



## Test Monitoring Center


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

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

MEMORANDUM: 20-018

DATE: April 20, 2020

TO: Kristijan Drlja, Chairman, L-60-1 Surveillance Panel

FROM: Dylan Beck 

SUBJECT: L-60-1 Reference Oil Testing from October 1, 2019 through March 31, 2020

Attached is a summary of testing activity this period.

DJB/djb/mem20-018.djb.doc

cc: Frank Farber

Jeff Clark

L-60-1 Surveillance Panel

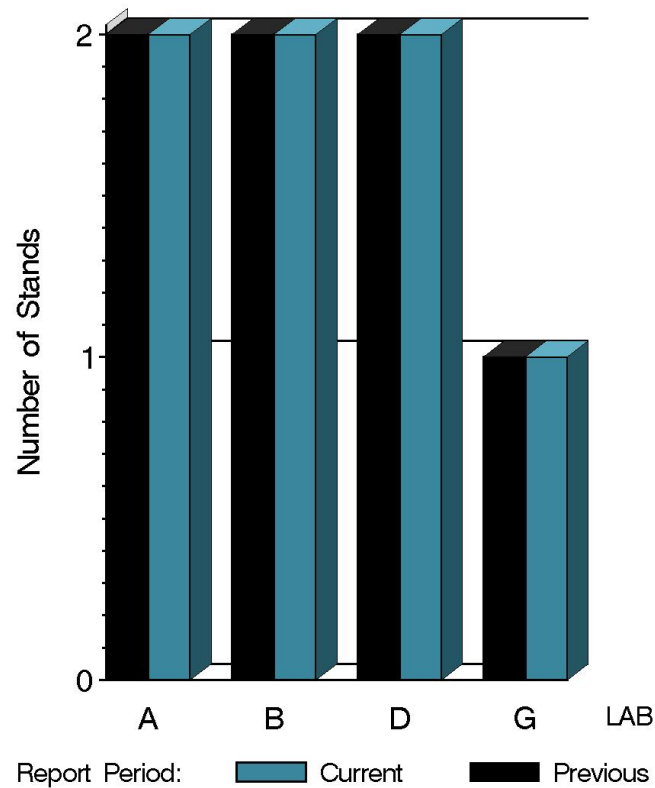
<http://www.astmtmc.cmu.edu/ftp/docs/gear/l601/semiannualreports/l601-04-2020.pdf>

Distribution: email

# L-60-1 (D5704)

	Reporting Data	Calibrated on 3-31-20
Number of Labs	4	4
Number of Stands	7	7

BY-LAB STAND  
DISTRIBUTION



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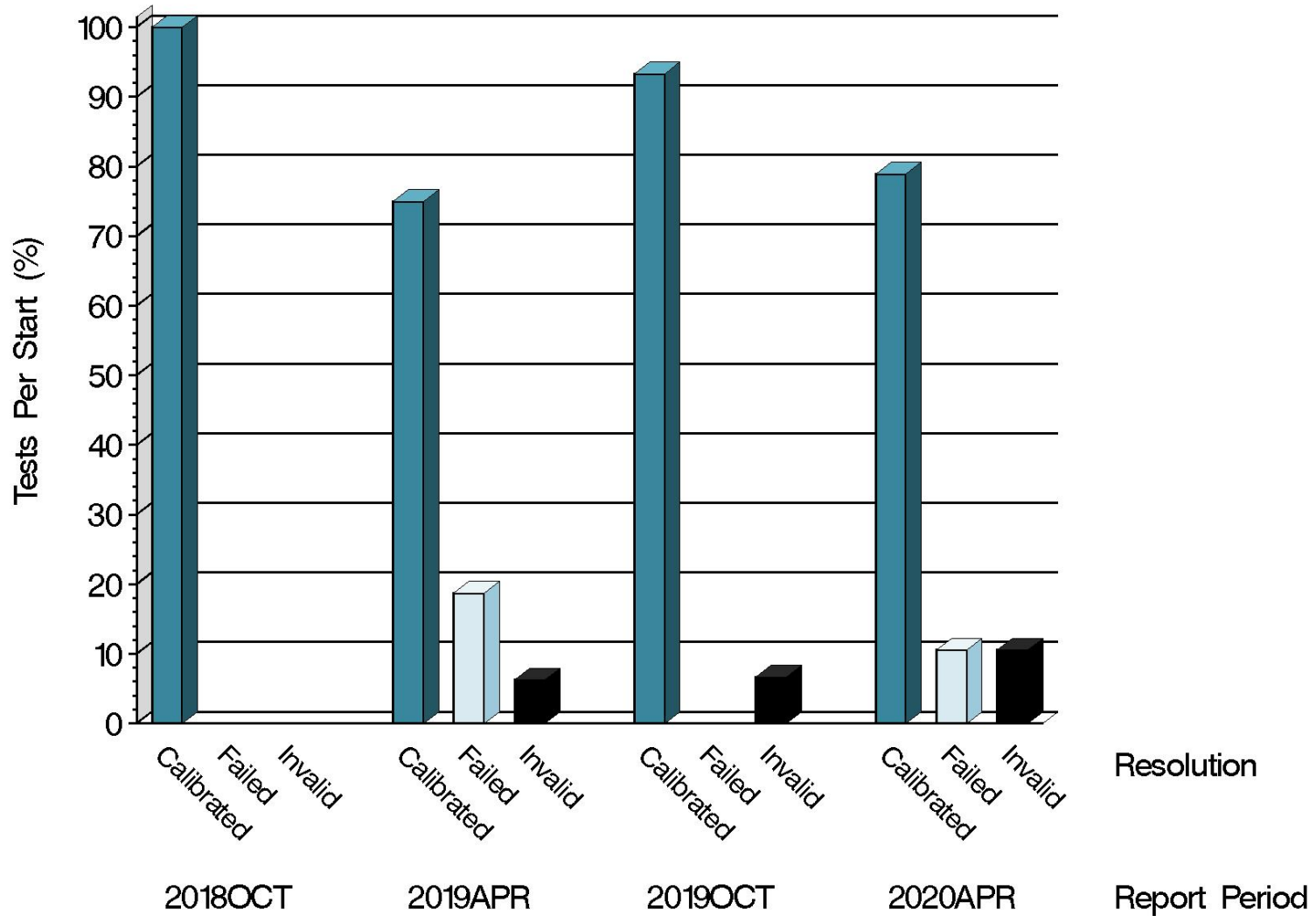
# L-60-1 (D5704)

## Test Distribution by Oil and Validity

				Totals	
		148-1	155-1	Last Period	This Period
Accepted for calibration	AC	8	7	14	15
Rejected (Mild)	OC	0	0	0	0
Rejected (Severe)	OC	2	0	0	2
Rejected (Combination)	OC	0	0	0	0
Rejected (Precision)	OC	0	0	0	0
Invalidated calibration	LC	0	0	1	0
Acceptable info run	NI	0	0	0	0
Aborted info run	XI	0	0	0	0
Aborted	XC	2	0	0	2
<b>Total</b>		<b>12</b>	<b>7</b>	<b>15</b>	<b>19</b>

# L-60-1 (D5704)

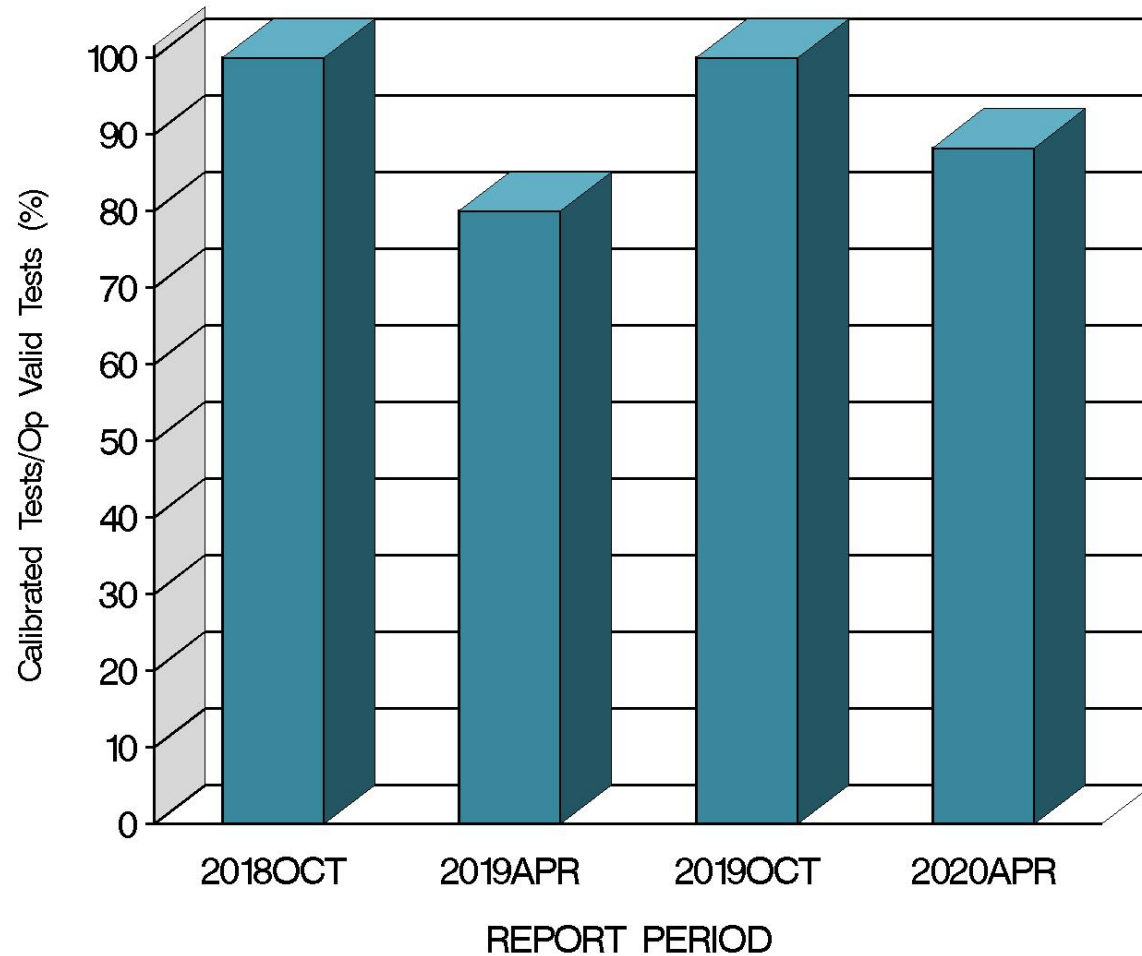
## CALIBRATION ATTEMPT SUMMARY



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# L-60-1 (D5704)

OPERATIONALLY VALID TESTS  
MEETING ACCEPTANCE CRITERIA



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# L-60-1 (D5704)

## CAUSES FOR LOST TESTS

		Oil		Validity			Loss Rate		
Lab	Cause	148-1	155-1	RC	LC	XC	Lost	Starts	%
A	Oil Leak	●				●	2	19	10%
	Lost	2	0	0	0	2			
	Starts	12	7	19	19	19			
	%	17%	0%	0%	0%	10%			

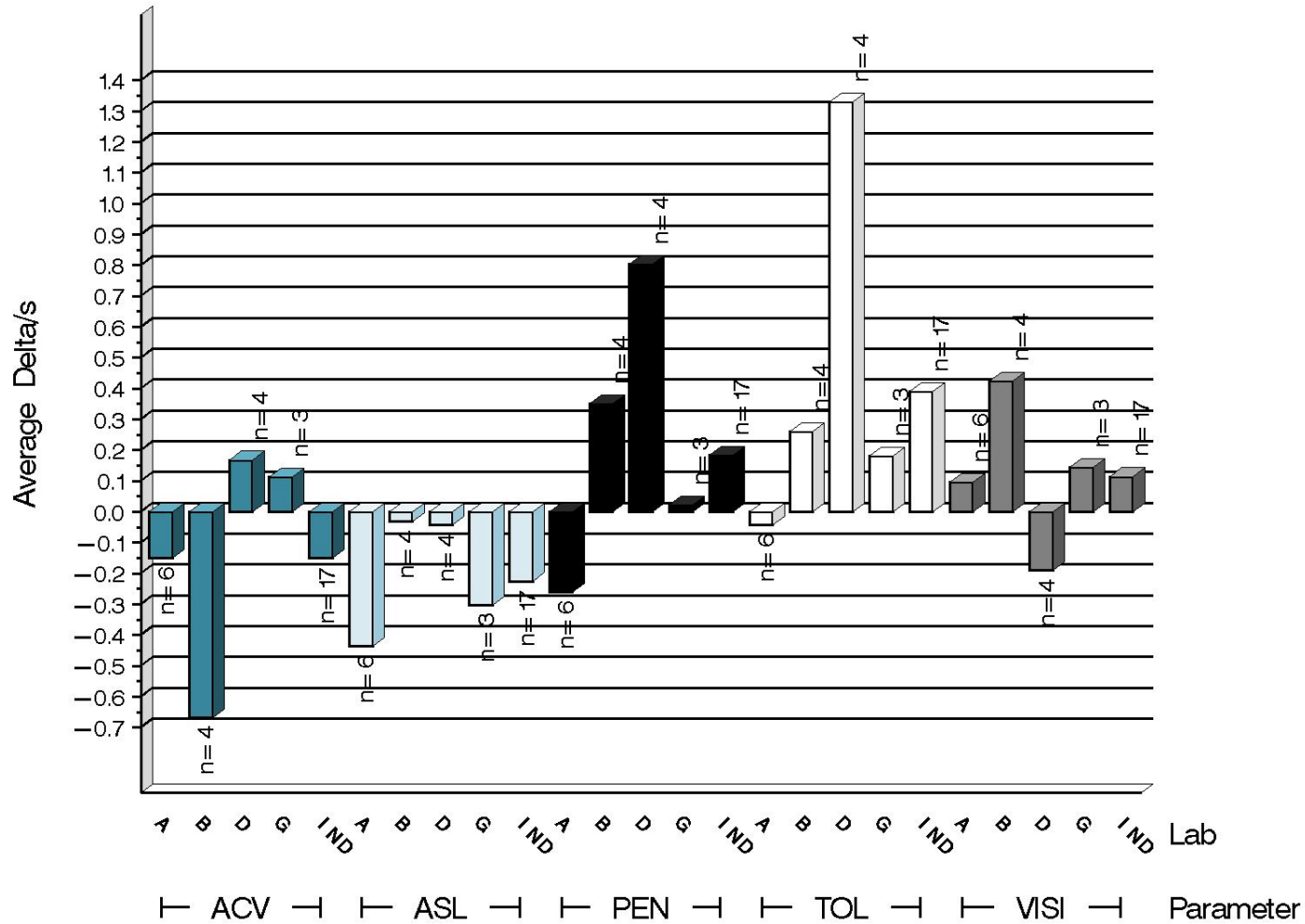
# L-60-1 (D5704)

Average $\Delta$ /s by Lab						
Lab	n	VISI	PEN	TOL	ACV	ASL
A	6	0.097	-0.261	-0.044	-0.151	-0.437
B	4	0.424	0.351	0.260	-0.668	-0.032
D	4	-0.190	0.802	1.330	0.167	-0.043
G	3	0.144	0.022	0.180	0.112	-0.303
Industry	17	0.114	0.183	0.391	-0.151	-0.225
Shift*	17	0.877	0.076%	0.097%	-0.077 merit	-0.024 merit

\*computed using severity adjustment standard deviation.

# L-60-1 (D5704)

TEST SEVERITY  
DELTA/S BY LAB

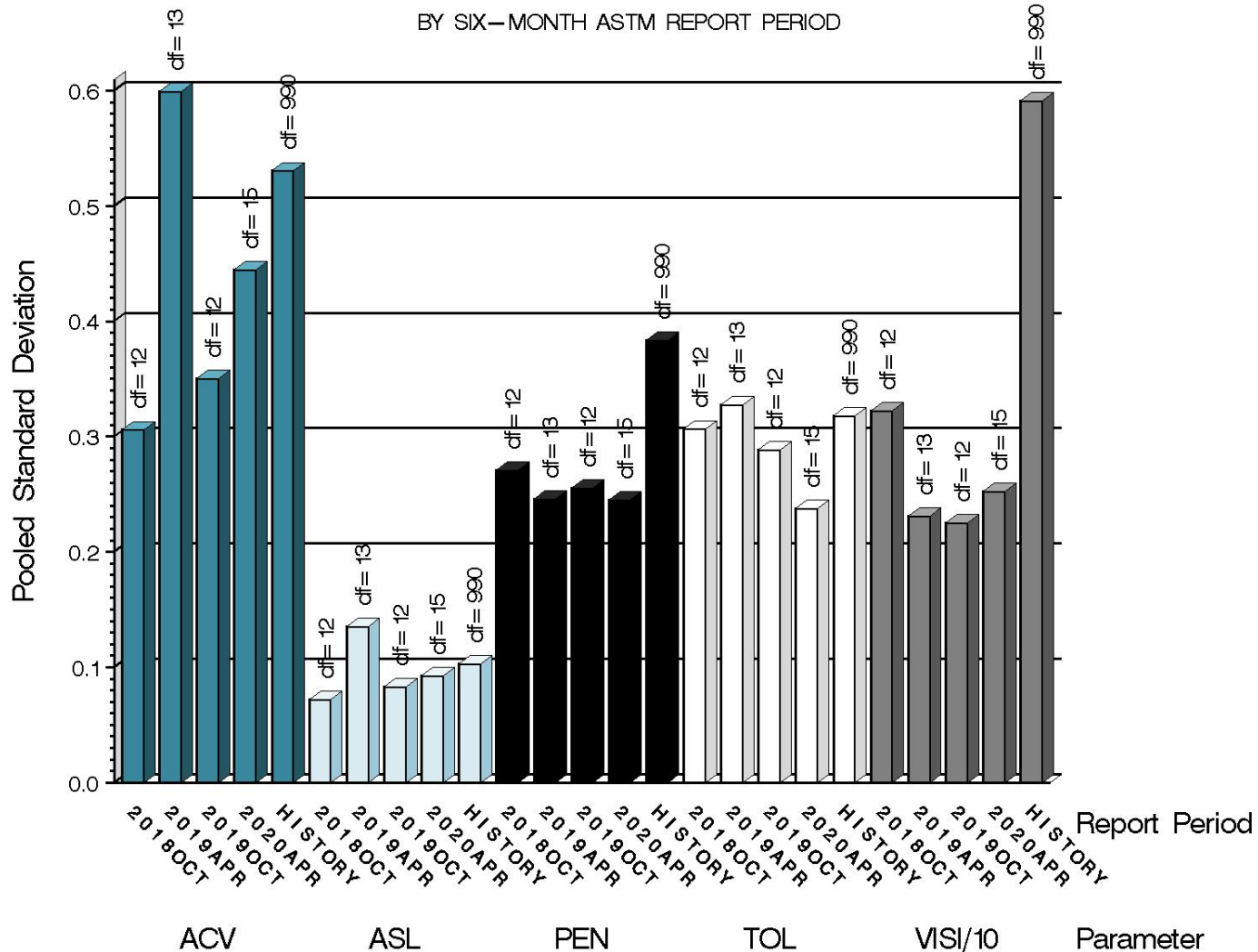


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# L-60-1 (D5704)

TEST PRECISION  
 POOLED STANDARD DEVIATION  
 BY SIX-MONTH ASTM REPORT PERIOD



due to the vastly larger reported results for VISI in relation to the other parameters, it is shown scaled by 0.1

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# L-60-1 (D5704)

## SUMMARY OF SEVERITY & PRECISION

### Severity

All parameters have remained within limits this period.

### Precision

Precision for all parameters remained within limits this period.

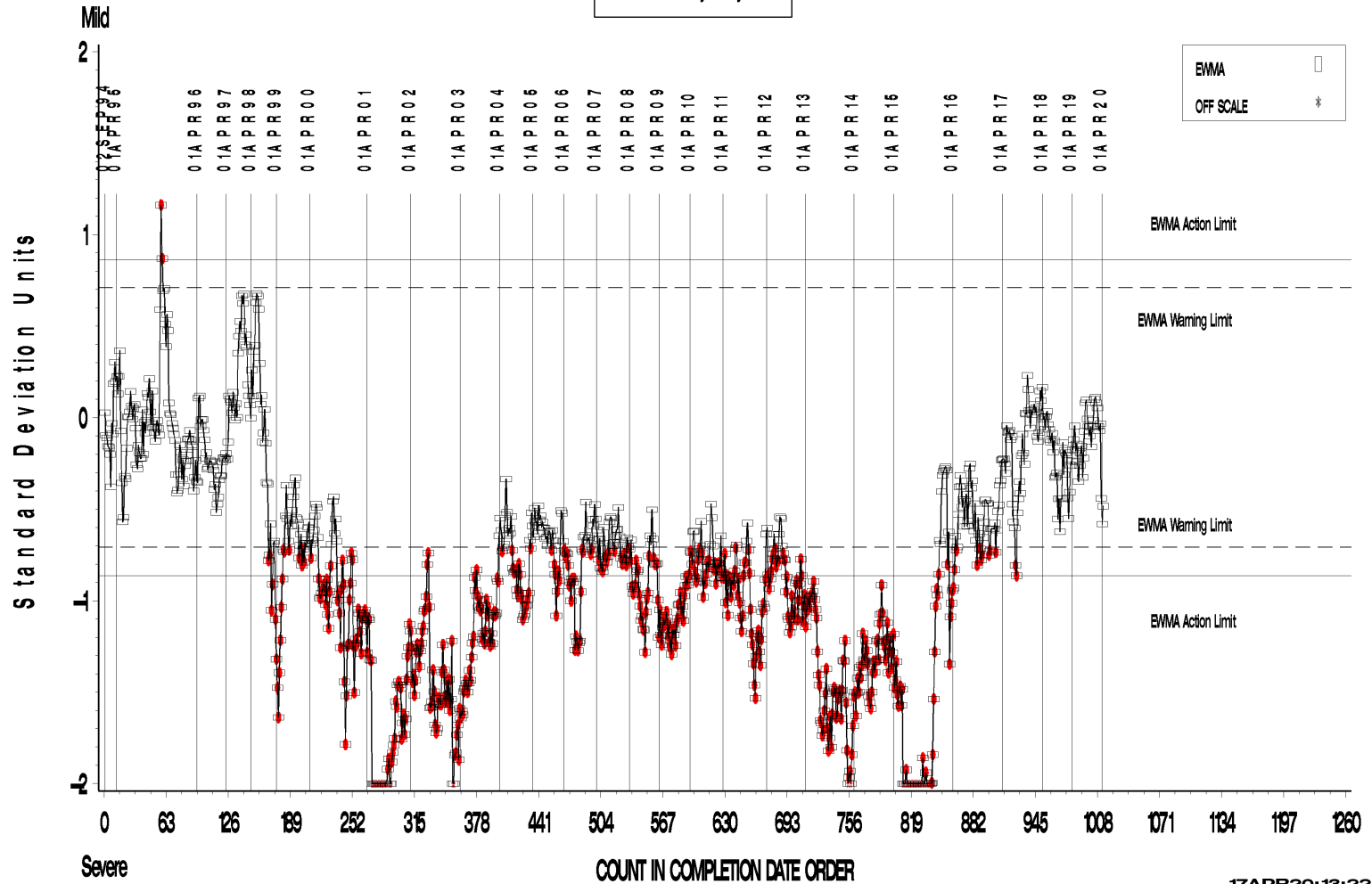
Industry control charts follow.

# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE CARBON/ VARNISH

LTMS Severity Analysis

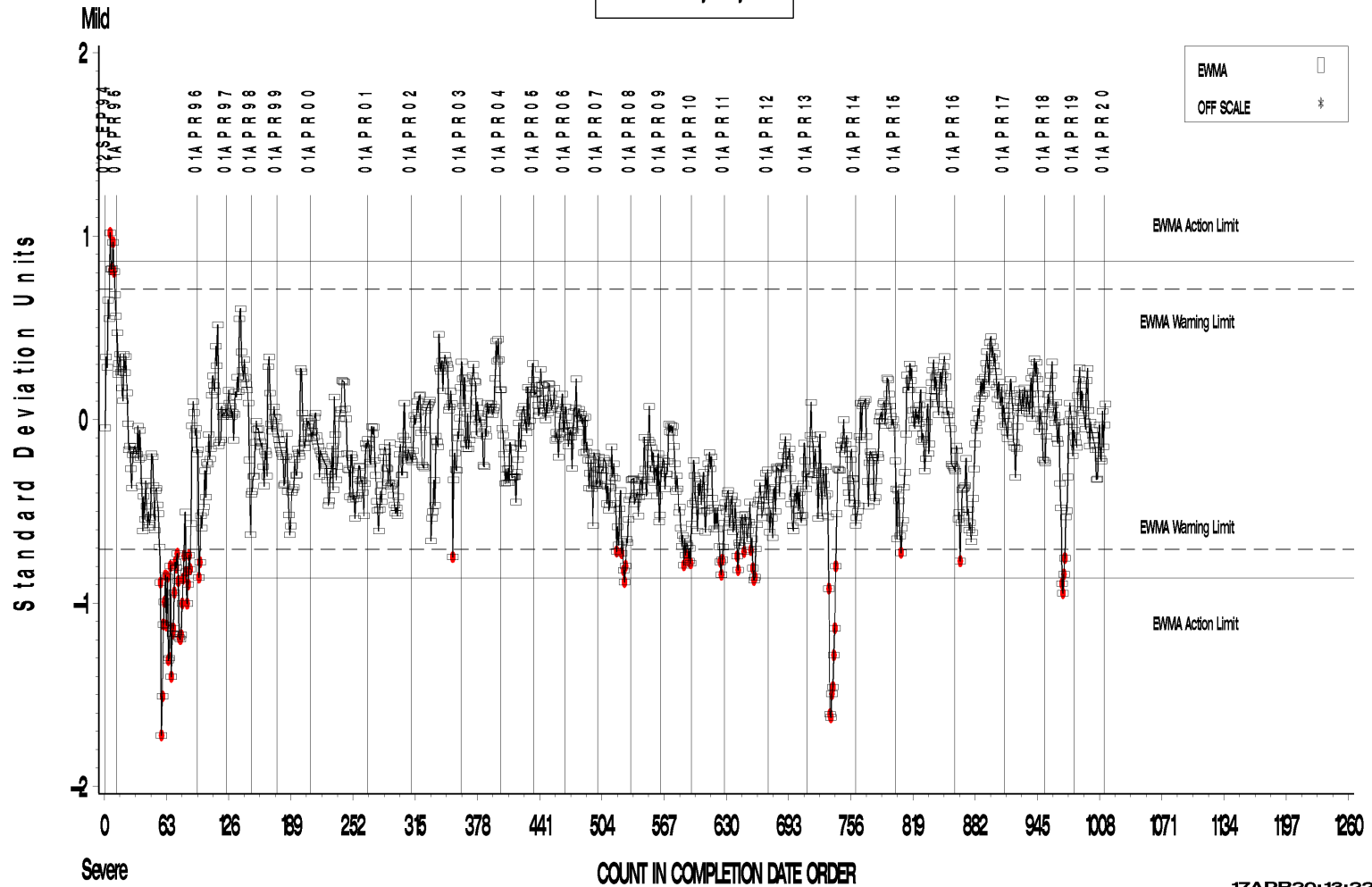


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE SLUDGE

LTMS Severity Analysis



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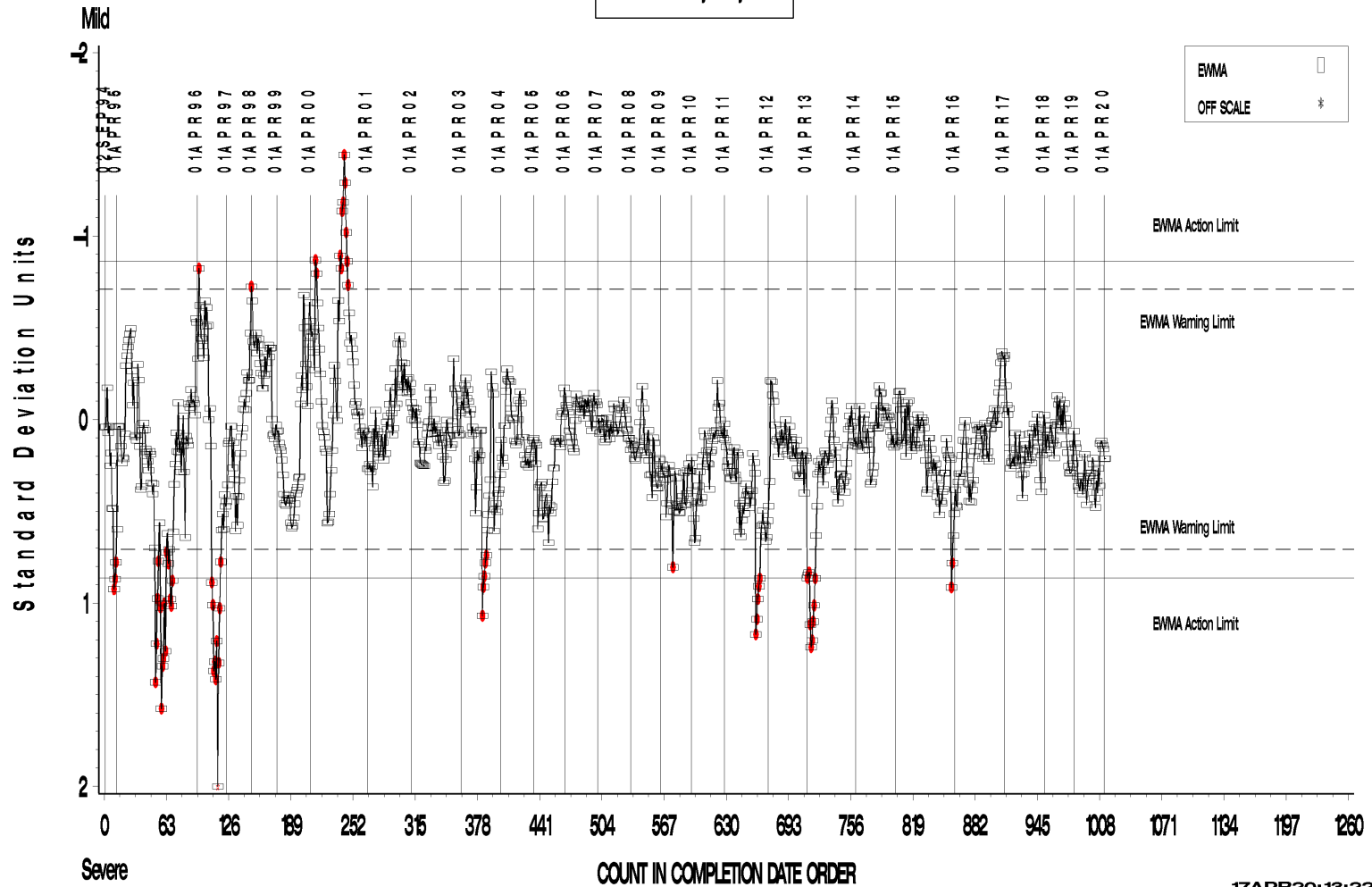
A Program of ASTM International

# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL PENTANE INSOLUBLES

LTMS Severity Analysis

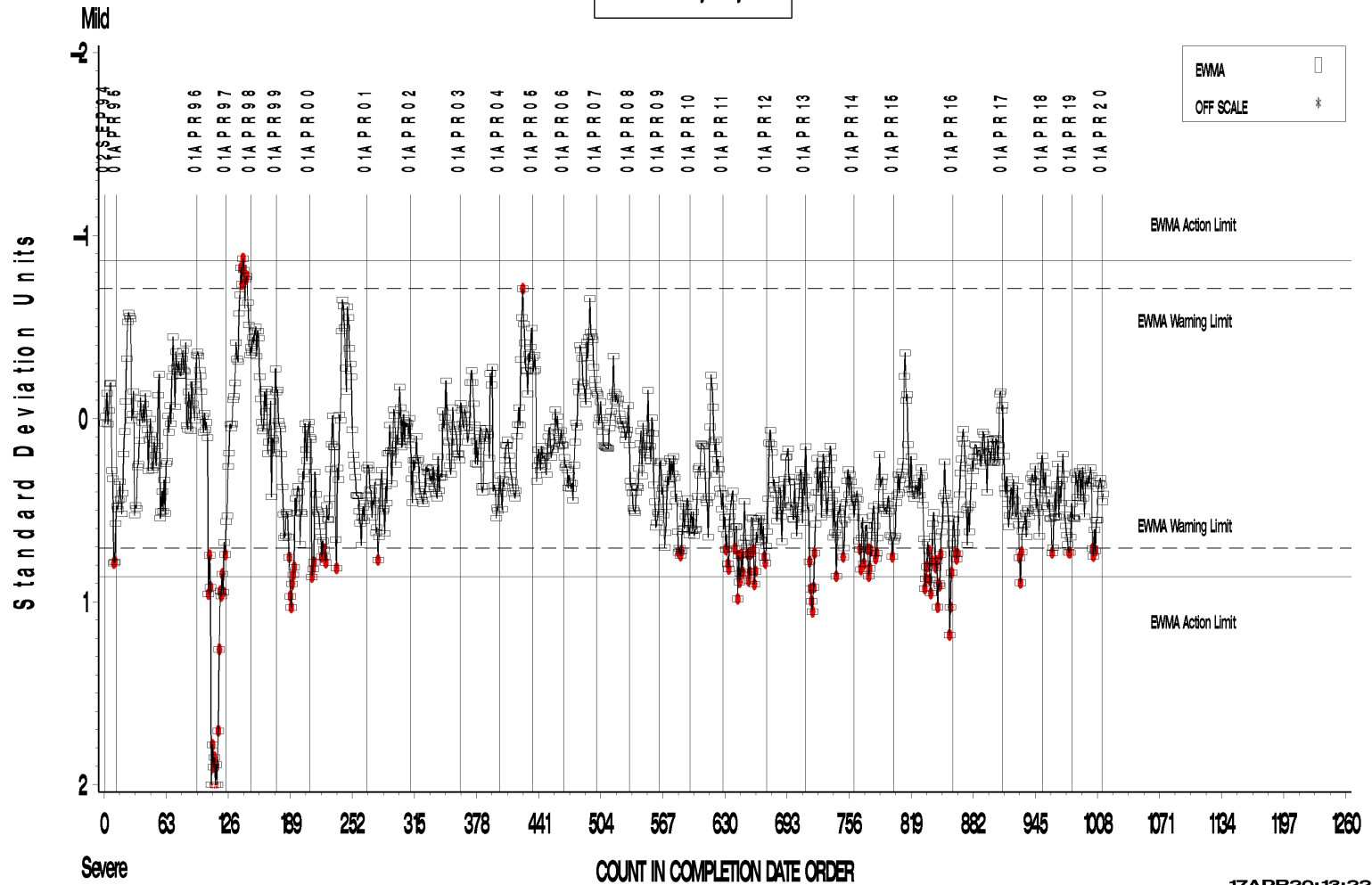


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL TOLUENE INSOLUBLES

LTMS Severity Analysis



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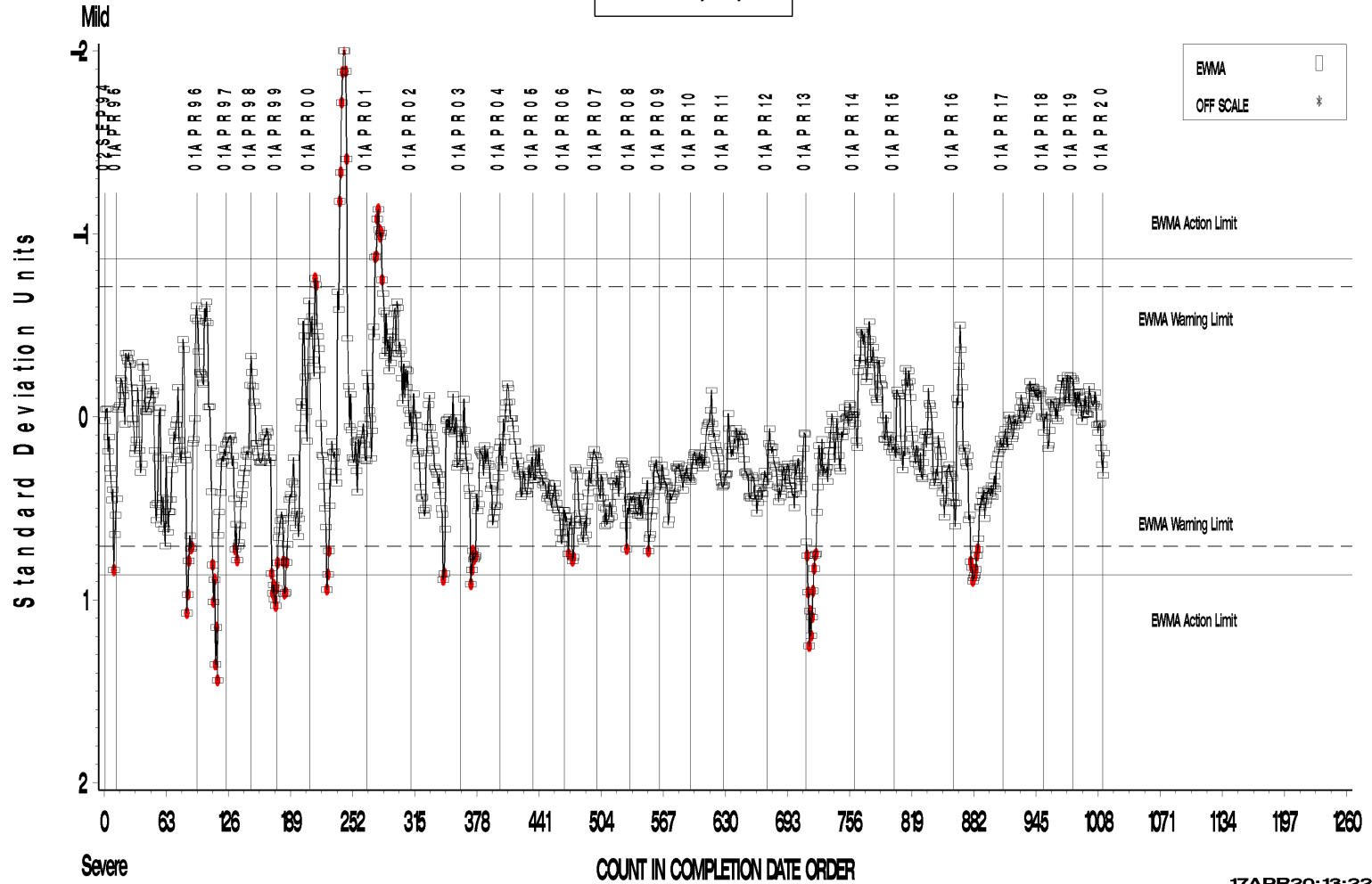
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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL VISCOSITY INCREASE

LTMS Severity Analysis

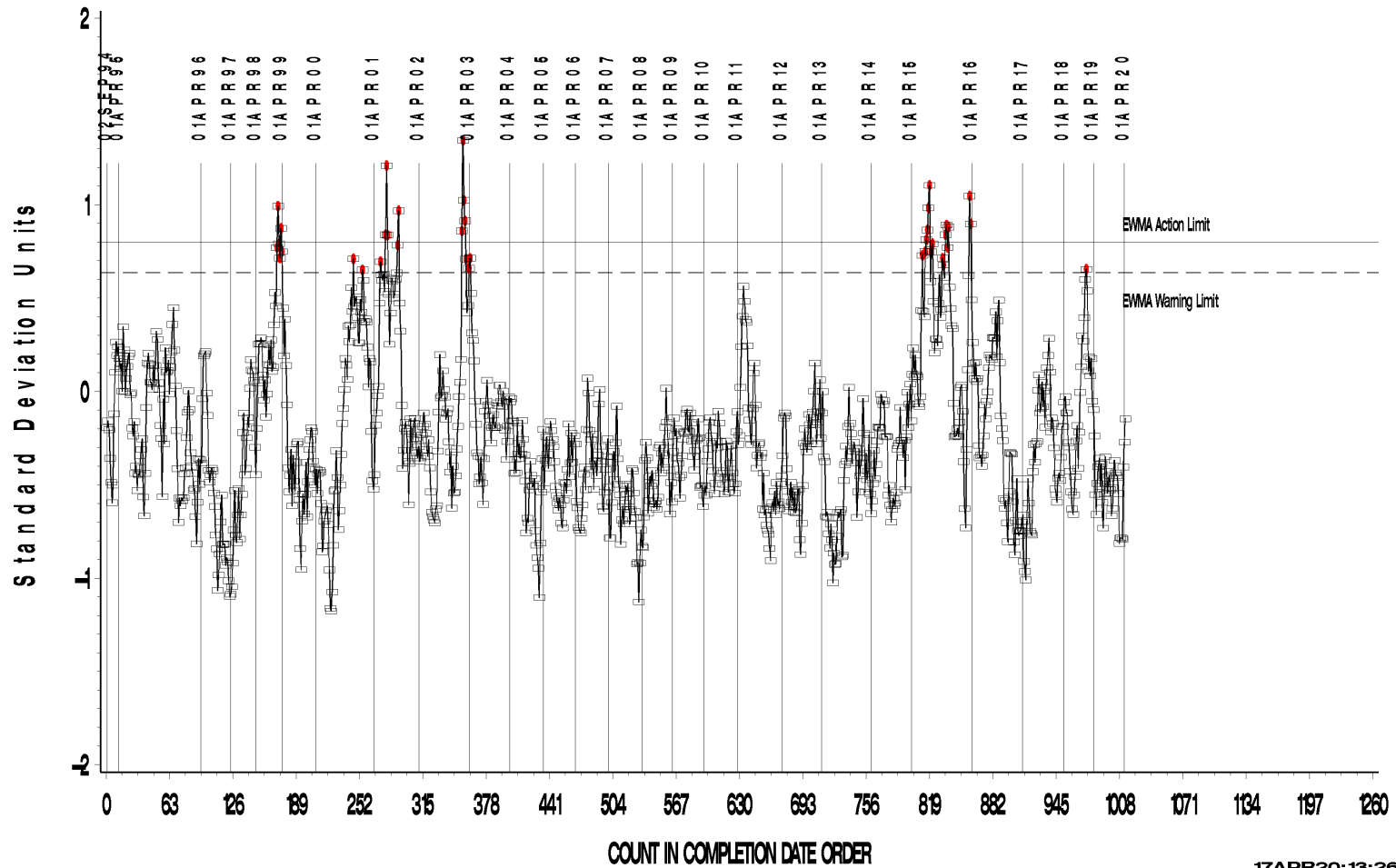


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE CARBON/ VARNISH

LTMS Precision Analysis



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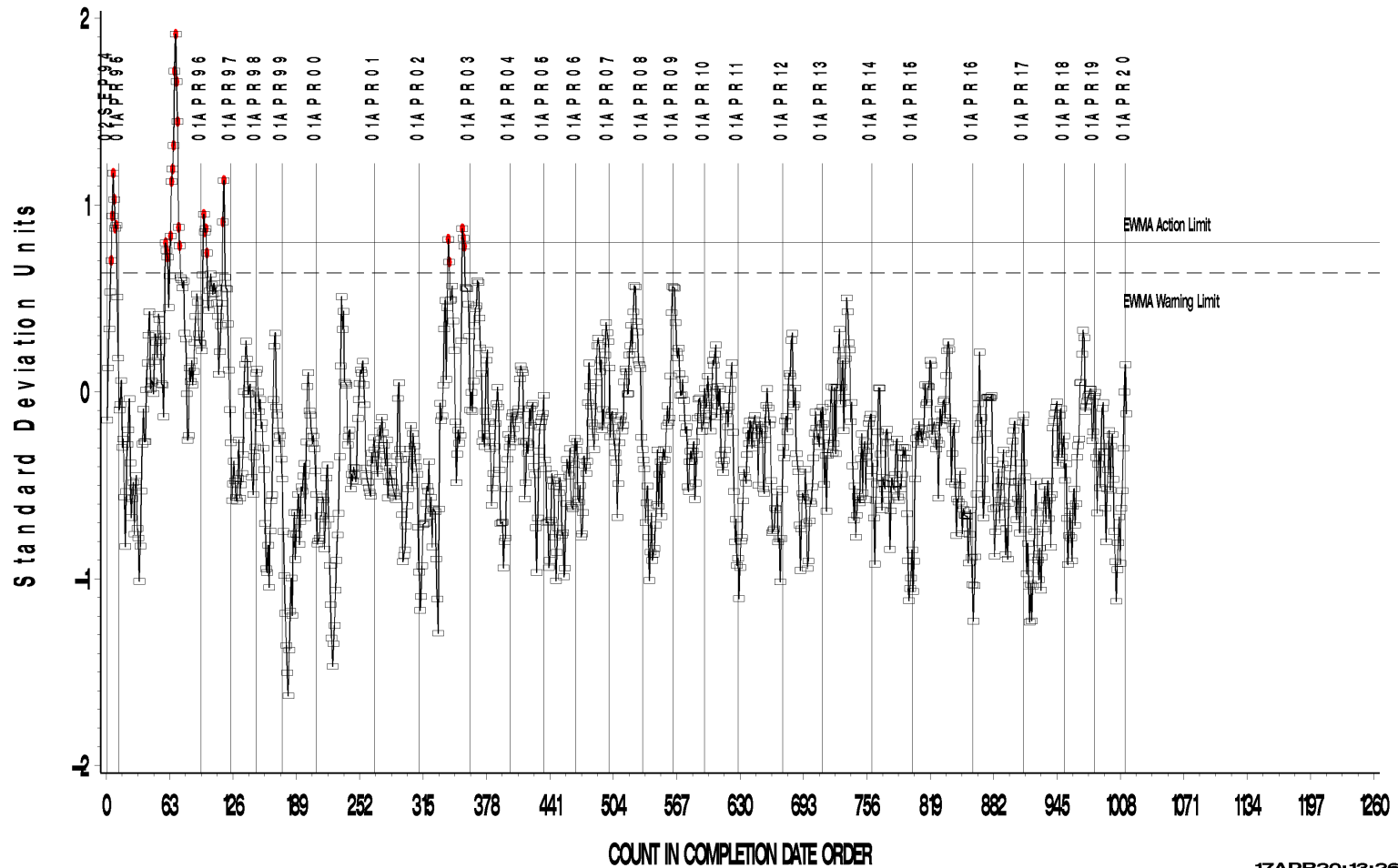


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE SLUDGE

LTMS Precision Analysis



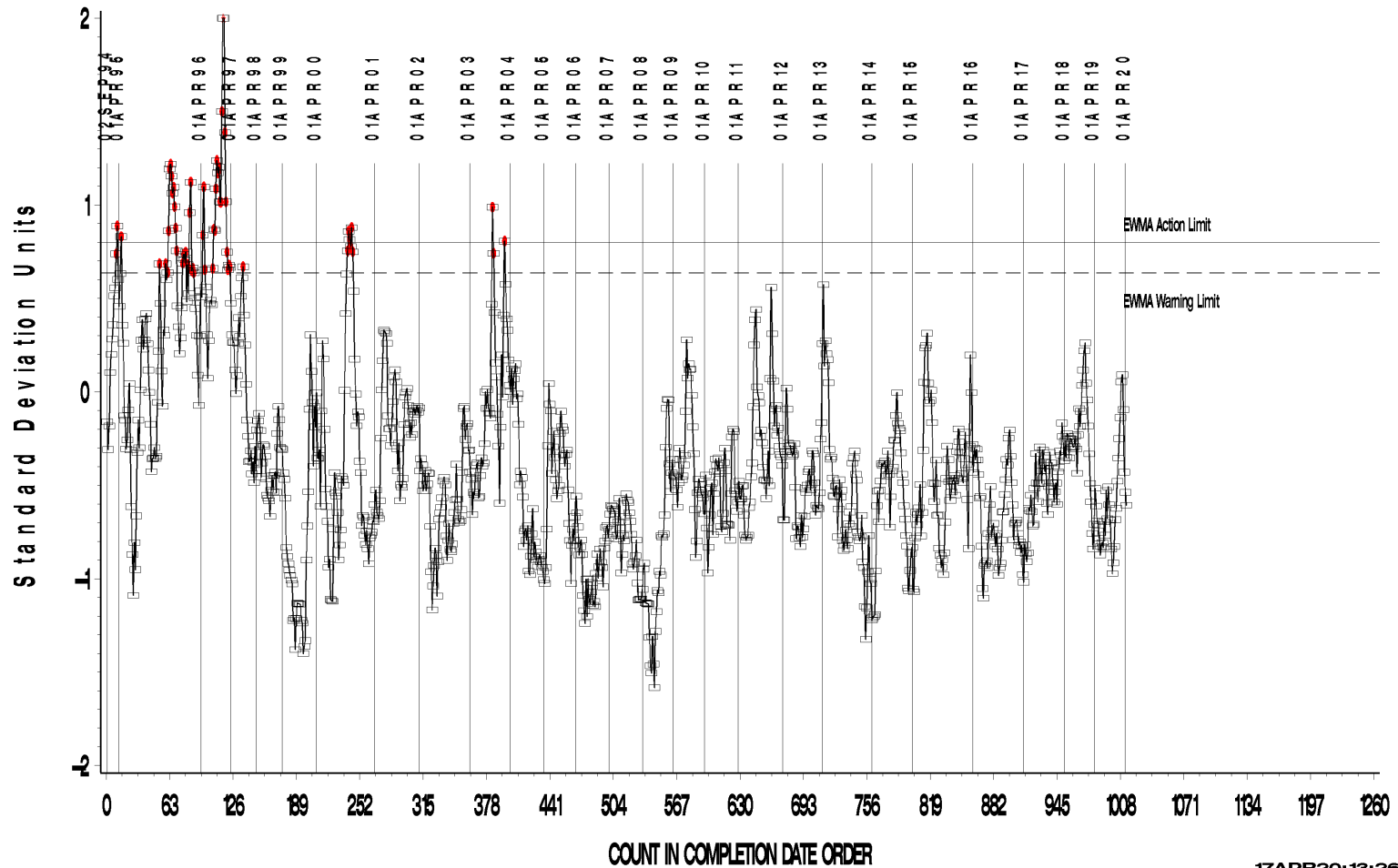
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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL PENTANE INSOLUBLES

LTMS Precision Analysis



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Test Monitoring Center

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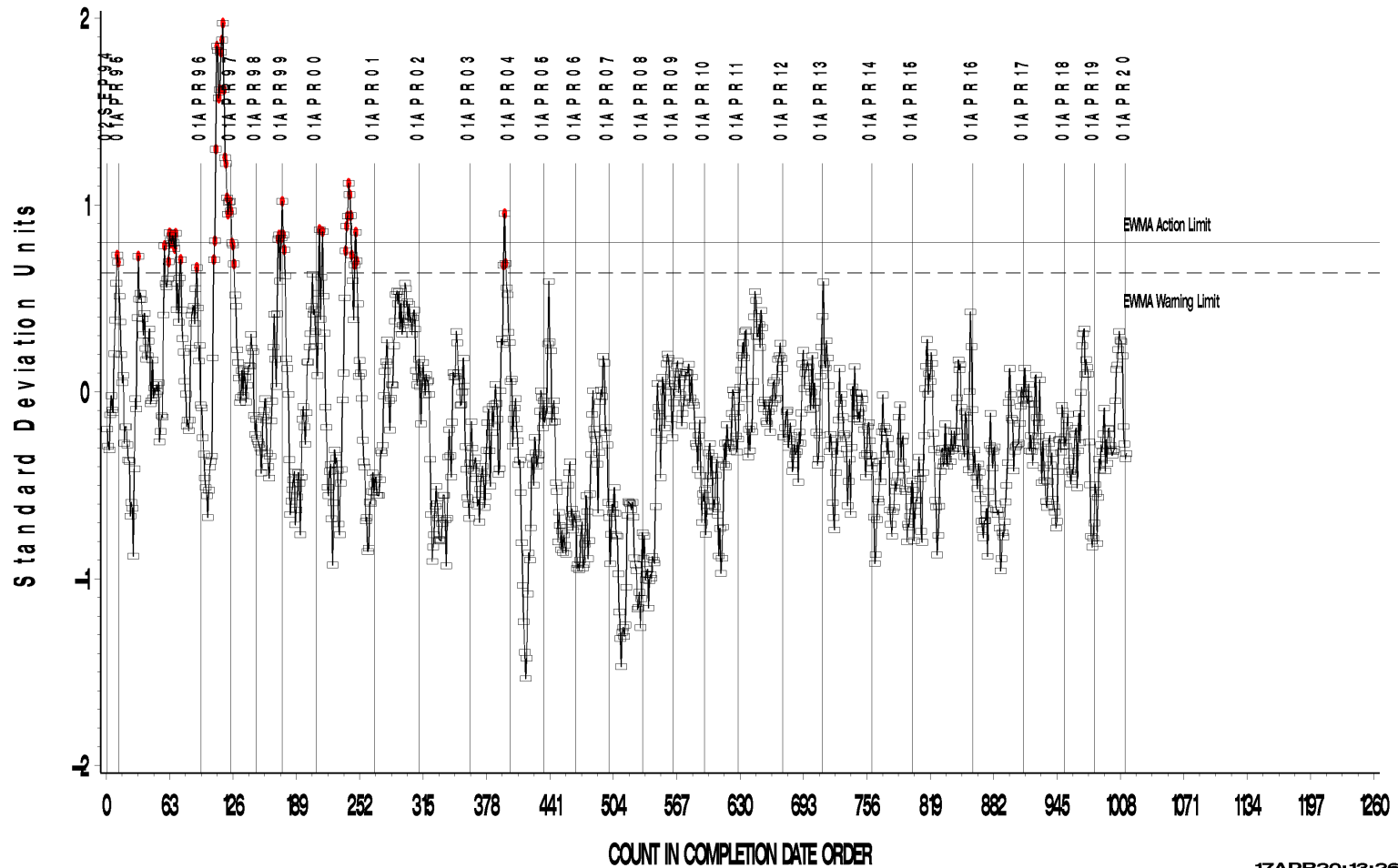
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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL TOLUENE INSOLUBLES

LTMS Precision Analysis



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Test Monitoring Center

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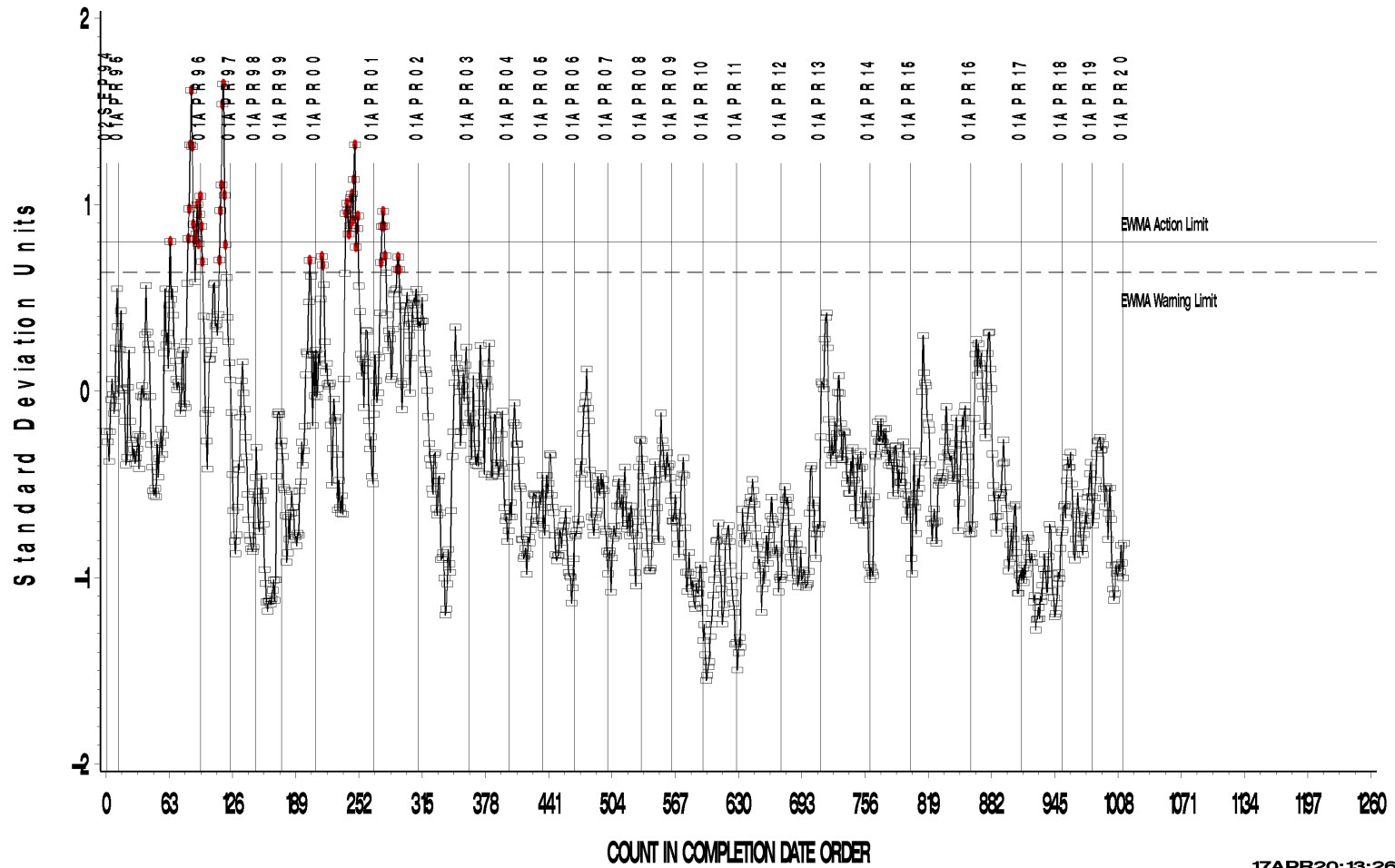
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L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL VISCOSITY INCREASE

LTMS Precision Analysis



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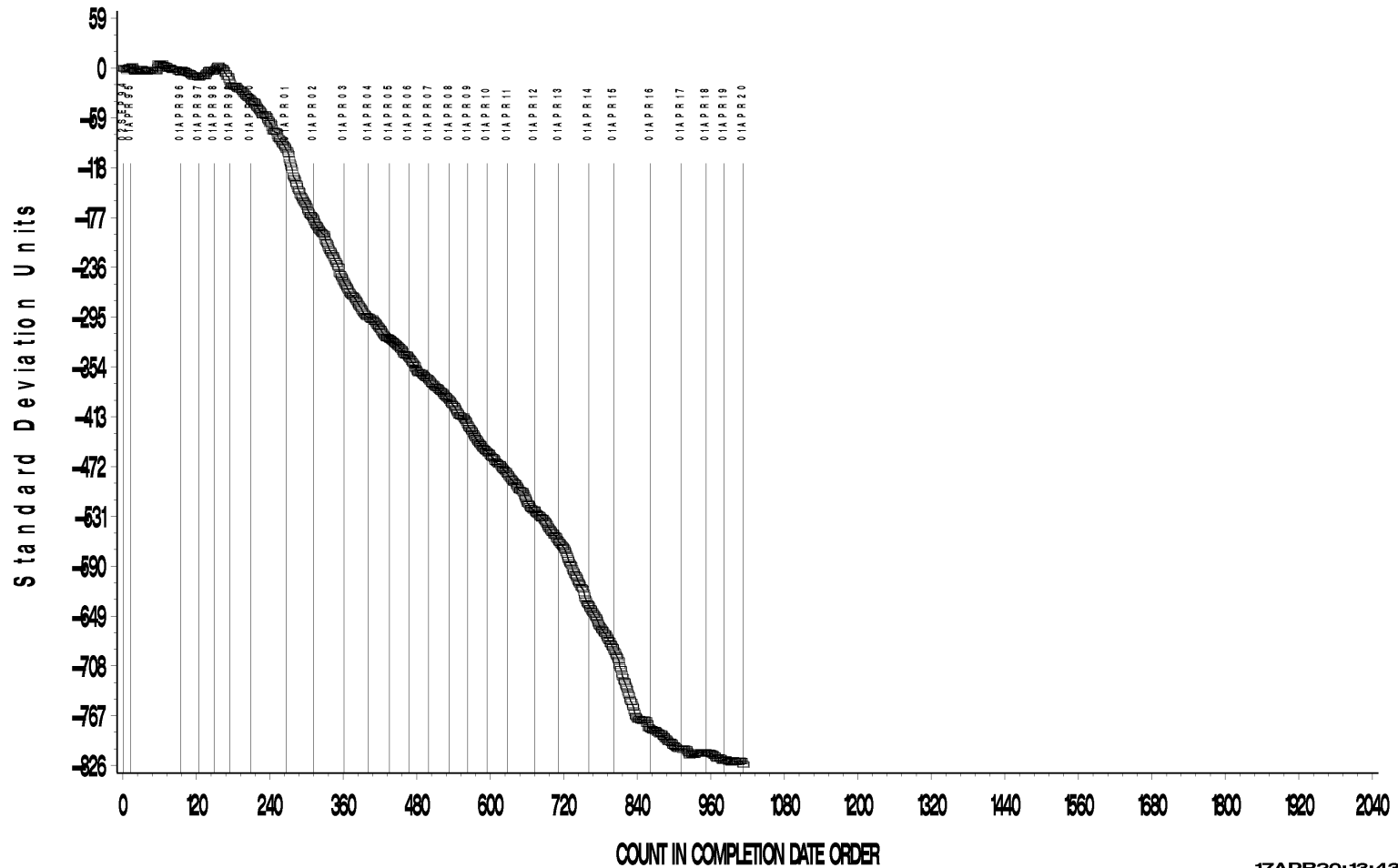
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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE CARBON/ VARNISH

CUSUM Severity Analysis



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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE SLUDGE

CUSUM Severity Analysis



17APR20:13:43

# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL PENTANE INSOLUBLES

CUSUM Severity Analysis



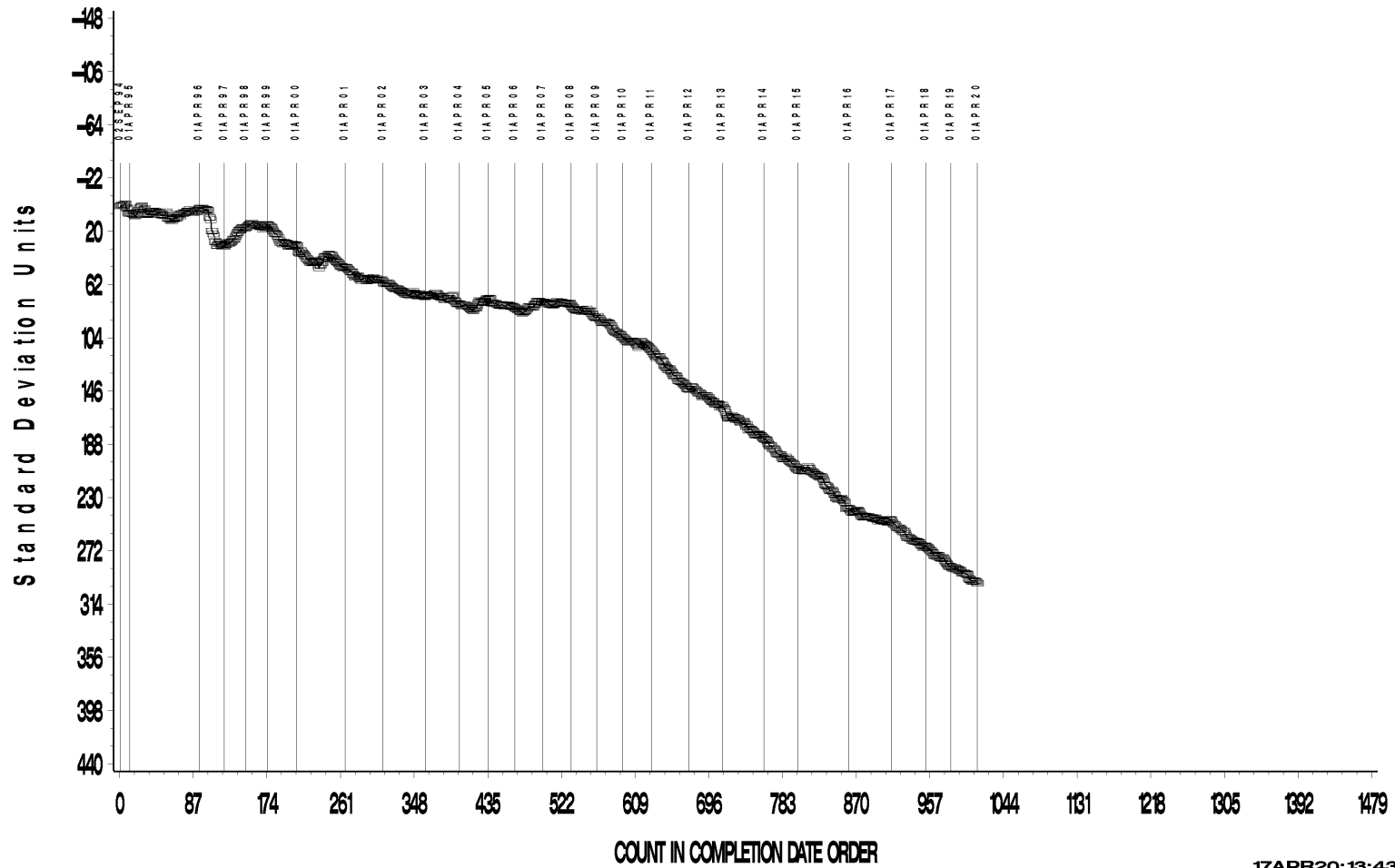
17APR20:13:43

# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL TOLUENE INSOLUBLES

CUSUM Severity Analysis



17APR20:13:43

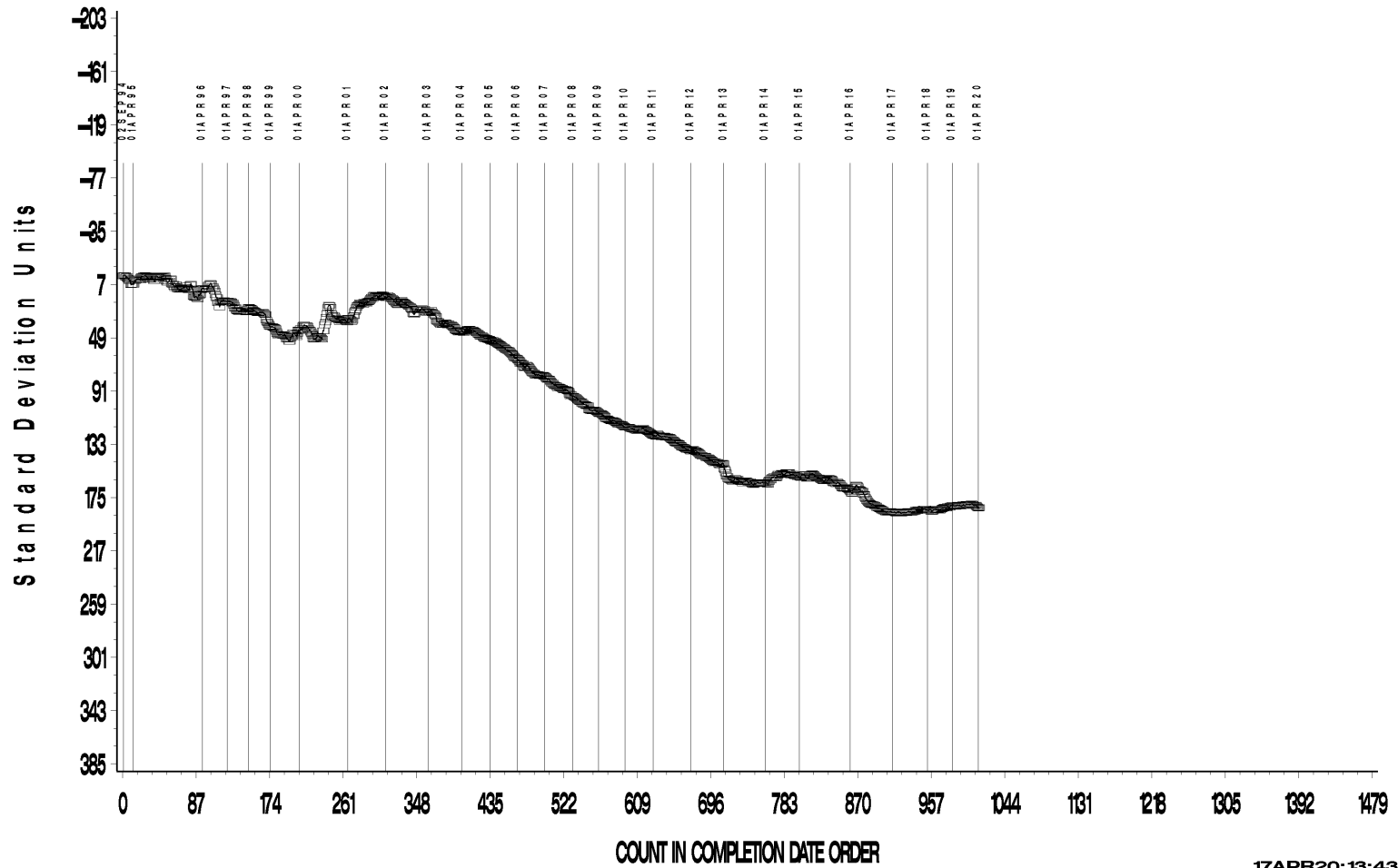


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL VISCOSITY INCREASE

CUSUM Severity Analysis



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# L-60-1 (D5704)

## TIMELINE ADDITIONS

Effective Date	Information Letter	Event
November 25, 2019	19-01	Section 8.4.1 of the test method was modified to change Nox-Rust paper from the sole supplier for corrosion inhibiting paper, to a suitable supplier. In addition, the requirement of wrapping the gears in a paper towel was removed since this would act as a barrier between the gear surface and the corrosion inhibiting paper.

# L-60-1 (D5704)

## LAB VISITS

One L-601 lab visit was conducted during this period. During the inspection it was discovered that the V-ring seals were stored in a small plastic bag with no part number identifying them. The lab submitted a corrective action report shortly after the visit, and the parts are now stored in a bag labeled with the part number.

## INFORMATION LETTERS

Information letter 19-01 was issued during this period.

# L-60-1 (D5704)

## STATUS OF REFERENCE OIL SUPPLY

Oil	Cans @ Labs	@ TMC	
		Cans	Gallons
148-1	28	190	11.9
155-1	28	564	35.3
Total	56	754	47.2

The surveillance panel has asked that the TMC reserve a portion of oil 155-1 for L-60-1 testing. The TMC quantity shown for this oil is for that reserved portion. A separate quantity of 65.46 gallons is available for use in other gear testing. 190 tests of oil 148-1 remain in TMC inventory; however, this is only 11 gallons. When the need arises, it will not be possible to obtain a reblend of this oil. The panel is advised to begin considering a possible replacement for this oil.