



Test Monitoring Center

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

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

MEMORANDUM: 19-044
DATE: October 17, 2019
TO: Robert Slocum, Chairman, L-37 Surveillance Panel
FROM: Dylan Beck *Dylan Beck*
SUBJECT: L-37 Testing from April 1, 2019 through September 30, 2019

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

DJB/djb/mem19-044.djb.doc

cc: Frank Farber
Jeff Clark

L-37 Surveillance Panel

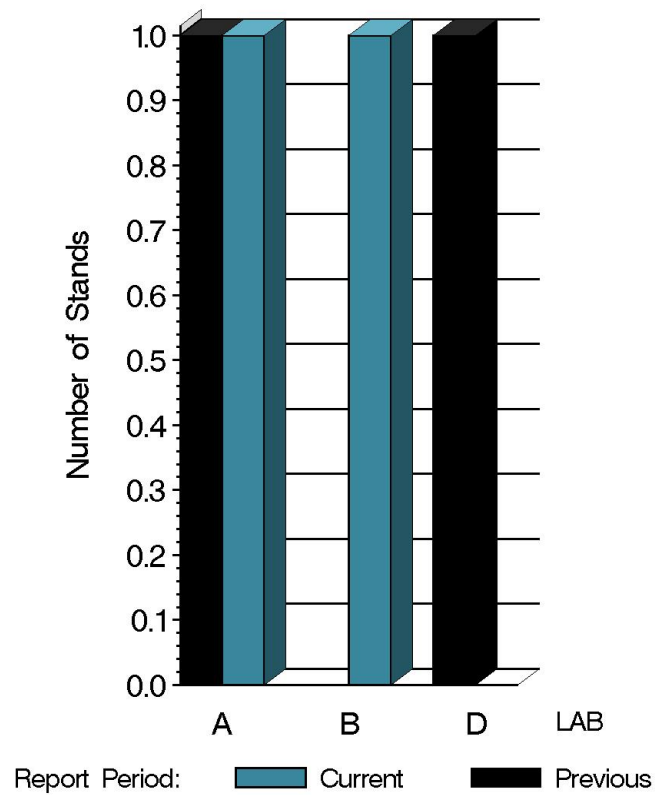
<http://www.astmtmc.cmu.edu/ftp/docs/gear/l37/semiannualreports/l37-10-2019.pdf>

Distribution: email

L-37 (D6121)

	Reporting Data	Calibrated on 9-30-19
Number of Labs	2	2
Number of Stands	2	2

BY-LAB STAND
DISTRIBUTION



14:59:13 14OCT2019

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	0	0	0	2	2	2
Rejected (Mild)	OC	0	0	0	0	0	0	0
Rejected (Severe)	OC	0	0	0	0	1	0	1
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	0	0	0	3	2	3

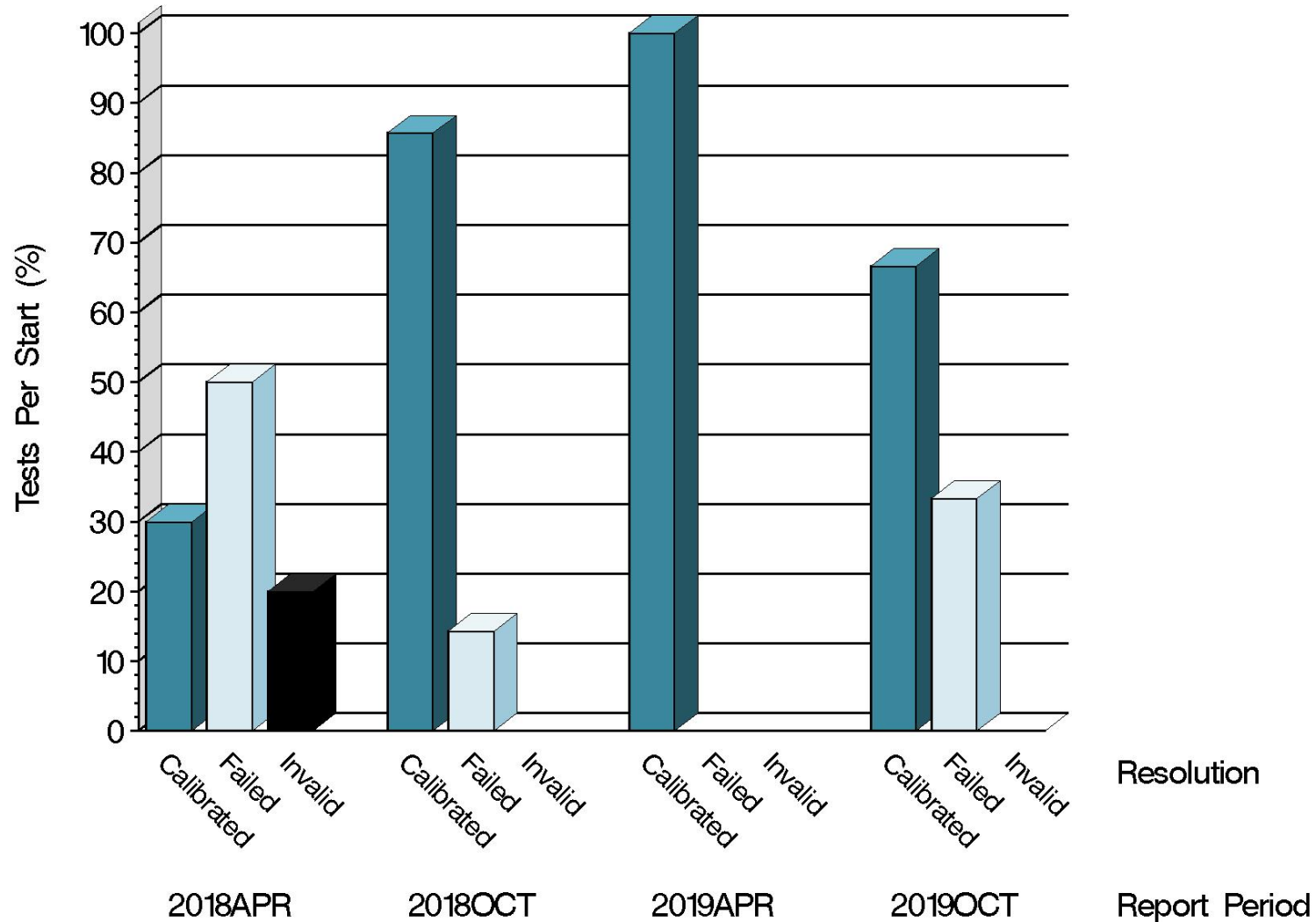
L-37 (D6121)

Calibration Attempt Detail

	Gear Batch	Acceptable	Failed	Total
LUBRITED	V1L500/P4T813	0	0	0
	V1L528/P4T883A	2	1	3
	Total	2	1	3
NONLUBRITED	V1L500/P4T813	0	0	0
	V1L528/P4T883A	0	0	0
	Total	0	0	0

L-37 (D6121)

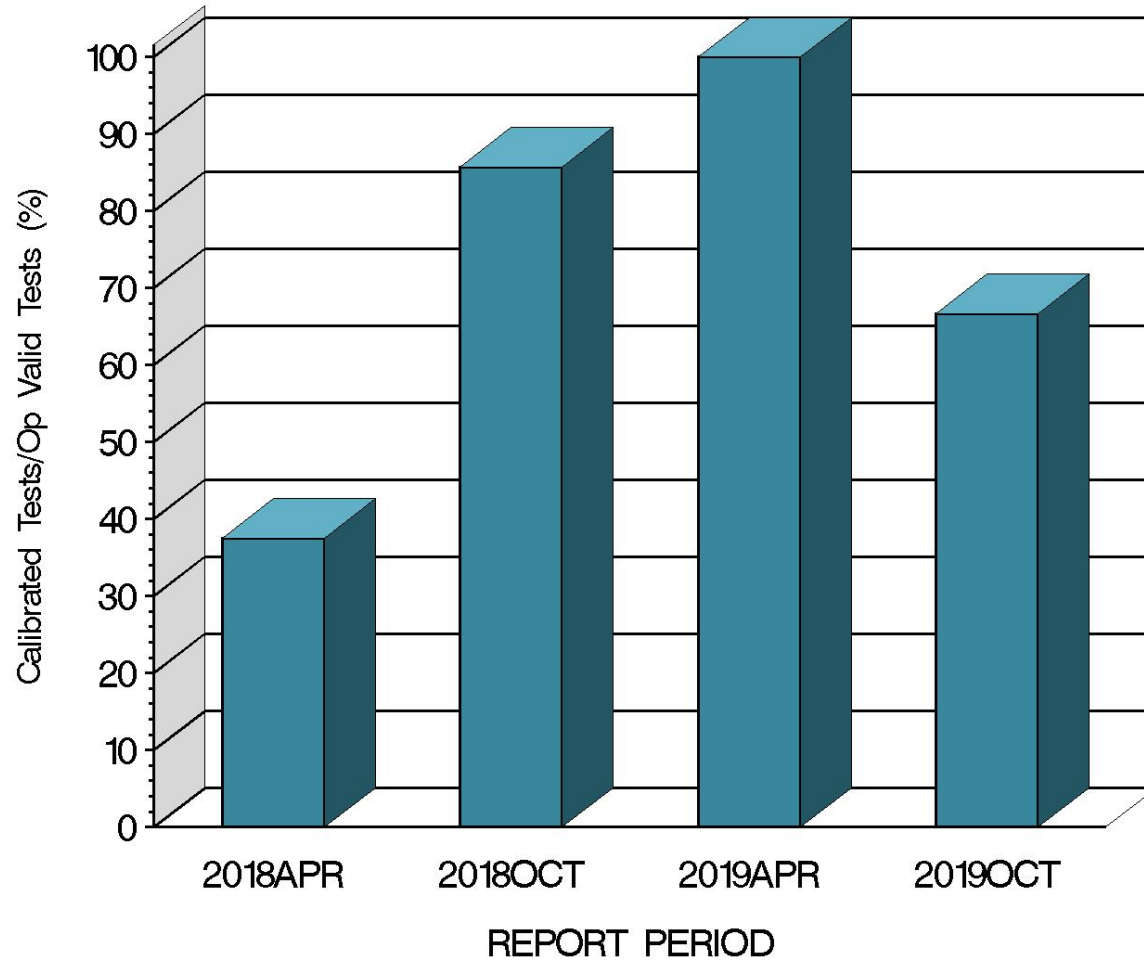
CALIBRATION ATTEMPT SUMMARY



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L-37 (D6121)

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	3	0
	Lost	0	0	0	0	0	0	0	0			
	Starts	0	0	0	0	3	3	3	3			
	%	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	3	-1.155	1.400	-1.155	-1.651
RIPP	V1L528/P4T883A	3	0.306	0.000	0.306	0.146
SPIT	V1L528/P4T883A	3	-0.975	2.138	-0.975	-0.565
WEAR	V1L528/P4T883A	3	-0.983	2.162	-0.983	-0.510

^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)

GEAR BATCH SEVERITY (continued)

NON-LUBRITED HARDWARE						
Parameter	Gear Batch	N	Δ/s	s^A	Overall Δ/s	Overall Shift (in Merits) ^B
RIDG	2124463/2124397	0	.	.	.	.
RIPP	2124463/2124397	0	.	.	.	.
SPIT	2124463/2124397	0	.	.	.	.
WEAR	2124463/2124397	0	.	.	.	.

^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	-0.347	0.306	0.259	0.266
	B	2	-1.559	0.306	-1.593	-1.607

NON-LUBRITED HARDWARE AVERAGE Δ/s						
Gear Batch	Lab	N	RIDG	RIPP	SPIT	WEAR
V1L528/P4T883A	All	0	.	.	.	.

L-37 (D6121)

SUMMARY OF SEVERITY & PRECISION

Severity

Nonlubrited – RIDG ended the period exceeding the warning limit. All other parameters were within limits.

Lubrited –SPIT remained outside of the action limit this period. WEAR started the period outside of the action limit but is currently only exceeding the warning limit. RIDG is currently exceeding the warning limit.

L-37 (D6121)

SUMMARY OF SEVERITY & PRECISION (cont.)

Precision

Nonlubrited – All parameters within limits during this period.

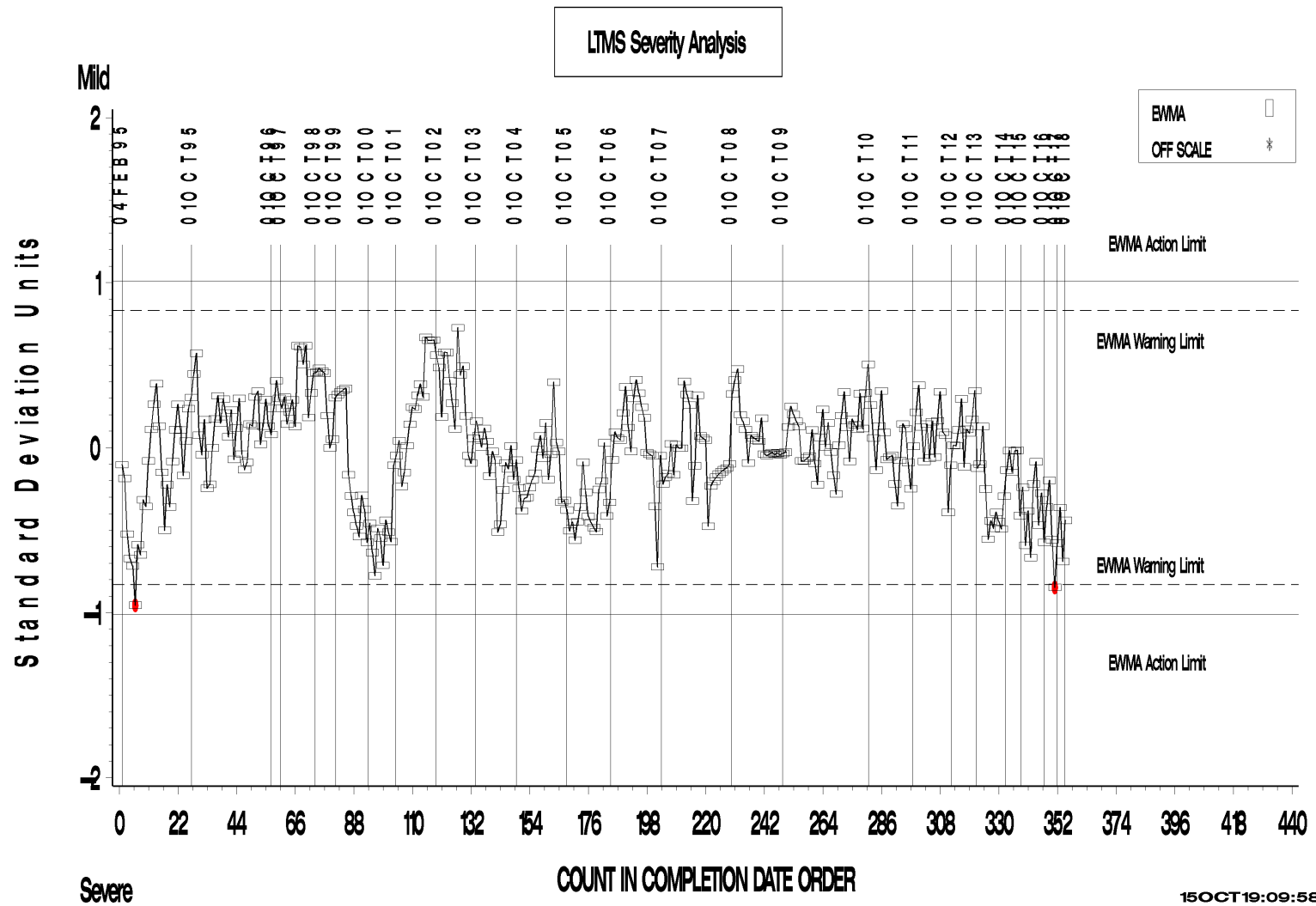
Lubrited –SPIT remains outside the action limit this period. All other parameters were within limits.

Industry control charts follow.

L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

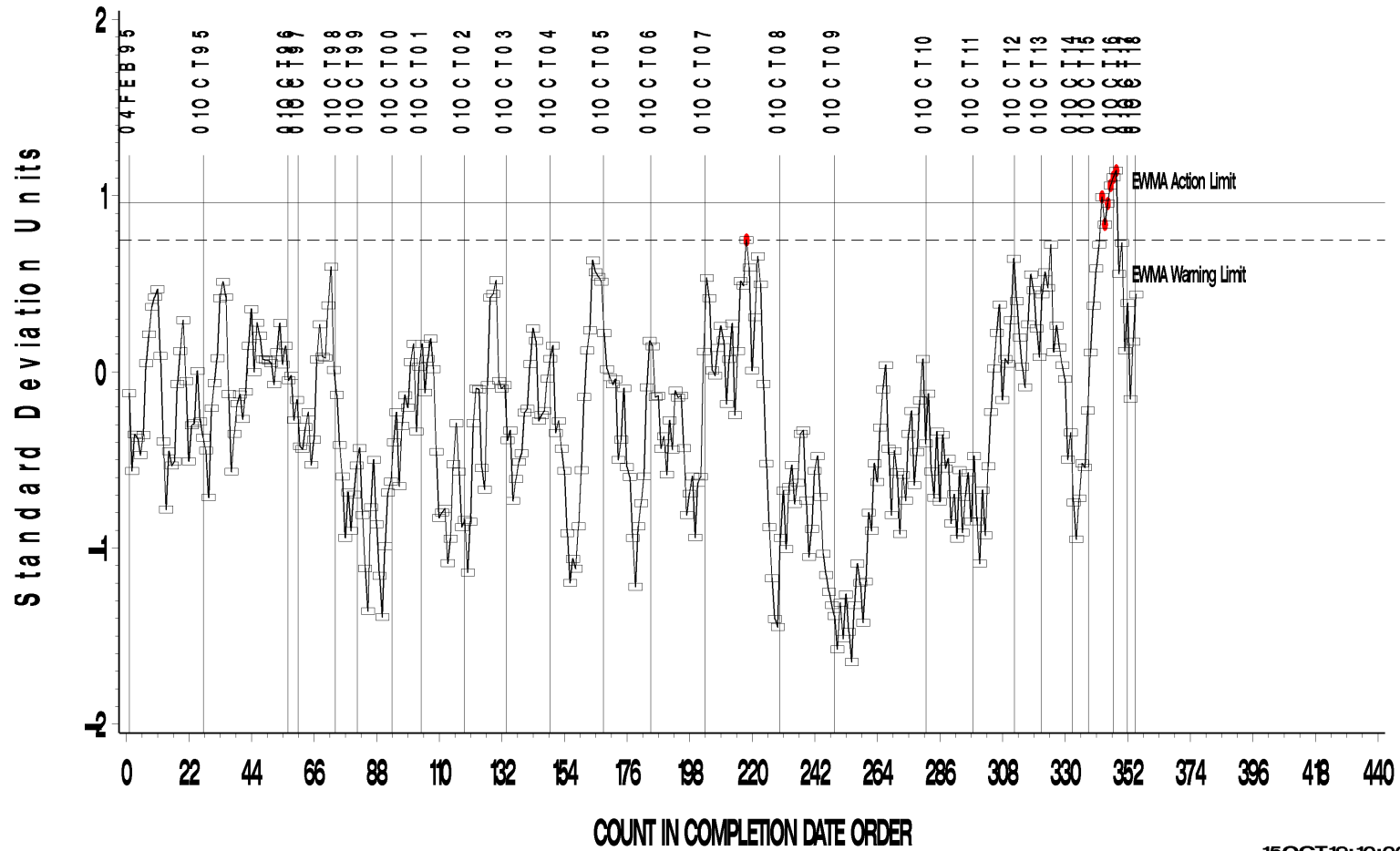


L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



15OCT19:10:00

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L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis

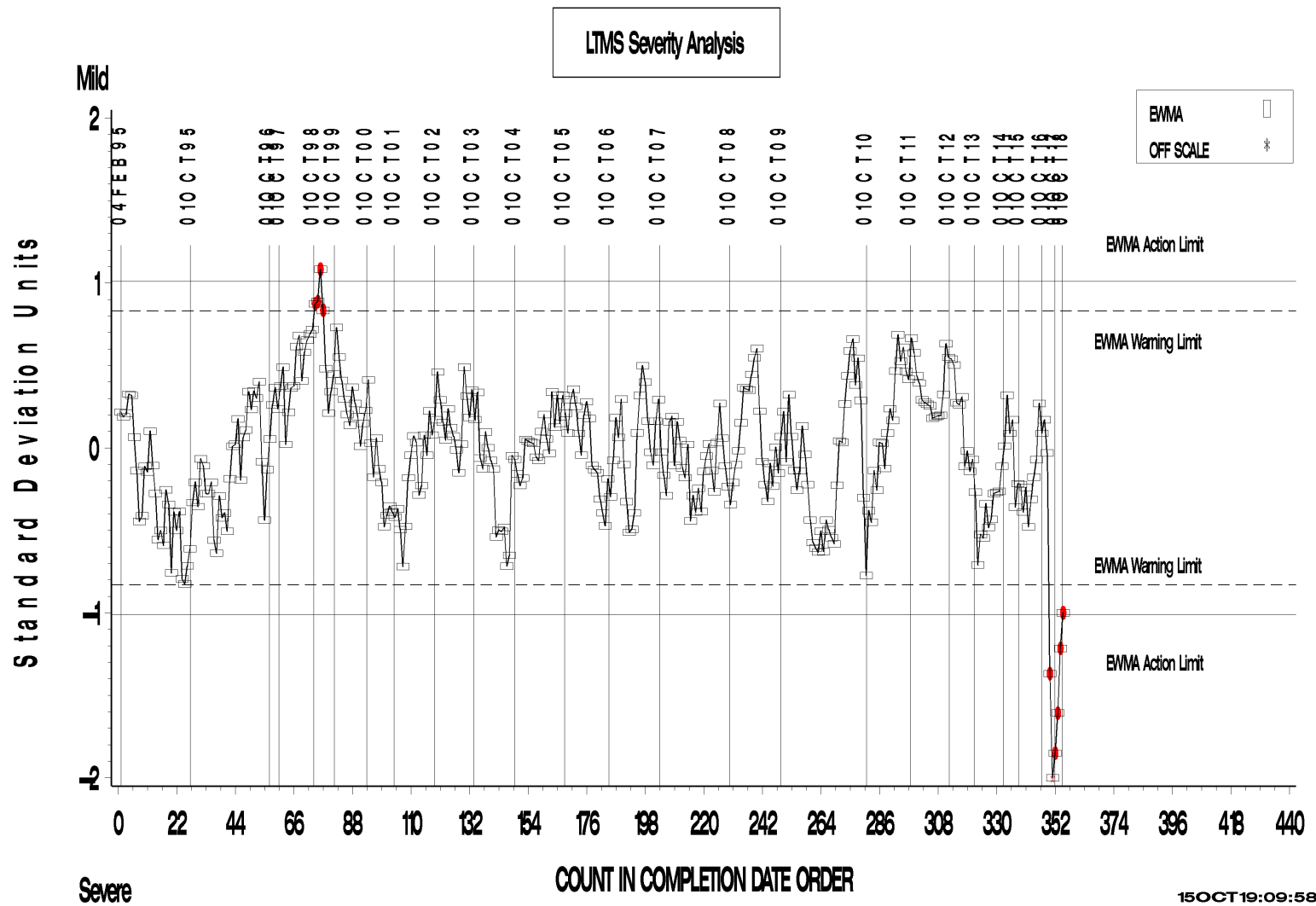


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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

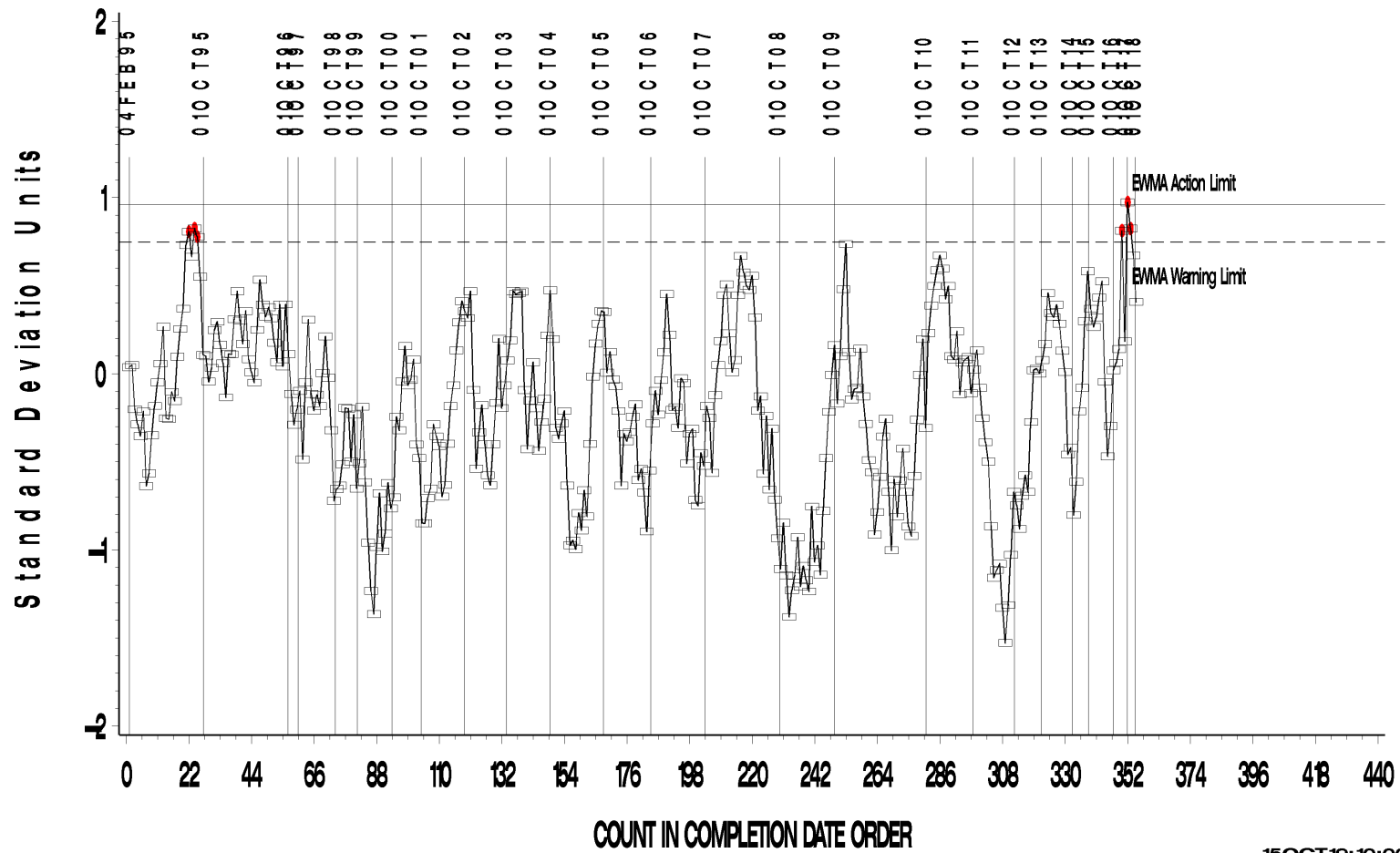


L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Precision Analysis

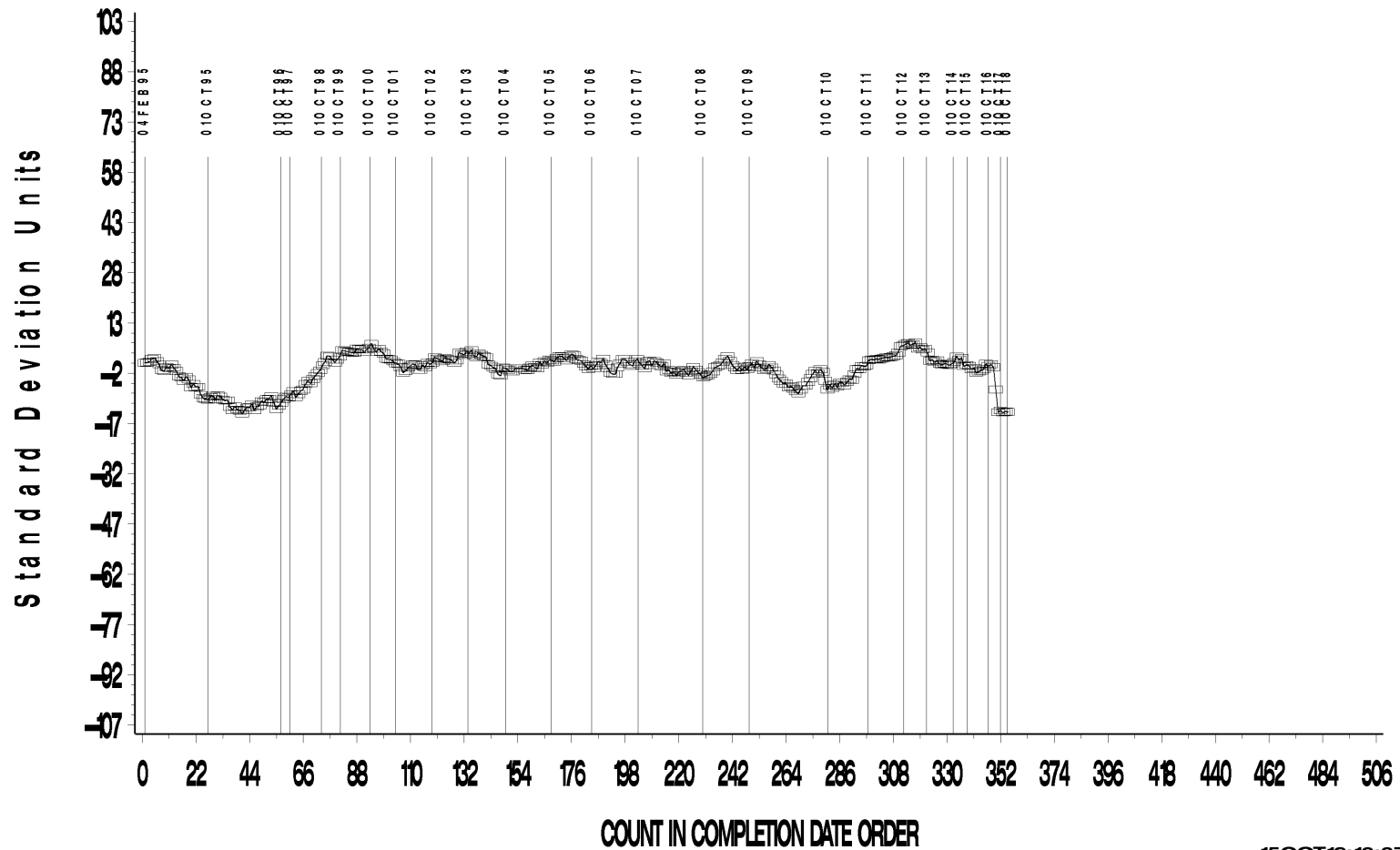


L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

CUSUM Severity Analysis



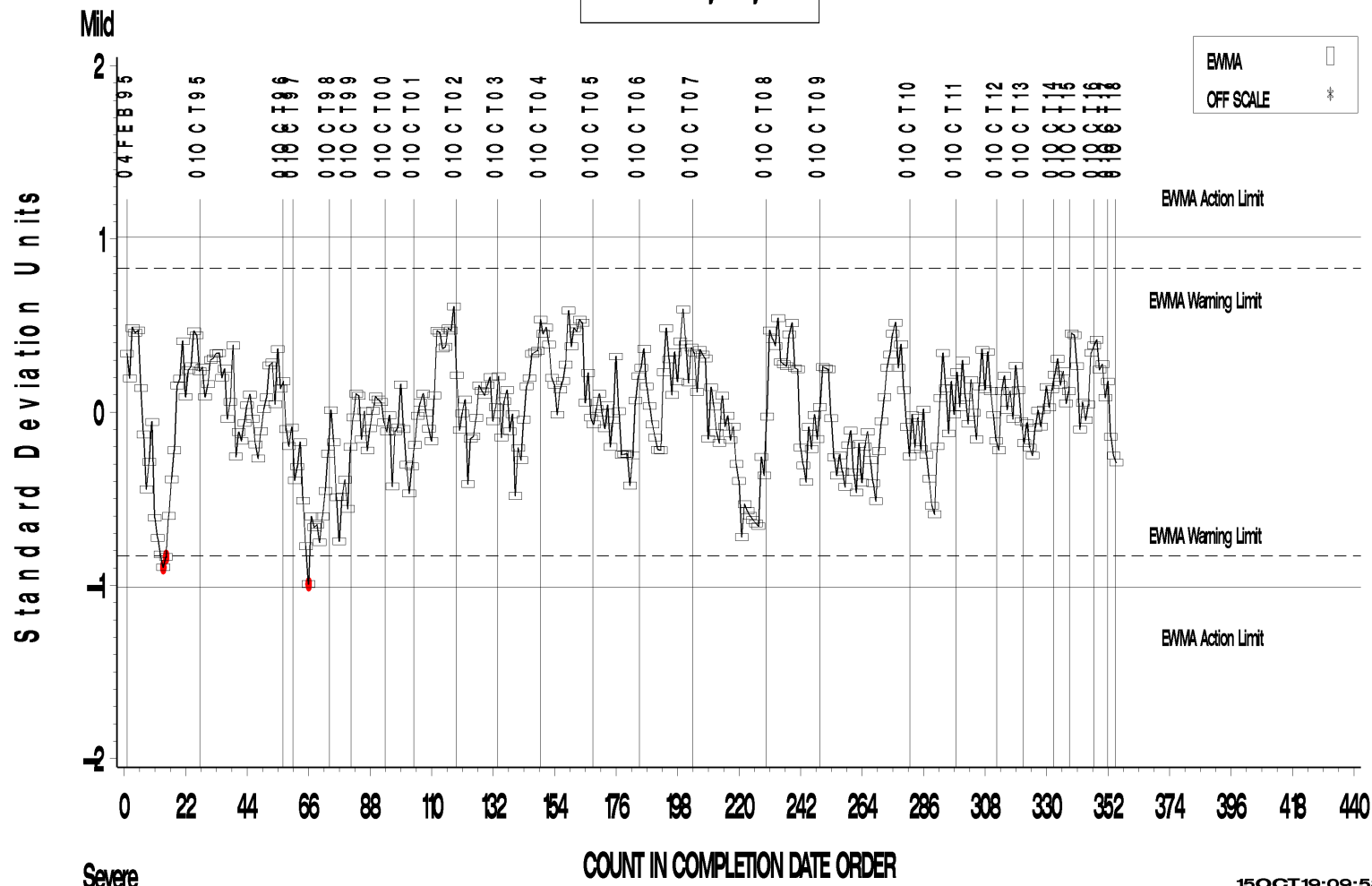
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Severity Analysis



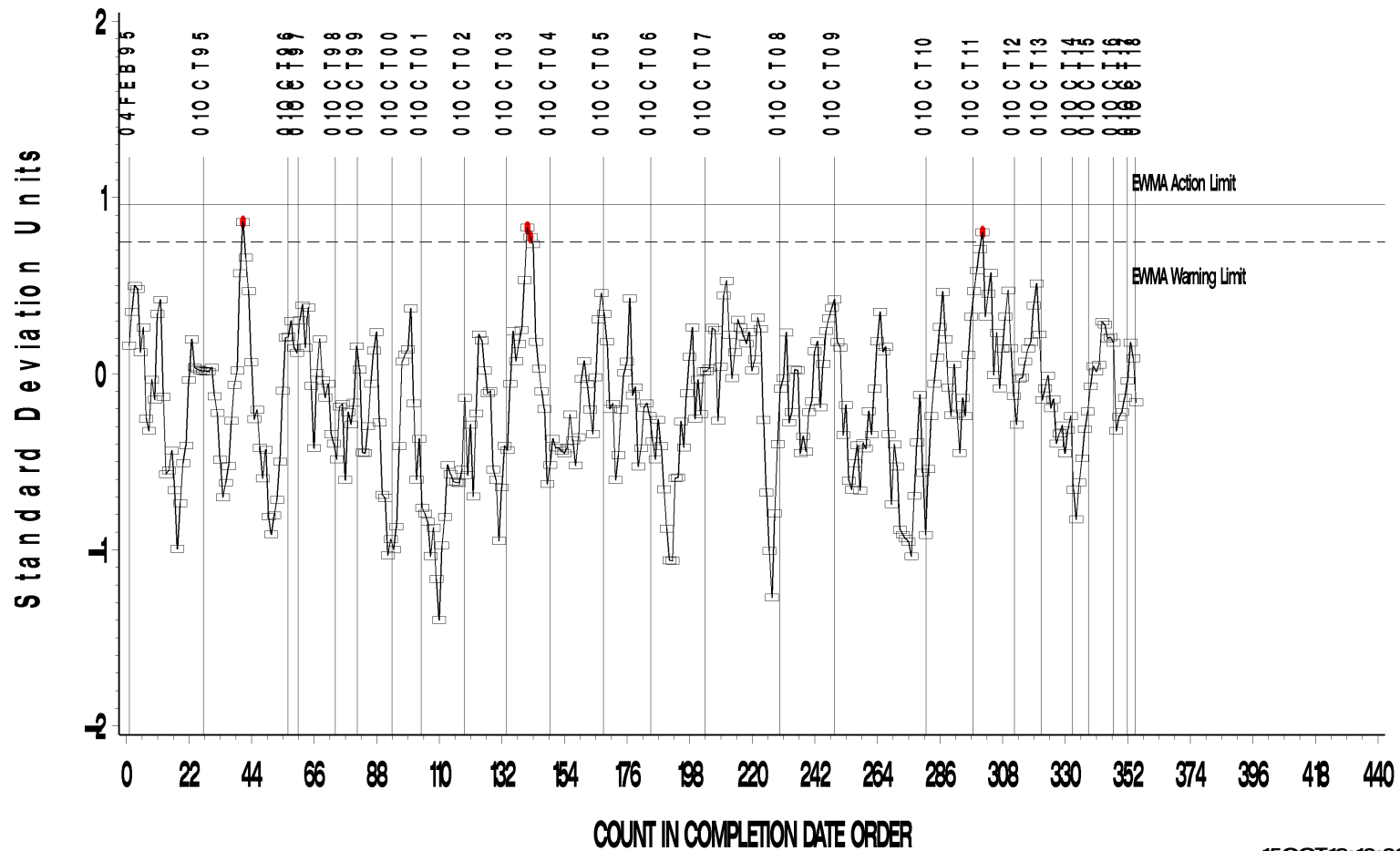
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Precision Analysis



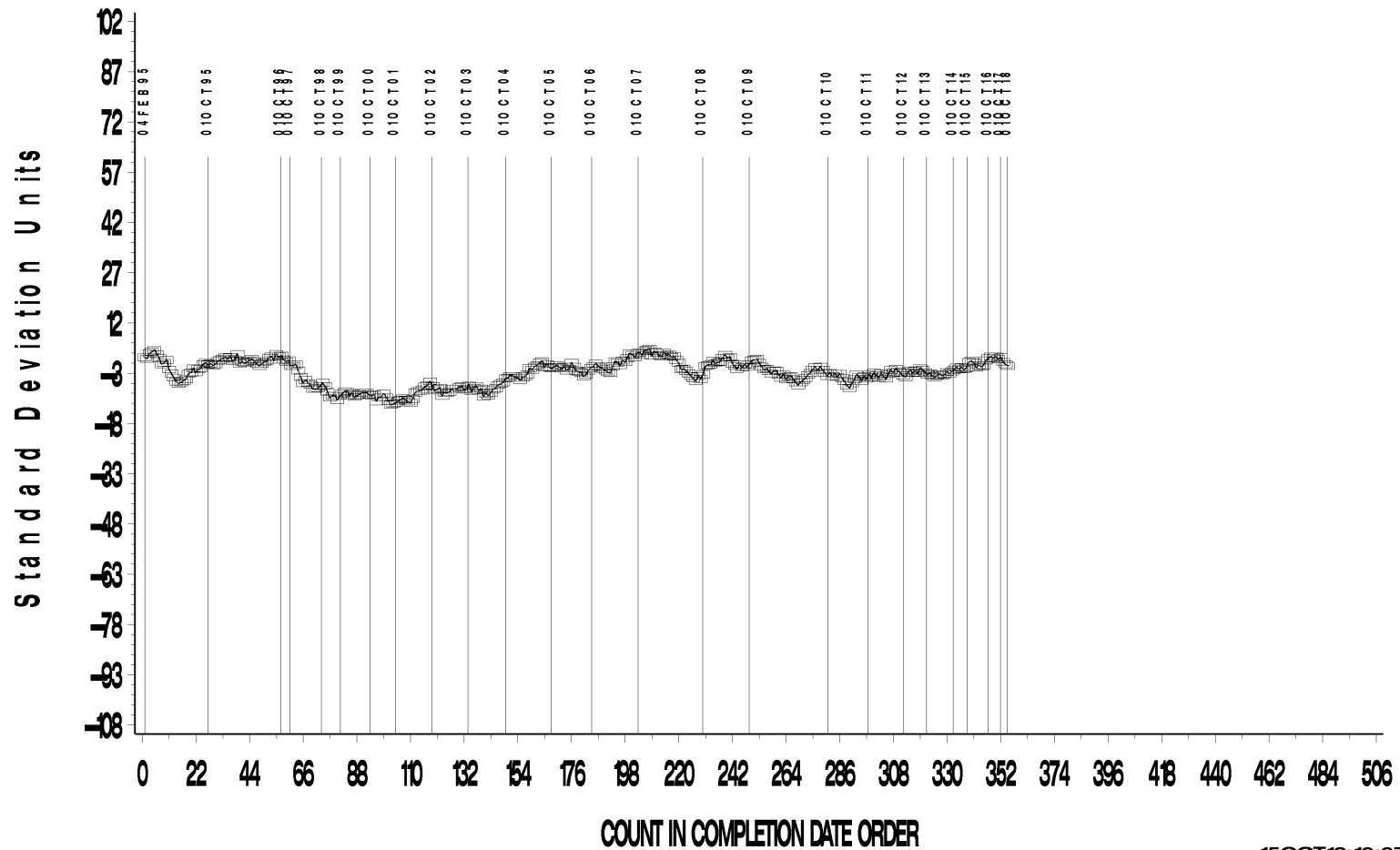
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

CUSUM Severity Analysis

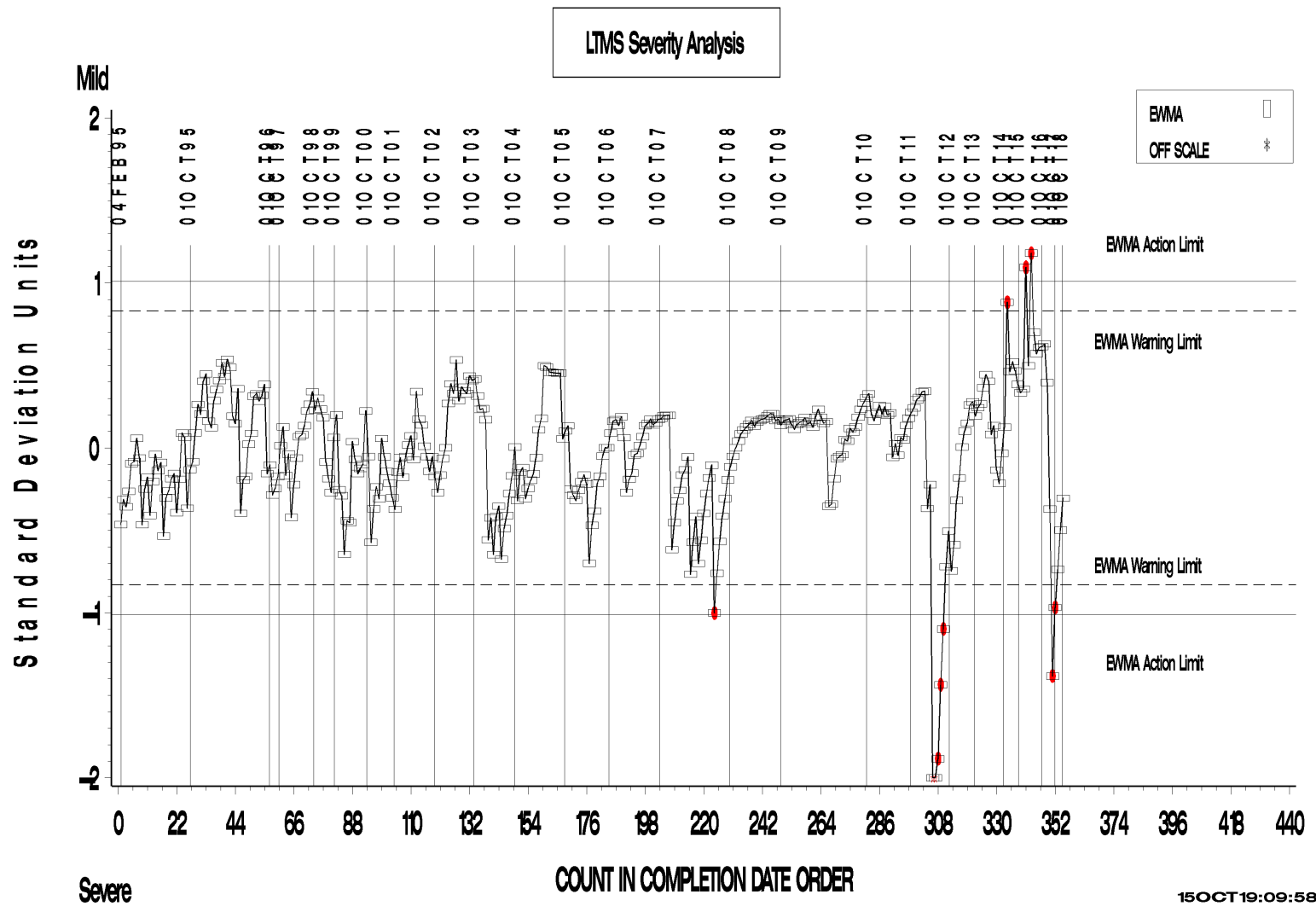


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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

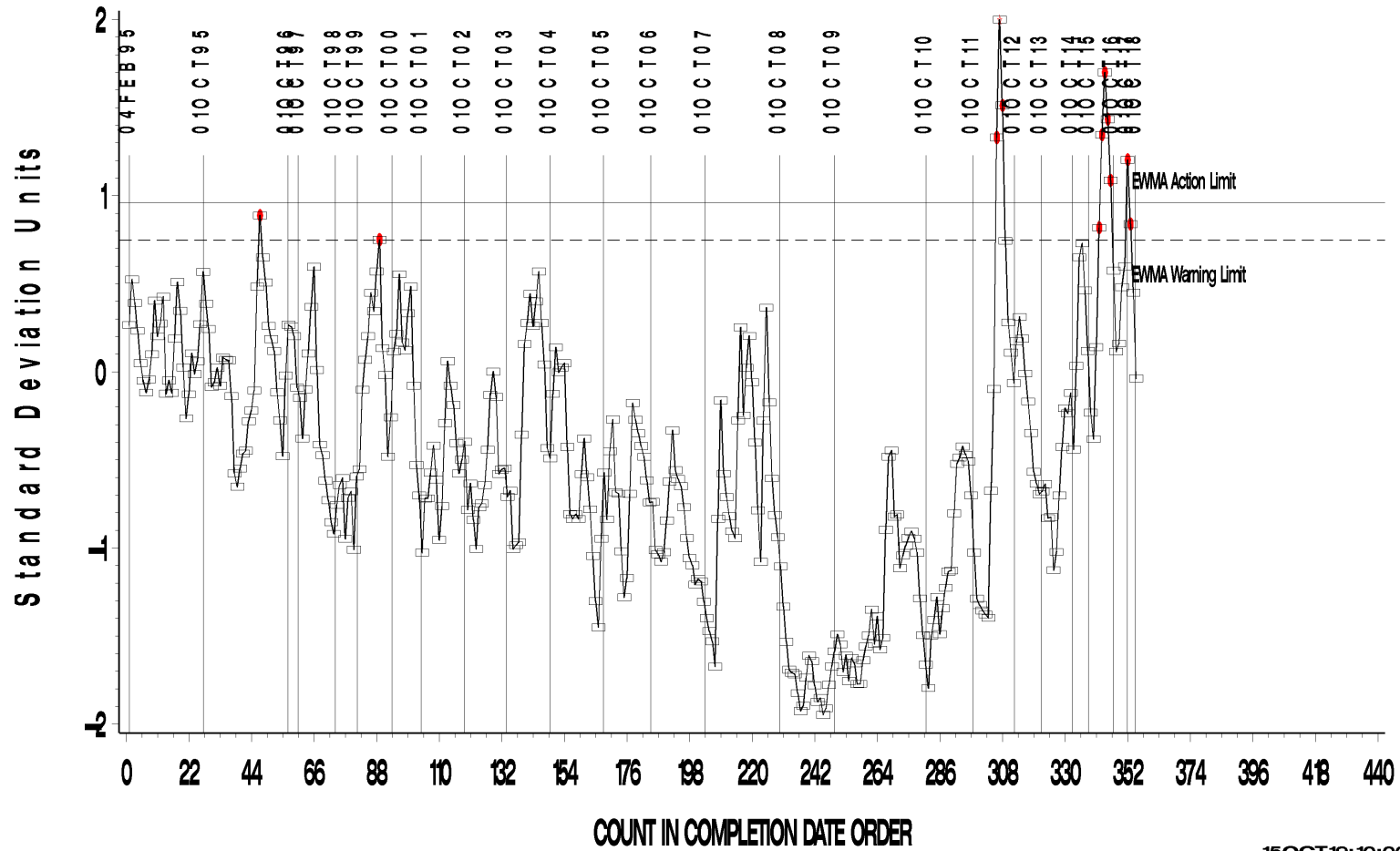


L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

LTMS Precision Analysis



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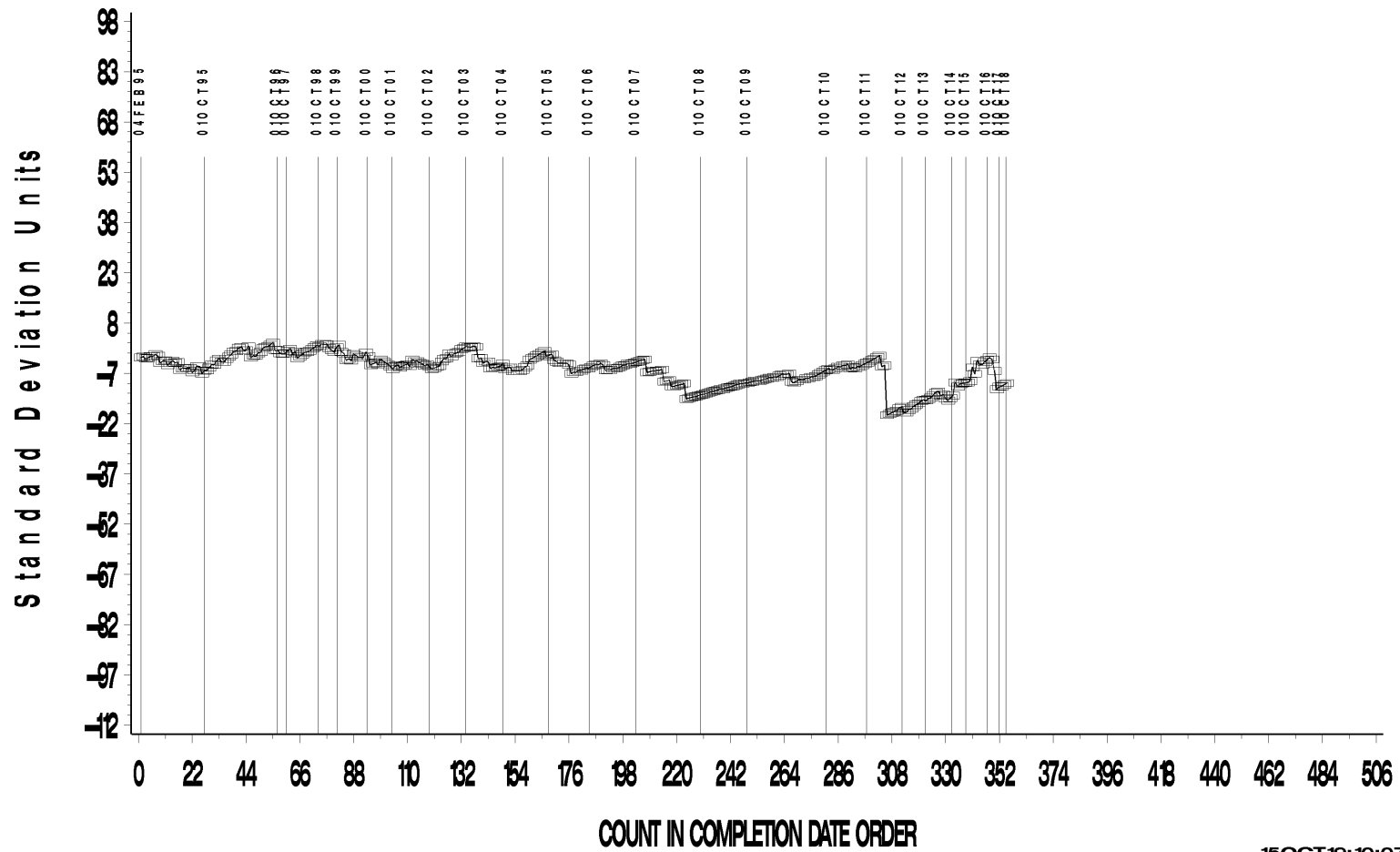
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis



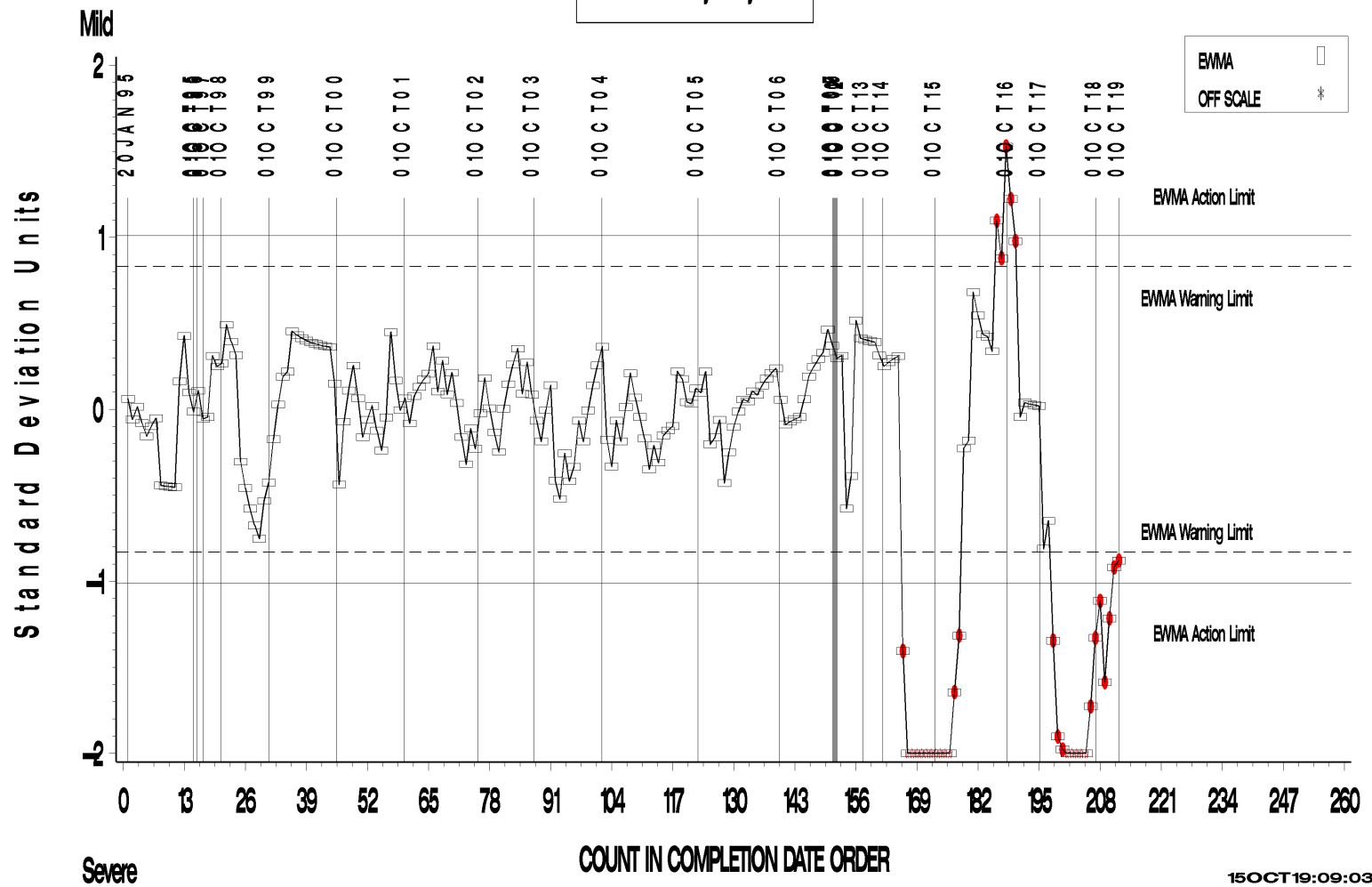
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Severity Analysis



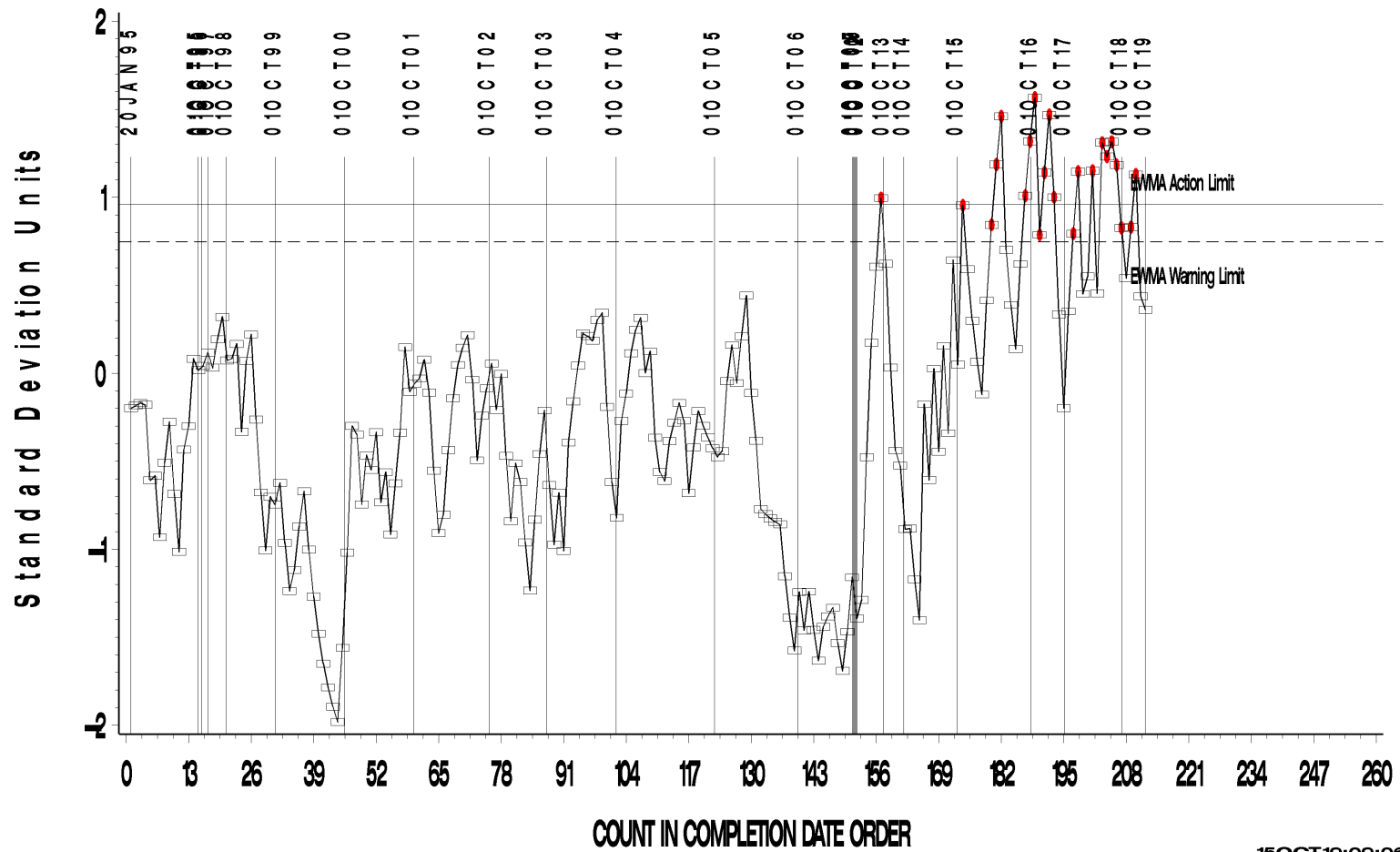
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



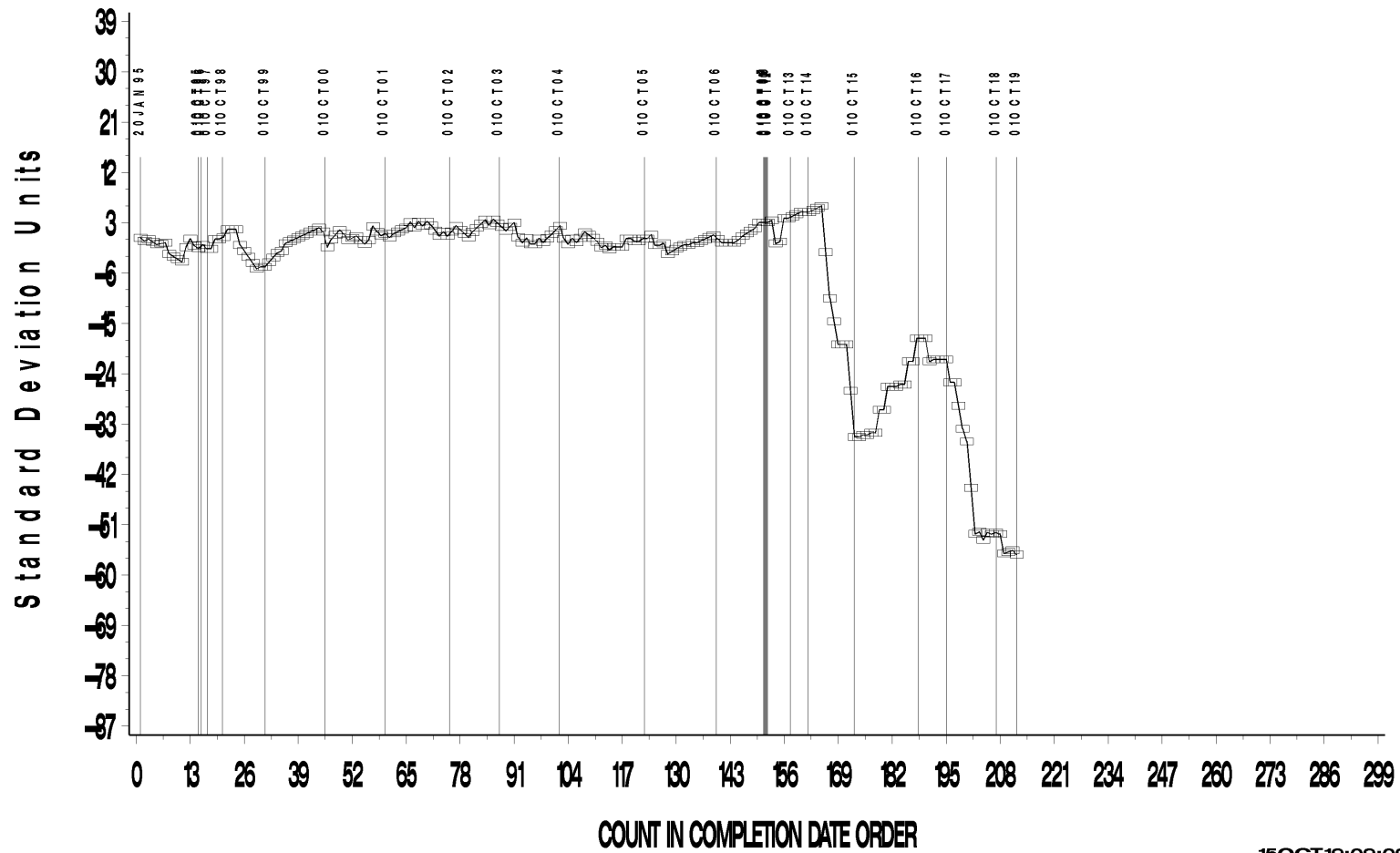
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis



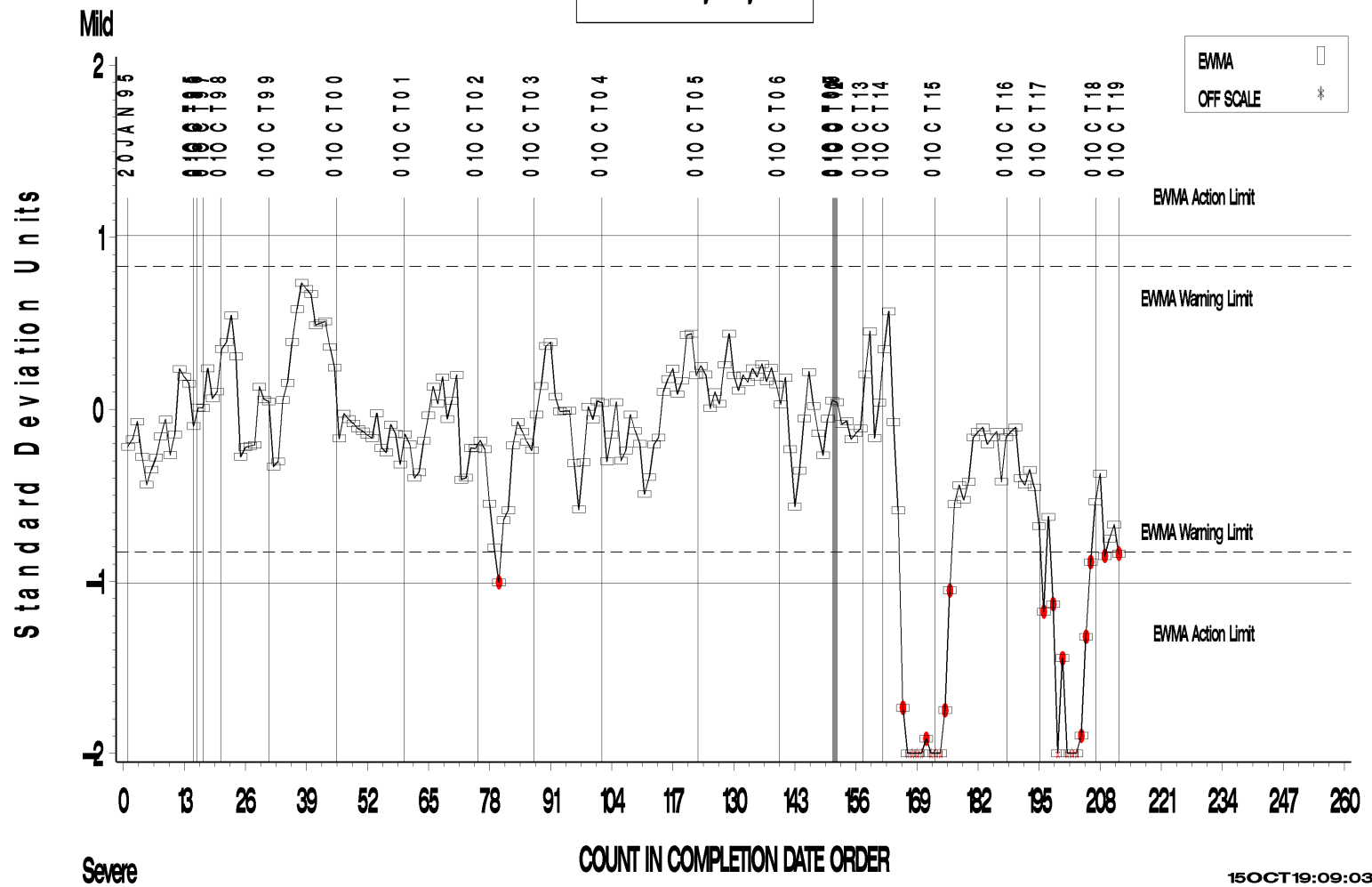
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Severity Analysis



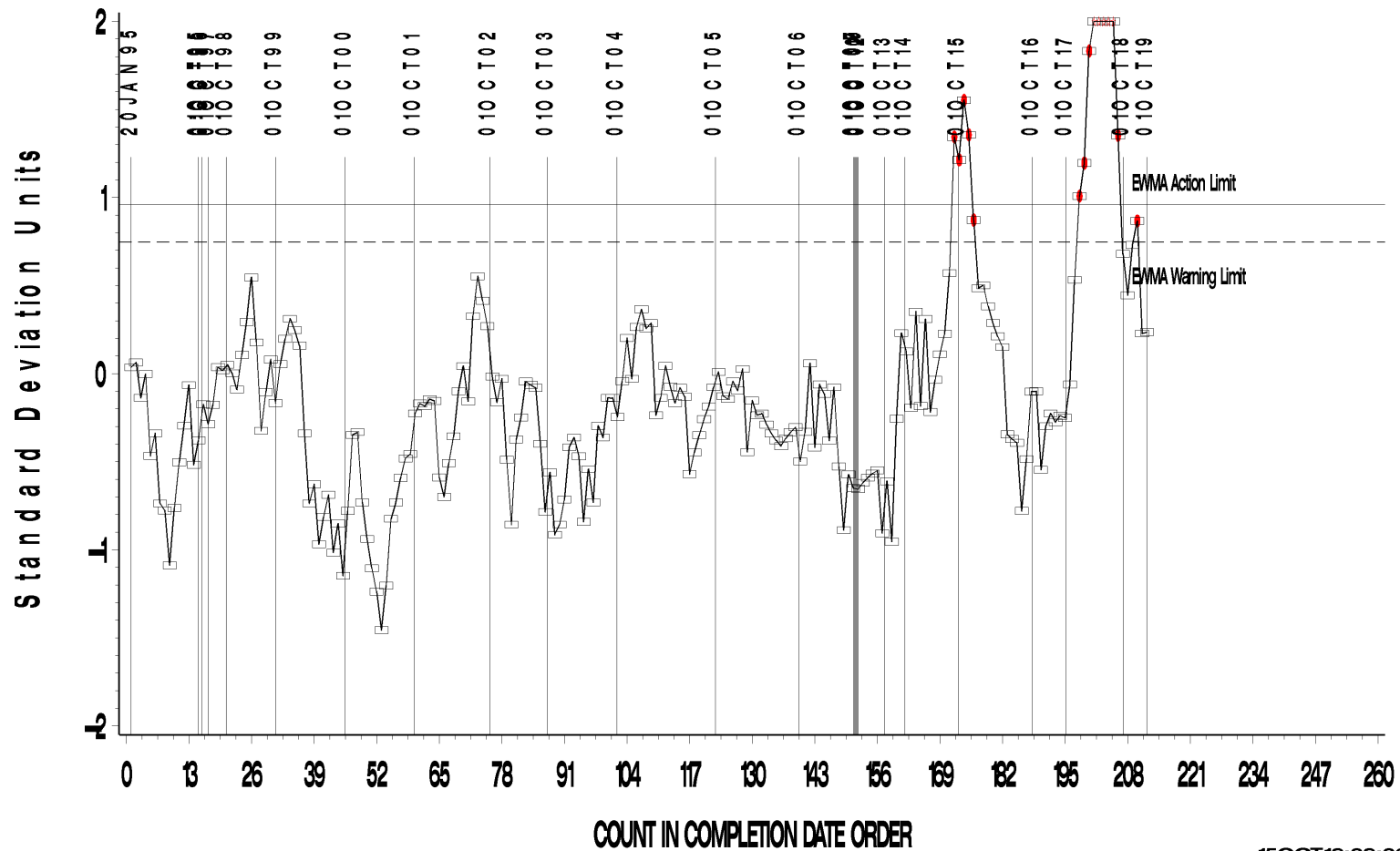
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Precision Analysis



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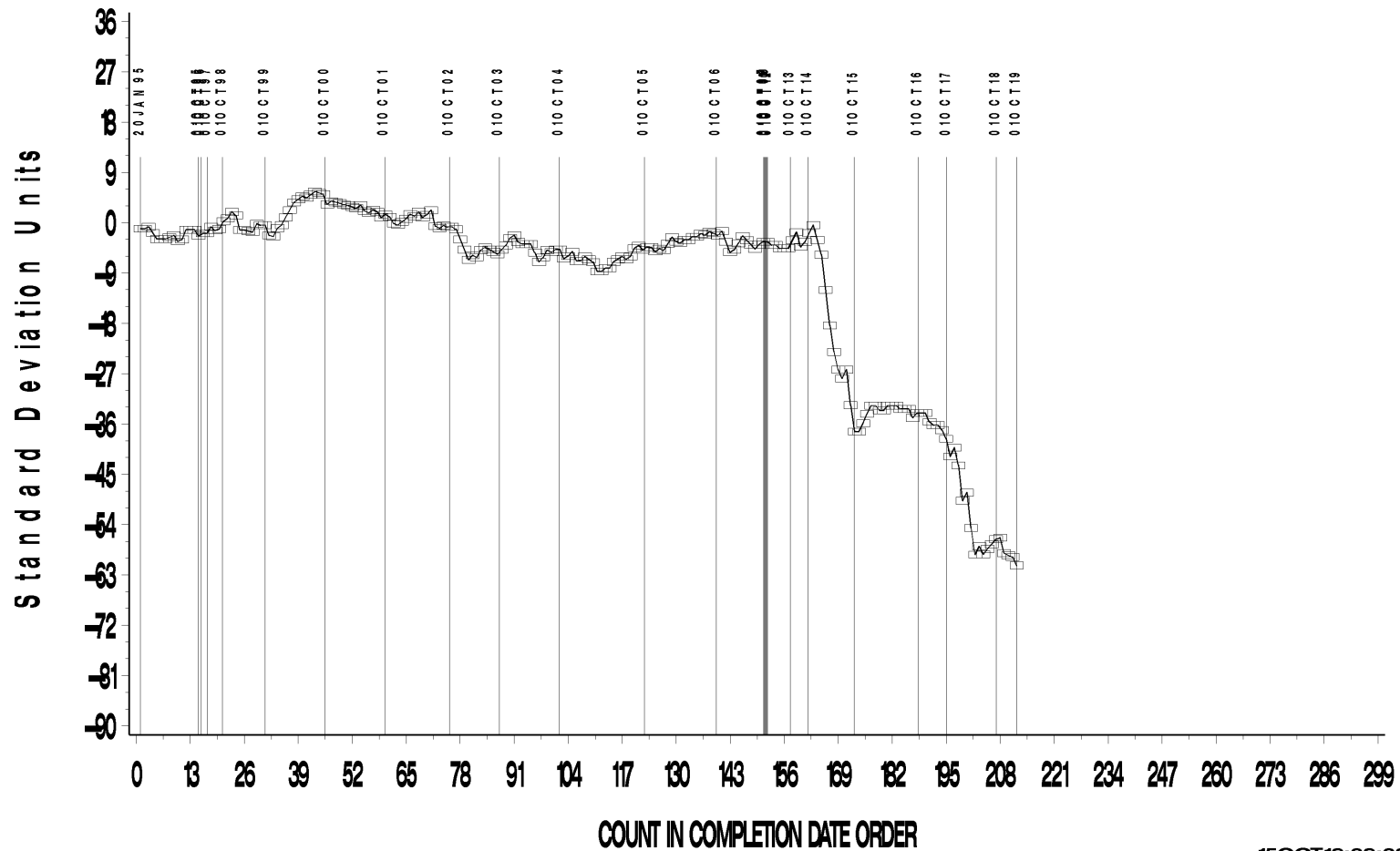
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

CUSUM Severity Analysis



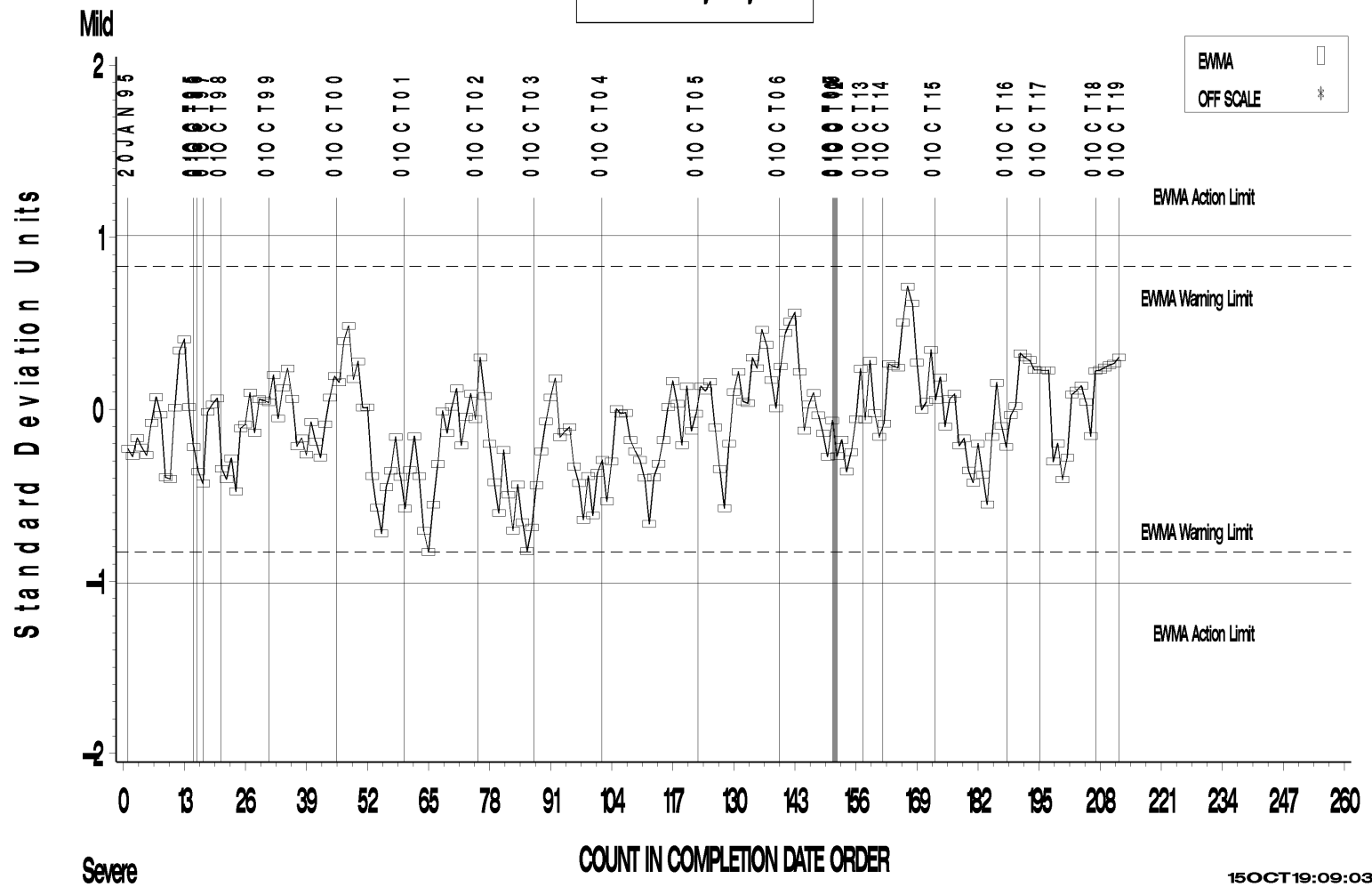
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Severity Analysis



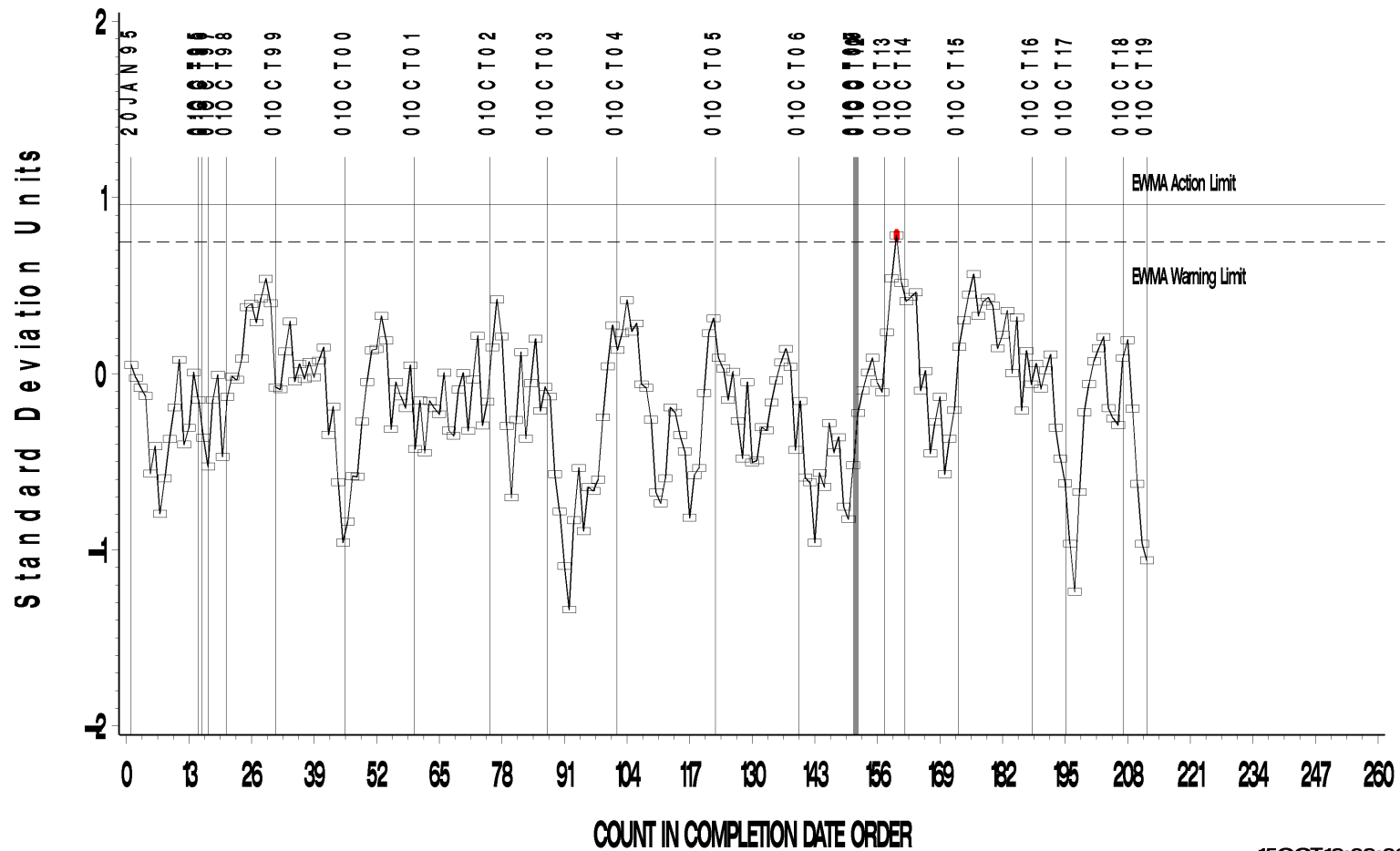
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Precision Analysis



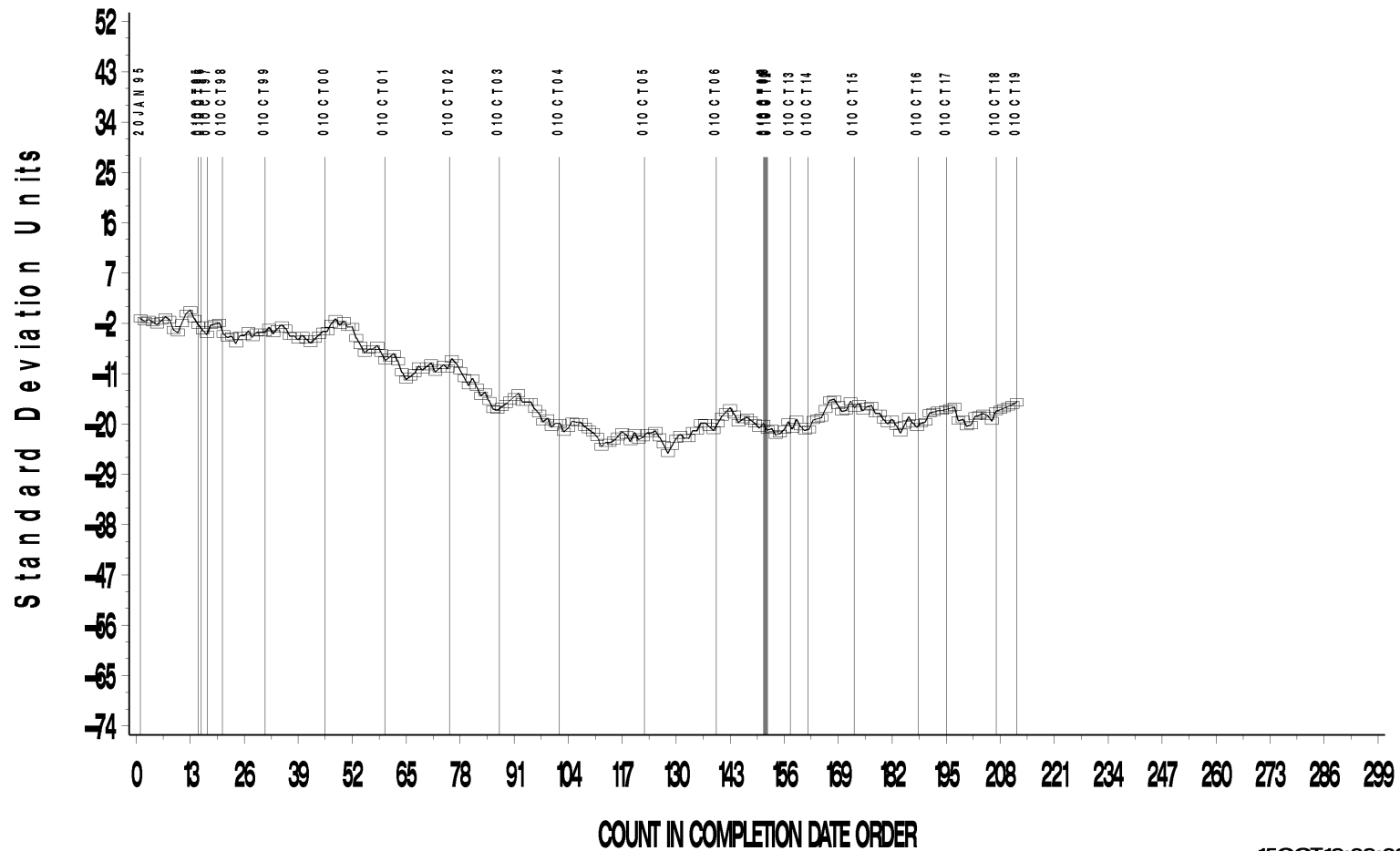
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

CUSUM Severity Analysis



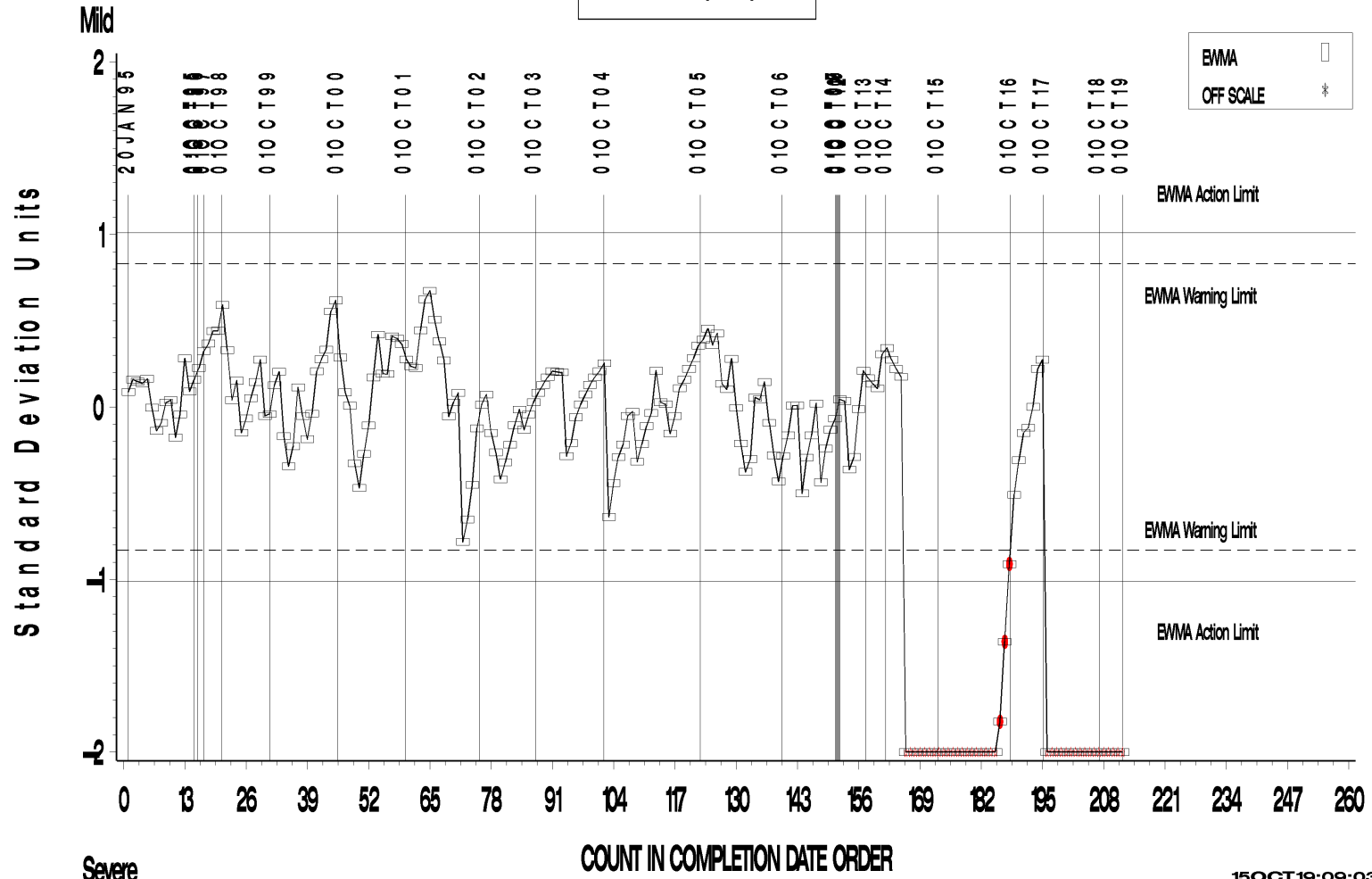
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

LTMS Severity Analysis

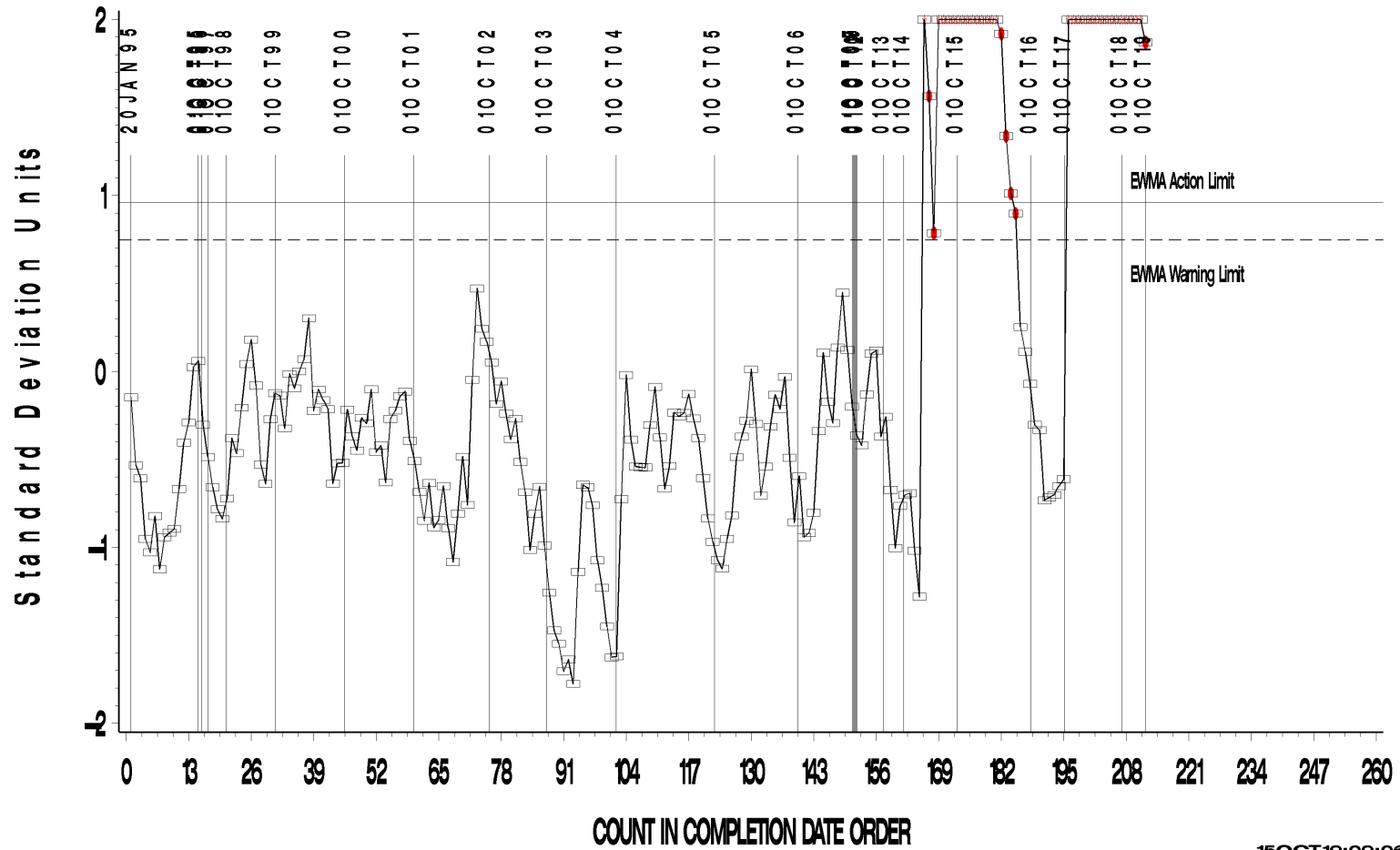


L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

LTMS Precision Analysis



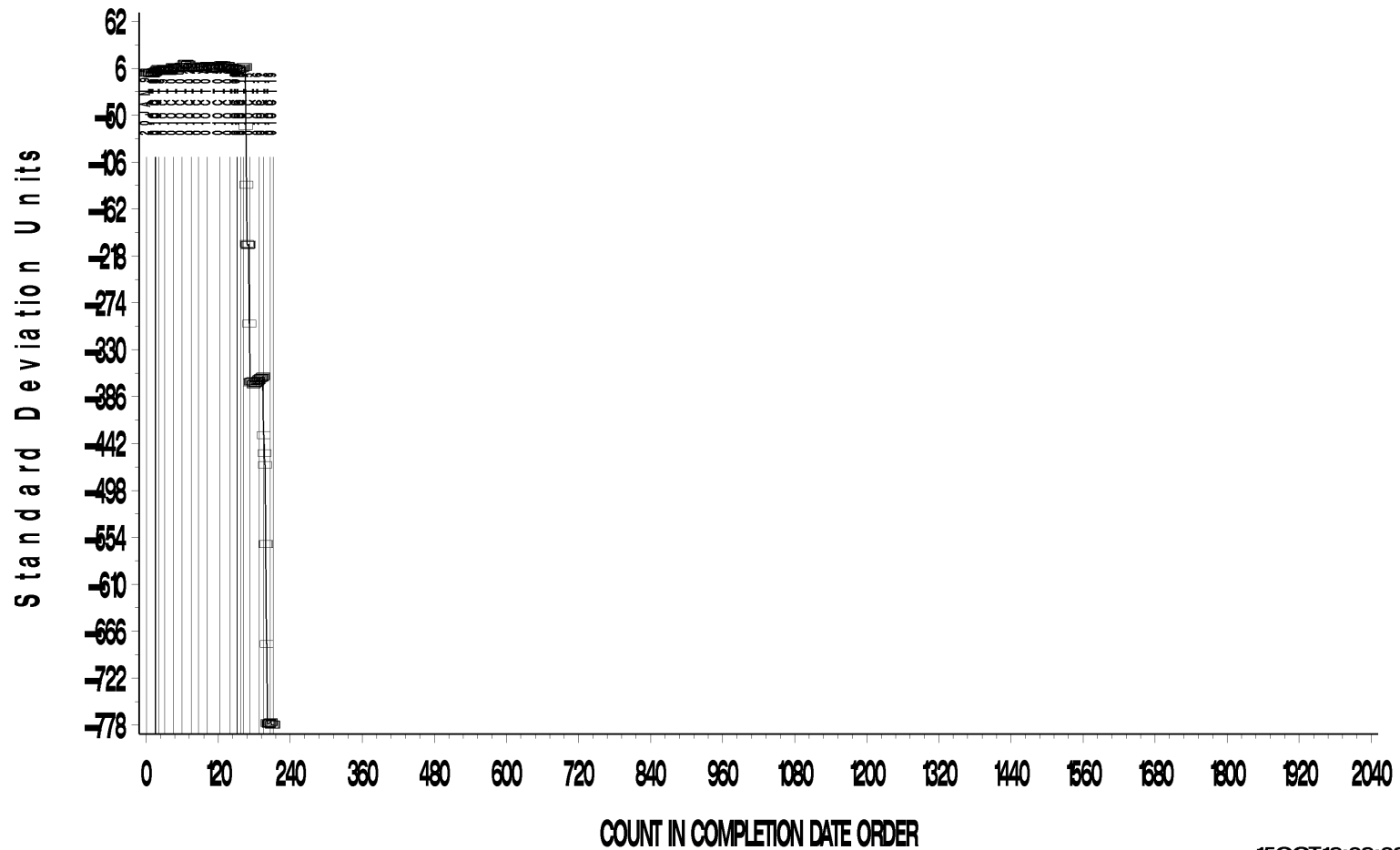
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis



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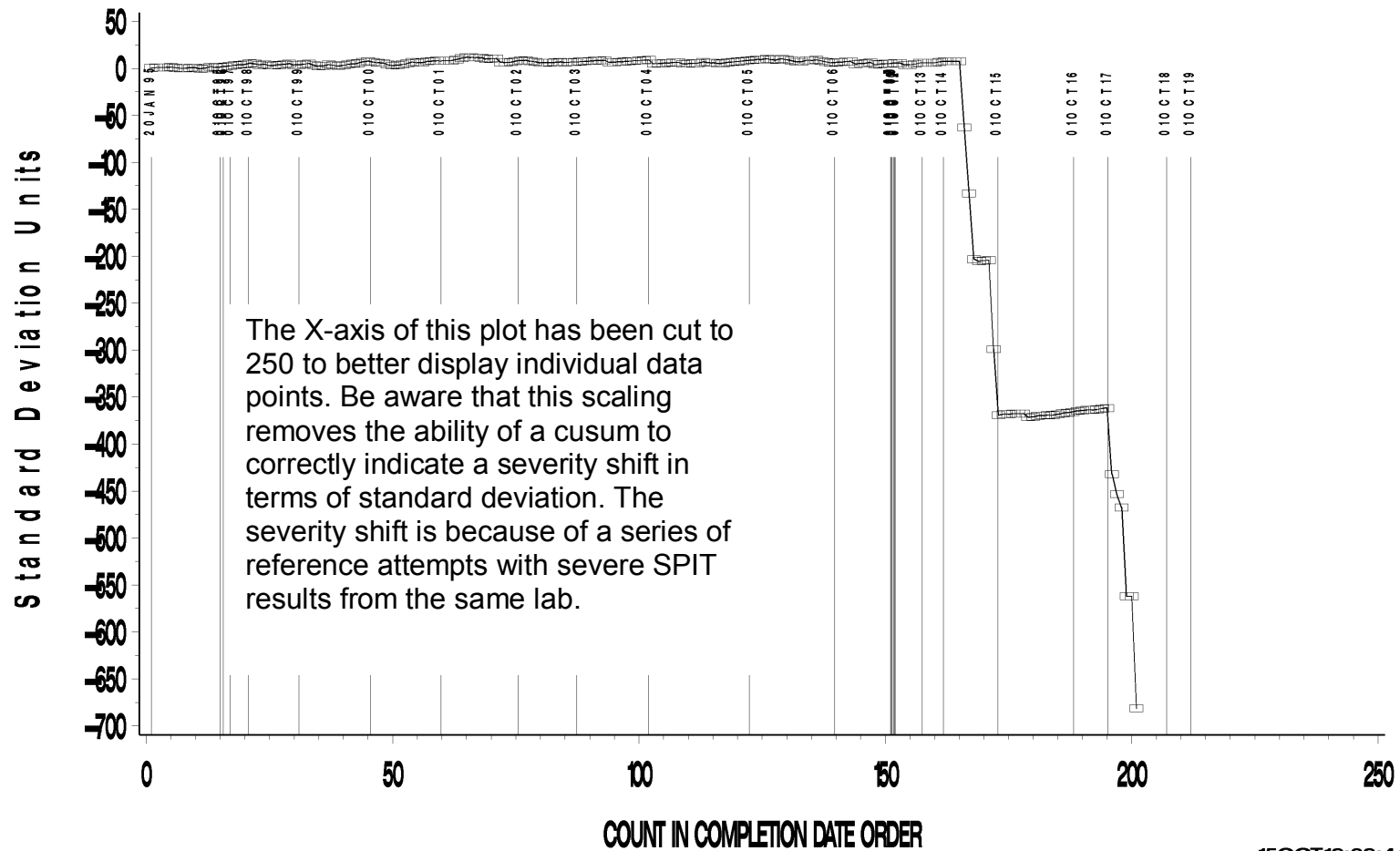
L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA



FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis



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L-37 (D6121)

TIMELINE ADDITIONS

Effective Date	Information Letter	Event
May 8, 2019	19-2	Clarification added to the test procedure to state that any approved hardware could be used for testing. Previous wording stated a specific hardware type.

L-37 (D6121)

LAB VISITS

No L-37 lab visits were conducted this period.

INFORMATION LETTERS

Information letter 19-02 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	342	342.0
134	2	0	0.0
134-1	14	150	150.0
152-2	16	95	95.0
153-1	35	0	0.0
155	20	27	27.5
155-1	15	80	80.0
Total	102	694	694.5

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-37-1, 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.