



A Program of ASTM International

Test Monitoring Center

<https://www.astmtmc.org>

ASTM D02.B2 Semi-Annual Report Heavy Duty Reference Oil Testing

Spring 2025

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Heavy Duty Testing

Executive Summary

▶ Test Issues

- COAT
 - COAT to EOAT equivalency finished and recommendation for a limit 12.2% aeration was sent to CLOG.
- T13 Oil consumption increase
 - Investigation ongoing
- ISBVIS BOIVGRA complete
- FVTW development work continues

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Calibrated Labs and Stands*

Test	Labs	Stands		Test	Labs	Stands
1K	1	1		EOAT	1	1
1N	2	2		RFWT	1	1
1P	1	1		T-8/E	1	1
1R	0	0		T-11	2	3
C13	3	5		T-12/T-12A	3/3	3/3
COAT	1	1		T-13	4	6
ISB	3	7		DD13	3	3
ISM	4	5				
ISBV108	4	7				
ISBV156	4	7				

*As of 5/20/2025

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SCOTE 1K

»» April 2025

1 K Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	1
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		1

1 K Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

1 K Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

*Invalid and aborted tests

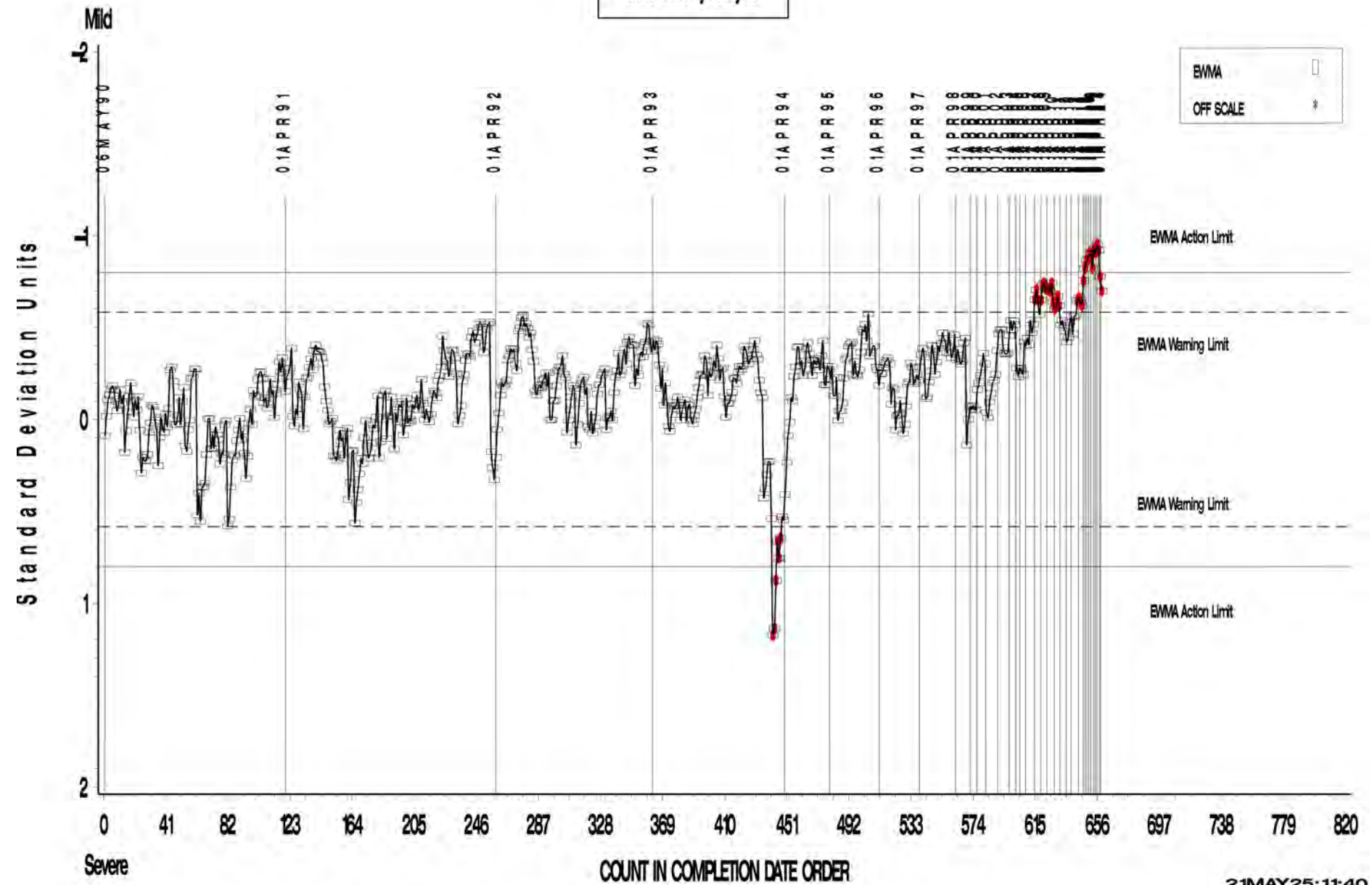
1 K Test Severity

- ▶ BSOC and TGF in severity warning alarm mild direction
- ▶ ETOC, TLHC, WDK are in control



FINAL BSOC

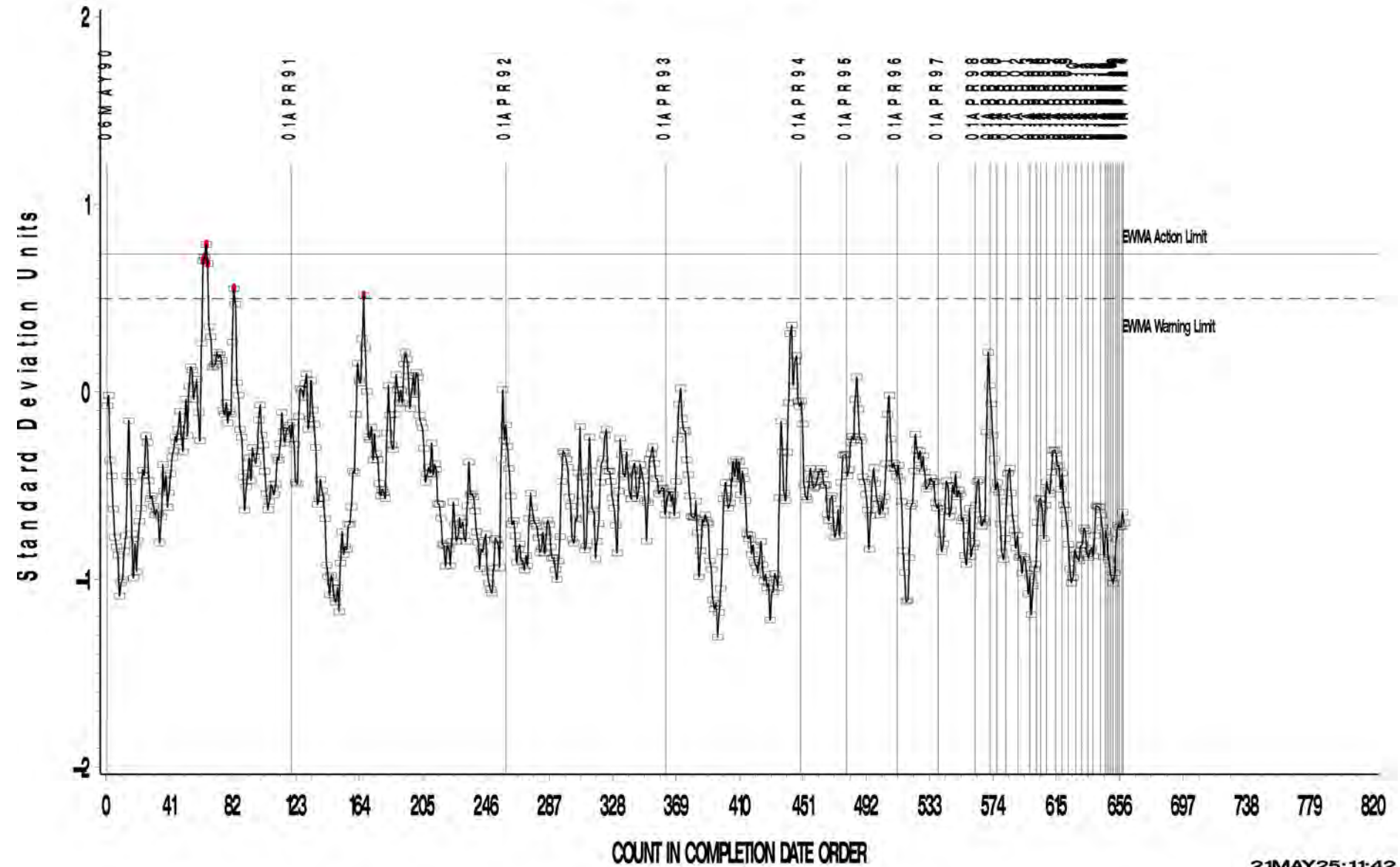
LTMS Severity Analysis





FINAL BSOC

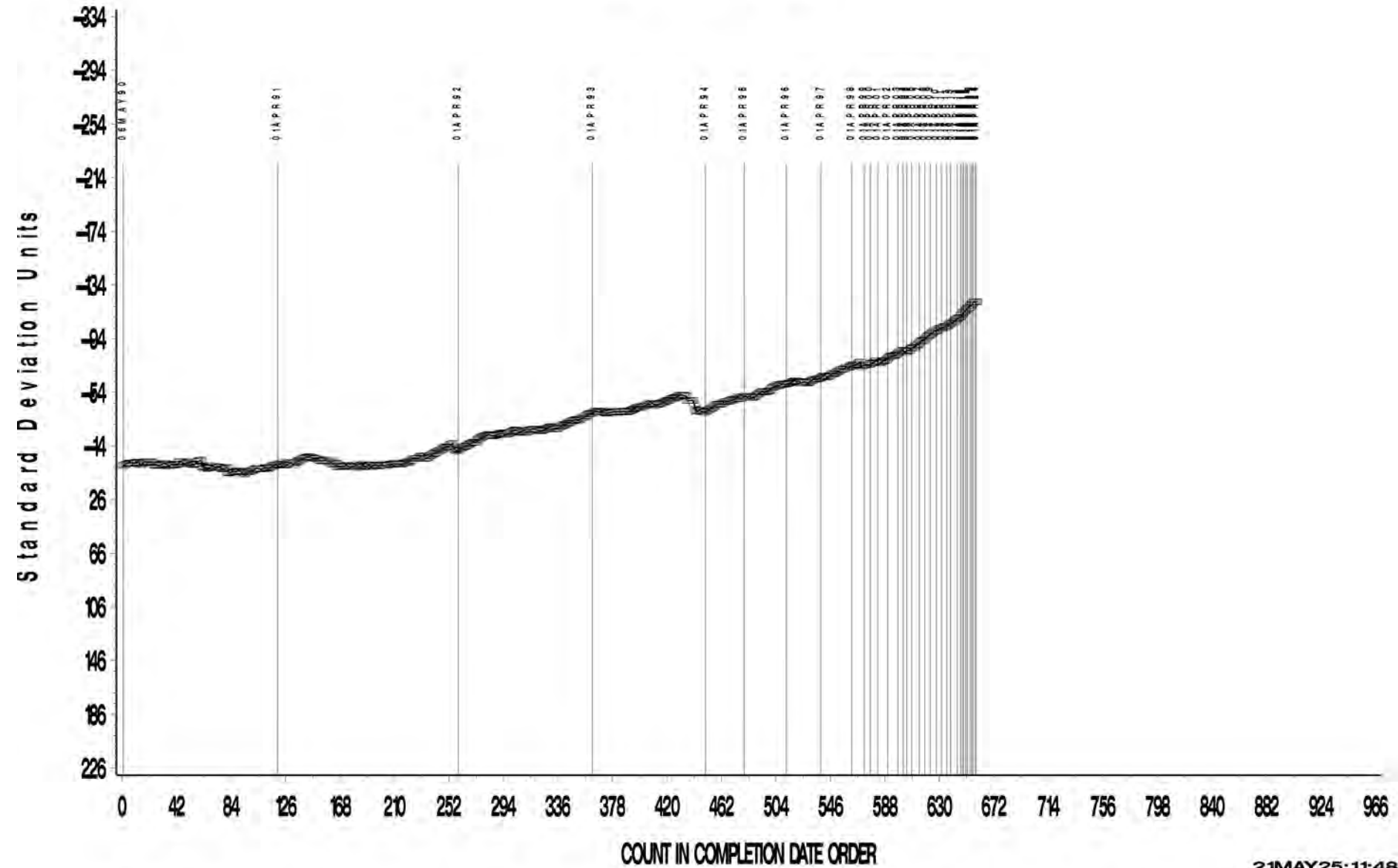
LTMS Precision Analysis





FINAL BSOC

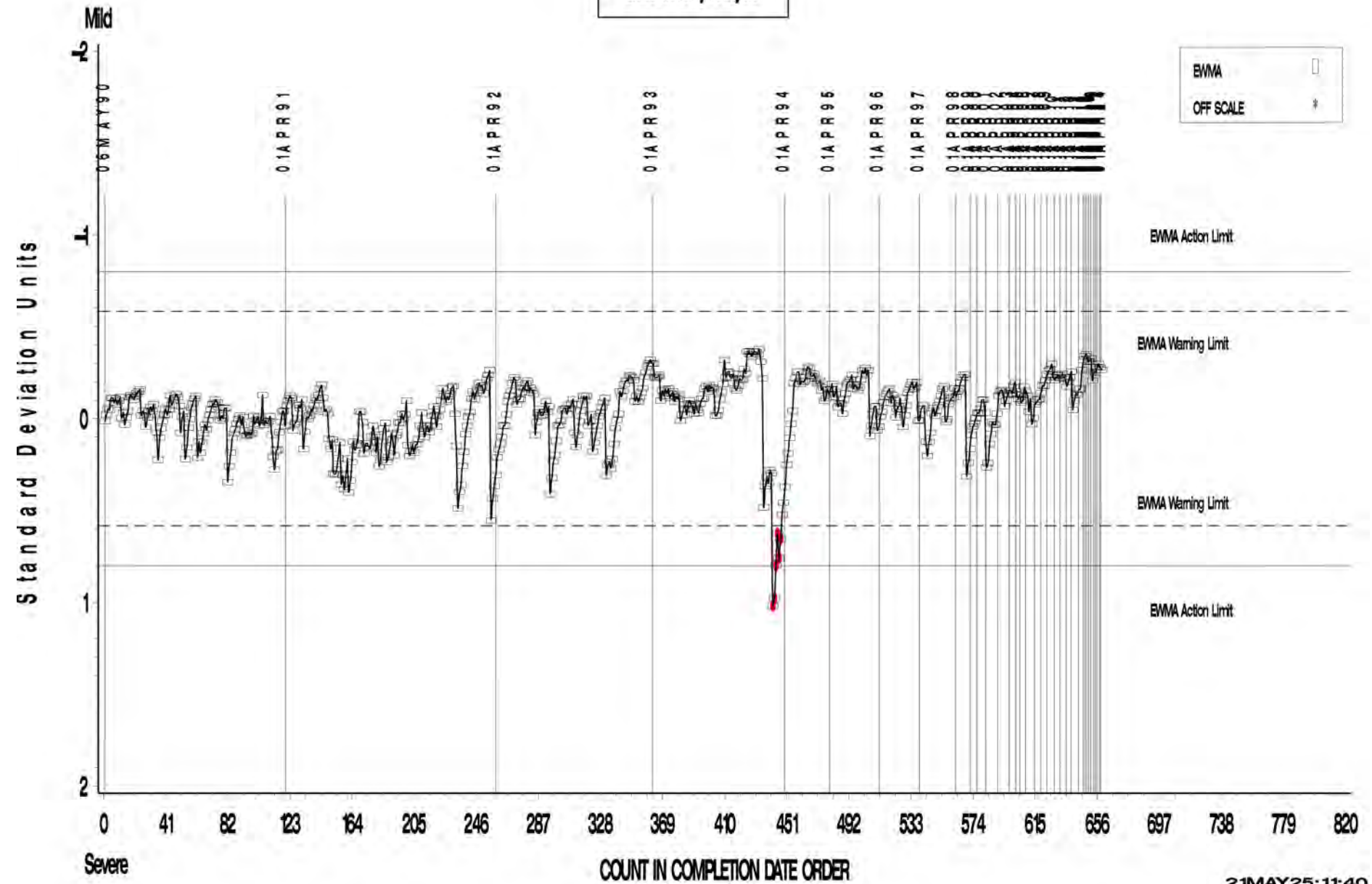
CUSUM Severity Analysis





FINAL EOTOC

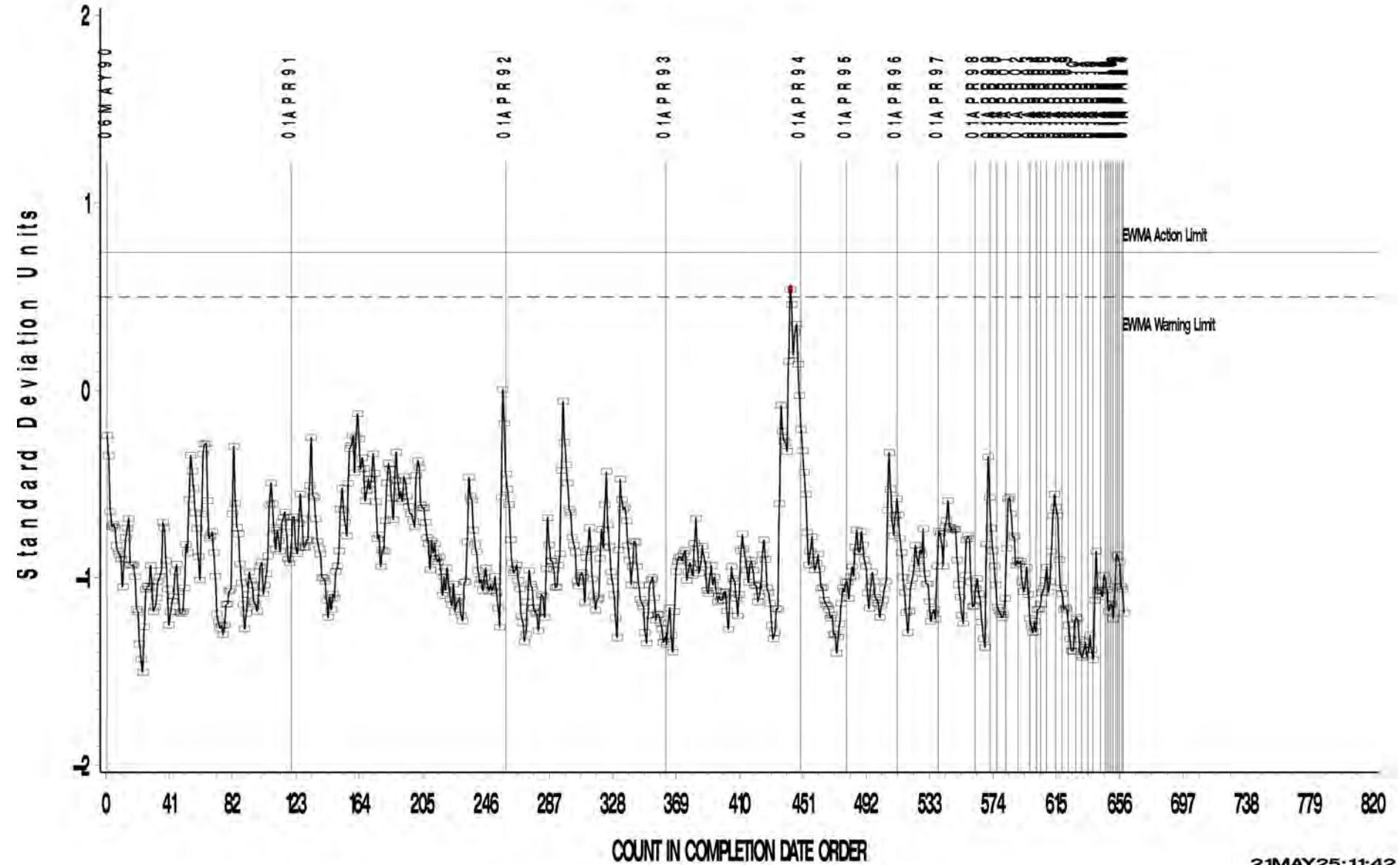
LTMS Severity Analysis





FINAL EOTOC

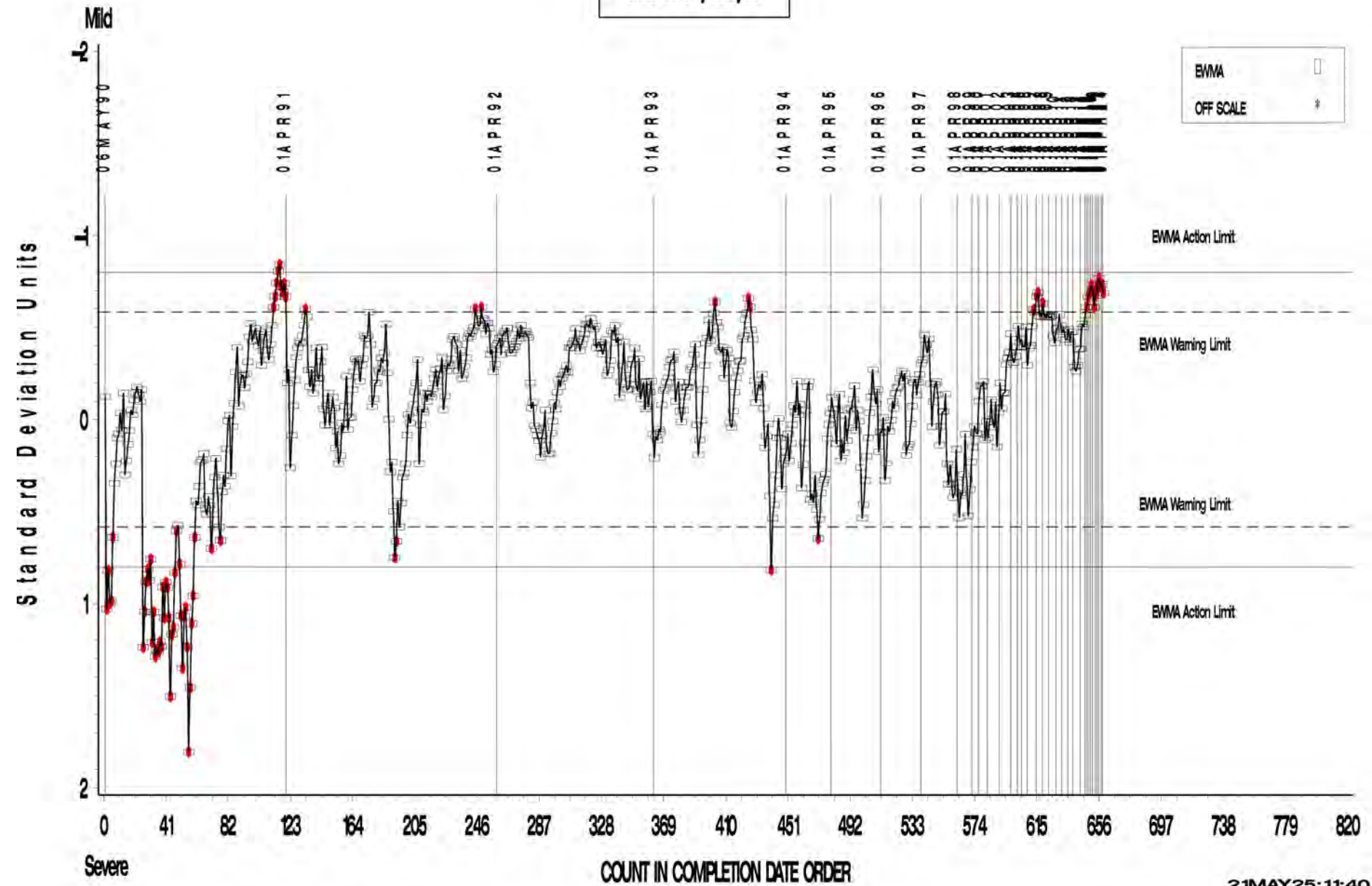
LTMS Precision Analysis





FINAL TGF

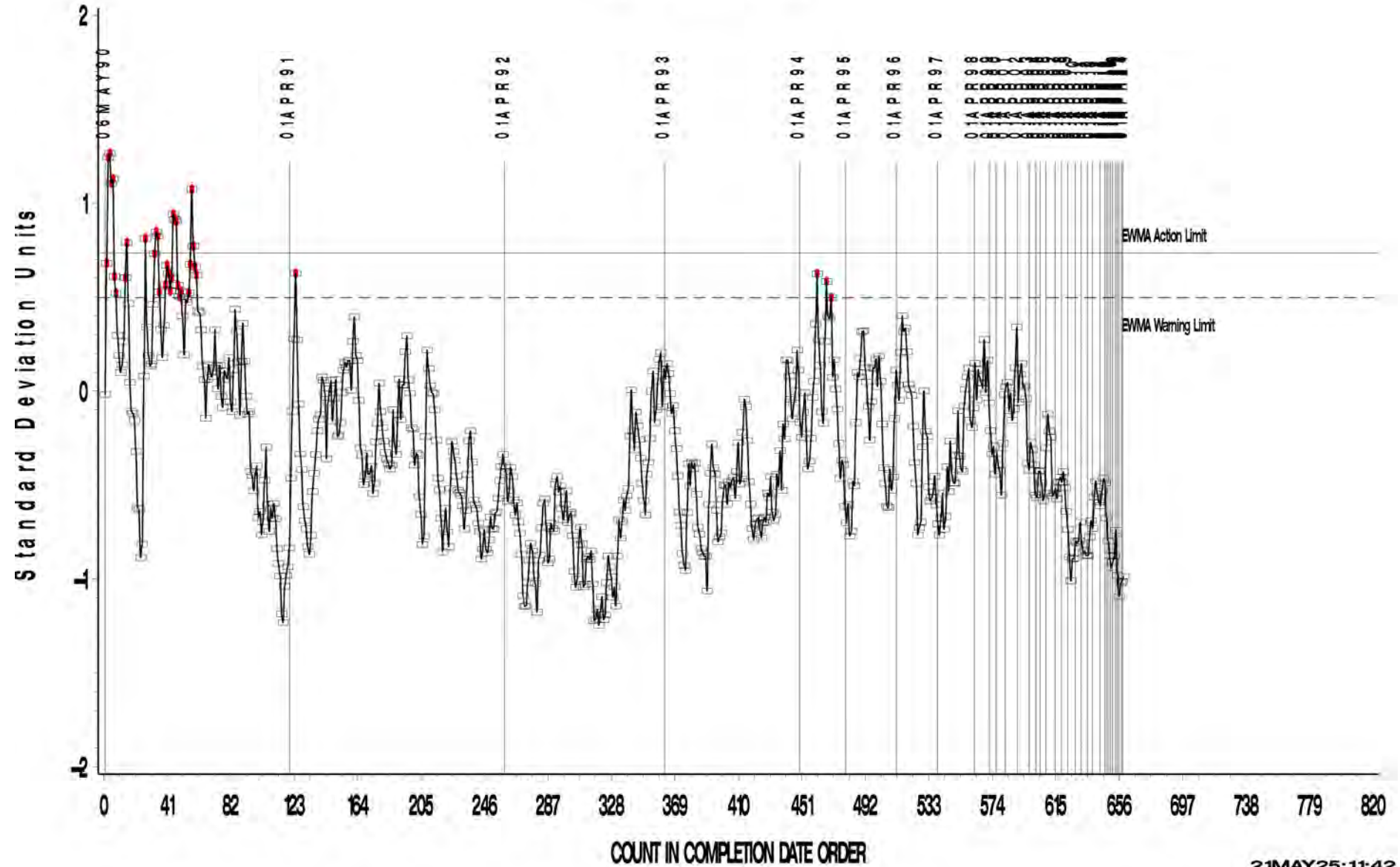
LTMS Severity Analysis





FINAL TGF

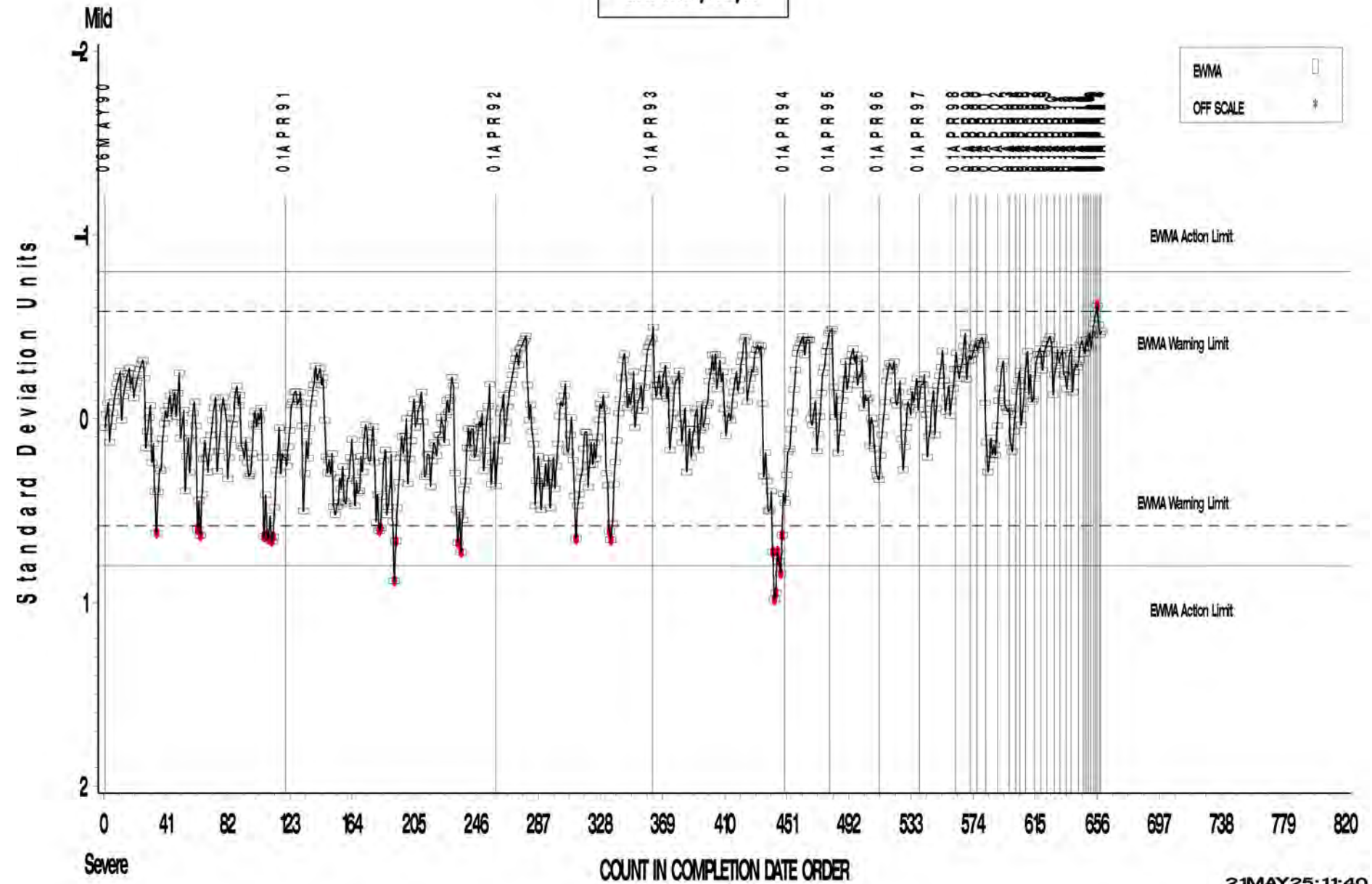
LTMS Precision Analysis





FINAL TLHC

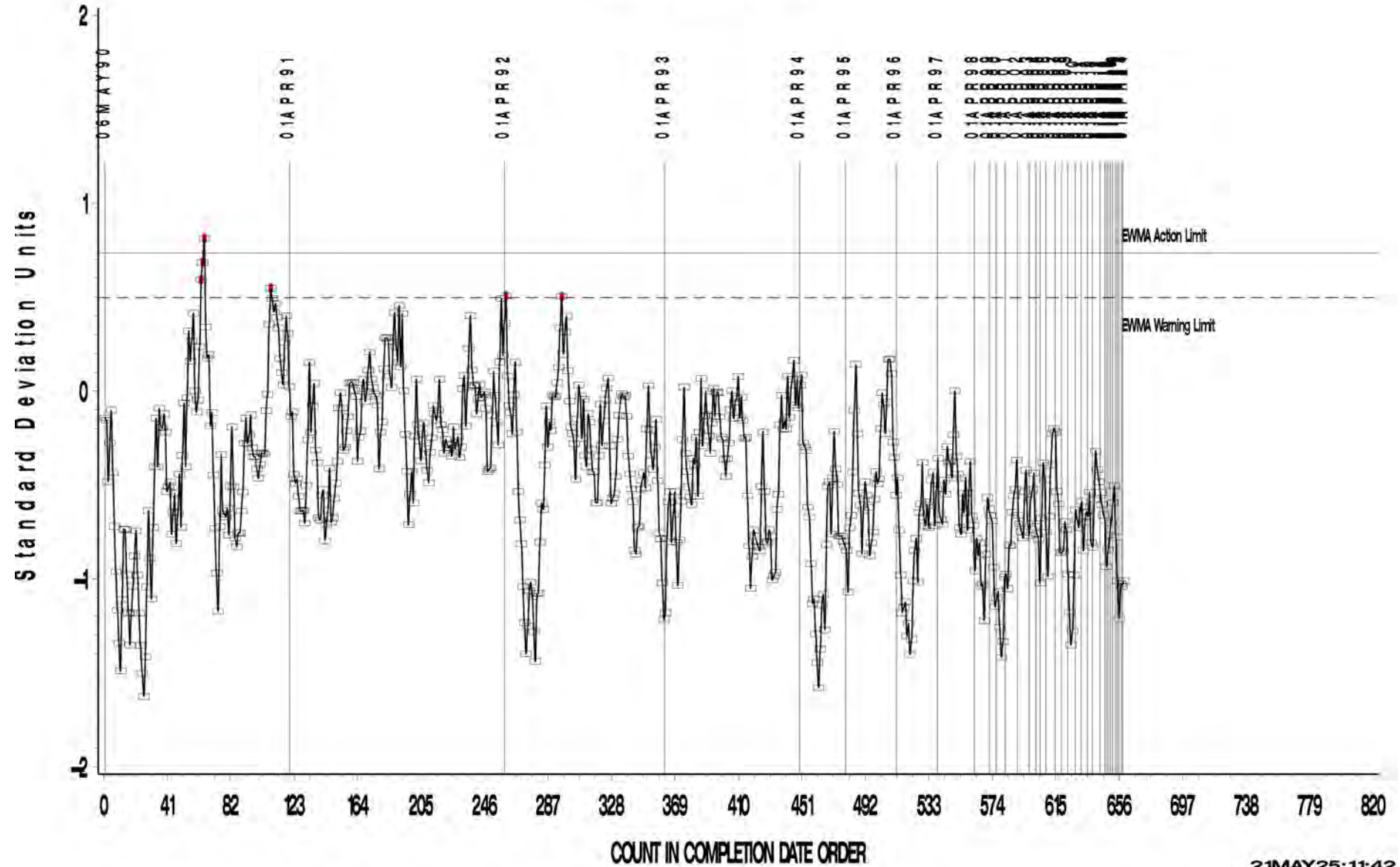
LTMS Severity Analysis





FINAL TLHC

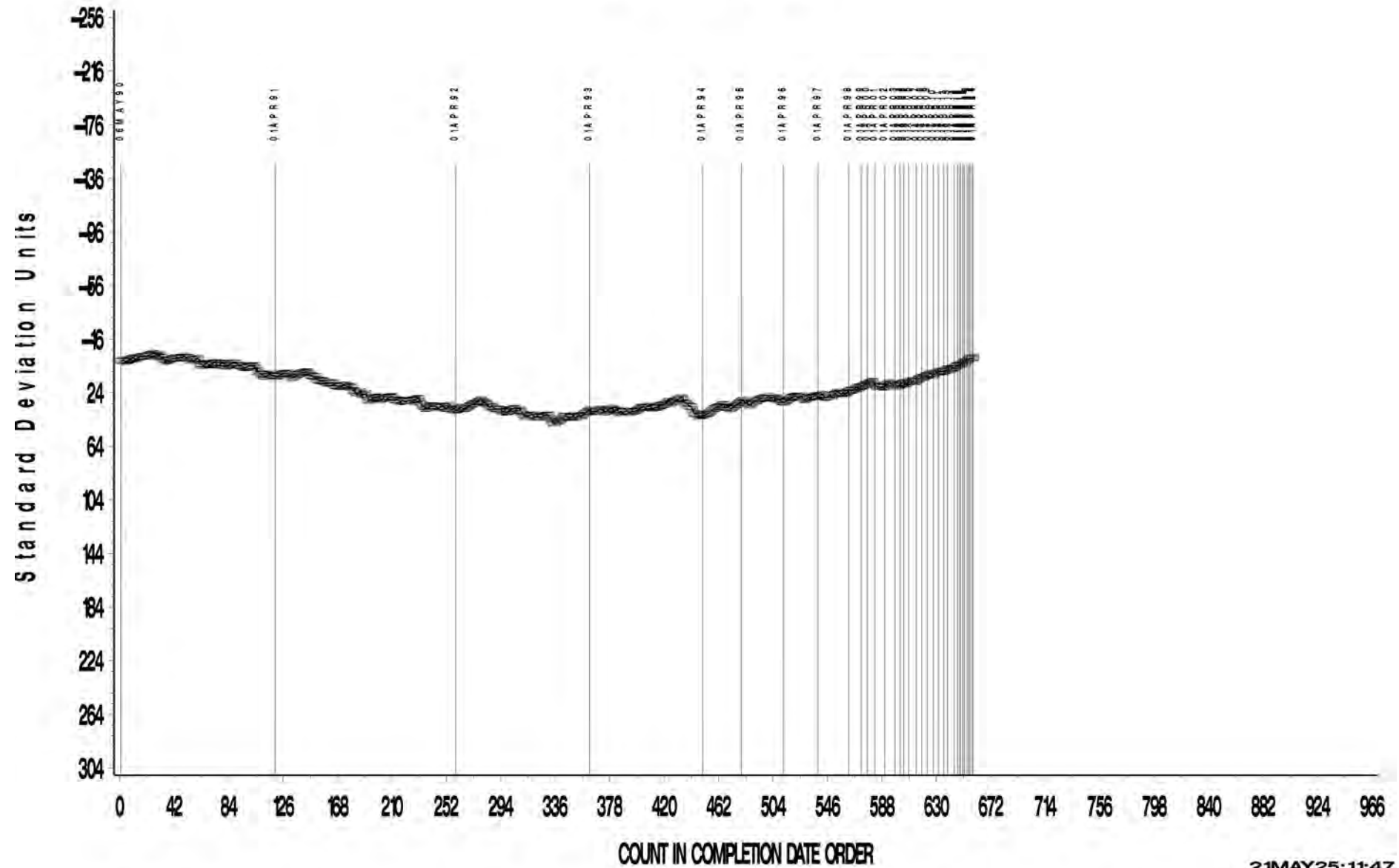
LTMS Precision Analysis





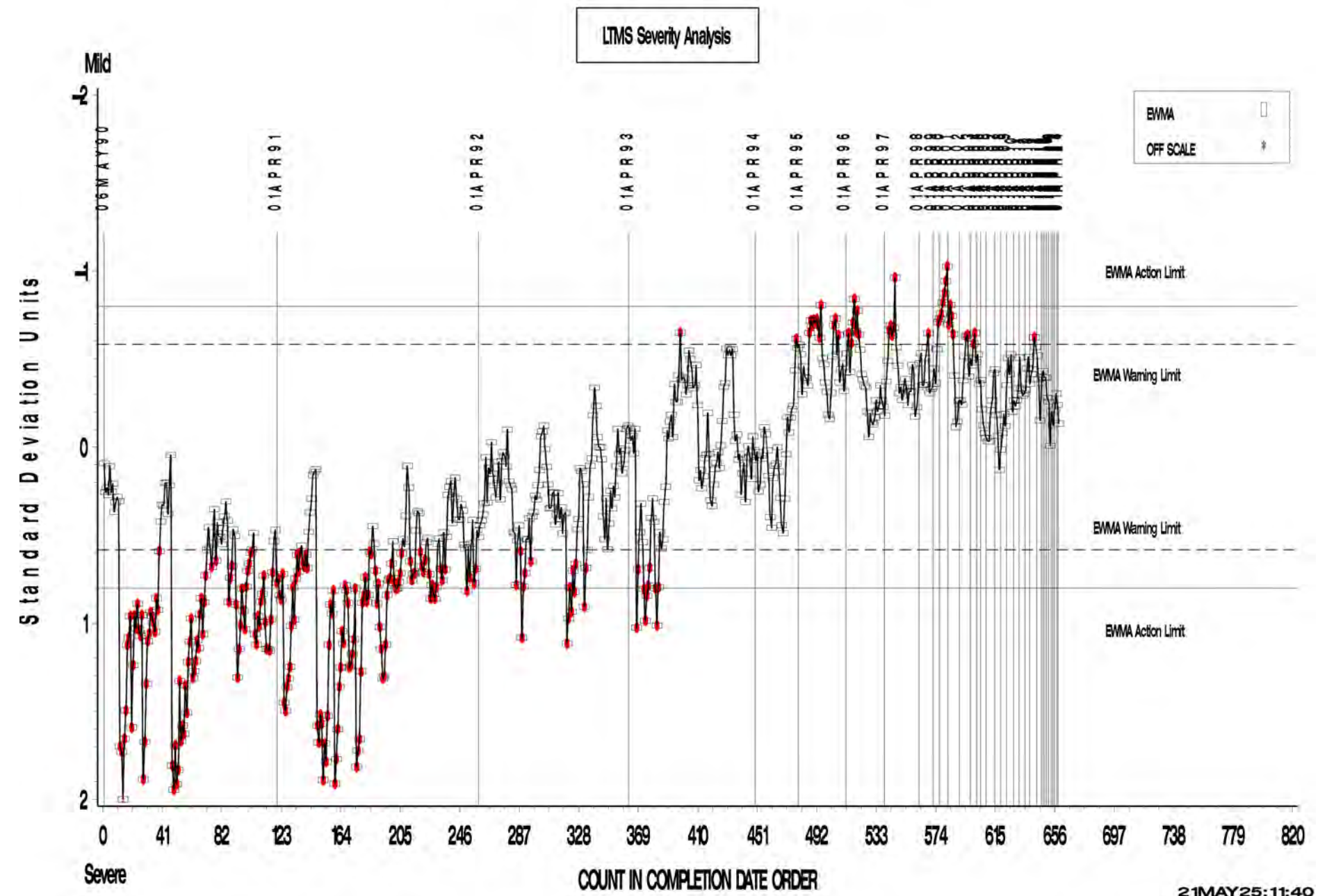
FINAL TLHC

CUSUM Severity Analysis





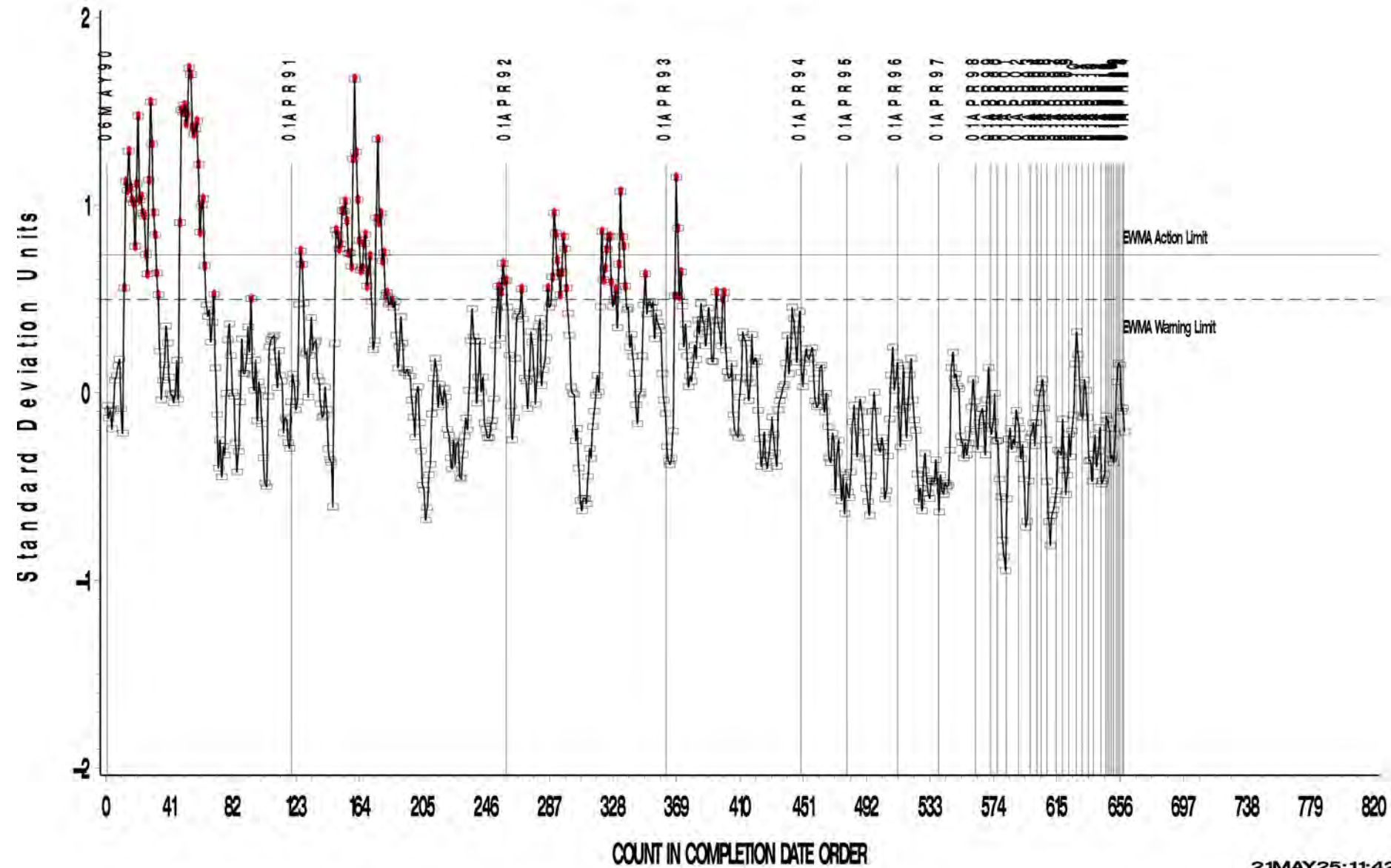
FINAL Weighted Total Demerits



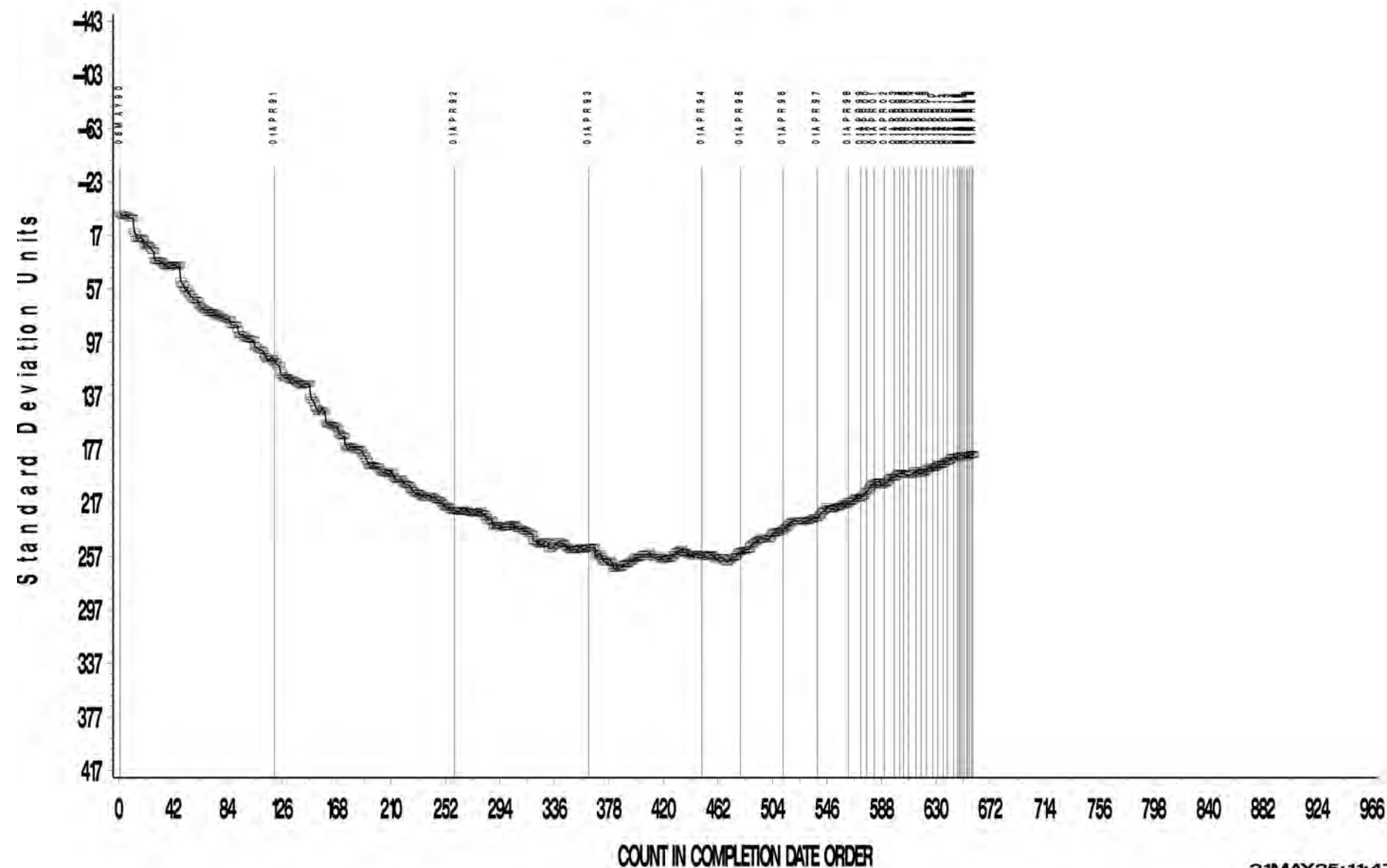


FINAL Weighted Total Demerits

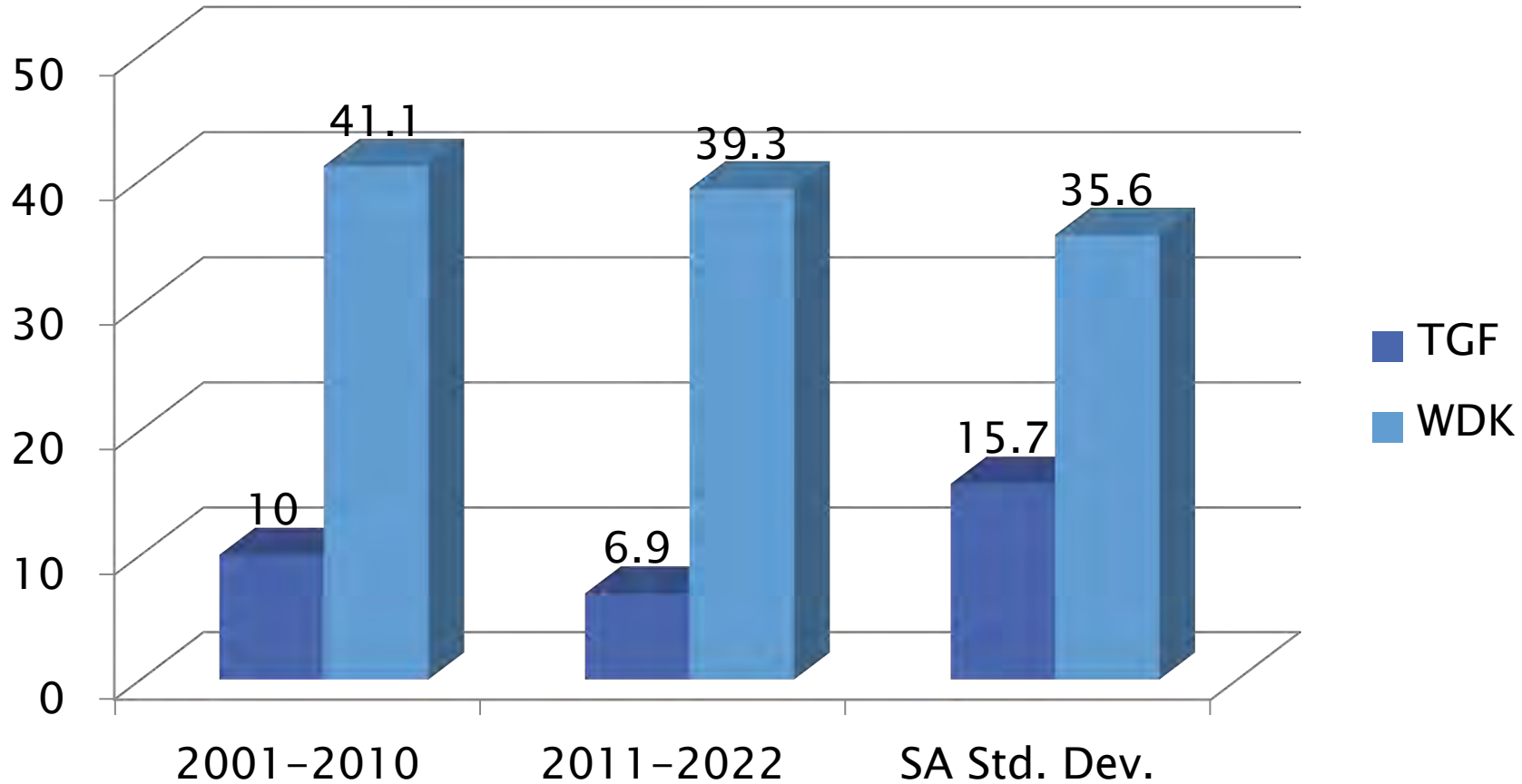
LTMS Precision Analysis



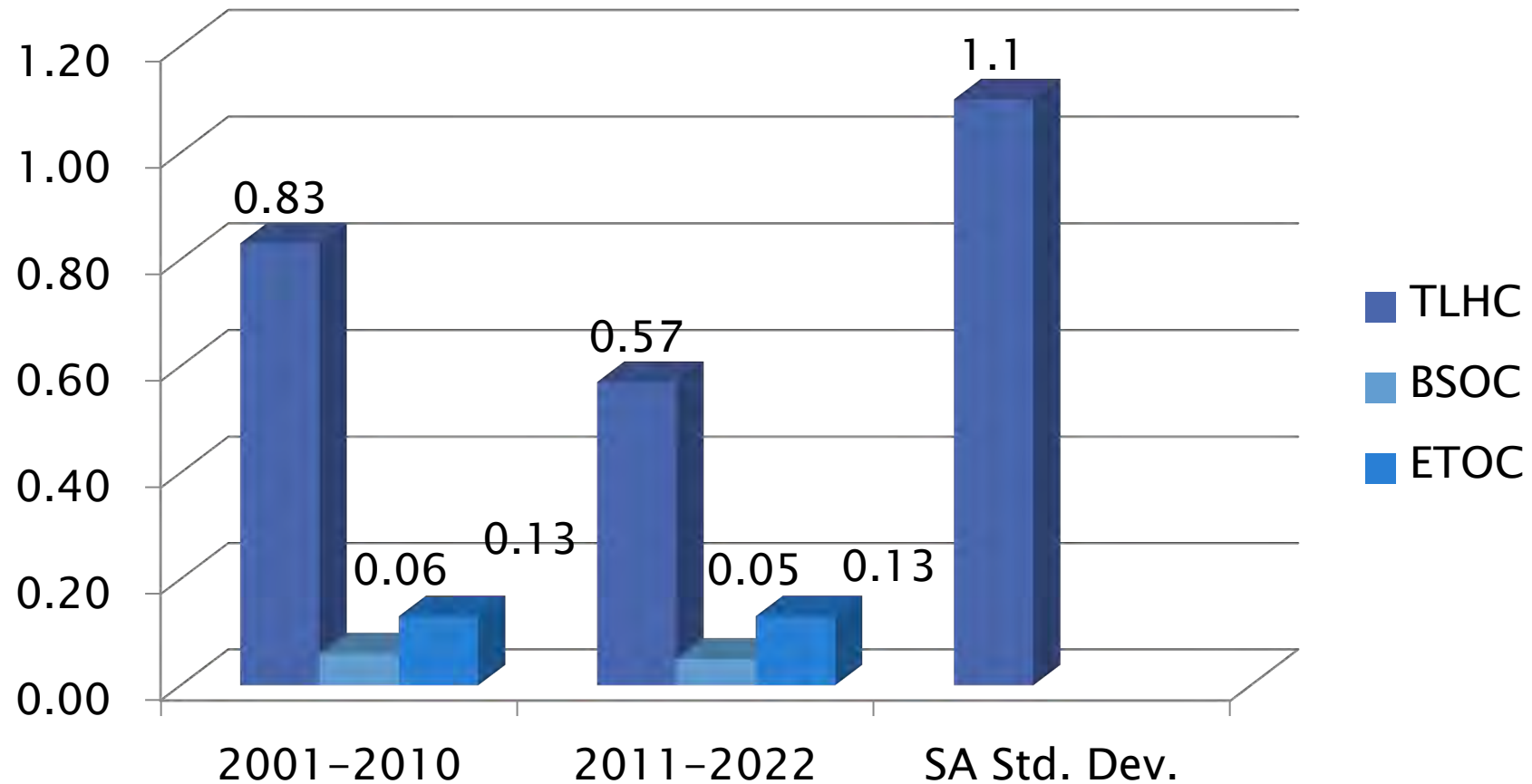
CUSUM Severity Analysis



1 K Precision Estimates



1 K Precision Estimates



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SCOTE 1 N

»» April 2025

1 N Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	1
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Informational	NN	0
Total		1

1 N Failed Tests

Failed Parameter	Number of Tests
No Failed Tests	0
Total	0

1 N Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

*Invalid and aborted tests

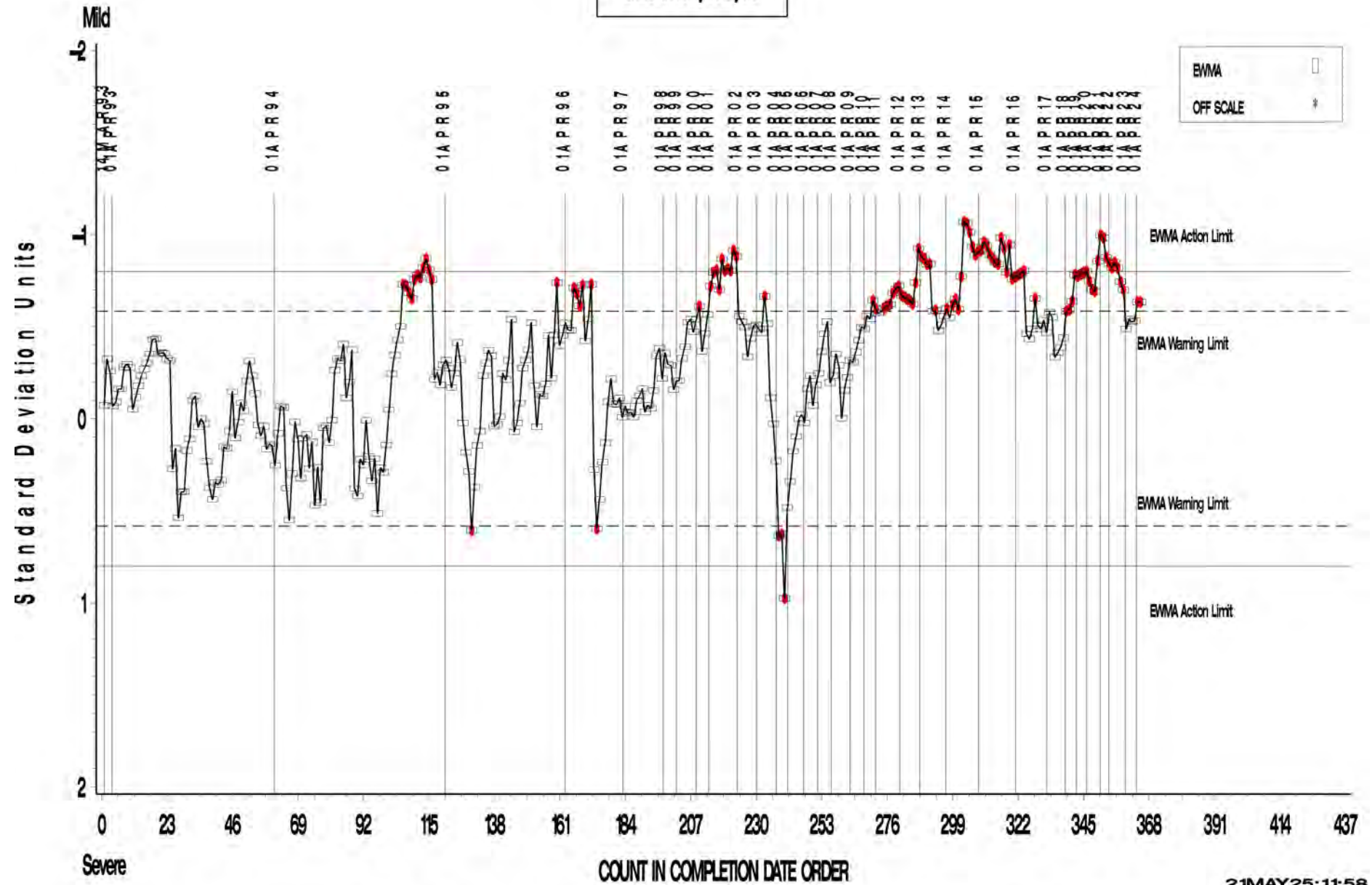
1 N Test Severity

- ▶ TGF is in precision action alarm
- ▶ BSOC in severity warning alarm in the mild direction
- ▶ All other parameters are in control



BSOC

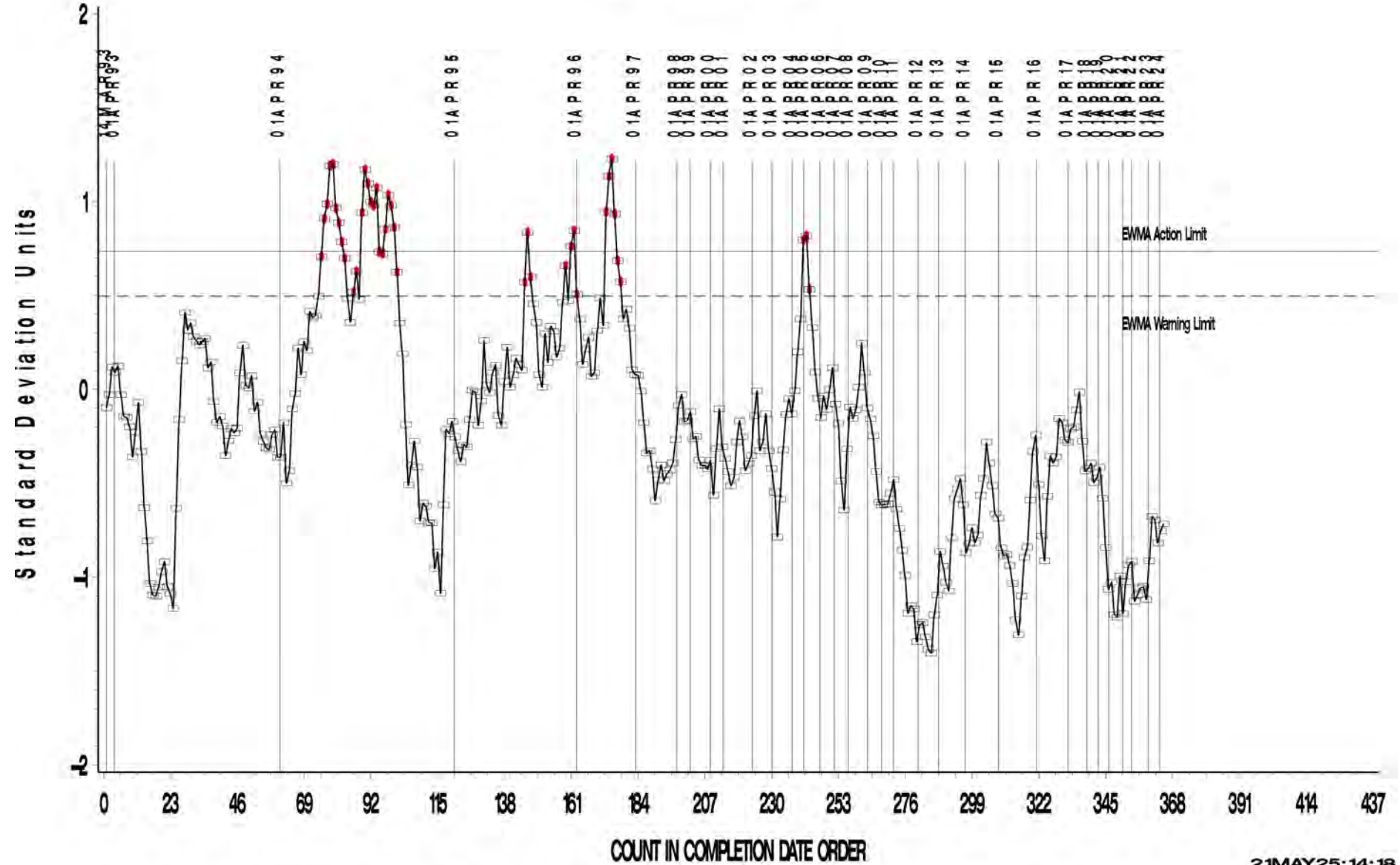
LTMS Severity Analysis





BSOC

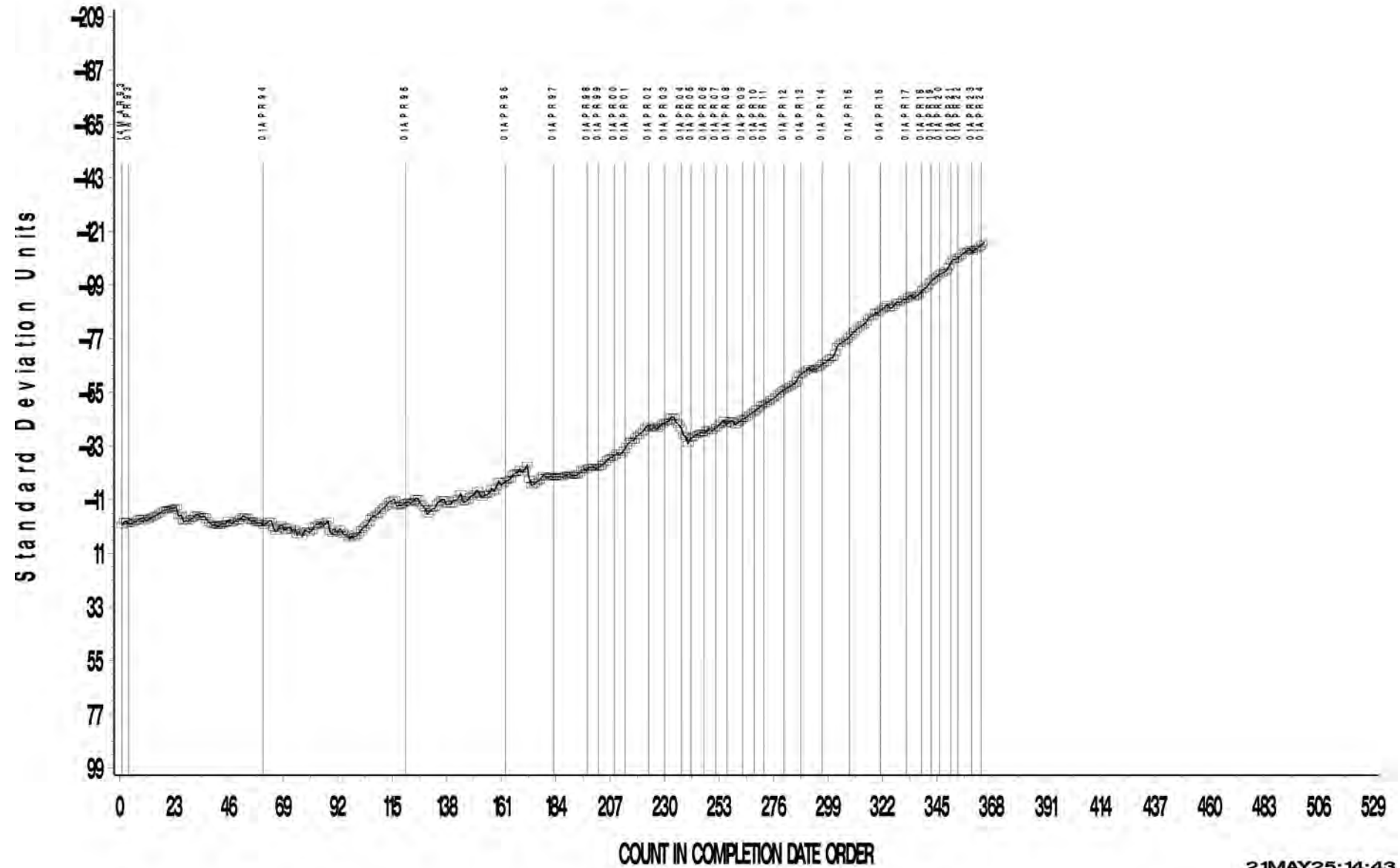
LTMS Precision Analysis





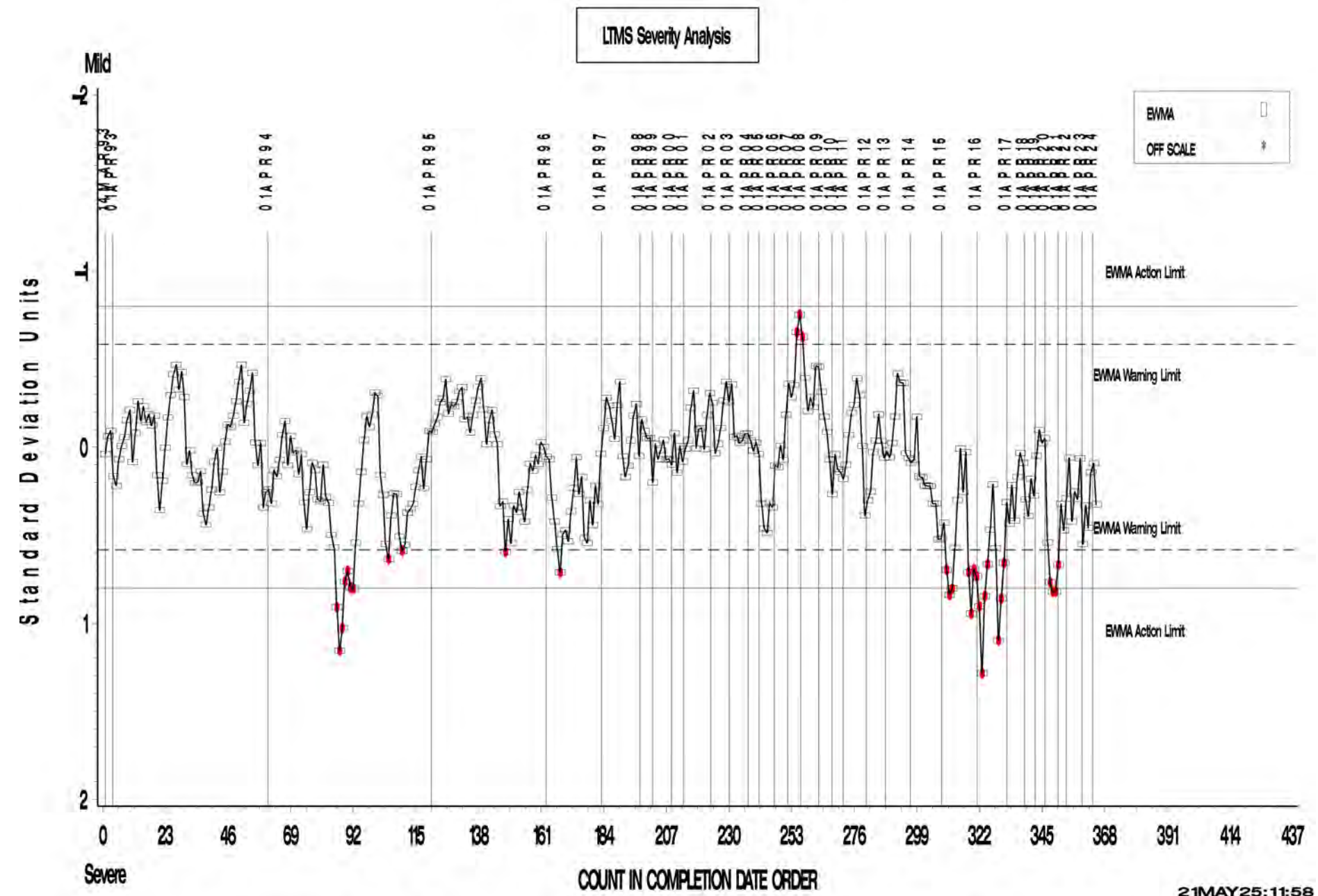
BSOC

CUSUM Severity Analysis





FINAL CORRECTED TGF



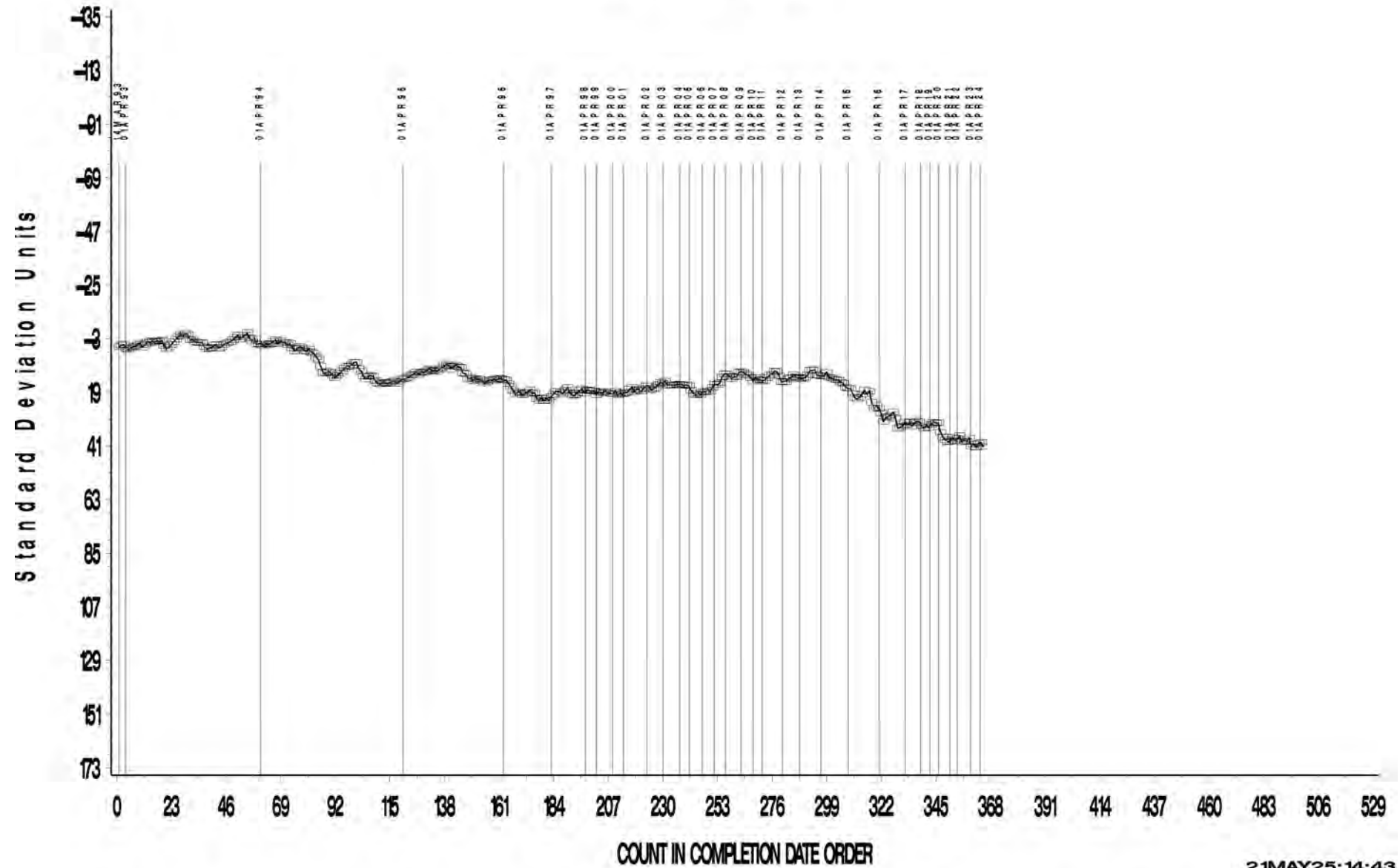
LTMS Precision Analysis





FINAL CORRECTED TGF

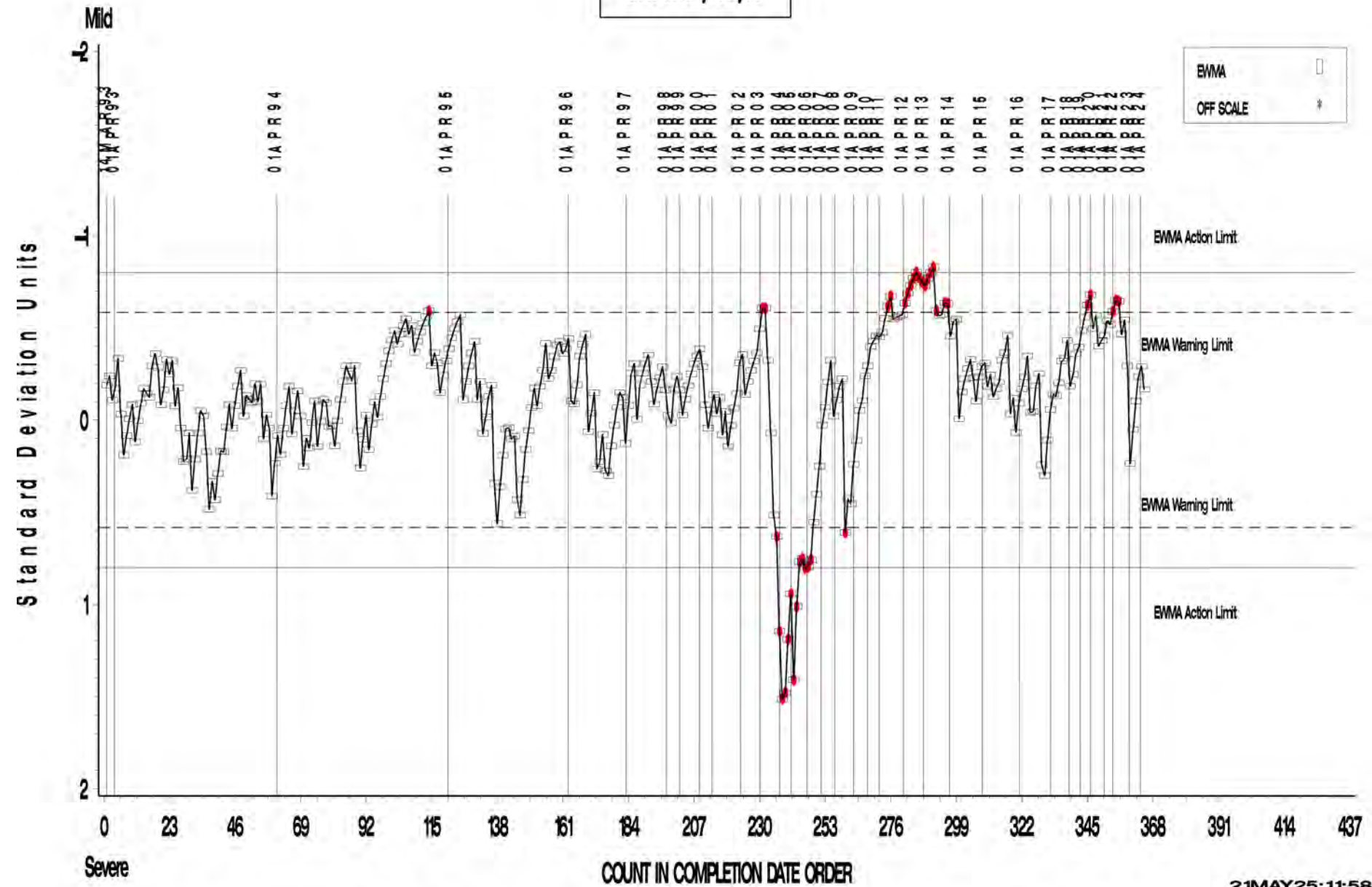
CUSUM Severity Analysis





Top Land Heavy Carbon

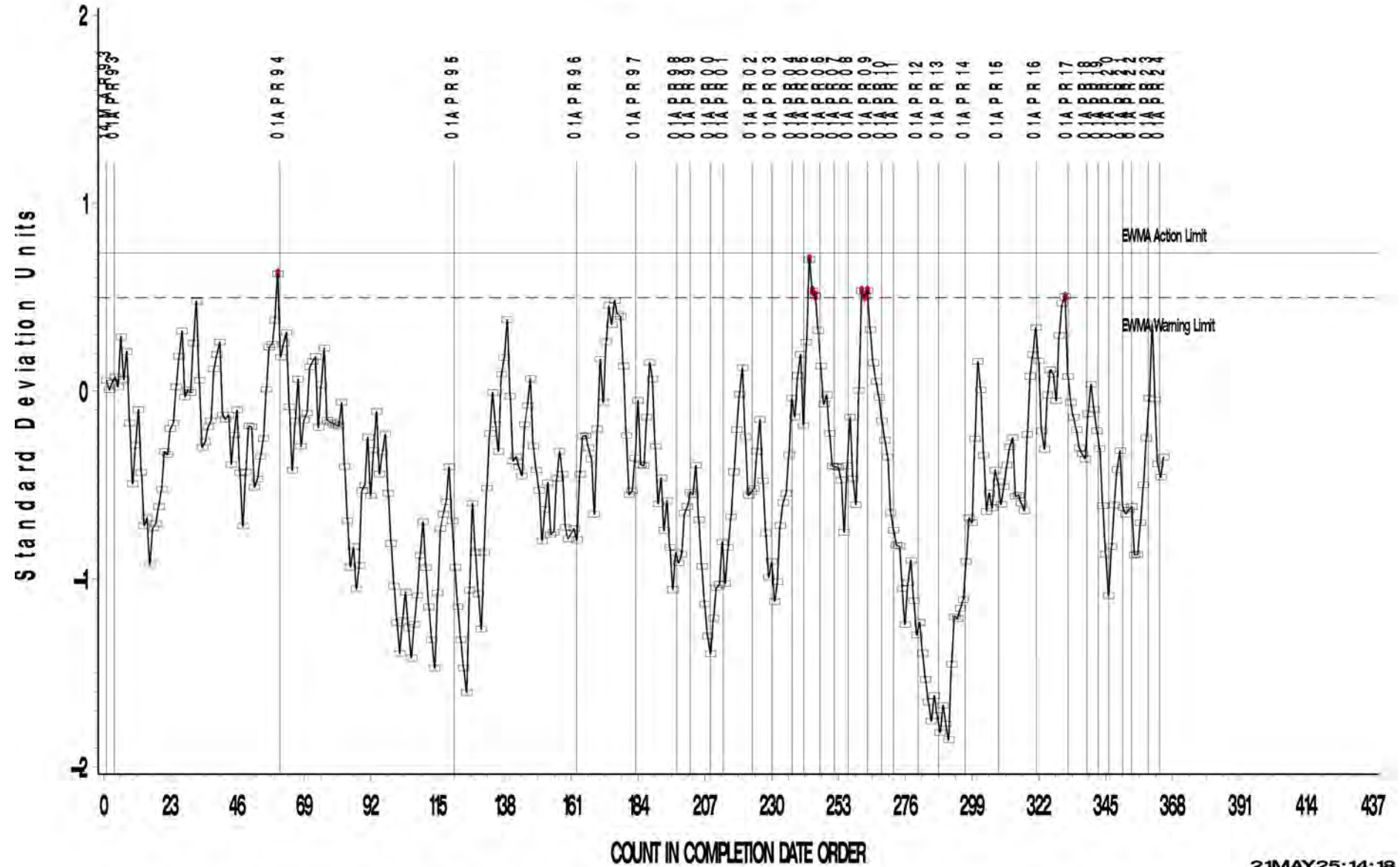
LTMS Severity Analysis





Top Land Heavy Carbon

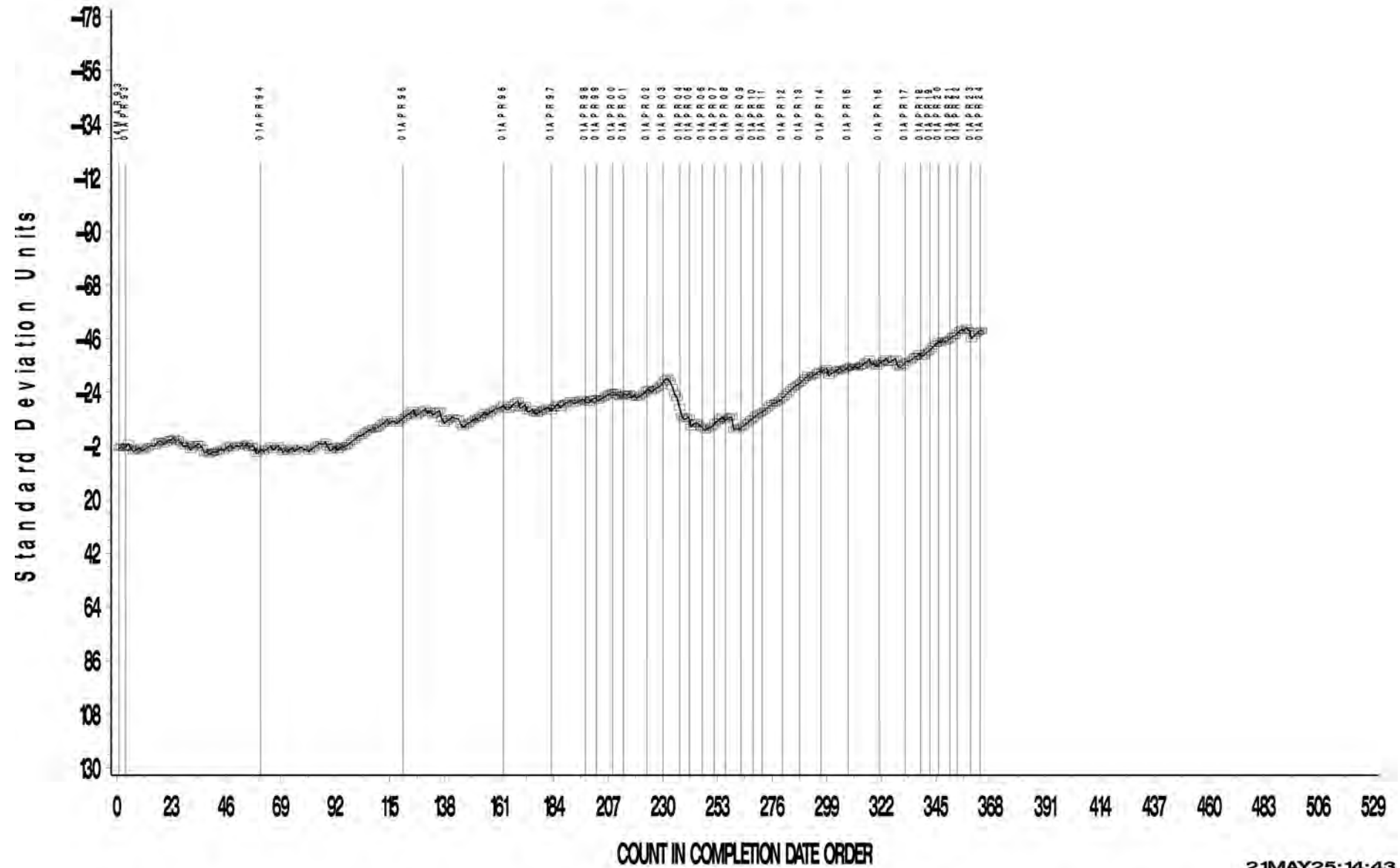
LTMS Precision Analysis





Top Land Heavy Carbon

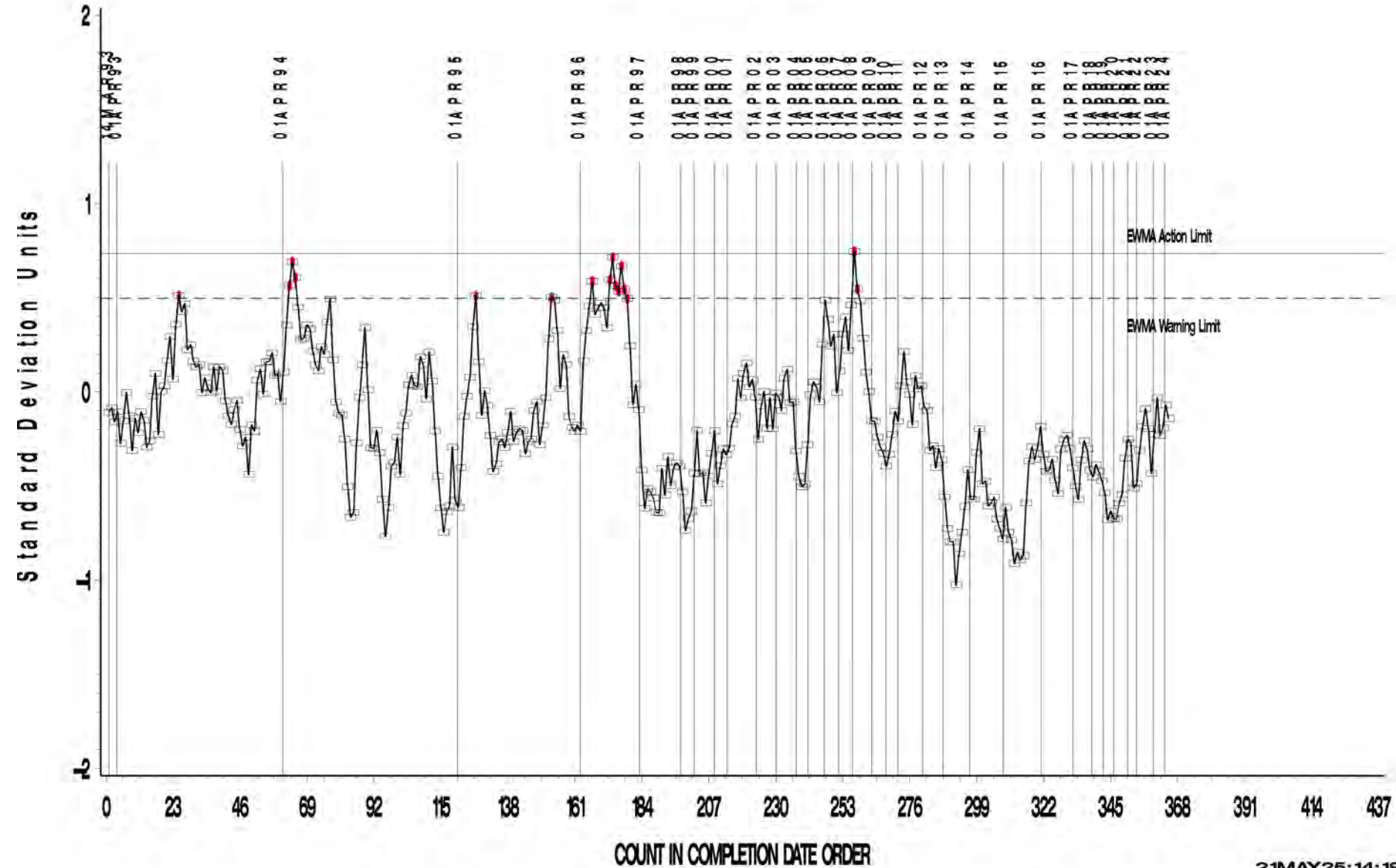
CUSUM Severity Analysis





Weighted Total Demerits

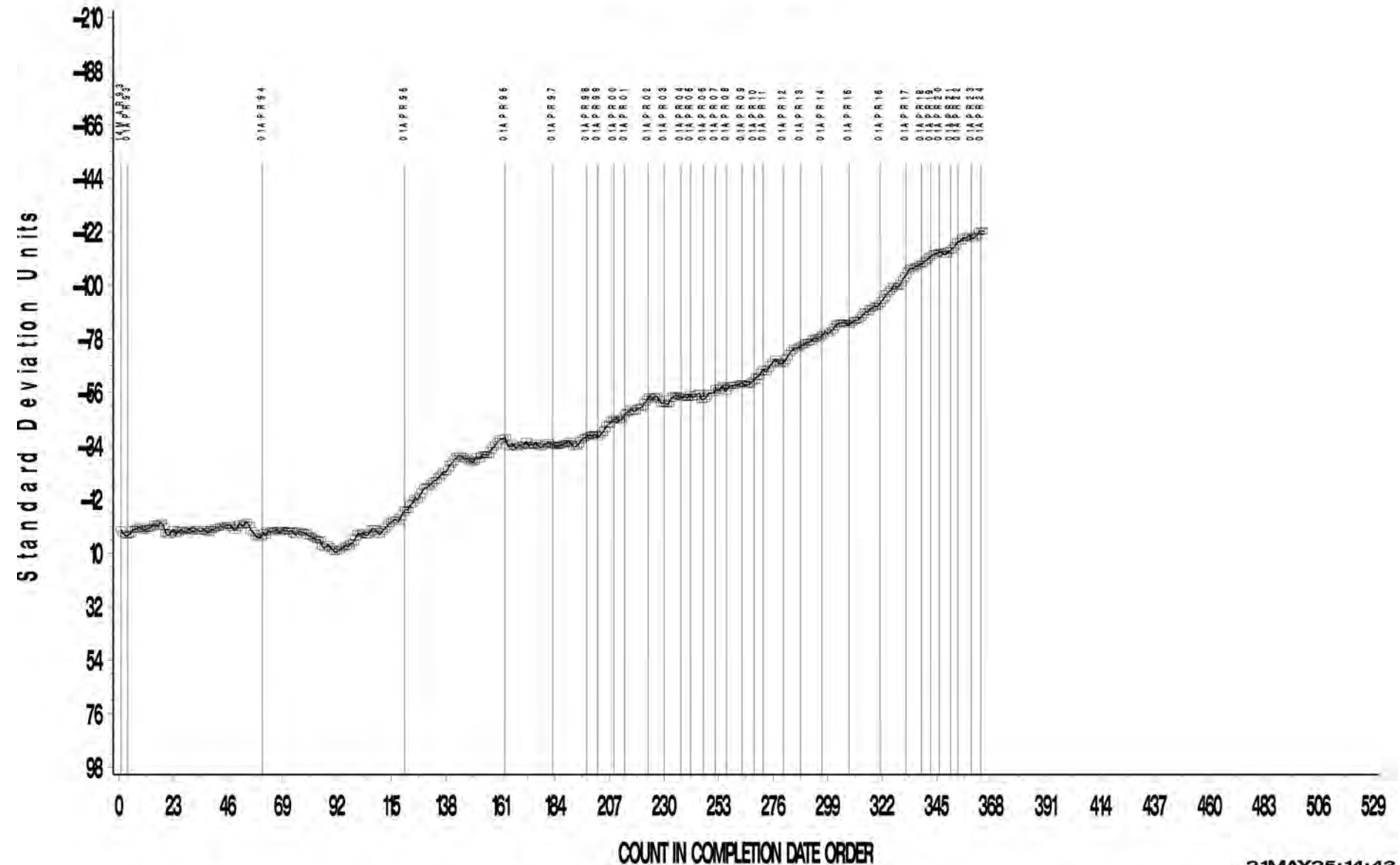
LTMS Precision Analysis



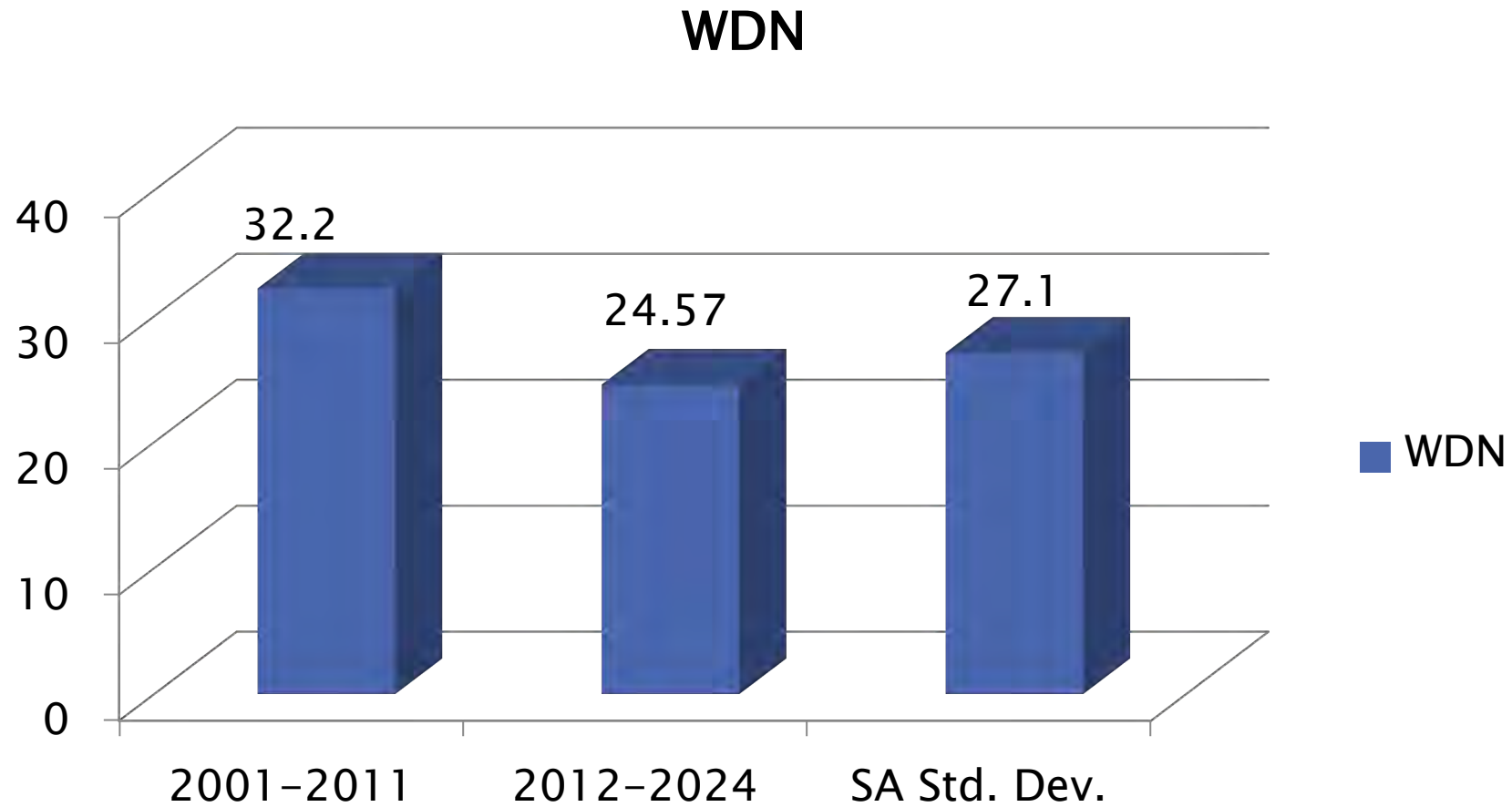


Weighted Total Demerits

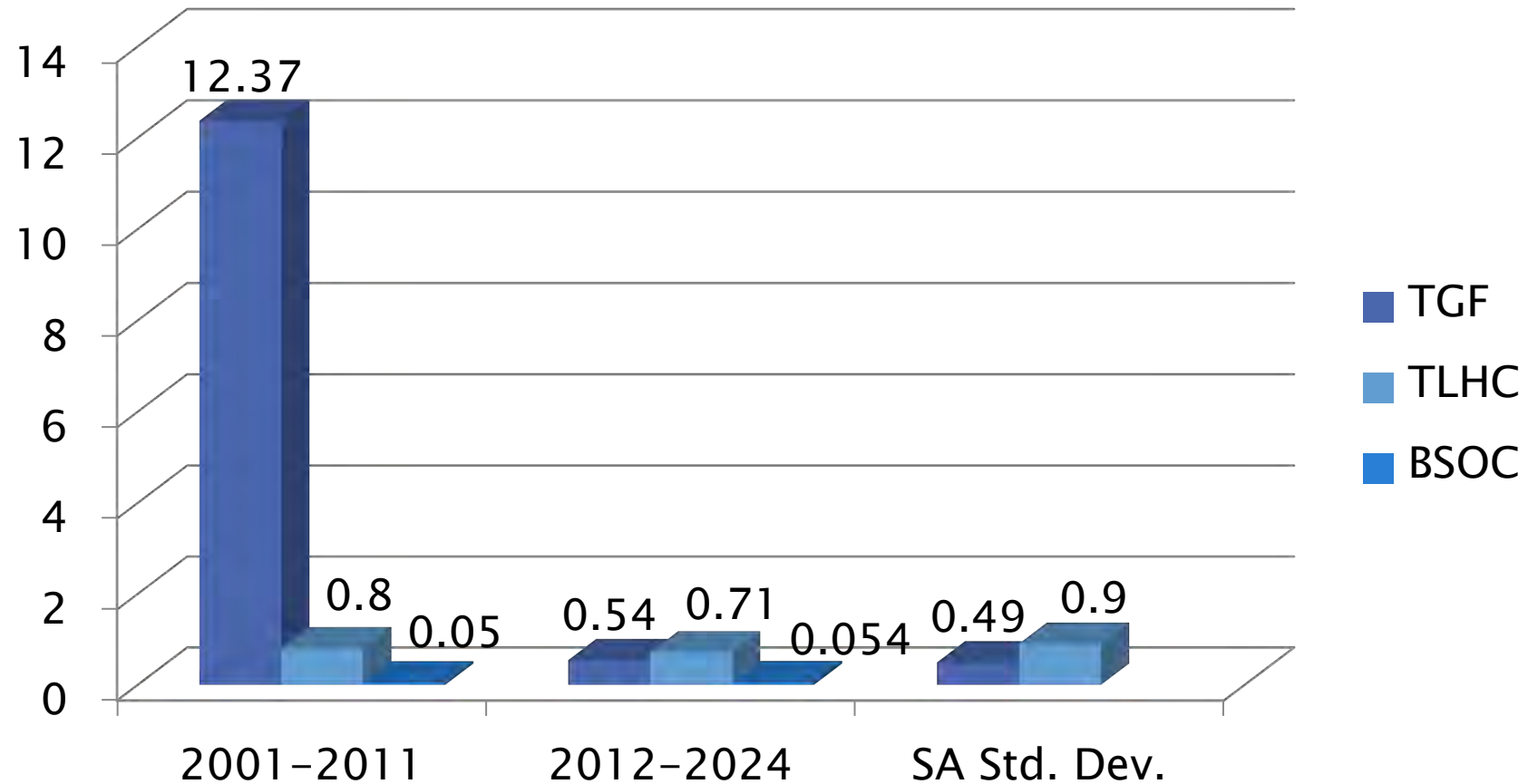
CUSUM Severity Analysis



1 N Precision Estimates



1 N Precision Estimates



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SCOTE 1 P

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1 P Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	1
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		1

1 P Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

1 P Lost Tests*

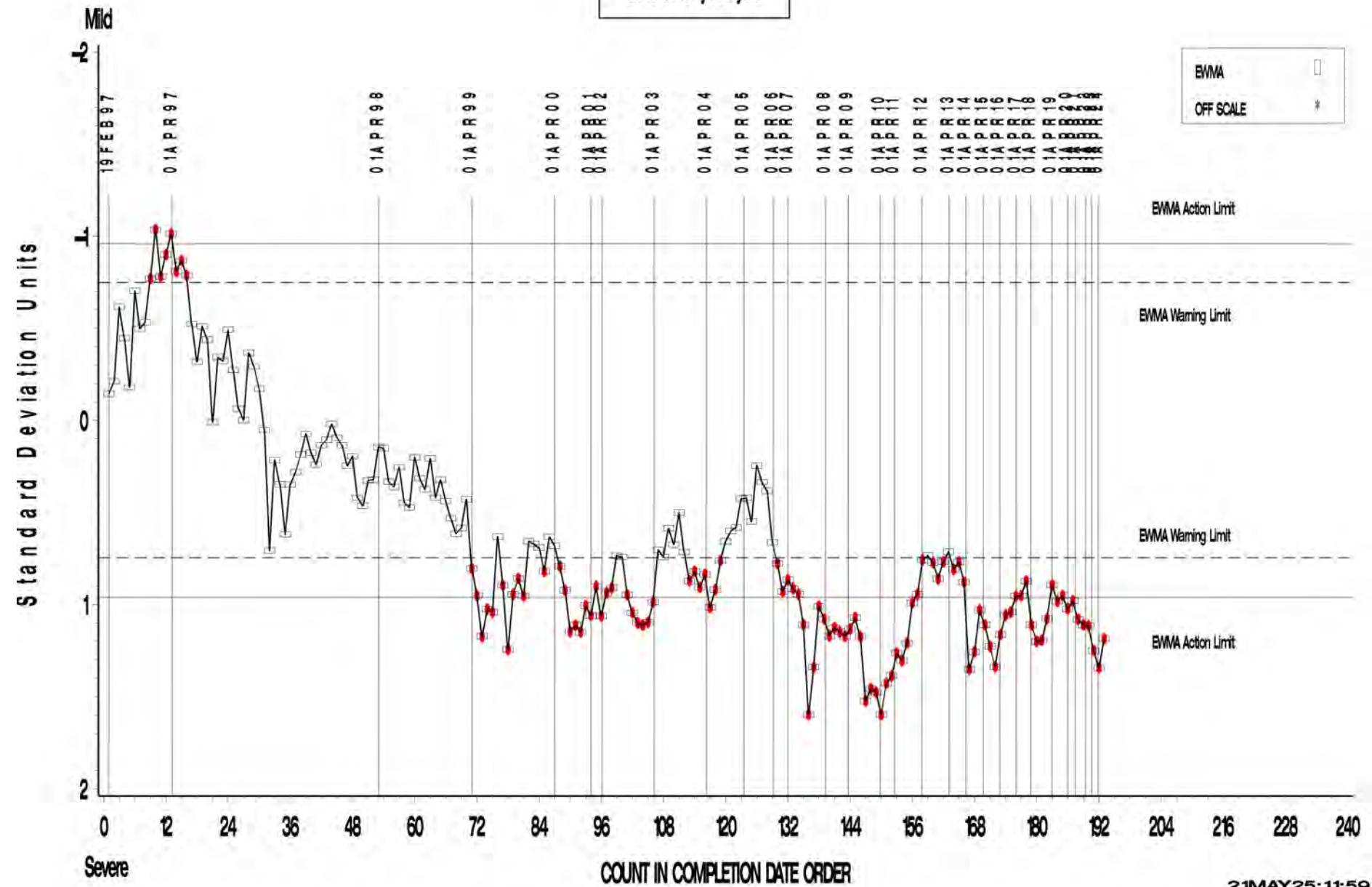
Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

*Invalid and aborted tests

1 P Test Severity

- ▶ TGC, TLC and OC are in control.
- ▶ WD is in severity warning alarm in the severe direction
- ▶ EOTOC is in severity action alarm in the severe direction.

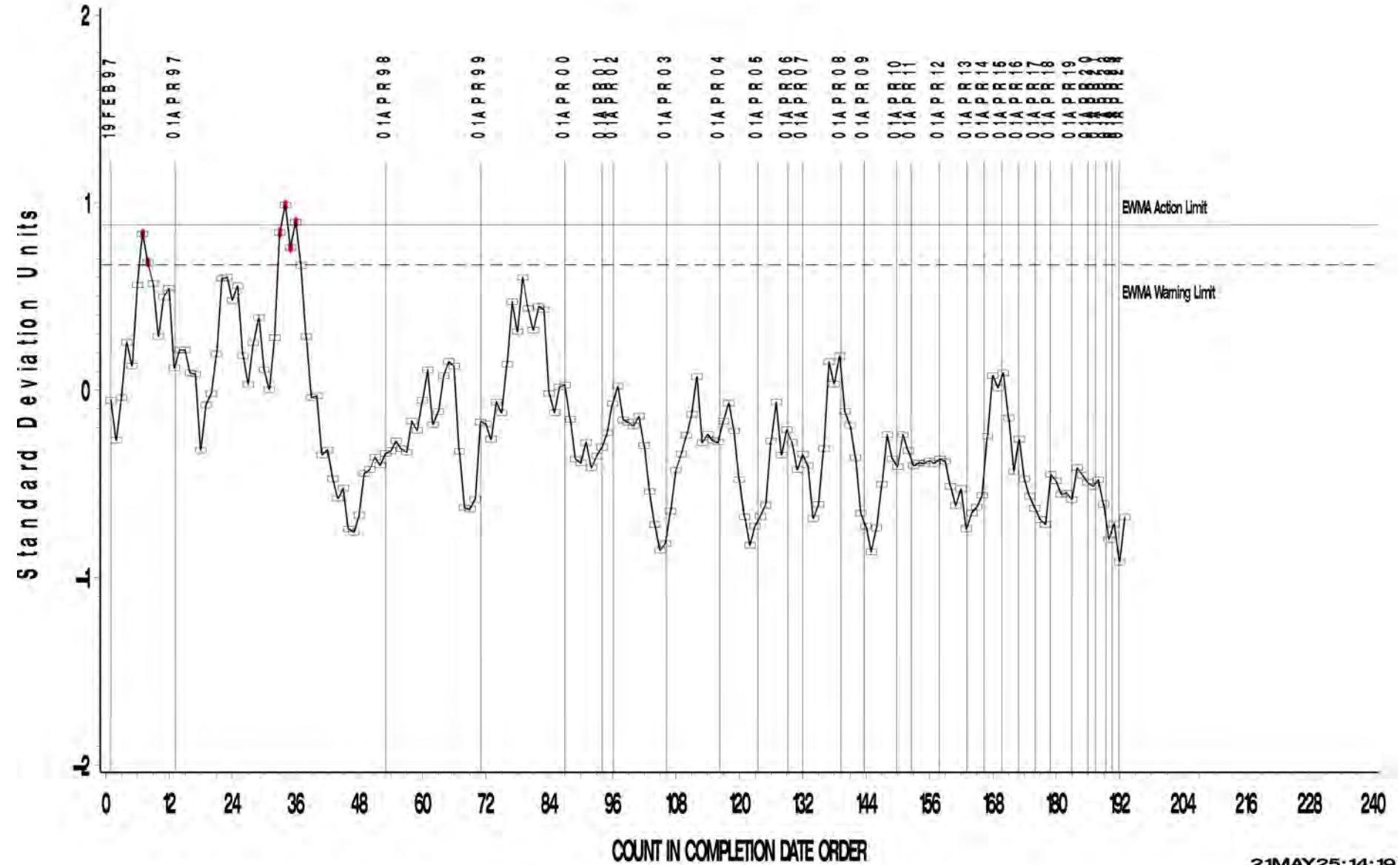
LTMS Severity Analysis





EOTOC

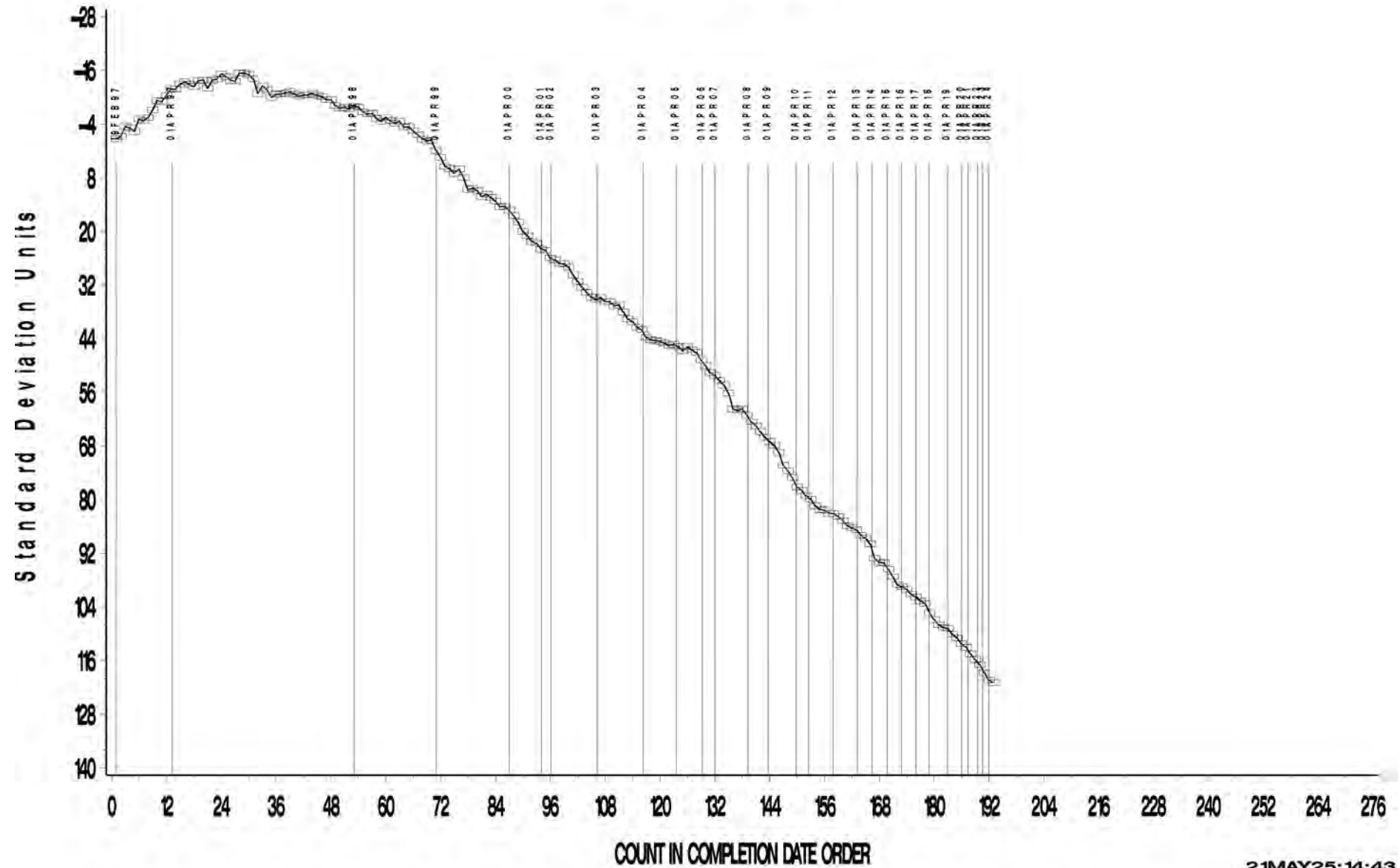
LTMS Precision Analysis





EOTOC

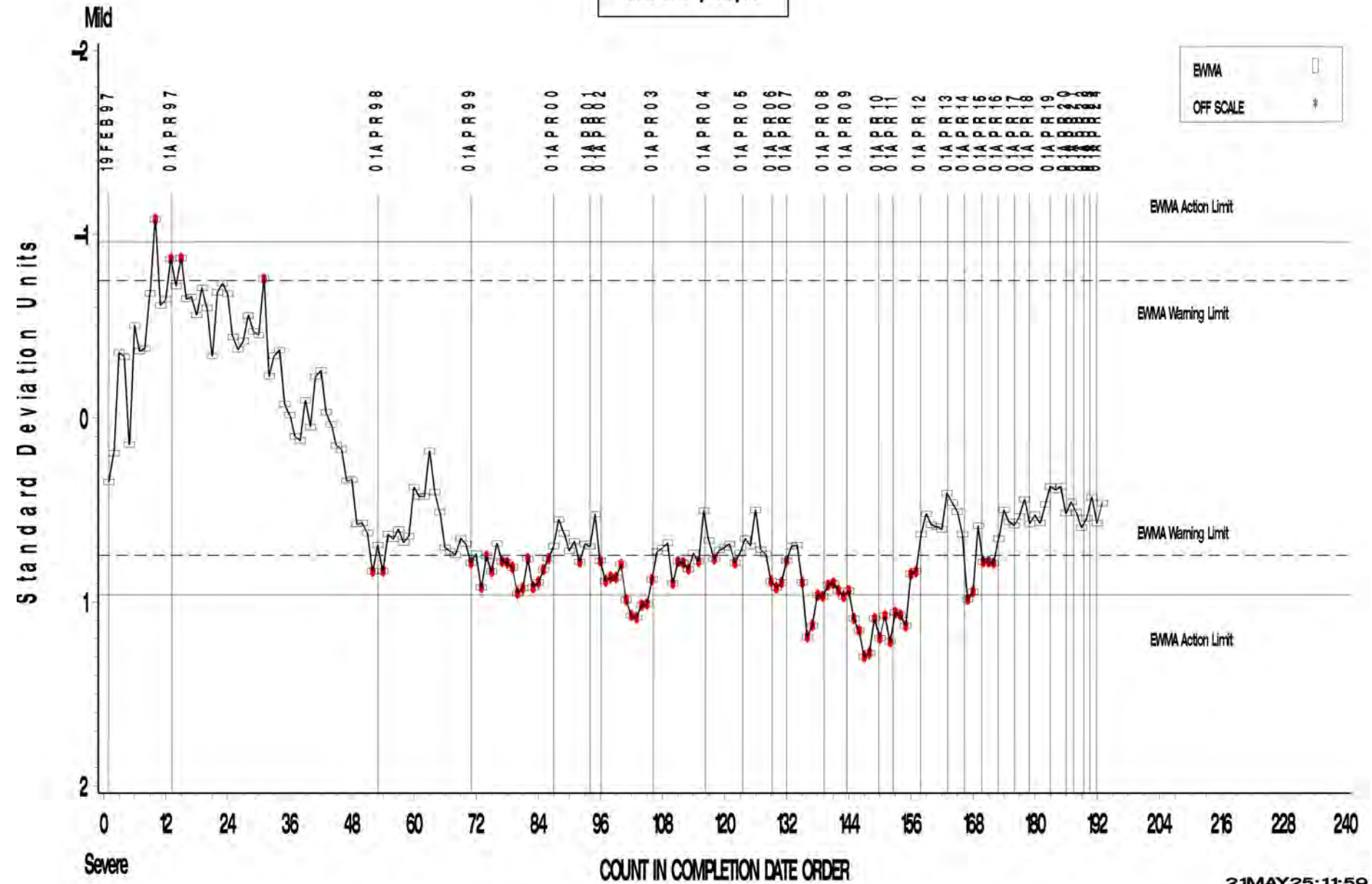
CUSUM Severity Analysis





OIL CONSUMPTION

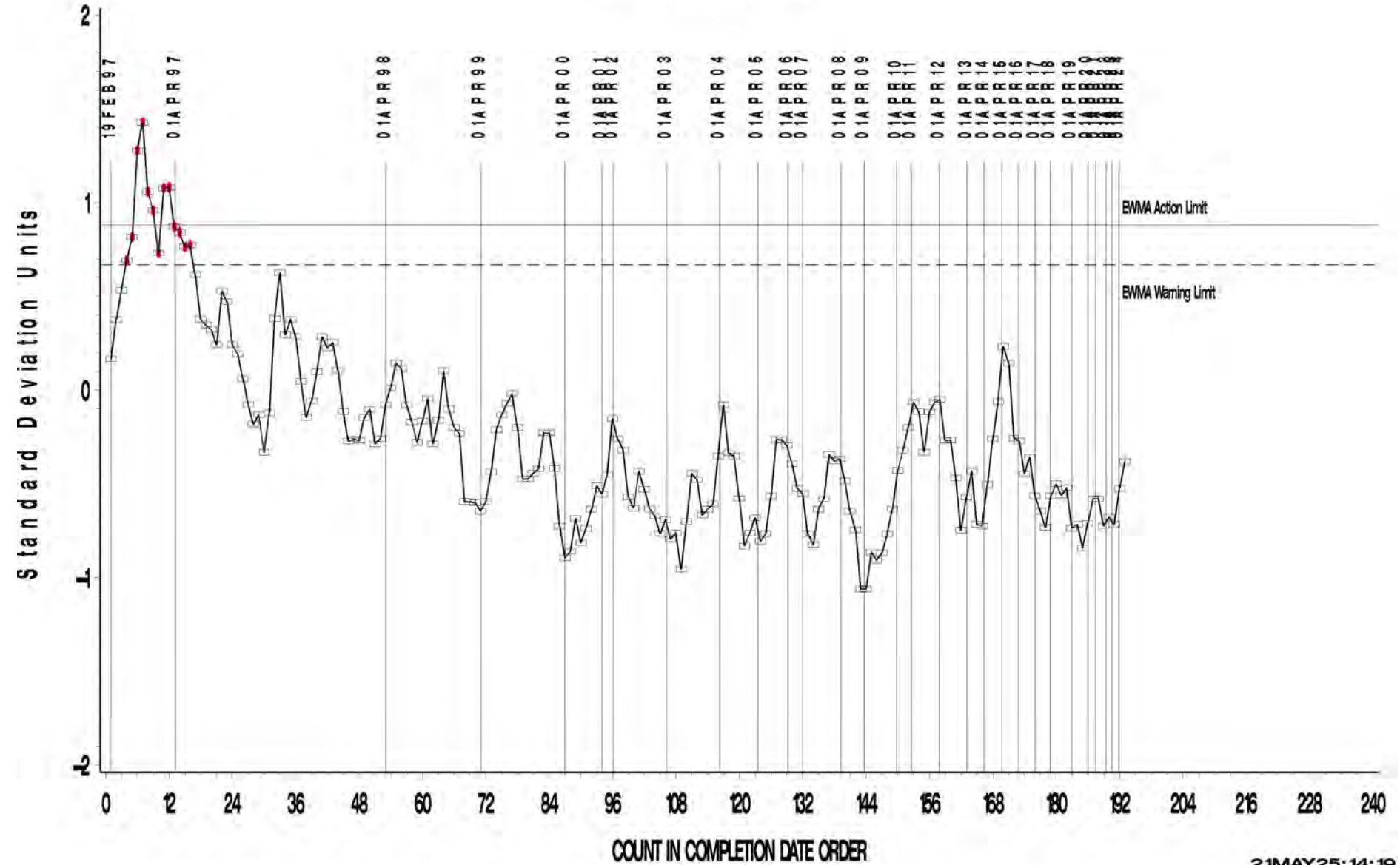
LTMS Severity Analysis





OIL CONSUMPTION

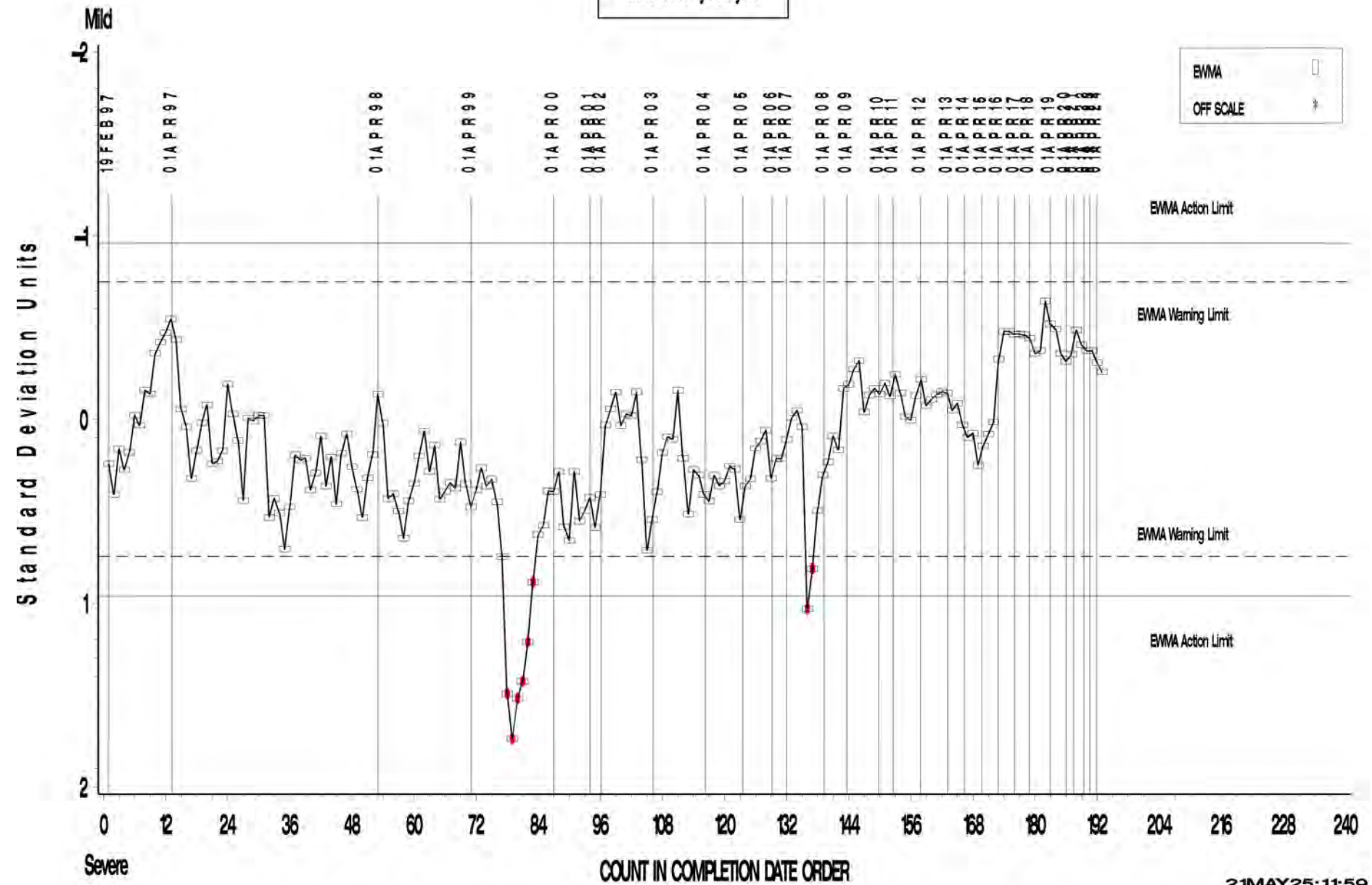
LTMS Precision Analysis





TOP GROOVE CARBON

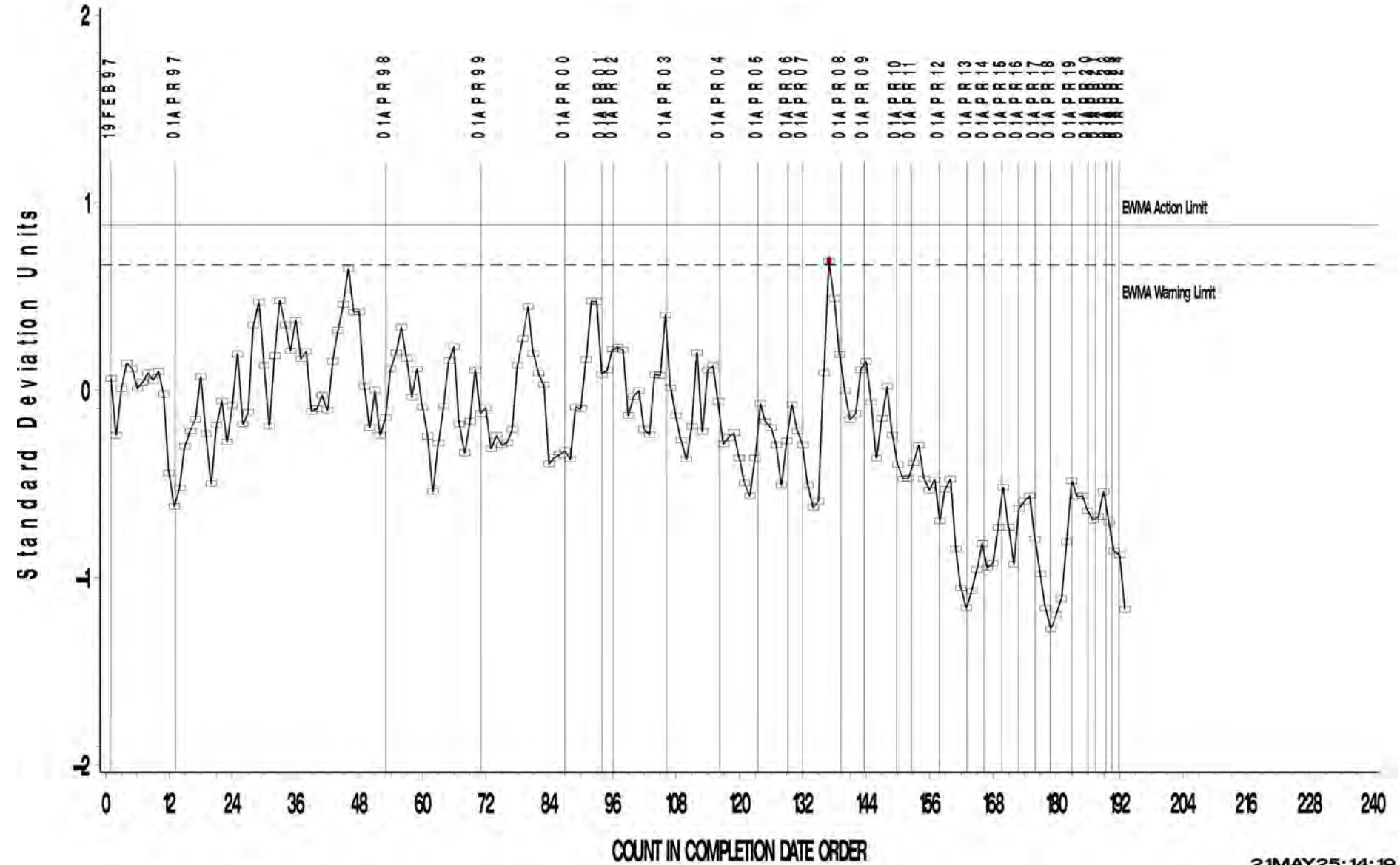
LTMS Severity Analysis



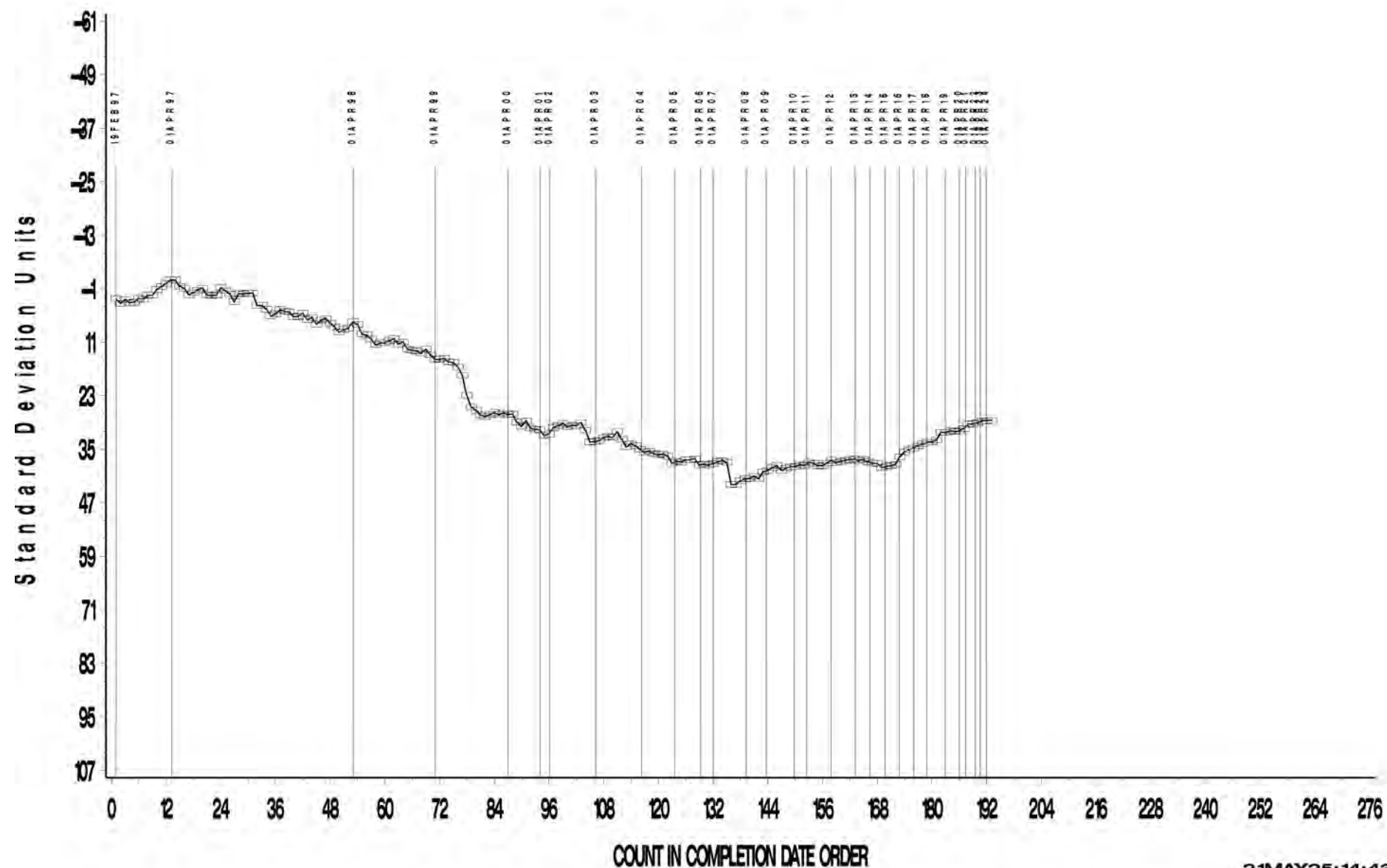


TOP GROOVE CARBON

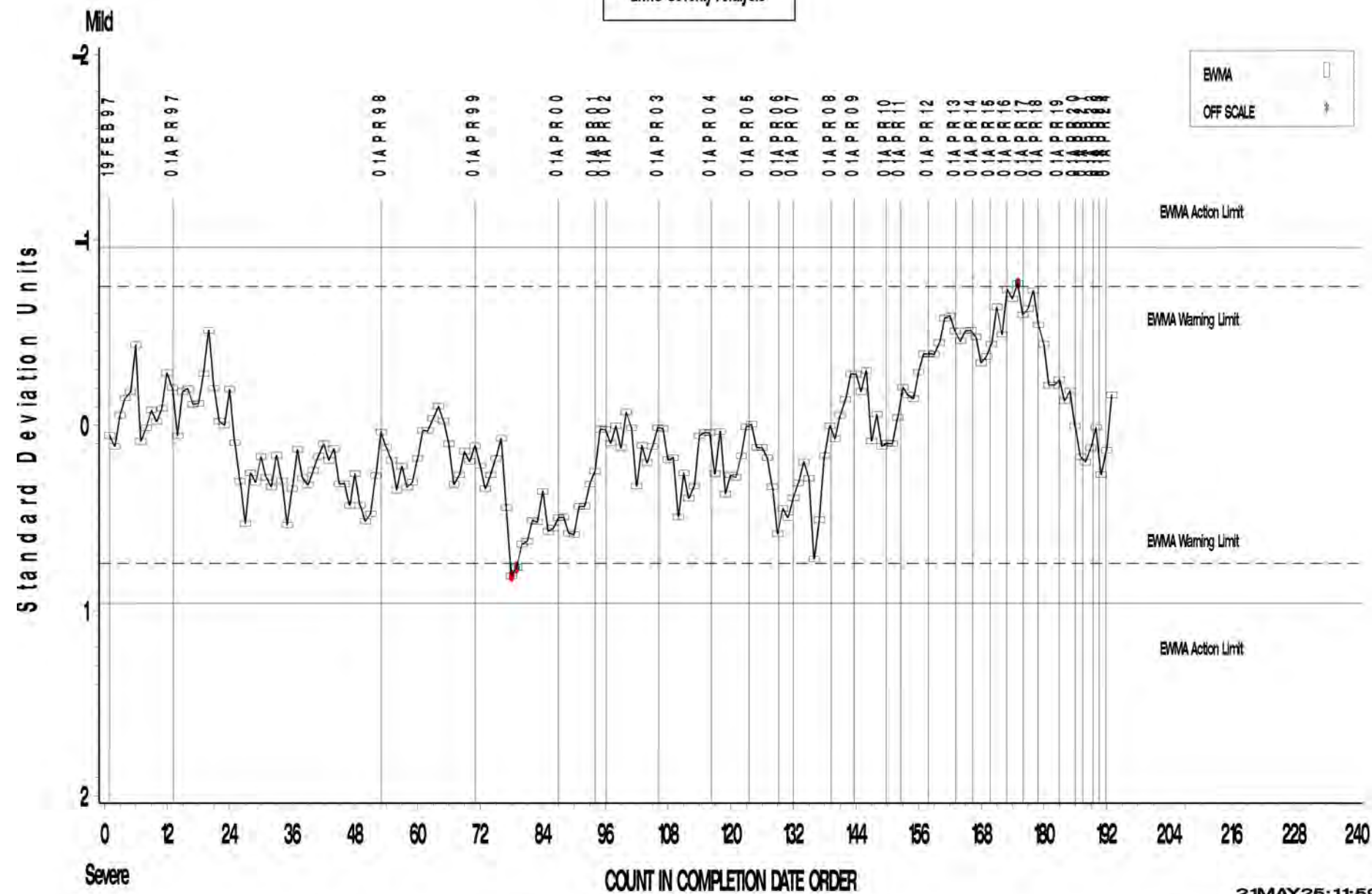
LTMS Precision Analysis



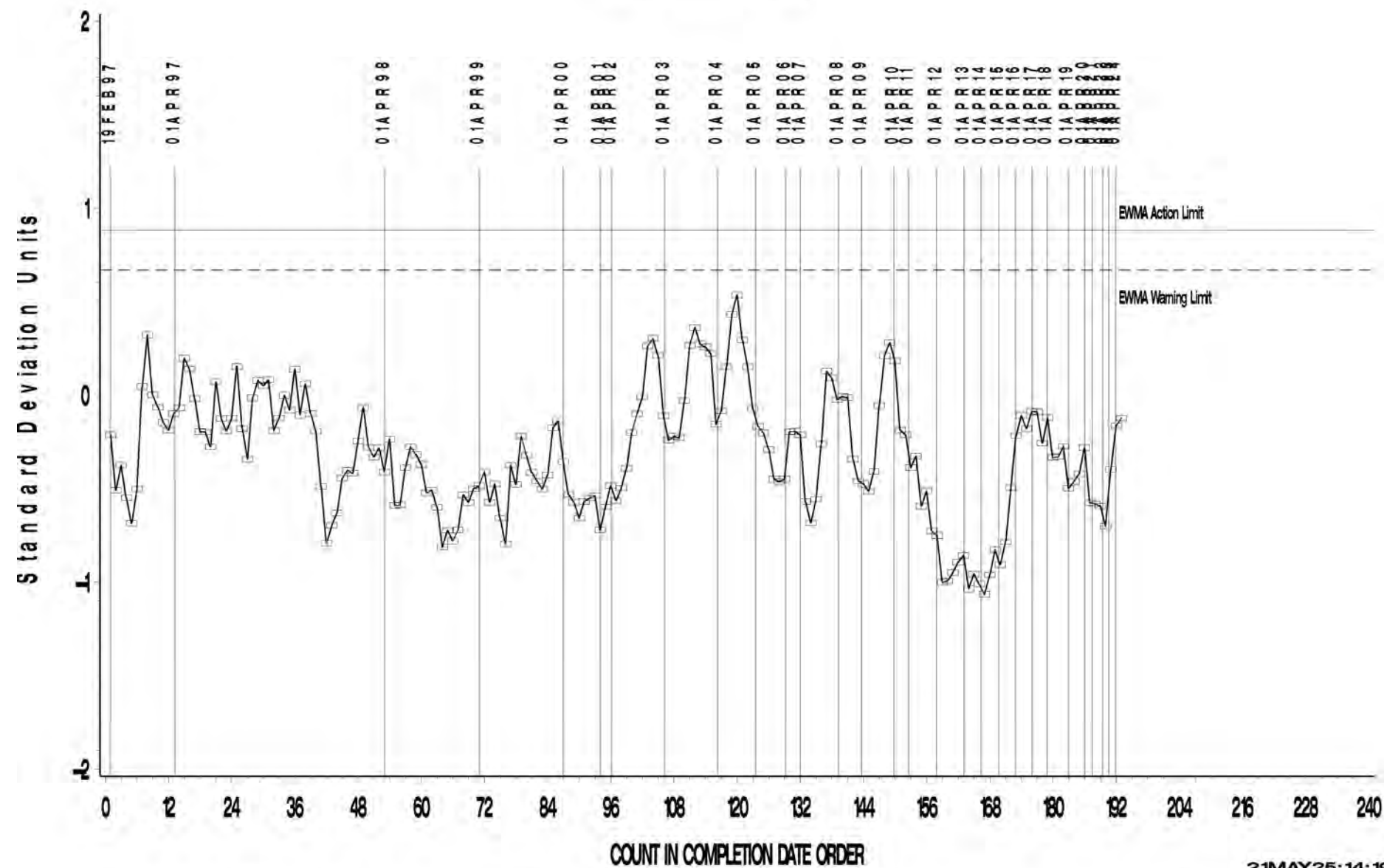
CUSUM Severity Analysis



LTMS Severity Analysis



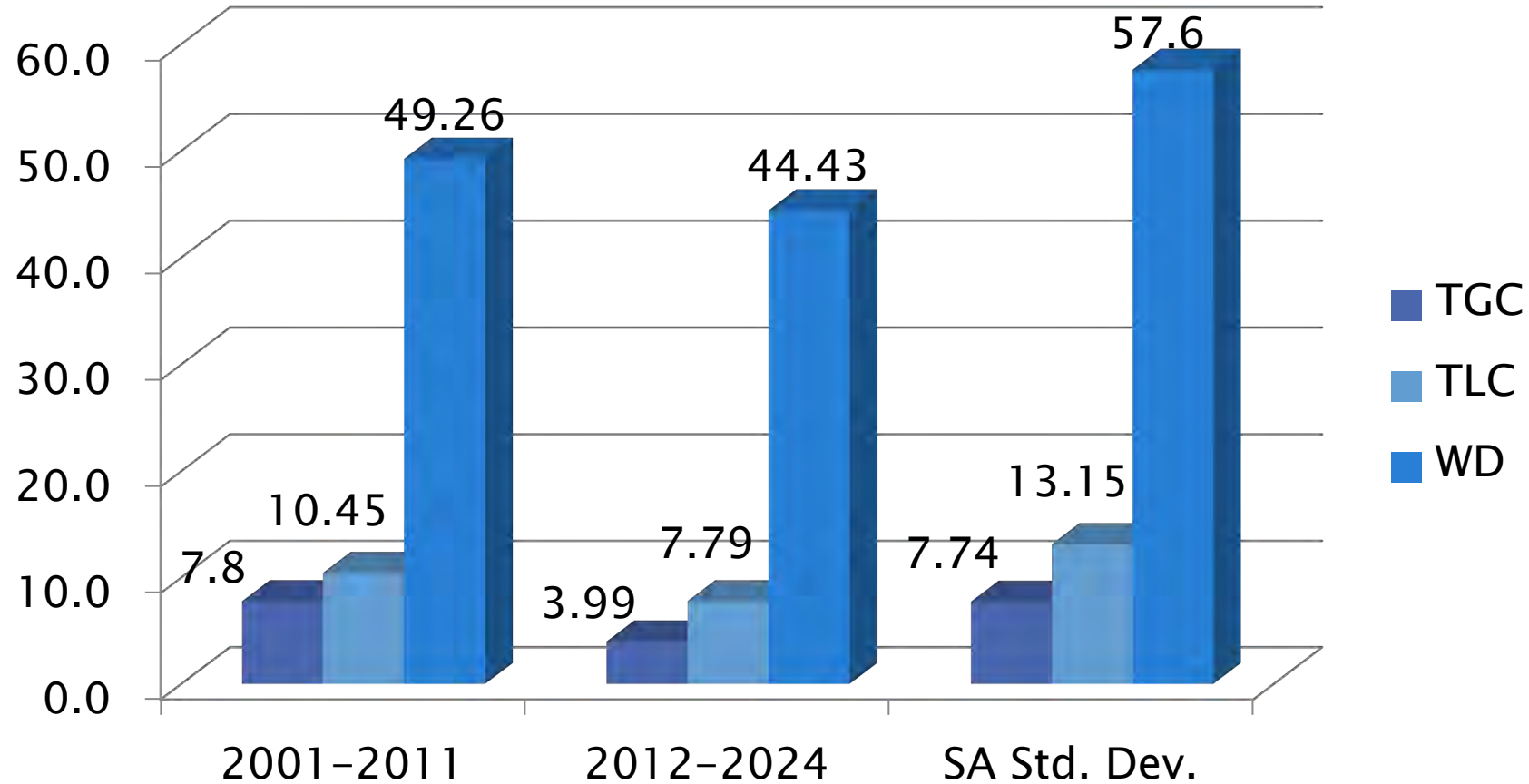
LTMS Precision Analysis



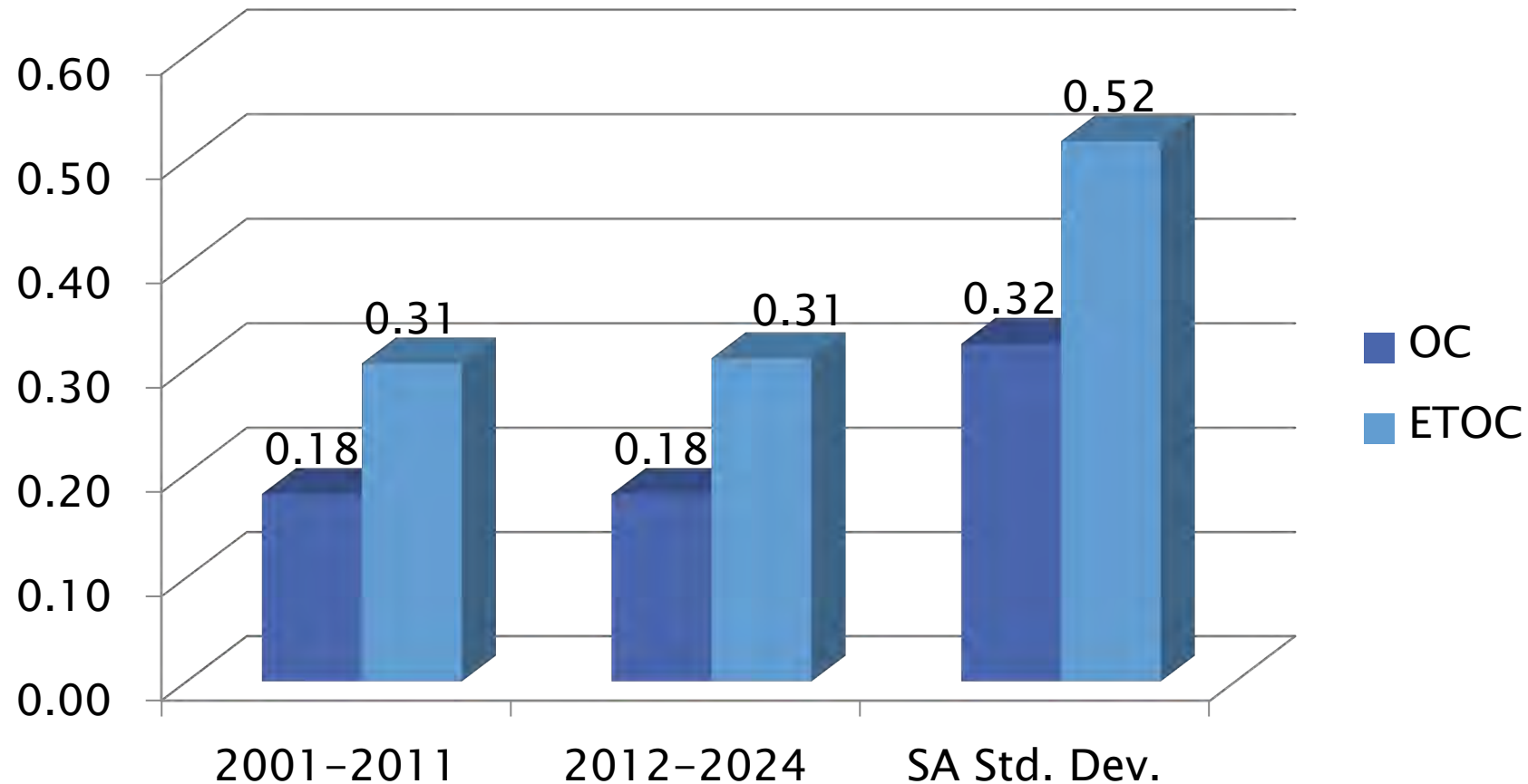
LTMS Precision Analysis



1 P Precision Estimates



1 P Precision Estimates



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SCOTE 1 R

»» April 2025

1 R Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	0
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		0

1 R Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

1 R Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

*Invalid and aborted tests

1 R Test Severity

- ▶ As no chartable 1 R tests were run during this reporting period, no statement on test severity can be made.

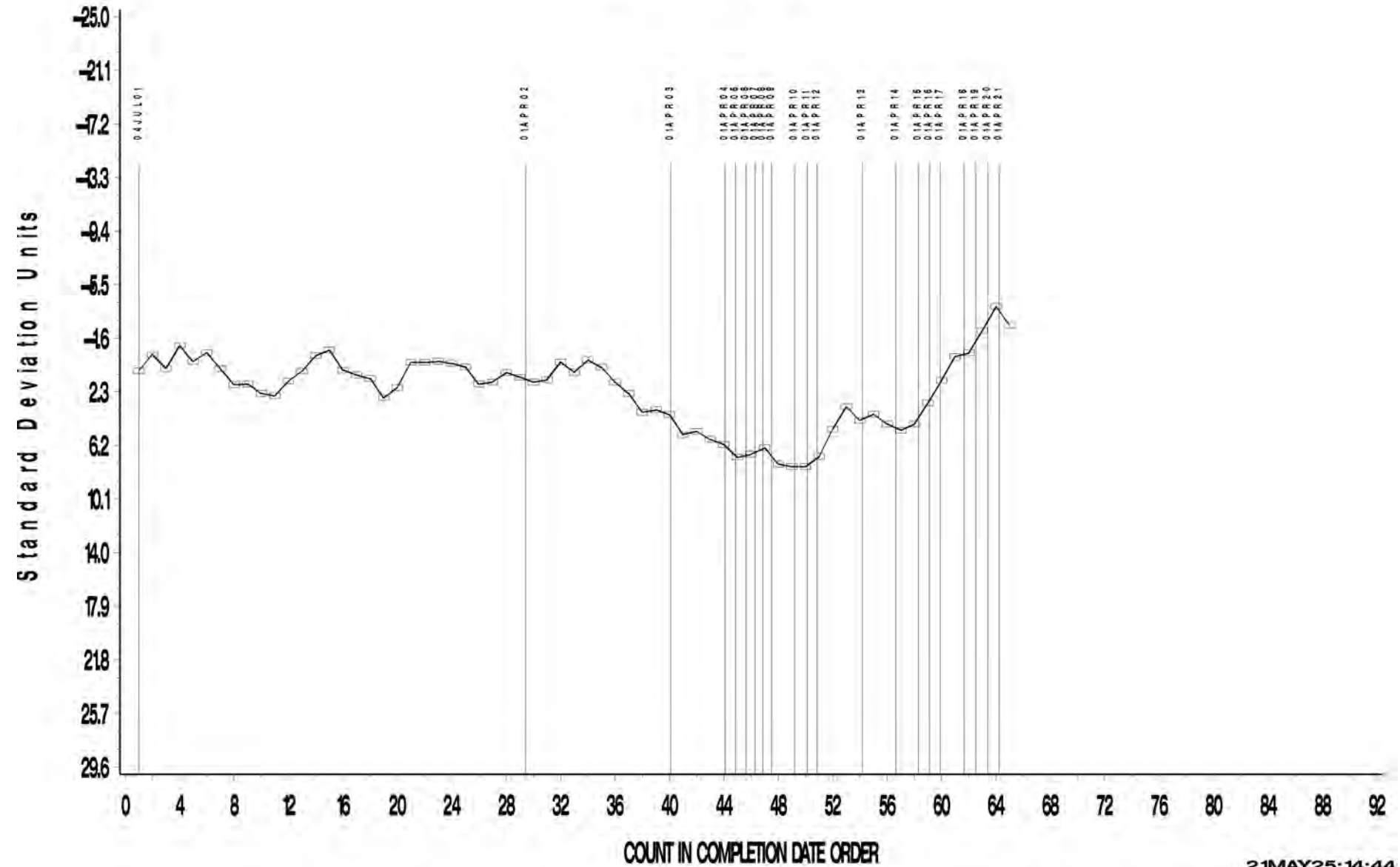
LTMS Severity Analysis





FINAL BOTOC

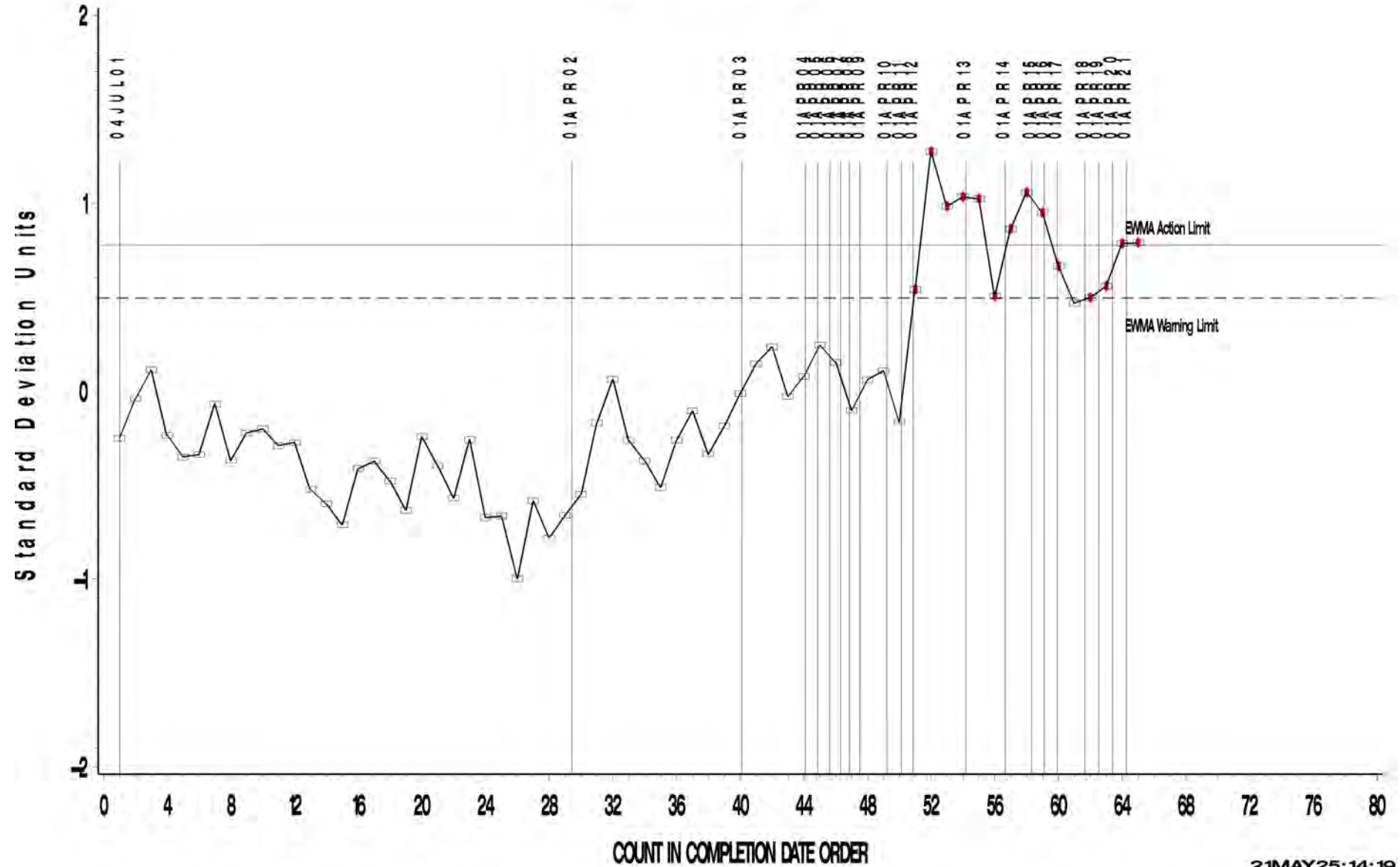
CUSUM Severity Analysis





FINAL EOTOC (g/h)

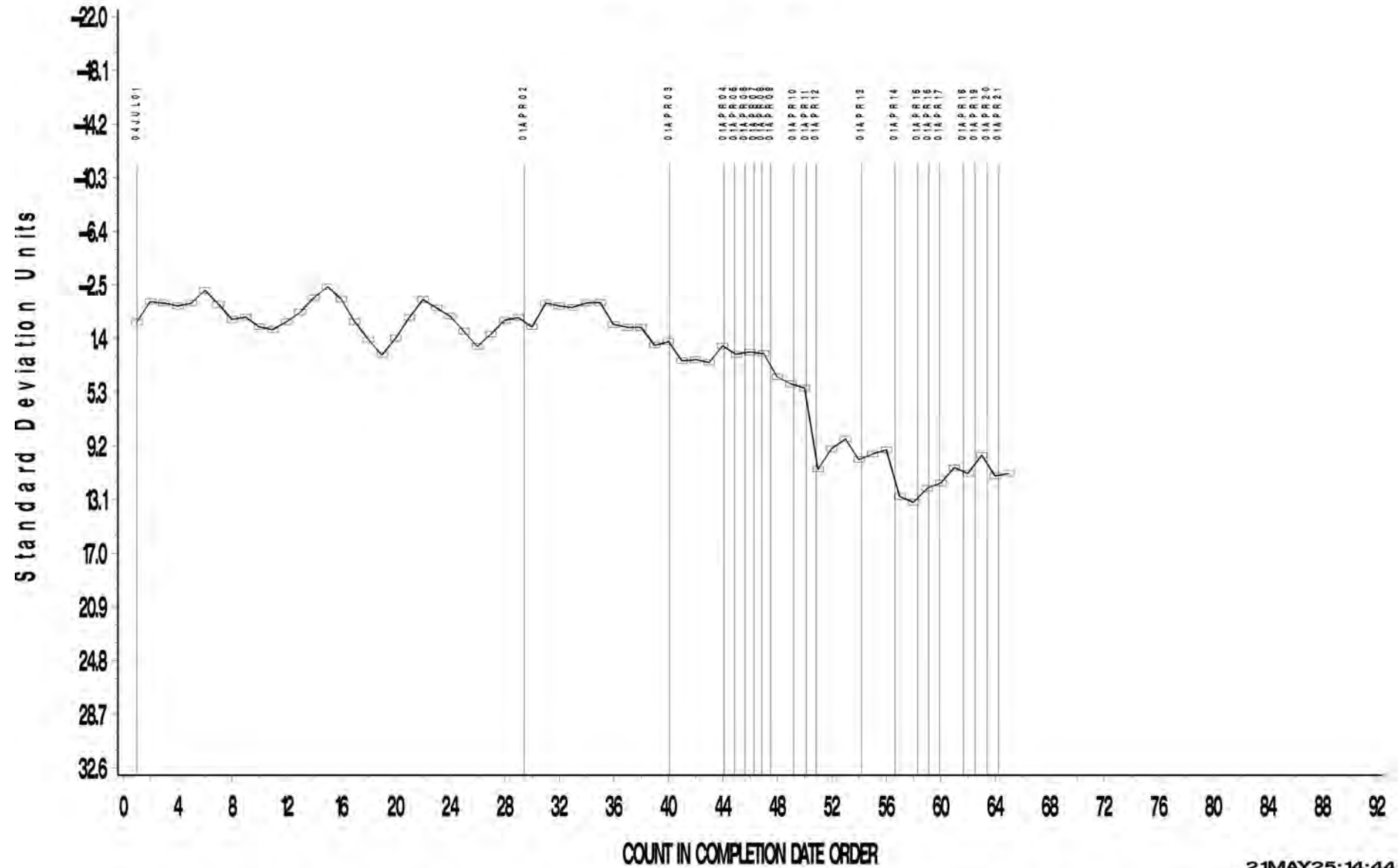
LTMS Precision Analysis





FINAL EOTOC (g/h)

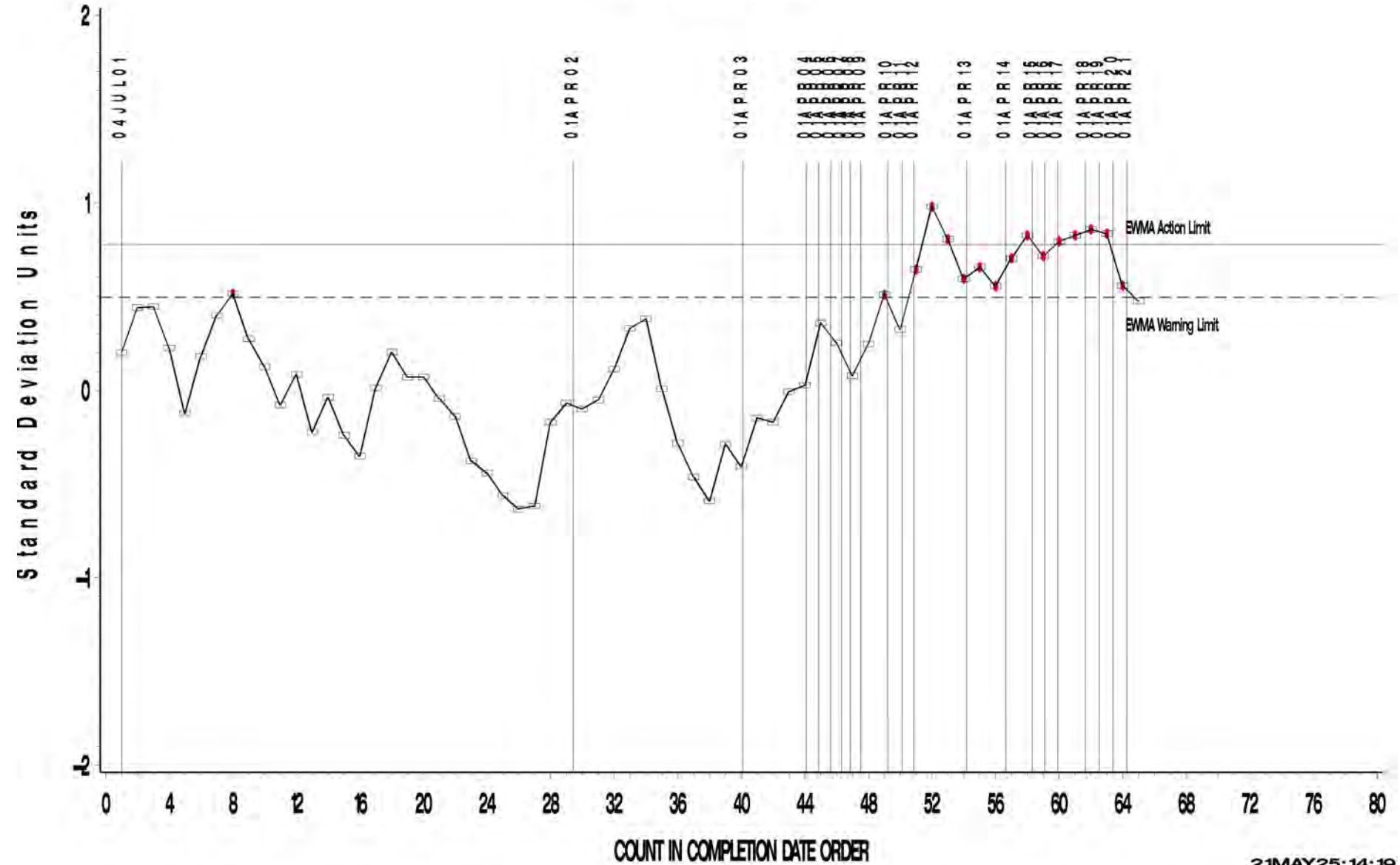
CUSUM Severity Analysis





FINAL TOP GROOVE CARBON (DEMERITS)

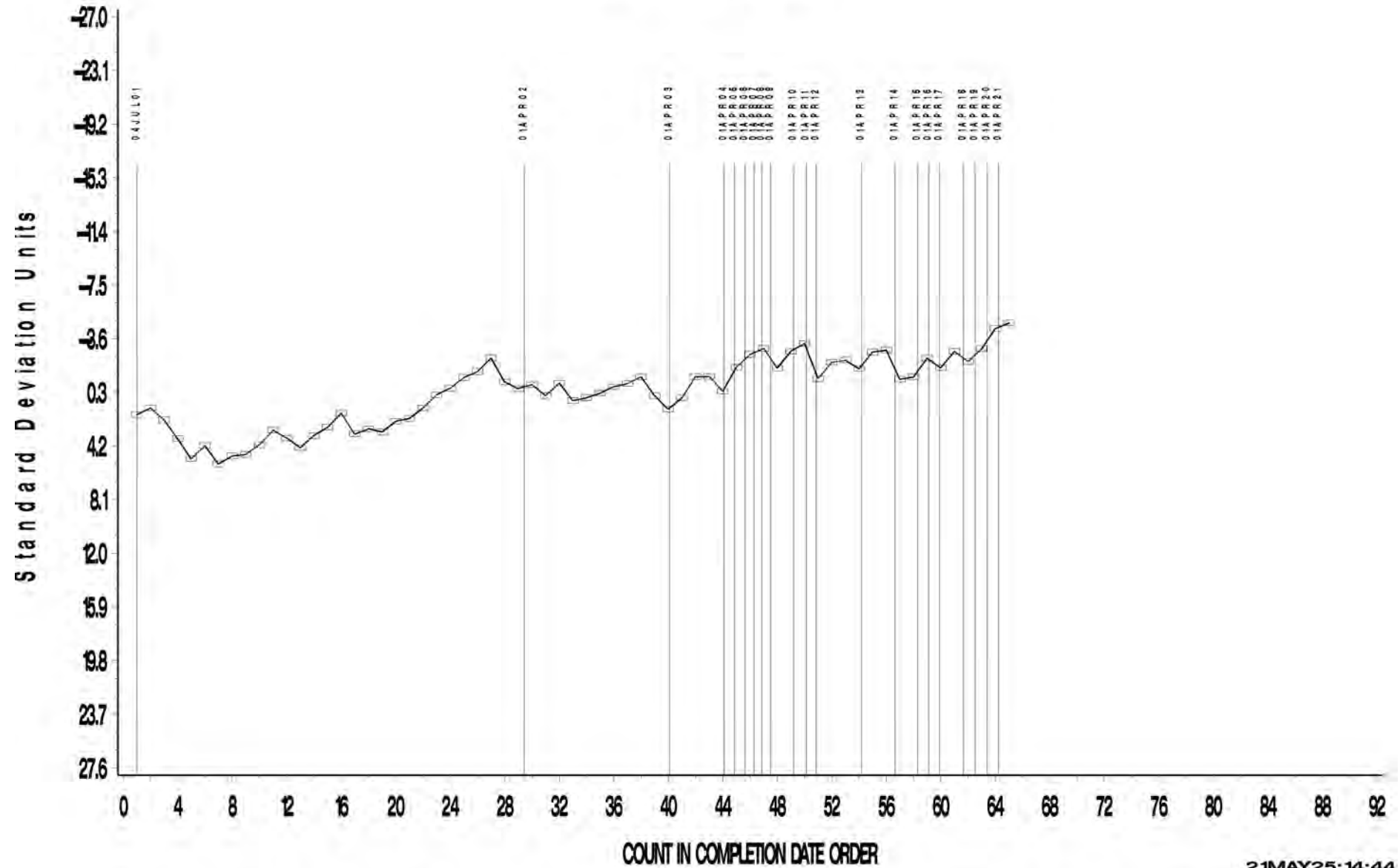
LTMS Precision Analysis





FINAL TOP GROOVE CARBON (DEMERITS)

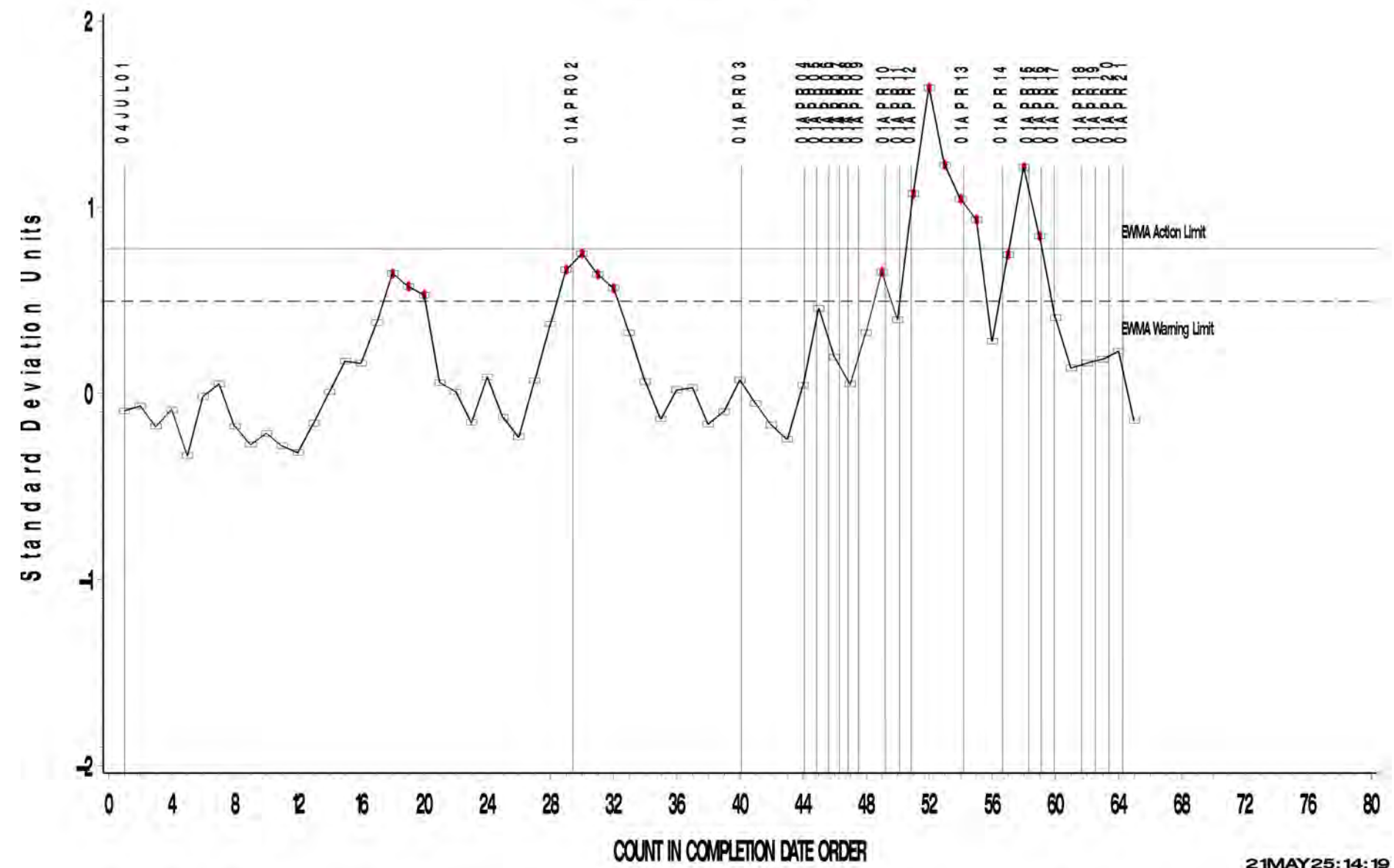
CUSUM Severity Analysis





FINAL TOP LAND CARBON (DEMERITS)

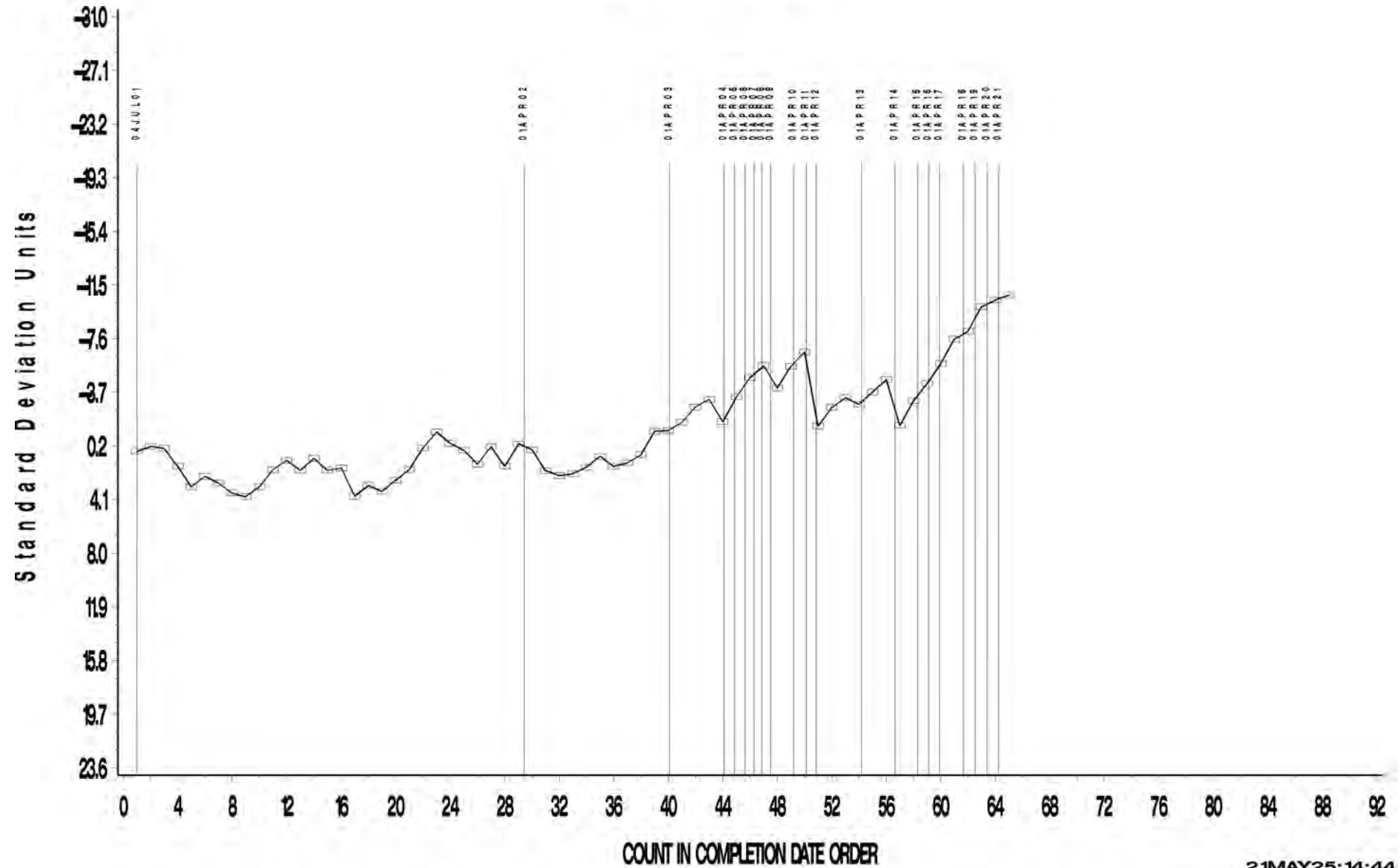
LTMS Precision Analysis





FINAL TOP LAND CARBON (DEMERITS)

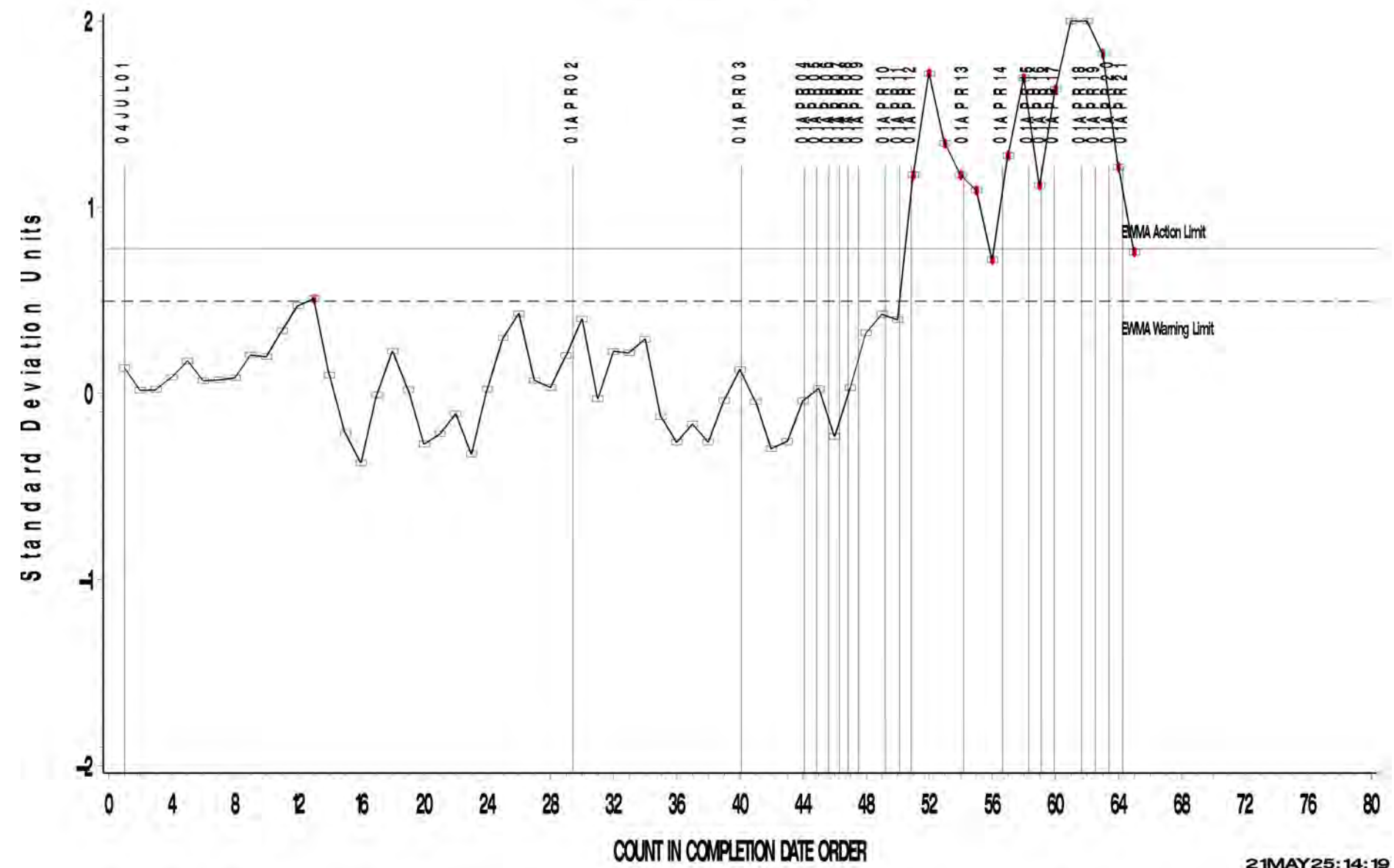
CUSUM Severity Analysis





FINAL WEIGHTED TOTAL DEMERITS (DEMERITS)

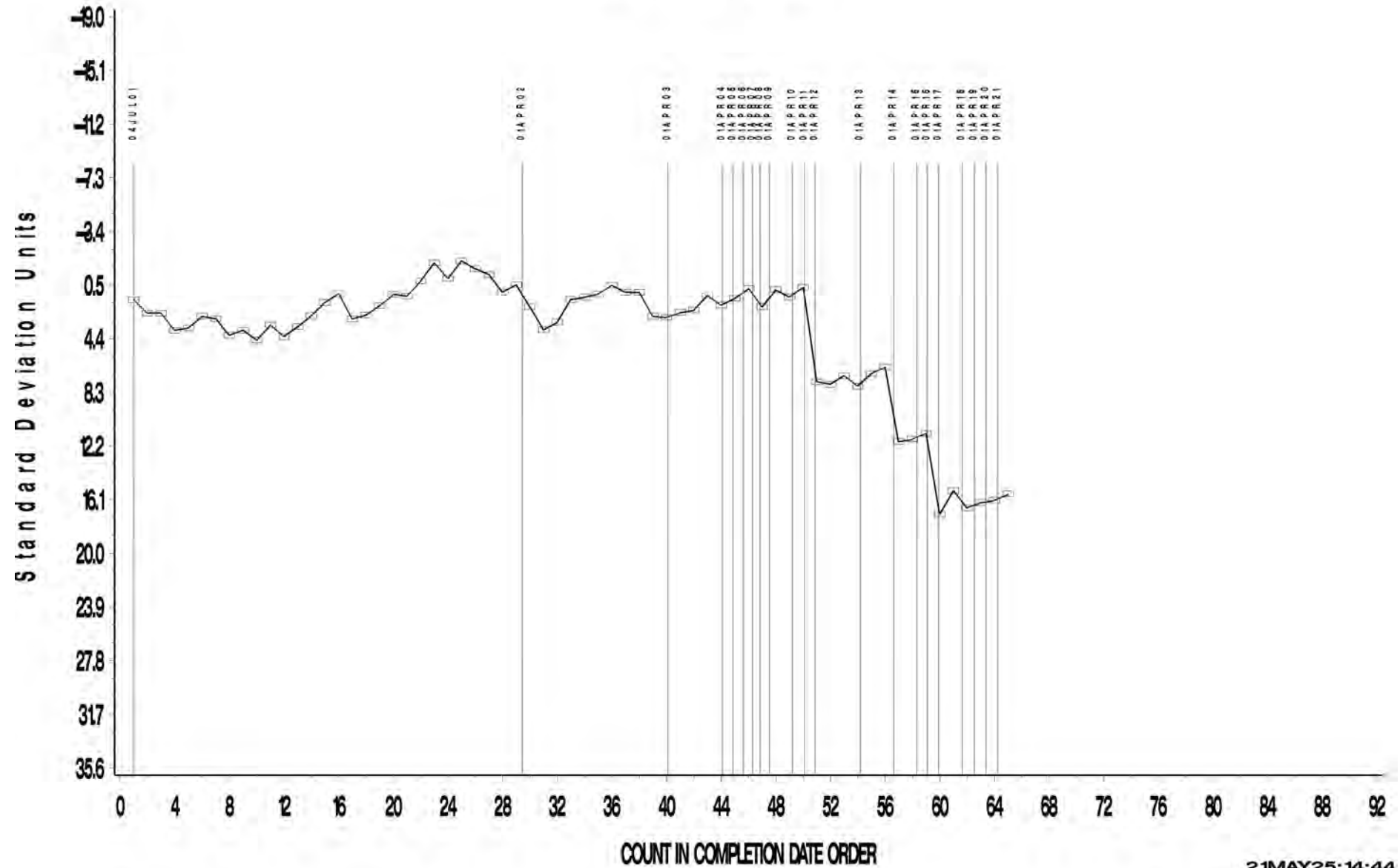
LTMS Precision Analysis



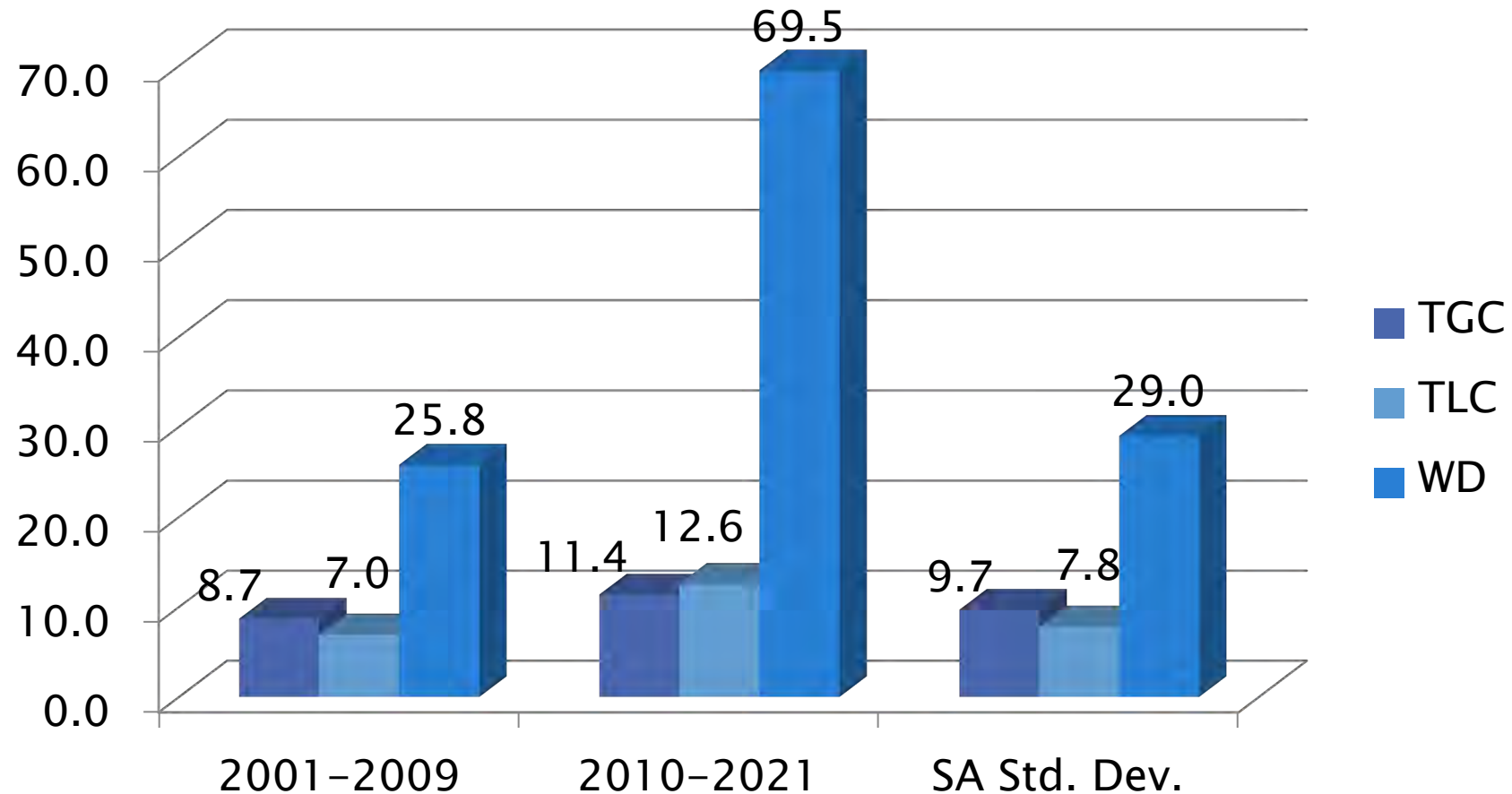


FINAL WEIGHTED TOTAL DEMERITS (DEMERITS)

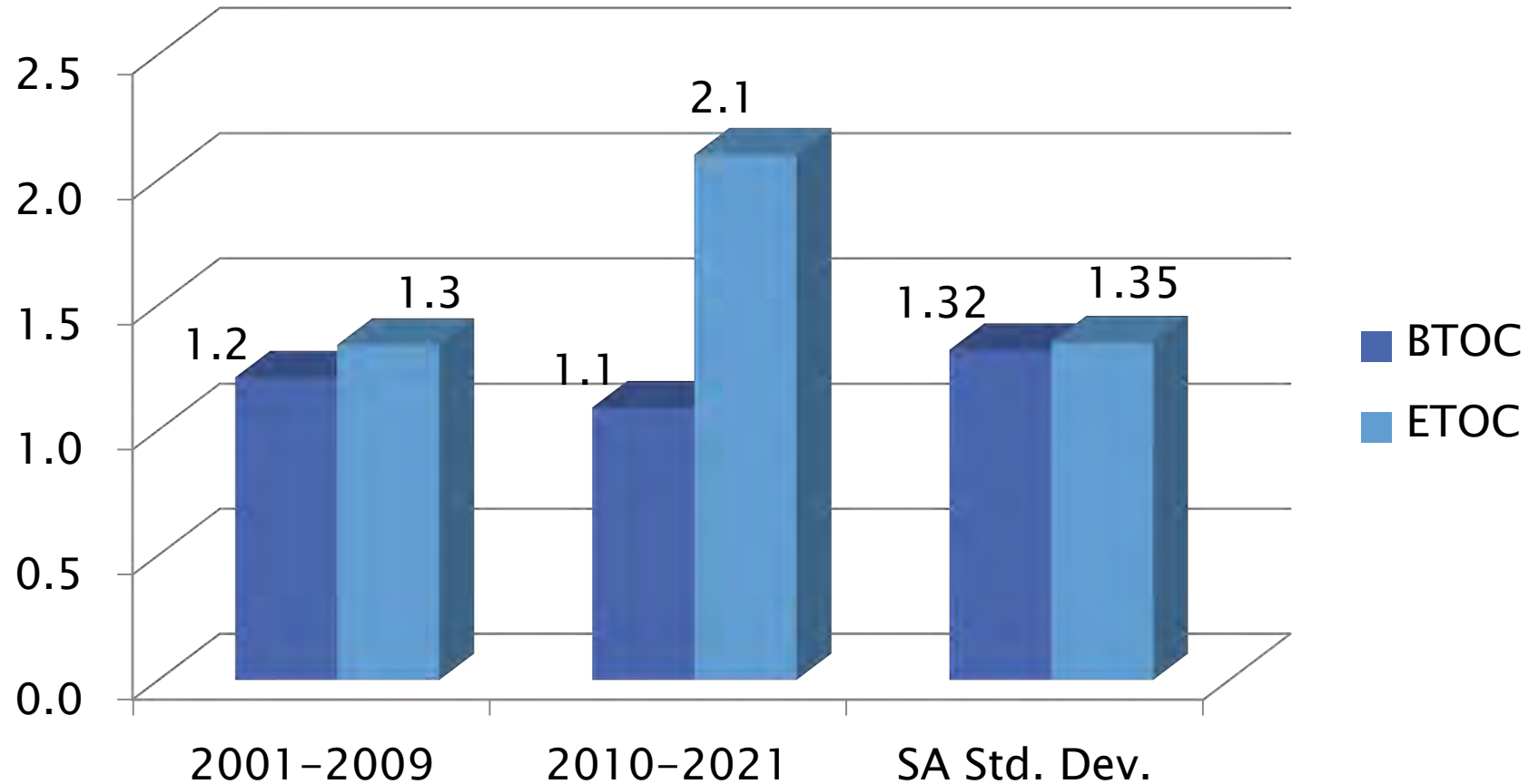
CUSUM Severity Analysis



1 R Precision Estimates



1 R Precision Estimates



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CAT C13

»» April 2025

C13 Test Activity

Test Status	Validity Code	C13
Acceptable Calibration Test	AC	3
Failed Calibration Test	OC	1
Operationally Invalid	LC	0
Aborted	XC	0
Total		4

C13 Failed Tests

Failed Parameter	Number of Tests
TGC and OC mild	1
Total	1

C13 Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

*Invalid and aborted tests

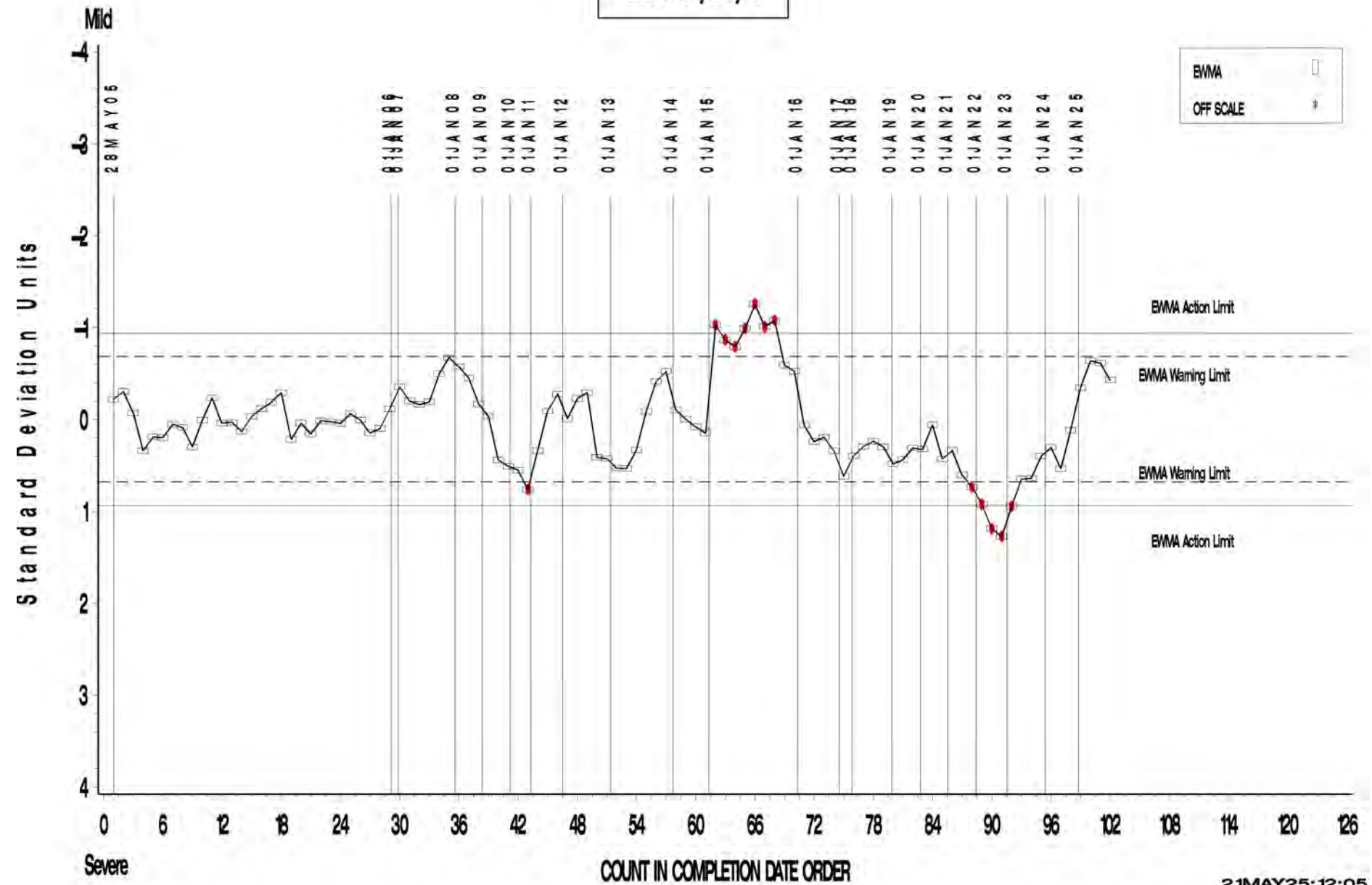
C13 Test Severity

- ▶ TGC is in severity warning alarm in the mild direction. TGC is also in precision action alarm.
- ▶ All other parameters are in control



OIL CONS. DELTA — FINAL RESULT

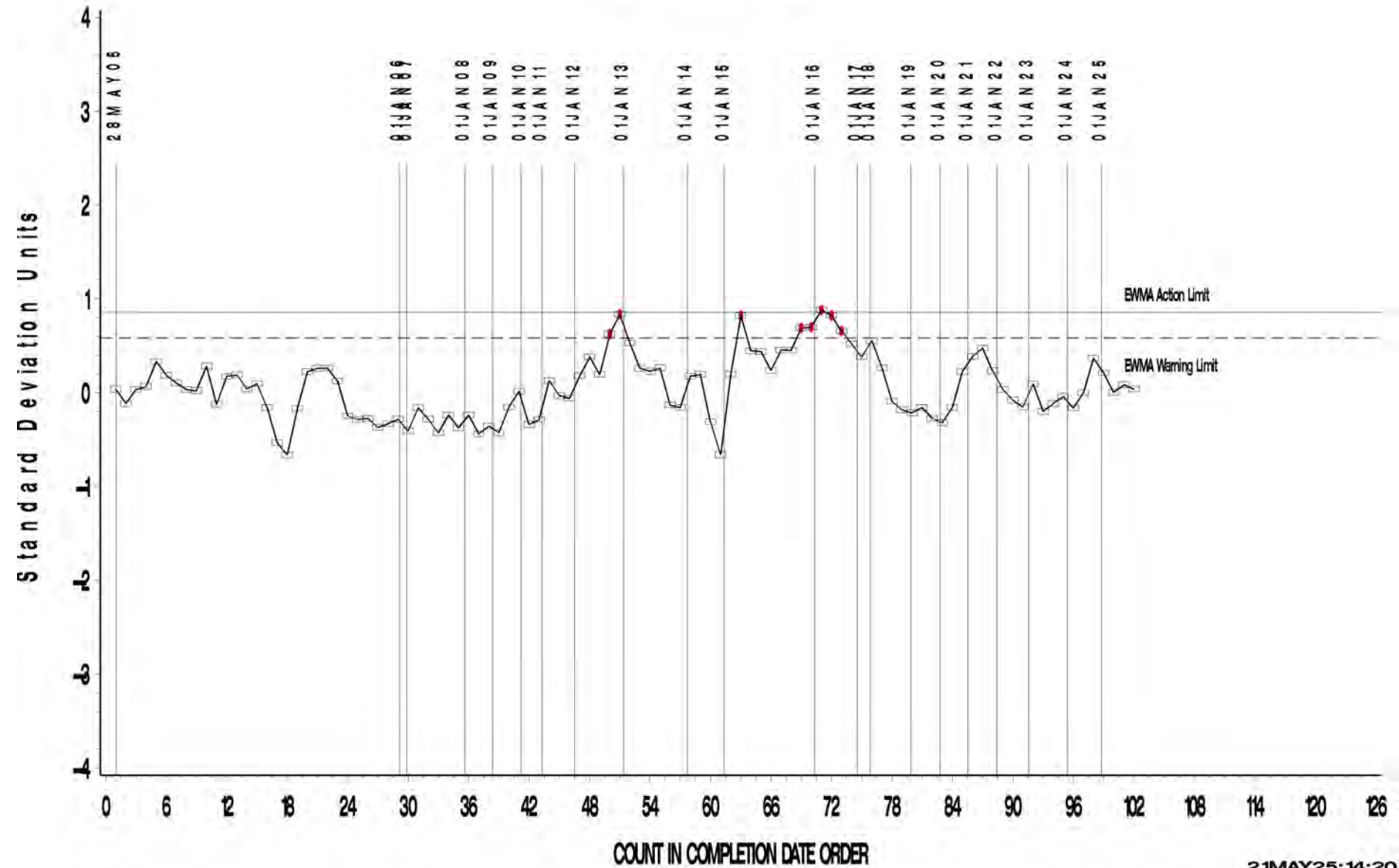
LTMS Severity Analysis





OIL CONS. DELTA — FINAL RESULT

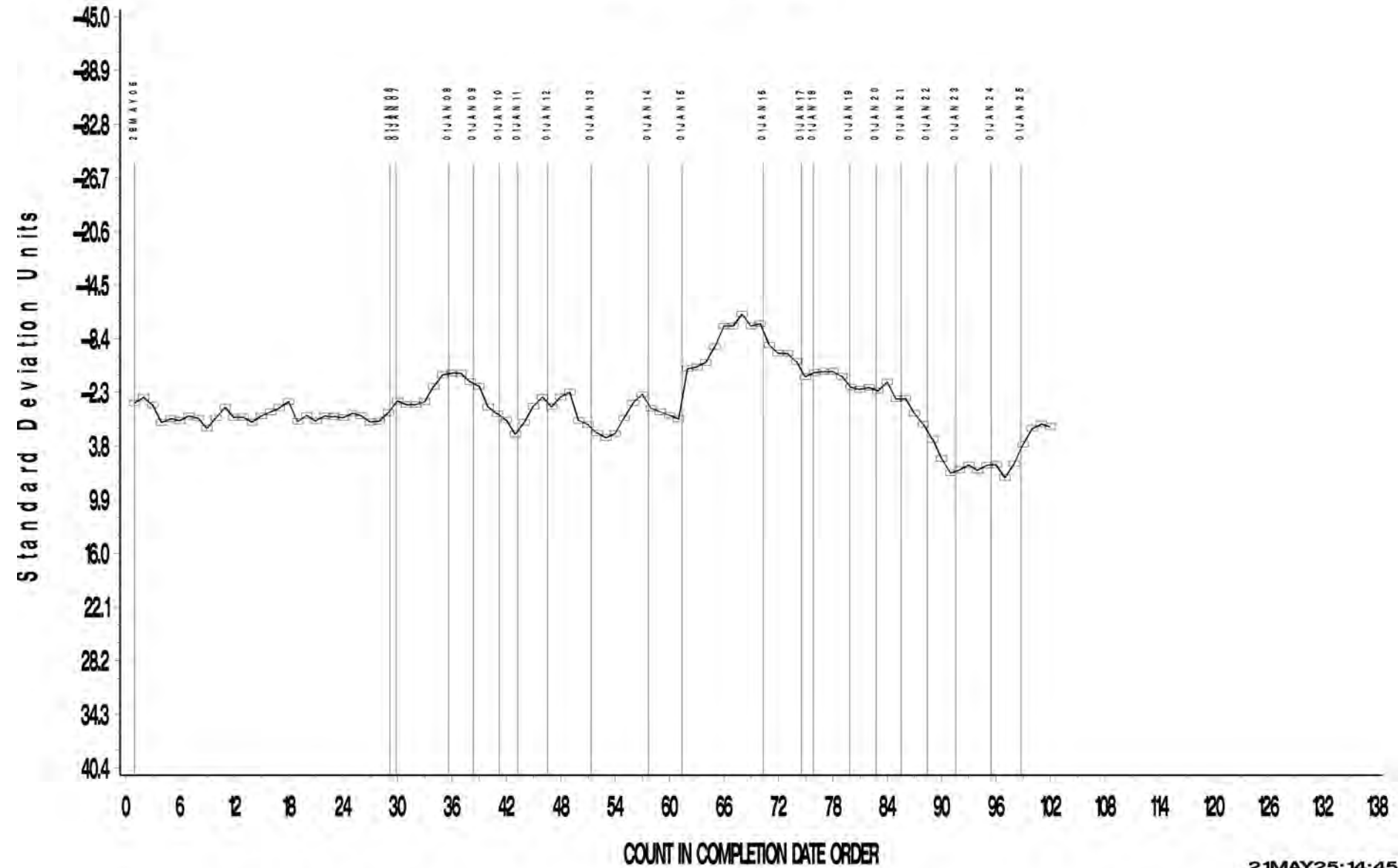
LTMS Precision Analysis





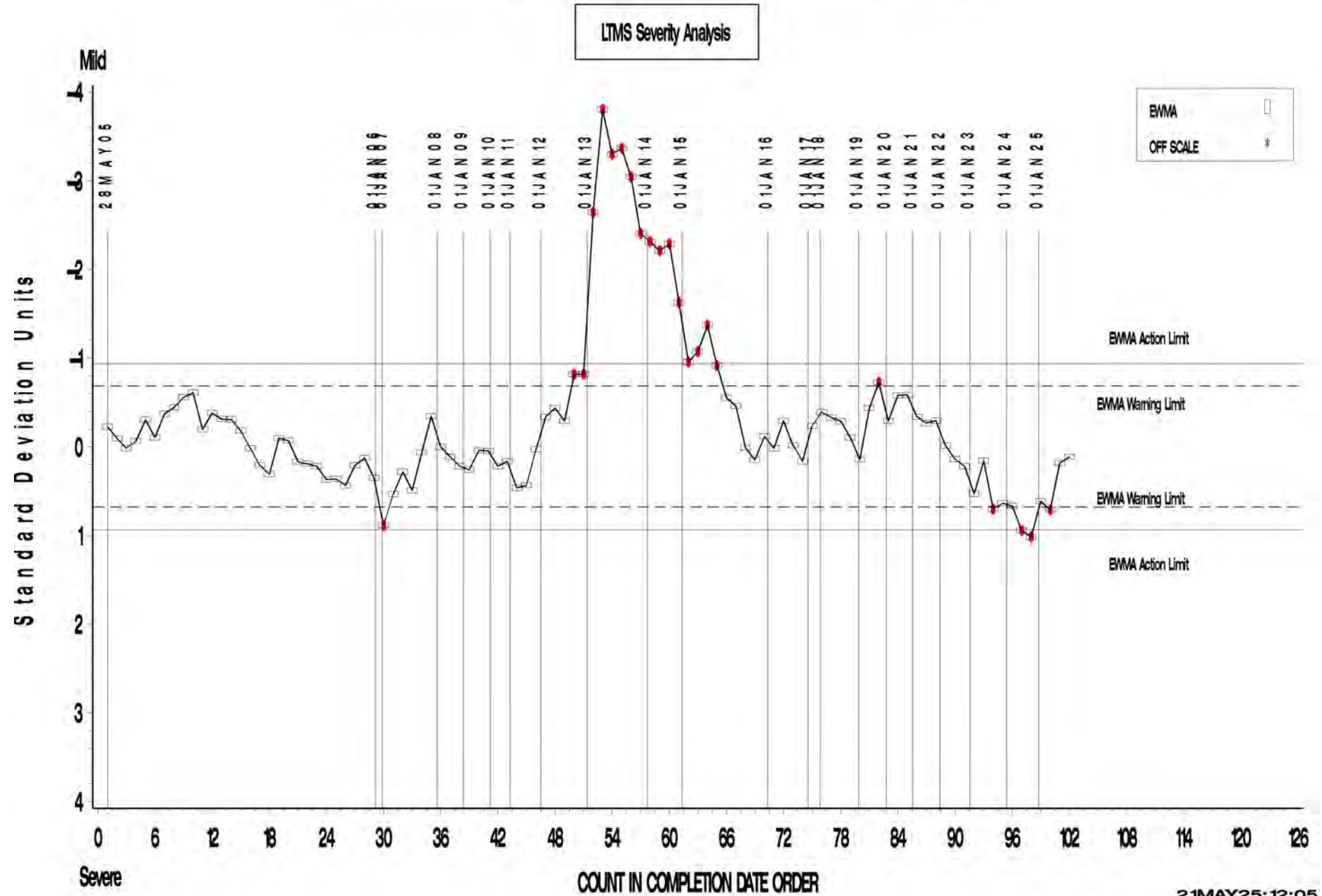
OIL CONS. DELTA — FINAL RESULT

CUSUM Severity Analysis





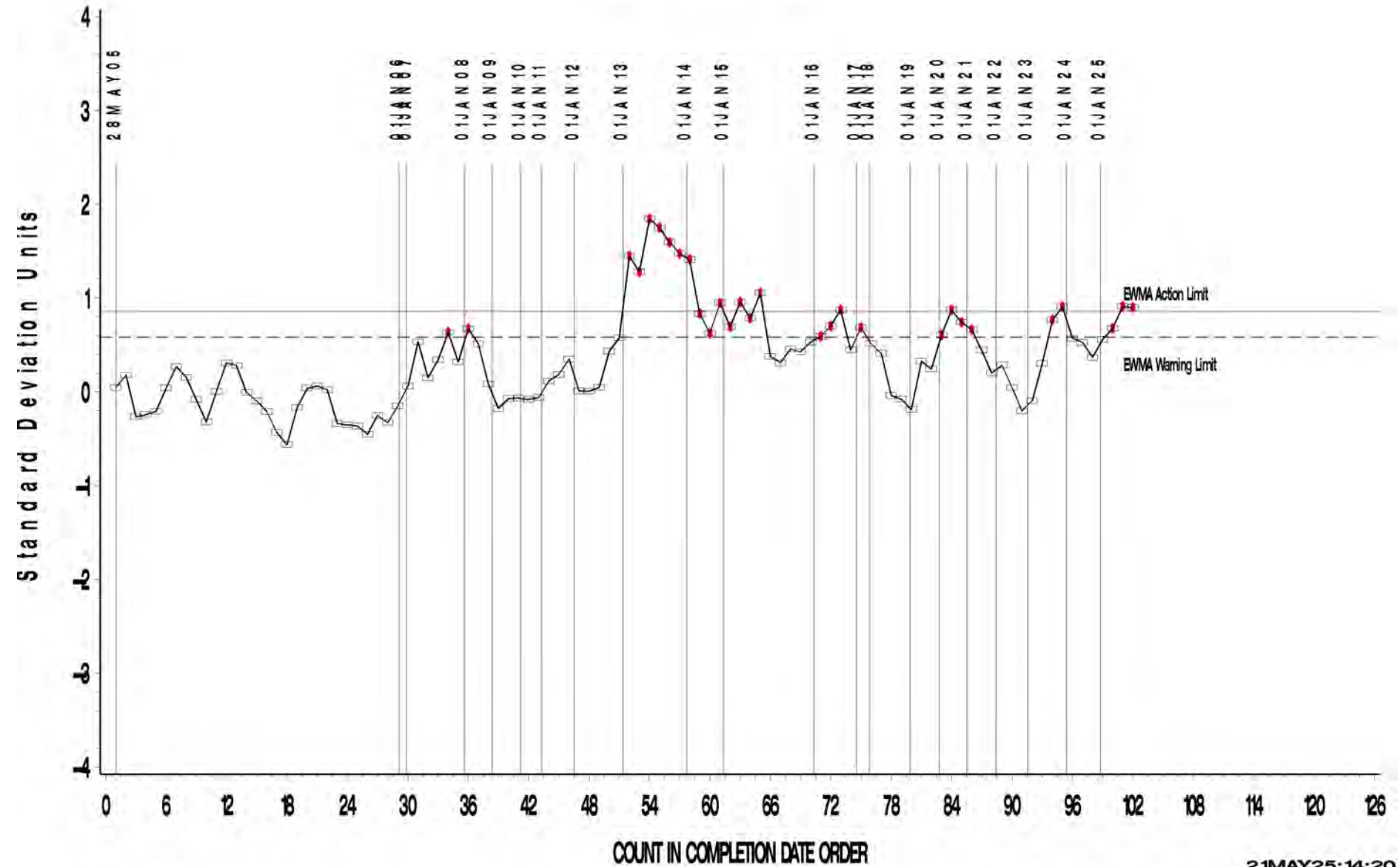
2ND RING TOP CARBON AVG. — FINAL RESULT





2ND RING TOP CARBON AVG. — FINAL RESULT

LTMS Precision Analysis





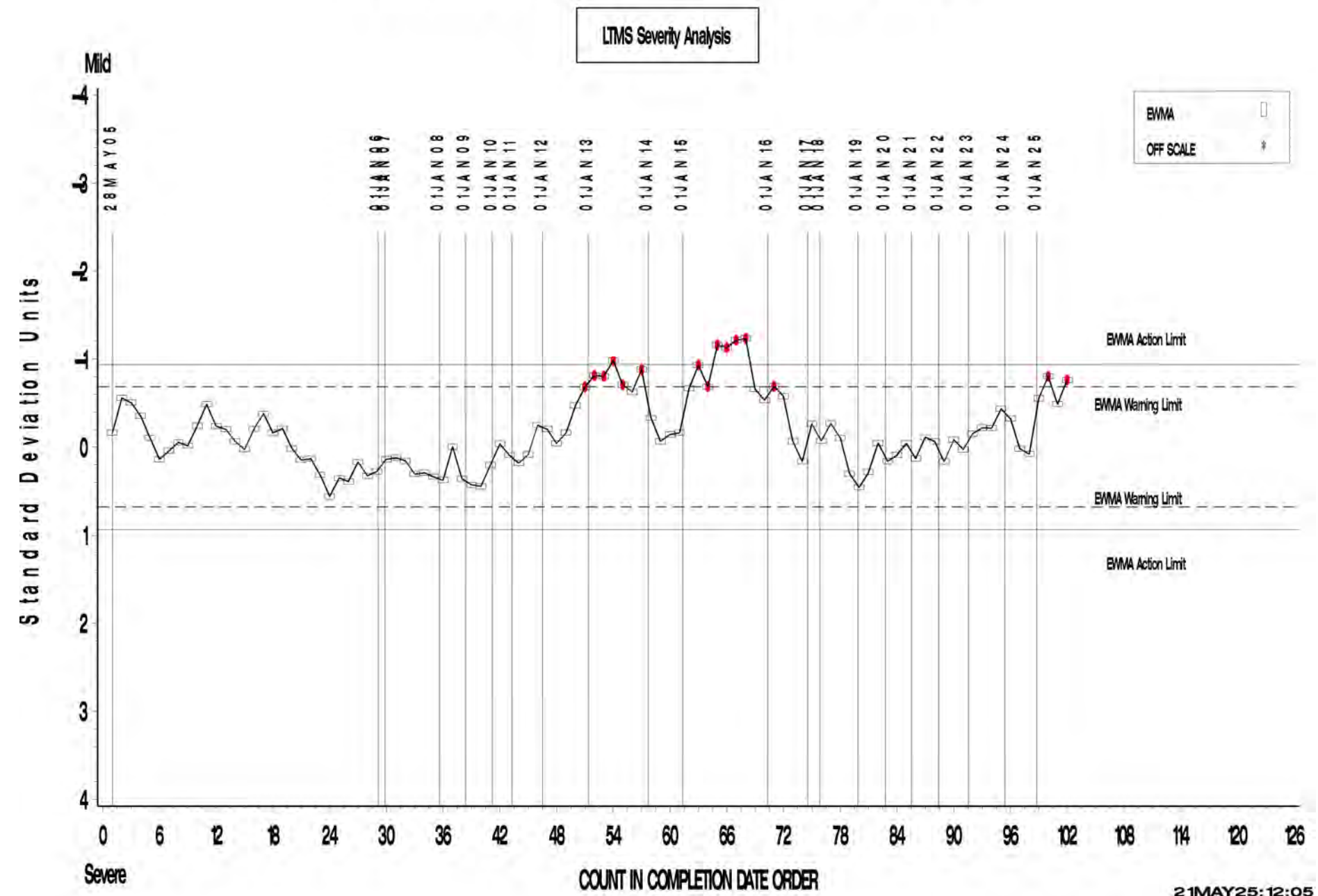
2ND RING TOP CARBON AVG. — FINAL RESULT

CUSUM Severity Analysis





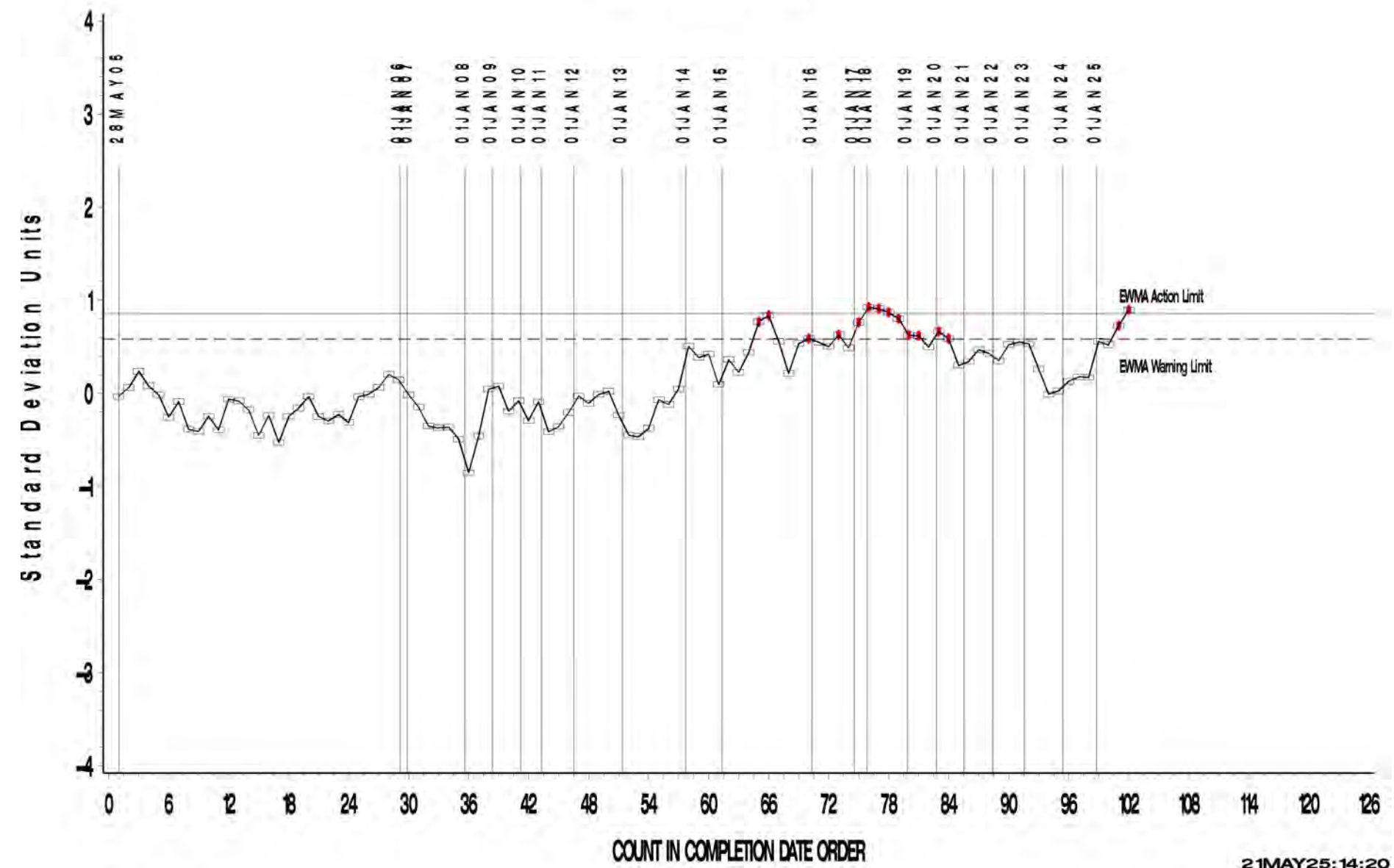
C13 INDUSTRY OPERATIONALLY VALID DATA
TOP GROOVE CARBON AVG — FINAL RESULT





TOP GROOVE CARBON AVG — FINAL RESULT

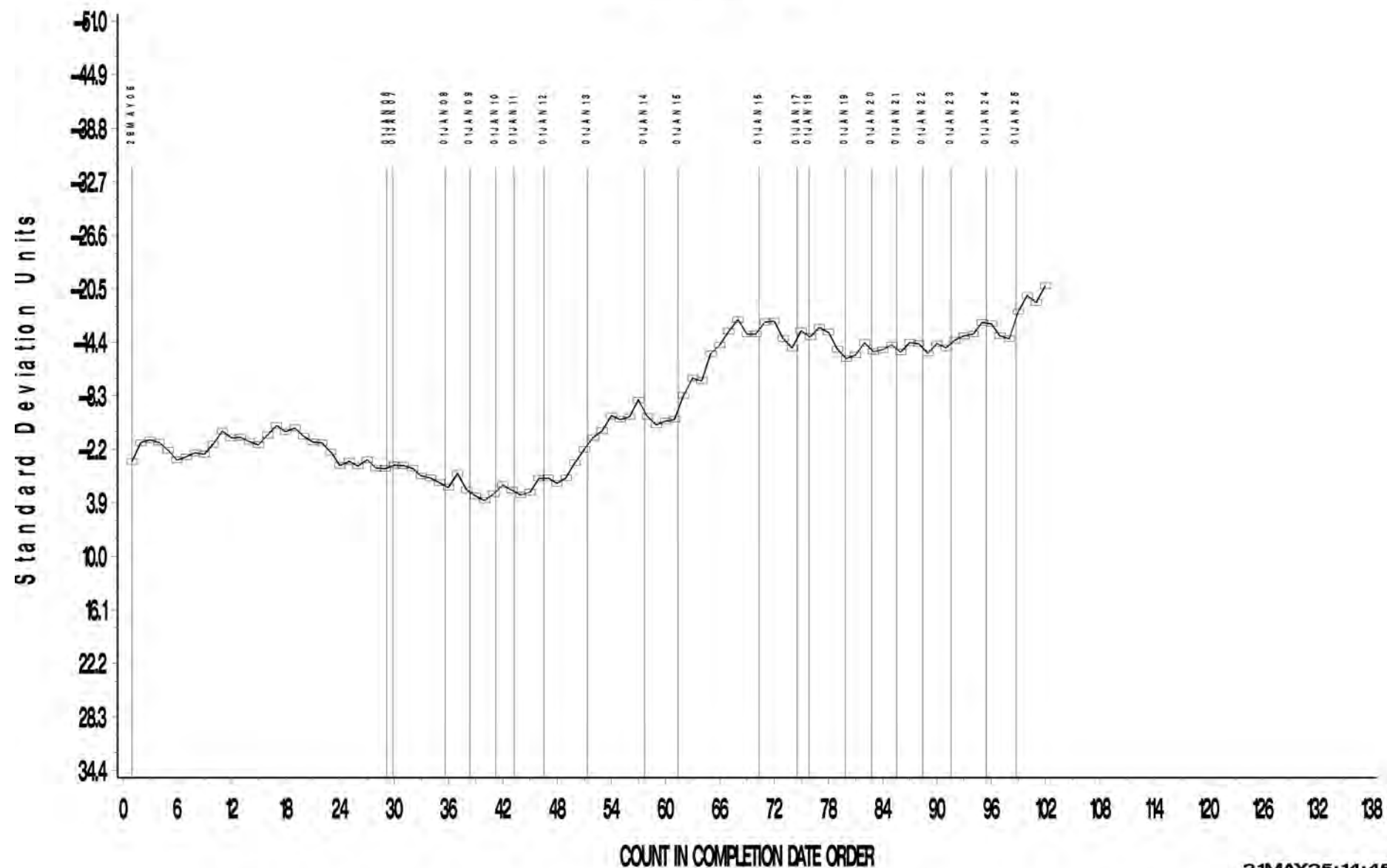
LTMS Precision Analysis





C13 INDUSTRY OPERATIONALLY VALID DATA
TOP GROOVE CARBON AVG — FINAL RESULT

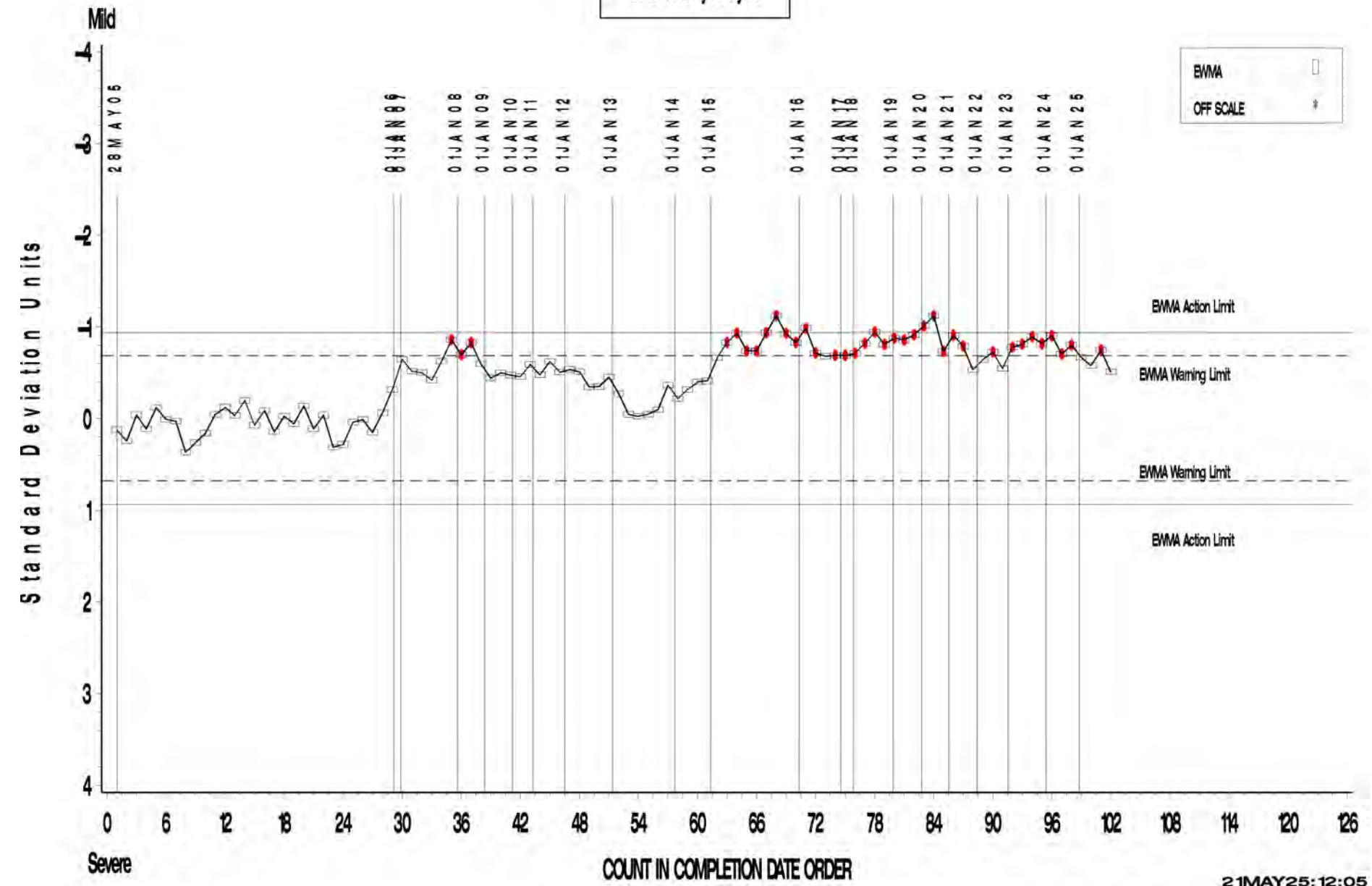
CUSUM Severity Analysis





TOP LAND CARBON AVG. — FINAL RESULT

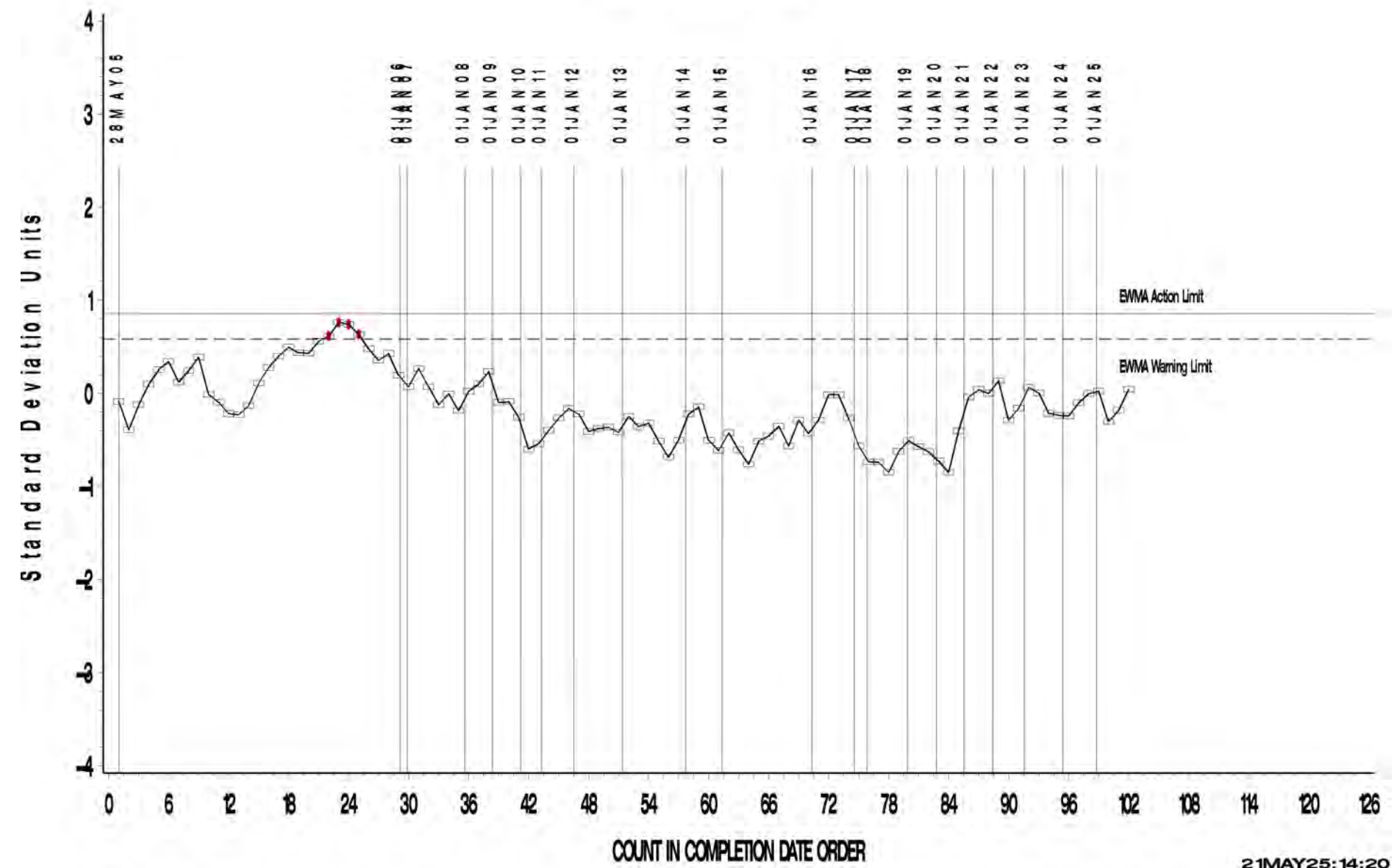
LTMS Severity Analysis





TOP LAND CARBON AVG. — FINAL RESULT

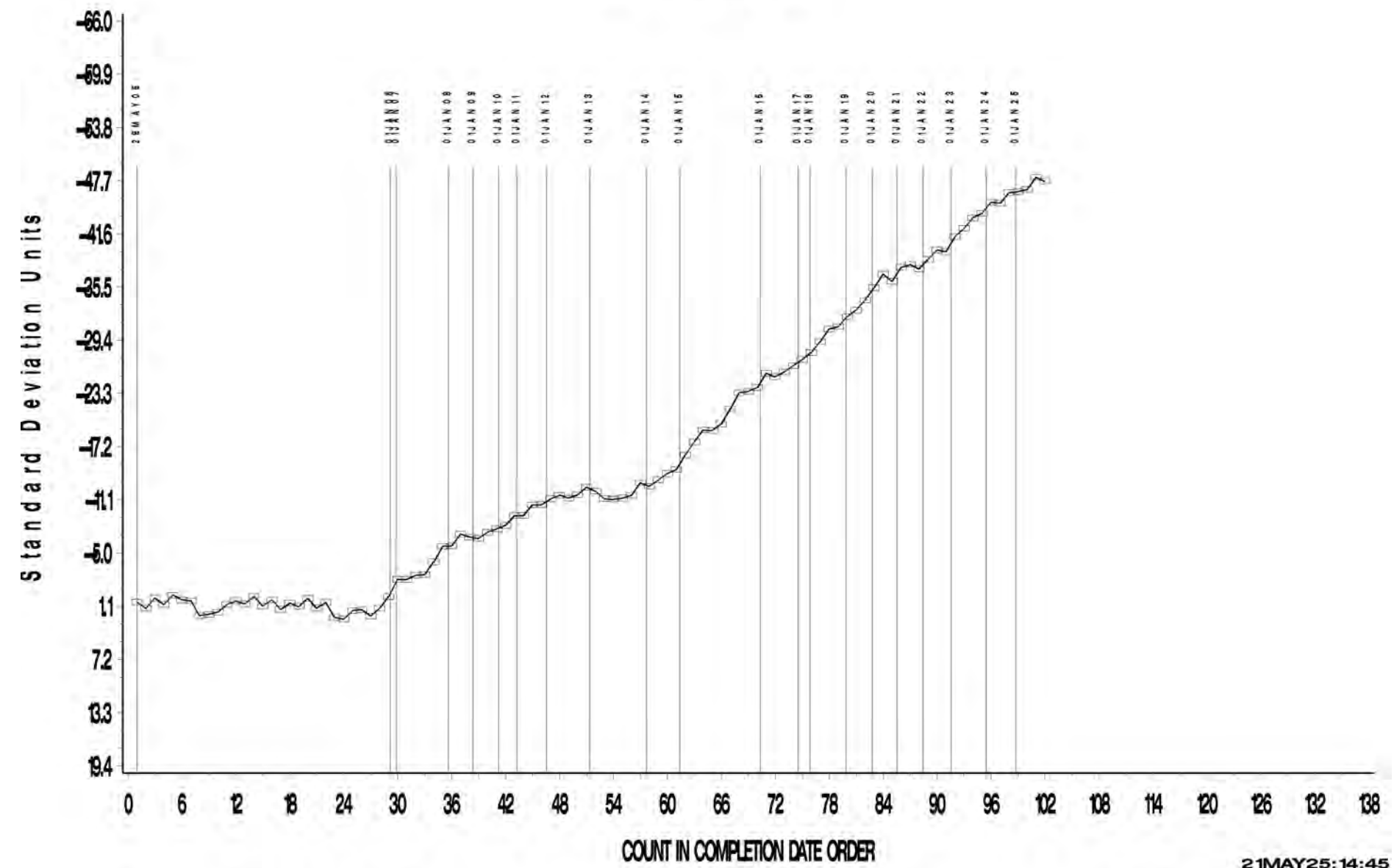
LTMS Precision Analysis



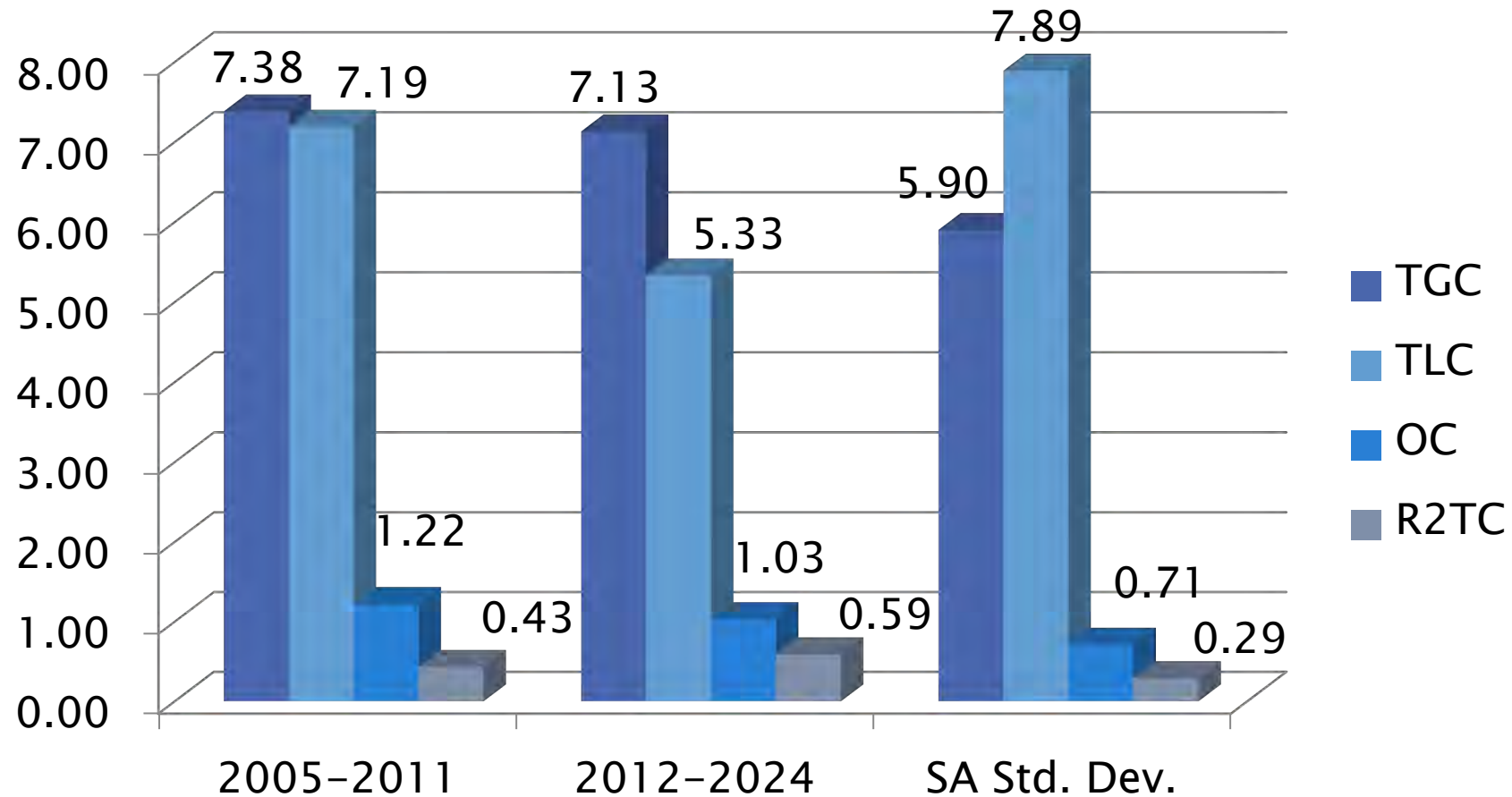


TOP LAND CARBON AVG. — FINAL RESULT

CUSUM Severity Analysis



C13 Precision Estimates



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Test Monitoring Center
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C13 Oil Aeration (COAT)

»» April 2025

COAT Test Activity

Test Status	Validity Code	COAT
Acceptable Calibration Test	AC	3
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Informational	NN	6
Total		9

COAT Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

COAT Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

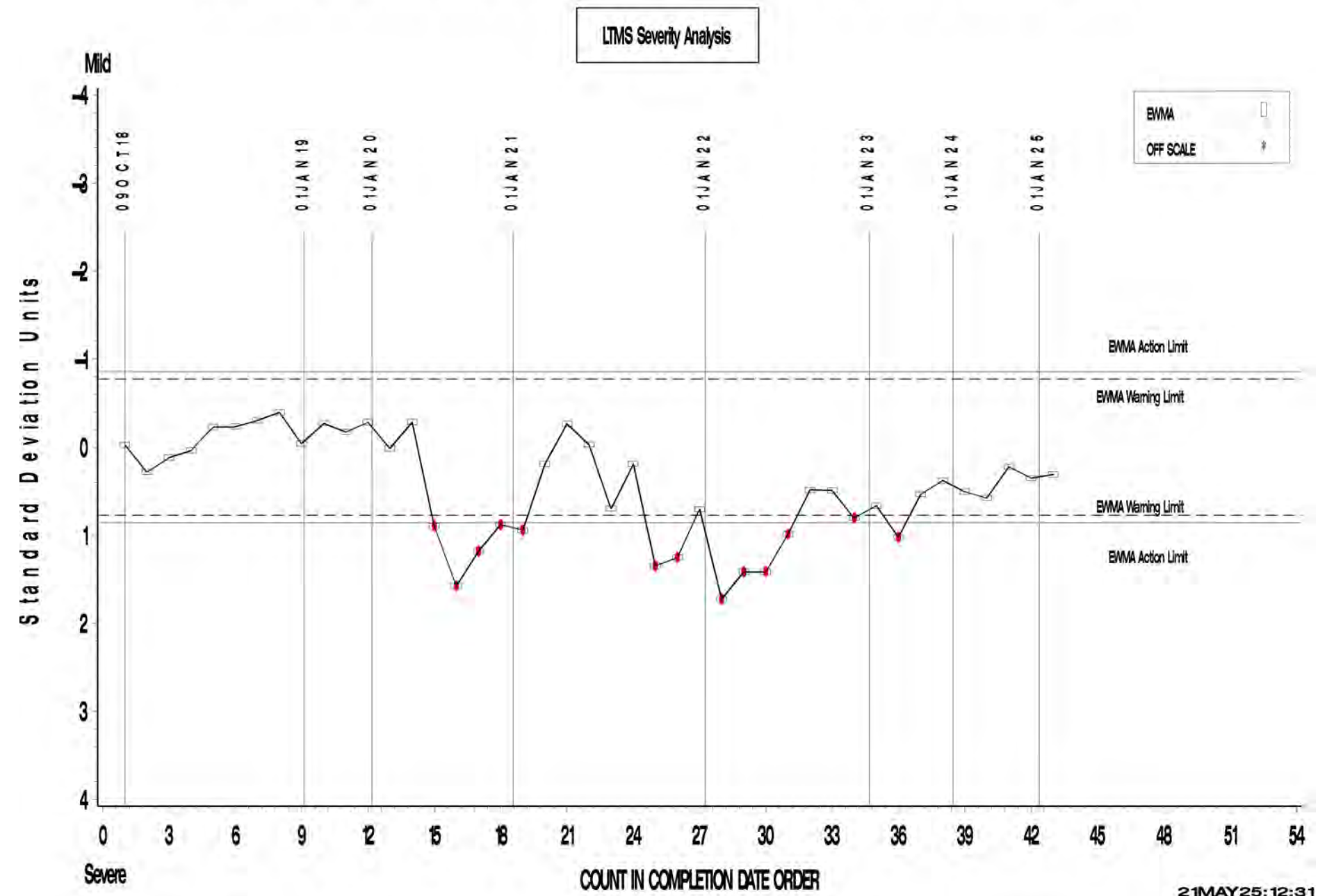
*Invalid and aborted tests

COAT Test Severity

- ▶ AAVE is in control



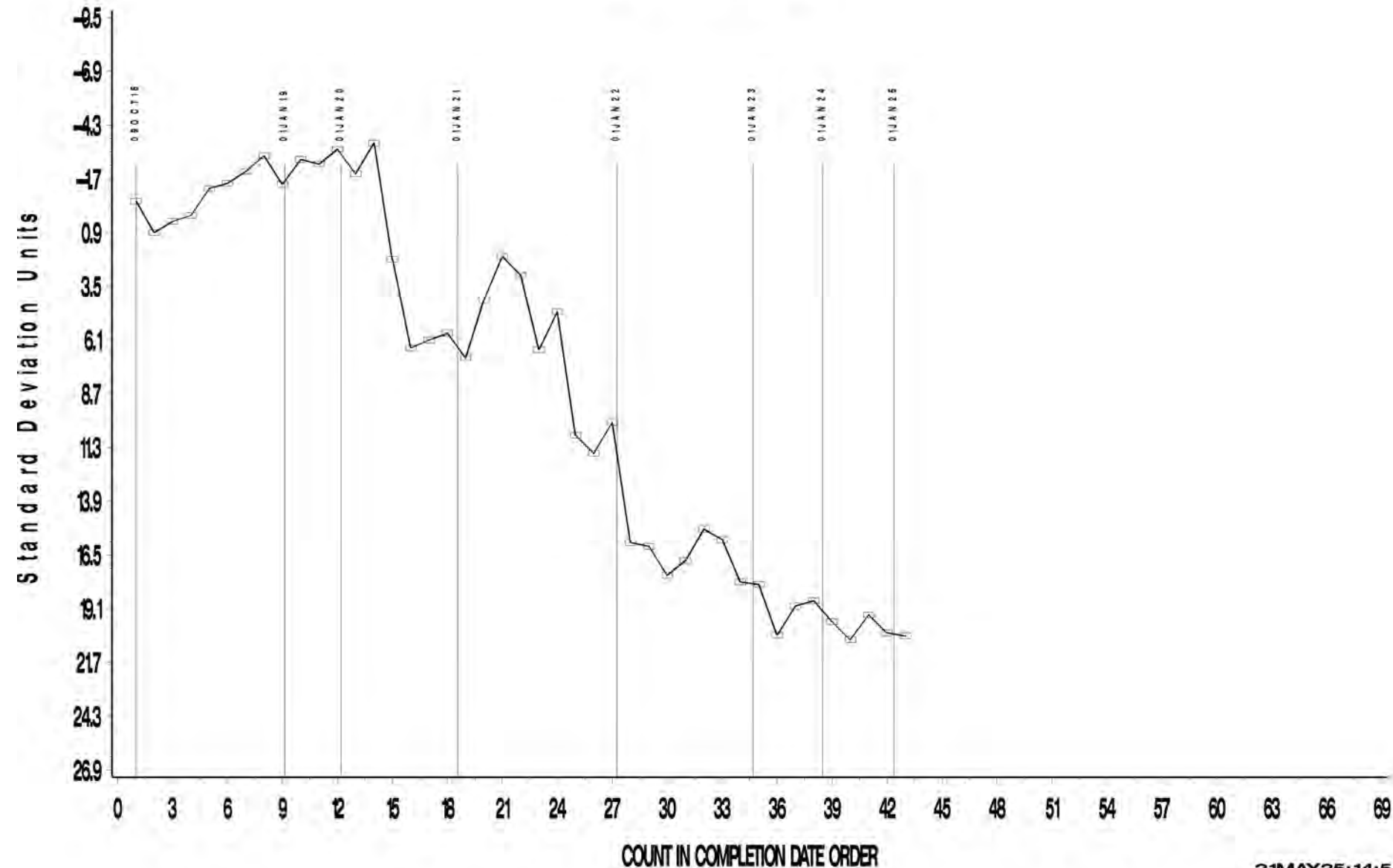
CORRECTED AVERAGE OIL AERATION OVER TEST HOURS 40 — 50





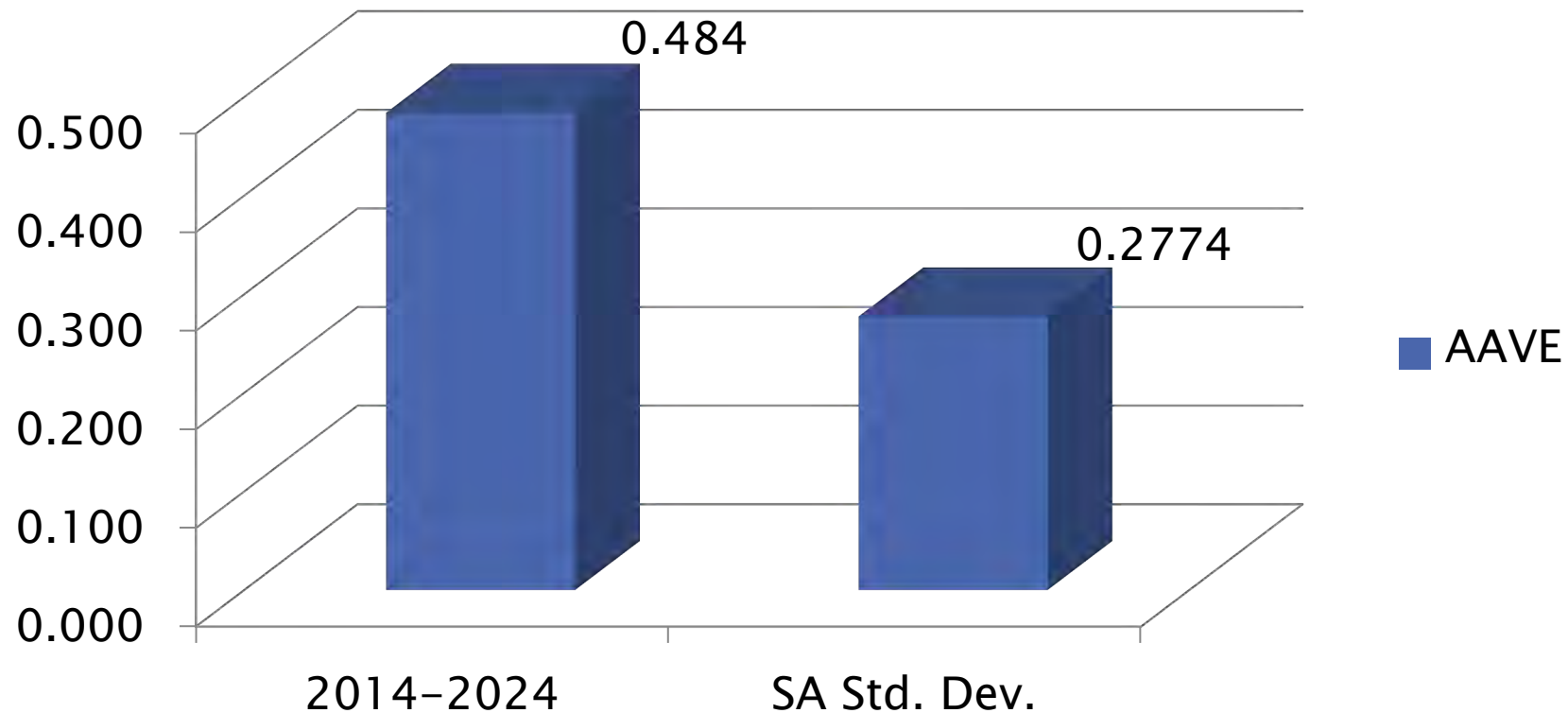
CORRECTED AVERAGE OIL AERATION OVER TEST HOURS 40 — 50

CUSUM Severity Analysis



COAT Precision Estimates

AAVE



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



Daimler DD13 Scuffing Test

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



DD13 Test Activity

Test Status	Validity Code	COAT
Acceptable Calibration Test	AC	1
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Valid Matrix Test	AM	17
Invalid Matrix Test	LM	1
Total		19

DD13 Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

DD13 Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

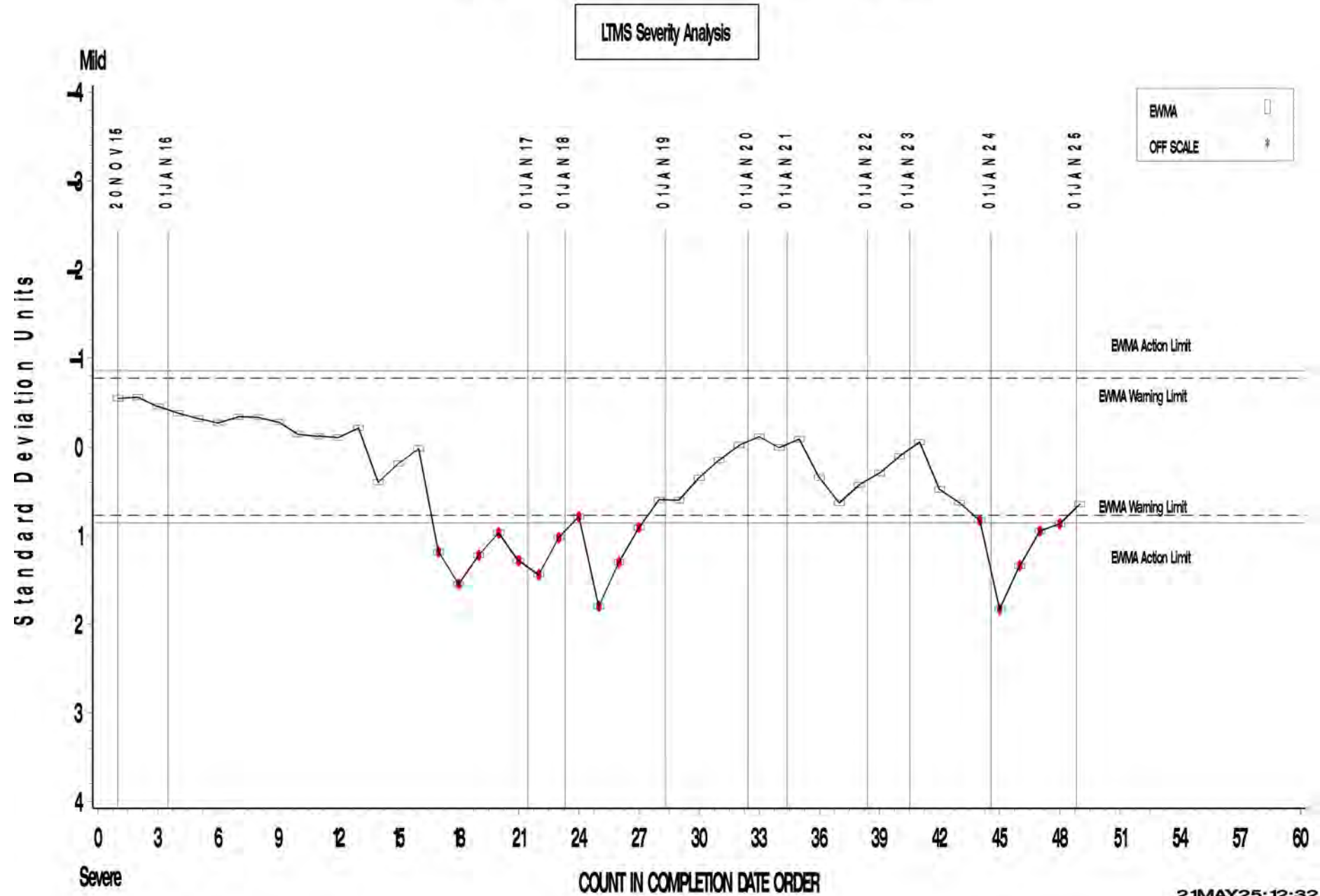
*Invalid and aborted tests

DD13 Test Severity

- ▶ HRS2 is in control.



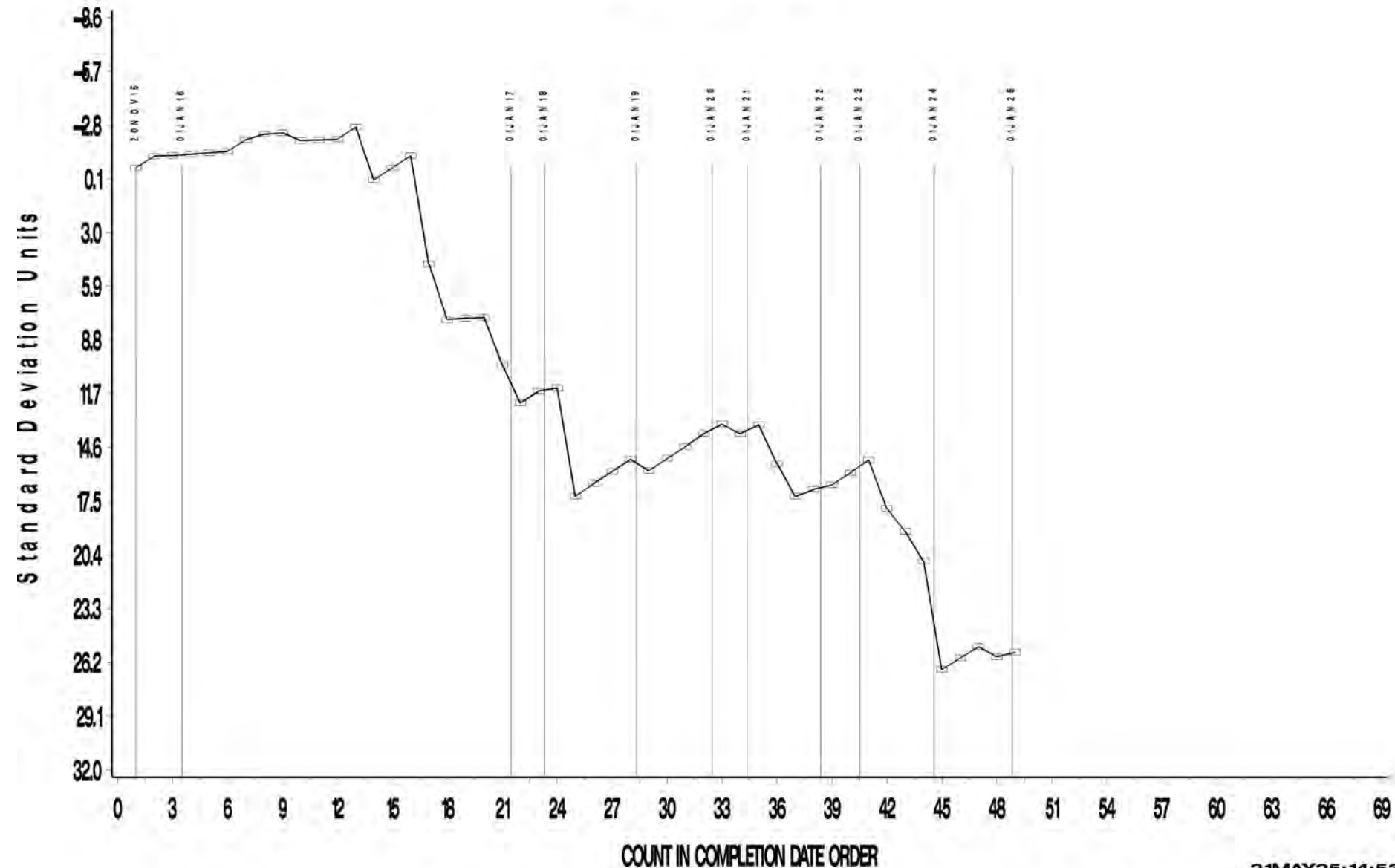
FNL. ORIG. UNIT HOURS TO SCUFF





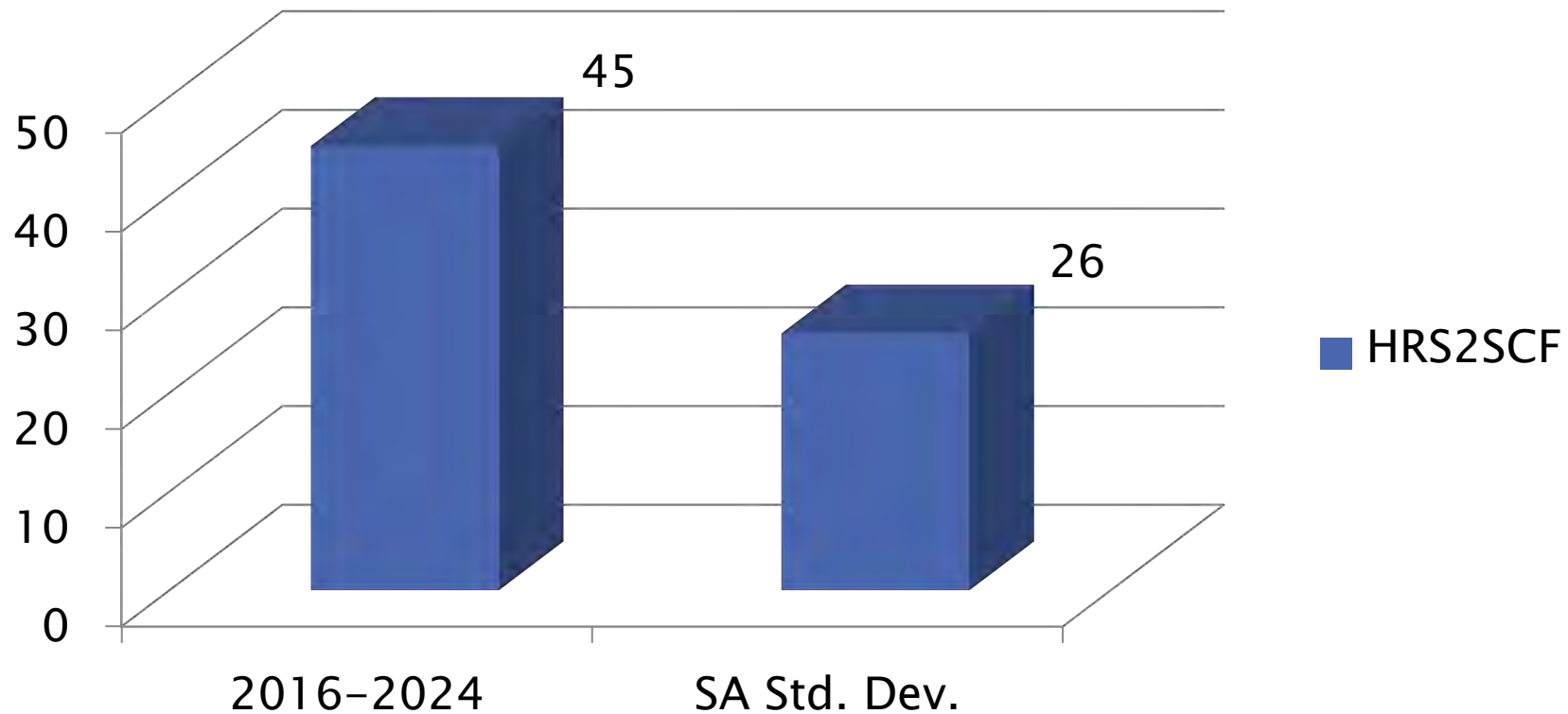
FNL. ORIG. UNIT HOURS TO SCUFF

CUSUM Severity Analysis



DD13 Precision Estimates

HRS2SCF



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Test Monitoring Center
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EOAT

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Test Monitoring Center
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EOAT Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	1
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		1

EOAT Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

EOAT Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

*Invalid and aborted tests

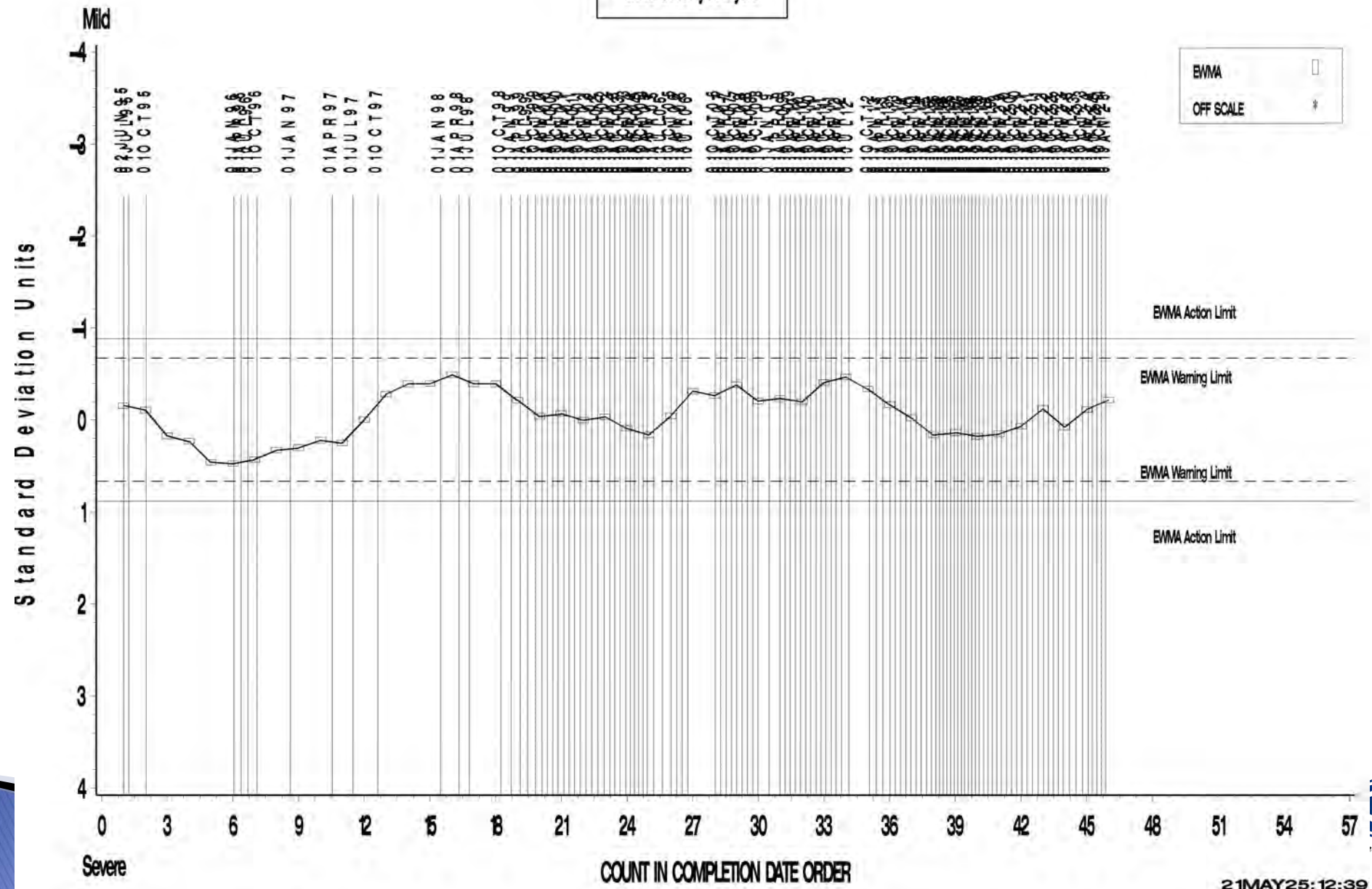
EOAT Test Severity

- ▶ AEOA is in control.



ENGINE OIL AERATION

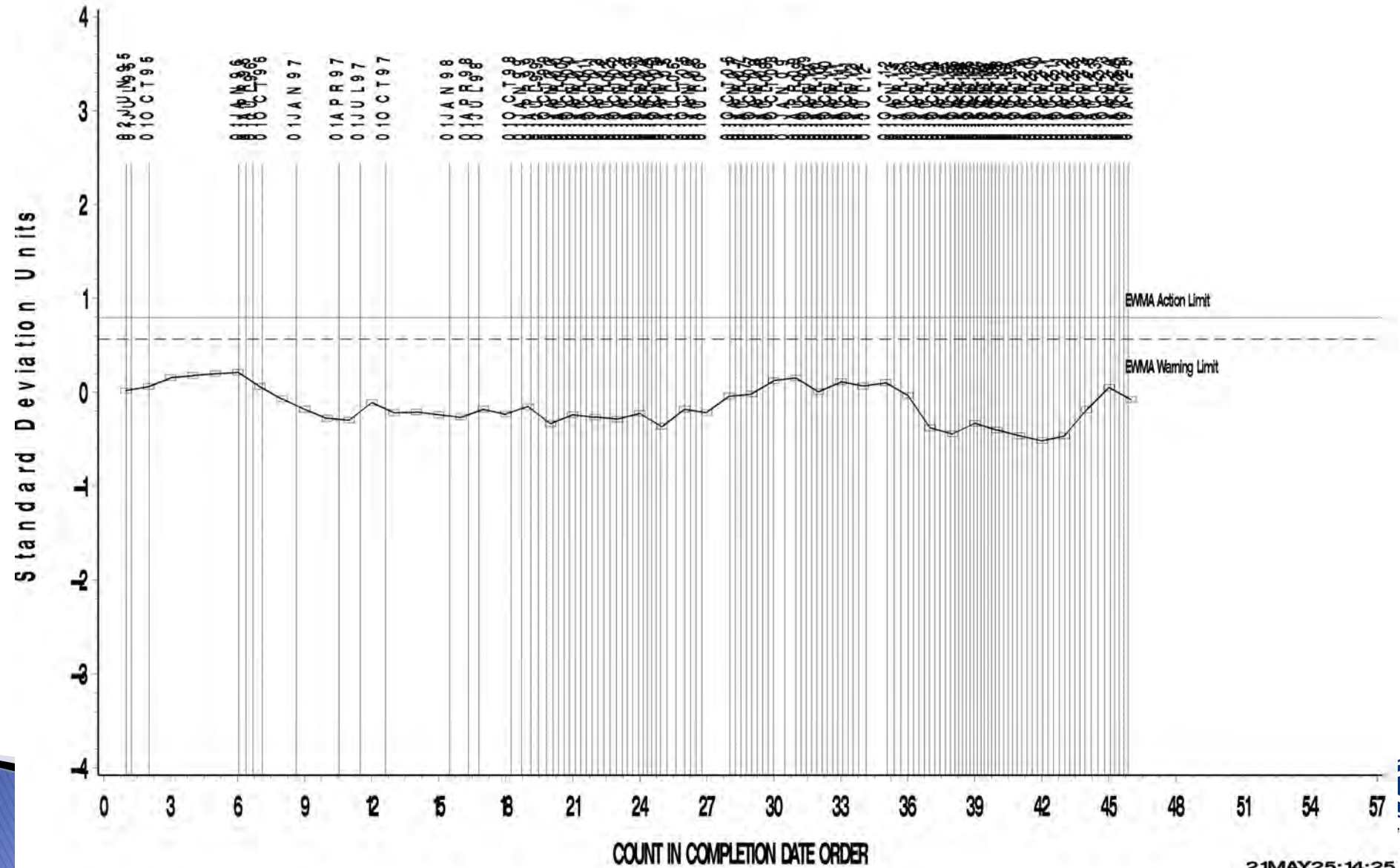
LTMS Severity Analysis





ENGINE OIL AERATION

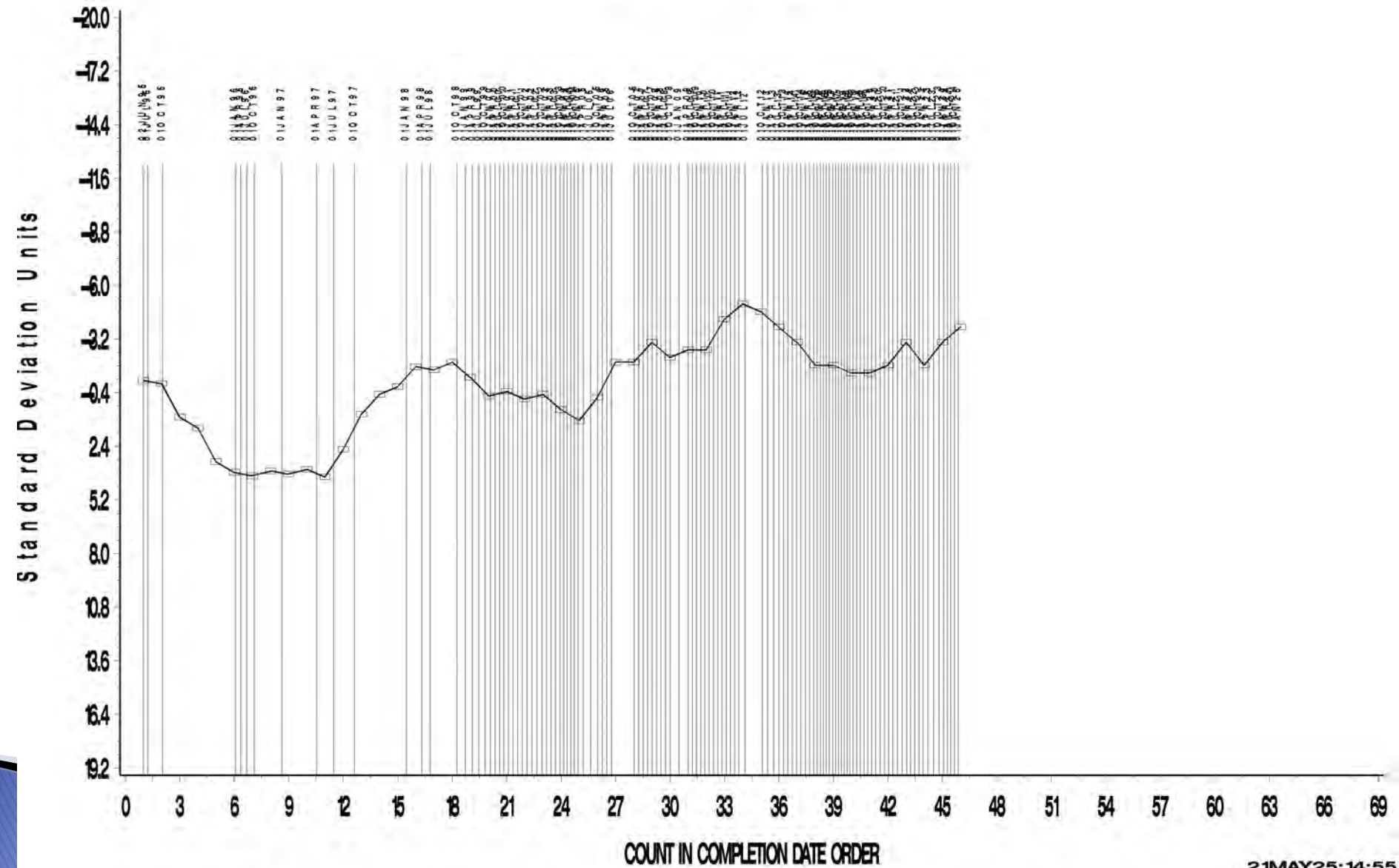
LTMS Precision Analysis



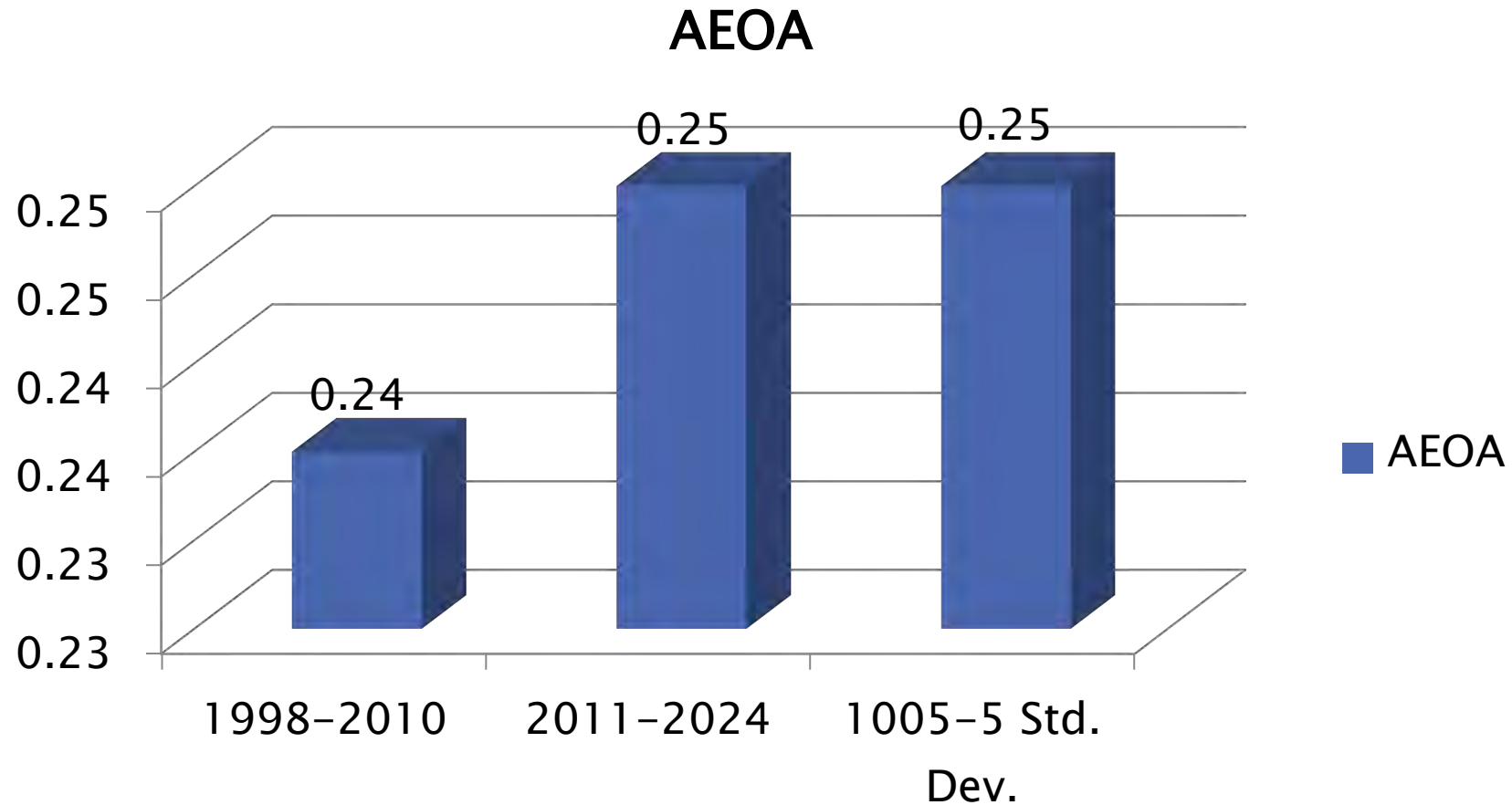


ENGINE OIL AERATION

CUSUM Severity Analysis



EOAT Precision Estimates



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Test Monitoring Center
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Cummins ISB

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ISB Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	7
Failed Calibration Test	OC	0
Operationally Invalid	LC	1
Aborted	XC	0
Hardware Approval Test	NI	1
Precision Matrix	AM	3
Total		12

ISB Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

ISB Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

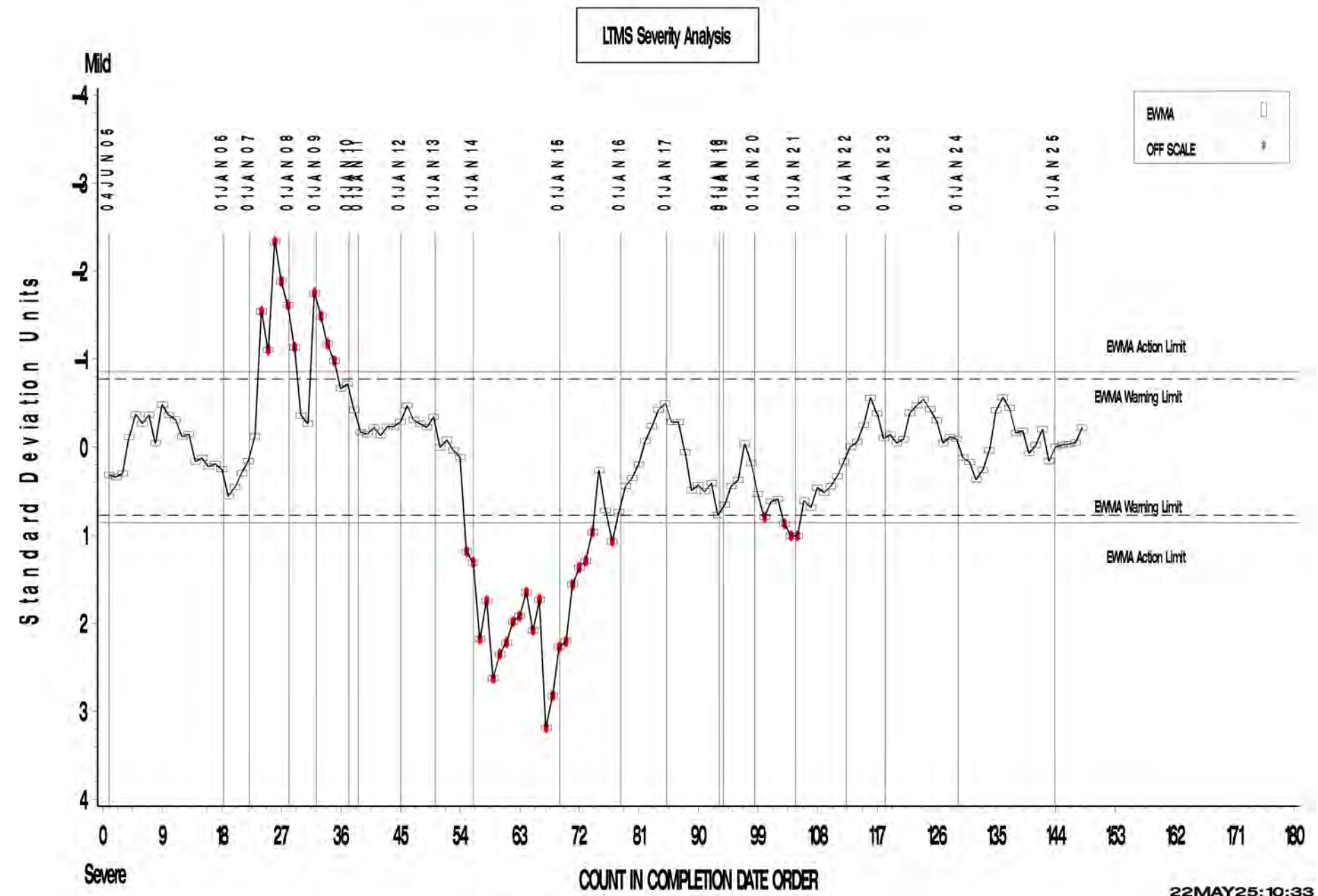
*Invalid and aborted tests

ISB Test Severity

- ▶ ACSW and ATWL are in control.



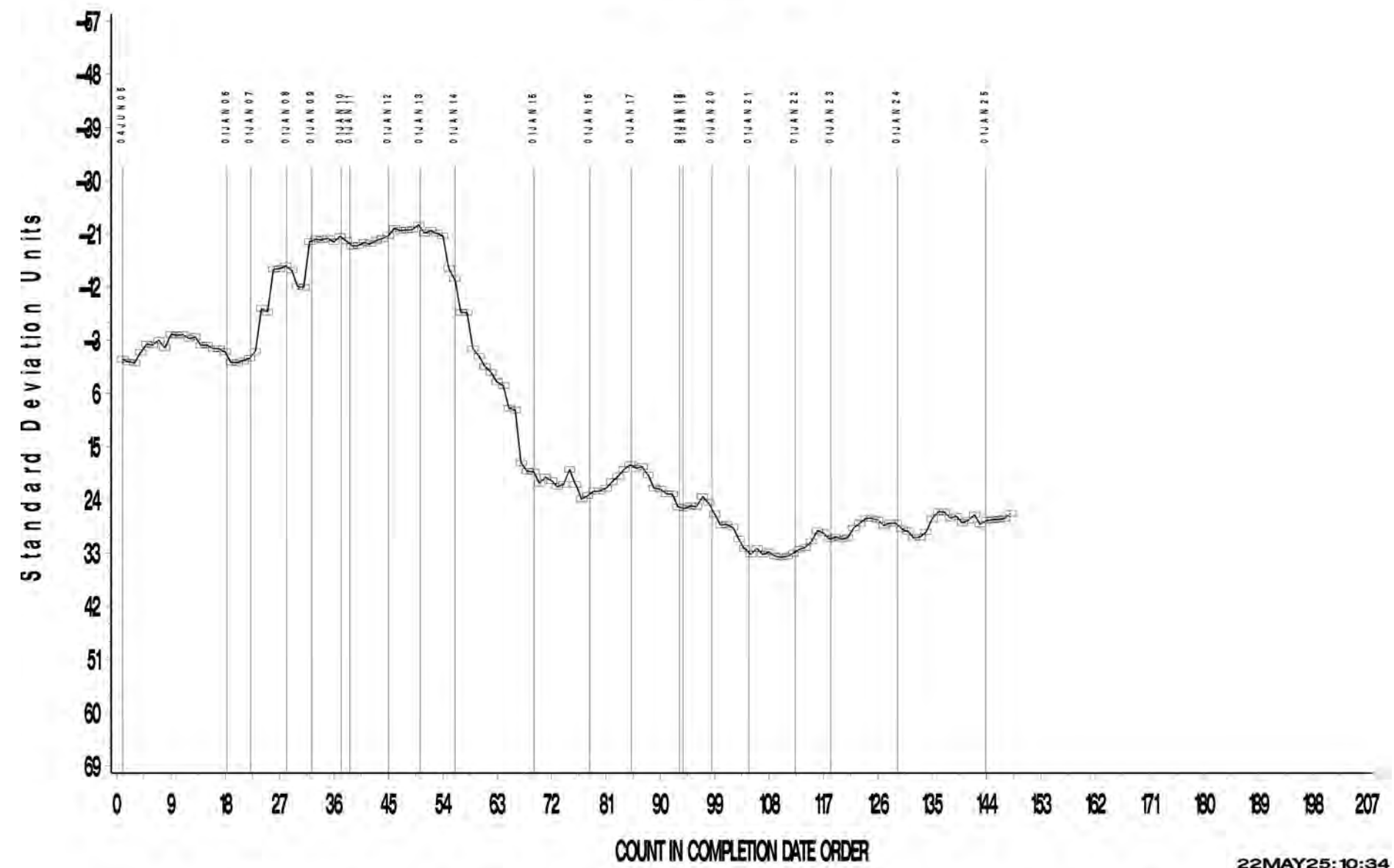
TRANS FINAL AVG CAMSHAFT WEAR





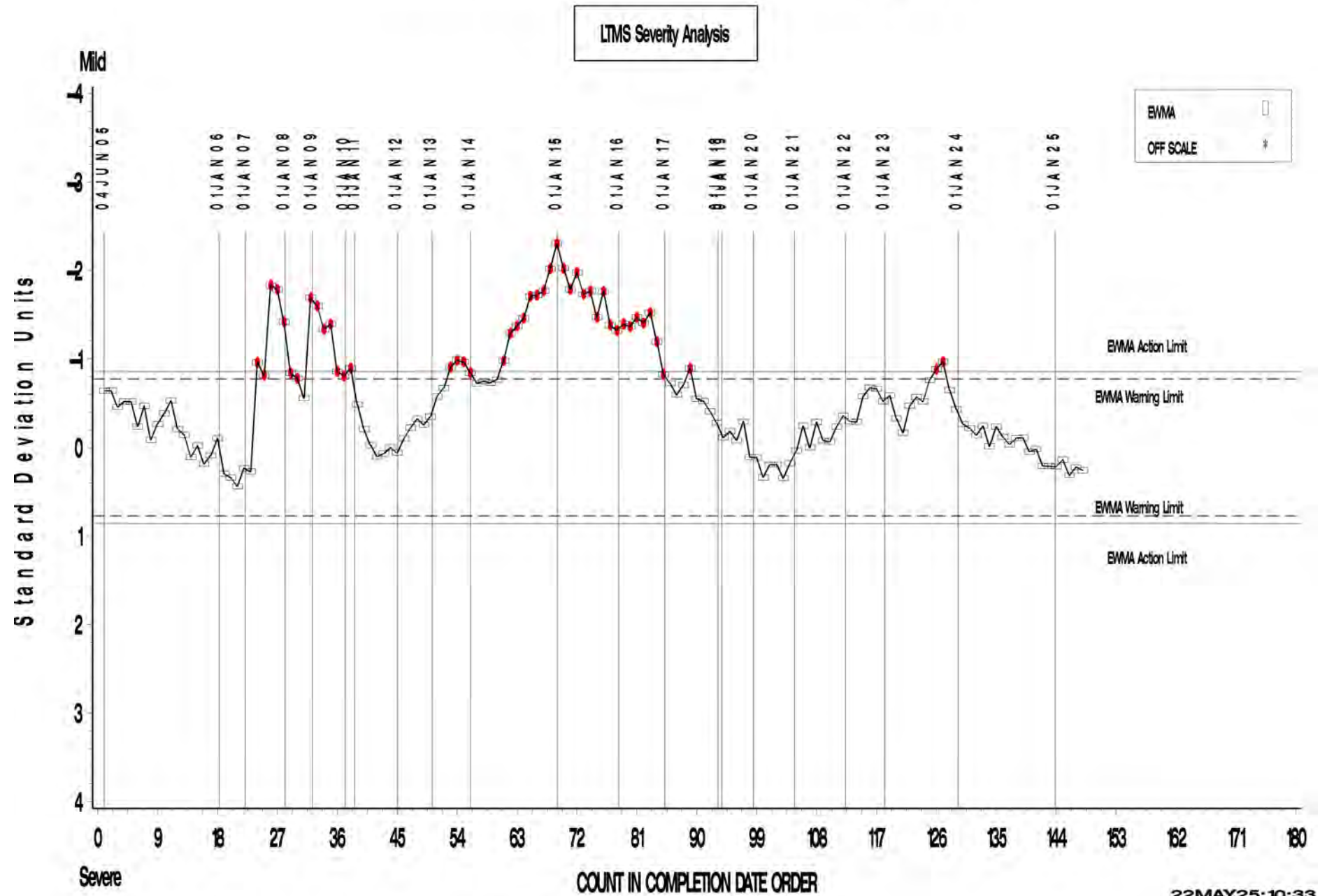
TRANS FINAL AVG CAMSHAFT WEAR

CUSUM Severity Analysis





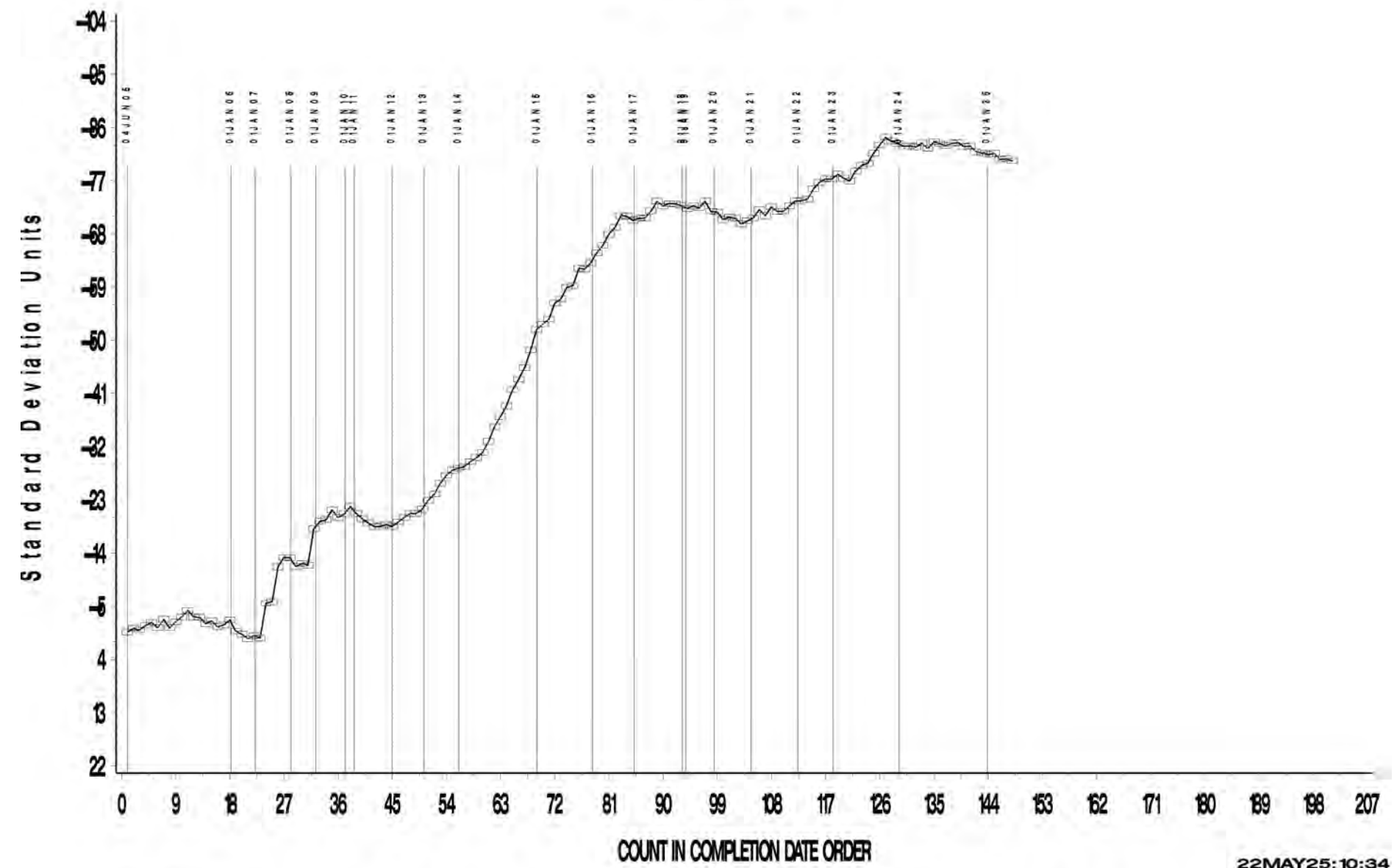
TRANS FINAL AVG TAPPET WEIGHT LOSS



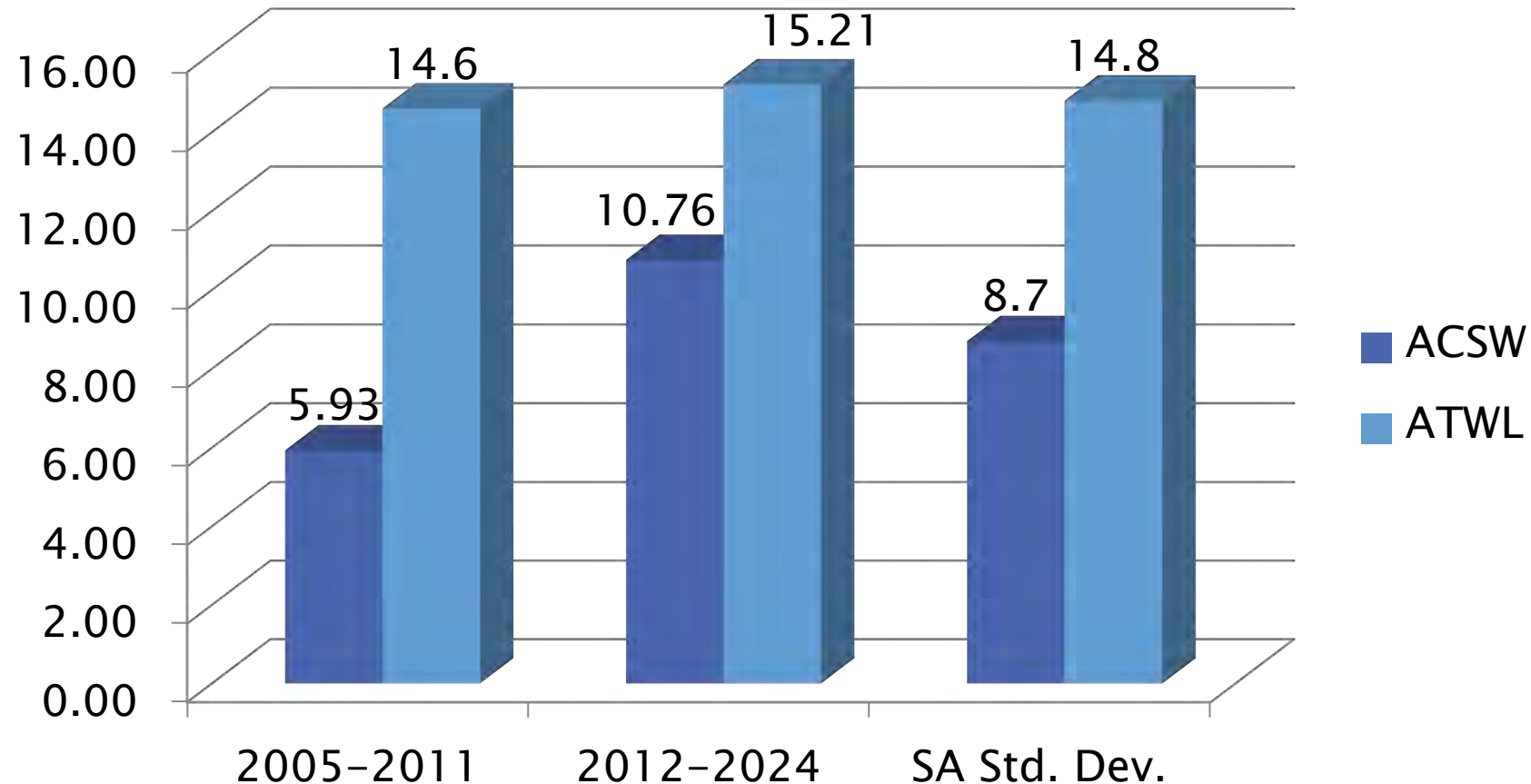


TRANS FINAL AVG TAPPET WEIGHT LOSS

CUSUM Severity Analysis



ISB Precision Estimates



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Test Monitoring Center
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Cummins ISM

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



ISM Test Activity

Test Status	Validity Code	#
Acceptable Calibration	AC	4
Failed Calibration	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		4

ISM Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

ISM Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

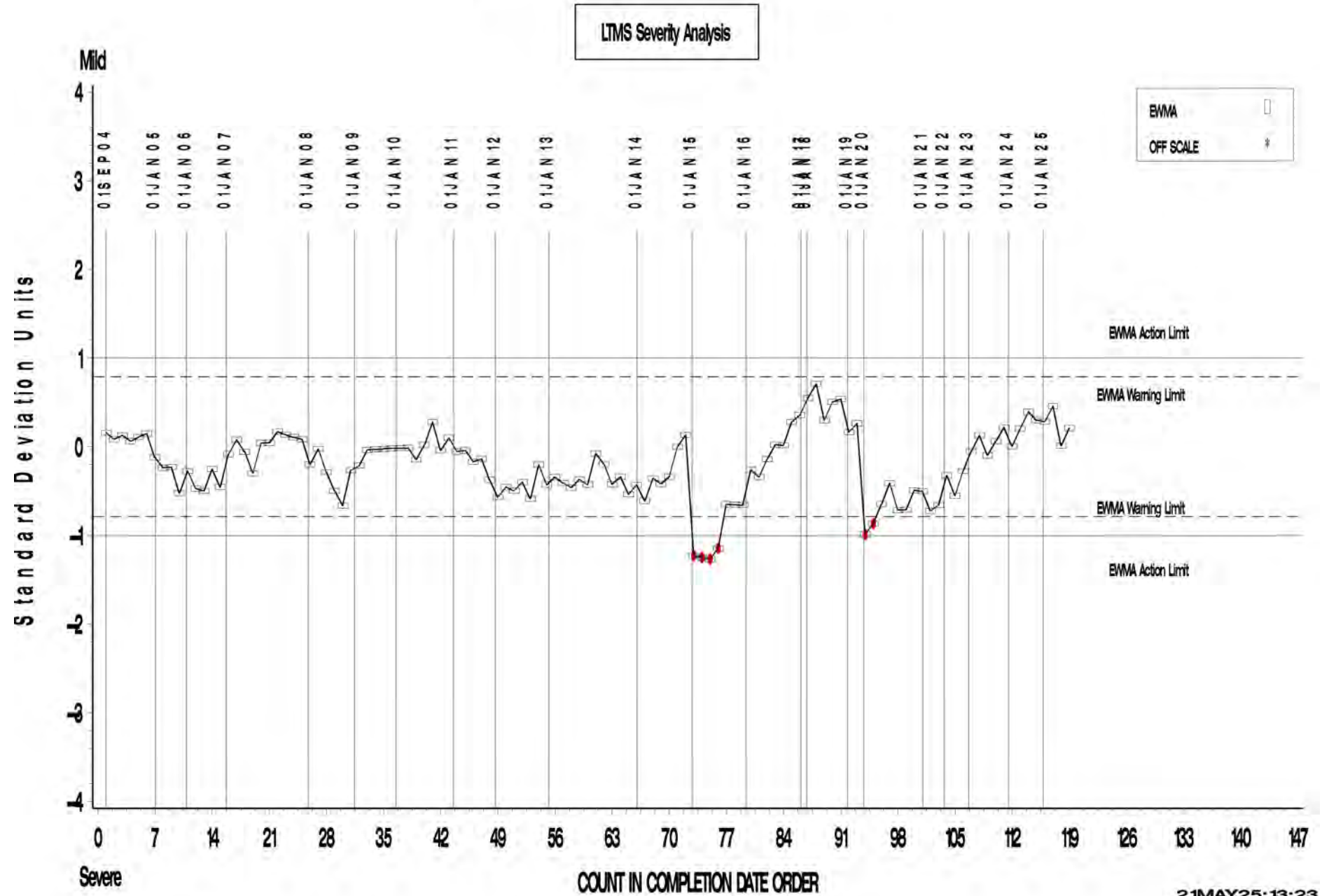
*Invalid and aborted tests

ISM Test Severity

- ▶ CWL is in severity warning alarm in the mild direction.
- ▶ IAS is in severity action alarm in the severe direction.
- ▶ FPD and ASR are in control.



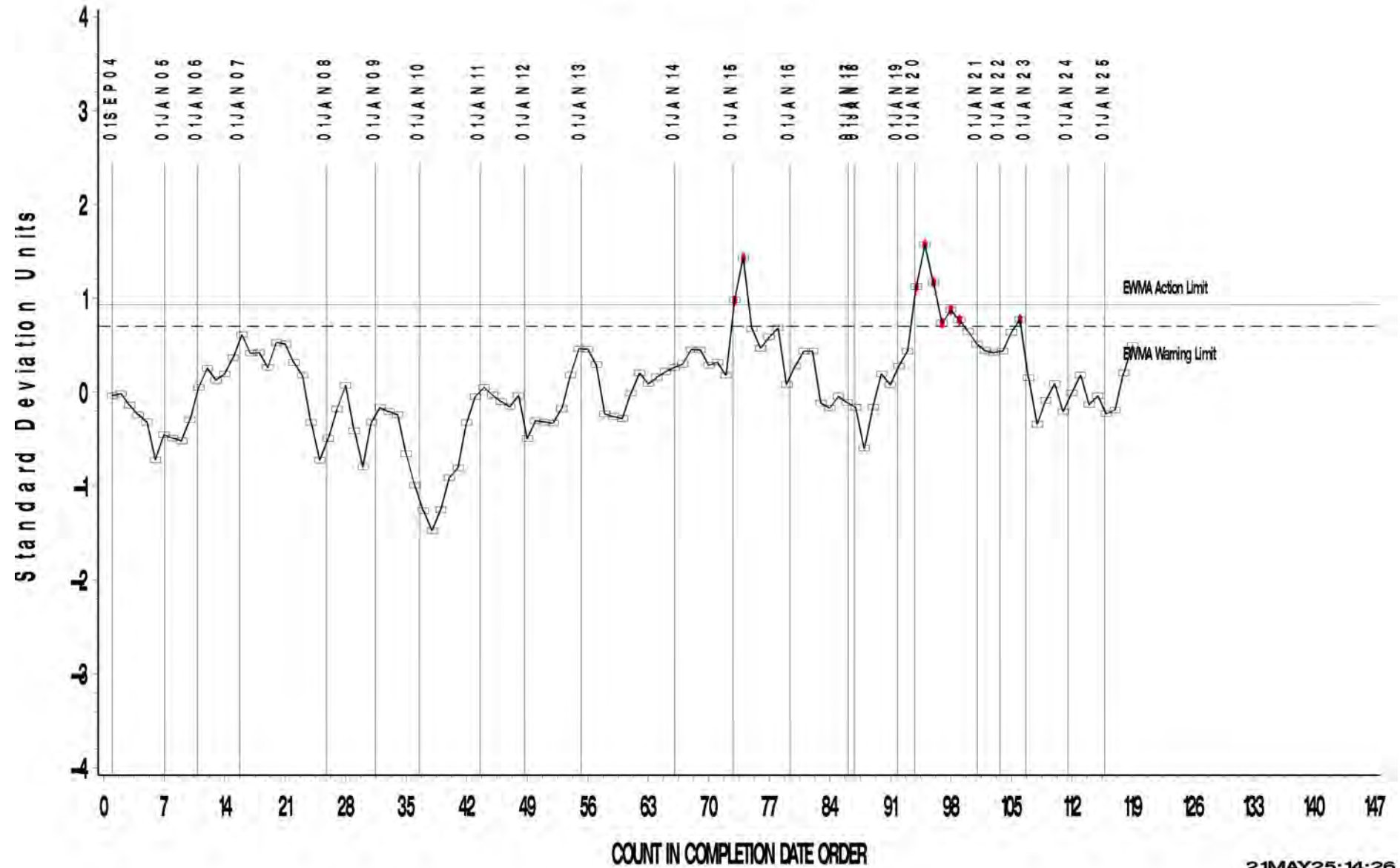
AVERAGE SLUDGE RATING





AVERAGE SLUDGE RATING

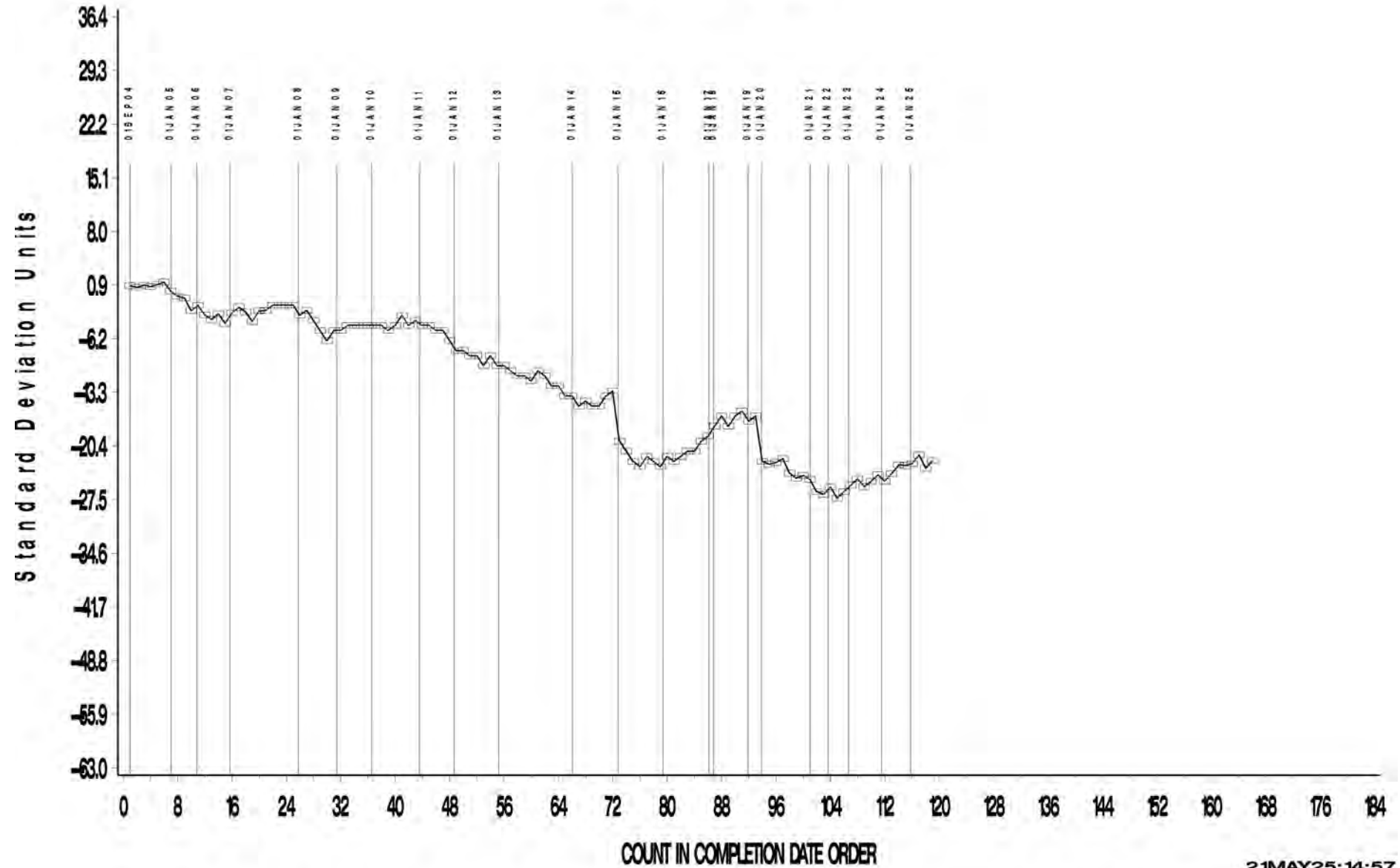
LTMS Precision Analysis





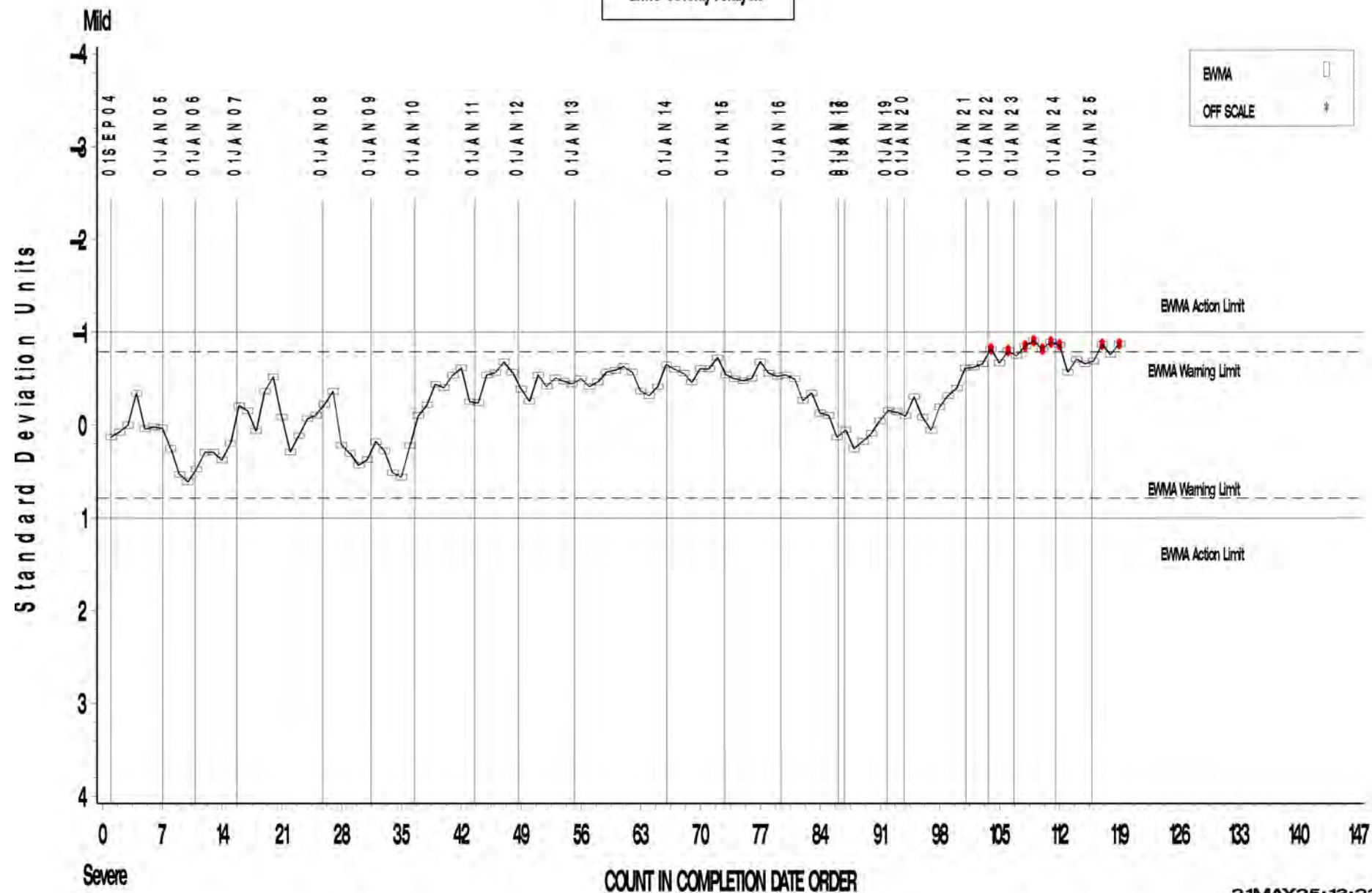
AVERAGE SLUDGE RATING

CUSUM Severity Analysis



CROSSHEAD WEIGHT LOSS ADJUSTED TO 3.9 % SOOT

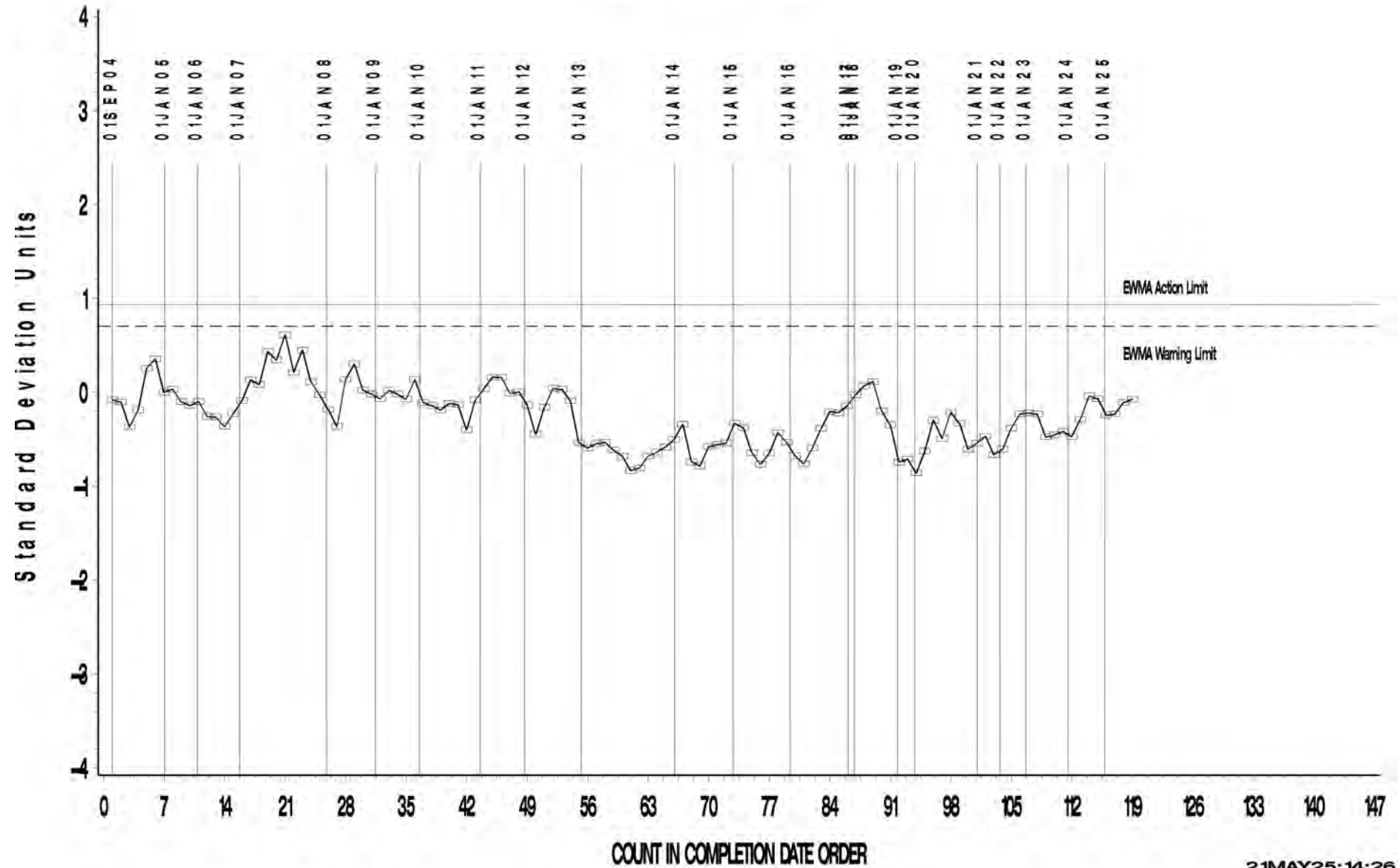
LTMS Severity Analysis





CROSSHEAD WEIGHT LOSS ADJUSTED TO 3.9 % SOOT

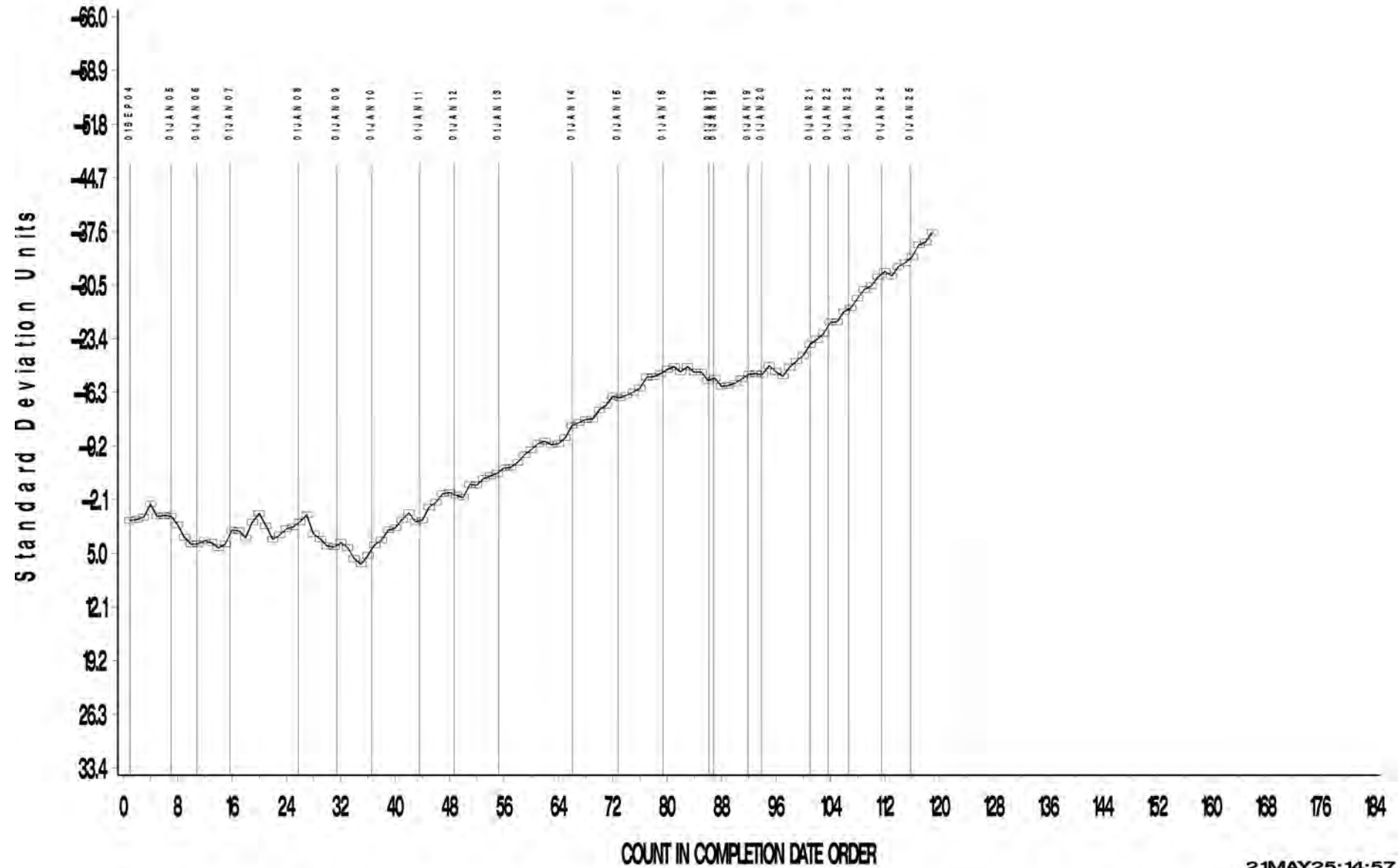
LTMS Precision Analysis





CROSSHEAD WEIGHT LOSS ADJUSTED TO 3.9 % SOOT

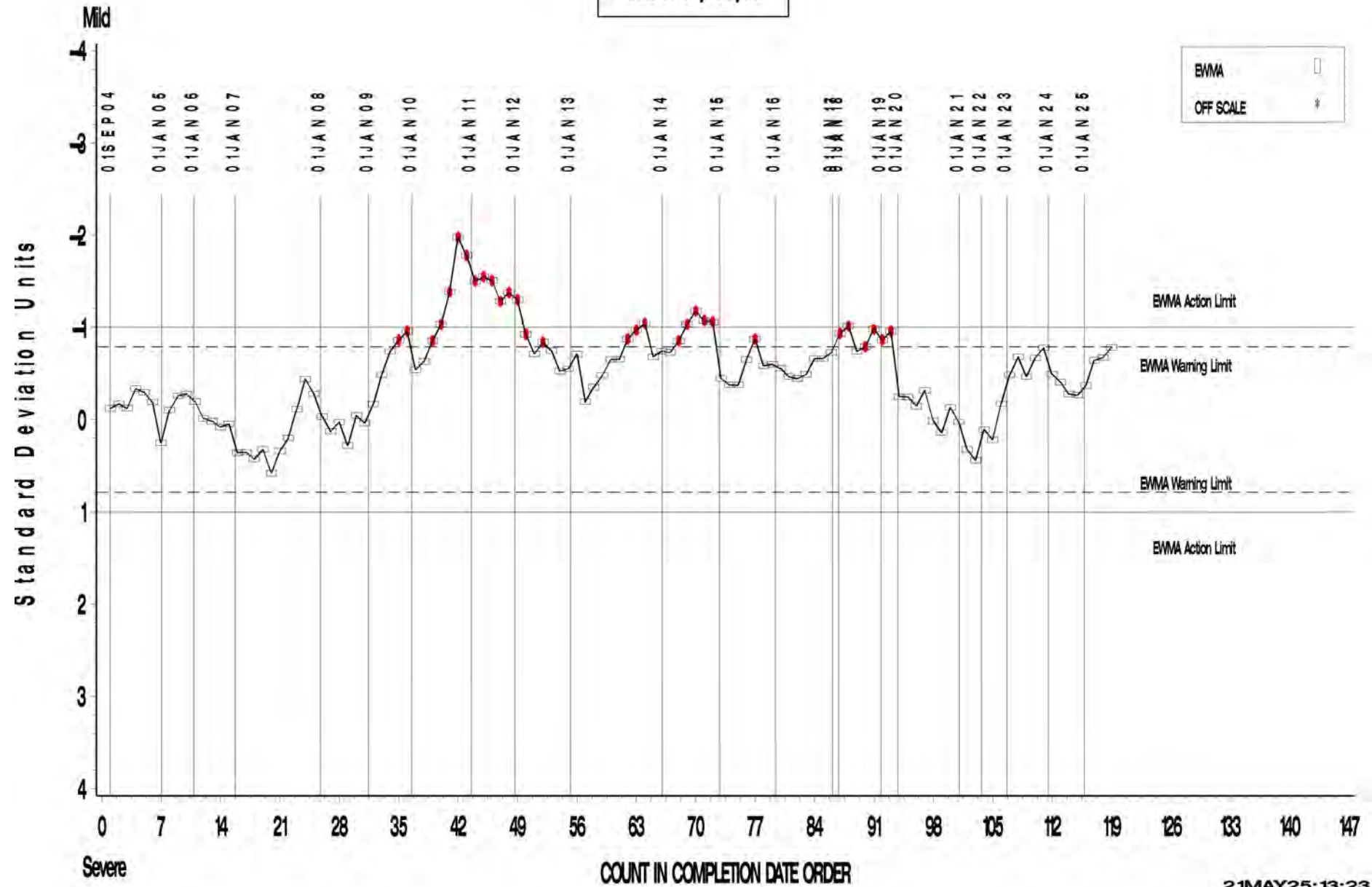
CUSUM Severity Analysis





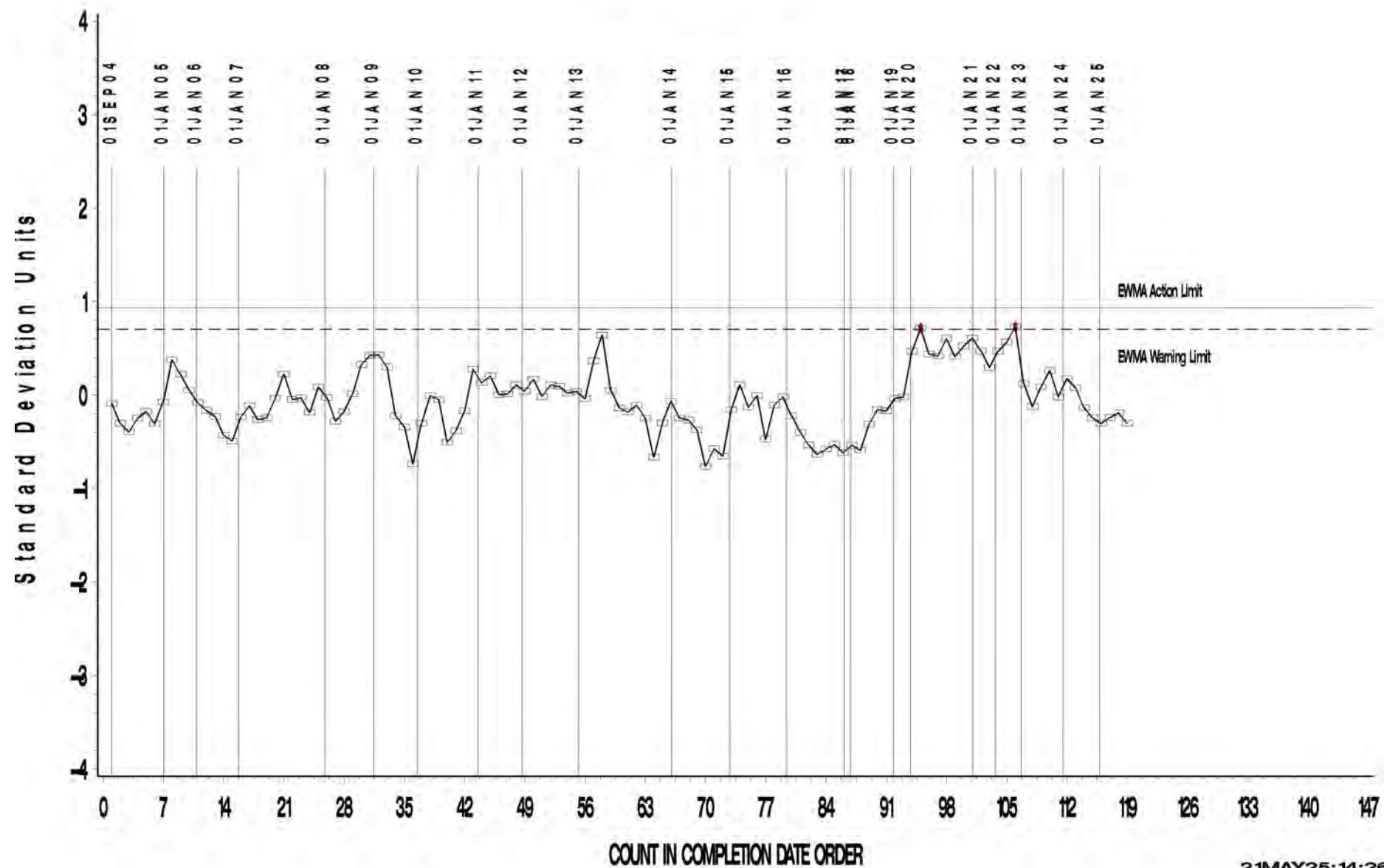
OIL FILTER DELTA PRESSURE

LTMS Severity Analysis



OIL FILTER DELTA PRESSURE

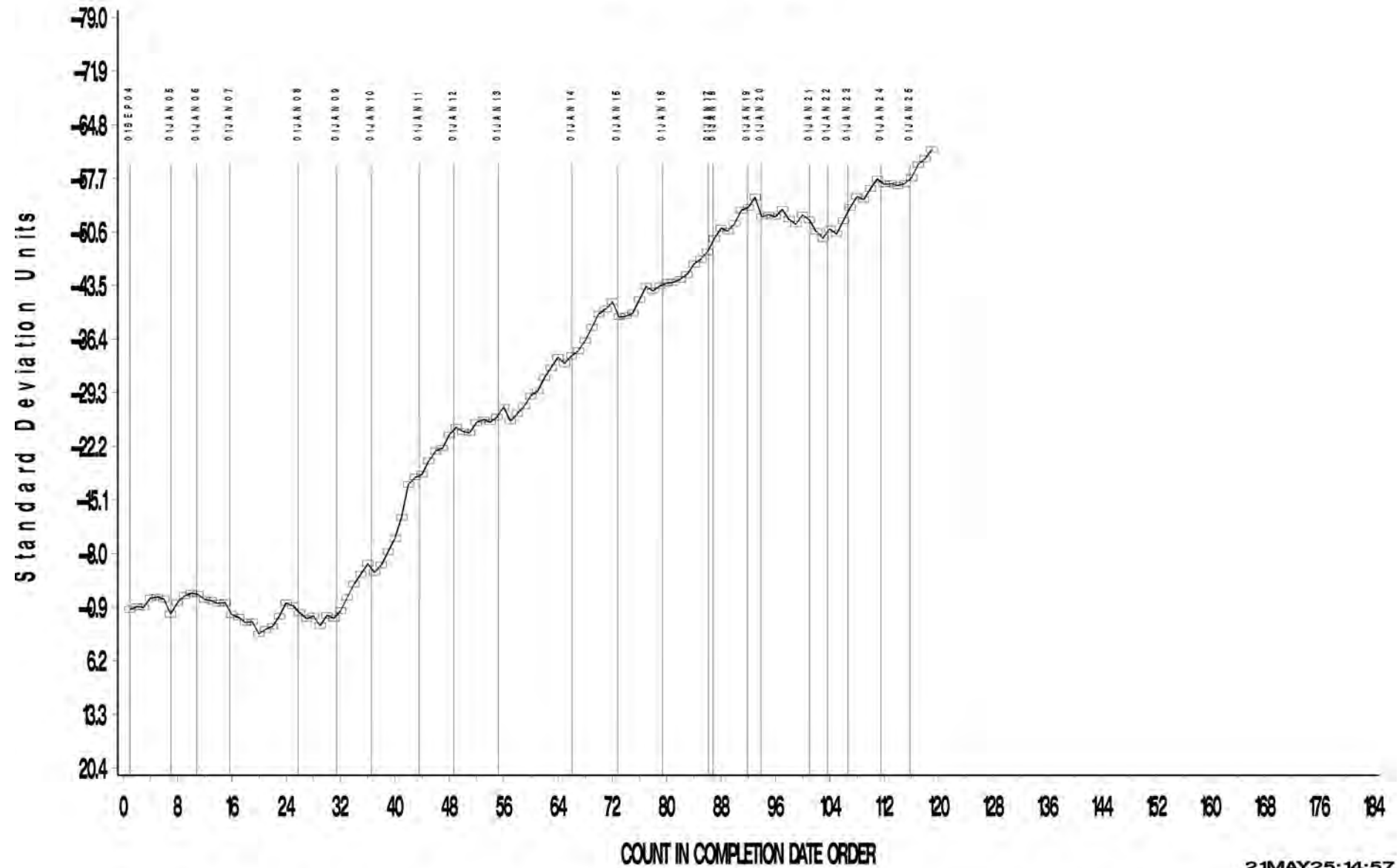
LTMS Precision Analysis





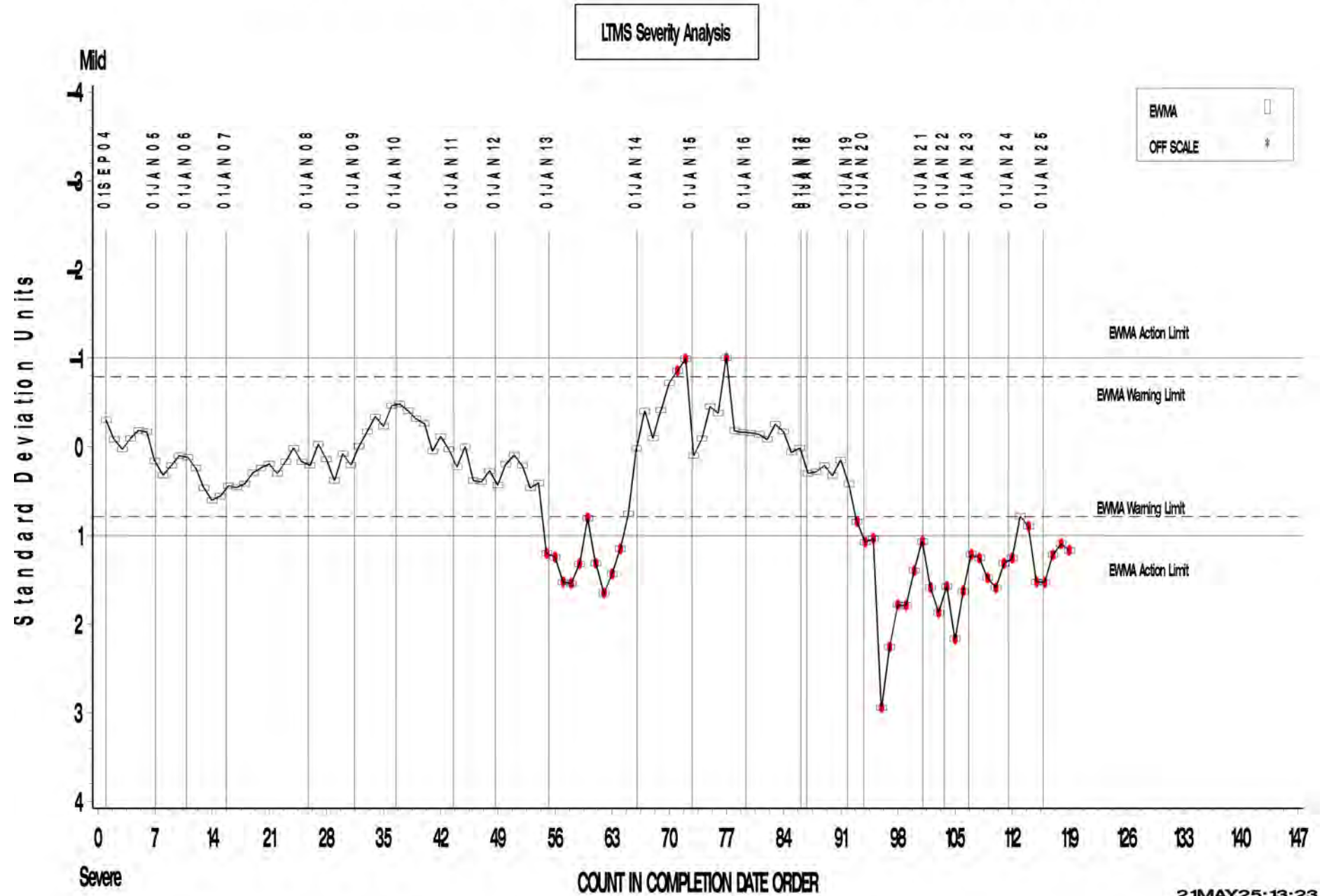
OIL FILTER DELTA PRESSURE

CUSUM Severity Analysis





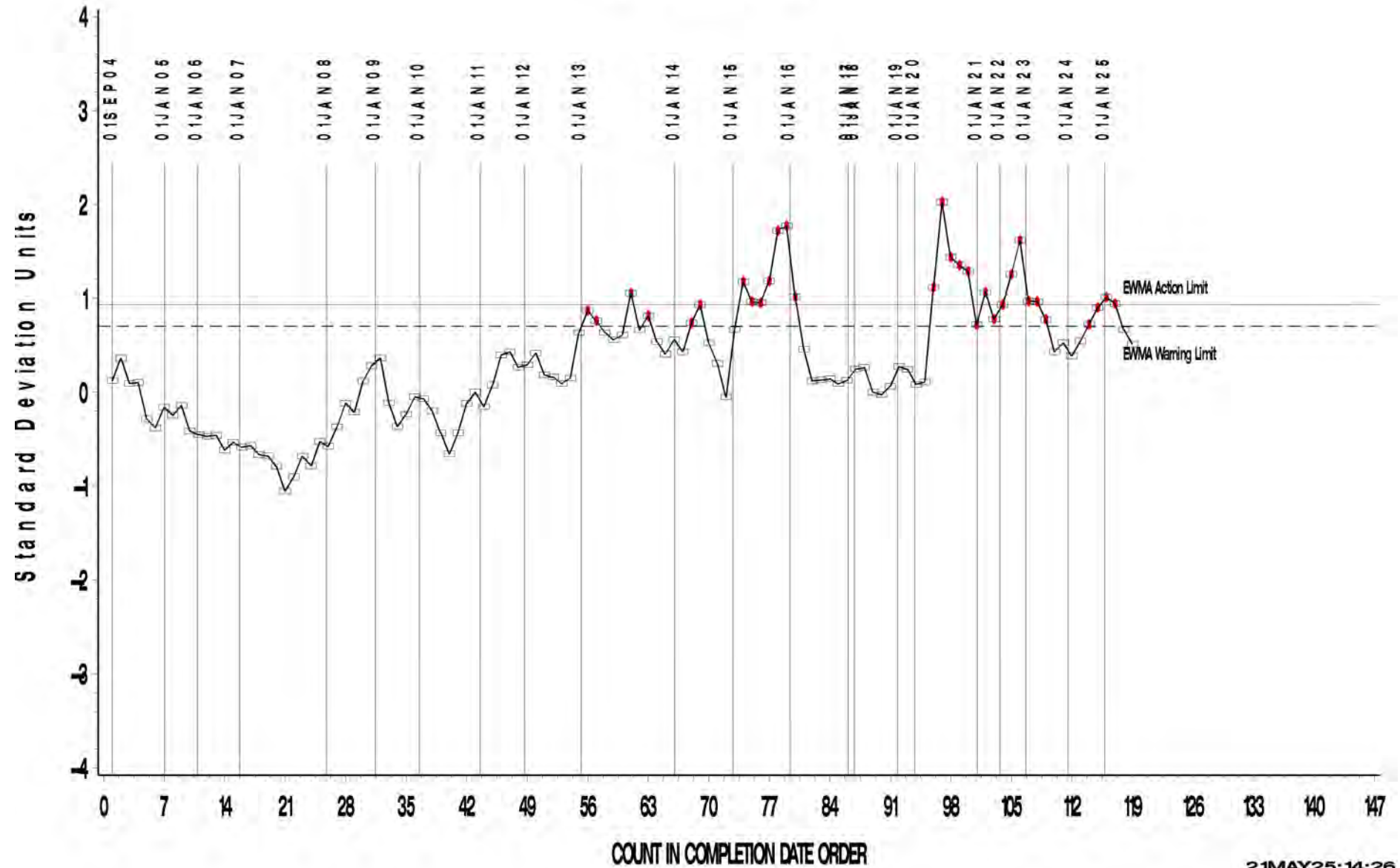
INJECTOR SCREW WEIGHT LOSS ADJUSTED TO 3.9% SOOT





INJECTOR SCREW WEIGHT LOSS ADJUSTED TO 3.9% SOOT

LTMS Precision Analysis

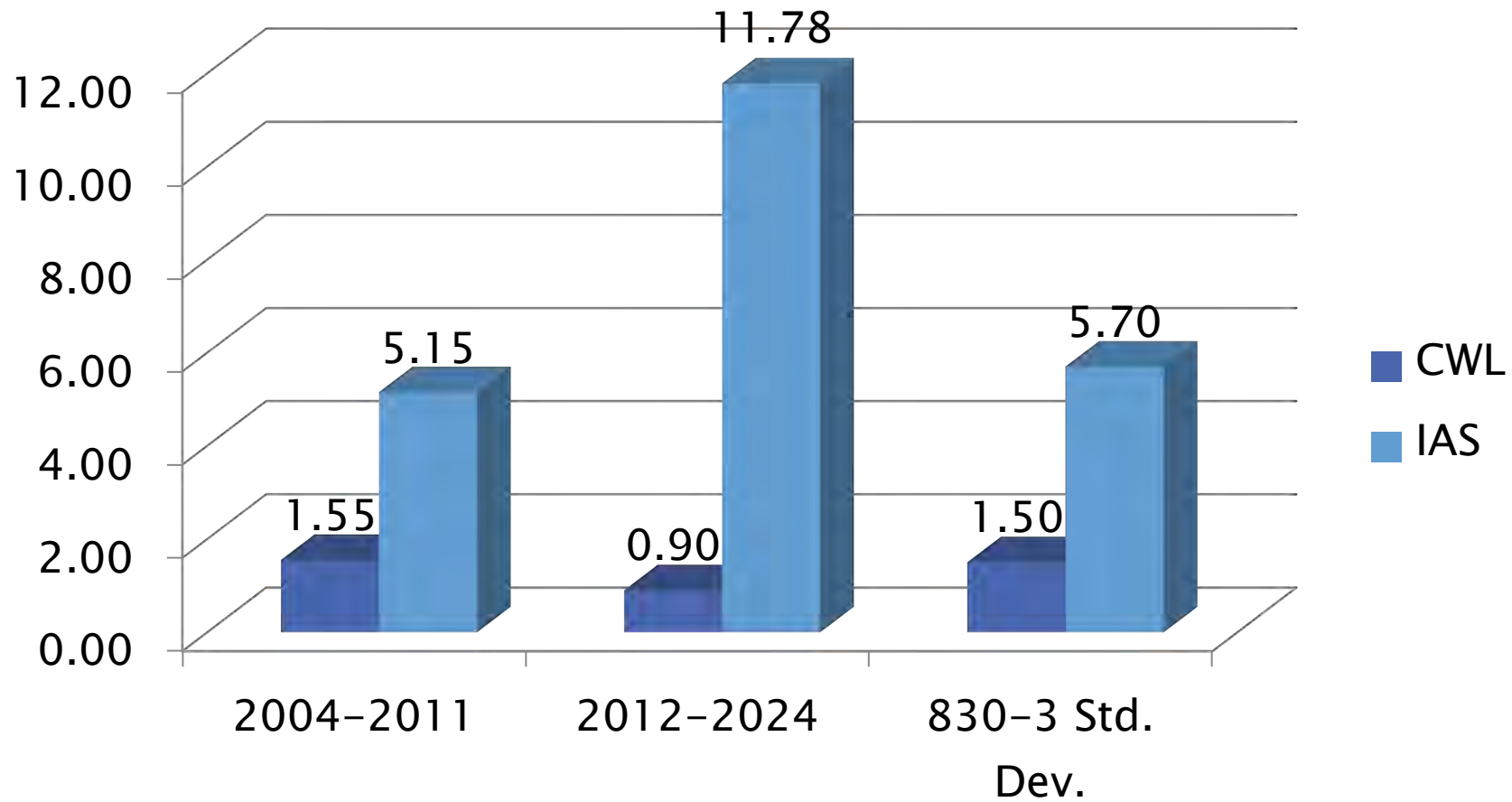


INJECTOR SCREW WEIGHT LOSS ADJUSTED TO 3.9% SOOT

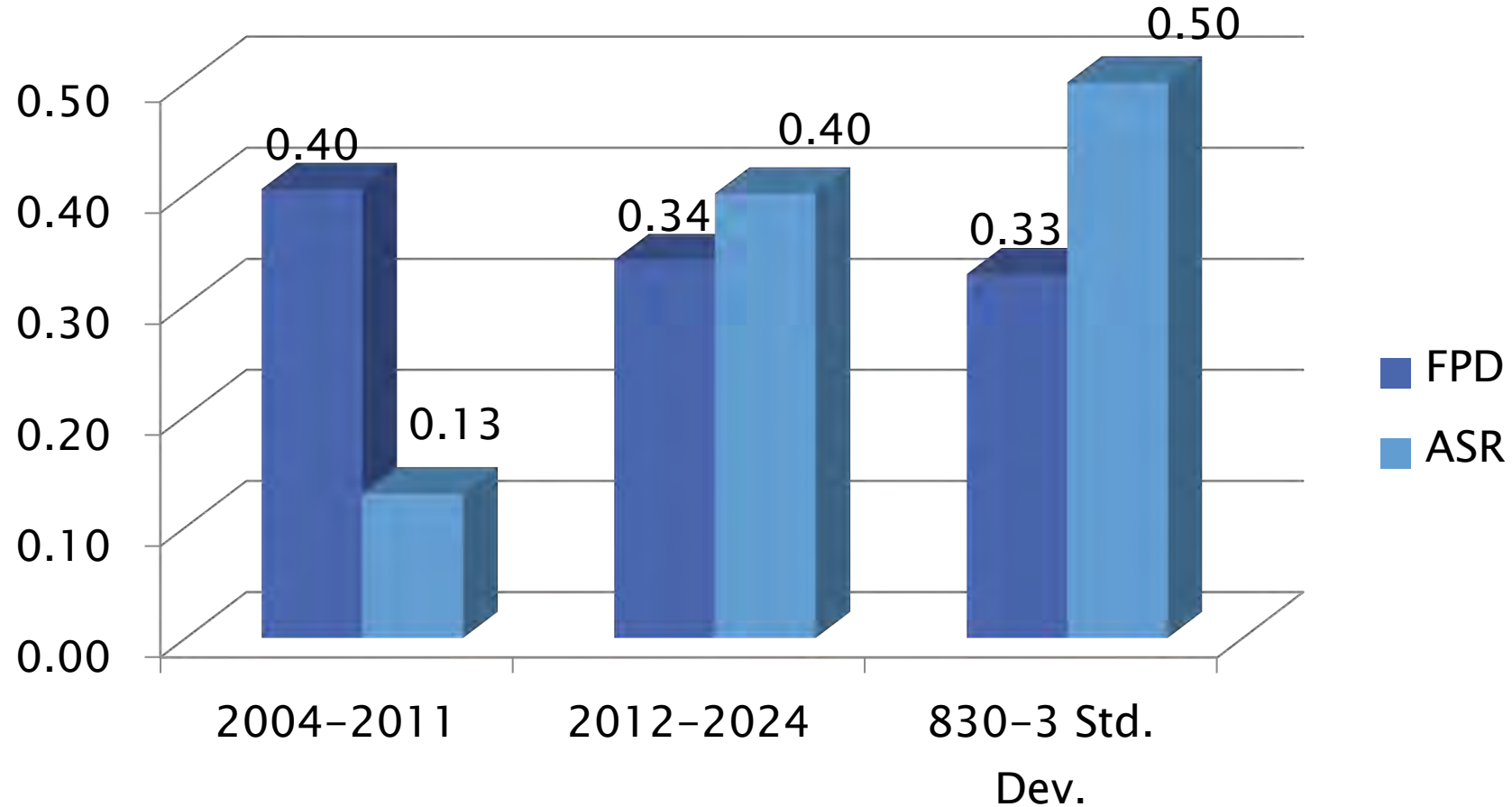
CUSUM Severity Analysis



ISM Precision Estimates



ISM Precision Estimates



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Test Monitoring Center
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Cummins ISBV108

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



ISBV108 Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	8
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		8

ISBV108 Failed Tests

Failed Parameter	Number of Tests
No Failed Tests	0
Total	0

ISBV108 Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

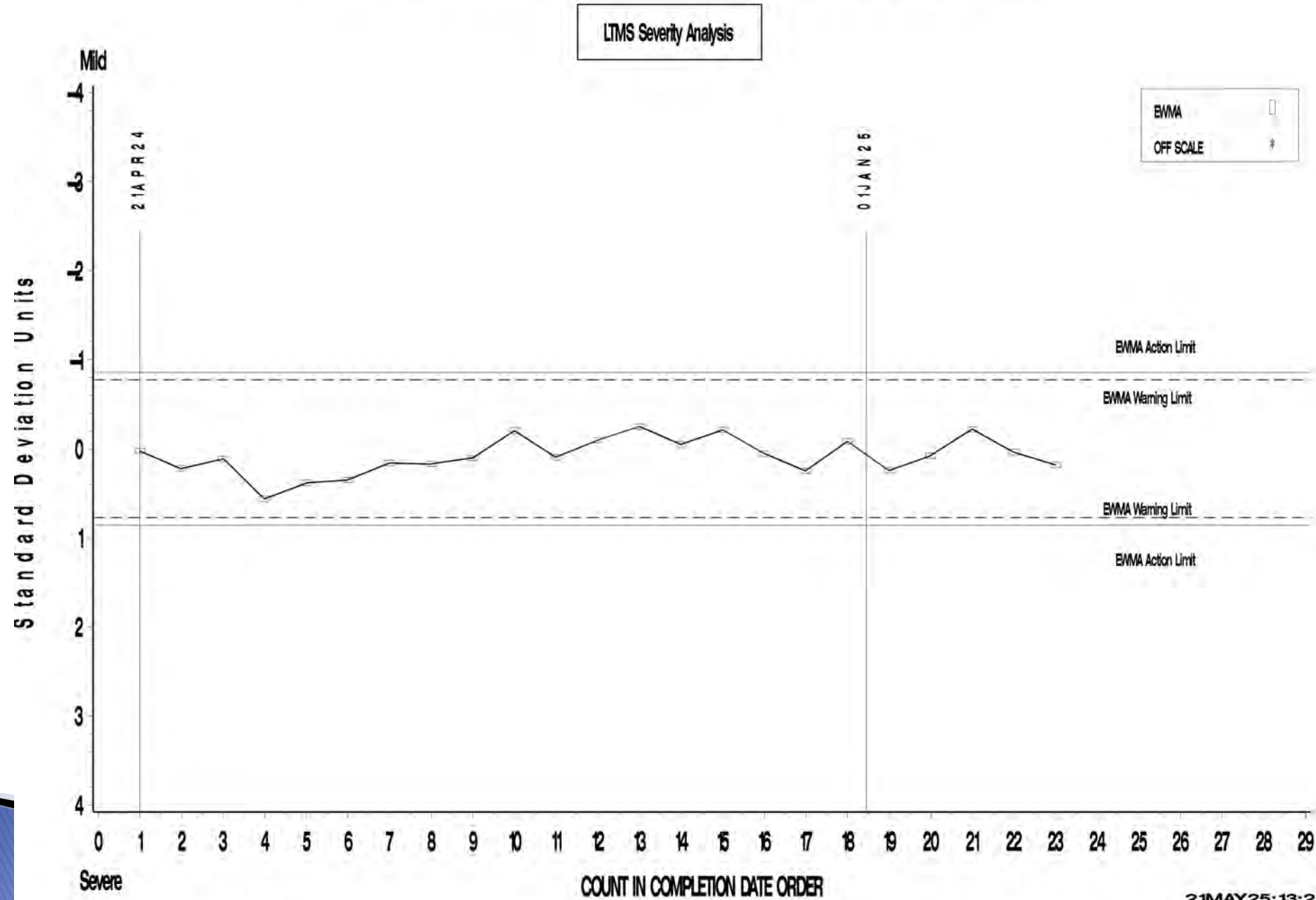
*Invalid and aborted tests

ISBV108 Test Severity

- ▶ All parameters are in control



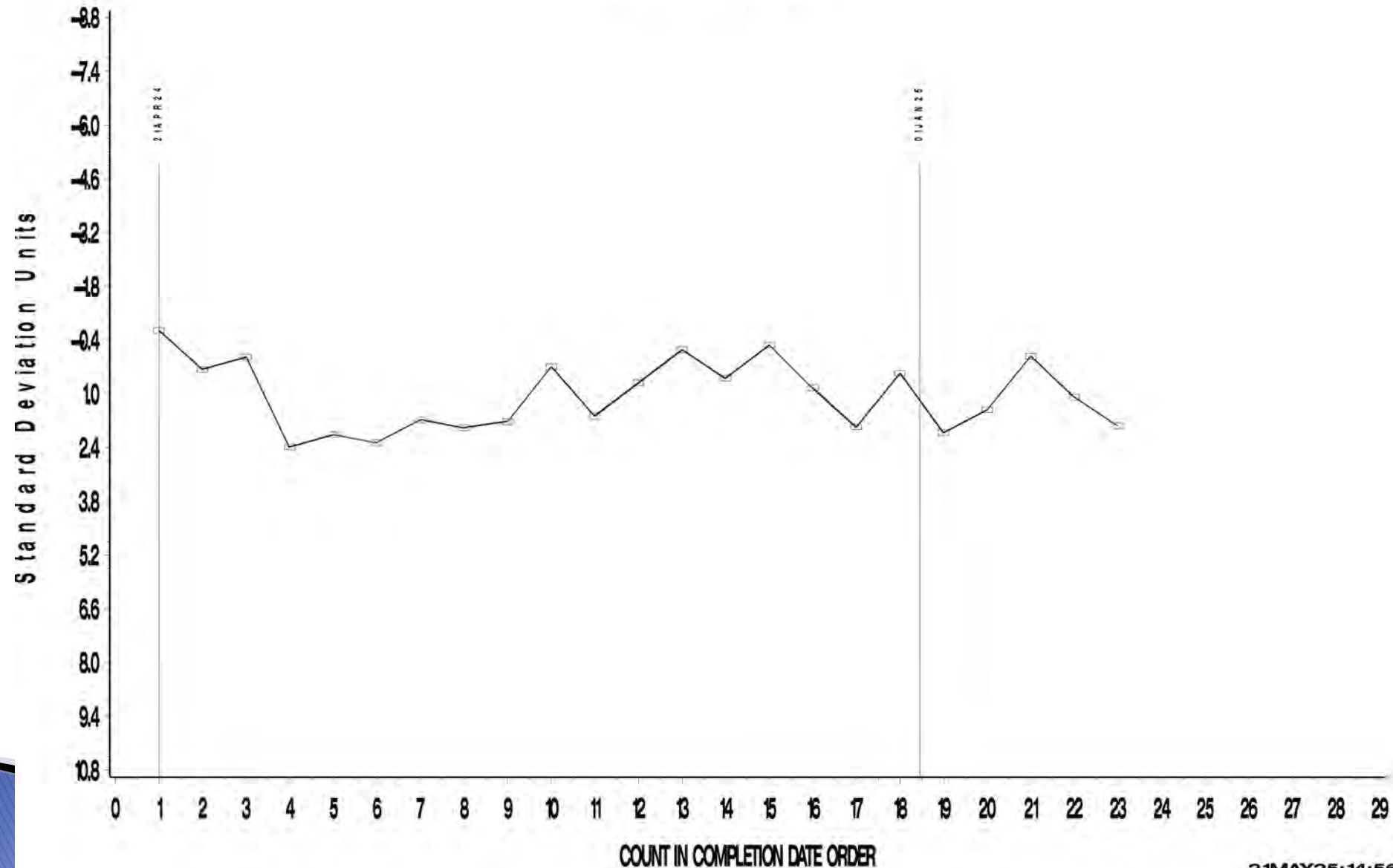
FINAL MRV VISCOSITY [NM, SOLID, FROZEN, <, >]





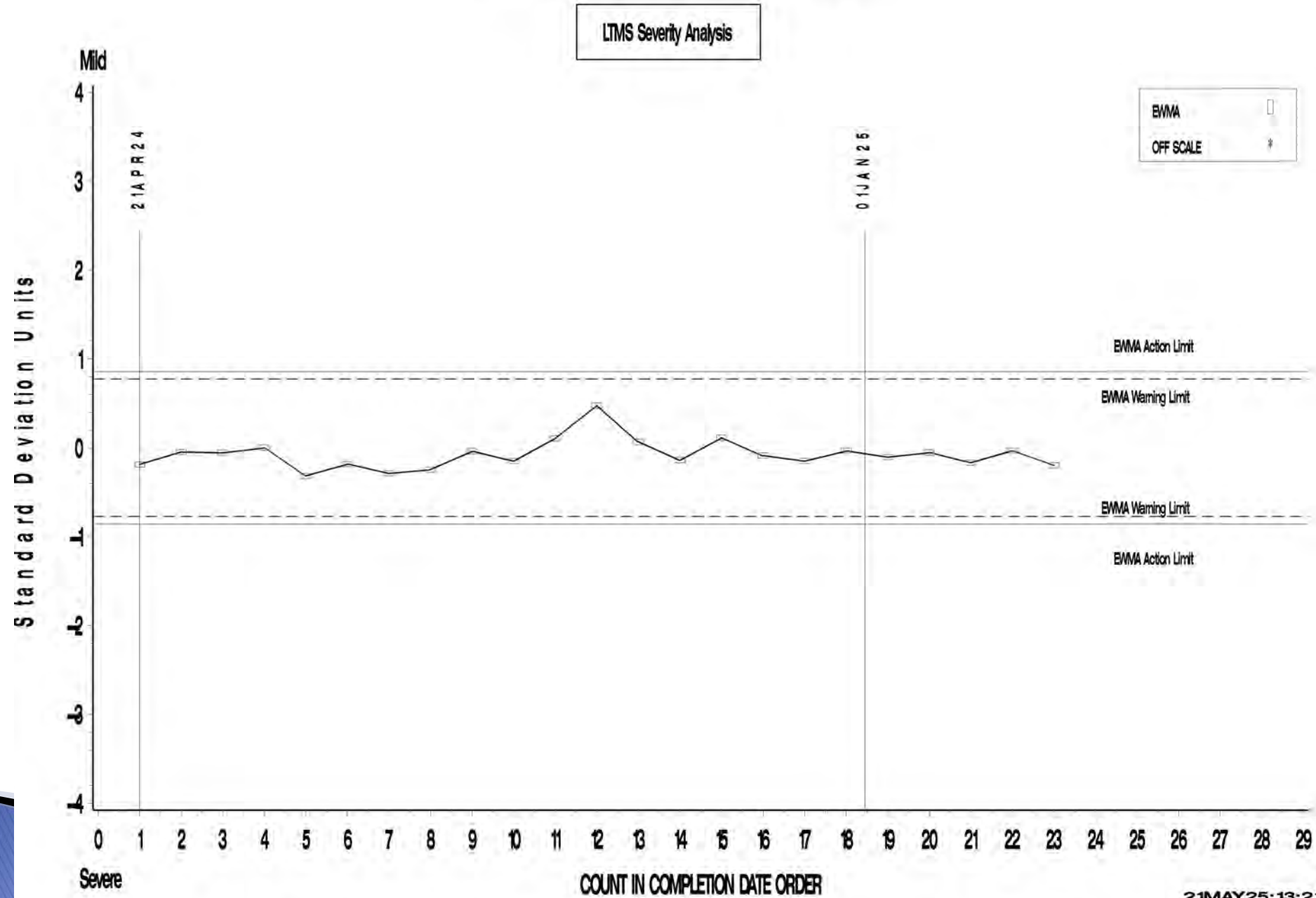
FINAL MRV VISCOSITY [NM, SOLID, FROZEN, <, >]

CUSUM Severity Analysis



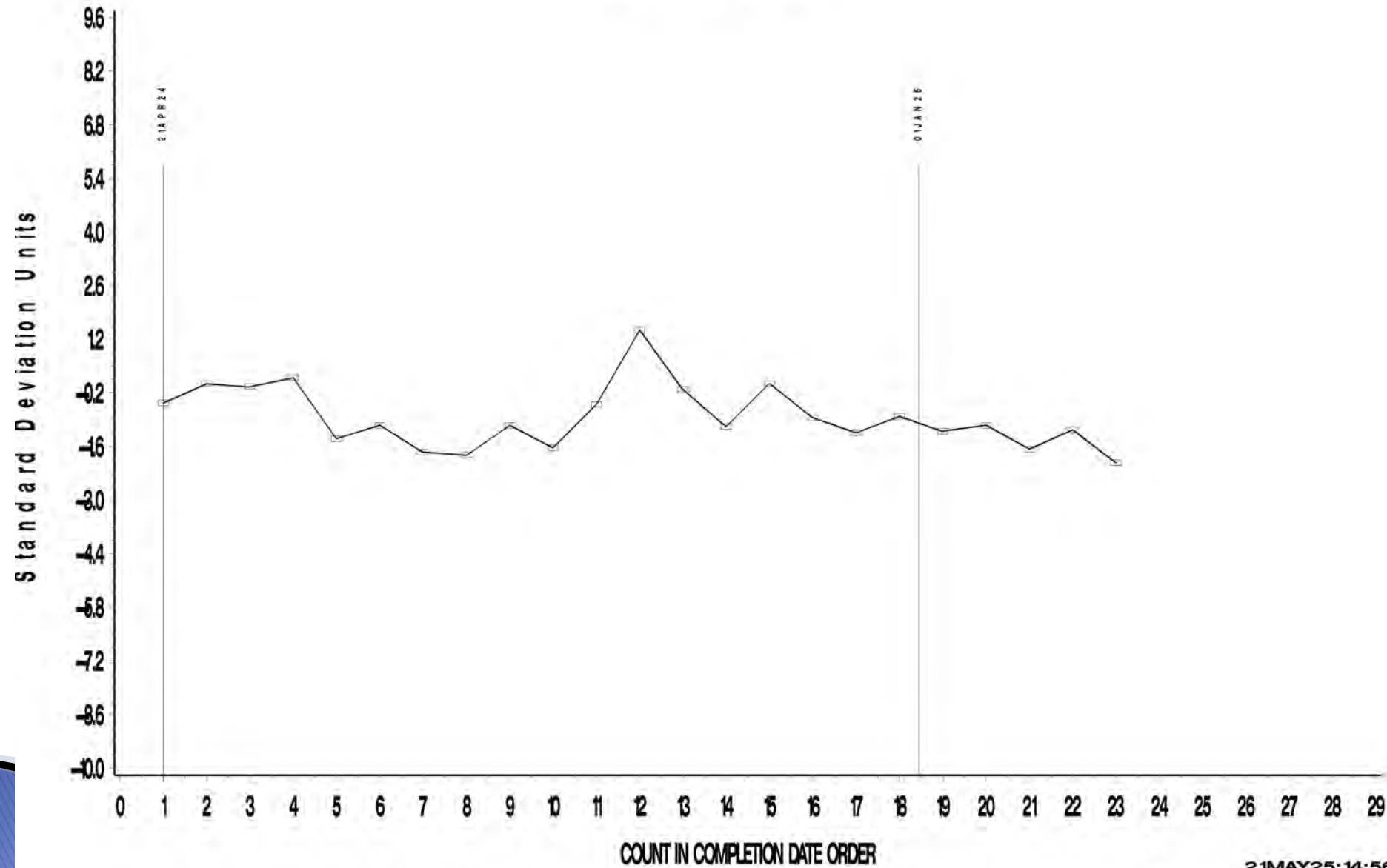


FINAL SOOT % AT 12 cSt [$>$]



FINAL SOOT % AT 12 cSt [>]

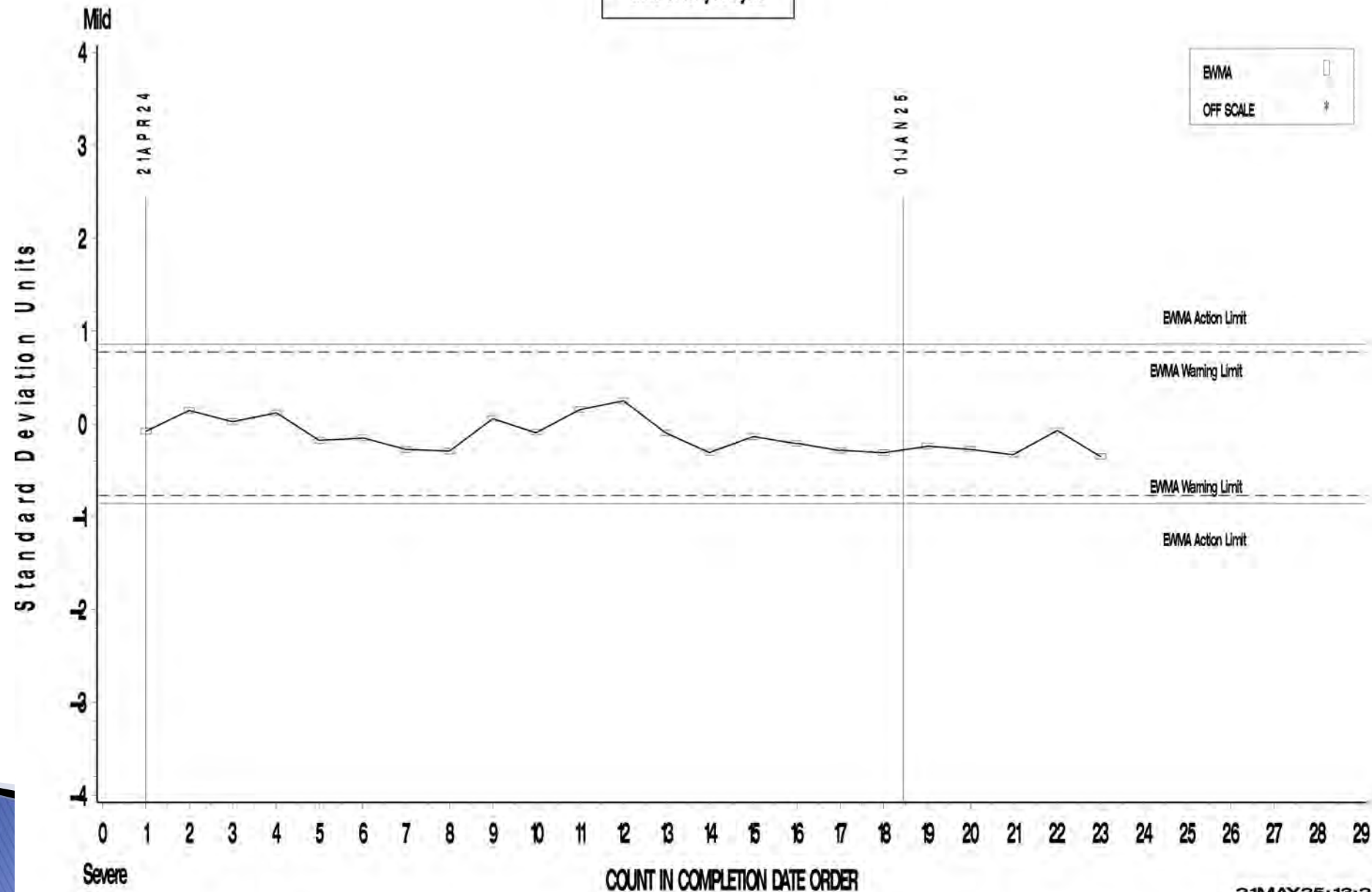
CUSUM Severity Analysis





FINAL SOOT % AT 4 cSt [$>$]

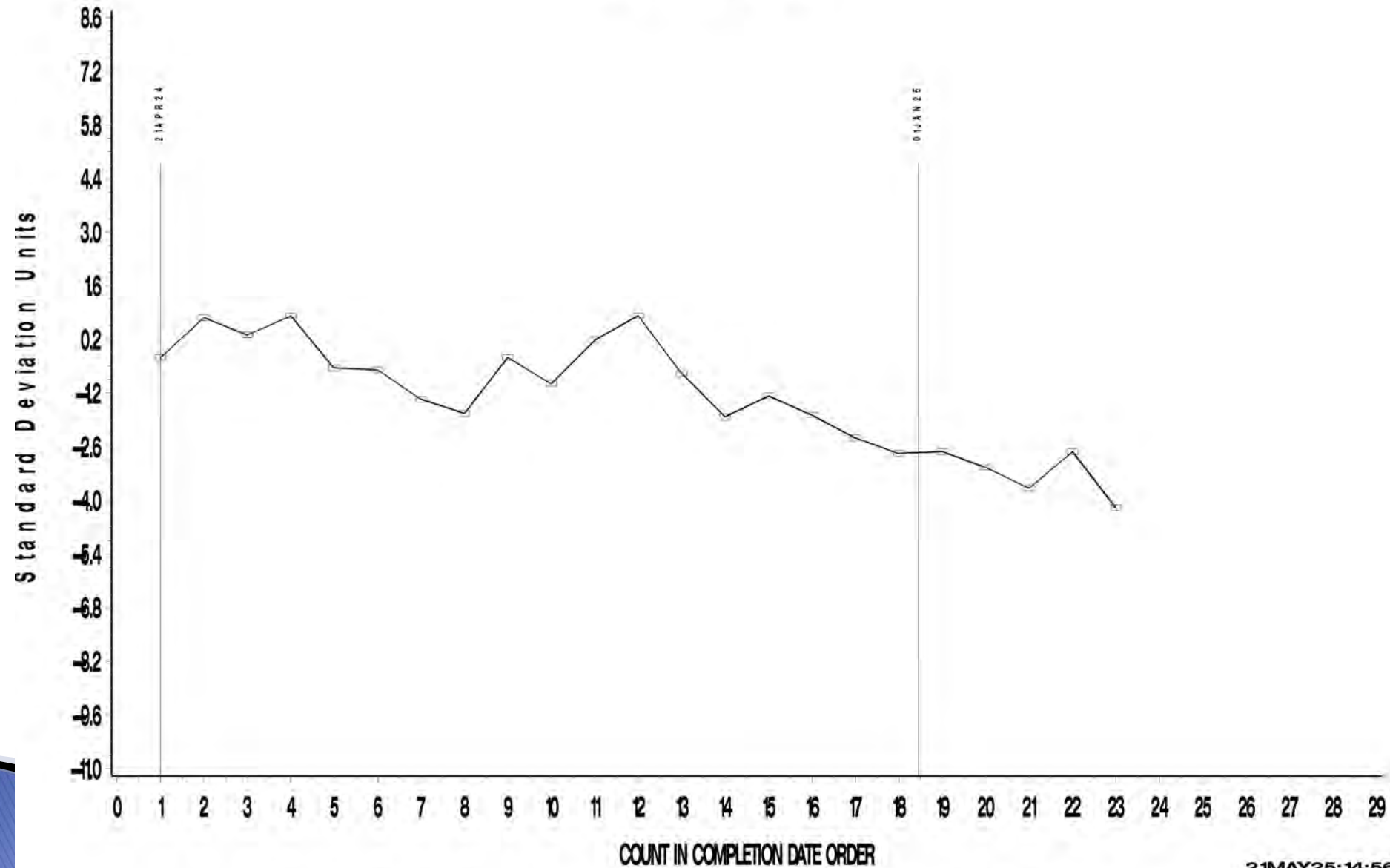
LTMS Severity Analysis





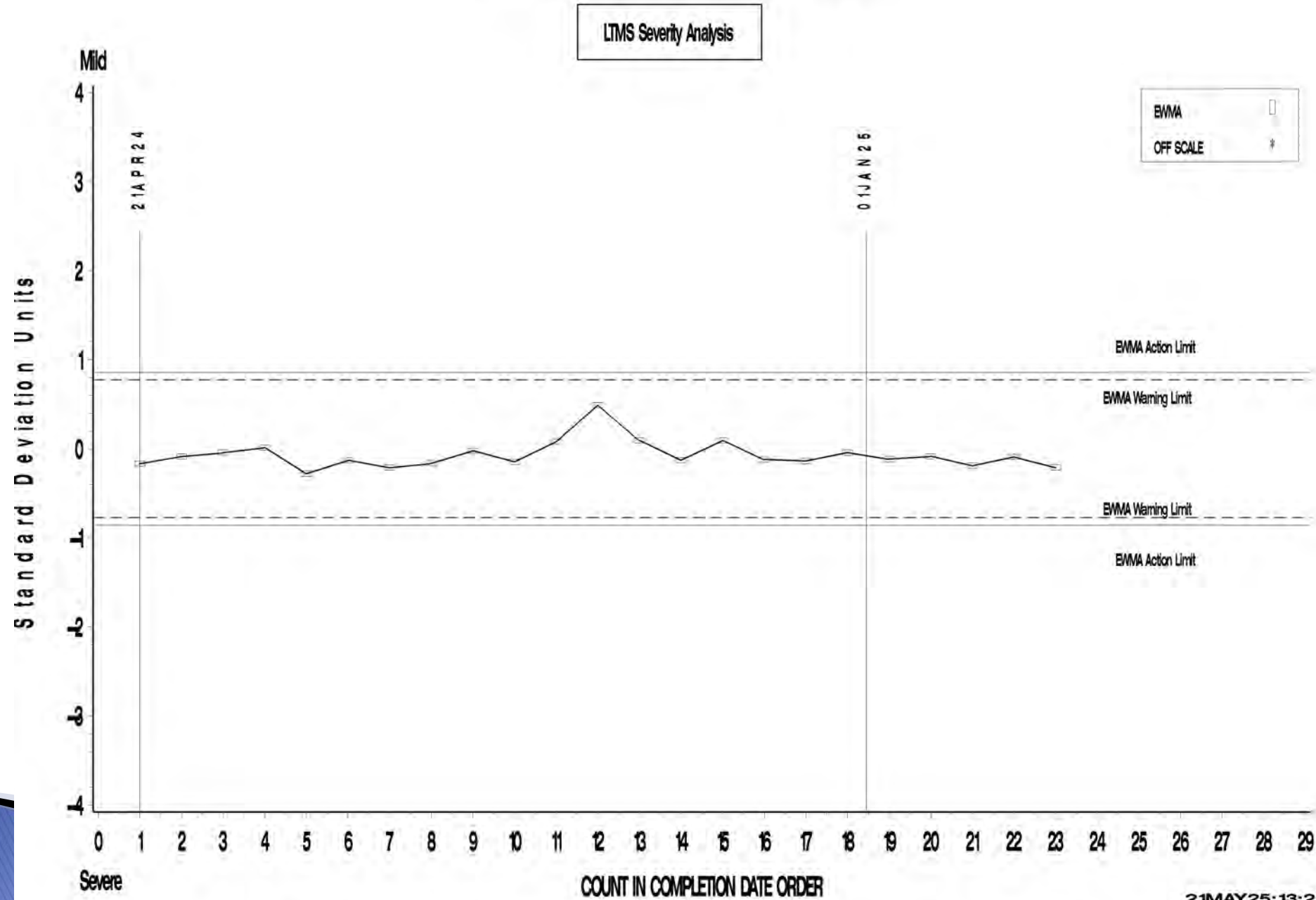
FINAL SOOT % AT 4 cSt [$>$]

CUSUM Severity Analysis





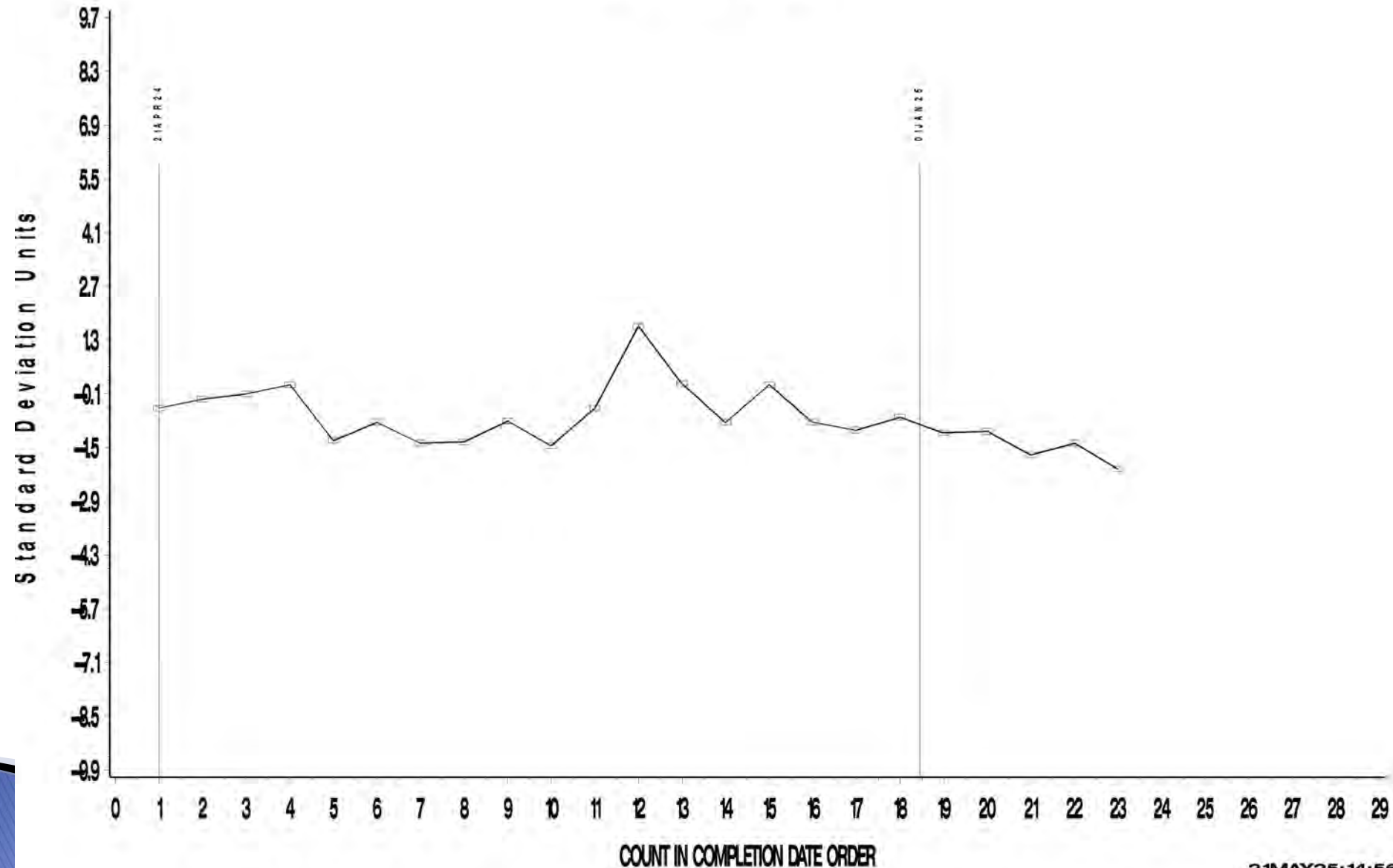
FINAL SOOT % AT 15 cSt [$>$]



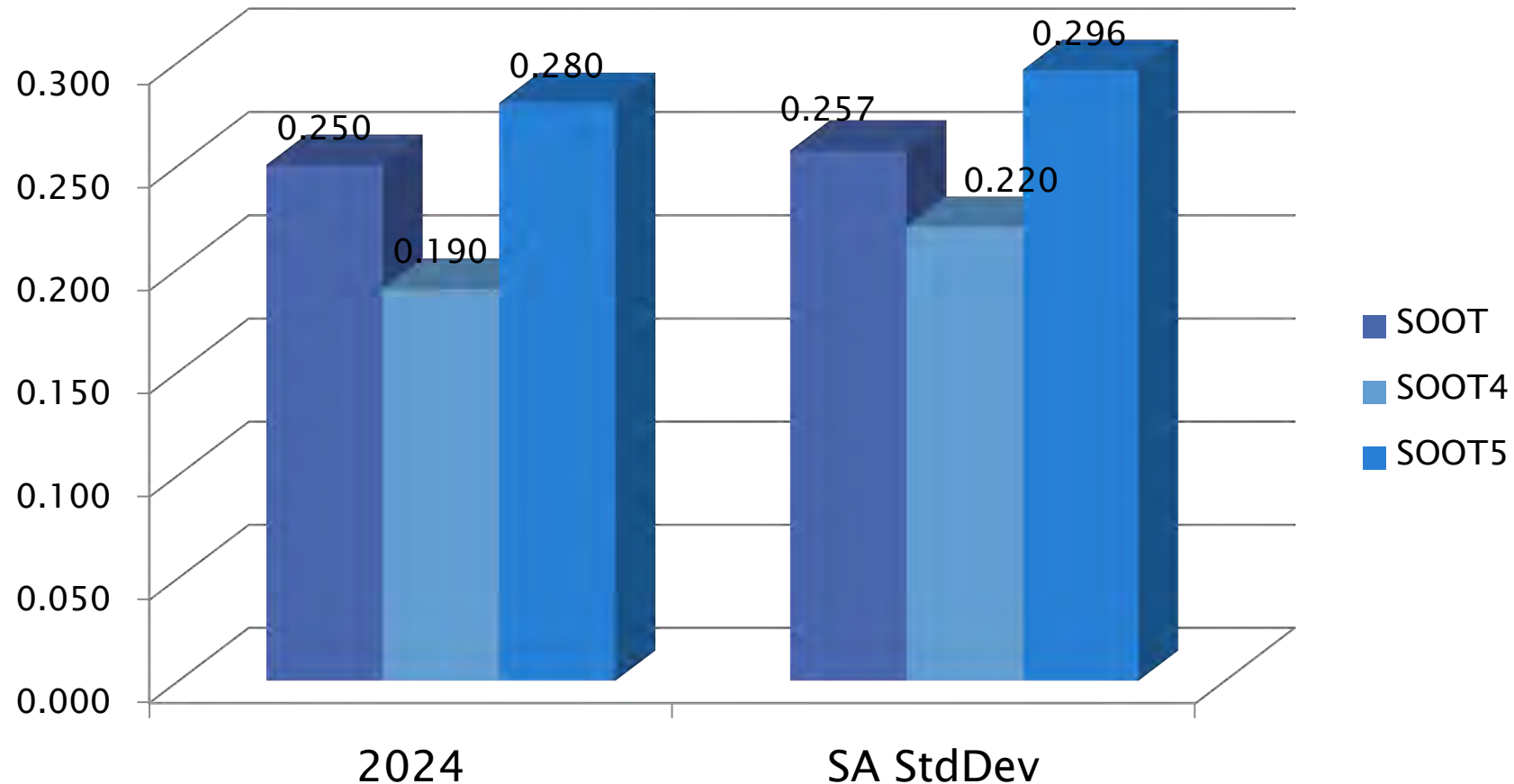


FINAL SOOT % AT 15 cSt [$>$]

CUSUM Severity Analysis



ISBV108 Precision Estimates

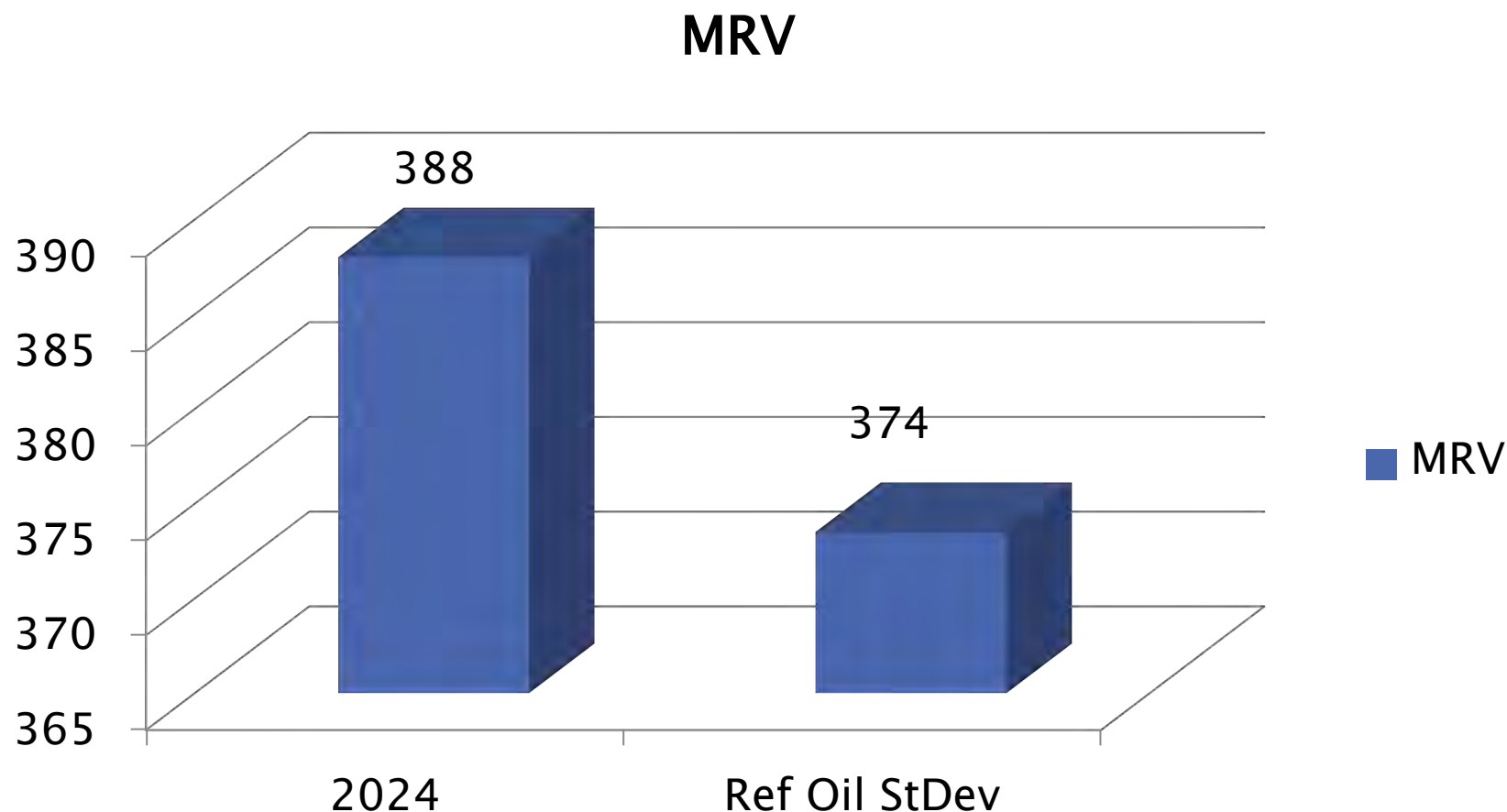


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ISBV1 56 Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	9
Failed Calibration Test	OC	2
Operationally Invalid	LC	3
Aborted	XC	0
Matrix Test	AM	30
Invalid Matrix Test	LM	1
Aborted	XC	0
Total		45

ISBV1 56 Failed Tests

Failed Parameter	Number of Tests
Soot Mild	2
Total	2

ISBV1 56 Lost Tests*

Status	Cause	#
Invalid	Poor speed control	1
Invalid	Missed soot window	2
Invalid	EOT oil sample lost	1
Aborted	No aborted tests	0
Total		4

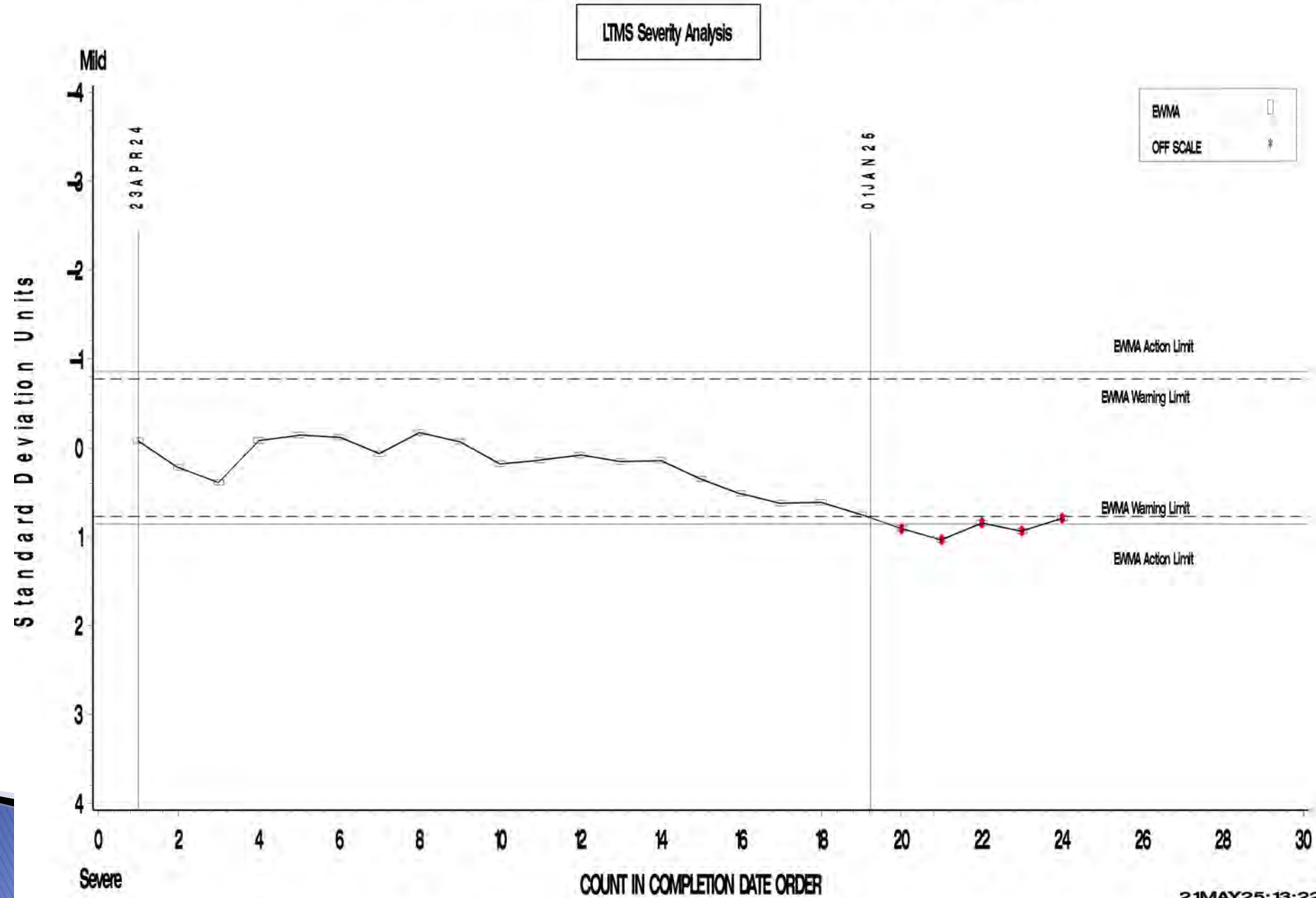
*Invalid and aborted tests

ISBV1 56 Test Severity

- ▶ MRV, SOOT4 is in severity warning alarm in the severe direction
- ▶ SOOT and SOOT5 are in control



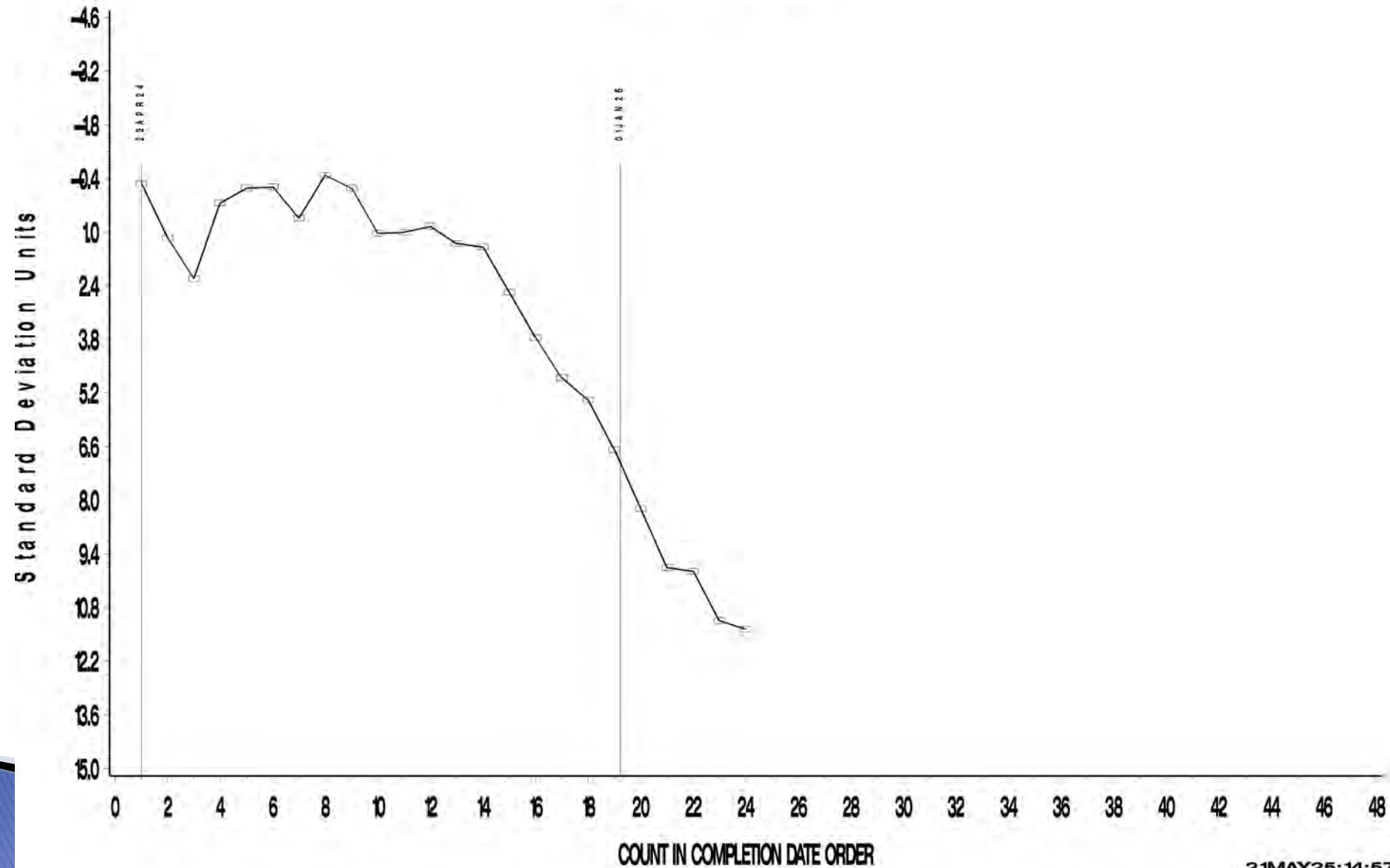
FINAL MRV VISCOSITY [NM, SOLID, FROZEN, <, >]





FINAL MRV VISCOSITY [NM, SOLID, FROZEN, <, >]

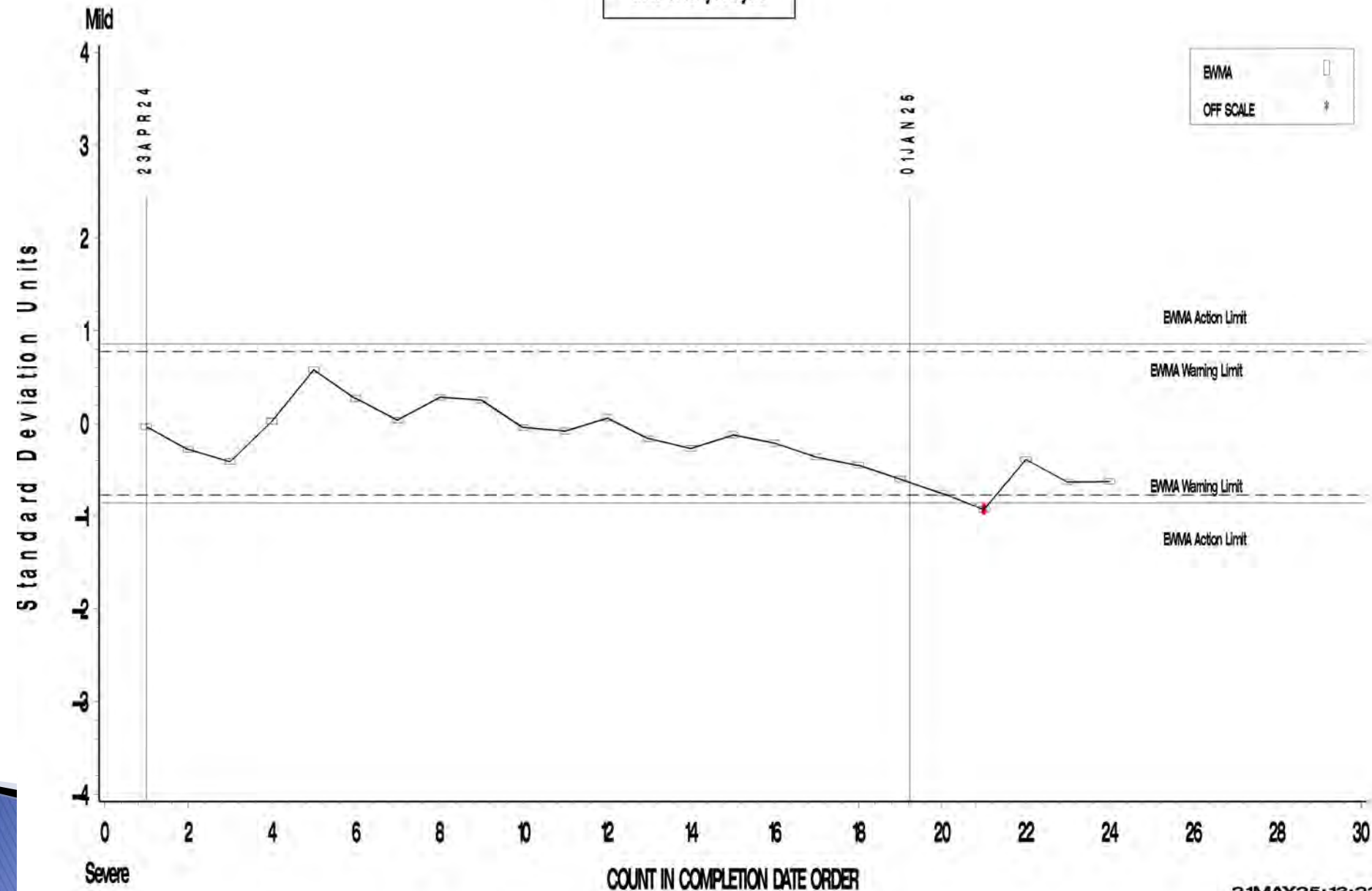
CUSUM Severity Analysis





FINAL SOOT % AT 12 cSt [$>$]

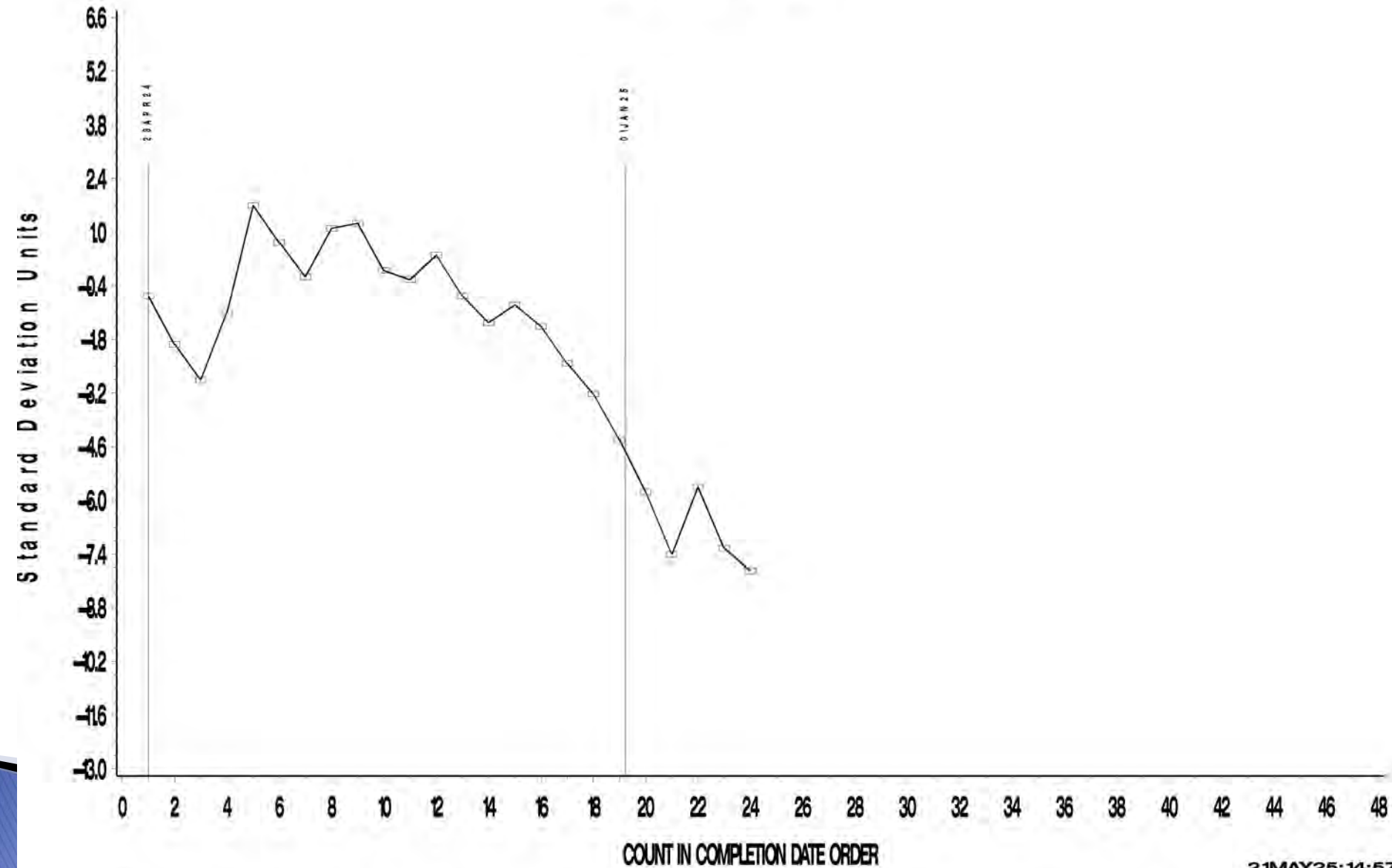
LTMS Severity Analysis





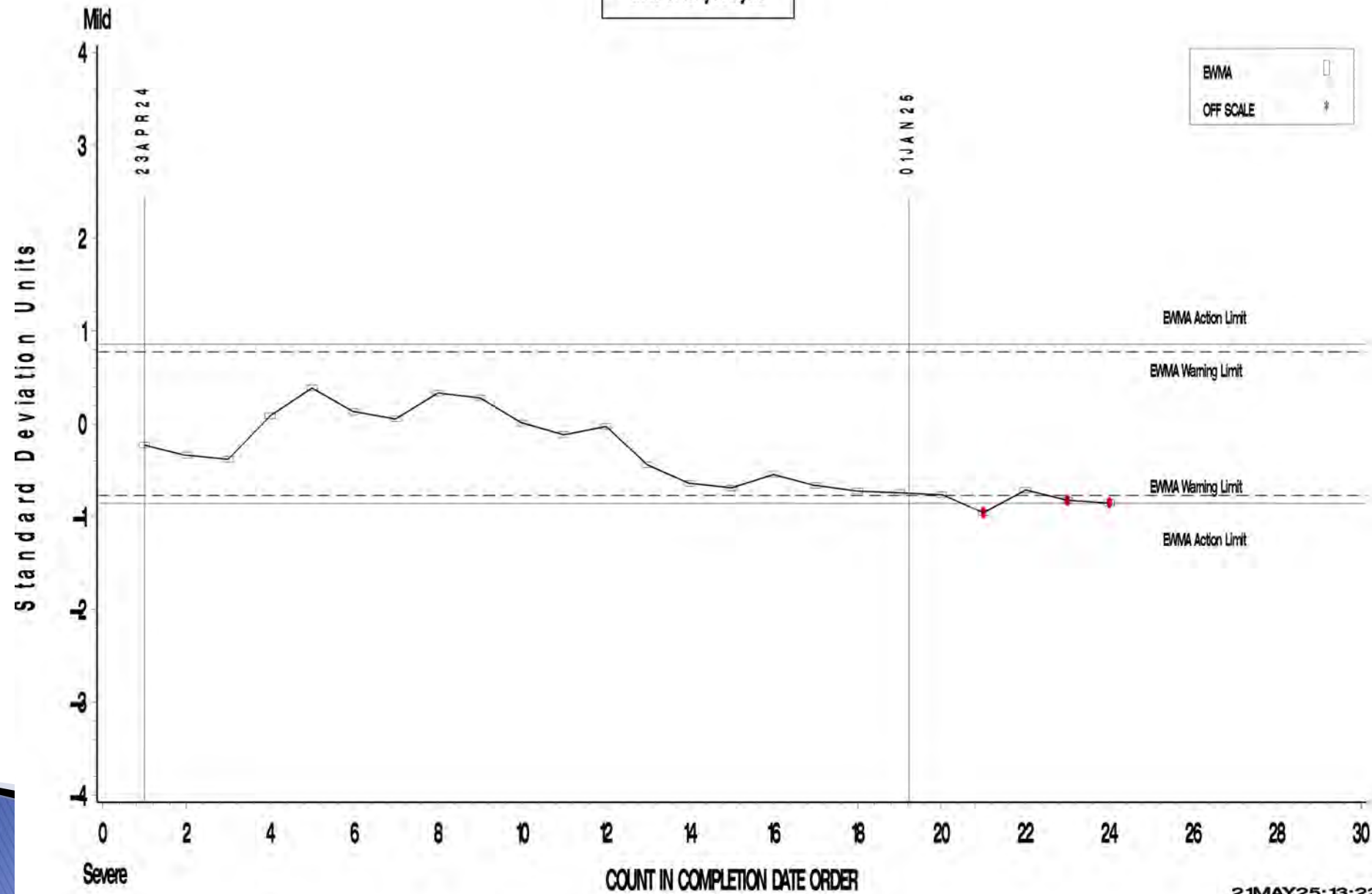
FINAL SOOT % AT 12 cSt [$>$]

CUSUM Severity Analysis



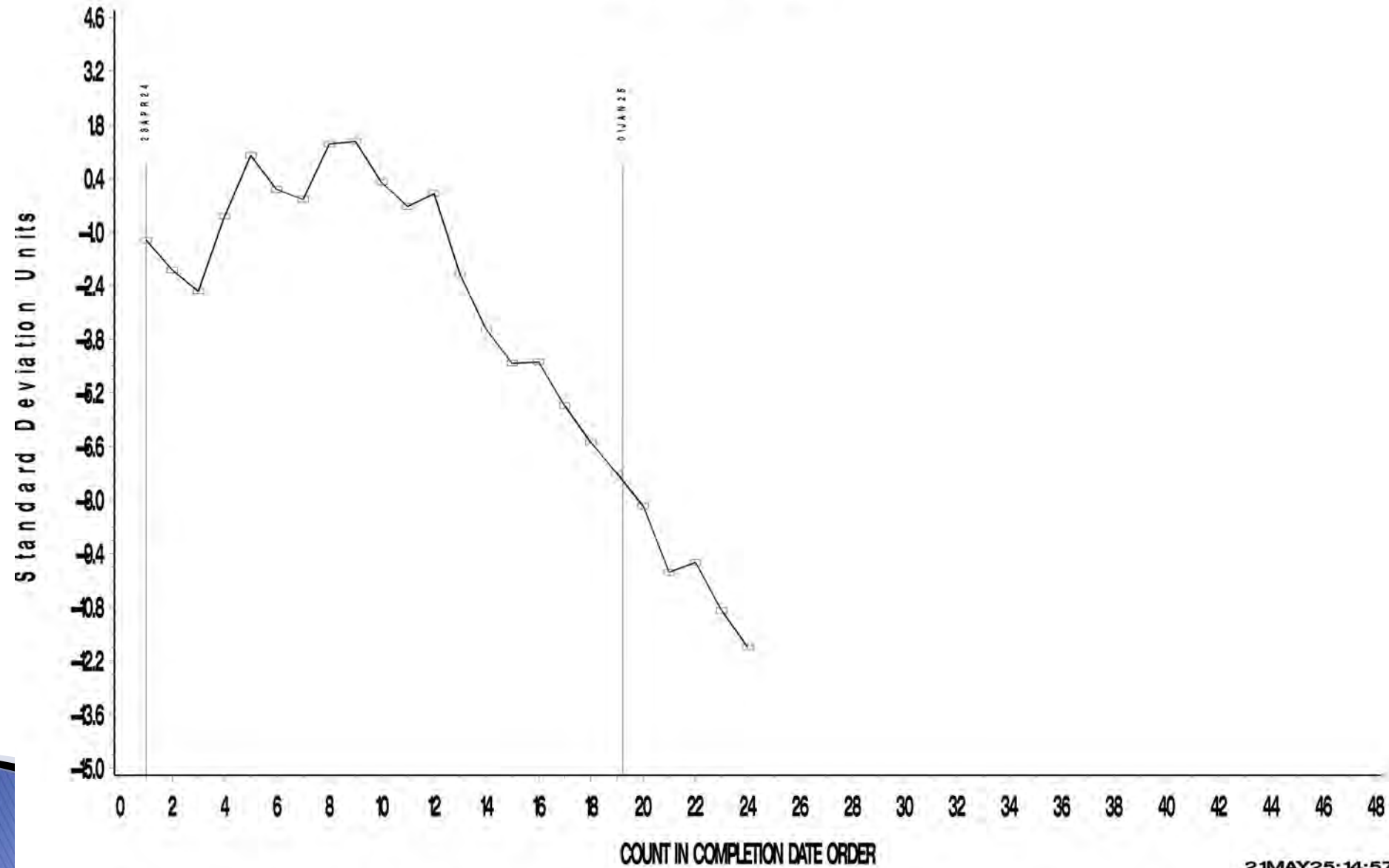
FINAL SOOT % AT 4 cSt [$>$]

LTMS Severity Analysis



FINAL SOOT % AT 4 cSt [$>$]

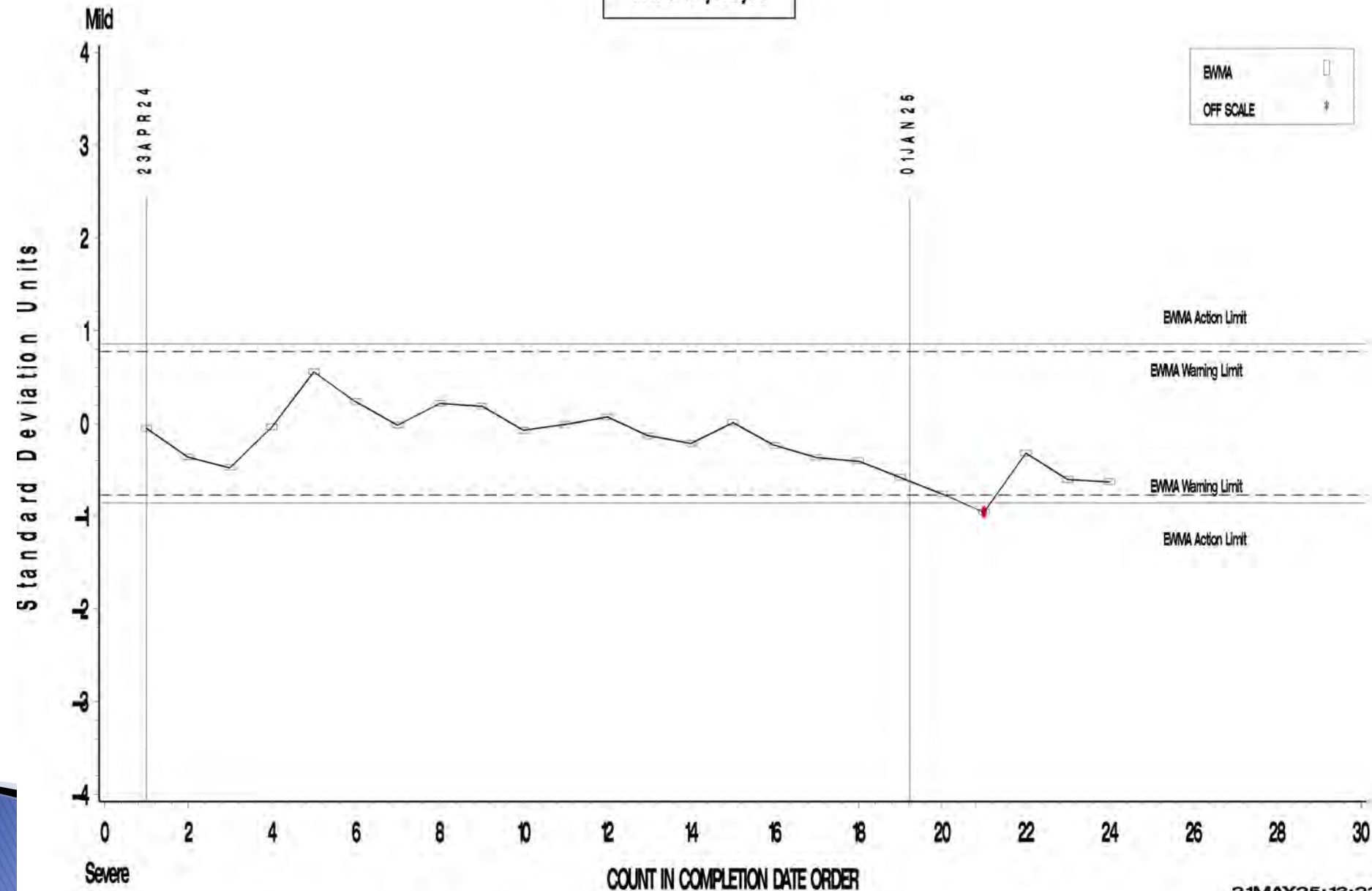
CUSUM Severity Analysis





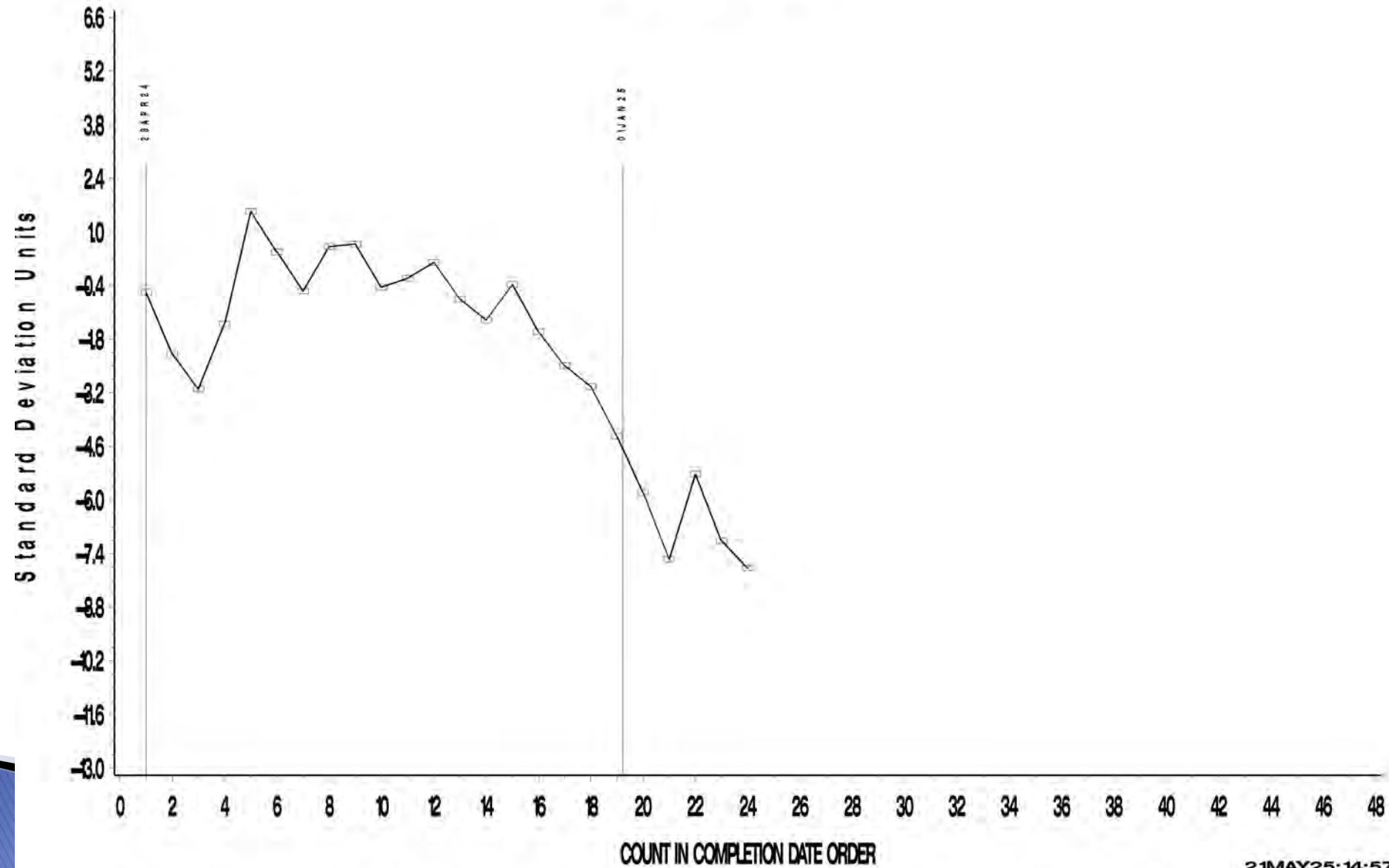
FINAL SOOT % AT 15 cSt [$>$]

LTMS Severity Analysis

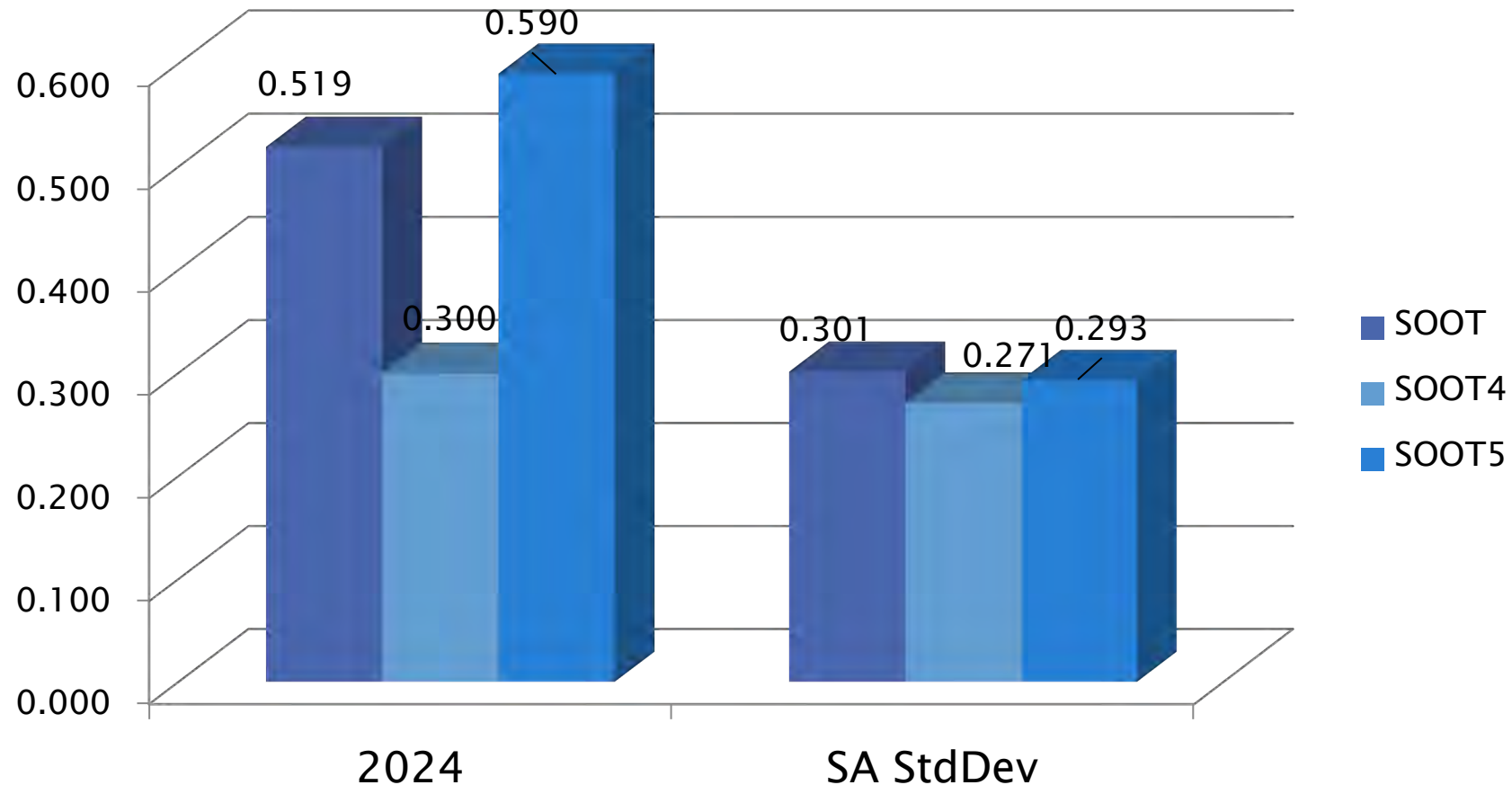


FINAL SOOT % AT 15 cSt [$>$]

CUSUM Severity Analysis



ISBV1 56 Precision Estimates

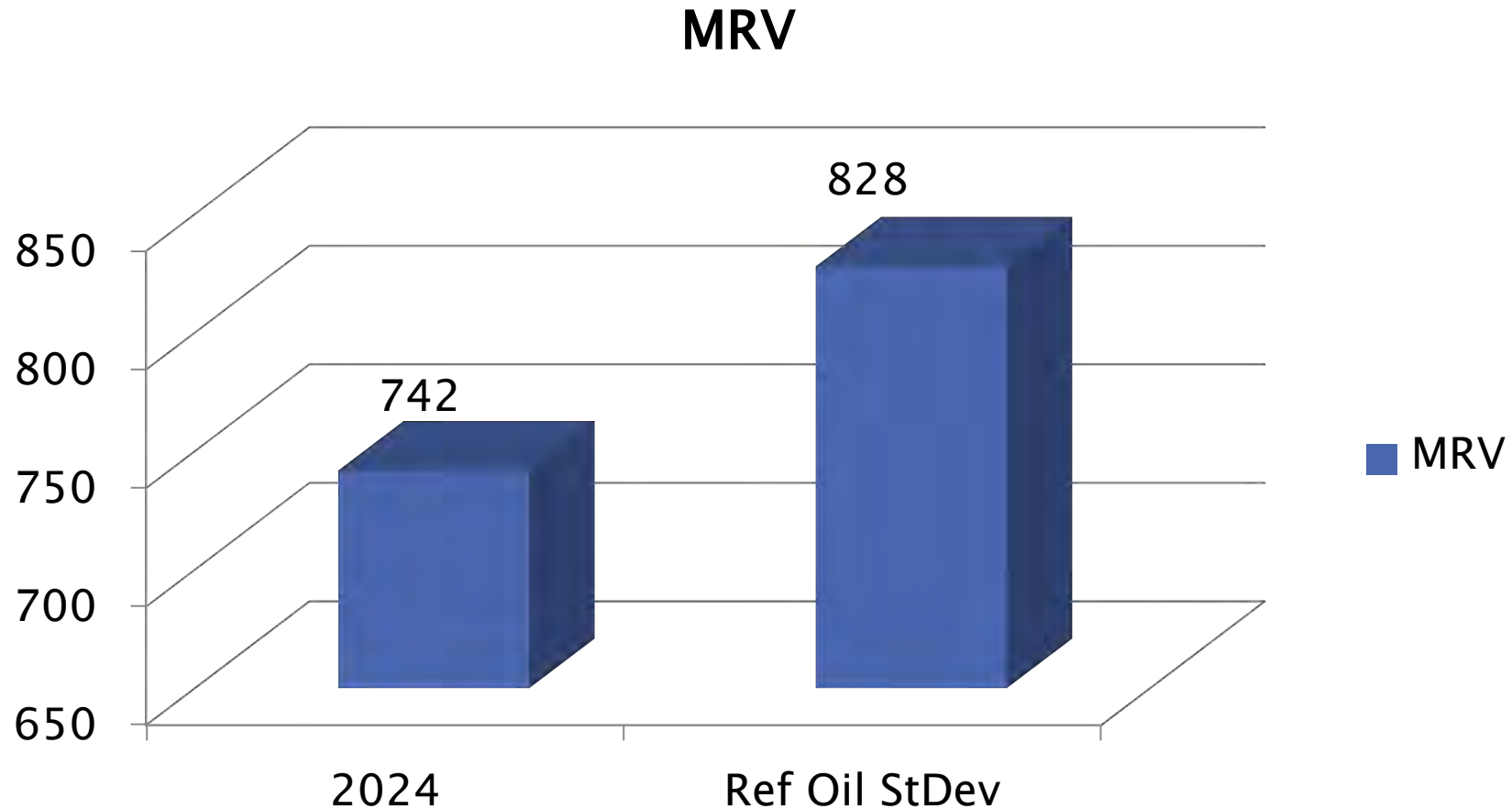


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ISBV1 56 Precision Estimates



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RFWT

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RFWT Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	1
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		1

RFWT Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

RFWT Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

*Invalid and aborted tests

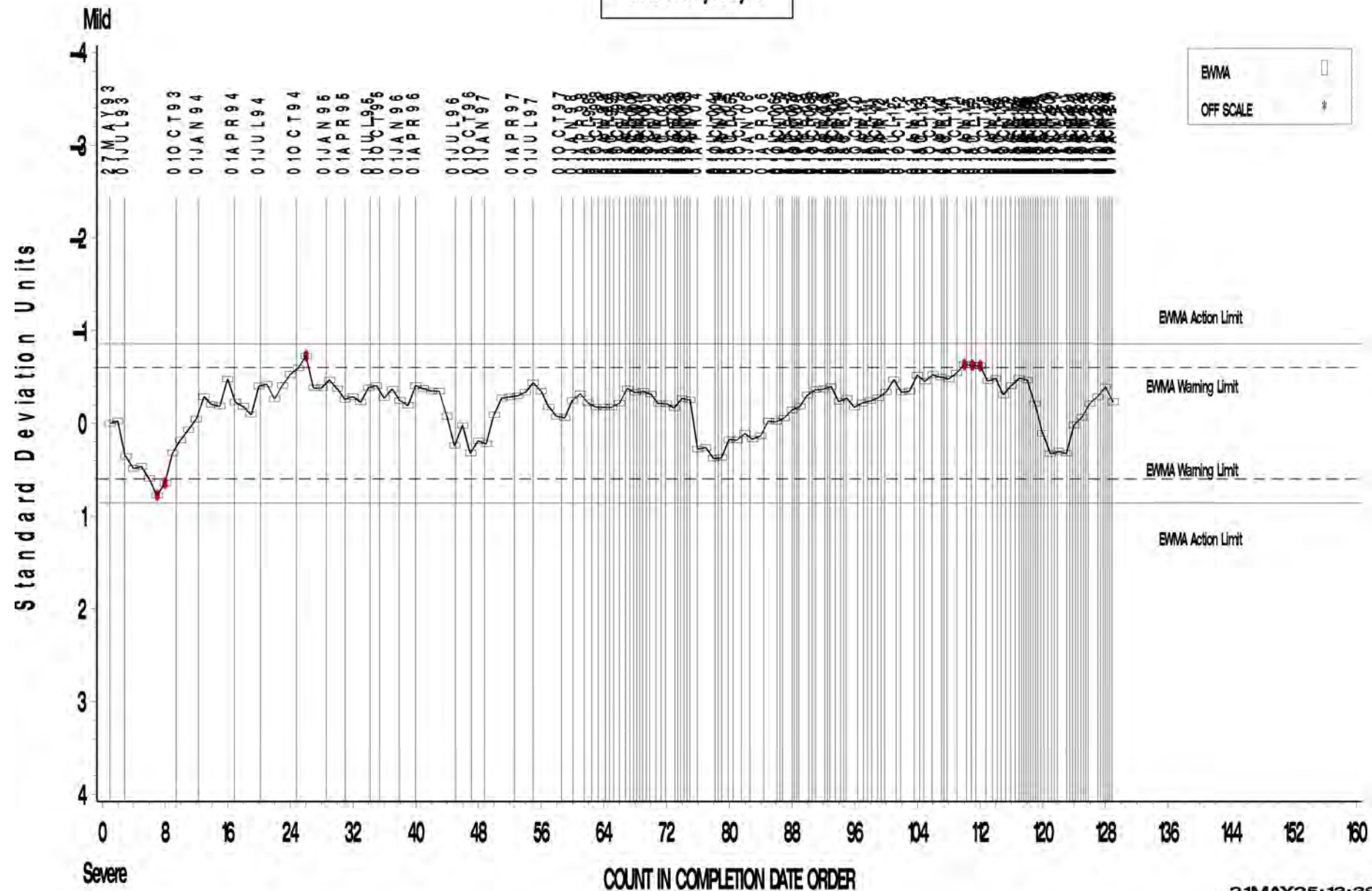
RFWT Test Severity

- ▶ AFW is in control.



Average Follower Wear

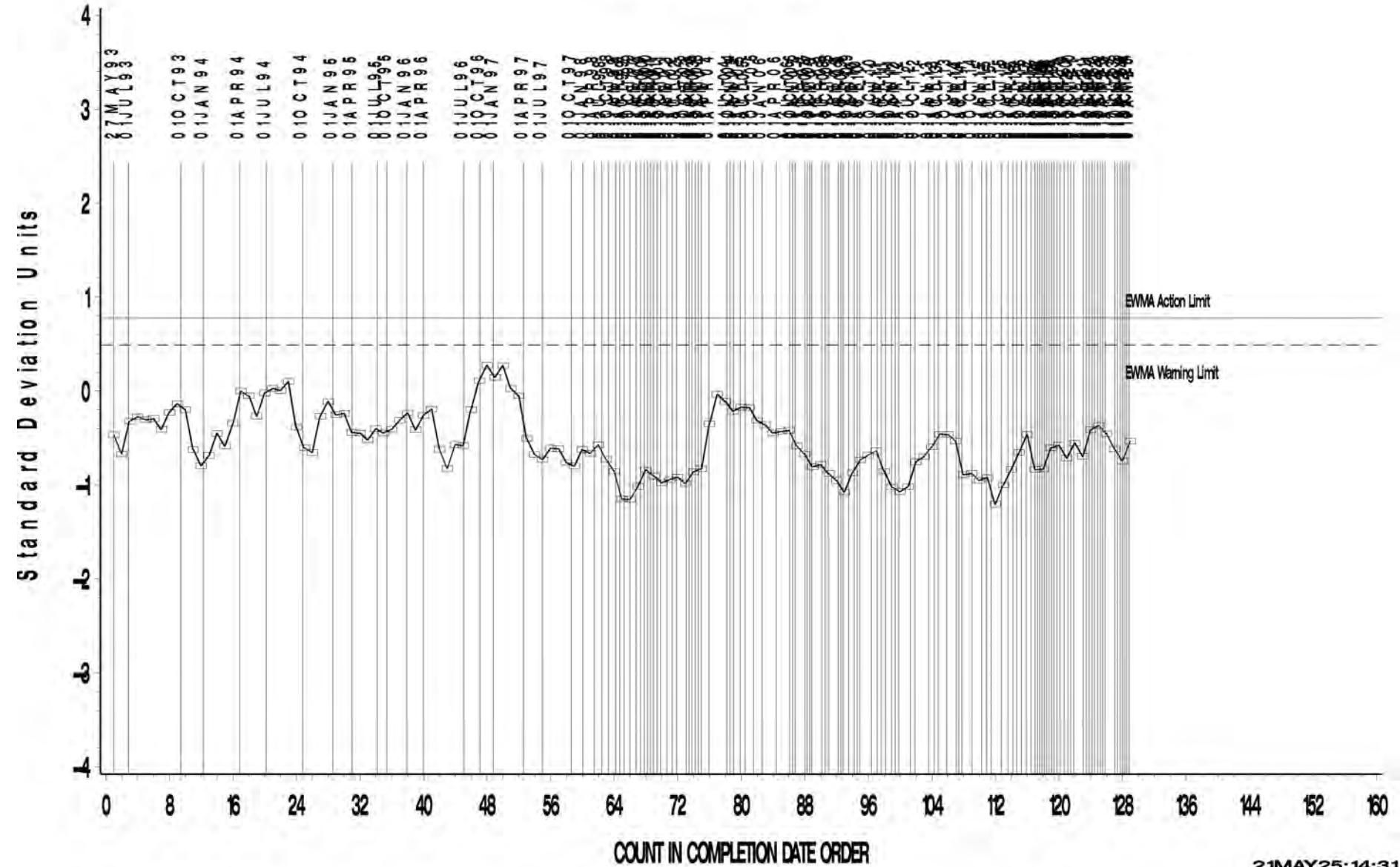
LTMS Severity Analysis





Average Follower Wear

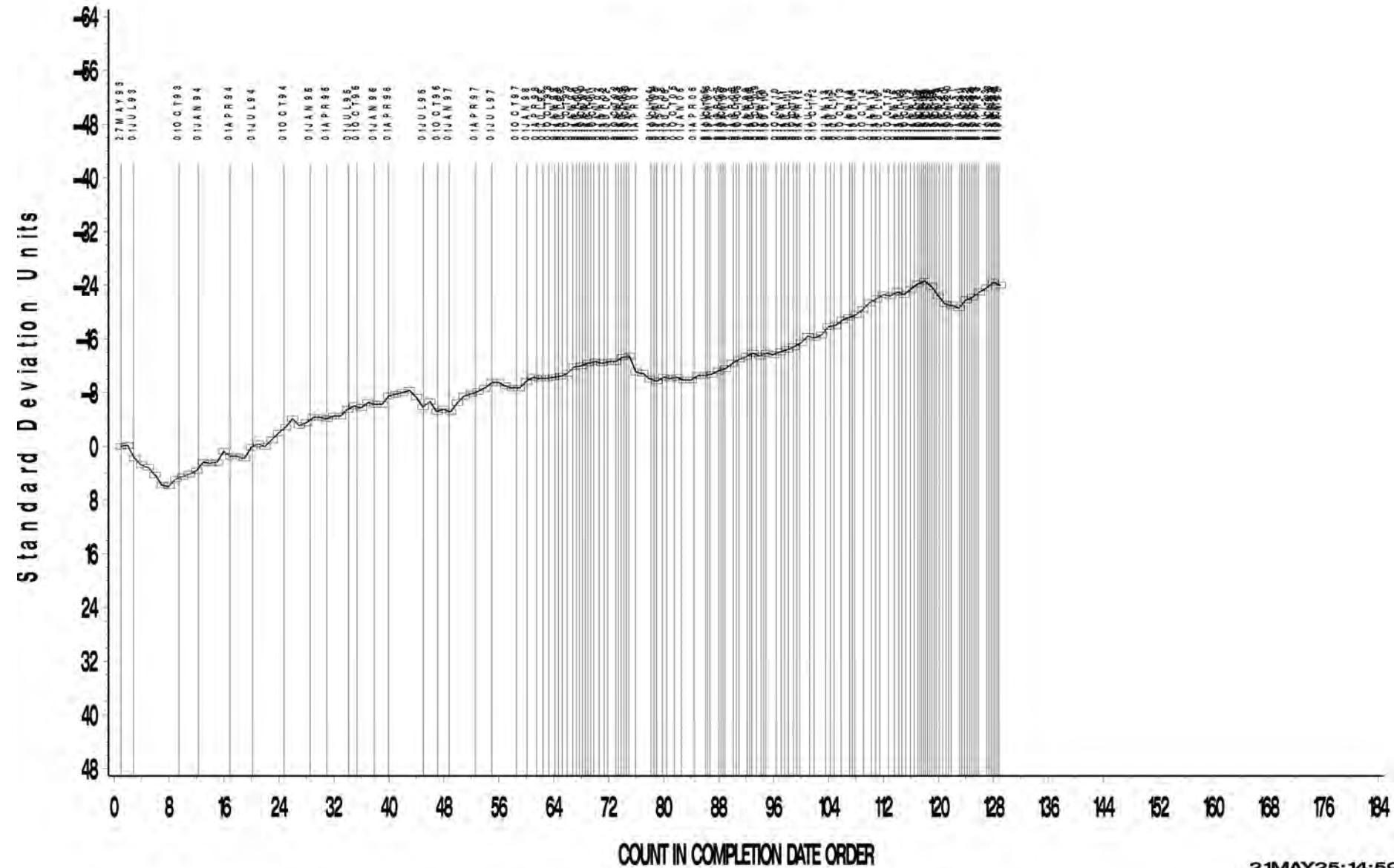
LTMS Precision Analysis



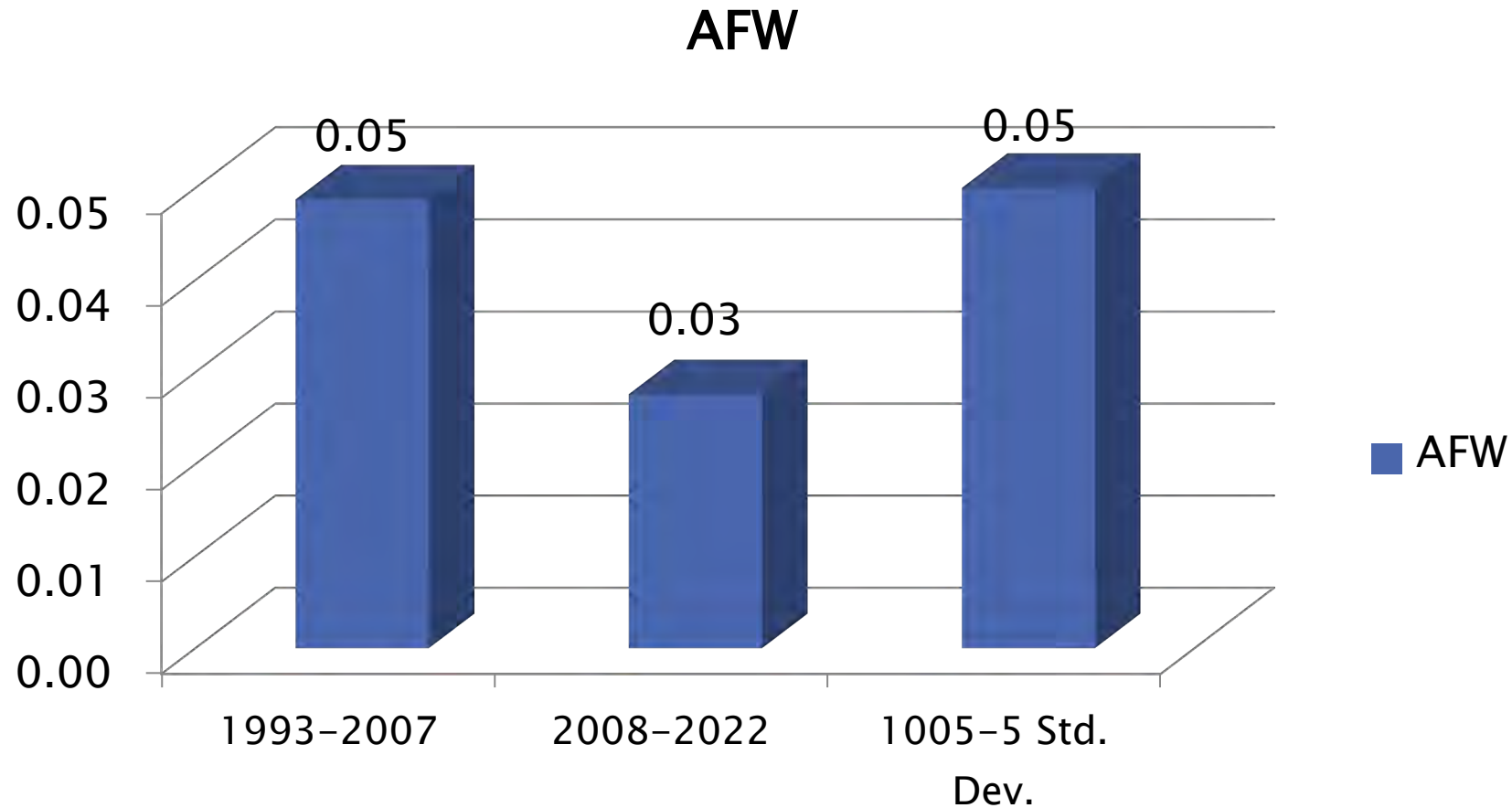


Average Follower Wear

CUSUM Severity Analysis



RFWT Precision Estimates



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Mack T-8/T-8E

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Test Monitoring Center
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T-8/T-8E Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	1
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		1

T-8/T8-E Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

T-8/T8-E Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

*Invalid and aborted tests

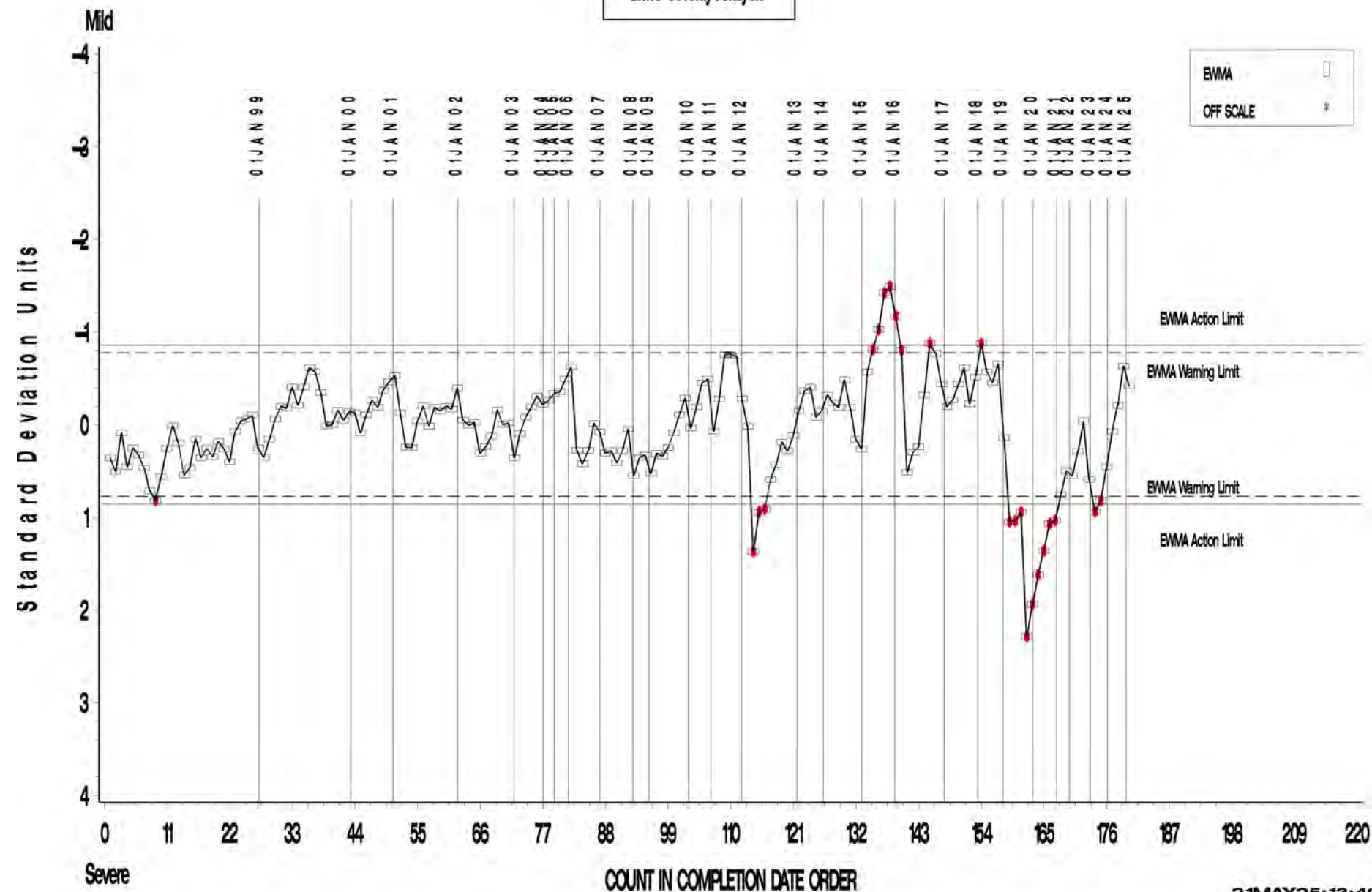
T-8/T-8E Test Severity

- ▶ VI38 is in level 2 Zi alarm in mild direction.
- ▶ RV2 and RV48 are in control.



RELATIVE VISCOSITY @ 4.8% (100% LOSS)

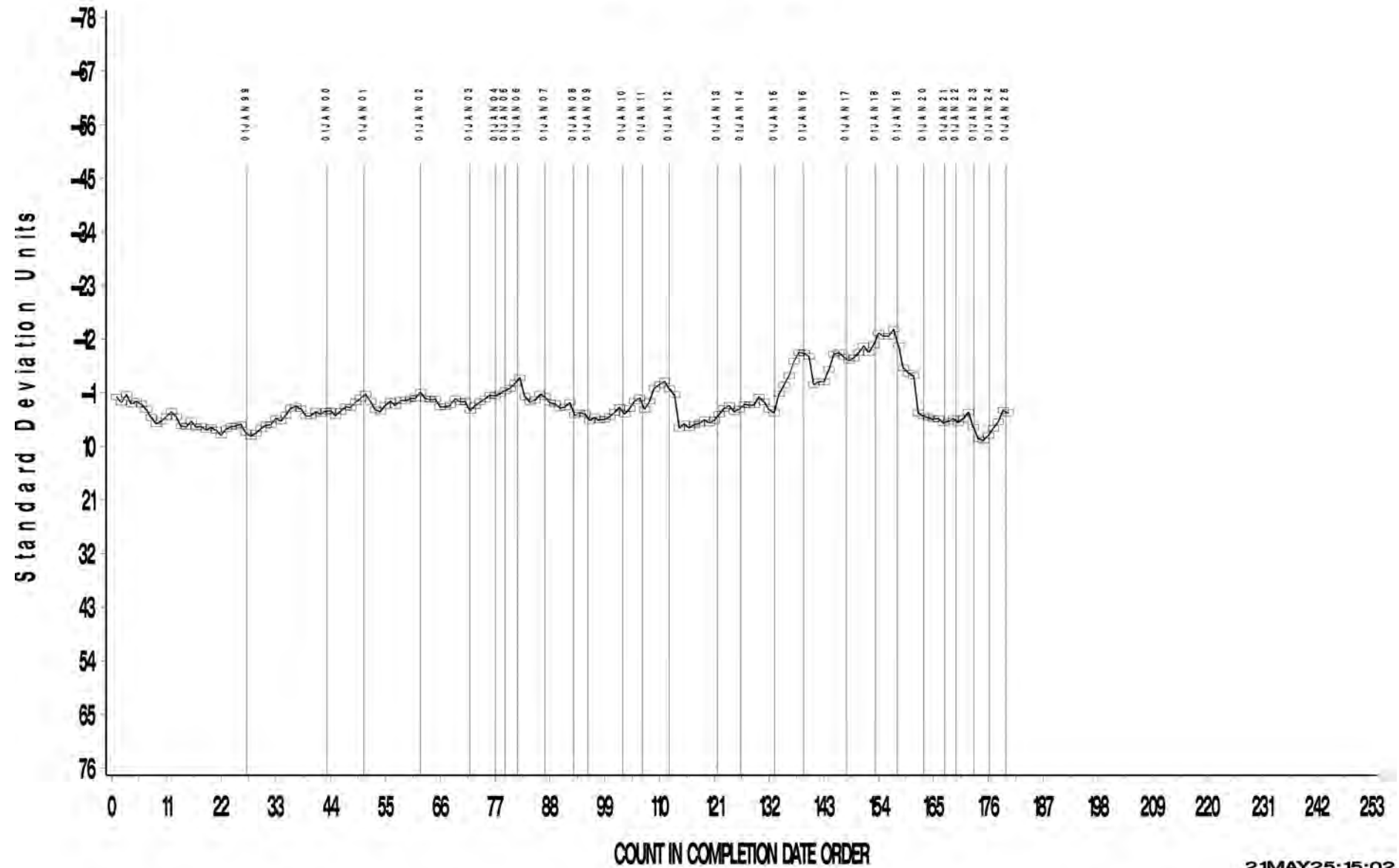
LTMS Severity Analysis





RELATIVE VISCOSITY @ 4.8% (100% LOSS)

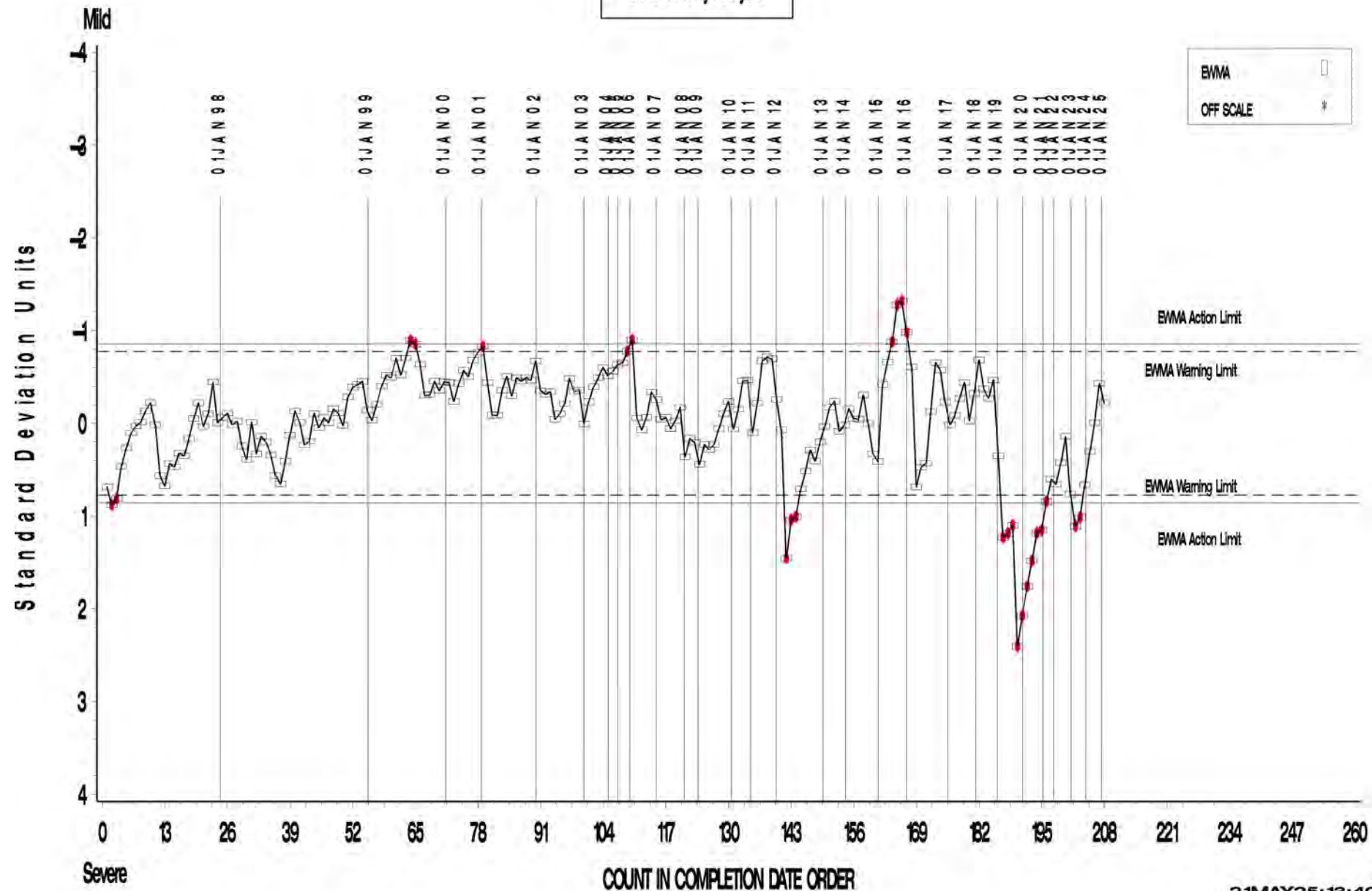
CUSUM Severity Analysis





RELATIVE VISCOSITY @ 4.8% (50% LOSS)

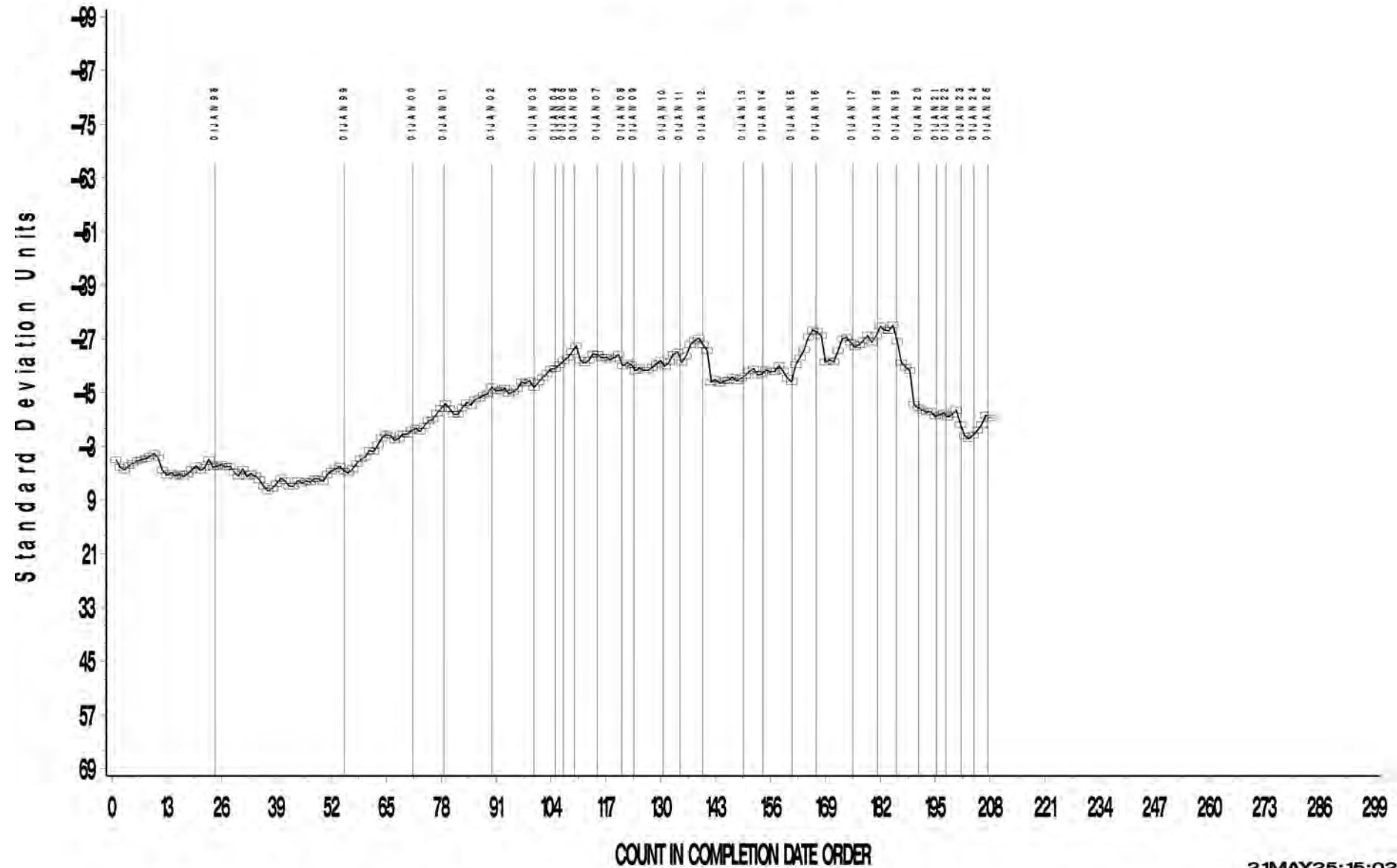
LTMS Severity Analysis





RELATIVE VISCOSITY @ 4.8% (50% LOSS)

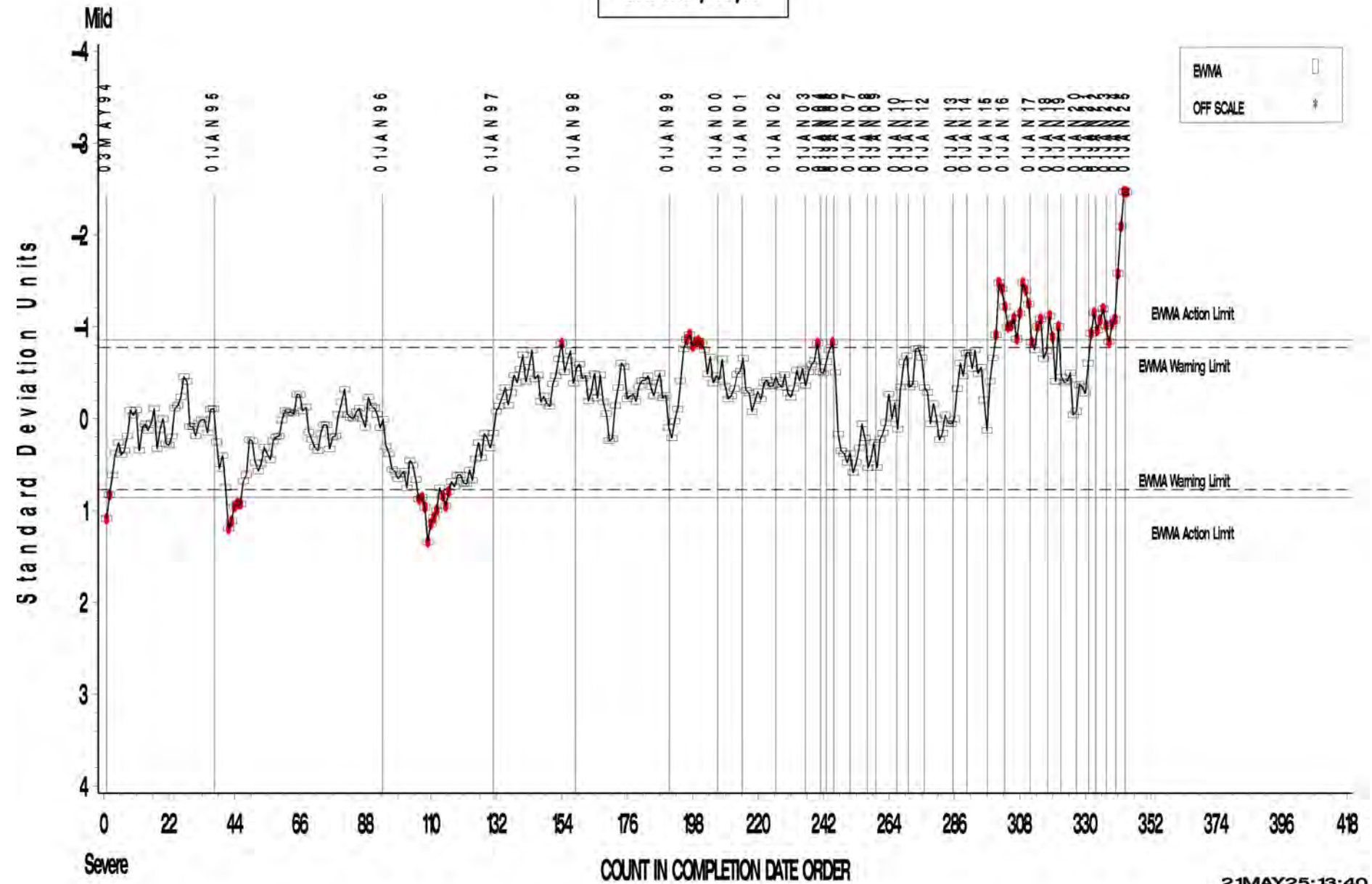
CUSUM Severity Analysis





VISCOSITY INCR @ 3.8% SOOT

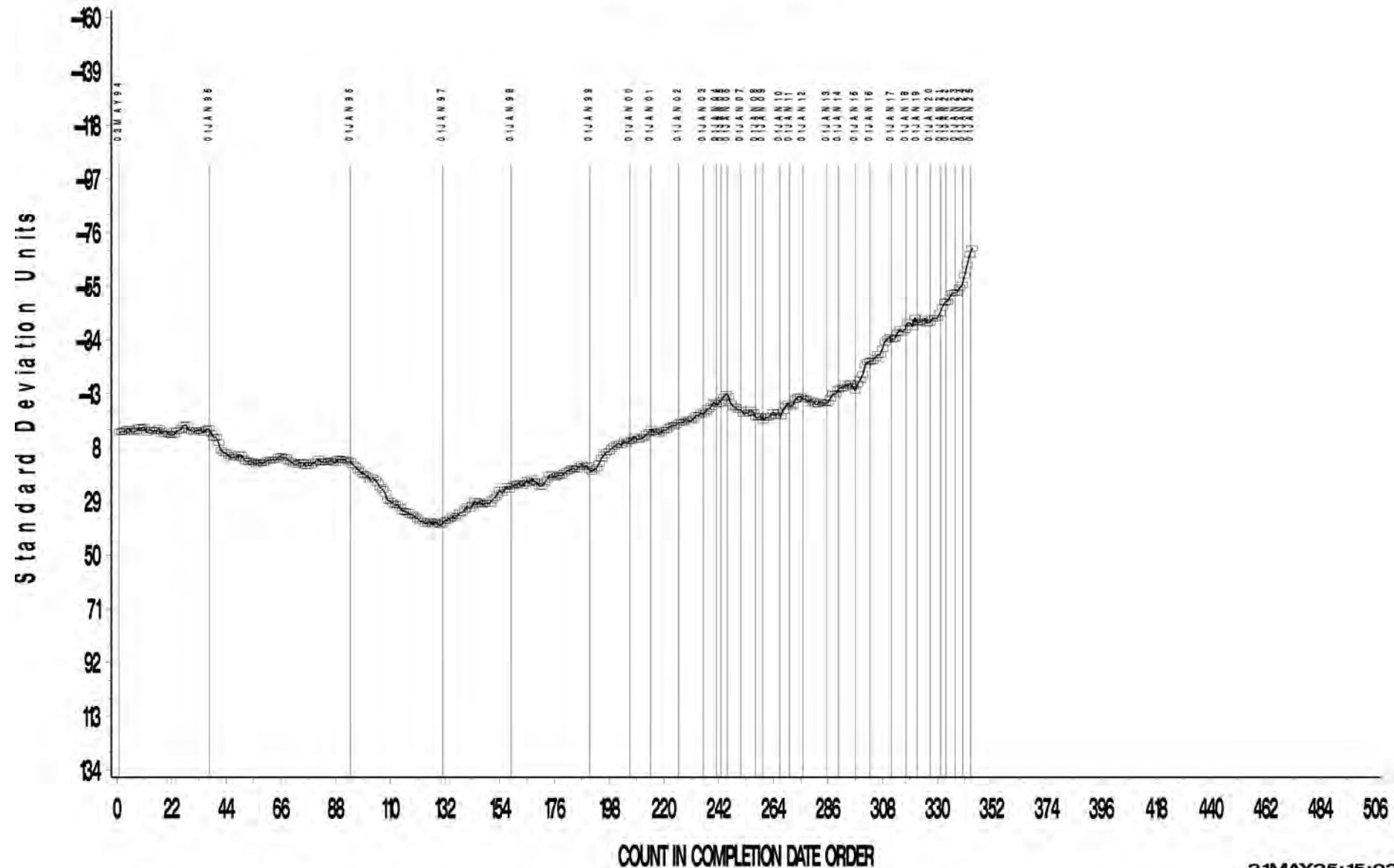
LTMS Severity Analysis



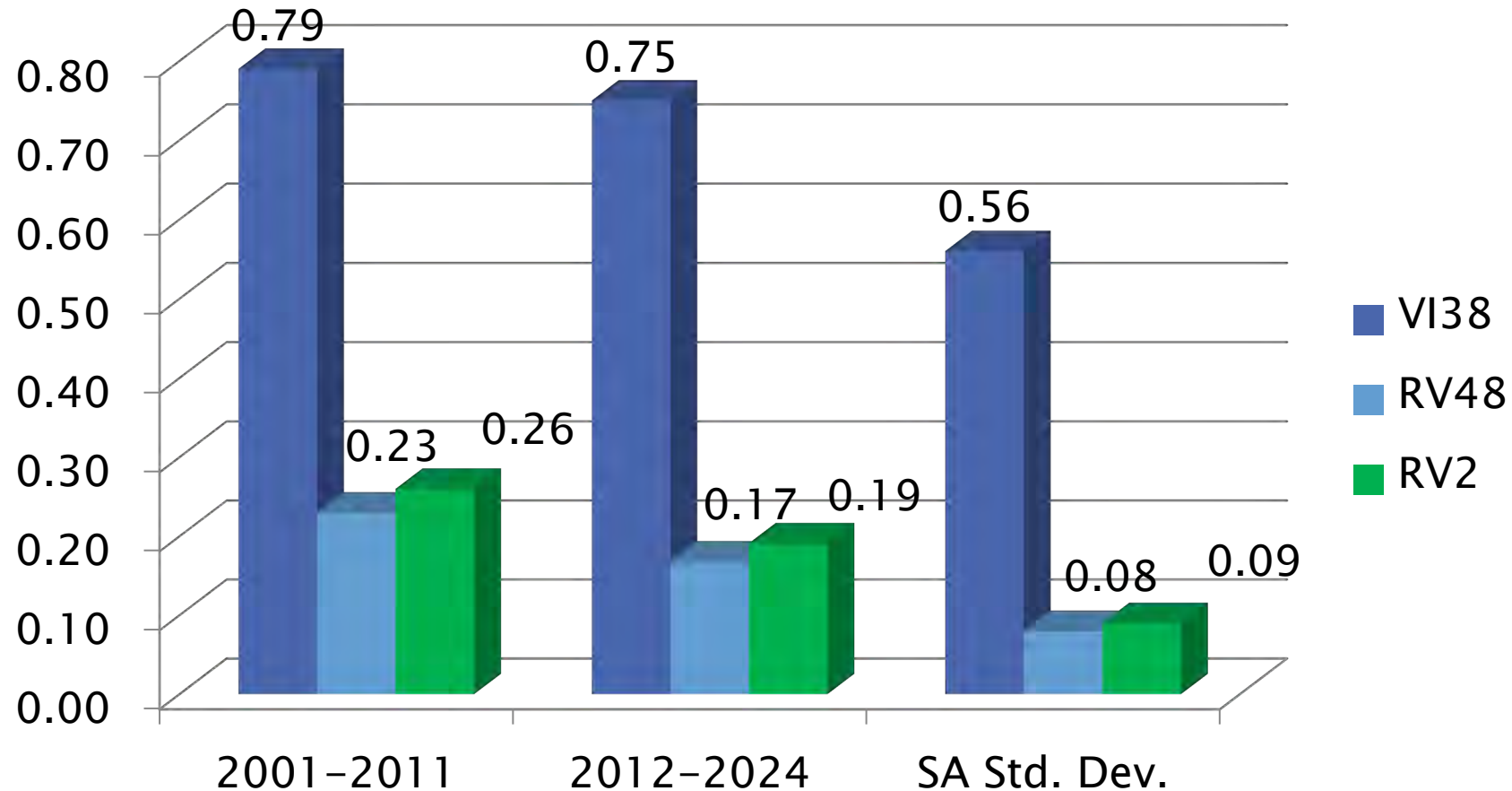


VISCOSITY INCR @ 3.8% SOOT

CUSUM Severity Analysis



T-8/E Precision Estimates



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Test Monitoring Center

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Mack T-11

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T-11 Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	2
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		2

T-11 Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

T-11 Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

*Invalid and aborted tests

T-11 Test Severity

- ▶ SOOT, SOOT5 and MRV are in control.
- ▶ SOOT4 is in severity action alarm in the severe direction. SOOT4 also in precision action alarm.

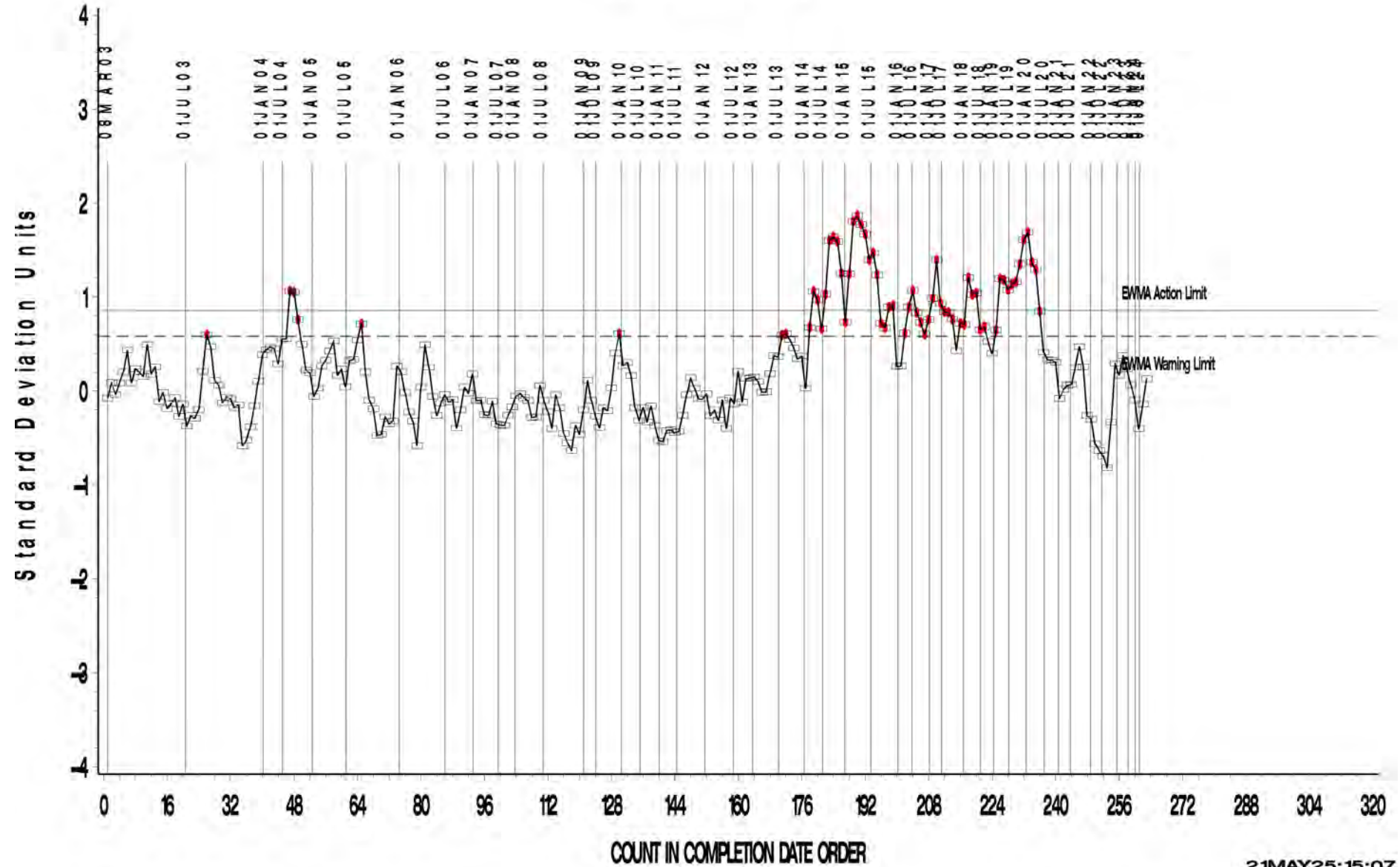
LTMS Severity Analysis





MRV VISCOSITY

LTMS Precision Analysis





MRV VISCOSITY

CUSUM Severity Analysis



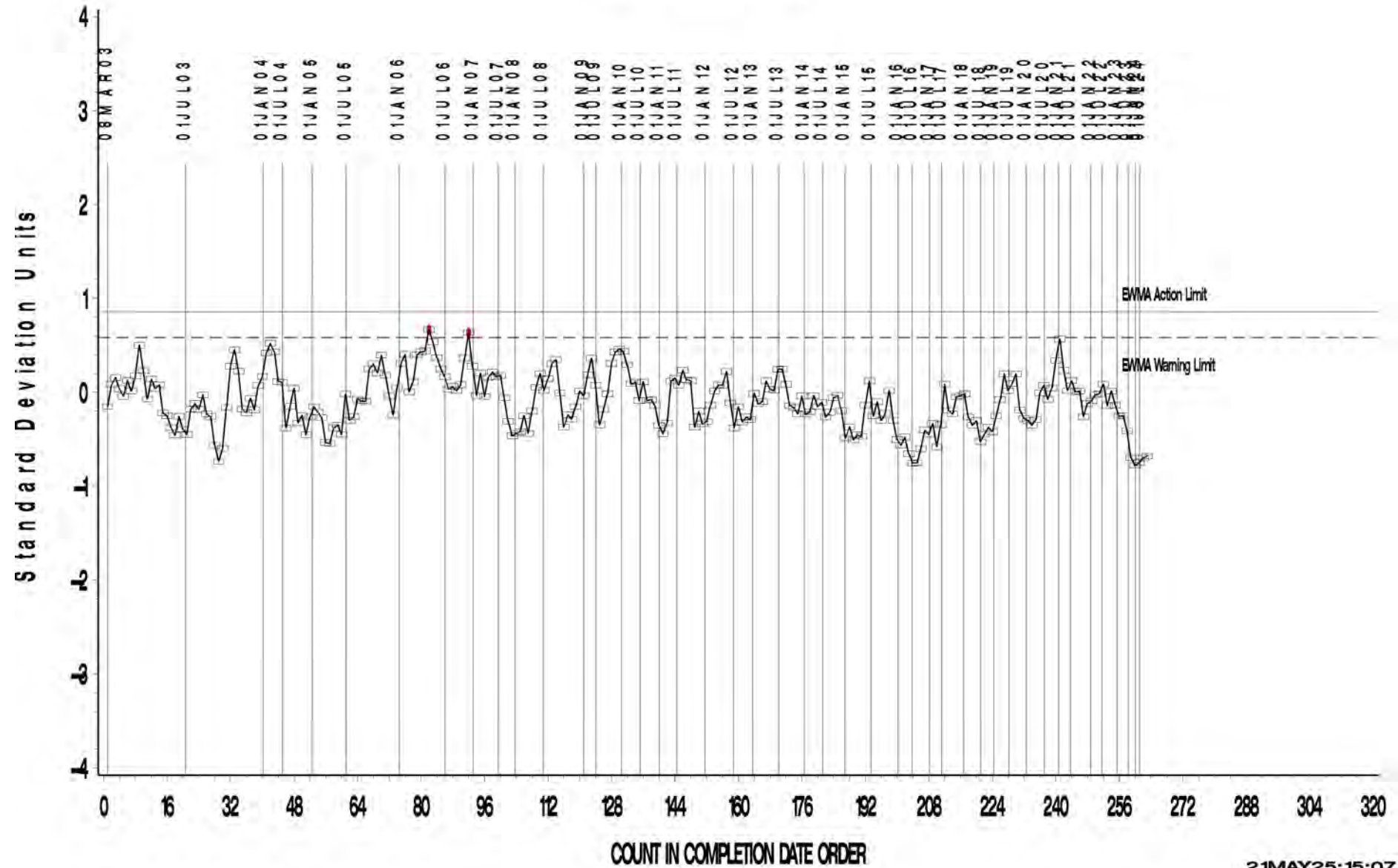
LTMS Severity Analysis





SOOT AT 12 cSt

LTMS Precision Analysis





SOOT AT 12 cSt

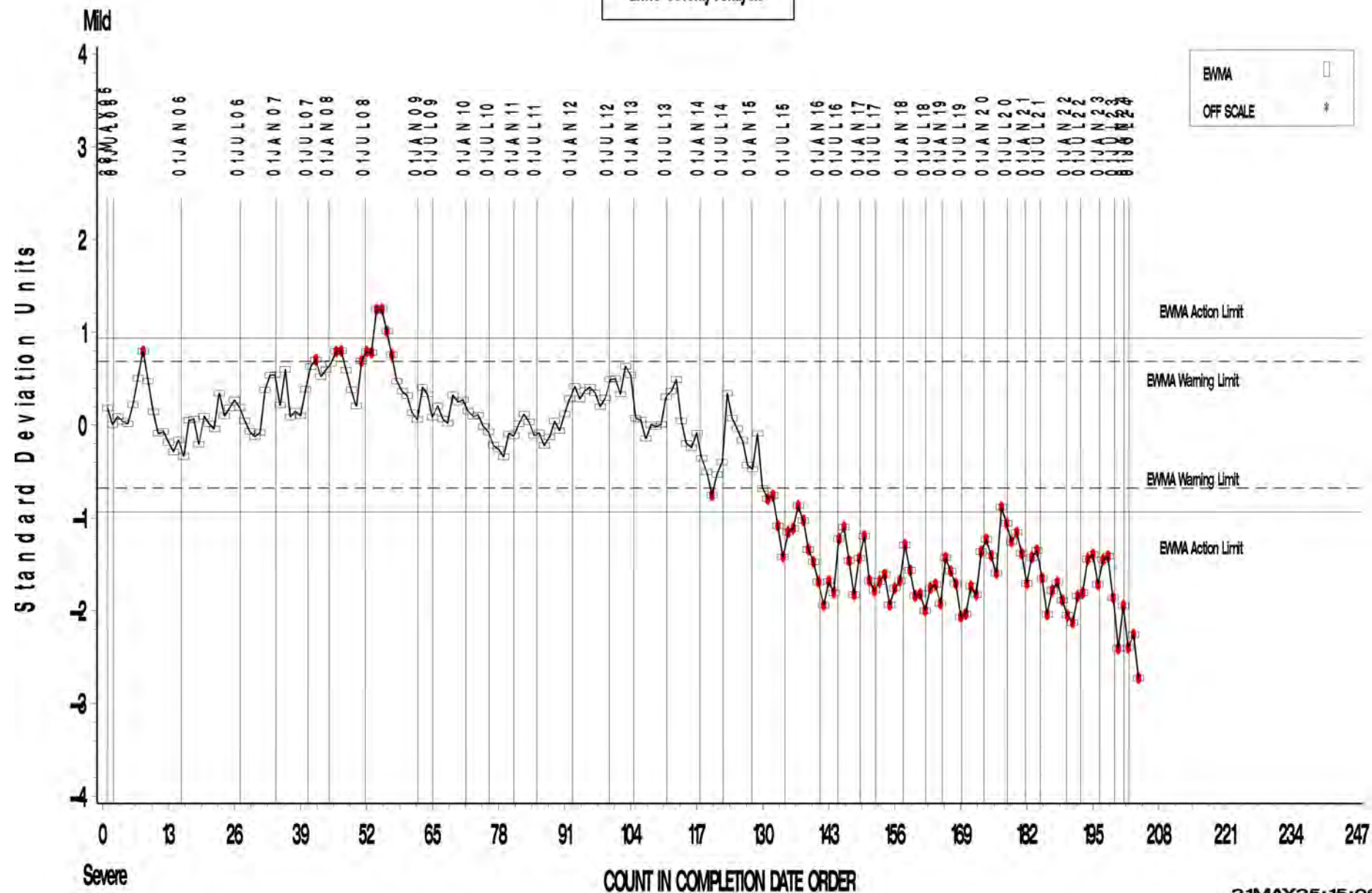
CUSUM Severity Analysis





SOOT @ 4 cSt — FINAL RESULT

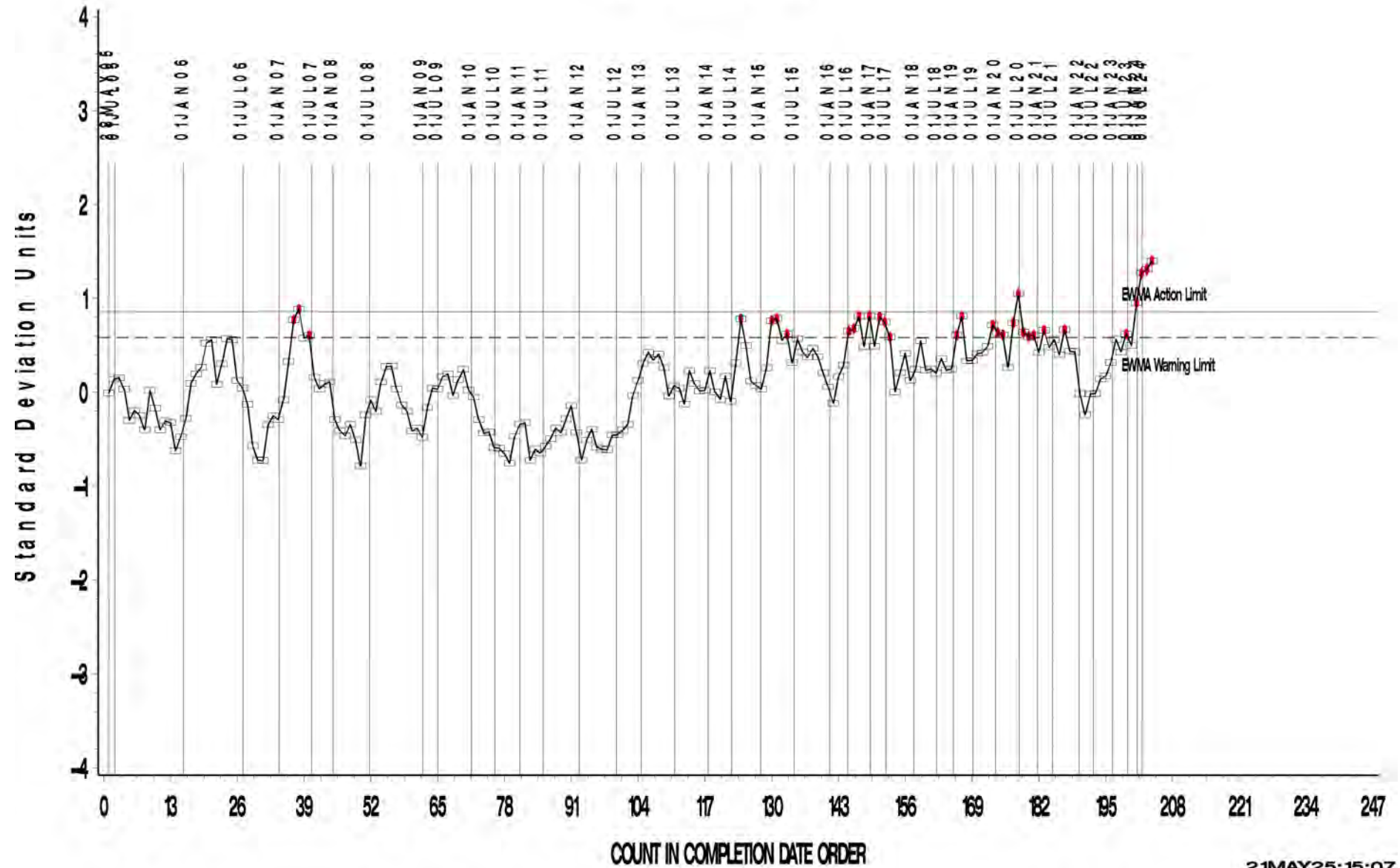
LTMS Severity Analysis





SOOT @ 4 cSt — FINAL RESULT

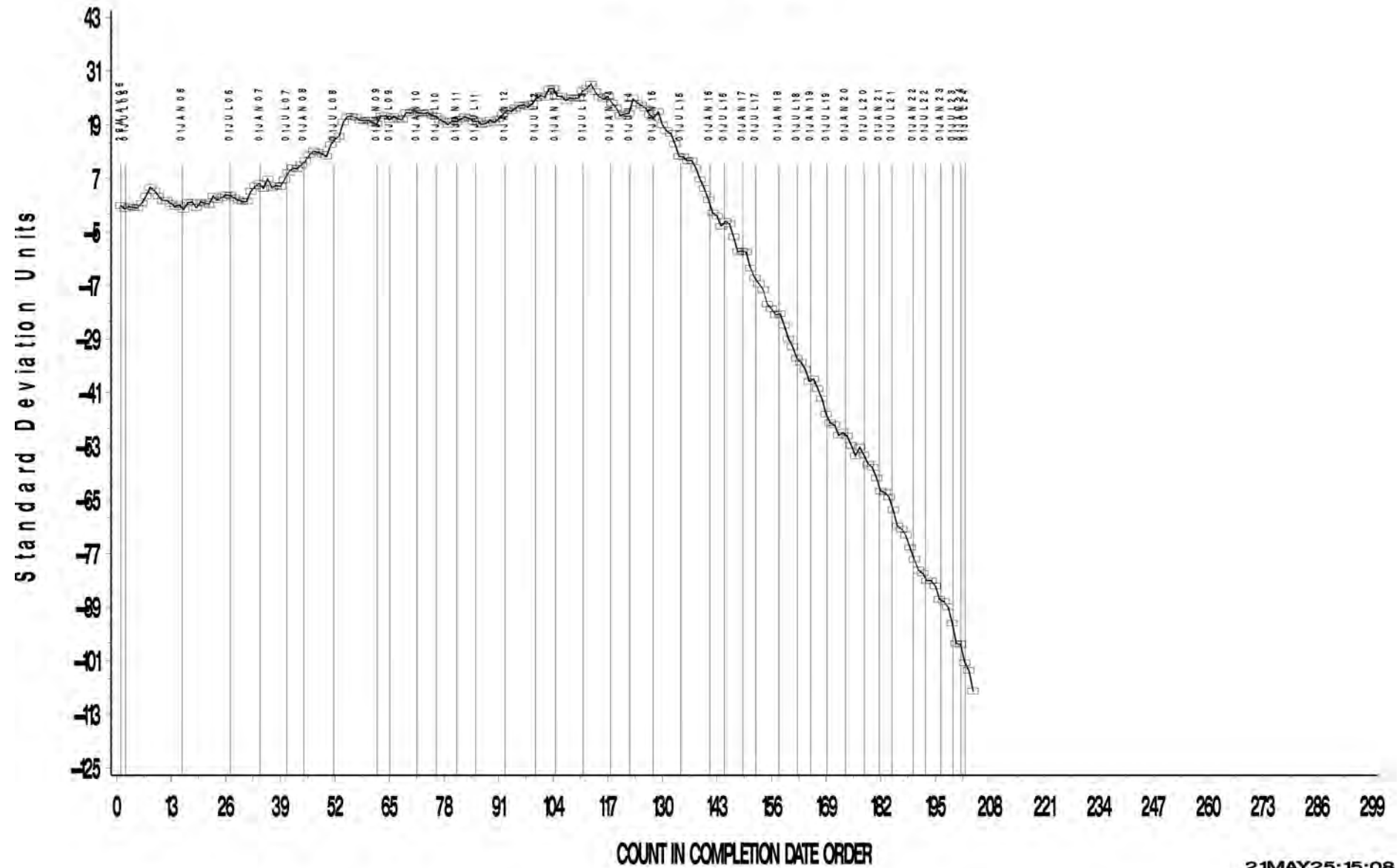
LTMS Precision Analysis





SOOT @ 4 cSt — FINAL RESULT

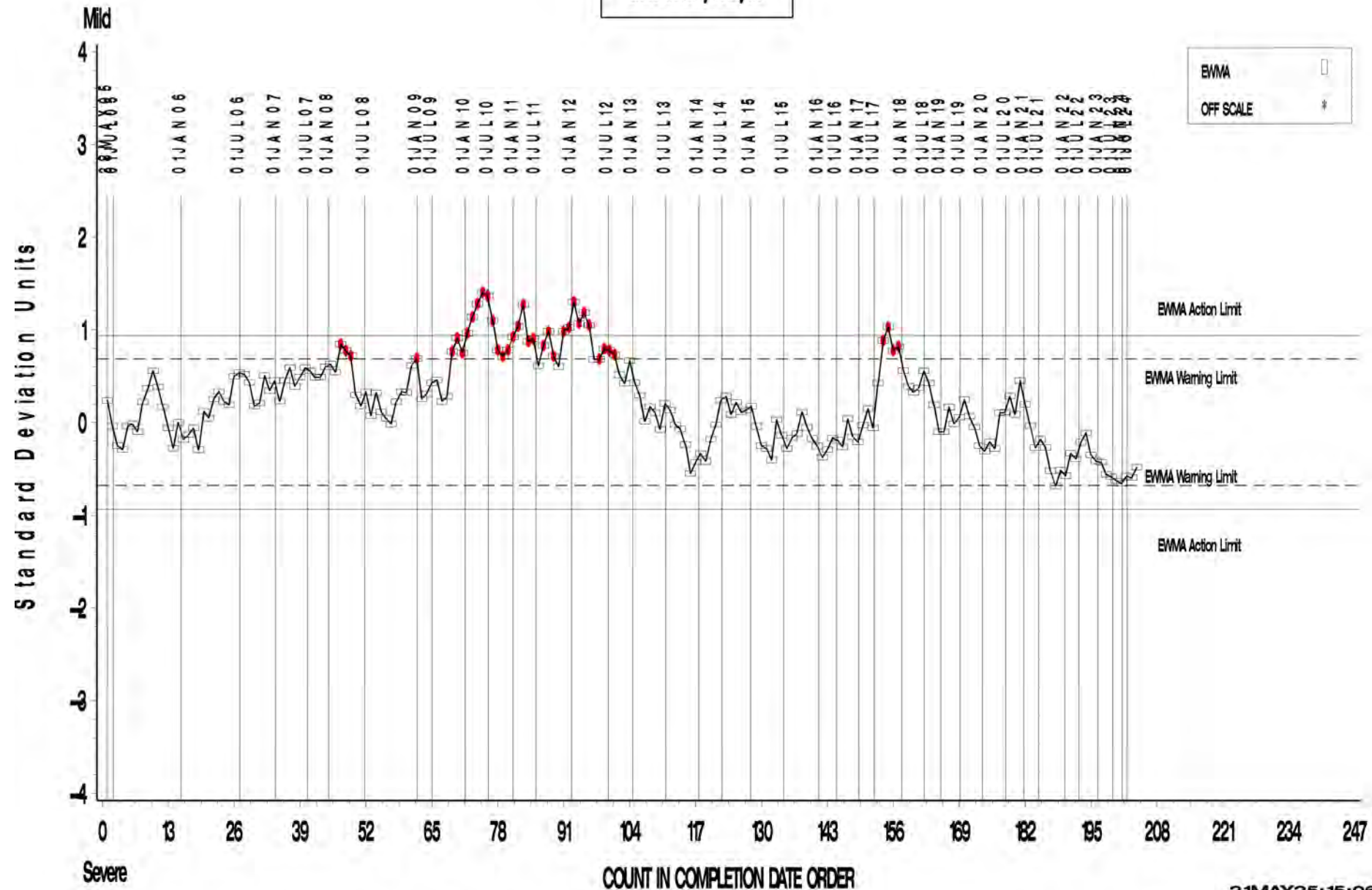
CUSUM Severity Analysis





SOOT @ 15 cSt — FINAL RESULT

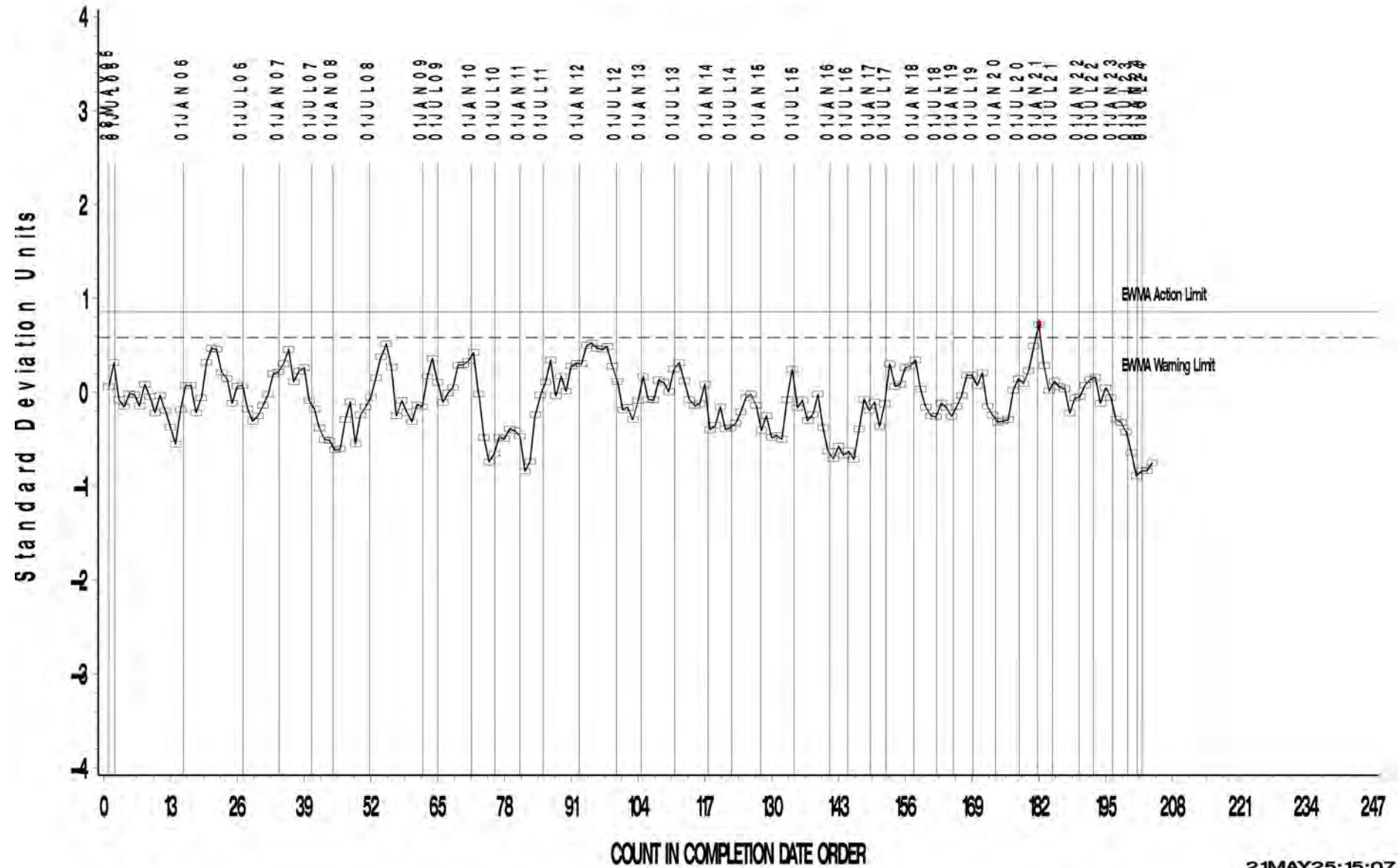
LTMS Severity Analysis





SOOT @ 15 cSt — FINAL RESULT

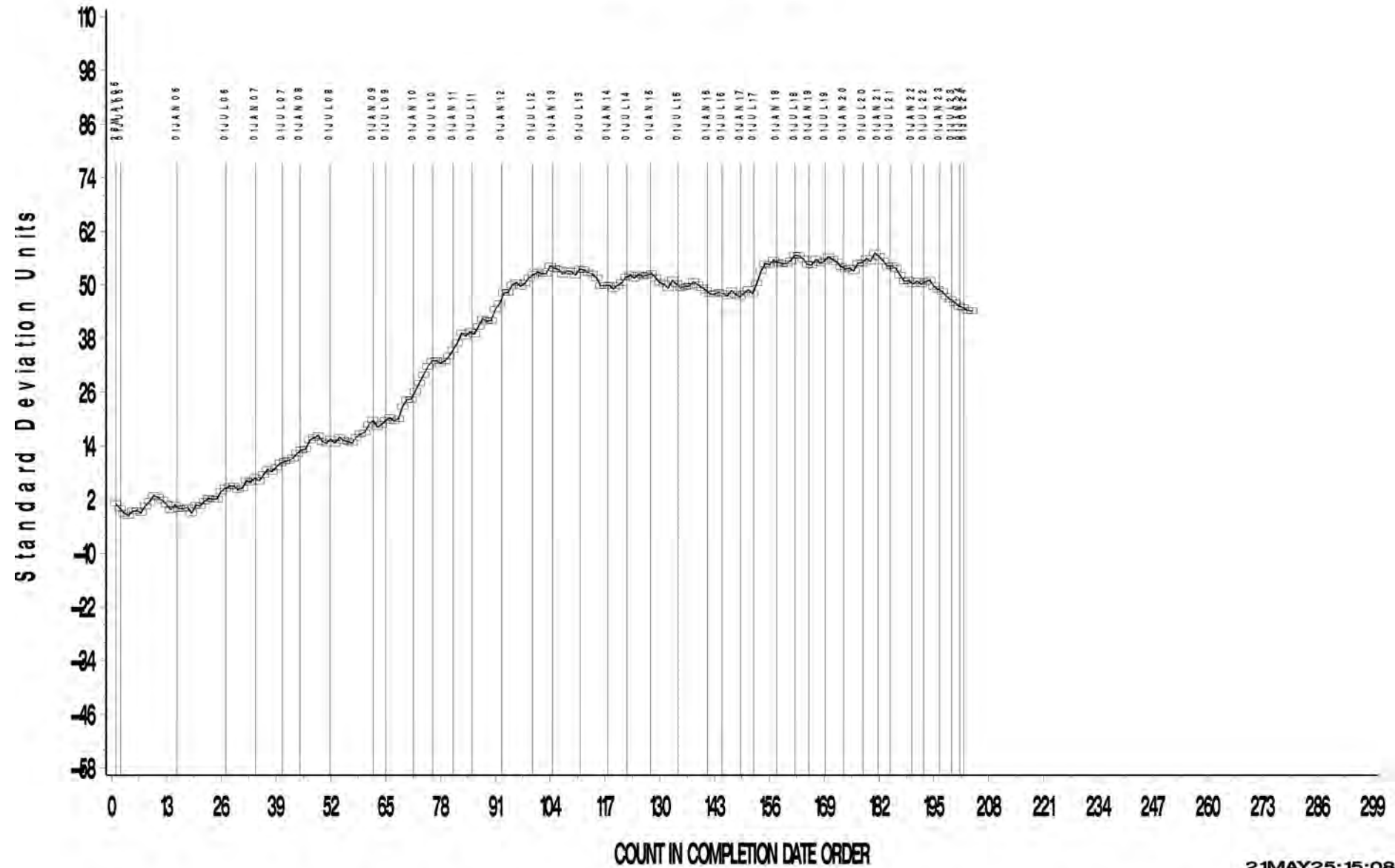
LTMS Precision Analysis



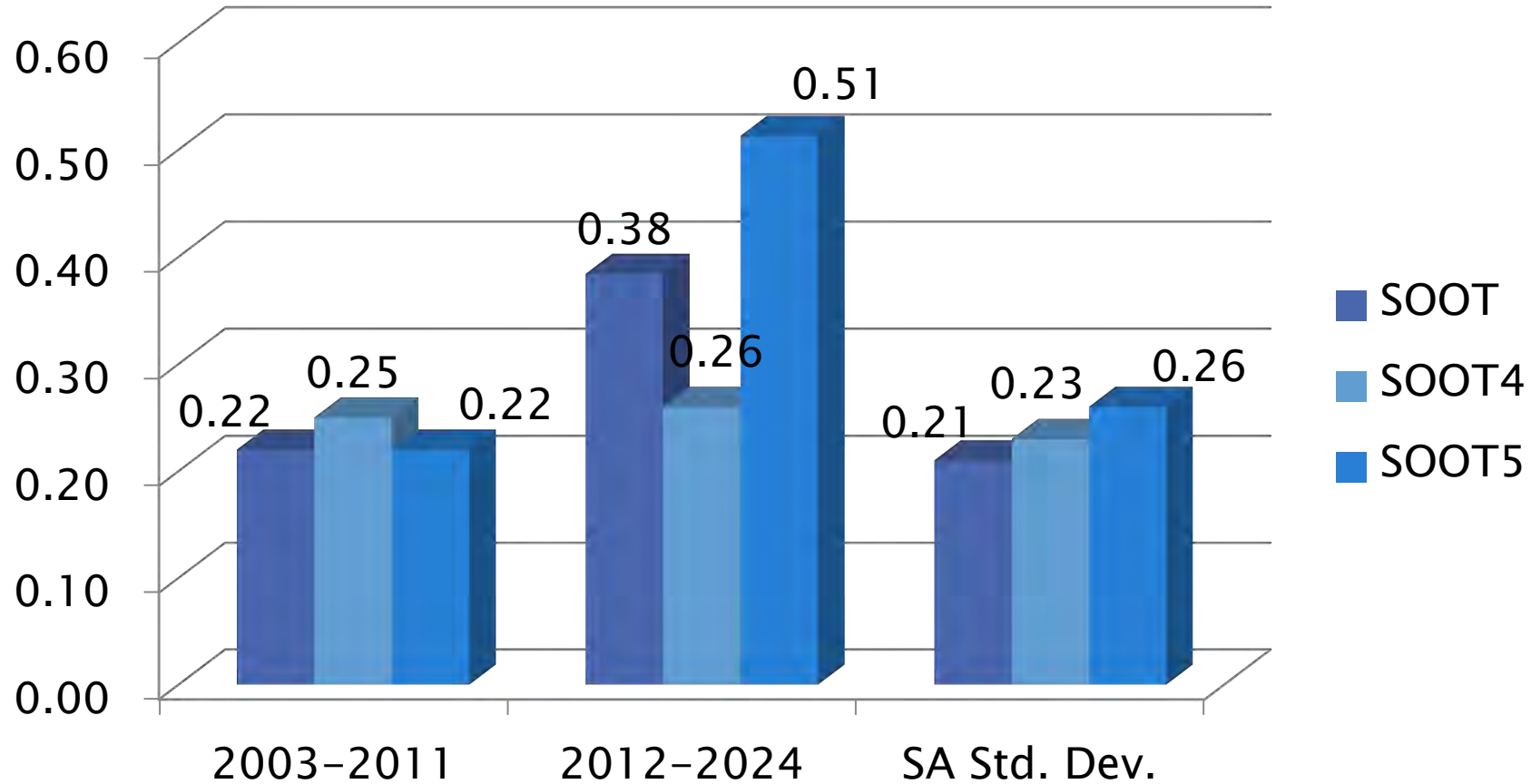


SOOT @ 15 cSt —FINAL RESULT

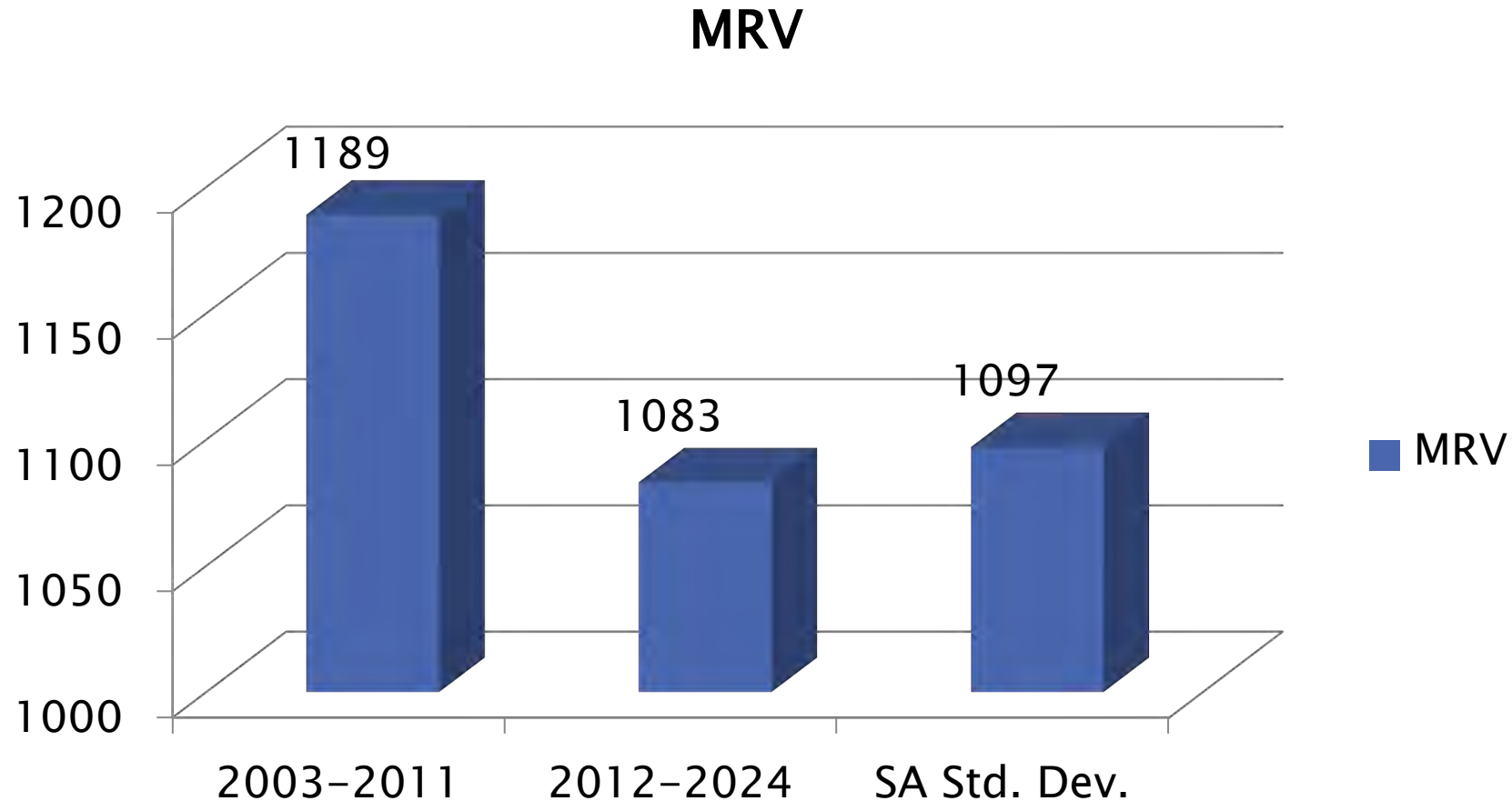
CUSUM Severity Analysis



T-11 Precision Estimates



T-11 Precision Estimates



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



Mack T-12

»» April 2025

T-12 Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	2
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		2

T-12 Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

T-12 Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

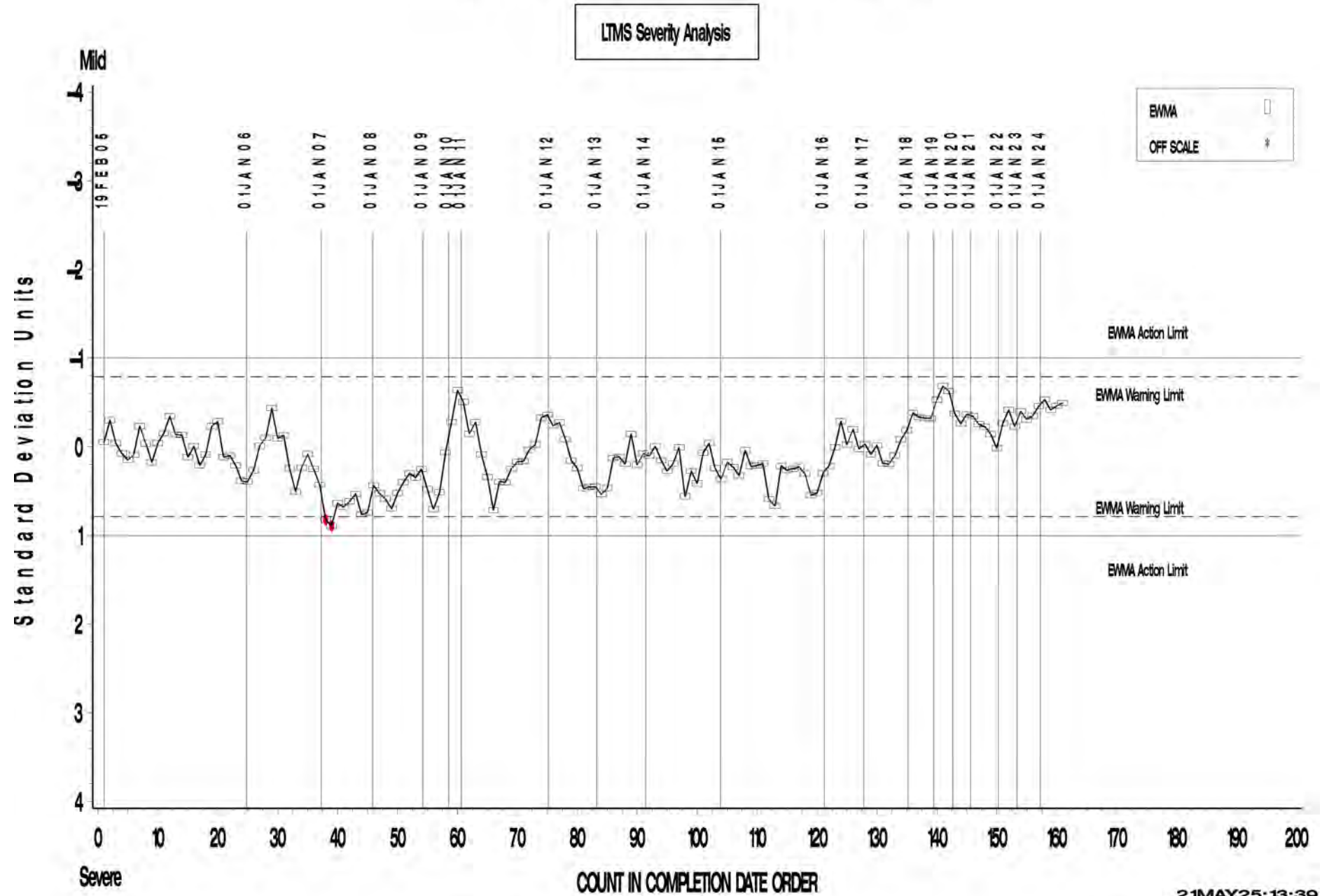
*Invalid and aborted tests

T-12 Test Severity

- ▶ PB2 is in severity warning alarm in the mild direction.
- ▶ All other parameters are in control.



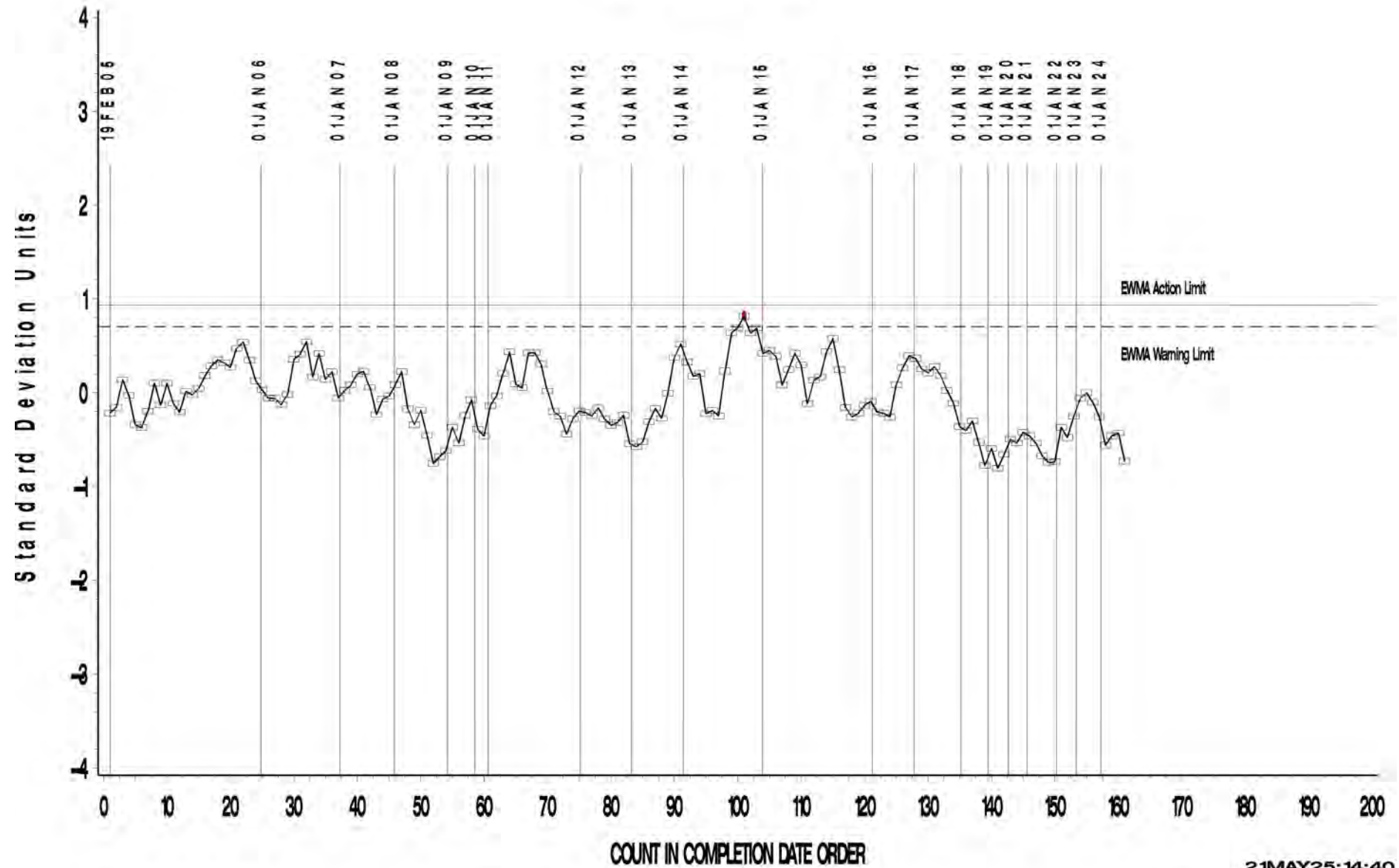
AVG. CYLINDER LINER WEAR (CLW)





AVG. CYLINDER LINER WEAR (CLW)

LTMS Precision Analysis





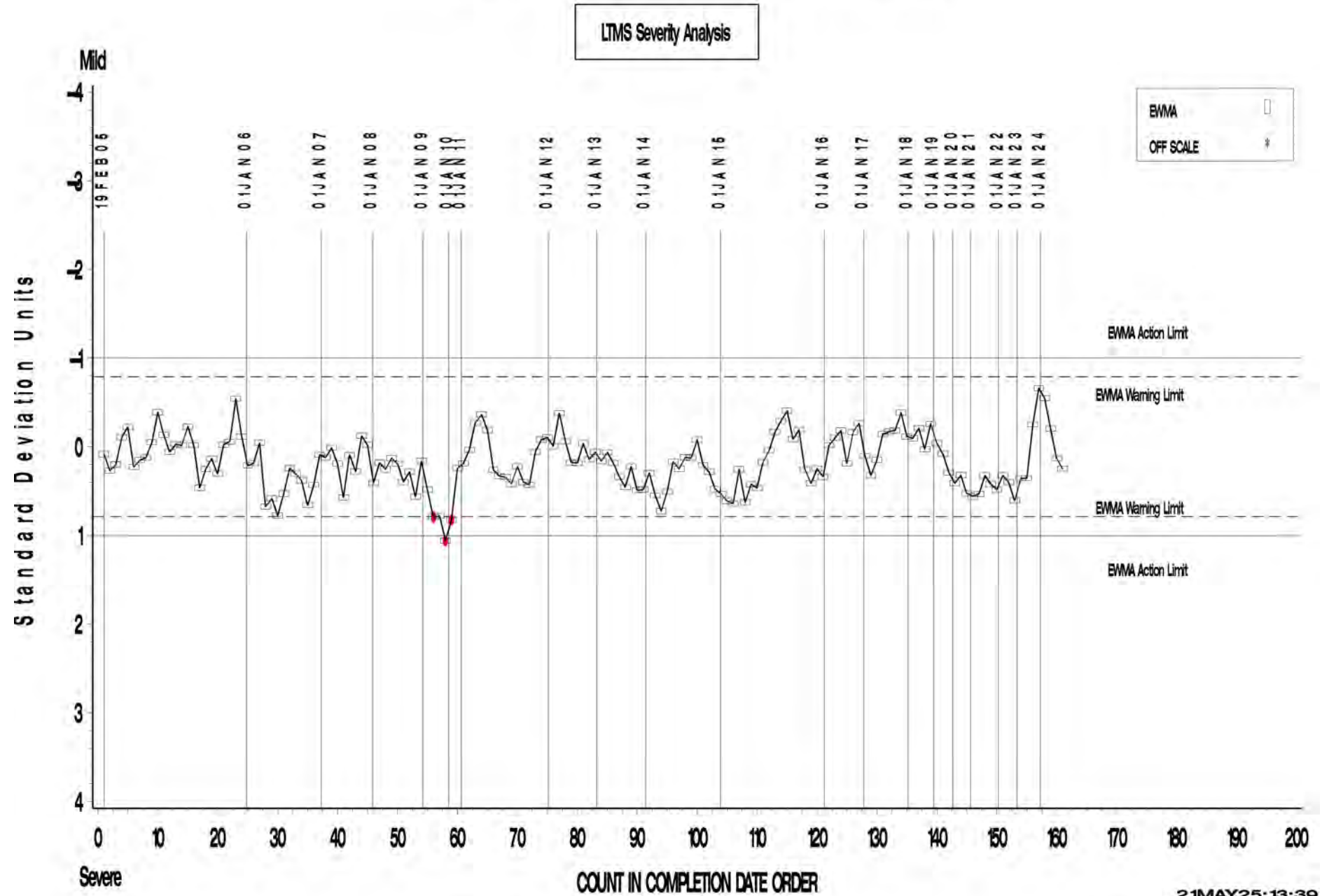
AVG. CYLINDER LINER WEAR (CLW)

CUSUM Severity Analysis





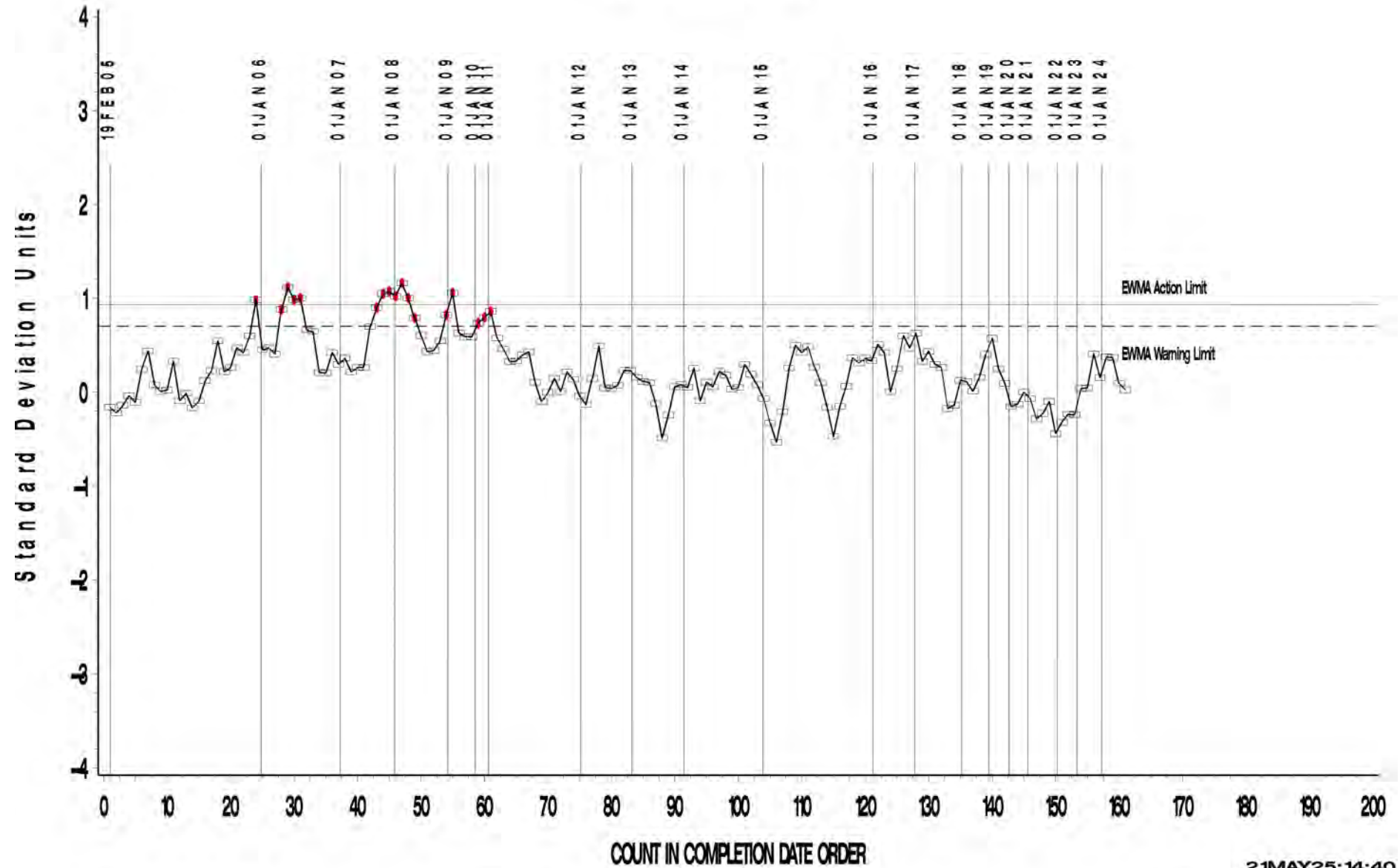
FINAL TRANS. RES. OIL CONSUMPTION





FINAL TRANS. RES. OIL CONSUMPTION

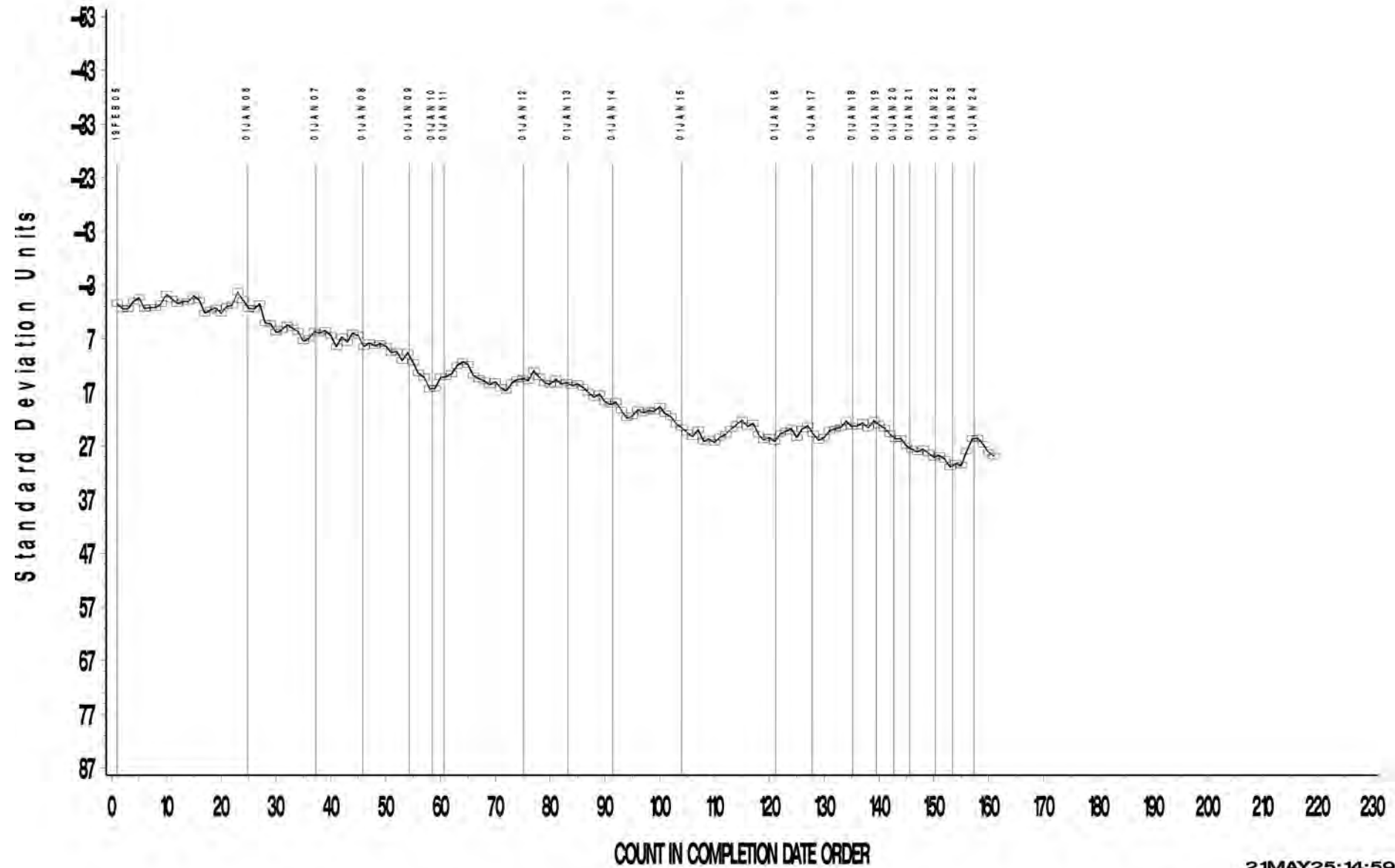
LTMS Precision Analysis



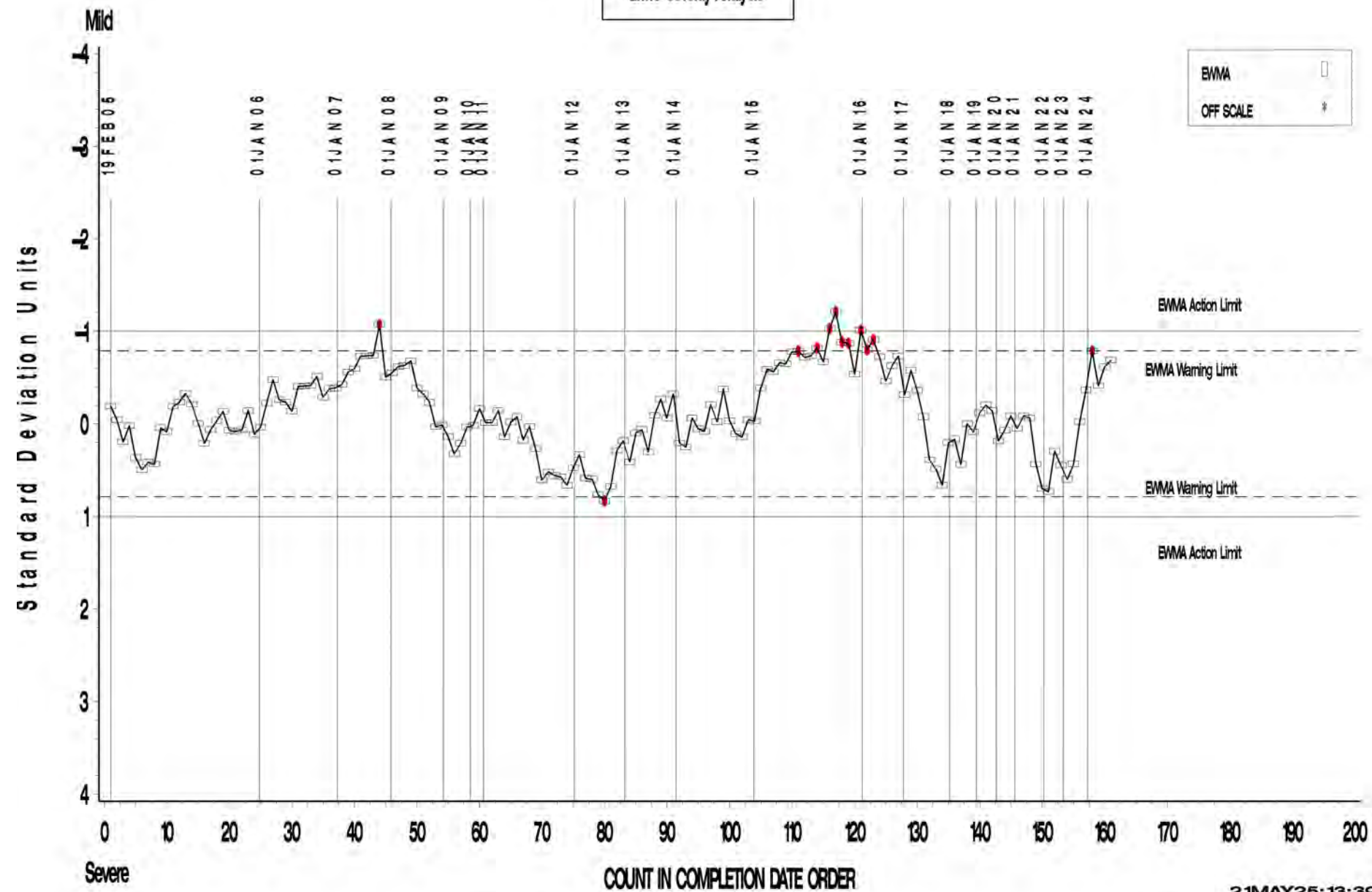


FINAL TRANS. RES. OIL CONSUMPTION

CUSUM Severity Analysis



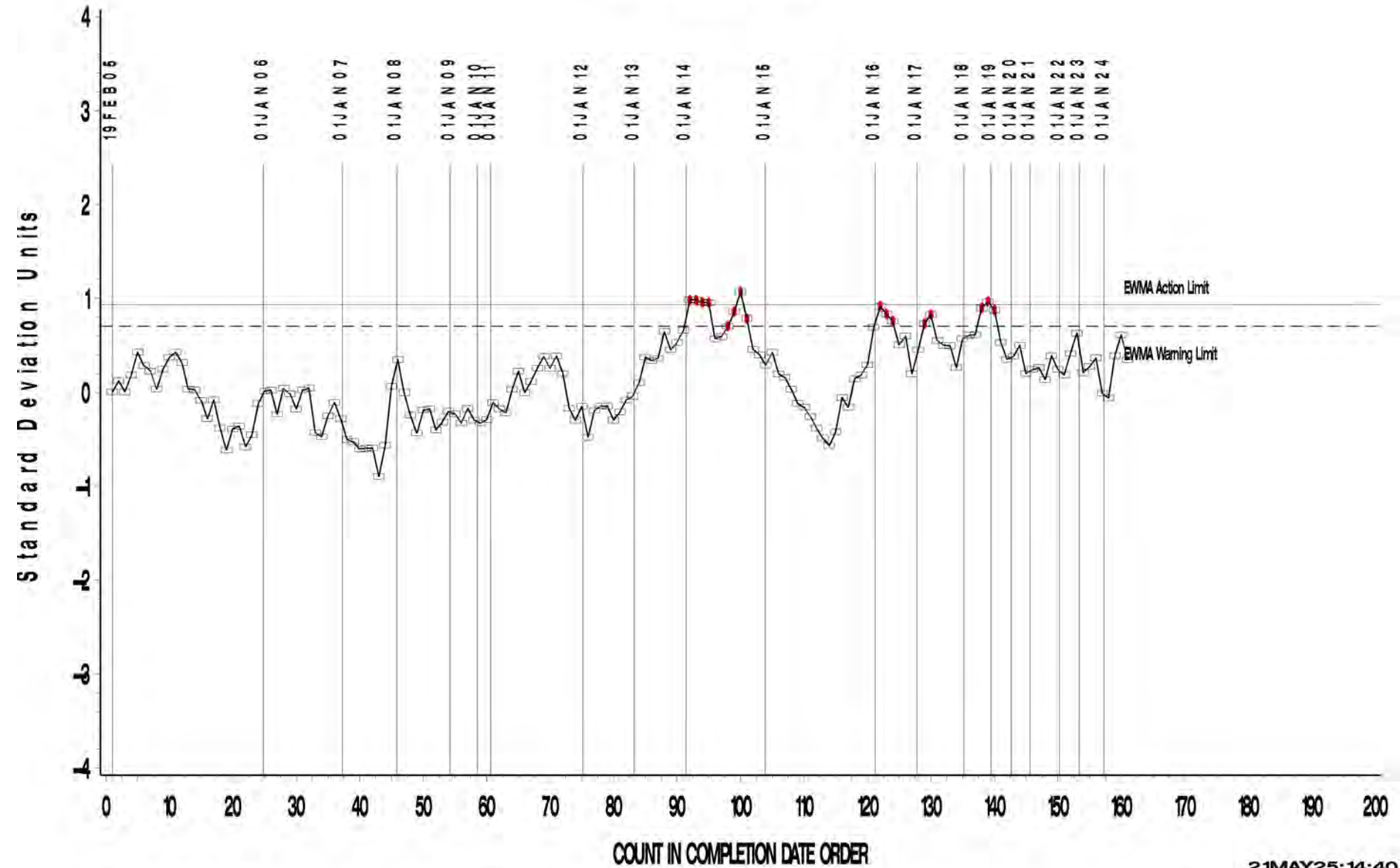
LTMS Severity Analysis





FINAL TRANS. RES. DELTA PB @ EOT

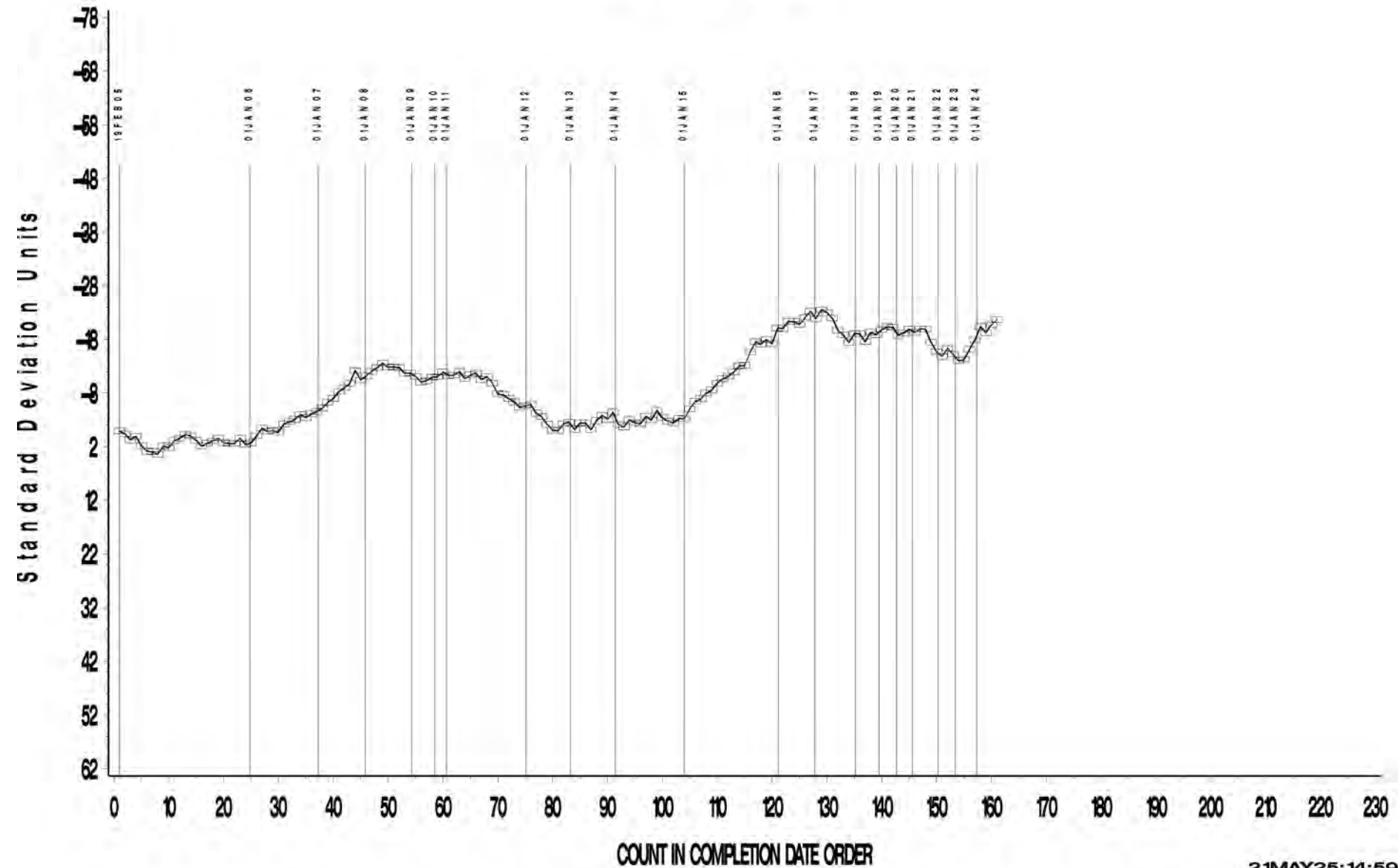
LTMS Precision Analysis





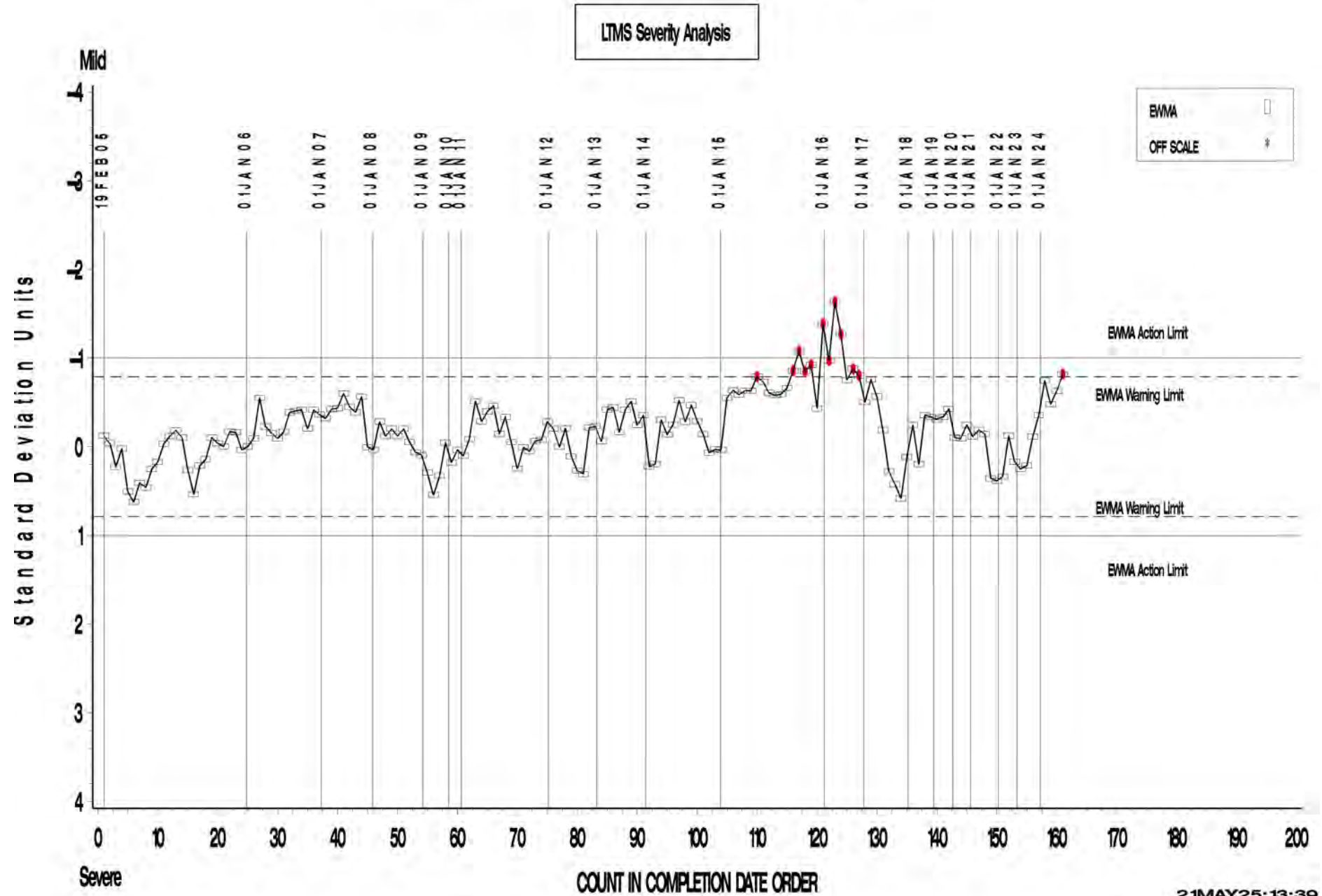
FINAL TRANS. RES. DELTA PB @ EOT

CUSUM Severity Analysis





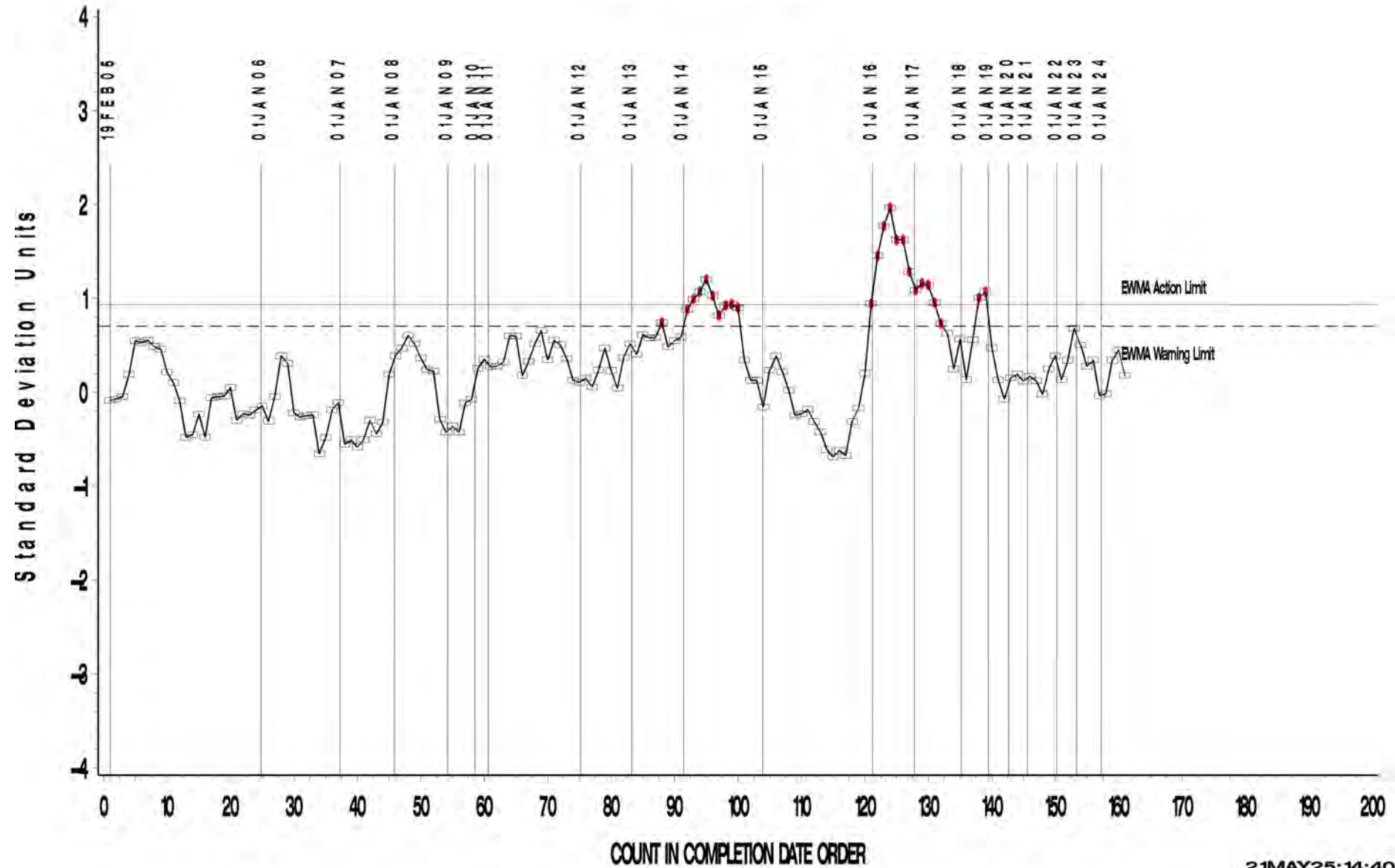
FINAL TRANS. RES. DELTA PB 250-300H





FINAL TRANS. RES. DELTA PB 250-300H

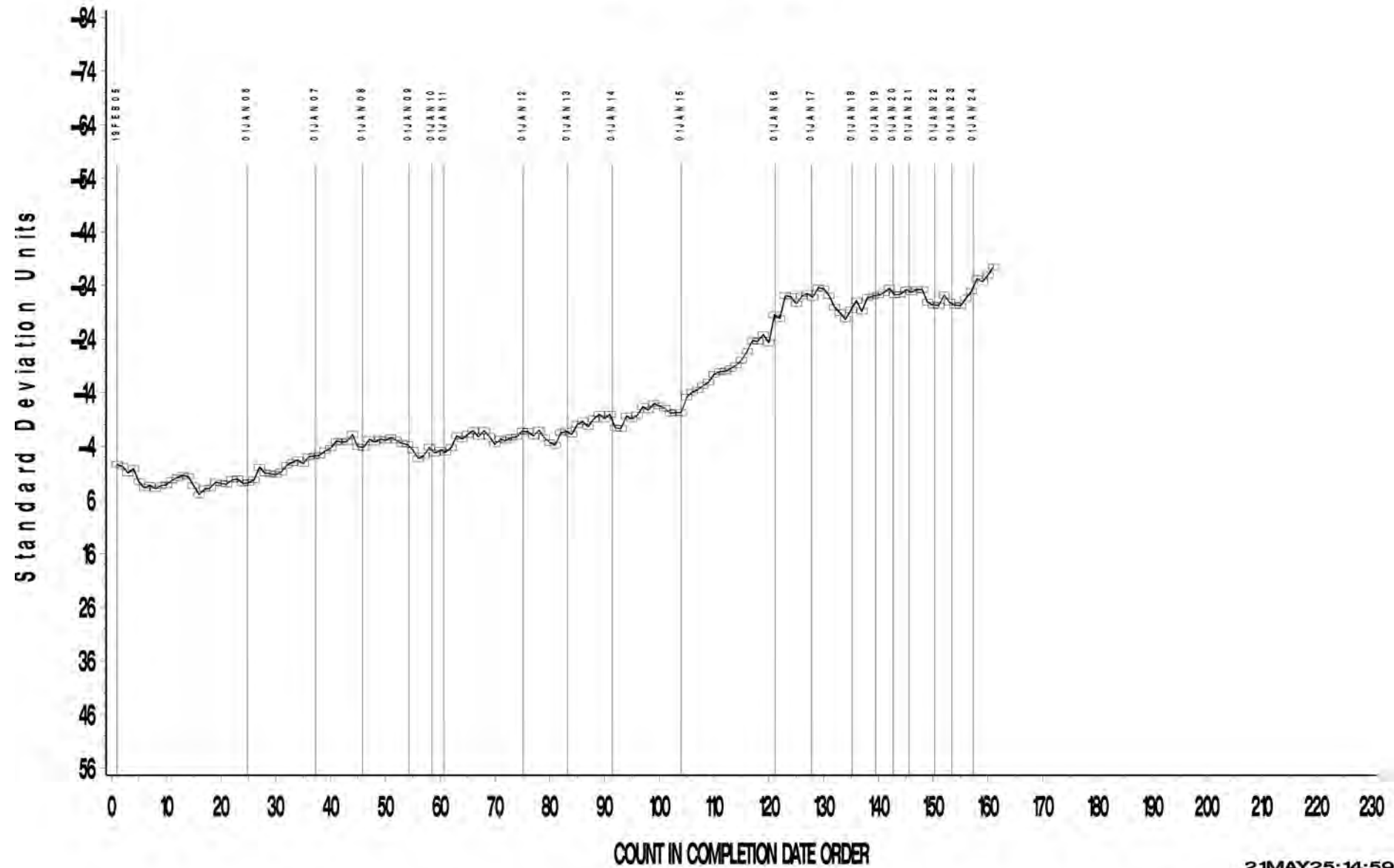
LTMS Precision Analysis





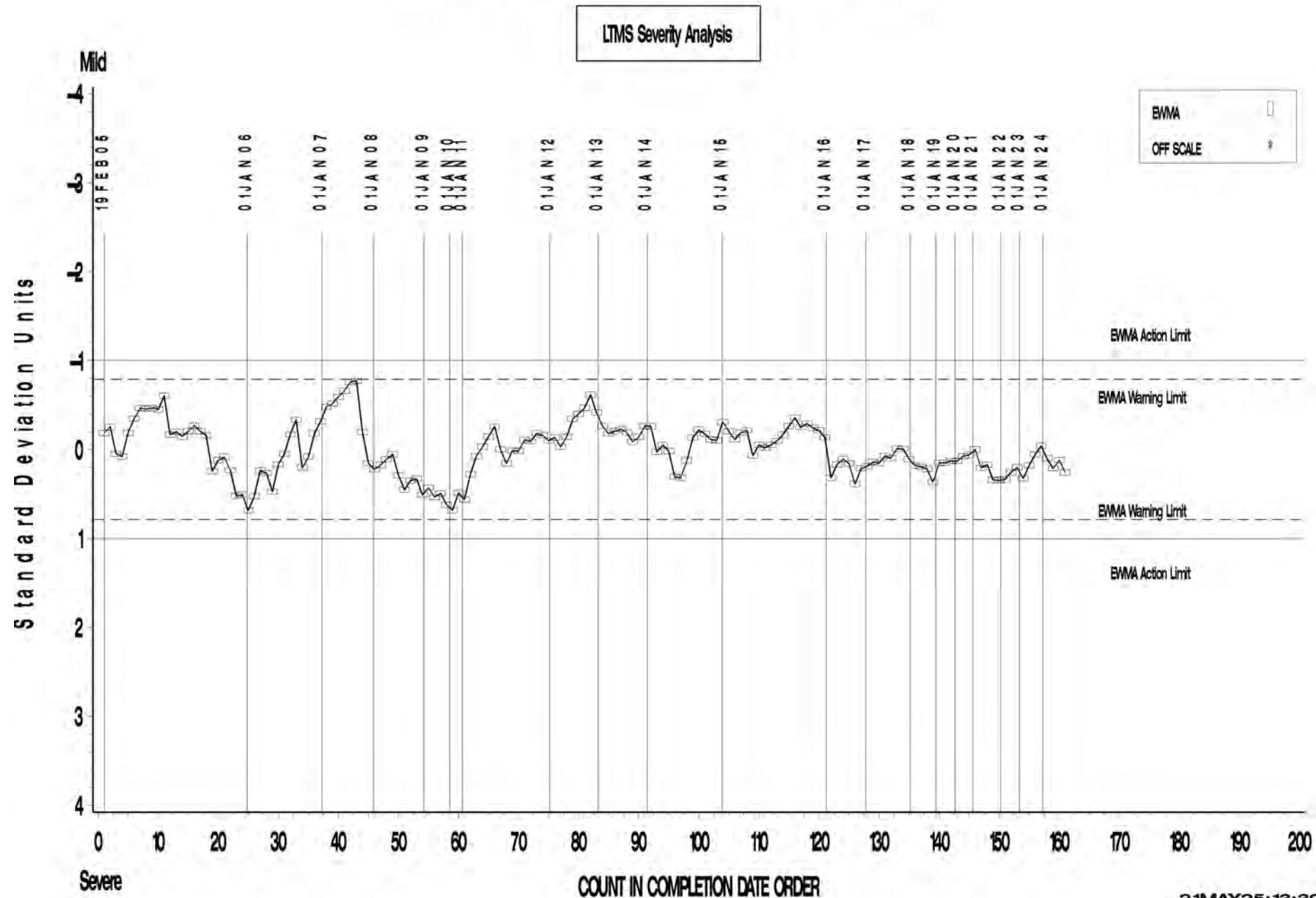
FINAL TRANS. RES. DELTA PB 250-300H

CUSUM Severity Analysis





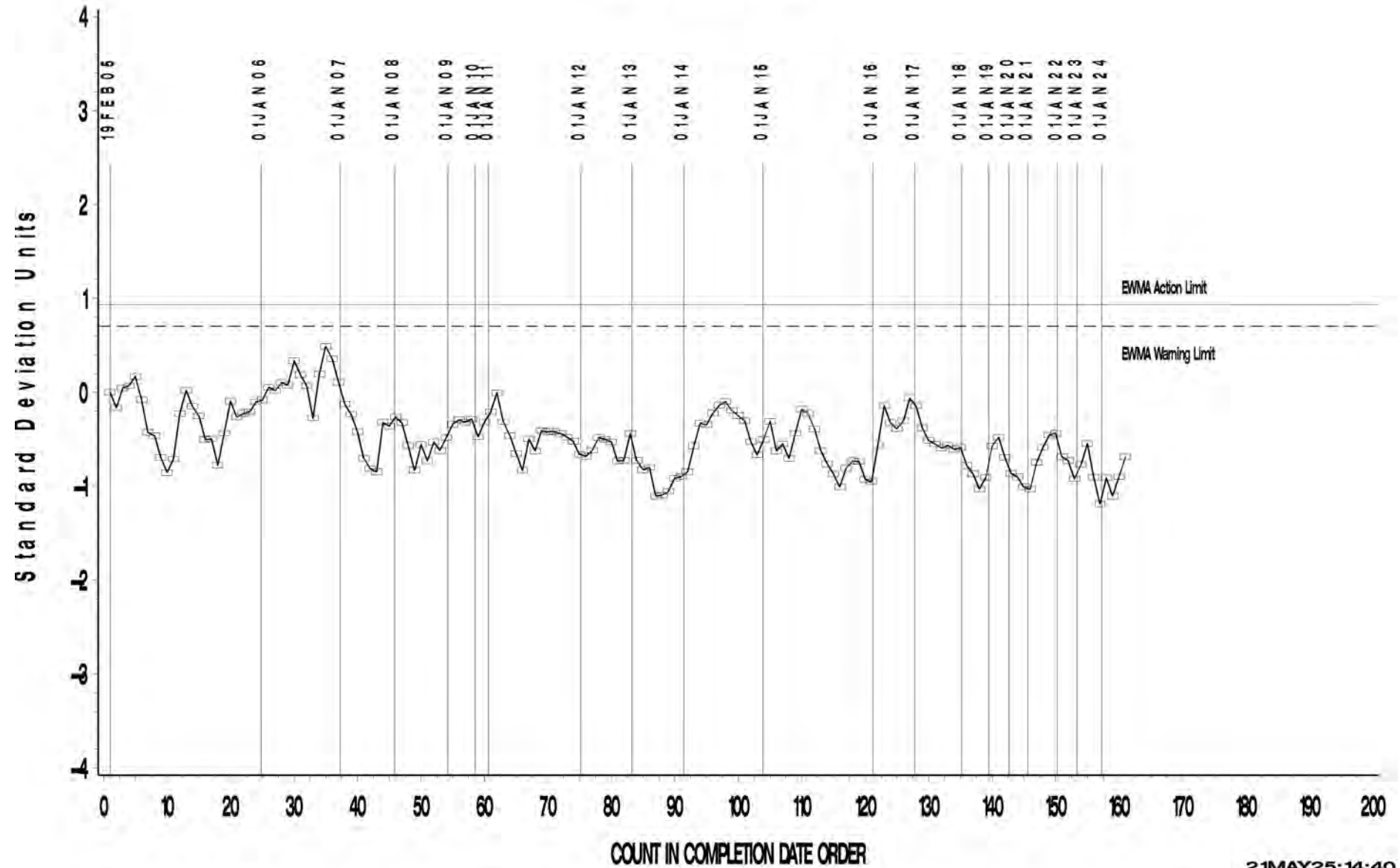
AVG. TOP RING WEIGHT LOSS (TRWL)





AVG. TOP RING WEIGHT LOSS (TRWL)

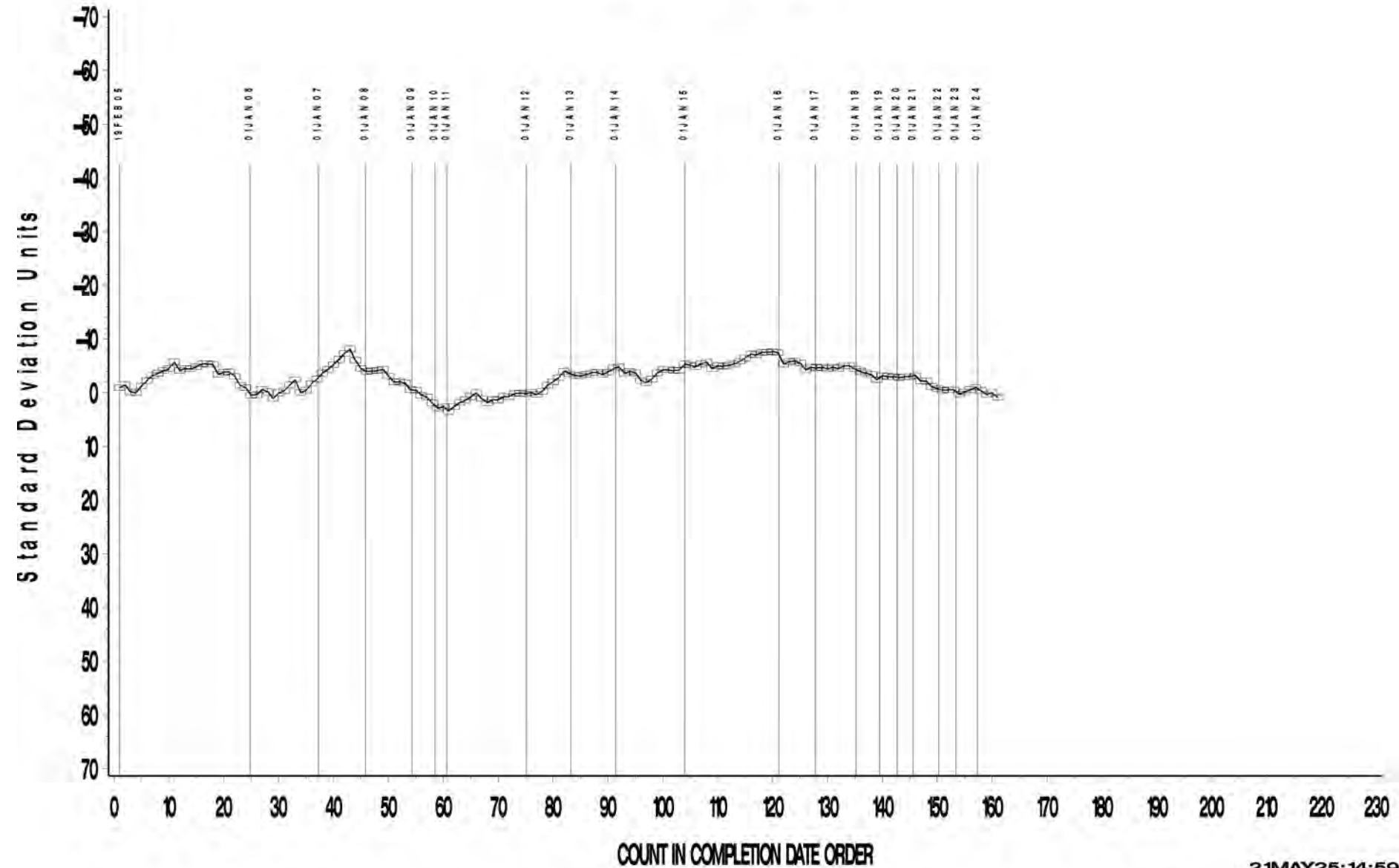
LTMS Precision Analysis



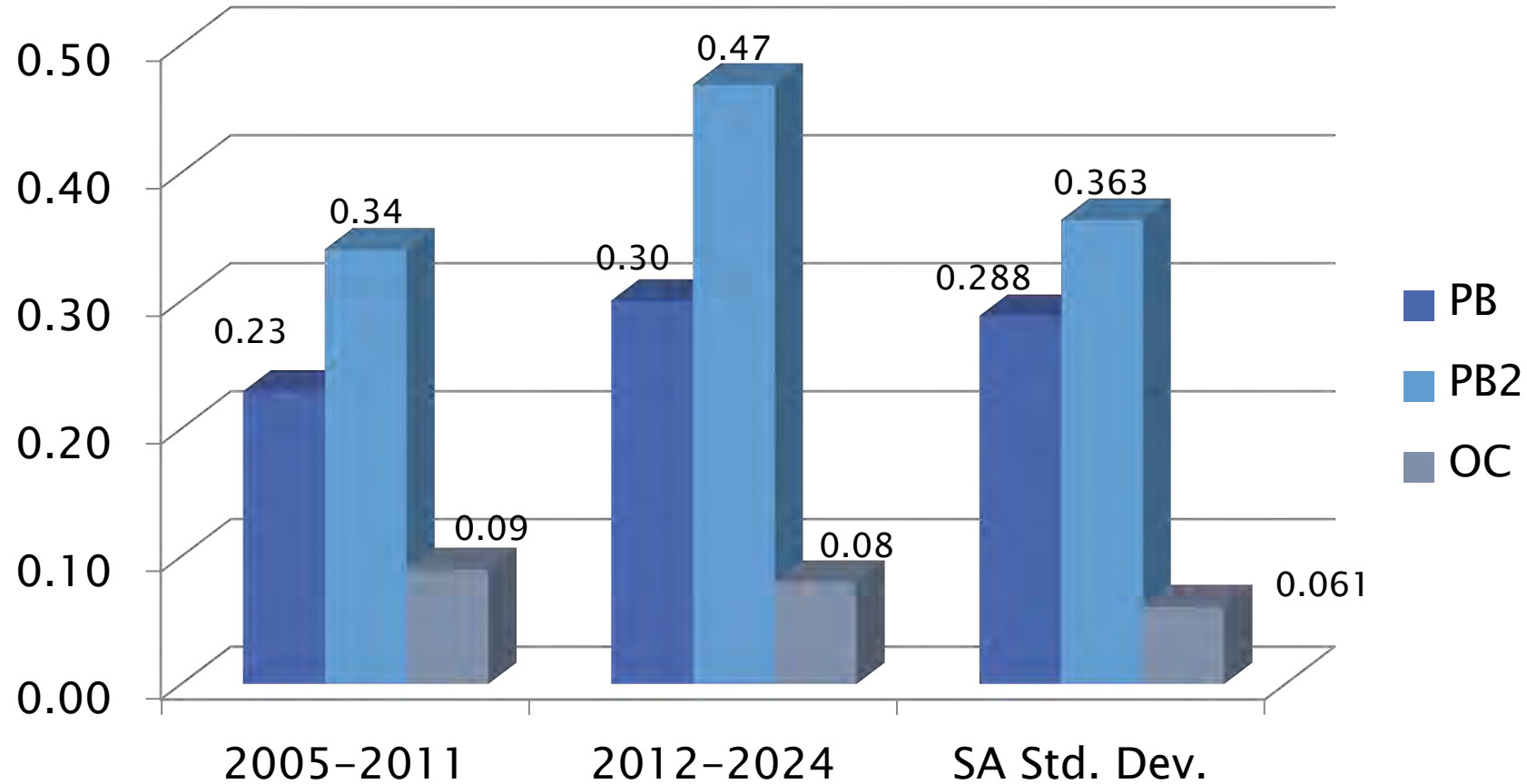


AVG. TOP RING WEIGHT LOSS (TRWL)

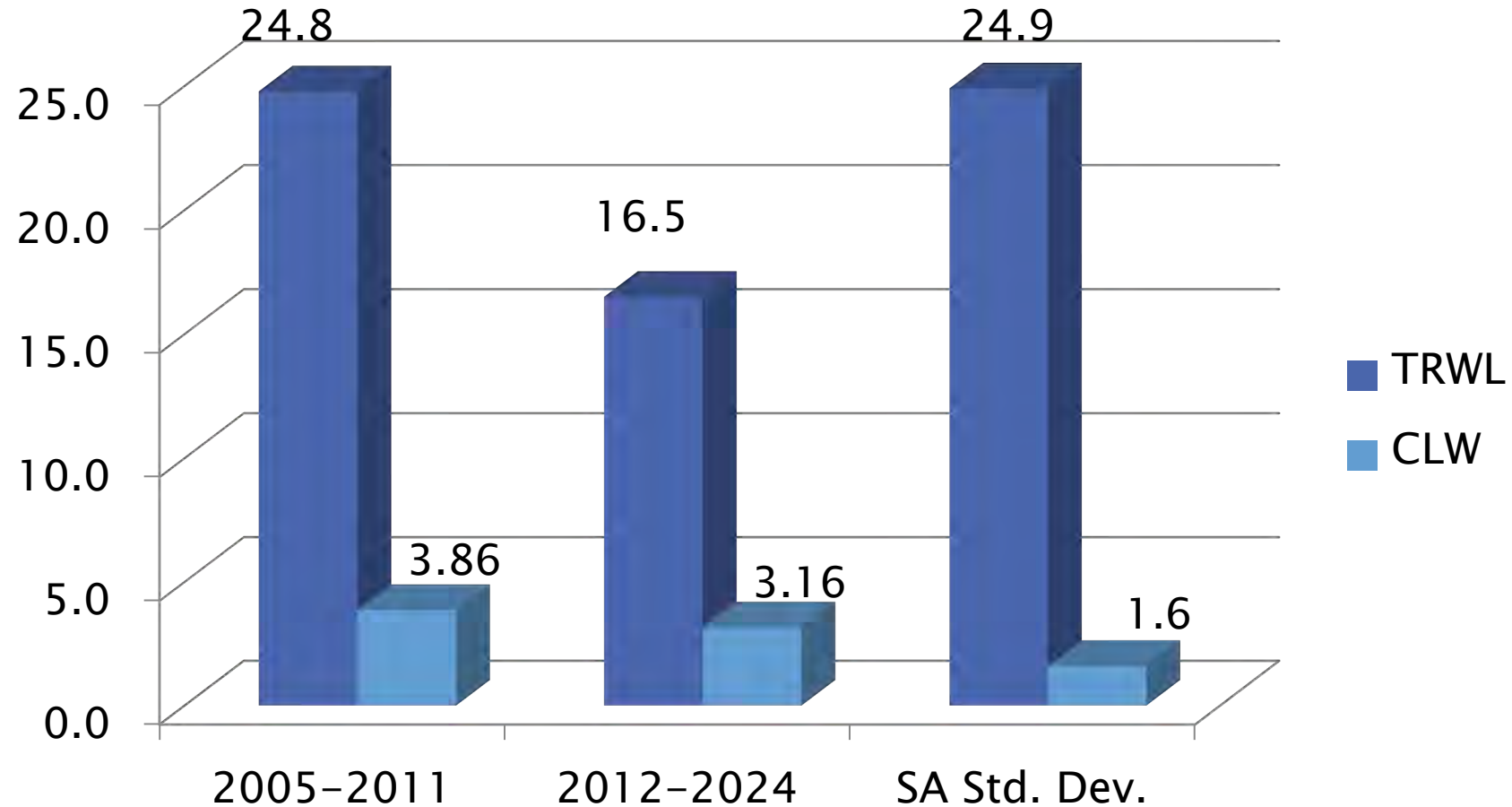
CUSUM Severity Analysis



T-12 Precision Estimates



T-12 Precision Estimates



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Mack T-12A

»» April 2025

T-12A Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	3
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Total		3

T-12A Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

T-12A Lost Tests*

Status	Cause	#
Invalid	No invalid tests	0
Aborted	No aborted tests	0
Total		0

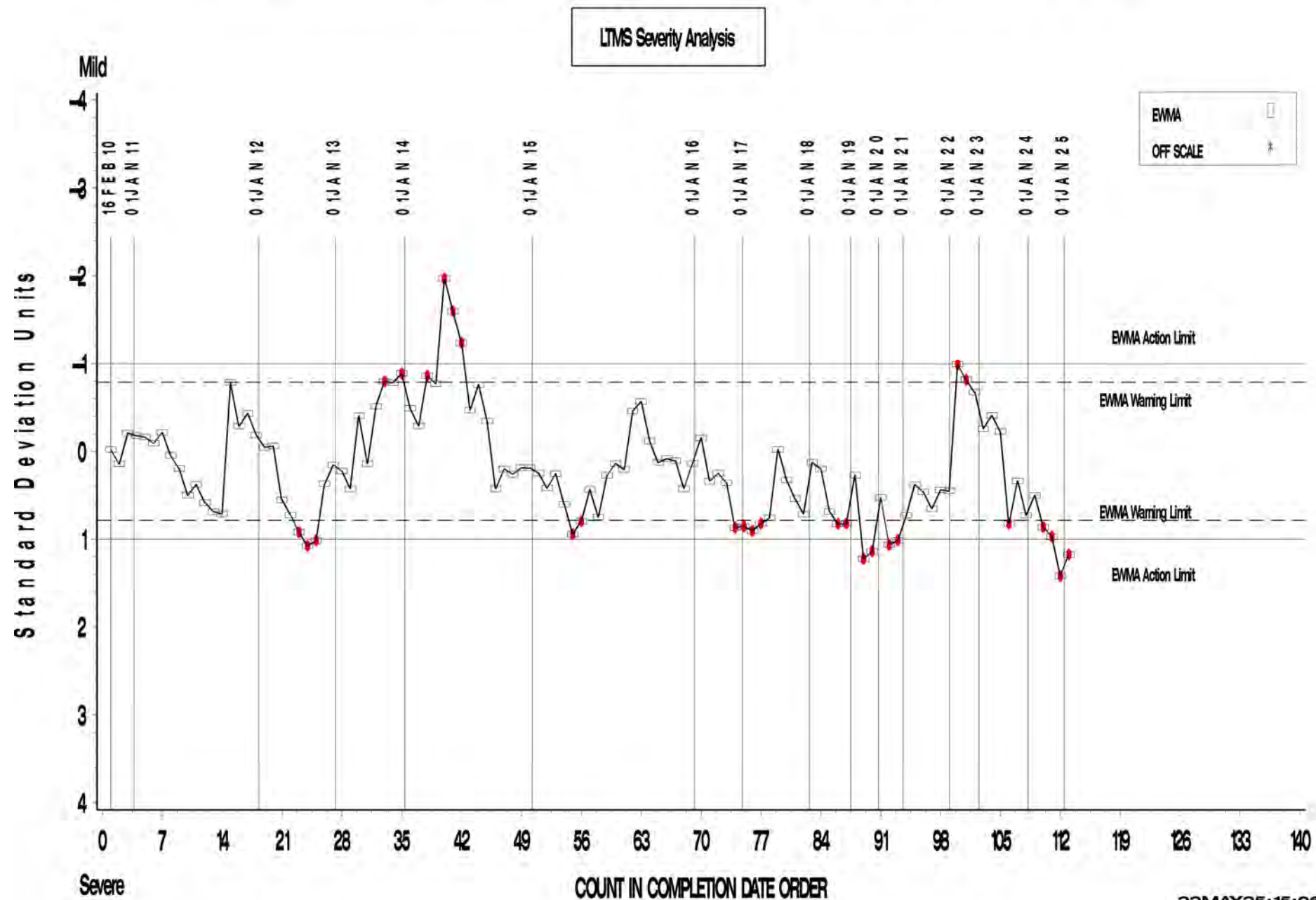
*Invalid and aborted tests

T-12A Test Severity

- ▶ MRV is in severity action alarm in the severe direction.
- ▶ MRV is also in precision action alarm.



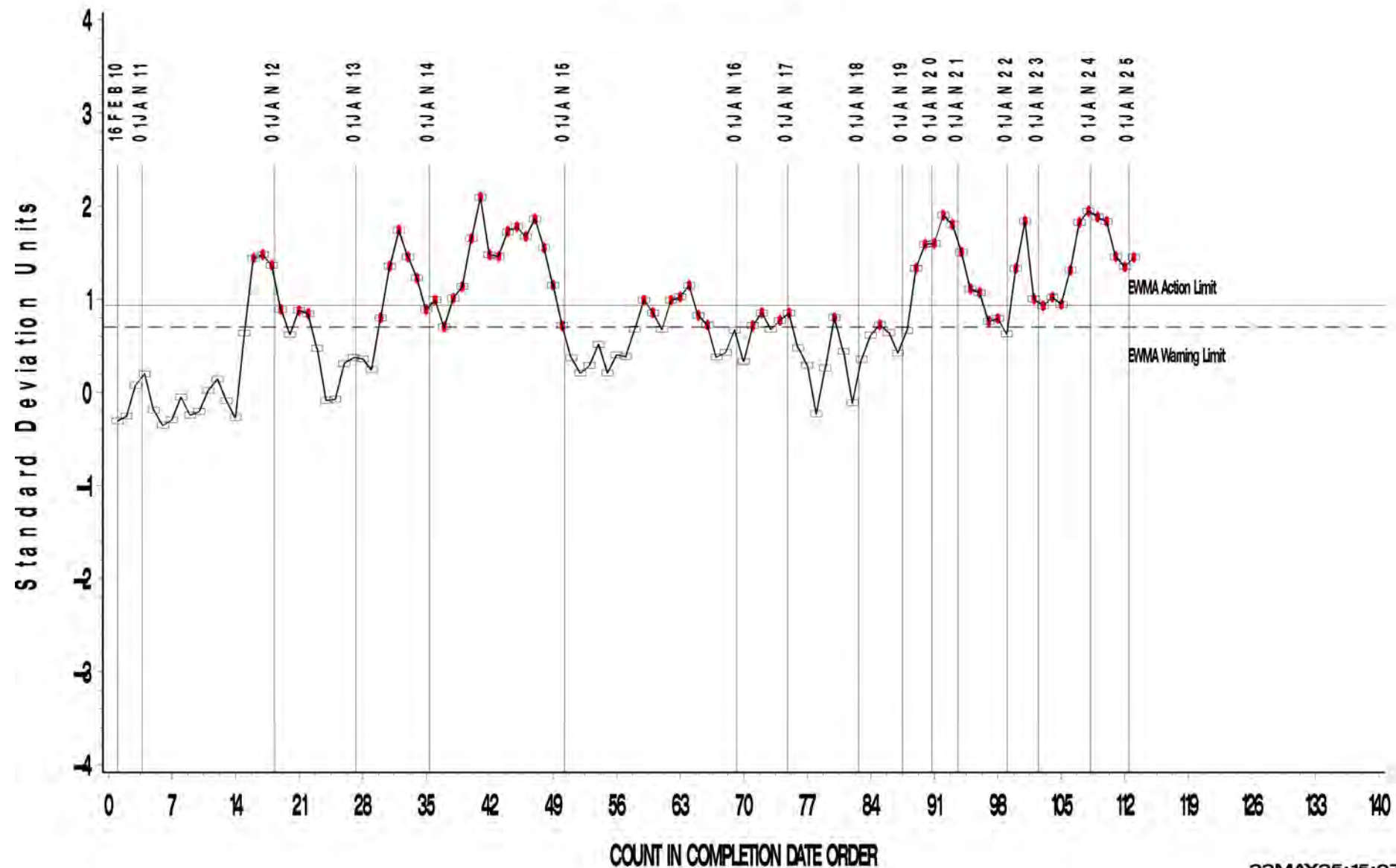
FINAL ORIGINAL UNIT MRV VISCOSITY [NM, SOLID, FROZEN, <, >]





FINAL ORIGINAL UNIT MRV VISCOSITY [NM, SOLID, FROZEN, <, >]

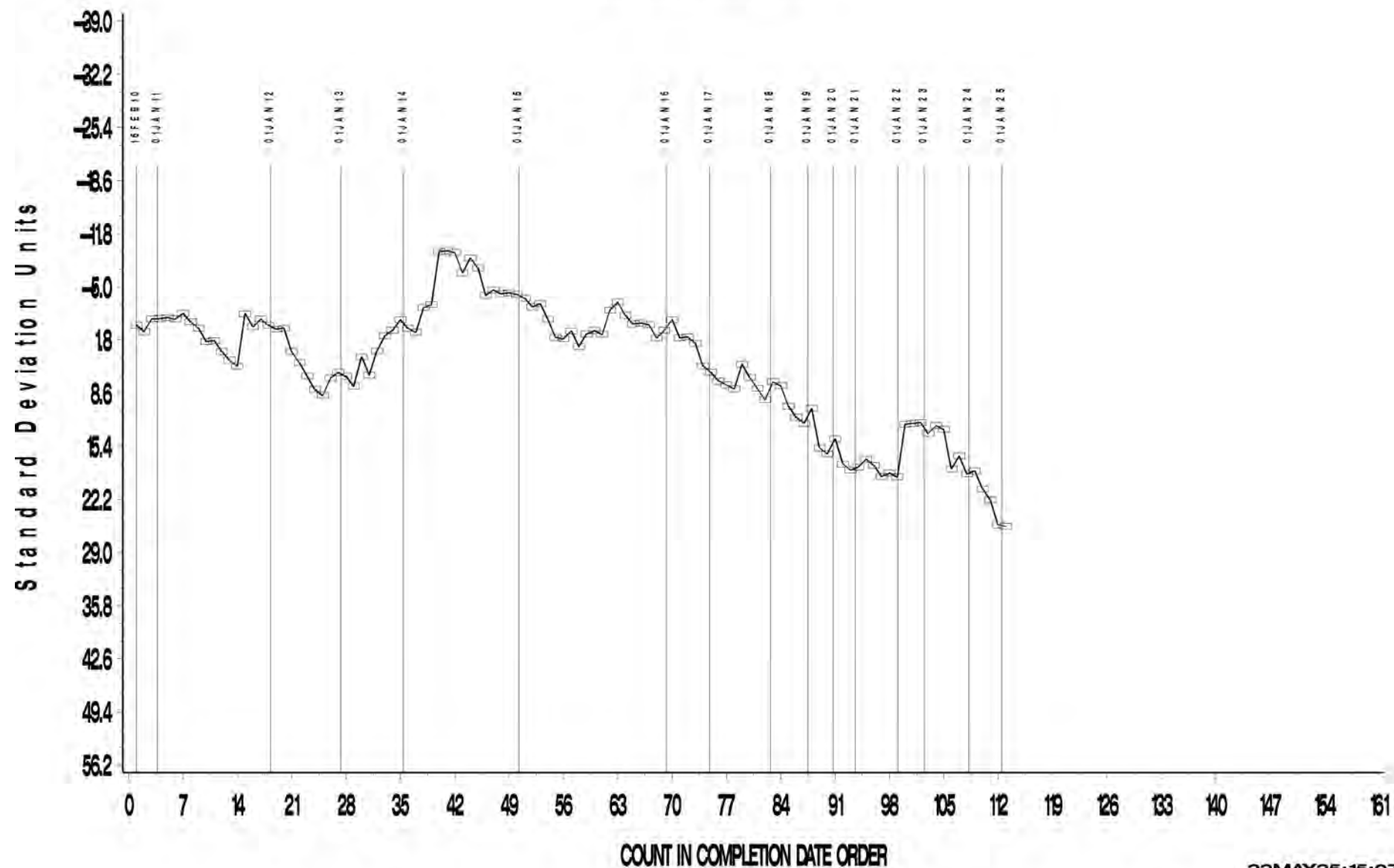
LTMS Precision Analysis



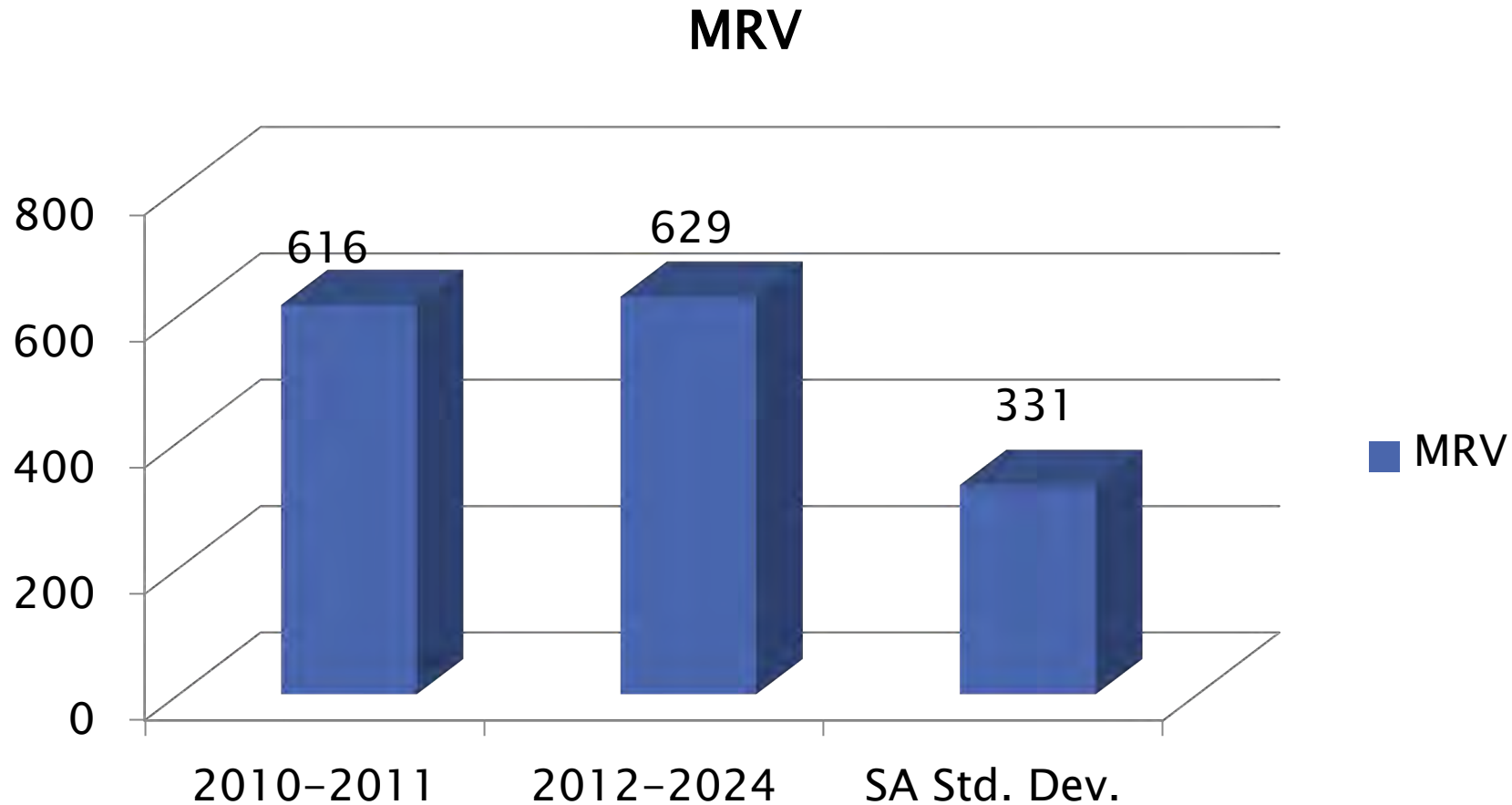


FINAL ORIGINAL UNIT MRV VISCOSITY [NM, SOLID, FROZEN, <, >]

CUSUM Severity Analysis



T-12A Precision Estimates



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Mack T-13

»» April 2025

T-13 Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	7
Failed Calibration Test	OC	0
Operationally Invalid	LC	1
Aborted	XC	0
Matrix test	AM	4
Total		12

T-13 Failed Tests

Failed Parameter	Number of Tests
No failed tests	0
Total	0

T-13 Lost Tests*

Status	Cause	#
Invalid	Bad oil addition	1
Aborted	No aborted tests	0
Total		1

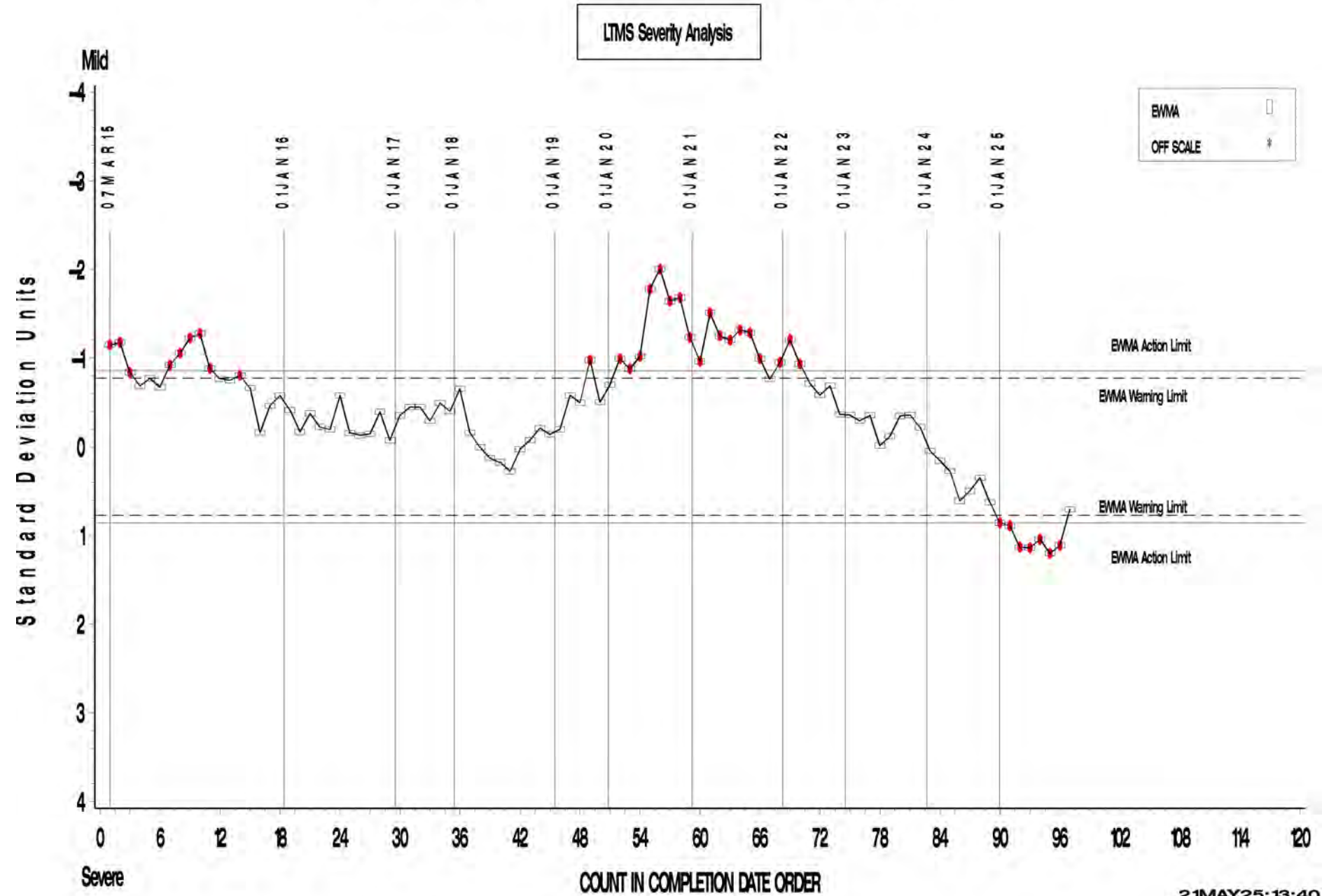
*Invalid and aborted tests

T-13 Test Severity

- ▶ IRPH and KV40 are in control



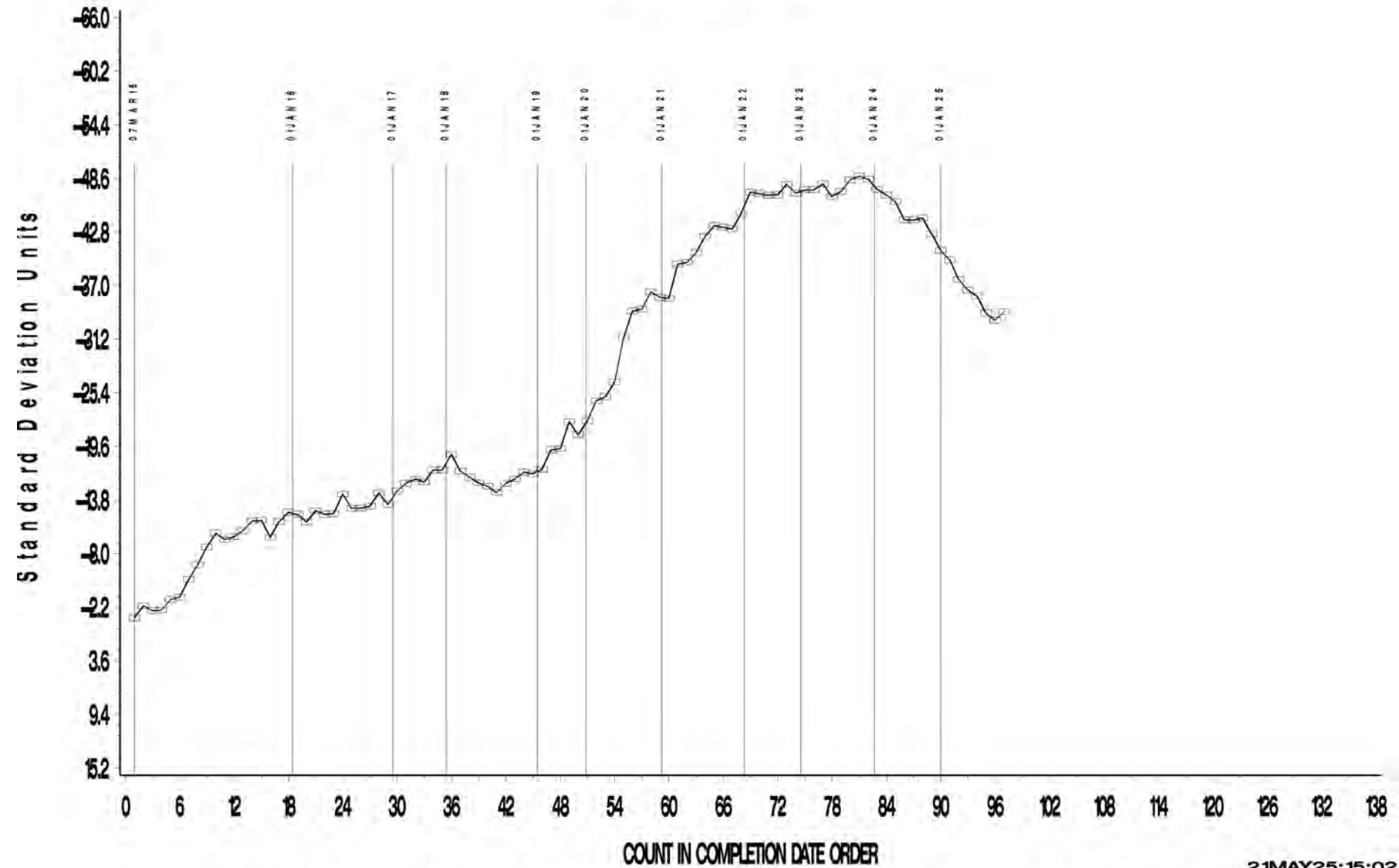
FINAL ORIGINAL PEAK HEIGHT IR AT EOT





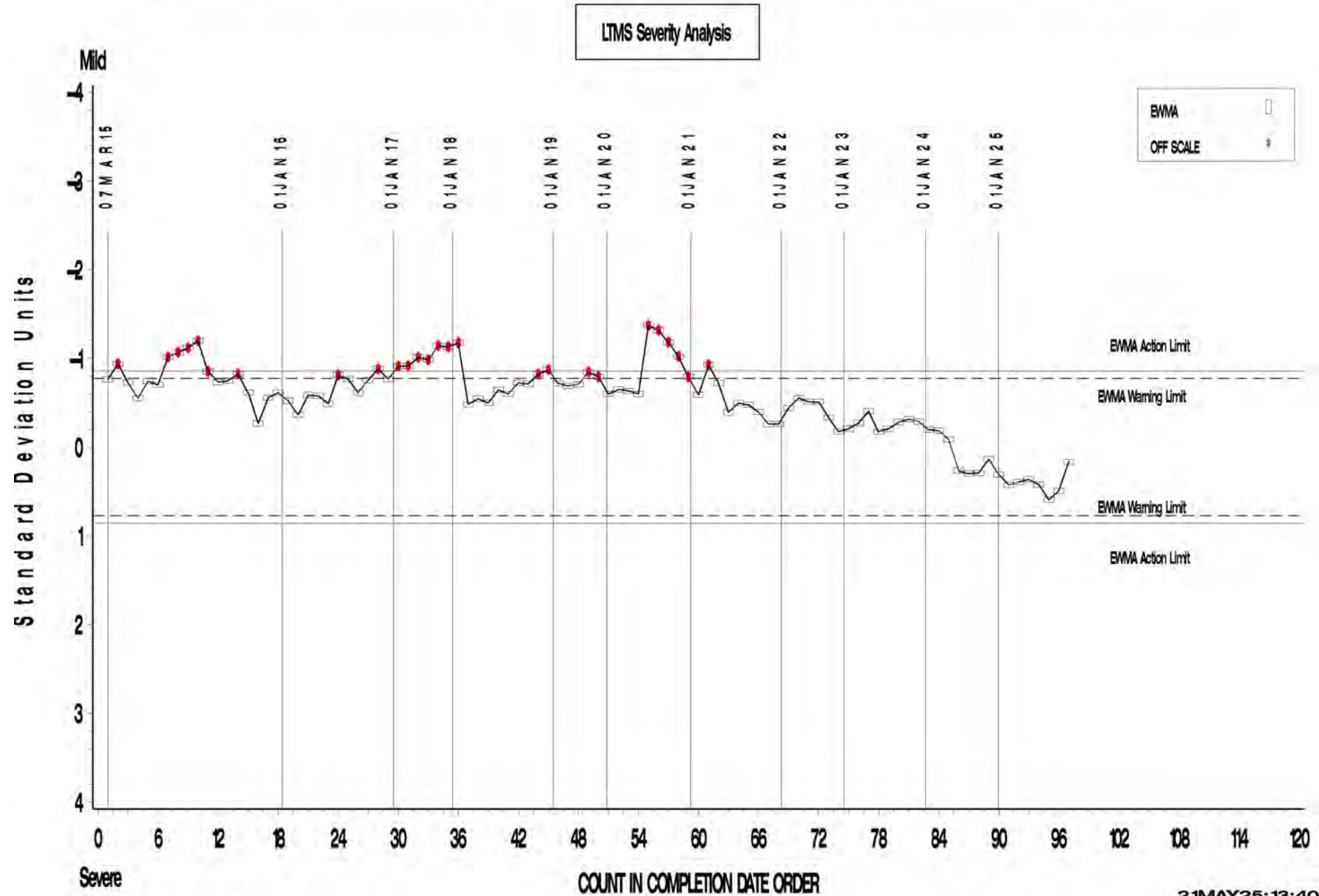
FINAL ORIGINAL PEAK HEIGHT IR AT EOT

CUSUM Severity Analysis





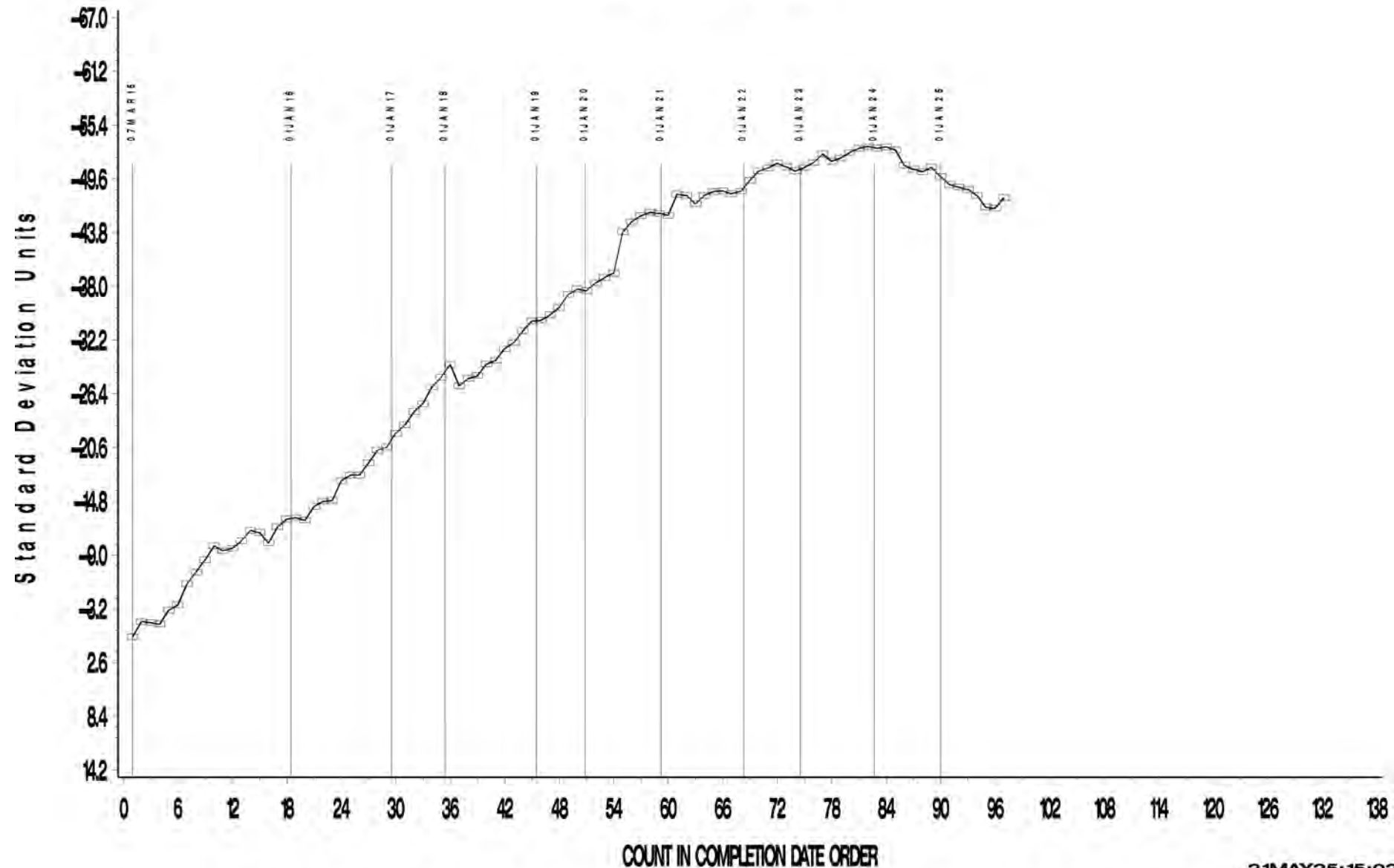
FNL. ORIG. UNIT KINEMATIC VISCOSITY AT 40 DEG C % CHANGE 300-360 HRS



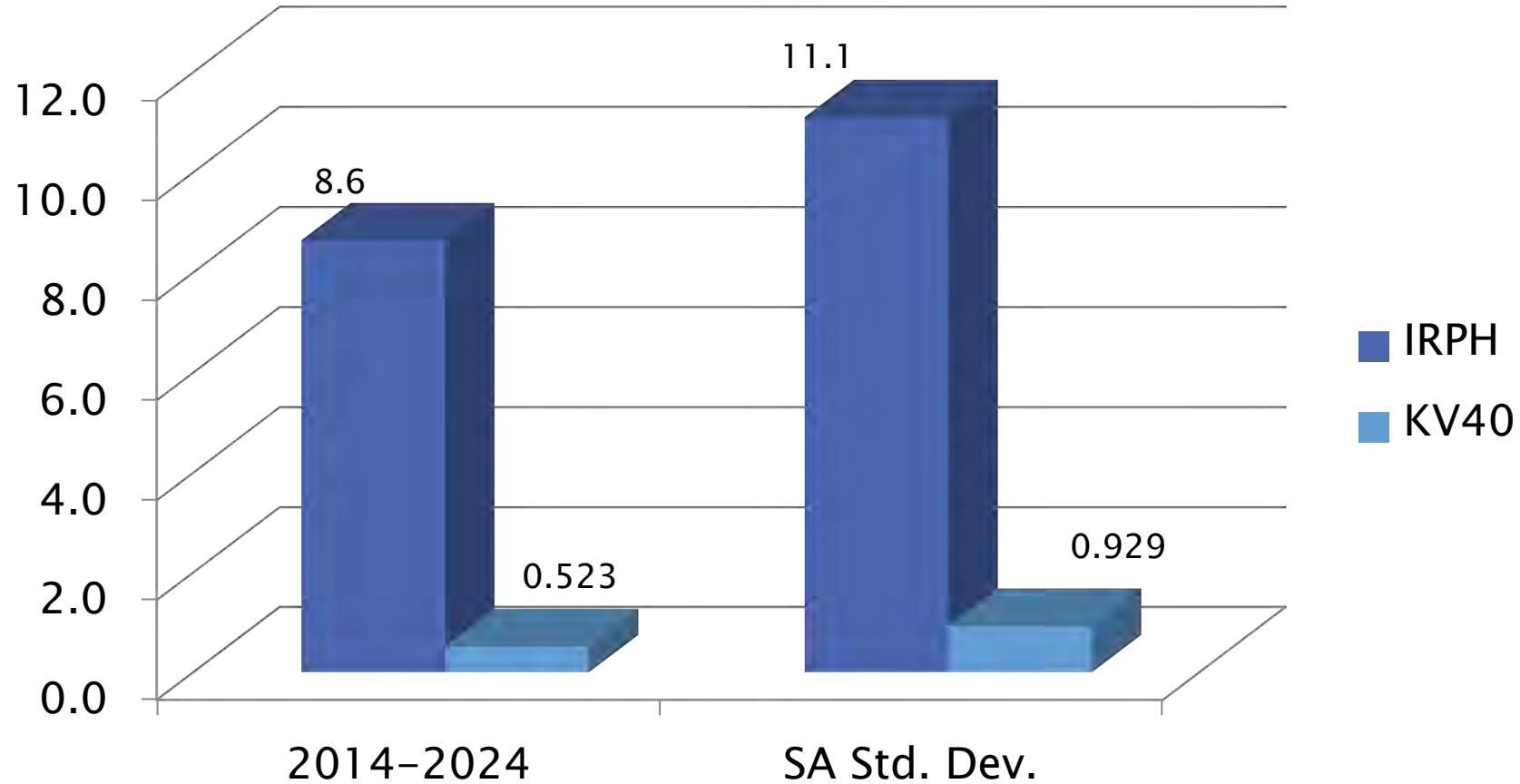


FNL. ORIG. UNIT KINEMATIC VISCOSITY AT 40 DEG C % CHANGE 300-360 HRS

CUSUM Severity Analysis



T-13 Precision Estimates



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Information Letters

»» October 1, 2024 – March 31, 2025

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



Information Letters*

Test	Date	IL	Topic
T12	3/10/25	25-1	Discontinue use of Penncool Coolant and Updated Lead Industry Correction Factors
T13	3/10/25	25-1	Non-mandatory Parameter Updates
ISB	3/24/25	25-1	New Average Tappet Mass Loss and Average Camshaft Wear Correction Factors

*Available from TMC Website

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<https://www.astmtmc.org>



Memos

➤➤ October 1, 2024 – March 31, 2025

Memos*

Date	Number	Topic
2/21/25	25-5	ISB Reference Targets

*Available from TMC Website

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Reference Oil Inventory



Actions, Re-blends, Inventories
and Estimated Life

Reference Oil Reblends

- ▶ Re-blend of 831 (831-5) received. Introduction has not yet occurred.

Reference Oil Inventory Estimated Life

<u>Original Blend</u>	<u>Section</u>	<u>Oil</u>	<u>Tests</u>	<u>Year</u>	<u>Blend Quantity</u>	<u>TMC Inventory</u>
809	HDEO	809-1	1K, 1N	1991	9134	1846
811	HDEO	811-2	1K, 1N	1995	1732	700
821	HDEO	821-4	T-12	2013	4495	1824
822	HDEO	822-2	1R, T-11, ISBV156	2013	4386	554
823	HDEO	823-1	T-13	2021	1421	890
824	HDEO	824	T-13	2024	881	625
830	HDEO	830-3	ISM	2016	2891	1930
831	HDEO	831-5	C13, ISB	2024	1884	1846
832	HDEO	832-1	COAT	2018	1951	1214
832	HDEO	832-2	COAT	2022	734	514
833	HDEO	833-1	COAT	2022	1248	110
833	HDEO	833-2	COAT	2022	1078	801
834	HDEO	834-1	ISBV108	2024	1499	1499

Reference Oil Inventory Estimated Life

<u>Original Blend</u>	<u>Section</u>	<u>Oil</u>	<u>Tests</u>	<u>Year</u>	<u>Blend Quantity</u>	<u>TMC Inventory</u>
835	HDEO	835	ISB	2024	867	396
864	HDEO	864-1	DD13	2016	1576	313
864	HDEO	864-2	DD13	2023	1491	1459
1005	HDEO	1005-5	1P, 1R, EOAT, RFTW, T-8E	2015	3826	254
1005	HDEO	1005-6	EOAT, COAT	2021	480	238
1005	HDEO	1005-7	1P, 1R, EOAT, RFTW, T-8E	2024	981	981
FVTW1	HDEO	FVTW1	FVTW	2021	1020	692
FVTW2	HDEO	FVTW2	FVTW	2021	1020	693
FVTW3	HDEO	FVTW3-1	FVTW	2022	753	692

LTMS Deviations

»» October 1, 2024 – March 31, 2025

LTMS Deviations

- No LTMS Deviations in Current Period

Historical Count of HD LTMS Deviations

Test	LTMS Deviations
1M-PC	2
1N	2
T-8/E	2
T-10A	1
T-12	1

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Quality Index Deviations

»» October 1, 2024 – March 31, 2025

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Quality Index Deviations

- ▶ COAT – intake air temperature due to sudden drop in ambient temperature from fast moving cold front.

Quality Index Deviations

Historical Count of HD Quality Index Deviations

Test	Qi Deviations
1P	15
1R	1
ISM	3
C13	2
T-10A	1
T-11	3
T-12	8
T-13	3
COAT	6

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TMC Laboratory Visits

➤➤ October 1, 2024 – March 31, 2025

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TMC Lab Visits

Test	Number of Labs Visited
ISB	3
ISBV108	2
ISBV156	2
ISM	3
T13	3

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TMC Lab Visits

- ▶ There were no findings from the TMC lab visits that were conducted this period.

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Test Area Timelines

»» October 1, 2024 – March 31, 2025

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Test Area Timeline Additions*

Test	Date	IL/Memo	Topic
ISB	20250219		ACSW AND ATWL TRANSFORMS ADOPTED
ISB	20250219		NEW TARGETS AND STANDARD DEVIATIONS FOR 831-3 & 831-4
ISB	20250219		TARGETS ADOPTED FOR NEW REFERENCE OIL 835
ISB	20250219		NEW CORRECTION FACTORS FOR BATCH F TAPPETS

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*As of 3/31/24

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Miscellaneous Information

- ▶ Available on TMC Website:
 - Oil Assignment Request and Test File Upload
 - 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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