



Test Monitoring Center

@ Carnegie Mellon University
6555 Penn Avenue, Pittsburgh, PA 15206, USA

<http://astmtmc.cmu.edu>
412-365-1000

MEMORANDUM: 19-004
DATE: April 8, 2019
TO: Robert Slocum, Chairman, L-37 Surveillance Panel
FROM: Dylan Beck *Dylan Beck*
SUBJECT: L-37 Testing from November 1, 2018 through March 31, 2019

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

DJB/djb/mem19-004.djb.doc

cc: Frank Farber
Jeff Clark

L-37 Surveillance Panel

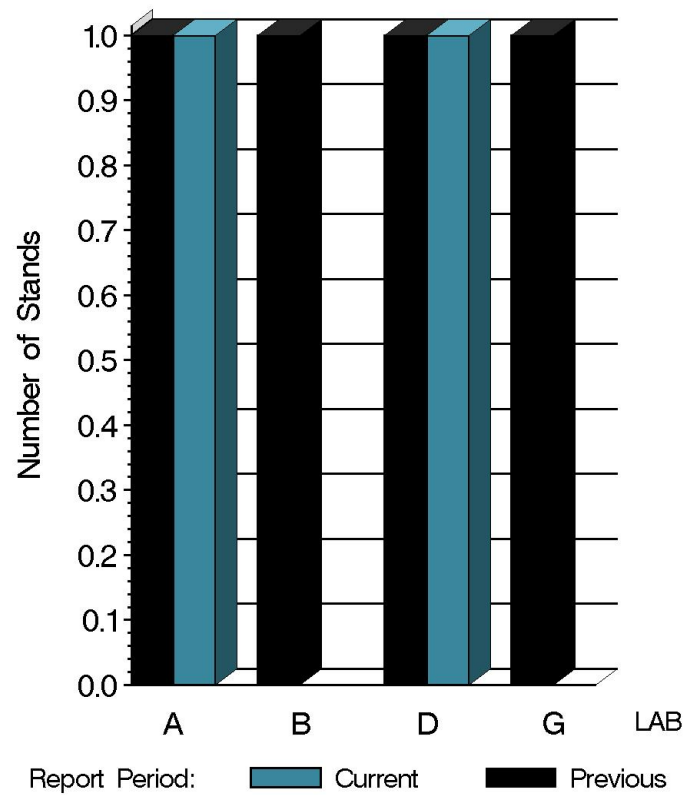
<http://www.astmtmc.cmu.edu/ftp/docs/gear/l37/semiannualreports/l37-04-2019.pdf>

Distribution: email

L-37 (D6121)

	Reporting Data	Calibrated on 3-31-19
Number of Labs	2	2
Number of Stands	2	2

BY-LAB STAND
DISTRIBUTION



11:40:16 02APR2019

L-37 (D6121)

Test Distribution by Oil and Validity

							Totals	
		134	134-1	152-2	155	155-1	Last Period	This Period
Accepted for calibration	AC	0	1	1	0	0	6	2
Rejected (Mild)	OC	0	0	0	0	0	0	0
Rejected (Severe)	OC	0	0	0	0	0	1	0
Rejected (Precision)	OC	0	0	0	0	0	0	0
Operationally invalid	LC	0	0	0	0	0	0	0
Aborted run	XC	0	0	0	0	0	0	0
Acceptable info run	NI	0	0	0	0	0	0	0
Aborted info run	XI	0	0	0	0	0	0	0
Total		0	1	1	0	0	7	2

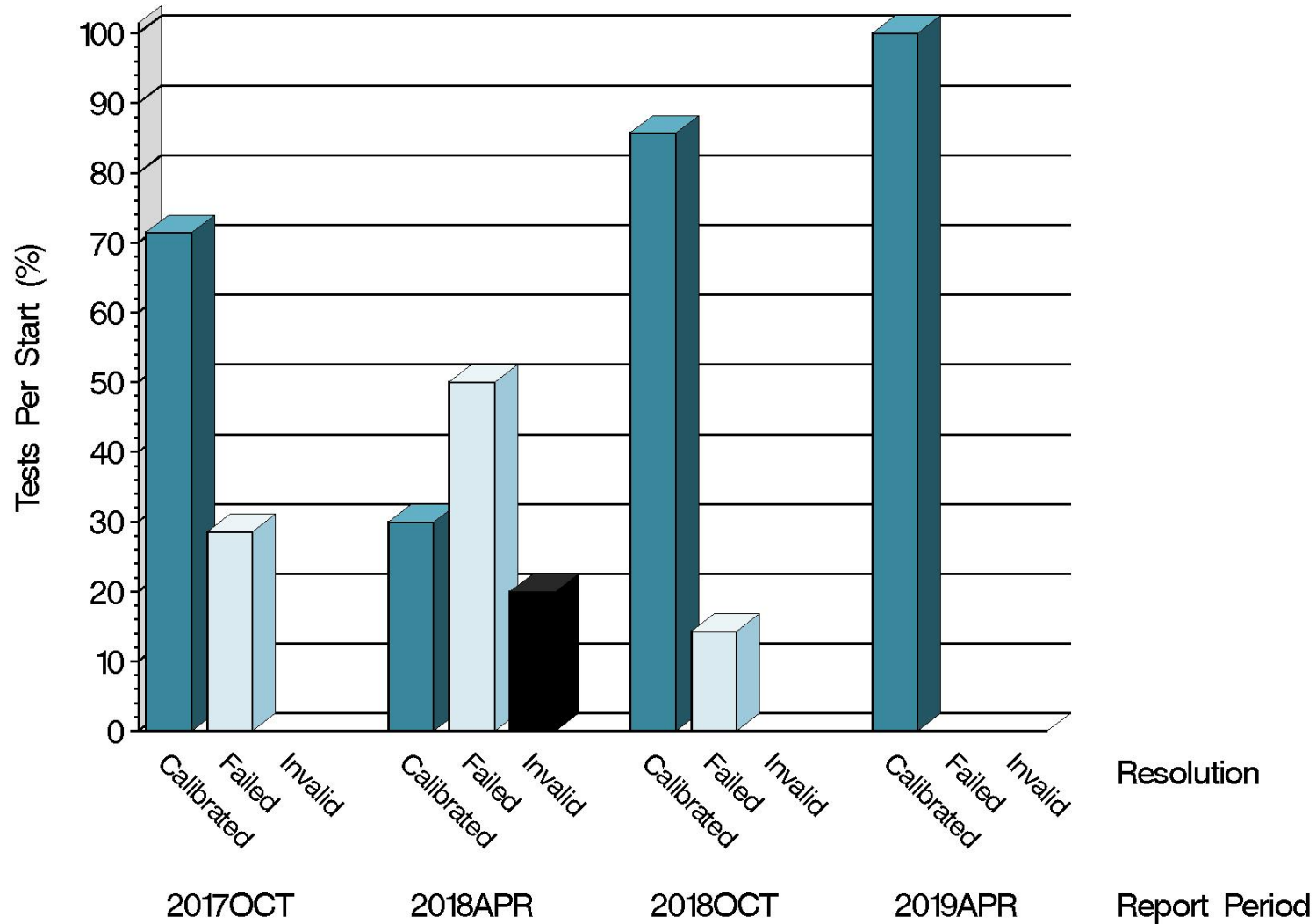
L-37 (D6121)

Calibration Attempt Detail

	Gear Batch	Acceptable	Failed	Total
LUBRITED	V1L500/P4T813	0	0	0
	V1L528/P4T883A	1	0	1
	Total	0	0	0
NONLUBRITED	V1L500/P4T813	0	0	0
	V1L528/P4T883A	1	0	1
	Total	2	0	2

L-37 (D6121)

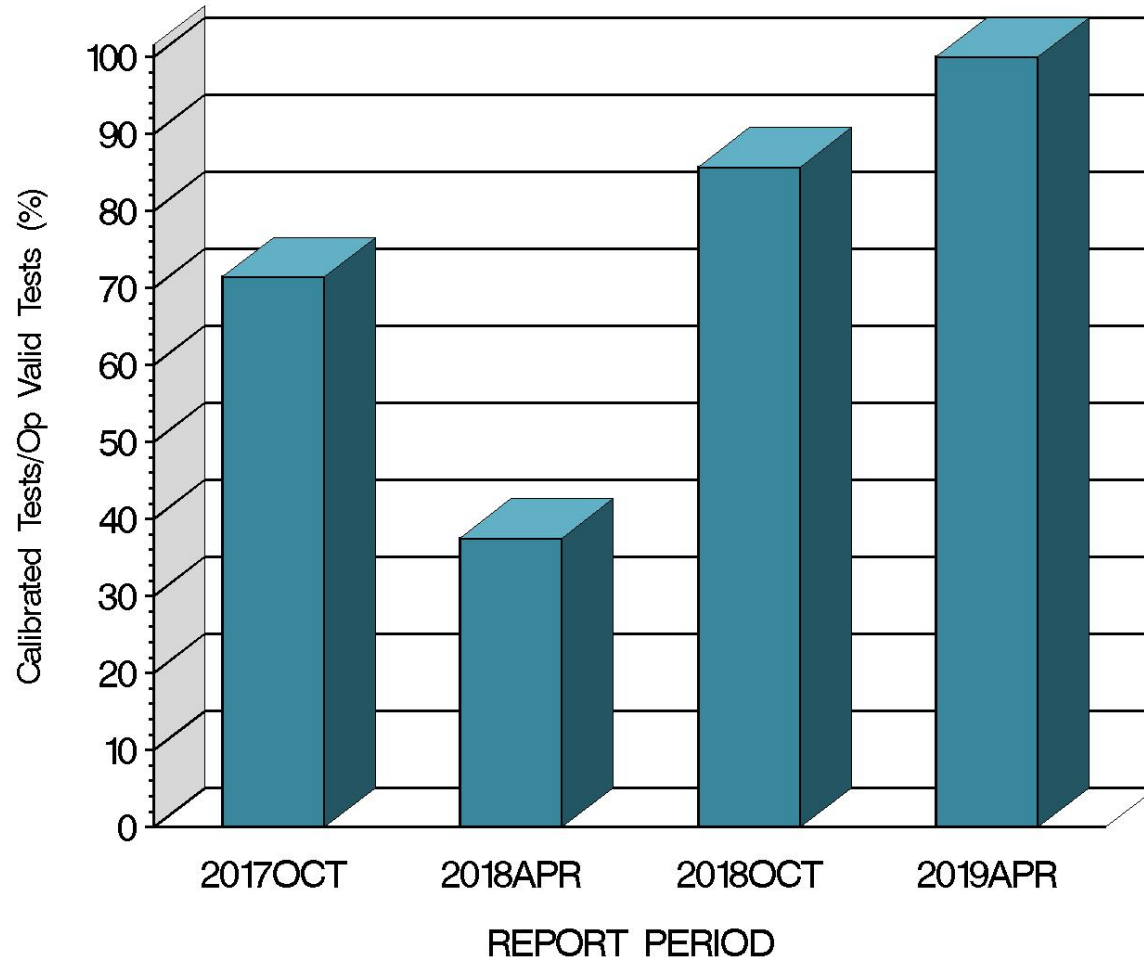
CALIBRATION ATTEMPT SUMMARY



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OPERATIONALLY VALID TESTS
MEETING ACCEPTANCE CRITERIA



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L-37 (D6121)

CAUSES FOR LOST TESTS

		Oil					Validity			Loss Rate		
Lab	Cause	134	134-1	152-2	155	155-1	XC	LC	XI	Lost	Starts	%
	No test lost this period									0	2	0
	Lost	0	0	0	0	0	0	0	0			
	Starts	0	1	1	0	0	2	2	2			
	%	0%	0%	0%	0%	0%	0%	0%	0%			

L-37 (D6121)

GEAR BATCH SEVERITY

LUBRITED HARDWARE						
Parameter	Gear Batch	N	Δ/s	s^A	Overall Δ/s	Overall Shift (in Merits) ^B
RIDG	V1L528/P4T883A	1	0.283	.	0.283	0.404
RIPP	V1L528/P4T883A	1	0.250	.	0.250	0.119
SPIT	V1L528/P4T883A	1	0.795	.	0.795	0.460
WEAR	V1L528/P4T883A	1	-0.250	.	-0.250	-0.130

^A Because the number of tests completed this period was too small to compute a representative pooled standard deviation, the straight standard deviation is shown.

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

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GEAR BATCH SEVERITY (continued)

NON-LUBRITED HARDWARE						
Parameter	Gear Batch	N	Δ/s	s^A	Overall Δ/s	Overall Shift (in Merits) ^B
RIDG	V1L528/P4T883A	1	-0.137	-	-0.137	-0.091
RIPP	V1L528/P4T883A	1	-0.450	-	-0.450	-0.251
SPIT	V1L528/P4T883A	1	0.469	-	0.469	0.397
WEAR	V1L528/P4T883A	1	0.555	-	0.555	0.396

^A Because the number of tests completed this period was too small to compute a representative pooled standard deviation, the straight standard deviation is shown.

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

L-37 (D6121)

LAB SEVERITY

LUBRITED HARDWARE AVERAGE Δ/s						
Gear Batch	Lab	N	RIDG	RIPP	SPIT	WEAR
V1L528/P4T883A	A	1	0.283	0.250	0.795	-0.250

NON-LUBRITED HARDWARE AVERAGE Δ/s						
Gear Batch	Lab	N	RIDG	RIPP	SPIT	WEAR
V1L528/P4T883A	D	1	-0.137	-0.450	0.469	0.555

L-37 (D6121)

SUMMARY OF SEVERITY & PRECISION

Severity

Nonlubrited – RIDG started this period exceeding the action limit, but has since returned within the limits.

Lubrited – WEAR and SPIT exceeded the action limit this period. WEAR is trending in the right direction while SPIT remains well outside the limits.

L-37 (D6121)

SUMMARY OF SEVERITY & PRECISION (cont.)

Precision

Nonlubrited – All parameters within limits during this period.

Lubrited – WEAR, and SPIT started this period exceeding the action limit for precision. WEAR returned within the limit during this period, but SPIT remains outside the action limit.

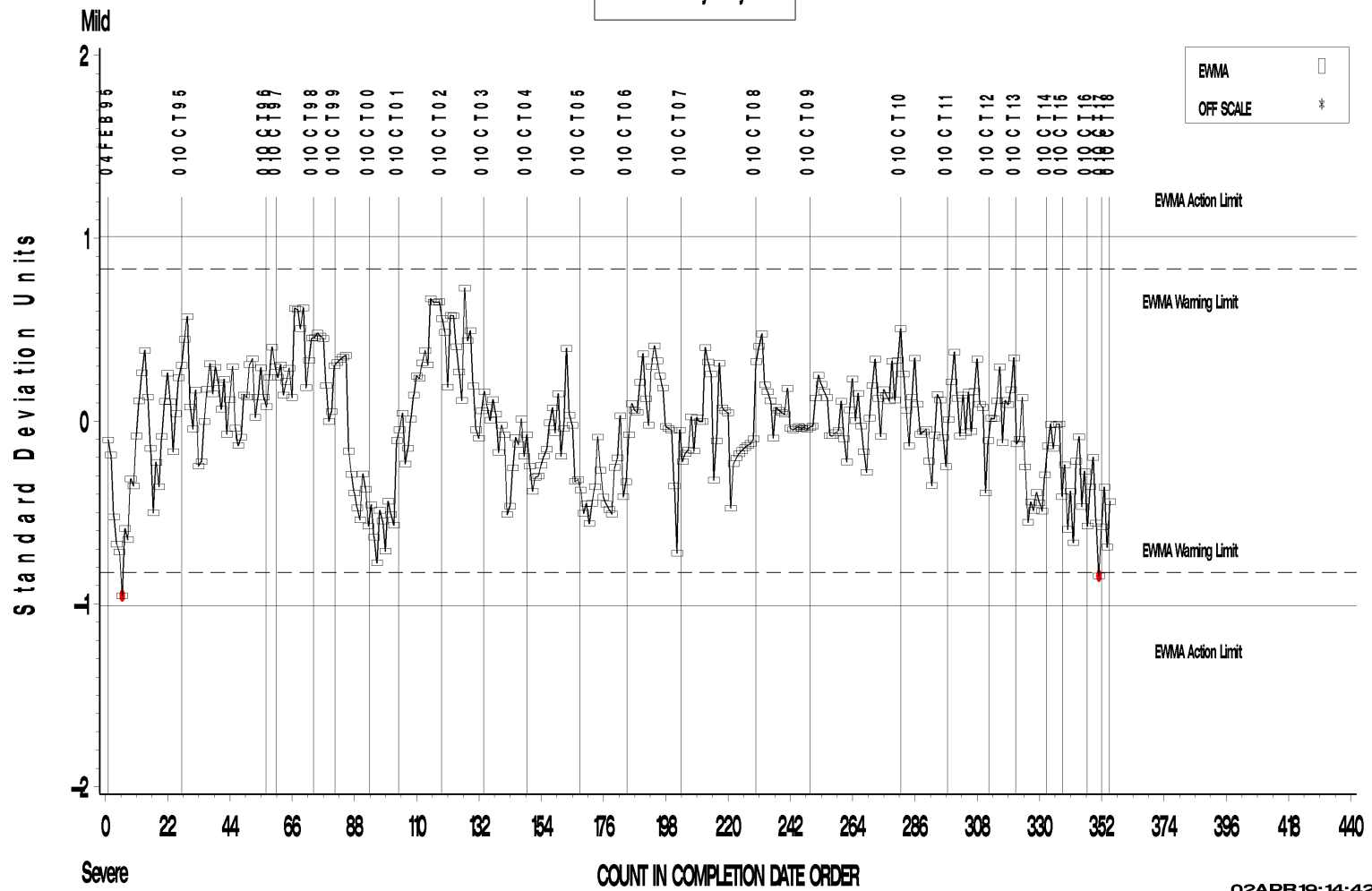
Industry control charts follow.

L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Severity Analysis

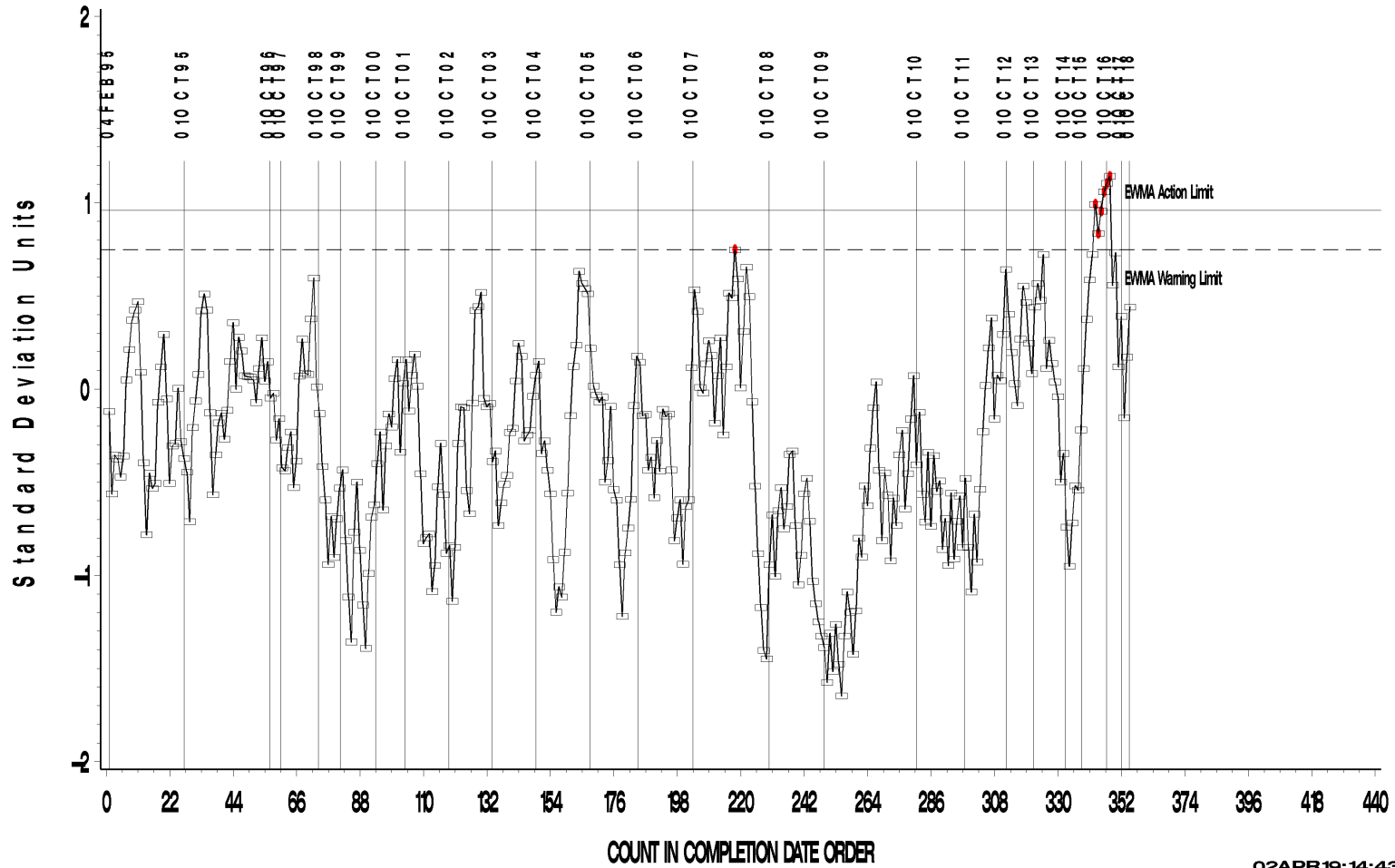


L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



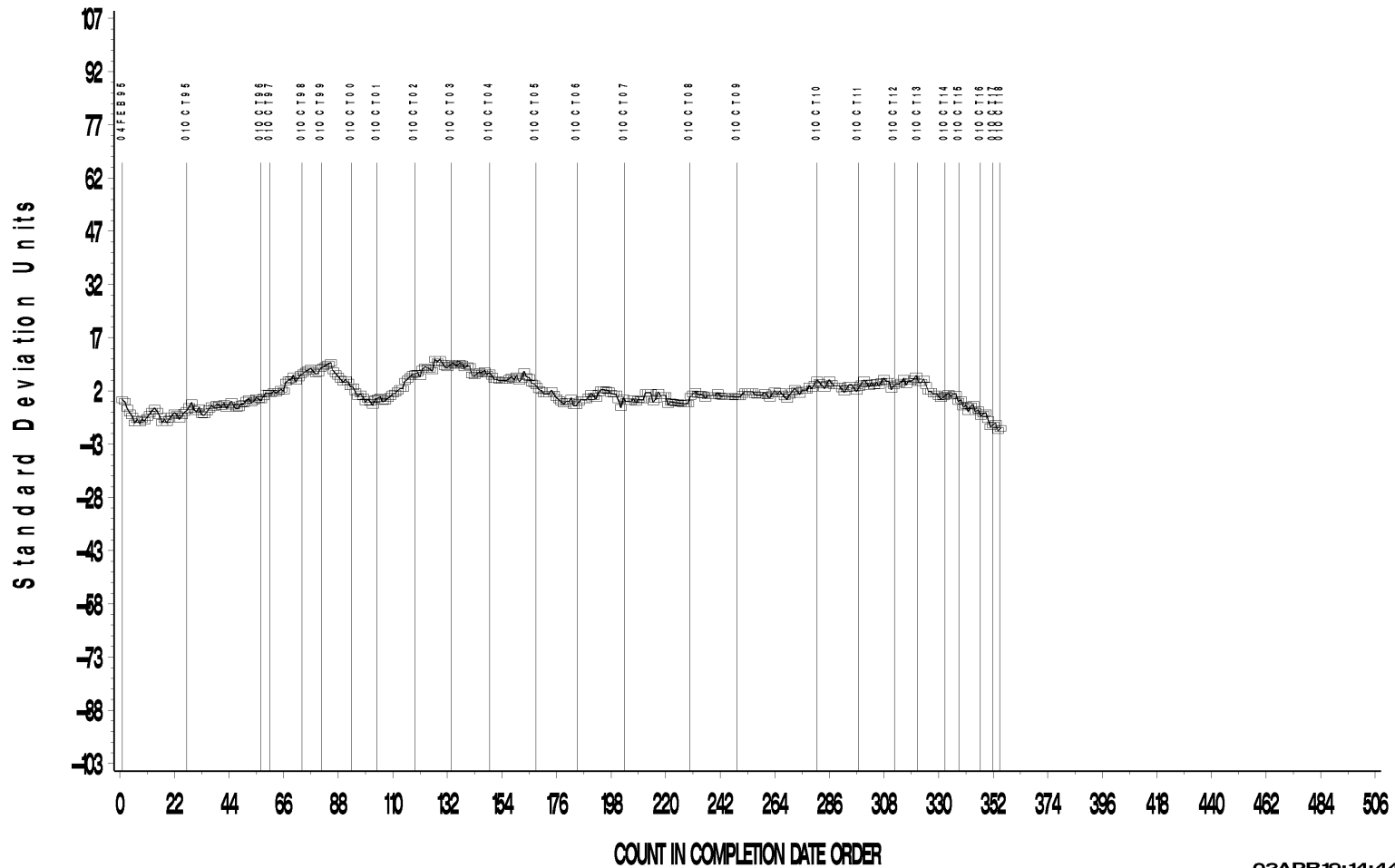
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis

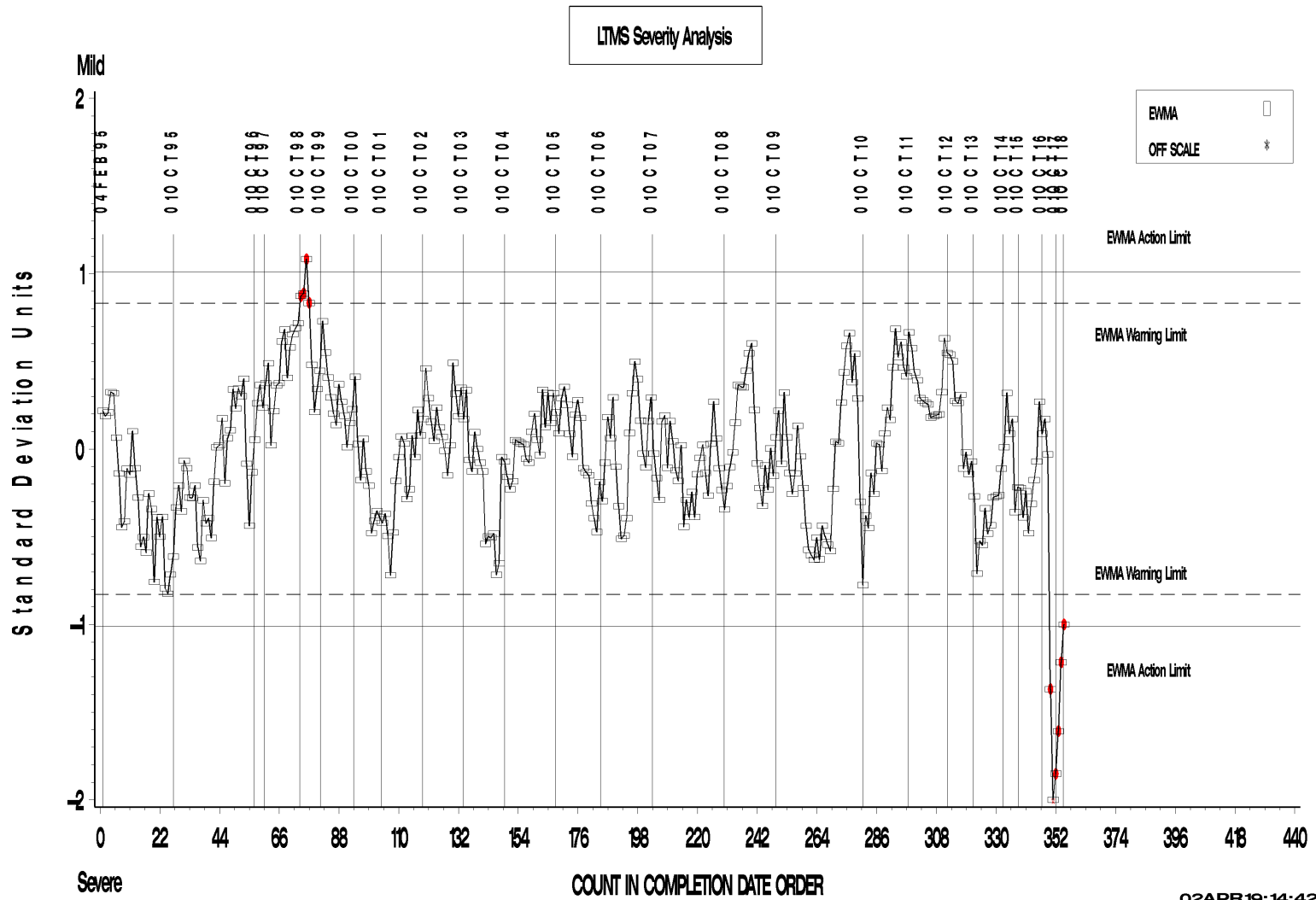


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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

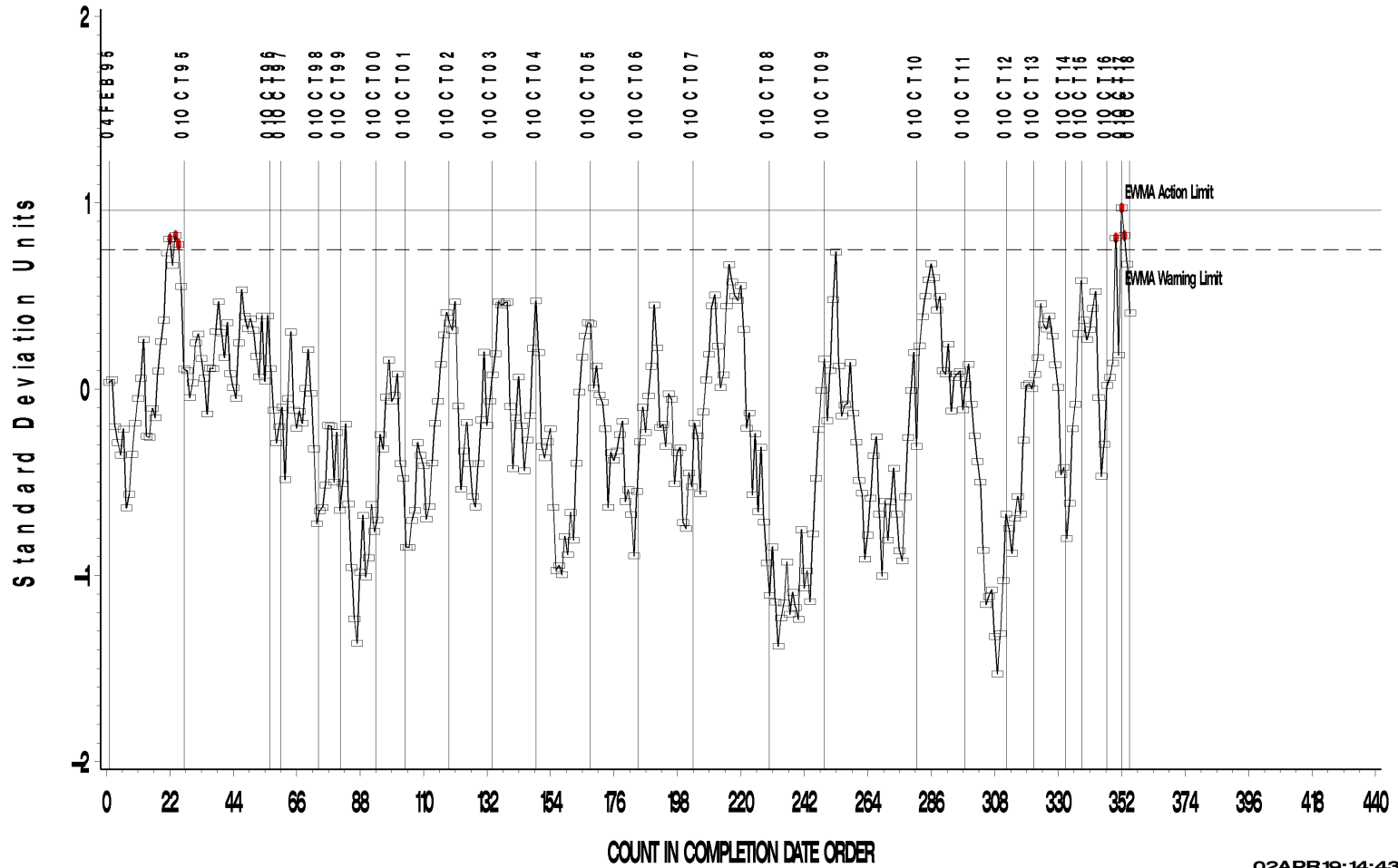


L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTVS Precision Analysis

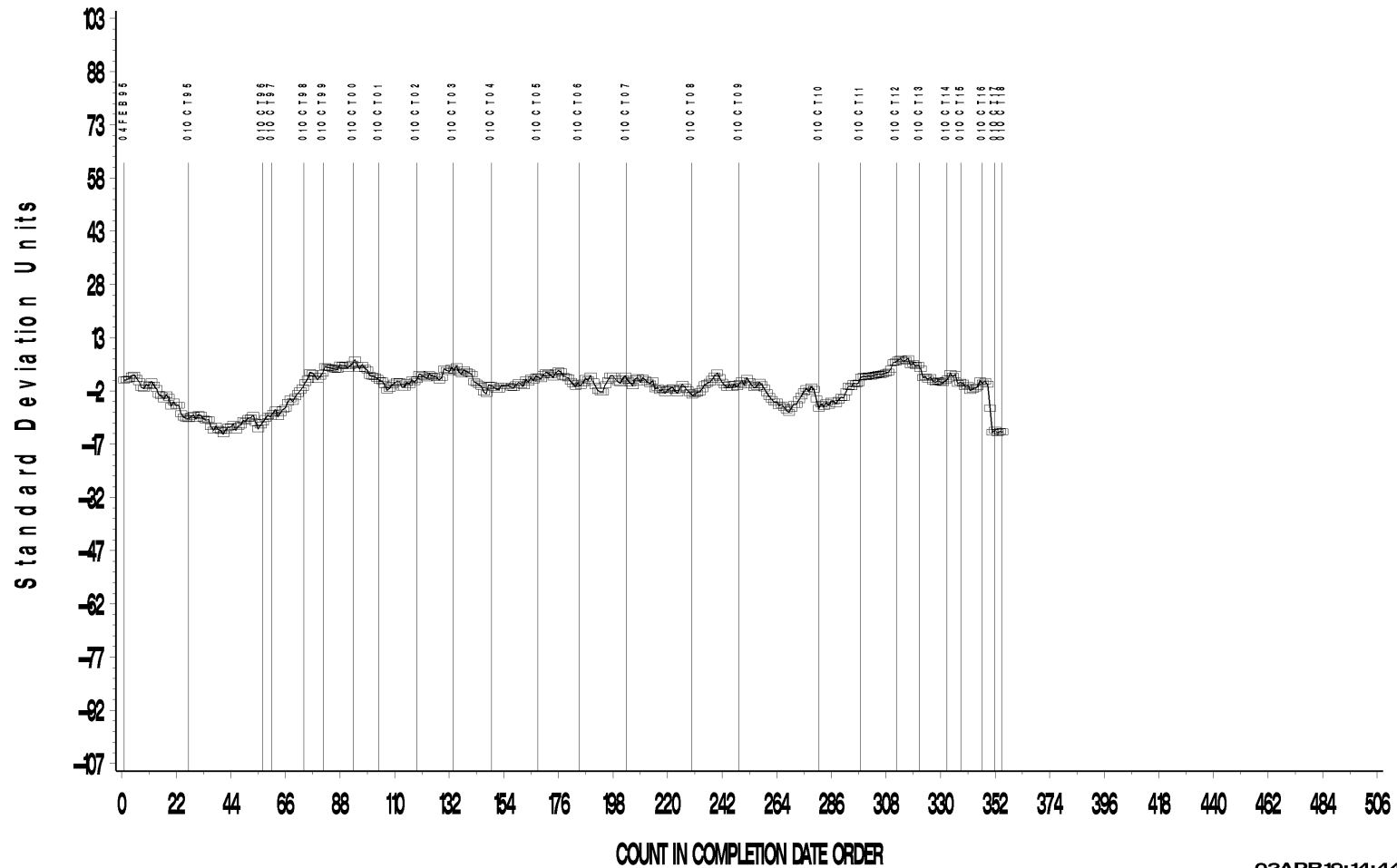


L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

CUSUM Severity Analysis

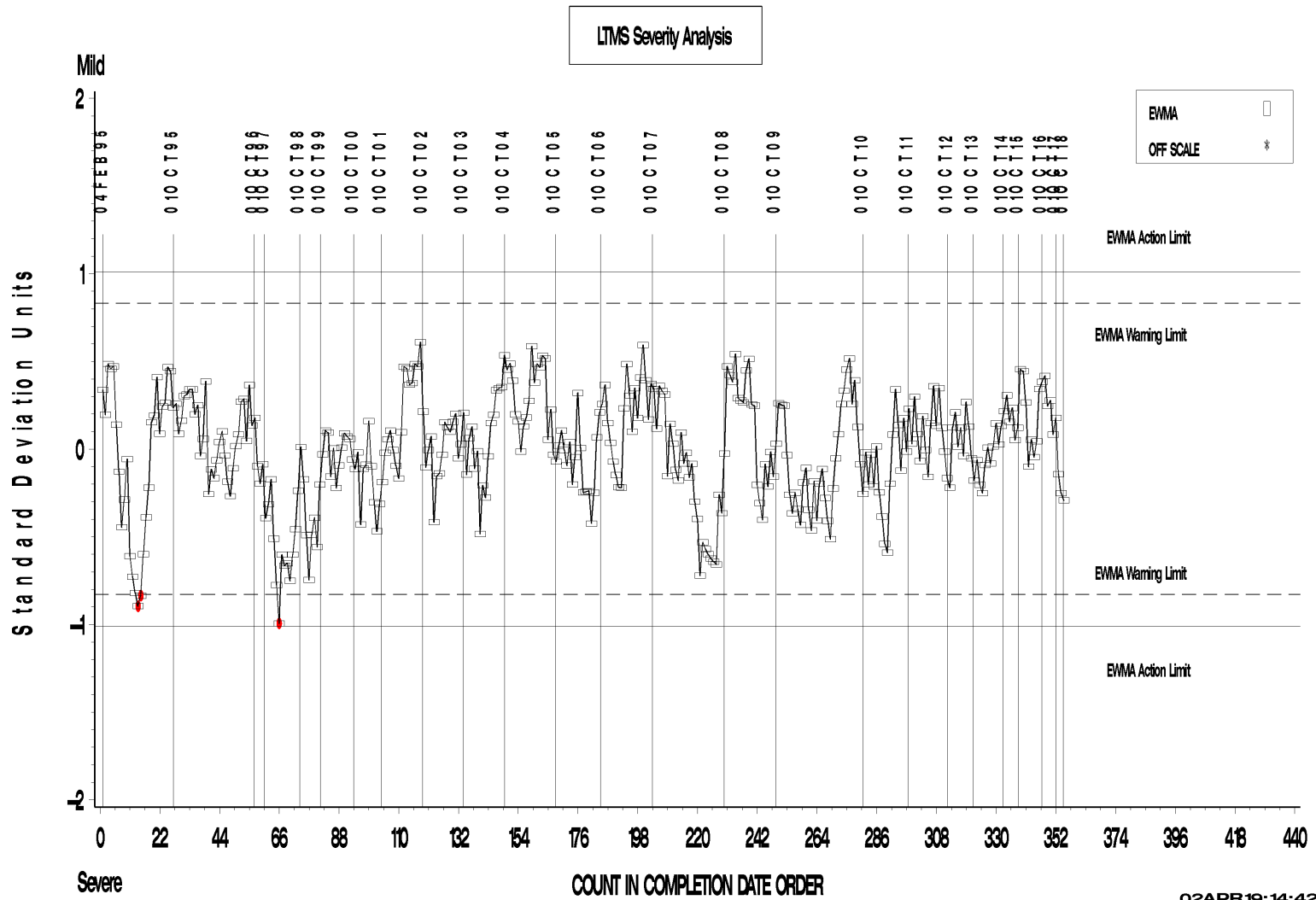


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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

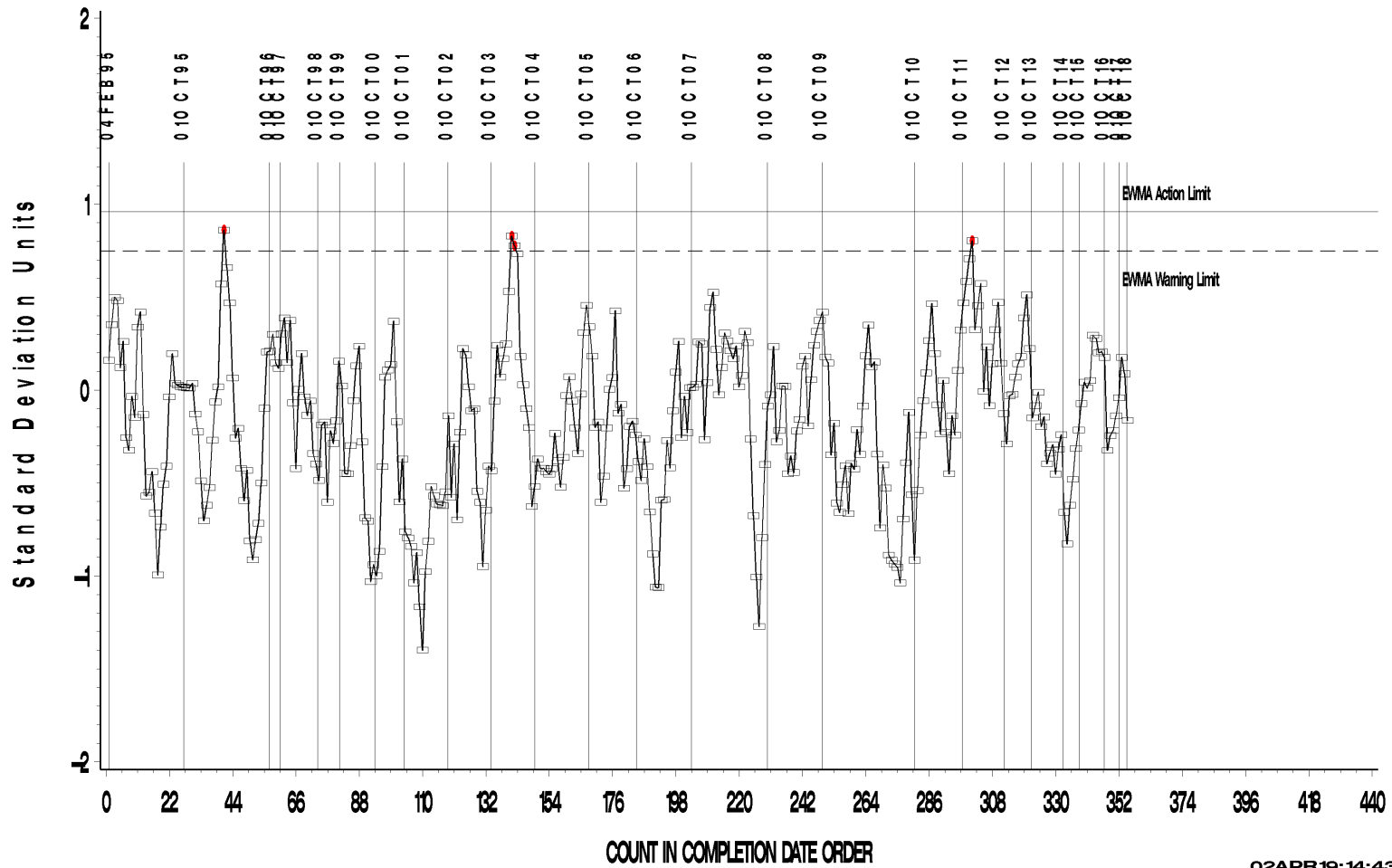


L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Precision Analysis



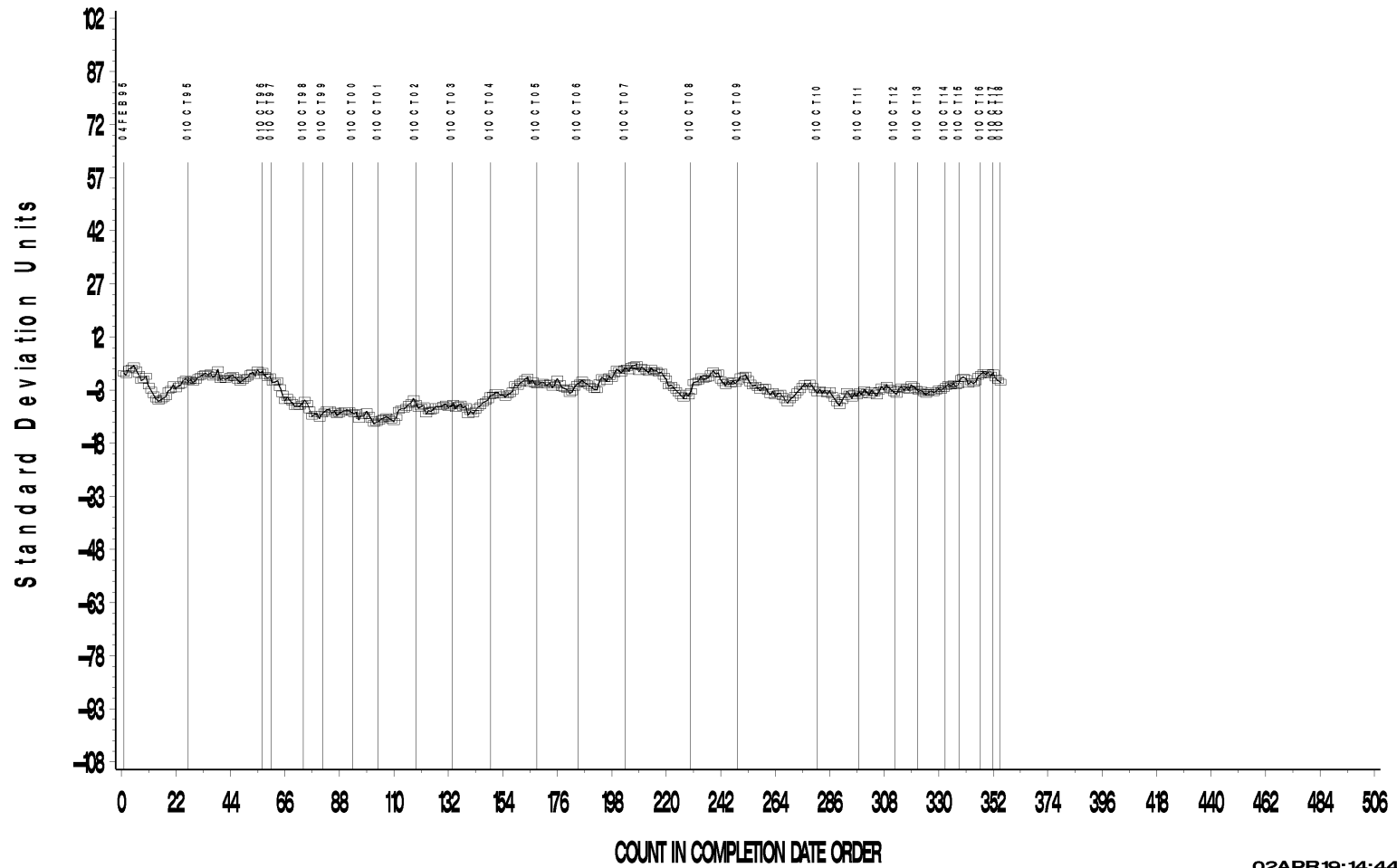
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

CUSUM Severity Analysis

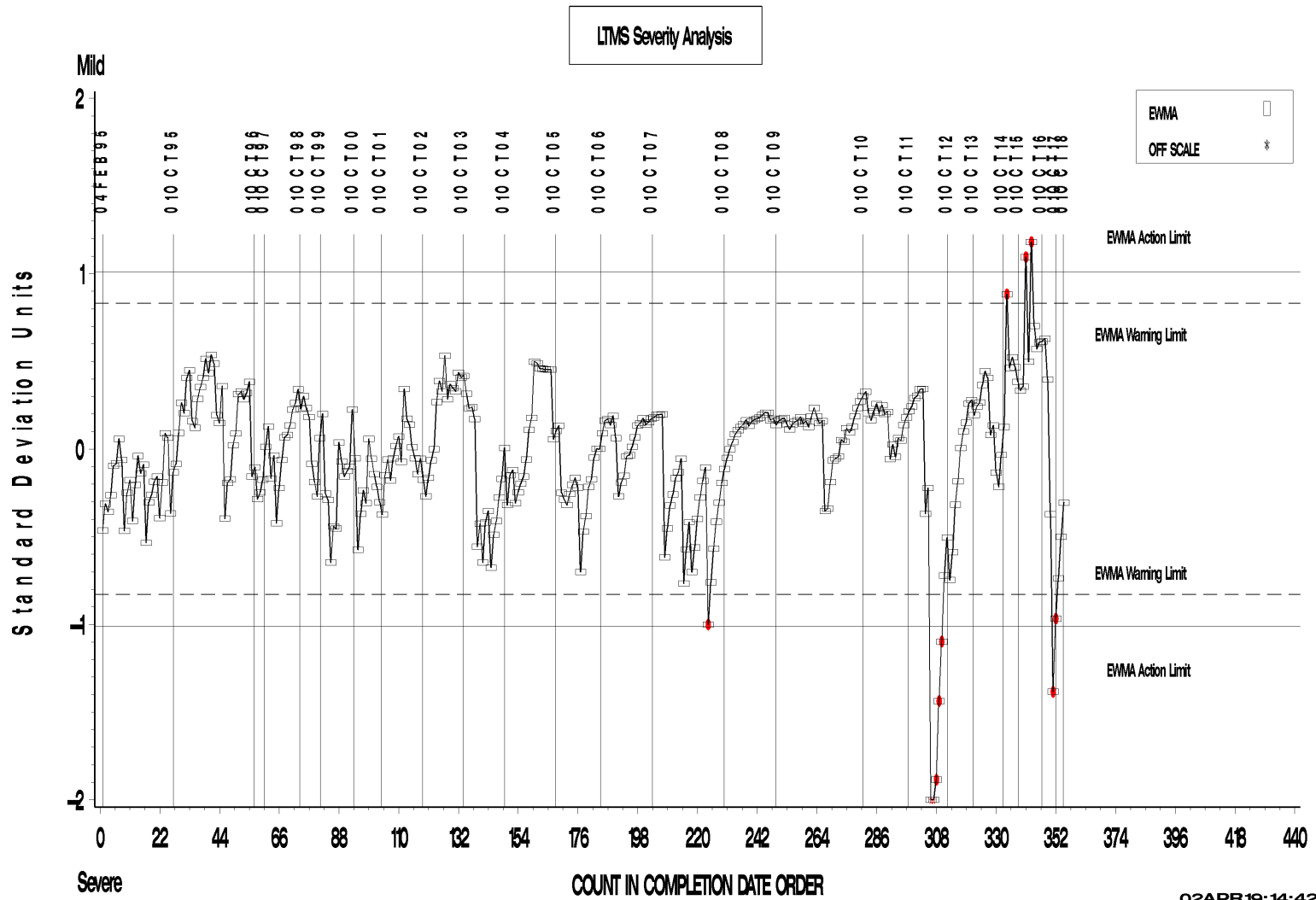


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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

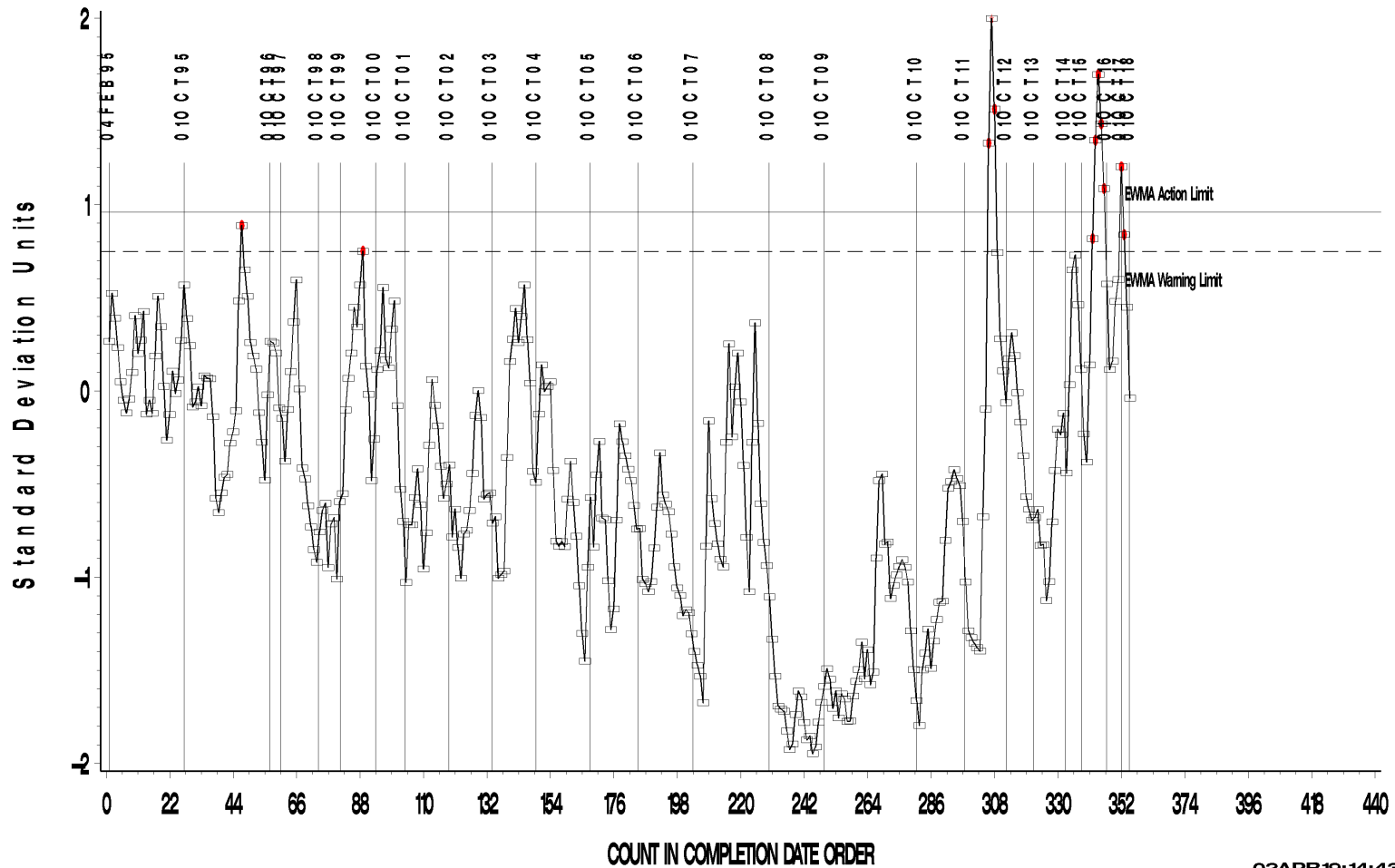


L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

LTMS Precision Analysis



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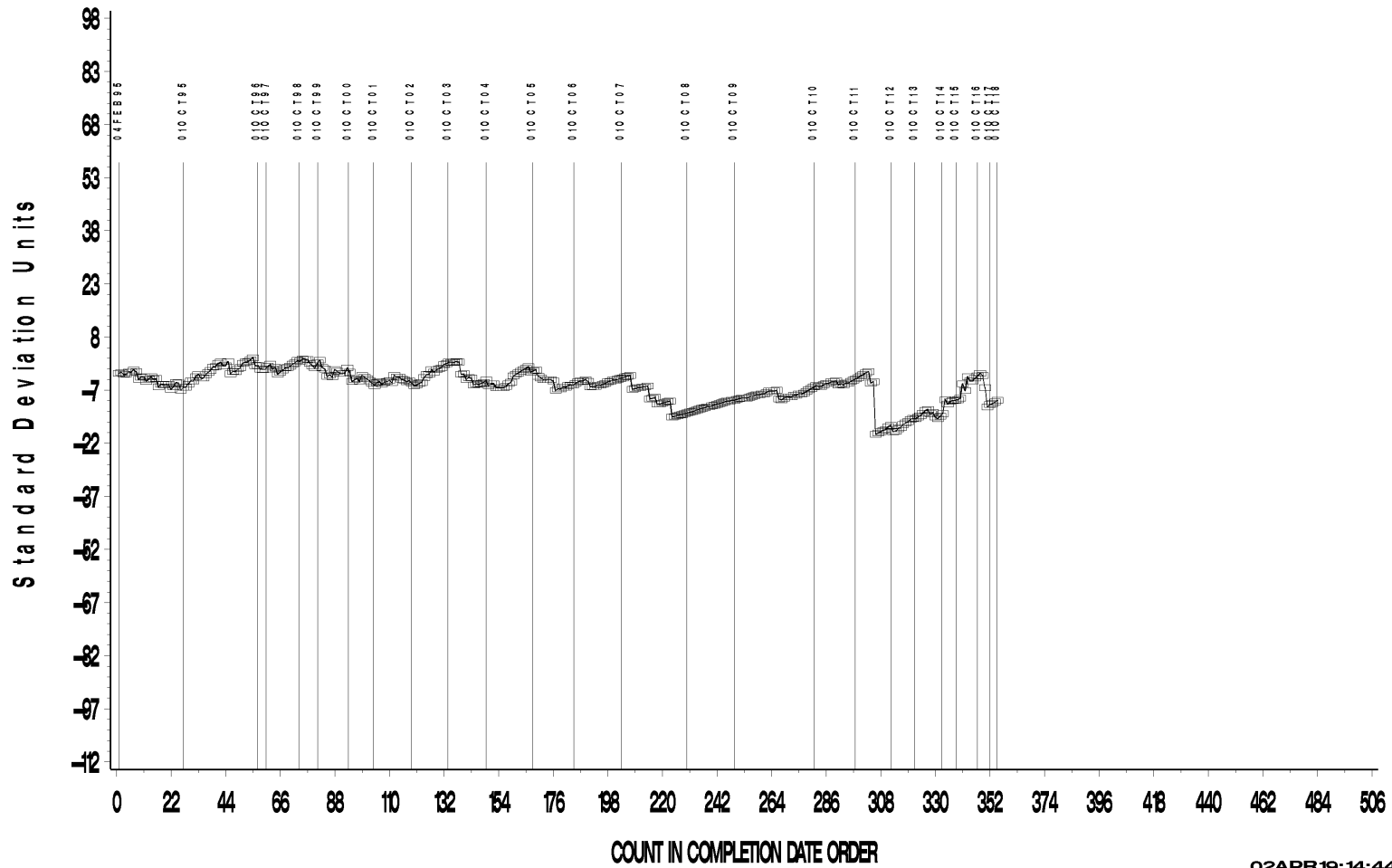
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis

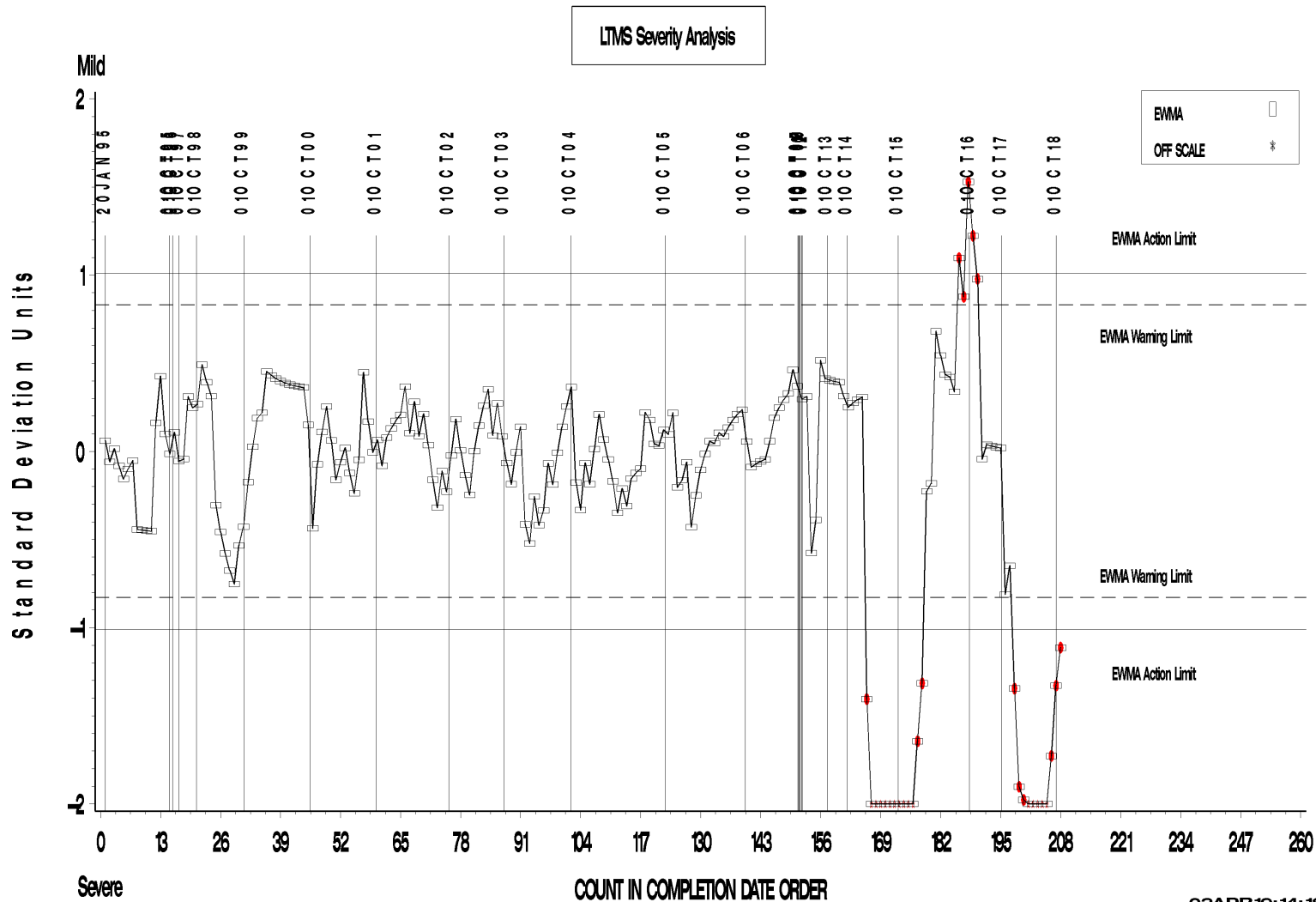


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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

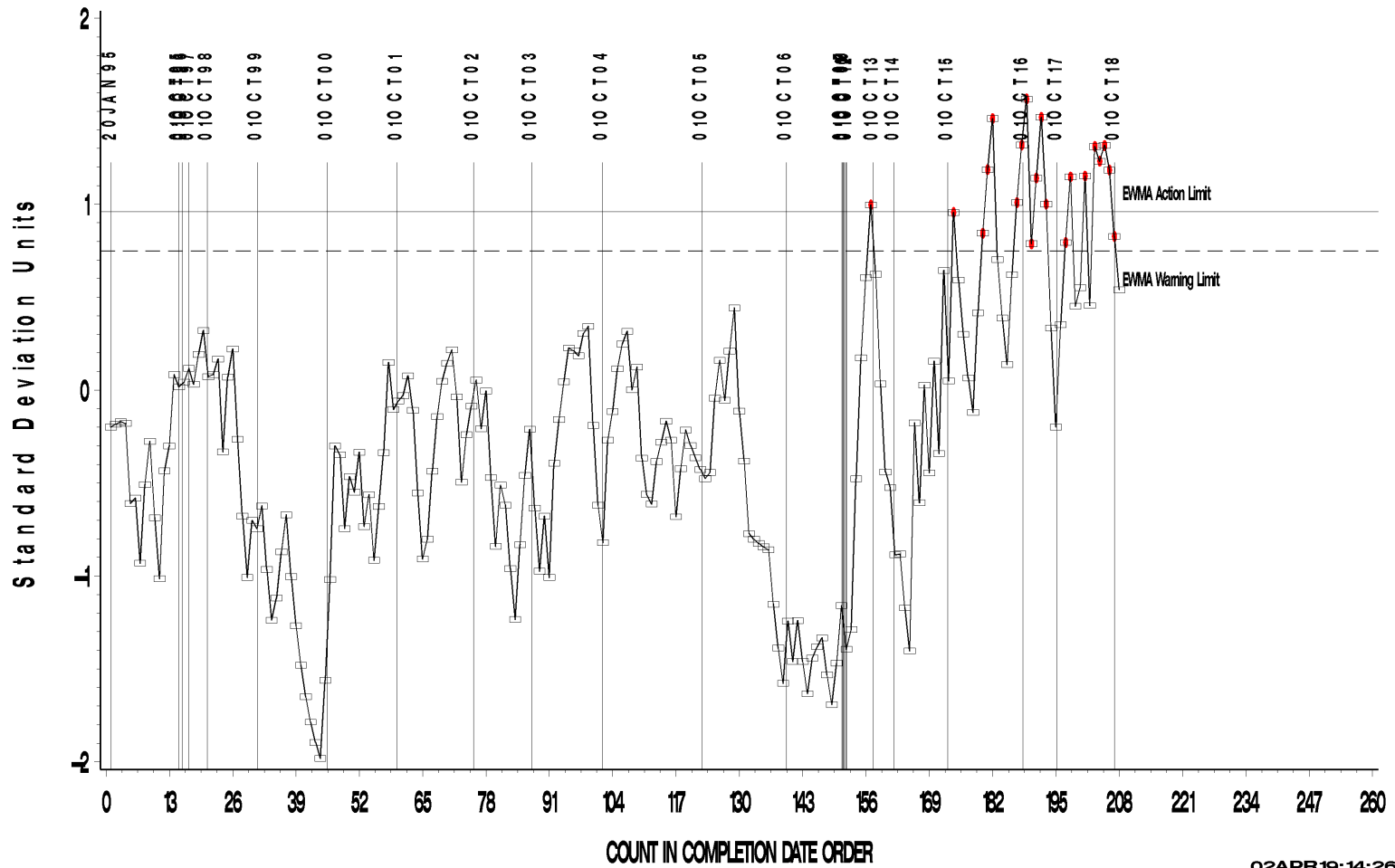


L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



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L-37 (D6121)

L-37 LUBRICATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis

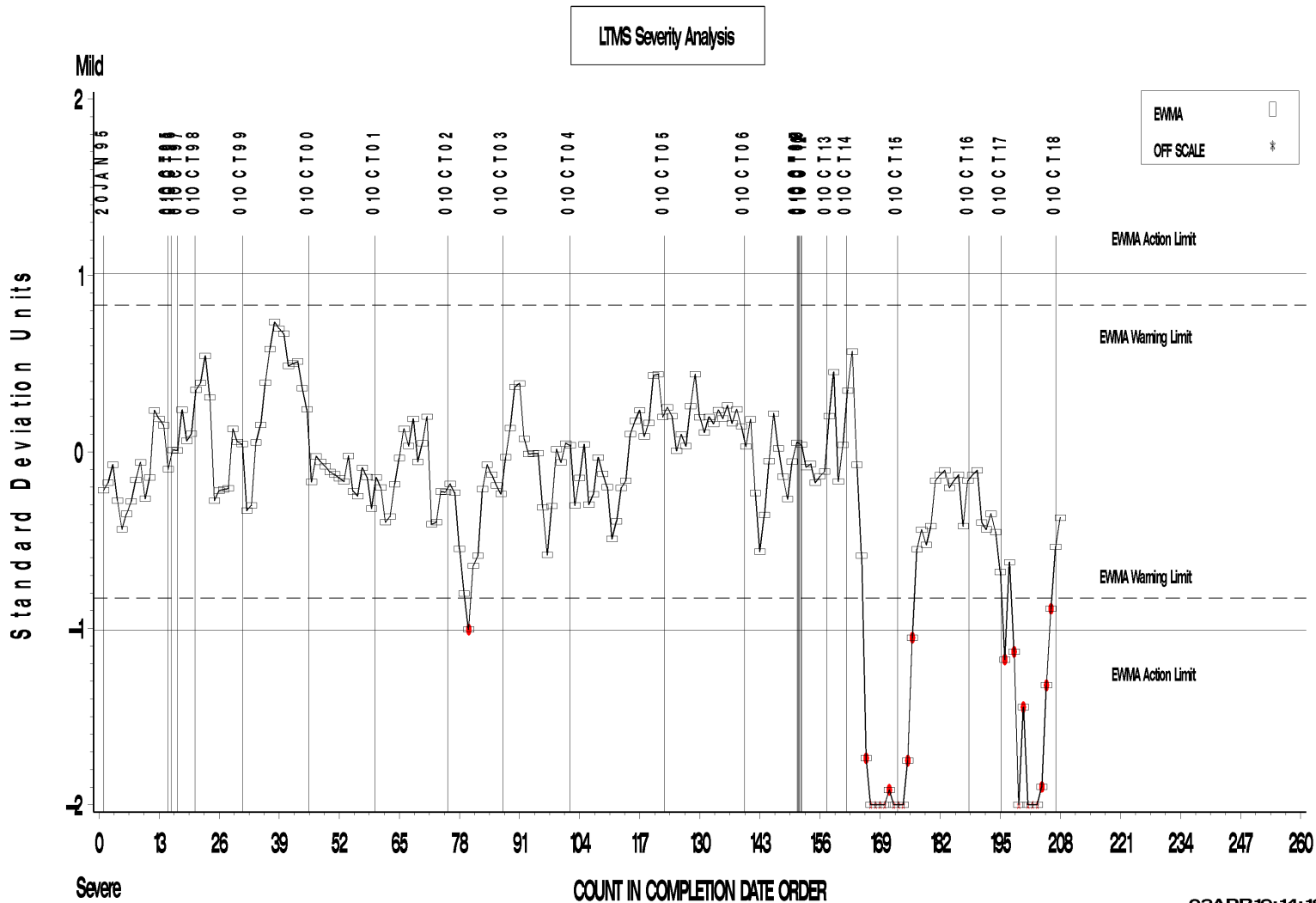


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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

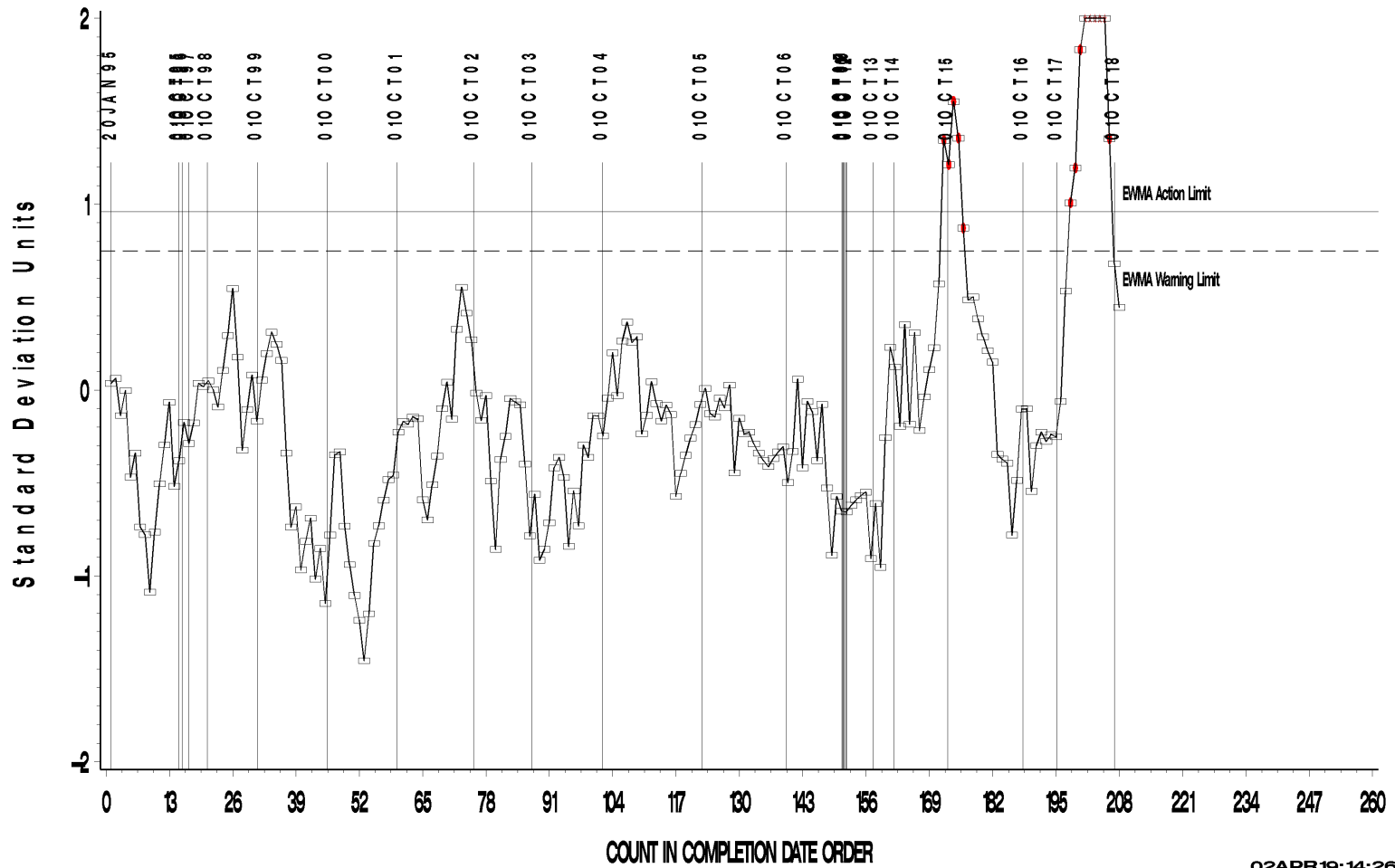


L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTVS Precision Analysis



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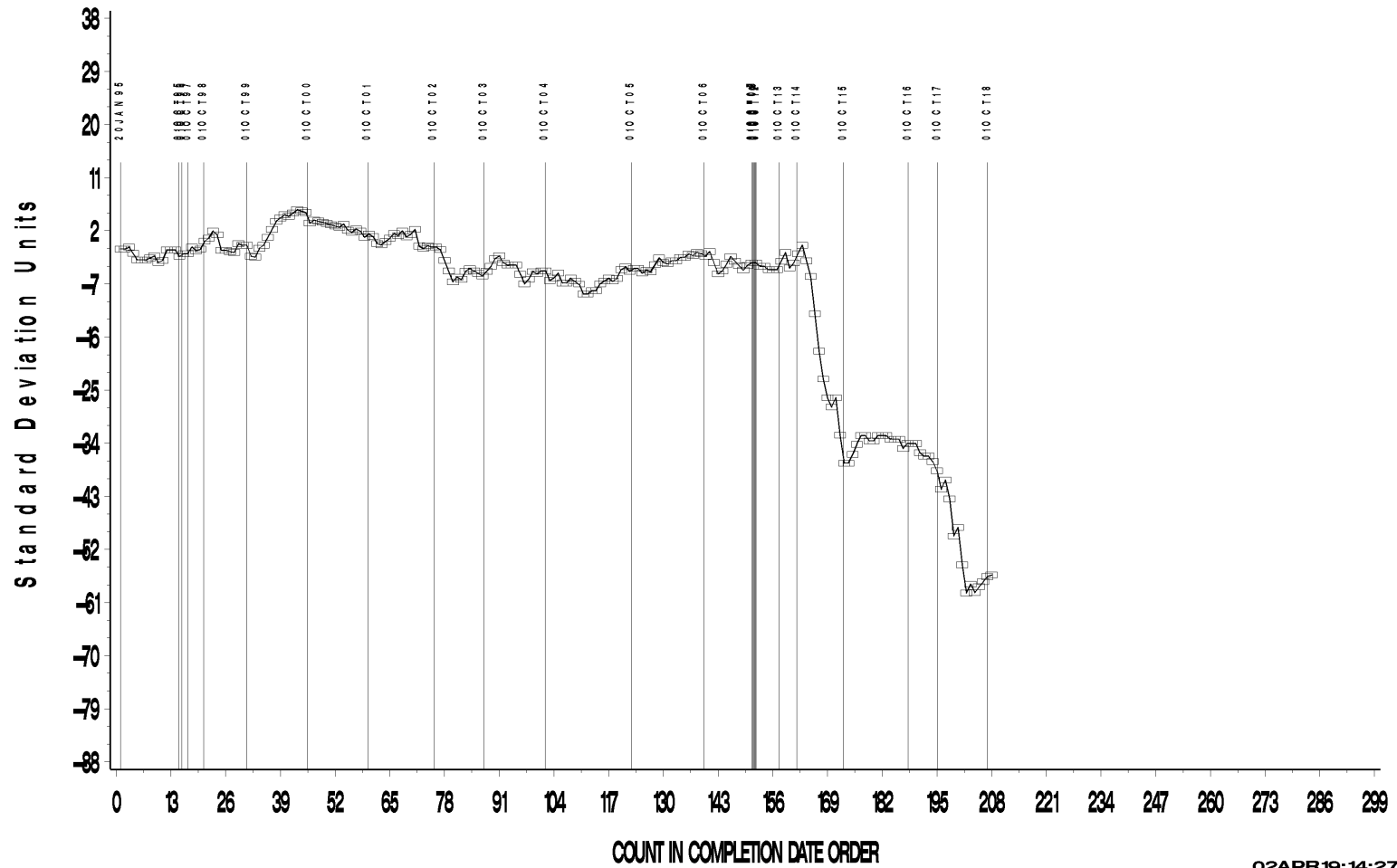
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L-37 (D6121)

L-37 LUBRICATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

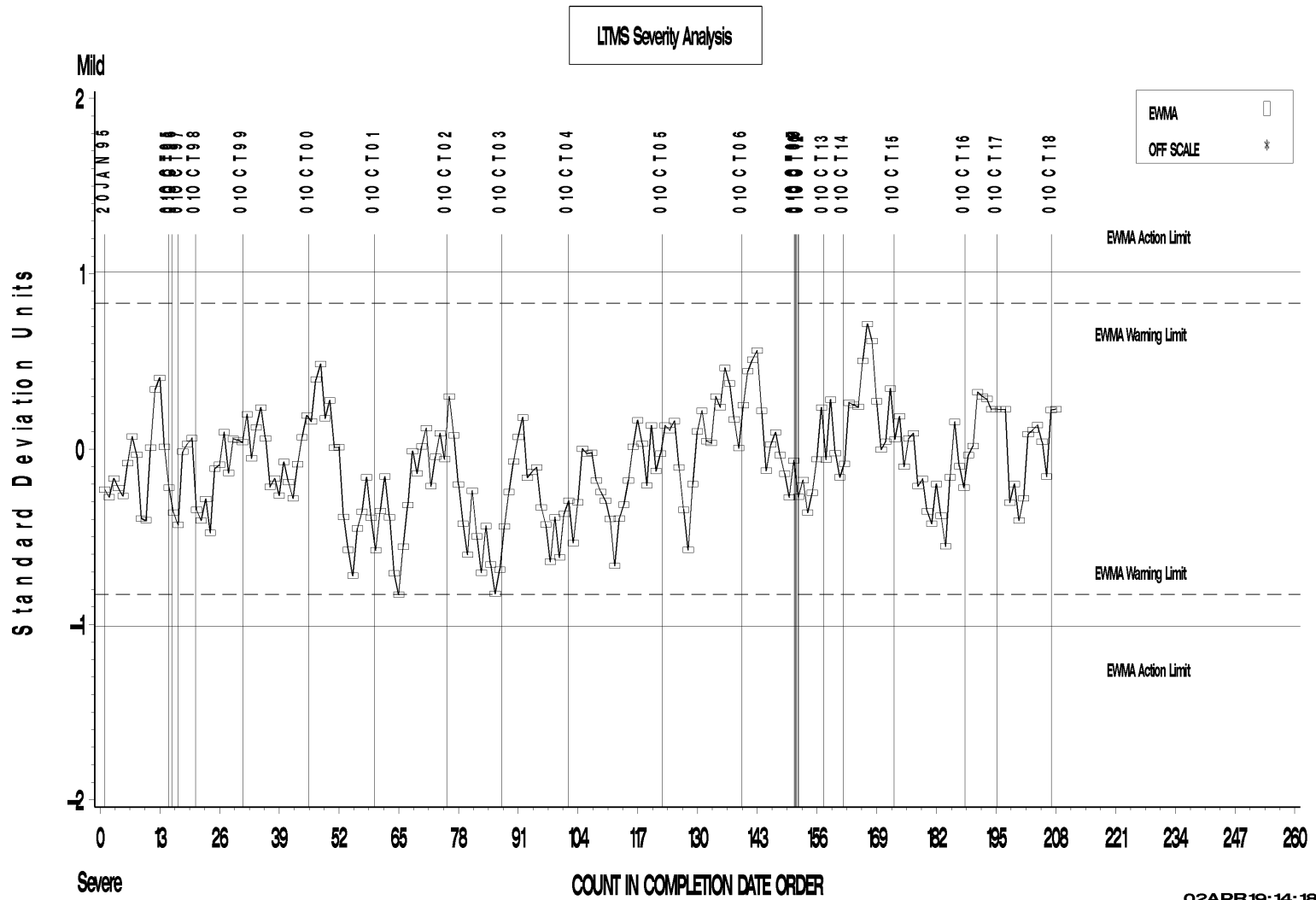
CUSUM Severity Analysis



L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING



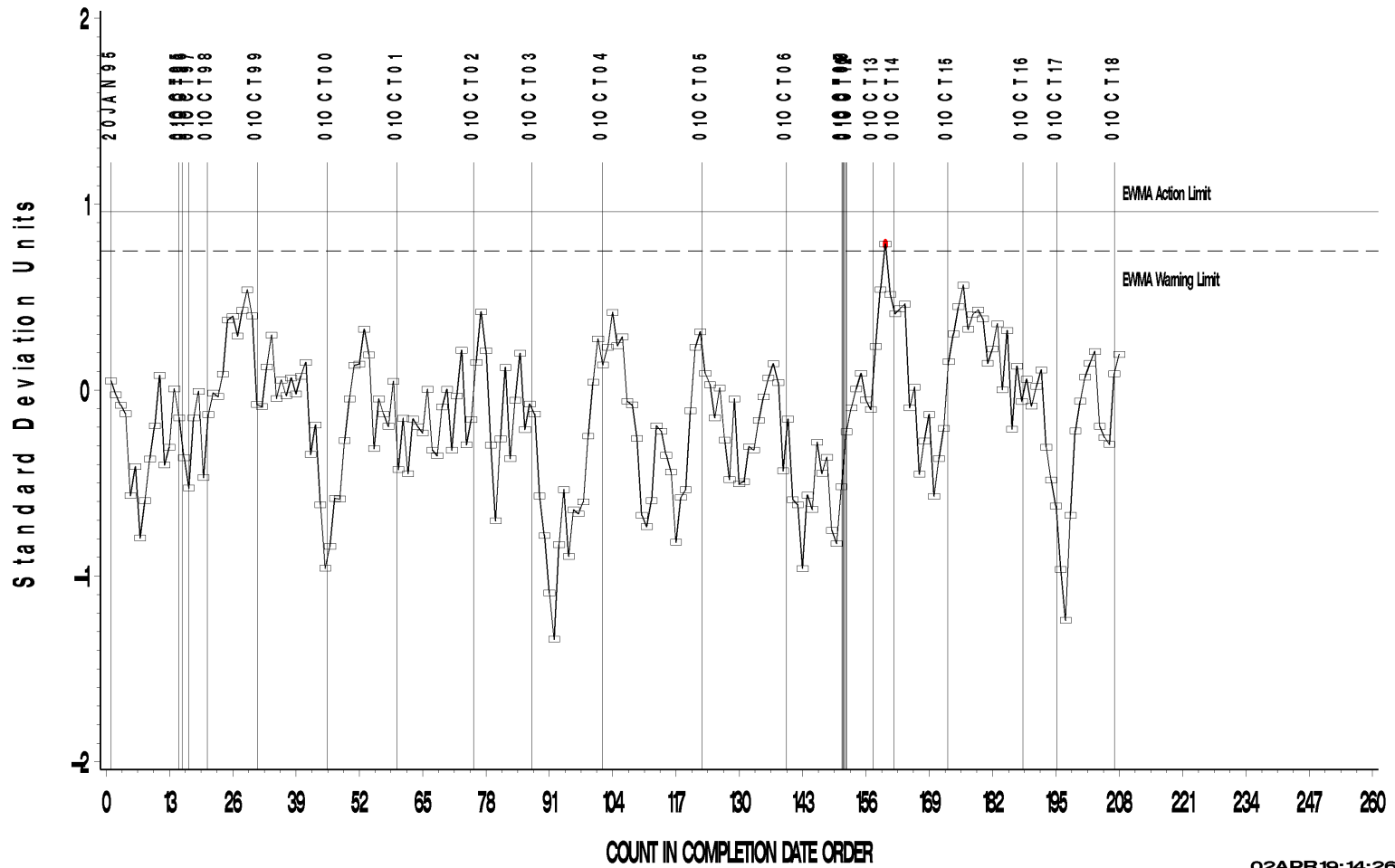
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Precision Analysis



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L-37 (D6121)

L-37 LUBRICATED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

CUSUM Severity Analysis

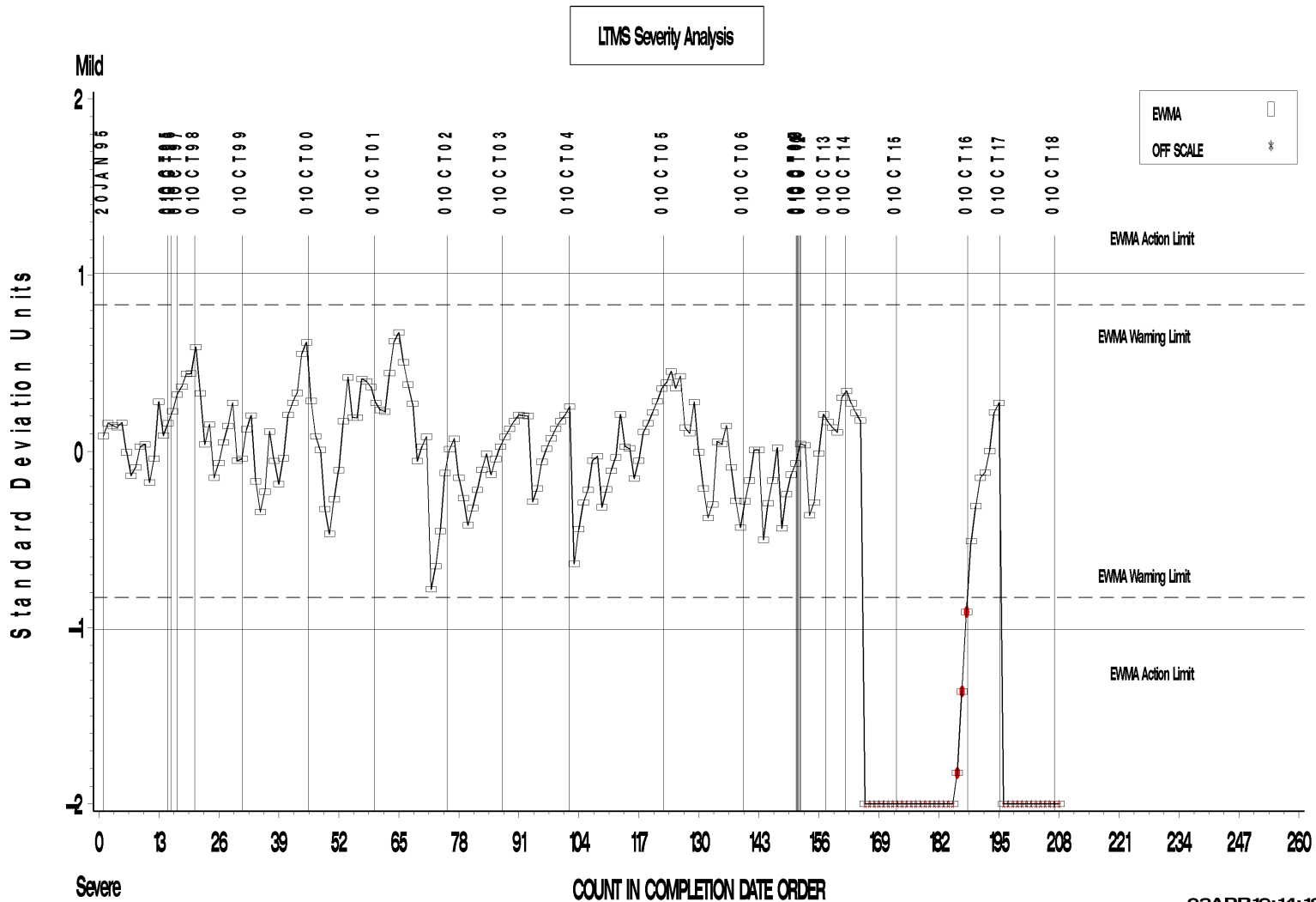


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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

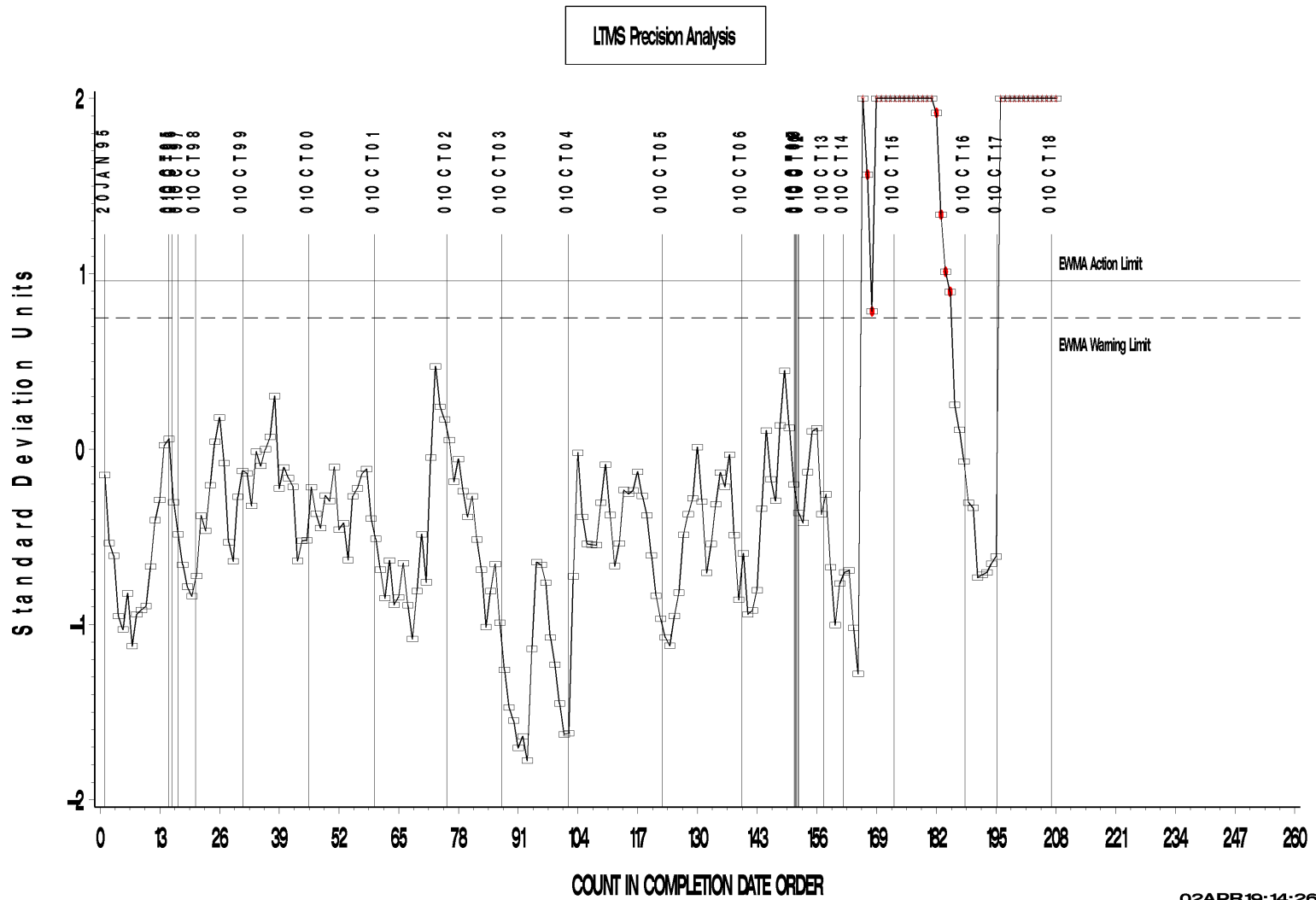
FINAL PINION GEAR PITTING/SPALLING



L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

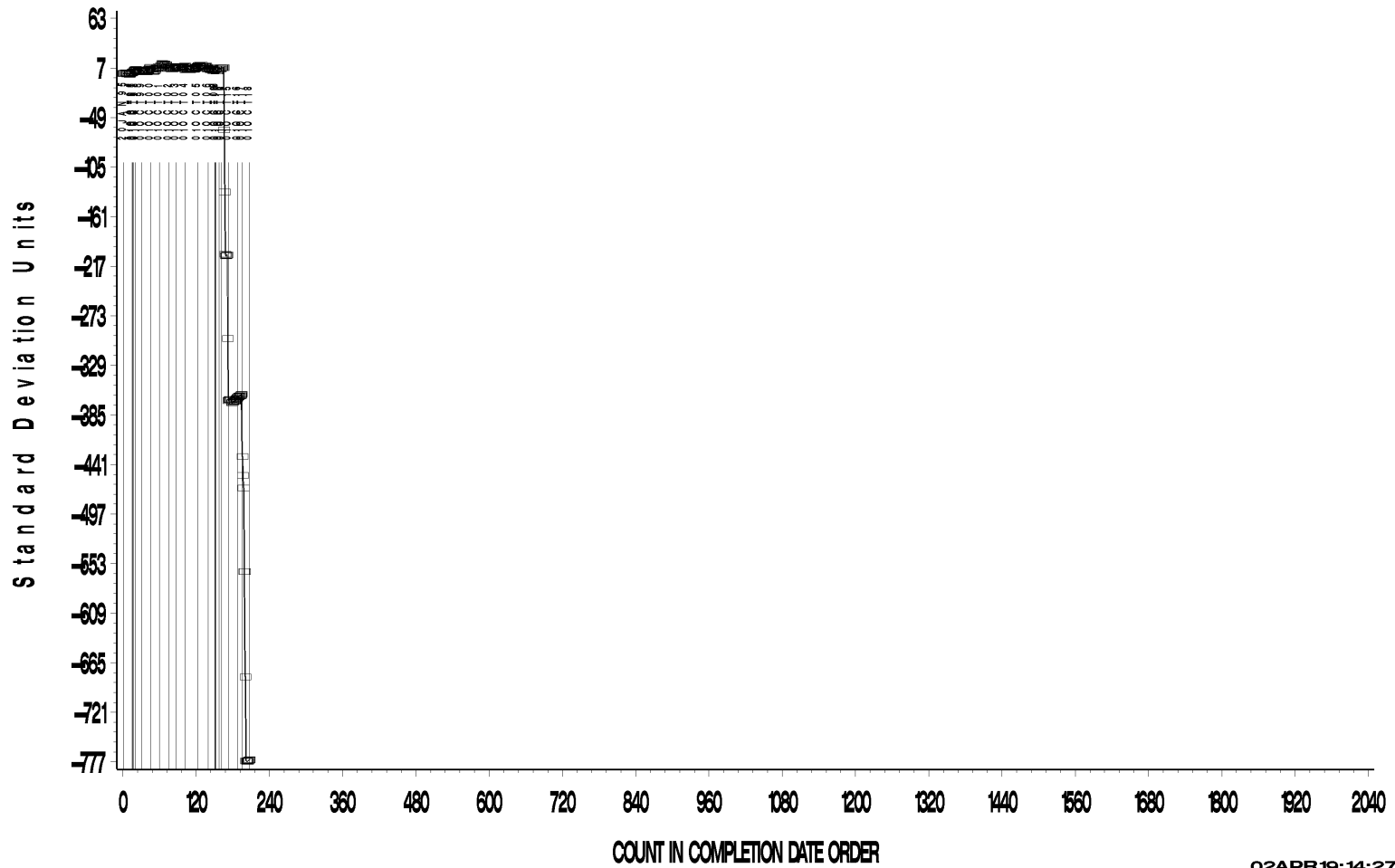


L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis



02APR19:14:27

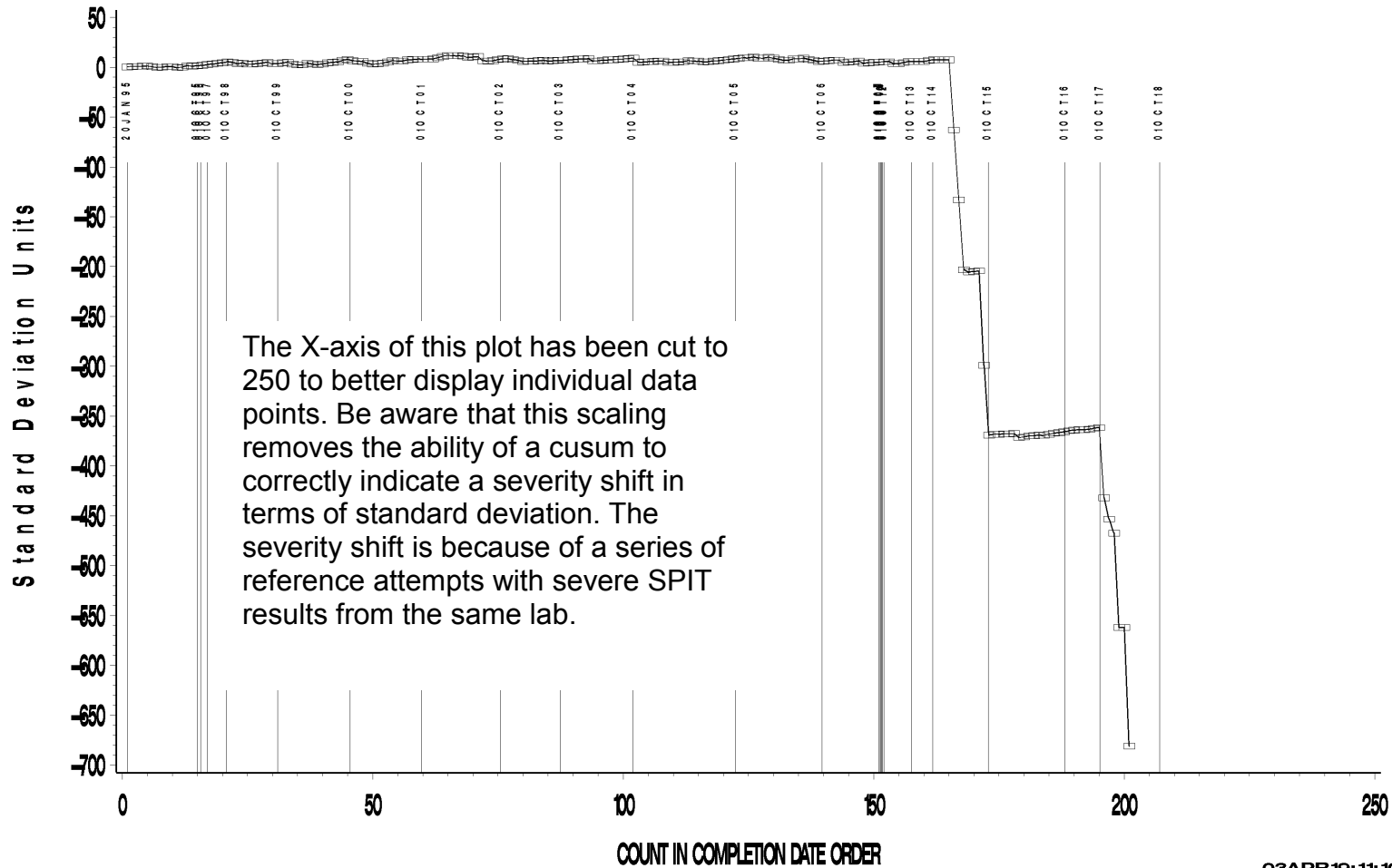
L-37 (D6121)

L-37 LUBRICATED INDUSTRY OPERATIONALLY VALID DATA



FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis



03APR19:11:10

L-37 (D6121)

TIMELINE ADDITIONS

Effective Date	Information Letter	Event
Feb 21, 2019	19-1	Clarifications added to the test procedure to state that a lab must be approved for testing instead of a builder being approved. Previous wording could have been misinterpreted.

L-37 (D6121)

LAB VISITS

No L-37 lab visit were conducted this period.

INFORMATION LETTERS

Information letter 19-01 was issue during this period.

L-37 (D6121)

LTMS DEVIATIONS

No LTMS deviations were written this report period.

L-37 (D6121)

STATUS OF REFERENCE OIL SUPPLY

Oil	Cans @ Labs	@ TMC	
		Cans	Gallons
117	0	360	360.0
134	2	0	0.0
134-1	12	180	180.0
152-2	11	119	119.9
153-1	35	0	0.0
155	20	27	27.5
155-1	11	105	105.6
Total	91	791	793.0

The TMC quantity remaining presumes usage only for L-37 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 38.6 gal) for use in that test.

TMC stocks of oil 134 have been depleted. The 134-1 reblend has been introduced to testing.