



A Program of ASTM International

Test Monitoring Center

203 Armstrong Drive, Freeport, PA 16229, USA

www.astmtmc.org
412-365-1000

MEMORANDUM: 23-037
DATE: November 16, 2023
TO: Nick Schaup, Chairman, L-37-1 Surveillance Panel
FROM: Dylan Beck *Dylan Beck*
SUBJECT: L-37-1 Testing from April 1, 2023 through September 30, 2023

Attached is a summary of reference oil testing activity this period.

DJB/djb/mem23-037.djb.doc

cc: Jeff Clark

Sean Moyer

L-37-1 Surveillance Panel

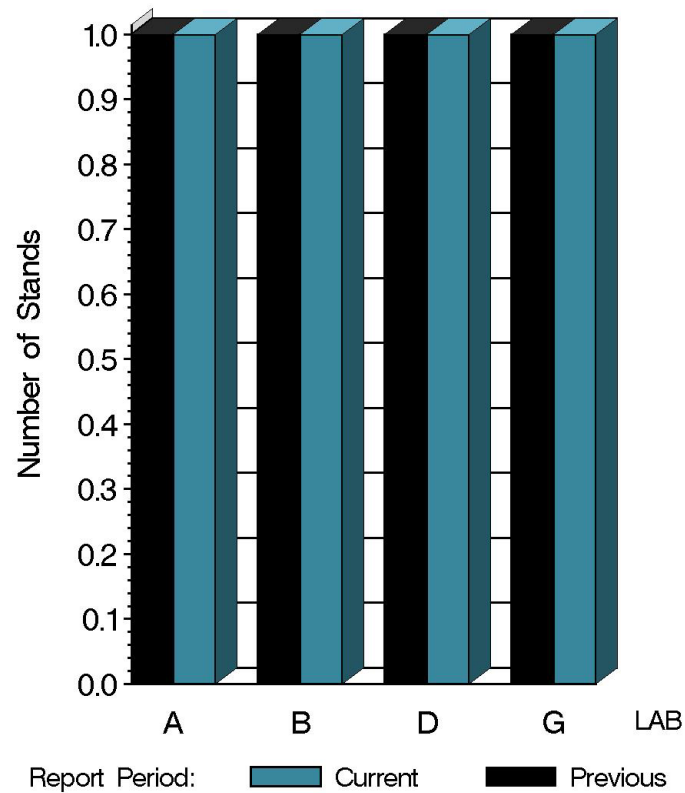
<https://www.astmtmc.org/ftp/docs/gear/l371/semiannualreports/l371-10-2023.pdf>

Distribution: email

L-37-1 (D8165)

	Reporting Data	Calibrated on 9-30-23
Number of Labs	4	4
Number of Stands	4	4

BY-LAB STAND
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L-37-1 (D8165)

Test Distribution by Oil and Validity

					Totals	
					Last Period	This Period
		134/ 134-1	152-2	155-1		
Accepted for calibration	AC	4	4	2	7	10
Rejected (Mild)	OC	0	0	1	5	1
Rejected (Severe)	OC	0	0	1	1	1
Rejected (Both)	OC	1	0	0	0	1
Aborted cal attempt	XC	2	0	0	0	2
Invalid cal attempt	LC	0	0	1	0	1
Acceptable donated run	AG	1	1	0	1	2
Acceptable info run	NI	3	4	4	11	11
Total		11	9	9	27	29

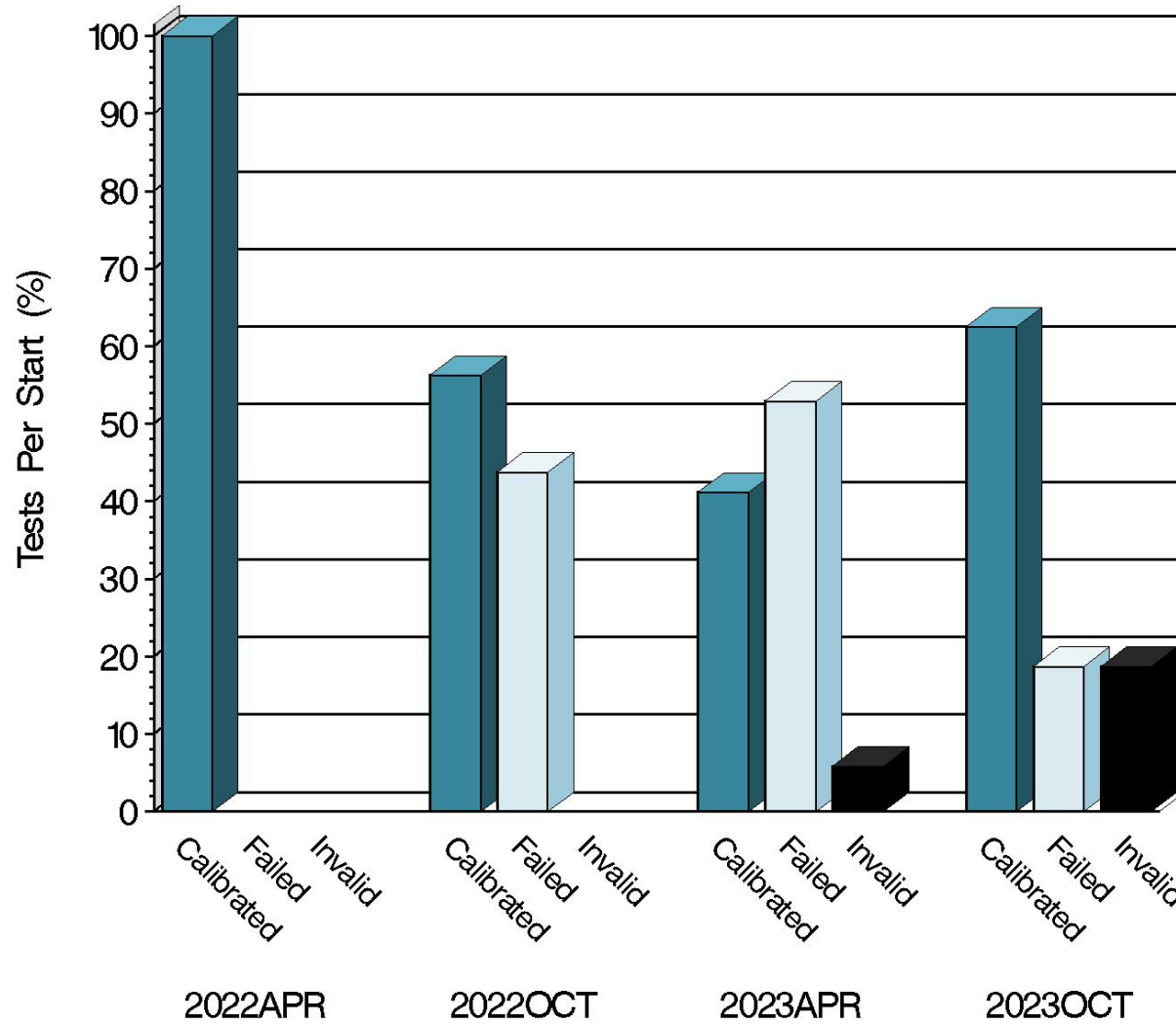
L-37-1 (D8165)

Calibration Attempt Detail

	Gear Batch	Acceptable	Aborted	Failed	Total
Uncoated	01-2020	2	0	1	3
	04-2021	4	0	0	4
	12-2019	1	1	2	4
MnP Coated	04-2021	1	1	0	2
	04-2014	2	0	0	2
	Total	10	2	3	15

L-37-1 (D8165)

CALIBRATION ATTEMPT SUMMARY



Resolution

Report Period

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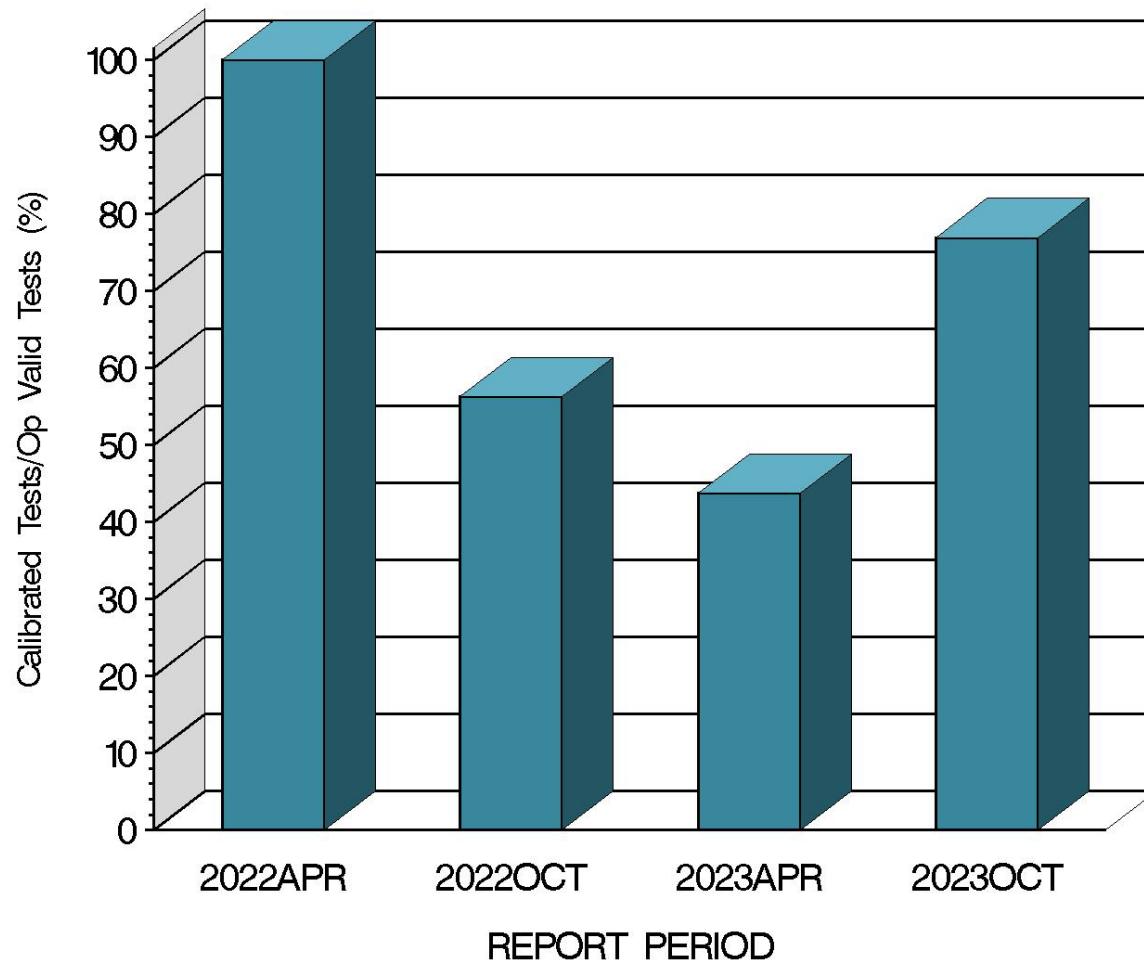
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L-37-1 (D8165)

OPERATIONALLY VALID TESTS
MEETING ACCEPTANCE CRITERIA



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L-37-1 (D8165)

CAUSES FOR LOST TESTS

Lab	Cause	Validity			Loss Rate			Lost	Starts	%
		134-1	152-2	155-1	XC	LC	XI			
B	Broken Teeth	●			●			1	9	11%
D	Broken Teeth	●			●			2	8	25%
	Pre-Test breakaway torque out of spec			●		●				
Lost		2	0	1	2	1	0			
Starts		11	9	9	29	29	29			
%		18%	0%	11%	6.9%	3.4%	0%			

L-37-1 (D8165)

GEAR BATCH SEVERITY

MNP COATED HARDWARE						
Parameter	Gear Batch	N	Δ/s	s^A	Overall Δ/s	Overall Shift (in Merits) ^B
RIDG	04-2014	2	-1.400	0.000	-0.933	.
RIPP	04-2014	2	-0.600	0.000	-0.400	.
SPIT	04-2014	2	0.333	0.000	0.222	.
WEAR	04-2014	2	-0.286	0.000	-0.790	.
RIDG	04-2021	1	0.000	.	-0.933	.
RIPP	04-2021	1	0.000	.	-0.400	.
SPIT	04-2021	1	0.000	.	0.222	.
WEAR	04-2021	1	-1.799	.	-0.790	.

UNCOATED HARDWARE						
Parameter	Gear Batch	N	Δ/s	s^A	Overall Δ/s	Overall Shift (in Merits) ^B
RIDG	12-2019	3	0.630	0.642	0.378	.
RIPP	12-2019	3	0.623	0.450	-0.532	.
SPIT	12-2019	3	0.550	.	0.650	.
WEAR	12-2019	3	1.688	0.788	0.829	.
RIDG	01-2020	3	0.630	0.642	0.378	.
RIPP	01-2020	3	-1.714	0.714	-0.532	.
SPIT	01-2020	3	1.000	0.000	0.650	.
WEAR	01-2020	3	1.148	0.642	0.829	.
RIDG	04-2021	4	0.000	0.817	0.378	.
RIPP	04-2021	4	-0.511	0.354	-0.532	.
SPIT	04-2021	4	0.333	0.577	0.650	.
WEAR	04-2021	4	-0.056	0.926	0.829	.

^A As computed using SA standard deviation published in the LTMS document.

L-37-1 (D8165)

LAB SEVERITY

MNP COATED HARDWARE AVERAGE Δ/s						
Gear Batch	Lab	N	RIDG	RIPP	SPIT	WEAR
04-2014	B	2	-1.400	-0.600	0.333	-0.286
04-2021	A	1	0.000	0.000	0.000	-1.799

UNCOATED HARDWARE AVERAGE Δ/s						
Gear Batch	Lab	N	RIDG	RIPP	SPIT	WEAR
01-2020	G	3	0.630	-1.714	1.000	1.148
04-2021	A	1	1.000	-1.000	1.000	0.778
	D	3	-0.333	-0.348	0.000	-0.333
12-2019	B	3	0.630	0.623	0.550	1.688

L-37-1 (D8165)

SUMMARY OF SEVERITY & PRECISION

Severity

Uncoated– Wear exceeded the action limit in the mild direction during this reporting period but has since returned within limits.

MnP Coated – Rippling exceeded the action limit in the severe direction this period but has since returned within limits.

L-37-1 (D8165)

SUMMARY OF SEVERITY & PRECISION (cont.)

Precision

Uncoated – All parameters remained within the precision limit this period.

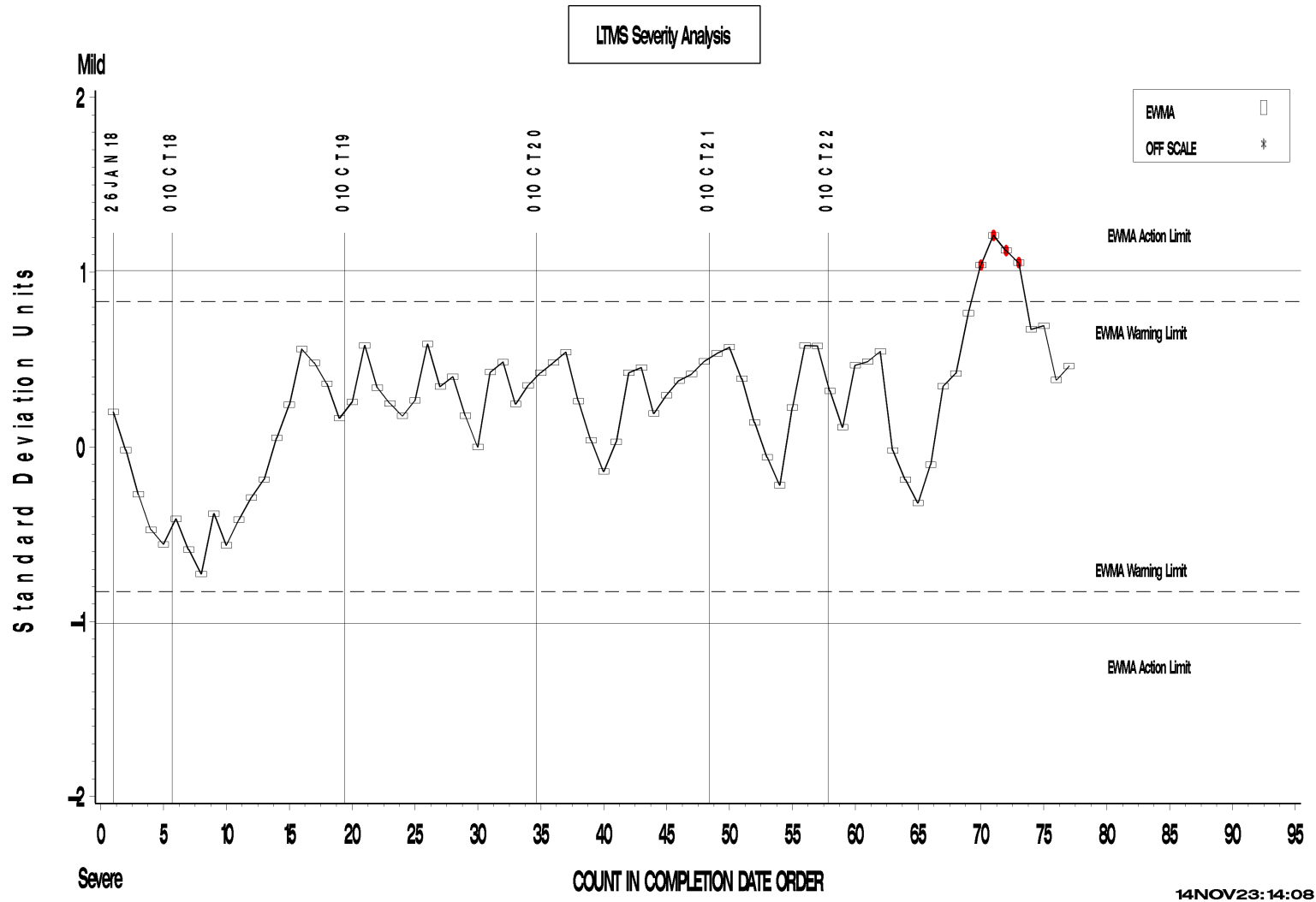
MnP Coated – All parameters remained within the precision limit this period.

Industry control charts follow.

L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR



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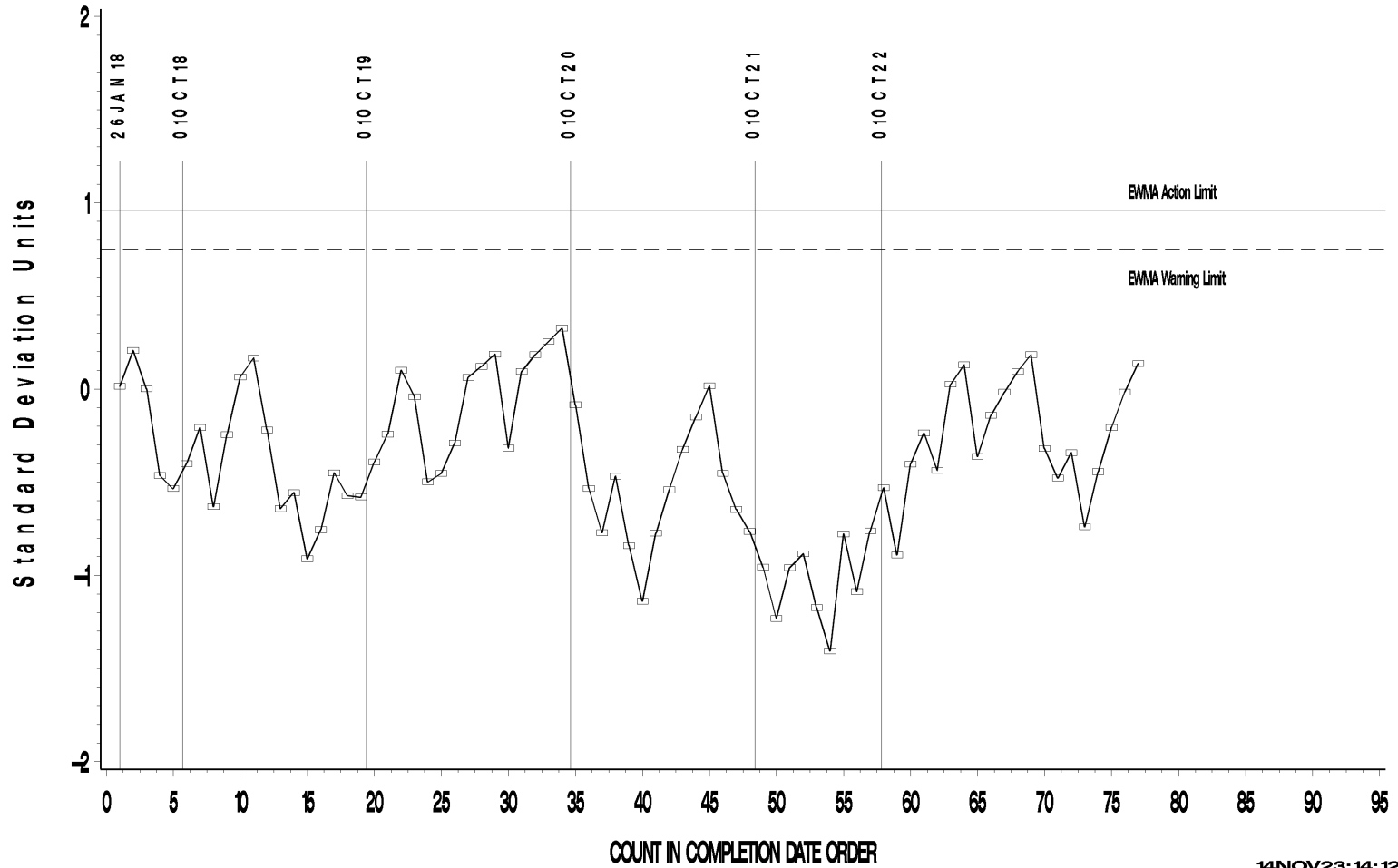
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



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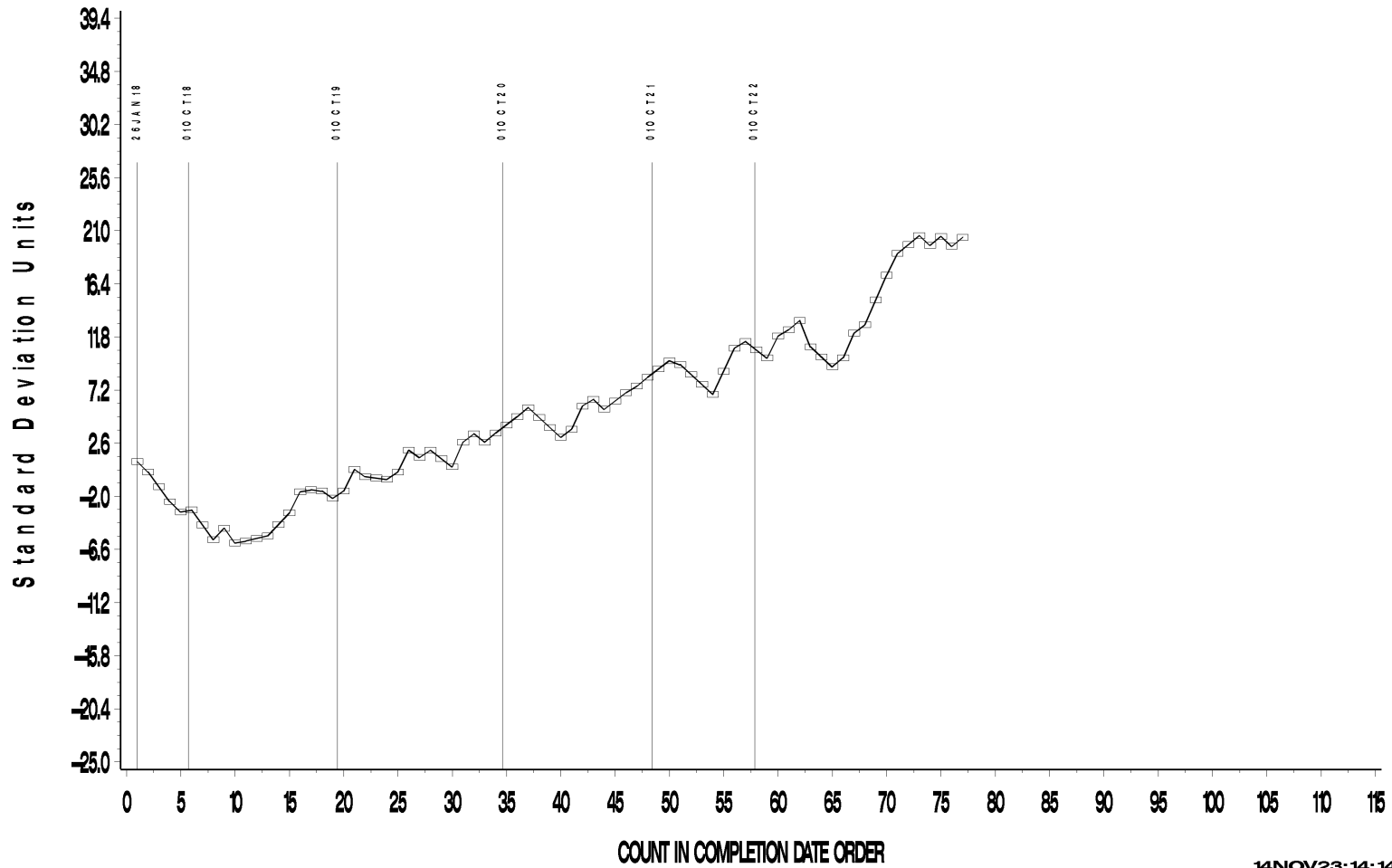
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L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis



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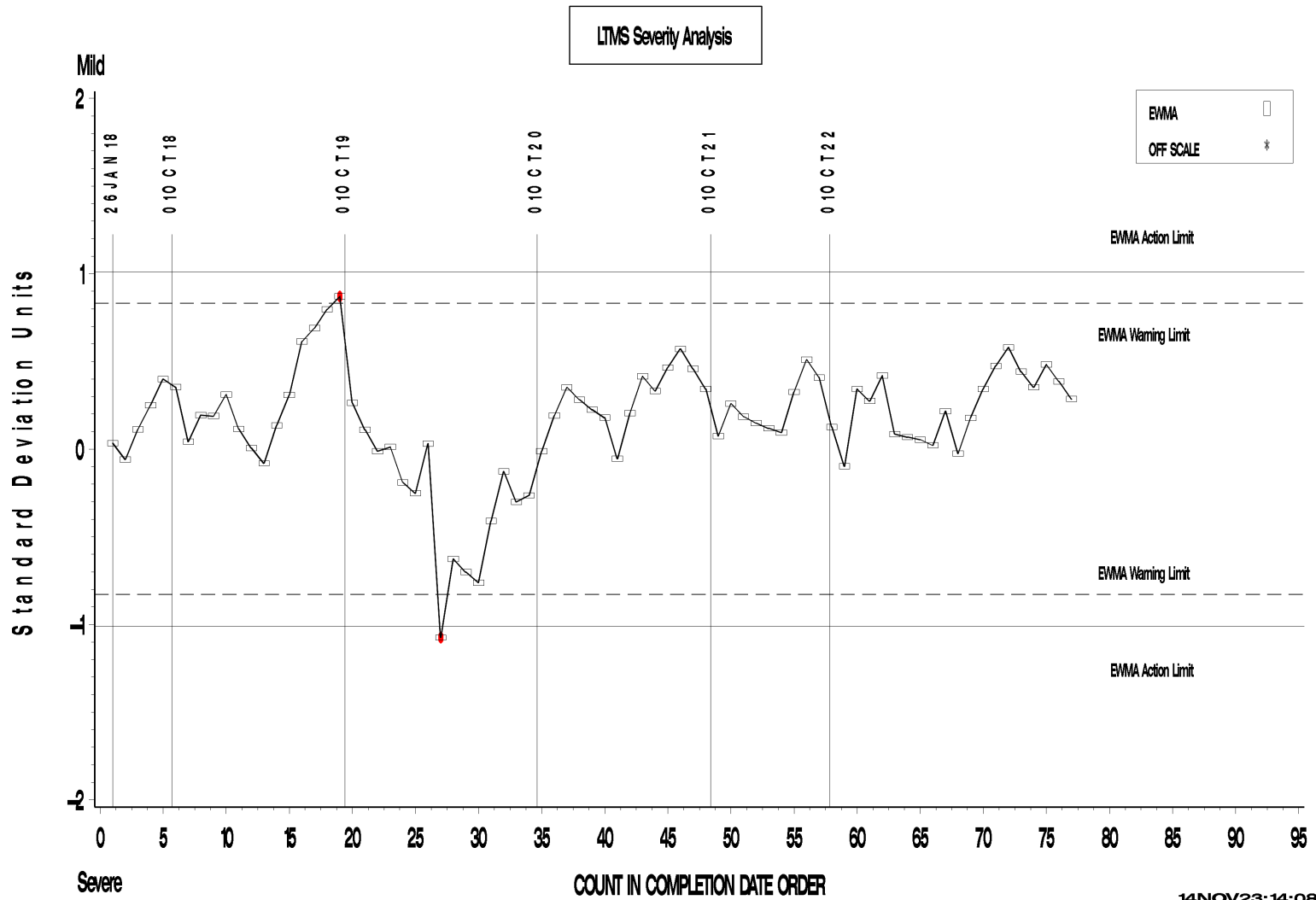
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

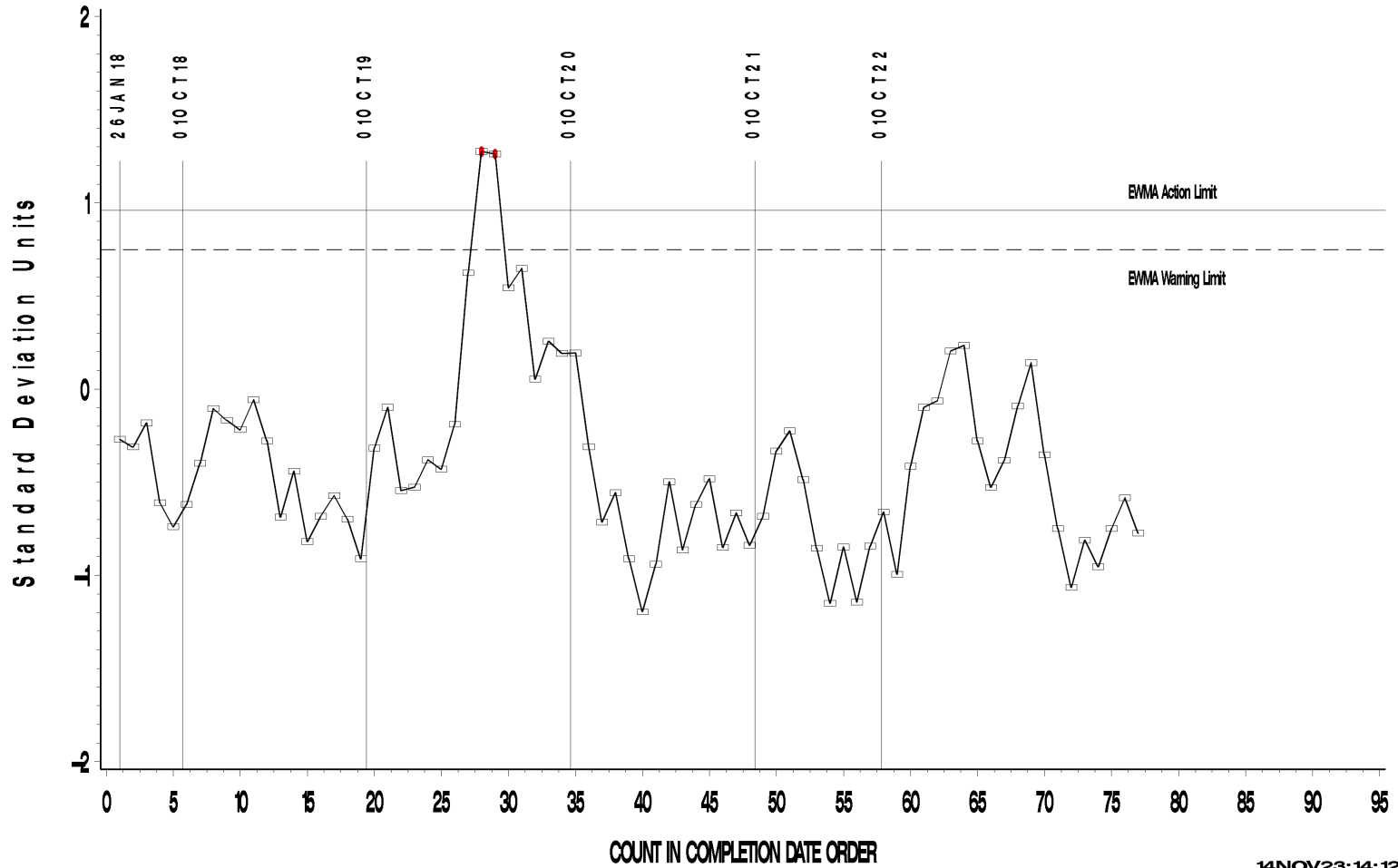


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L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Precision Analysis



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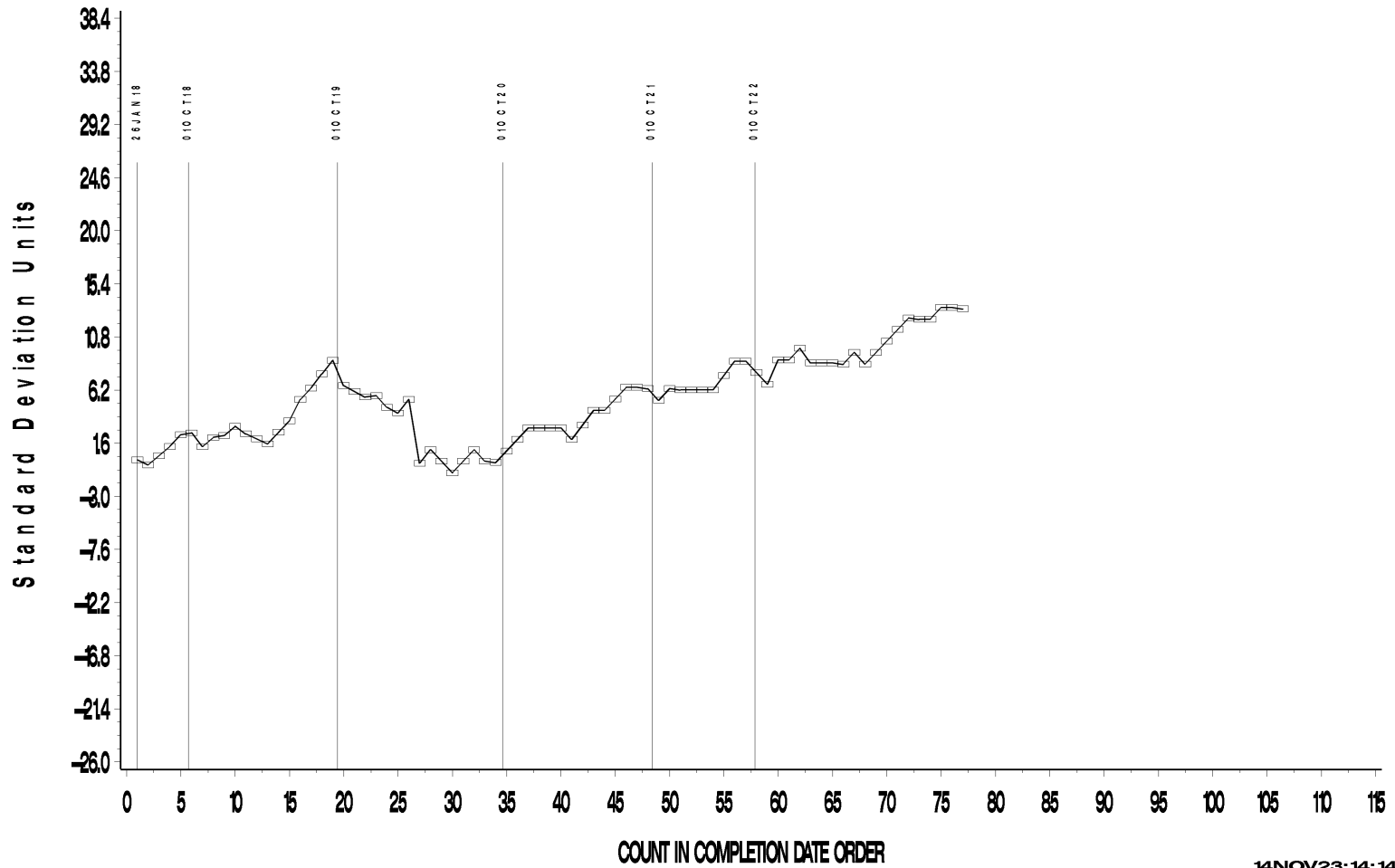
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L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

CUSUM Severity Analysis



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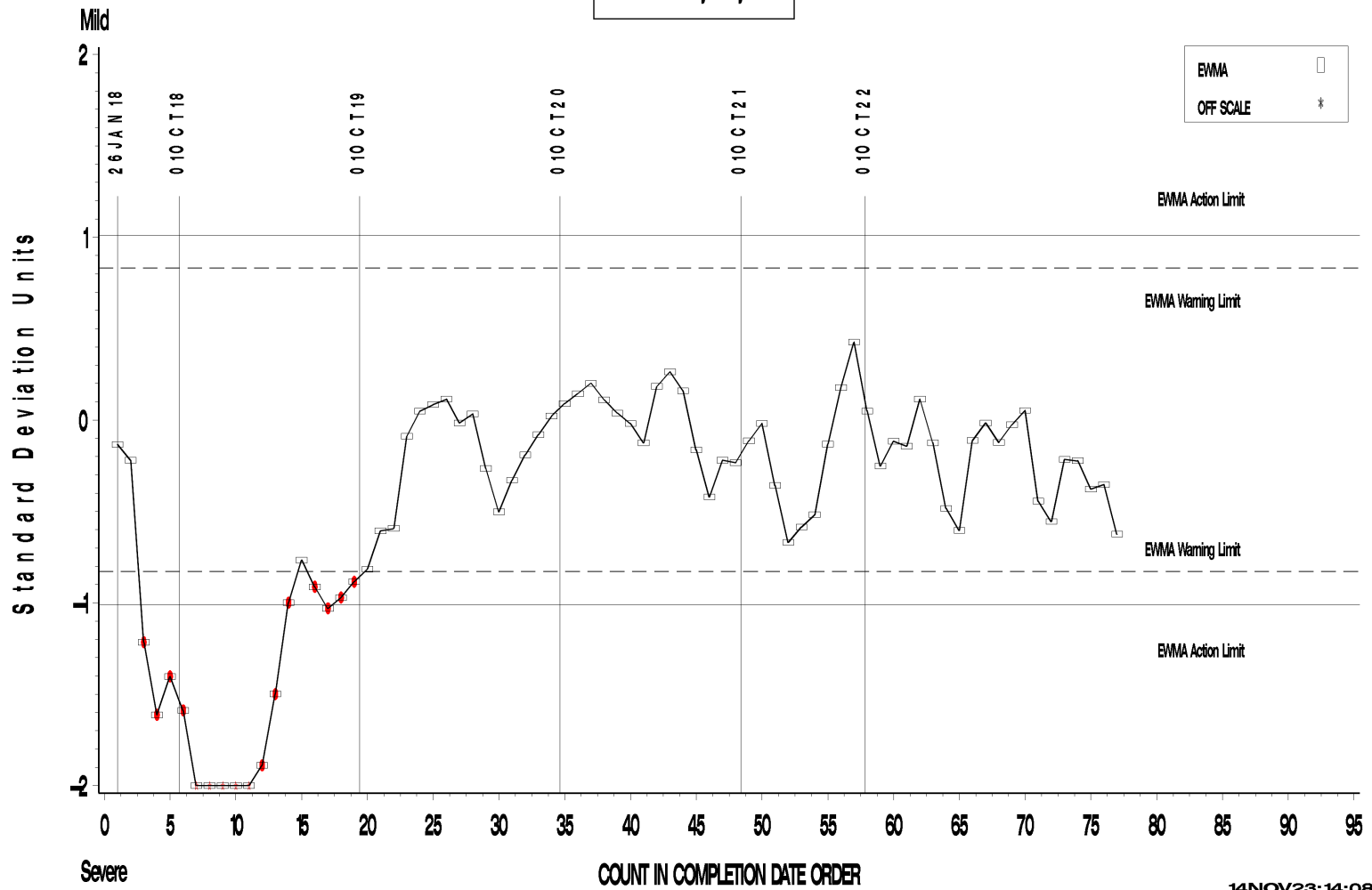
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Severity Analysis



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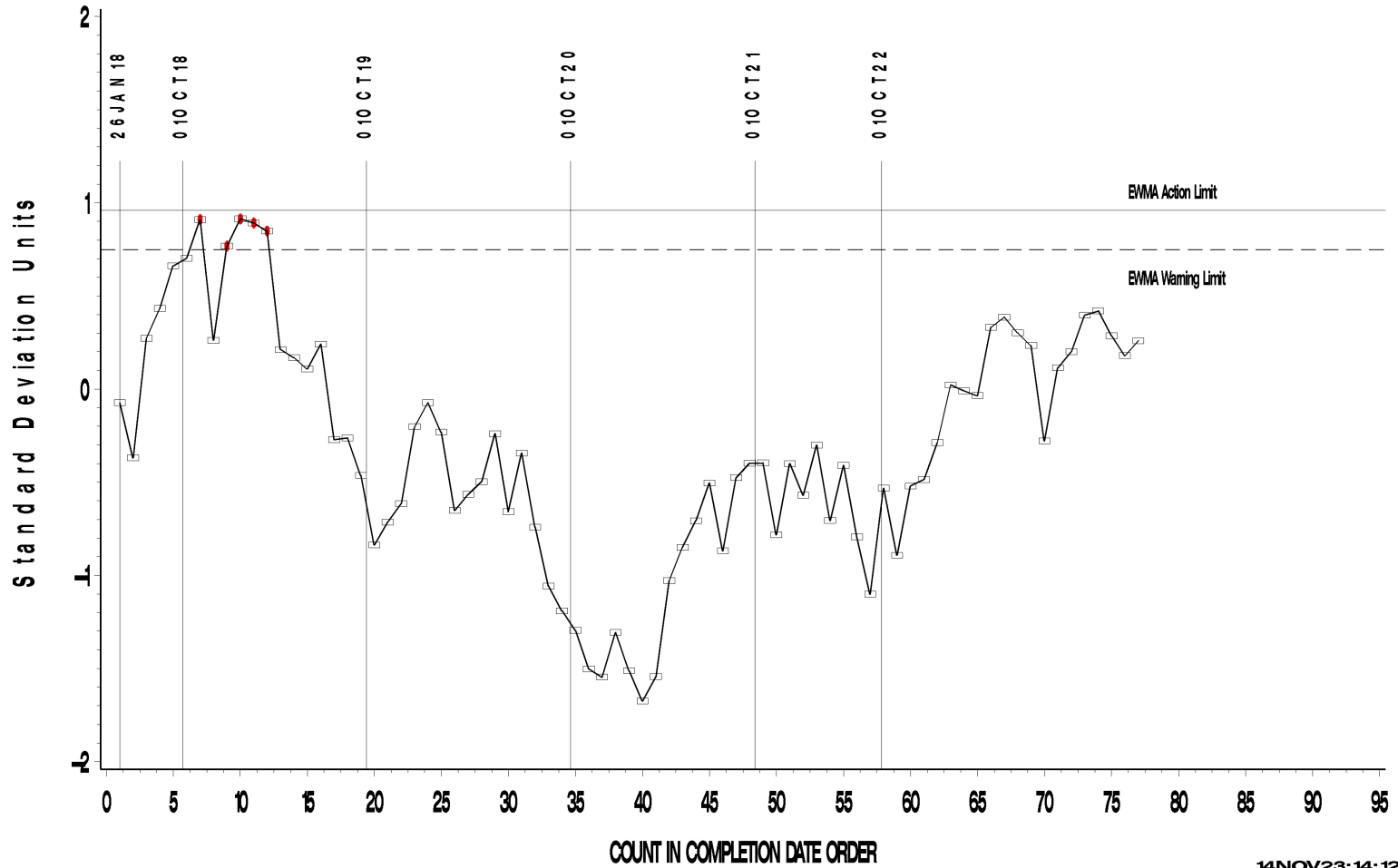
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Precision Analysis



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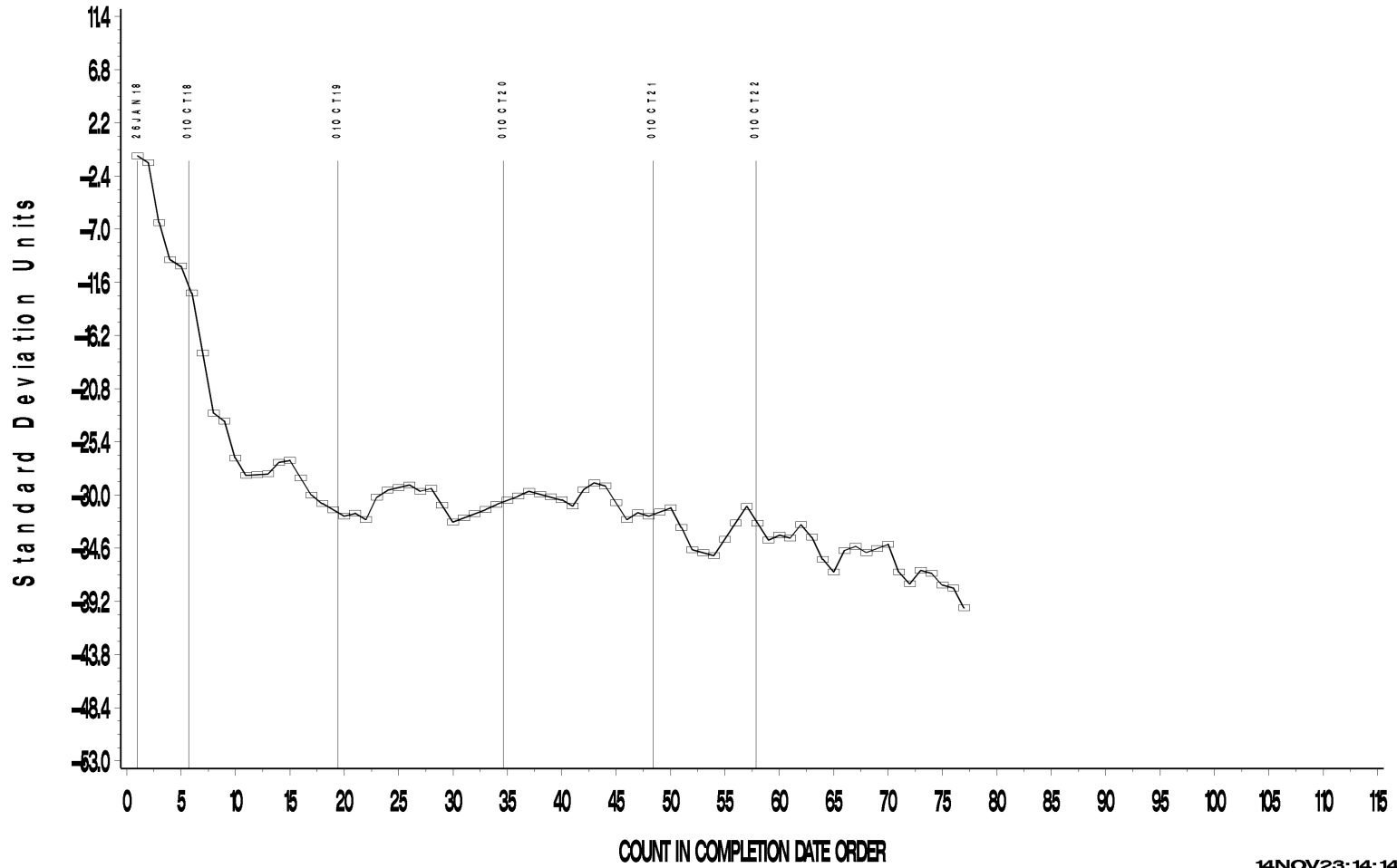
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIBBLING

CUSUM Severity Analysis



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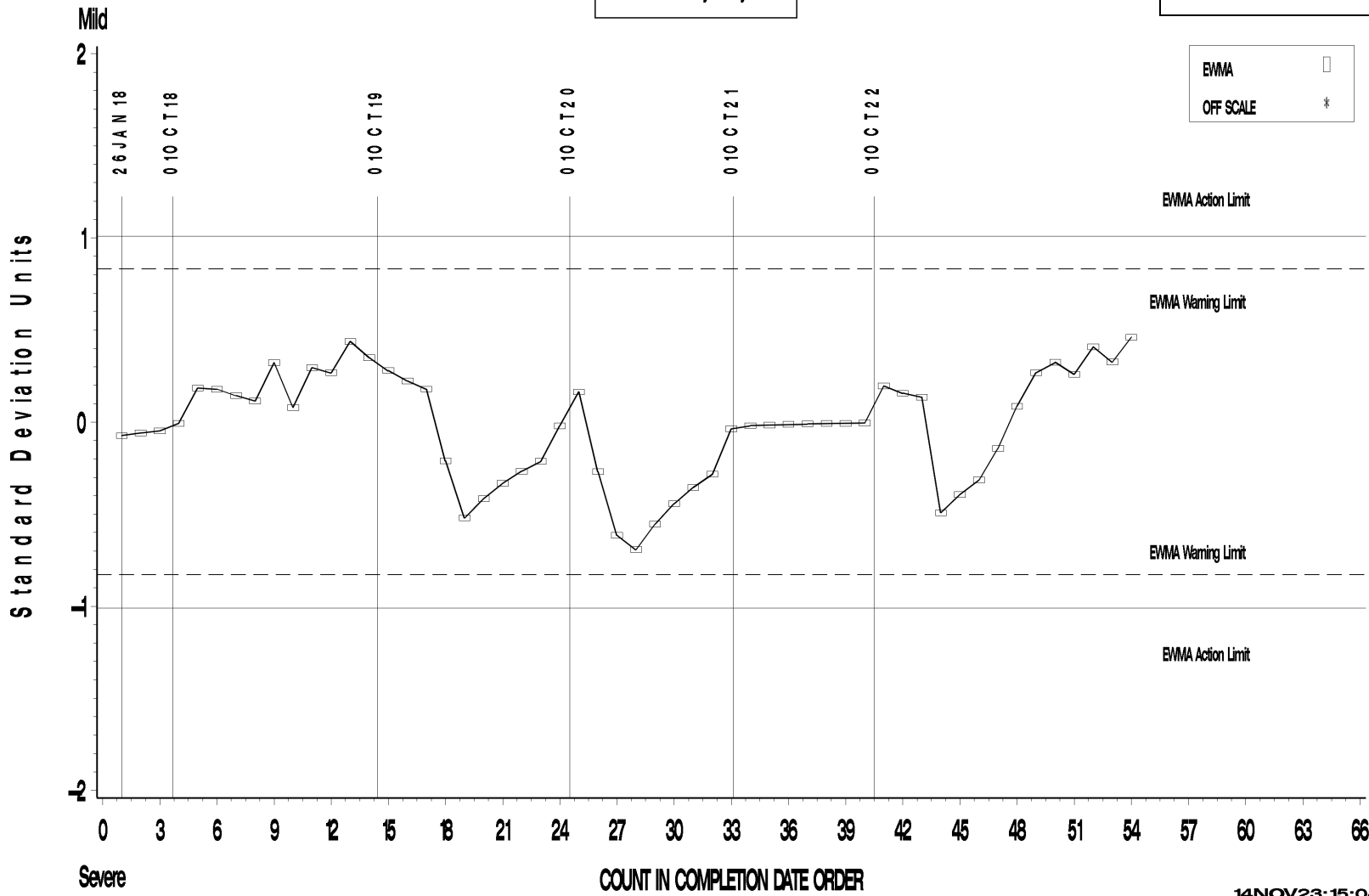
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA
 IND not = '155-1'
 FINAL PINION GEAR PITTING/SPALLING

Results for 155-1 are not included in this SPIT chart due to its current targets yielding undefined calculations.

LTMS Severity Analysis



EWMA □
 OFF SCALE *

EWMA Action Limit

EWMA Warning Limit

EWMA Warning Limit

EWMA Action Limit

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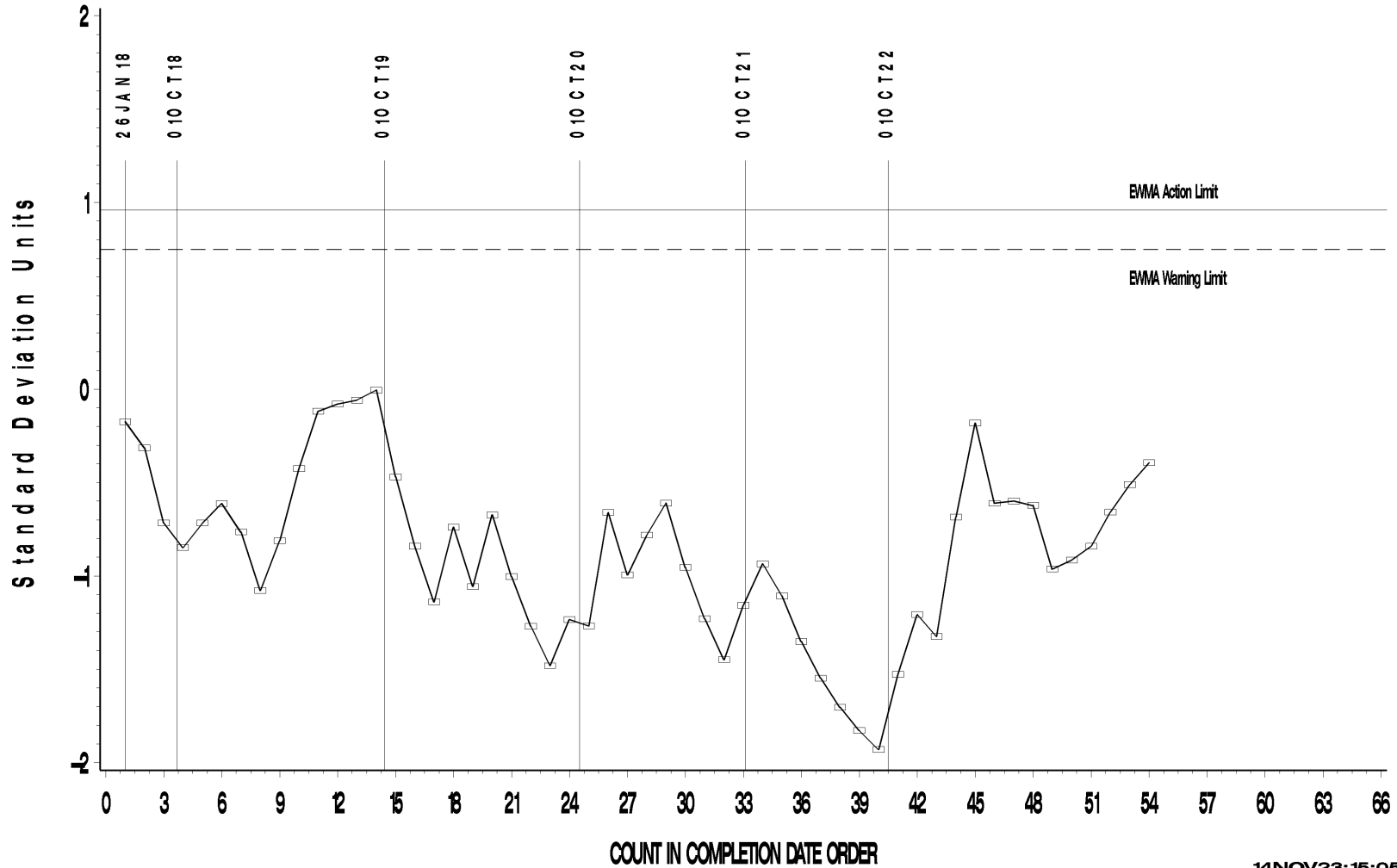
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA
IND not = '155-1'
FINAL PINION GEAR PITTING/SPALLING

Results for 155-1 are not included in this SPIT chart due to its current targets yielding undefined calculations.

LTMS Precision Analysis



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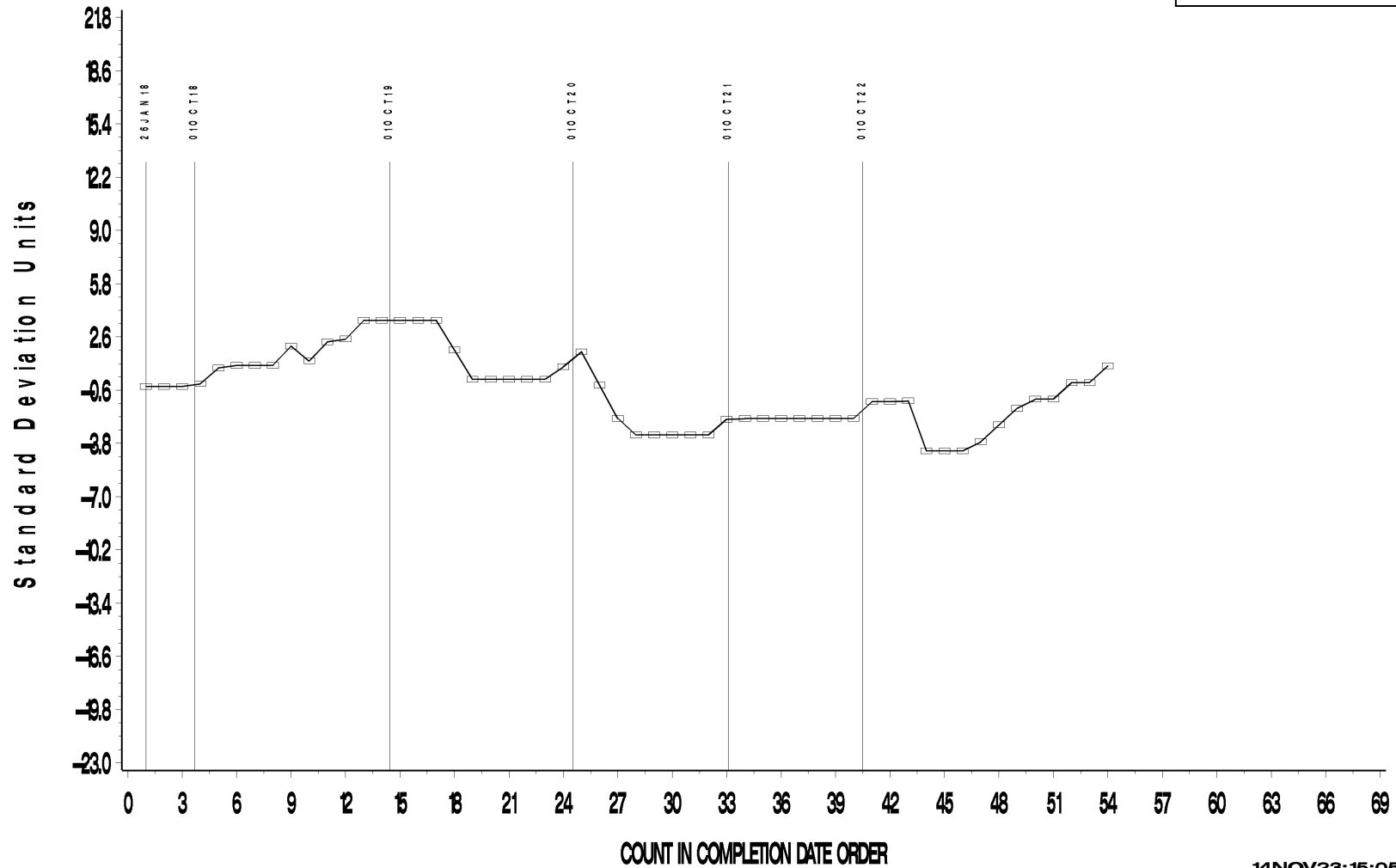
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA
IND not = '155-1'
FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis

Results for 155-1 are not included in this SPIT chart due to its current targets yielding undefined calculations.



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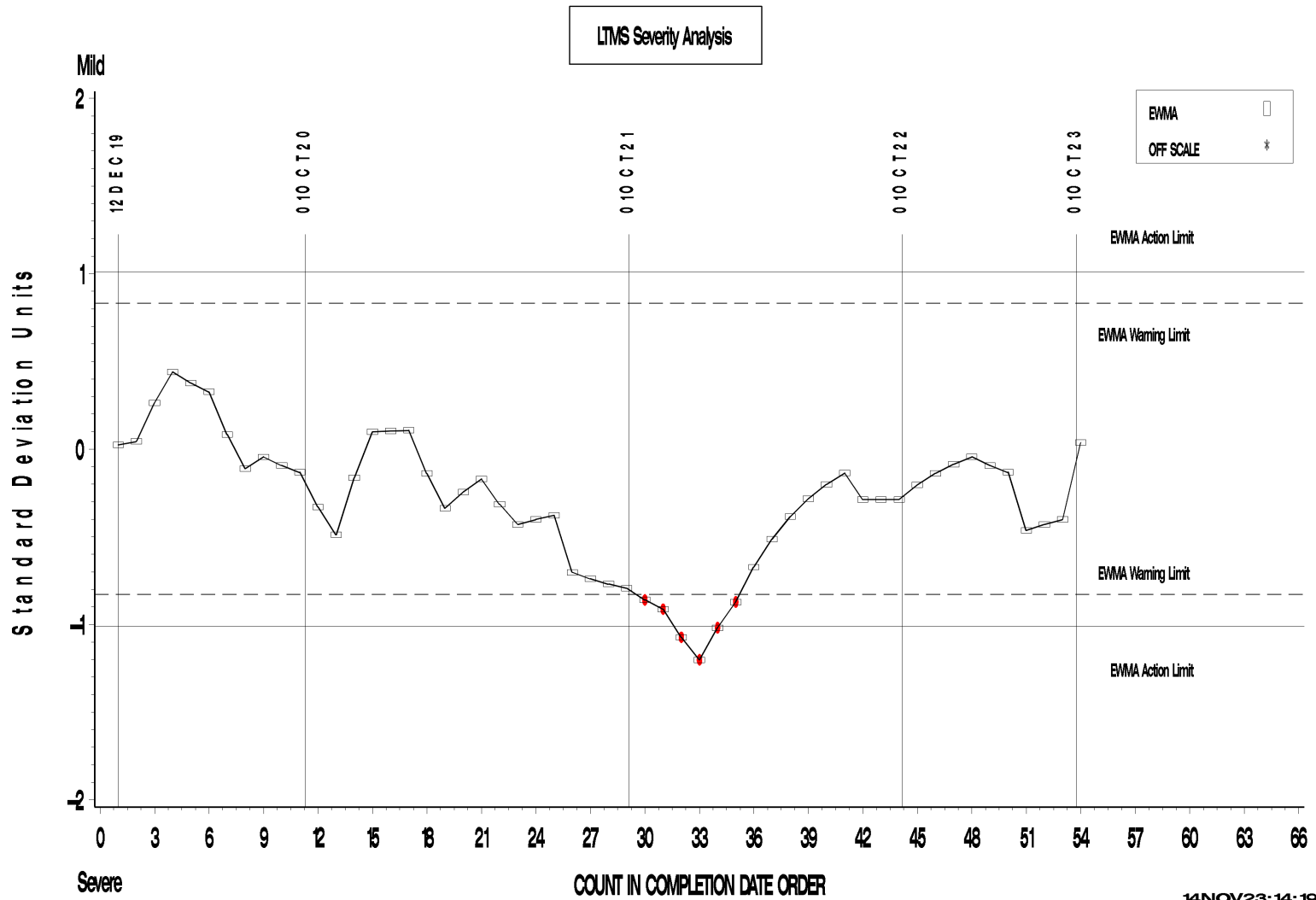
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

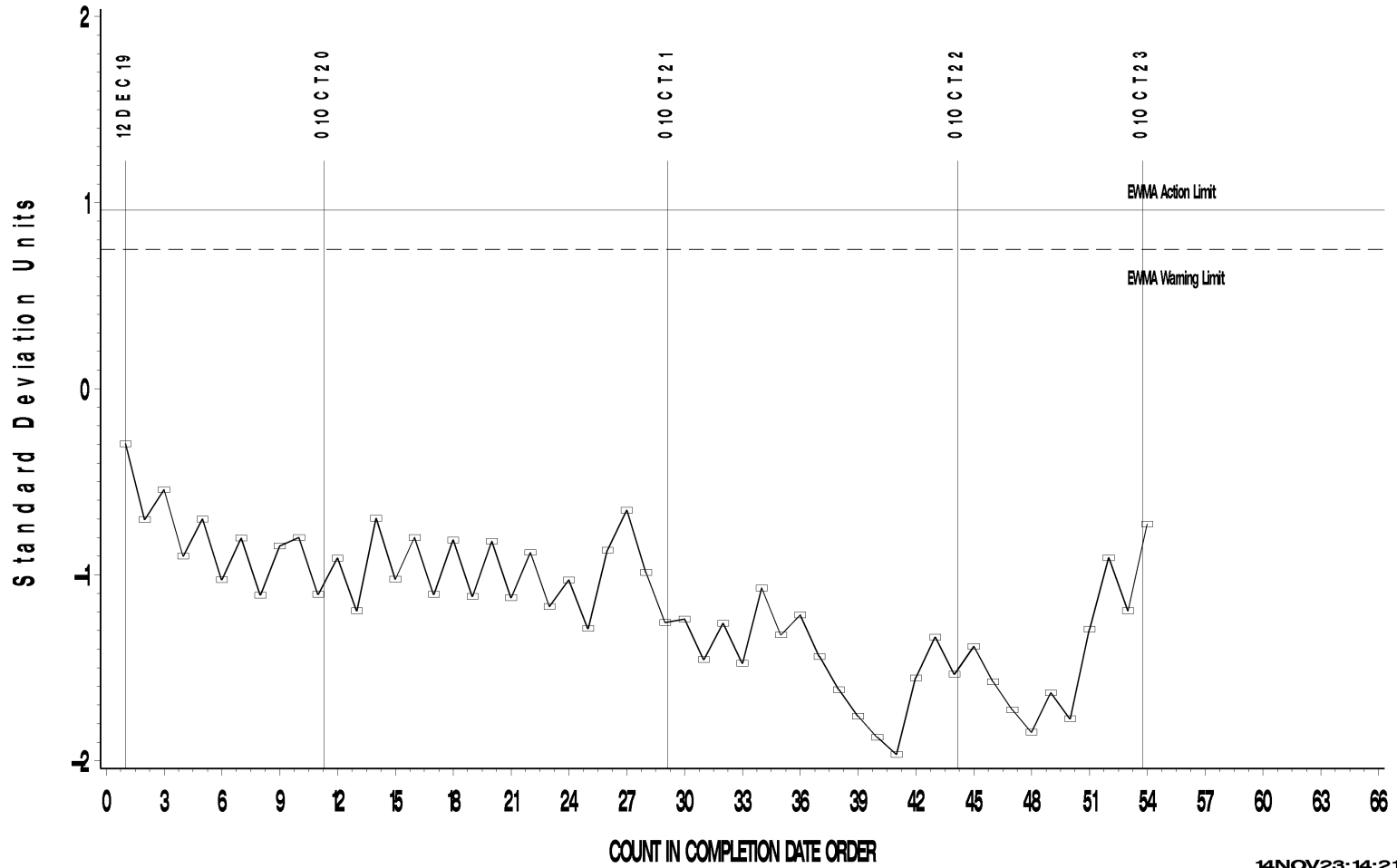


L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



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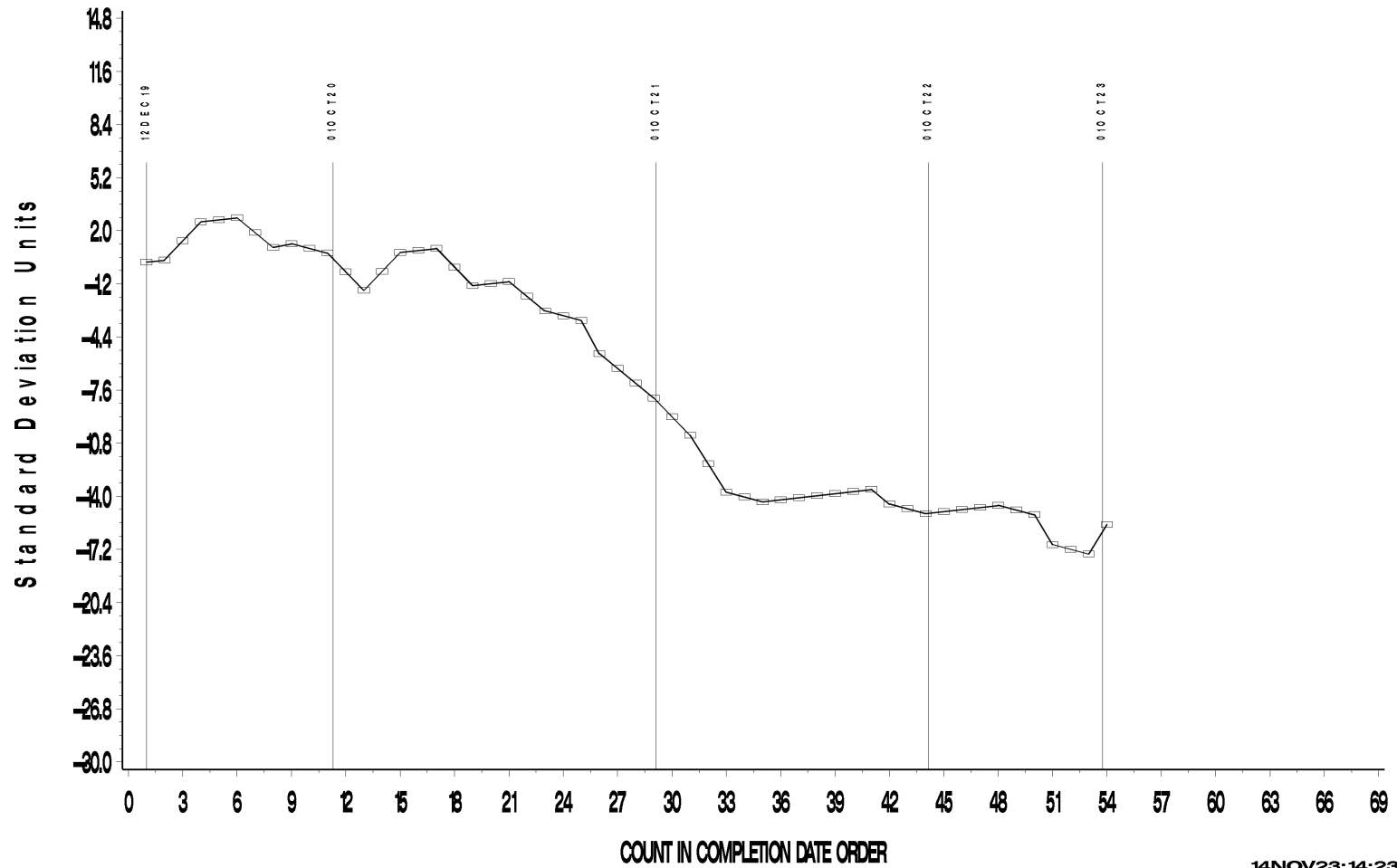
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis



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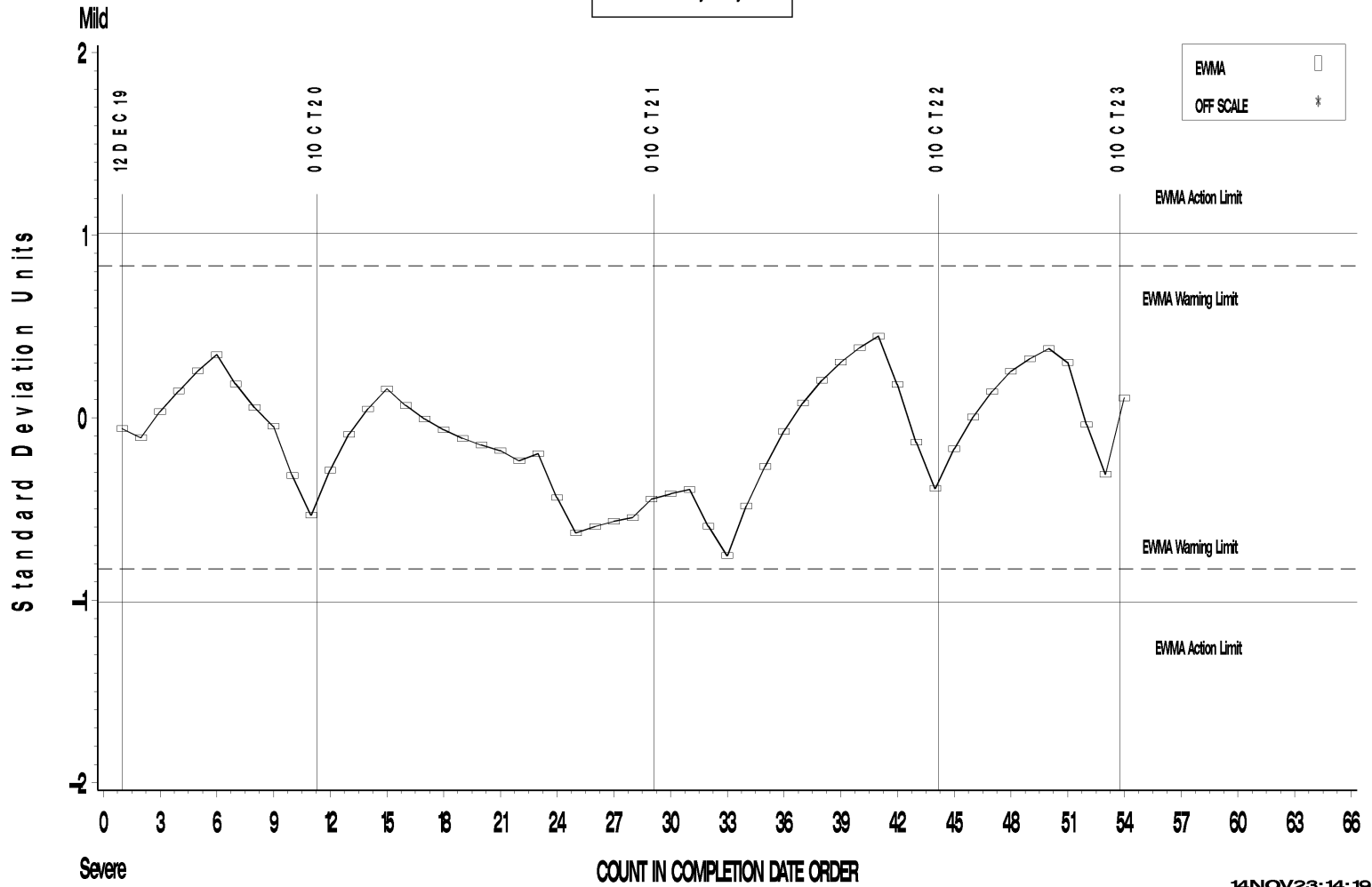
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Severity Analysis



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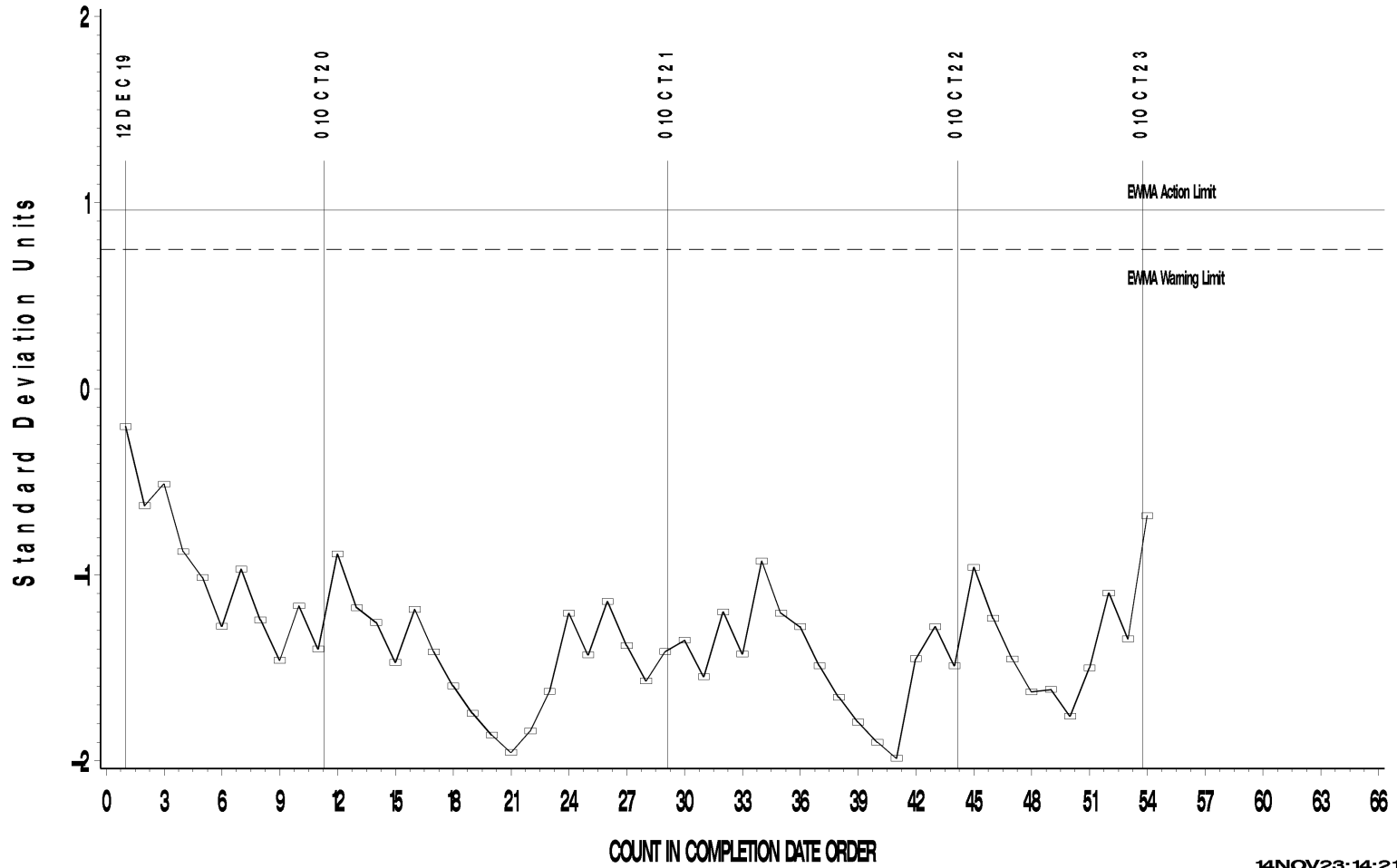
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Precision Analysis



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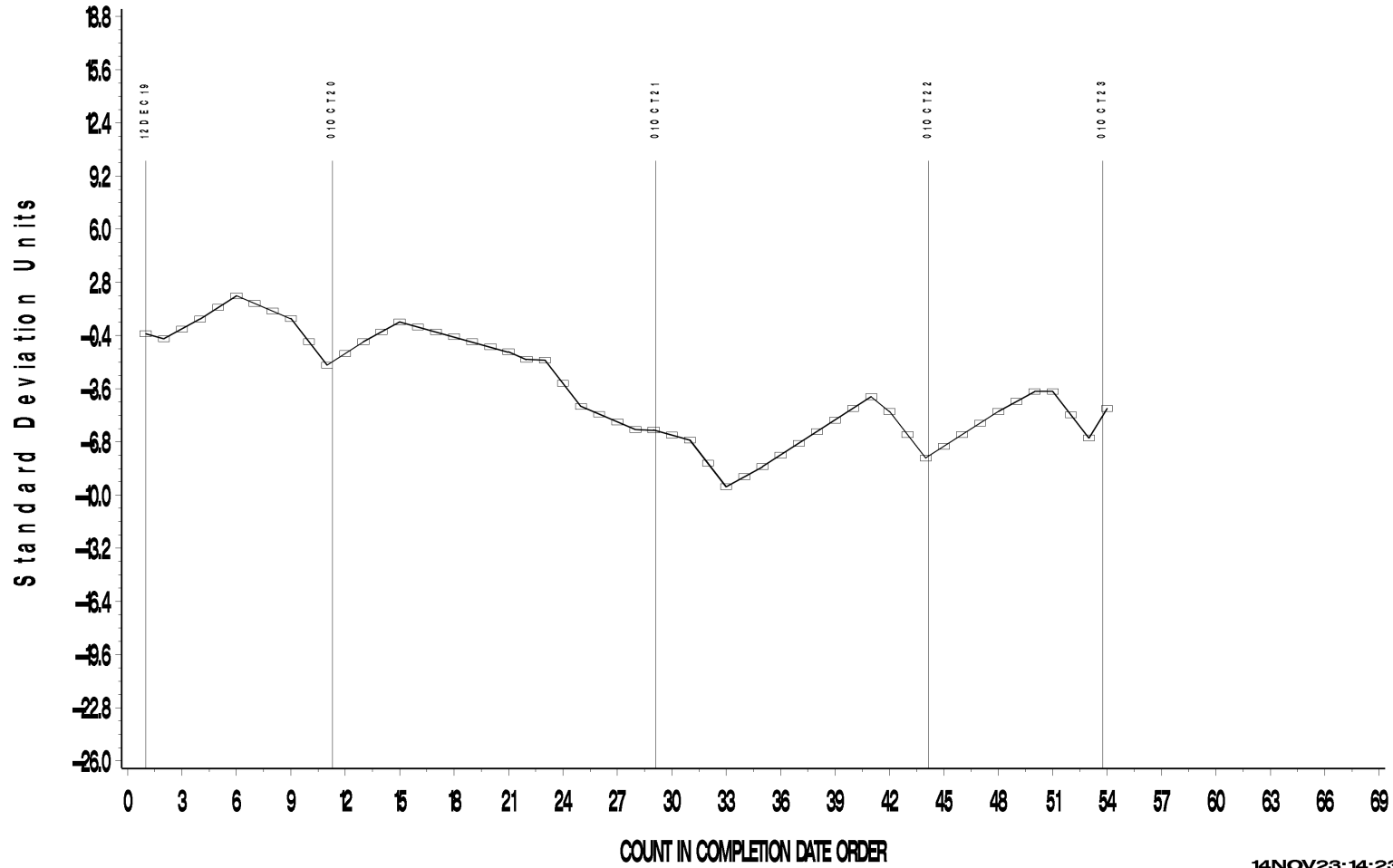
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

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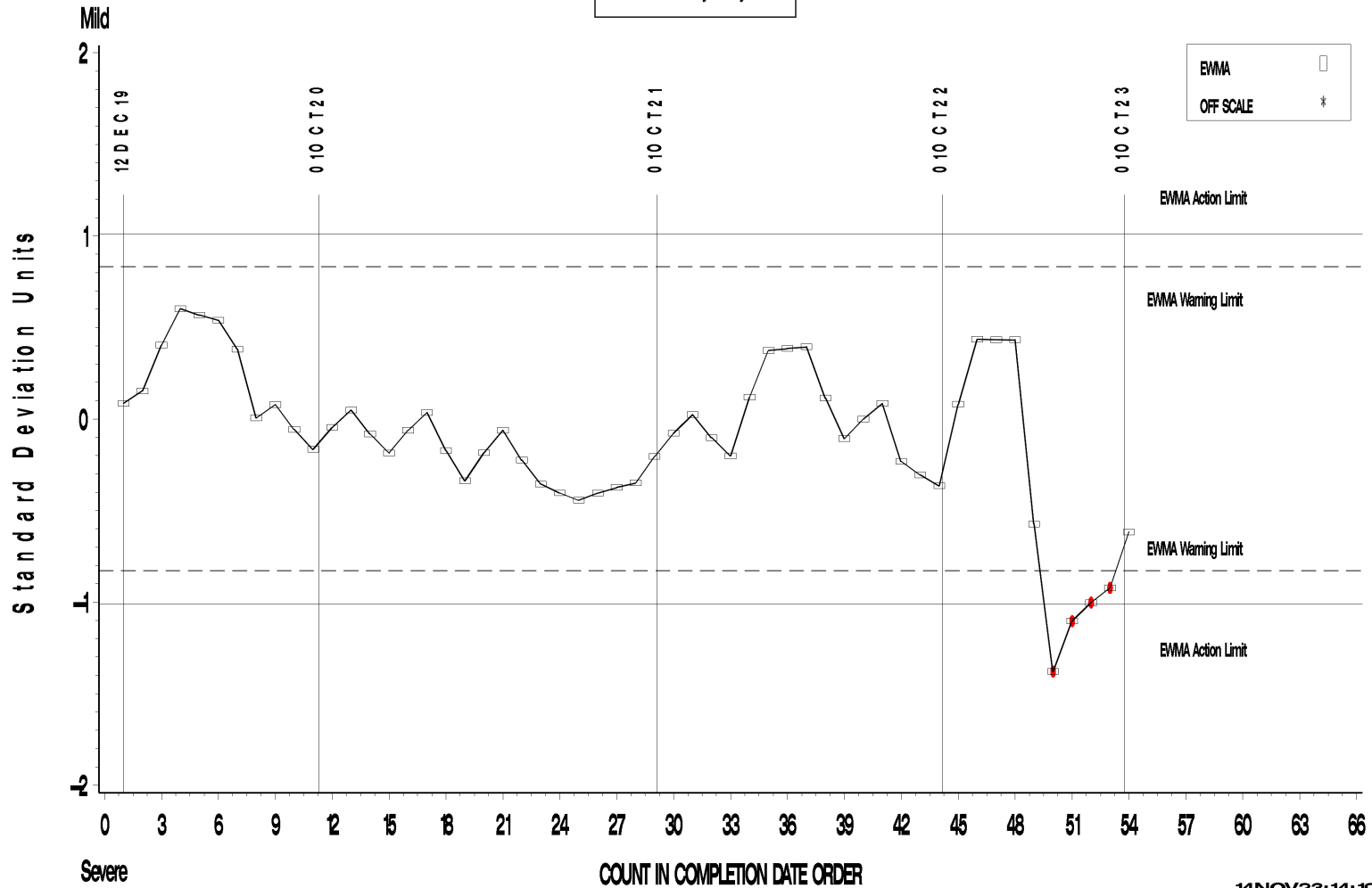
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Severity Analysis



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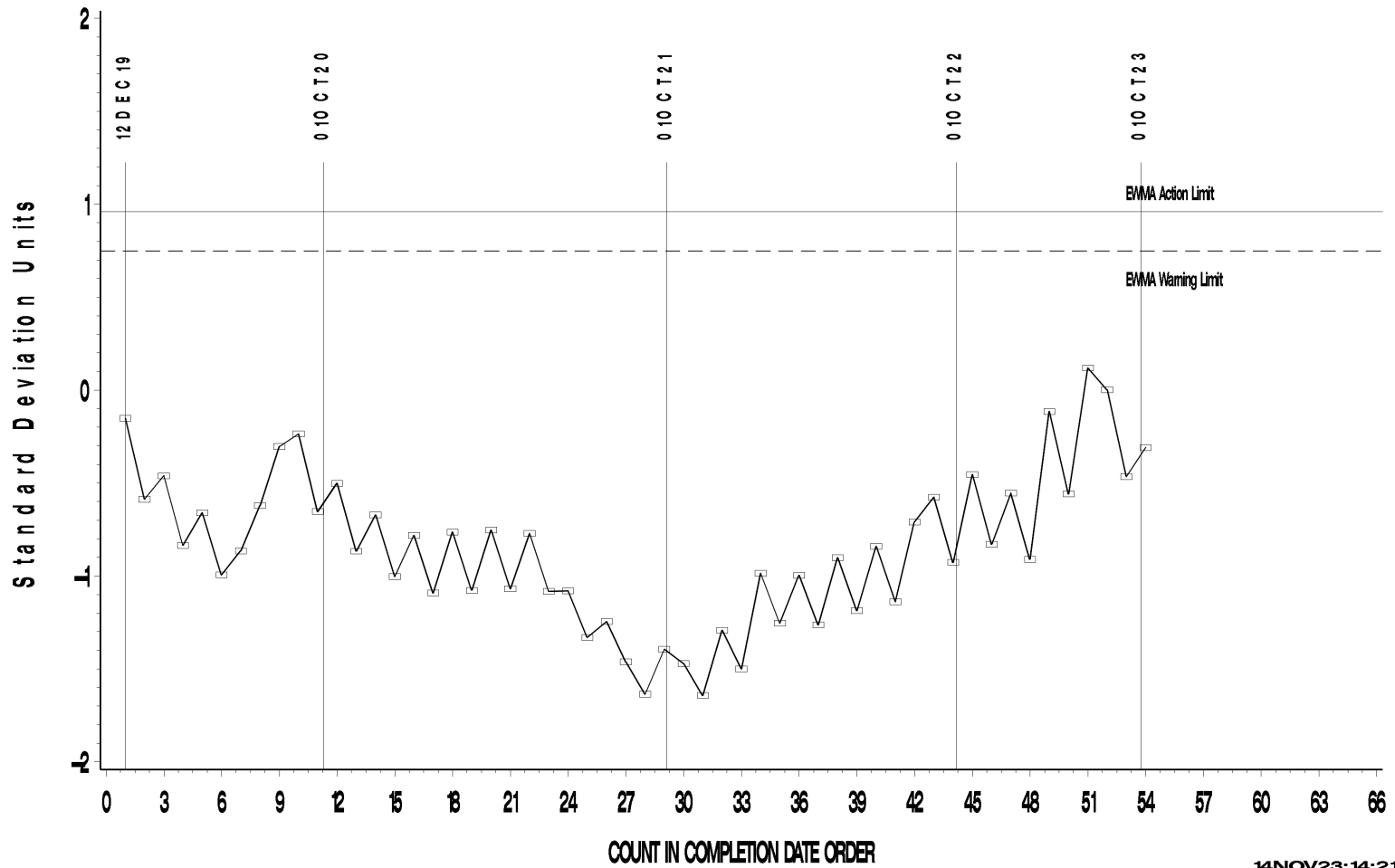
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

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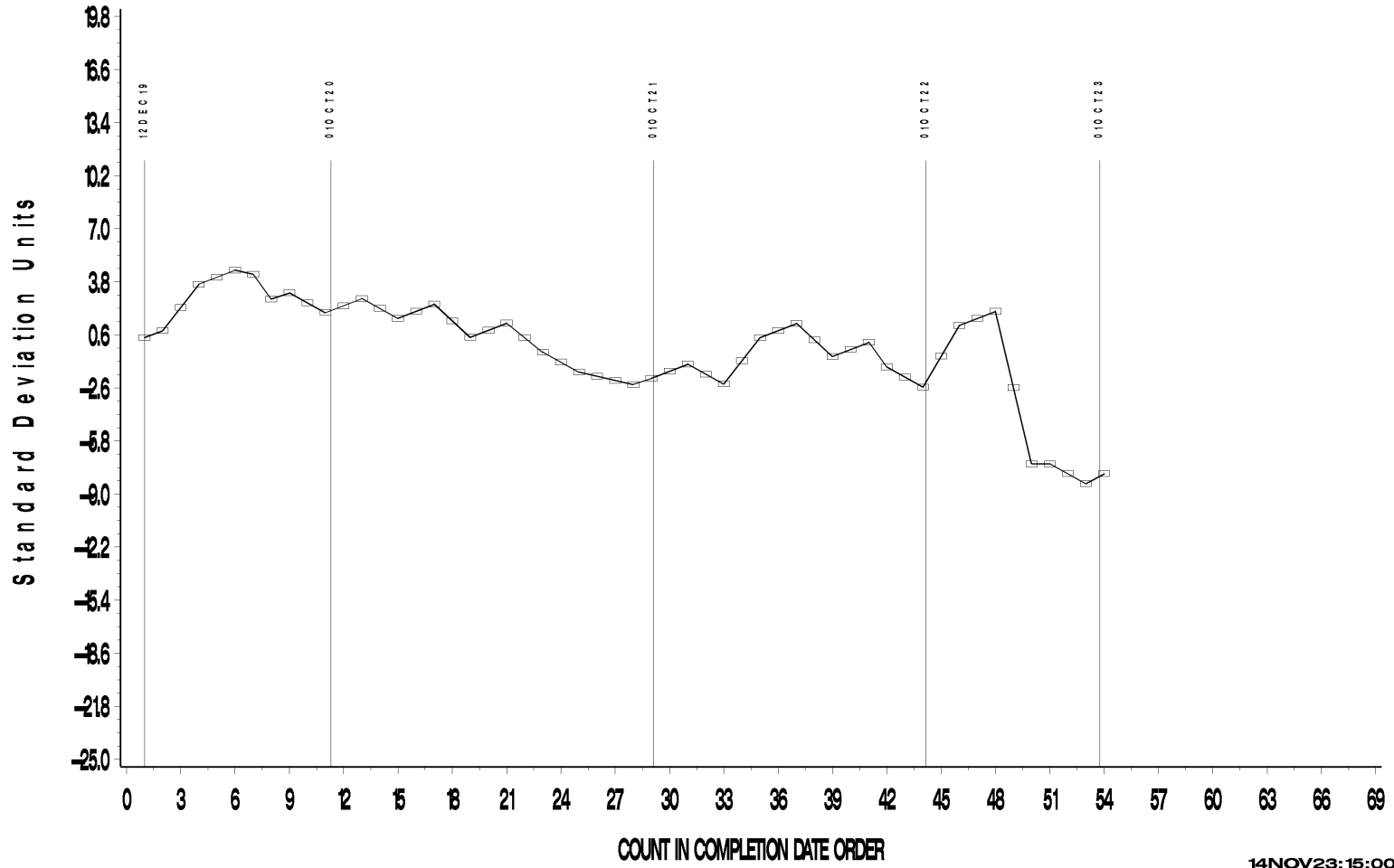
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIBBLING

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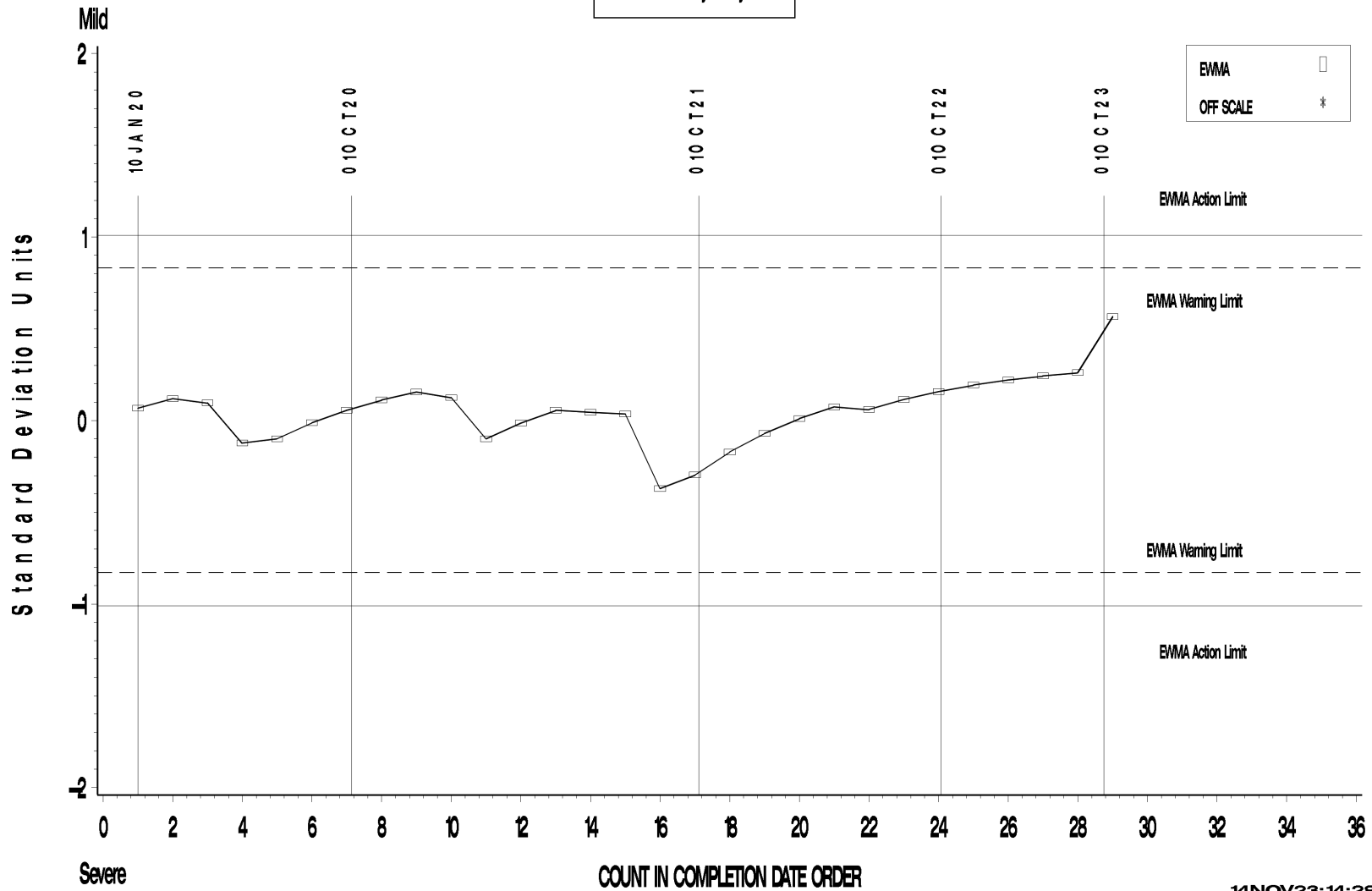
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA
 IND not = '155-1'
 FINAL PINION GEAR PITTING/SPALLING

Results for 155-1 are not included in this SPIT chart due to its current targets yielding undefined calculations.

LTMS Severity Analysis



EWMA □
 OFF SCALE *

EWMA Action Limit
 EWMA Warning Limit
 EWMA Warning Limit
 EWMA Action Limit



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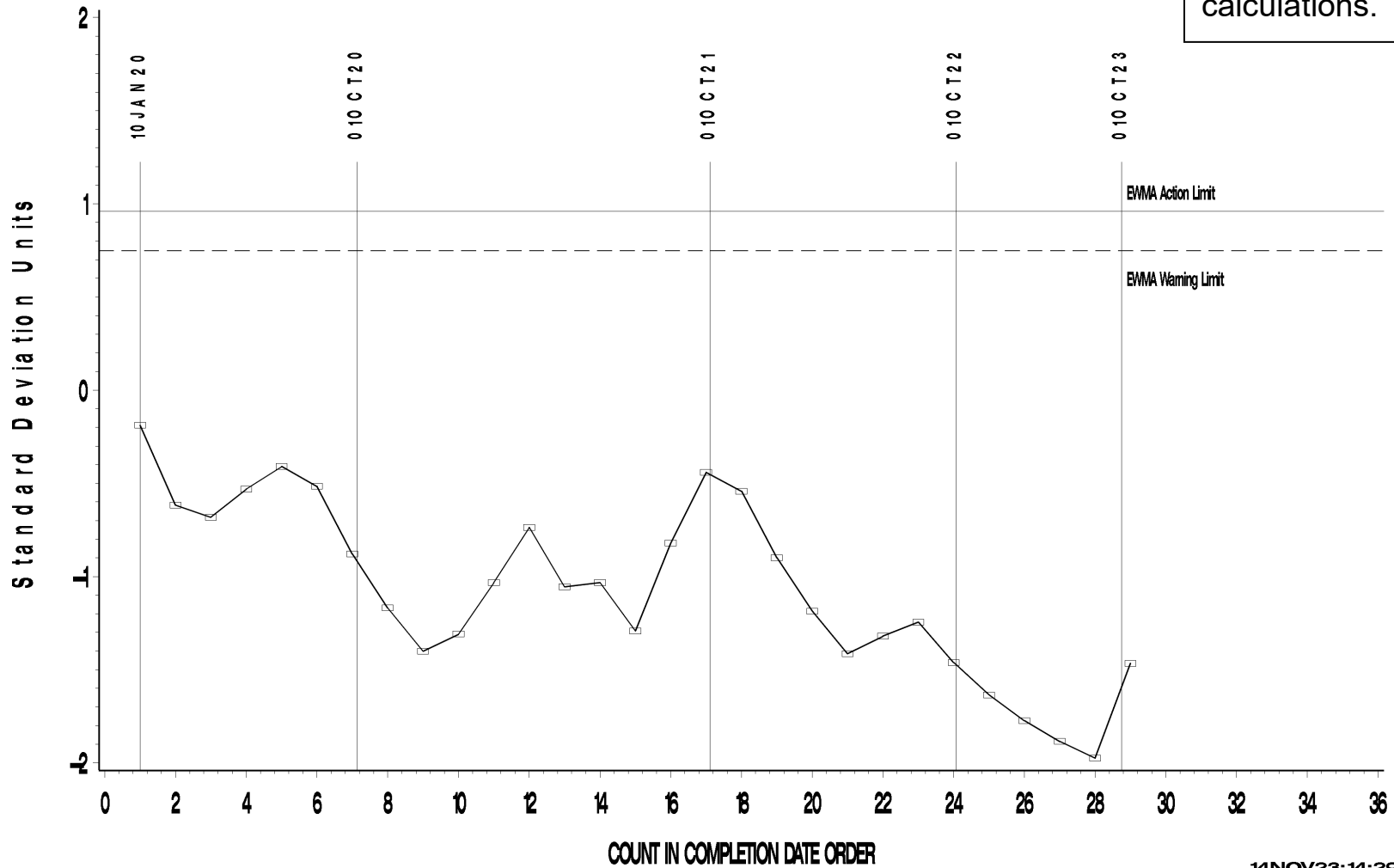
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA
 IND not = '155-1'
 FINAL PINION GEAR PITTING/SPALLING

Results for 155-1 are not included in this SPIT chart due to its current targets yielding undefined calculations.

LTMS Precision Analysis



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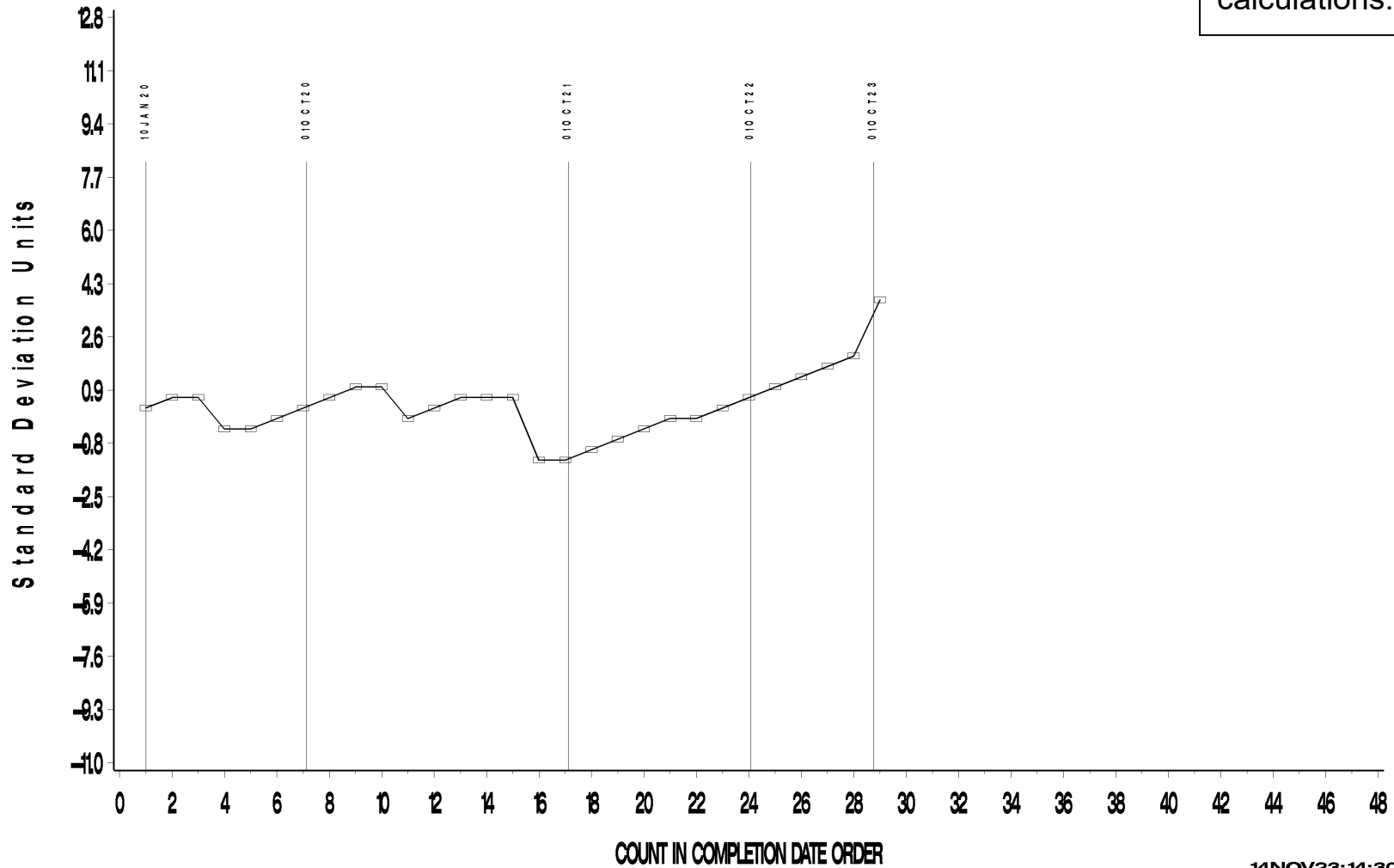
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA
IND not = '155-1'
FINAL PINION GEAR PITTING/SPALLING

Results for 155-1 are not included in this SPIT chart due to its current targets yielding undefined calculations.

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L-37-1 (D8165)

TIMELINE ADDITIONS

Effective Date	Information Letter	Event
		No information letters issued during this reporting period.

LAB VISITS

No lab visit were conducted during this reporting period.

L-37-1 (D8165)

INFORMATION LETTERS

No information letters issued during this reporting period.

LTMS DEVIATIONS

No LTMS deviations were written this report period.

L-37-1 (D8165)

STATUS OF REFERENCE OIL SUPPLY

Oil	Cans @ Labs	@ TMC	
		Cans	Gallons
134-1	15	102	102.0
152-2	15	42	42.3
155-1	14	13	13.5
155-2	12	222	222.9
Total	56	157	380.7

The TMC quantity remaining presumes usage only for L-371 testing. Oil 155/155-1 is also used in other test areas (L-33-1, L-60-1, and HTCT). The 155-1 total also reflects that the L-60-1 surveillance panel has requested that TMC reserve a quantity of that oil (currently 15.7 gal) for use in that test.

A re-blend of 155-1 is available but has not yet been approved by the surveillance panel for L-37-1 test use.