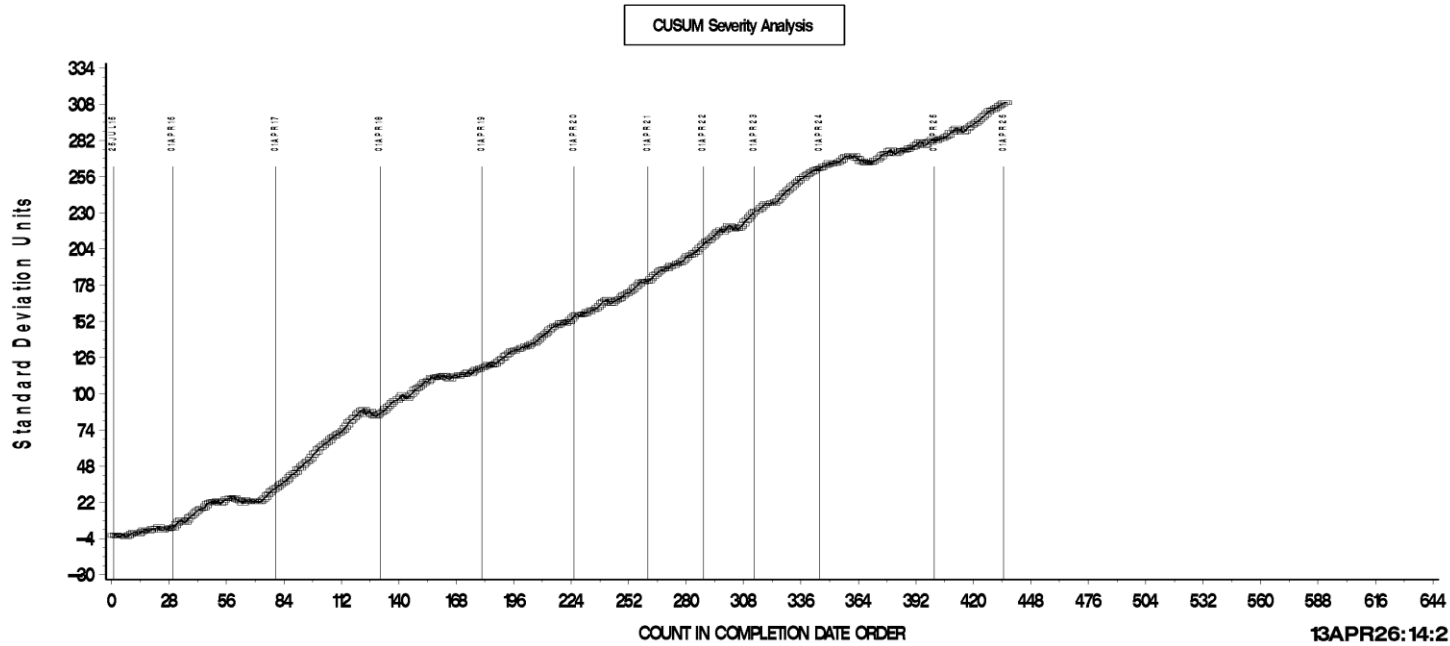
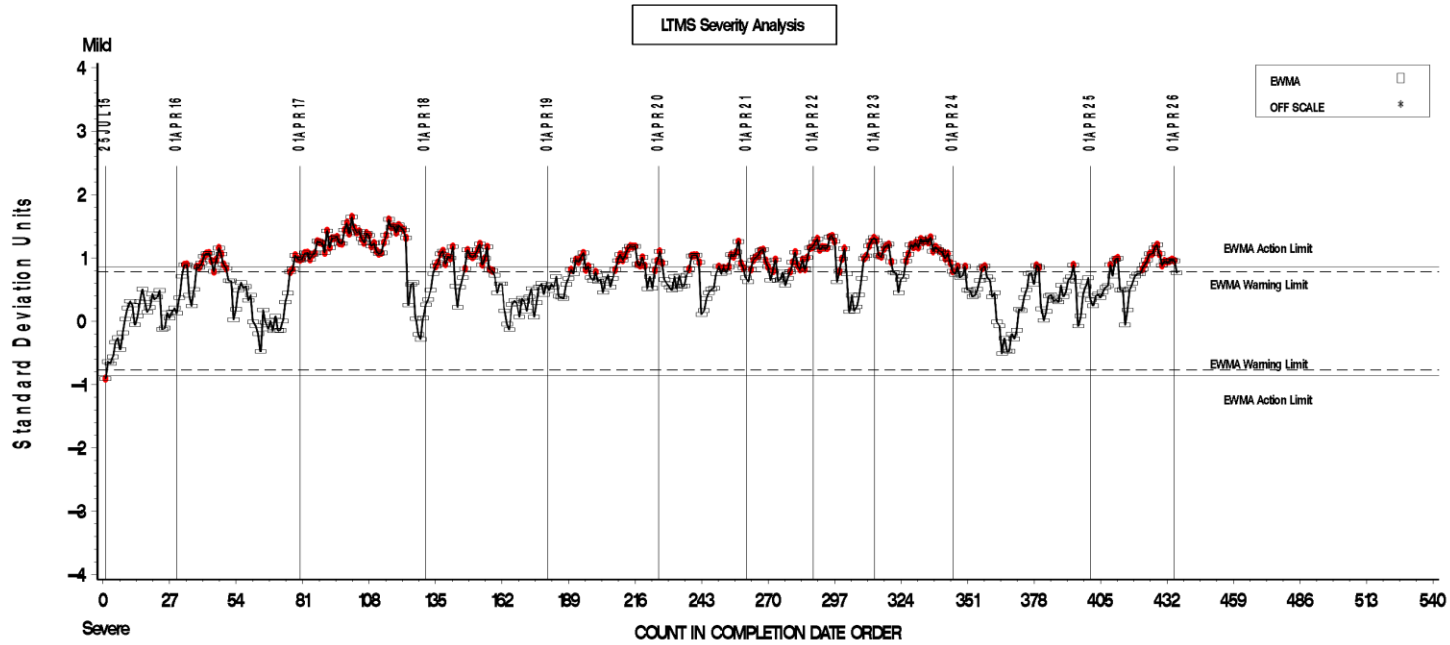
VISCOSITY INCREASE FINAL ORIG UNIT RES



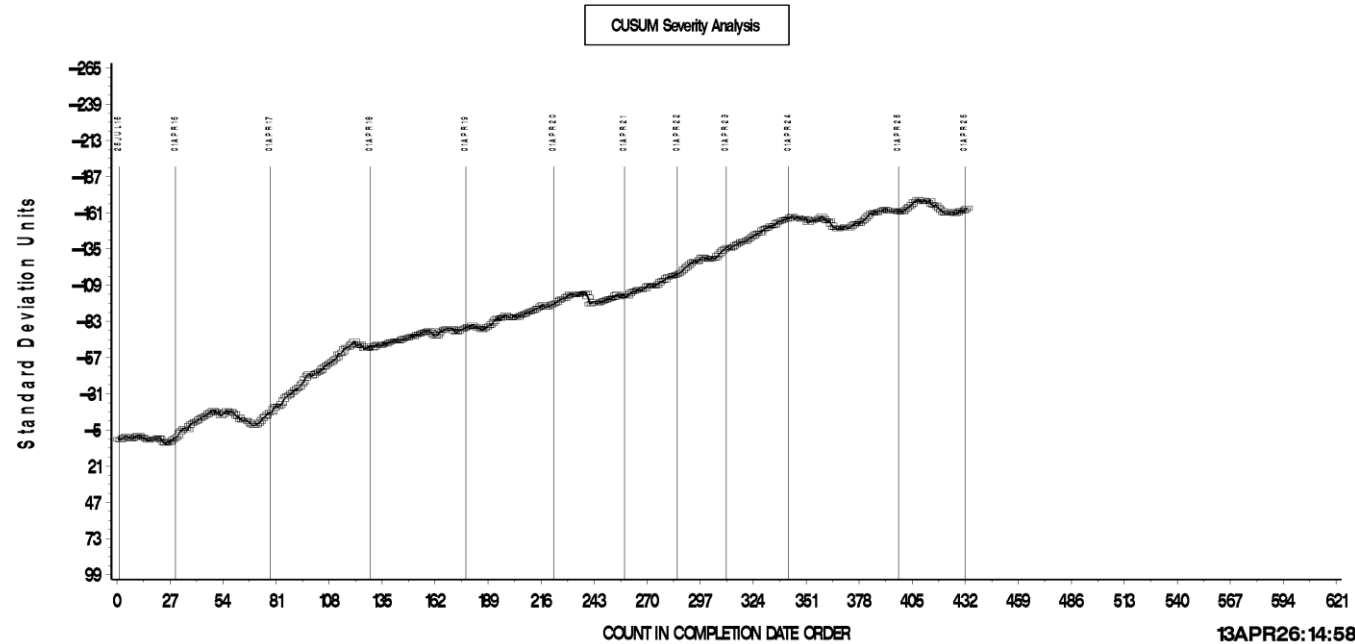
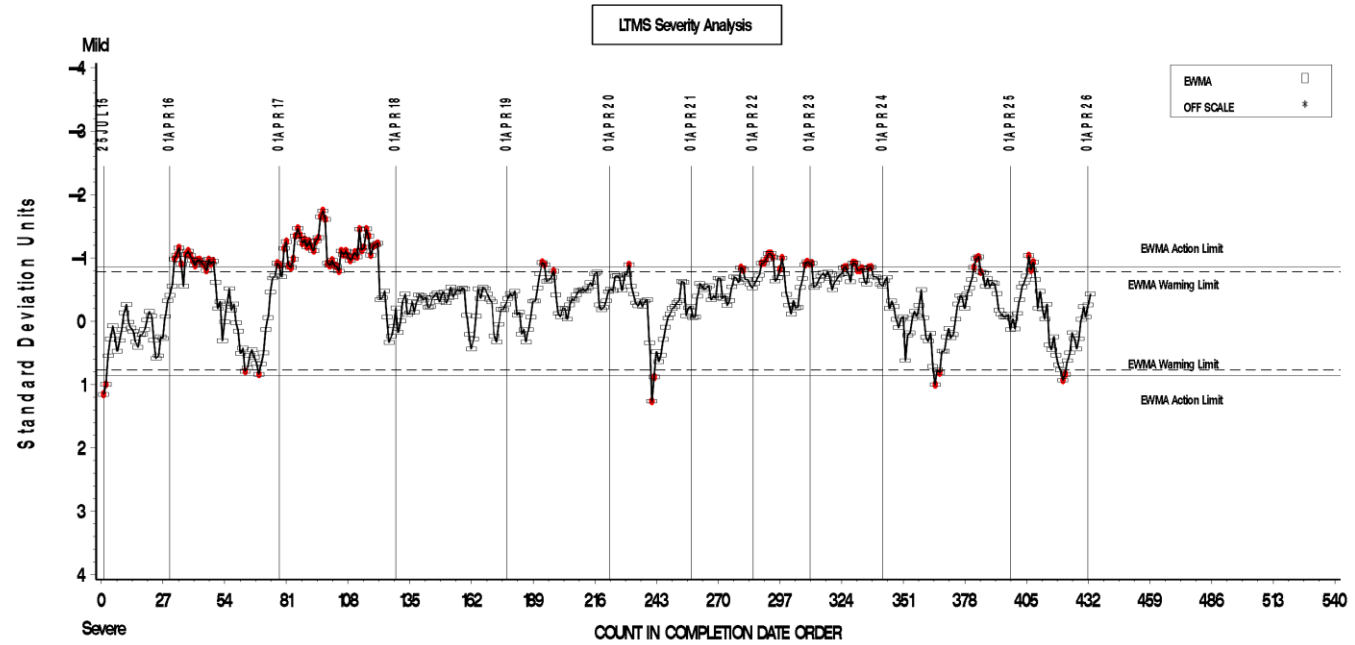
AVERAGE WEIGHTED PISTON DEPOSITS FNL ORIG U



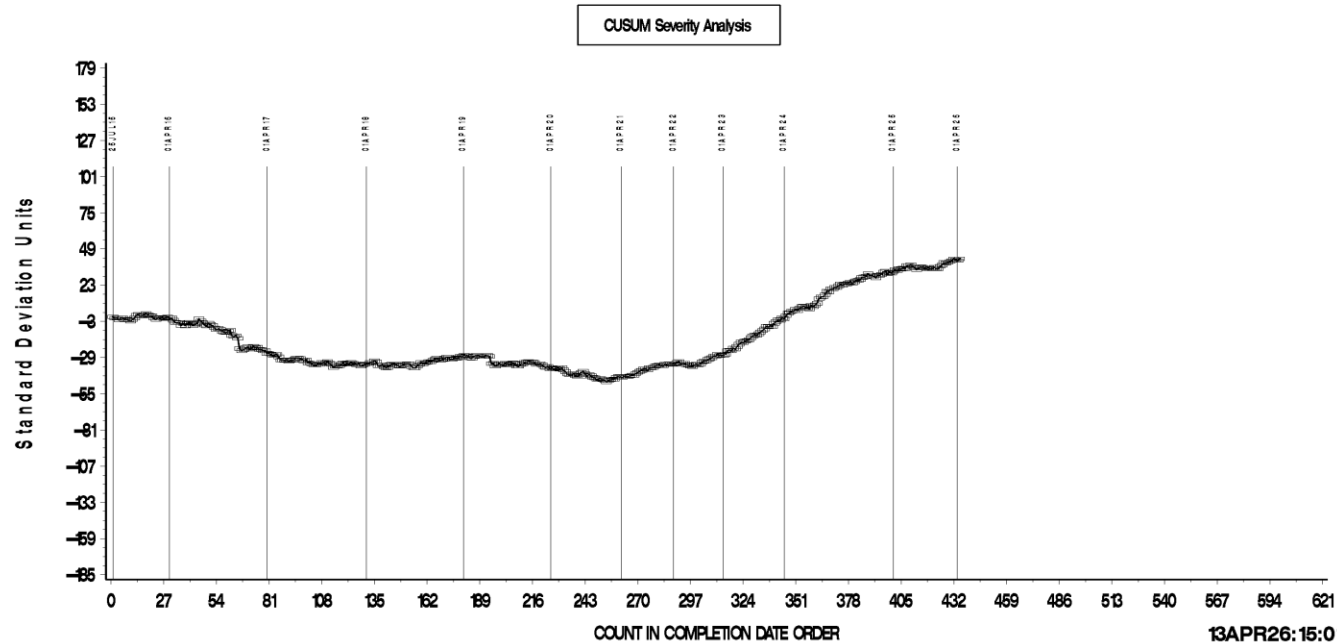
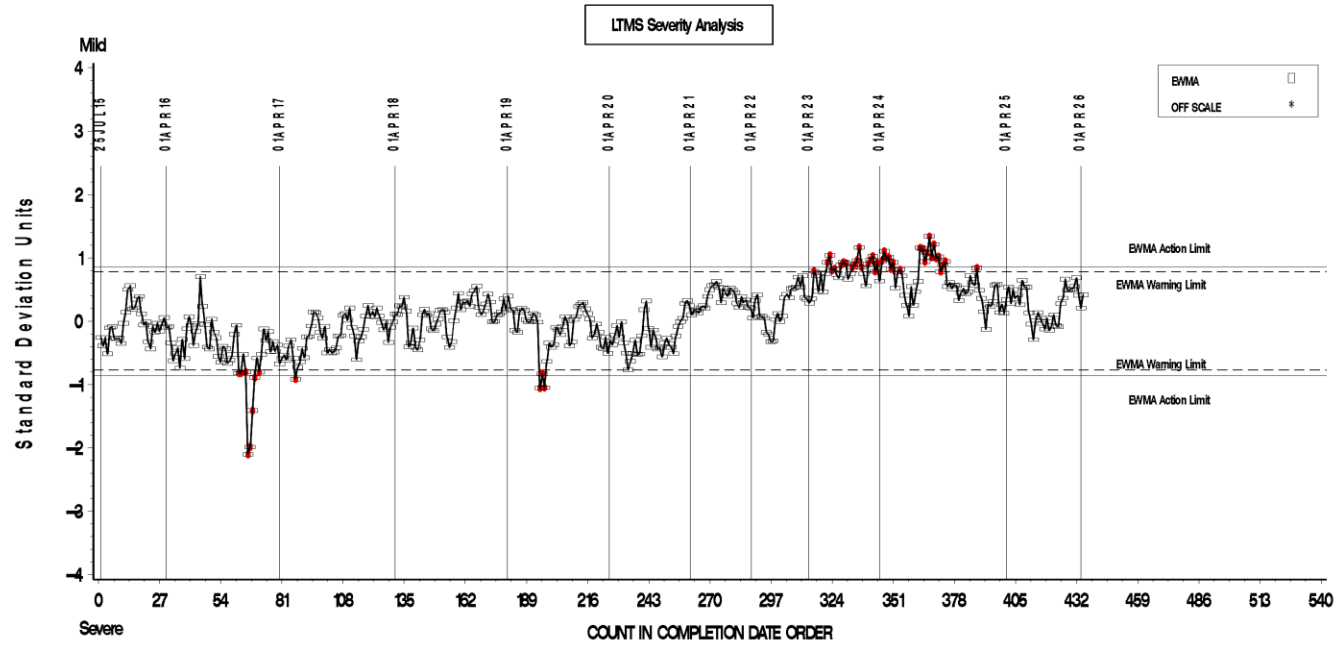
AVERAGE PISTON SKIRT VARNISH



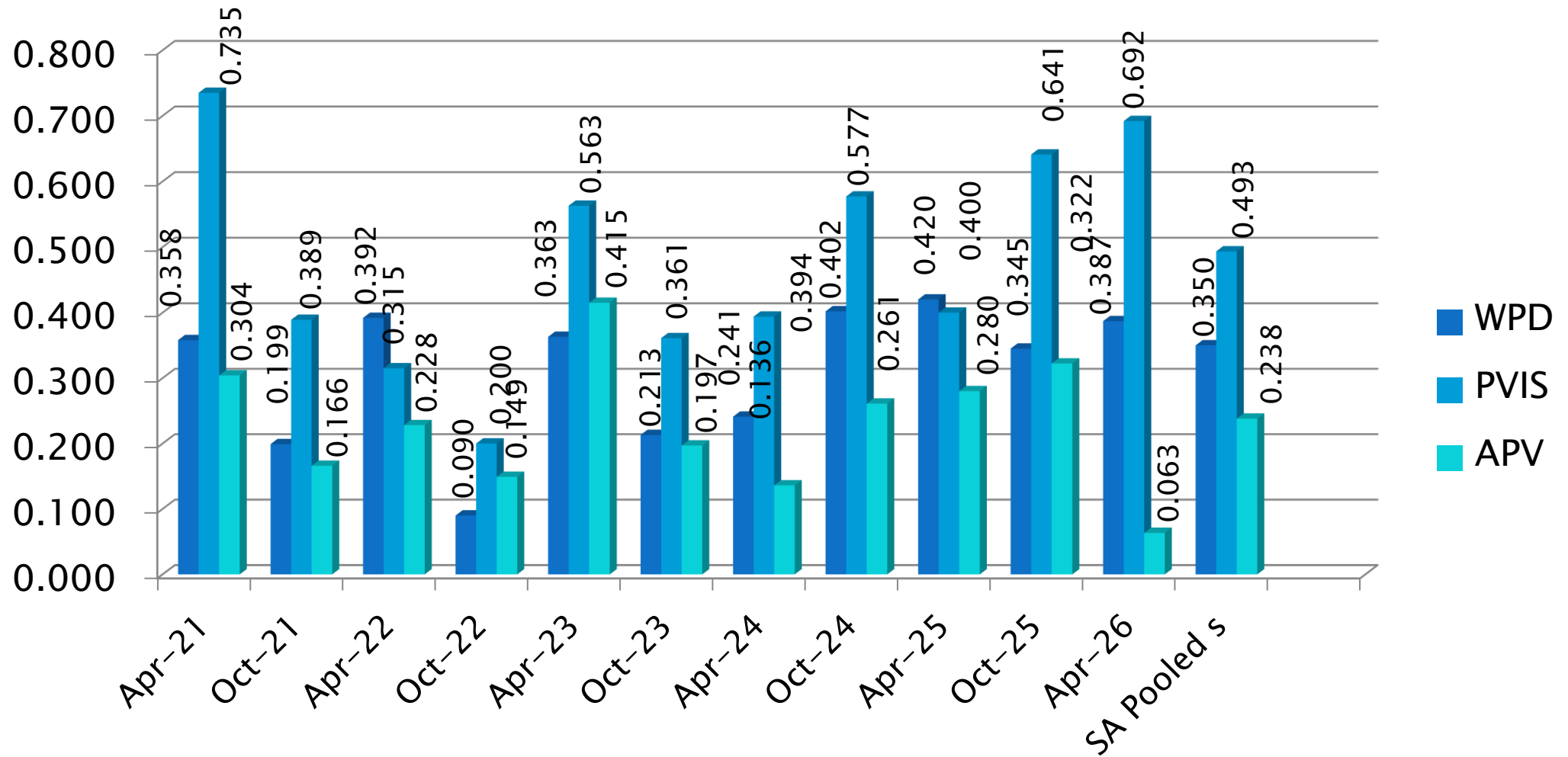
MRV FINAL ORIG UNIT RES [NM, FROZEN, SOLID]



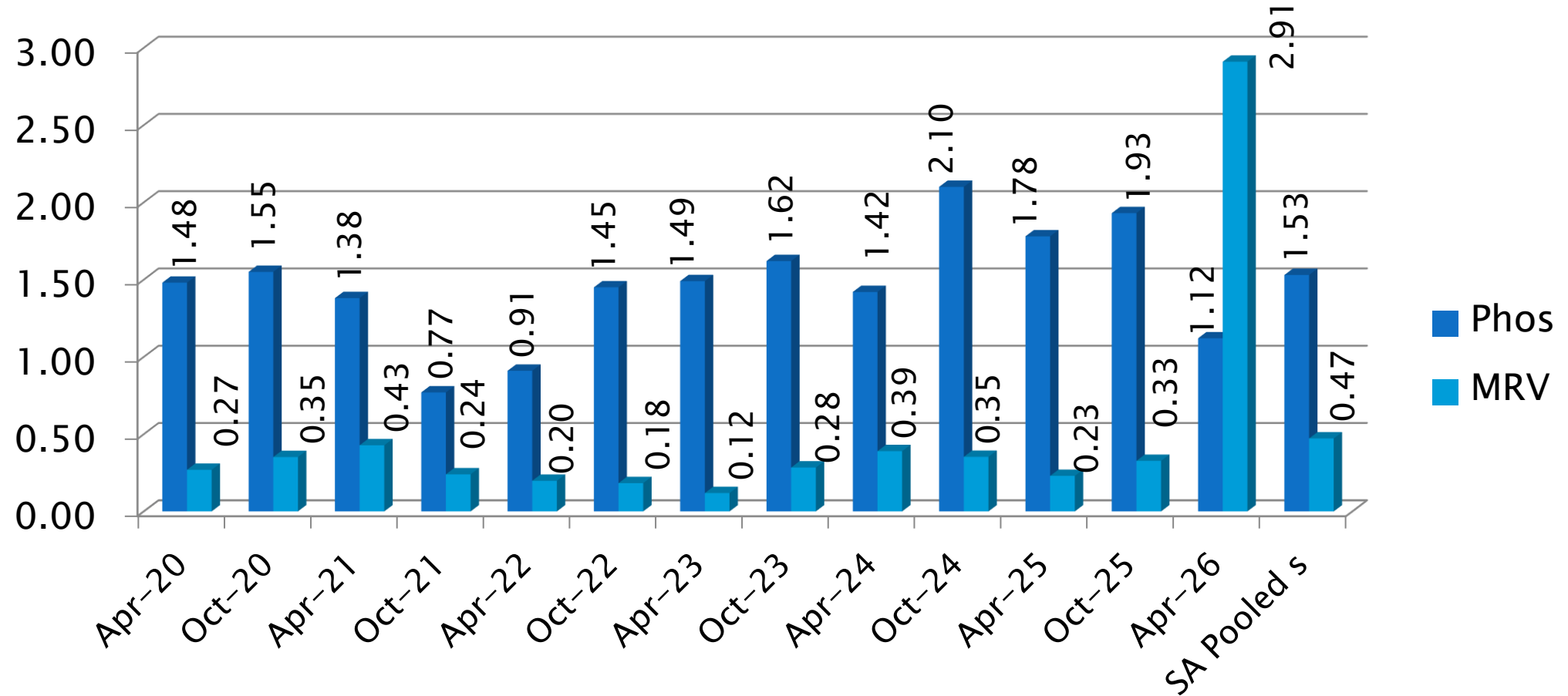
PHOSPHORUS RETENTION, FINAL RESULT



IIH Precision Estimates



Sequence IIHA/B Precision Estimates



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Sequence IVA

»» April 2026

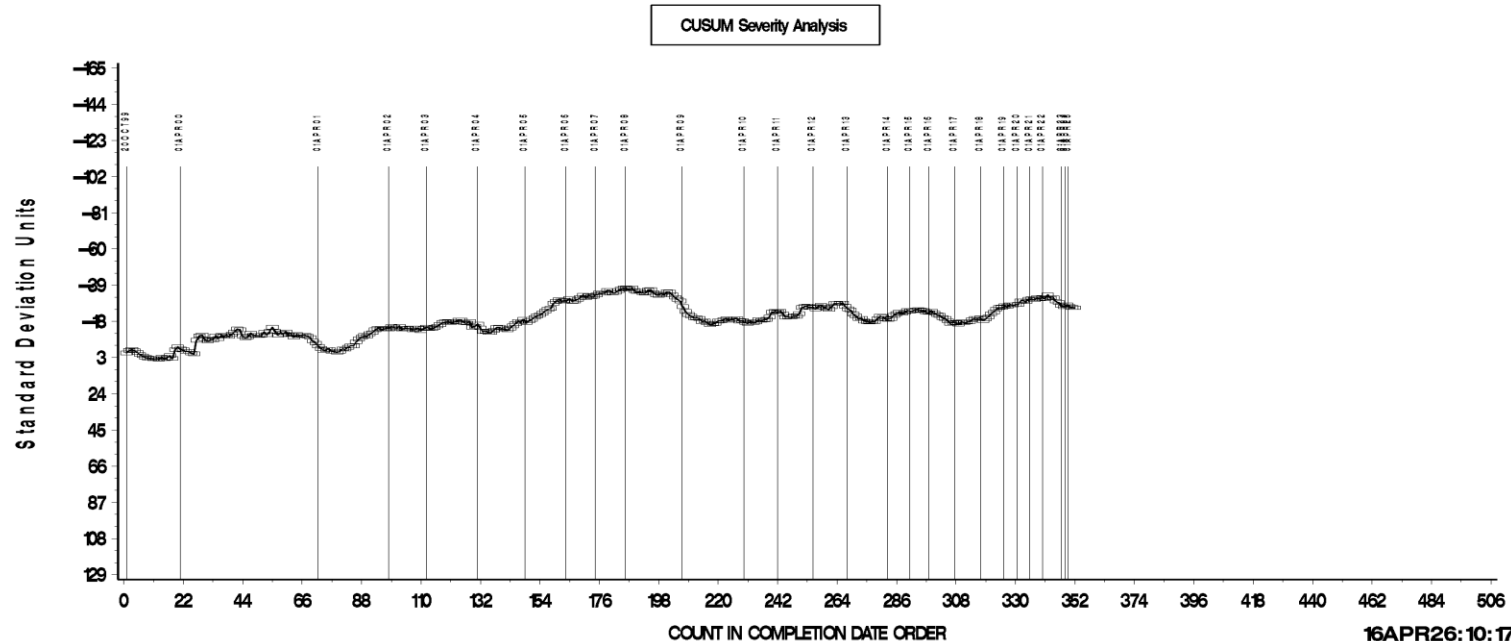
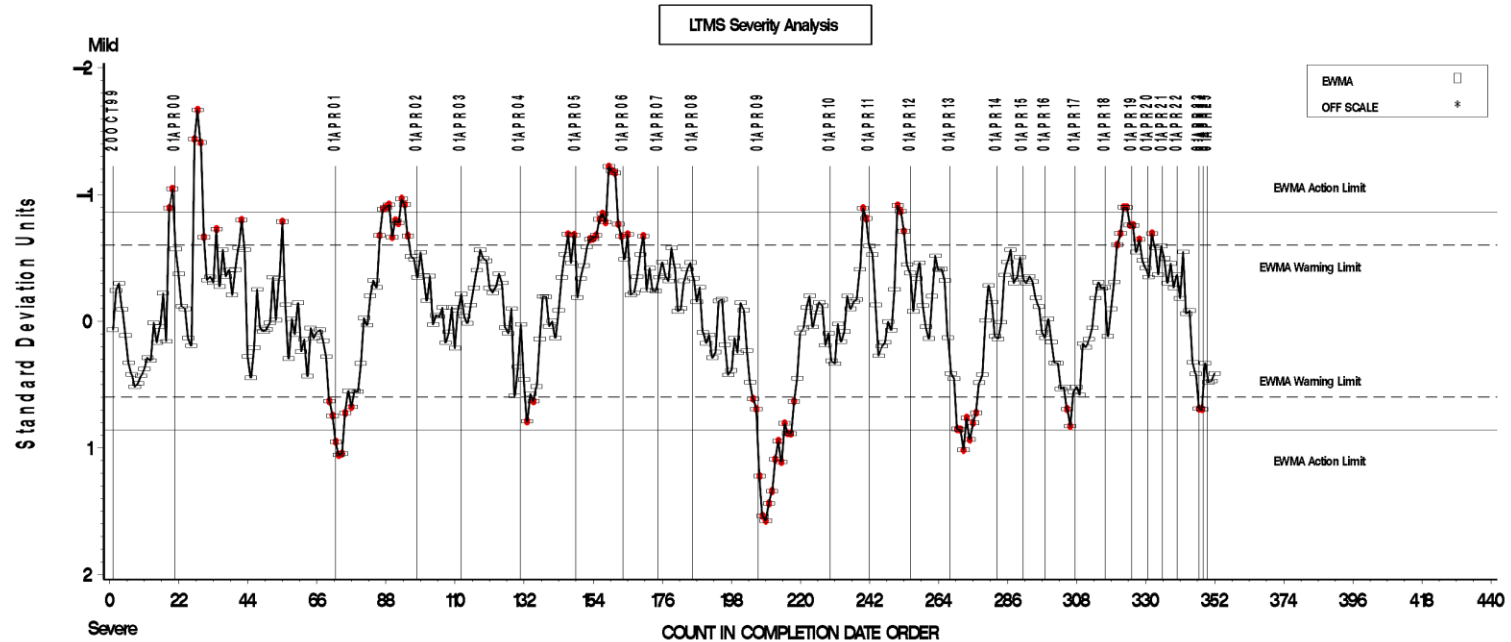
Sequence IVA Activity

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

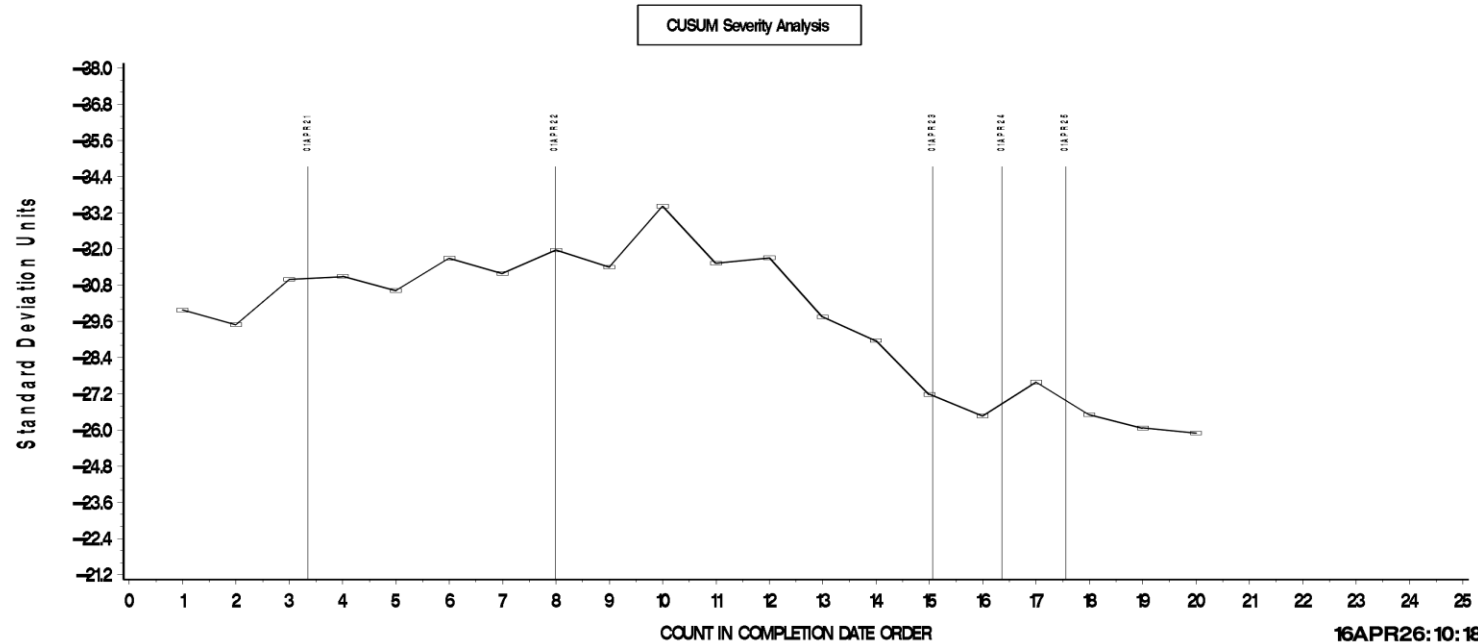
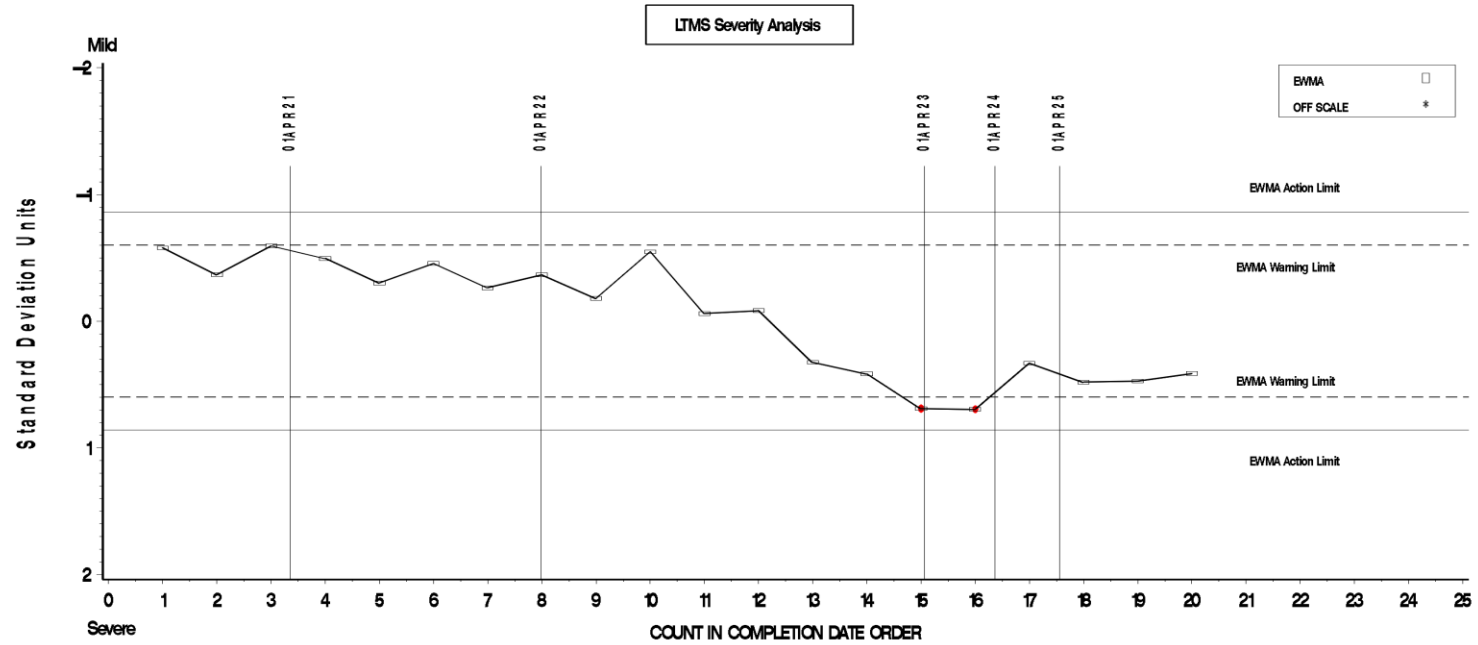
Sequence IVA Test Severity

- No limits exceeded this reporting period.

AVERAGE CAM WEAR

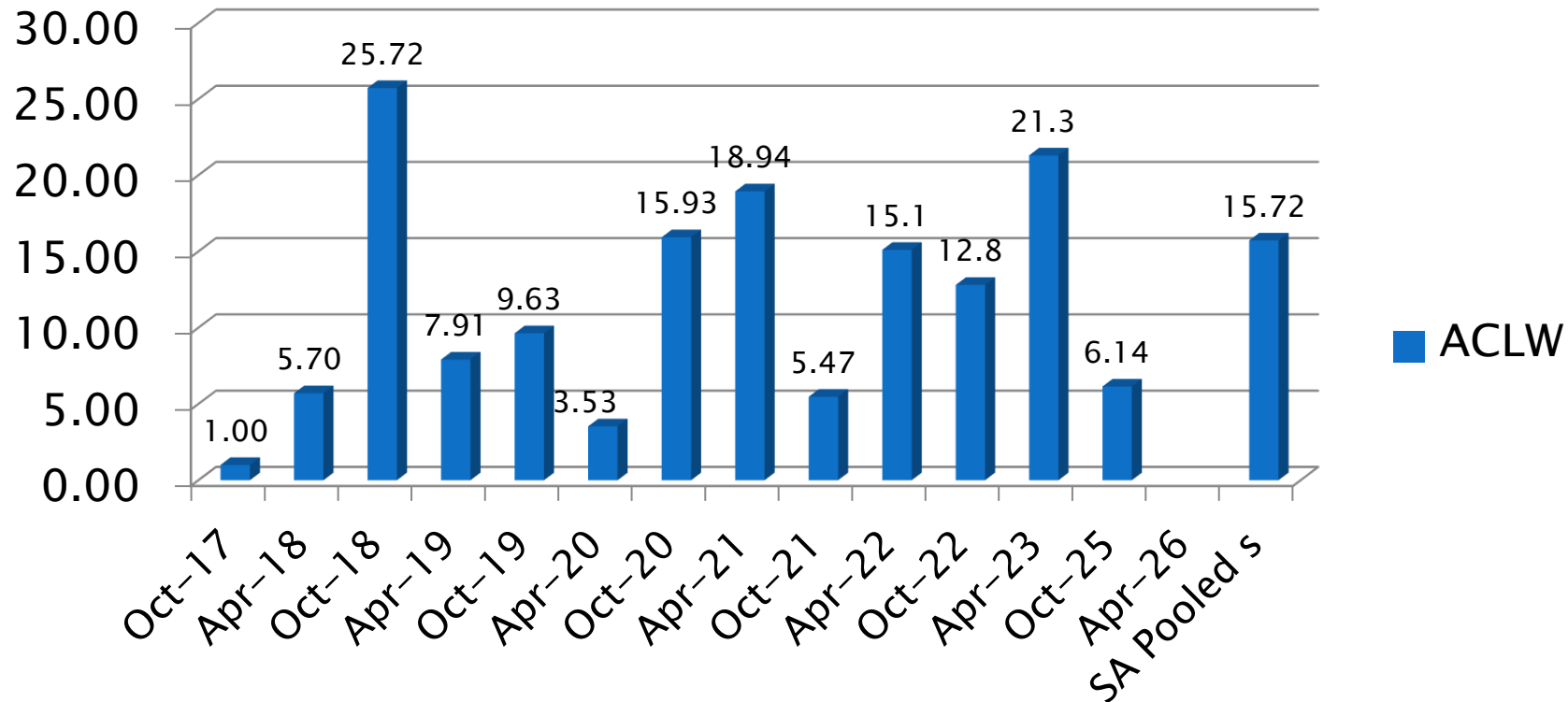


AVERAGE CAM WEAR



Sequence IVA Precision Estimates

ACW



Only one test was reported for Apr-26 period, no precision estimate is available

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Sequence IVB

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Sequence IVB Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	5
Failed Calibration Test	OC	1
Operationally Invalid (Declared By Lab) Calibration Test	LC	2
Total		8

Sequence – Failing Tests

Test Status	Validity Code	#
Failed Calibration Test, end of test Iron (severe)	OC	1
Total		1

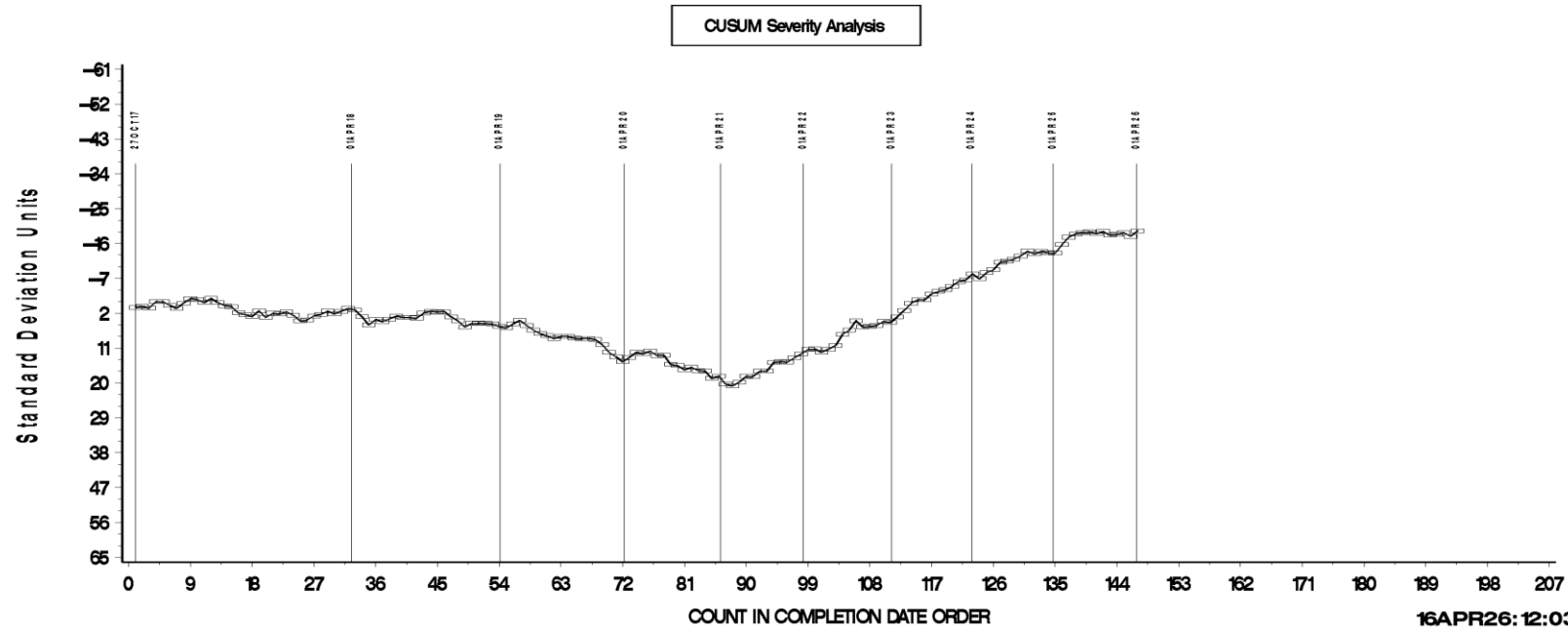
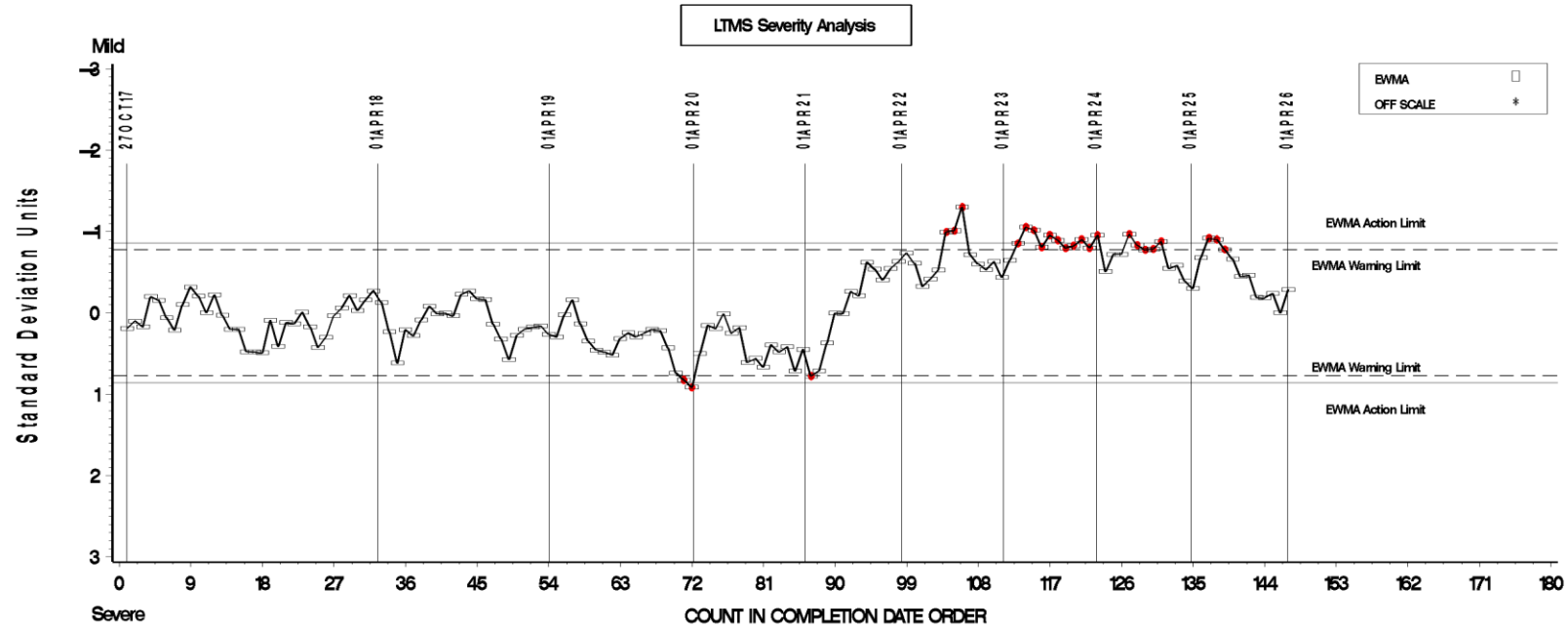
Sequence – Lost Tests

Test Status	Cause	#
LC	Kinked crankcase hose	1
LC	Load measurement error	1
Totals		2

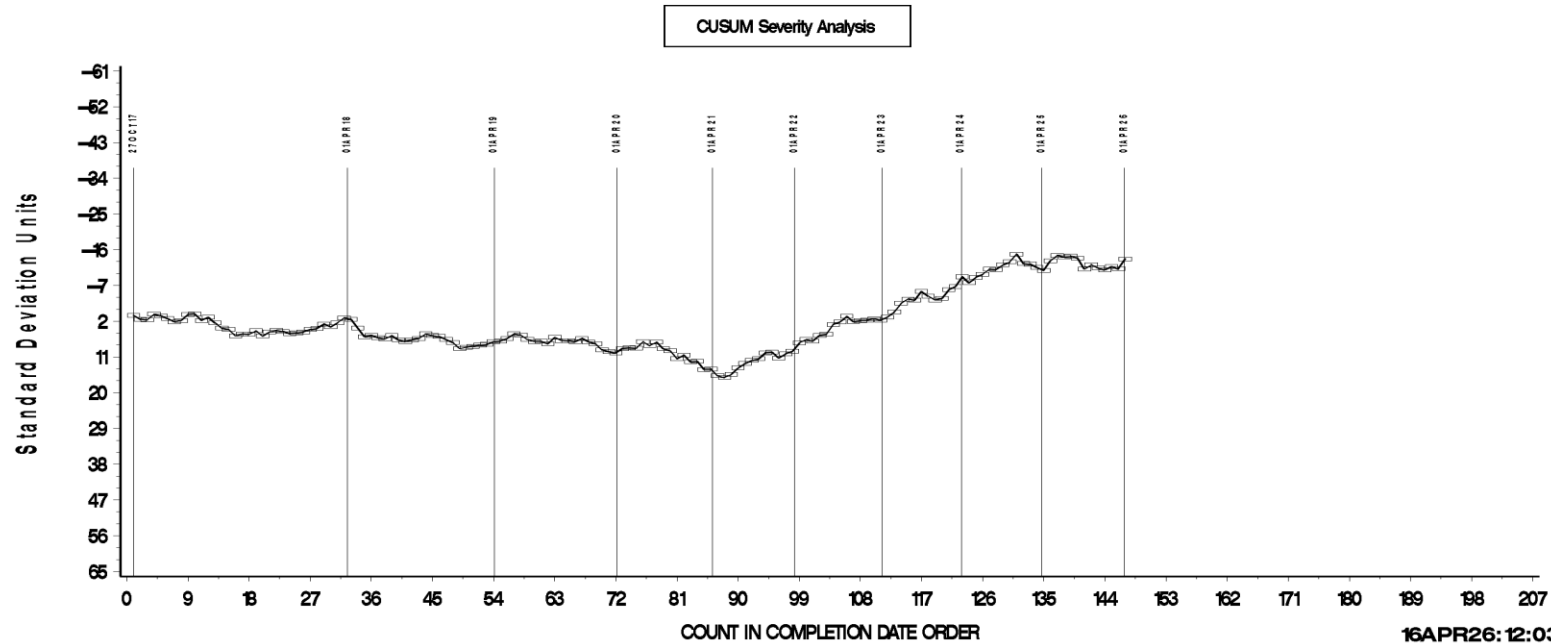
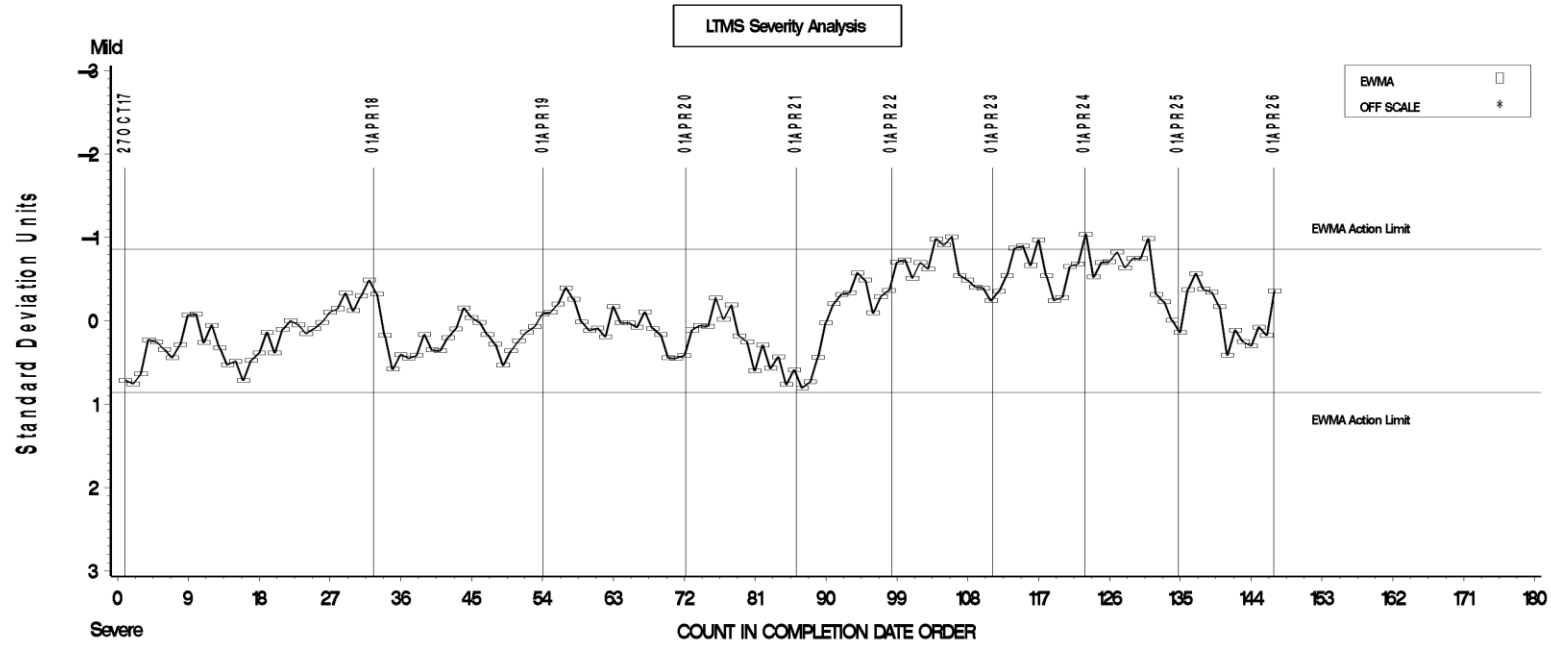
Sequence IVB Test Severity

- Both parameters remained within limits during this reporting period.

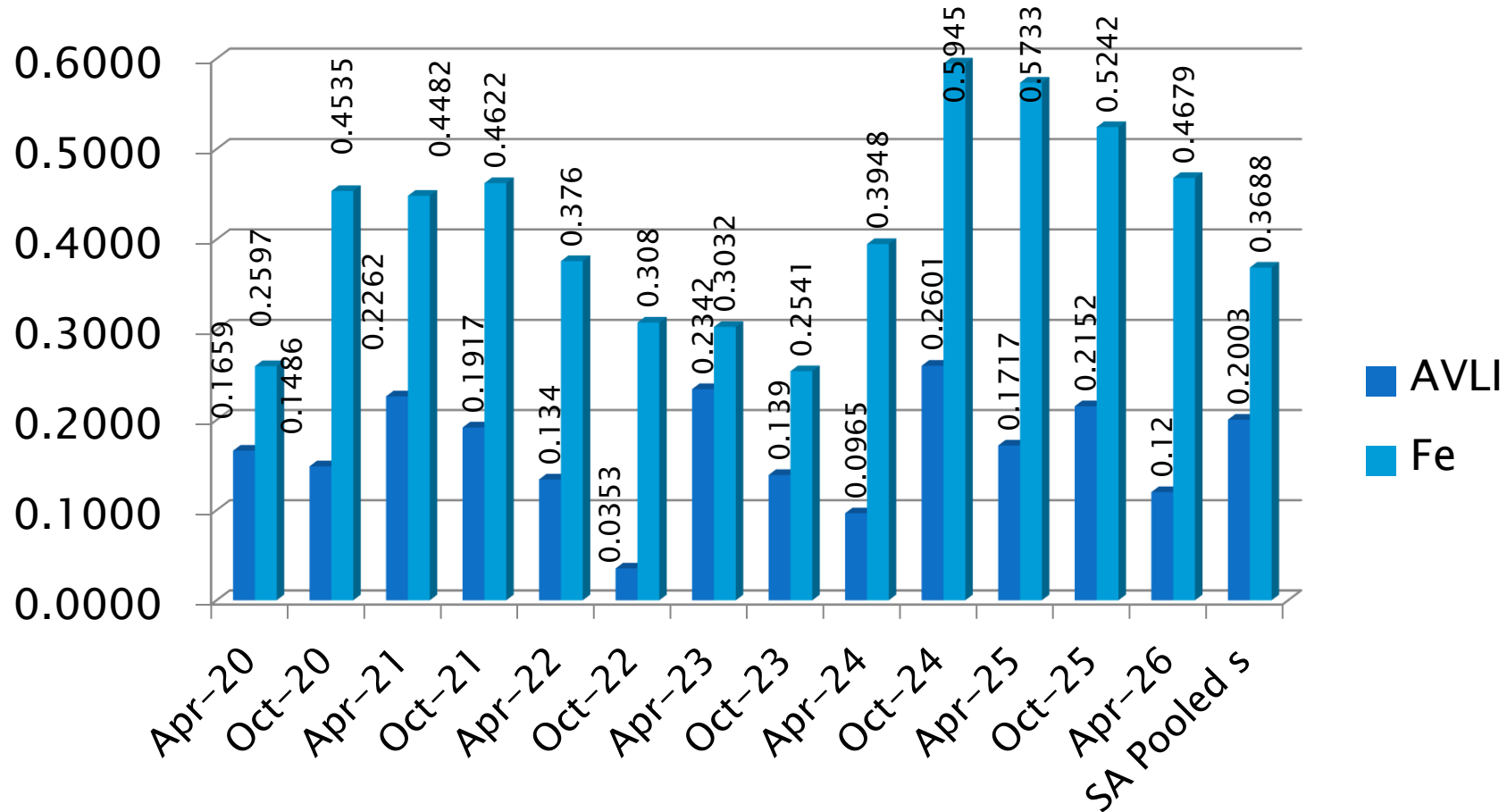
AVERAGE VOLUME LOSS BY KEYENCE INTAKE Final



END OF TEST FE FINAL Severity Adjusted RESULT



Sequence IVB Precision Estimates



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Sequence VH

➤➤ April 2026

Sequence VH Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	14
Statistically Unacceptable Calibration Test	OC	3
Aborted Calibration Test	XC	2
Operationally Invalid (Declared By Lab) Calibration Test	LC	1
Total		20

Sequence VH – Failing Tests

Test Status	#
Zi Level 2 varnish, severe direction	1
Ei Level 3 sludge, severe direction	2
Total	2

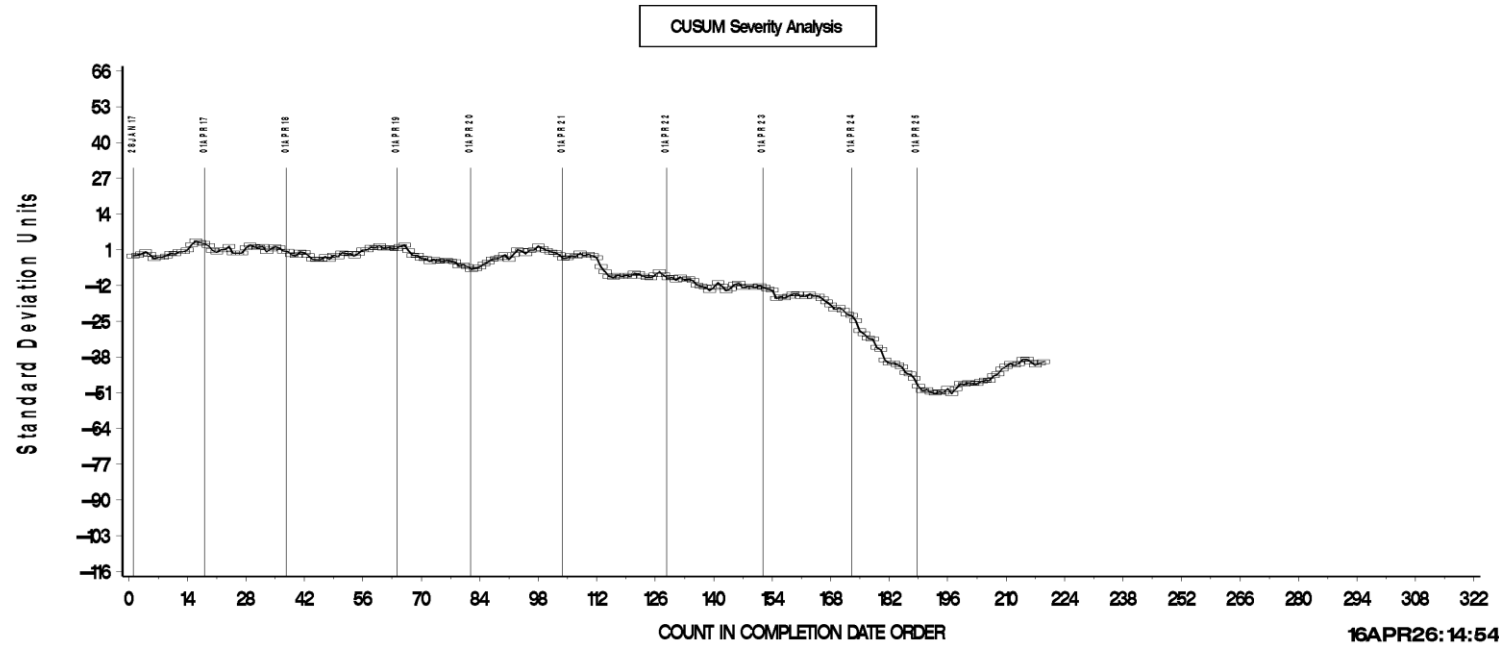
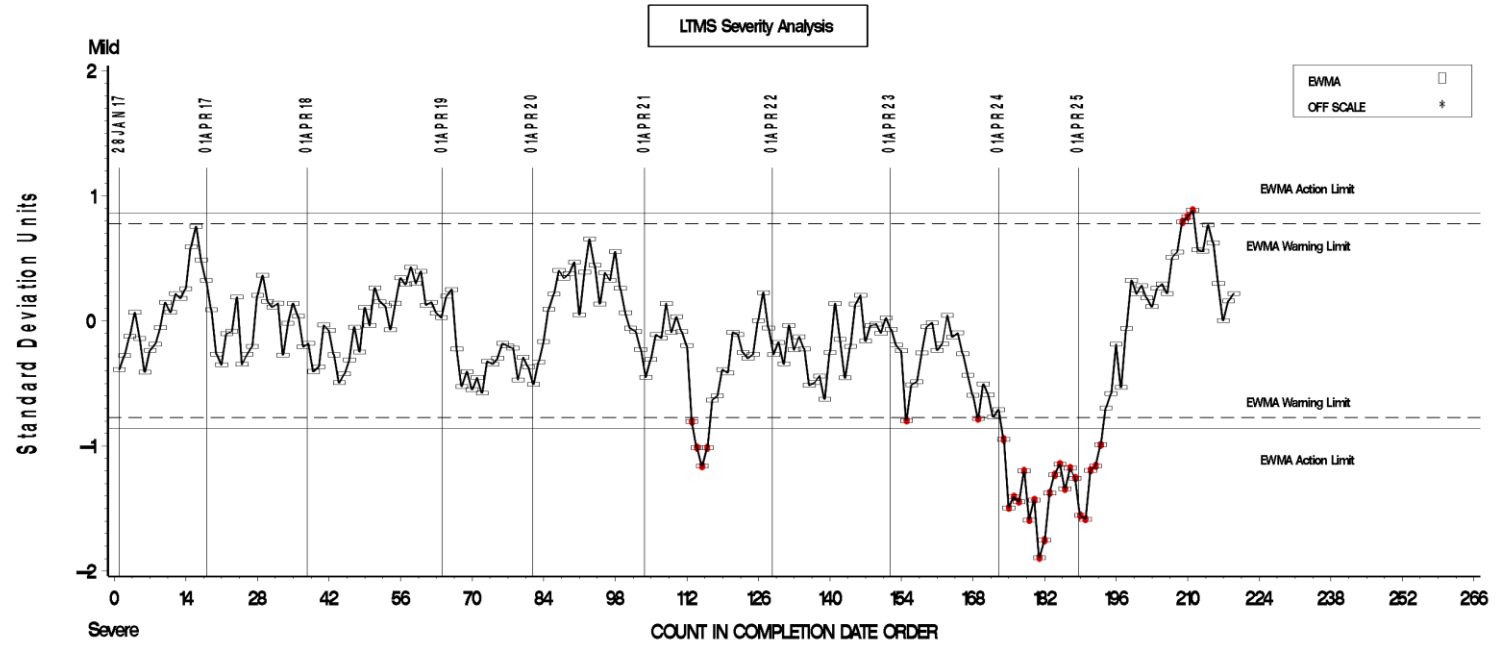
Sequence VH – Lost Tests

Test Status	Cause	#
XC	Oil addition error	1
XC	Low Oil Pressure	1
LC	Oil temp out of specified limits	1
Totals		3

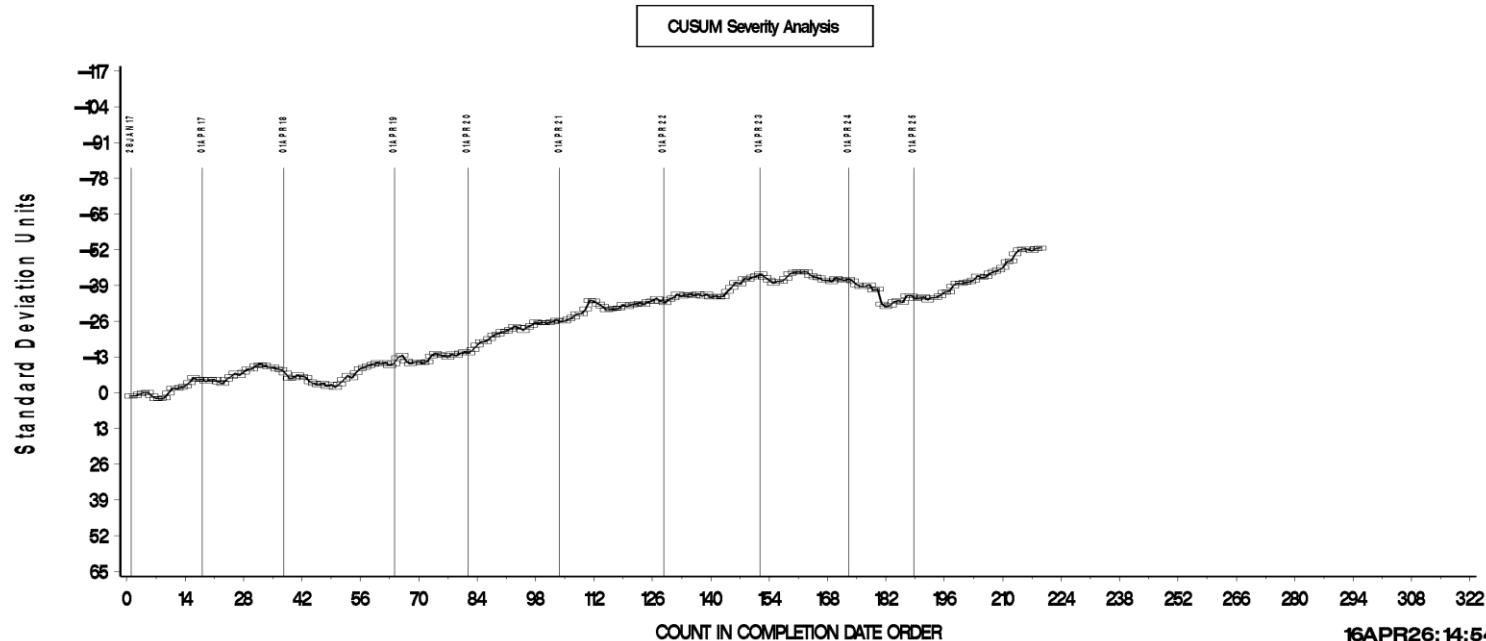
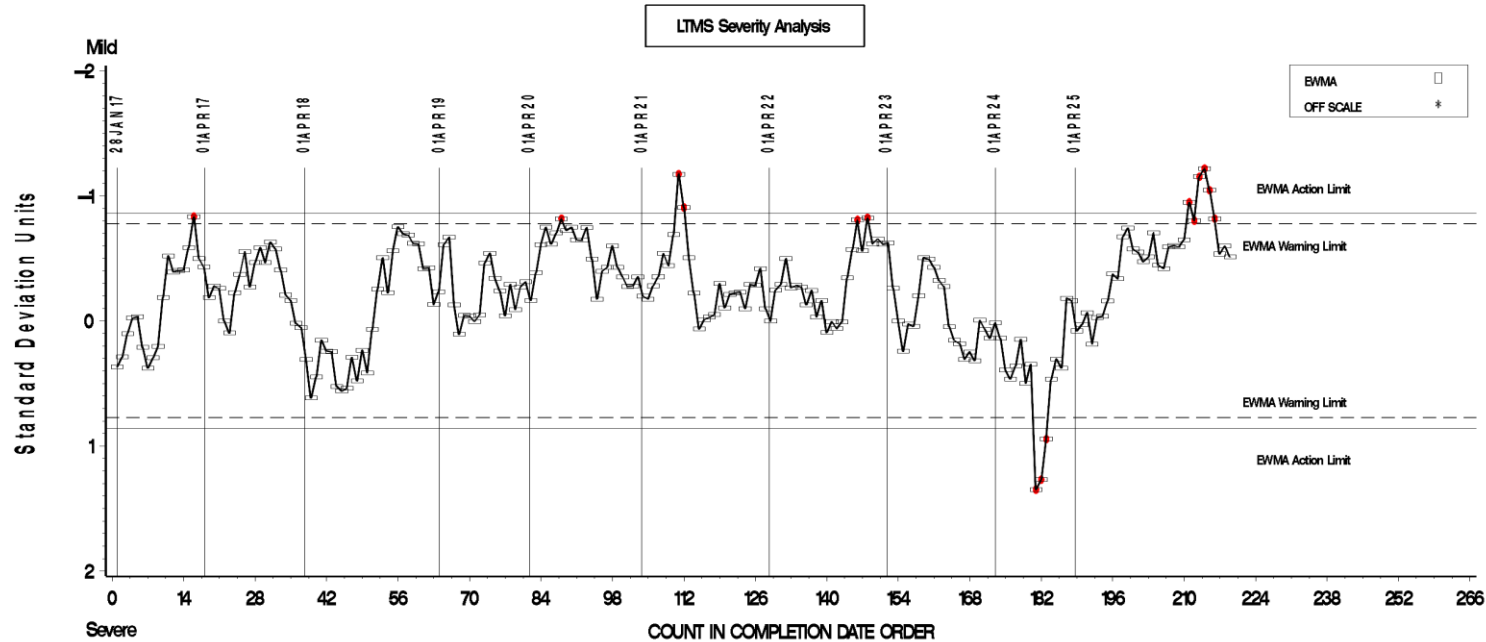
Sequence VH Test Severity

- AE50 and AP50 both exceeded the action limit in the severe direction this reporting period.
- AES and RAC both exceeded the action limit in the mild direction this reporting period.

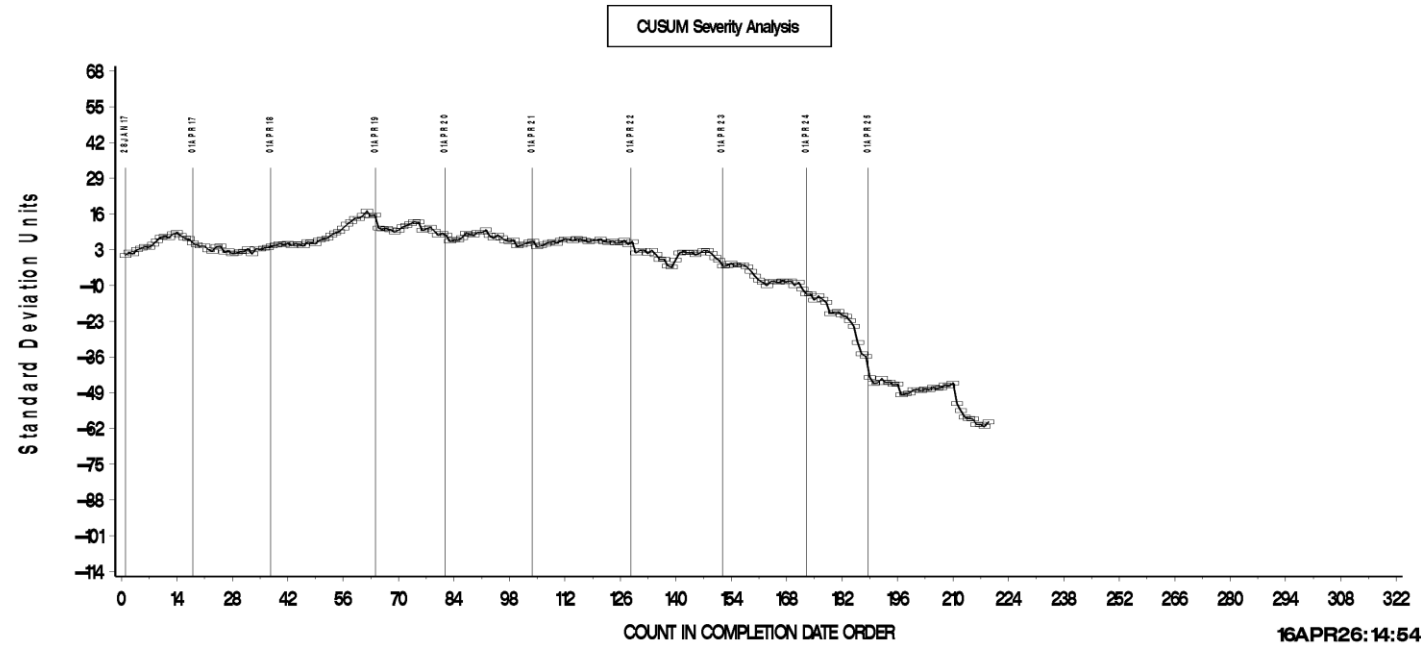
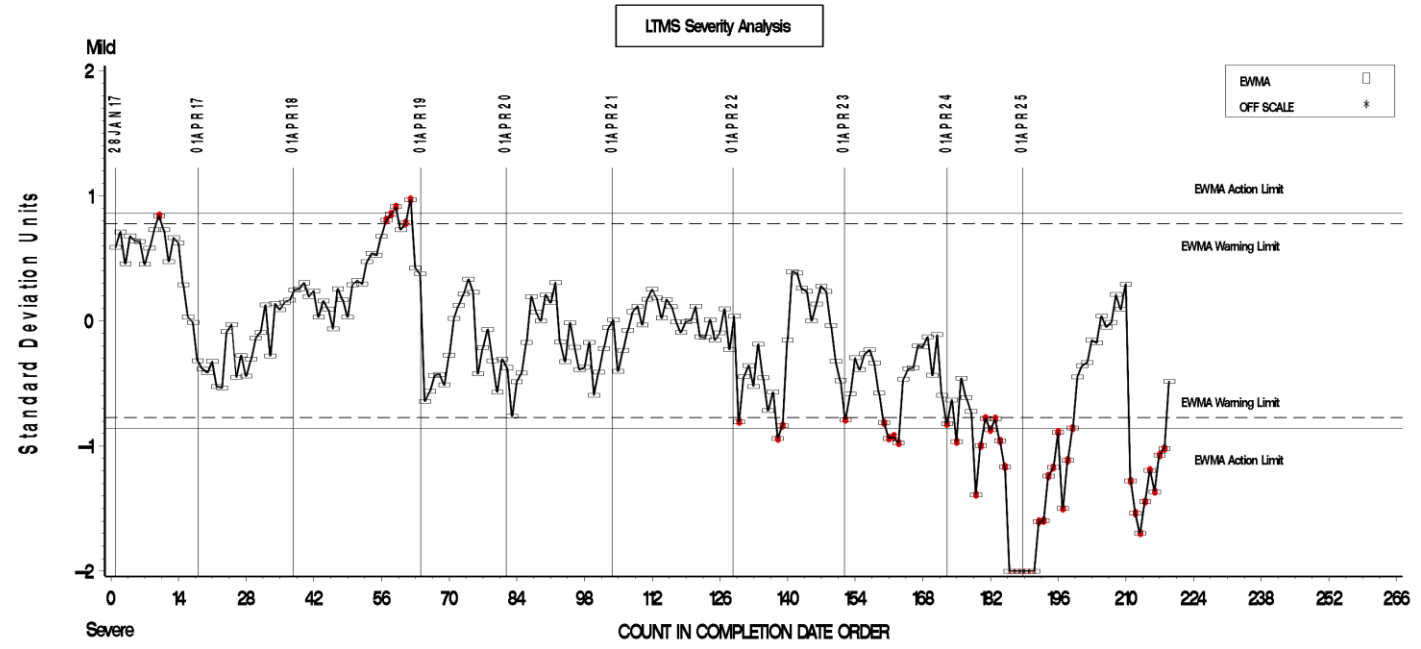
AVERAGE ENGINE SLUDGE



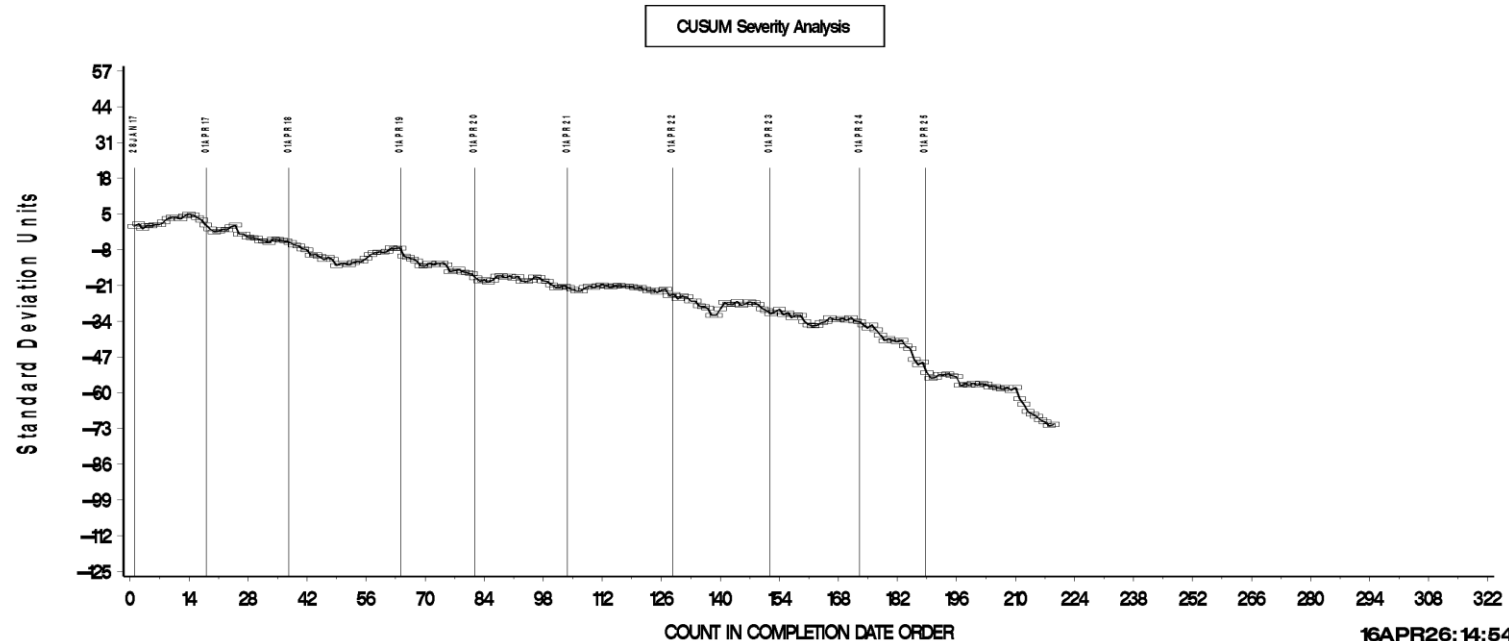
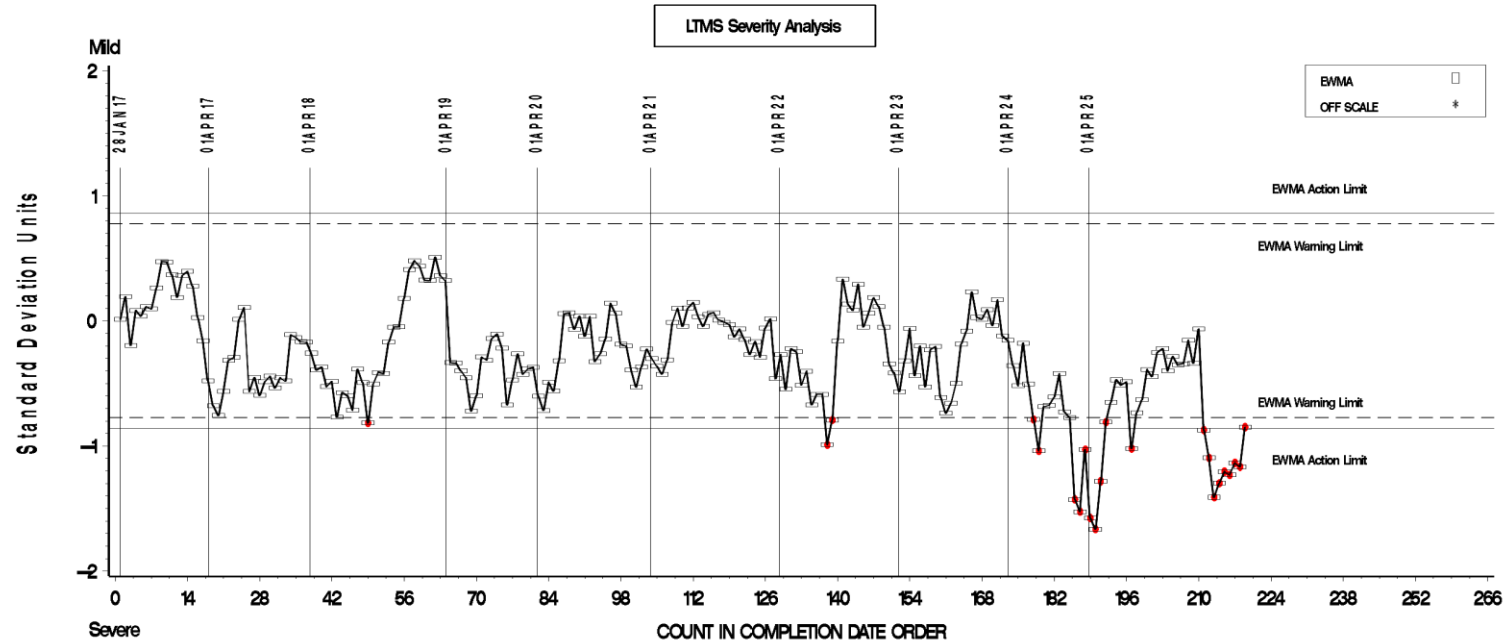
AVERAGE ROCKER COVER SLUDGE



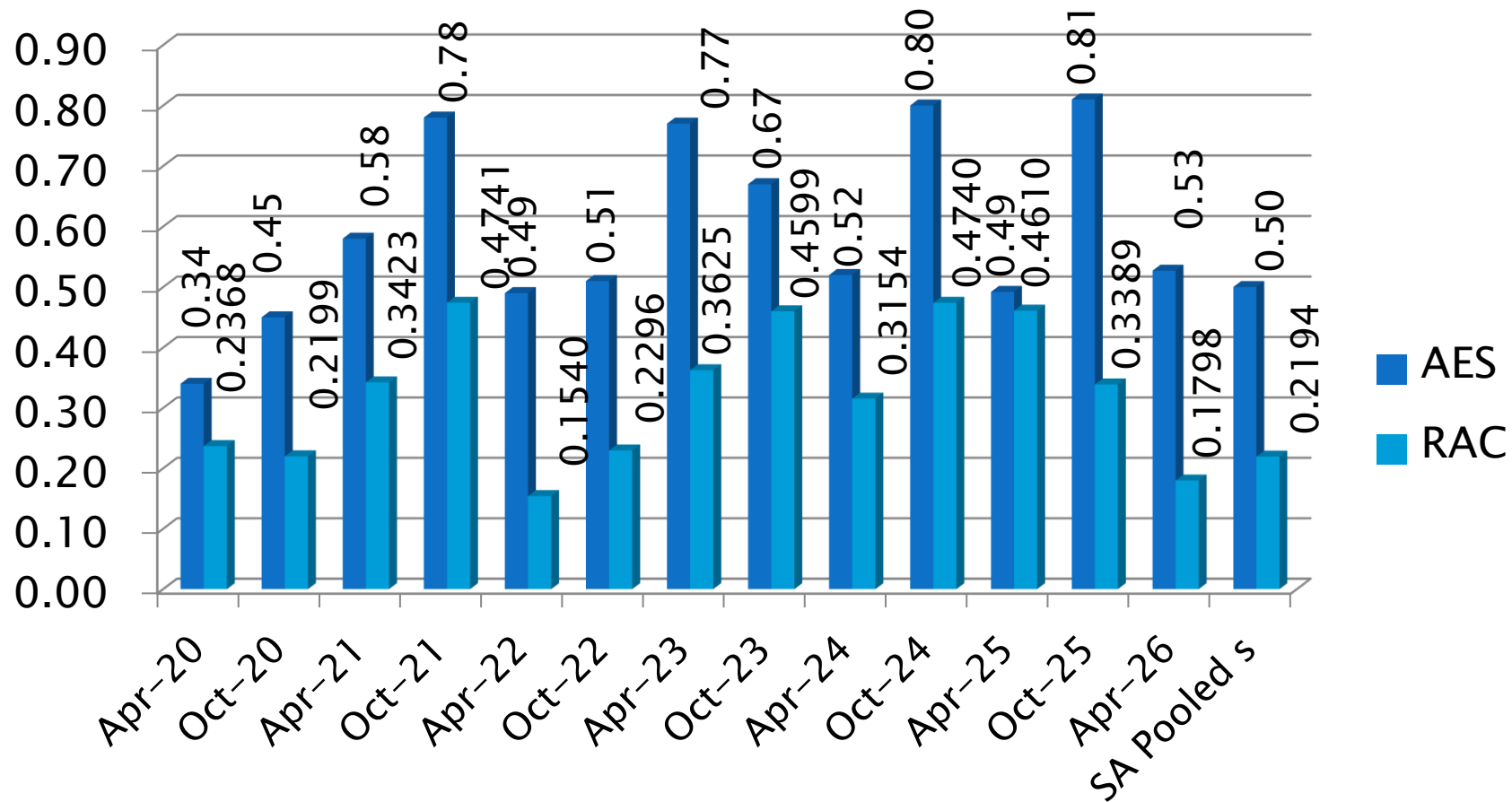
AVG. ENG. VARN. 50% RATING



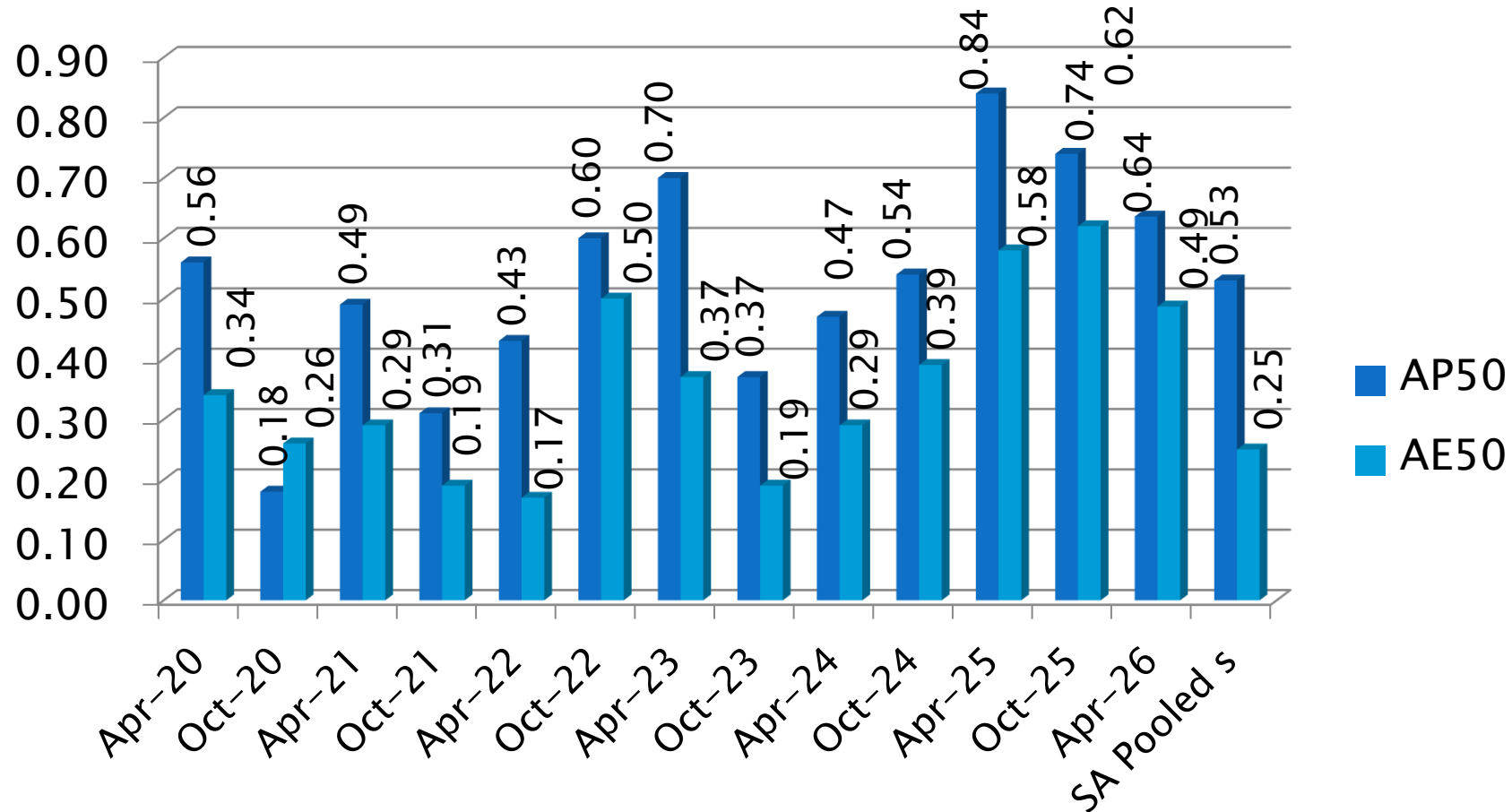
AVG PISTON SKIRT 50% RATING



Sequence VH Precision Estimates



Sequence VH Precision Estimates



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Sequence VIE

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Sequence VIE Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	29
Engine Abandoned	MC	2
Statistically Unacceptable Calibration Test	OC	0
Aborted Calibration Test	XC	1
Invalid Test	LC	3
Total		35

Sequence VIE – Failing Tests

Test Status		Cause	#
OC	No failing tests		0
Total			0

Sequence VIE – Lost Tests*

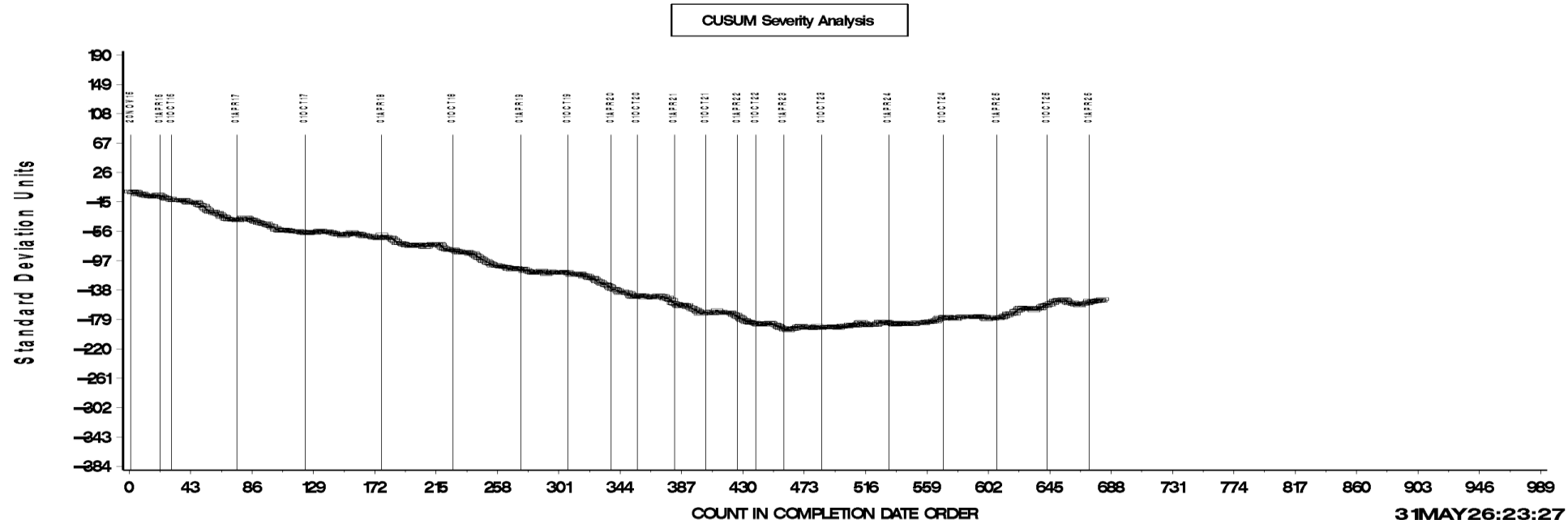
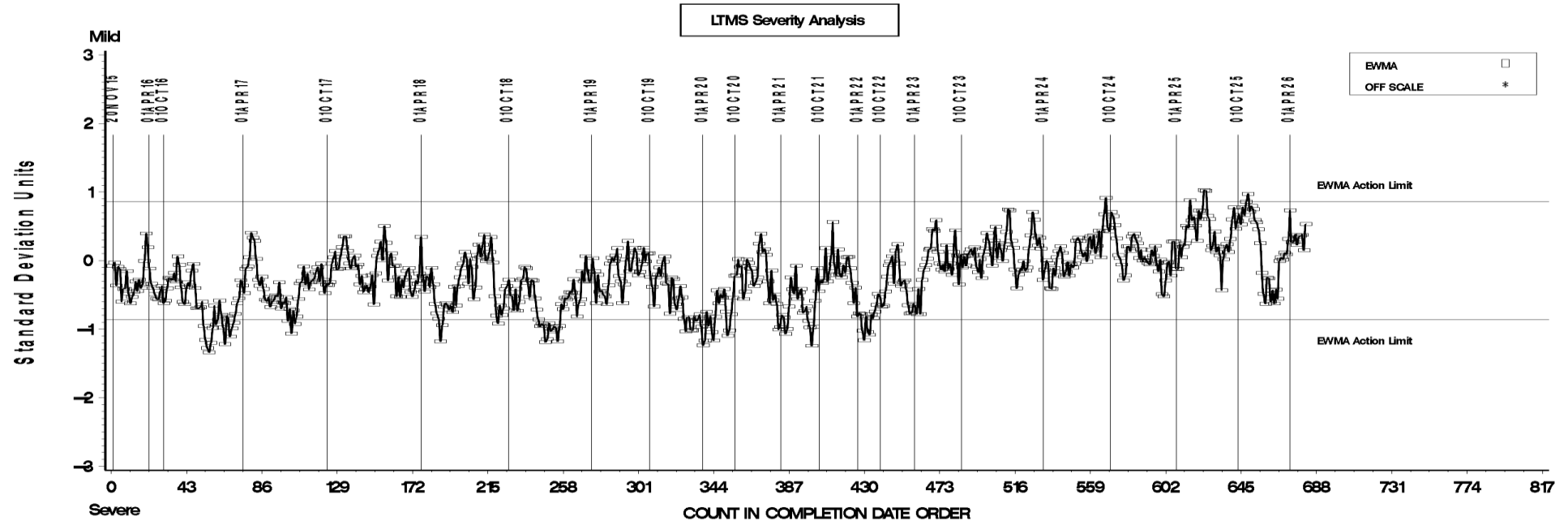
Test Status	Cause	#
LC	AFR out	1
LC	Exceeded load cell delta T	1
LC	Low intake air humidity	1
XC	Mechanical failure	1
Total		4

*Invalid and aborted tests

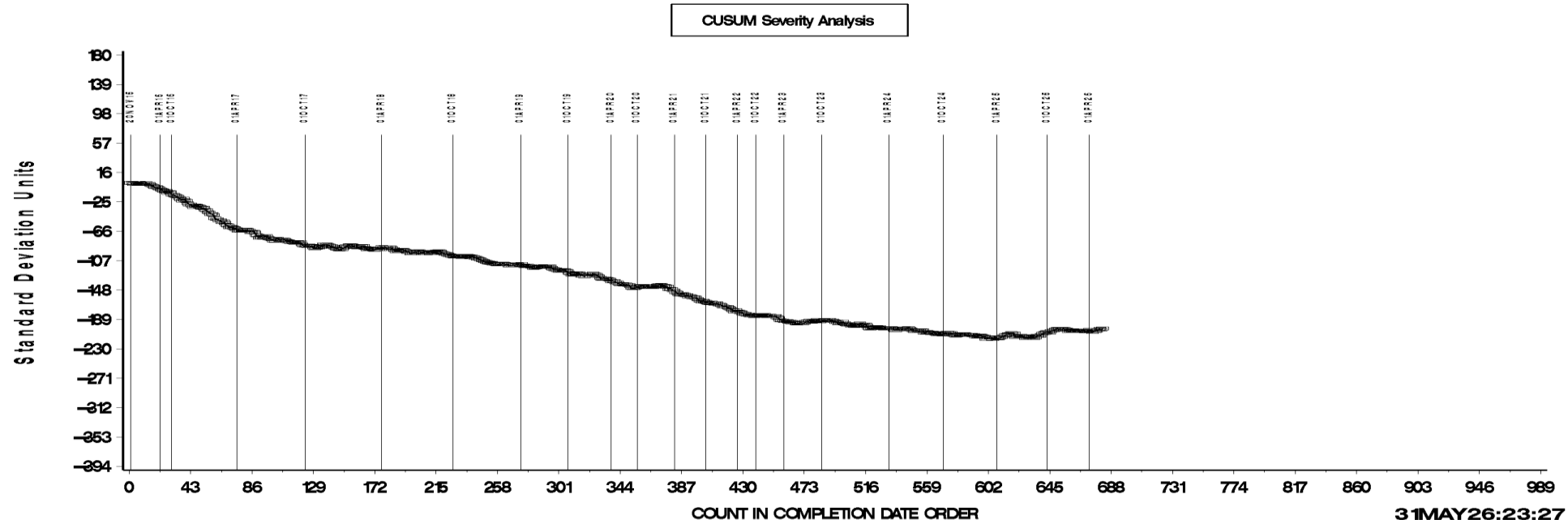
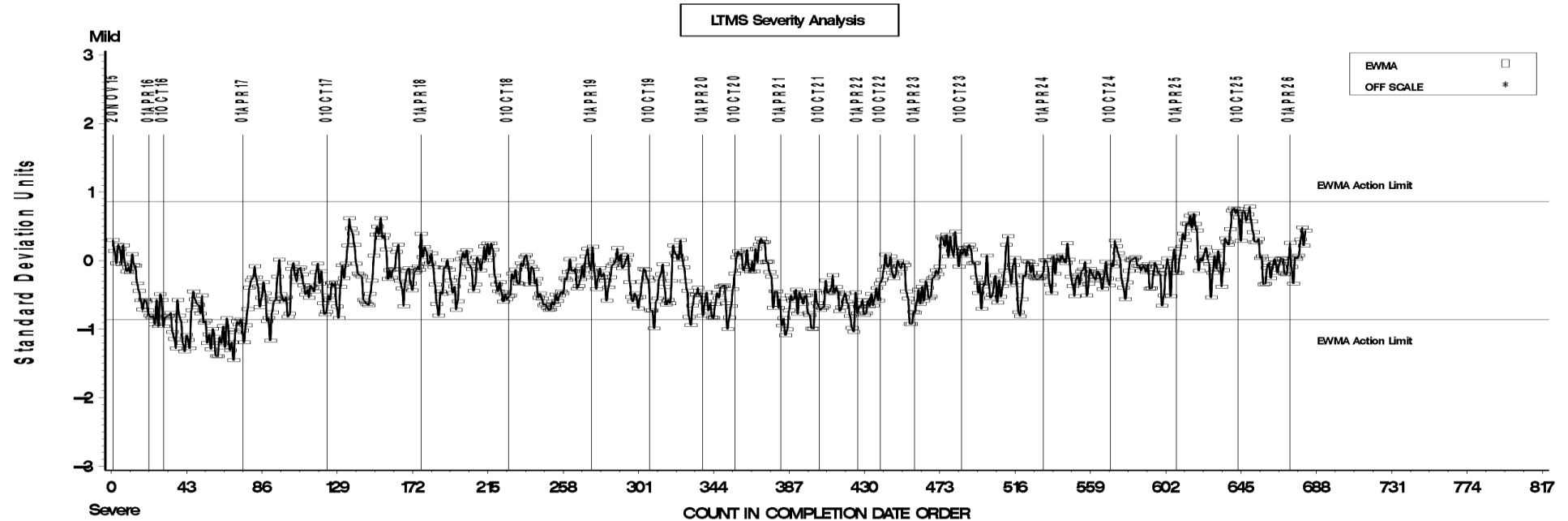
Sequence VIE Test Severity

- FEI1 & FEI2 are in control.

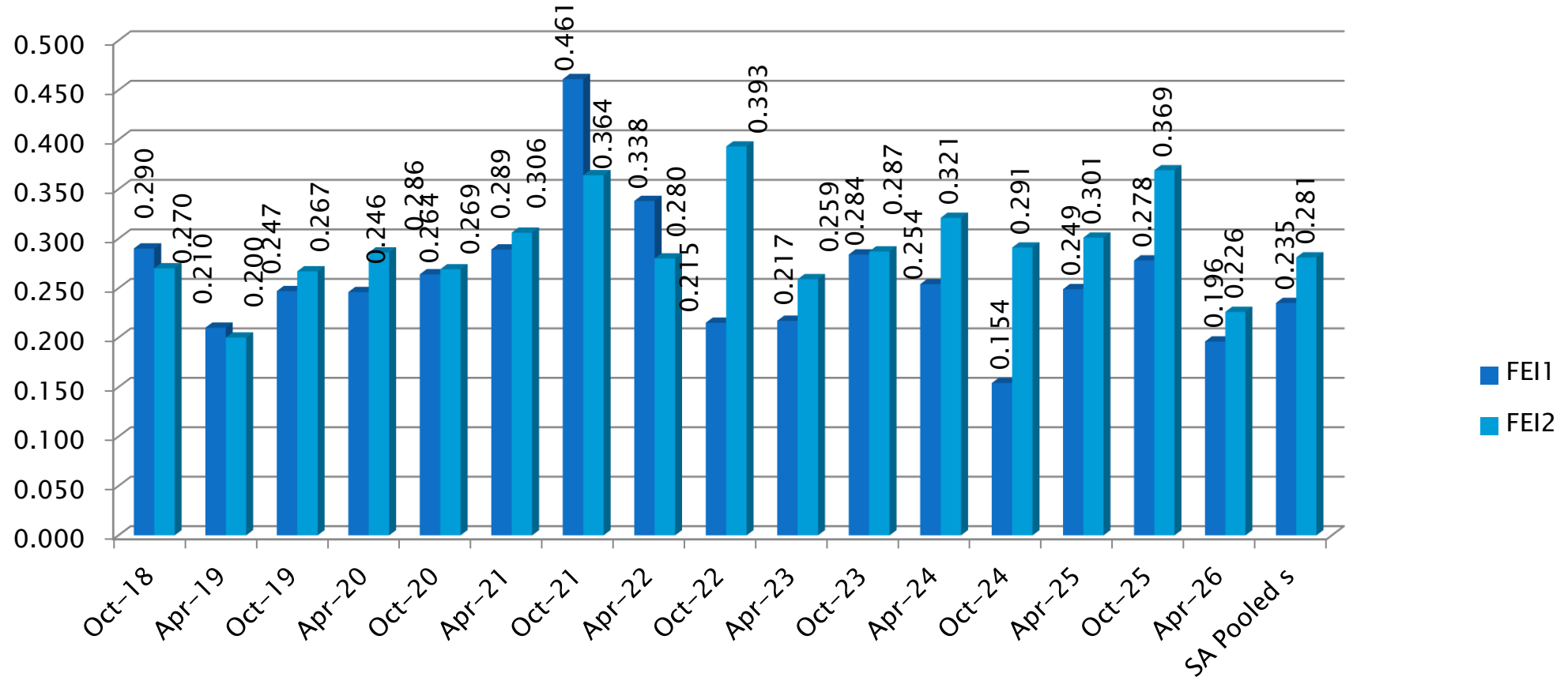
FEI FINAL RESULT PHASE I



FEI FINAL RESULT PHASE II



Sequence VIE Precision Estimates



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Sequence VIF

»» April 2026

Sequence VIF Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	27
Statistically Unacceptable Calibration Test	OC	0
Invalid Calibration Test	LC	0
Aborted Calibration Test	XC	3
Total		30

Sequence VIF – Failing Tests

Test Status		Cause	#
OC	No failing tests		0
Total			0

Sequence VIF – Lost Tests*

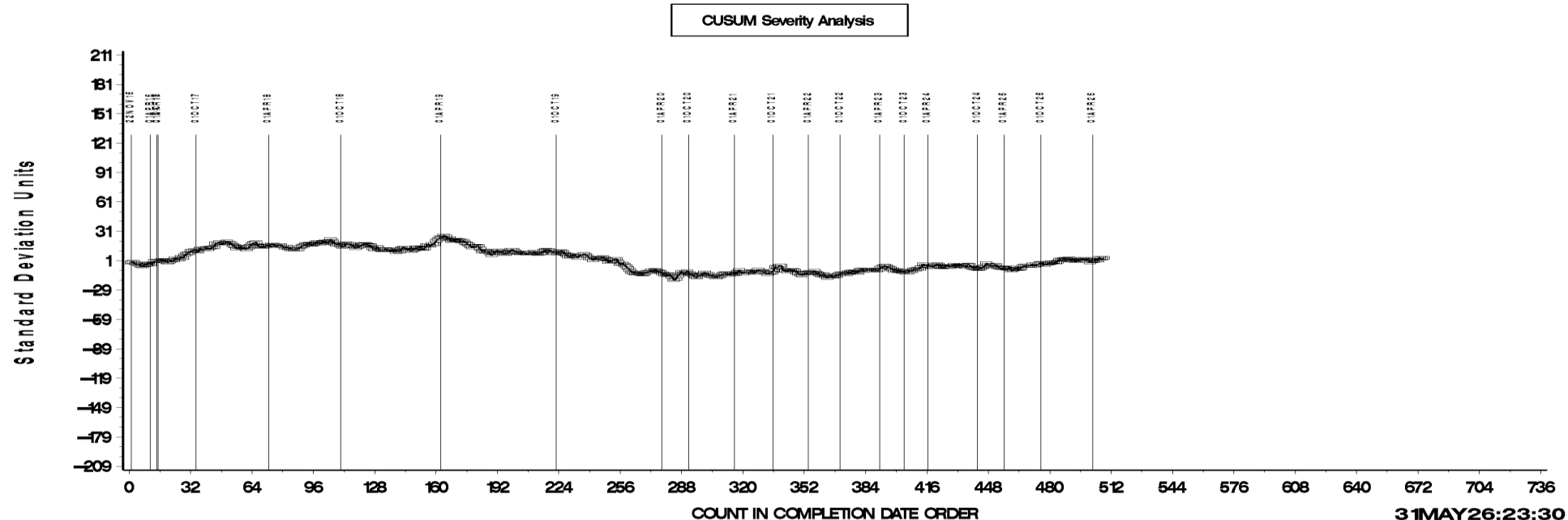
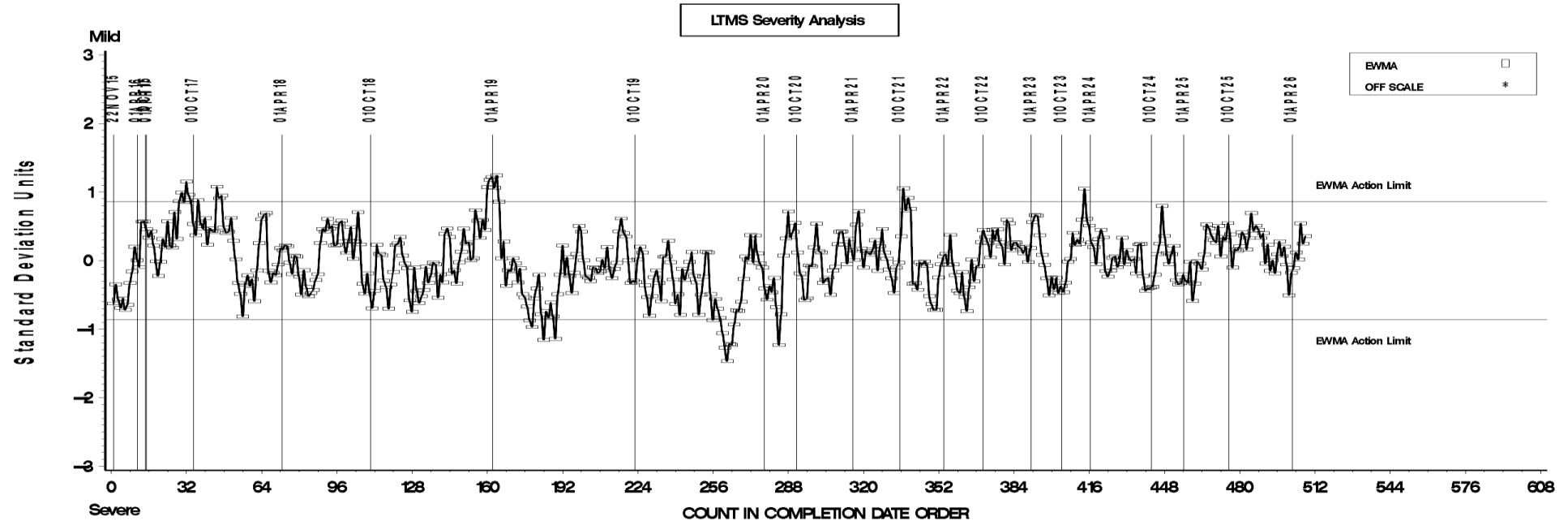
Test Status	Cause	#
LC	No invalid tests	0
XC	Exceeded shutdown limit	1
XC	Mechanical failure	1
XC	Stand mild	1
Total		3

*Invalid and aborted tests

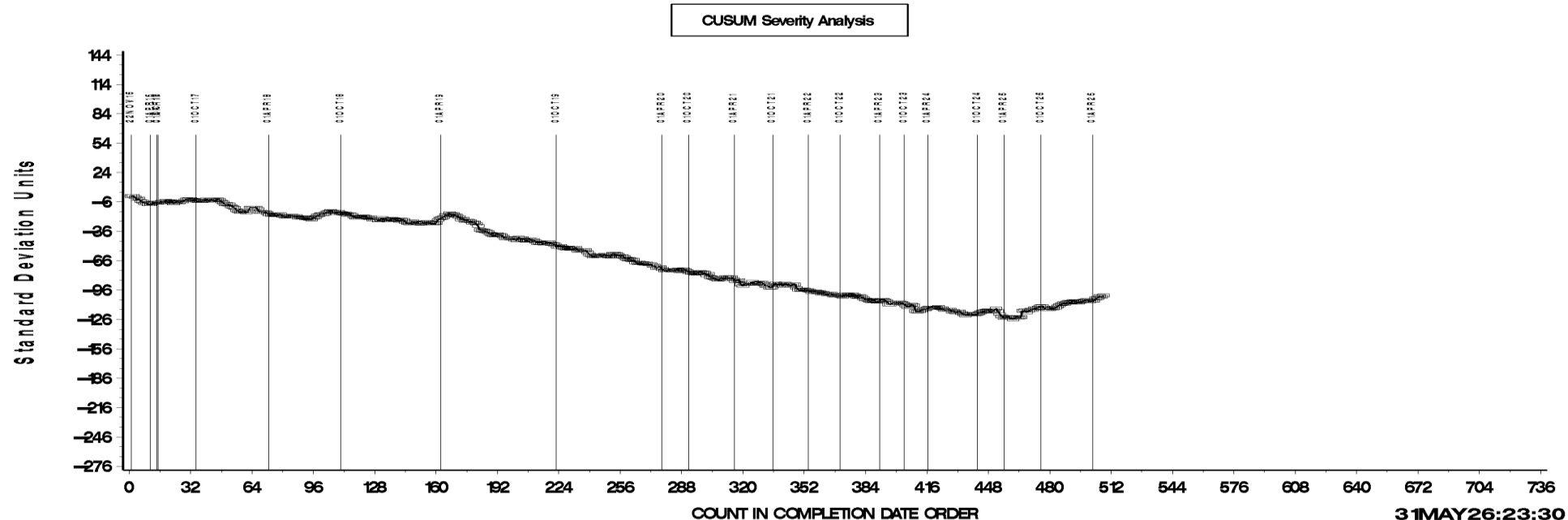
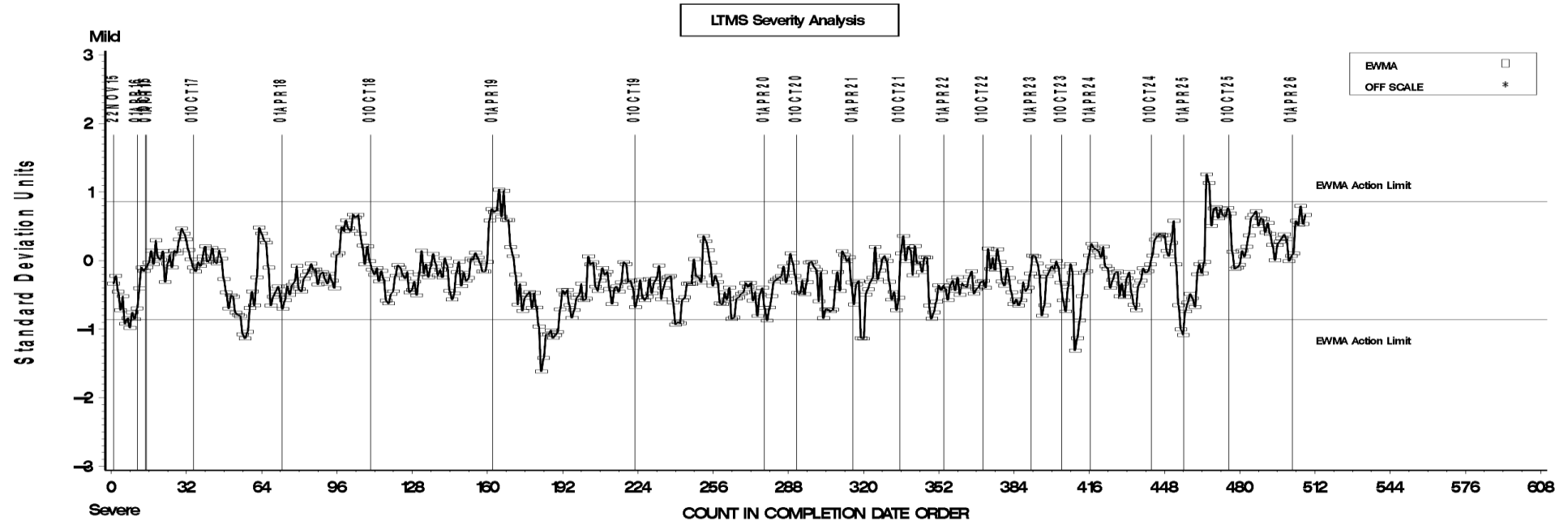
Sequence VIF Test Severity

- FEI1 & FEI2 are in control.

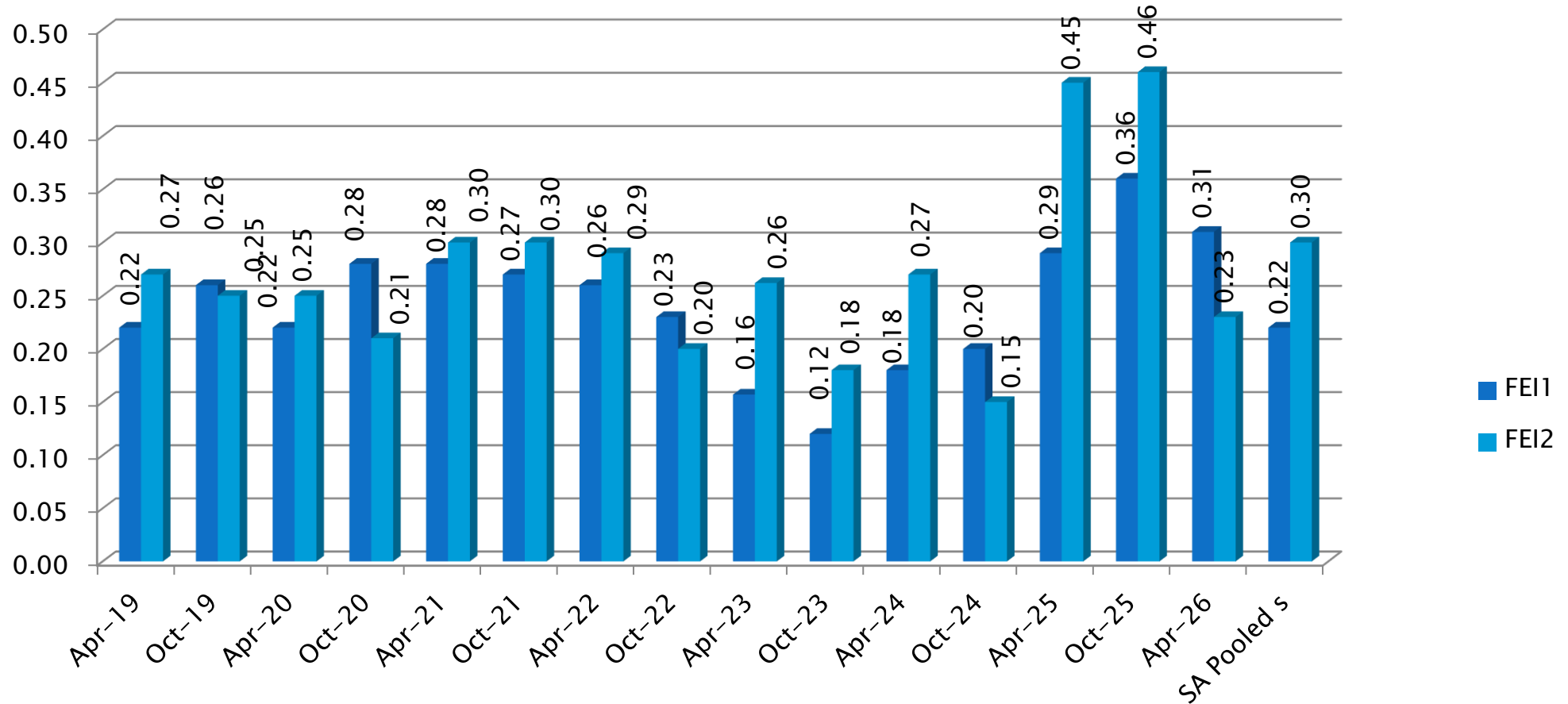
FEI FINAL RESULT PHASE I



FEI FINAL RESULT PHASE II



Sequence VIF Precision Estimates



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Sequence VIII

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Sequence VIII Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	4
Statistically Unacceptable Calibration Test	OC	0
Invalid Calibration Test	LC	3
Aborted Calibration Test	XC	1
Total		8

Sequence VIII – Lost Tests*

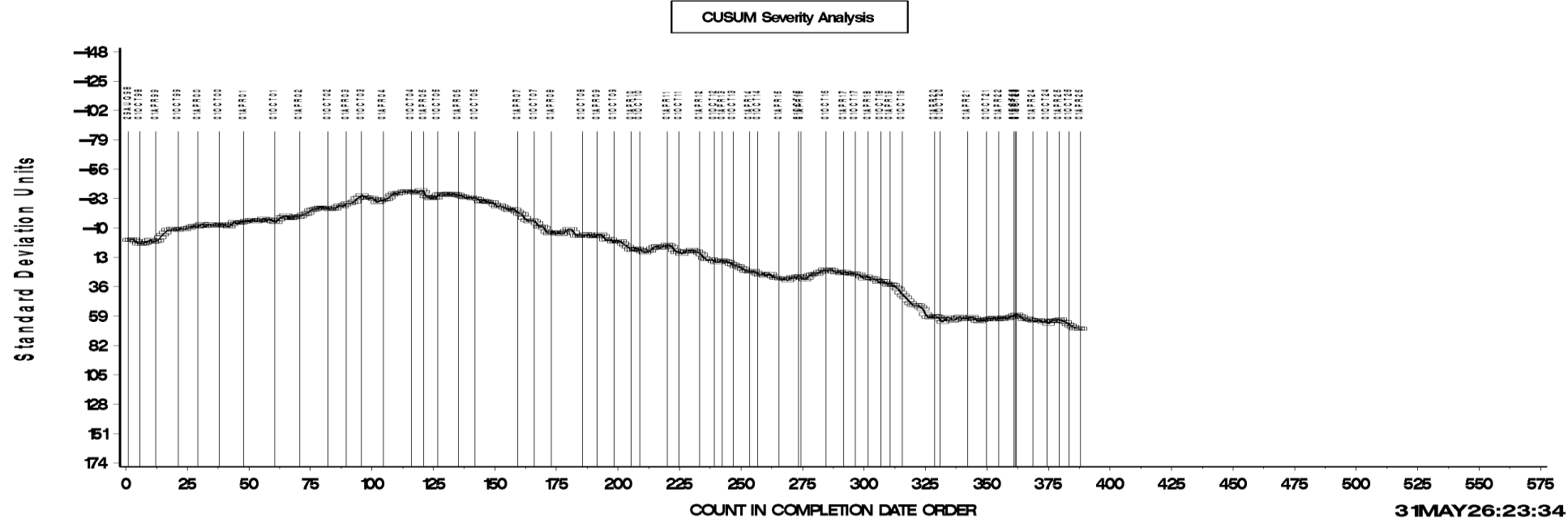
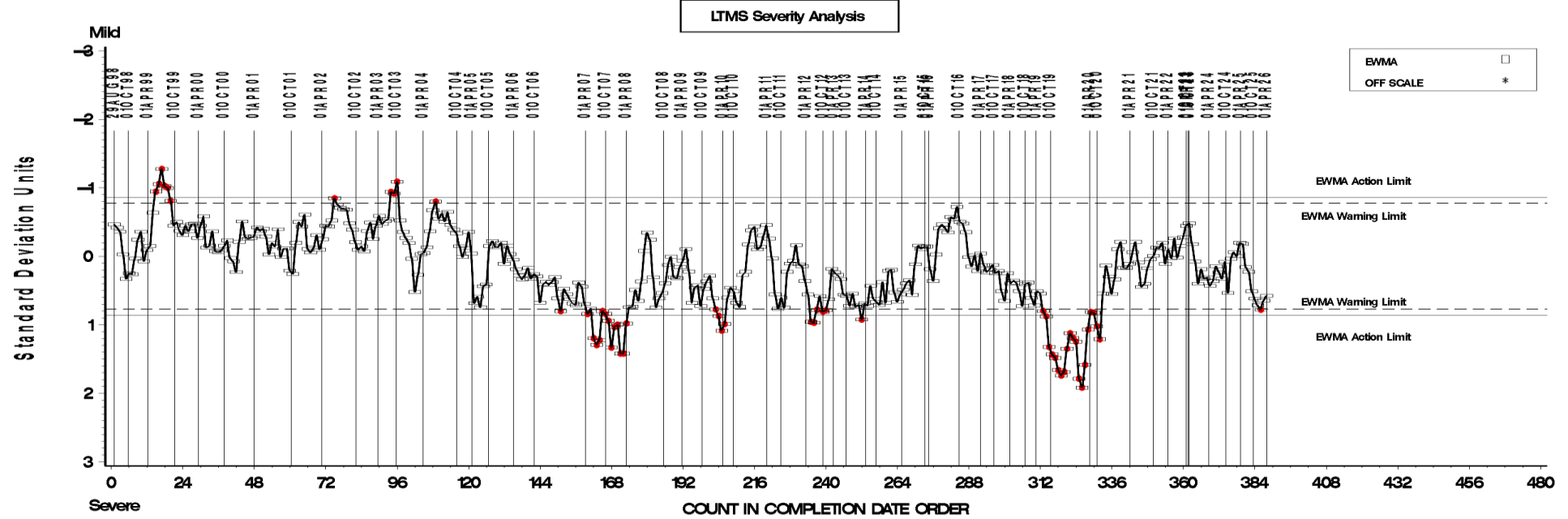
Test Status	Cause	#
LC	Fuel pressure control issues	1
LC	Fuel flow % deviation	1
LC	Mechanical wear connecting rod bearings	1
XC	Oil leak	1
Total		4

*Invalid and aborted tests

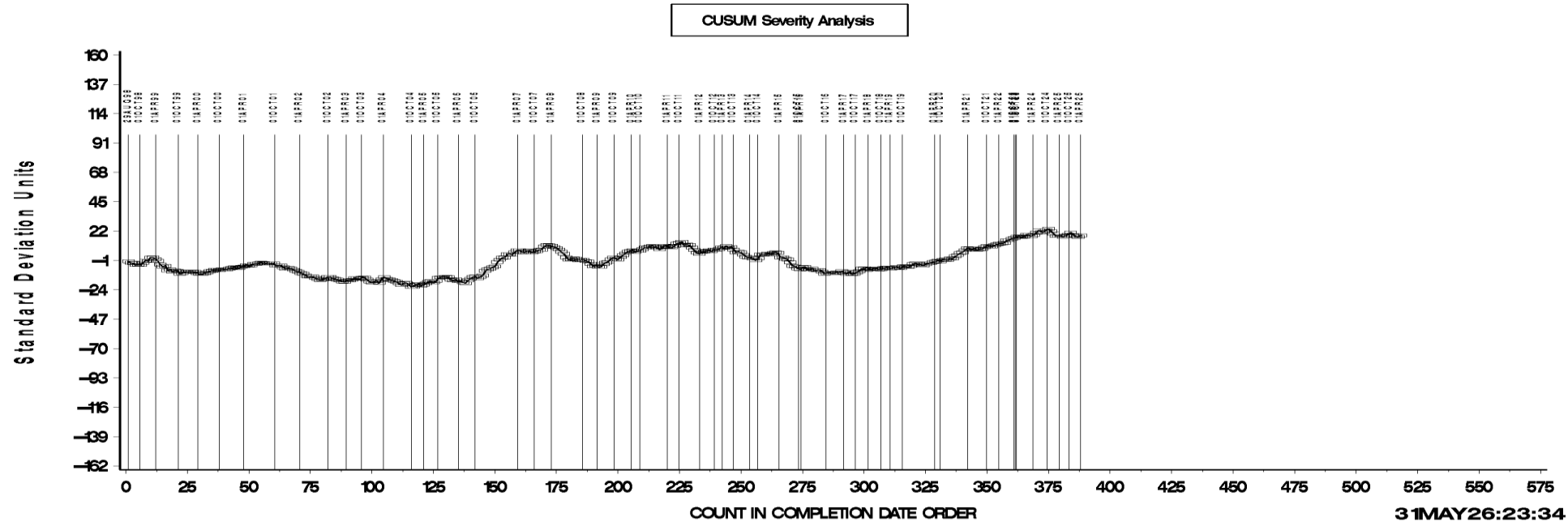
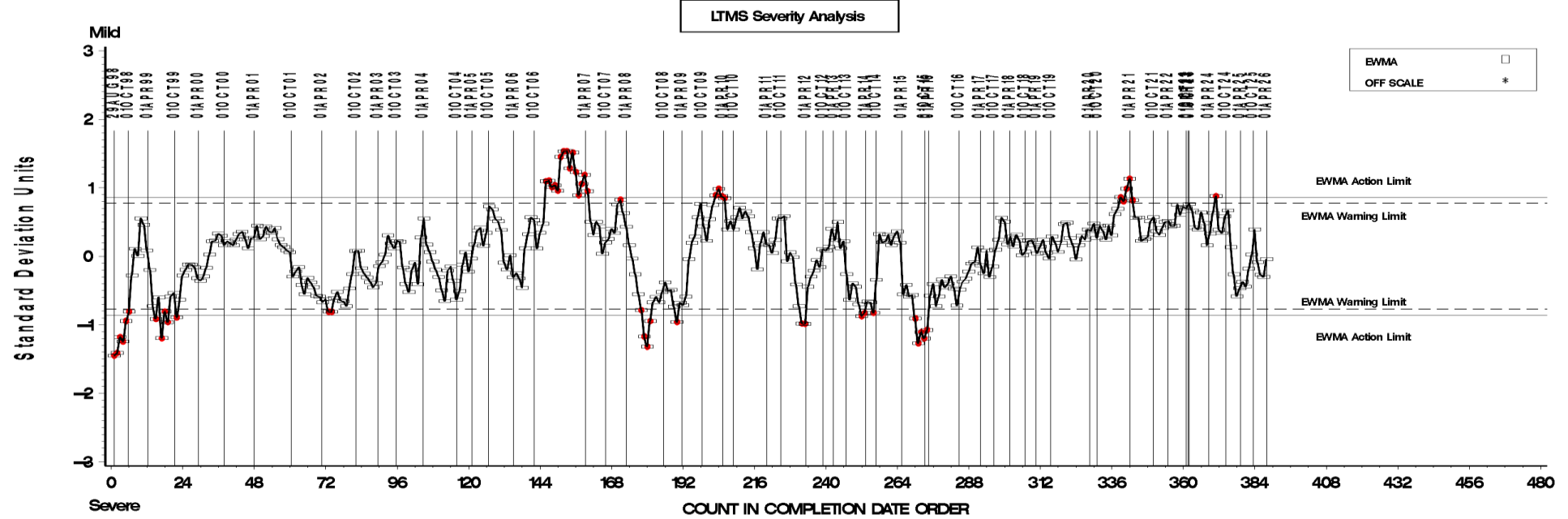
Sequence VIII Test Severity

- BWLS & SVIS are in control

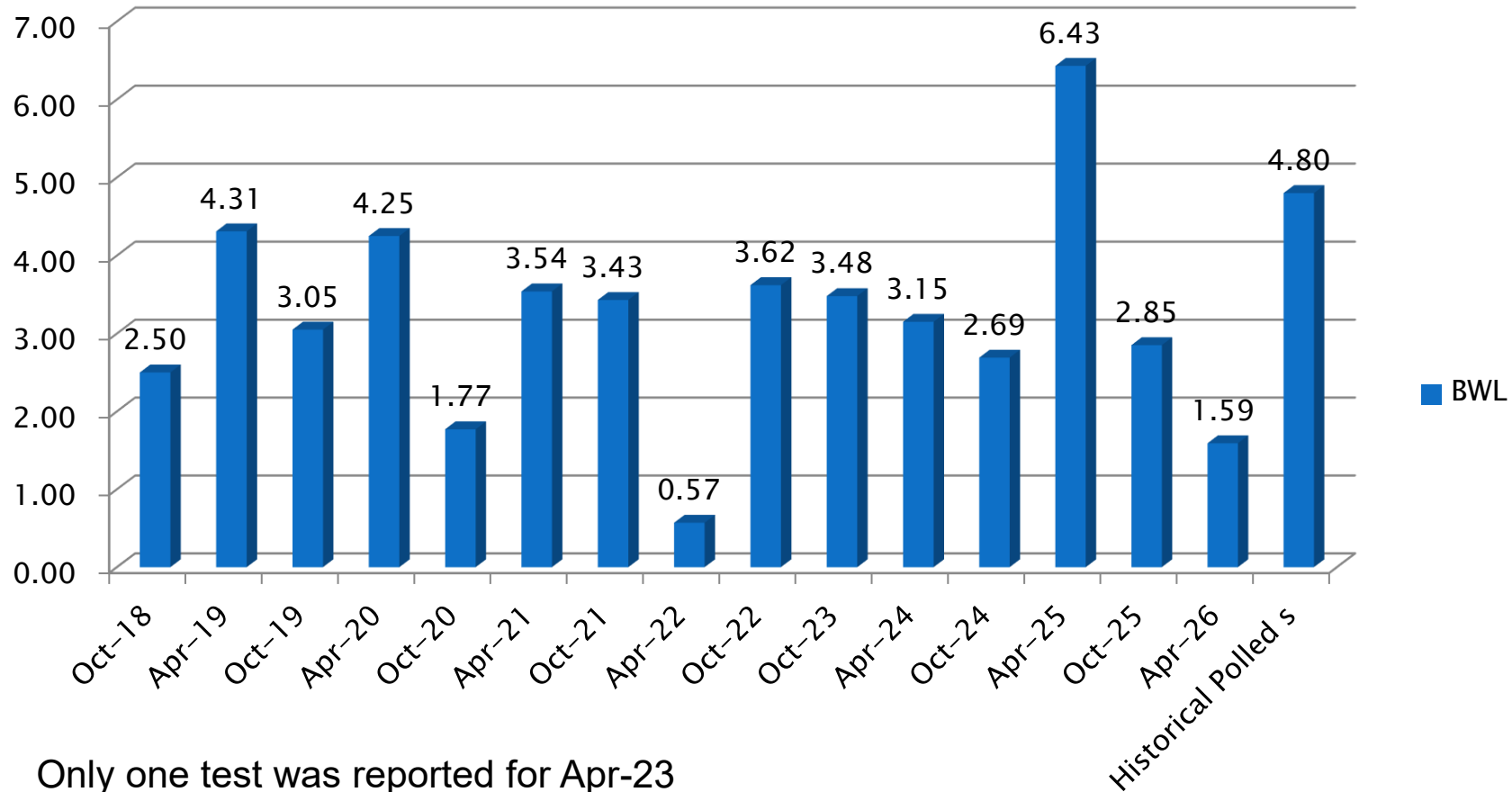
FINAL BEARING WEIGHT LOSS



STRIPPED VIS. @ 100 DEG C

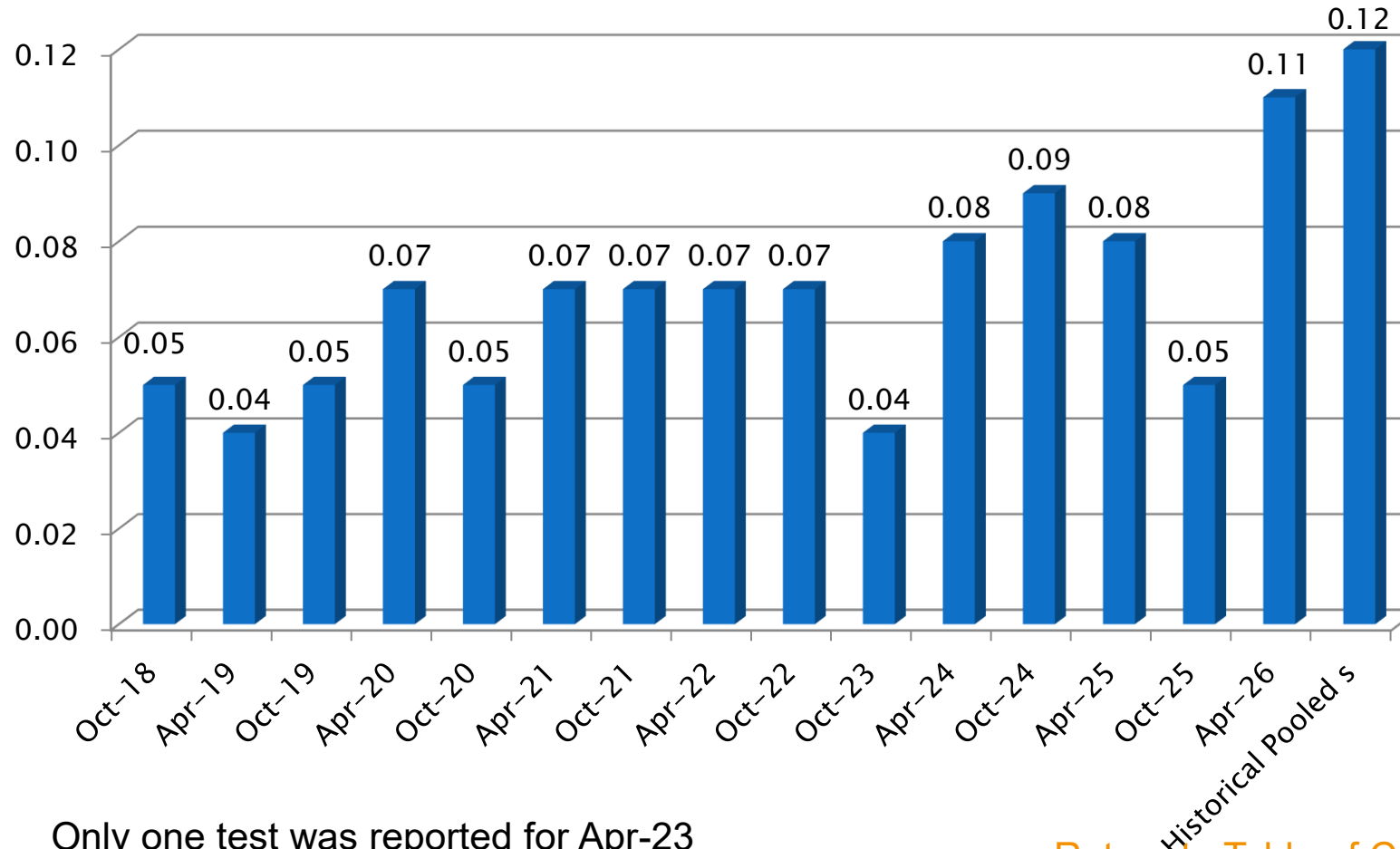


Sequence VIII Precision Estimates



Only one test was reported for Apr-23 period, no precision estimate is available

Sequence VIII Precision Estimates



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

■ SVIS

Only one test was reported for Apr-23 period, no precision estimate is available

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Sequence IX

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Sequence IX Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	32
Statistically Unacceptable Calibration Test	OC	9
Operationally Invalid Calibration Test	LC	0
Engine Break-in	AN	1
Aborted Calibration Test	XC	1
Total		43

Sequence IX – Failed Tests

Test Status	Number of Tests
Zi Level 2 alarm (severe)	3
Zi Level 2, Ei Level 3 (severe)	1
Ei Level 2	1
Ei Level 3	4
Total	9

Sequence IX – Lost Tests*

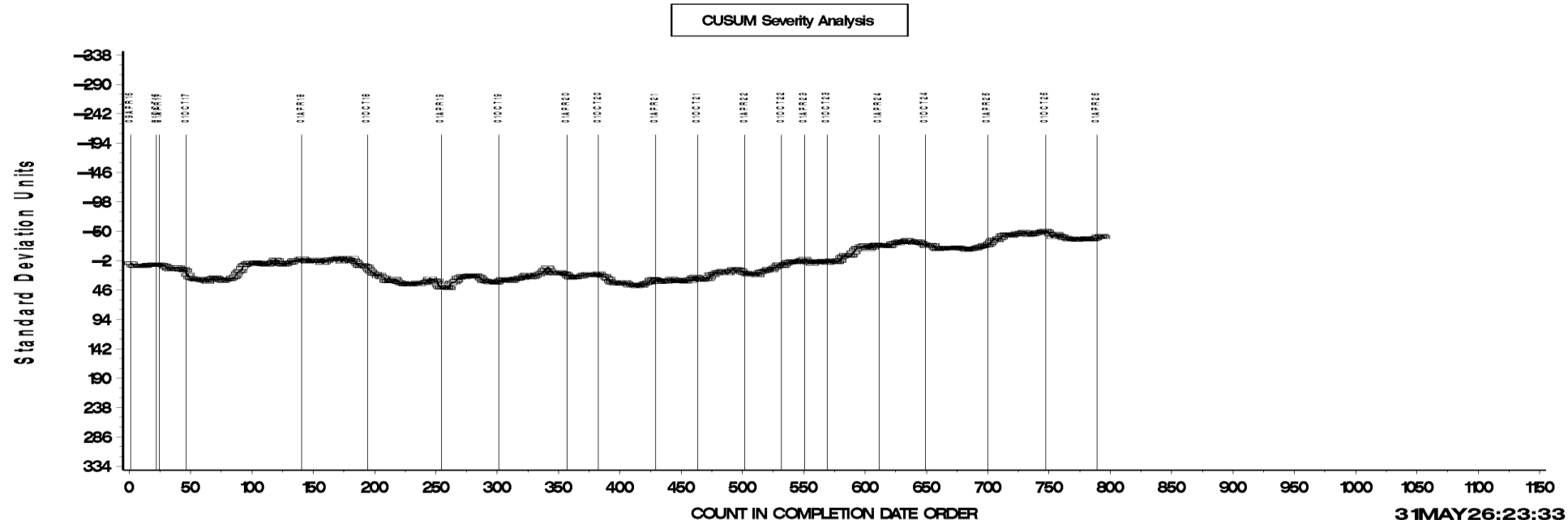
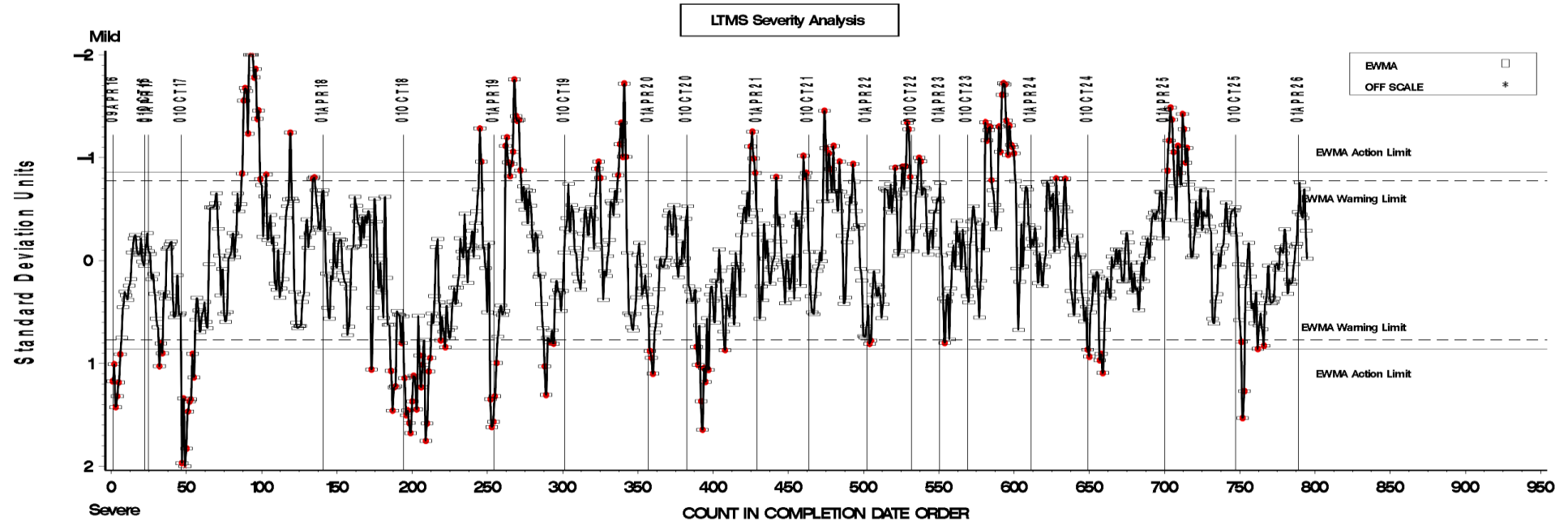
Test Status	Cause	#
Invalid	No invalid tests	0
Aborted	Mechanical failure	1
Totals		1

*Invalid and aborted tests

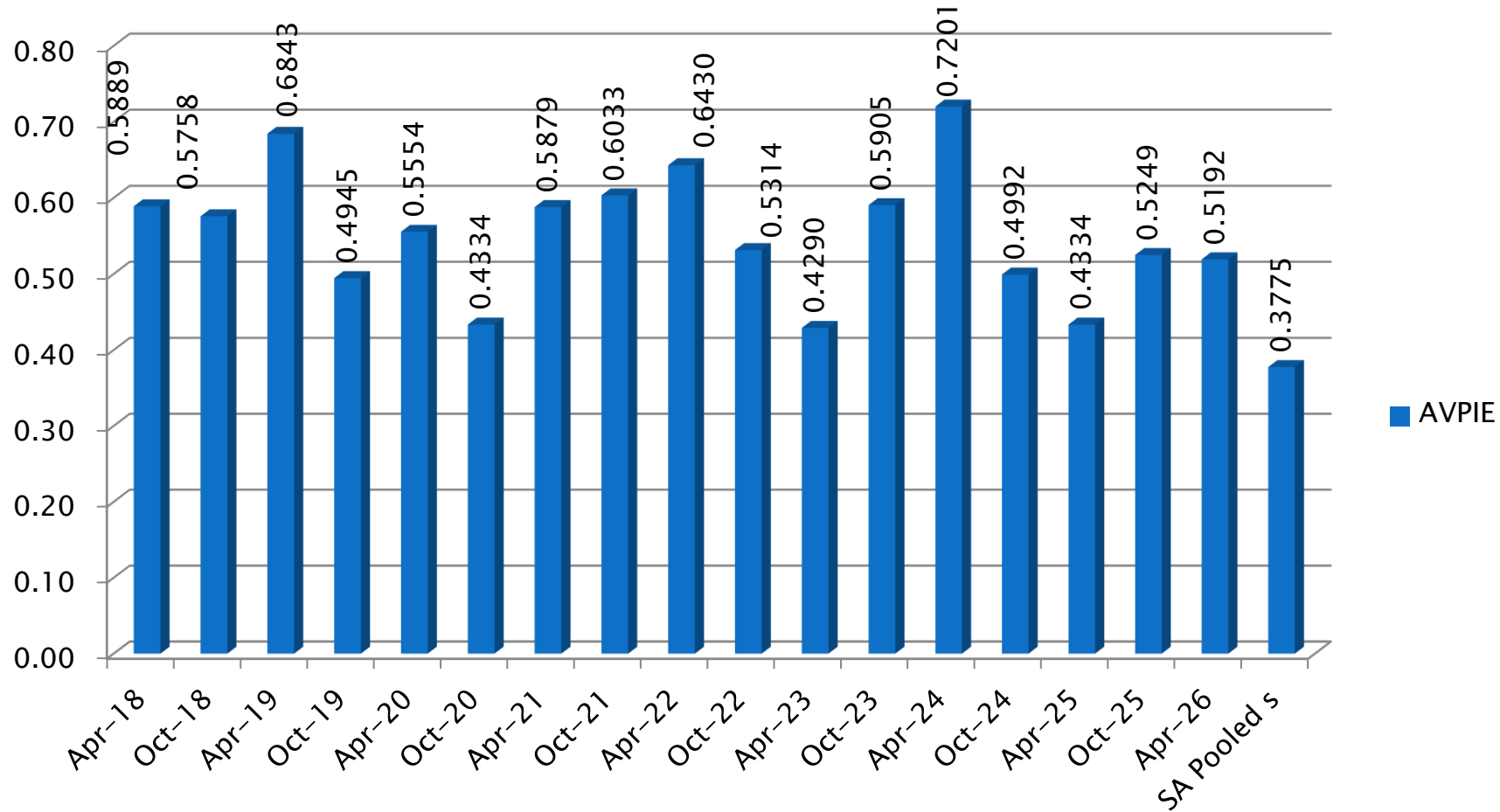
Sequence IX Test Severity

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

AVERAGE NUMBER OF PREIGNITIONS FROM VALID ITERATIONS



Sequence IX Precision Estimates



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Sequence IXAGED

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Sequence IXAGED Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	5
Statistically Unacceptable Calibration Test	OC	1
Invalid Calibration Test	LC	0
Aborted Calibration Test	XC	0
Total		6

Sequence IXAGED – Failed Tests

Test Status	Number of Tests
Yi severe	1
Total	1

Sequence IXAGED – Lost Tests*

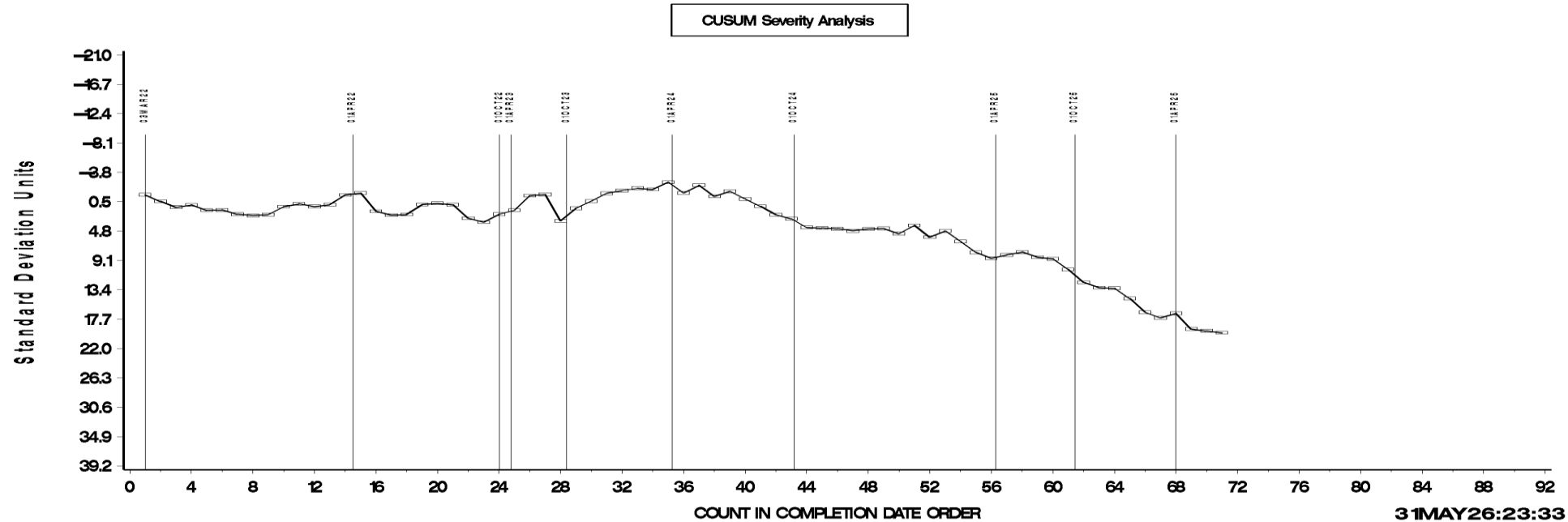
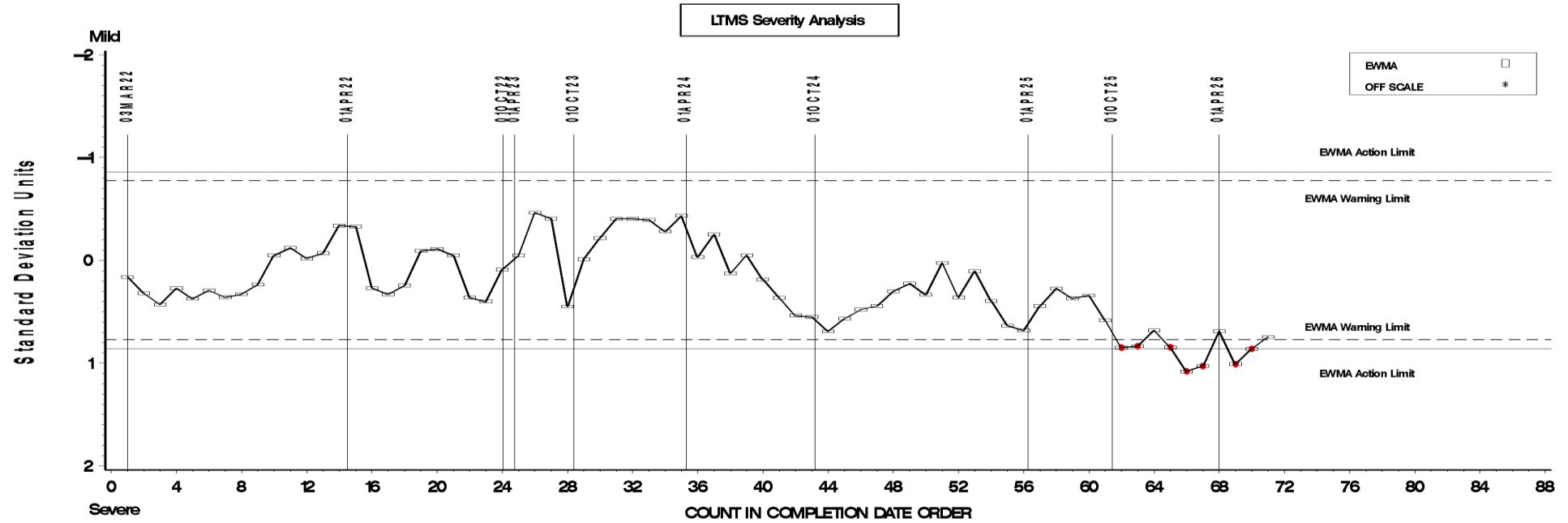
Test Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Totals		0

*Invalid and aborted tests

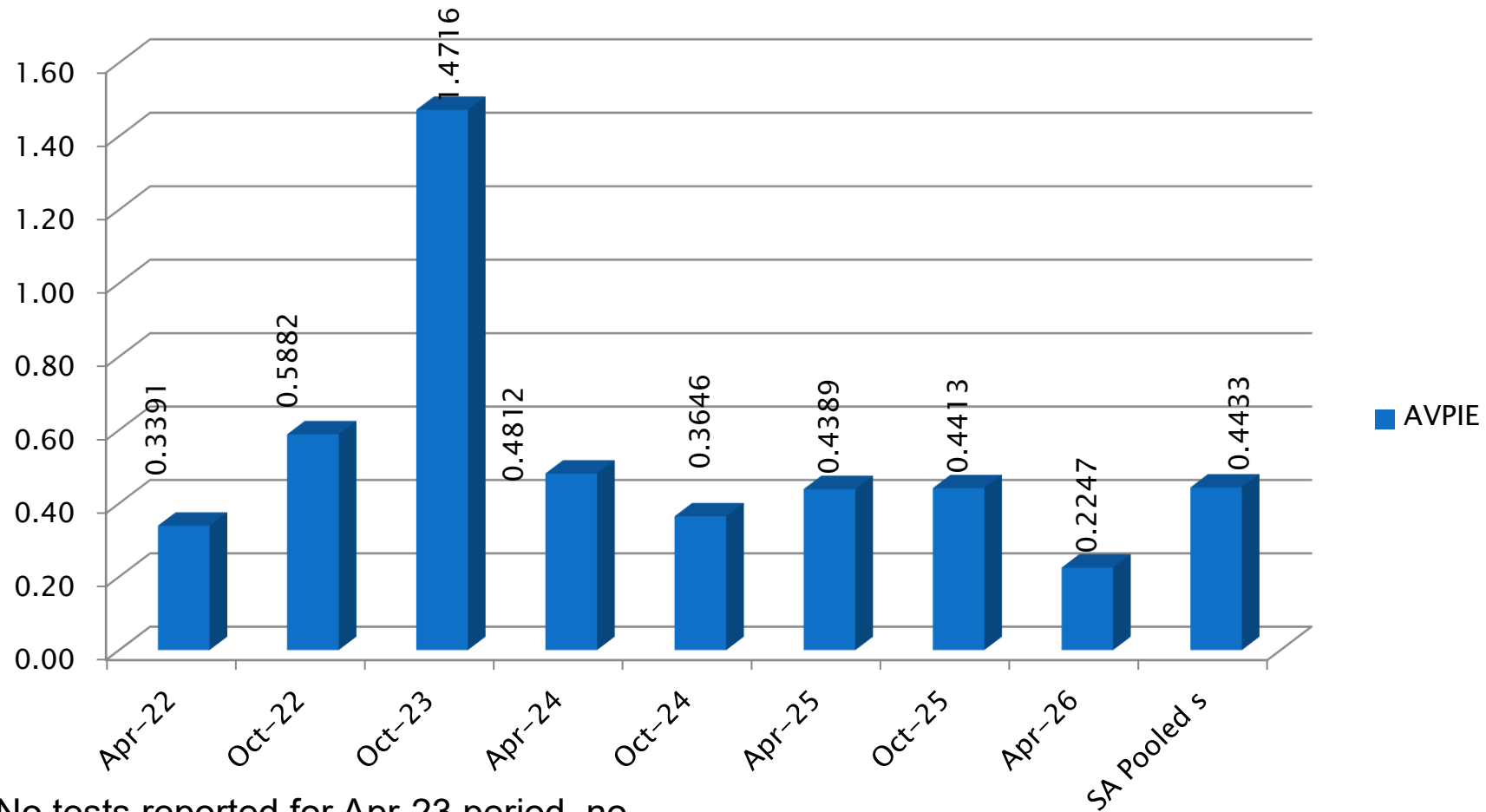
Sequence IXAGED Test Severity

- 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

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Sequence X



April 2026

Sequence X Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	7
Acceptable Discrimination Test	AS	4
Statistically Unacceptable Calibration Test	OC	2
Operationally Invalid Calibration Test	LC	1
Aborted Calibration tests	XC	0
Total Number of Tests		14

Sequence X – Failed Tests

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

Sequence X – Lost Tests*

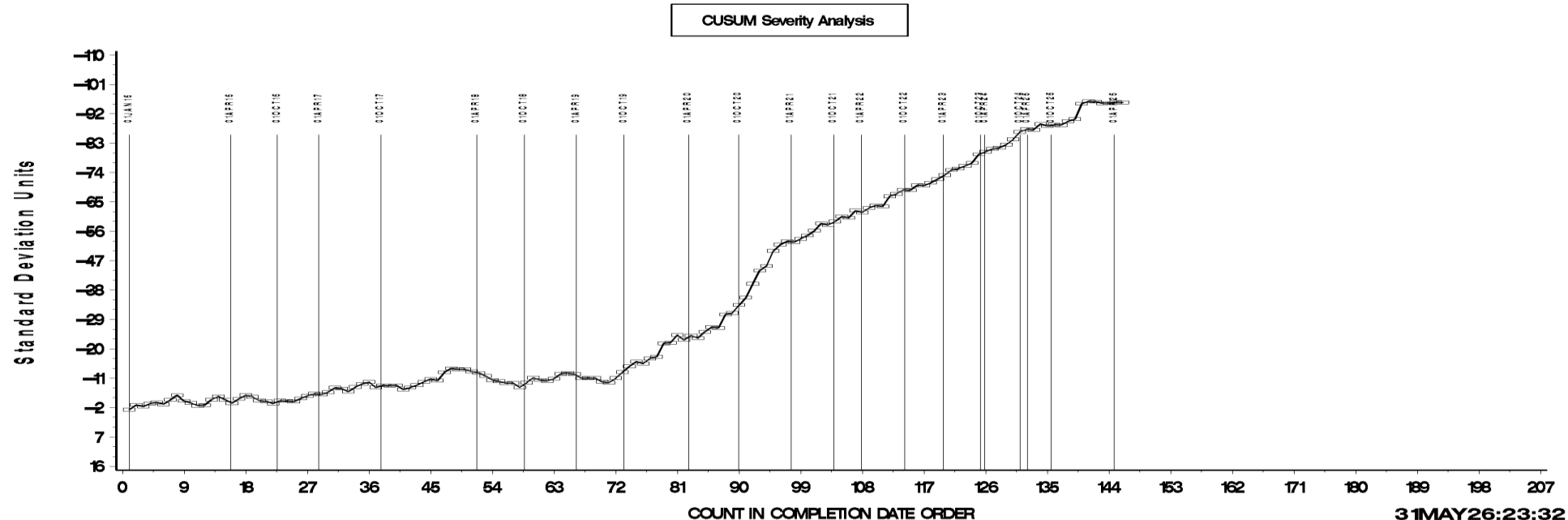
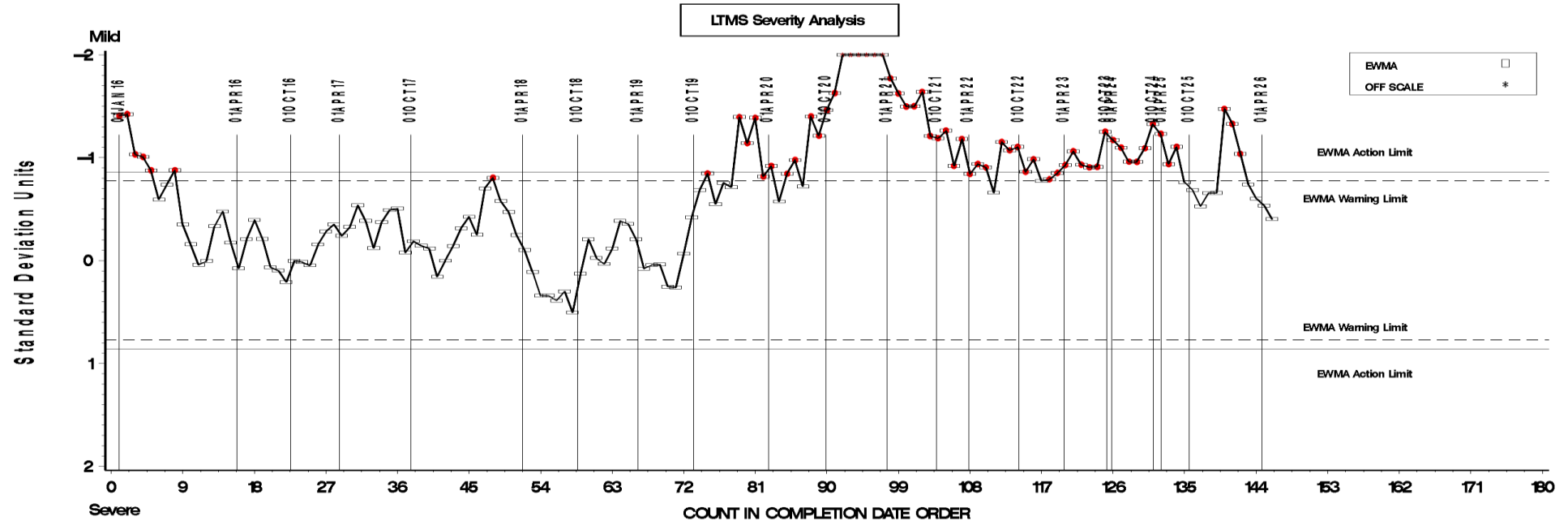
Test Status	Cause	#
Invalid	Air Charge Temperature (-QI)	1
Aborted	No aborted tests	0
Totals		1

*Invalid and aborted tests

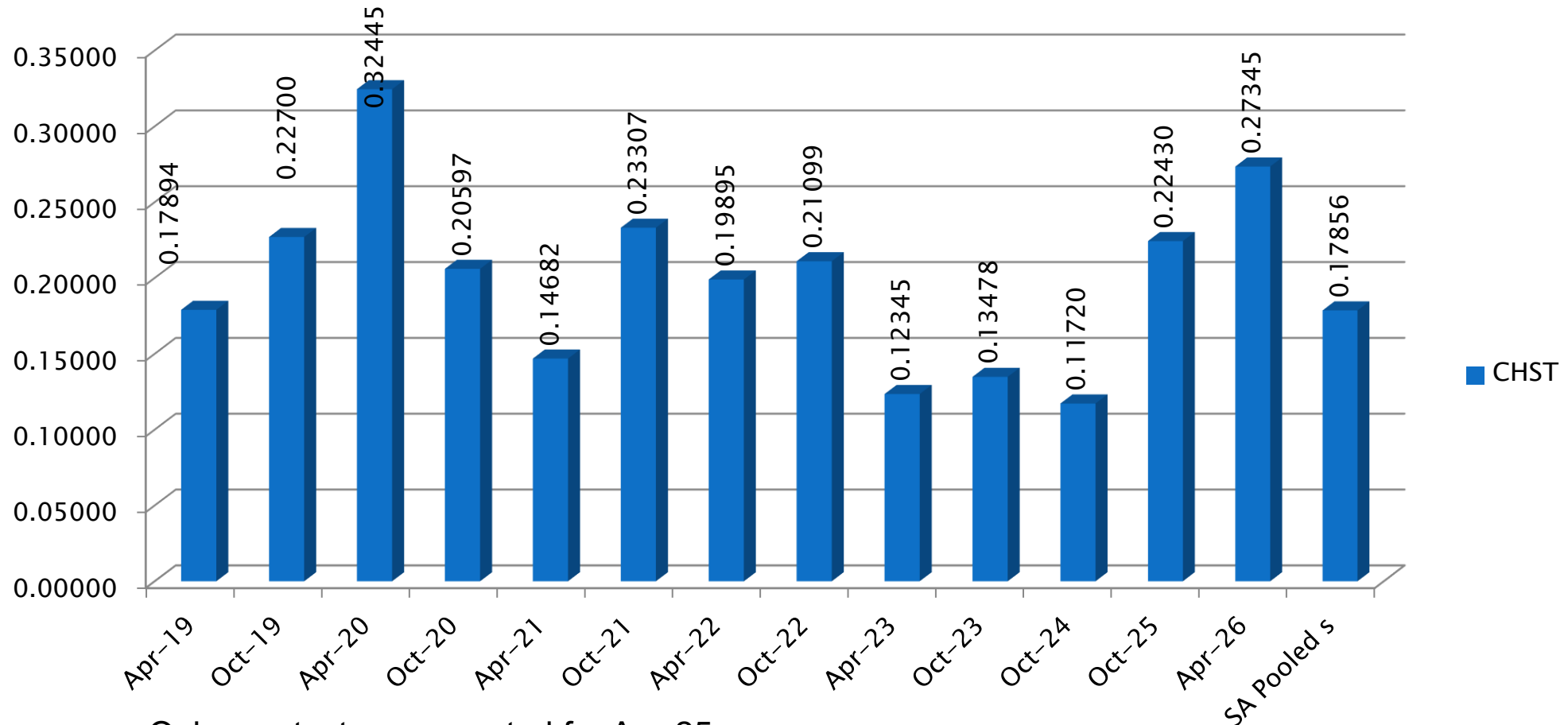
Sequence X Test Severity

- End of test chain wear is currently in control but had been in action alarm in the mild direction for quite some time. 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

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Information Letters



April 2026

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			No information letters this period
VIE			No information letters this period
VIF			No information letters this period
VIII			No information letters this period
IX			No information letters this period
IXAGED			No information letters this period
X			No information letters this period

* Available from TMC Website

** New contact information needed from Stellantis

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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 940 until the panel agrees on how to approve Reference Oil 940-1. 940-1 is currently being used for VJ test development.

Reference Oil Re-blends

➤ TMC 1006-2

- No inventory remains at the 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 1010-3

- Introduced by panel as an acceptable re-blend for calibration purposes. This oil is used for referencing 40% of the time.

Reference Oil Re-blends

➤ TMC 1011-1

- Inventory of 1011-1 at the TMC is getting low. Estimated to be about 1.5 years remaining. This reference oil is used for sequence IVB, VH, and VIF testing.
- The reference oil supplier has stated that the oil can be reblended, however this is likely to be the last time for a reblend. If the panel desired, a new reference oil could be provided with more modern technology (LSPI compliant).

Reference Oil Inventory Estimated Life

Oil	Tests	Year	Blend Quantity	TMC Inventory	Estimated Life	Comment
220-1	IX	2022	1060	868	> 5	Break-In oil only
221-1	IX	2015	992	666	3	
224-2	IX	2022	780	187	1	Reblend being persued
270	X	2015	1100	382	4.5	
271	X	2015	980	522	>5	
300-1	IVB	2017	378	104	2	
434-3	IIIH, GMOD	2017	980	384	4	
436	IIIH	2014	1100	428	3.5	
438-2	IIIH	2017	540	360	5	Suspended by panel
542-5	VIE, VIF	2021	1060	192	1	Reblend received by TMC and currently in QC receiving
543-1	VIF	2020	1000	629	3.5	
544	VIE	2015	1003	0	<1	544-1 is an available reblend.
544-1	VIE	2025	542	352	>5	
931	VH	2020	912	644	> 5	
940-1	VH	2018	485	415	> 5	
1006-2	IVA, VIII	2000	5500	10	3	"Beyond useful life"
1009-1	VIII	2017	1000	777	> 5	
1010-2	VIE	2022	555	53.5	<1	Reblend requested
1010-3	VIE	2025	650	464	2	
1011-1	IVB, VH, VF, X	2019	1395	378	1.5	
1012	IVB	2017	2145	843	4	
API01-1	IXAGED	2024	480	265	>5	
API02-1	IXAGED	2024	473	281	>5	

LTMS Deviations



October 1, 2025 – March 31, 2026

LTMS Deviations

- No LTMS deviation occurred during this reporting period.

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

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Quality Index Deviations



October 1, 2025 – March 31, 2026

Quality Index Deviations

- Two Quality Index Deviations were requested this report period
 - VH deviation for both speed and manifold pressure due to a 2-minute manifold pressure drop.
 - IIIH deviation for coolant out temperature due to heat exchanger flow issues.

Quality Index Deviations

Historical Count of PCEO Quality Index Deviations

Test	Quality Index Deviations
IIIH	11
IVA	33
IVB	2
VH	14
IX	3
X	3

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TMC Laboratory Visits



October 1, 2025 – March 31, 2026

TMC Lab Visits

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

No TMC lab visits conducted during this reporting period.

Lab Visit Issues

- ▶ No lab visit issues occurred during this reporting period

Test Area Timelines



October 1, 2025 – March 31, 2026

Test Area Timeline Additions*

Test	Date	Topic	IL
IIIH	**	Update engine build manual to add new model honing machine and ultra sonic cleaner.	**
VH	January 15, 2026	Additional build parameters added to the VH report packet.	Revision Notice VH – 20260115

*As of 03/31/2026

** 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>

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