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: 21-010

DATE: April 20, 2020

TO: Don Bell, Chairman, OSCT Surveillance Panel

FROM: Dylan Beck

SUBJECT: OSCT Reference oil testing from October 1, 2020 through March 31, 2021

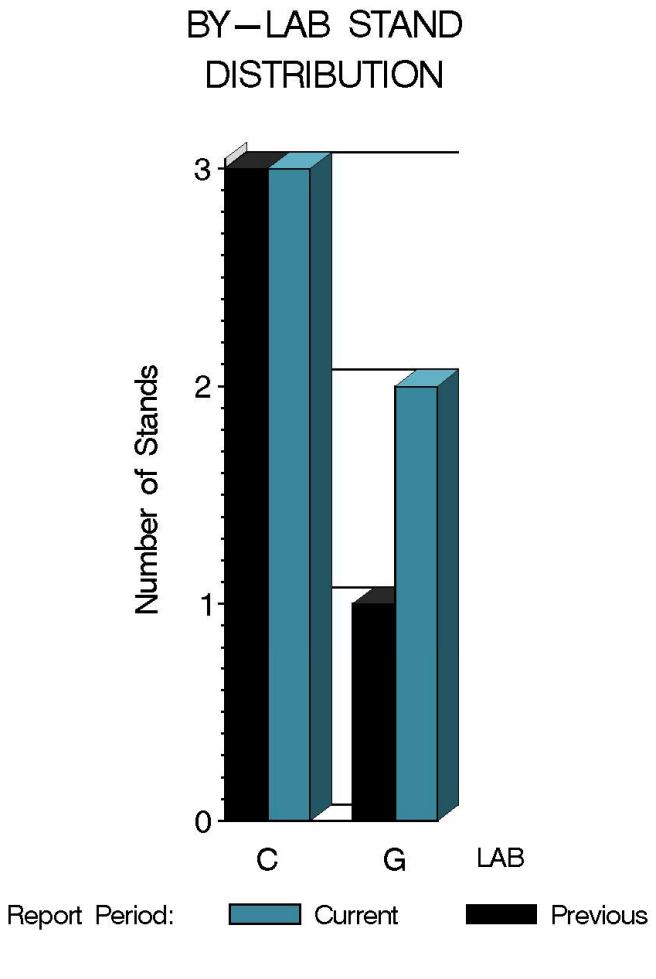
Attached is a summary of reference oil testing activity this period.

DJB/djb/mem21-010.djb.doc
cc: Frank Farber
Jeff Clark
OSCT Surveillance Panel
http://www.astmtmc.cmu.edu/ftp/docs/gear/osct/semiannualreports/osct-04-2021.pdf

Distribution: email

OSCT (D5662)

	Reporting Data	Calibrated on 3-31-2021
Number of Labs	2	2
Number of Stands	5	5

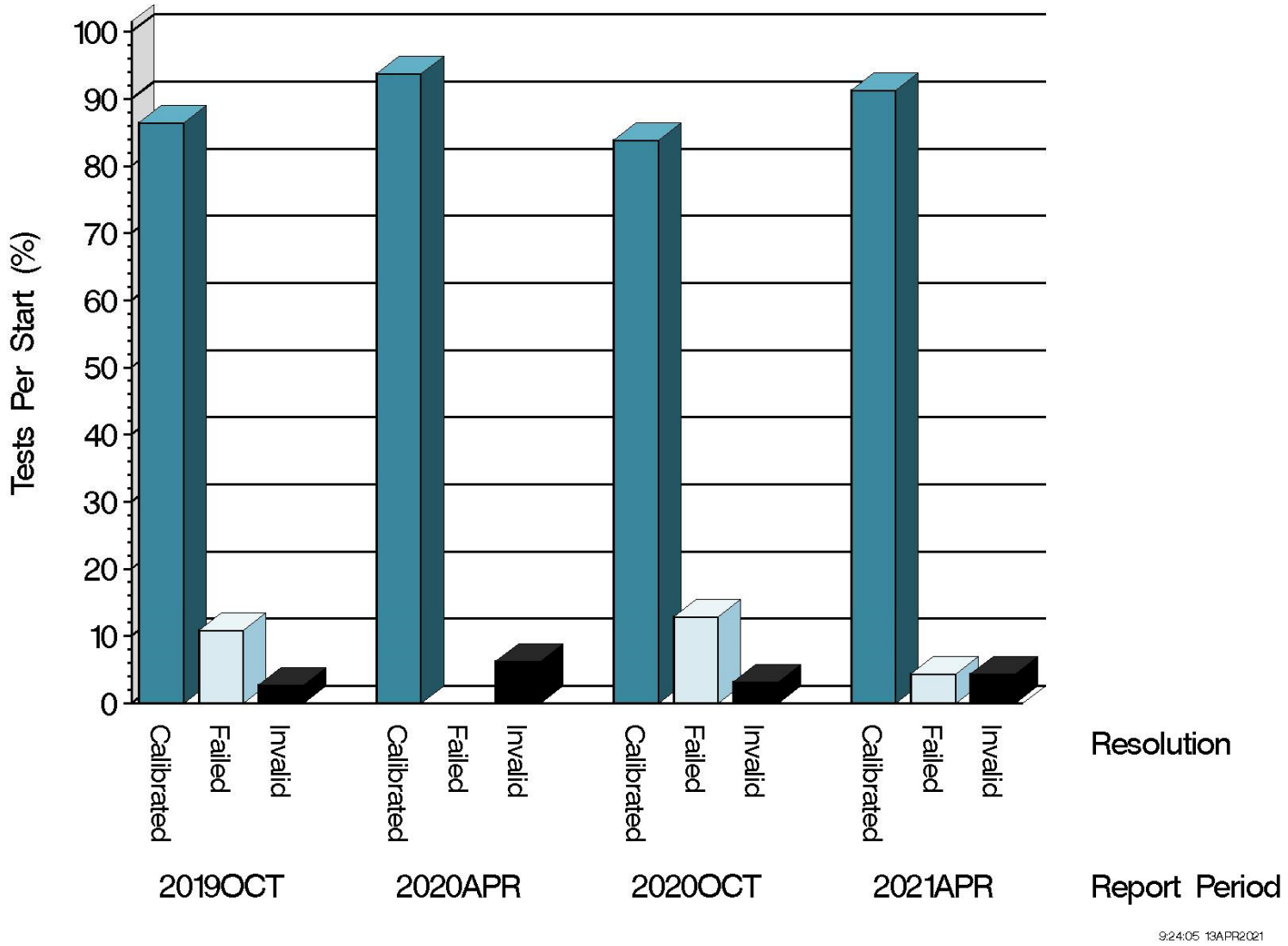


OSCT (D5662)
Test Distribution by Elastomer and Validity

		FL	NI	PA	Totals	
					Last Period	This Period
Accepted for calibration	AC	6	7	8	26	21
Rejected (low result)	OC	0	0	0	2	0
Rejected (high result)	OC	1	0	0	1	1
Rejected (high and low)	OC	0	0	0	1	0
Op. invalid	LC	0	1	0	0	1
Aborted	XC	0	0	0	1	0
Elastomer approval run	NI	0	0	1	21	1
Aborted information run	XI	0	0	0	1	0
Op. invalid approval run	LI	0	0	0	0	0
Total		7	8	9	53	24

OSCT (D5662)

CALIBRATION ATTEMPT SUMMARY



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OSCT (D5662)
CAUSES FOR LOST TESTS

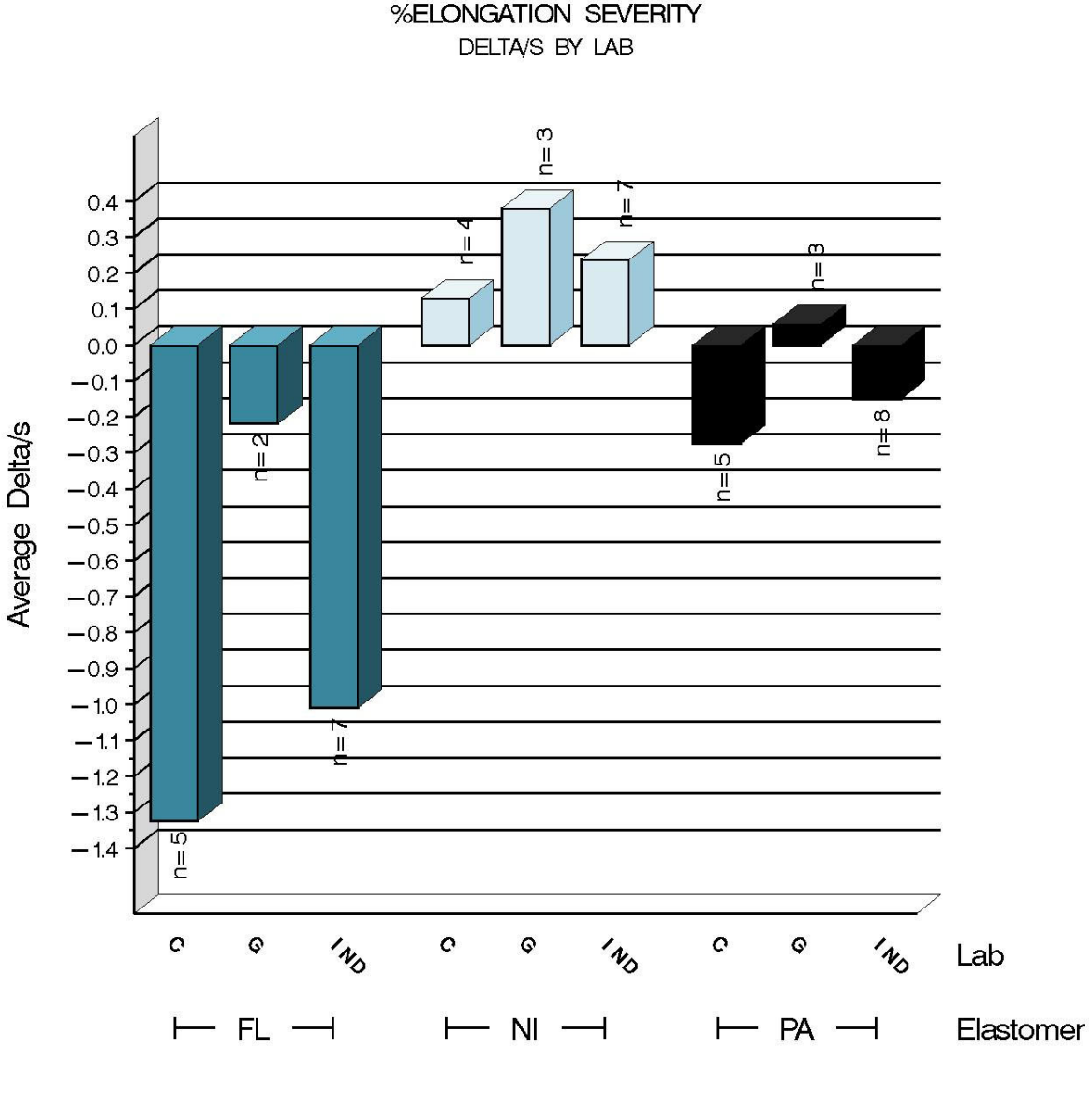
			Elastomer			Loss Rate						
Lab	Cause		FL	NI	PA	LI	XI	LC	XC	Lost	Starts	%
C	Test Data Loss			●				●		1	15	6.7%
		Lost	0	1	0	0	0	1	0			
		Starts	7	8	9	24	24	24	24			
		%	0%	12%	0%	0%	0%	4%	0%			

OSCT (D5662)

Average Δ/s by Lab					
Elastomer	**Lab**	**N**	**PELA**	**PVCA**	**SAHA**
FL	C	5	-1.326	-0.323	-0.409
	G	2	-0.220	0.260	-1.483
	Industry	7	-1.010	-0.156	-0.716
	Shift*	7	-7.680	-0.083	-1.001
NI	C	4	0.131	0.590	-1.038
	G	3	0.379	1.273	-0.859
	Industry	7	0.237	0.883	-0.961
	Shift*	7	1.206	0.440	-1.130
PA	C	5	-0.276	-0.293	0.247
	G	3	0.058	-1.192	0.435
	Industry	8	-0.150	-0.630	0.317
	Shift*	8	-3.185	-1.198	0.809

*computed using historic pooled s

OSCT (D5662)


%ELONGATION SEVERITY
DELTA/S BY LAB
Average Delta/s
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
−0.5
−0.6
−0.7
−0.8
−0.9
−1.0
−1.1
−1.2
−1.3
−1.4
n=5
n=2
n=7
n=4
n=3
n=7
n=5
n=3
n=8
C
G
IND
C
G
IND
C
G
IND
Lab
FL
NI
PA
Elastomer
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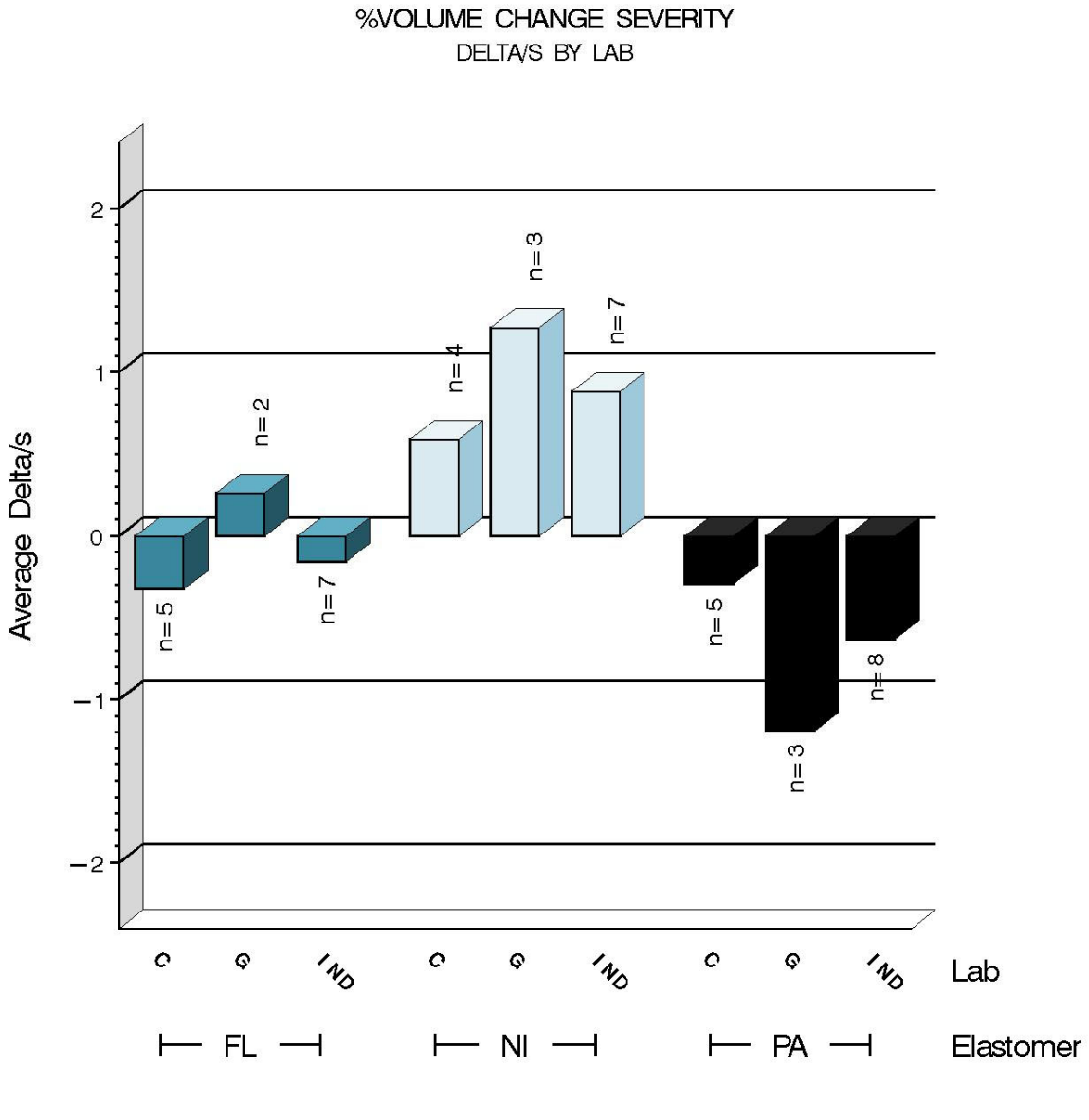
OSCT (D5662)


%VOLUME CHANGE SEVERITY
DELTA/S BY LAB
Average Delta/s
2
1
0
−1
−2
n= 5
n= 2
n= 7
n= 4
n= 3
n= 7
n= 5
n= 3
n= 8
C
G
IND
C
G
IND
C
G
IND
Lab
FL
NI
PA
Elastomer
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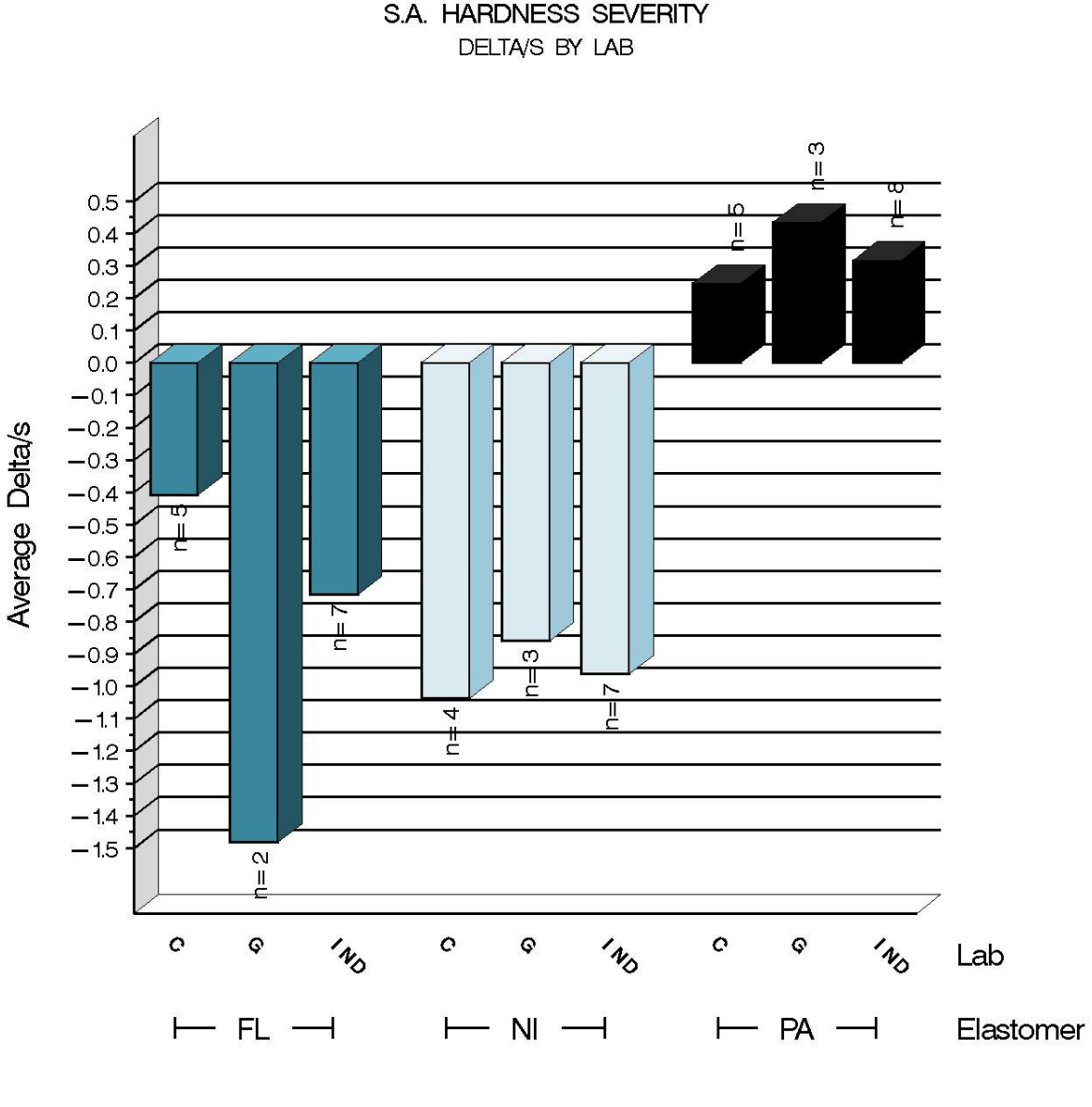
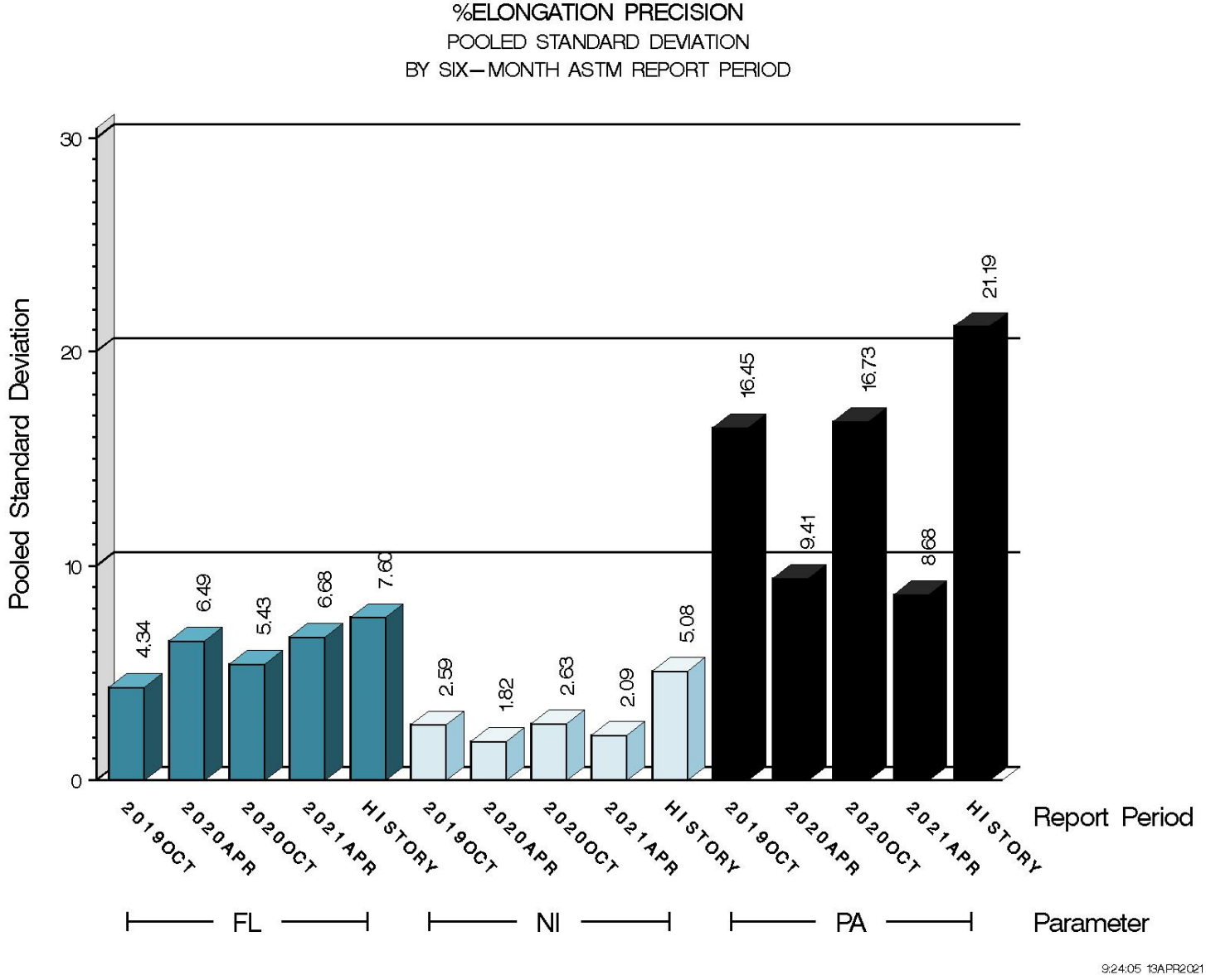
OSCT (D5662)


S.A. HARDNESS SEVERITY
DELTA/S BY LAB
Average Delta/s
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
−0.5
−0.6
−0.7
−0.8
−0.9
−1.0
−1.1
−1.2
−1.3
−1.4
−1.5
n= 5
n= 2
n= 7
n= 4
n= 3
n= 7
n= 5
n= 3
n= 8
C
G
IND
C
G
IND
C
G
IND
Lab
FL
NI
PA
Elastomer
9:24:05 13APR2021

OSCT (D5662)


%ELONGATION PRECISION
POOLED STANDARD DEVIATION
BY SIX–MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
30
20
10
0
4.34
6.49
5.43
6.68
7.60
2.59
1.82
2.63
2.09
5.08
16.45
9.41
16.73
8.68
21.19
2019OCT
2020APR
2020OCT
2021APR
HISTORY
Report Period
FL
NI
PA
Parameter
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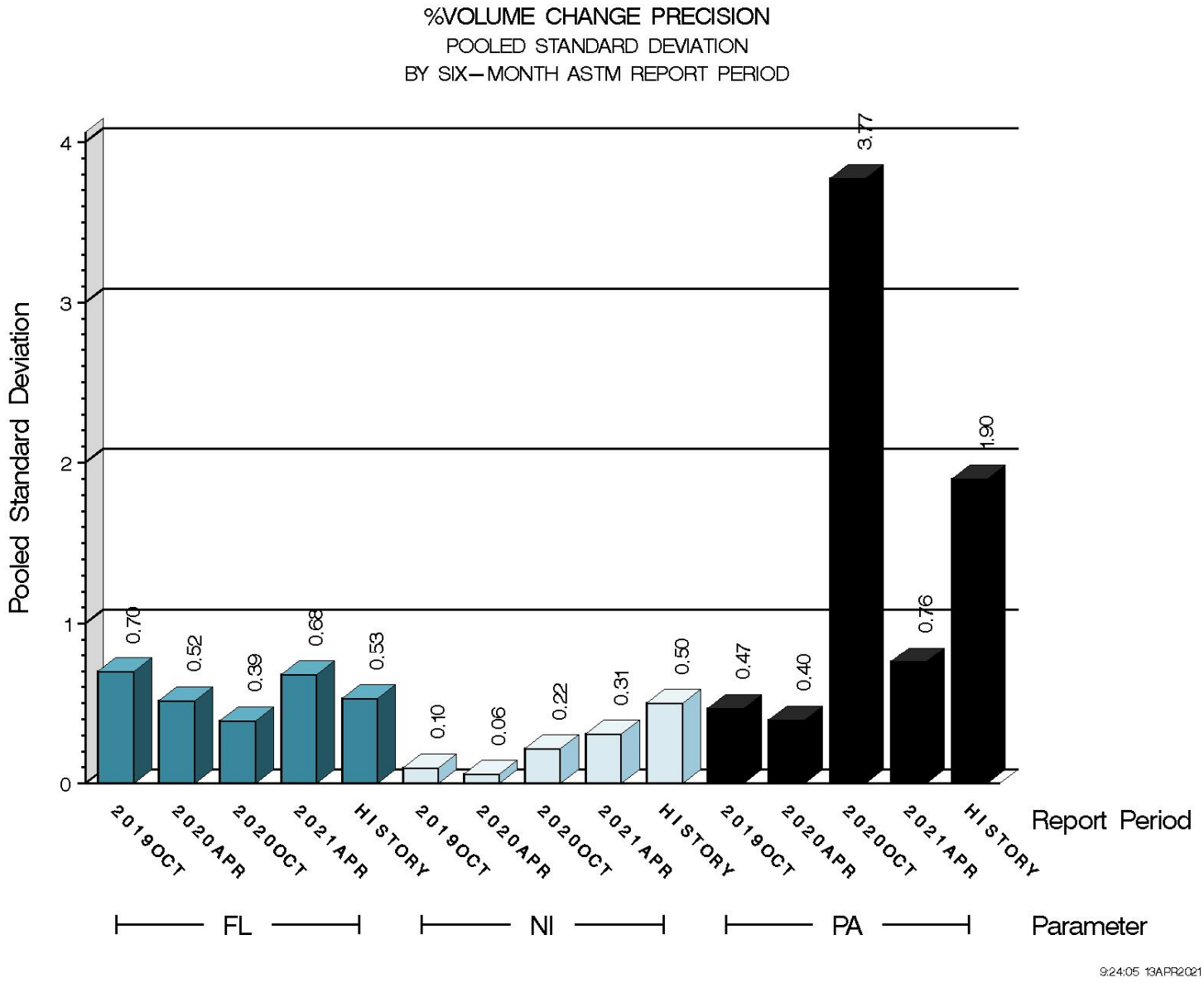
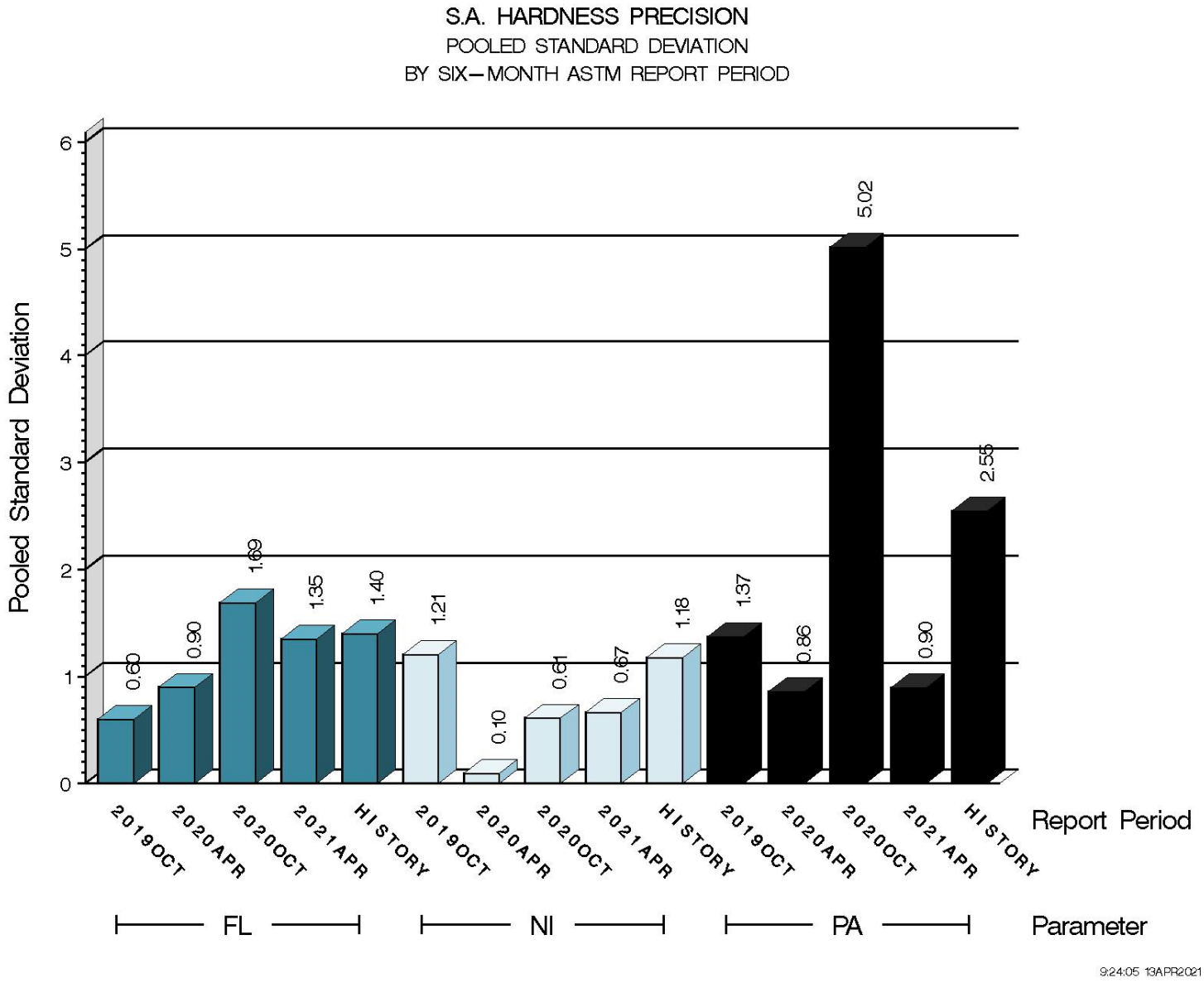
OSCT (D5662)


%VOLUME CHANGE PRECISION
POOLED STANDARD DEVIATION
BY SIX–MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
0
1
2
3
4
0.70
0.52
0.39
0.68
0.53
0.10
0.06
0.22
0.31
0.50
0.47
0.40
3.77
0.76
1.90
2019OCT
2020APR
2020OCT
2021APR
HISTORY
Report Period
FL
NI
PA
Parameter
9:24:05 13APR2021

OSCT (D5662)


S.A. HARDNESS PRECISION
POOLED STANDARD DEVIATION
BY SIX–MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
0
1
2
3
4
5
6
0.60
0.90
1.69
1.35
1.40
1.21
0.10
0.61
0.67
1.18
1.37
0.86
5.02
0.90
2.55
2019OCT
2020APR
2020OCT
2021APR
HISTORY
2019OCT
2020APR
2020OCT
2021APR
HISTORY
2019OCT
2020APR
2020OCT
2021APR
HISTORY
Report Period
FL
NI
PA
Parameter
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OSCT (D5662)

SUMMARY OF SEVERITY & PRECISION

Severity

The combined-elastomer industry charts show that PVCA exceeded the limits in the severe direction this period, but are now back in line.

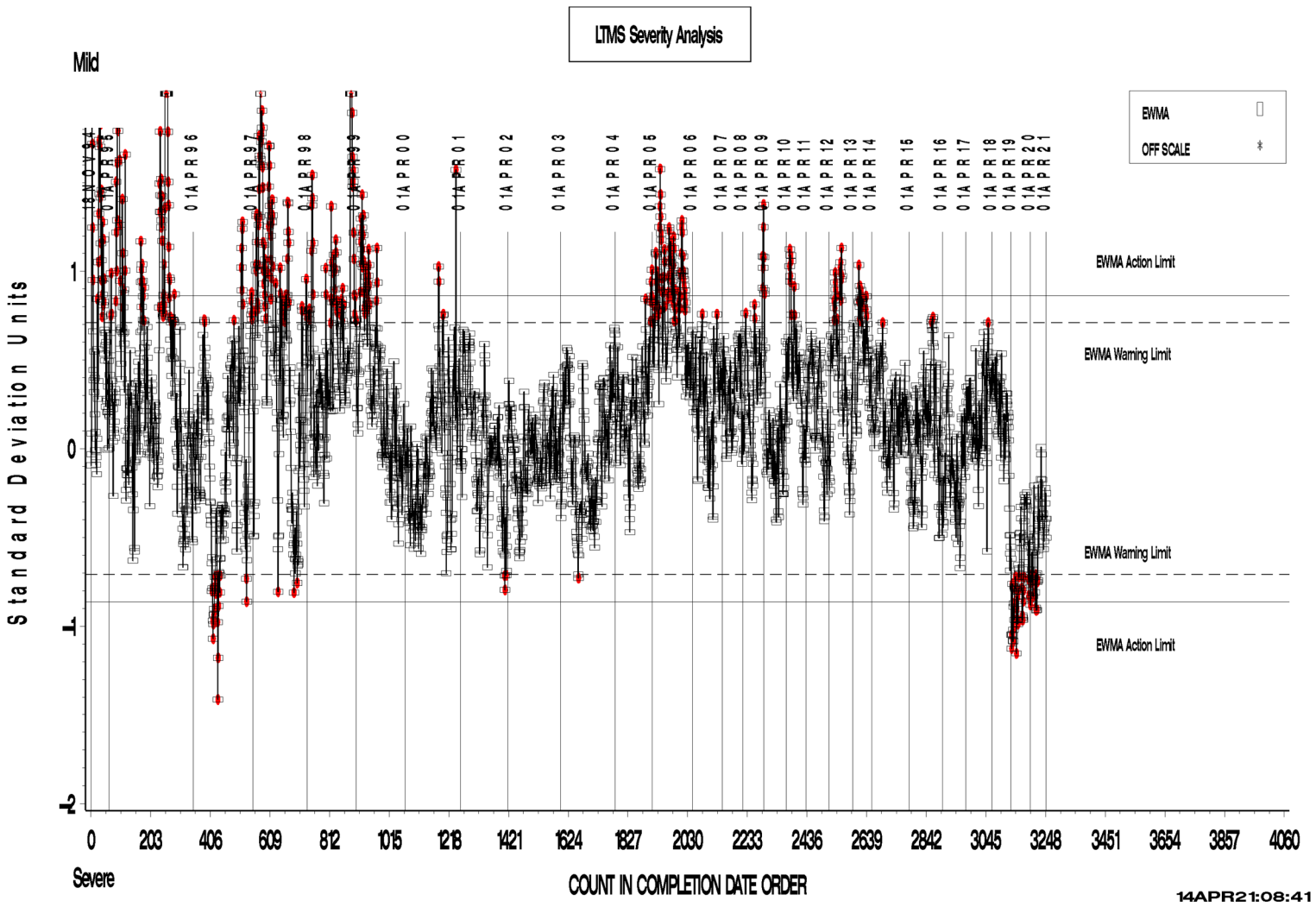
FL PELA, NI PVCA, PA PVCA, NI SAHA, and PA SAHA all exceeded the limits this period.

Precision

PVCA exceeded the action limits this period but has since returned within limits. All other parameters remained within the precision limits.

Industry control charts follow.

OSCT (D5662)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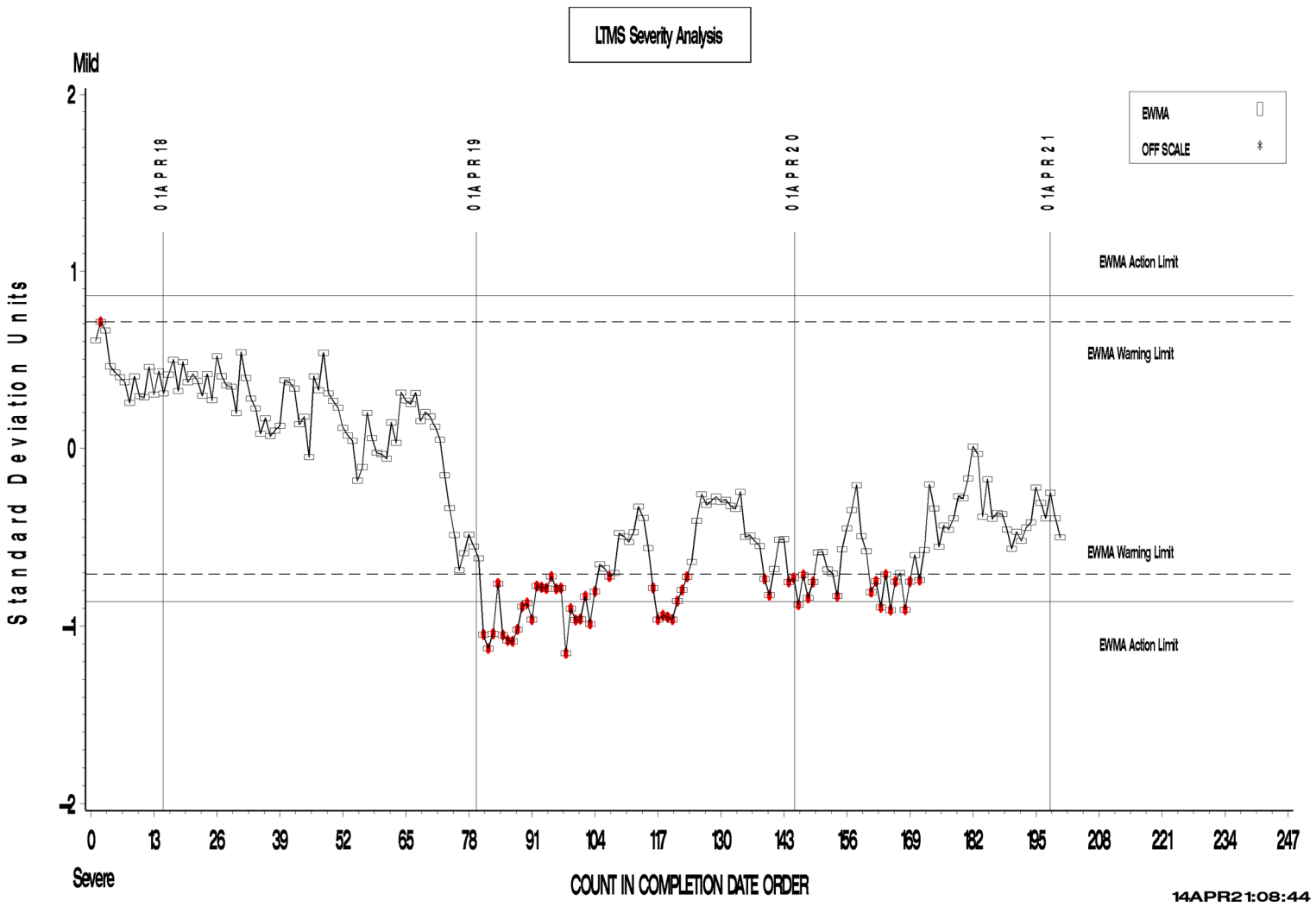
REF. ELONGATION CHANGE AVG.
LTMS Severity Analysis
Mild
Severe
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
EWMA
OFF SCALE
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
1
0
-1
-2
0
203
406
609
812
1015
1218
1421
1624
1827
2030
2233
2436
2639
2842
3045
3248
3451
3654
3857
4060
14APR21:08:41

OSCT (D5662)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Zoomed to show 200 most recent data points
REF. ELONGATION CHANGE AVG.
LTMS Severity Analysis
Mild
Severe
Standard Deviation Units
2
1
0
-1
-2
0 1 A P R 1 8
0 1 A P R 1 9
0 1 A P R 2 0
0 1 A P R 2 1
EWMA
OFF SCALE
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
0
13
26
39
52
65
78
91
104
117
130
143
156
169
182
195
208
221
234
247
COUNT IN COMPLETION DATE ORDER
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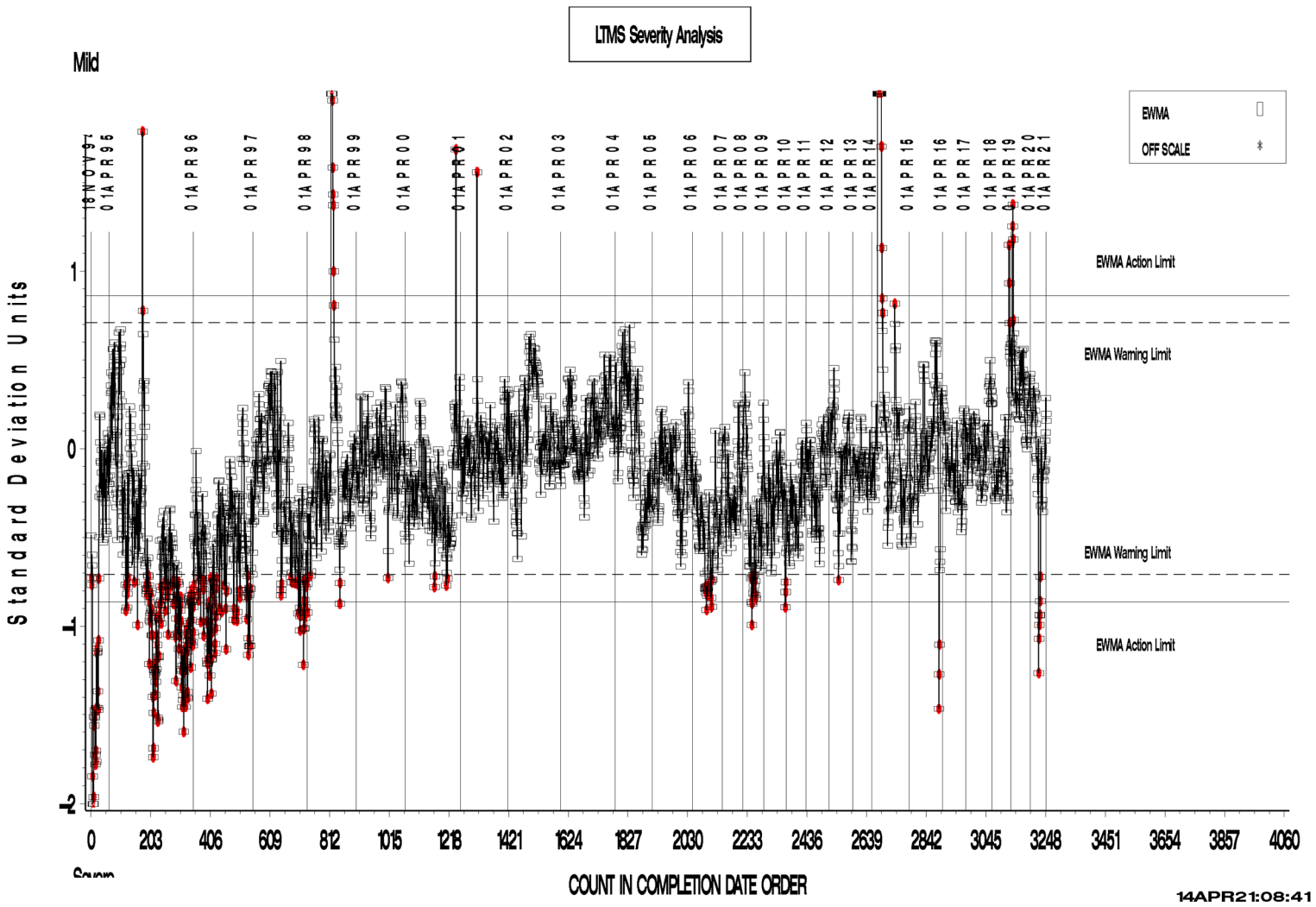
OSCT (D5662)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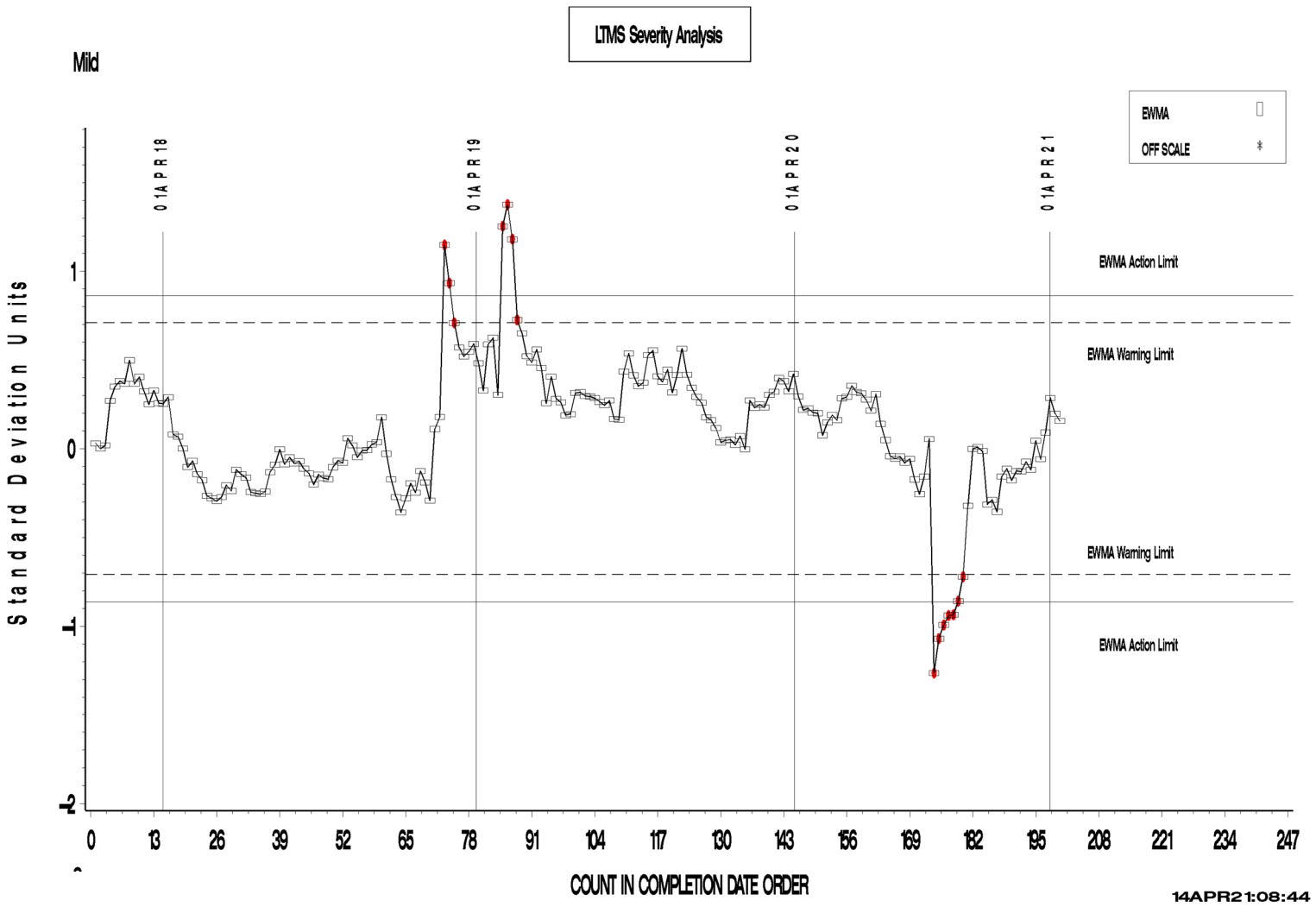
REF. PERCENT VOLUME CHANGE AVG.
LTMS Severity Analysis
Mild
EWMA
OFF SCALE
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
Standard Deviation Units
1
0
-1
-2
0
203
406
609
812
1015
1218
1421
1624
1827
2030
2233
2436
2639
2842
3045
3248
3451
3654
3857
4060
COUNT IN COMPLETION DATE ORDER
14APR21:08:41

OSCT (D5662)


OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to show 200 most recent data points
REF. PERCENT VOLUME CHANGE AVG.
LTMS Severity Analysis
Mild
EWMA
OFF SCALE
01APR18
01APR19
01APR20
01APR21
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
Standard Deviation Units
1
0
-1
-2
0
13
26
39
52
65
78
91
104
117
130
143
156
169
182
195
208
221
234
247
COUNT IN COMPLETION DATE ORDER
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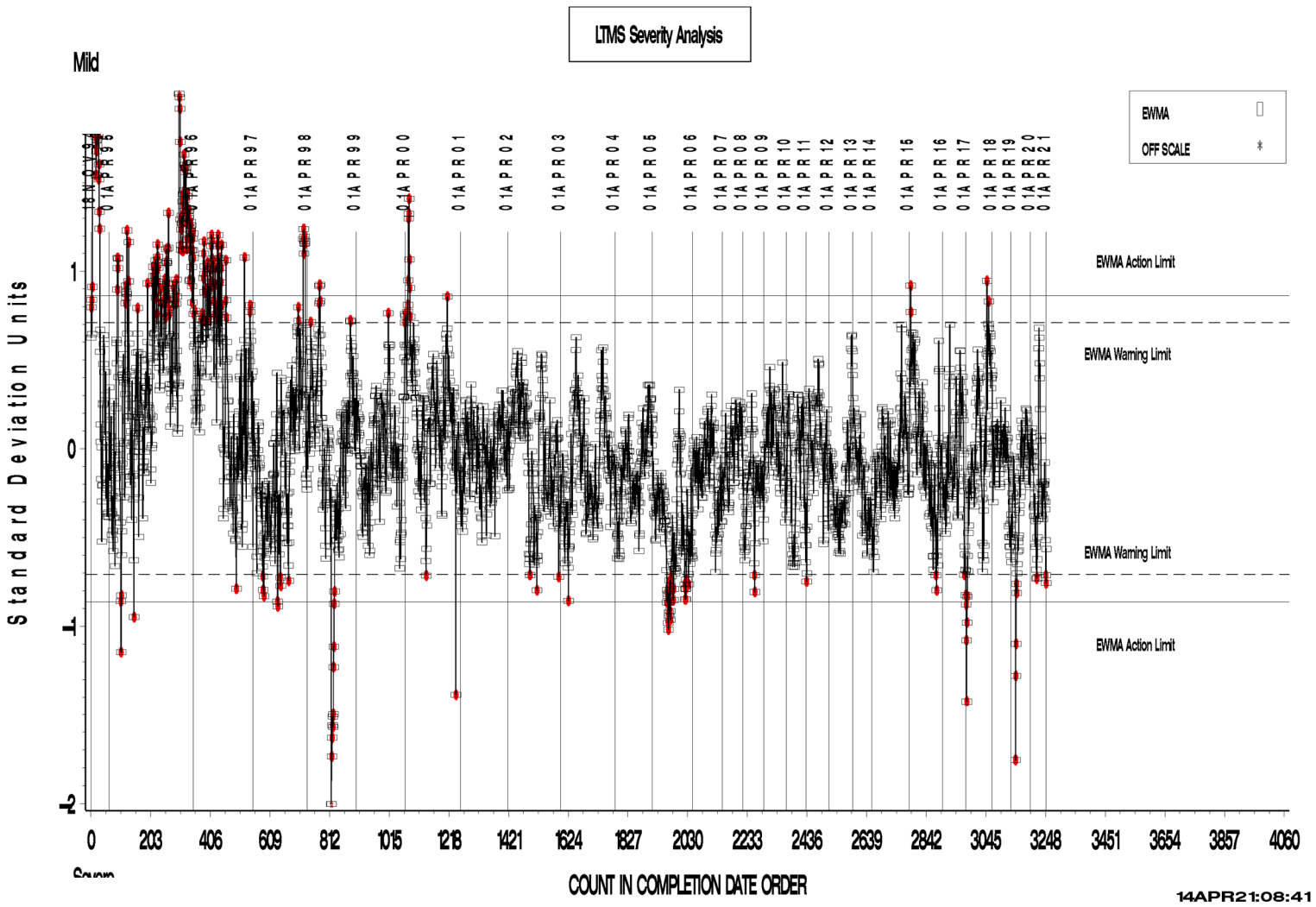
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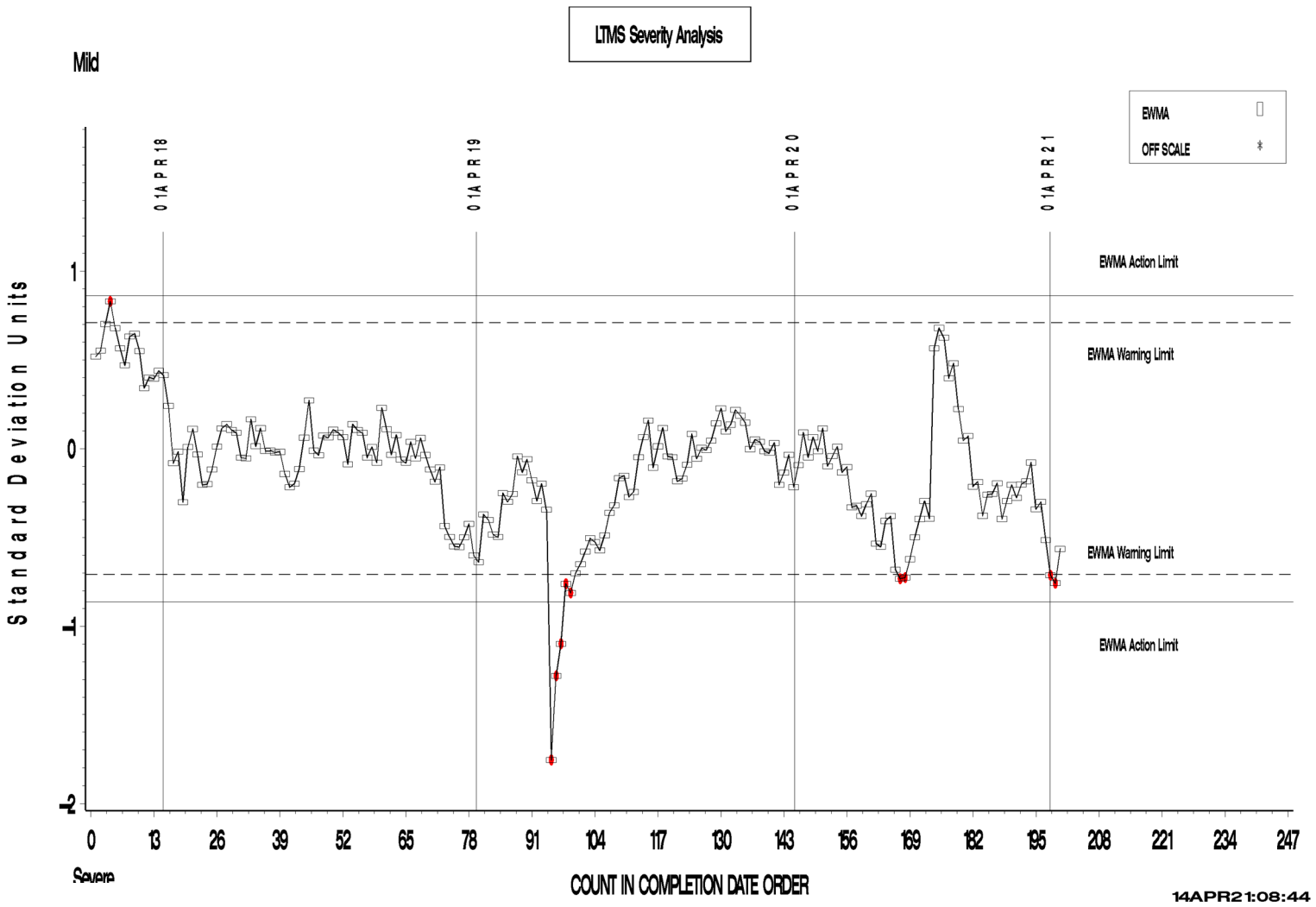
REF. SHORE A HARDNESS CHANGE AVG.
LTMS Severity Analysis
Mild
EWMA
OFF SCALE
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
14APR21:08:41

OSCT (D5662)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Zoomed to show 200 most recent data points
REF. SHORE A HARDNESS CHANGE AVG.
LTMS Severity Analysis
Mild
Severe
EWMA
OFF SCALE
01APR18
01APR19
01APR20
01APR21
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
Standard Deviation Units
1
0
-1
-2
0
13
26
39
52
65
78
91
104
117
130
143
156
169
182
195
208
221
234
247
COUNT IN COMPLETION DATE ORDER
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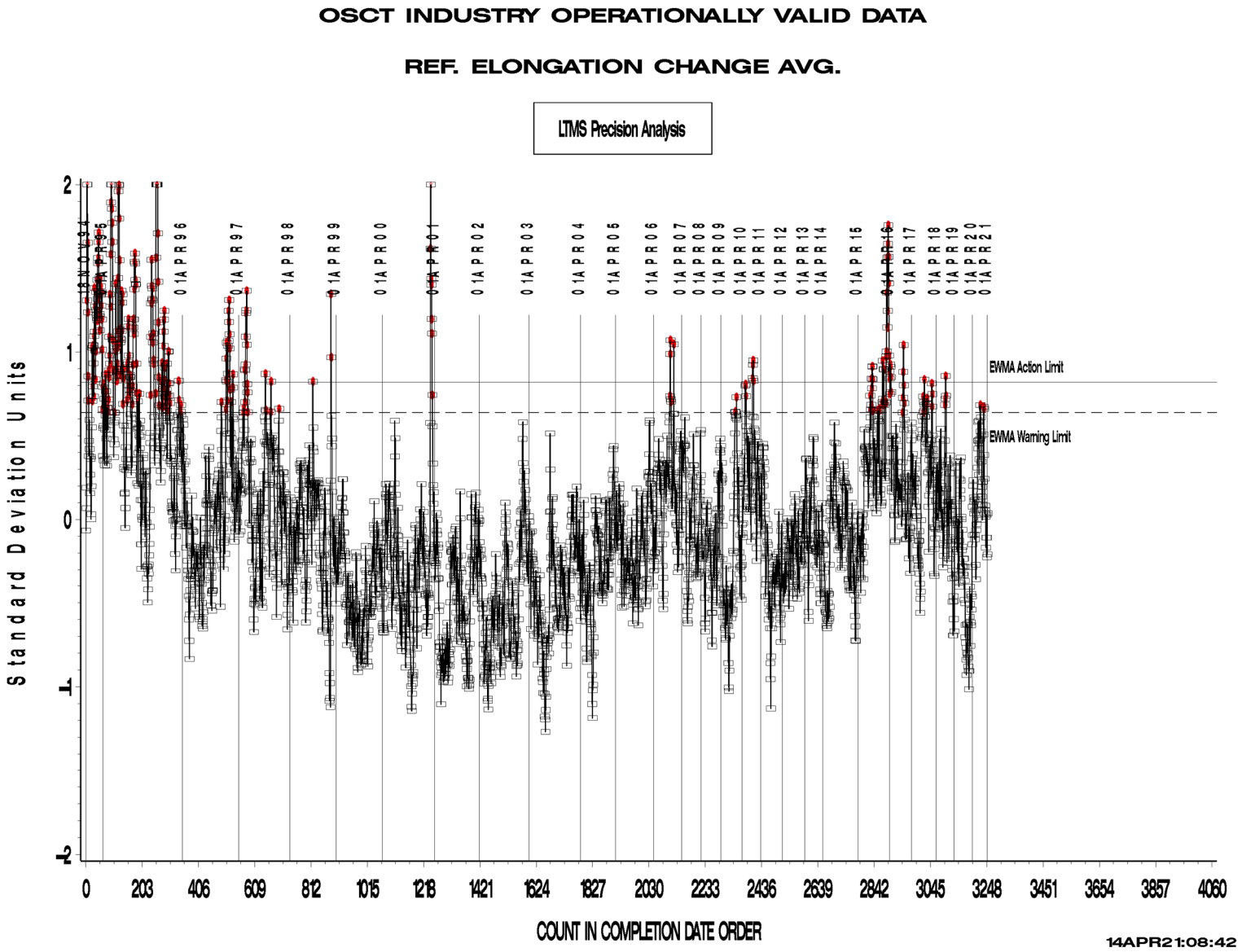
OSCT INDUSTRY OPERATIONALLY VALID DATA
REF. ELONGATION CHANGE AVG.
LTMS Precision Analysis
Standard Deviation Units
2
1
0
-1
-2
EWMA Action Limit
EWMA Warning Limit
0 1 A P R 9 6
0 1 A P R 9 7
0 1 A P R 9 8
0 1 A P R 9 9
0 1 A P R 0 0
0 1 A P R 0 1
0 1 A P R 0 2
0 1 A P R 0 3
0 1 A P R 0 4
0 1 A P R 0 5
0 1 A P R 0 6
0 1 A P R 0 7
0 1 A P R 0 8
0 1 A P R 0 9
0 1 A P R 1 0
0 1 A P R 1 1
0 1 A P R 1 2
0 1 A P R 1 3
0 1 A P R 1 4
0 1 A P R 1 5
0 1 A P R 1 6
0 1 A P R 1 7
0 1 A P R 1 8
0 1 A P R 1 9
0 1 A P R 2 0
0 1 A P R 2 1
0 203 406 609 812 1015 1218 1421 1624 1827 2030 2233 2436 2639 2842 3045 3248 3451 3654 3857 4060
COUNT IN COMPLETION DATE ORDER
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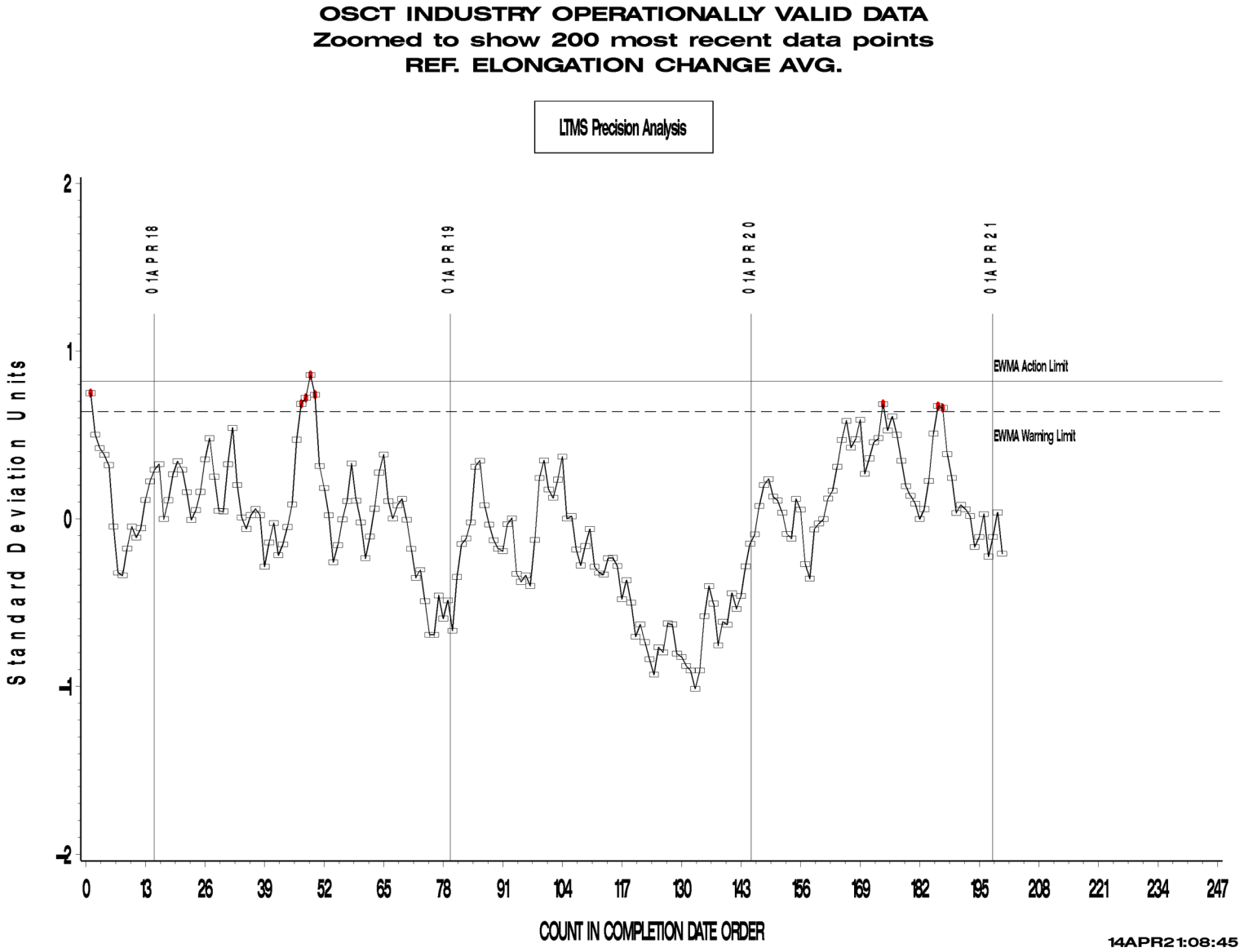
OSCT (D5662)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LTMS Precision Analysis
0 1A P R 18
0 1A P R 19
0 1A P R 20
0 1A P R 21
EWMA Action Limit
EWMA Warning Limit
Standard Deviation Units
2
1
0
-1
-2
0
13
26
39
52
65
78
91
104
117
130
143
156
169
182
195
208
221
234
247
COUNT IN COMPLETION DATE ORDER
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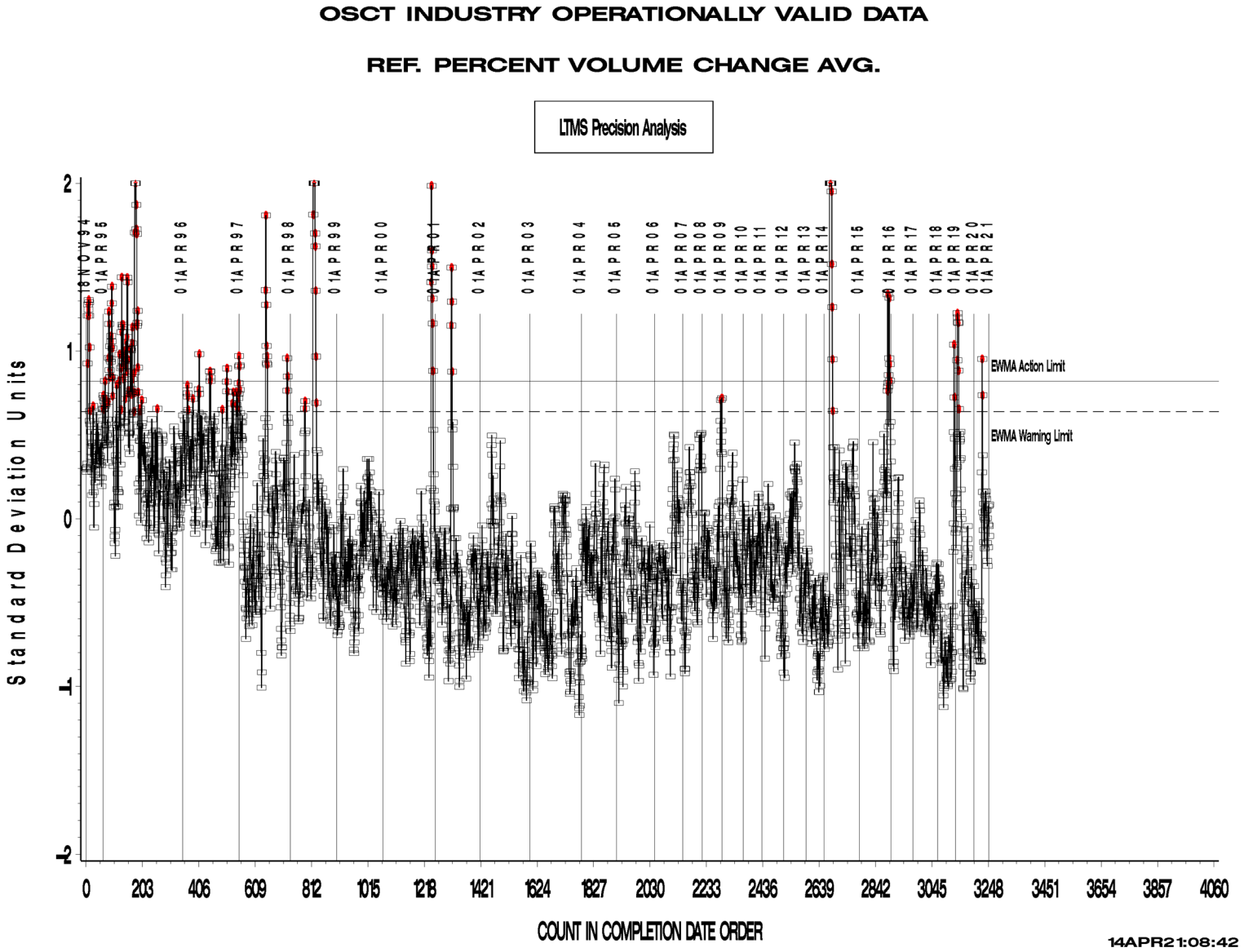
OSCT (D5662)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REF. PERCENT VOLUME CHANGE AVG.
LTMS Precision Analysis
Standard Deviation Units
2
1
0
-1
-2
18NOV94
01APR95
01APR96
01APR97
01APR98
01APR99
01APR00
01APR01
01APR02
01APR03
01APR04
01APR05
01APR06
01APR07
01APR08
01APR09
01APR10
01APR11
01APR12
01APR13
01APR14
01APR15
01APR16
01APR17
01APR18
01APR19
01APR20
01APR21
EWMA Action Limit
EWMA Warning Limit
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203
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1624
1827
2030
2233
2436
2639
2842
3045
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3451
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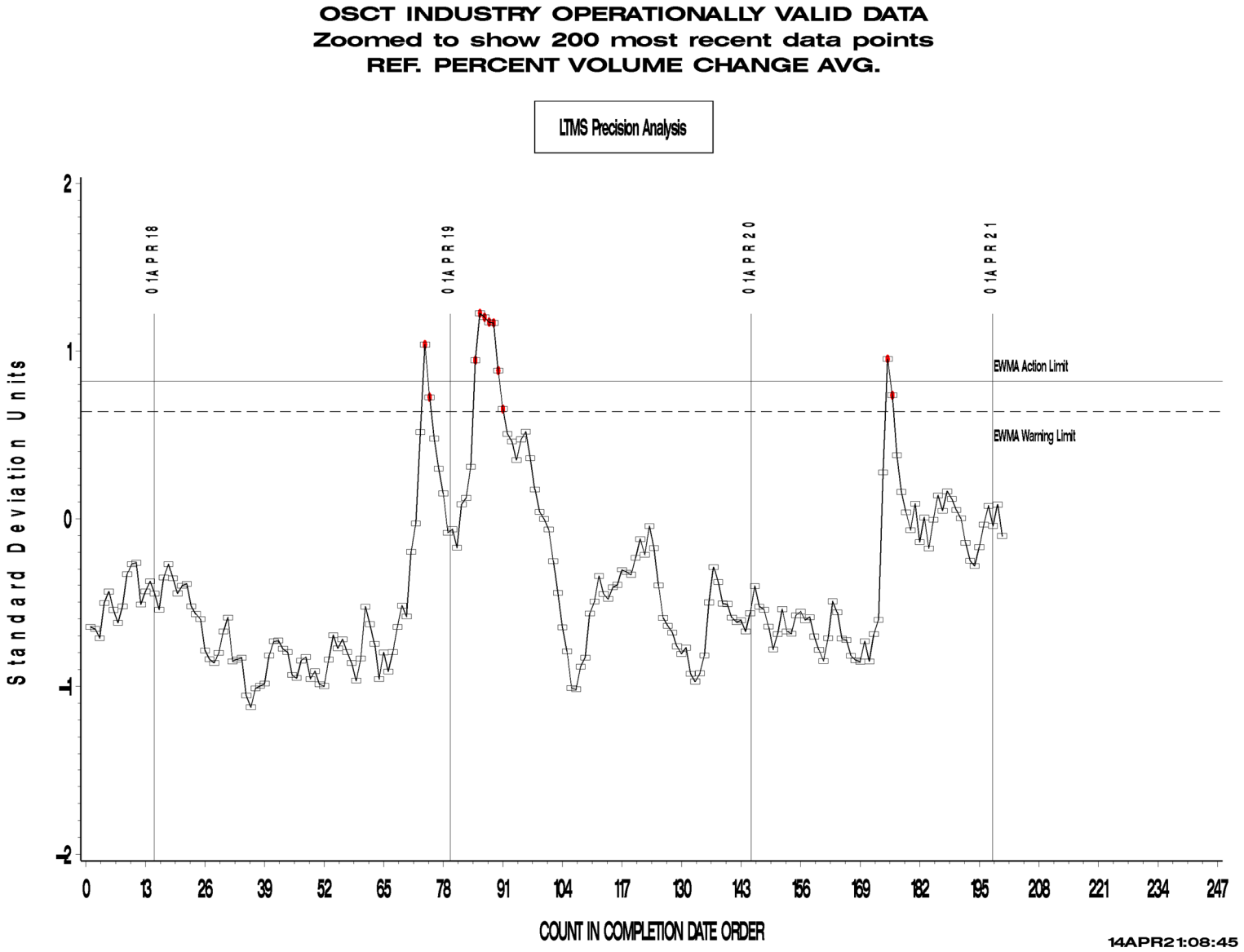
4060
COUNT IN COMPLETION DATE ORDER
14APR21:08:42

OSCT (D5662)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Zoomed to show 200 most recent data points
REF. PERCENT VOLUME CHANGE AVG.
LTMS Precision Analysis
01APR18
01APR19
01APR20
01APR21
EWMA Action Limit
EWMA Warning Limit
Standard Deviation Units
2
1
0
-1
-2
0
13
26
39
52
65
78
91
104
117
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169
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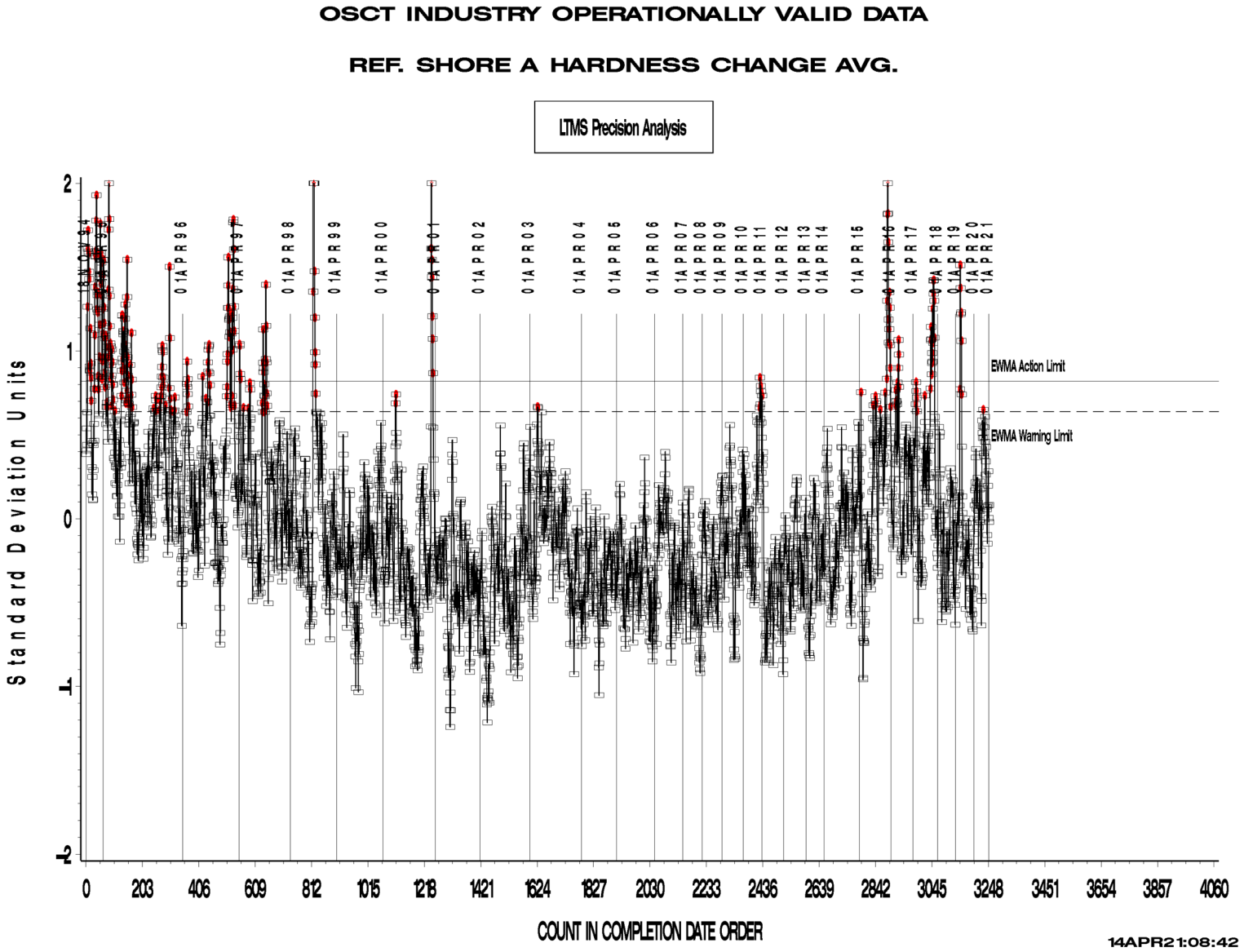
195
208
221
234
247
COUNT IN COMPLETION DATE ORDER
14APR21:08:45

OSCT (D5662)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REF. SHORE A HARDNESS CHANGE AVG.
LTMS Precision Analysis
Standard Deviation Units
2
1
0
-1
-2
01APR96
01APR97
01APR98
01APR99
01APR00
01APR01
01APR02
01APR03
01APR04
01APR05
01APR06
01APR07
01APR08
01APR09
01APR10
01APR11
01APR12
01APR13
01APR14
01APR15
01APR16
01APR17
01APR18
01APR19
01APR20
01APR21
EWMA Action Limit
EWMA Warning Limit
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203
406
609
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1218
1421
1624
1827
2030
2233
2436
2639
2842
3045
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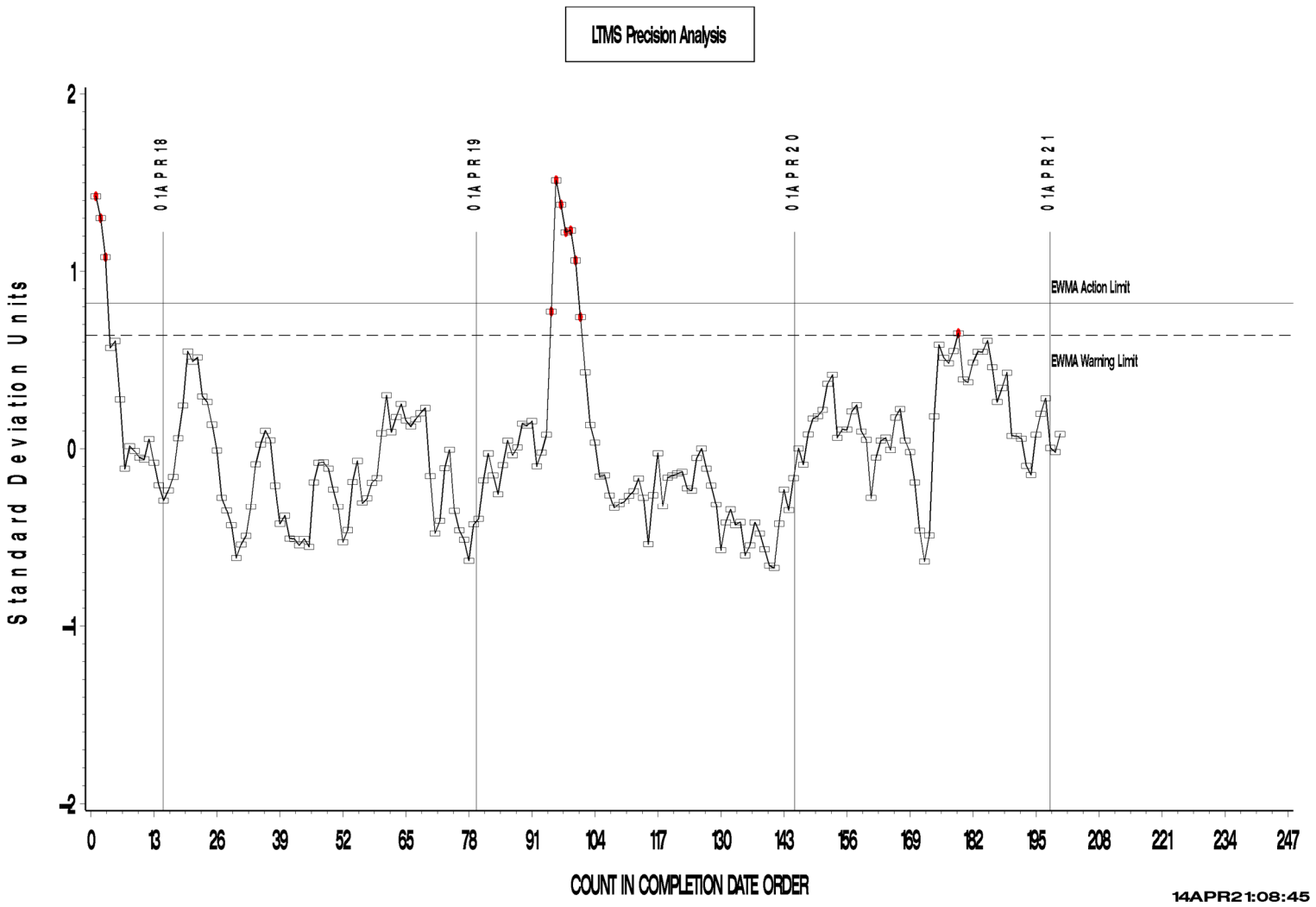
3451
3654
3857
4060
COUNT IN COMPLETION DATE ORDER
14APR21:08:42

OSCT (D5662)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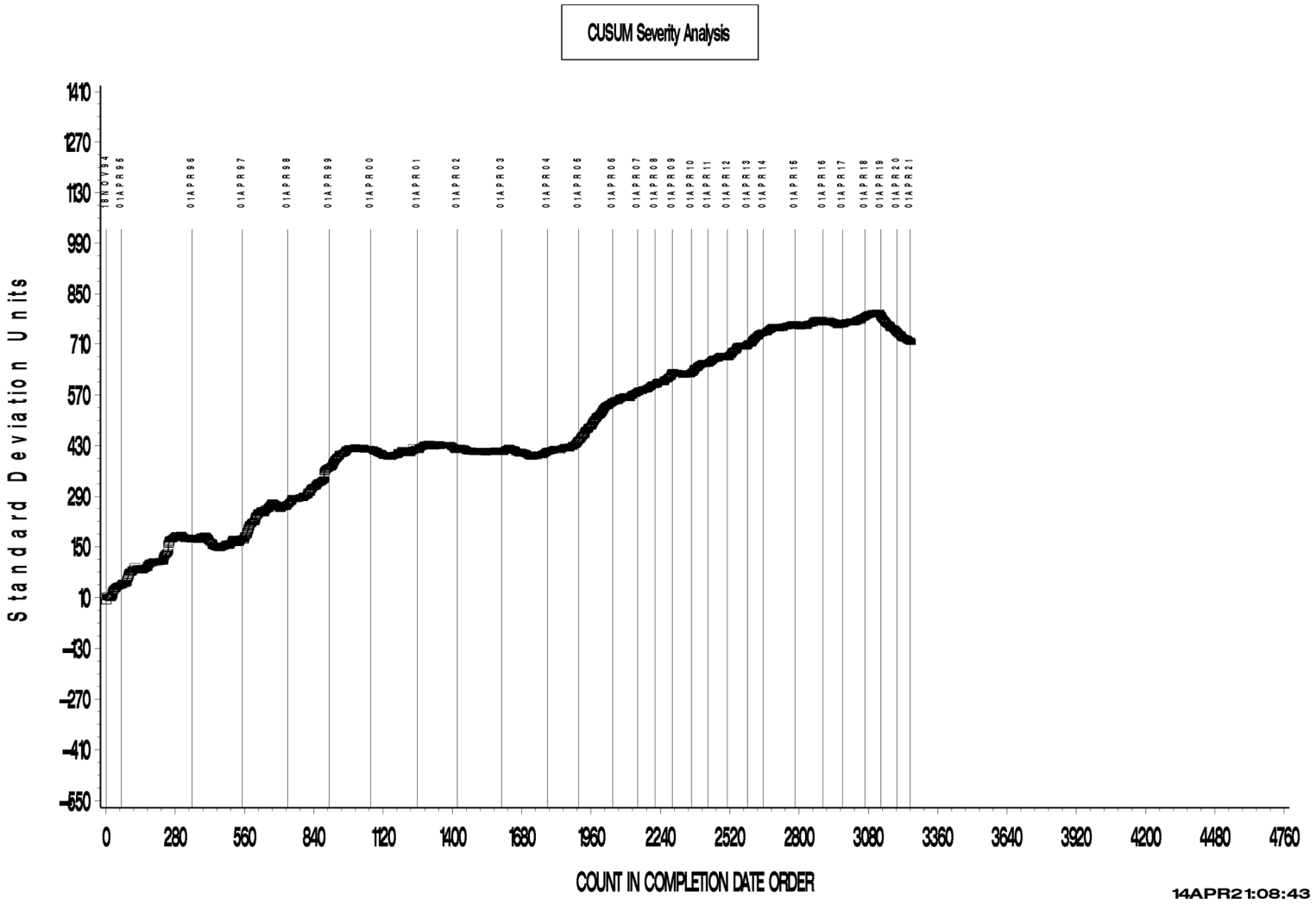
Zoomed to show 200 most recent data points
REF. SHORE A HARDNESS CHANGE AVG.
LTMS Precision Analysis
Standard Deviation Units
2
1
0
-1
-2
01APR18
01APR19
01APR20
01APR21
EWMA Action Limit
EWMA Warning Limit
0
13
26
39
52
65
78
91
104
117
130
143
156
169
182
195
208
221
234
247
COUNT IN COMPLETION DATE ORDER
14APR21:08:45

OSCT (D5662)

OSCT INDUSTRY OPERATIONALLY VALID DATA

REF. ELONGATION CHANGE AVG.



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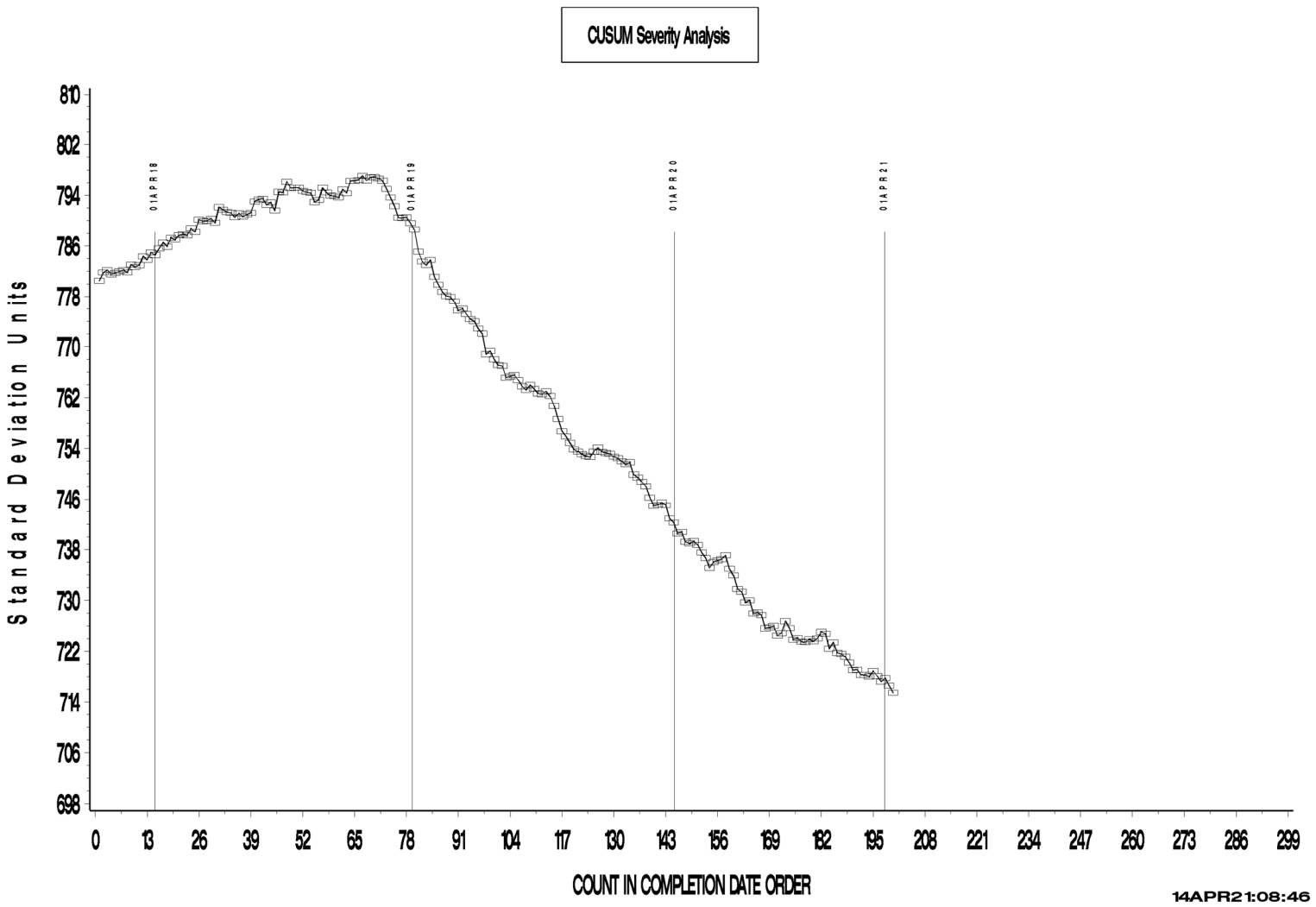
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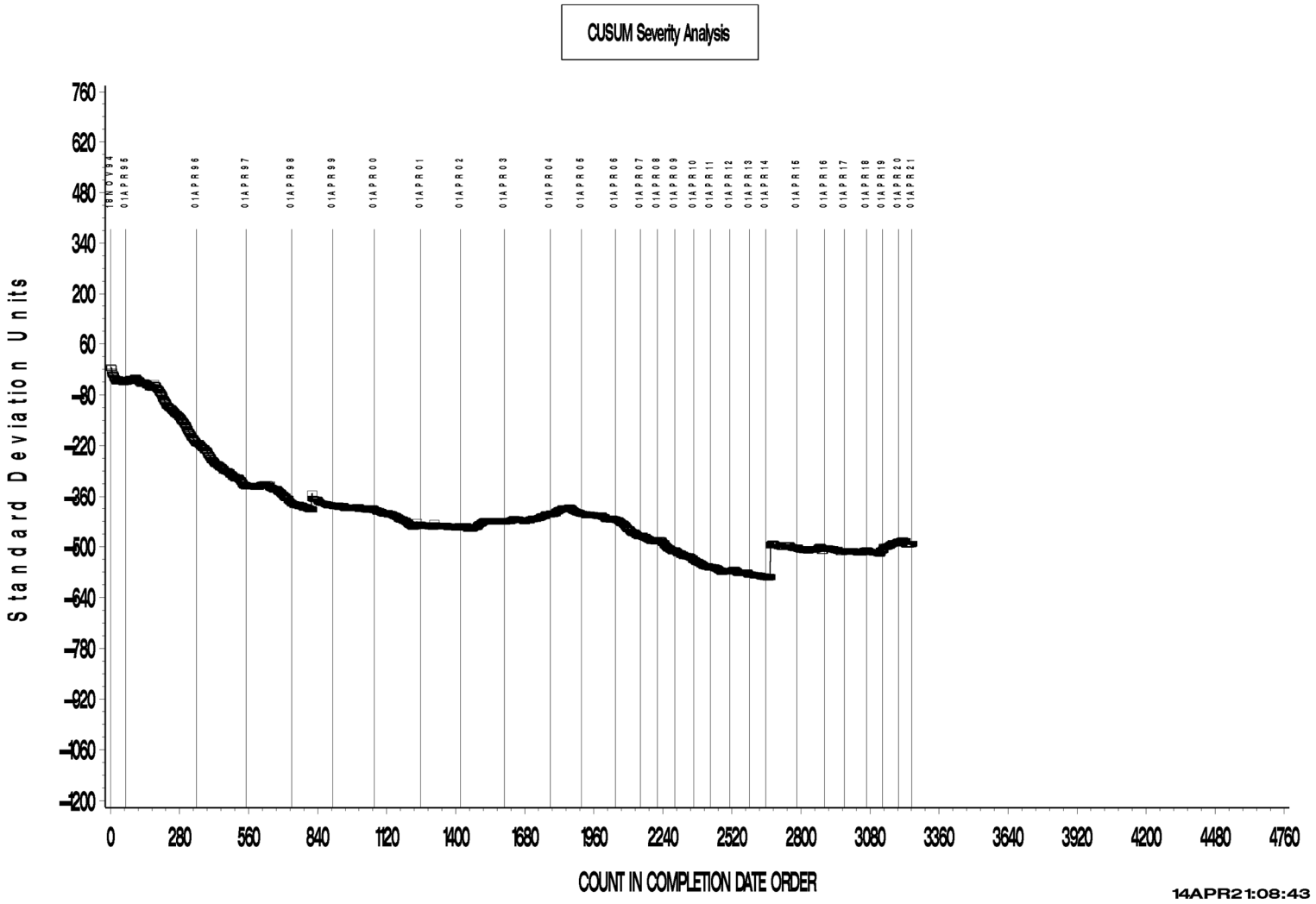
CUSUM Severity Analysis
Standard Deviation Units
810
802
794
786
778
770
762
754
746
738
730
722
714
706
698
01APR18
01APR19
01APR20
01APR21
0
13
26
39
52
65
78
91
104
117
130
143
156
169
182
195
208
221
234
247
260
273
286
299
COUNT IN COMPLETION DATE ORDER
14APR21:08:46

OSCT (D5662)

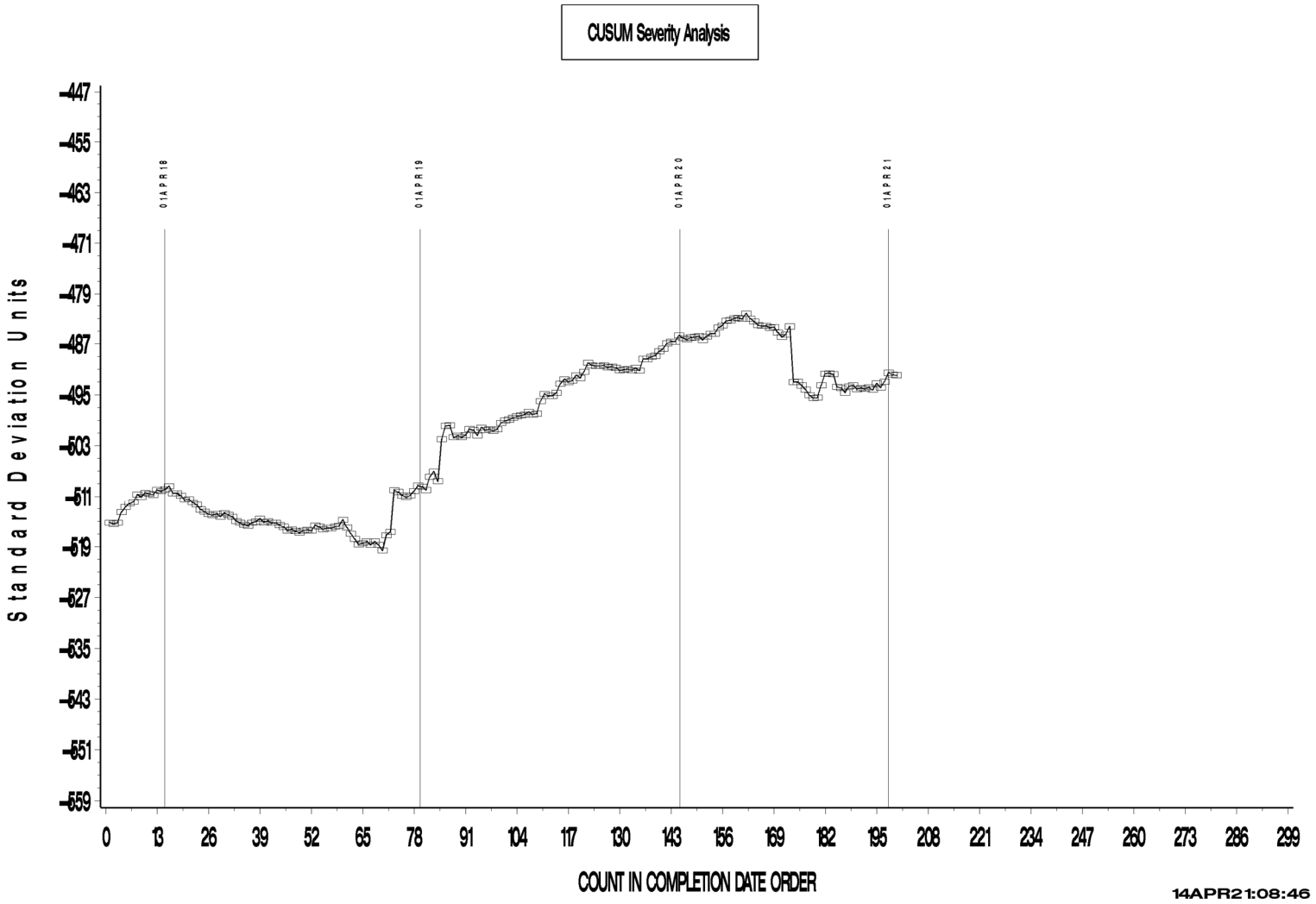
OSCT INDUSTRY OPERATIONALLY VALID DATA

REF. PERCENT VOLUME CHANGE AVG.



OSCT (D5662)

OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to show 200 most recent data points
REF. PERCENT VOLUME CHANGE AVG.



OSCT (D5662)

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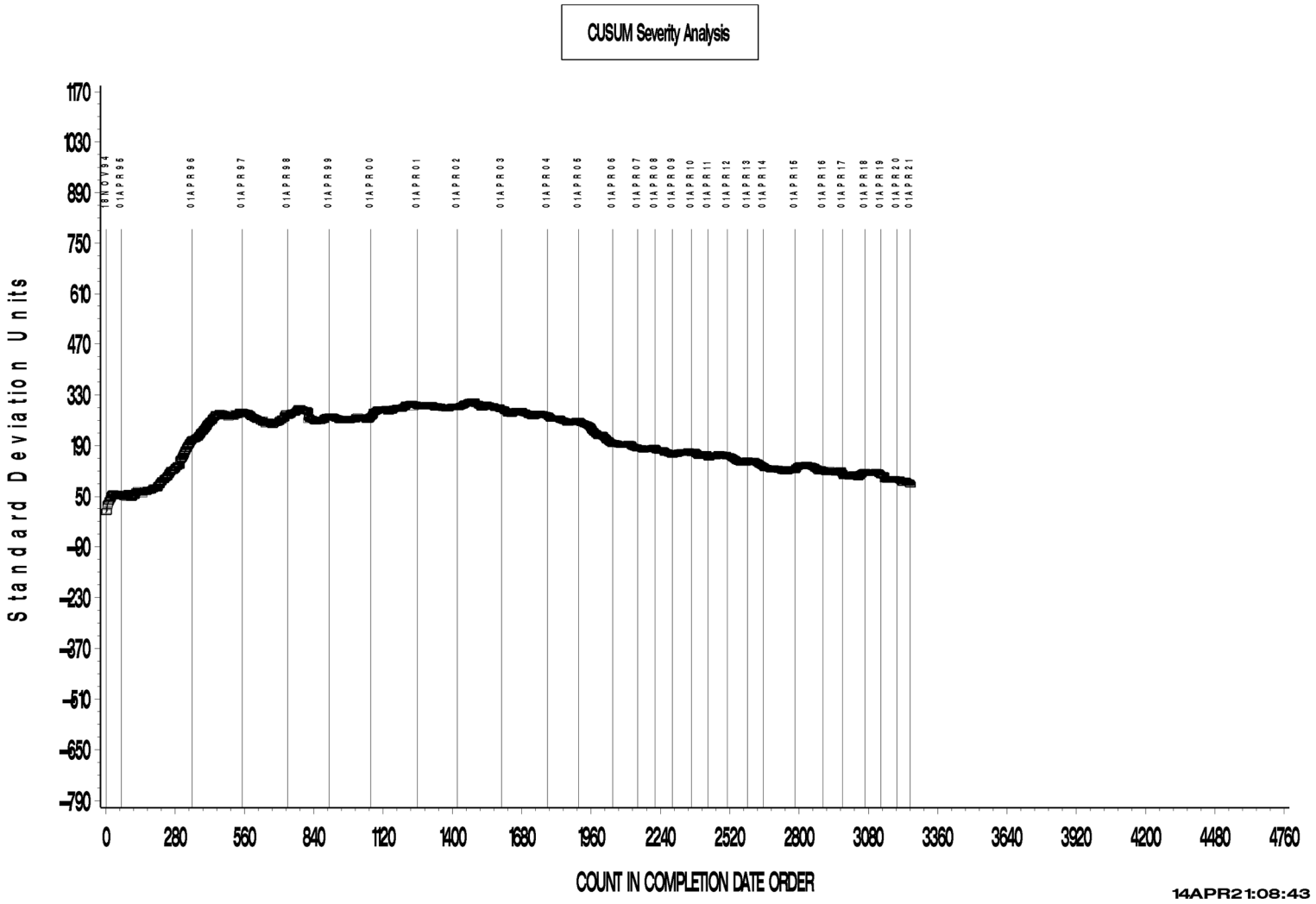

OSCT (D5662)

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Zoomed to show 200 most recent data points
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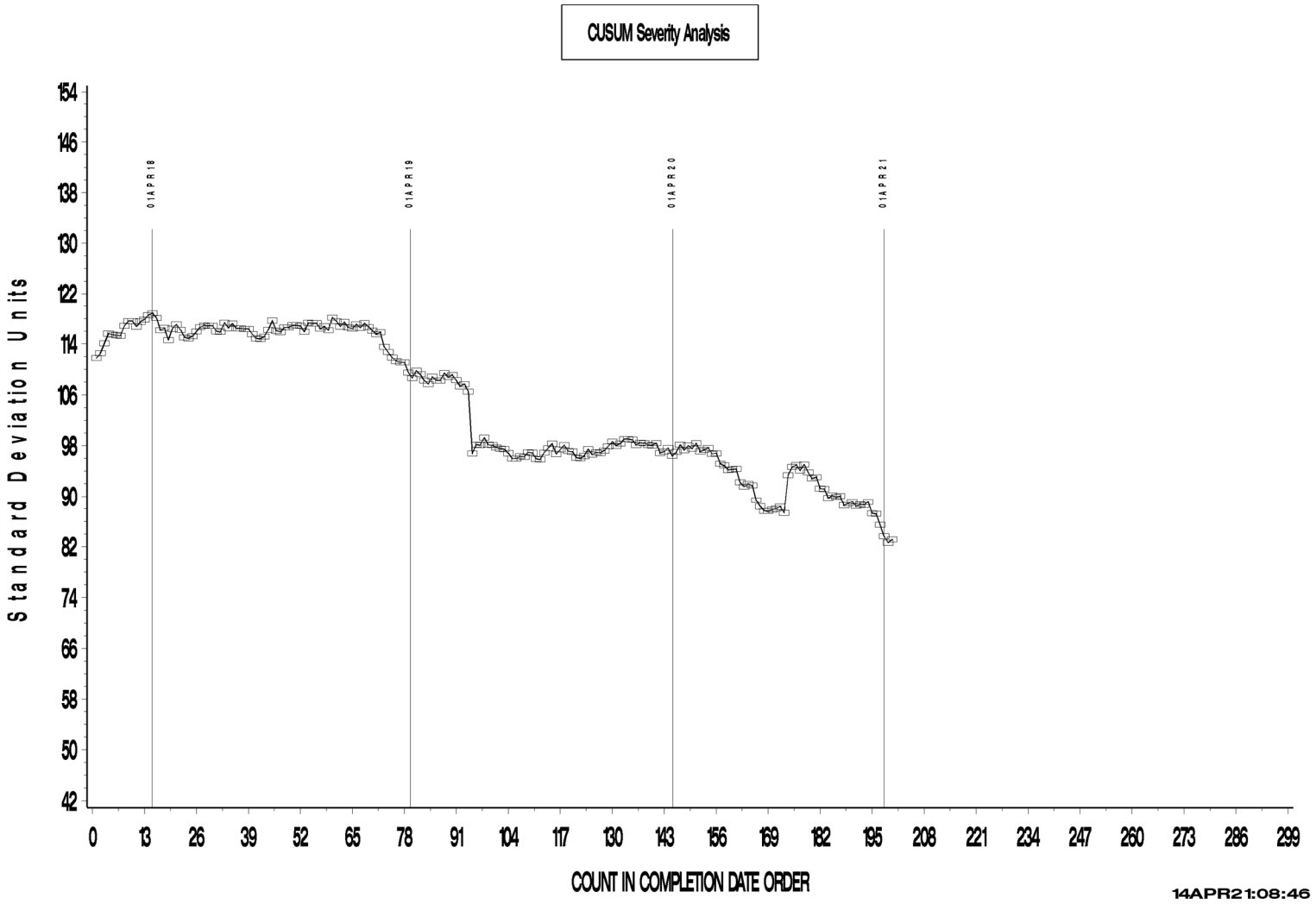
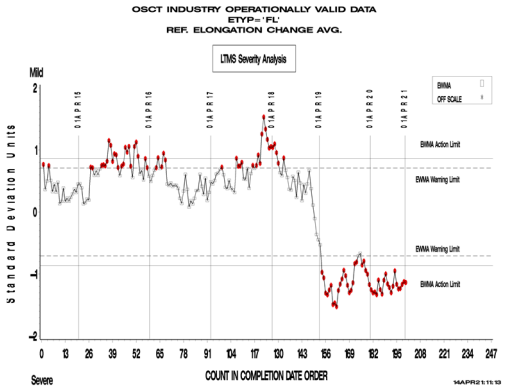
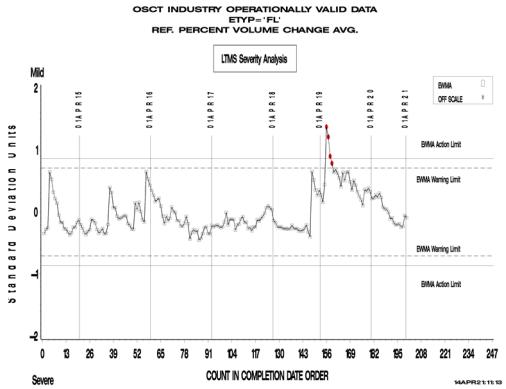
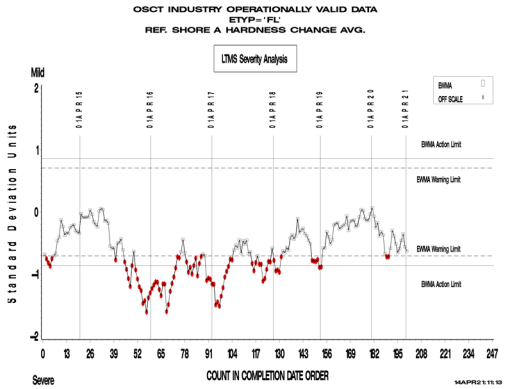


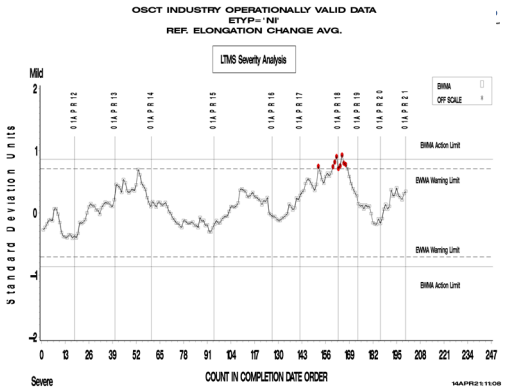
OSCT (D5662)

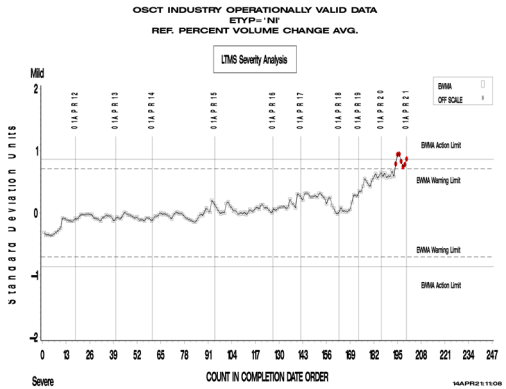
BY-ELASTOMER SEVERITY

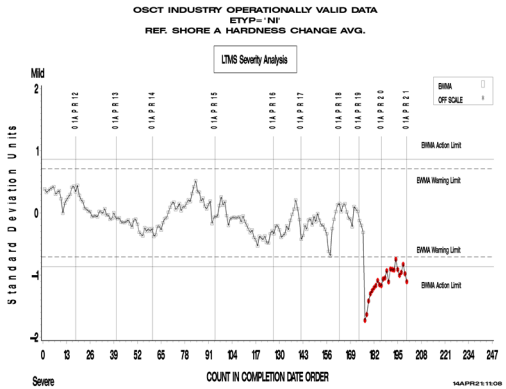


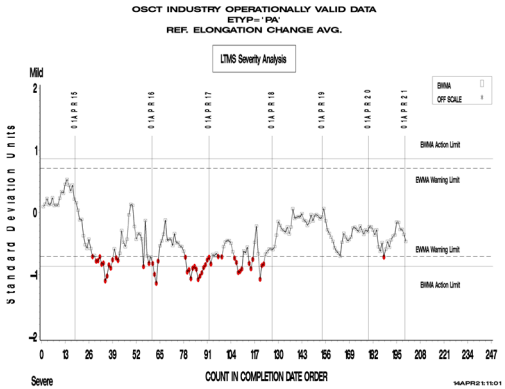


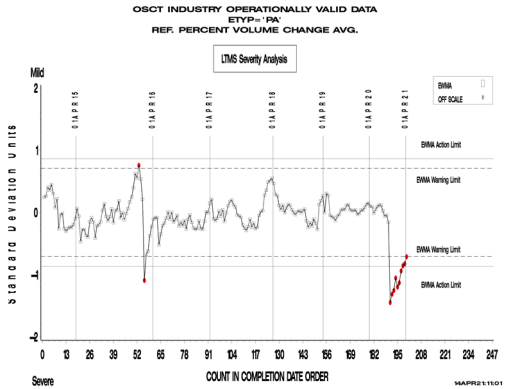


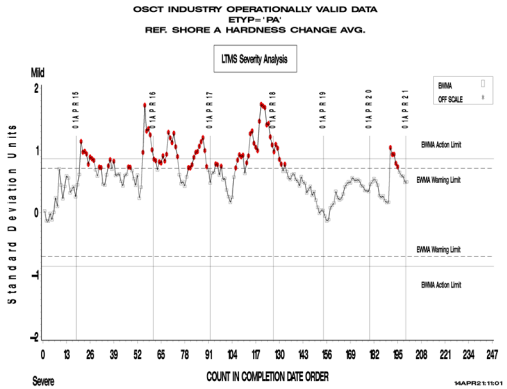












OSCT (D5662)

TIMELINE ADDITIONS

Effective Date	Information Letter	Event
		No timeline additions occurred during this period.

OSCT (D5662)

LAB VISITS

No lab visits were conducted during this period.

INFORMATION LETTERS

No information letters were issued during this period.

OSCT (D5662)

STATUS OF REFERENCE OIL SUPPLY

		@ TMC	
Oil	Cans @ Labs	Cans	Gallons
155-1	8	185	36.8
160-1	2	0	0.0
168	13	0	0.0
169	30	711	141.0
170	30	155	30.8
171	34	120	23.9
Total	109	986	195.6

Oil 168 is nearing depletion. Oil 170 has been introduced as a replacement. Oil 171 is the same additive package as oil 160-1 in a different base oil and has been introduced as a replacement.