A Program of ASTM International

Test Monitoring Center

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

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

MEMORANDUM: 13-022

DATE: April 24, 2012

TO: Chris Prengaman, Chairman, L-37 Surveillance Panel

FROM: Scott Parke

SUBJECT: L-37 Testing from October 1, 2012 through March 31, 2013

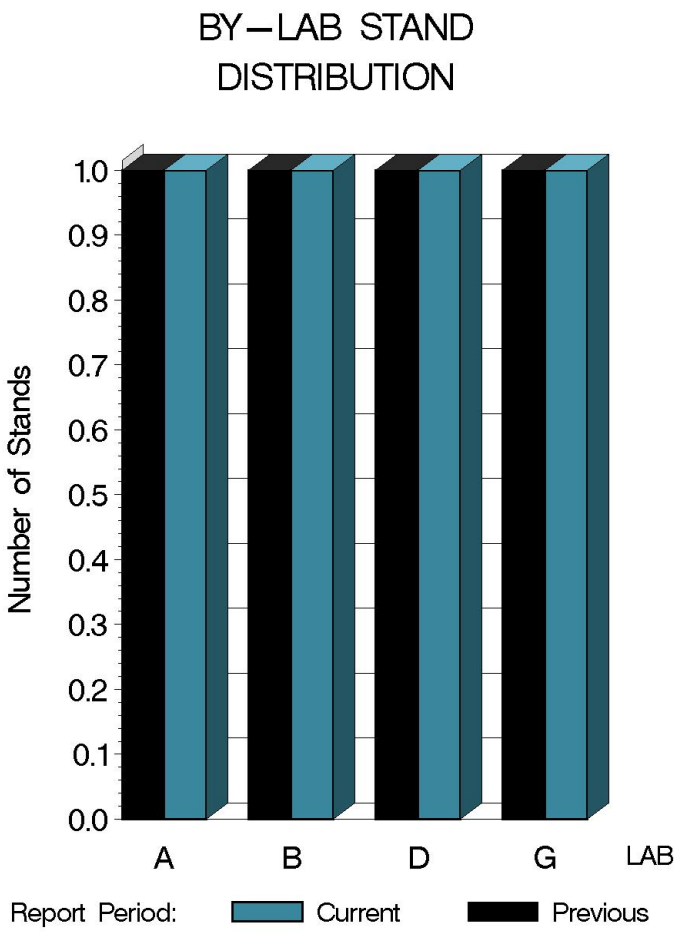
Please find attached a summary of testing activity this period.

SDP/sdp/mem13-022.sdp.doc
cc: Frank Farber
Jeff Clark
L-37 Surveillance Panel
ftp://ftp.astmtmc.cmu.edu/docs/gear/l37/semiannualreports/l37-04-2013.pdf

Distribution: email

L-37 (D6121)

	Reporting Data	Calibrated on 3-31-13
Number of Labs	4	4
Number of Stands	4	4



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L-37 (D6121)

Test Distribution by Oil and Validity

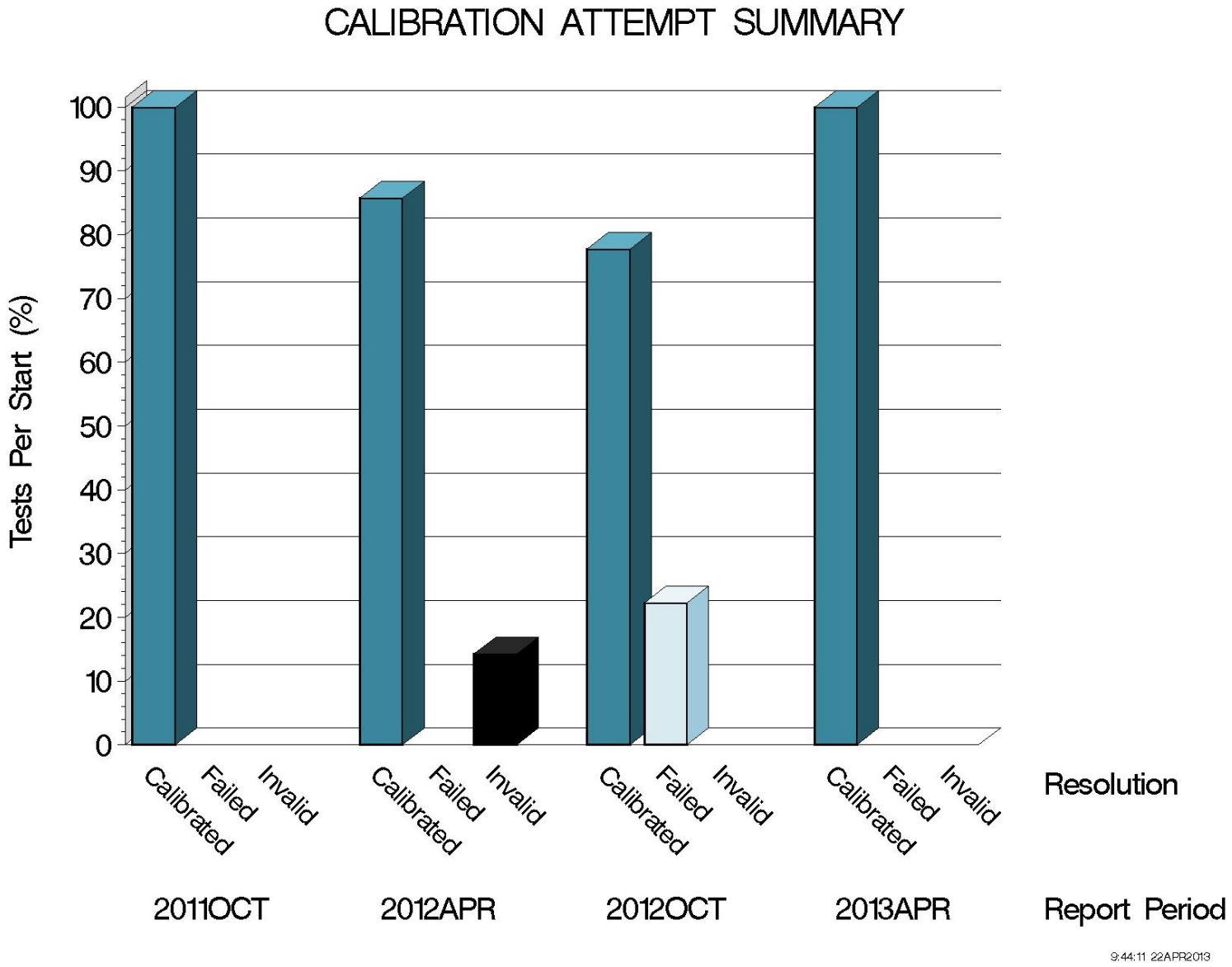
		134	151-1	152-2	155	Totals Last Period	Totals This Period
Accepted for calibration	AC	0	2	2	3	7	7
Rejected (Mild)	OC	0	0	0	0	0	0
Rejected (Severe)	OC	0	0	0	0	0	0
Rejected (Precision)	OC	0	0	0	0	2	0
Invalidated calibration	LC	0	0	0	0	0	0
Hardware approval run	NI	4	13	7	10	32	34
Total		4	15	9	13	41	41

L-37 (D6121)

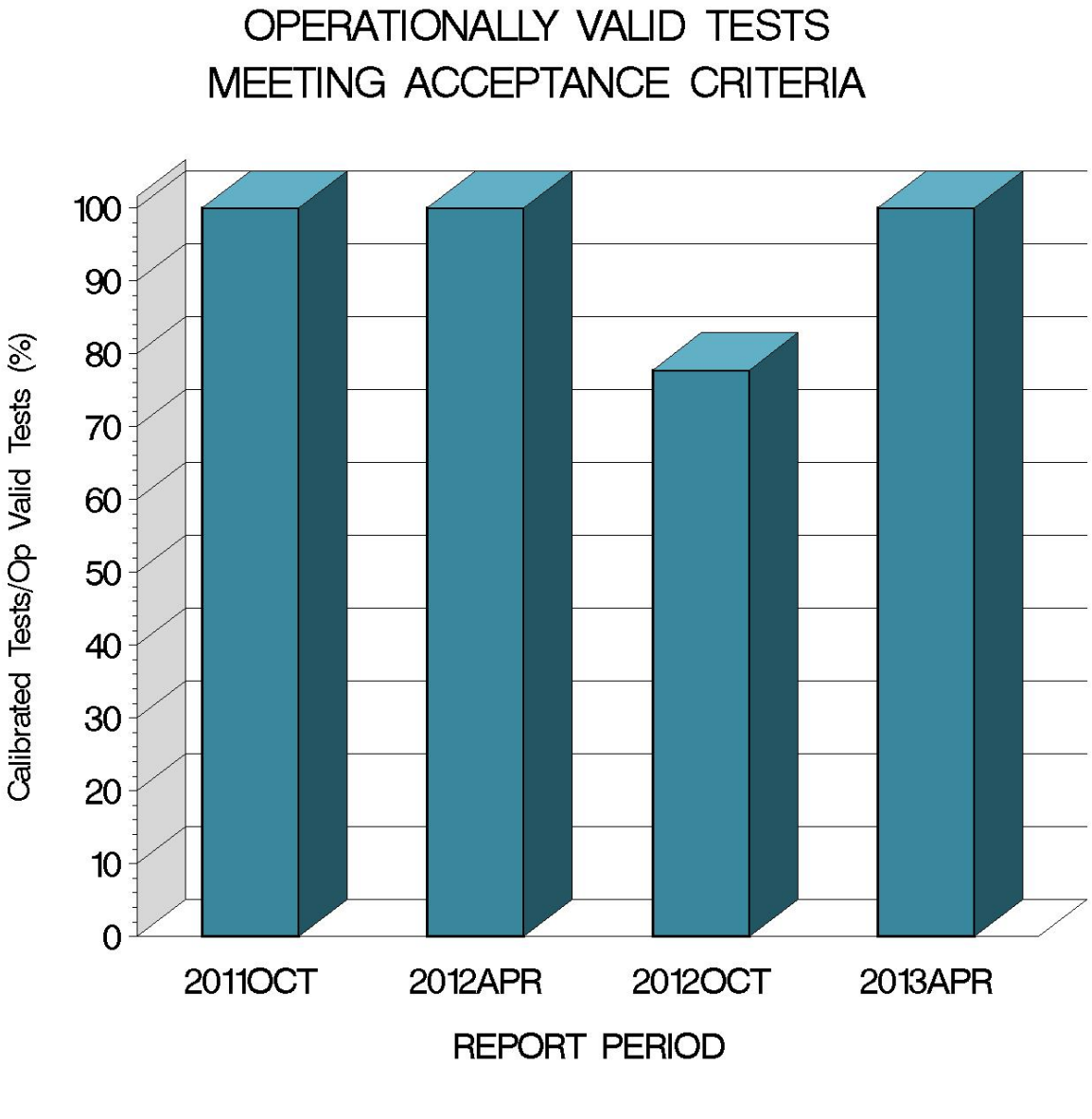
Calibration Attempt Detail

	Gear Batch	Acceptable	Failed	Total
LUBRITED	V1L500/P4T813	0	0	0
	V1L528/P4T883A	3	0	3
	Total	3	0	3
NONLUBRITED	V1L500/P4T813	1	0	1
	V1L528/P4T883A	3	0	3
	Total	4	0	4

L-37 (D6121)


CALIBRATION ATTEMPT SUMMARY
Tests Per Start (%)
100
90
80
70
60
50
40
30
20
10
0
Calibrated
Failed
Invalid
Resolution
2011OCT
2012APR
2012OCT
2013APR
Report Period
9:44:11 22APR2013

L-37 (D6121)


OPERATIONALLY VALID TESTS
MEETING ACCEPTANCE CRITERIA
Calibrated Tests/Op Valid Tests (%)
100
90
80
70
60
50
40
30
20
10
0
2011OCT
2012APR
2012OCT
2013APR
REPORT PERIOD
9:44:11 22APR2013

L-37 (D6121)

CAUSES FOR LOST TESTS

			Oil				Validity			Loss Rate		
Lab	Cause		134	151-1	152-2	155	RC	LC	XC	Lost	Starts	%
	No tests were lost this period.									0	41	0%
		Lost	0	0	0	0	0	0	0			
		Starts	4	15	9	13	41	41	41			
		%	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	-0.198	0.343	-0.198	-0.283
RIPP	V1L528/P4T883A	3	-0.667	0.754	-0.667	-0.318
SPIT	V1L528/P4T883A	3	-0.488	1.291	-0.488	-0.282
WEAR	V1L528/P4T883A	3	-1.254	2.500	-1.254	-0.651

[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	V1L500/P4T813	1	0.218	.	0.109	0.072
	V1L528/P4T883A	3	0.073	0.617		
RIPP	V1L500/P4T813	1	-0.771	.	0.211	0.117
	V1L528/P4T883A	3	0.538	0.965		
SPIT	V1L500/P4T813	1	0.357	.	-0.136	-0.115
	V1L528/P4T883A	3	-0.300	1.272		
WEAR	V1L500/P4T813	1	1.040	.	0.510	0.363
	V1L528/P4T883A	3	0.333	0.288		

[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	A	1	0.000	-1.102	0.488	0.000
	B	1	0.000	-1.102	-1.951	-4.132
	D	1	-0.594	0.203	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	-0.635	0.552	0.760	0.499
	B	1	0.354	1.496	0.050	0.000
	G	1	0.499	-0.434	-1.711	0.499

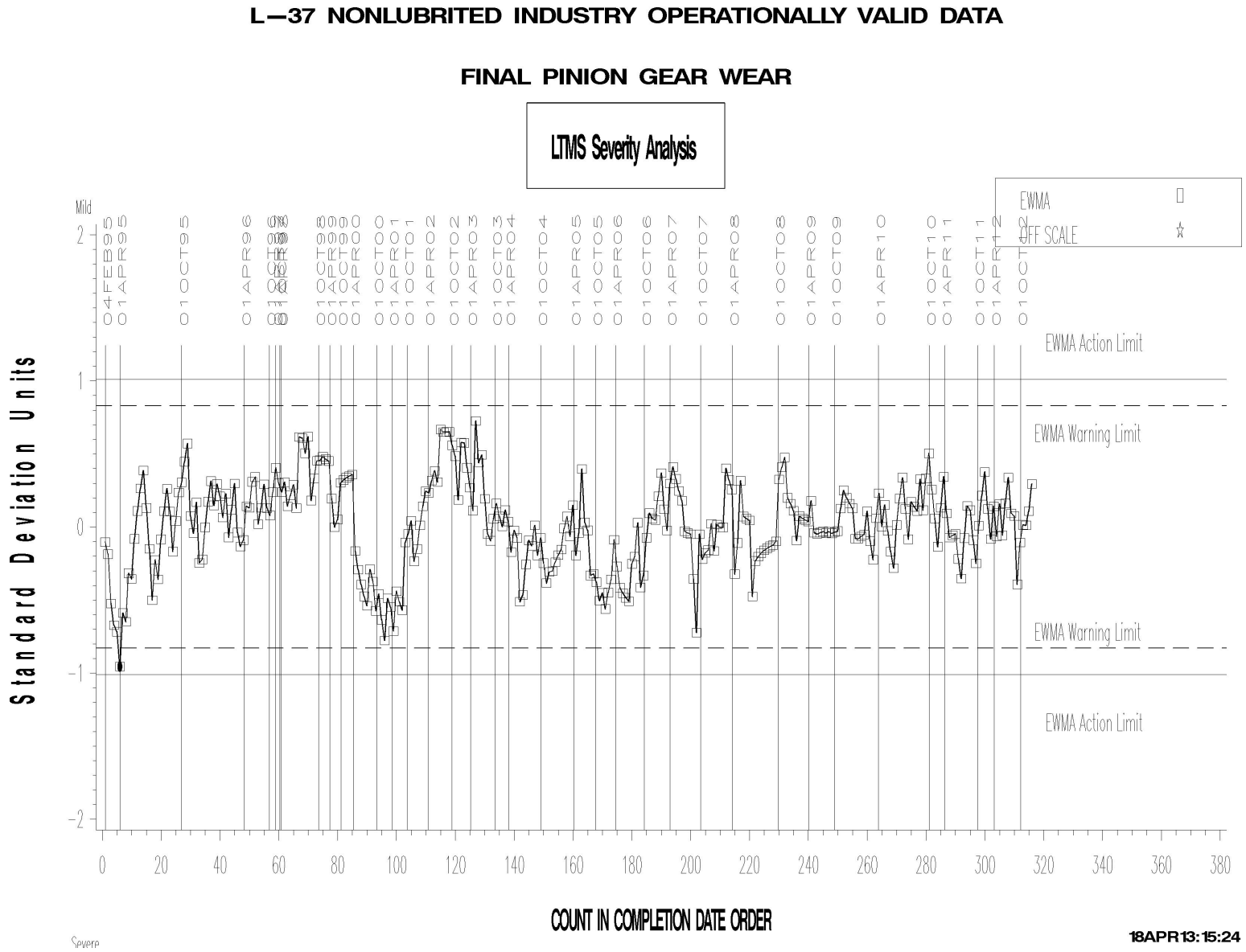
L-37 (D6121)

SUMMARY OF SEVERITY & PRECISION

Severity
Use of V1L528 hardware has been finalized this period. Testing on both lubrited and non-lubrited hardware thus far has remained within control chart limits.
Precision
Precision performance with the introduction of the new hardware has also remained within control chart limits.

Industry control charts follow.

L-37 (D6121)

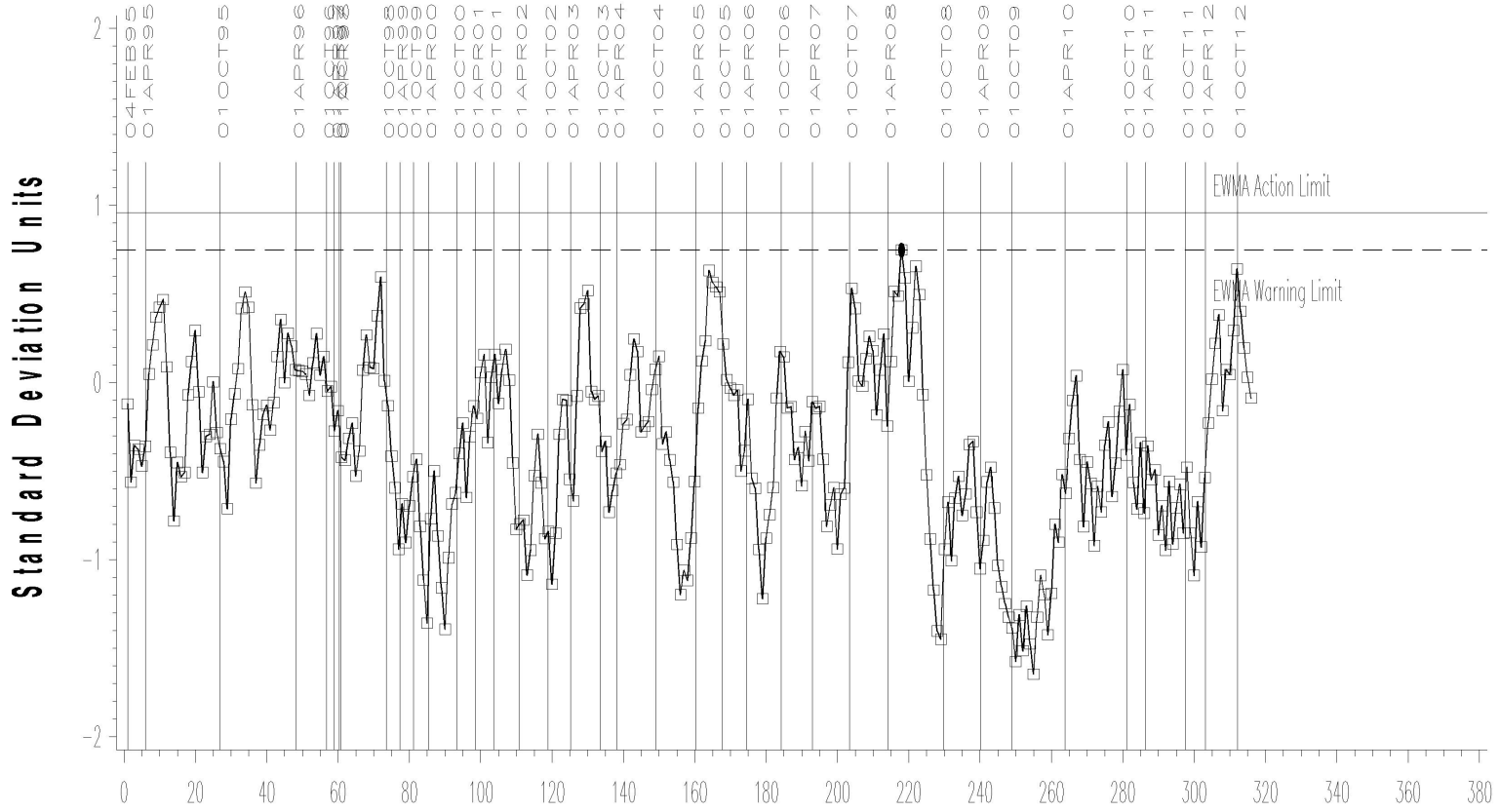

L—37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA
FINAL PINION GEAR WEAR
LTMS Severity Analysis
EWMA
OFF SCALE
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
18APR13:15:24

L-37 (D6121)

L—37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis

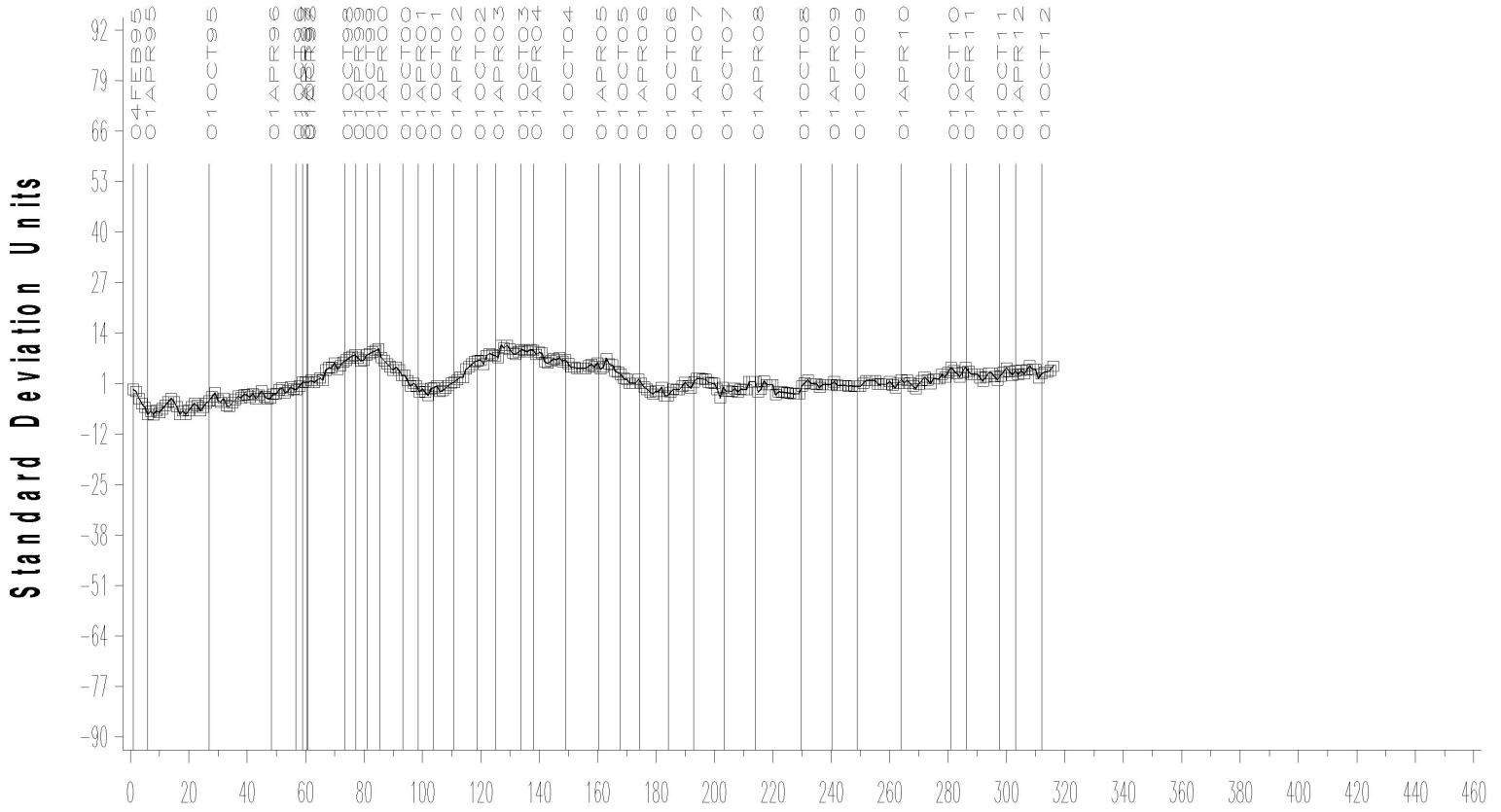


L-37 (D6121)

L—37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis



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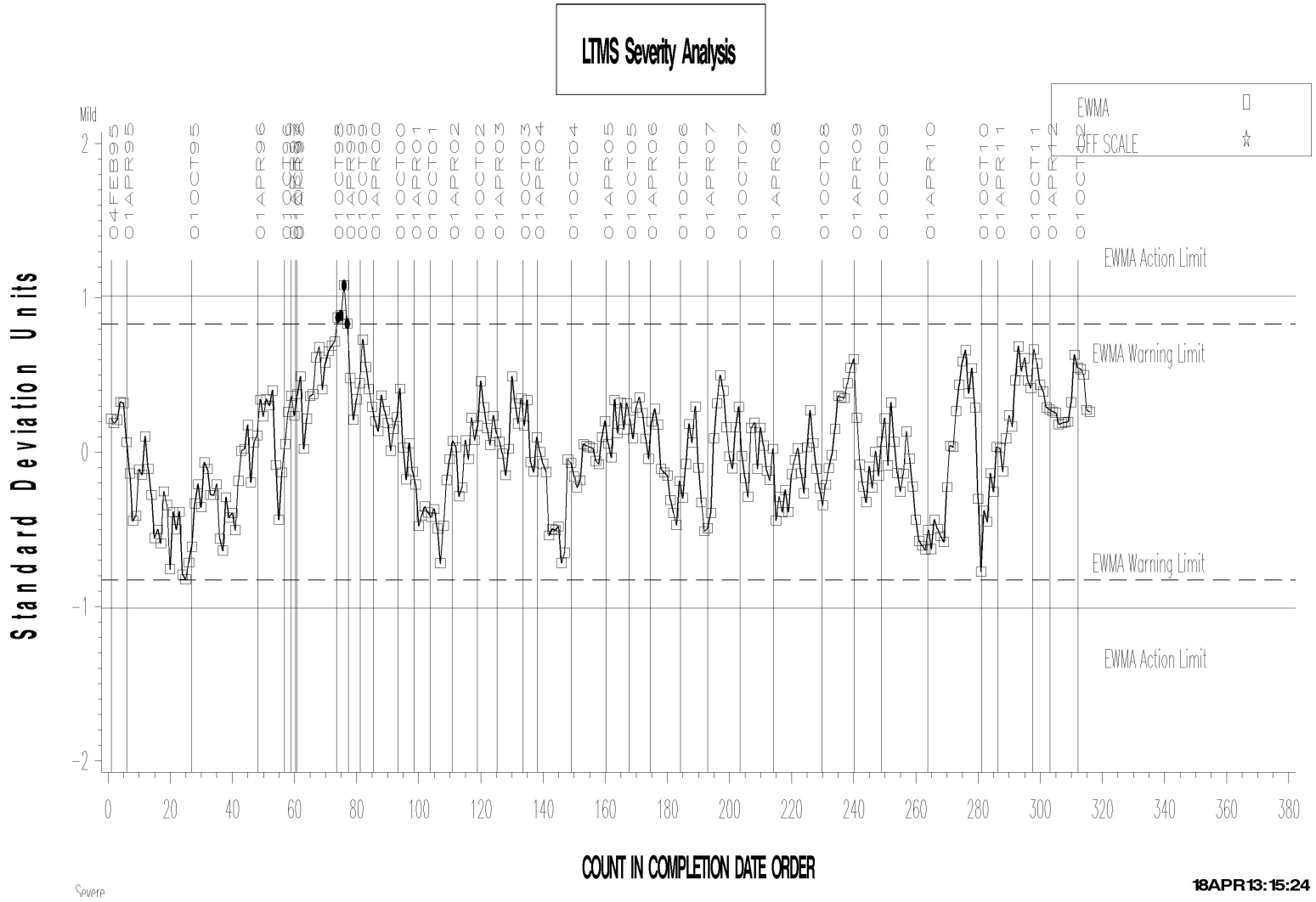
L-37 (D6121)

L—37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING



L-37 (D6121)

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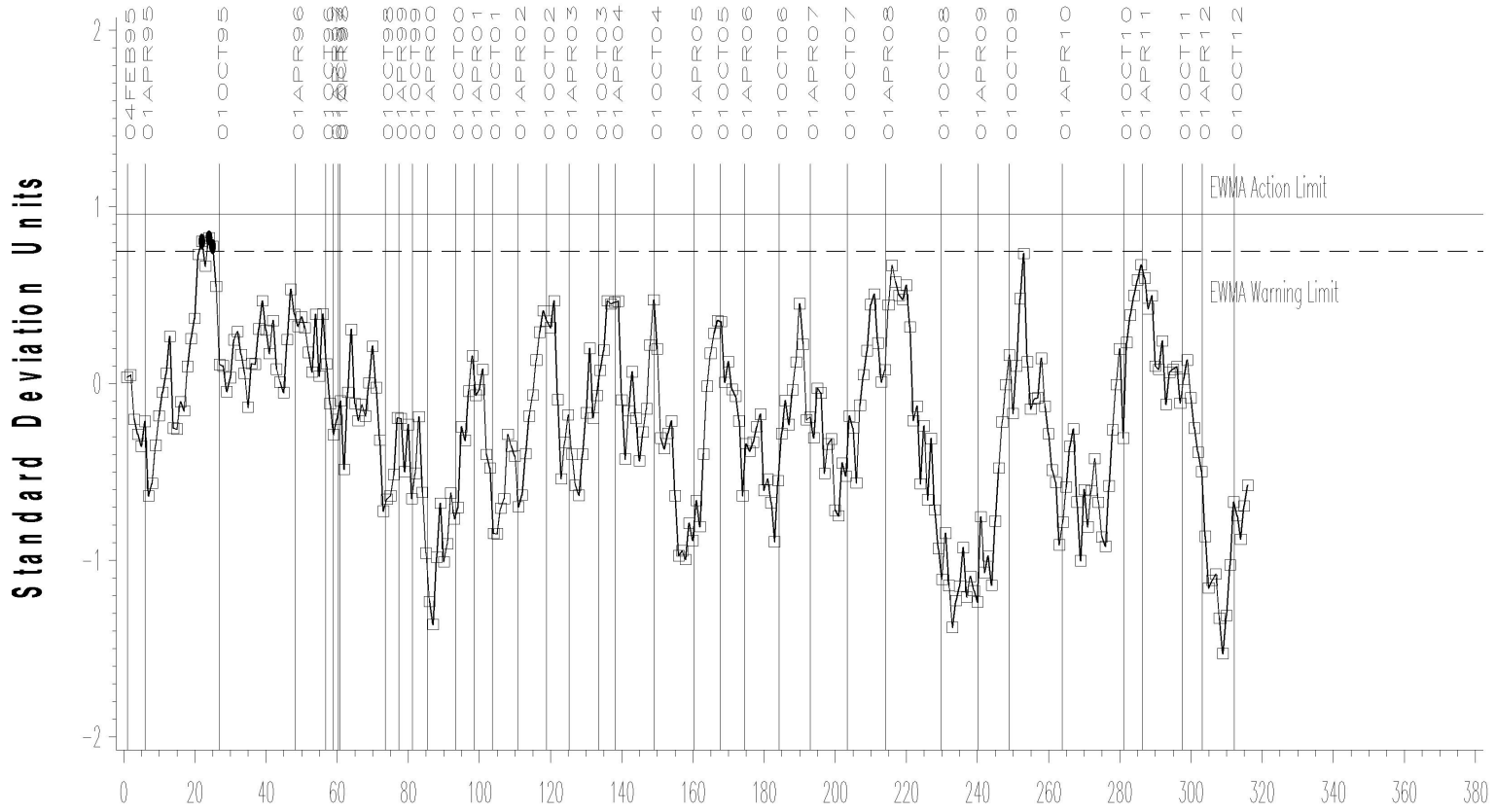

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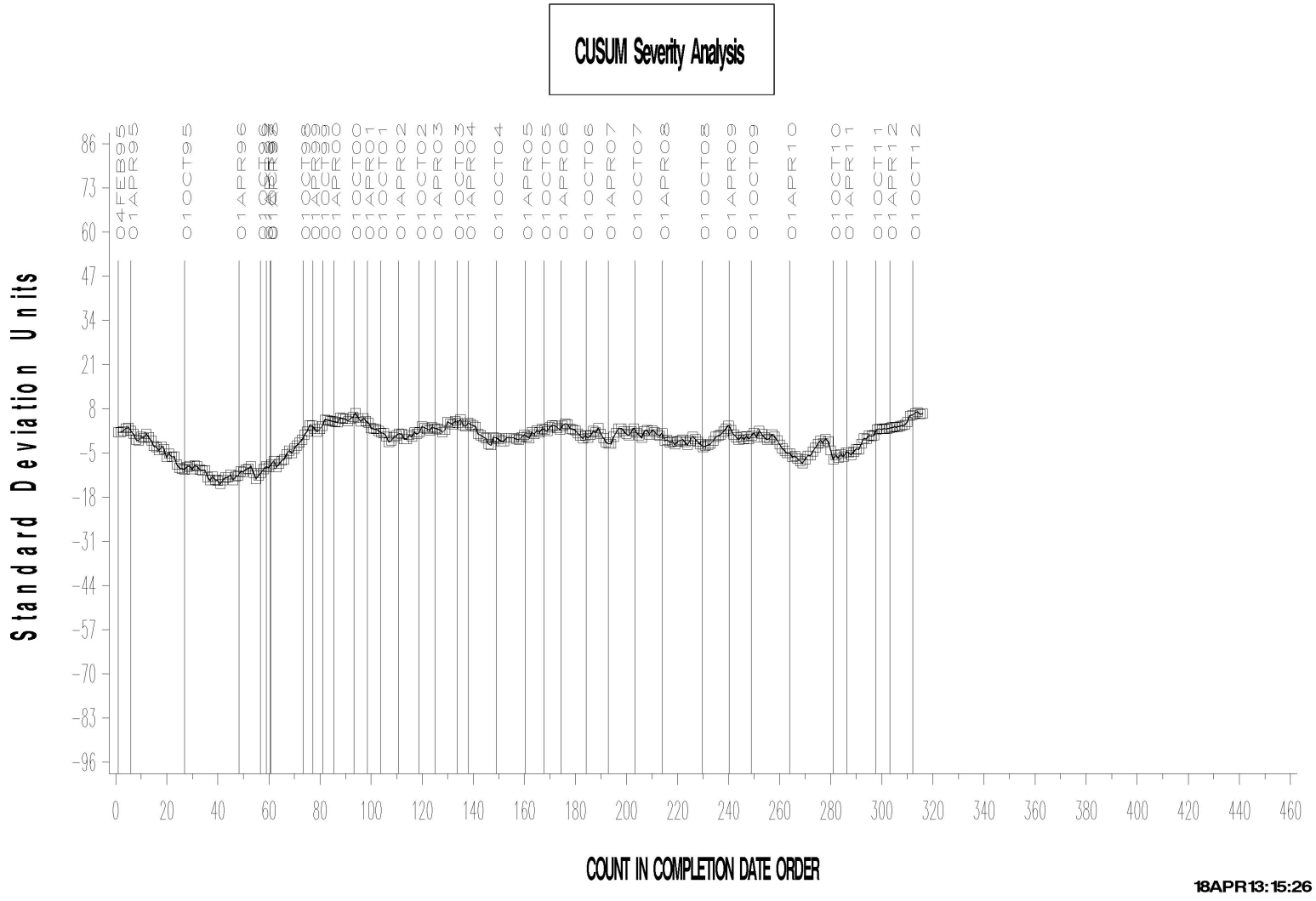
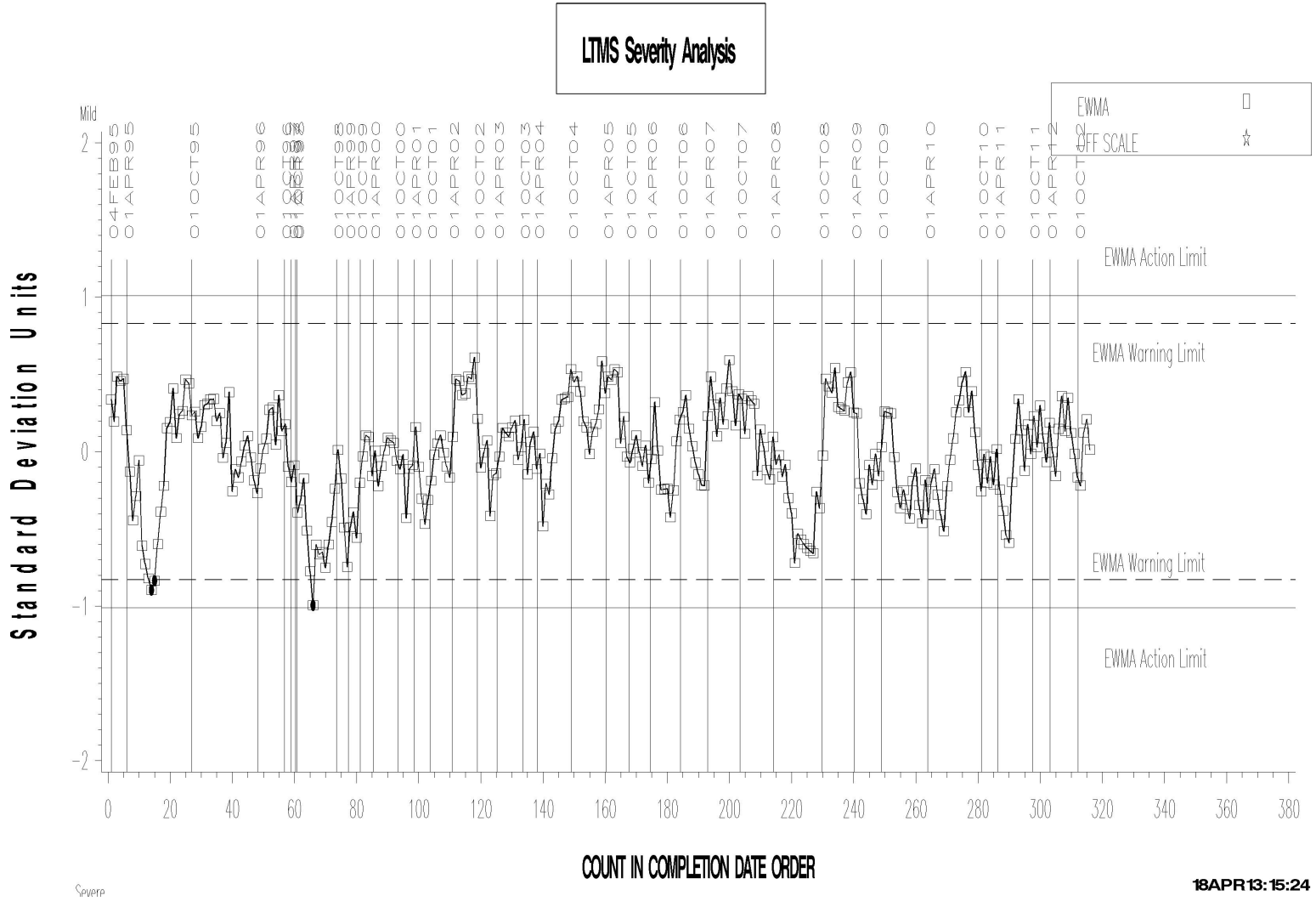
FINAL PINION GEAR RIDGING



L-37 (D6121)

L—37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING



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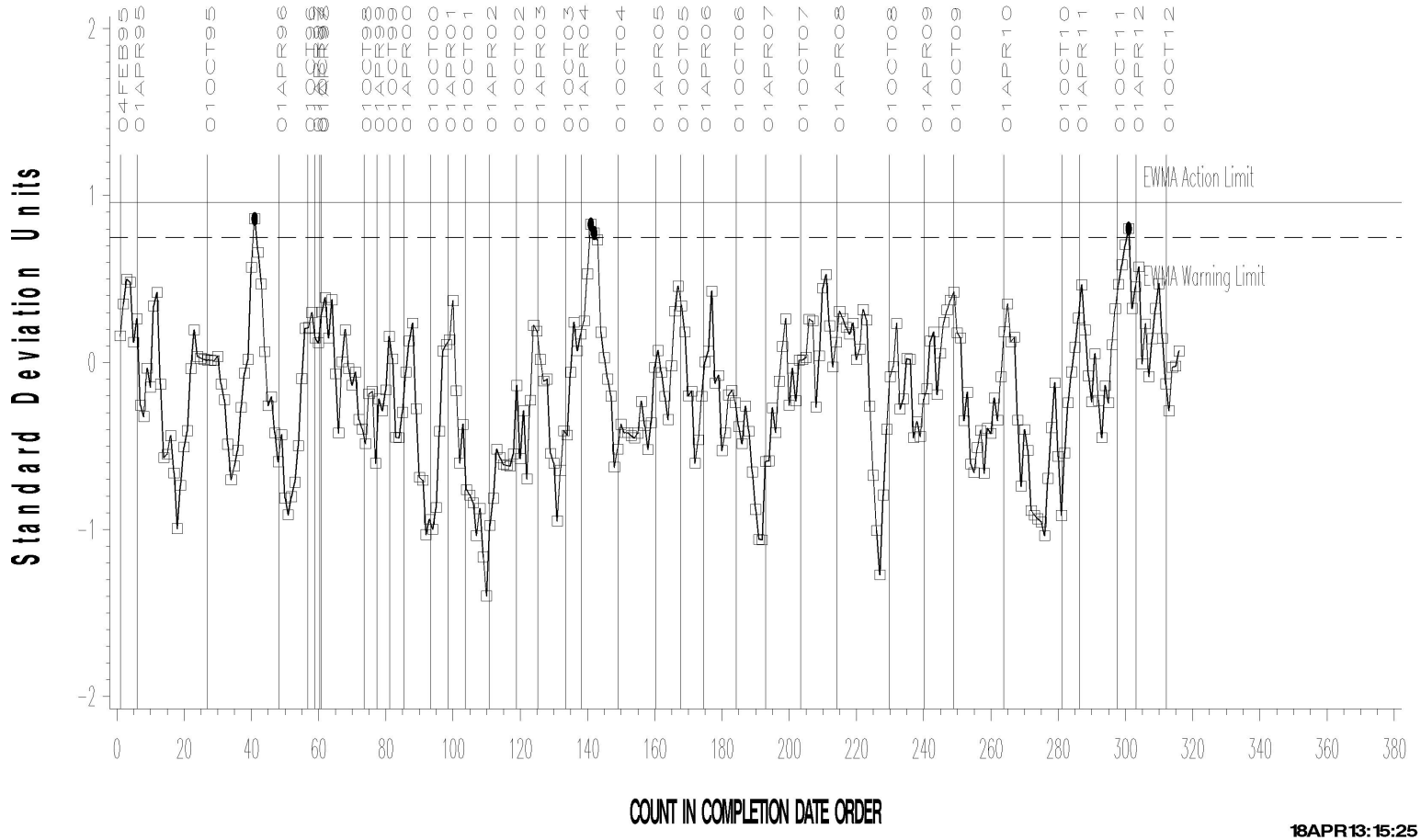

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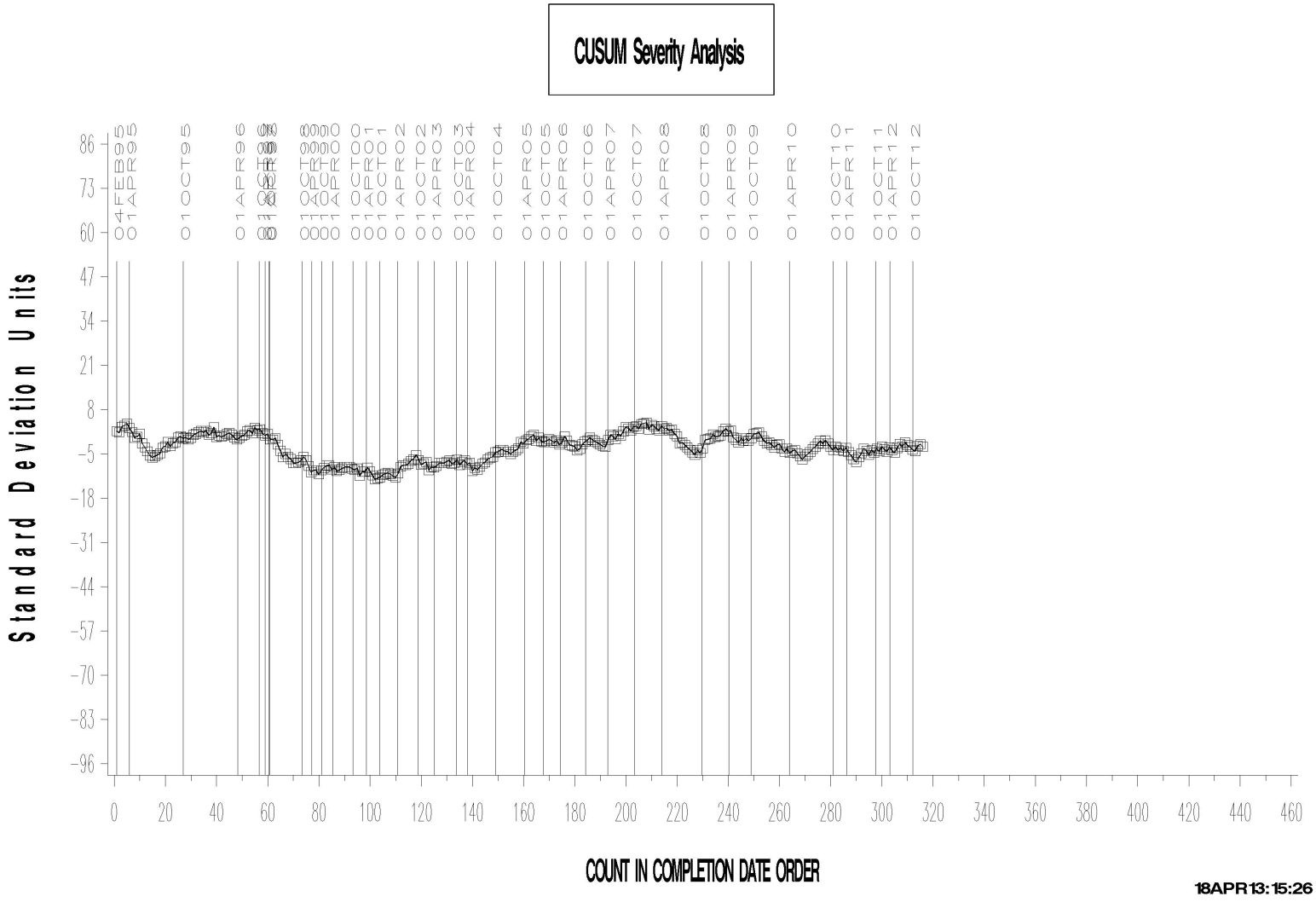
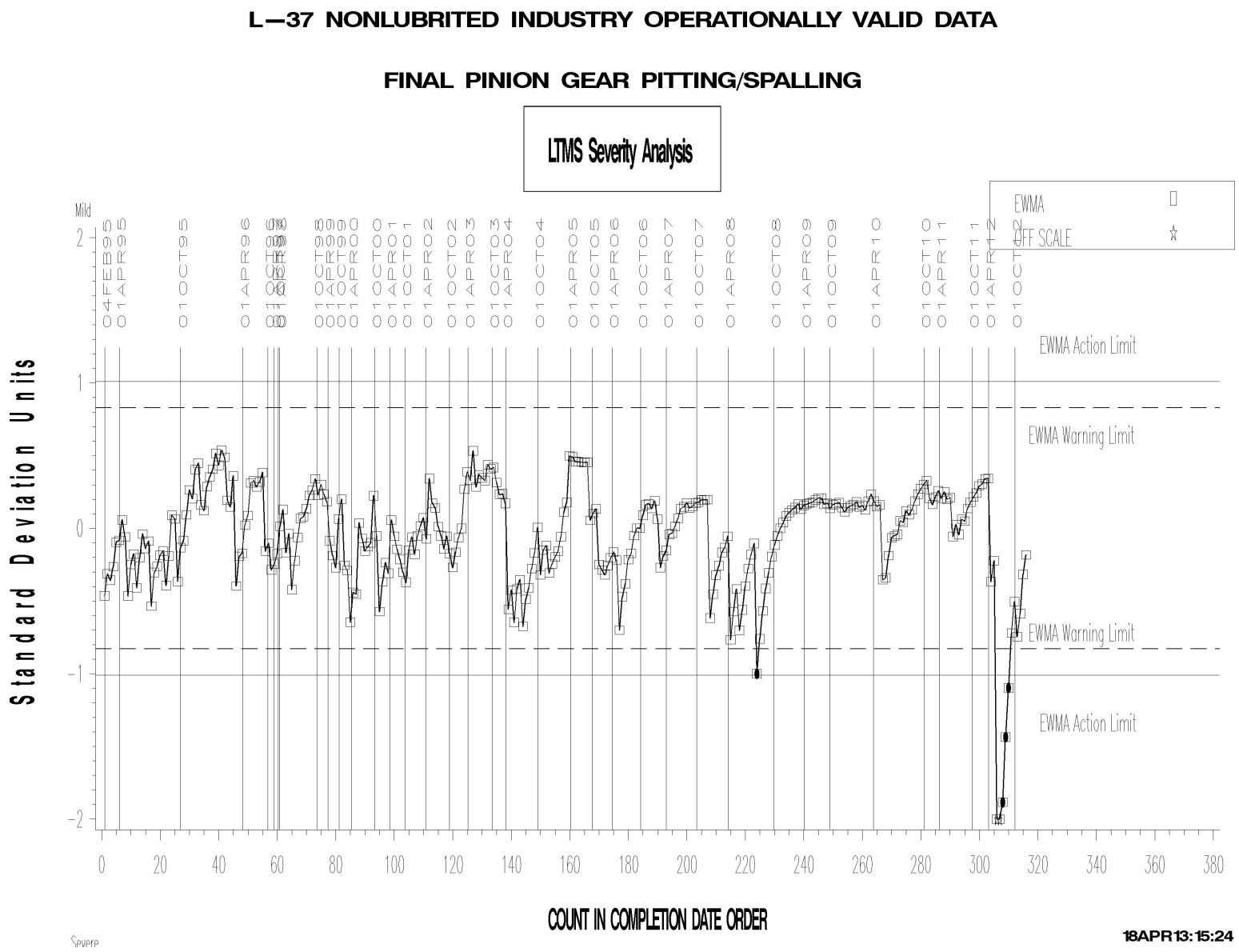
FINAL PINION GEAR RIPPLING



L-37 (D6121)


L—37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA
FINAL PINION GEAR PITTING/SPALLING
LTMS Severity Analysis
EWMA
OFF SCALE
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
18APR13:15:24

L-37 (D6121)

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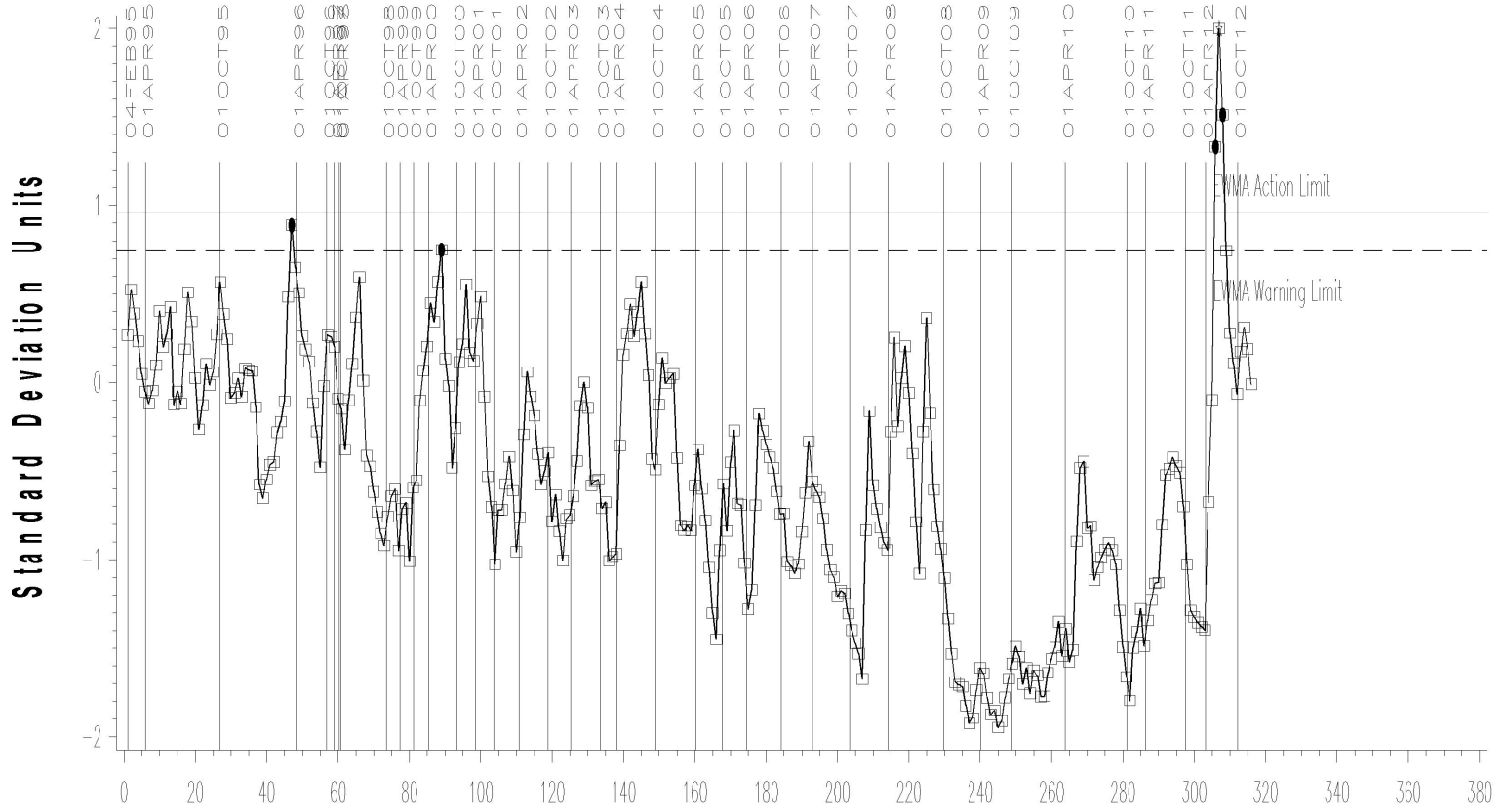
LTMS Precision Analysis



COUNT IN COMPLETION DATE ORDER

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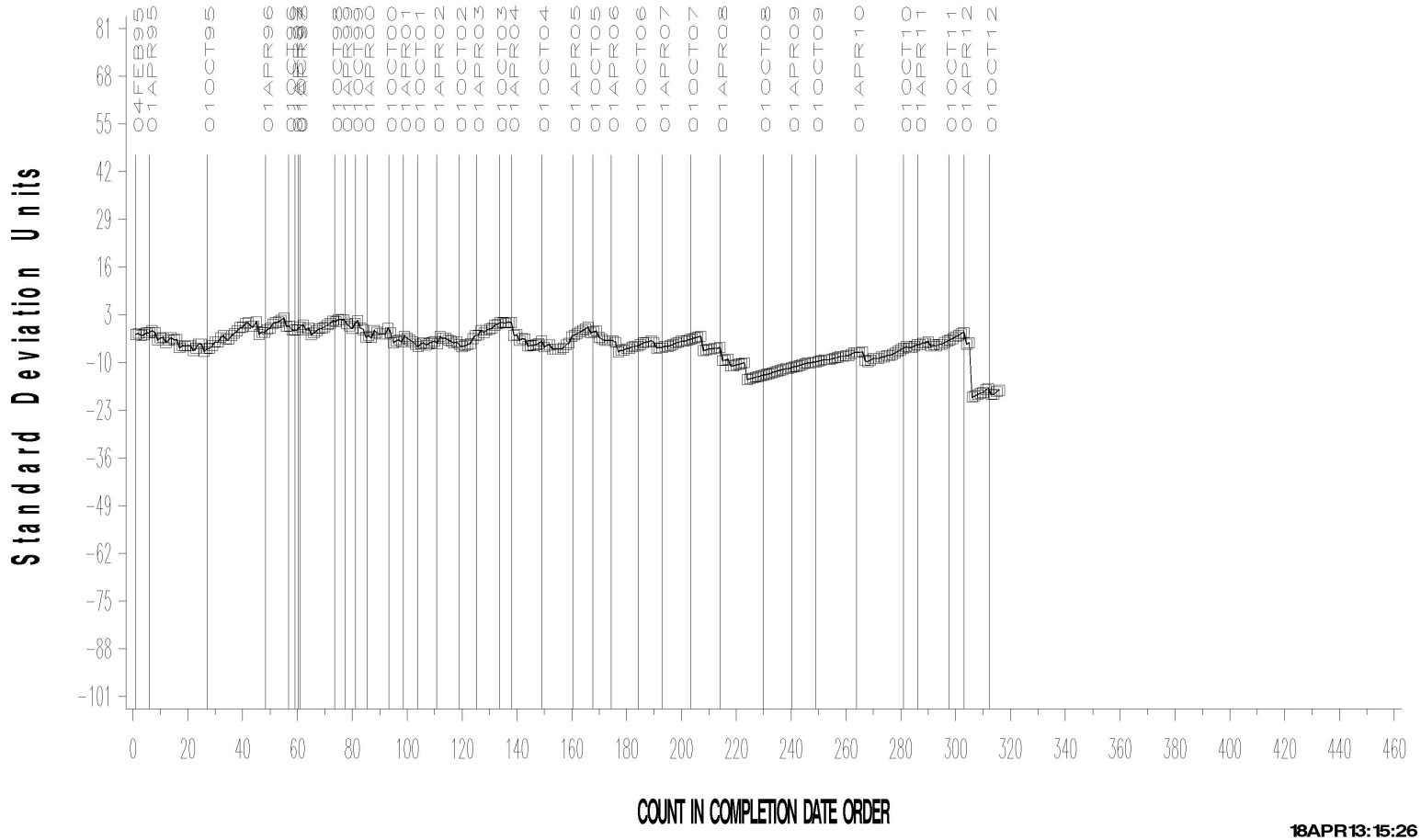
L-37 (D6121)

L—37 NONLUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR PITTING/SPALLING

CUSUM Severity Analysis



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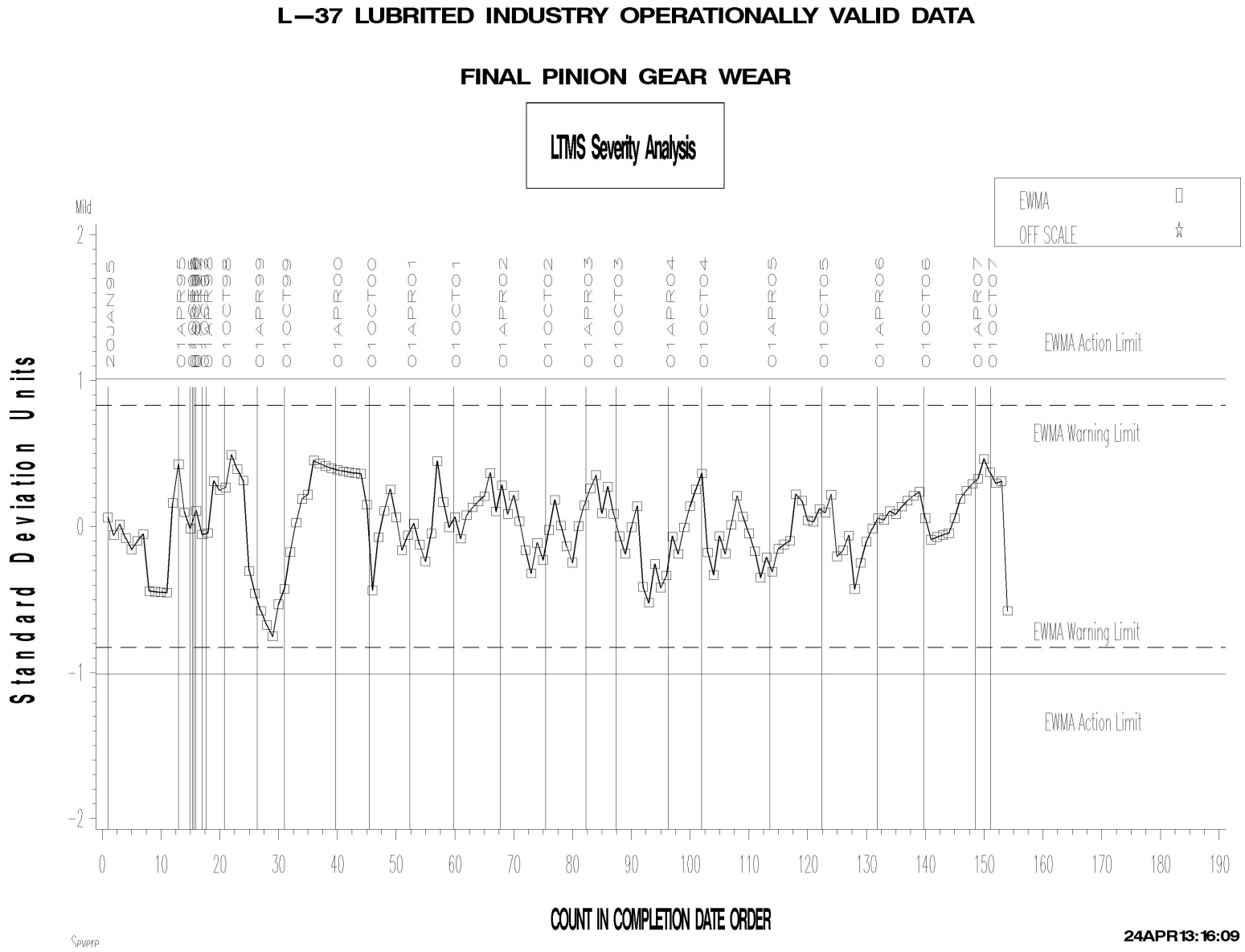
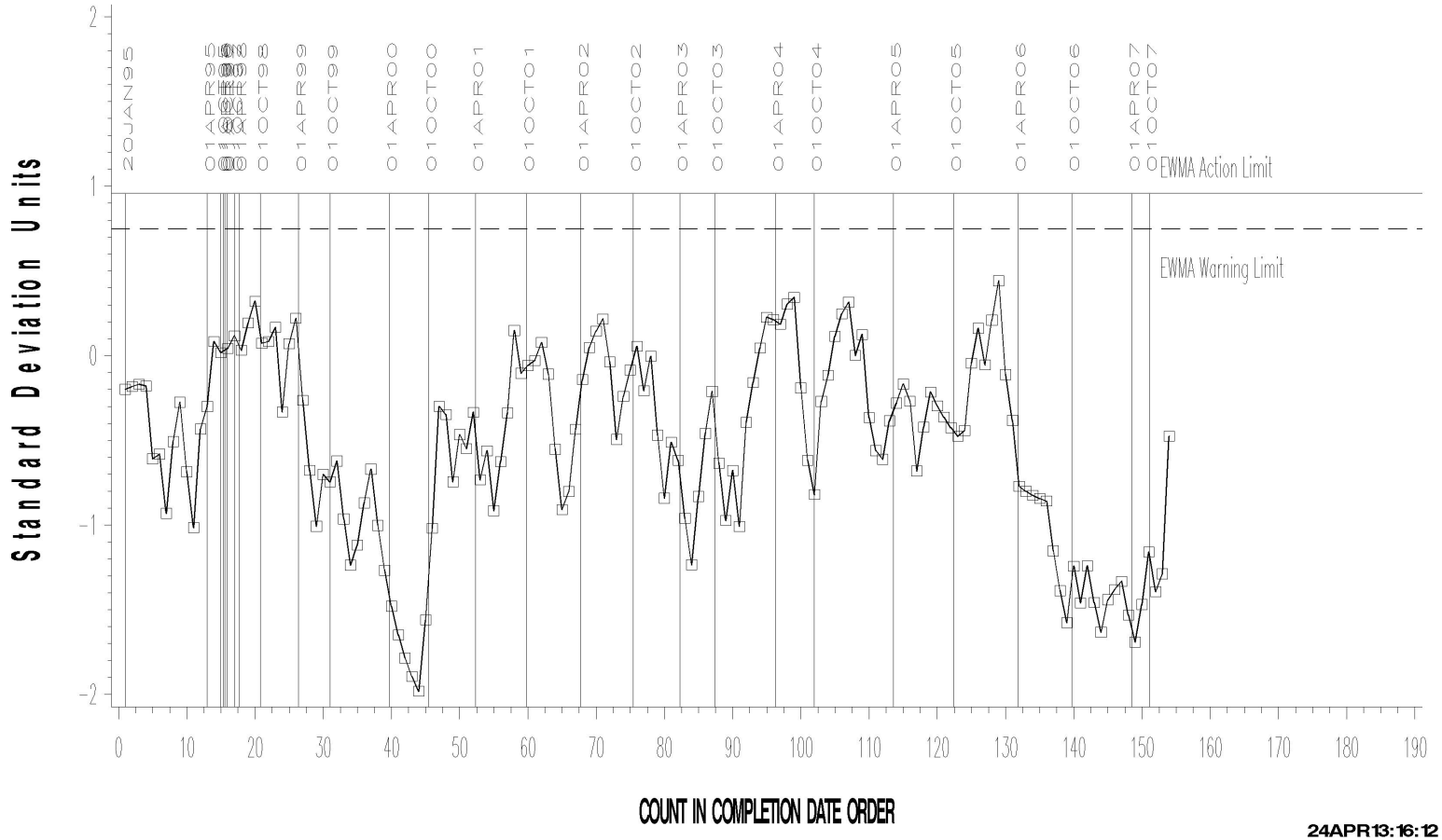

L—37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA
FINAL PINION GEAR WEAR
LTMS Severity Analysis
EWMA
OFF SCALE
Mild
Severe
Standard Deviation Units
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
COUNT IN COMPLETION DATE ORDER
24APR13:16:09

L-37 (D6121)

L—37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

LTMS Precision Analysis



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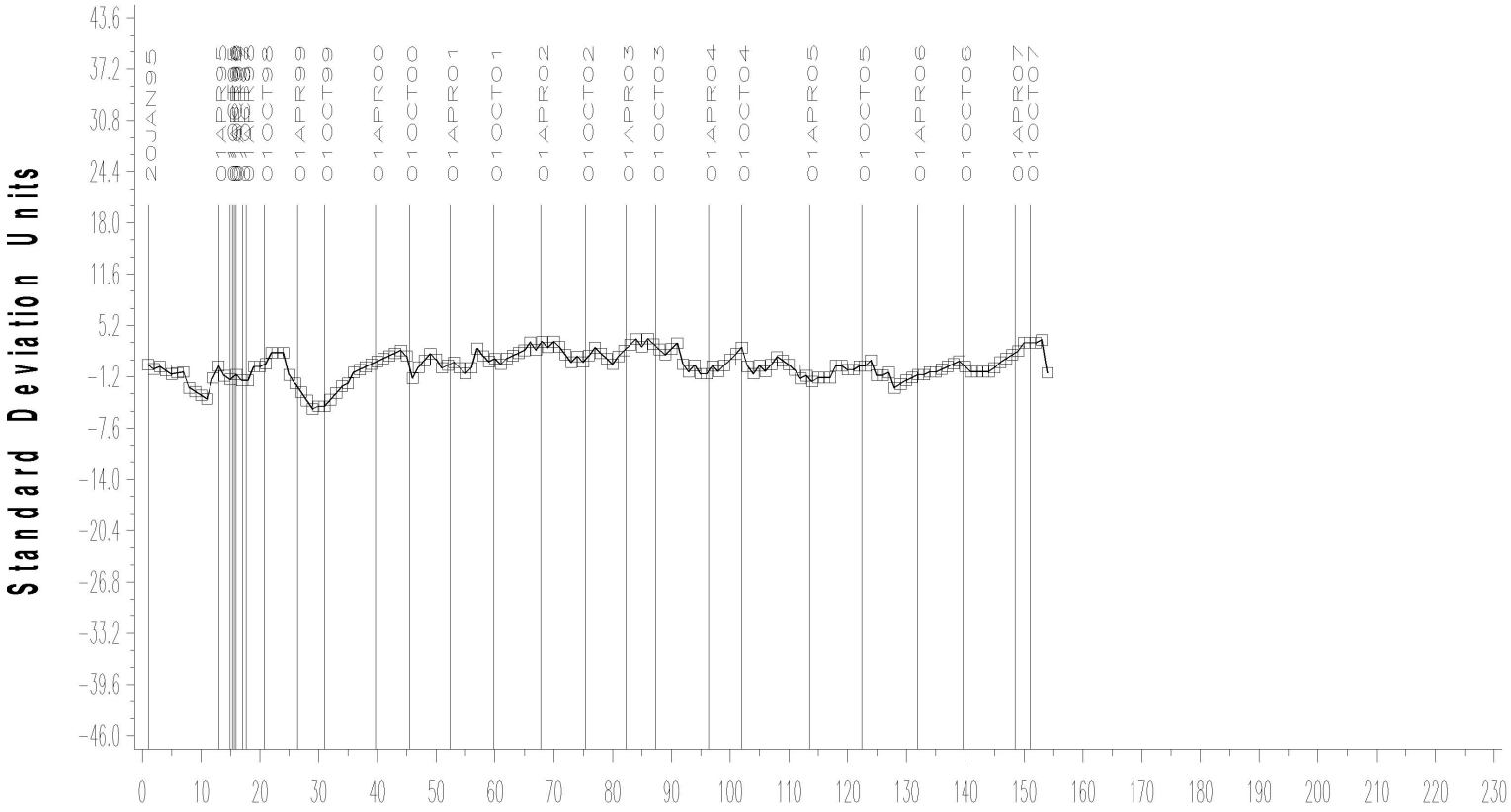
L-37 (D6121)

L—37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR WEAR

CUSUM Severity Analysis



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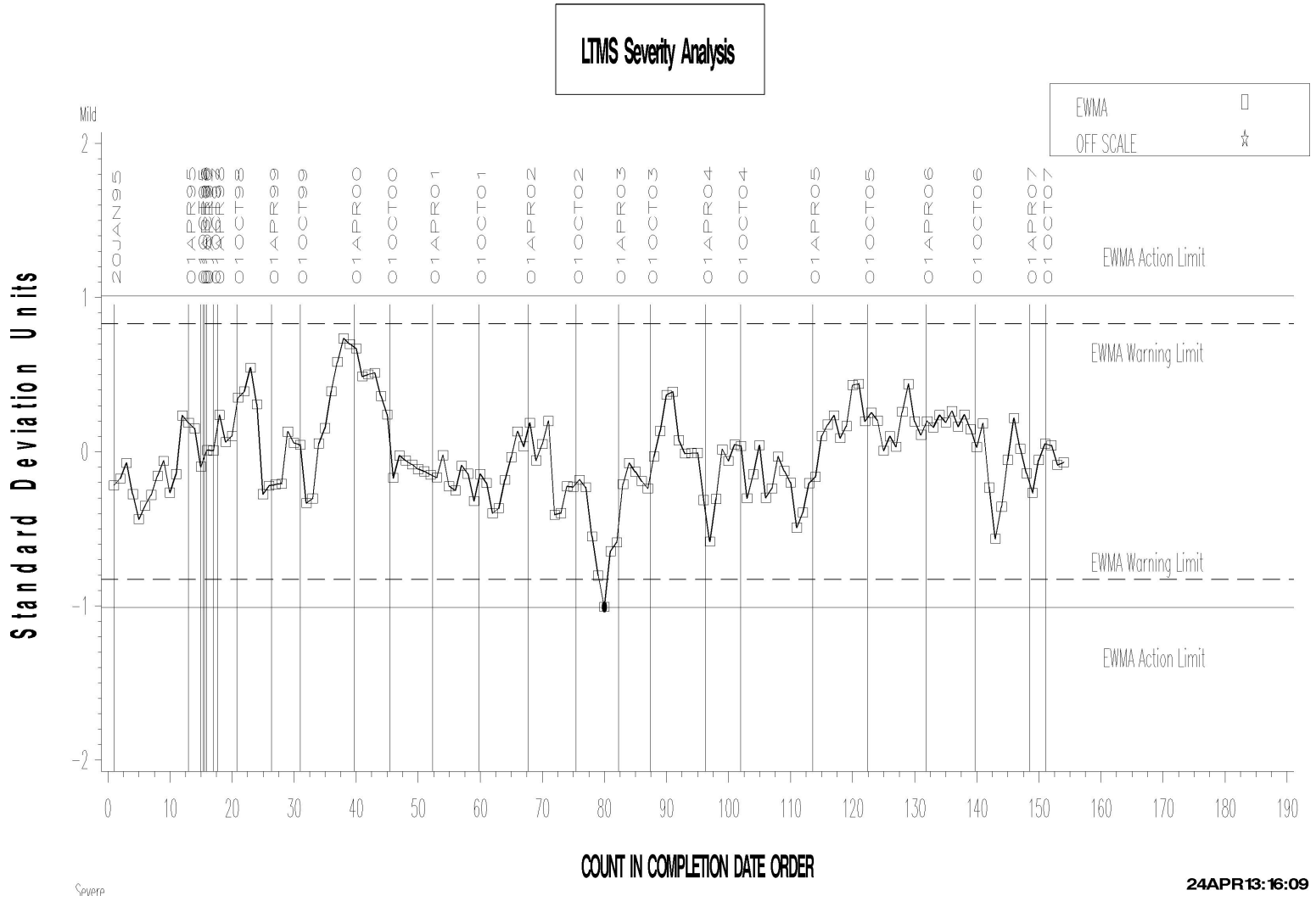
L-37 (D6121)

L—37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIDGING



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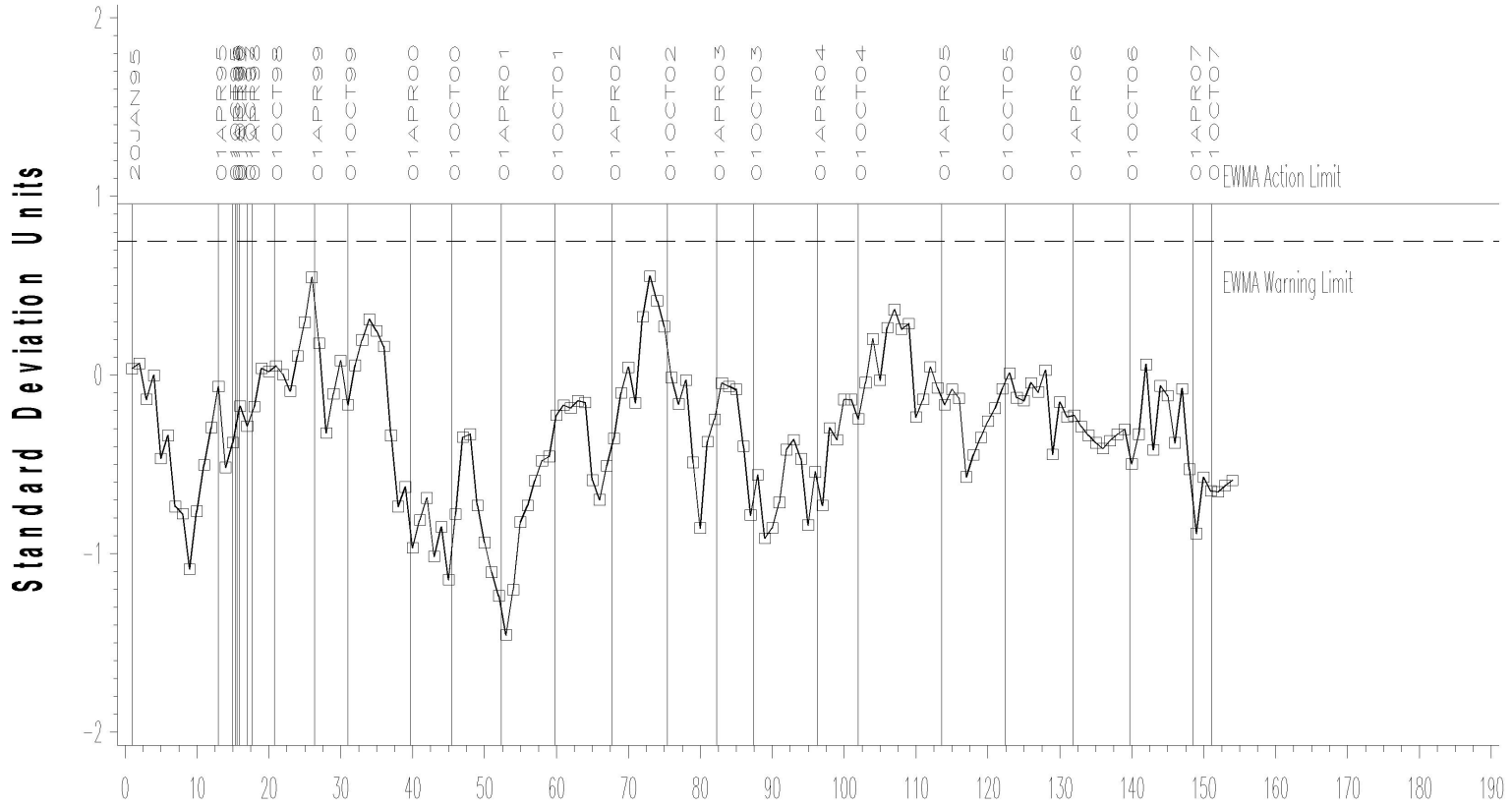
FINAL PINION GEAR RIDGING

LTMS Precision Analysis



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L-37 (D6121)

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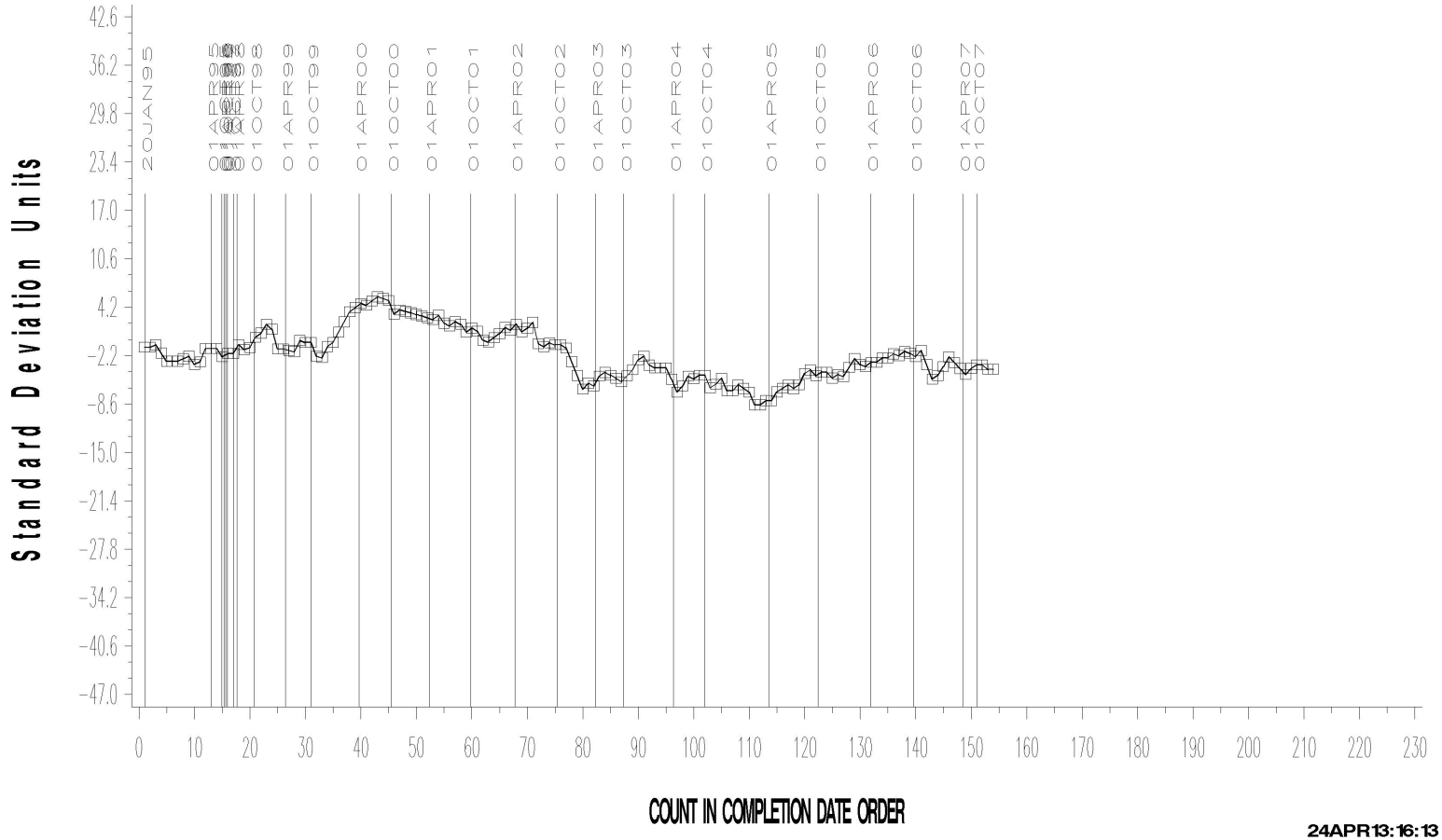
FINAL PINION GEAR RIDGING

CUSUM Severity Analysis



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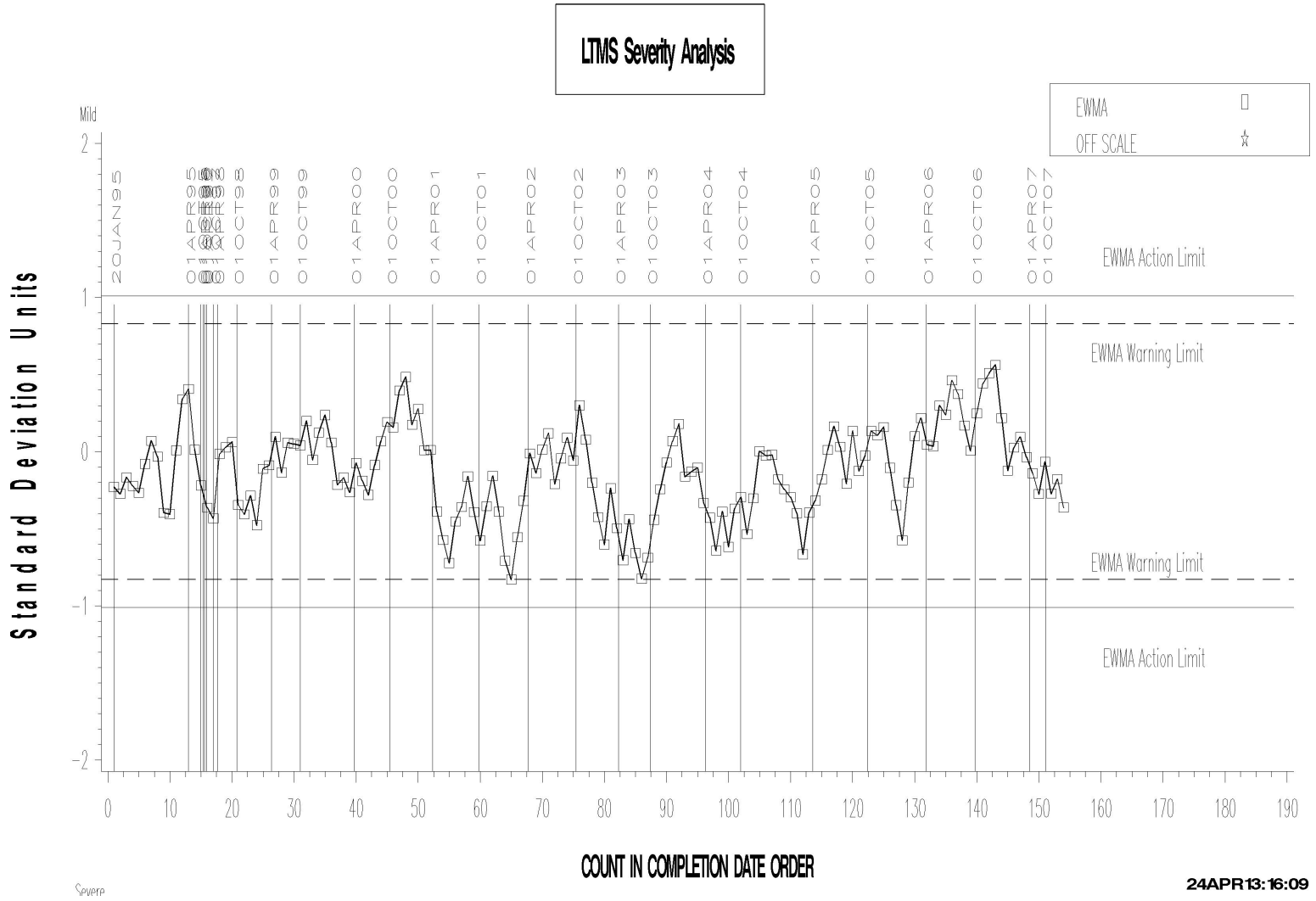
L-37 (D6121)

L—37 LUBRITED INDUSTRY OPERATIONALLY VALID DATA

FINAL PINION GEAR RIPPLING



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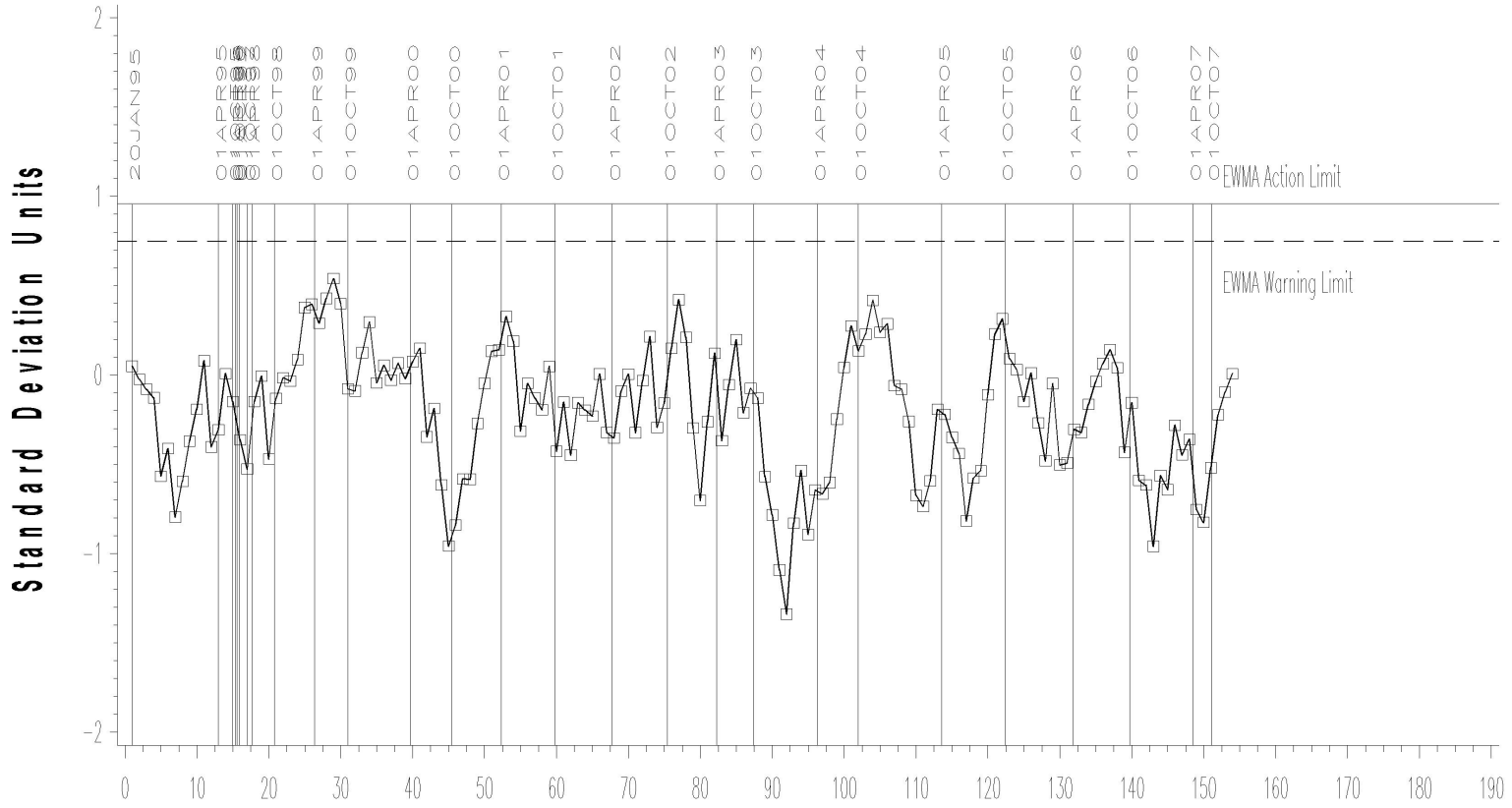

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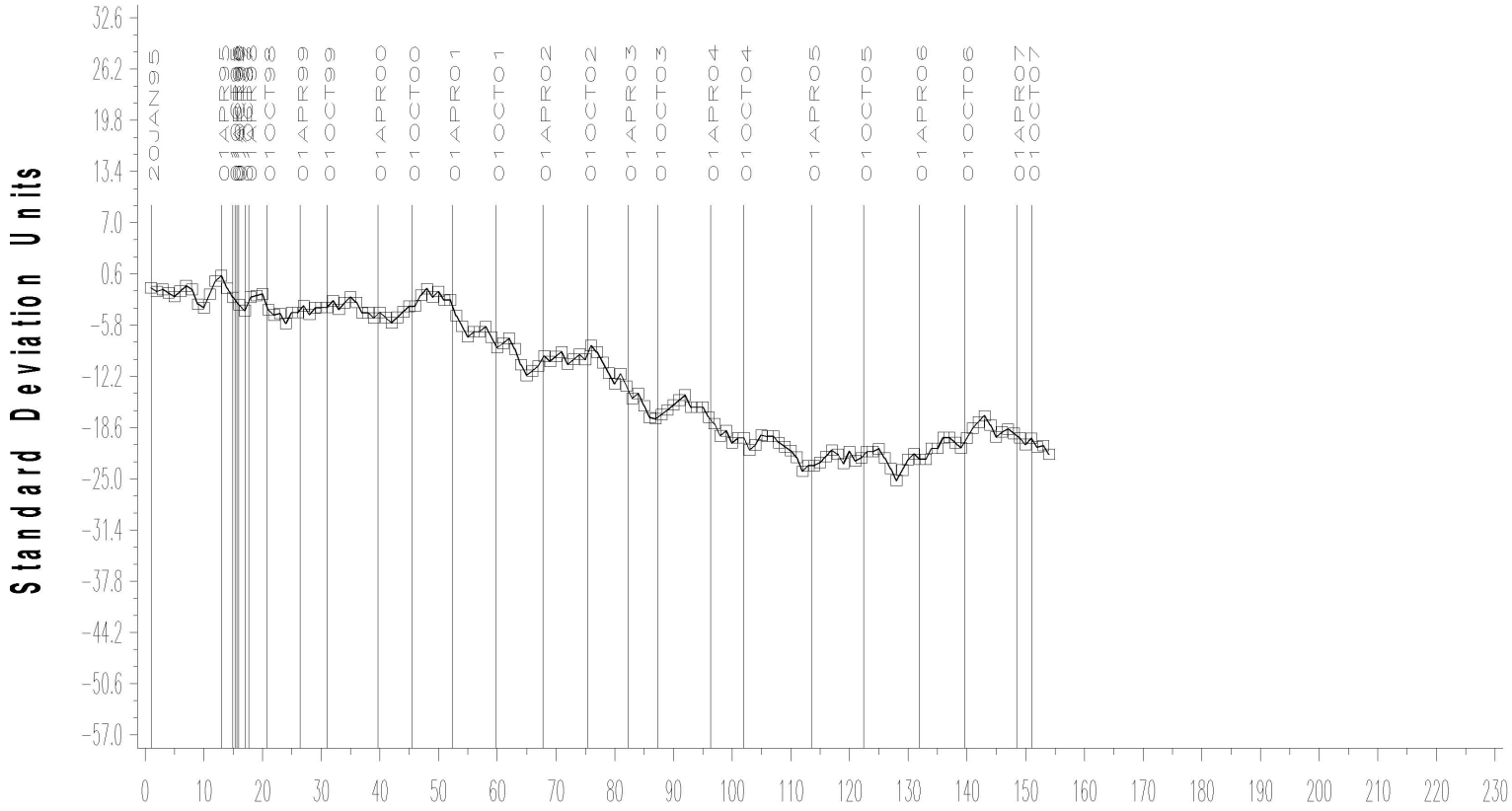

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L-37 (D6121)

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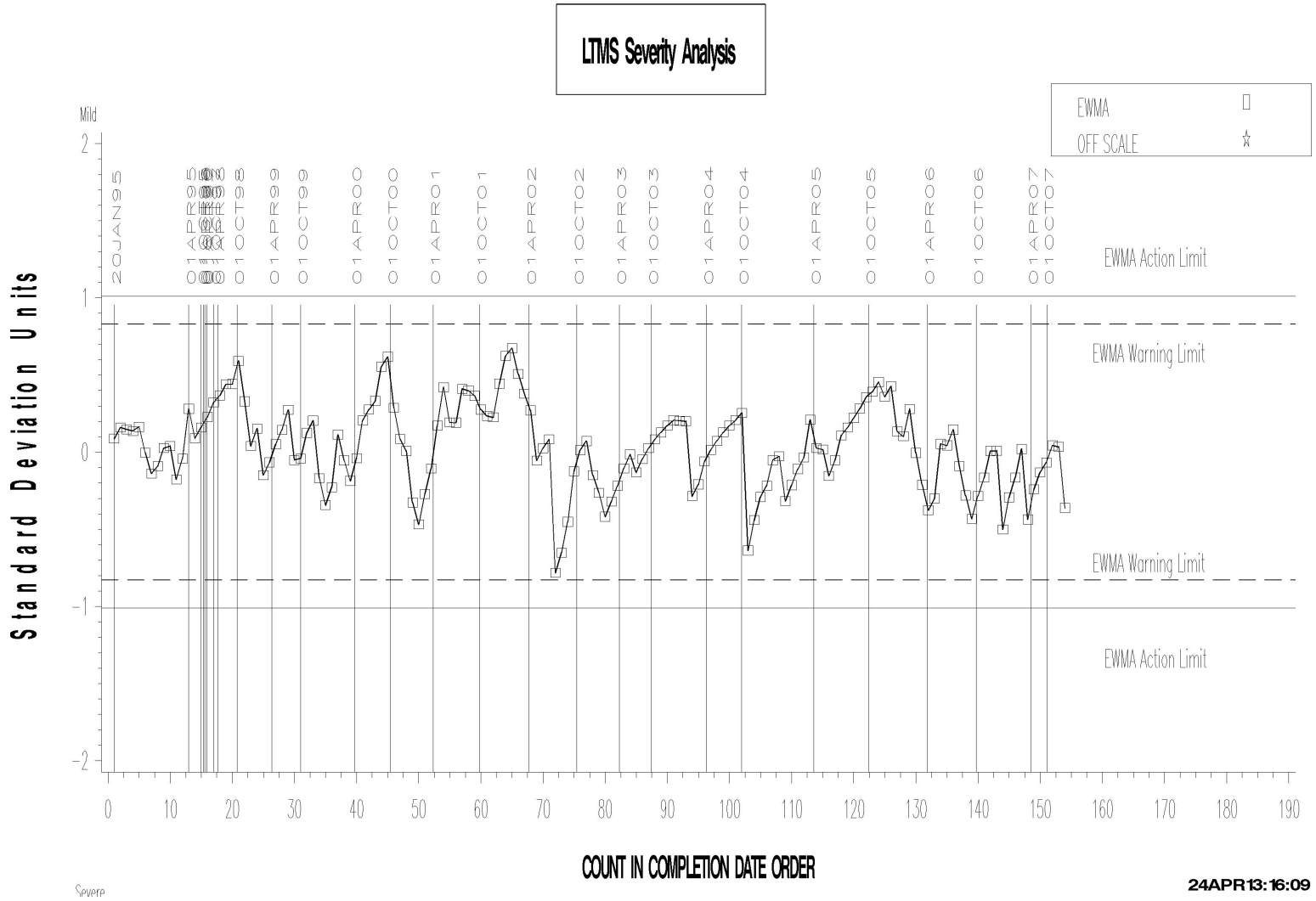
FINAL PINION GEAR PITTING/SPALLING



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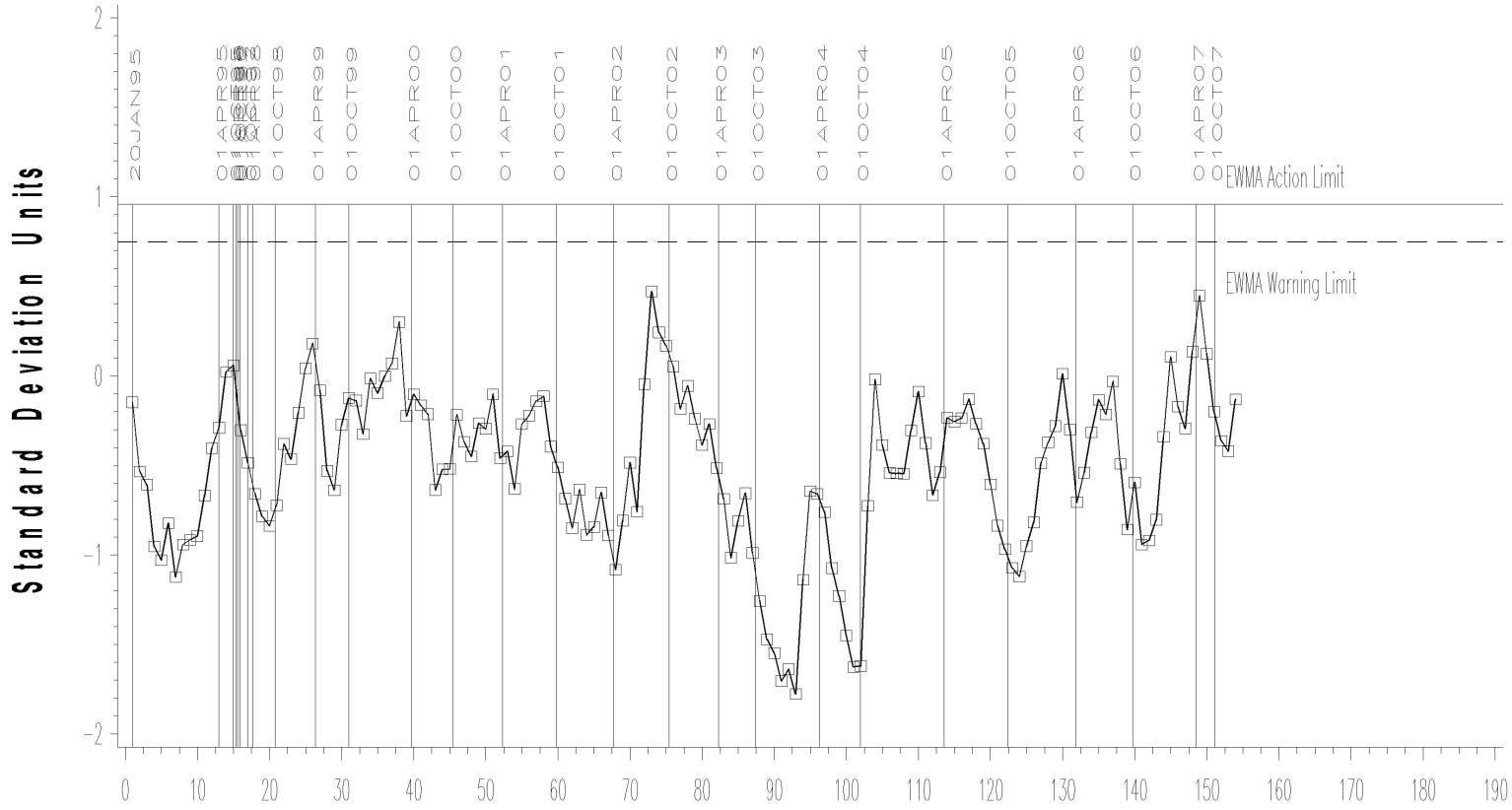

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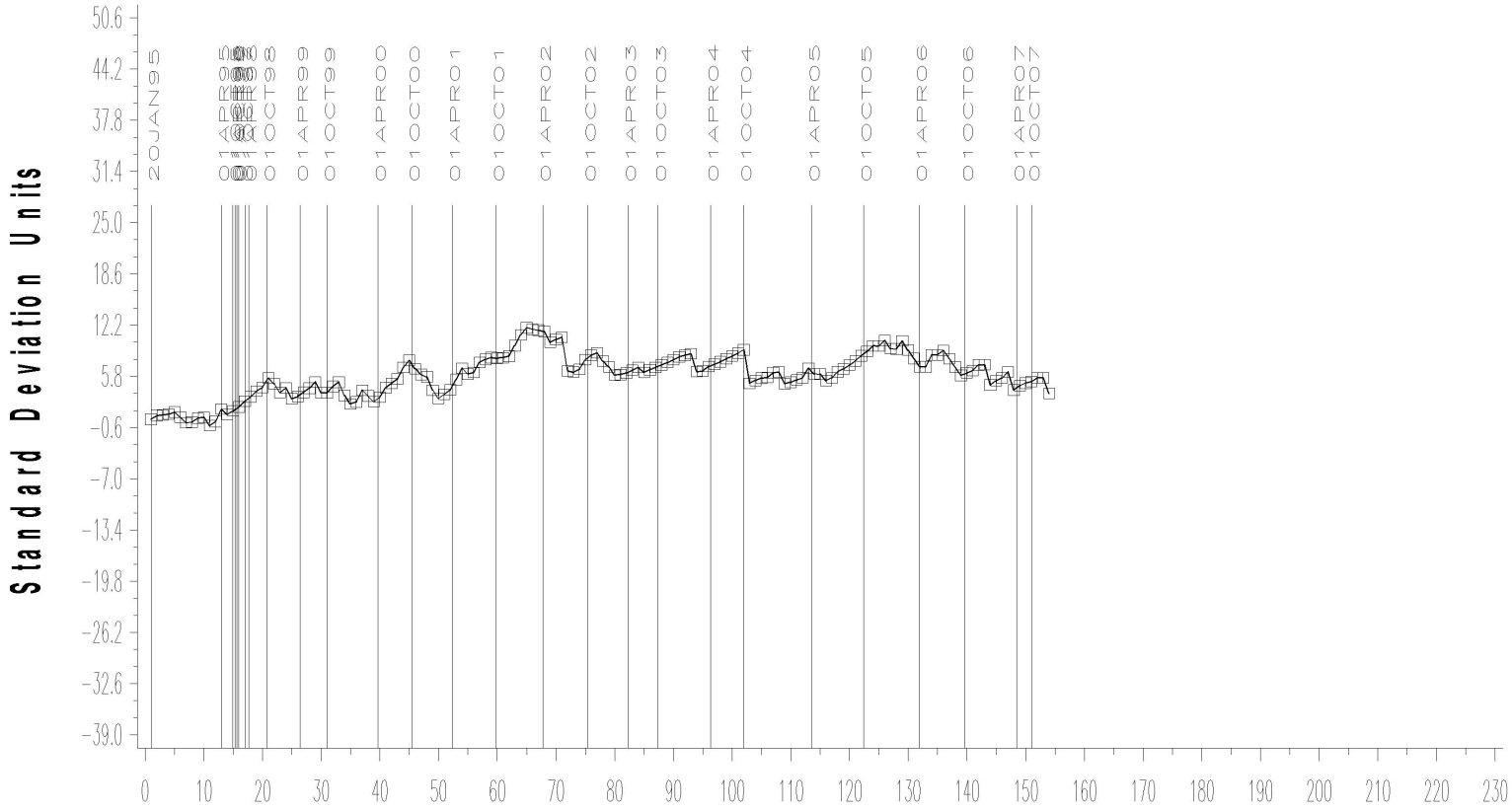

L-37 (D6121)

TIMELINE ADDITIONS

Effective Date	Information Letter	Event
20130311	13-1	Implementation of correction factors and exclusions for use with V1L528 hardware.
20130320	13-2	Operating conditions and documentation of spalling exclusions when using V1L528 hardware.

L-37 (D6121)

LAB VISITS

One L-37 lab visit was conducted during this period. No procedural deviations were noted.

INFORMATION LETTERS

Information Letter 13-1 was issued March 11, 2013 to implement correction factors and exclusions for use with the V1L528 hardware.

Information Letter 13-2 was issued March 20, 2013 to revise operating conditions used for V1L528 hardware and to specify how tests using spalling exclusions were to be documented.

L-37 (D6121)

LTMS DEVIATIONS

One LTMS deviation was written this period to calibrate a test stand generating a precision alarm.

The L-37 test uses acceptance bands for test approval instead of the control charted Shewhart values. This can result in accepted tests producing control chart precision alarms.

If this approach results in recurring precision 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

		@ TMC	
Oil	Cans @ Labs	Cans	Gallons
127	2	1	1.0
134	9	85	85.4
151-2	4	3	3.3
151-3	3	0	0.0
152-1	3	0	0.0
152-2	16	242	242.0
152-3	0	54	54.8
153-1	39	57	58.0
155	6	36	36.4
155-1	8	406	406.8
Total	90	884	887.6

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).