




Test Monitoring Center

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

MEMORANDUM: 14-013
DATE: May 23, 2014
TO: Chris Prengaman, Chairman, L-37 Surveillance Panel
FROM: Scott Parke 
SUBJECT: L-37 Testing from October 1, 2013 through March 31, 2014

Please find attached a summary of reference oil testing activity this period.

SDP/sdp/mem14-013.sdp.doc

cc: Frank Farber
Jeff Clark

L-37 Surveillance Panel

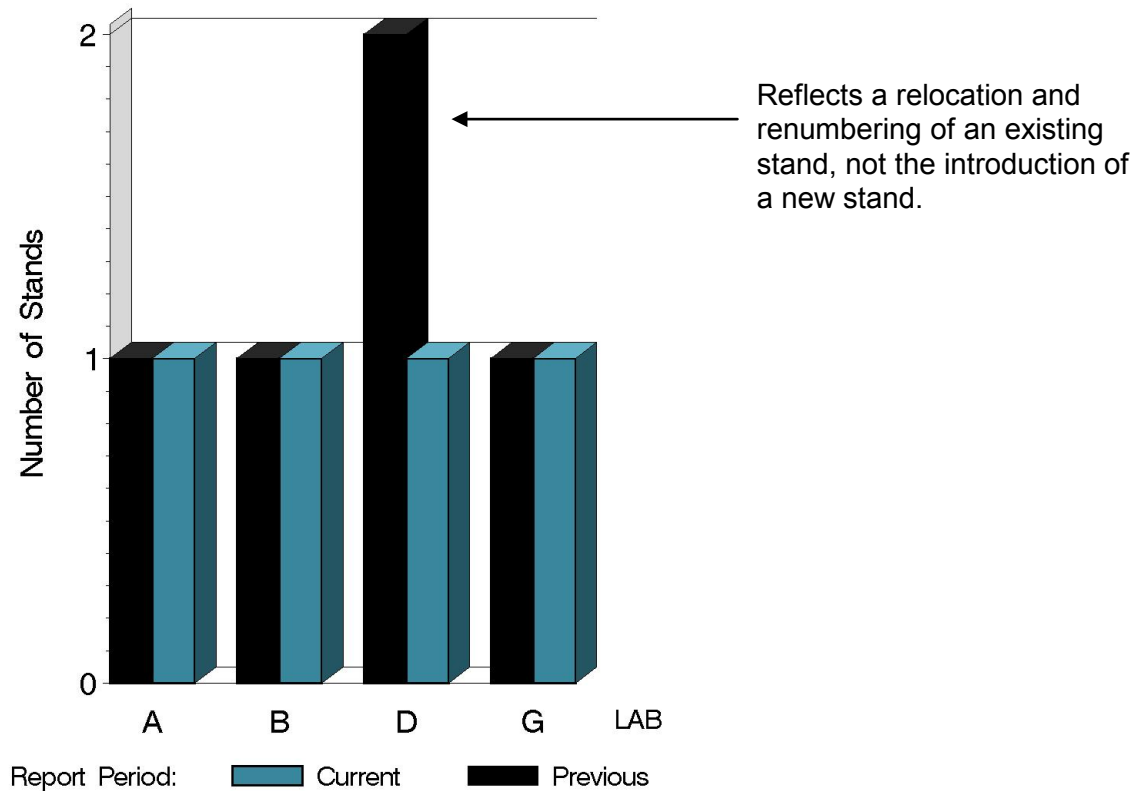
<ftp://ftp.astmtmc.cmu.edu/docs/gear/137/semiannualreports/137-04-2014.pdf>

Distribution: email

L-37 (D6121)

	Reporting Data	Calibrated on 3-31-14
Number of Labs	4	4
Number of Stands	4	4

BY-LAB STAND
DISTRIBUTION



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L-37 (D6121)

Test Distribution by Oil and Validity

							Totals	
		134	152-1	152-2	155	155-1	Last Period	This Period
Accepted for calibration	AC	0	1	2	1	1	8	5
Rejected (Mild)	OC	0	0	0	0	0	0	0
Rejected (Severe)	OC	0	0	0	0	0	0	0
Rejected (Precision)	OC	0	0	0	0	0	0	0
Invalidated calibration	LC	0	0	0	0	0	0	0
Acceptable info run	NI	1	0	0	0	0	2	1
Unacceptable info run	MI	0	0	0	0	0	1	0
Total		1	1	2	1	1	11	1

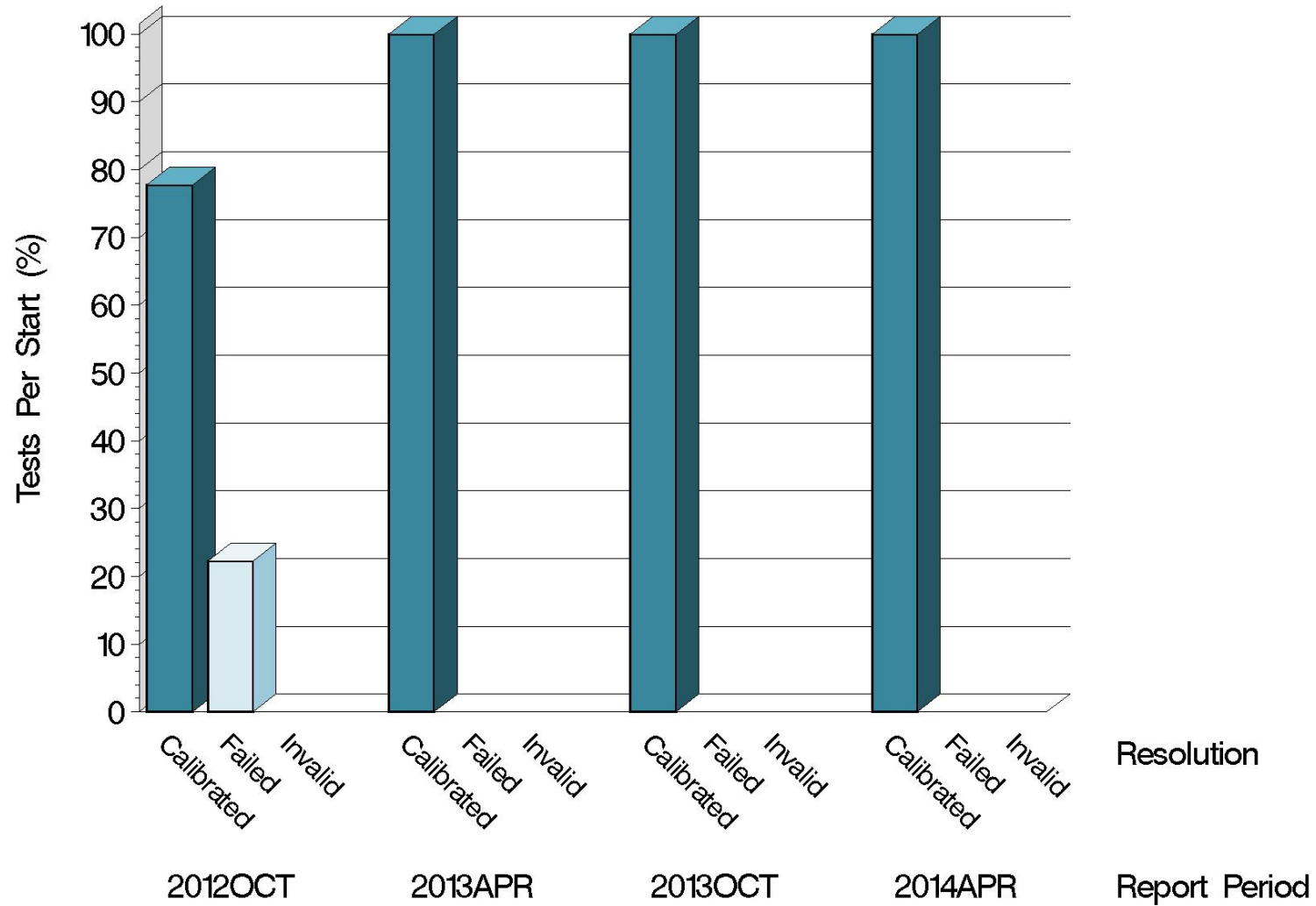
L-37 (D6121)

Calibration Attempt Detail

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

L-37 (D6121)

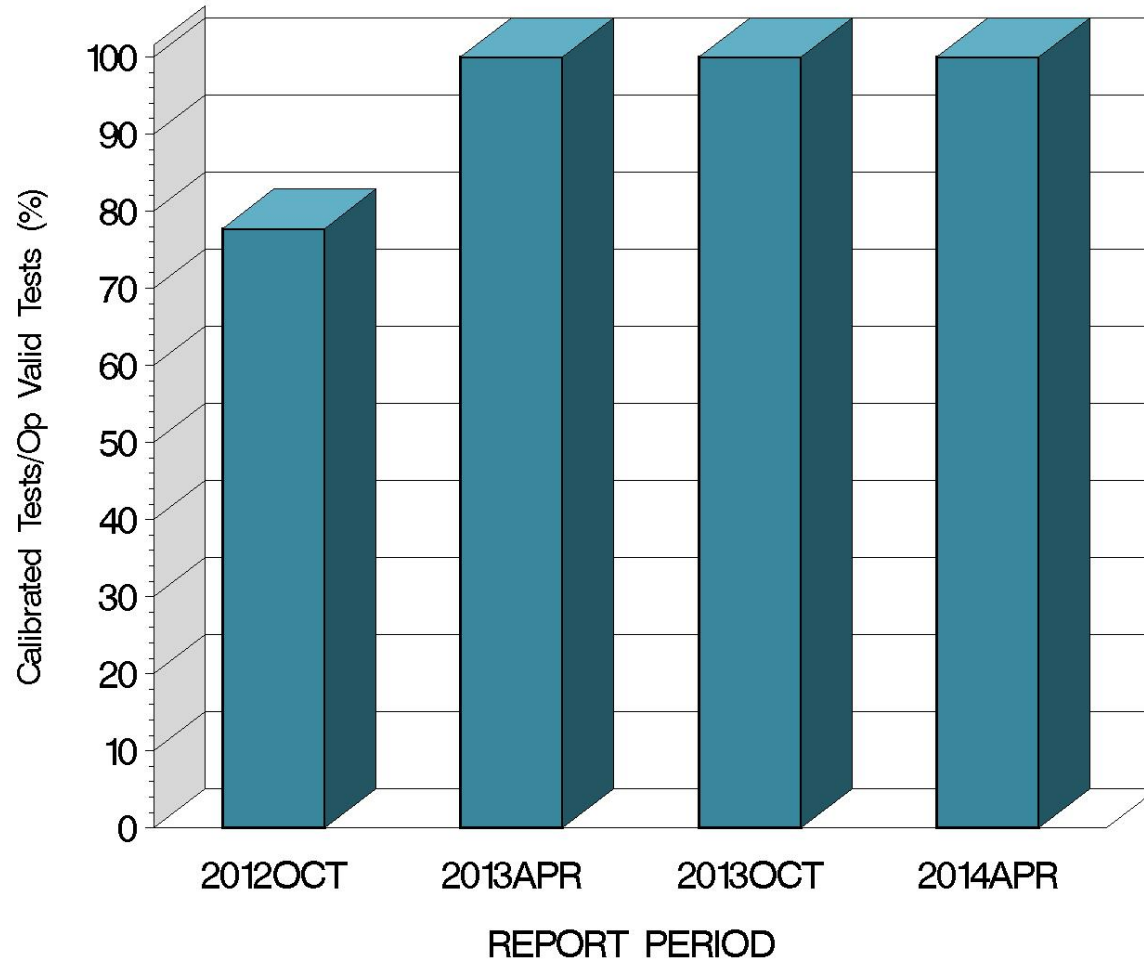
CALIBRATION ATTEMPT SUMMARY



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L-37 (D6121)

OPERATIONALLY VALID TESTS
MEETING ACCEPTANCE CRITERIA



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L-37 (D6121)

CAUSES FOR LOST TESTS

Lab	Cause	Oil					Validity			Loss Rate		
		134	152-1	152-2	155	155-1	RC	LC	XC	Lost	Starts	%
	No tests were lost this period.									0	6	0%
	Lost	0	0	0	0	0	0	0	0			
	Starts	1	1	2	1	1	6	6	6			
	%	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	2	1.455	0.000	1.455	2.081
RIPP	V1L528/P4T883A	2	0.203	2.050	0.203	0.097
SPIT	V1L528/P4T883A	2	0.000	0.000	0.000	0.000
WEAR	V1L528/P4T883A	2	0.370	0.000	0.370	0.192

^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	V1L500/P4T813	1	0.218	.	-1.106	-0.737
	V1L528/P4T883A	2	-1.768	1.000		
RIPP	V1L500/P4T813	1	-0.771	.	-0.352	-0.196
	V1L528/P4T883A	2	-0.142	0.772		
SPIT	V1L500/P4T813	1	0.357	.	0.219	0.185
	V1L528/P4T883A	2	0.150	0.423		
WEAR	V1L500/P4T813	1	1.040	.	-0.320	-0.228
	V1L528/P4T883A	2	-1.000	1.414		

^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						
Gear Batch	Lab	N	RIDG	RIPP	SPIT	WEAR
V1L528/P4T883A	B	1	1.455	1.652	0.000	0.370
	G	1	1.455	-1.246	0.000	0.370

NON-LUBRITED HARDWARE						
Gear Batch	Lab	N	RIDG	RIPP	SPIT	WEAR
V1L500/P4T813	D	1	0.218	-0.771	0.357	1.040
V1L528/P4T883A	A	1	-2.475	0.404	0.449	0.000
	B	1	-1.061	-0.688	-0.150	-2.000

L-37 (D6121)

SUMMARY OF SEVERITY & PRECISION

Severity

Testing on both lubrited and non-lubrited hardware remained within control chart limits this period.

Precision

Precision performance for both hardware types also remained within control chart limits.

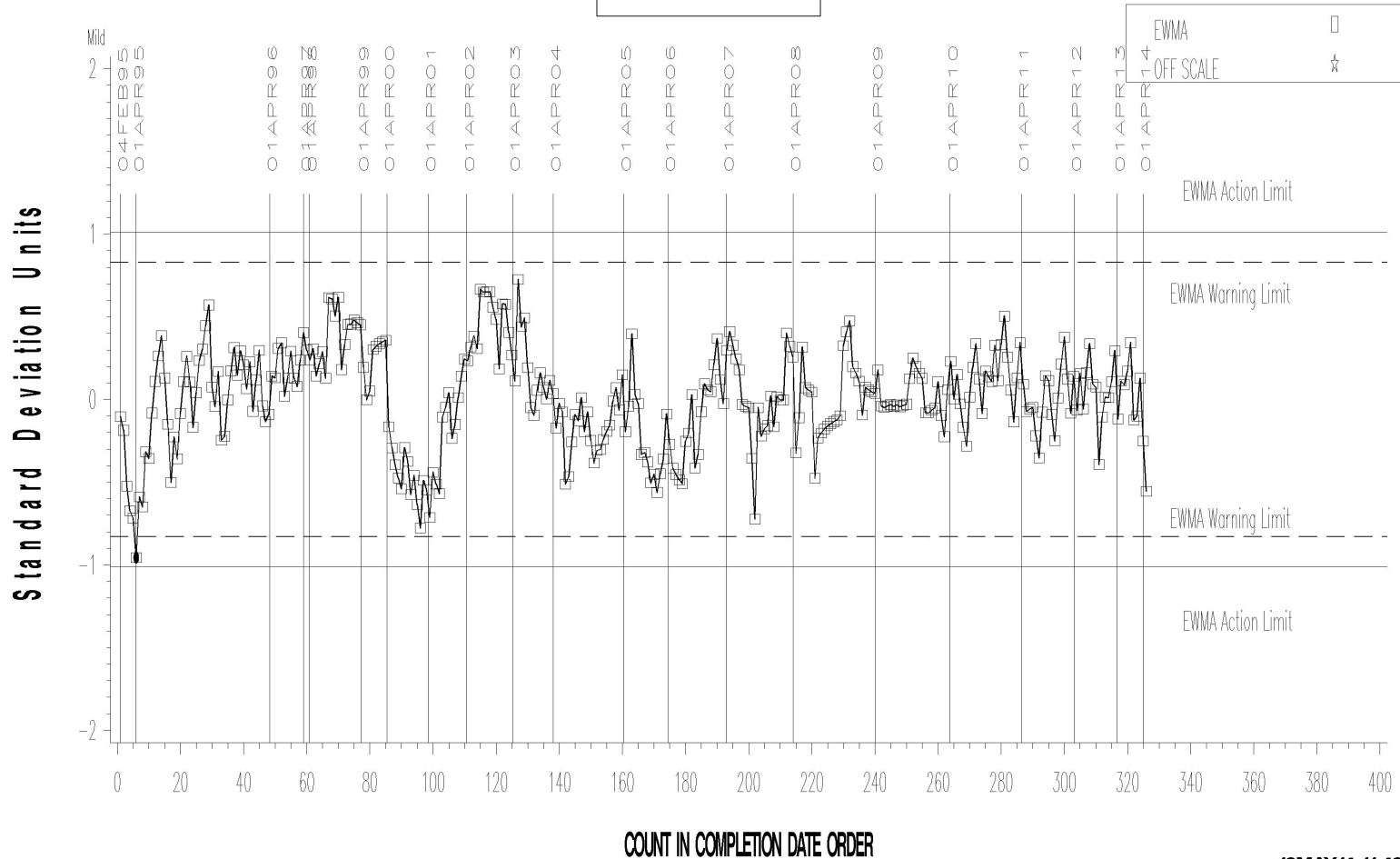
Industry control charts follow.

L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Severity Analysis



Severe

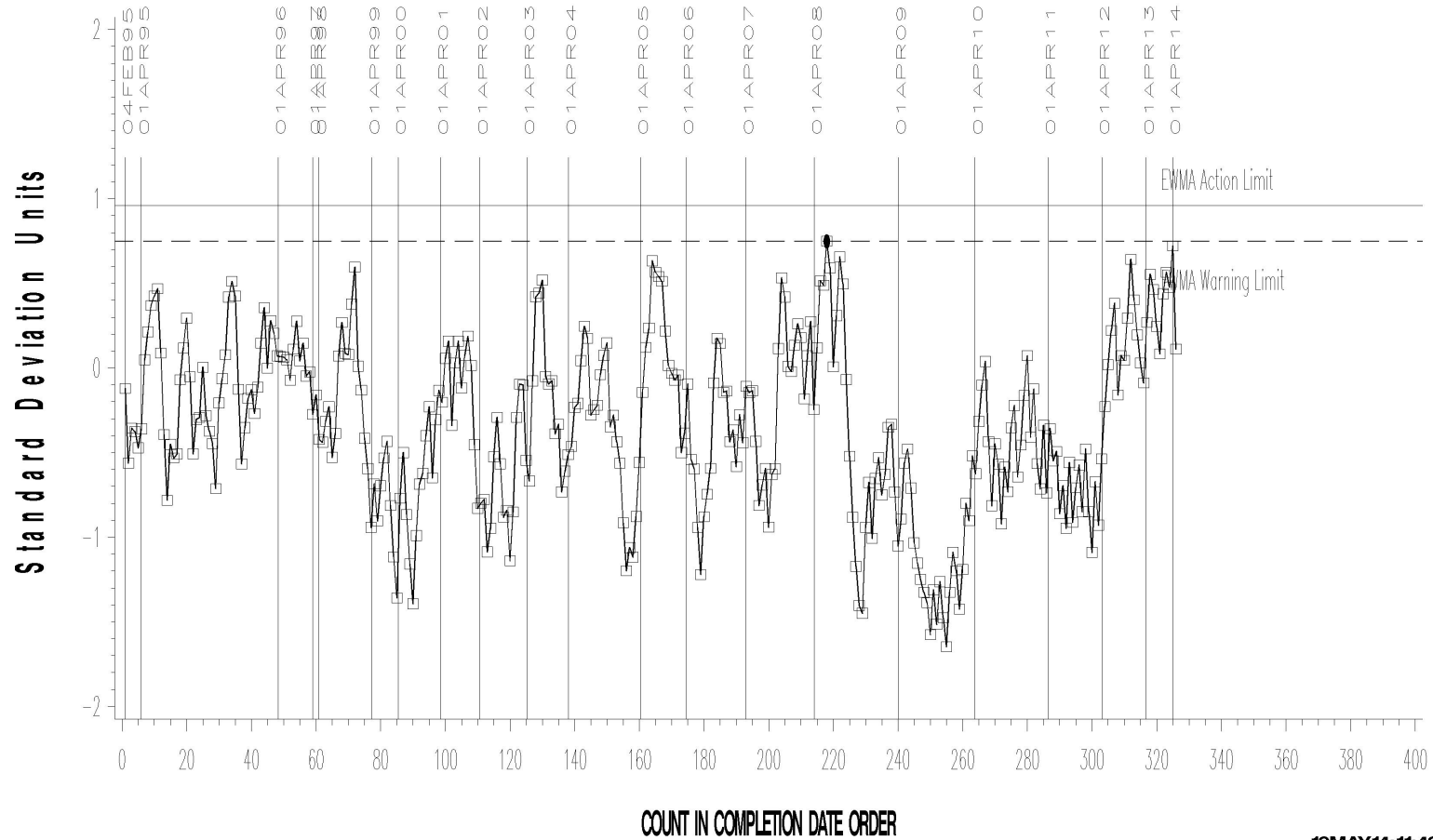
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



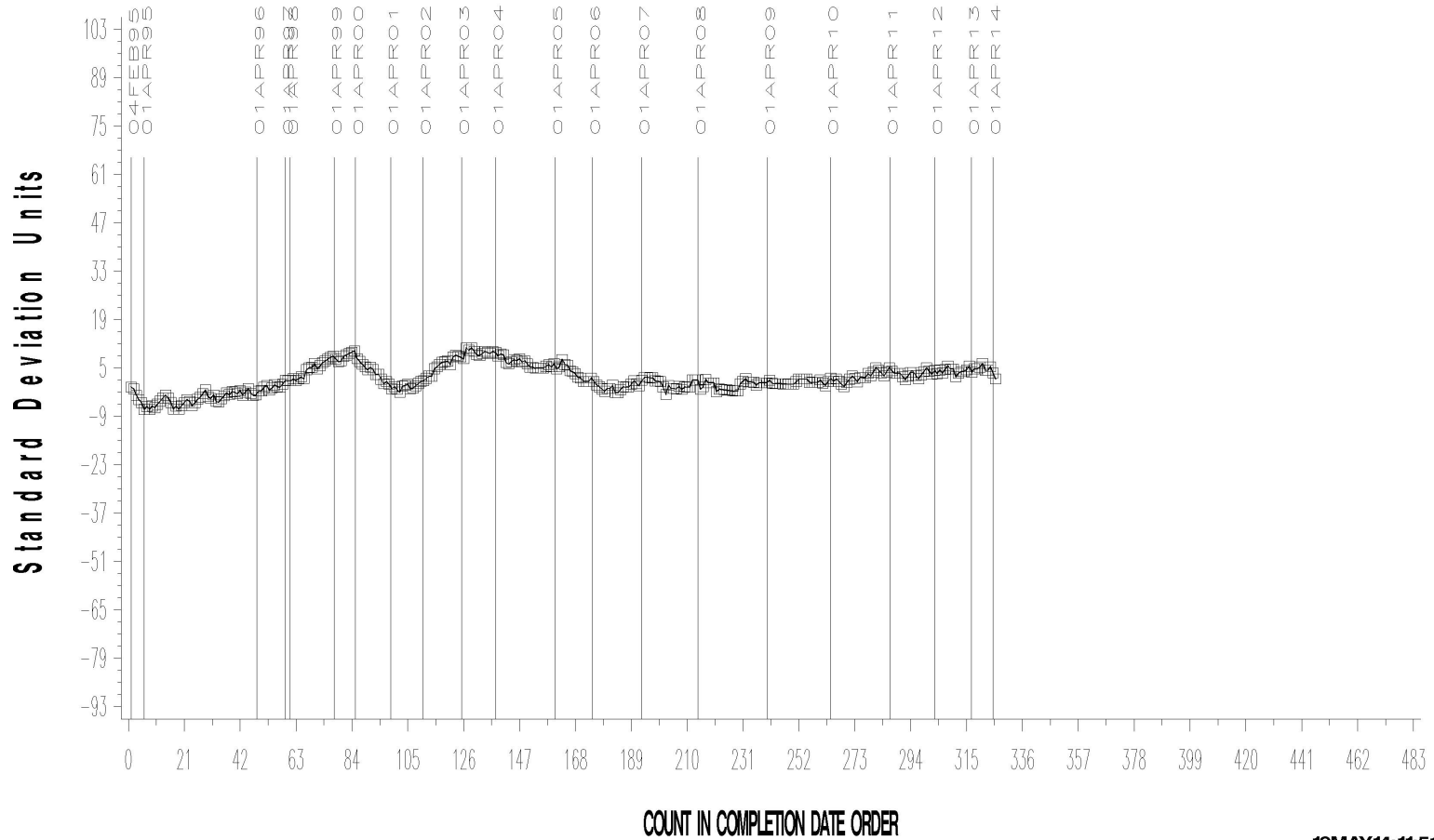
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis



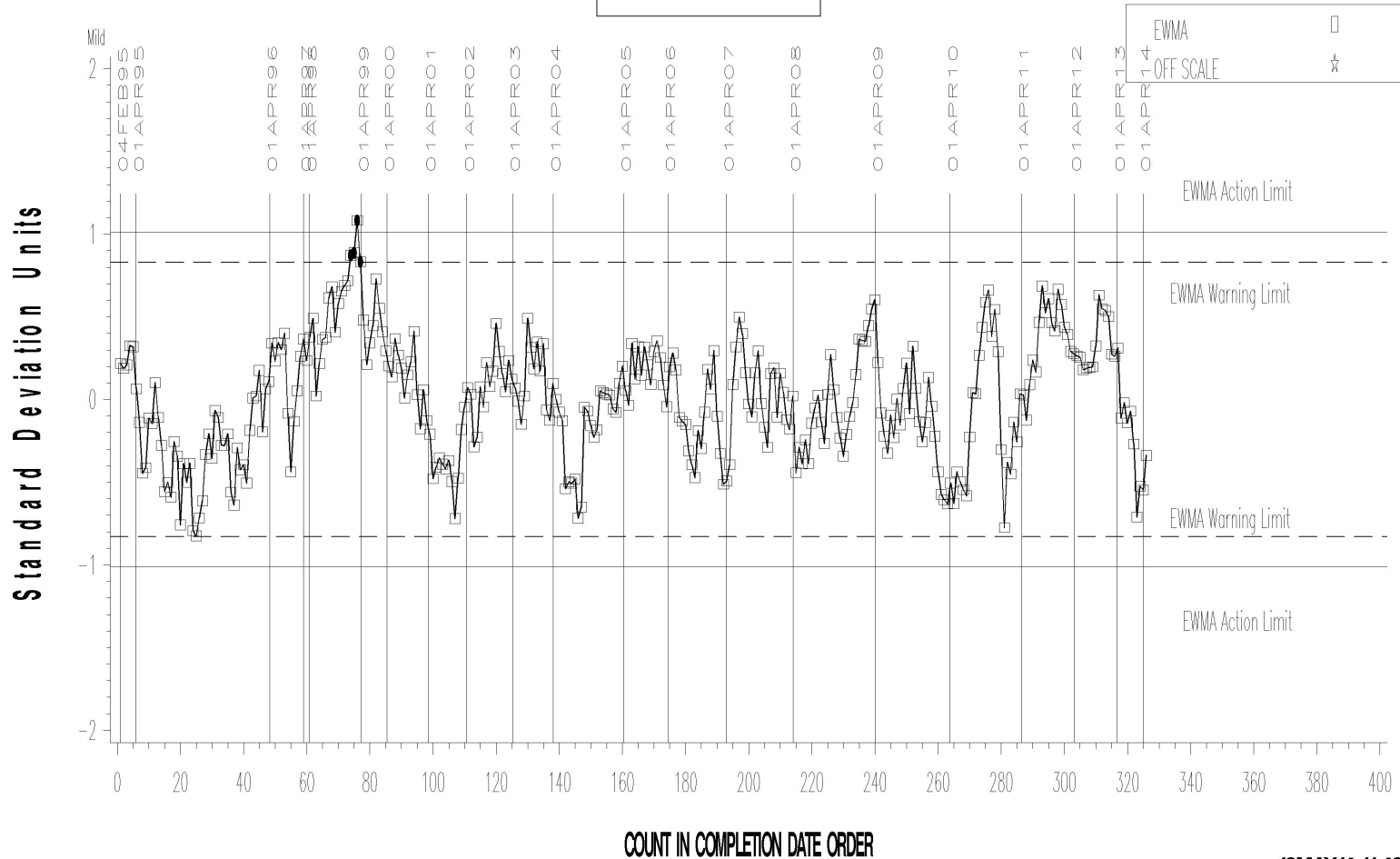
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Severity Analysis



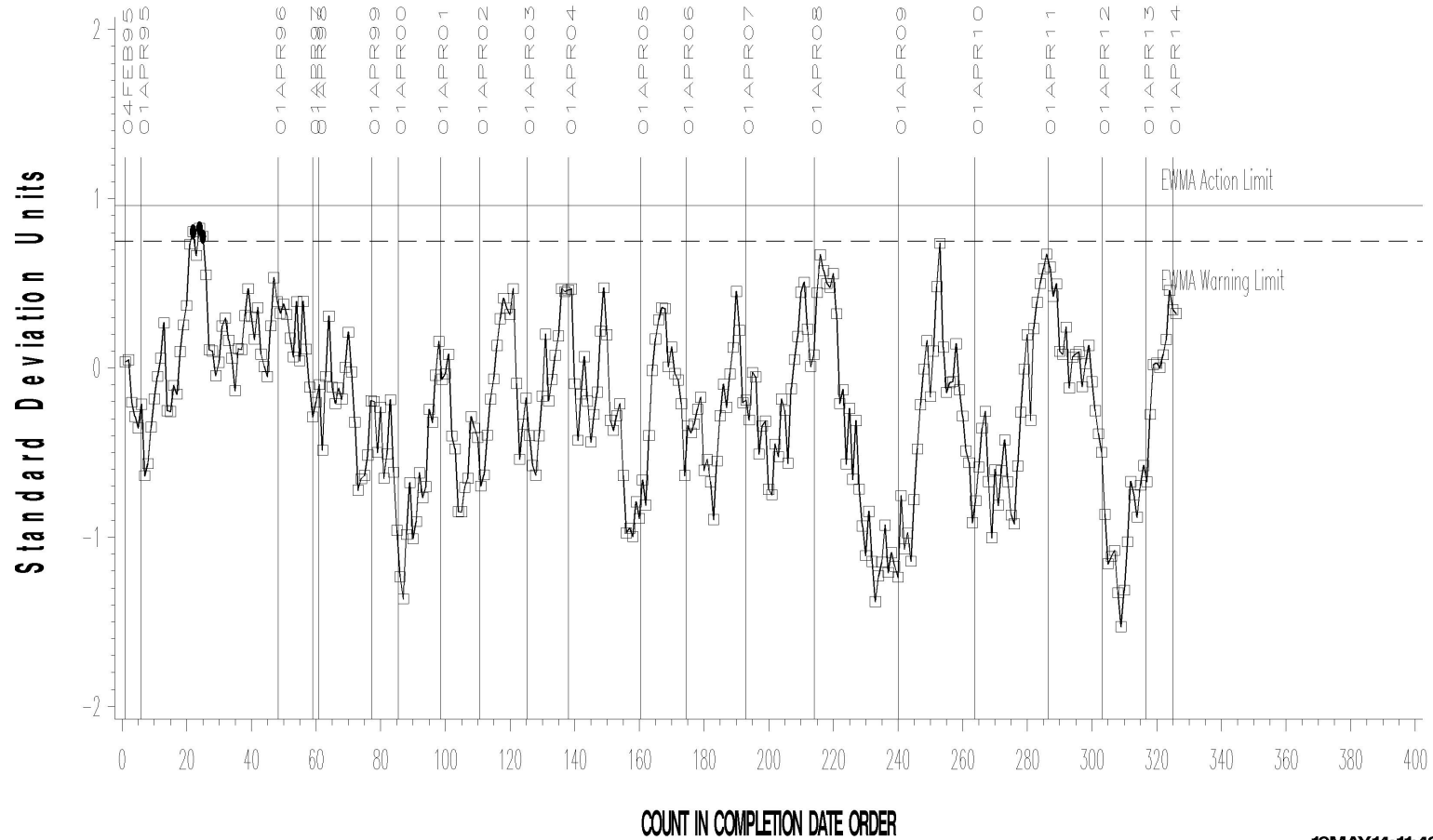
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Precision Analysis



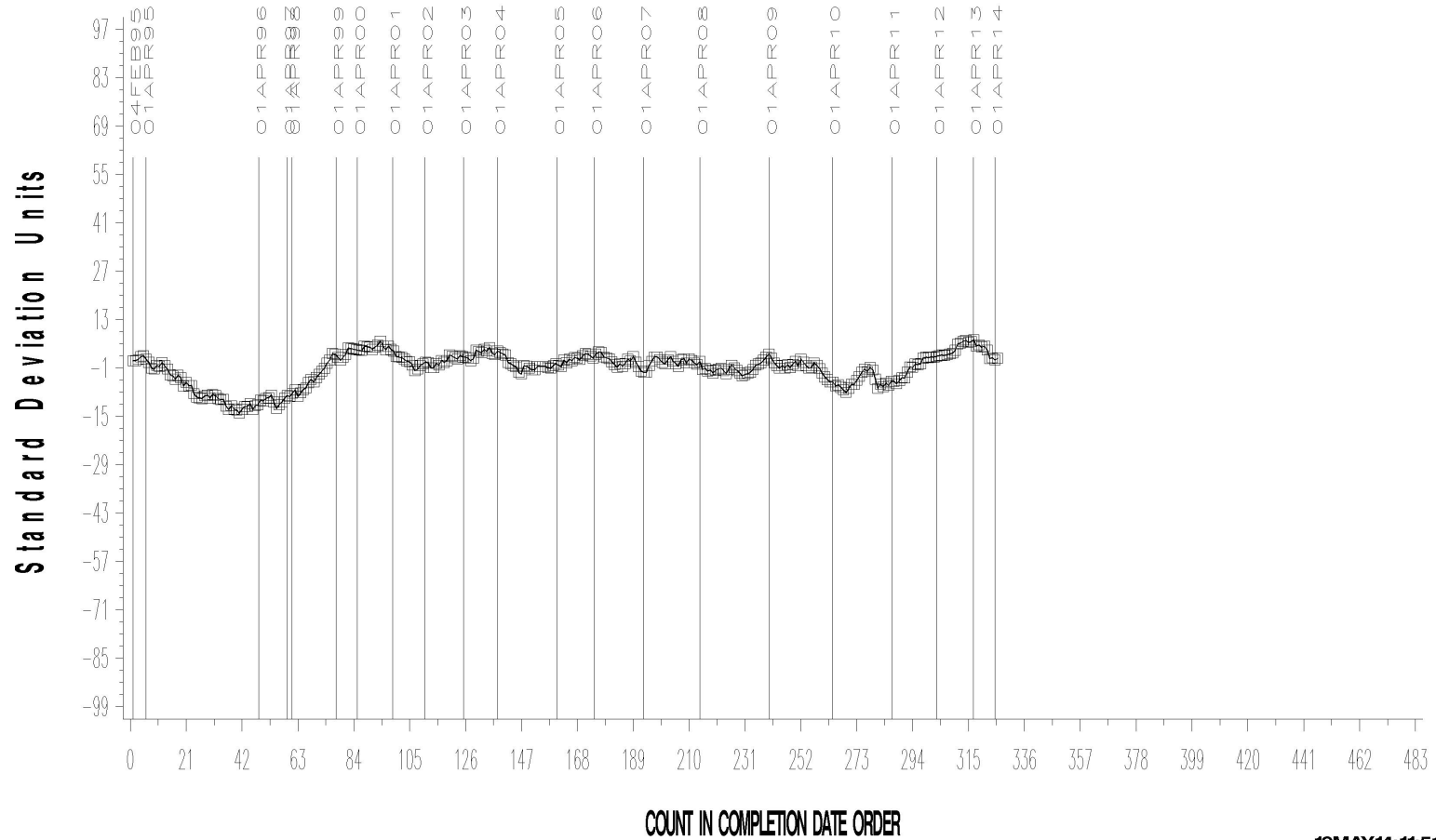
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

CUSUM Severity Analysis



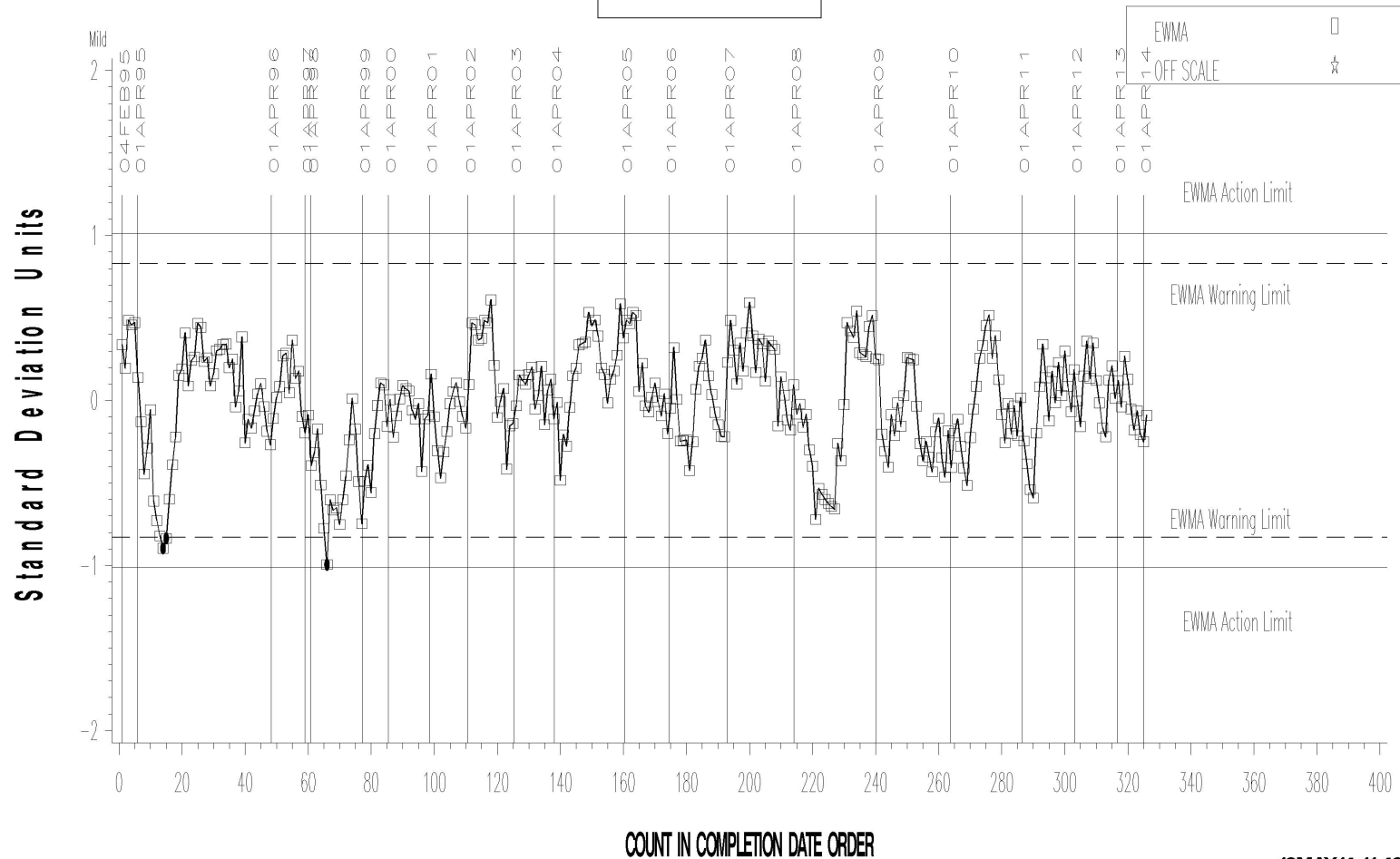
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Severity Analysis



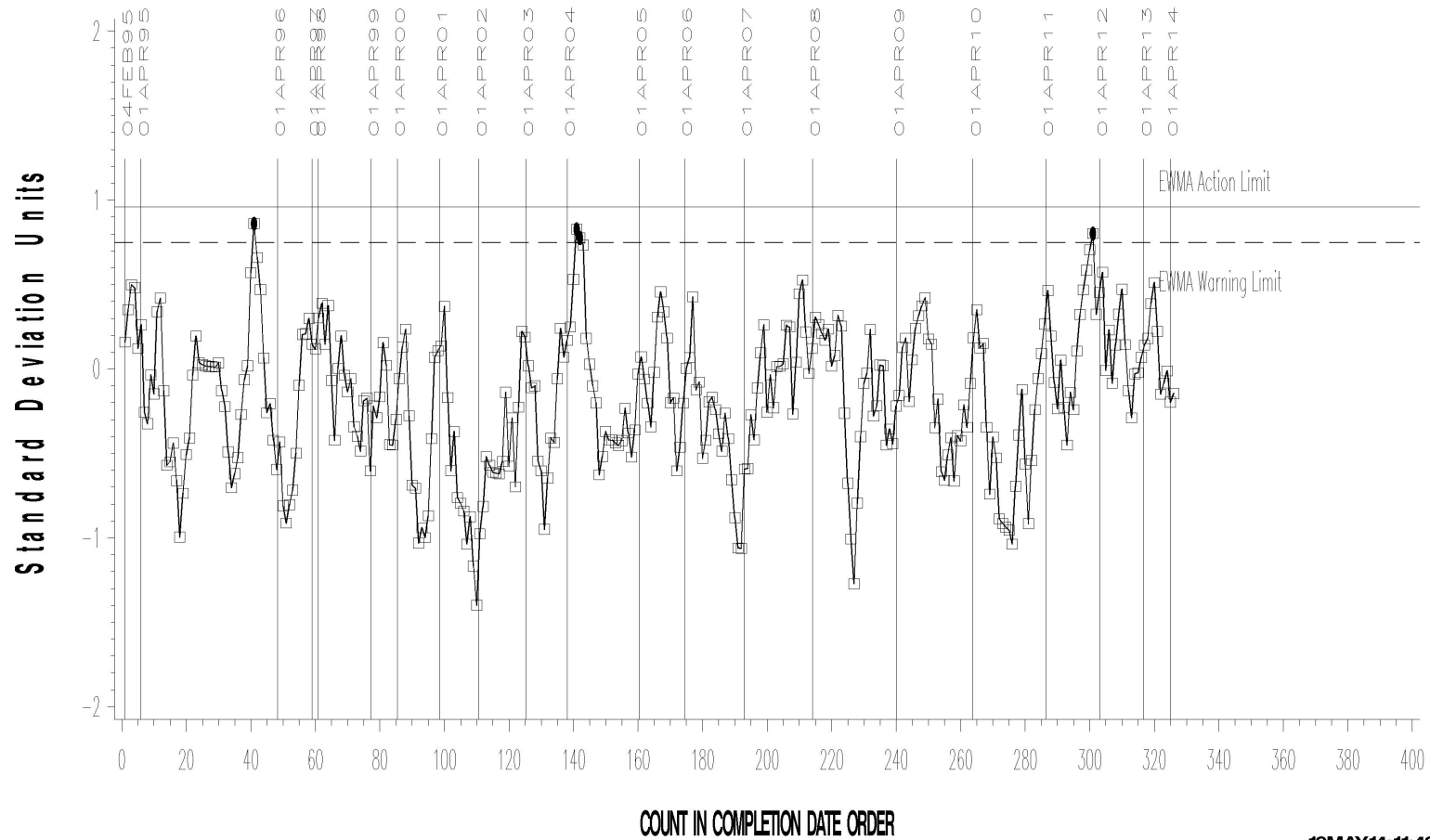
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L-37 (D6121)

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FINAL PINION GEAR RIPPLING

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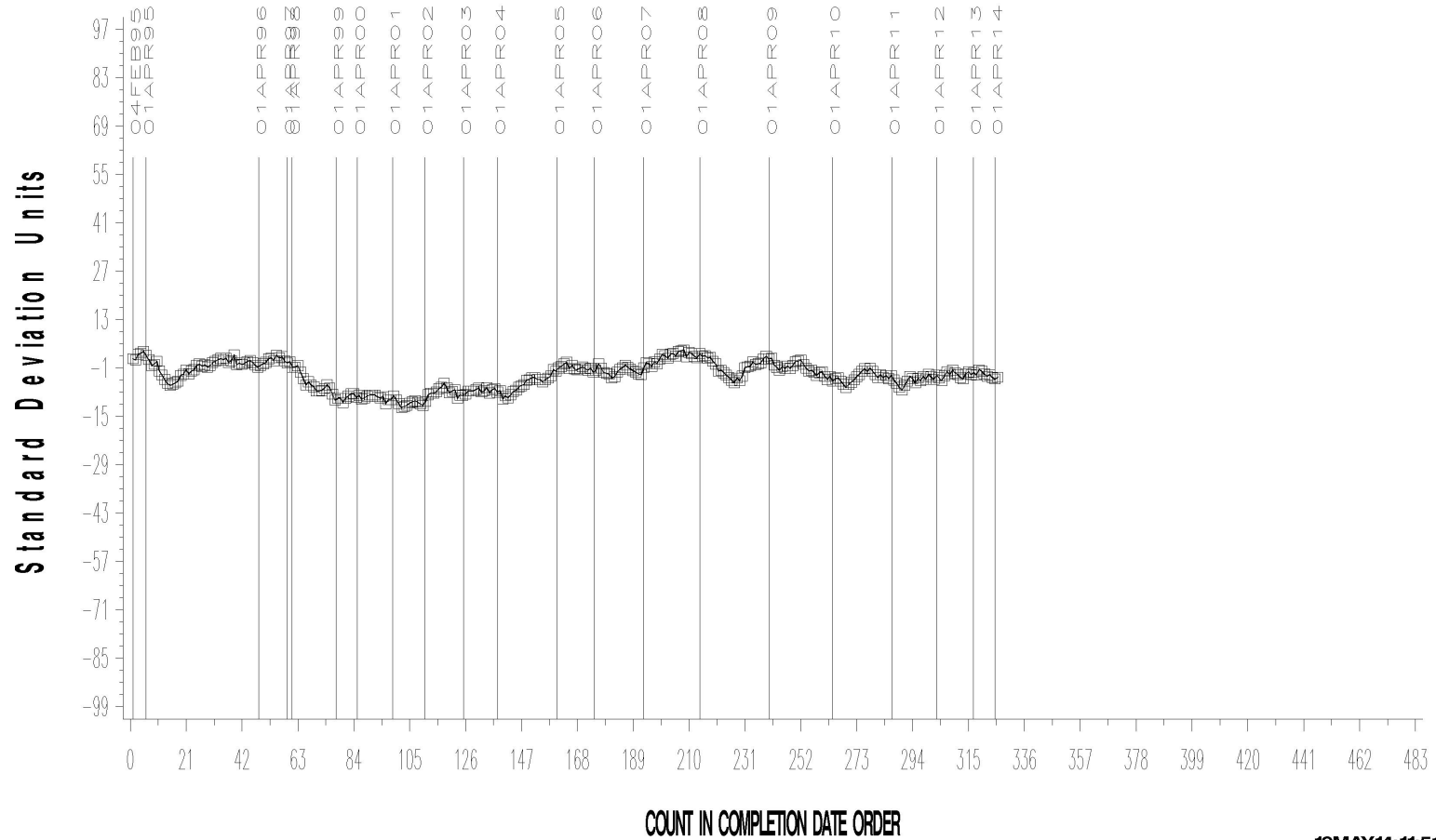
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L-37 (D6121)

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FINAL PINION GEAR RIPPLING

CUSUM Severity Analysis



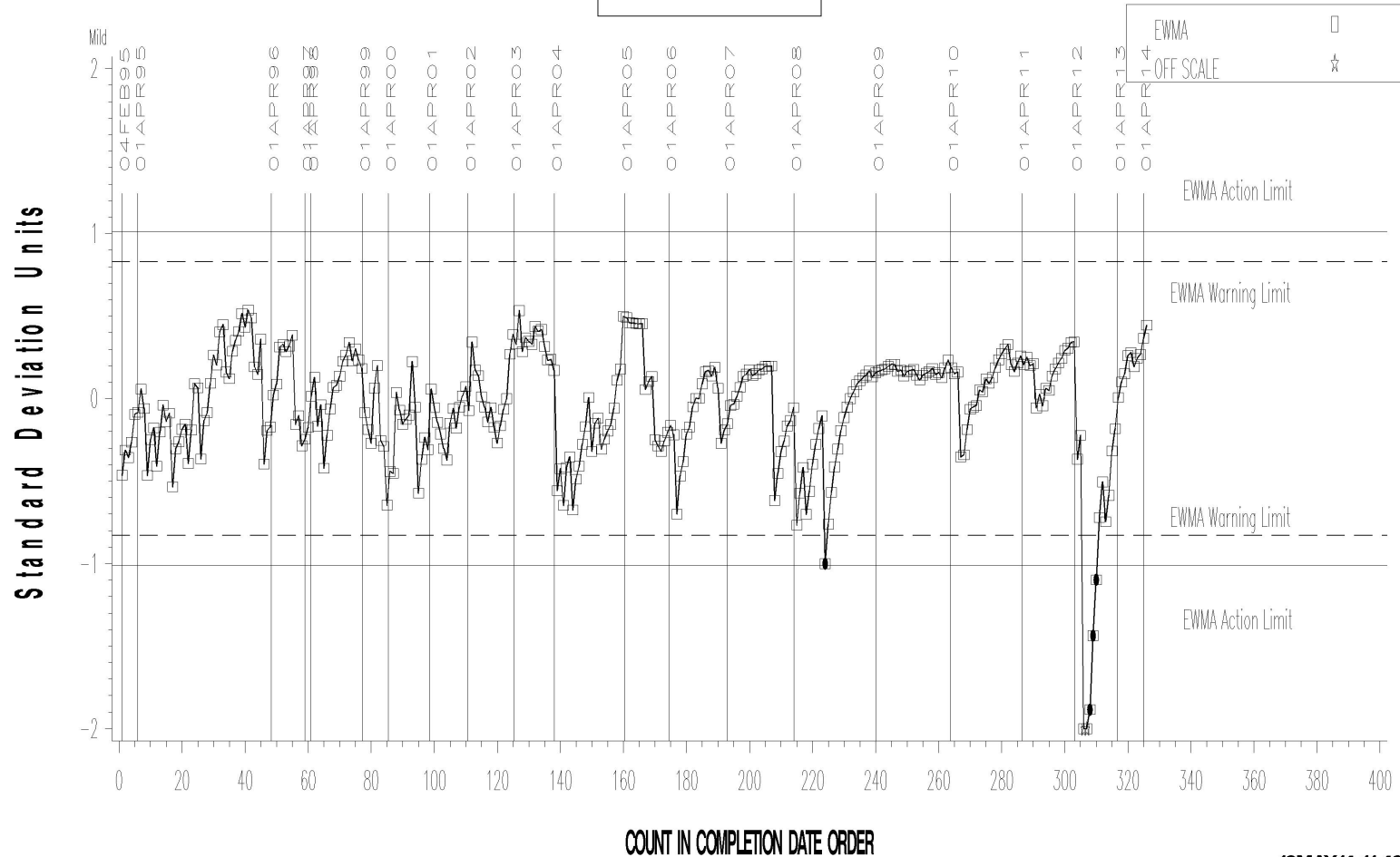
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

LTMS Severity Analysis



Severe

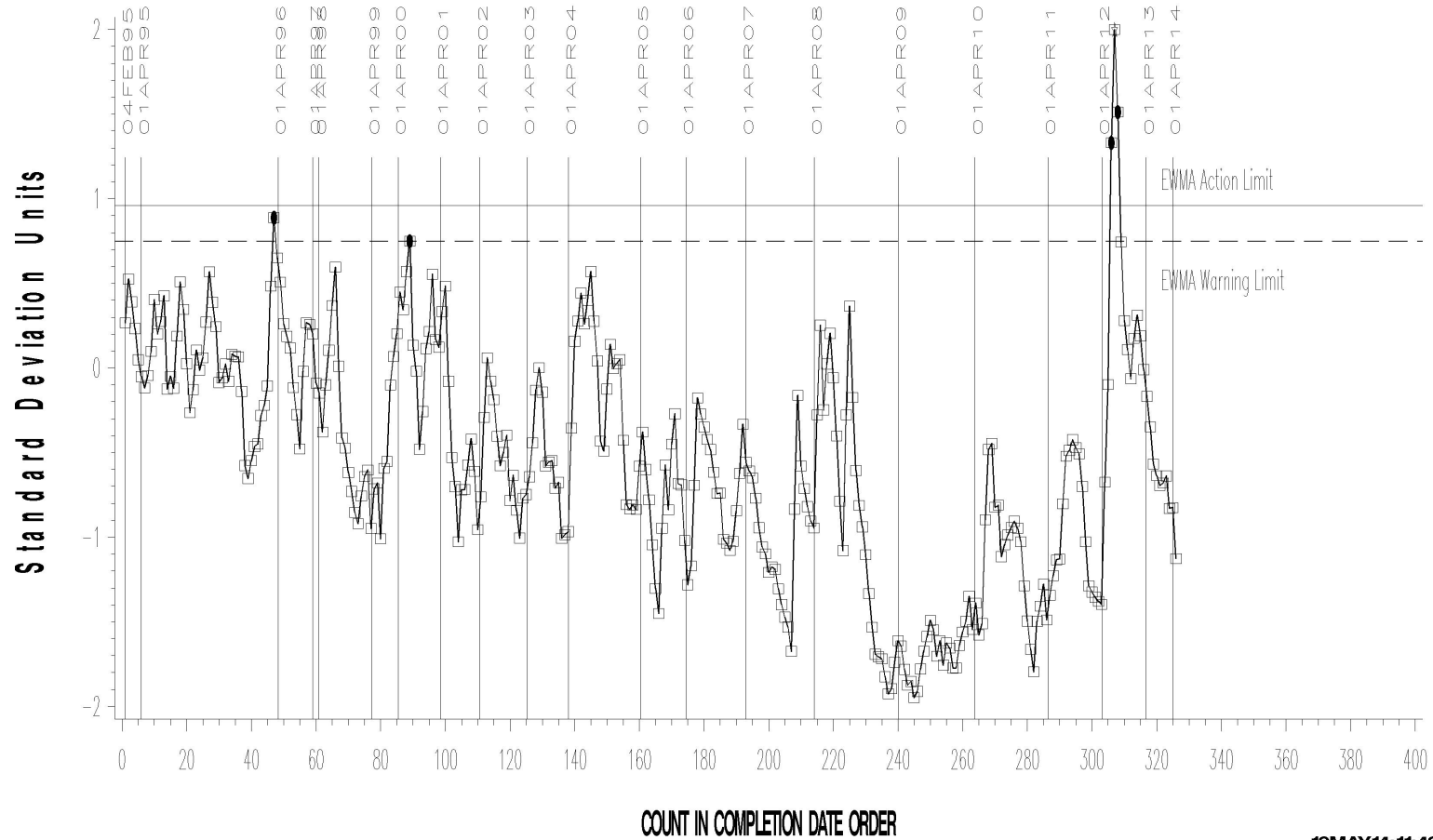
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

LTMS Precision Analysis



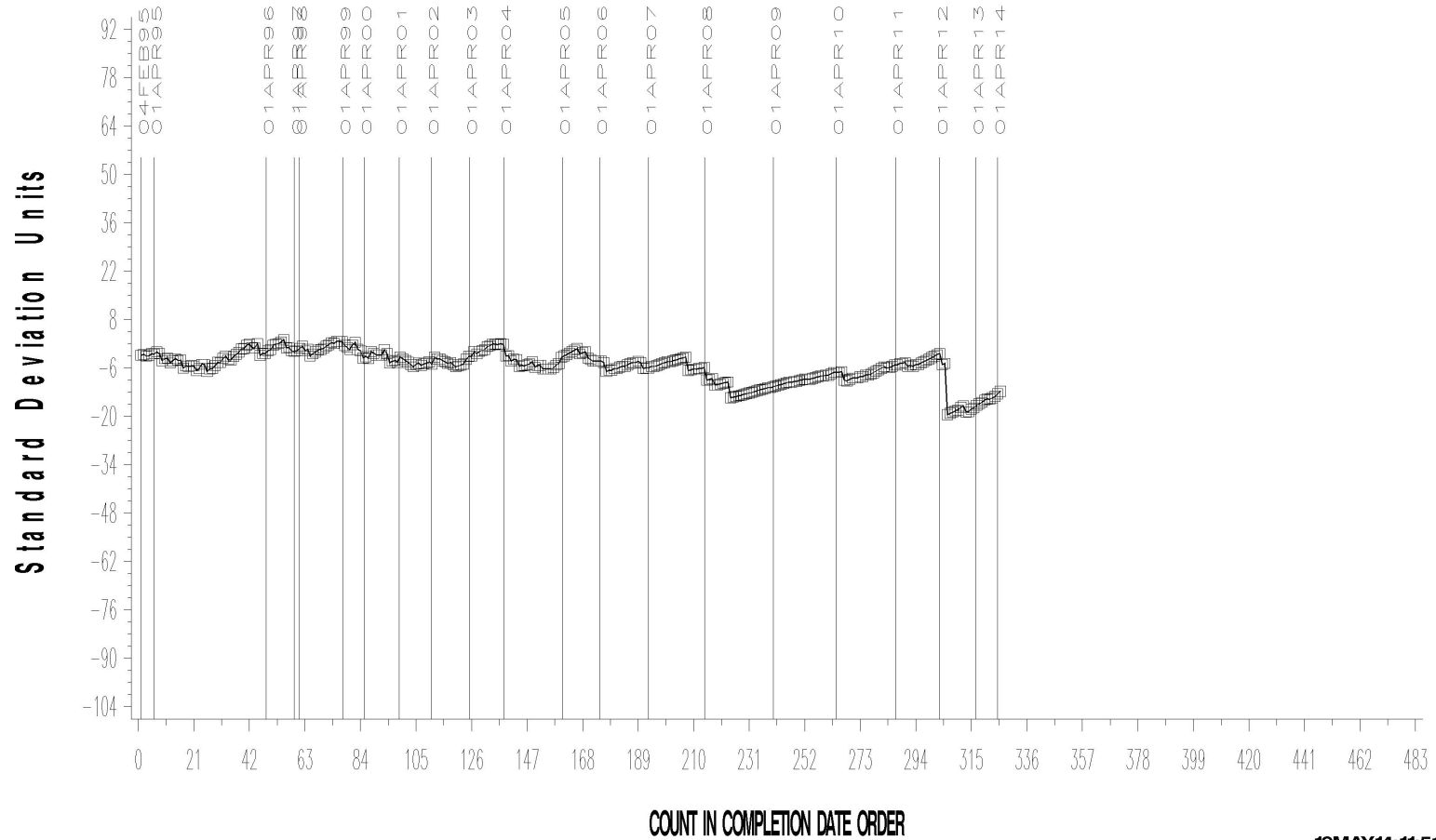
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L-37 (D6121)

L-37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis



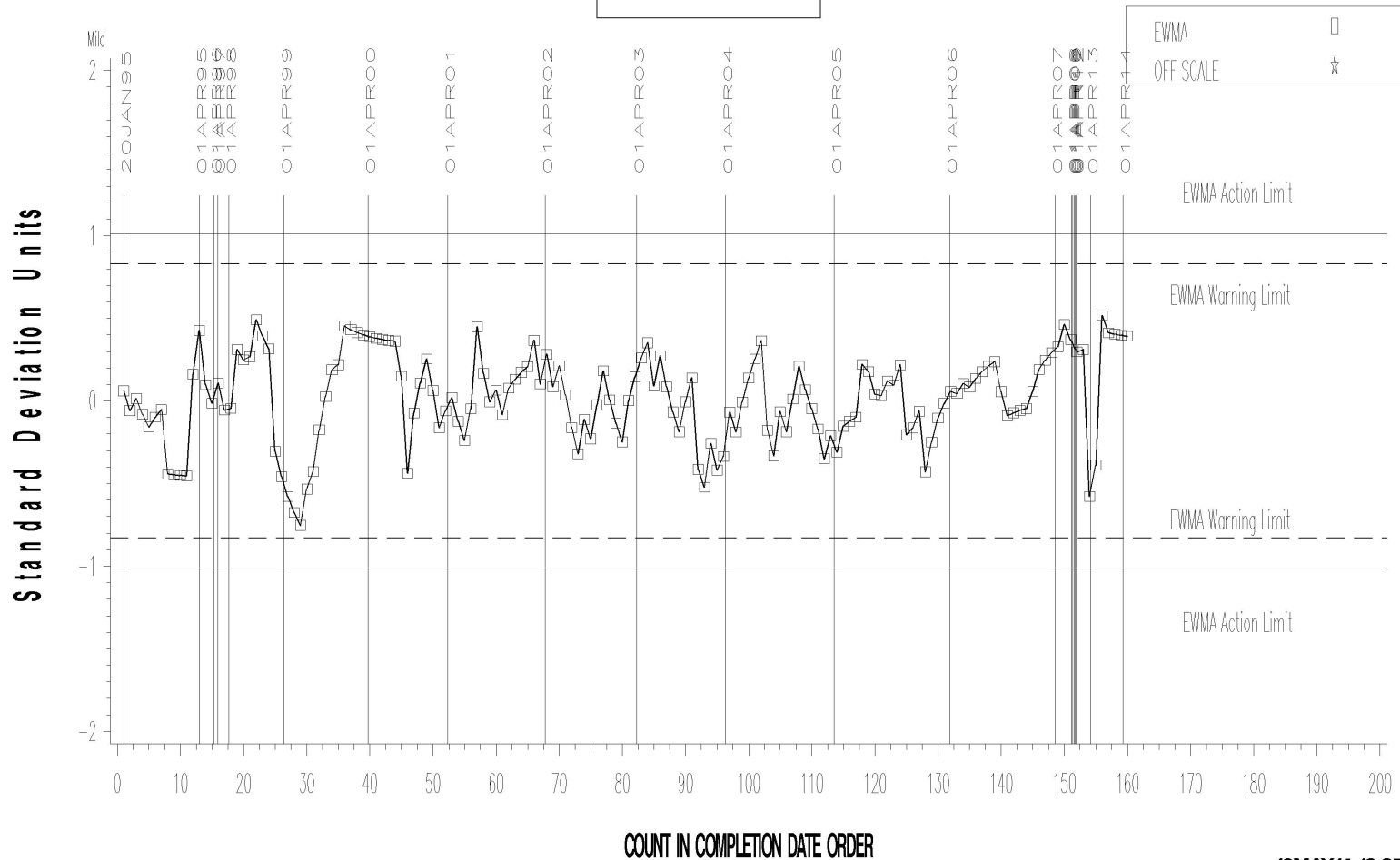
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Severity Analysis



Mild
Severe

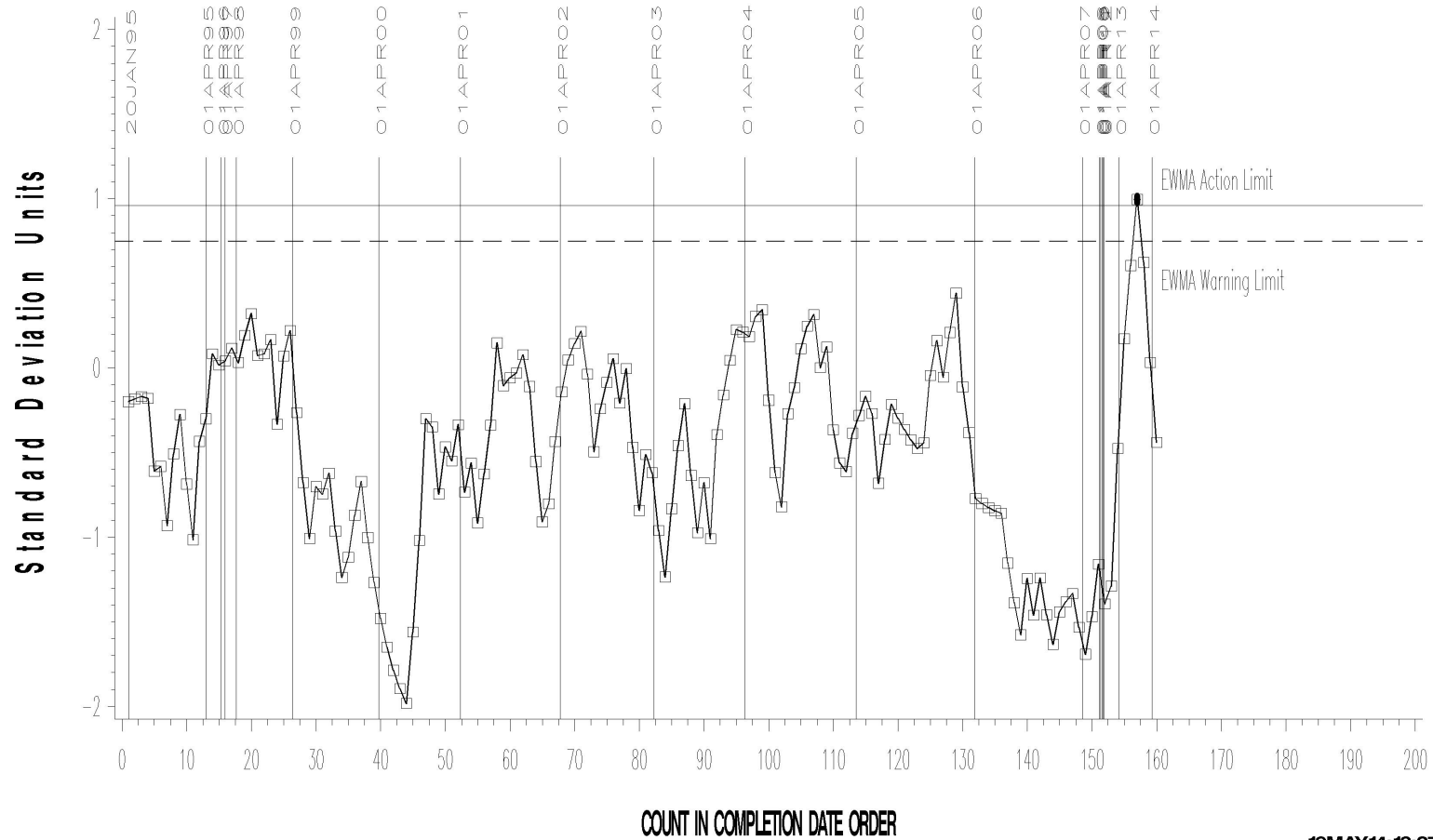
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



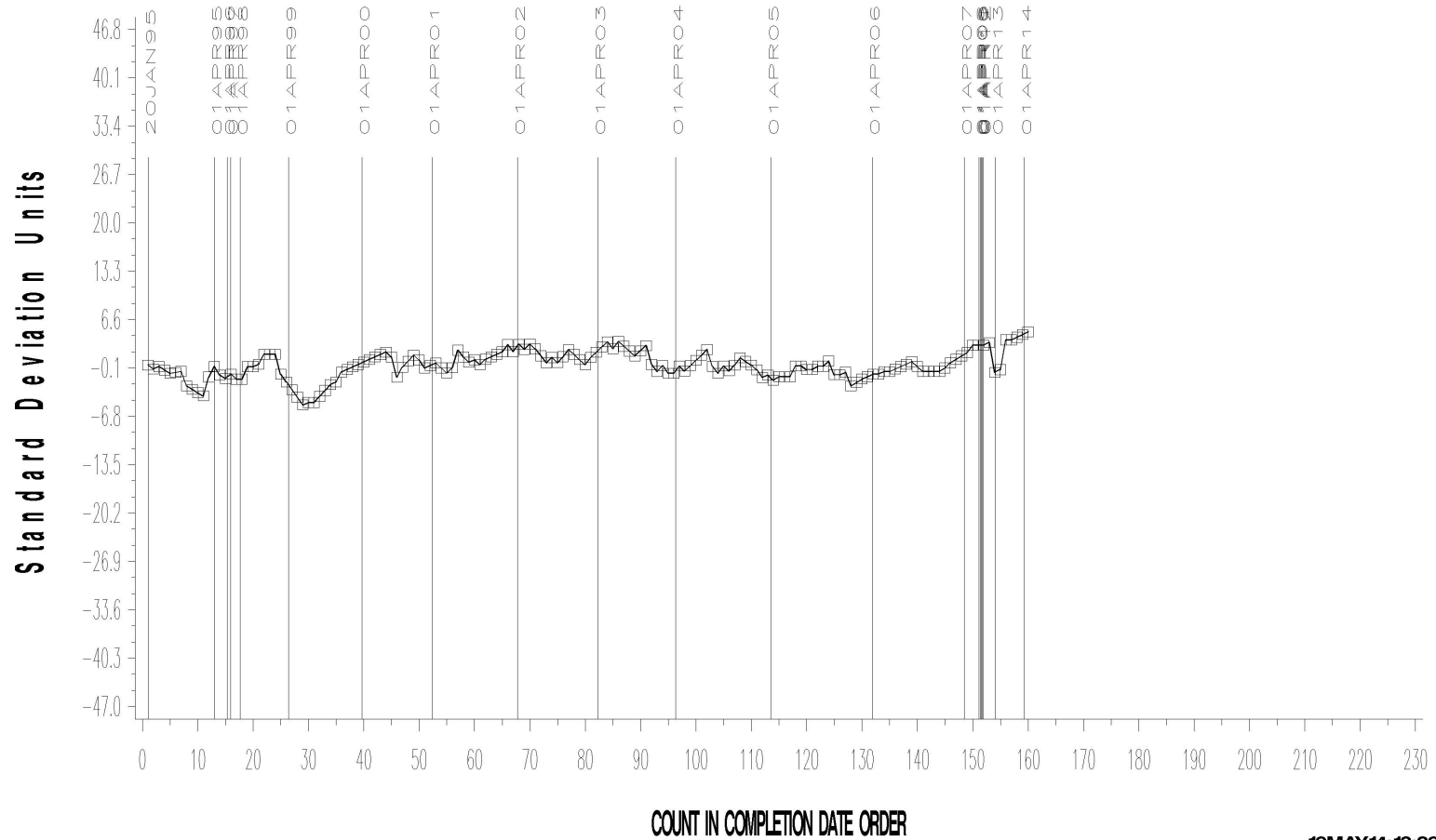
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis



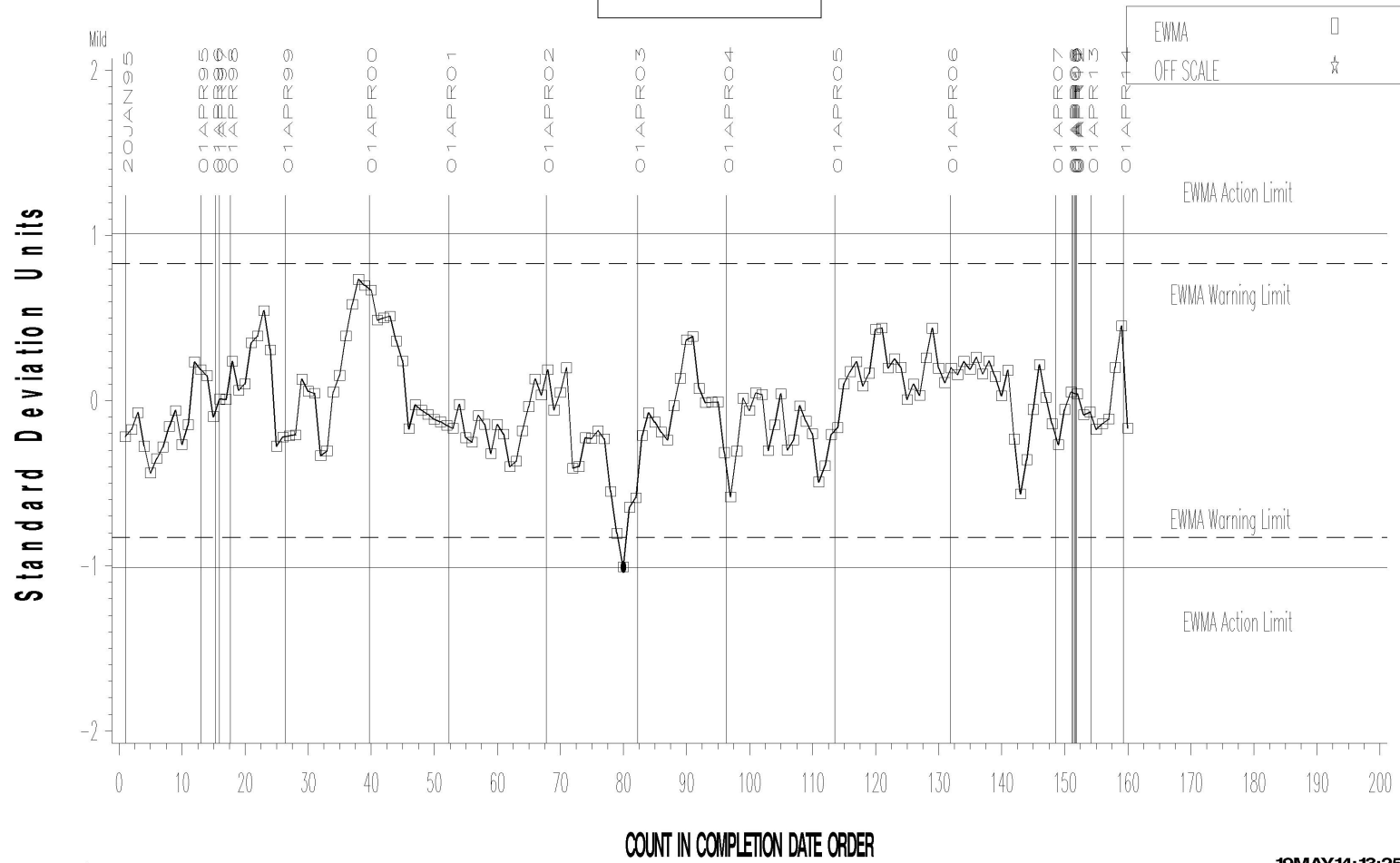
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Severity Analysis



Severe

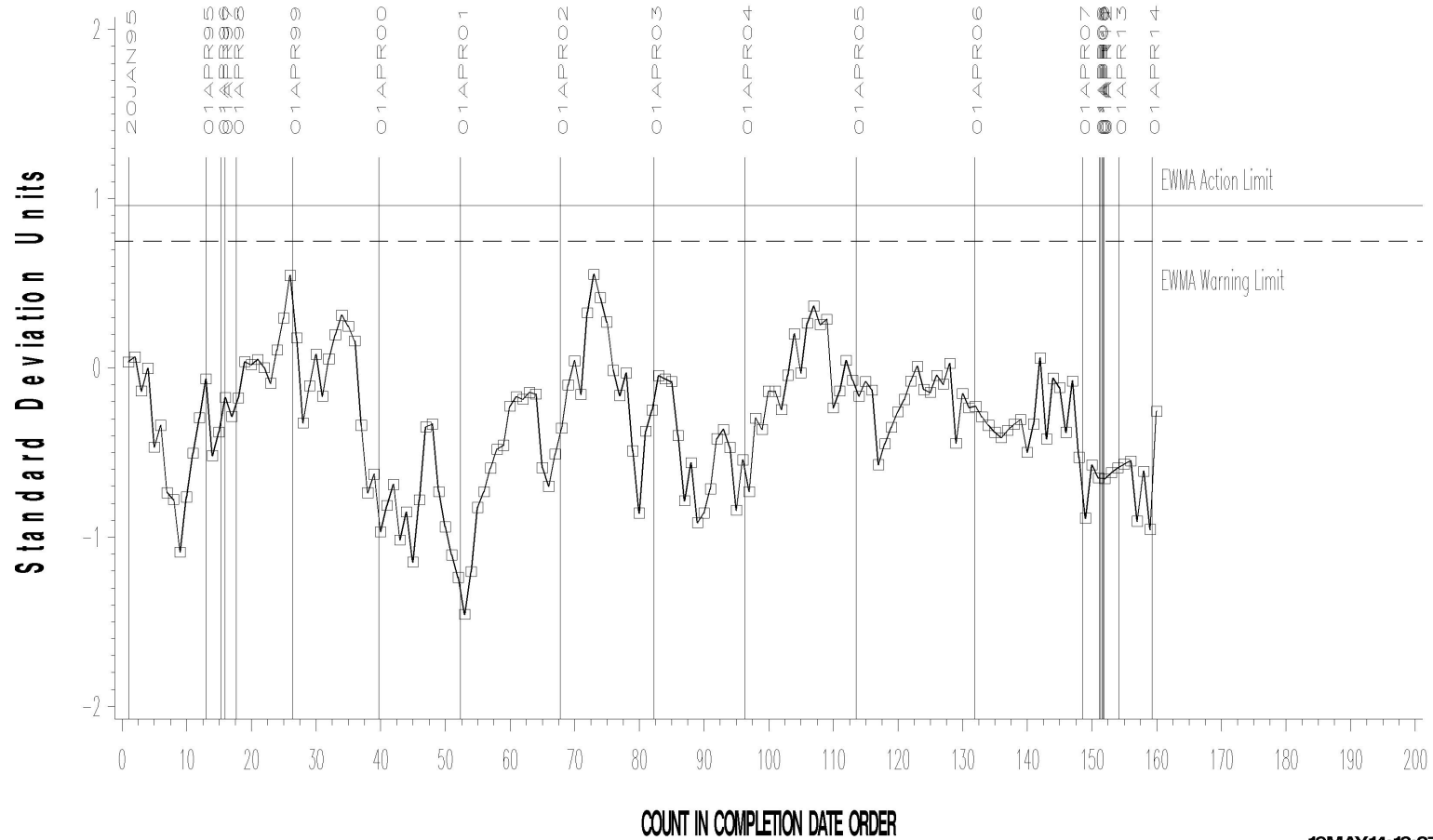
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING

LTMS Precision Analysis



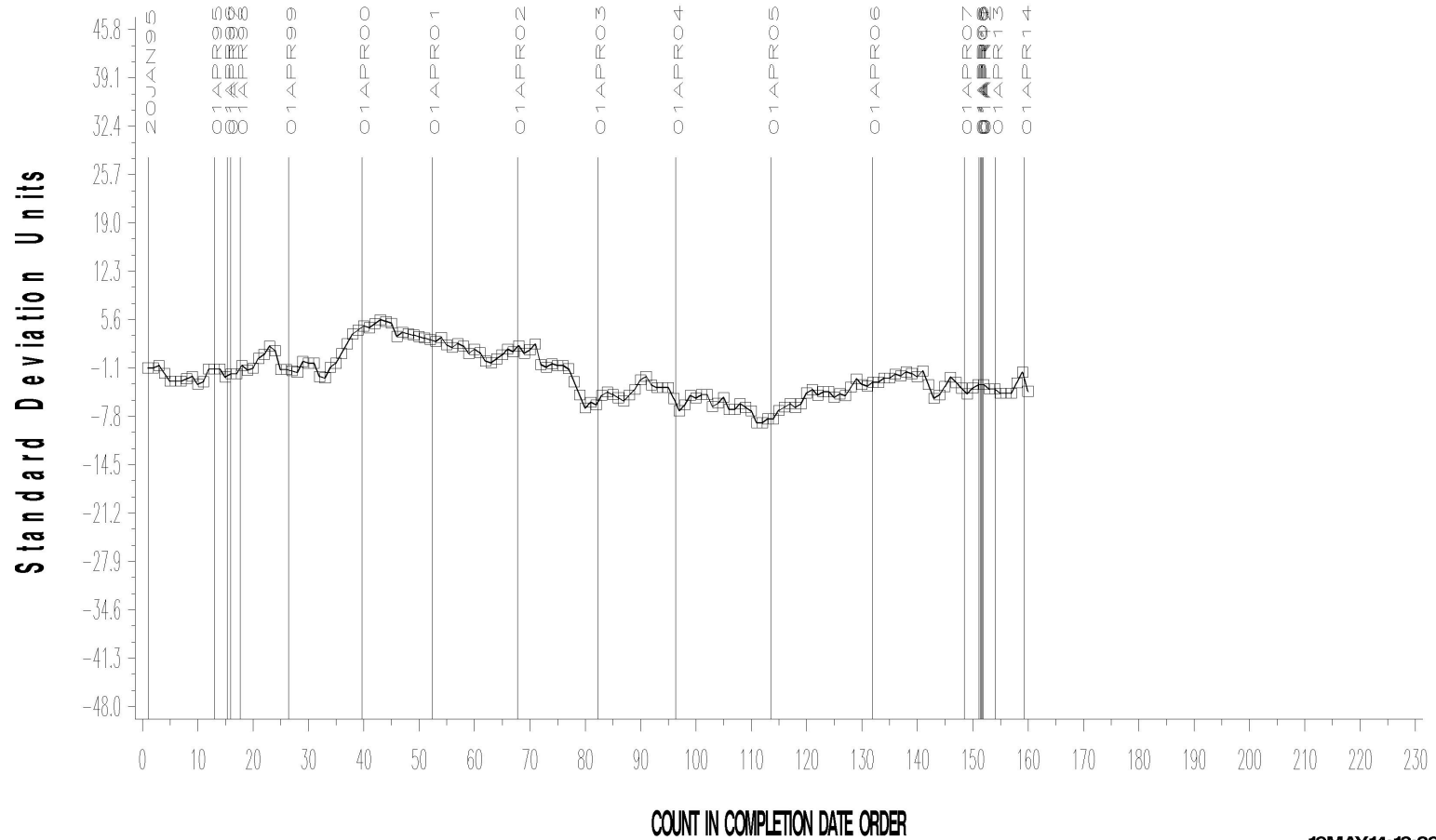
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L-37 (D6121)

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FINAL PINION GEAR RIDGING

CUSUM Severity Analysis



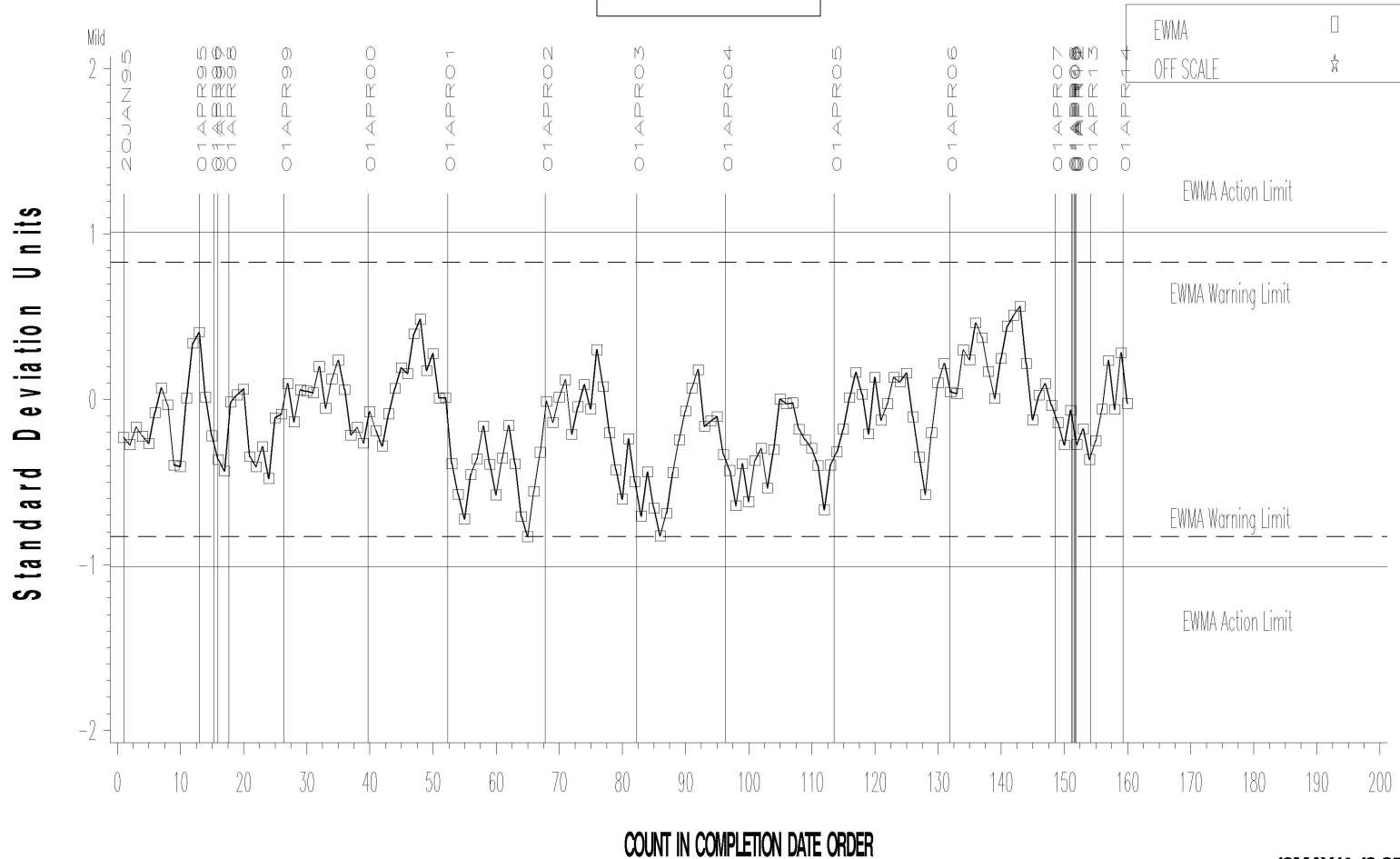
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Severity Analysis



Severe

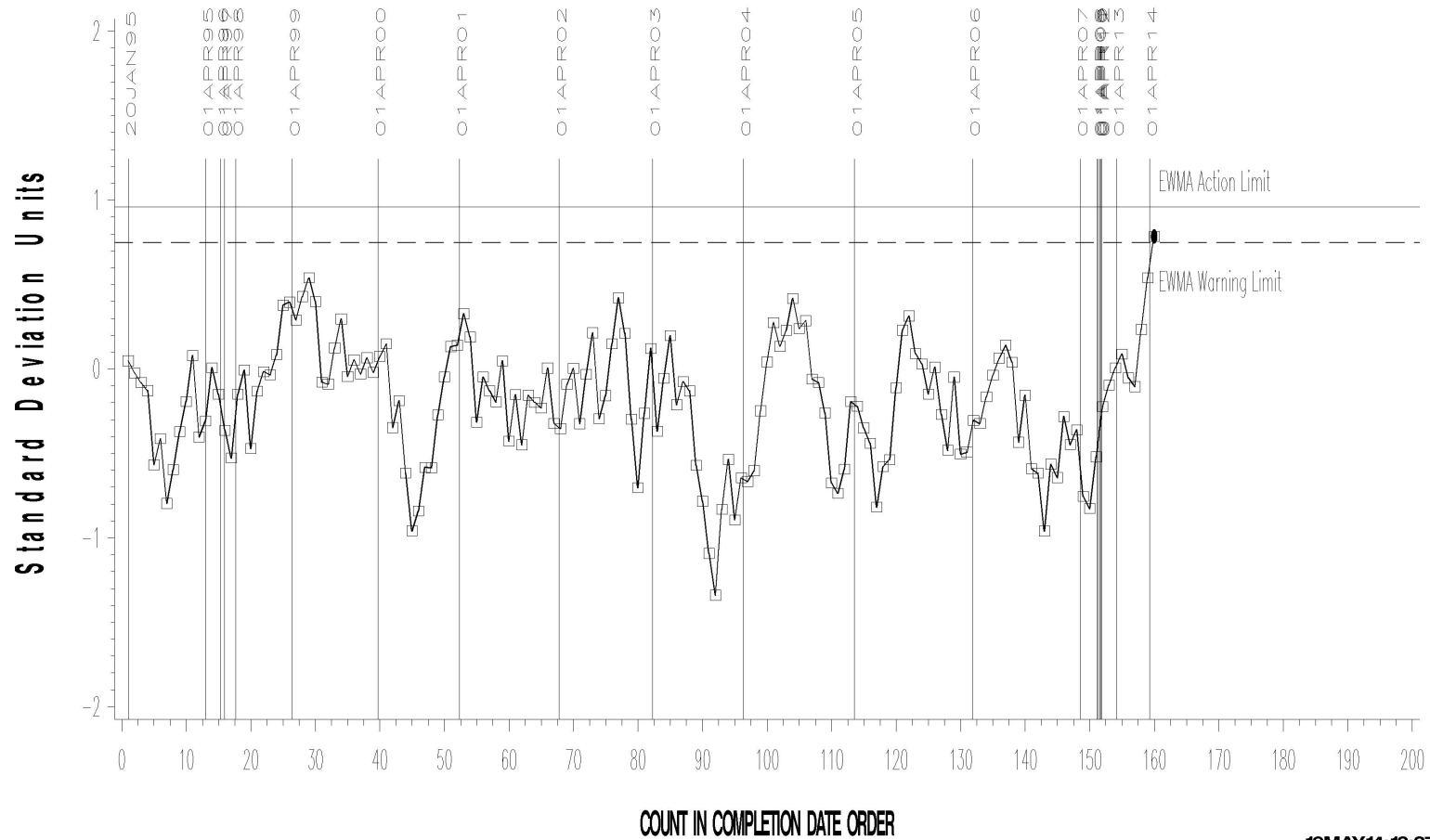
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING

LTMS Precision Analysis



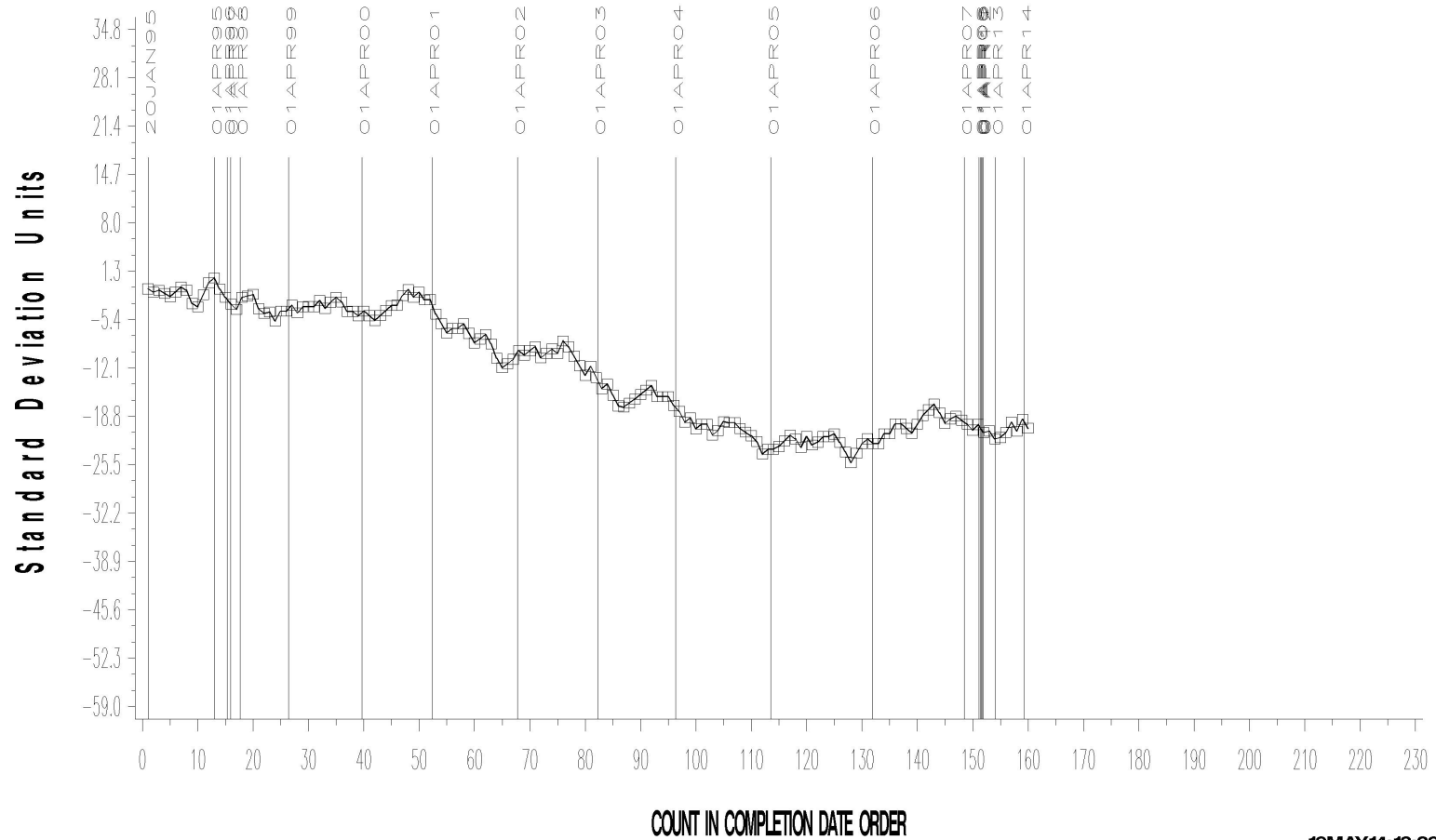
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L-37 (D6121)

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FINAL PINION GEAR RIPPLING

CUSUM Severity Analysis



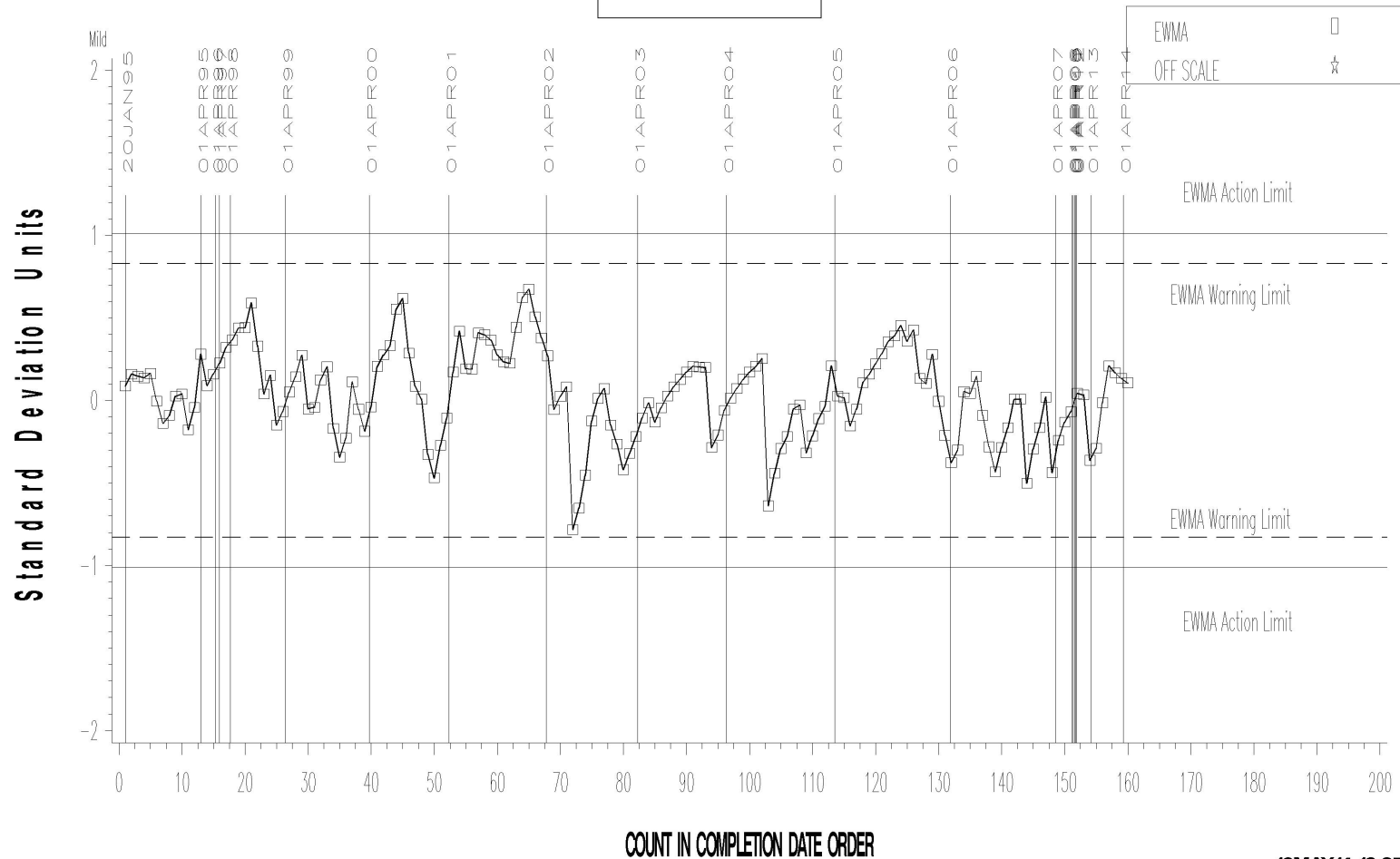
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

LTMS Severity Analysis



Severe

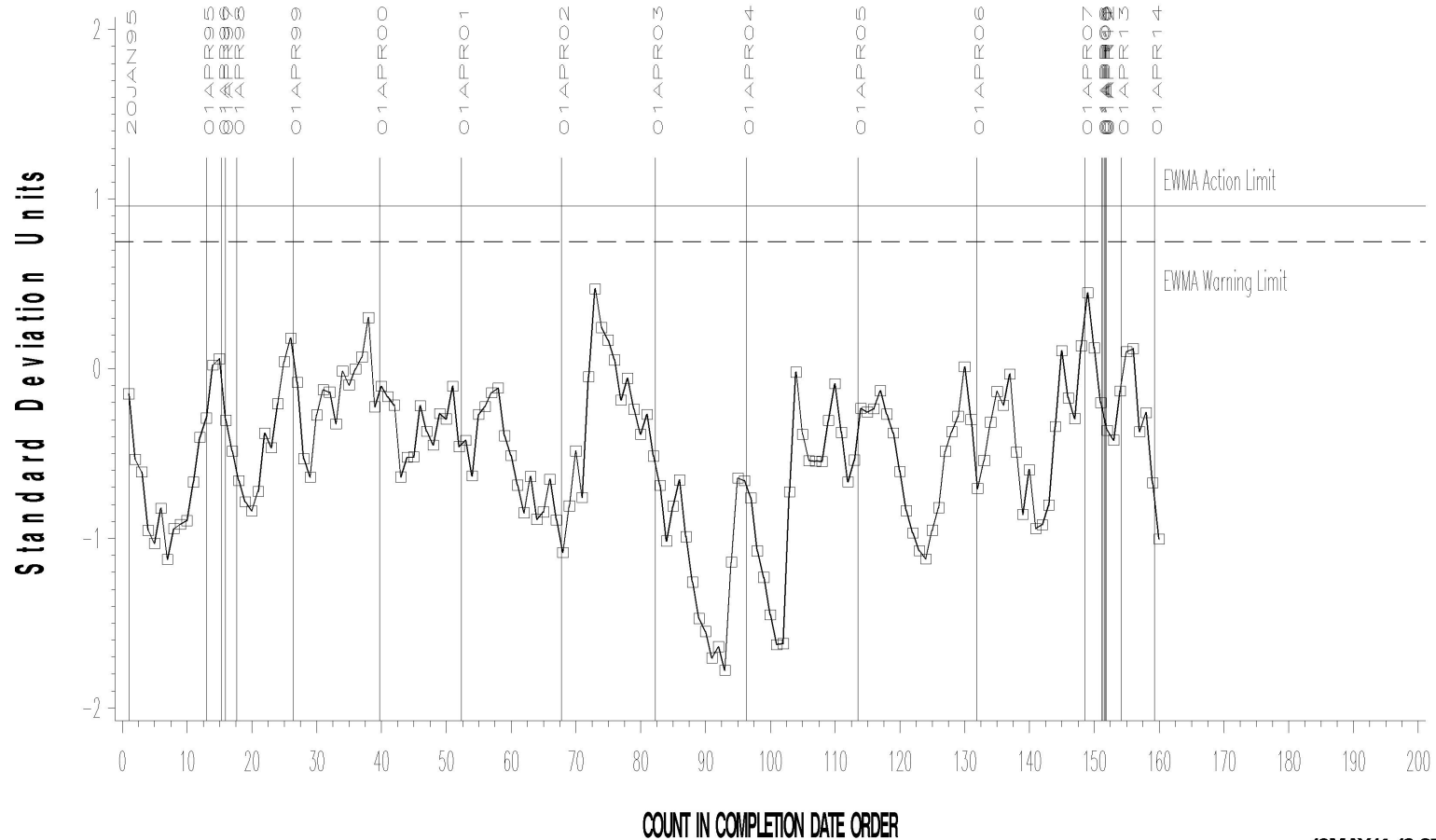
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L-37 (D6121)

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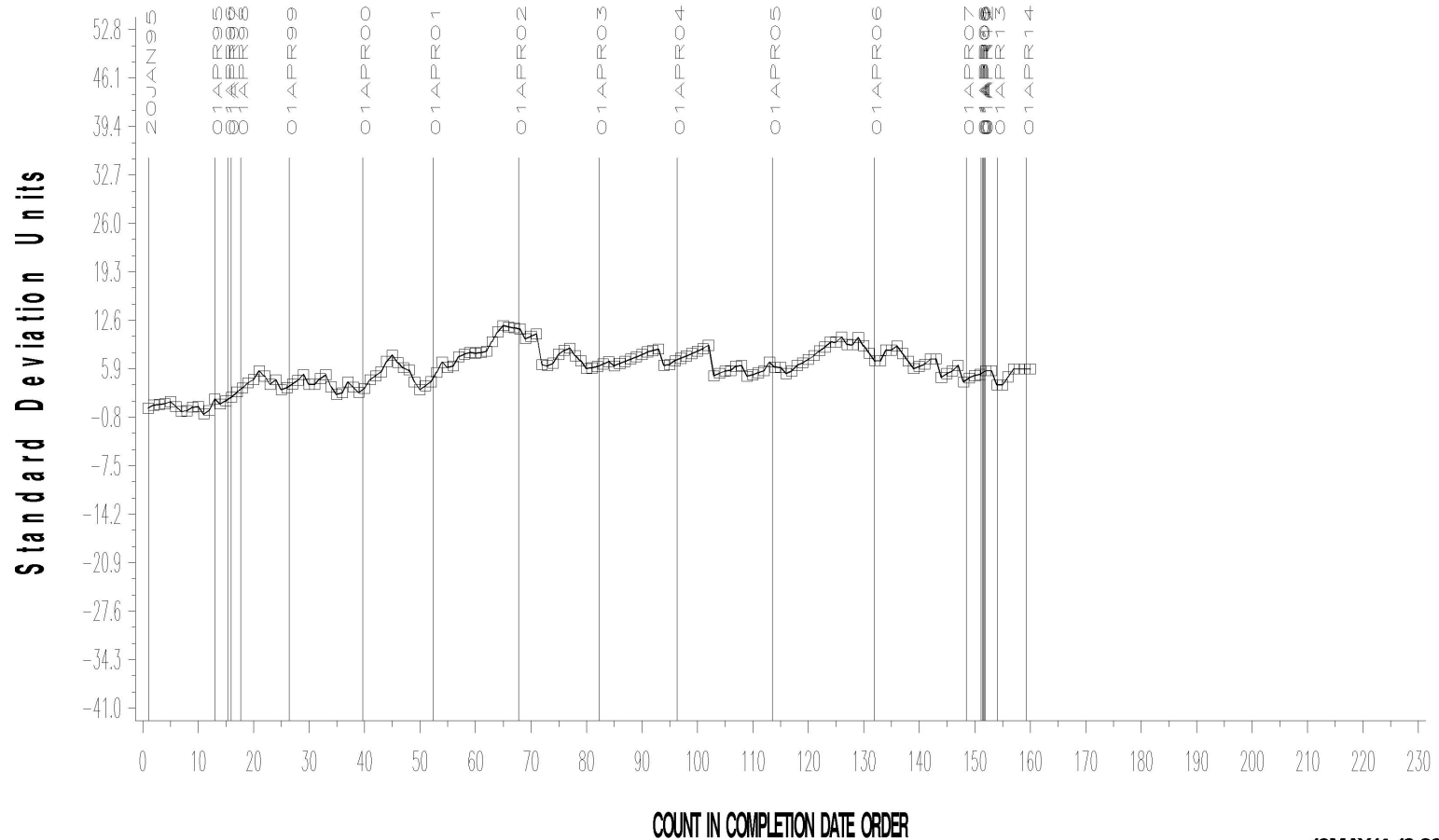
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L-37 (D6121)

L-37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis



19MAY14:13:29

L-37 (D6121)

TIMELINE ADDITIONS

Effective Date	Information Letter	Event
		No additions were made to the timeline this reporting period.

L-37 (D6121)

LAB VISITS

No L-37 lab visits were conducted during this period.

INFORMATION LETTERS

No L-37 information letters were issued this reporting period.

L-37 (D6121)

LTMS DEVIATIONS

One LTMS deviation was written this period to calibrate a test stand generating a precision alarm on WEAR using lubrified hardware.

For test acceptance, the L-37 surveillance panel has approved the use of acceptance bands that are not derived from calculations using the target mean, standard deviation, and k-value. This can produce widely divergent Shewhart severity values on successive tests and thereby result in precision alarms.

If this approach results in recurring alarms, it may be necessary for the surveillance panel to readdress how precision is evaluated for this test.

L-37 (D6121)

STATUS OF REFERENCE OIL SUPPLY

Oil	Cans @ Labs	@ TMC	
		Cans	Gallons
127	2	1	1.0
134	9	65	65.8
151-2	4	1	1.9
151-3	3	0	0.0
152-1	0	0	0.0
152-2	14	231	231.9
152-3	0	54	54.8
153-1	39	57	58.0
155	13	23	23.4
155-1	9	330	330.0
Total	93	762	766.6

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 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 41.75 gal) for use in that test.