



Test Monitoring Center

203 Armstrong Drive, Freeport, PA 16229, USA

www.astmtmc.org
412-365-1000

MEMORANDUM: 24-010
DATE: May 14, 2024
TO: Nick Schaup, Chairman, L-37-1 Surveillance Panel
FROM: Dylan Beck *Dylan Beck*
SUBJECT: L-37-1 Testing from November 1, 2023 through March 31, 2024

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

DJB/djb/mem24-010.djb.doc

cc: Jeff Clark

Sean Moyer

L-37-1 Surveillance Panel

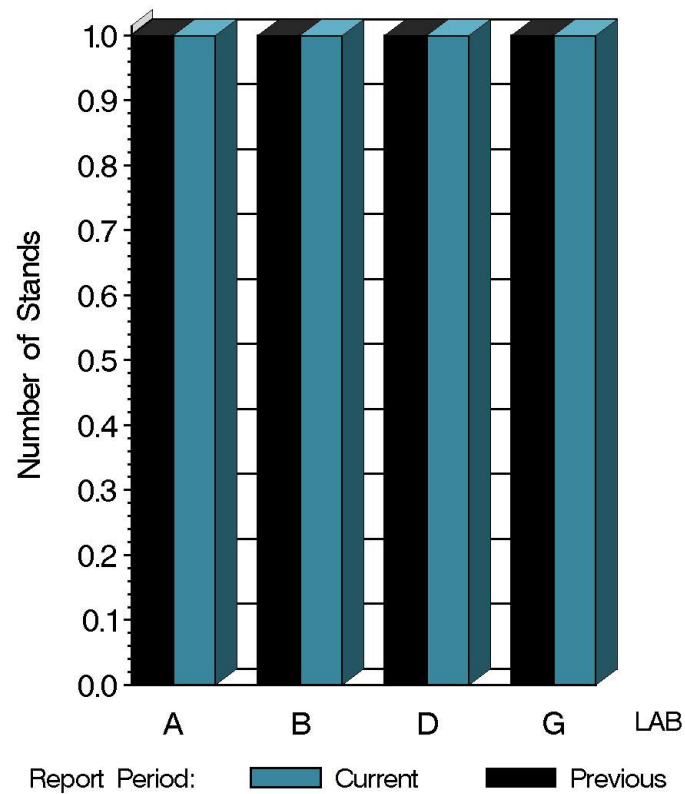
<https://www.astmtmc.org/ftp/docs/gear/1371/semiannualreports/1371-04-2024.pdf>

Distribution: email

L-37-1 (D8165)

	Reporting Data	Calibrated on 3-31-24
Number of Labs	4	4
Number of Stands	4	4

BY-LAB STAND
DISTRIBUTION



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L-37-1 (D8165)

Test Distribution by Oil and Validity

					Totals	
					Last Period	This Period
		134-1	152-2	155-1/ 155-2		
Accepted for calibration	AC	2	3	2	10	7
Rejected (Mild)	OC	0	3	0	1	3
Rejected (Severe)	OC	0	0	0	1	0
Rejected (Both)	OC	1	0	0	1	1
Aborted cal attempt	XC	0	0	0	2	0
Invalid info run	LI	0	0	1	1	1
Acceptable donated run	AG	0	0	0	2	0
Acceptable info run	NI	0	0	5	11	5
Total		3	6	8	29	17

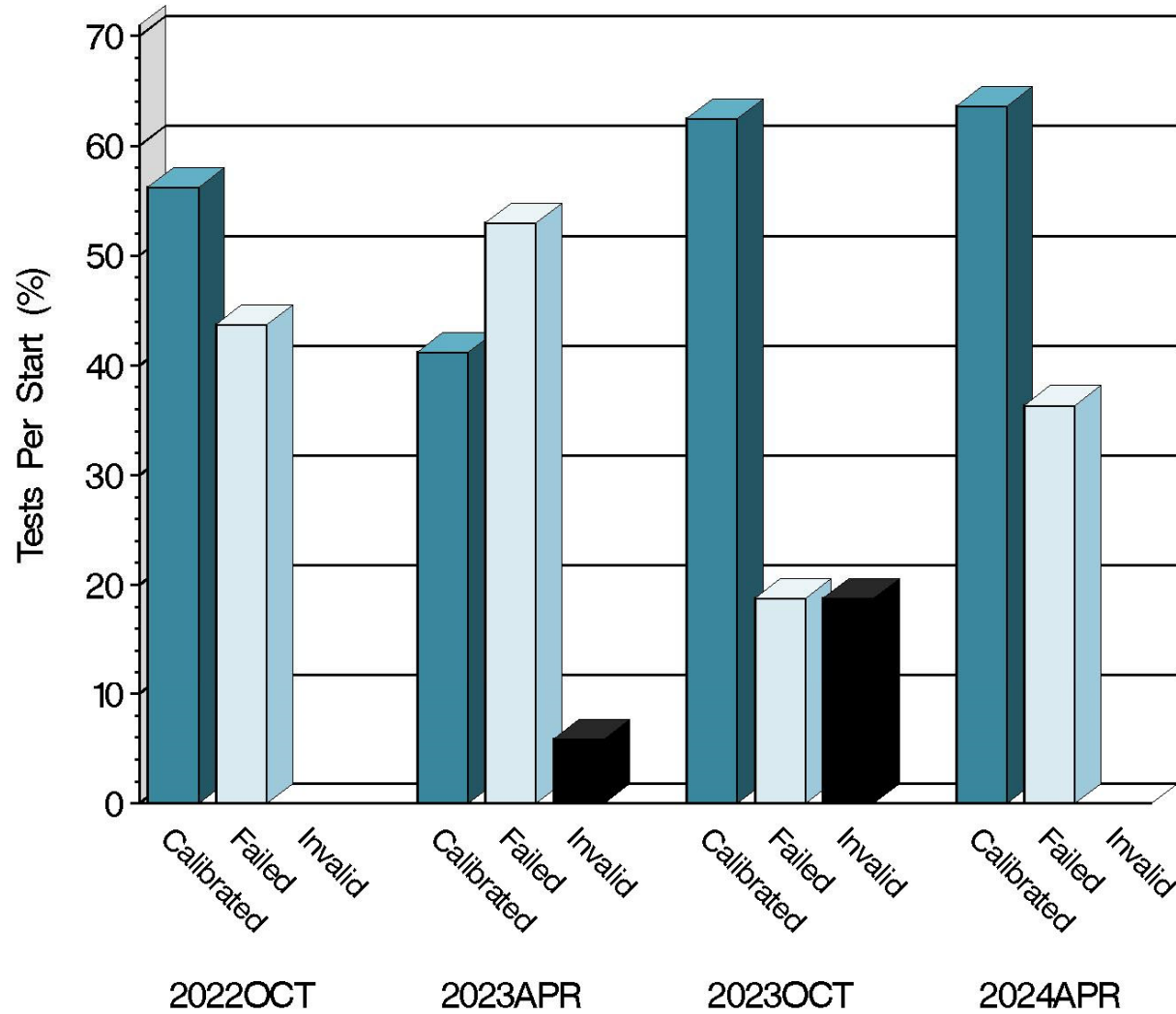
L-37-1 (D8165)

Calibration Attempt Detail

	Gear Batch	Acceptable	Invalid	Failed	Total
Uncoated	01-2020	1	1	0	2
	04-2021	4	0	1	5
	12-2019	1	0	3	4
MnP Coated	04-2021	6	0	0	6
	04-2014	0	0	0	0
	Total	12	1	4	17

L-37-1 (D8165)

CALIBRATION ATTEMPT SUMMARY



Resolution

Report Period

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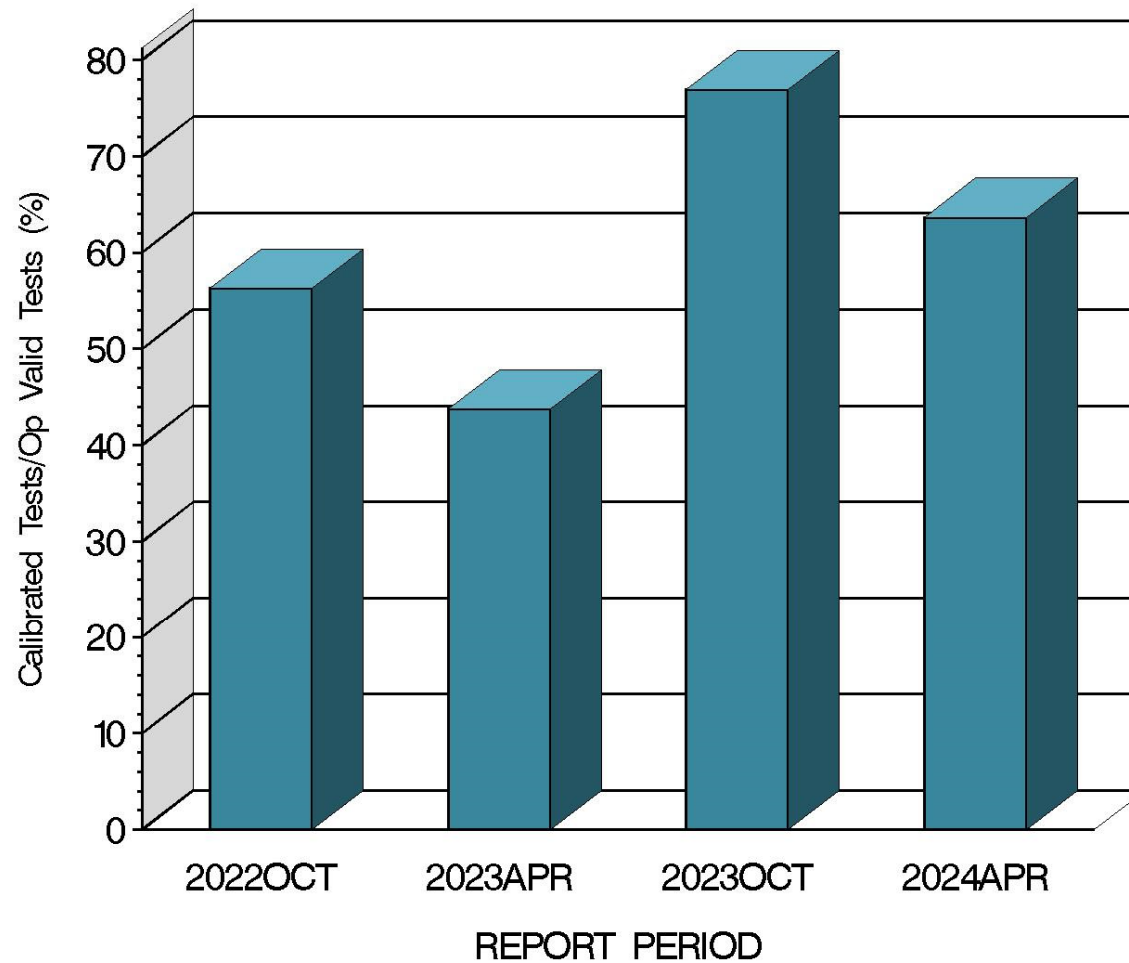
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L-37-1 (D8165)

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	5	20%
D	Broken Teeth	●			●			2	5	40%
	Pre-Test breakaway torque out of spec			●		●				
Lost		2	0	1	2	1	0			
Starts		11	9	9	17	17	17			
%		18%	0%	11%	12%	5.9%	0%			

L-37-1 (D8165)

GEAR BATCH SEVERITY

MNP COATED HARDWARE						
Parameter	Gear Batch	N	Δ/s	s	Overall Δ/s	Overall Shift (in Merits) ^A
RIDG	04-2021	3	-0.595	2.062	-0.595	.
RIPP	04-2021	3	0.201	0.348	0.201	.
SPIT	04-2021	3	0.000	1.786	0.000	.
WEAR	04-2021	3	-0.604	2.069	-0.604	.

UNCOATED HARDWARE						
Parameter	Gear Batch	N	Δ/s	s	Overall Δ/s	Overall Shift (in Merits) ^A
RIDG	12-2019	4	1.986	2.380	1.149	.
RIPP	12-2019	4	-0.229	0.647	0.115	.
SPIT	12-2019	4	-0.488	0.975	-0.279	.
WEAR	12-2019	4	1.337	0.770	0.681	.
RIDG	01-2020	1	0.000	.	1.149	.
RIPP	01-2020	1	-0.250	.	0.115	.
SPIT	01-2020	1	-1.000	.	-0.279	.
WEAR	01-2020	1	-0.857	.	0.681	.
RIDG	04-2021	3	0.417	1.233	1.149	.
RIPP	04-2021	3	0.697	0.402	0.115	.
SPIT	04-2021	3	0.500	0.707	-0.279	.
WEAR	04-2021	3	0.317	1.470	0.681	.

^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
04-2021	A	1	-1.786	0.000	-1.786	-1.799
04-2021	D	2	0.000	0.301	0.893	-0.006

UNCOATED HARDWARE AVERAGE Δ/s						
Gear Batch	Lab	N	RIDG	RIPP	SPIT	WEAR
01-2020	G	1	0.000	-0.250	-1.000	-0.857
04-2021	A	1	-1.000	0.364	.	-0.714
	B	1	1.250	0.583	0.000	2.000
	D	1	1.000	1.143	1.000	-0.333
12-2019	B	4	1.986	-0.229	-0.488	1.337

L-37-1 (D8165)

SUMMARY OF SEVERITY & PRECISION

Severity

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

MnP Coated – All parameters remained within the severity limits this period.

L-37-1 (D8165)

SUMMARY OF SEVERITY & PRECISION (cont.)

Precision

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

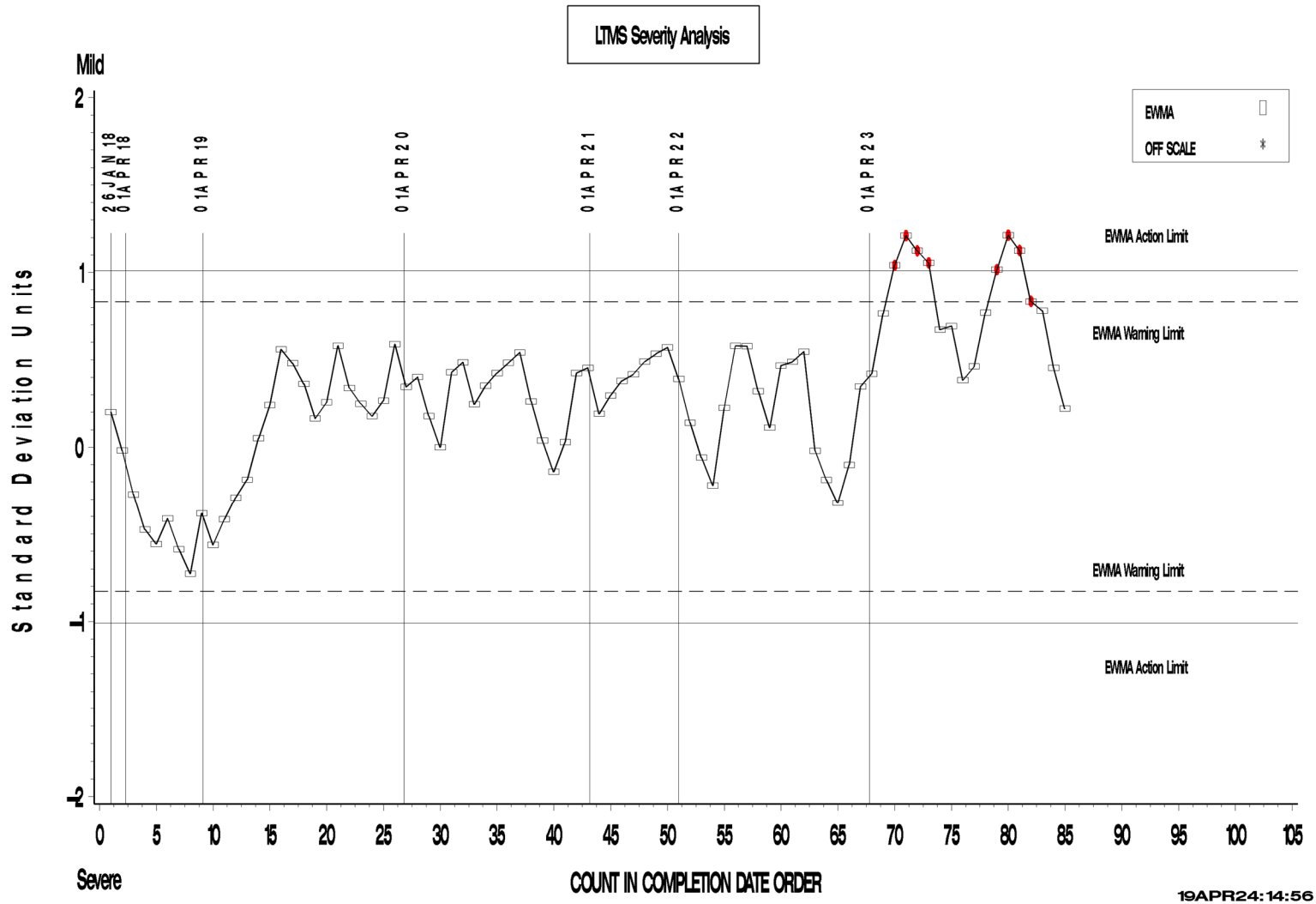
MnP Coated – All parameters remained within the precision limit this period.

Industry control charts follow.

L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR



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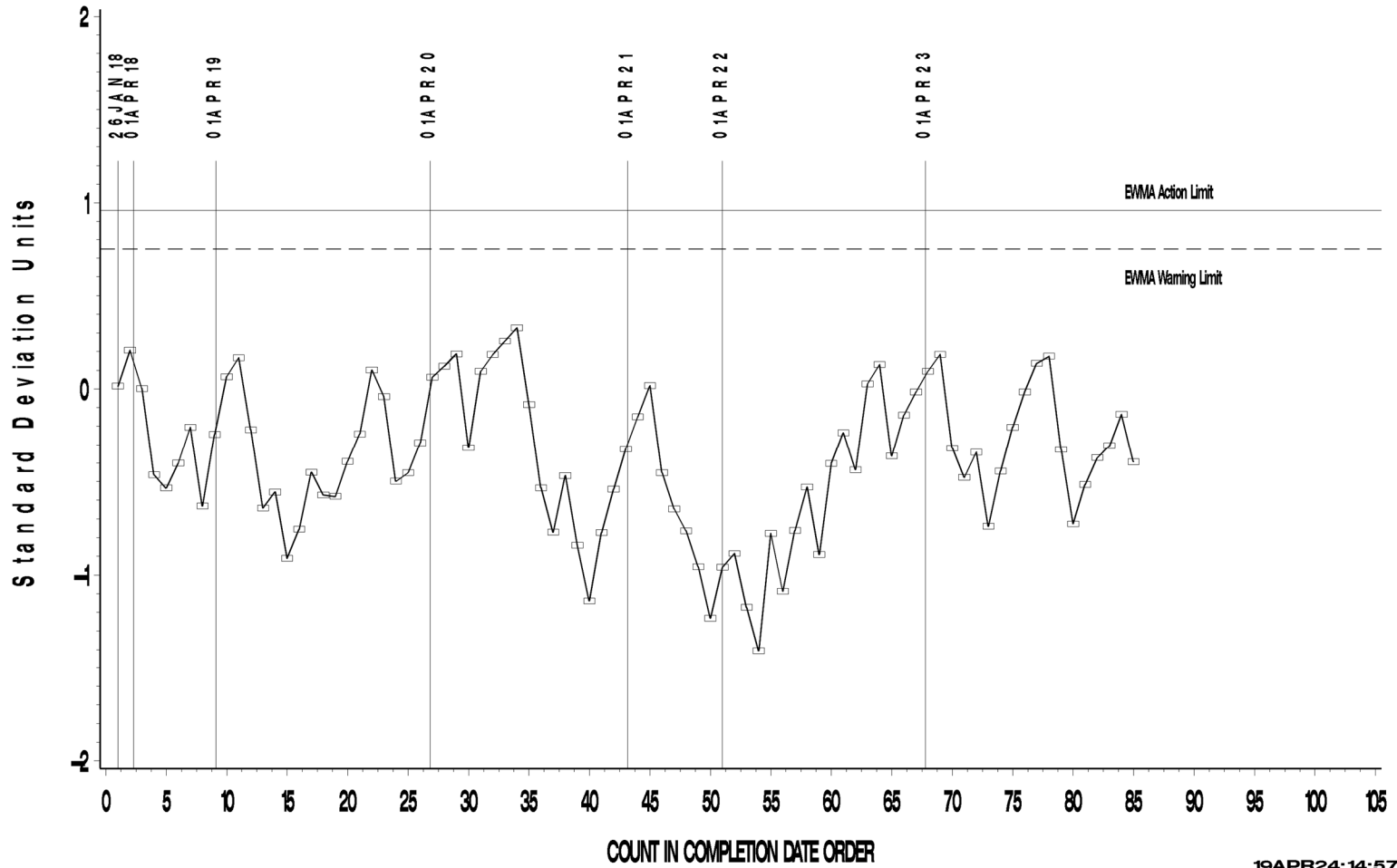
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L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



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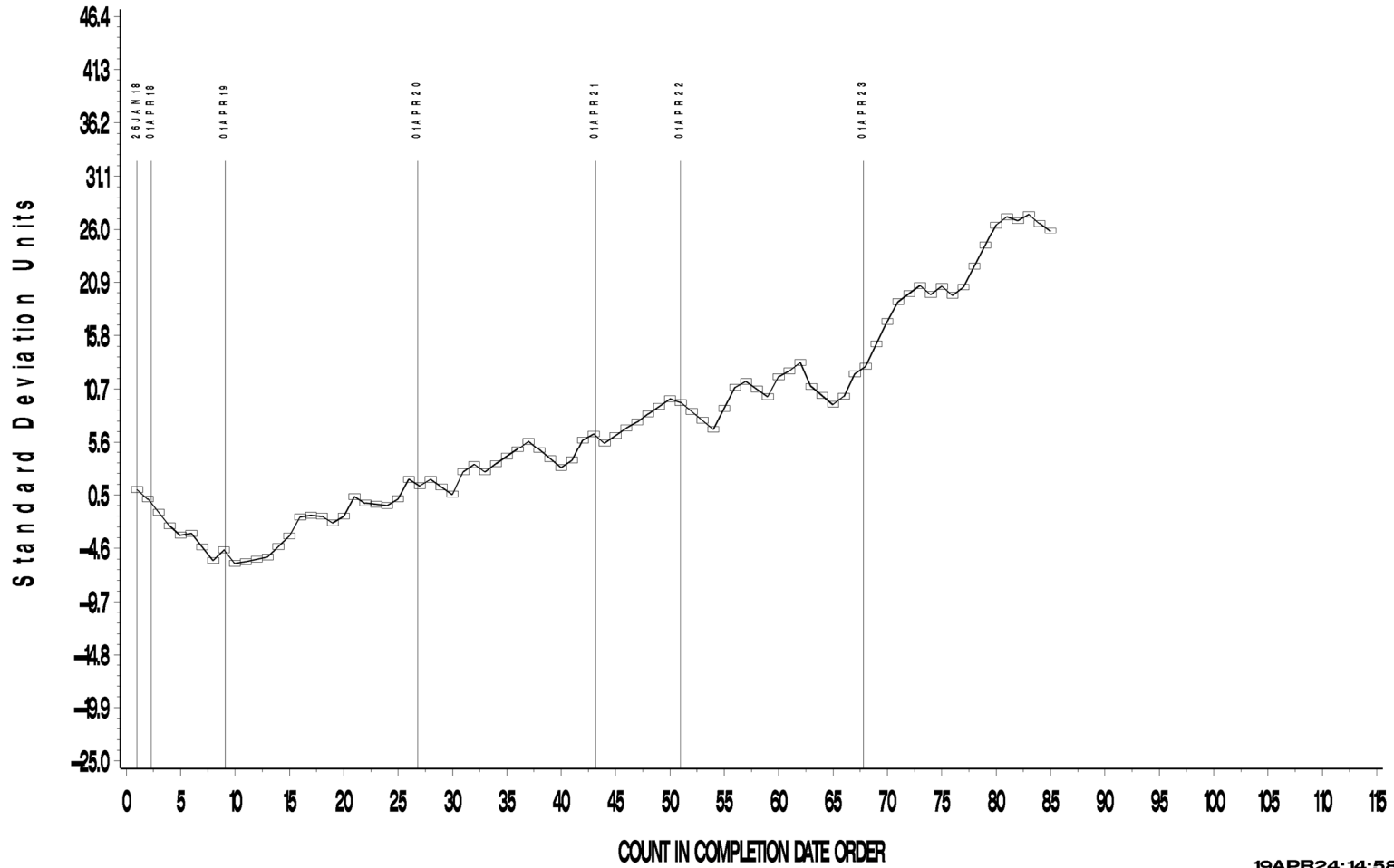
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

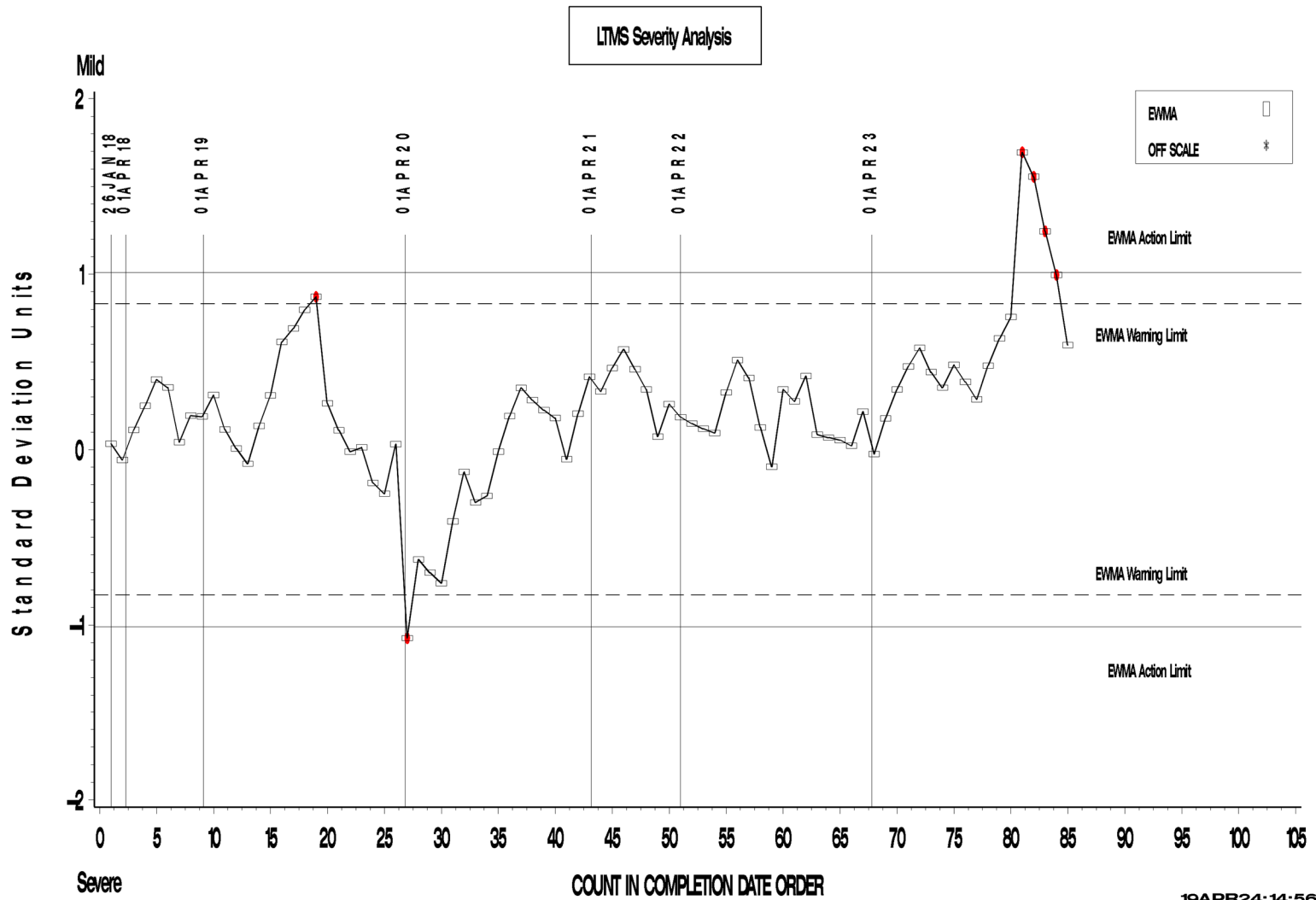
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING



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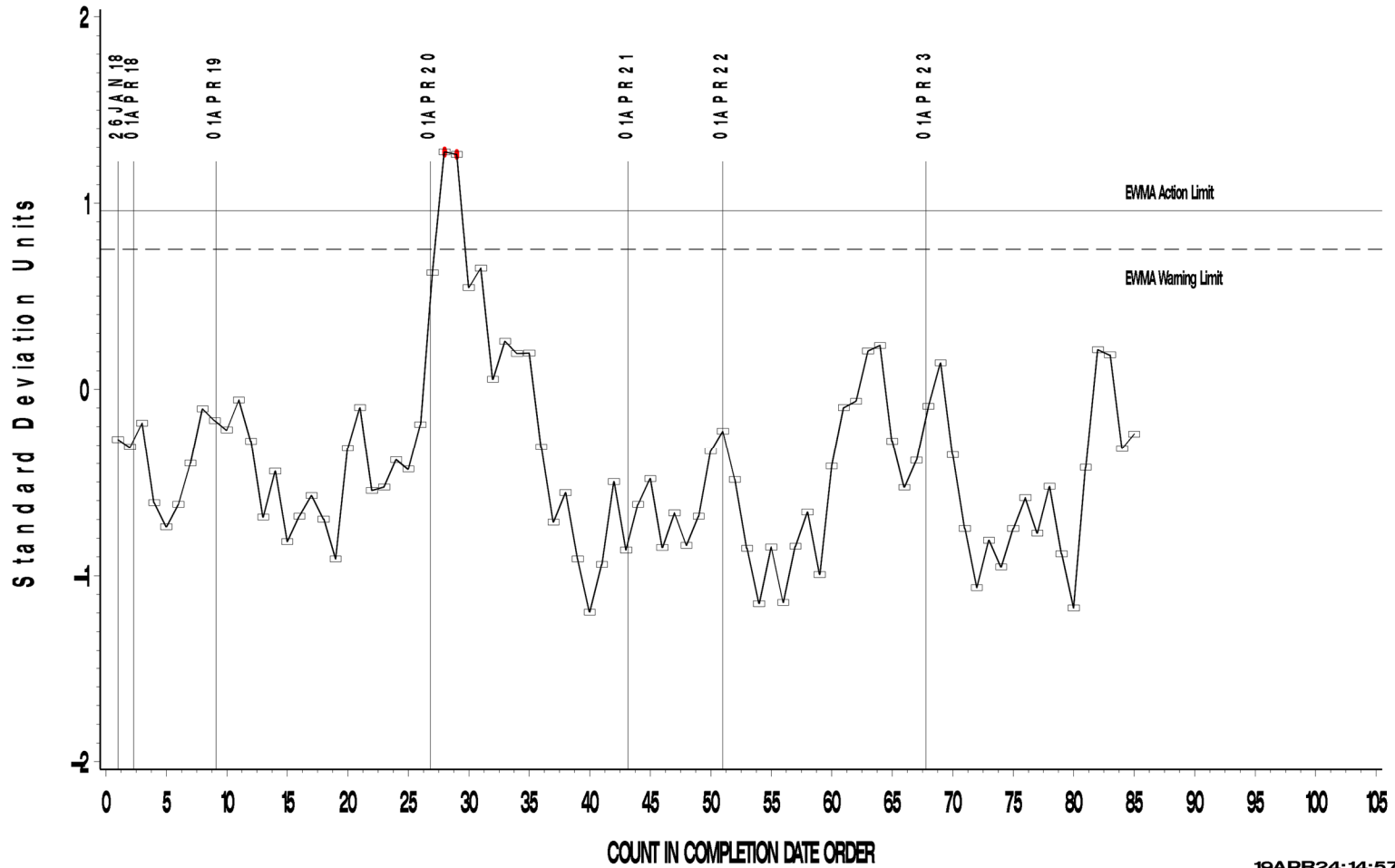
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L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Precision Analysis



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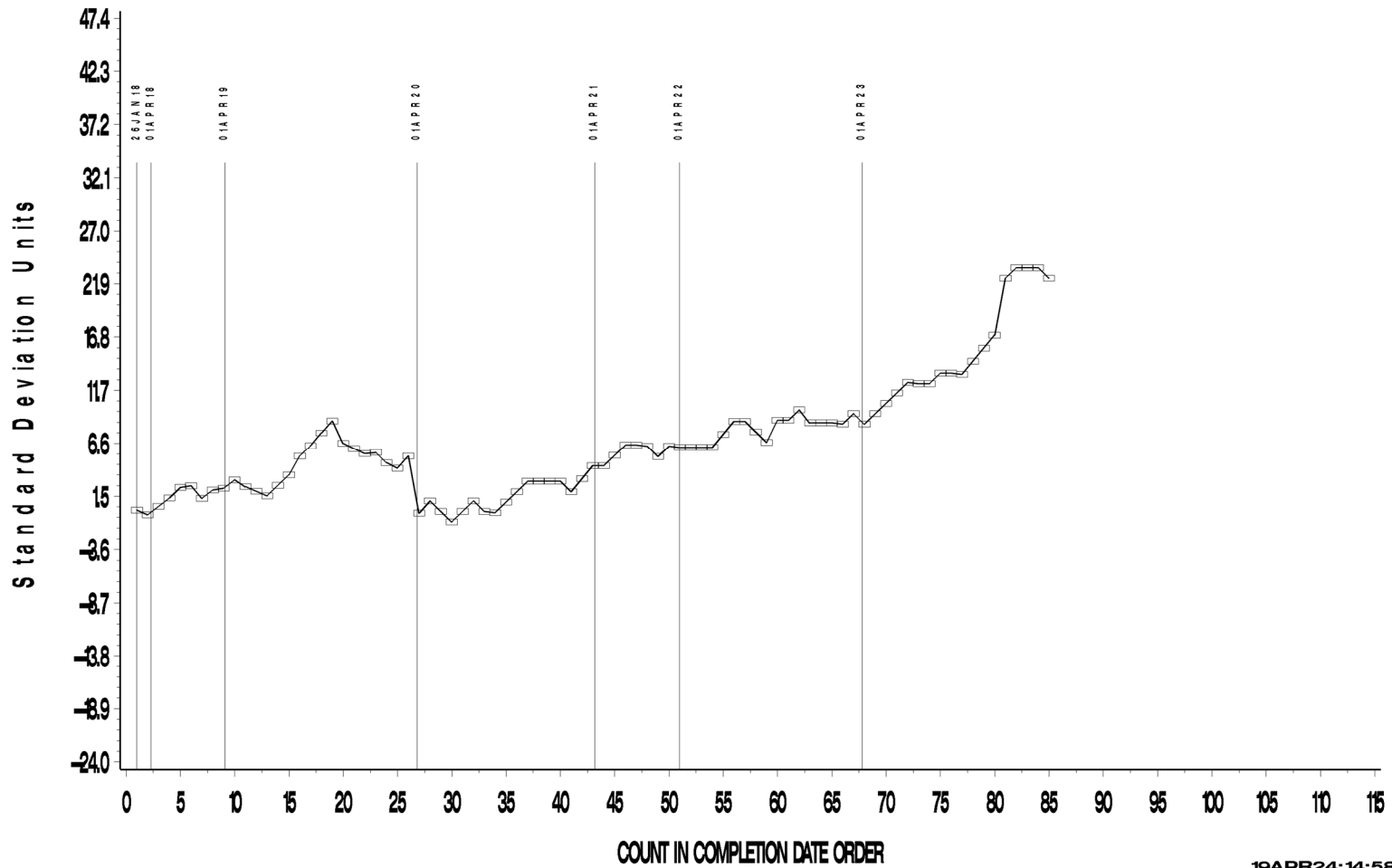
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L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

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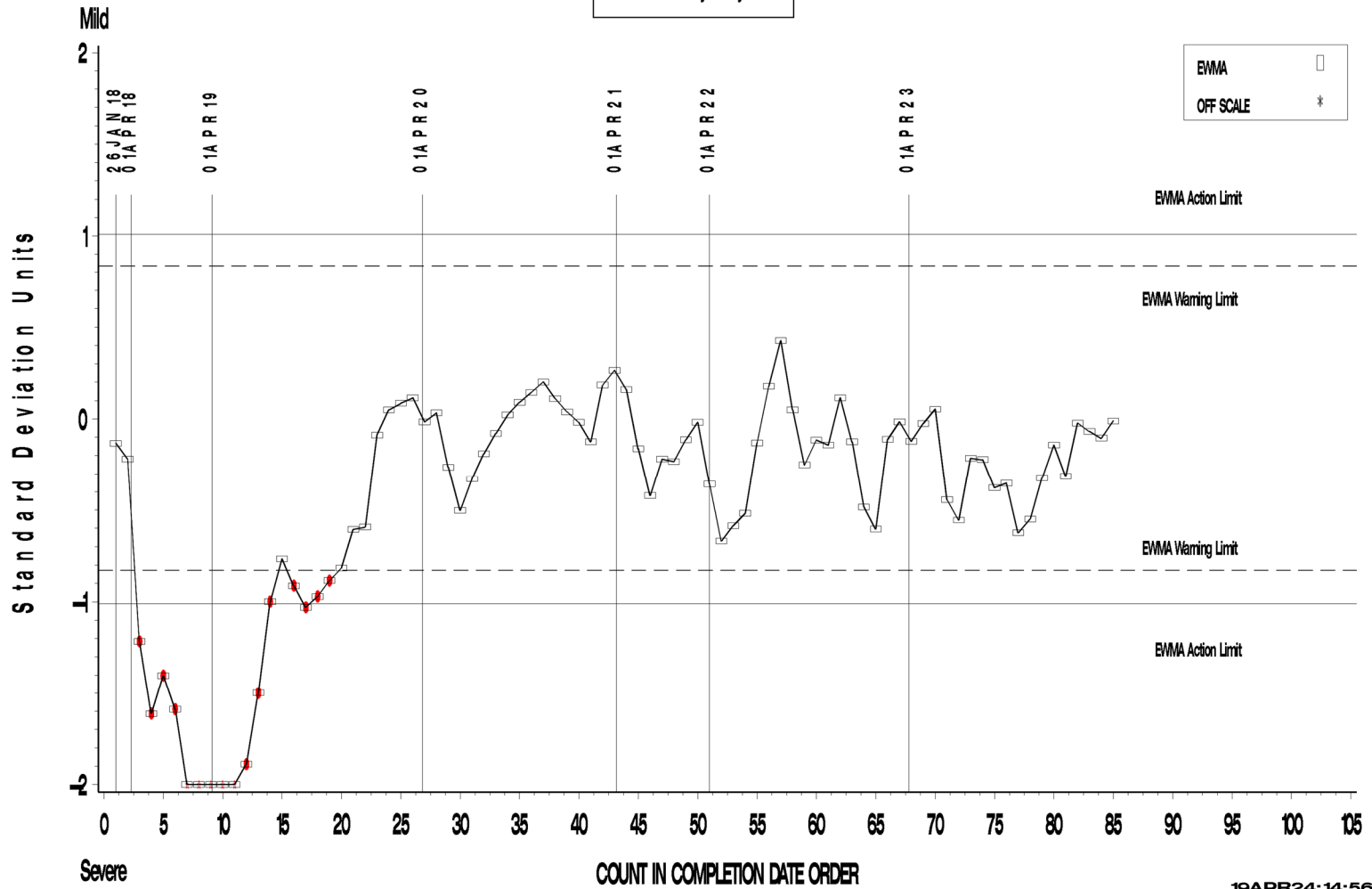
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIBBLING

LTMS Severity Analysis



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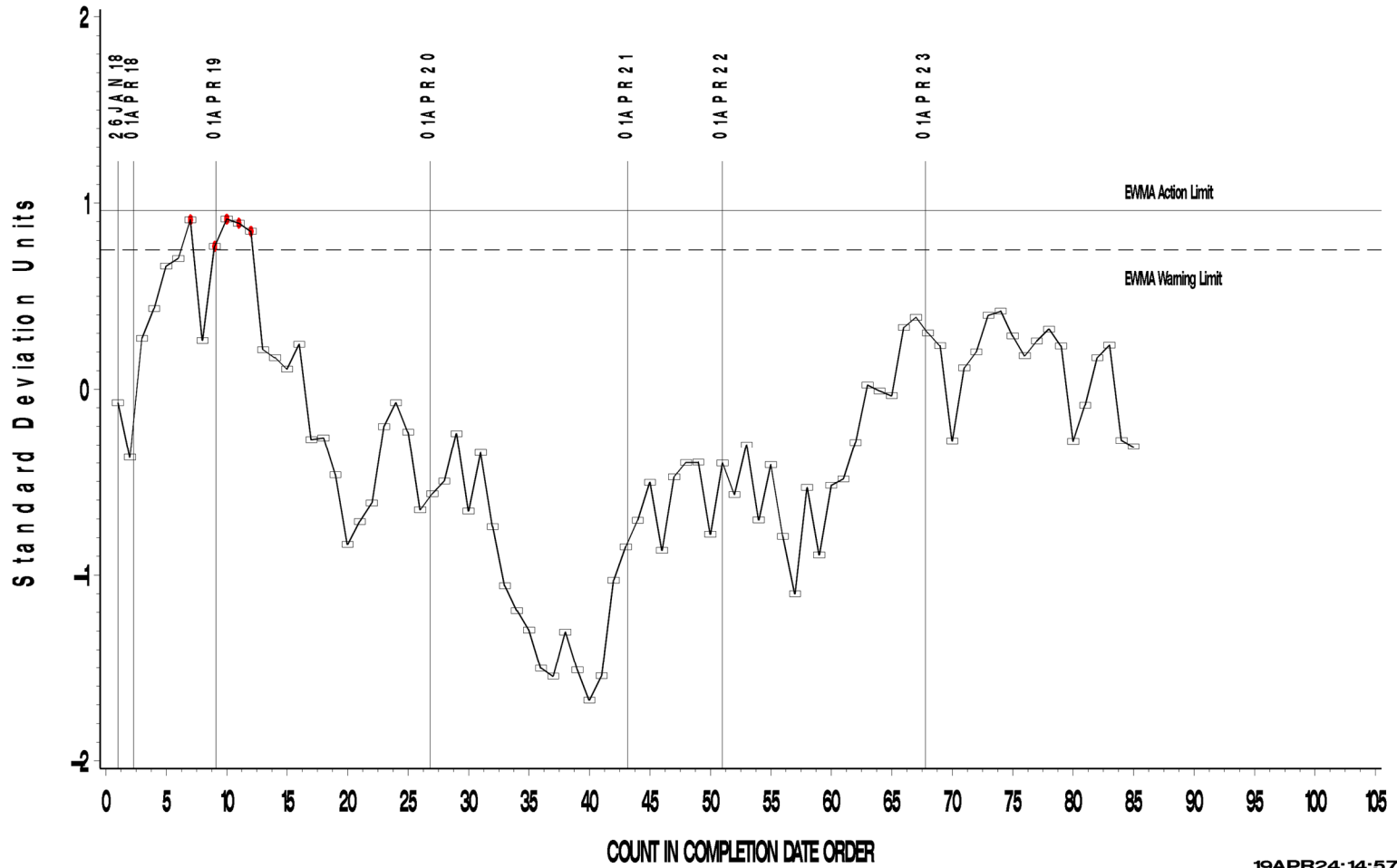
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIBBLING

LTMS Precision Analysis



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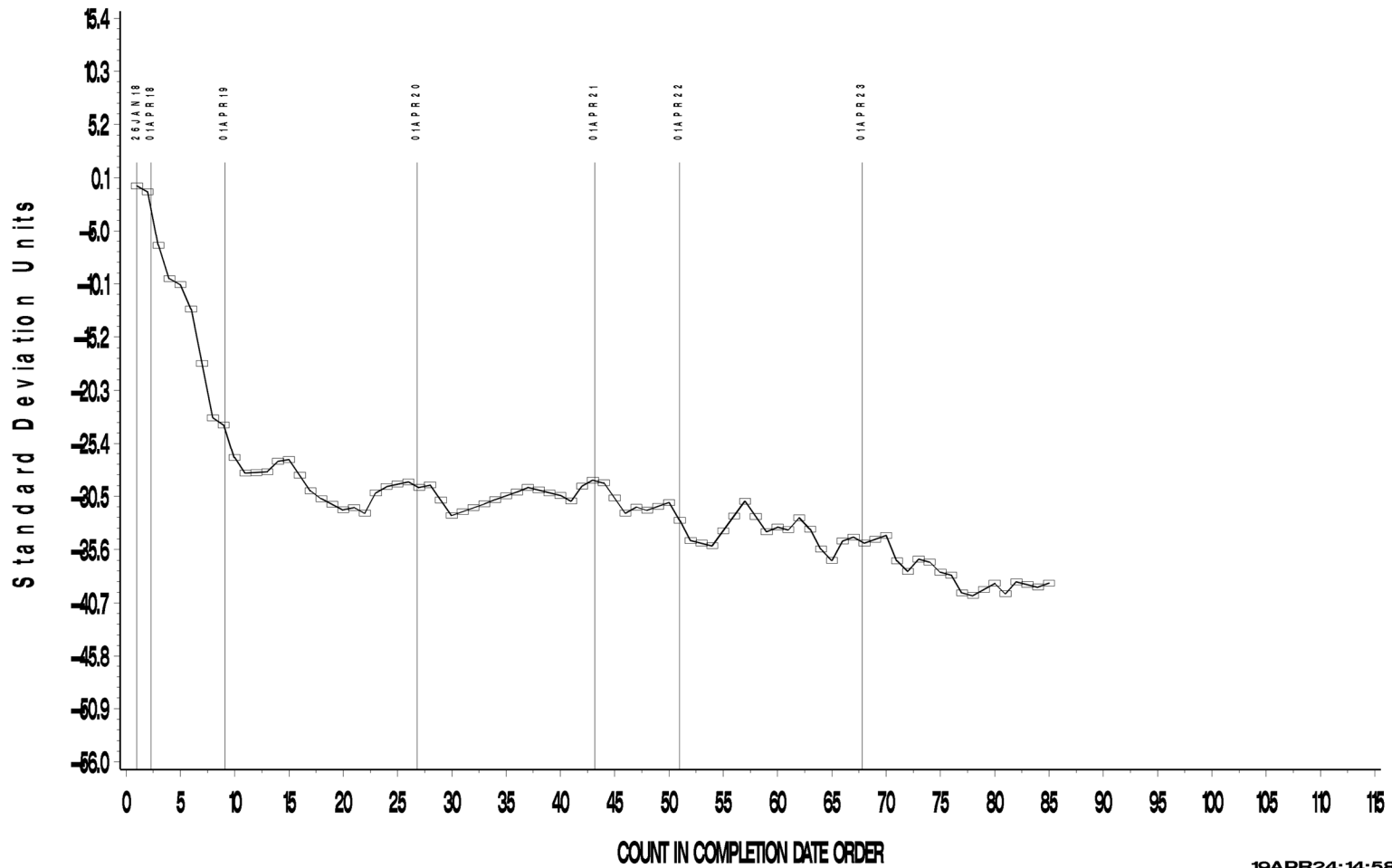
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L-37-1 (D8165)

L-37-1 UNCOATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIBBLING

CUSUM Severity Analysis



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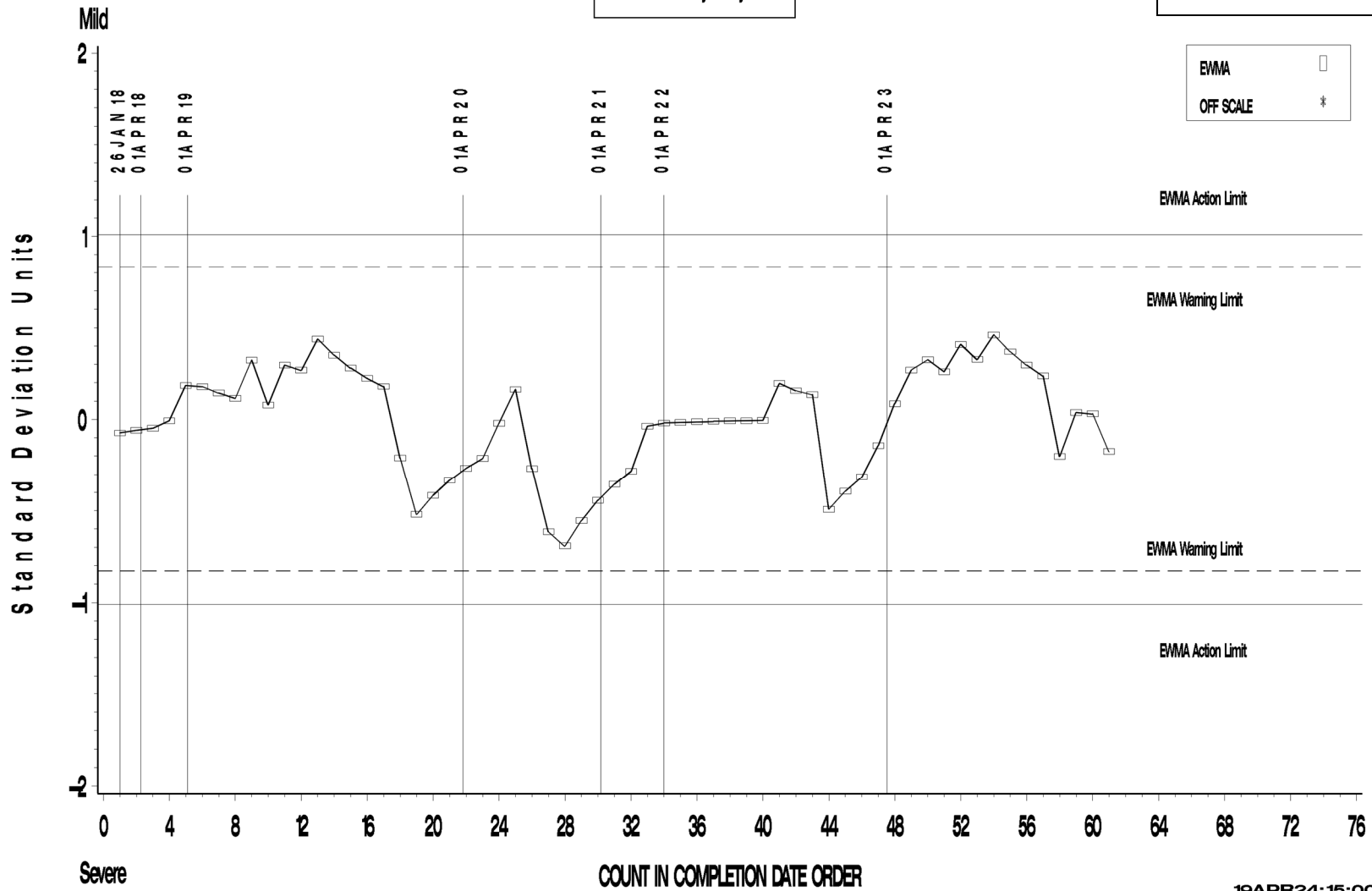
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L-37-1 (D8165)

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

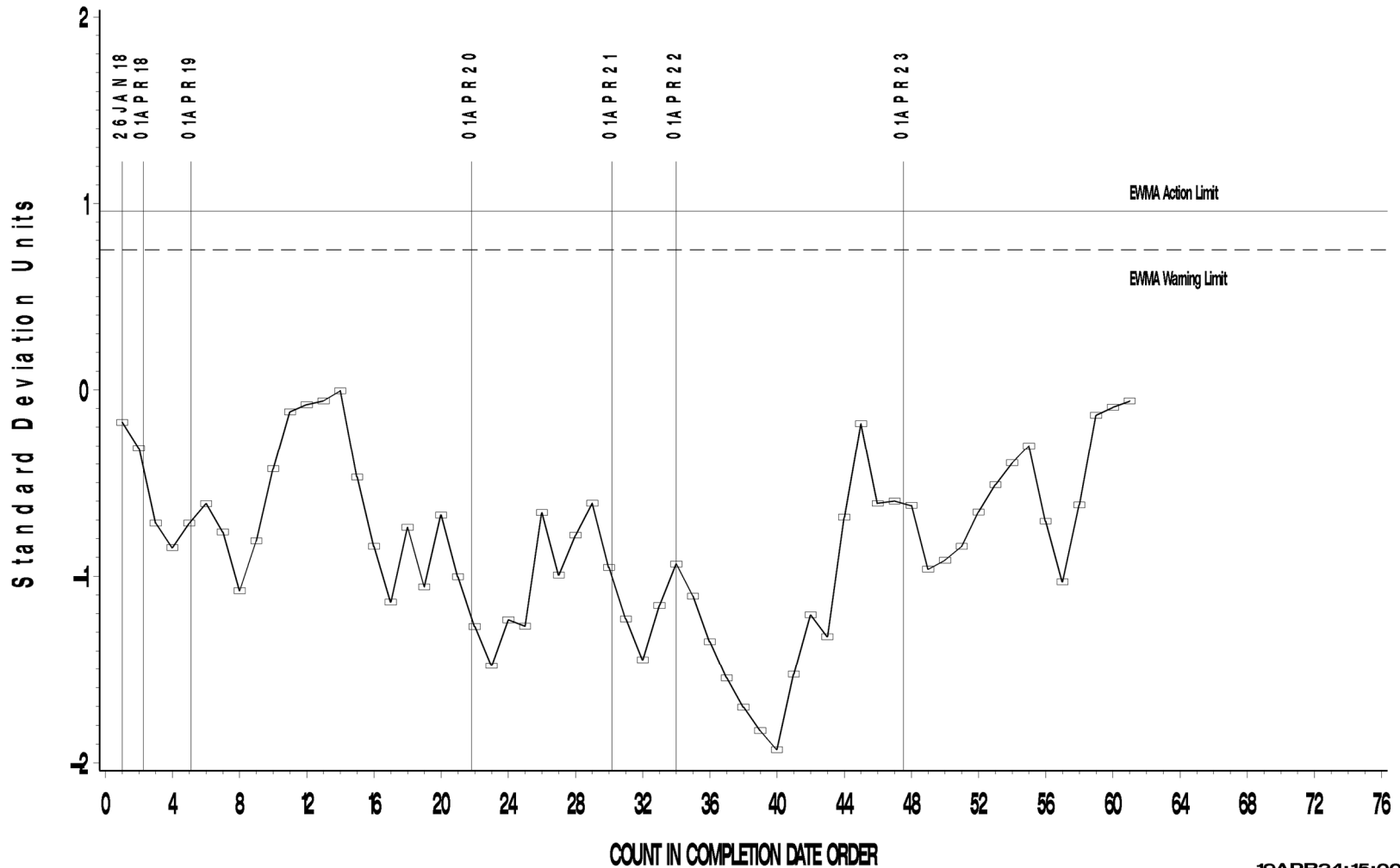


L-37-1 (D8165)

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

LTMS Precision Analysis

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



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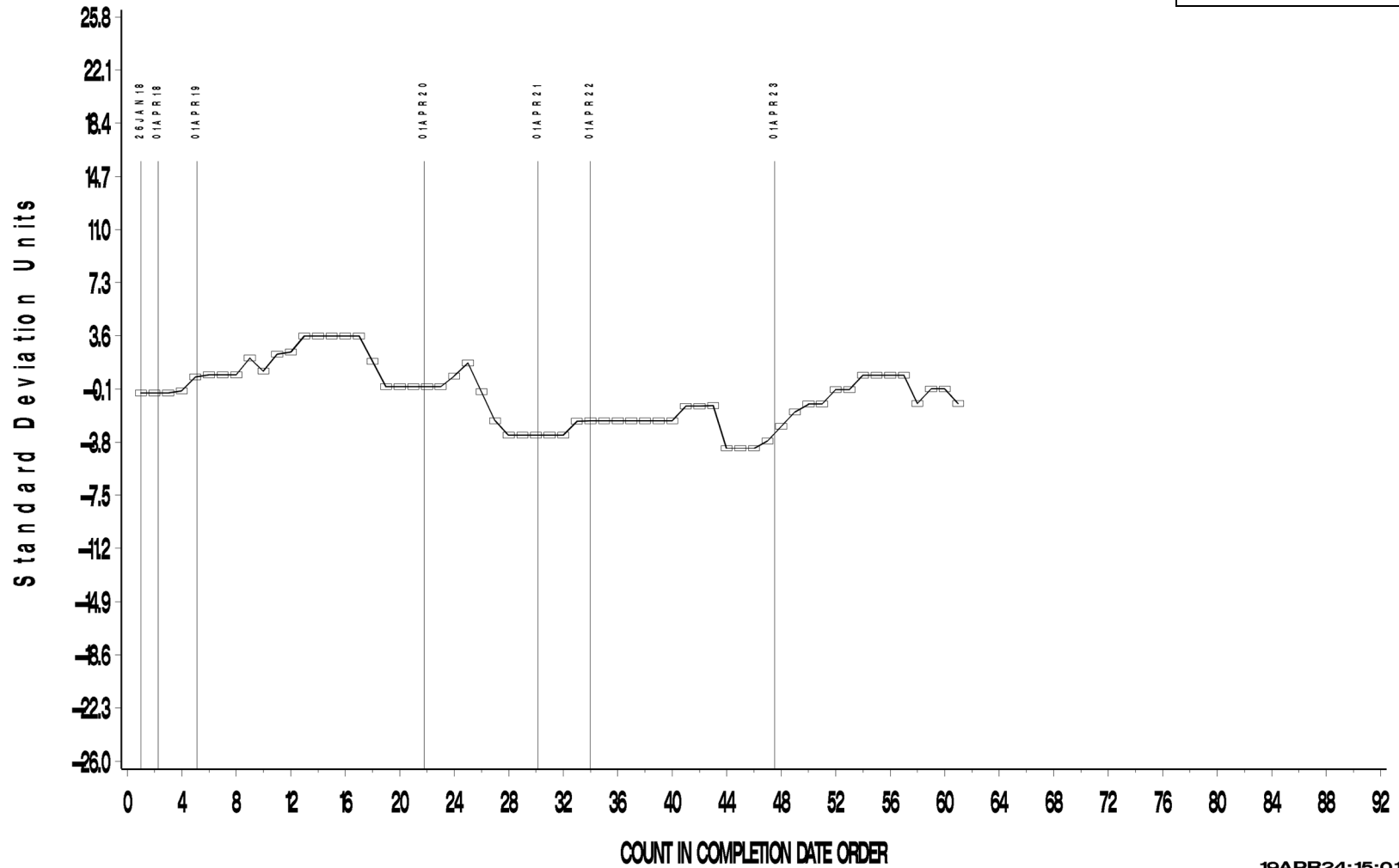
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L-37-1 (D8165)

L-37-1 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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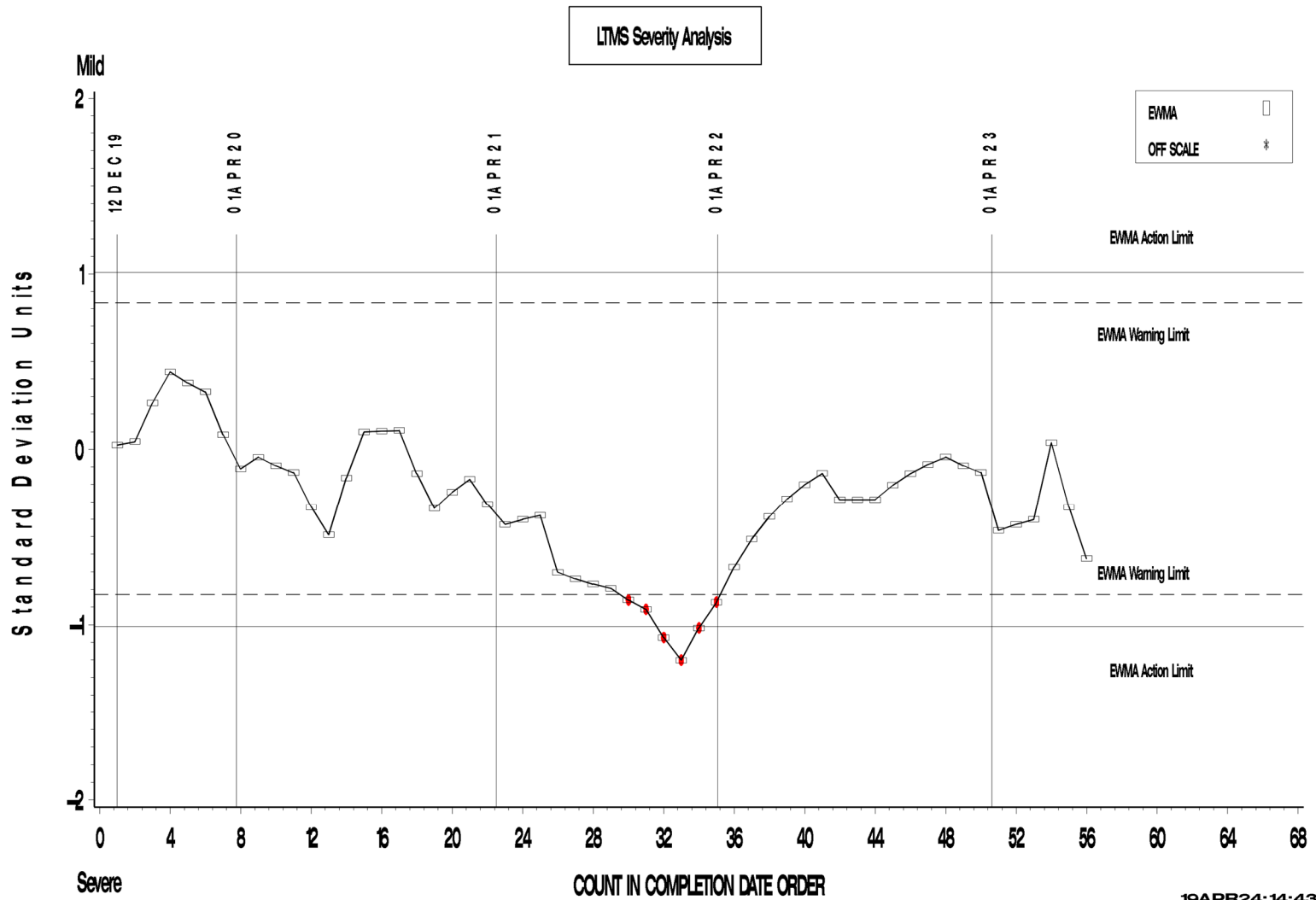
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR



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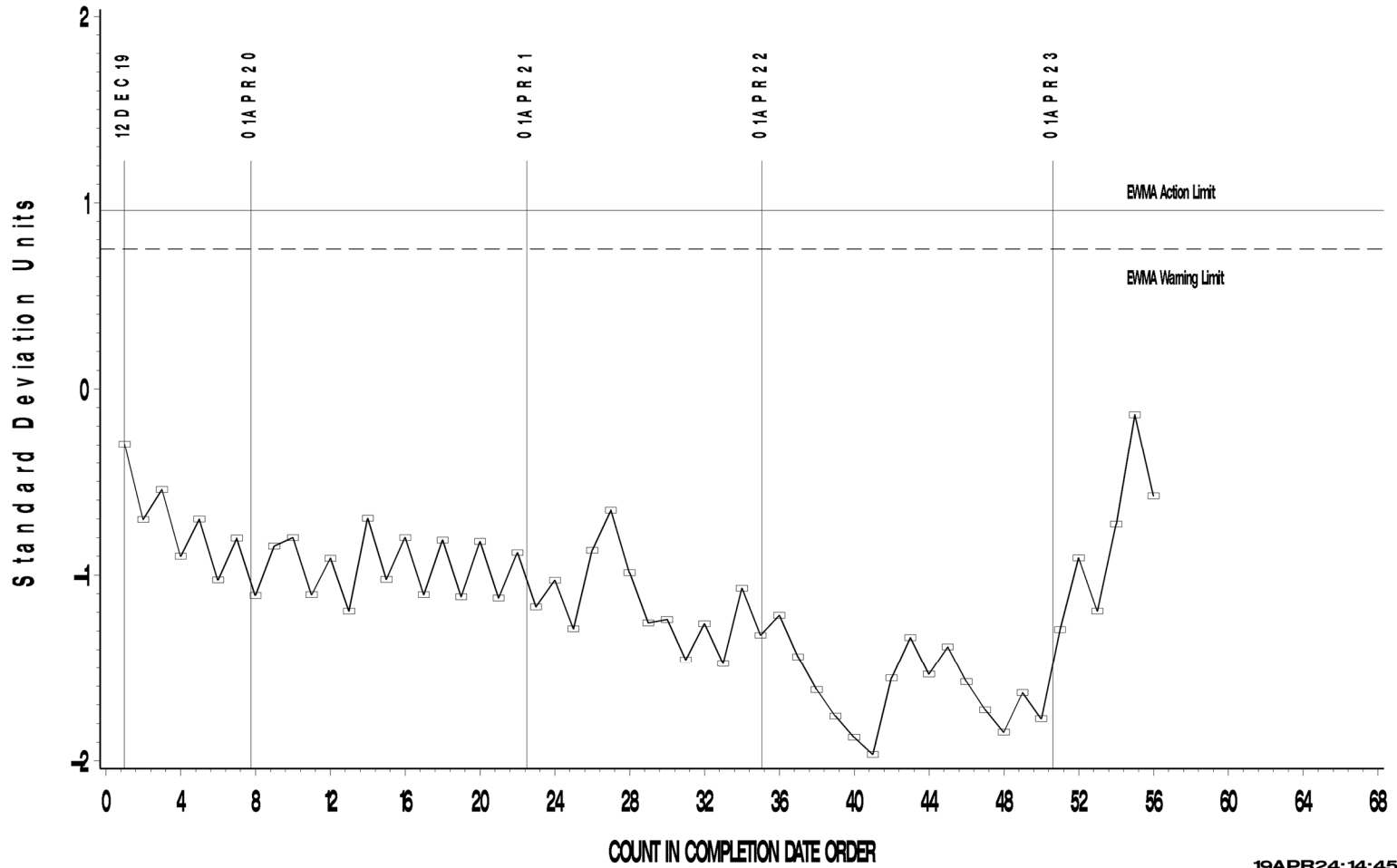
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



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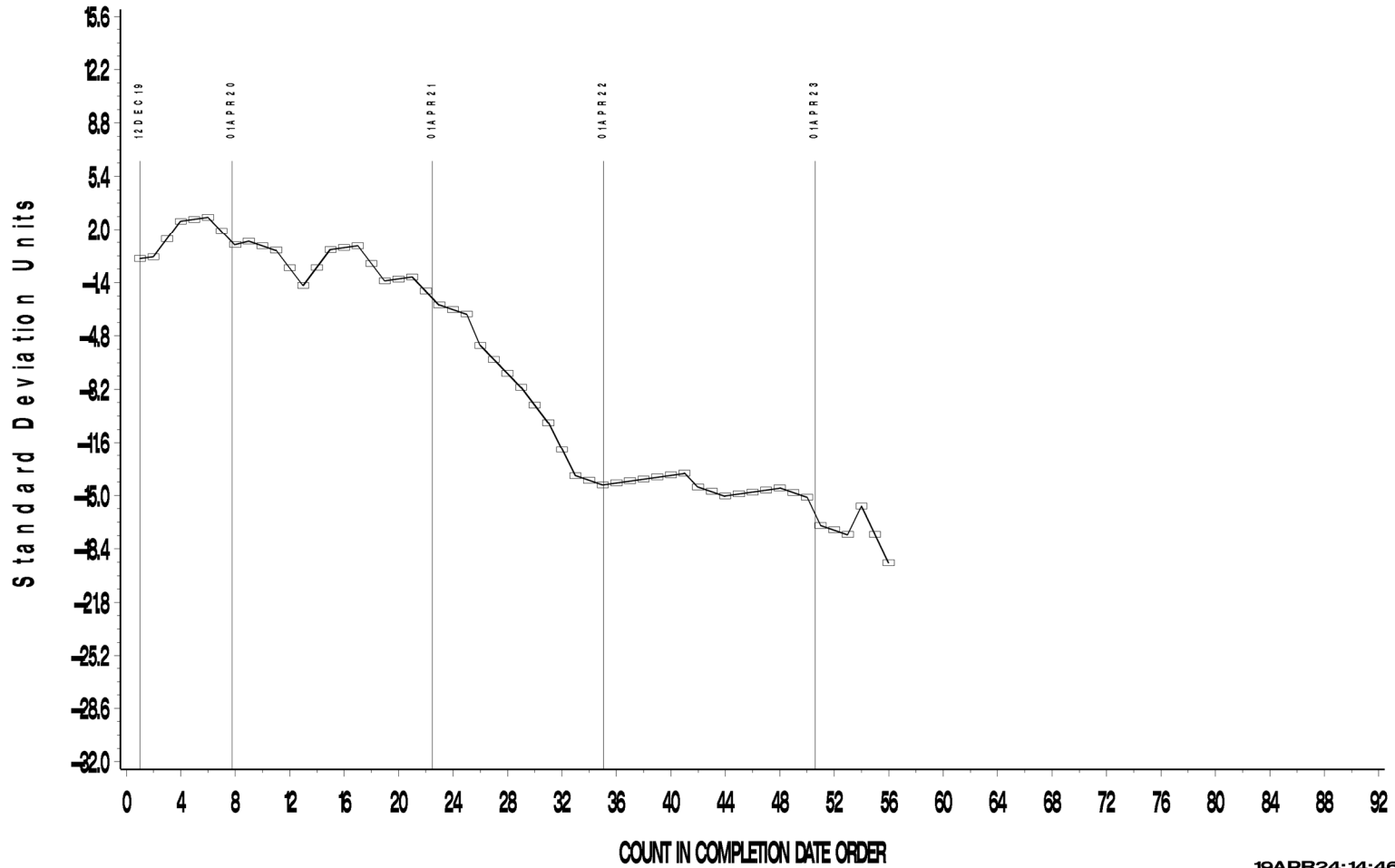
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis



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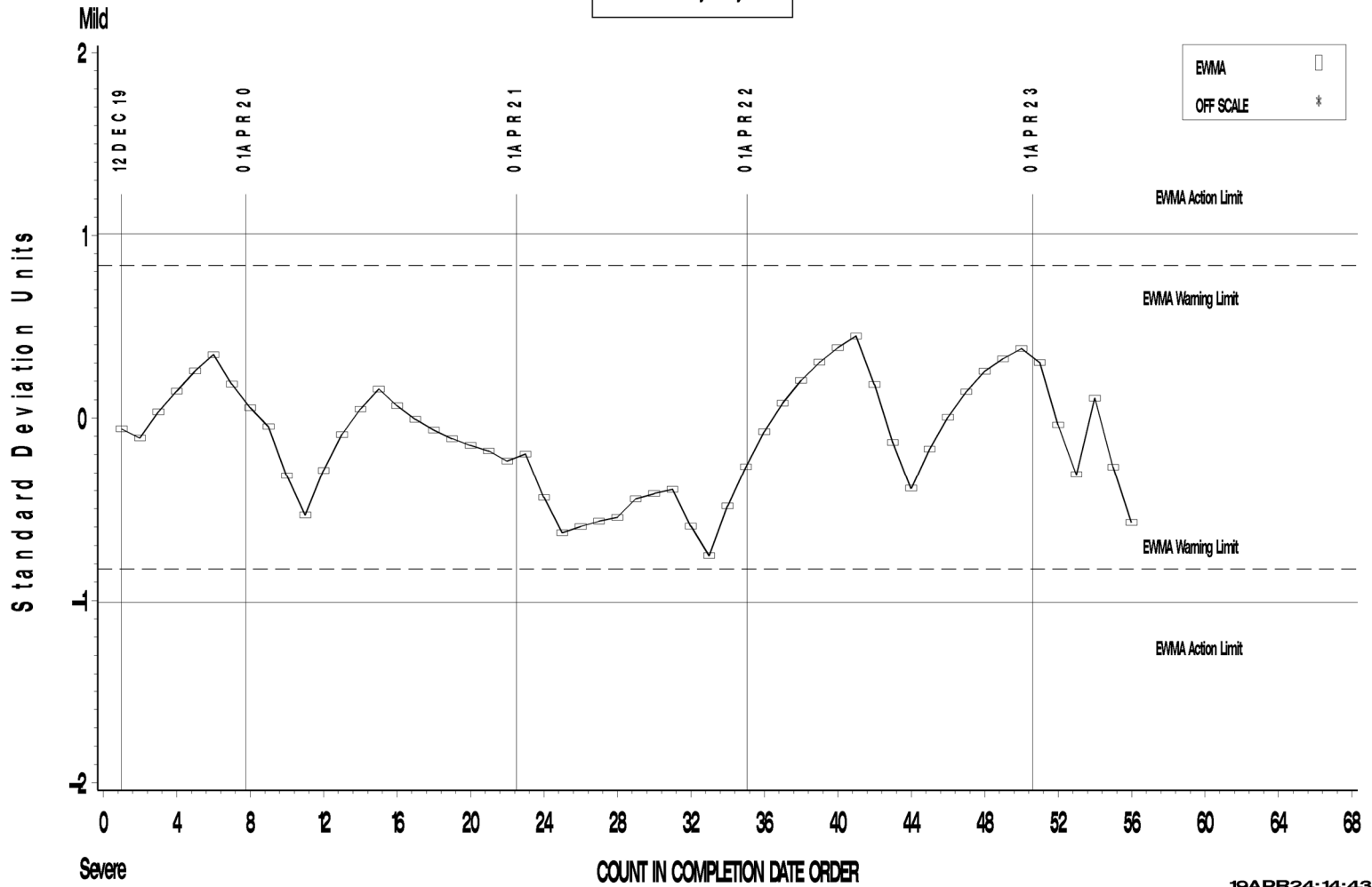
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Severity Analysis



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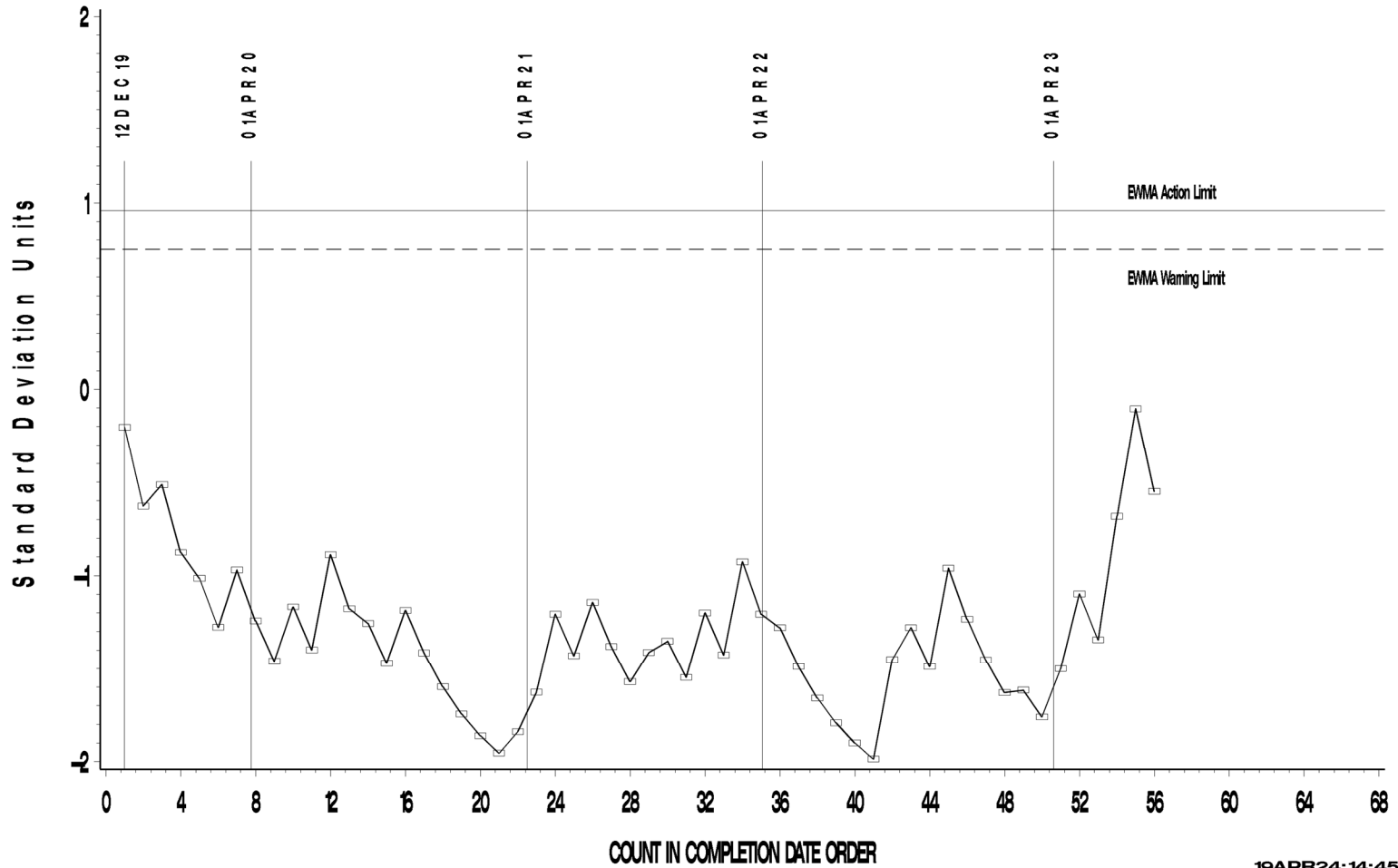
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Precision Analysis



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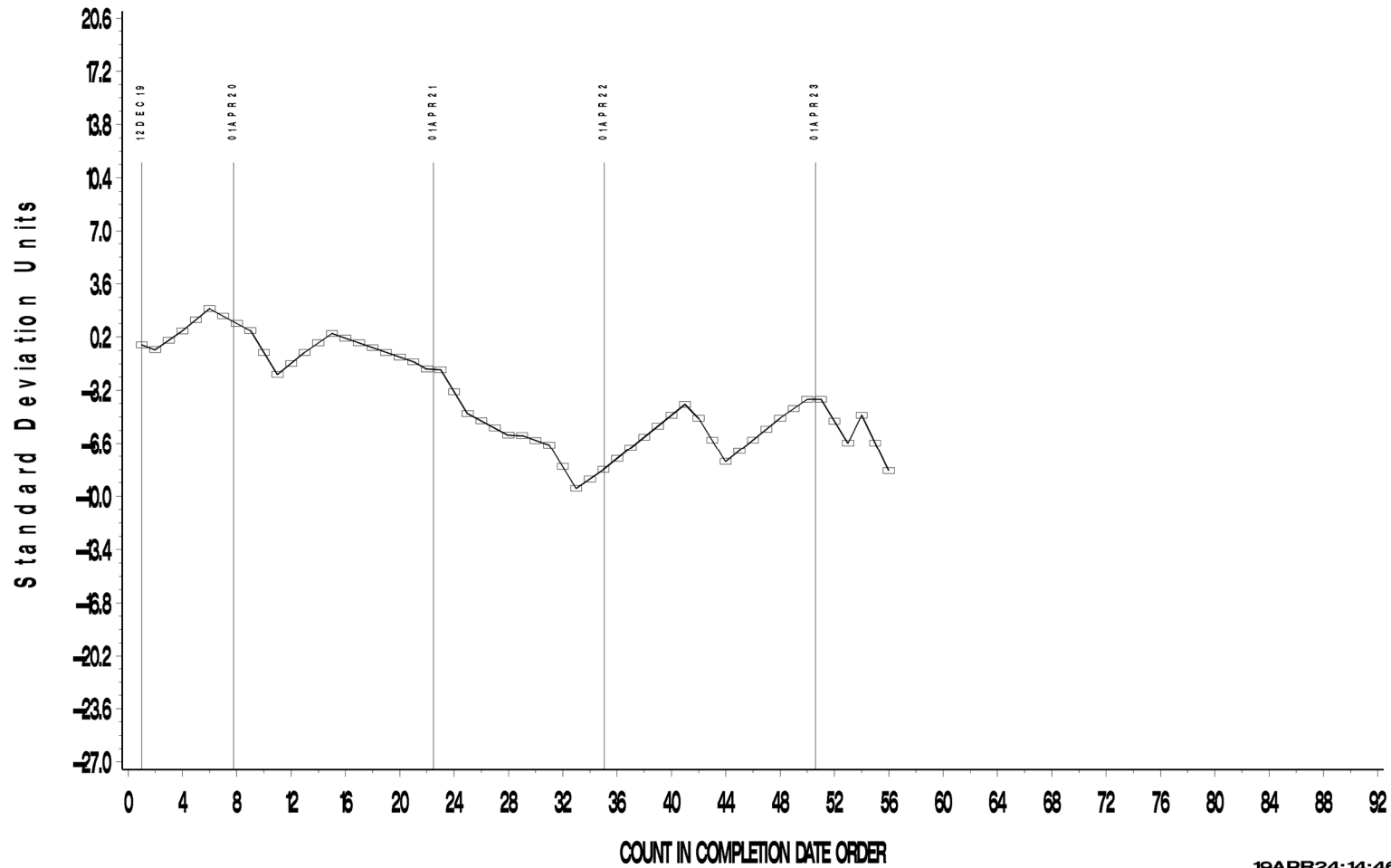
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

CUSUM Severity Analysis



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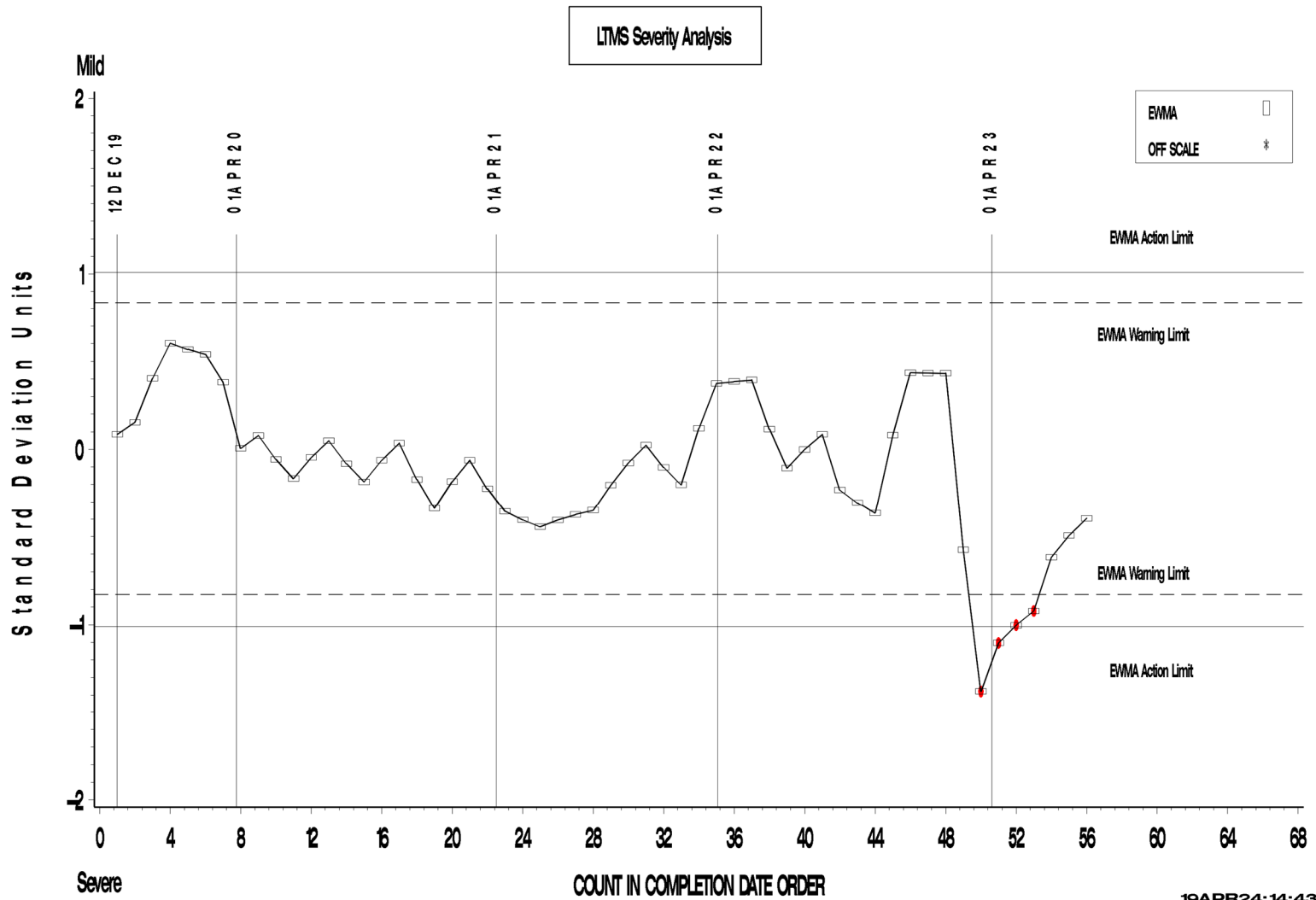
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

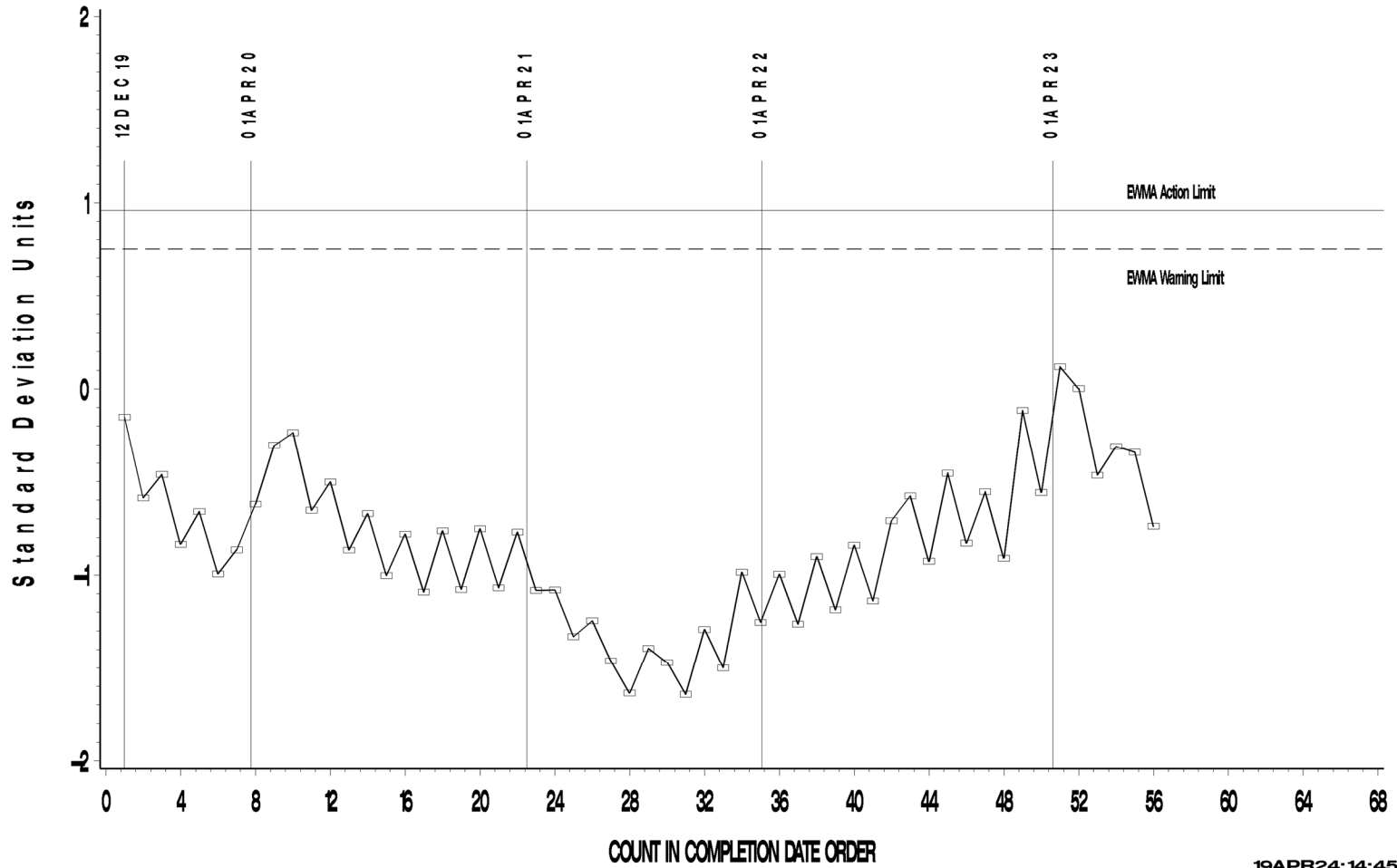


L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIBBLING

LTMS Precision Analysis



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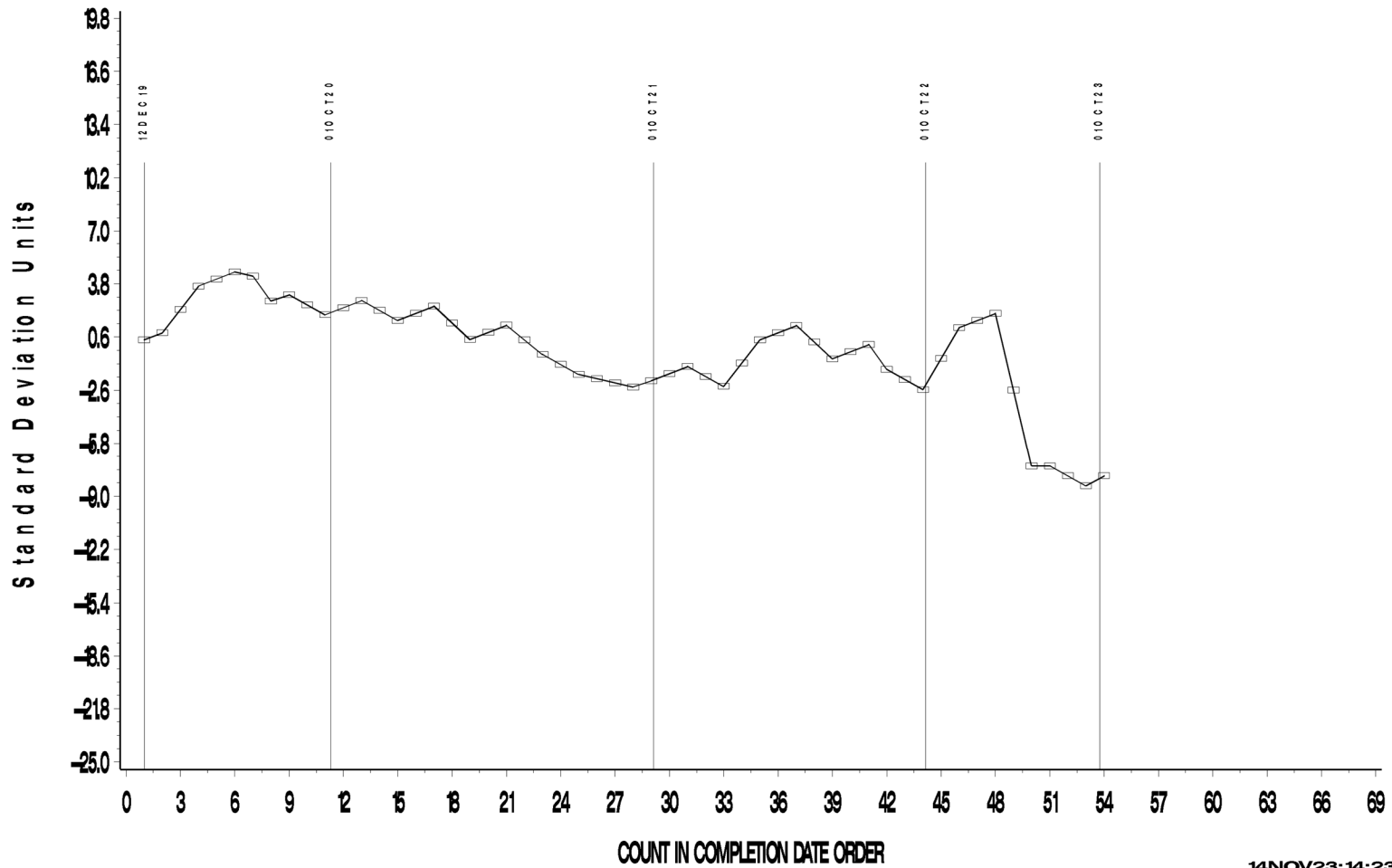
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L-37-1 (D8165)

L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIBBLING

CUSUM Severity Analysis



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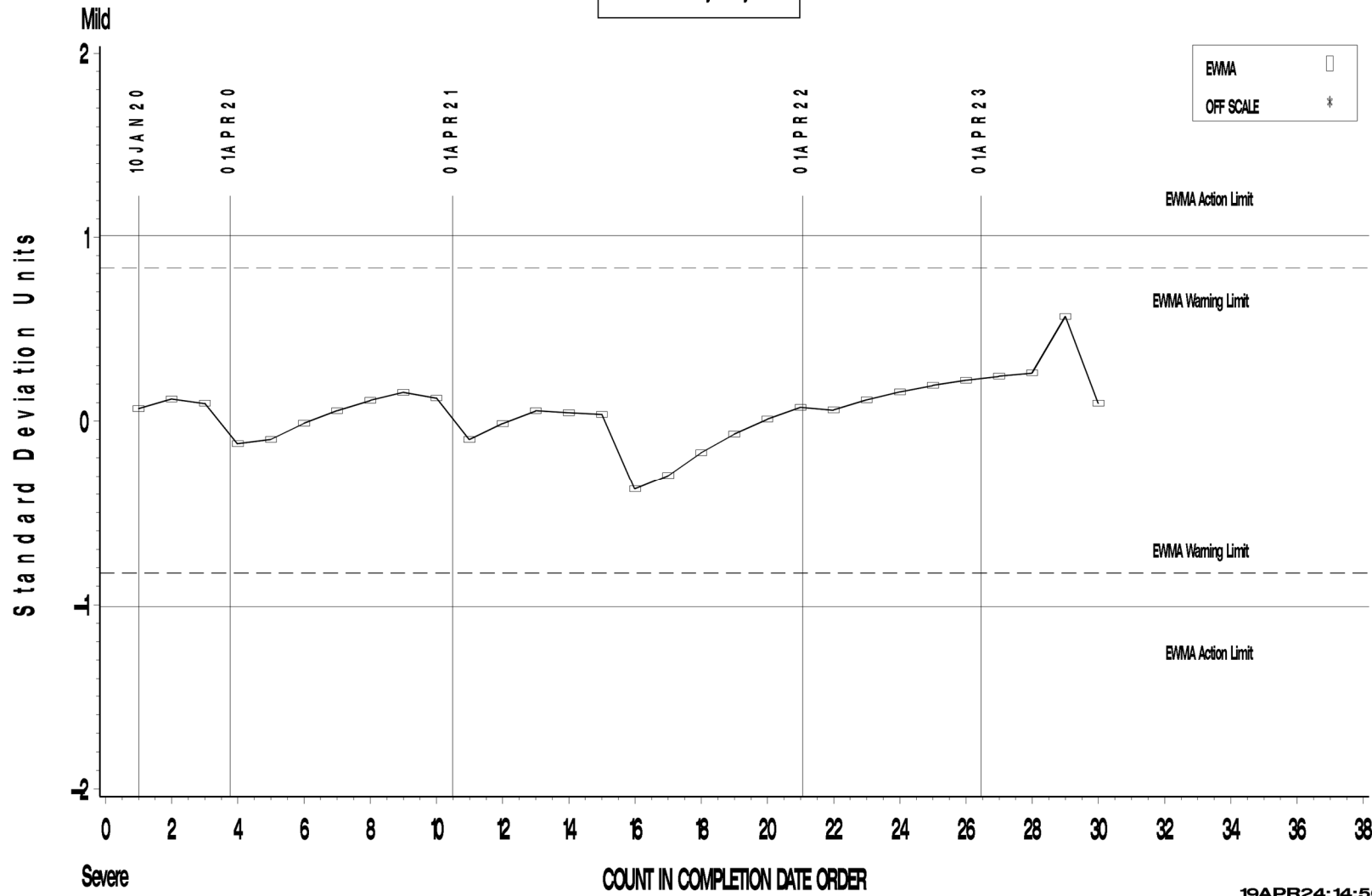
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L-37-1 (D8165)

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.

LIMS Severity Analysis



EWMA □
 OFF SCALE *

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

Severe

COUNT IN COMPLETION DATE ORDER

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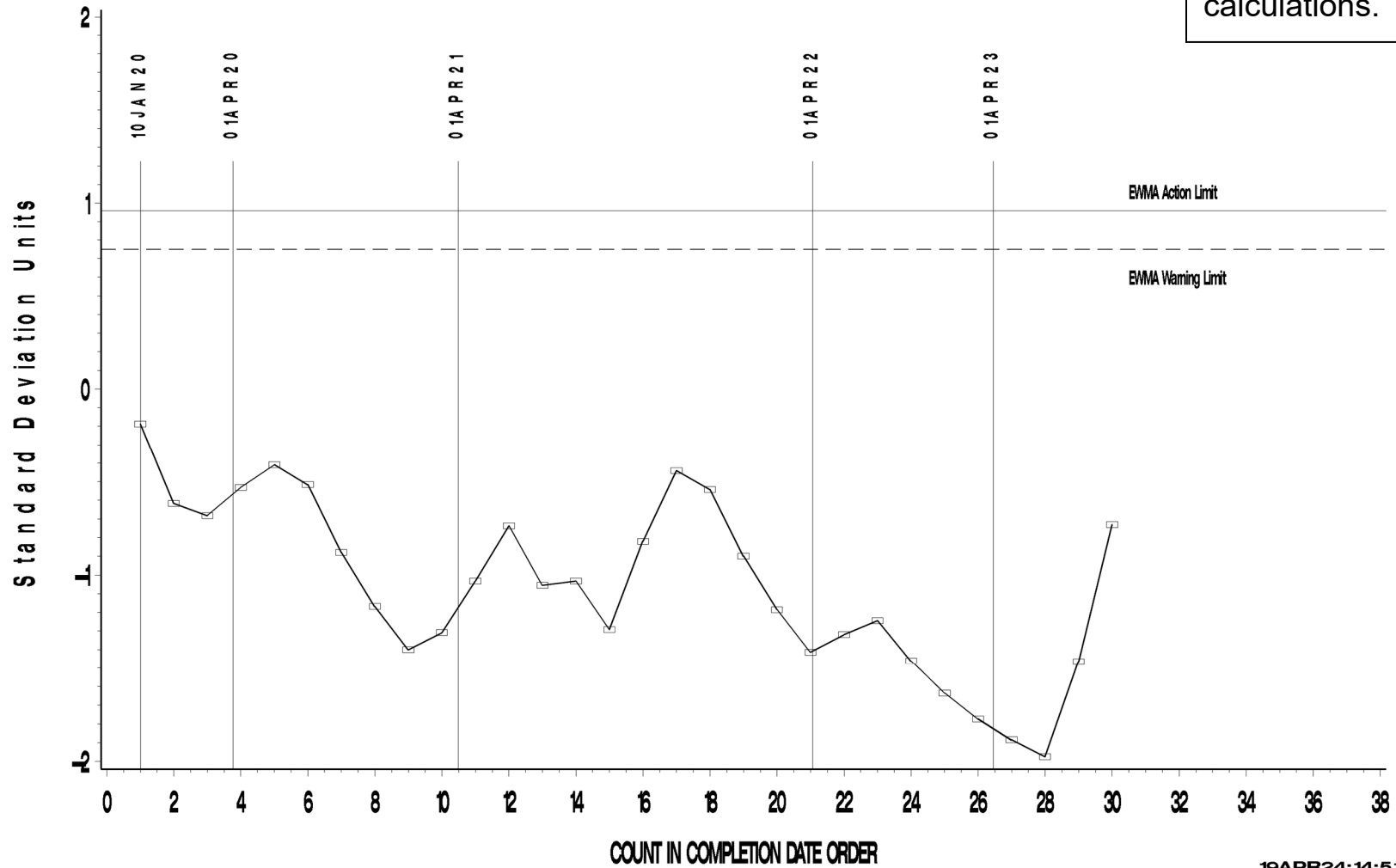
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L-37-1 (D8165)

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

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LTMS Precision Analysis



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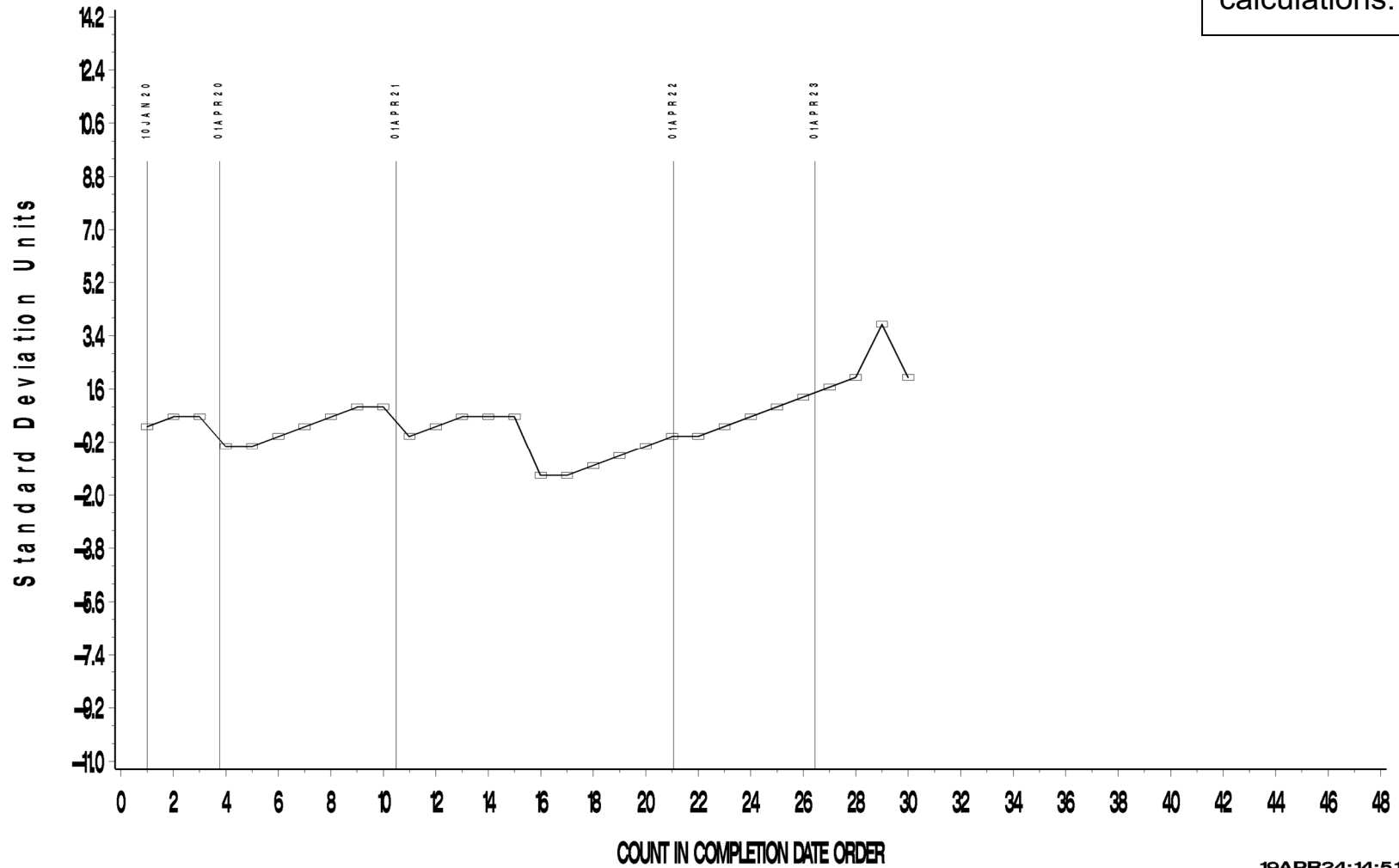
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L-37-1 (D8165)

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
Feb 7, 2024	IL 24-01	Removal of Canadian referencing requirements, and correction of typographical error.

LAB VISITS

One L-37-1 lab visit was conducted during this reporting period. No conflicts with the test procedure were observed during this visit.

L-37-1 (D8165)

INFORMATION LETTERS

IL-24-01 was issued during this reporting period. This information letter corrected a typographical error and removed the requirements for a Canadian reference.

LTMS DEVIATIONS

No LTMS deviations were written this report period.

L-37-1 (D8165)

STATUS OF REFERENCE OIL SUPPLY

Oil	Tests	Year	Blend Quantit	TMC Inventory	Estimated Life	Comment
134-1	L-37-1	2015	220	102	8 years	
152-2	L-37-1	2009	275	38.3	2 years	
155-1	L-33-1, L-37-1, L-60-1, HTCT, OSCT	2010	495	27.14	1.5 years	
155-2	L-33-1, L-37-1, L-60-1, HTCT, OSCT	2020	265	208	6 years	

Oil 155-1/155-2 is also used in other test areas (L-33-1, L-60-1, and HTCT).

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