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: 17-017

DATE: May 22, 2017

TO: Don Bell, Chairman, OSCT Surveillance Panel

FROM: Scott Parke

SUBJECT: OSCT Reference oil testing from October 1, 2016 through March 31, 2017

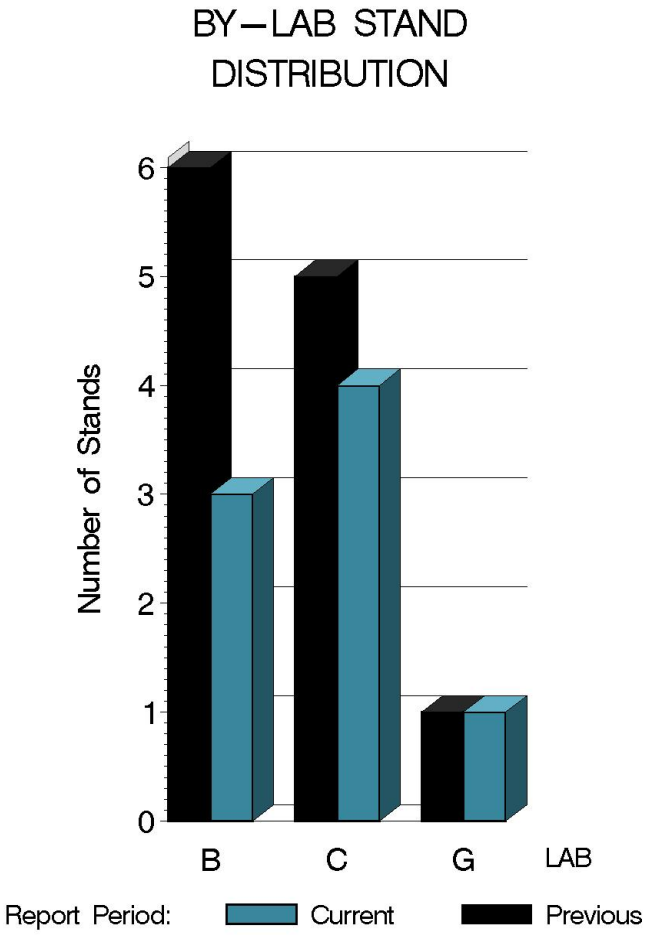
Attached is a summary of reference oil testing activity this period.

SDP/sdp/mem17-017.sdp.doc
cc: Frank Farber
Jeff Clark
OSCT Surveillance Panel
ftp://ftp.astmtmc.cmu.edu/docs/gear/osct/semiannualreports/osct-04-2017.pdf

Distribution: email

OSCT (D5662)

	Reporting Data	Calibrated on 3-31-2017
Number of Labs	3	3
Number of Stands	8	8

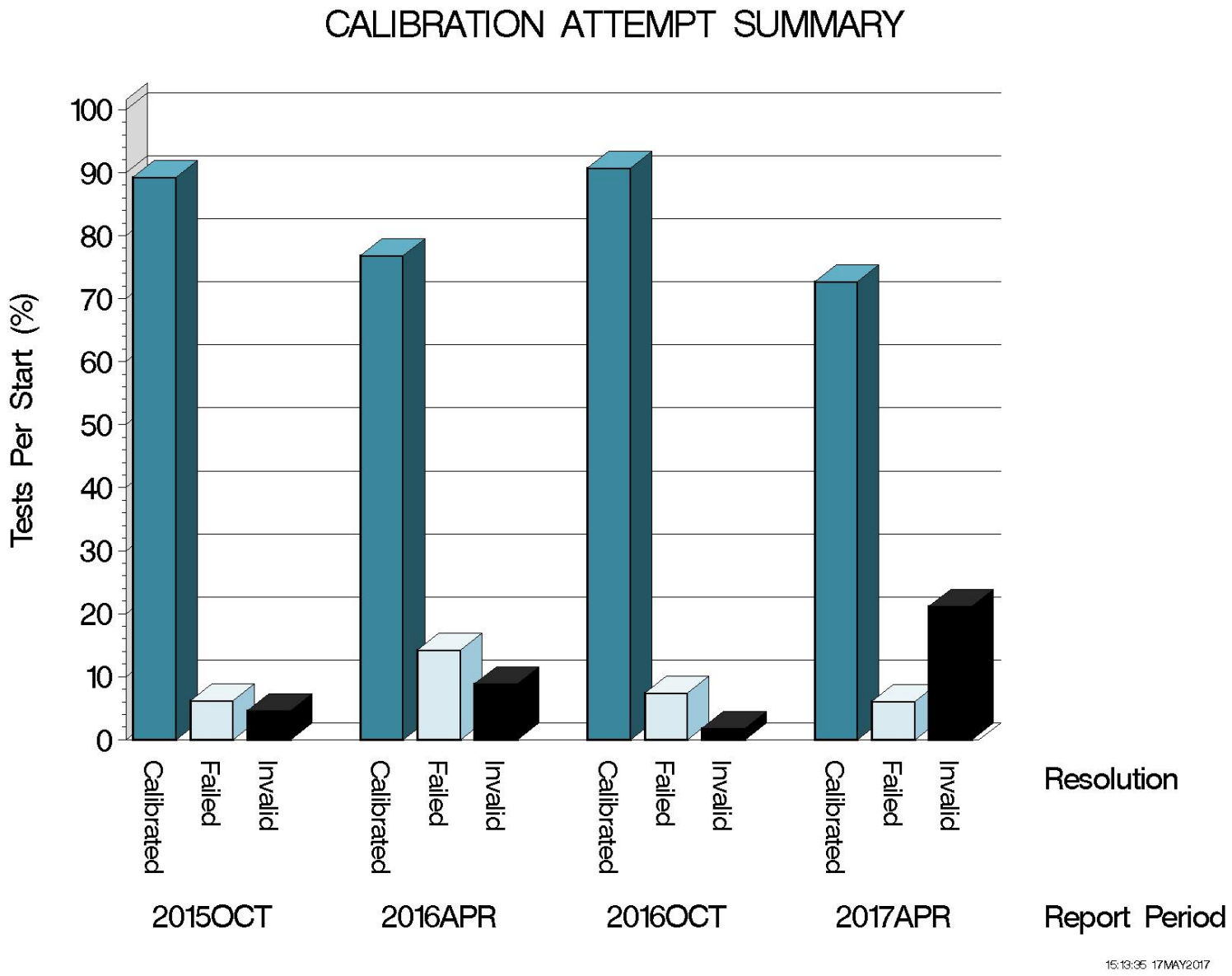


Test Distribution by Elastomer and Validity

OSCT (D5662)

					Totals	
		FL	NI	PA	Last Period	This Period
Accepted for calibration	AC	9	5	10	49	24
Rejected (low result)	OC	2	0	0	3	2
Rejected (high result)	OC	0	0	0	0	0
Rejected (combination)	OC	0	0	0	1	0
Invalidated by lab	LC	0	1	0	1	1
Invalidated	RC	1	0	0	0	1
Aborted	XC	3	0	2	0	5
Elastomer approval run	NI	16	0	9	34	25
Unacceptable approval run	MI	3	0	2	12	5
Aborted approval run	XI	4	0	2	0	6
Total		38	6	25	100	69

OSCT (D5662)


CALIBRATION ATTEMPT SUMMARY
Tests Per Start (%)
100
90
80
70
60
50
40
30
20
10
0
Calibrated
Failed
Invalid
Calibrated
Failed
Invalid
Calibrated
Failed
Invalid
Calibrated
Failed
Invalid
Resolution
2015OCT
2016APR
2016OCT
2017APR
Report Period
15:13:35 17MAY2017

OSCT (D5662)
CAUSES FOR LOST TESTS

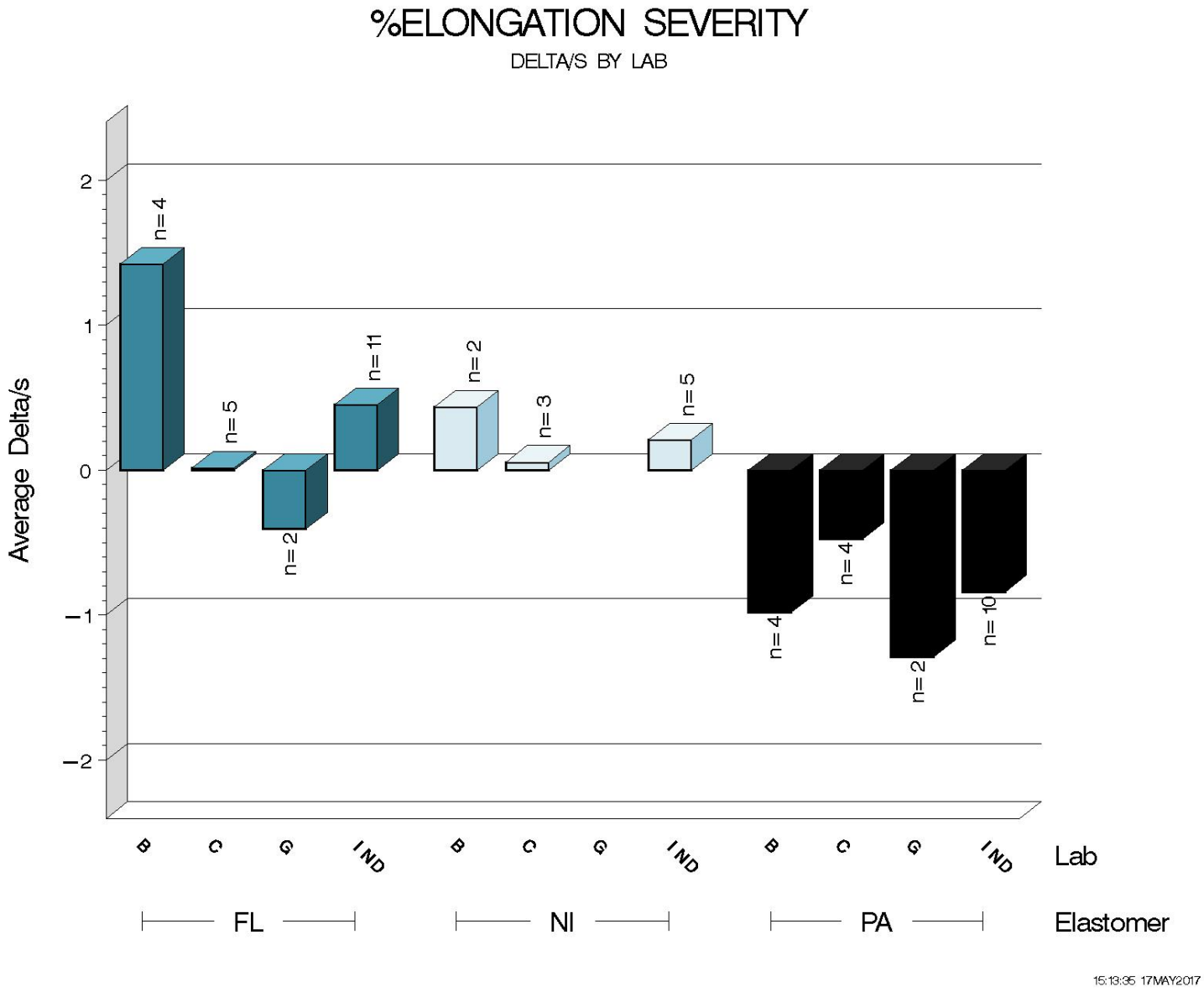
		Oil			Validity				Loss Rate		
Lab	Cause	FL	NI	PA	LC	RC	XC	XI	Lost	Starts	%
B	Temp out of spec.	●				●			2	24	8%
	Temp out of spec.		●		●						
C	Wrong bath temp.	●					●		3	27	11%
	Wrong bath temp.	●						●			
	Wrong bath temp.	●						●			
G	Temp logging problem.	●					●		8	18	44%
	Power outage.	●					●				
	Temp logging problem.	●						●			
	Power outage.	●						●			
	Lost temperature control.			●			●				
	Power outage.			●			●				
	Lost temperature control.			●				●			
	Power outage.			●				●			
	Lost	8	1	4	1	1	5	6			
	Starts	38	6	25	69	69	69	69			
	%	21%	17%	16%	1%	1%	7%	9%			

OSCT (D5662)

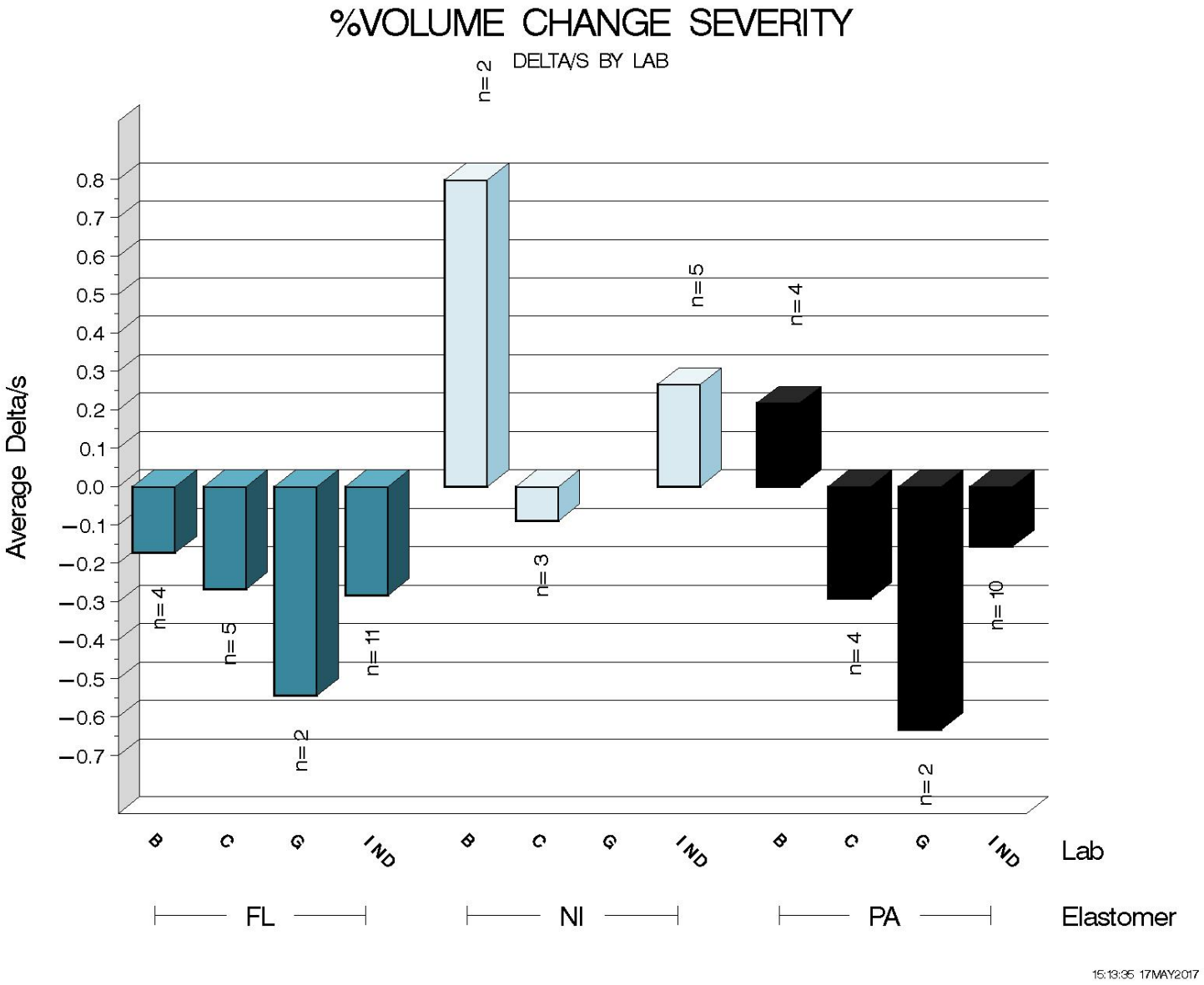
Average Δ/s by Lab					
Elastomer	**Lab**	**n**	**PELA**	**PVCA**	**SAHA**
FL	B	4	1.420	-0.173	-1.288
	C	5	0.016	-0.267	-0.449
	G	2	-0.406	-0.544	-1.747
	Industry	11	0.450	-0.283	-0.990
	Shift*	11	3.357%	-0.152%	-1.401 pts.
NI	B	2	0.436	0.799	-0.106
	C	3	0.055	-0.089	0.162
	Industry	5	0.207	0.266	0.055
	Shift*	5	1.116%	0.141%	0.067 pts.
PA	B	4	-0.983	0.217	0.698
	C	4	-0.475	-0.292	0.987
	G	2	-1.288	-0.633	1.237
	Industry	10	-0.841	-0.156	0.921
	Shift*	10	-18.204%	-0.305%	2.368 pts.

*computed using historic pooled s

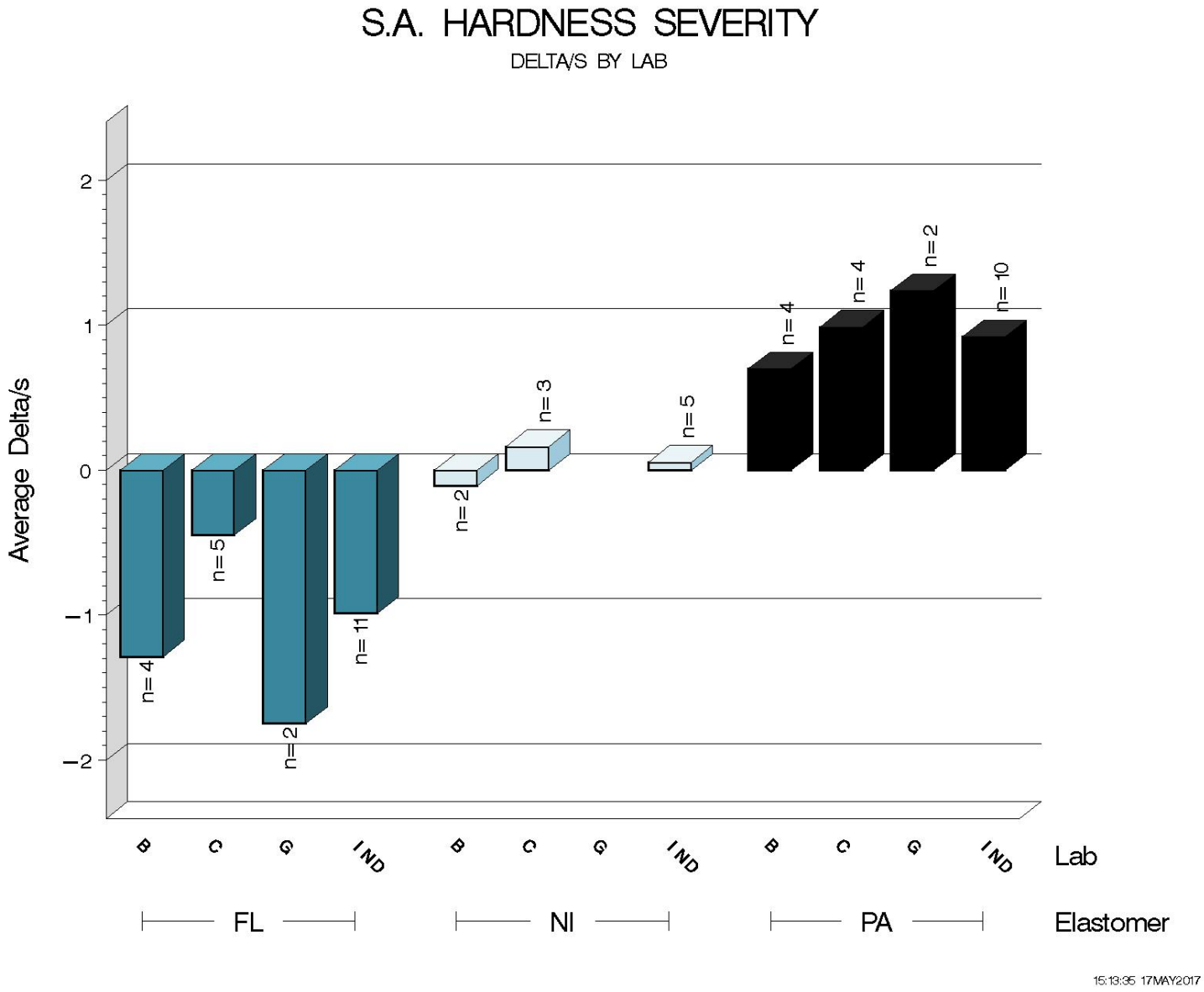
OSCT (D5662)


%ELONGATION SEVERITY
DELTA/S BY LAB
Average Delta/s
2
1
0
−1
−2
n= 4
n= 5
n= 2
n= 11
n= 2
n= 3
n= 5
n= 4
n= 4
n= 2
n= 10
B
C
G
IND
B
C
G
IND
B
C
G
IND
Lab
FL
NI
PA
Elastomer
15:13:35 17MAY2017

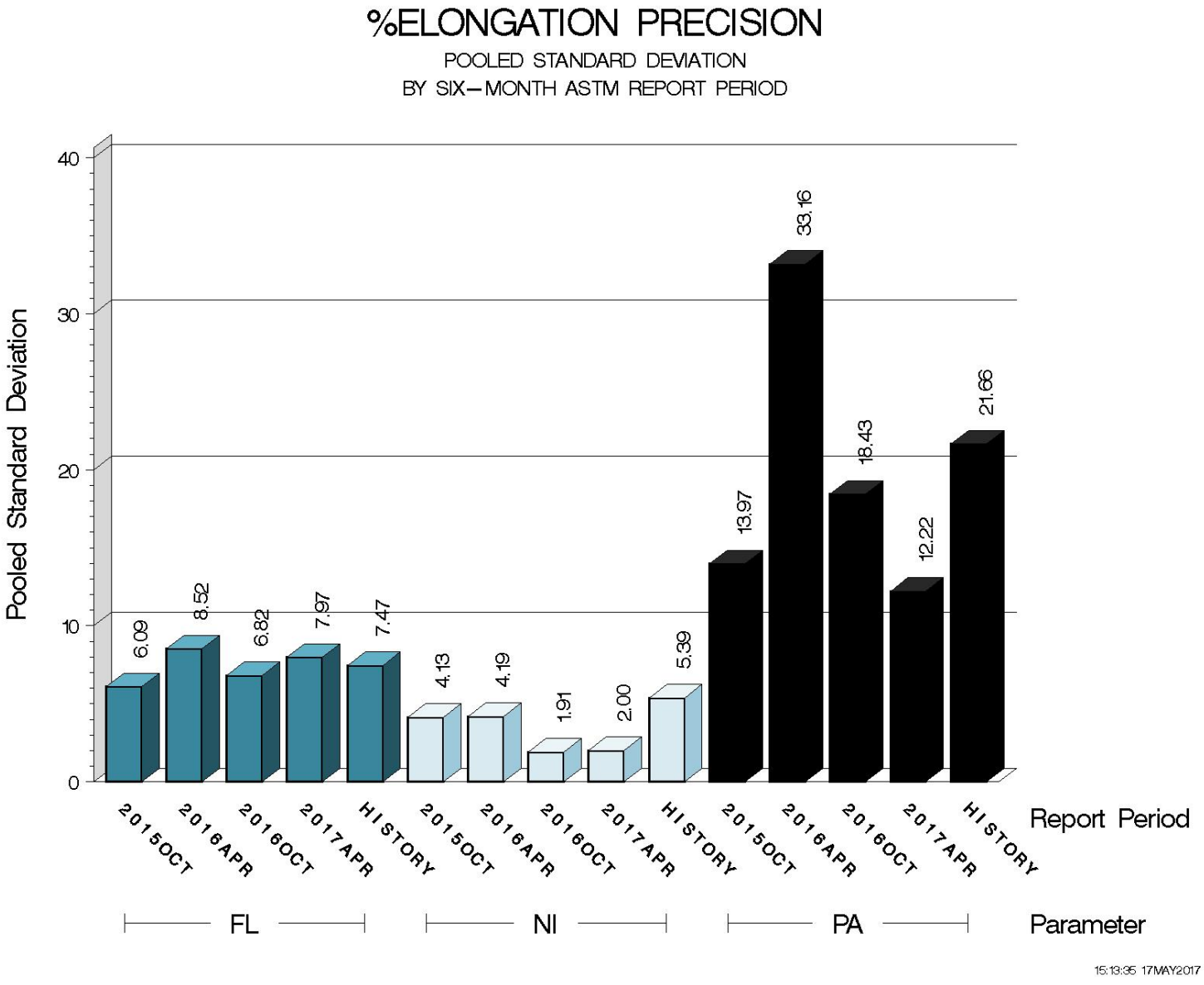
OSCT (D5662)


%VOLUME CHANGE SEVERITY
DELTA/S BY LAB
Average Delta/s
0.8
0.7
0.6
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
n= 4
n= 5
n= 2
n= 11
n= 2
n= 3
n= 5
n= 4
n= 4
n= 2
n= 10
B
C
G
IND
B
C
G
IND
B
C
G
IND
Lab
FL
NI
PA
Elastomer
15:13:35 17MAY2017

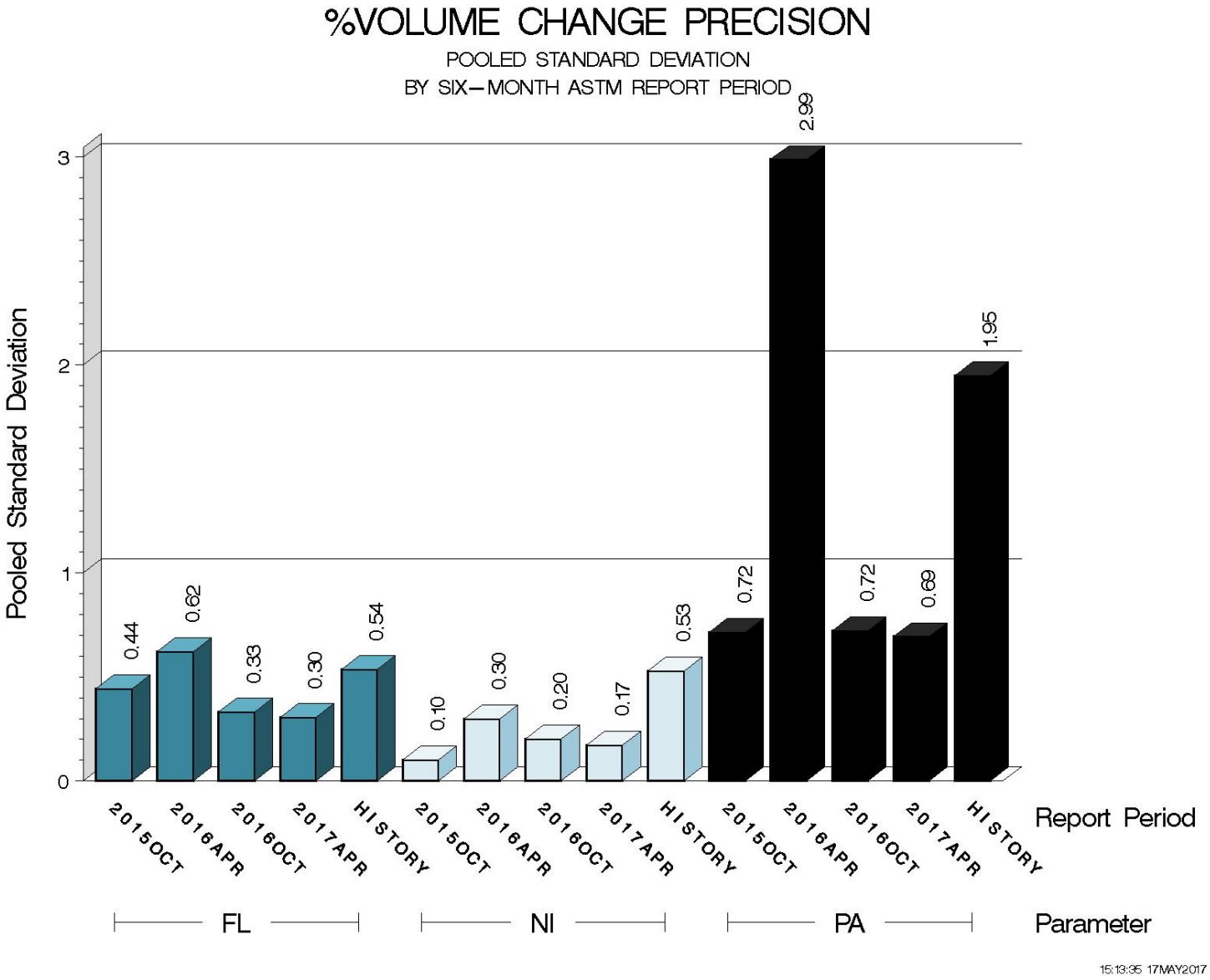
OSCT (D5662)


S.A. HARDNESS SEVERITY
DELTA/S BY LAB
Average Delta/s
2
1
0
−1
−2
n= 4
n= 5
n= 2
n= 11
n= 2
n= 3
n= 5
n= 4
n= 4
n= 2
n= 10
B
C
G
IND
B
C
G
IND
B
C
G
IND
Lab
FL
NI
PA
Elastomer
15:13:35 17MAY2017

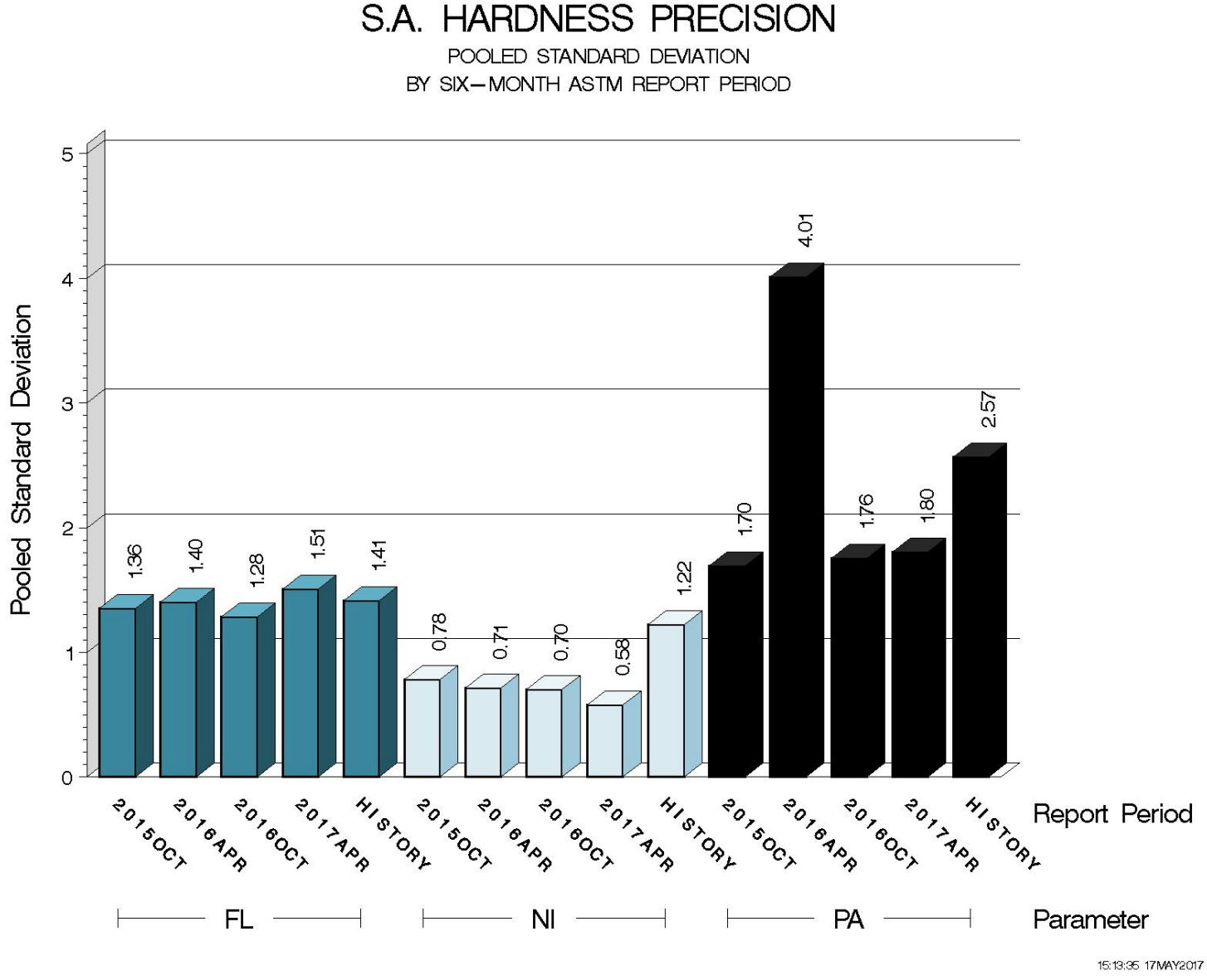
OSCT (D5662)


%ELONGATION PRECISION
POOLED STANDARD DEVIATION
BY SIX–MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
0
10
20
30
40
6.09
8.52
6.82
7.97
7.47
4.13
4.19
1.91
2.00
5.39
13.97
33.16
18.43
12.22
21.66
2015OCT
2016APR
2016OCT
2017APR
HISTORY
Report Period
FL
NI
PA
Parameter
15:13:35 17MAY2017

OSCT (D5662)


%VOLUME CHANGE PRECISION
POOLED STANDARD DEVIATION
BY SIX–MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
0
1
2
3
0.44
0.62
0.33
0.30
0.54
0.10
0.30
0.20
0.17
0.53
0.72
2.99
0.72
0.69
1.95
2015OCT
2016APR
2016OCT
2017APR
HISTORY
Report Period
FL
NI
PA
Parameter
15:13:35 17MAY2017

OSCT (D5662)


S.A. HARDNESS PRECISION
POOLED STANDARD DEVIATION
BY SIX–MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
0
1
2
3
4
5
1.36
1.40
1.28
1.51
1.41
0.78
0.71
0.70
0.58
1.22
1.70
4.01
1.76
1.80
2.57
2015OCT
2016APR
2016OCT
2017APR
HISTORY
Report Period
FL
NI
PA
Parameter
15:13:35 17MAY2017

OSCT (D5662)

SUMMARY OF SEVERITY & PRECISION

Severity

The combined-elastomer industry charts show severity for PELA and PVCA remained within limits over this report period. SAHA experienced a number of alarms.

The by-elastomer charts show that PELA for fluoroelastomer remained in limits this period after a lengthy period high of target. PELA results for polyacrylate continue to be low of target. SAHA performance on polyacrylate continues to run high of target while running low for fluoroelastomer. Nitrile results for all parameters have remained within control chart limits.

Precision

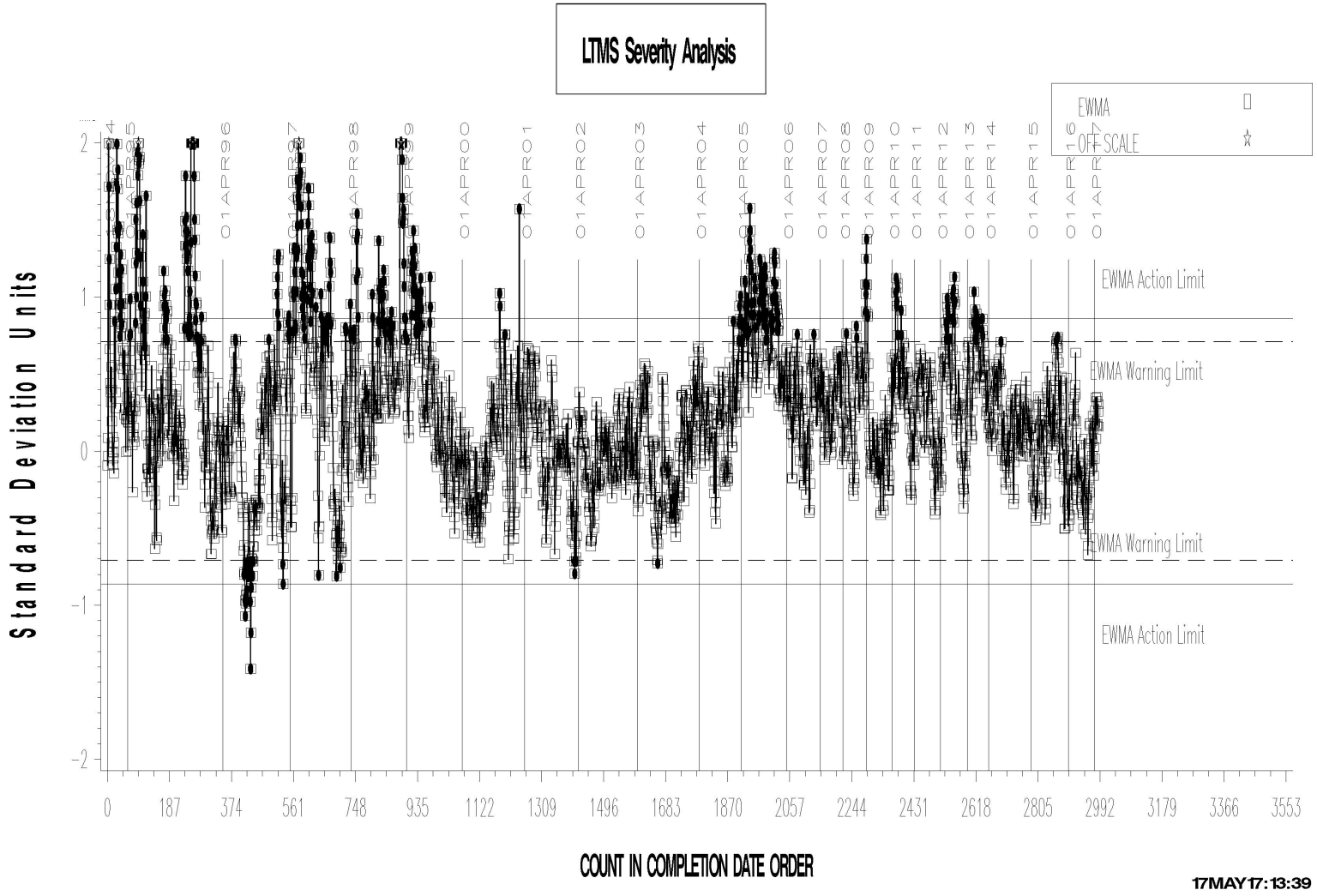
Both PELA and SAHA produced a number of alarms this period. PVCA remained within limits.

Industry control charts follow.

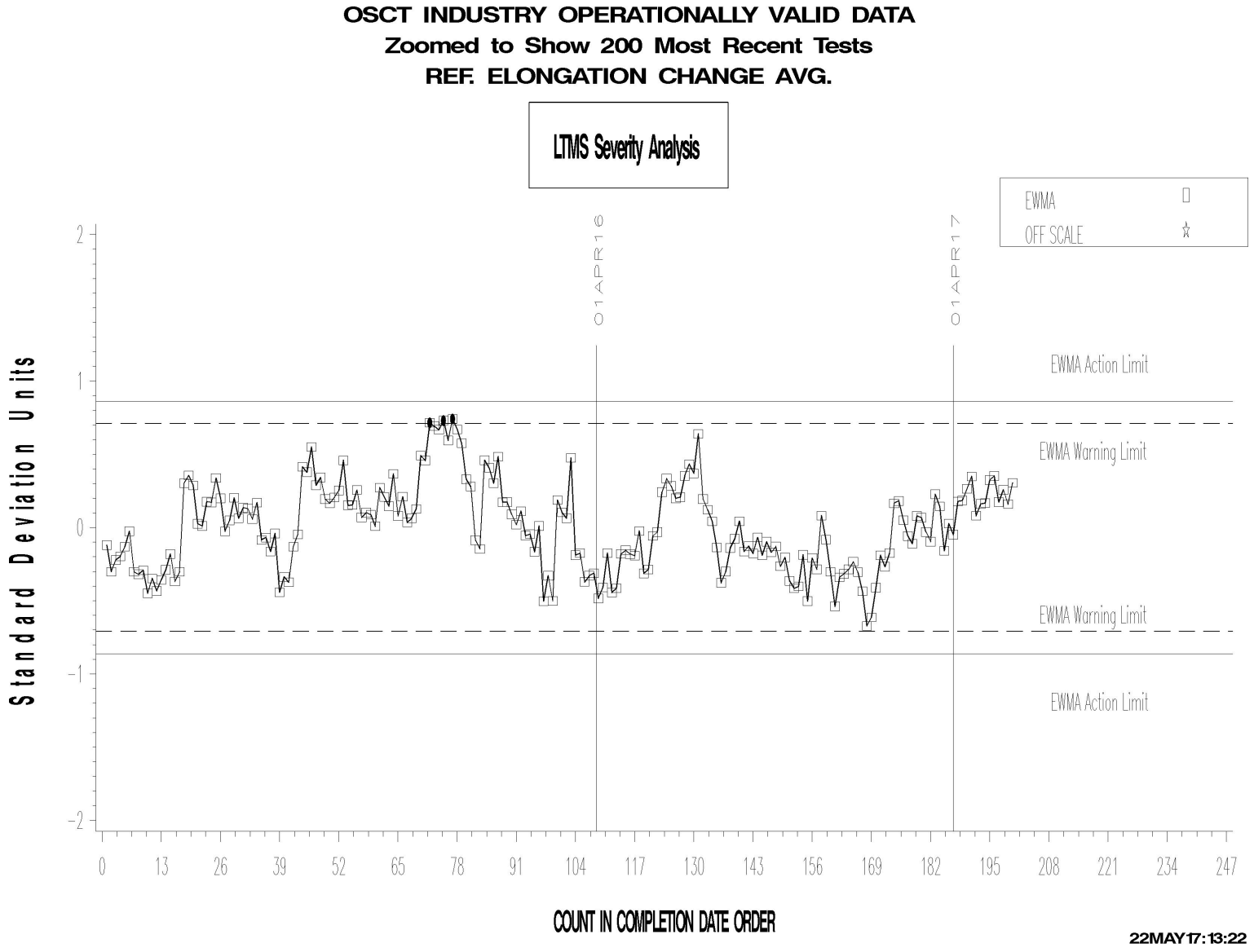
OSCT (D5662)

OSCT INDUSTRY OPERATIONALLY VALID DATA

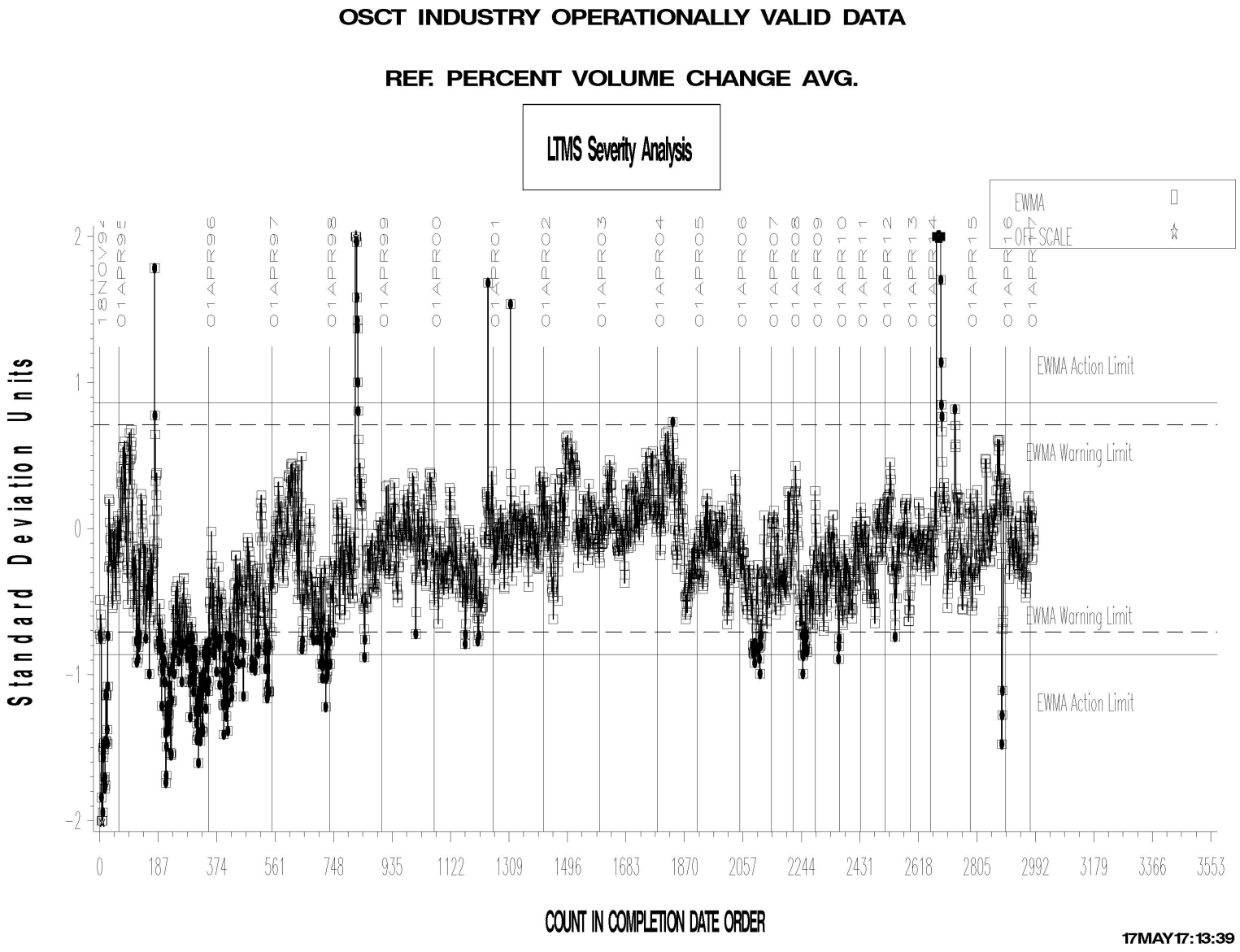
REF. ELONGATION CHANGE AVG.



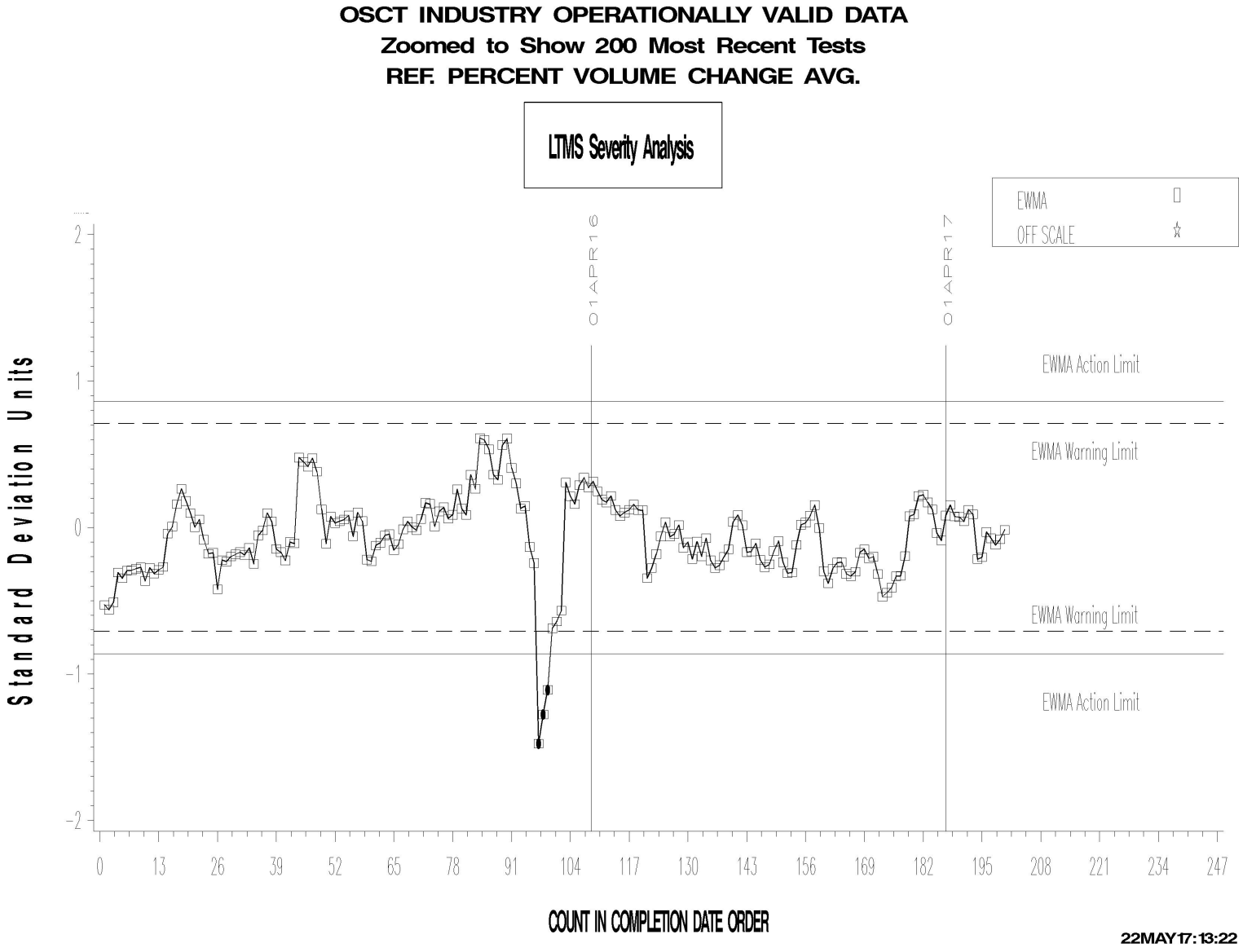
OSCT (D5662)


OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to Show 200 Most Recent Tests
REF. ELONGATION CHANGE AVG.
LTMS Severity Analysis
EWMA
OFF SCALE
01APR16
01APR17
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action 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
22MAY17:13:22

OSCT (D5662)


OSCT INDUSTRY OPERATIONALLY VALID DATA
REF. PERCENT VOLUME CHANGE AVG.
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
17MAY17:13:39

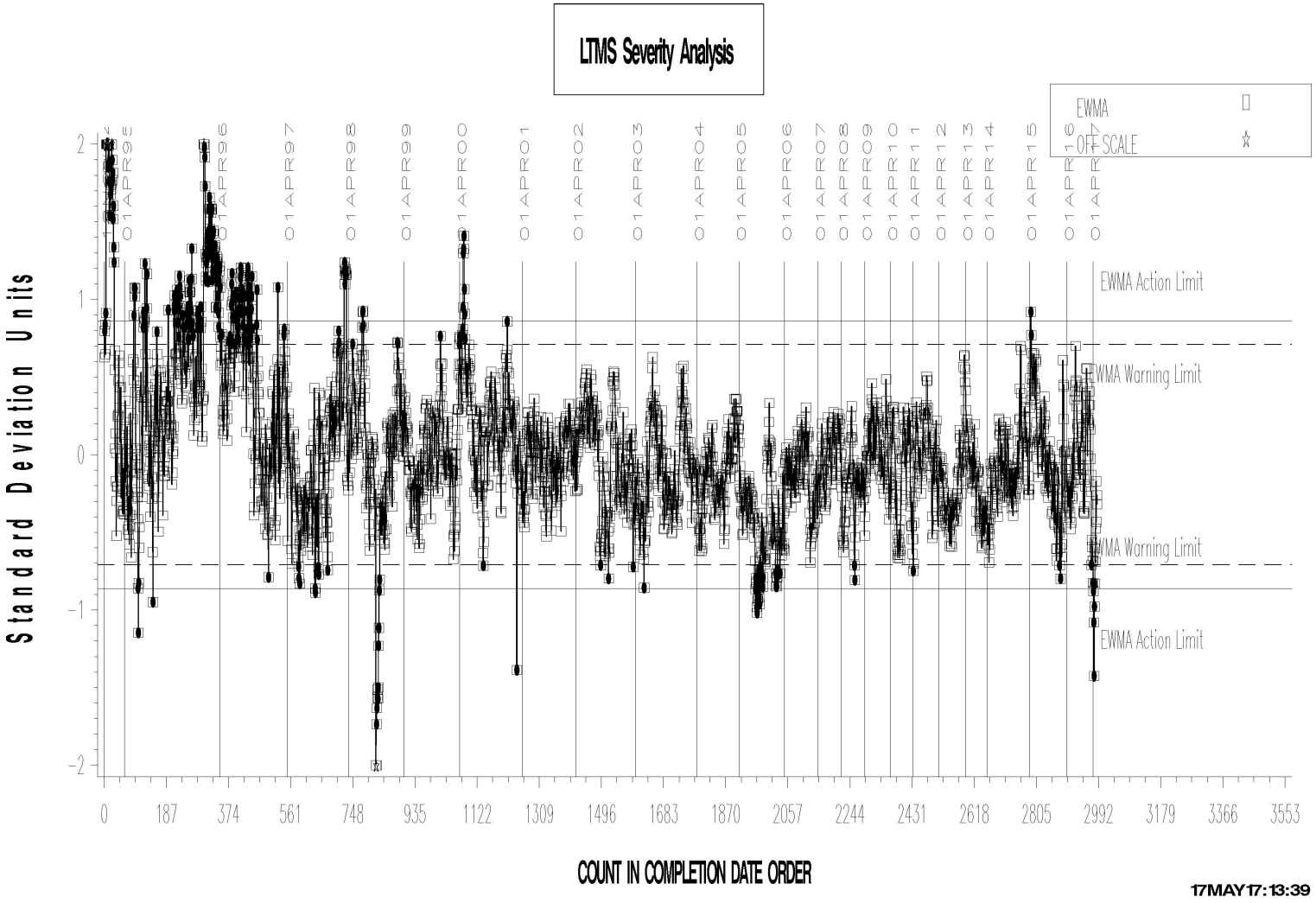
OSCT (D5662)


OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to Show 200 Most Recent Tests
REF. PERCENT VOLUME CHANGE AVG.
LTMS Severity Analysis
EWMA
OFF SCALE
01APR16
01APR17
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action 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
22MAY17:13:22

OSCT (D5662)

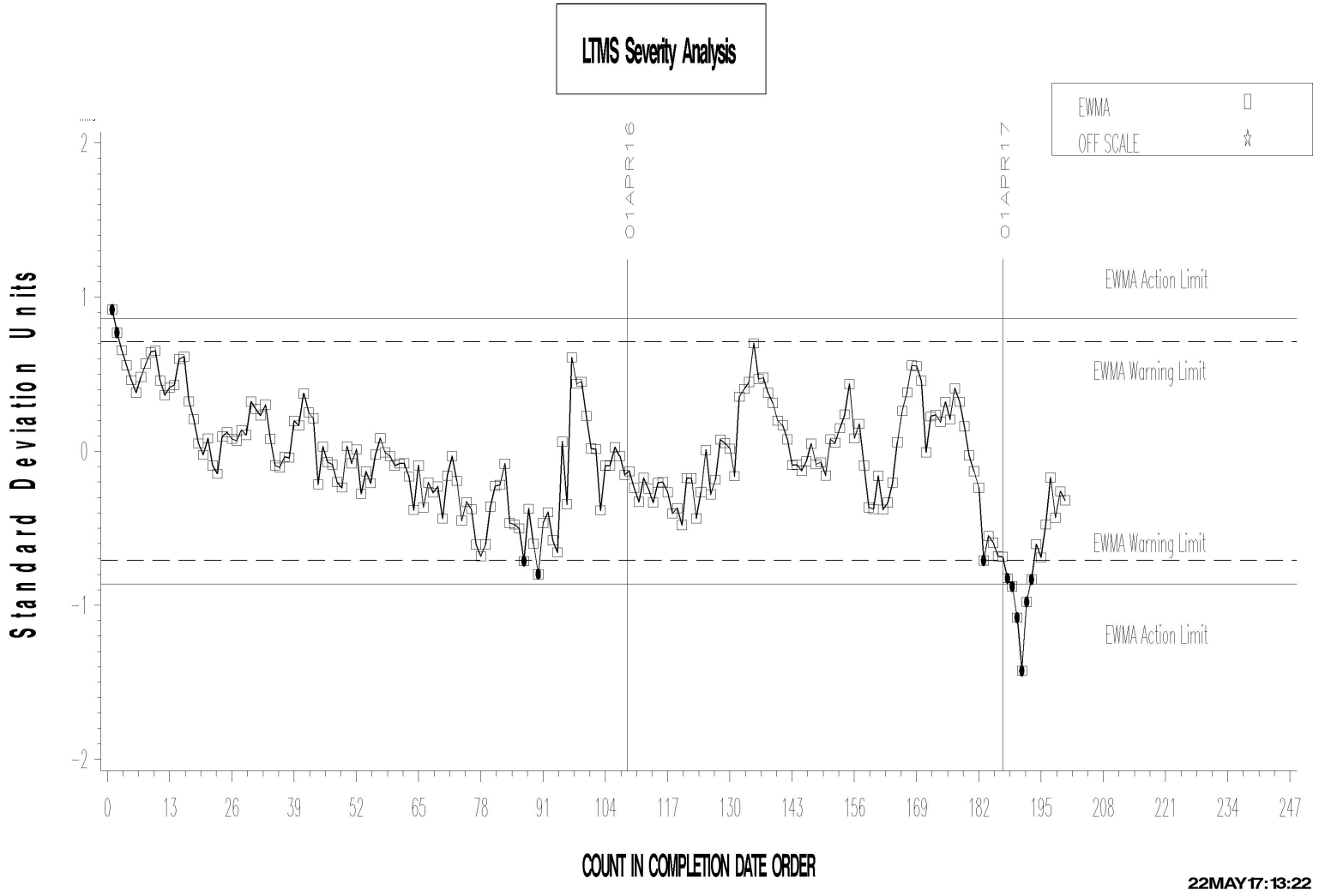
OSCT INDUSTRY OPERATIONALLY VALID DATA

REF. SHORE A HARDNESS CHANGE AVG.



OSCT (D5662)

OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to Show 200 Most Recent Tests
REF. SHORE A HARDNESS CHANGE AVG.

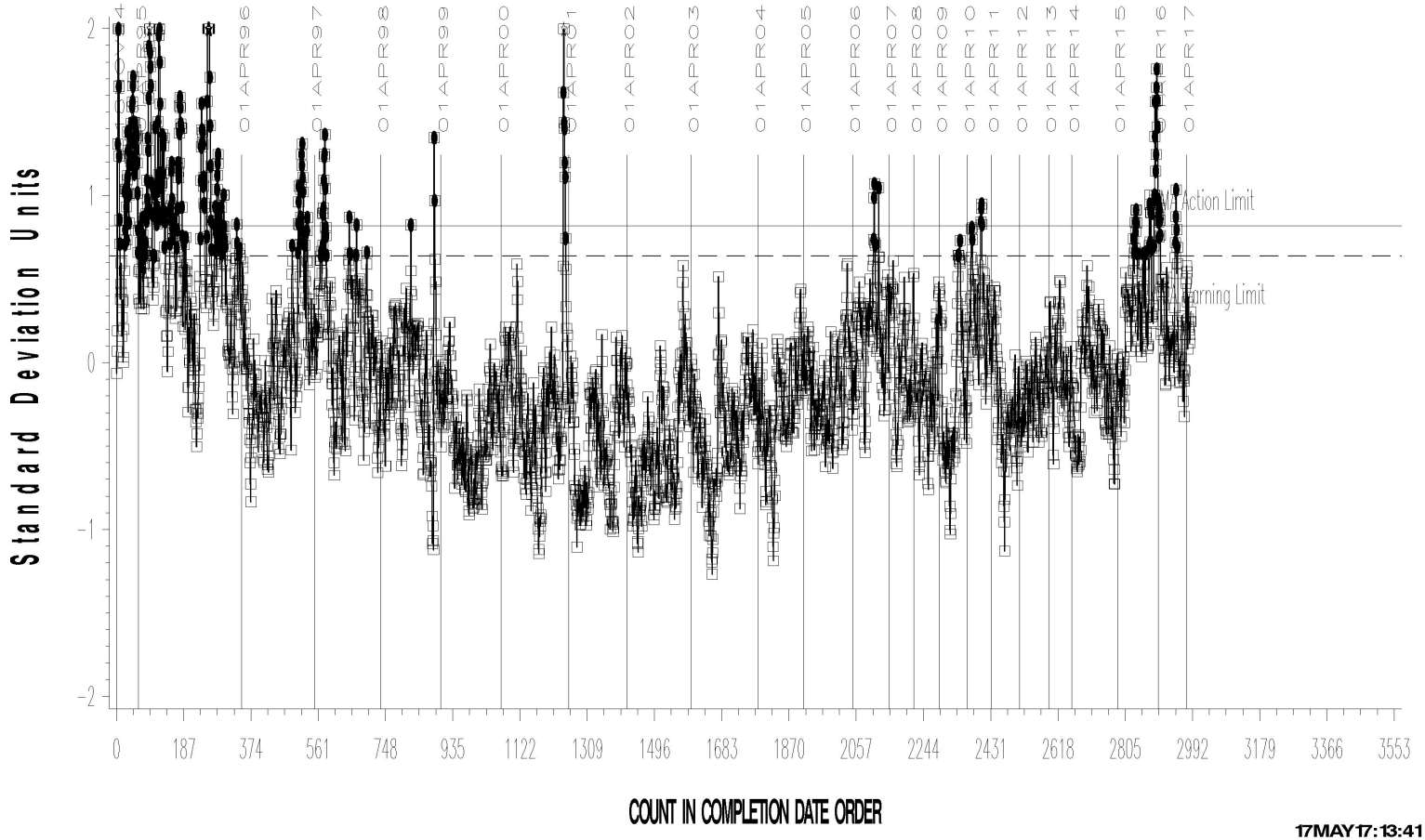


OSCT (D5662)

OSCT INDUSTRY OPERATIONALLY VALID DATA

REF. ELONGATION CHANGE AVG.

LTMS Precision Analysis



17MAY17:13:41

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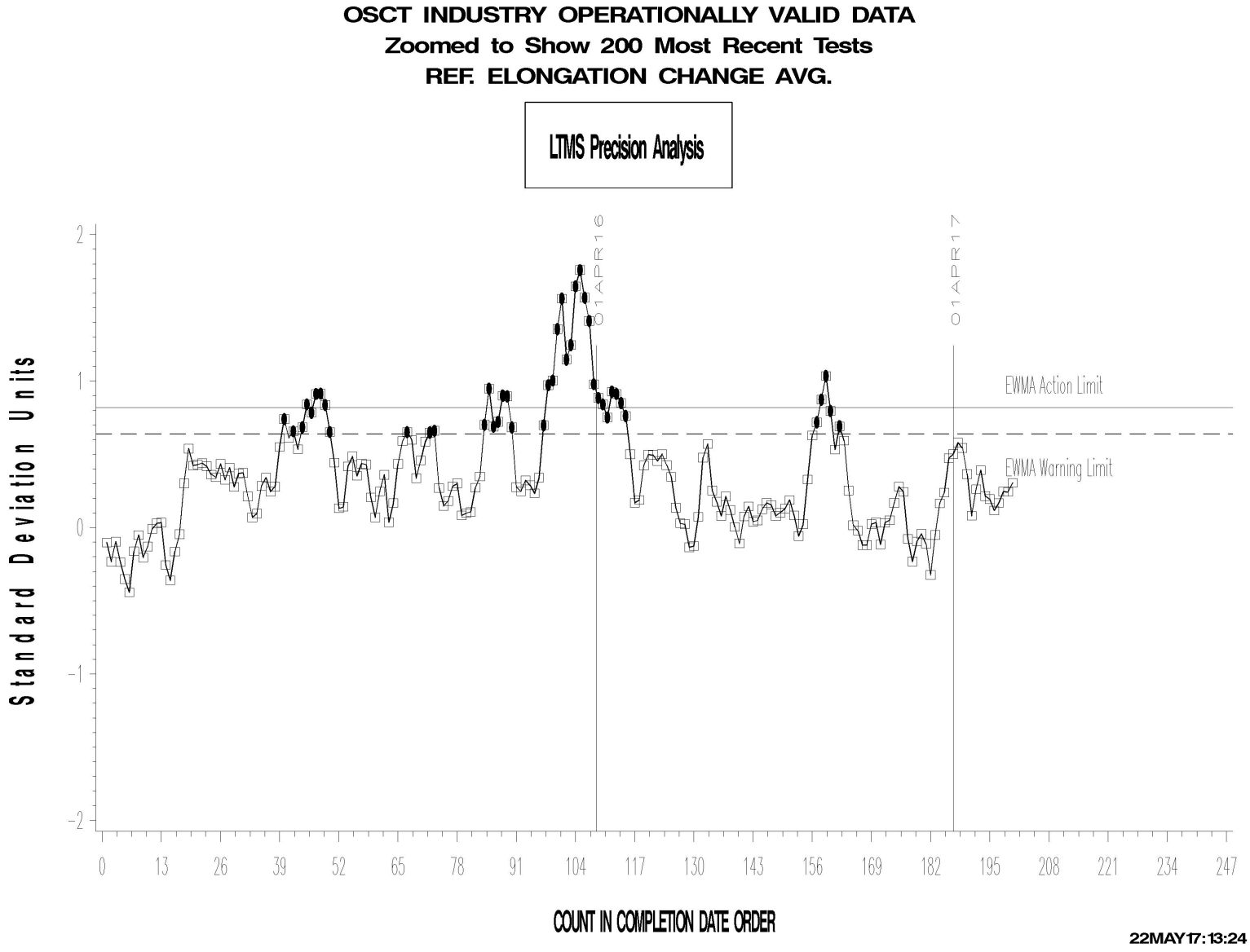
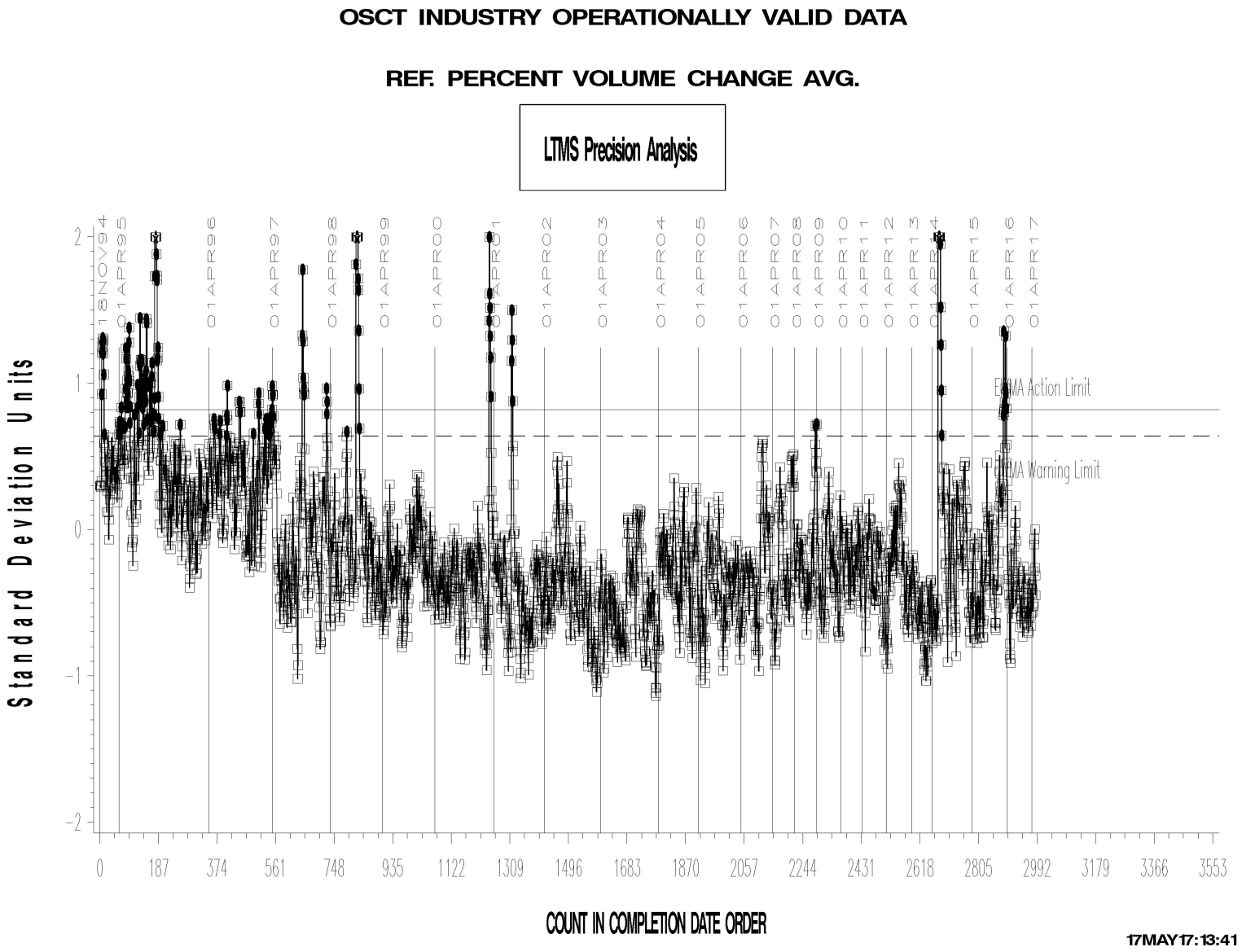
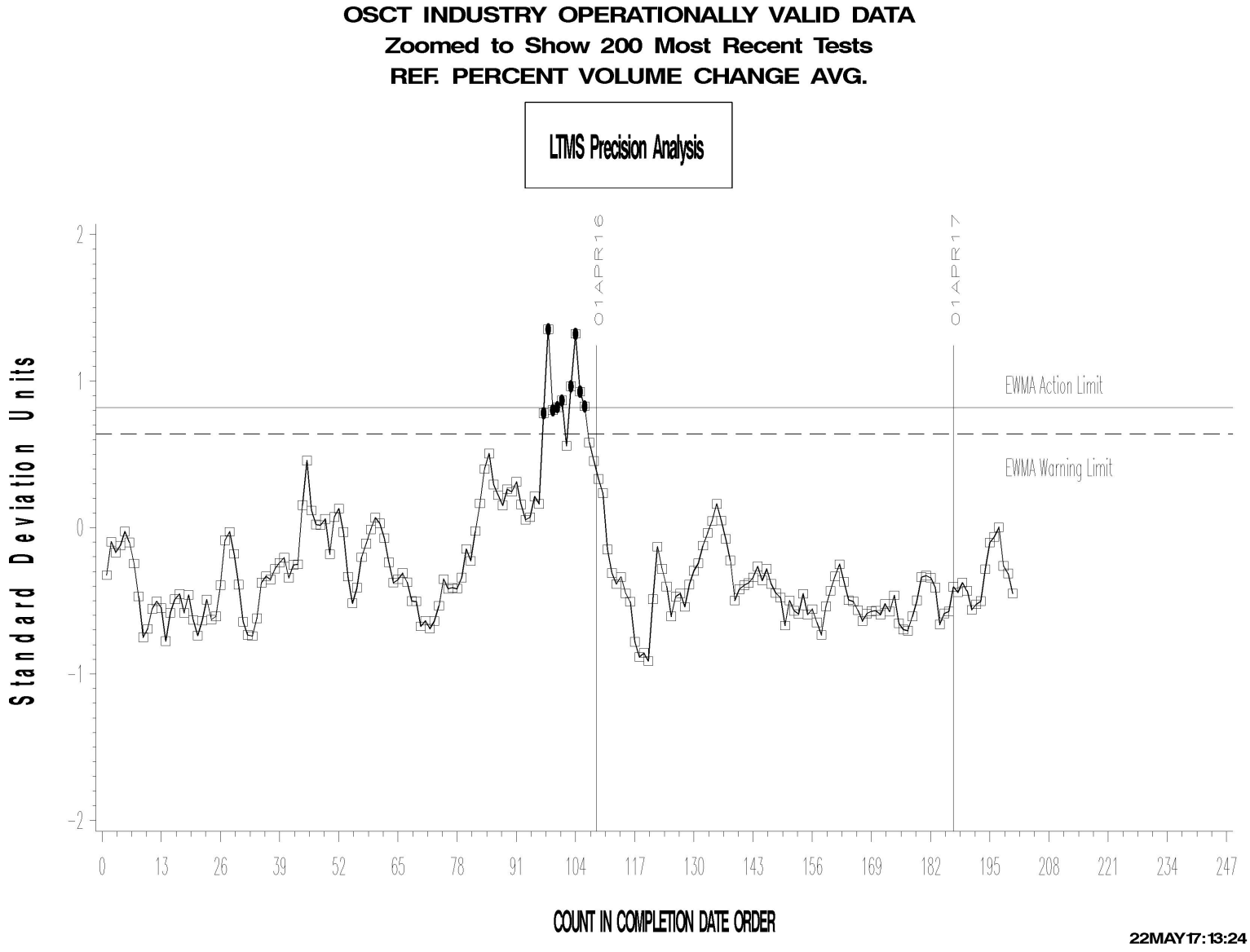

OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to Show 200 Most Recent Tests
REF. ELONGATION CHANGE AVG.
LTMS Precision Analysis
01APR16
01APR17
EWMA Action Limit
EWMA Warning Limit
Standard Deviation Units
2
1
0
-1
-2
0
13
26
39
52
65
78
91
104
117
130
143
156
169
182
195
208
221
234
247
COUNT IN COMPLETION DATE ORDER
22MAY17:13:24

OSCT (D5662)


OSCT INDUSTRY OPERATIONALLY VALID DATA
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
EWMA Action Limit
EWMA Warning Limit
0
187
374
561
748
935
1122
1309
1496
1683
1870
2057
2244
2431
2618
2805
2992
3179
3366
3553
COUNT IN COMPLETION DATE ORDER
17MAY17:13:41

OSCT (D5662)

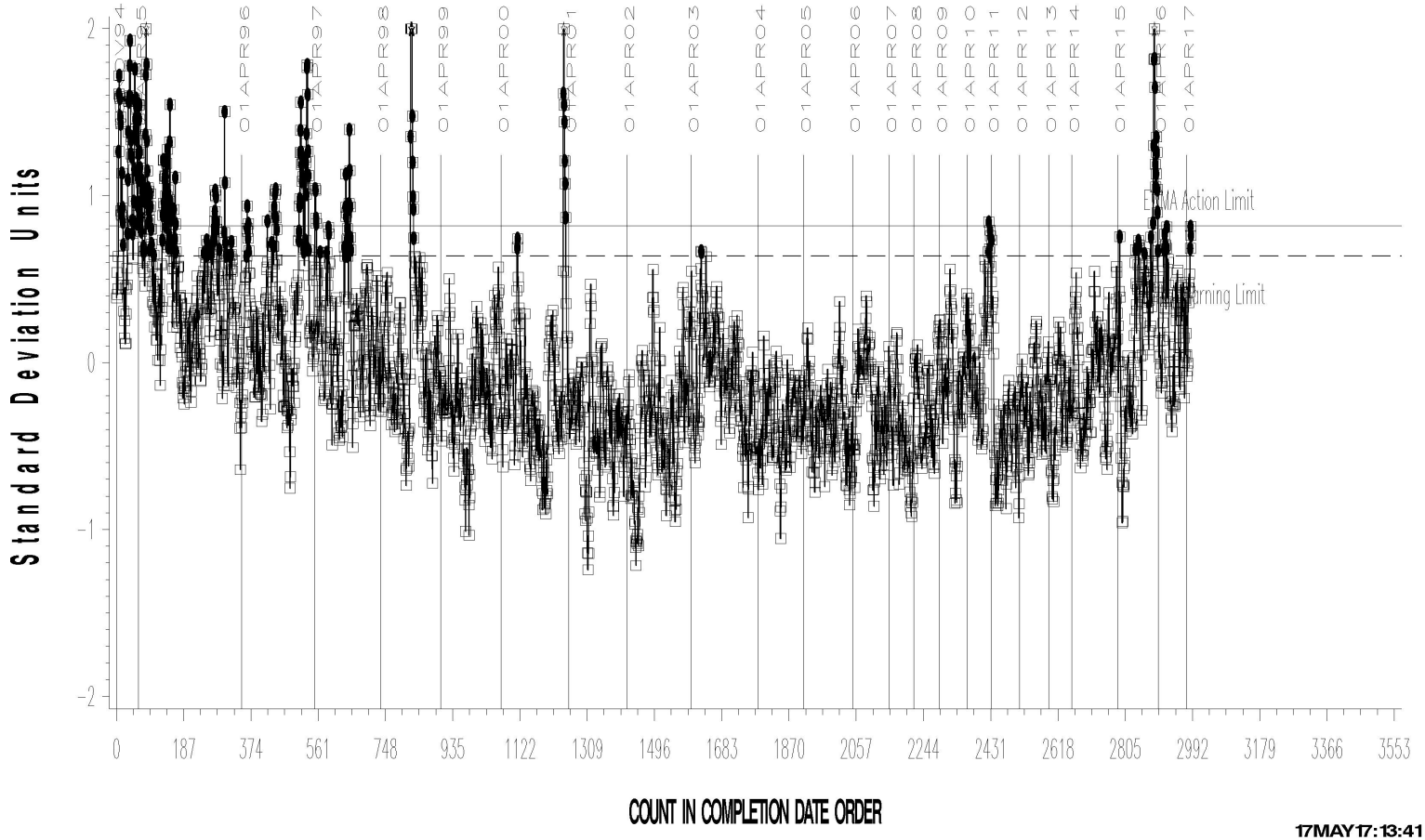

OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to Show 200 Most Recent Tests
REF. PERCENT VOLUME CHANGE AVG.
LTMS Precision Analysis
01APR16
01APR17
EWMA Action Limit
EWMA Warning Limit
Standard Deviation Units
2
1
0
-1
-2
0
13
26
39
52
65
78
91
104
117
130
143
156
169
182
195
208
221
234
247
COUNT IN COMPLETION DATE ORDER
22MAY17:13:24

OSCT (D5662)

OSCT INDUSTRY OPERATIONALLY VALID DATA

REF. SHORE A HARDNESS CHANGE AVG.

LTMS Precision Analysis



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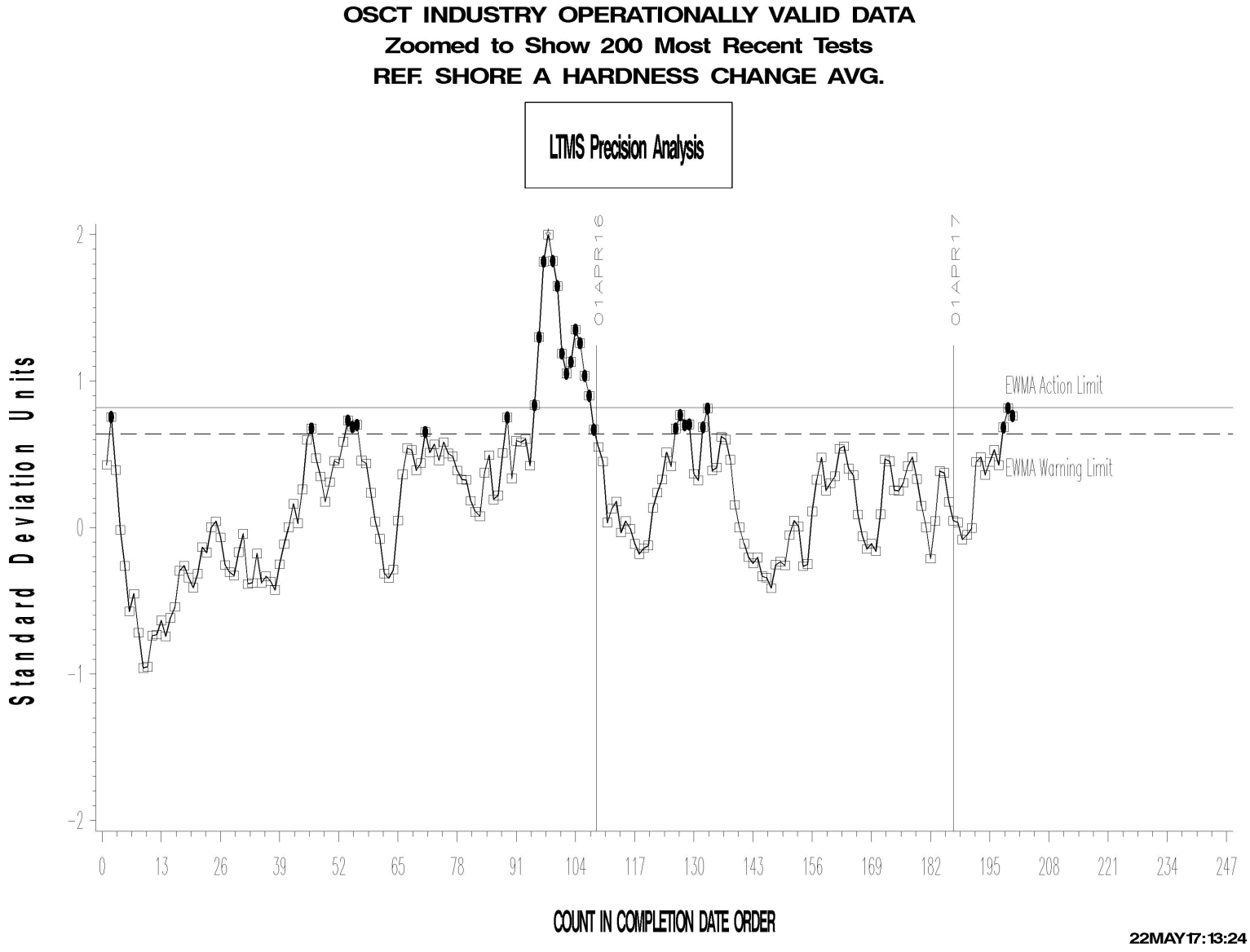
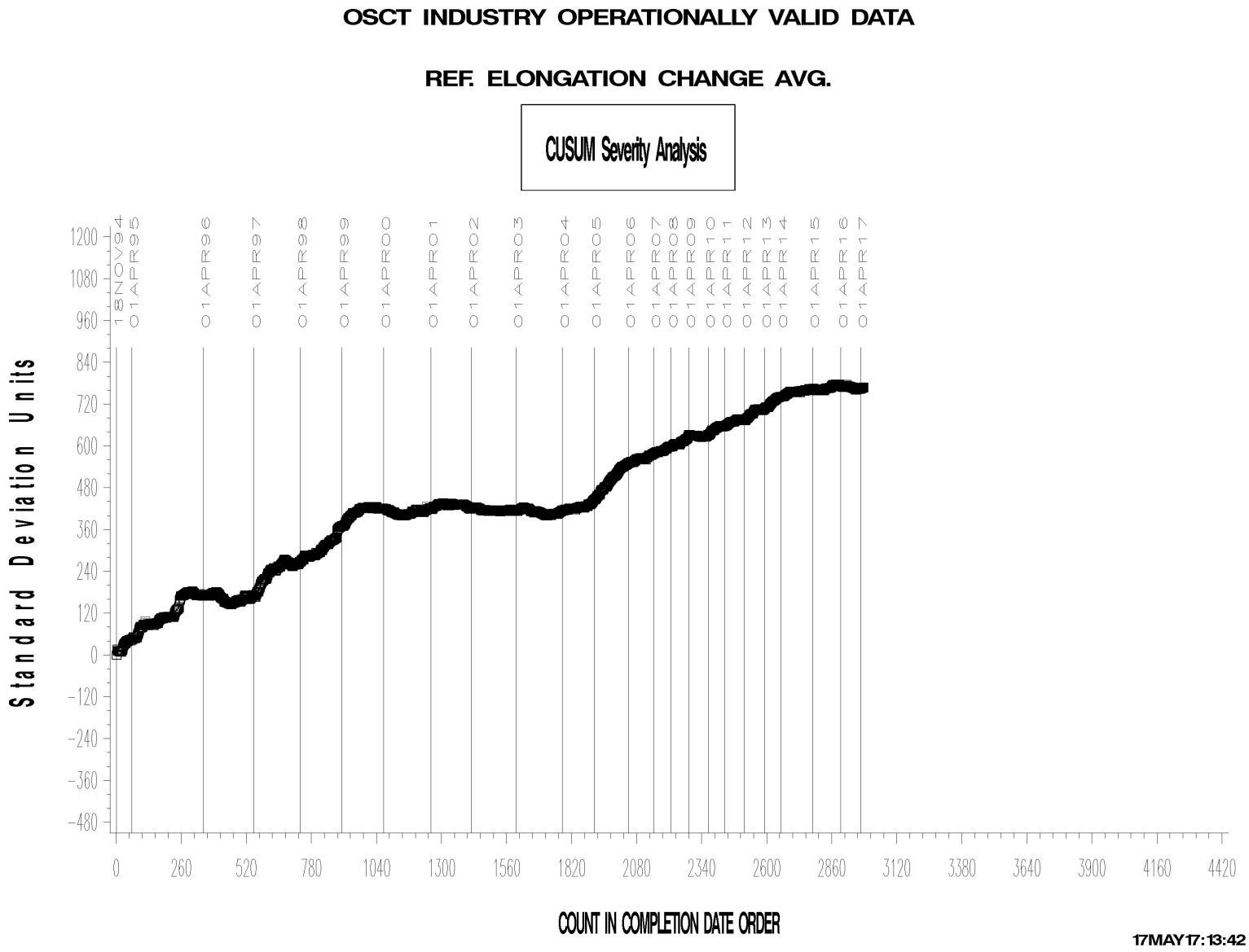
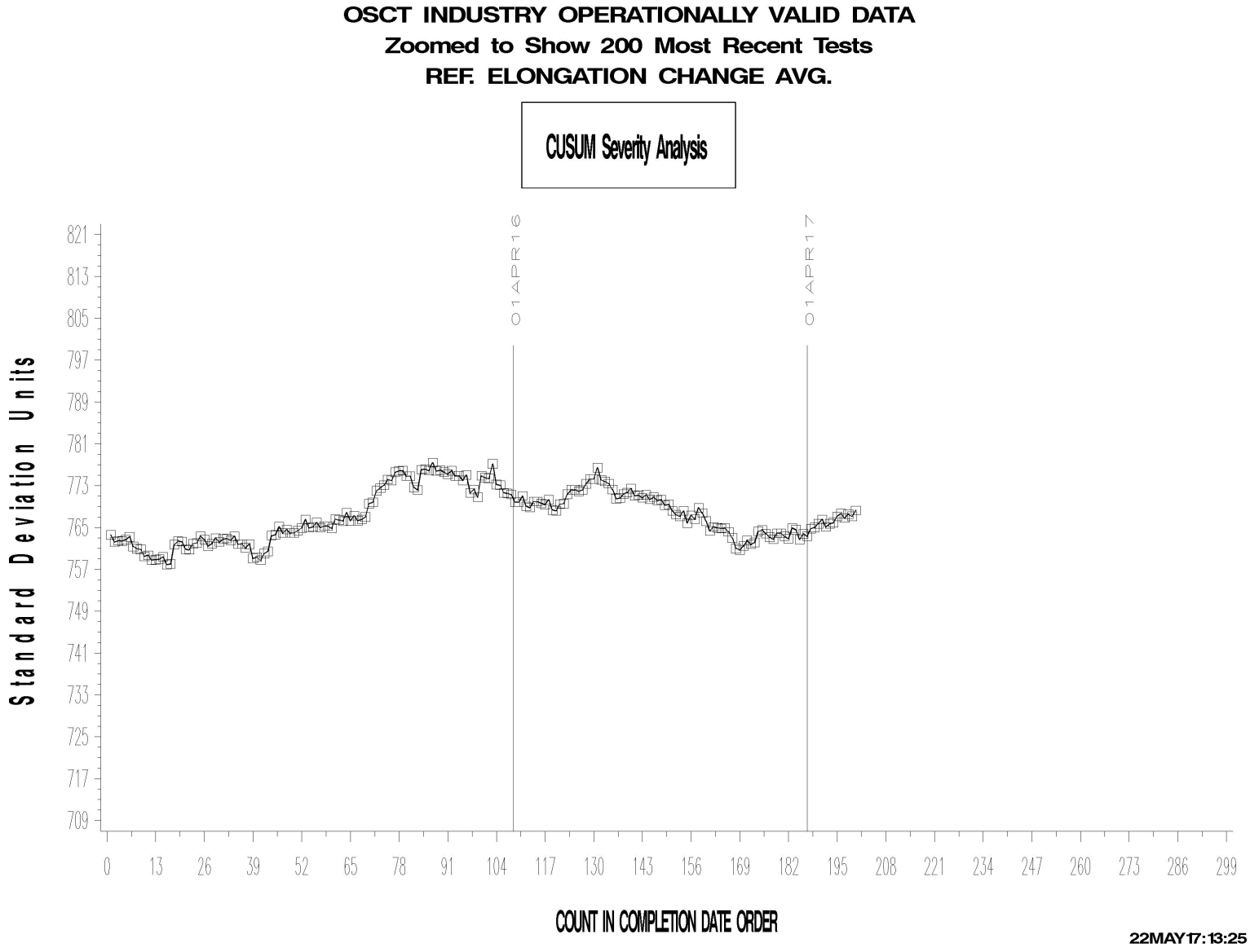
OSCT (D5662)


OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to Show 200 Most Recent Tests
REF. SHORE A HARDNESS CHANGE AVG.
LTMS Precision Analysis
Standard Deviation Units
2
1
0
-1
-2
01APR16
01APR17
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
22MAY17:13:24

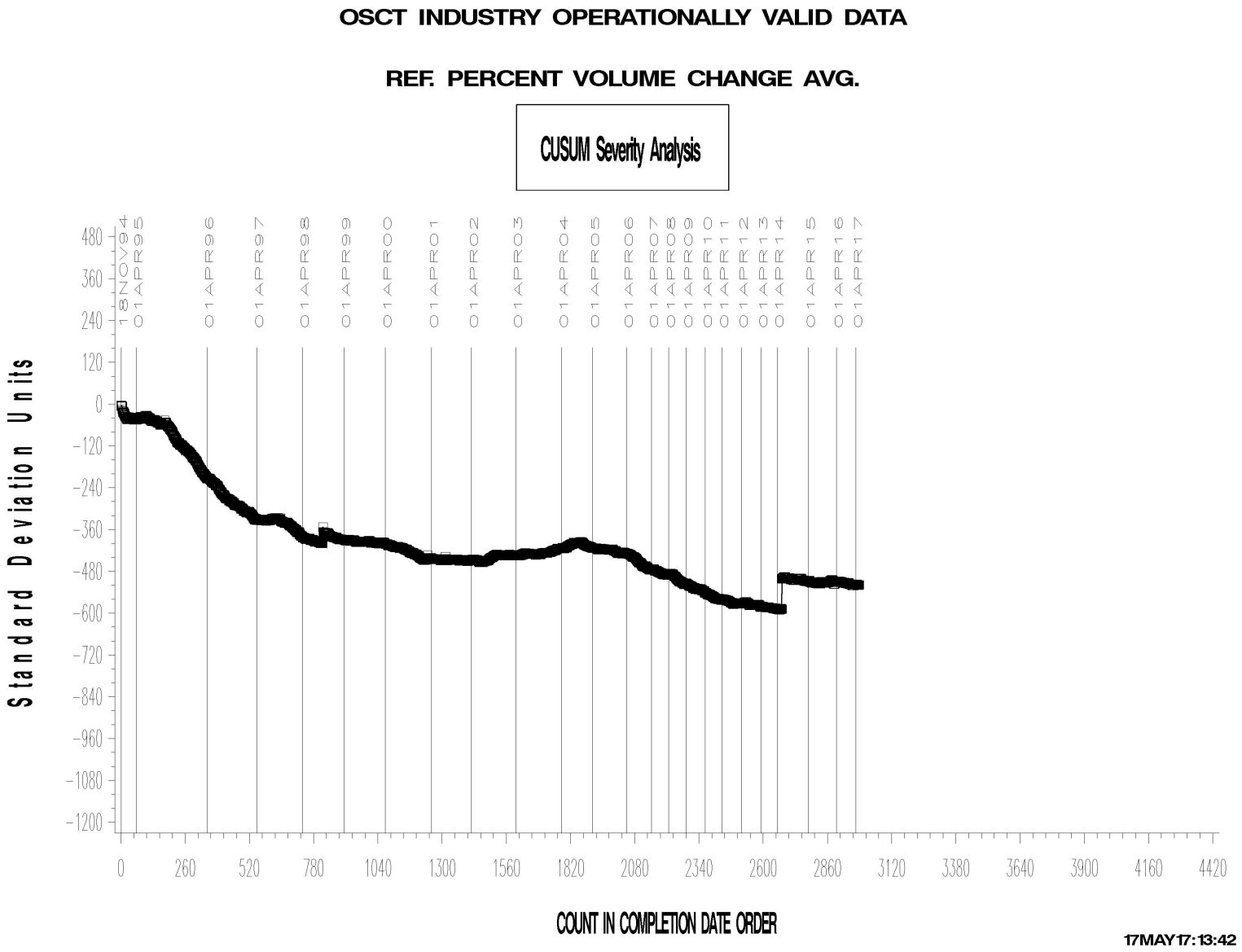
OSCT (D5662)


OSCT INDUSTRY OPERATIONALLY VALID DATA
REF. ELONGATION CHANGE AVG.
CUSUM Severity Analysis
Standard Deviation Units
1200
1080
960
840
720
600
480
360
240
120
0
-120
-240
-360
-480
18NOV94
01APR95
01APR96
01APR97
01APR98
01APR99
01APR00
01APR01
01APR02
01APR03
01APR04
01APR05
01APR06
01APR07
01APR08
01APR09
01APR10
01APR11
01APR12
01APR13
01APR14
01APR15
01APR16
01APR17
0
260
520
780
1040
1300
1560
1820
2080
2340
2600
2860
3120
3380
3640
3900
4160
4420
COUNT IN COMPLETION DATE ORDER
17MAY17:13:42

OSCT (D5662)

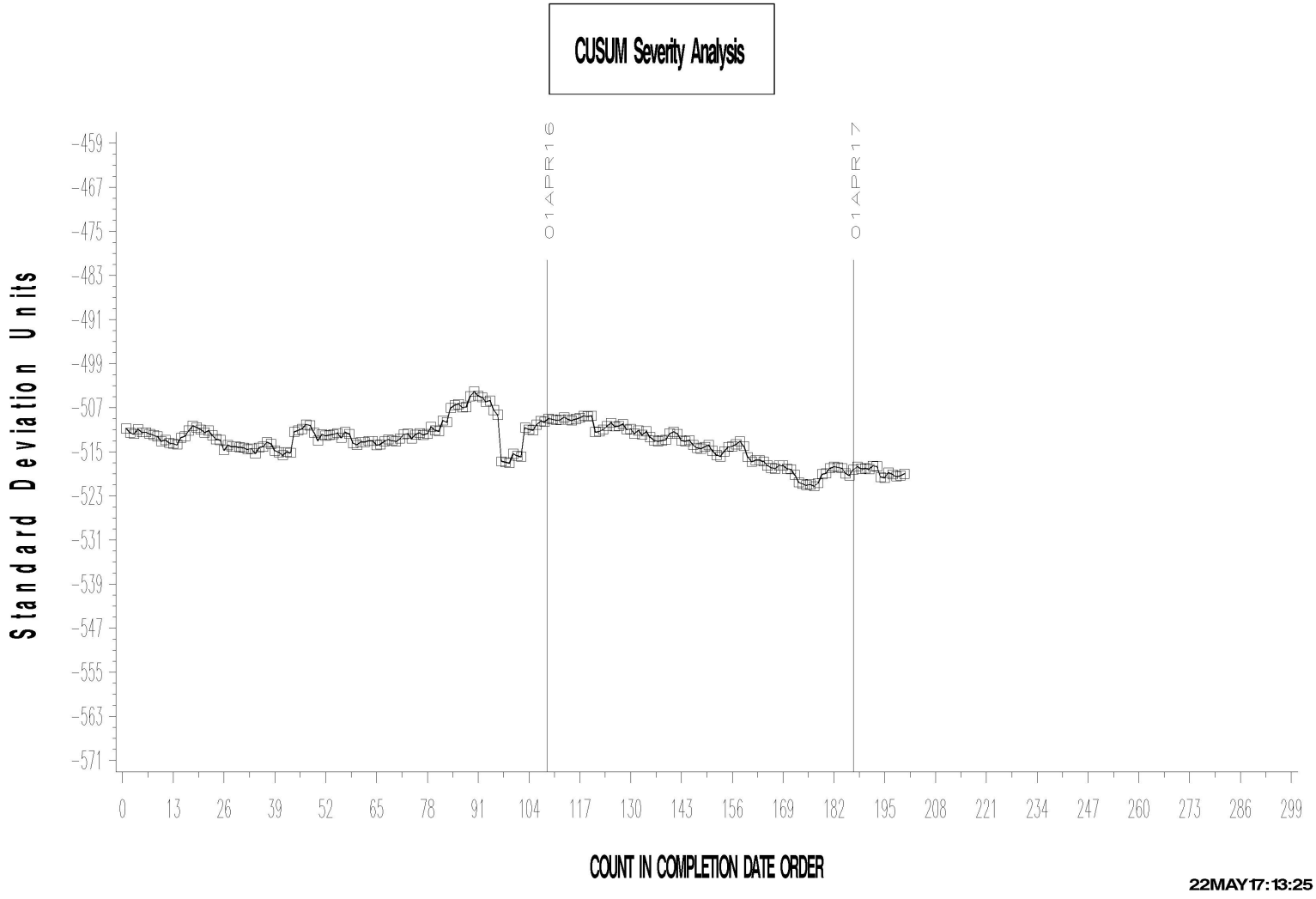

OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to Show 200 Most Recent Tests
REF. ELONGATION CHANGE AVG.
CUSUM Severity Analysis
01APR16
01APR17
Standard Deviation Units
821
813
805
797
789
781
773
765
757
749
741
733
725
717
709
0
13
26
39
52
65
78
91
104
117
130
143
156
169
182
195
208
221
234
247
260
273
286
299
COUNT IN COMPLETION DATE ORDER
22MAY17:13:25

OSCT (D5662)


OSCT INDUSTRY OPERATIONALLY VALID DATA
REF. PERCENT VOLUME CHANGE AVG.
CUSUM Severity Analysis
Standard Deviation Units
480
360
240
120
0
-120
-240
-360
-480
-600
-720
-840
-960
-1080
-1200
18NOV94
01APR95
01APR96
01APR97
01APR98
01APR99
01APR00
01APR01
01APR02
01APR03
01APR04
01APR05
01APR06
01APR07
01APR08
01APR09
01APR10
01APR11
01APR12
01APR13
01APR14
01APR15
01APR16
01APR17
0
260
520
780
1040
1300
1560
1820
2080
2340
2600
2860
3120
3380
3640
3900
4160
4420
COUNT IN COMPLETION DATE ORDER
17MAY17:13:42

OSCT (D5662)

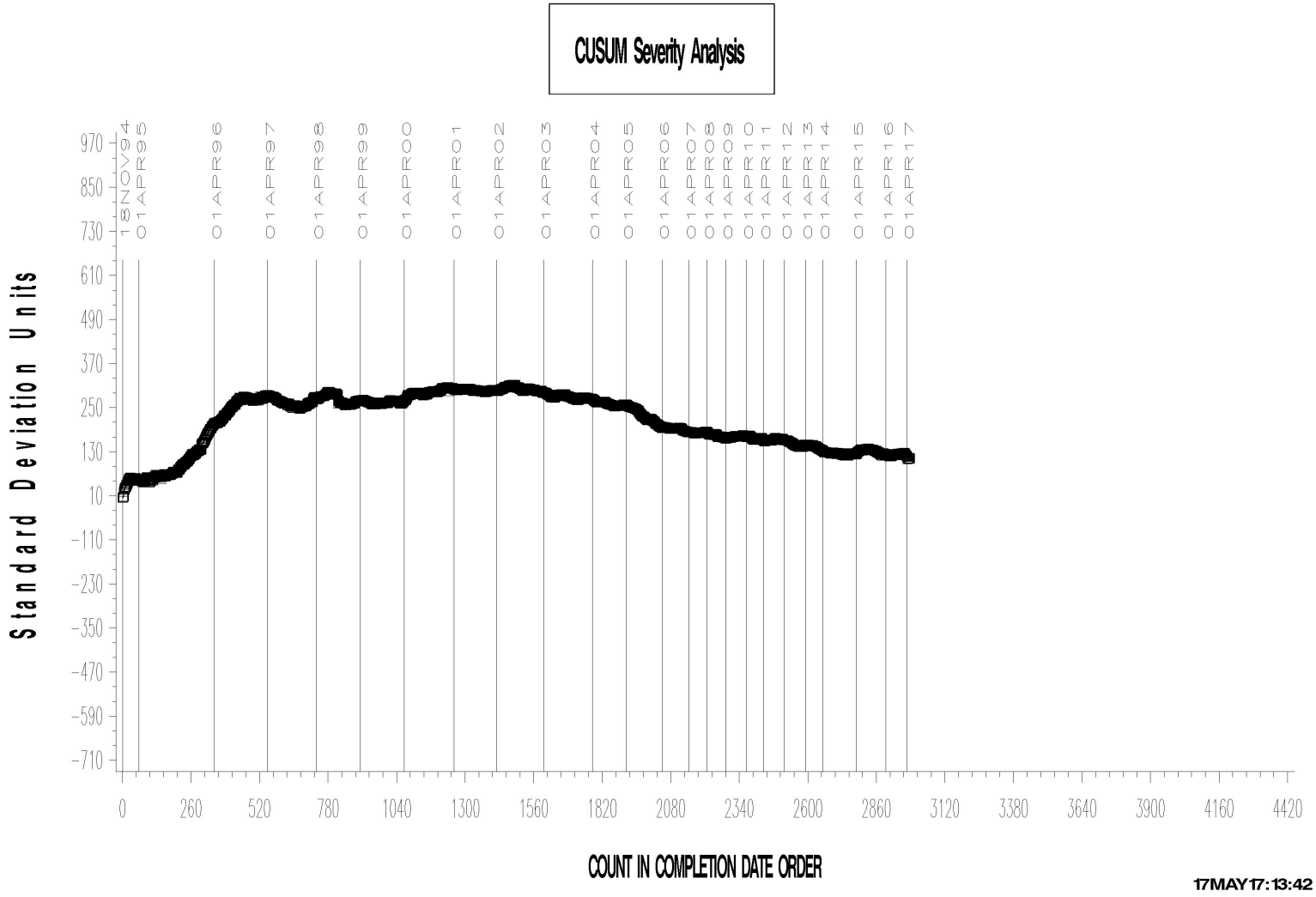
OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to Show 200 Most Recent Tests
REF. PERCENT VOLUME CHANGE AVG.



OSCT (D5662)

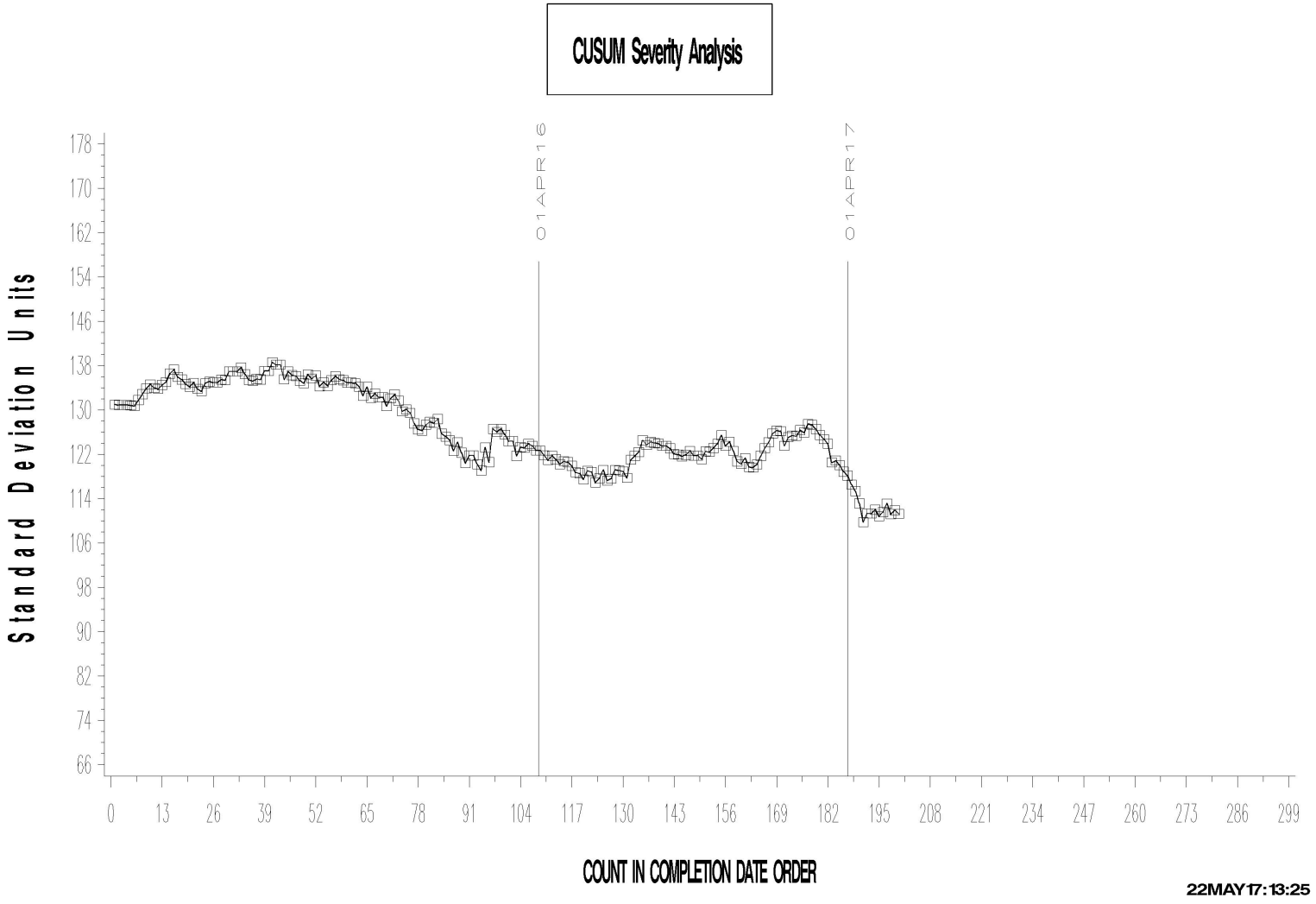
OSCT INDUSTRY OPERATIONALLY VALID DATA

REF. SHORE A HARDNESS CHANGE AVG.



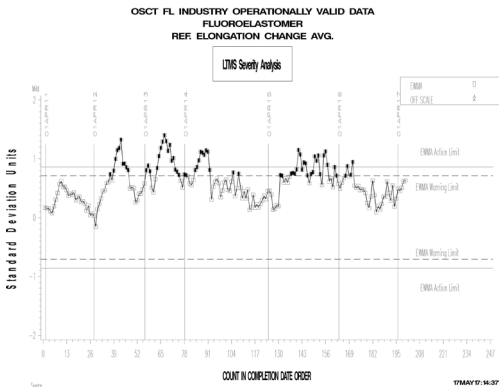
OSCT (D5662)

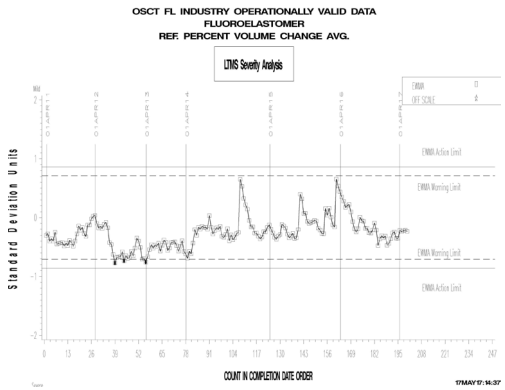
OSCT INDUSTRY OPERATIONALLY VALID DATA
Zoomed to Show 200 Most Recent Tests
REF. SHORE A HARDNESS CHANGE AVG.

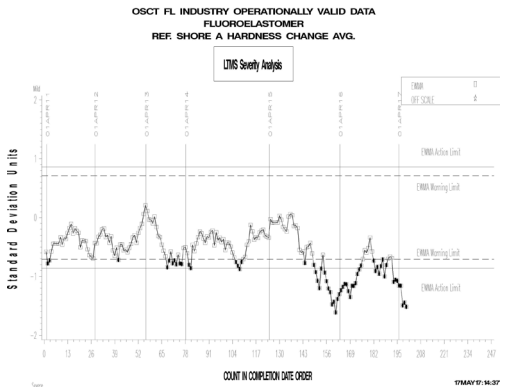


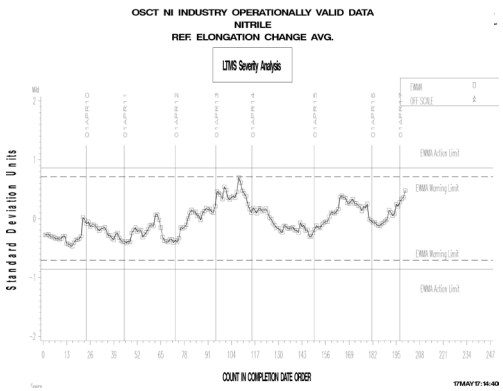
OSCT (D5662)

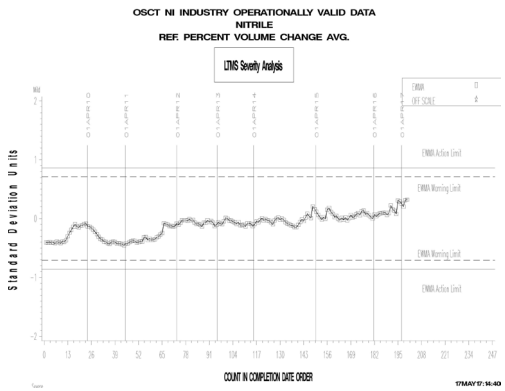
BY-ELASTOMER SEVERITY

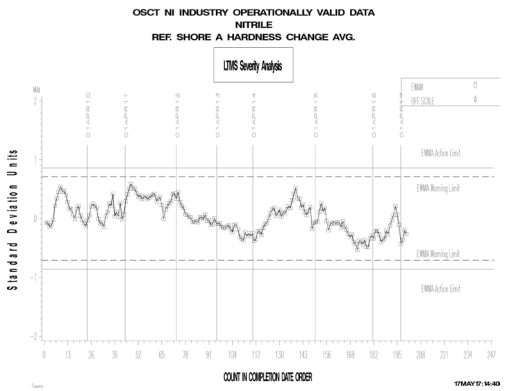


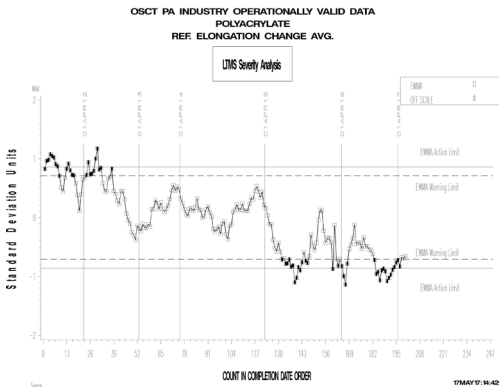


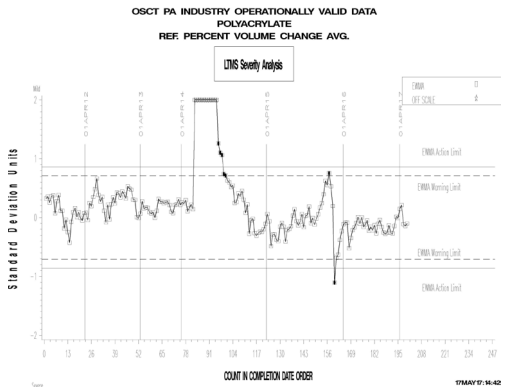


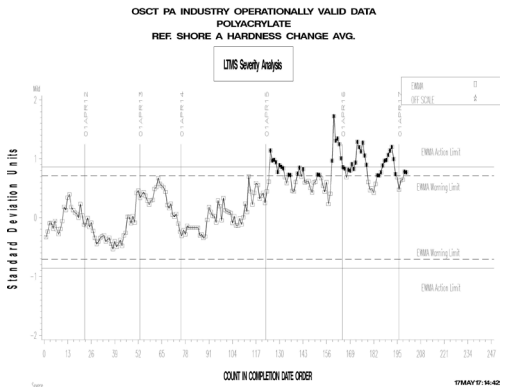












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TIMELINE ADDITIONS

Effective Date	Information Letter	Event
20170411	17-1	1. Cutting of pre-test elongation specimens 2. Standardization of separation washer size 3. Standardization of hanger hole size 4. Standardization of specimen marking method 5. Standardization of location for specimen hardness measurement 6. Clarification on post-test cooling period prior to result measurement 7. Computation of test result averages and standard deviations

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LAB VISITS

No OSCT lab visits were conducted during this period.

INFORMATION LETTERS

Information Letter 17-1 was issued 20170411 to standardize a number of procedural items (as previously described above in “Timeline Additions”).

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STATUS OF REFERENCE OIL SUPPLY

		@ TMC	
Oil	Cans @ Labs	Cans	Gallons
160-1	61	28	5.6
161-1	0	0	0.0
168	15	0	0.0
169	53	1103	183.9
170	16	226	44.9
Total	145	1357	234.3

Oil 161-1 has been depleted from TMC inventory. A reblend is not available.
Oil 169 has been introduced as a replacement. Oil 168 is nearing depletion.
Oil 170 has been introduced as a replacement. Oil 160-1 is nearly depleted.
Oil 171 is the same additive package in a different base oil and will be introduced as a replacement.