



## Test Monitoring Center

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

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

MEMORANDUM: 17-031

DATE: October 18, 2017

TO: Brad Bubonic, Chairman, L-60-1 Surveillance Panel

FROM: Dylan Beck *Dylan Beck*

SUBJECT: L-60-1 Reference Oil Testing from April 1, 2017 through September 30, 2017

Attached is a summary of testing activity this period.

DJB/djb/mem17-031.djb.doc

cc: Frank Farber

Jeff Clark

Scott Parke

L-60-1 Surveillance Panel

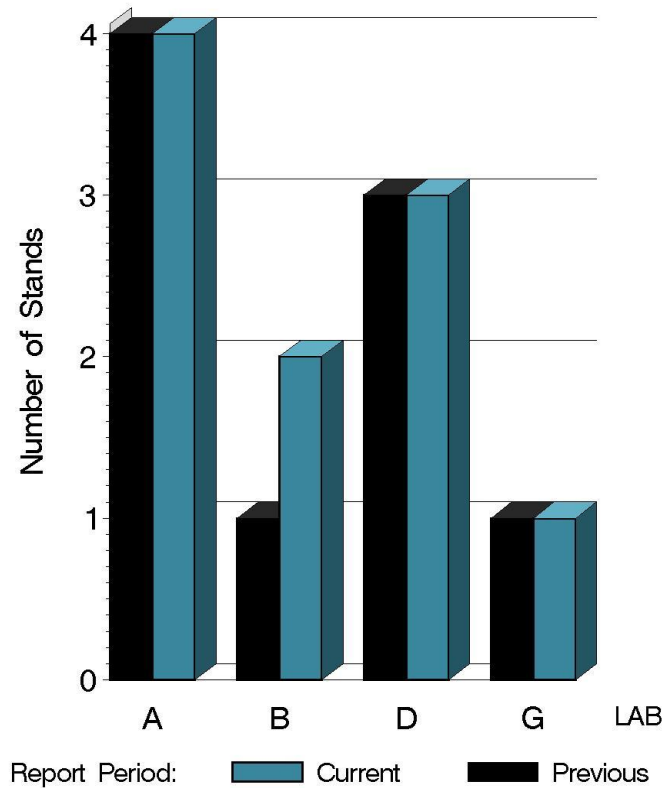
<http://www.astmtmc.cmu.edu/ftp/docs/gear/1601/semiannualreports/1601-10-2017.pdf>

Distribution: email

# L-60-1 (D5704)

	Reporting Data	Calibrated on 9-30-17
Number of Labs	4	4
Number of Stands	10	10

BY-LAB STAND  
DISTRIBUTION



14:11:52 18OCT2017

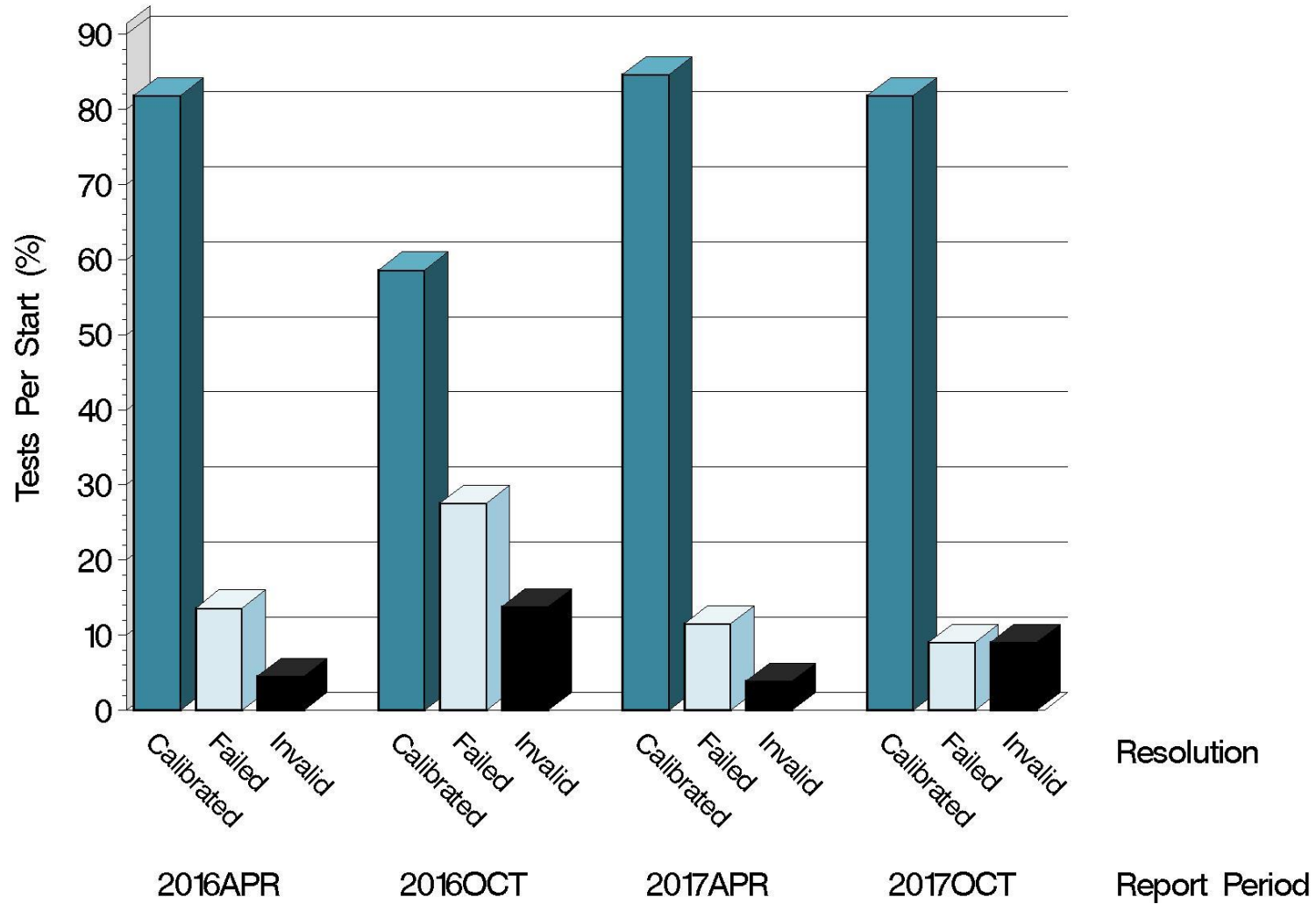
# L-60-1 (D5704)

## Test Distribution by Oil and Validity

				Totals	
		148-1	155-1	Last Period	This Period
Accepted for calibration	AC	11	7	22	18
Rejected (Mild)	OC	0	0	0	0
Rejected (Severe)	OC	2	0	2	2
Rejected (Combination)	OC	0	0	0	0
Rejected (Precision)	OC	0	0	1	0
Invalidated calibration	LC	0	0	0	0
Acceptable info run	NI	1	0	0	1
Unacceptable info run	MI	0	0	0	0
Aborted	XC	2	0	1	2
<b>Total</b>		<b>16</b>	<b>7</b>	<b>26</b>	<b>23</b>

# L-60-1 (D5704)

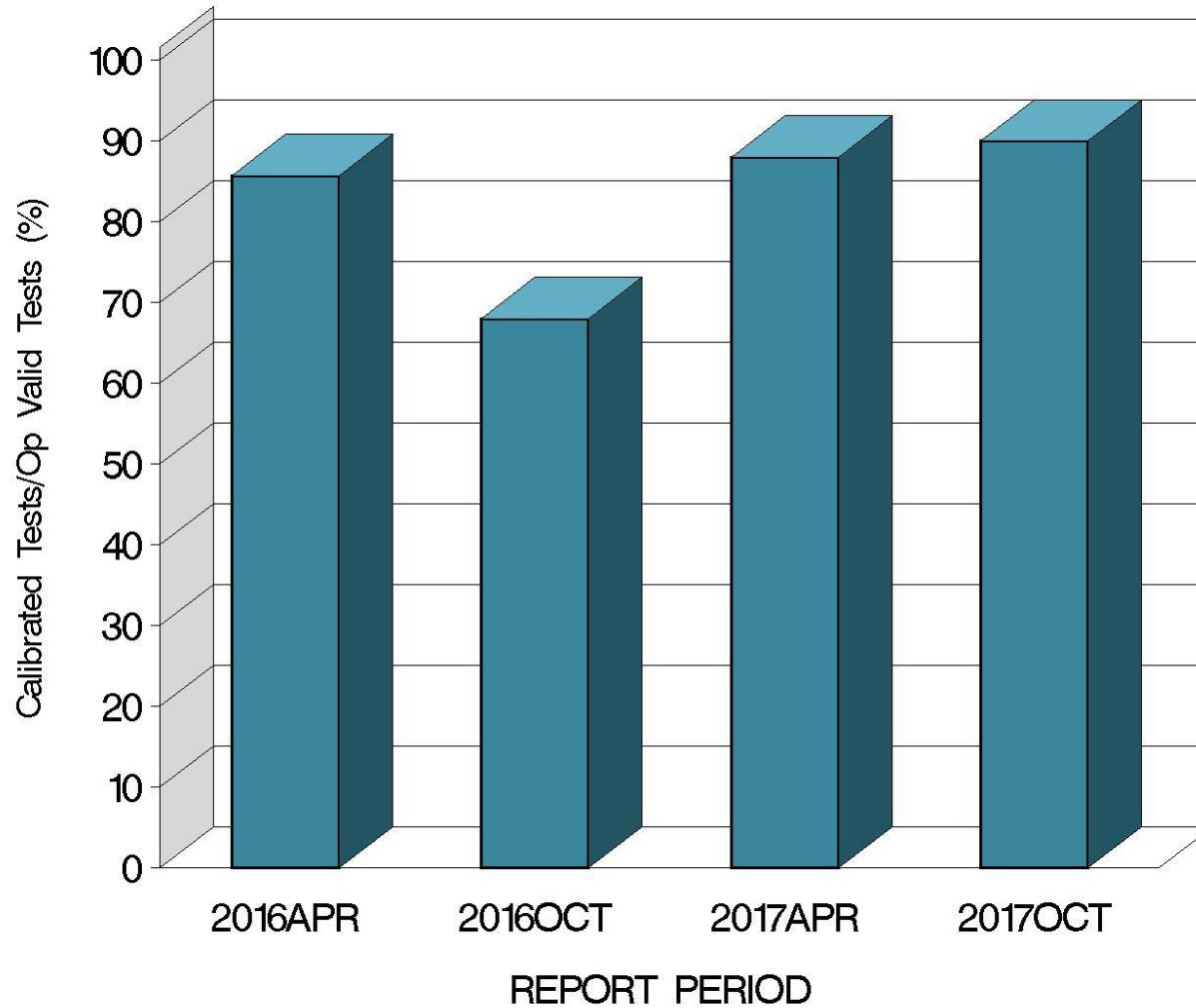
## CALIBRATION ATTEMPT SUMMARY



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# L-60-1 (D5704)

OPERATIONALLY VALID TESTS  
MEETING ACCEPTANCE CRITERIA



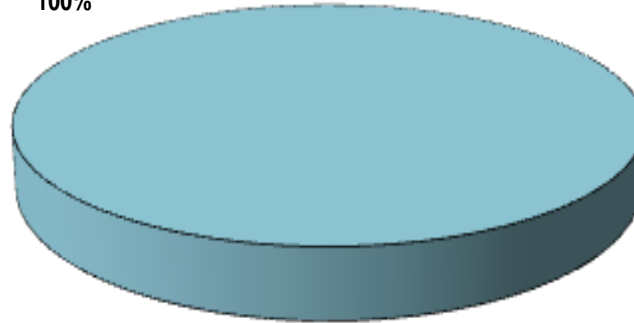
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# L-60-1 (D5704)

## CAUSES FOR FAILED TESTS

By Alarm Type

Severe  
2  
100%



By Parameter

ACV  
2  
100%



# L-60-1 (D5704)

## CAUSES FOR LOST TESTS

		Oil		Validity			Loss Rate		
Lab	Cause	148-1	155-1	RC	LC	XC	Lost	Starts	%
G	Power Outage	●				●	1	2	50%
D	Oil Leak, Air Line Left Out	●				●	1	9	11%
	Lost	2	0	0	0	2			
	Starts	16	7	23	23	23			
	%	12.5%	0%	0%	0%	8.7%			

# L-60-1 (D5704)

Average $\Delta$ /s by Lab						
Lab	n	VISI	PEN	TOL	ACV	ASL
A	6	0.195	-0.301	-0.150	0.600	-0.114
B	5	0.213	0.370	0.655	-1.342	0.075
D	8	-0.307	0.887	1.515	-0.298	0.215
G	1	-0.218	-0.942	-0.772	-1.126	-1.248
Industry	20	-0.022	0.310	0.686	-0.331	0.008
Shift*	20	-0.17%	0.12%	0.17%	-0.17 merit	0.00 merit

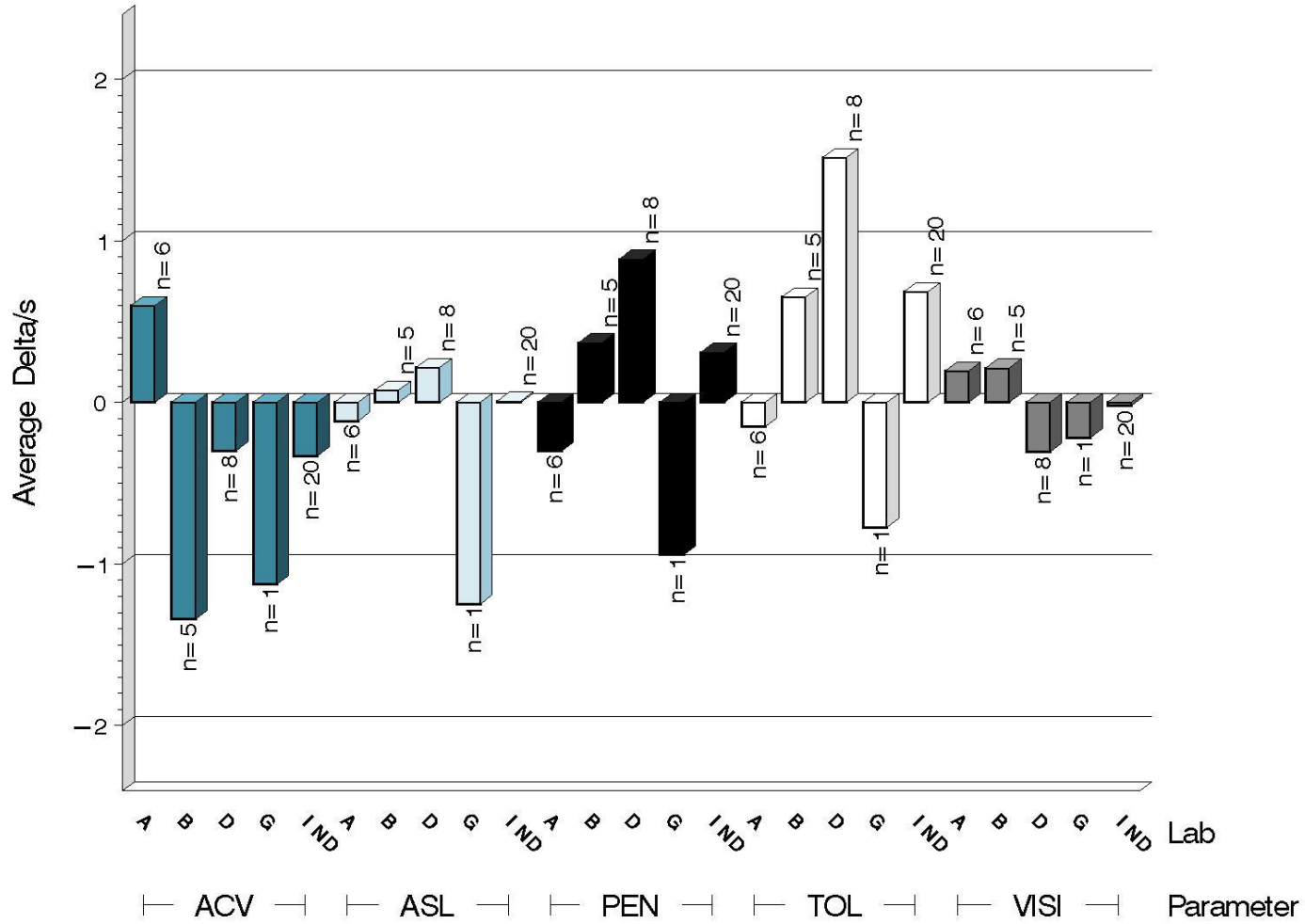
\*computed using severity adjustment standard deviation. A correction factor was implemented for ACV on October 1, 2015 that is intended to return industry ACV performance to the level originally seen in the test.



# L-60-1 (D5704)

## TEST SEVERITY

DELTA/S BY LAB

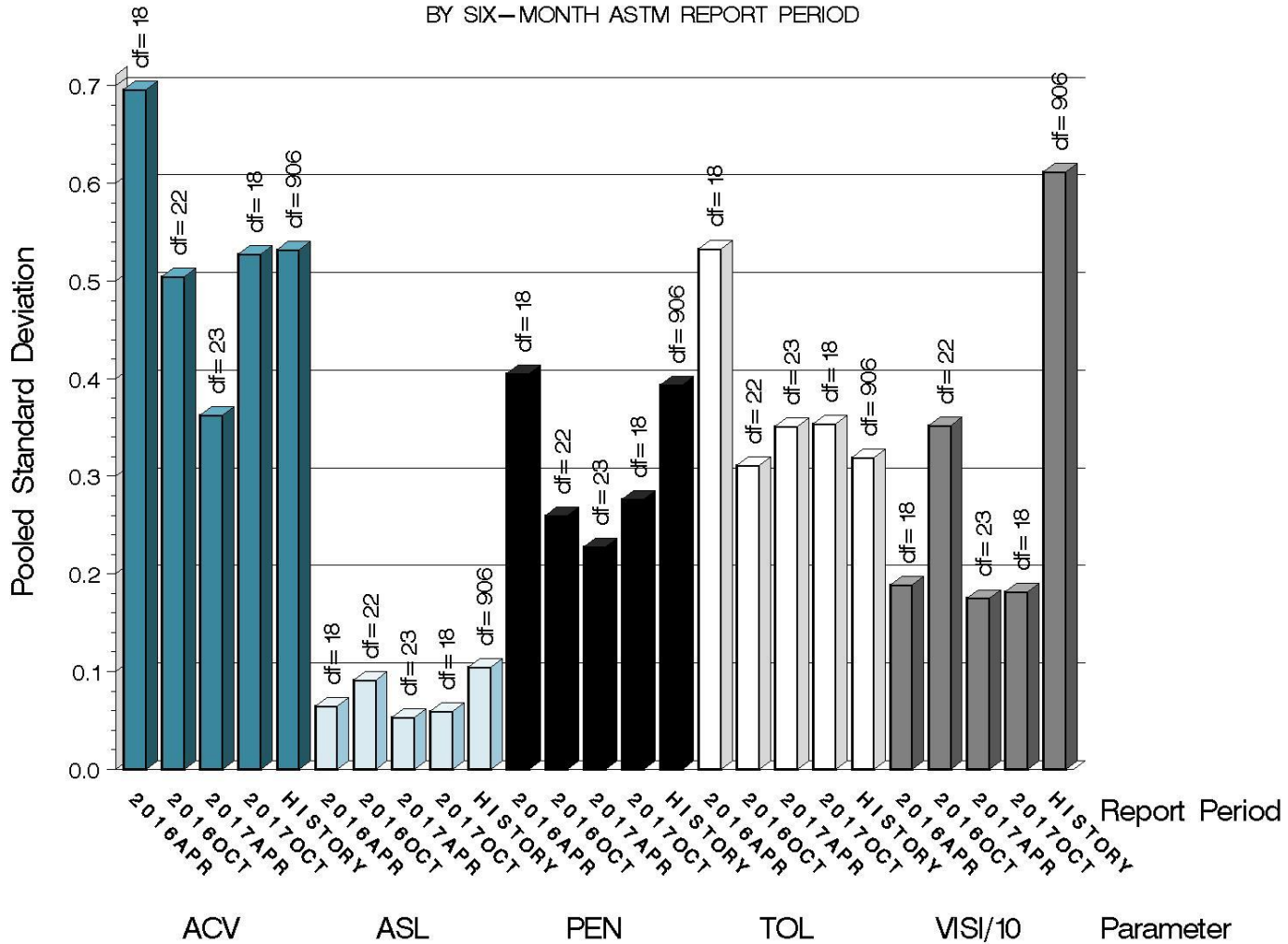


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# L-60-1 (D5704)

## 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

The Surveillance Panel implemented a correction factor for ACV on October 1, 2015 intended to return ACV to target. This correction has improved ACV severity but hasn't fully returned performance to target. One test caused the industry TOL severity to exceed the EWMA action limit this period but that alarm cleared over the next two tests.

### Precision

Precision for all parameters remained within limits this period.

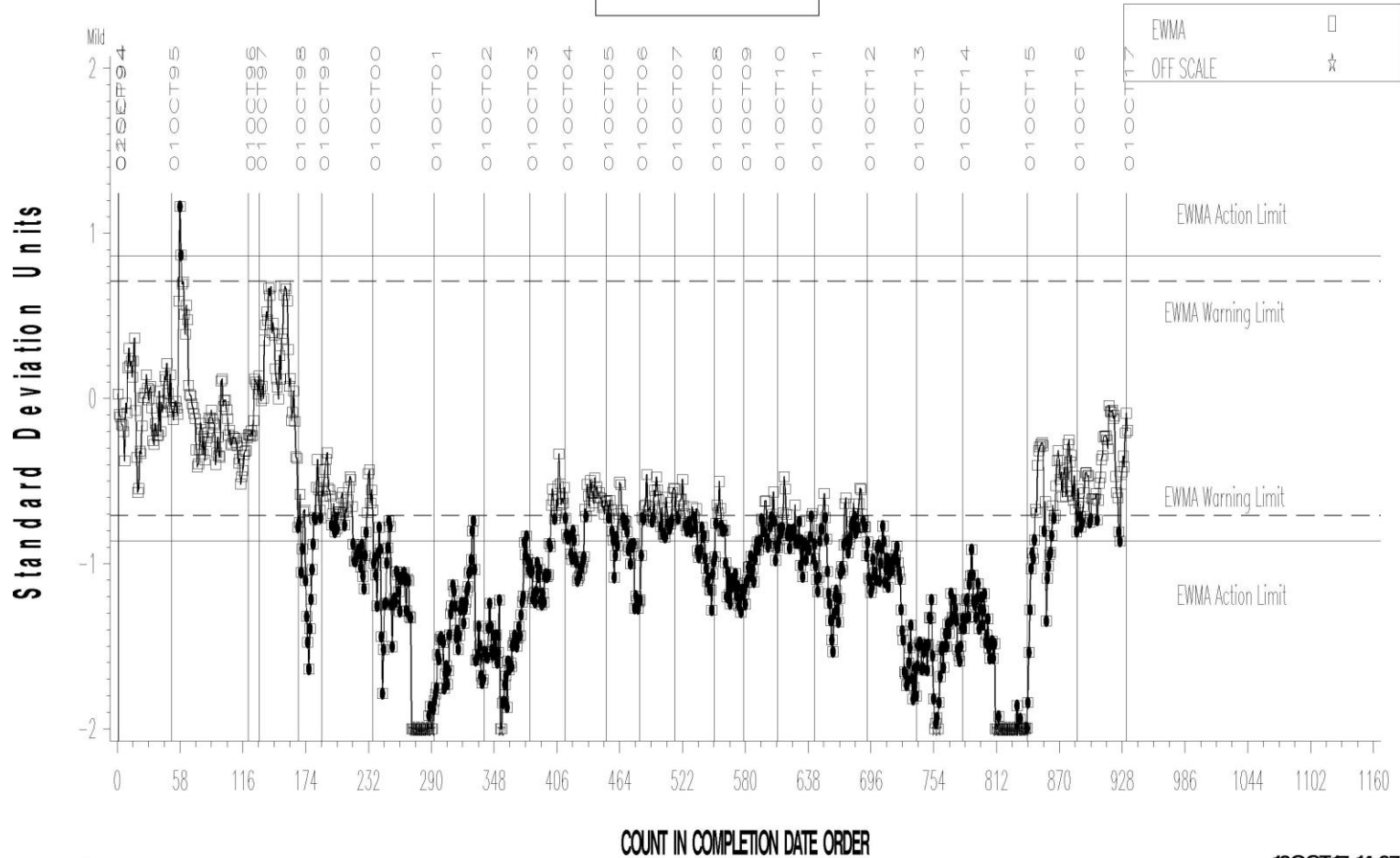
Industry control charts follow.

# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE CARBON/ VARNISH

LTMS Severity Analysis



SPUERP

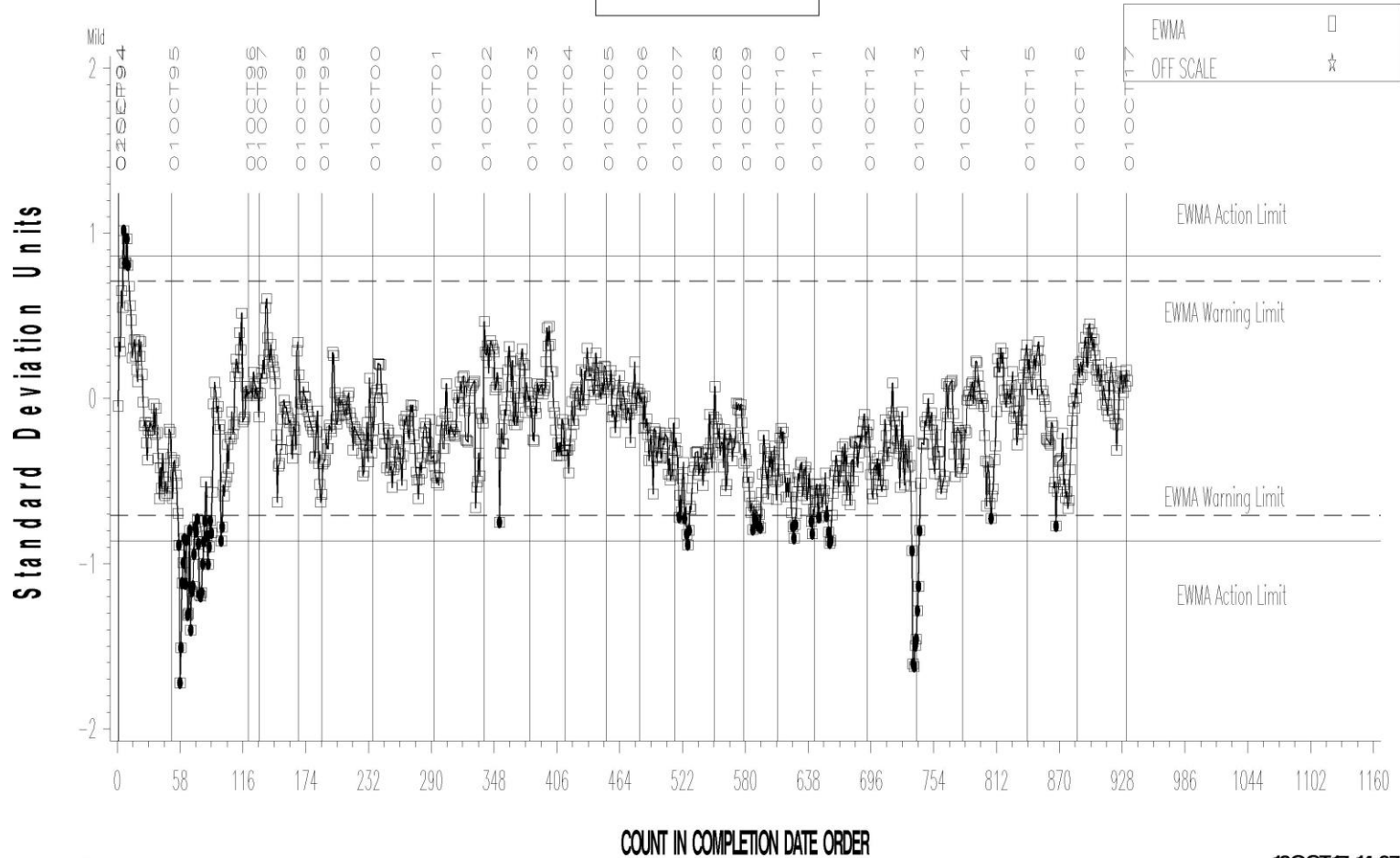
18OCT17: 14:07

# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE SLUDGE

LTMS Severity Analysis



SPVERP

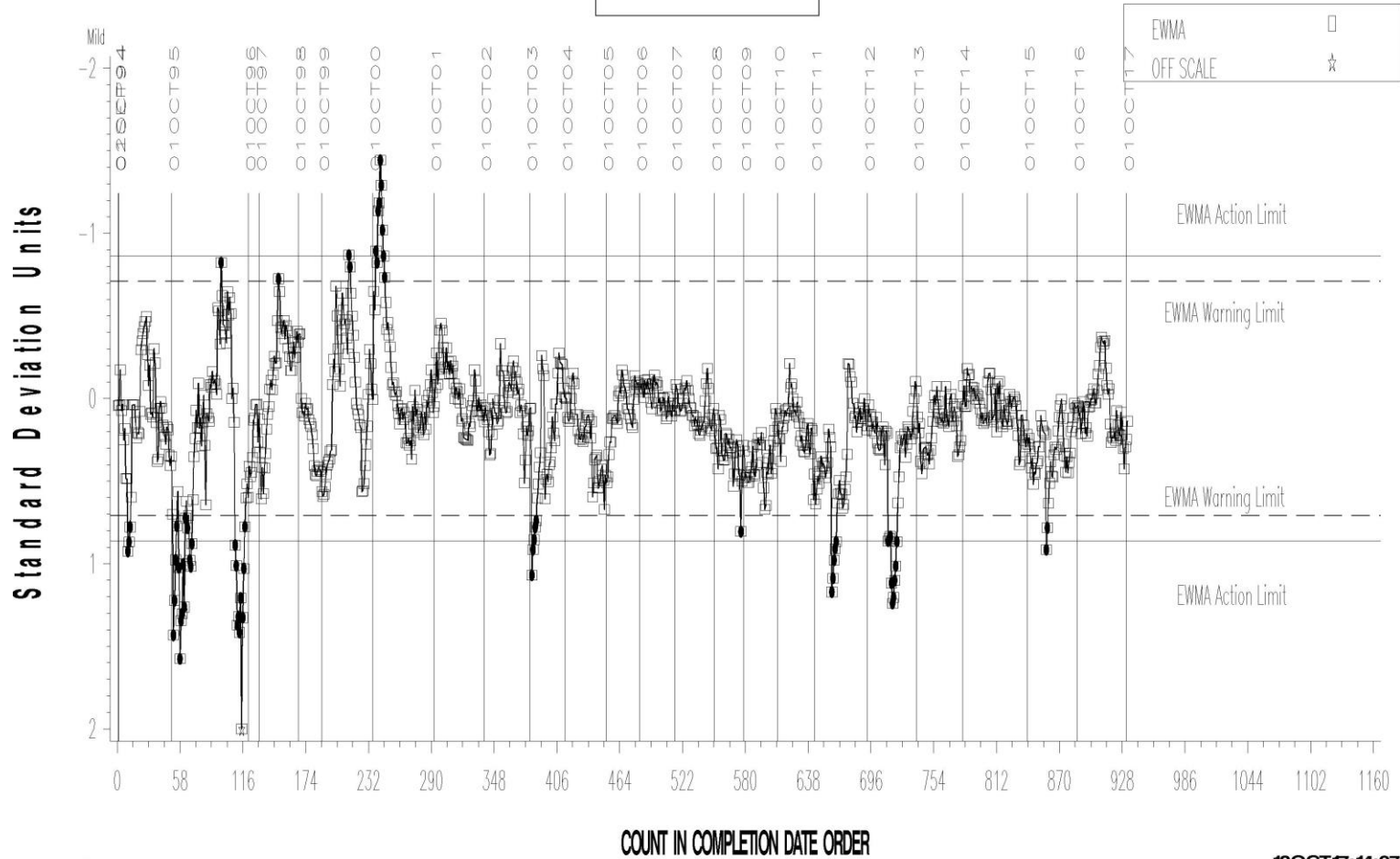
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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL PENTANE INSOLUBLES

LTMS Severity Analysis



SPVERP

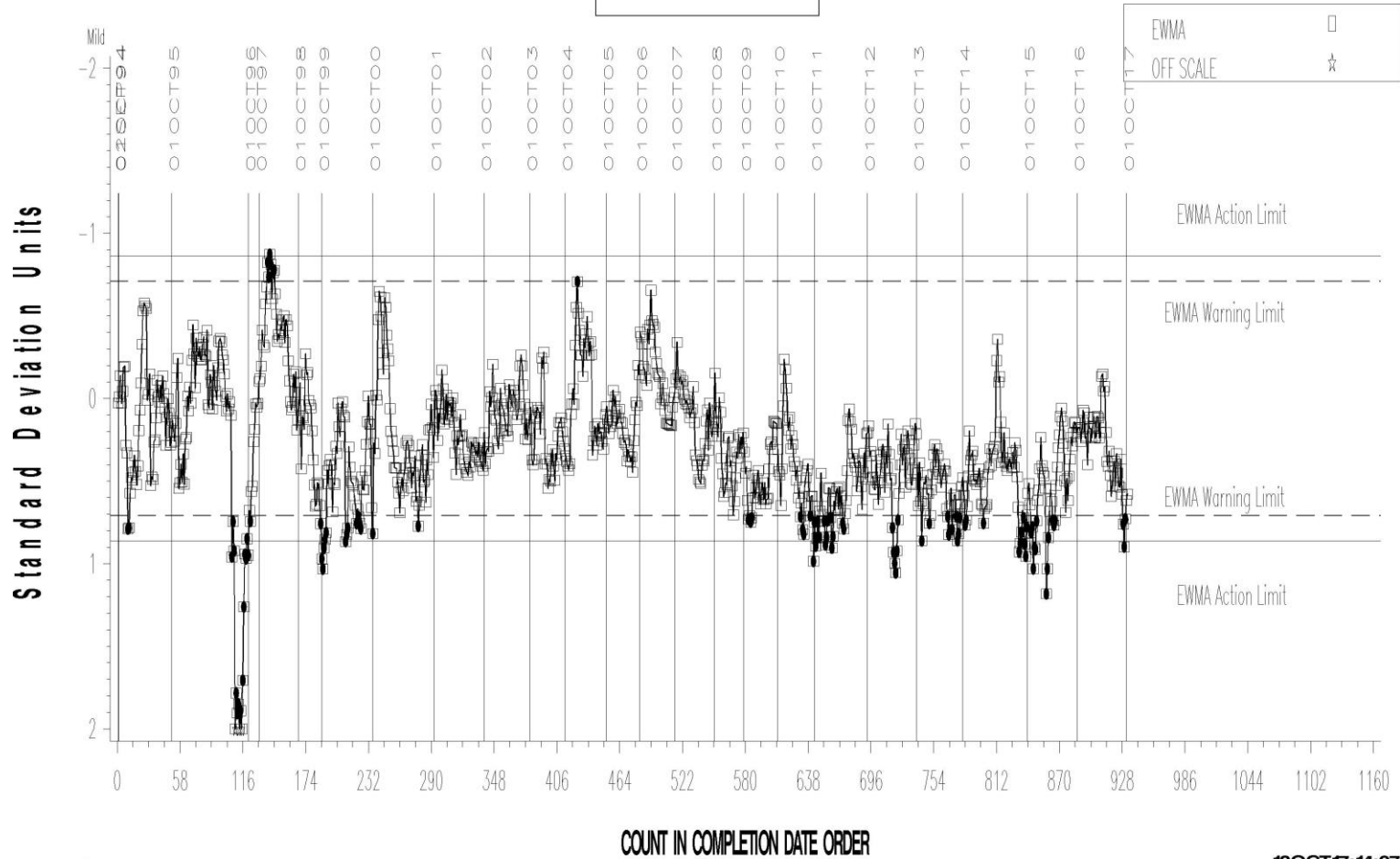
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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL TOLUENE INSOLUBLES

LTMS Severity Analysis



SPVERP

18OCT17: 14:07

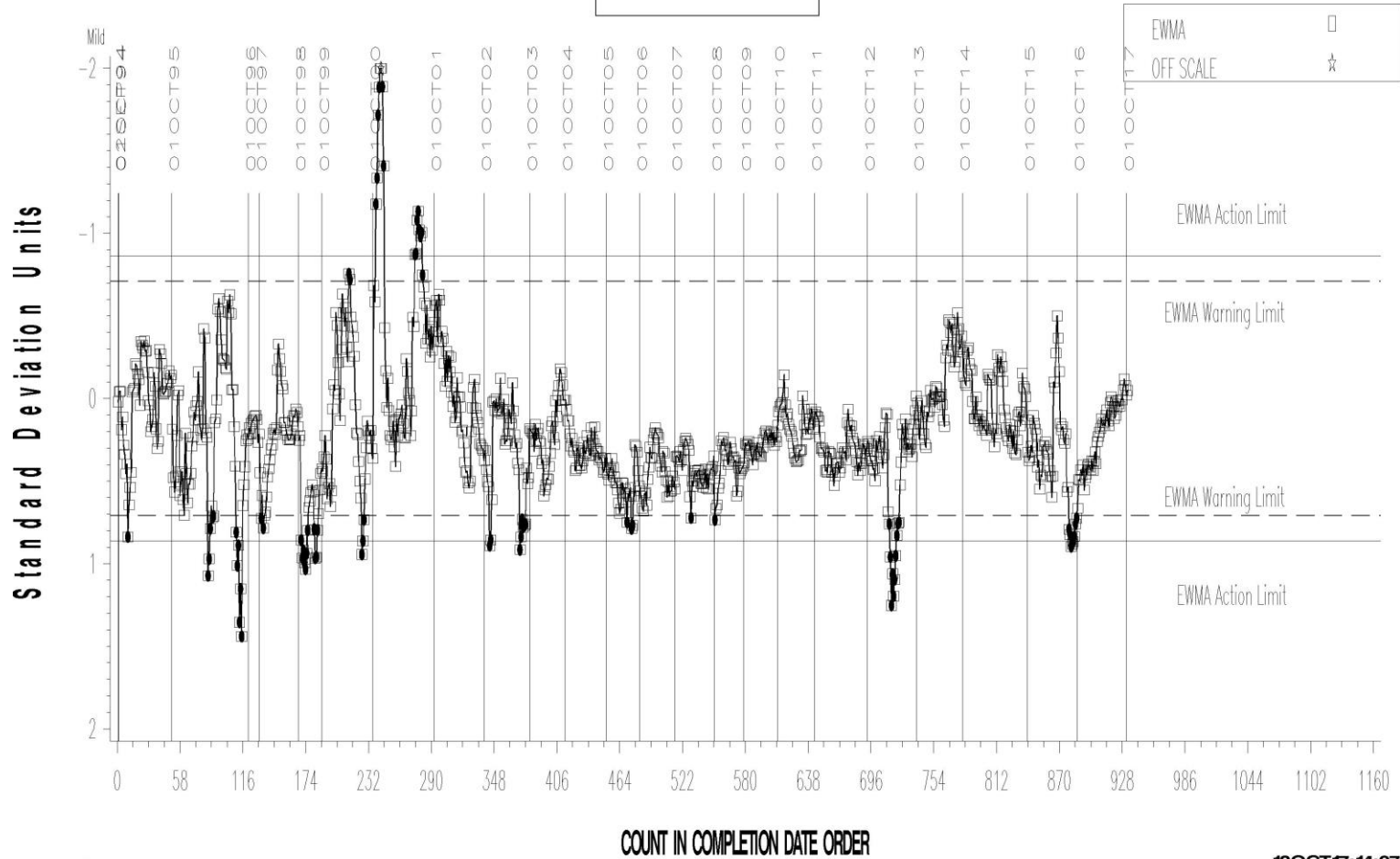


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL VISCOSITY INCREASE

LTMS Severity Analysis



SPVERP

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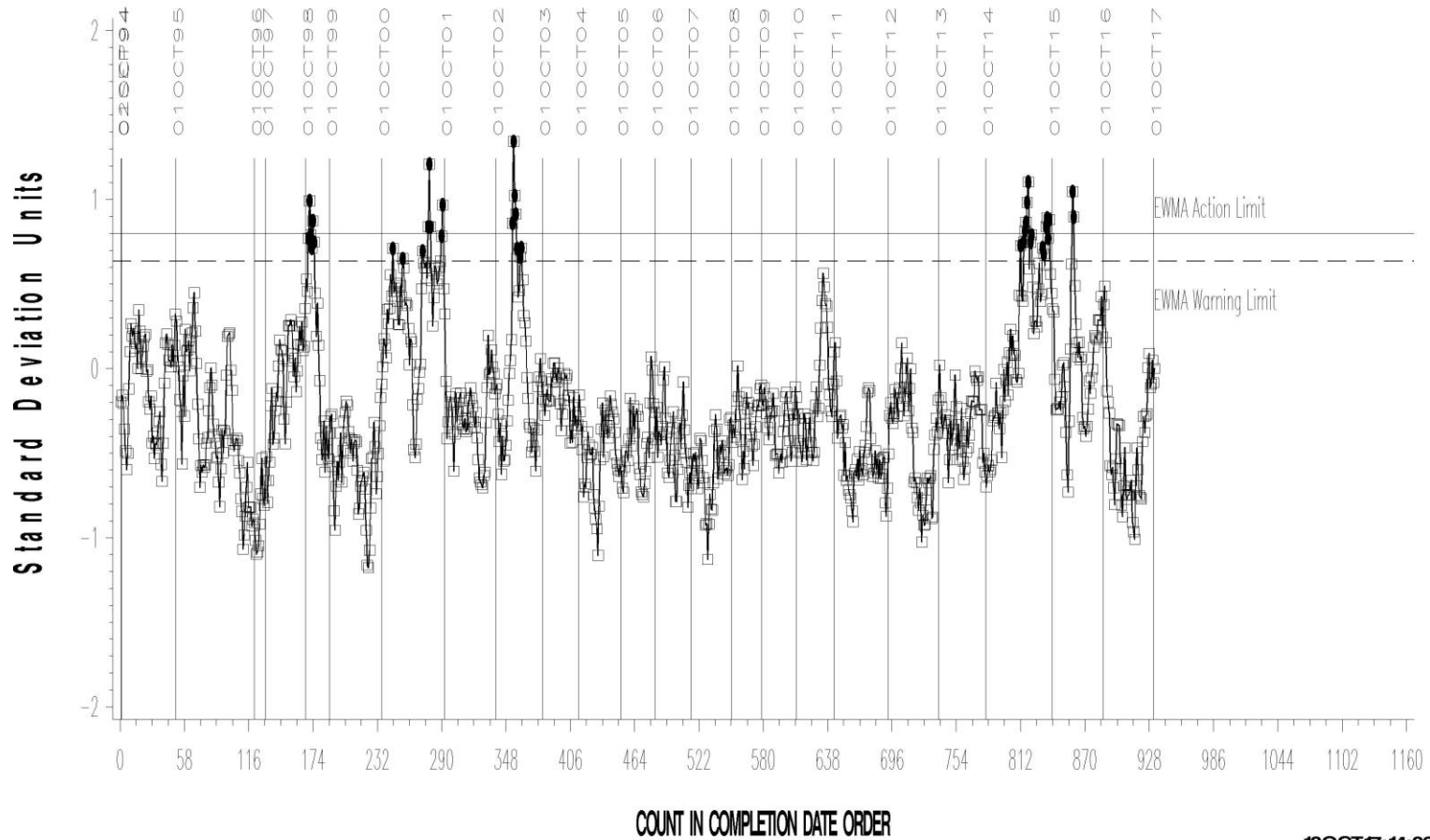


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE CARBON/ VARNISH

LTMS Precision Analysis



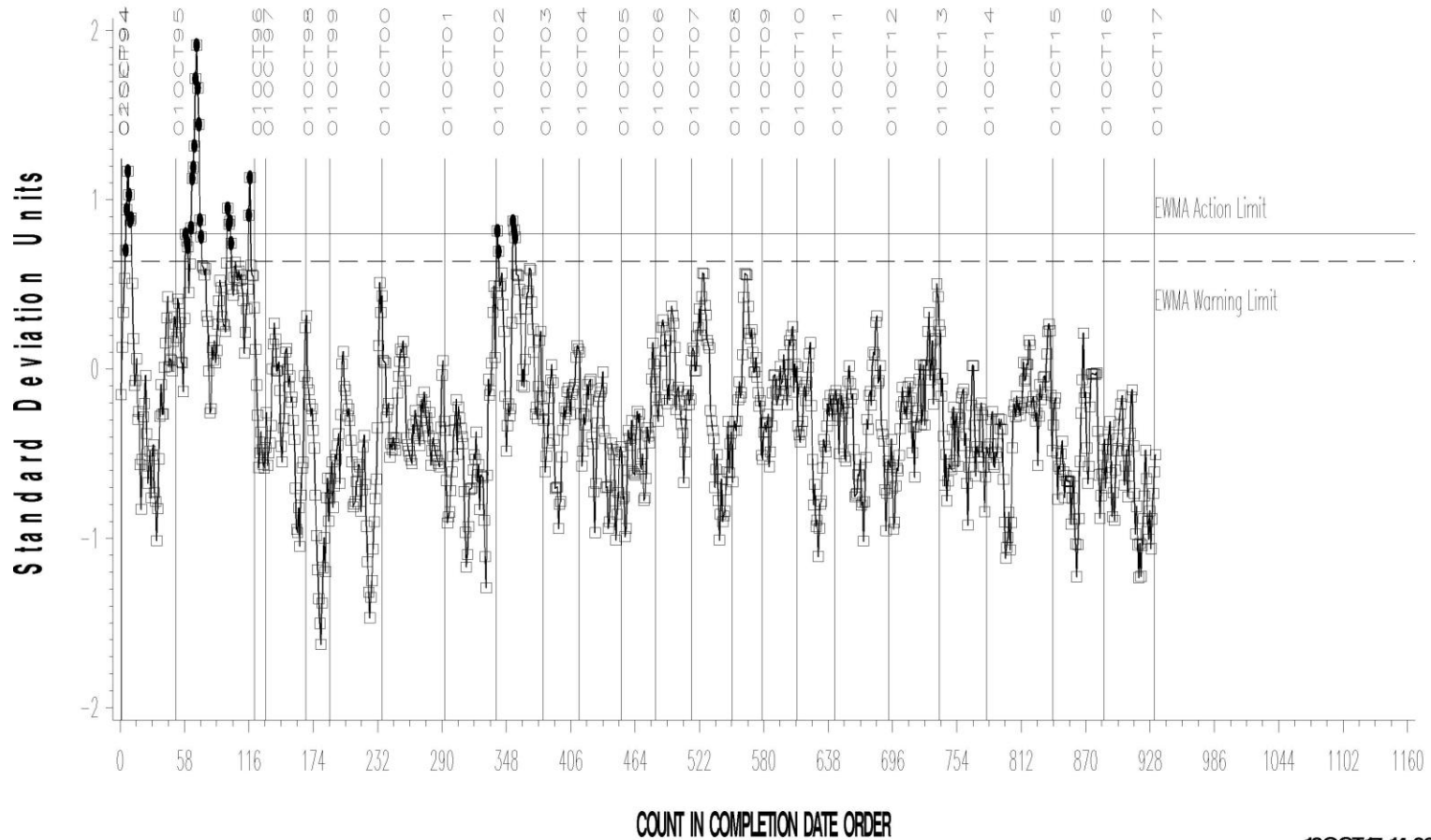
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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE SLUDGE

LTMS Precision Analysis



18OCT17: 14:09

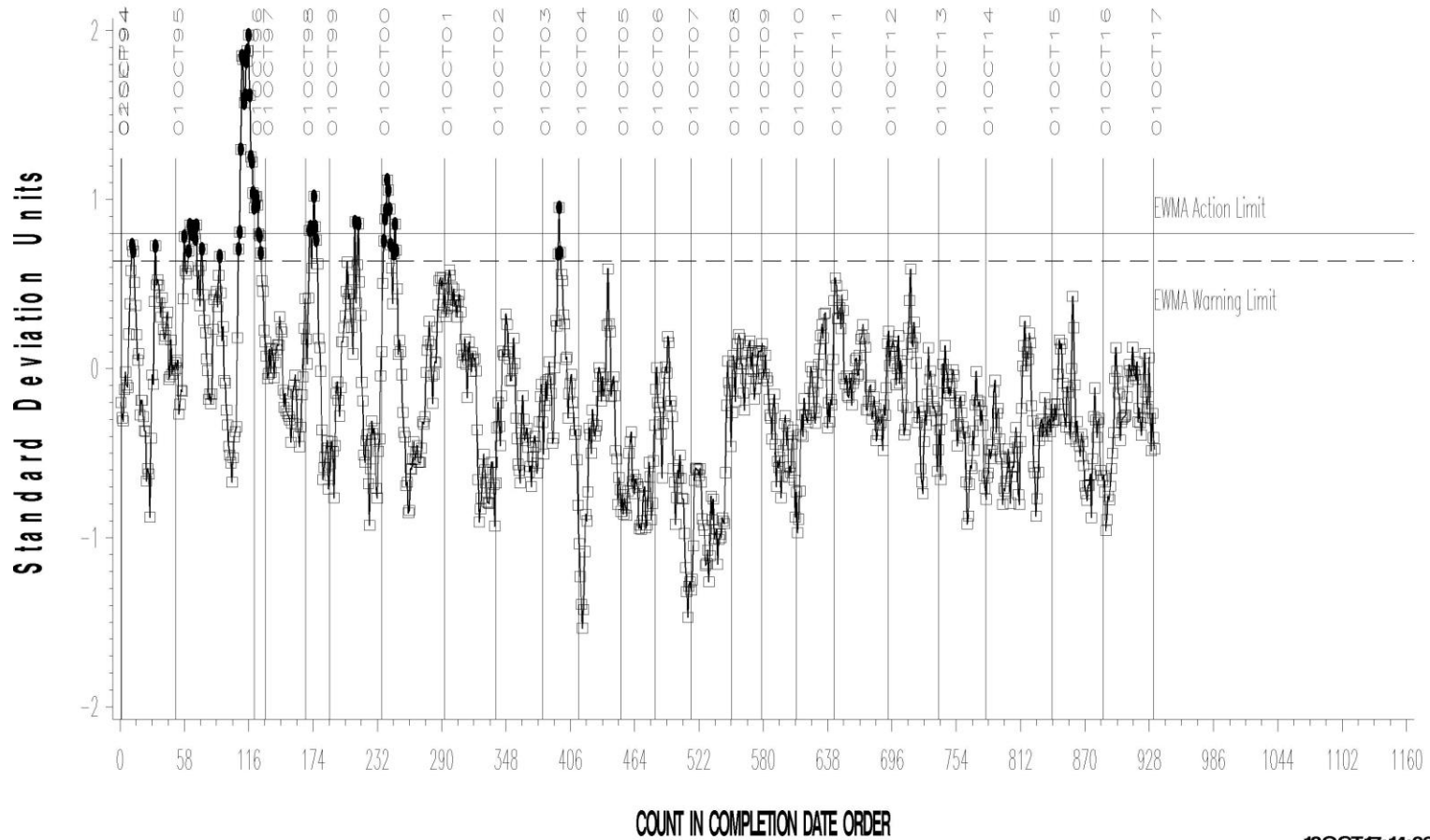


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL TOLUENE INSOLUBLES

LTMS Precision Analysis



18OCT17: 14:09

**Test Monitoring Center**

<http://astmtmc.cmu.edu>



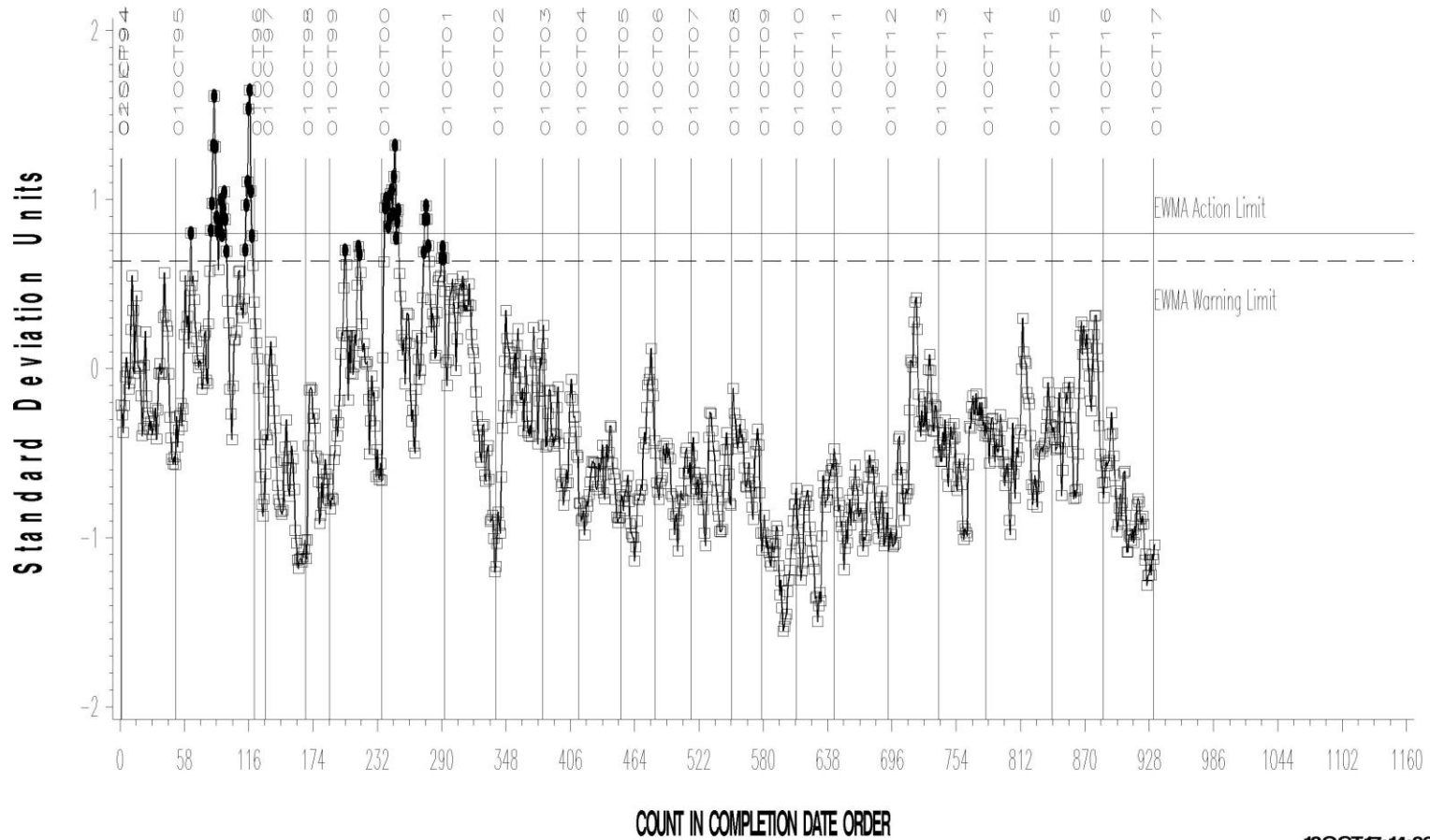
A Program of ASTM International

# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL VISCOSITY INCREASE

LTMS Precision Analysis



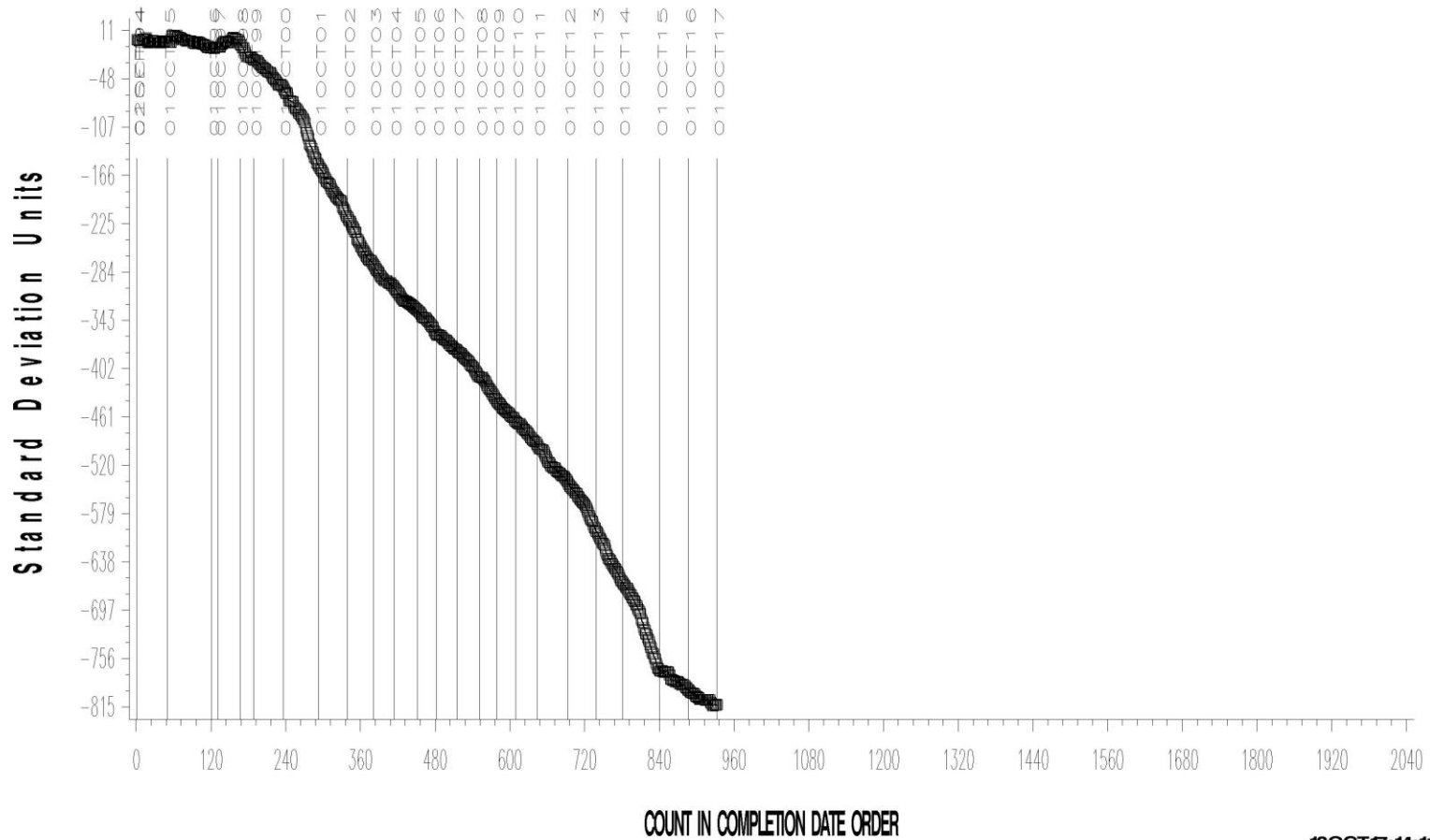
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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE CARBON/ VARNISH

CUSUM Severity Analysis



18OCT17:14:11

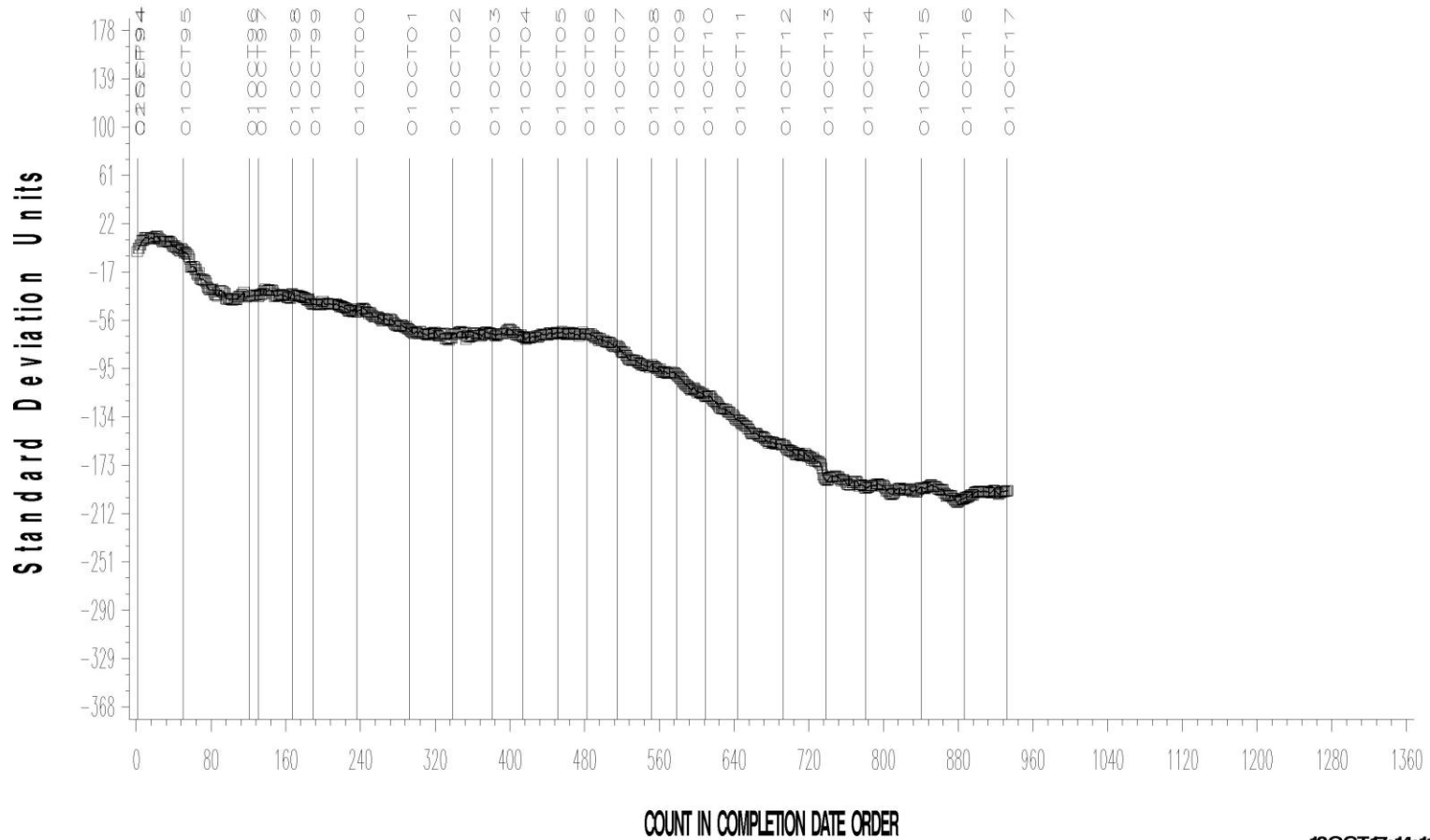


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE SLUDGE

CUSUM Severity Analysis



18OCT17:14:11

# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL PENTANE INSOLUBLES

CUSUM Severity Analysis



18OCT17:14:11

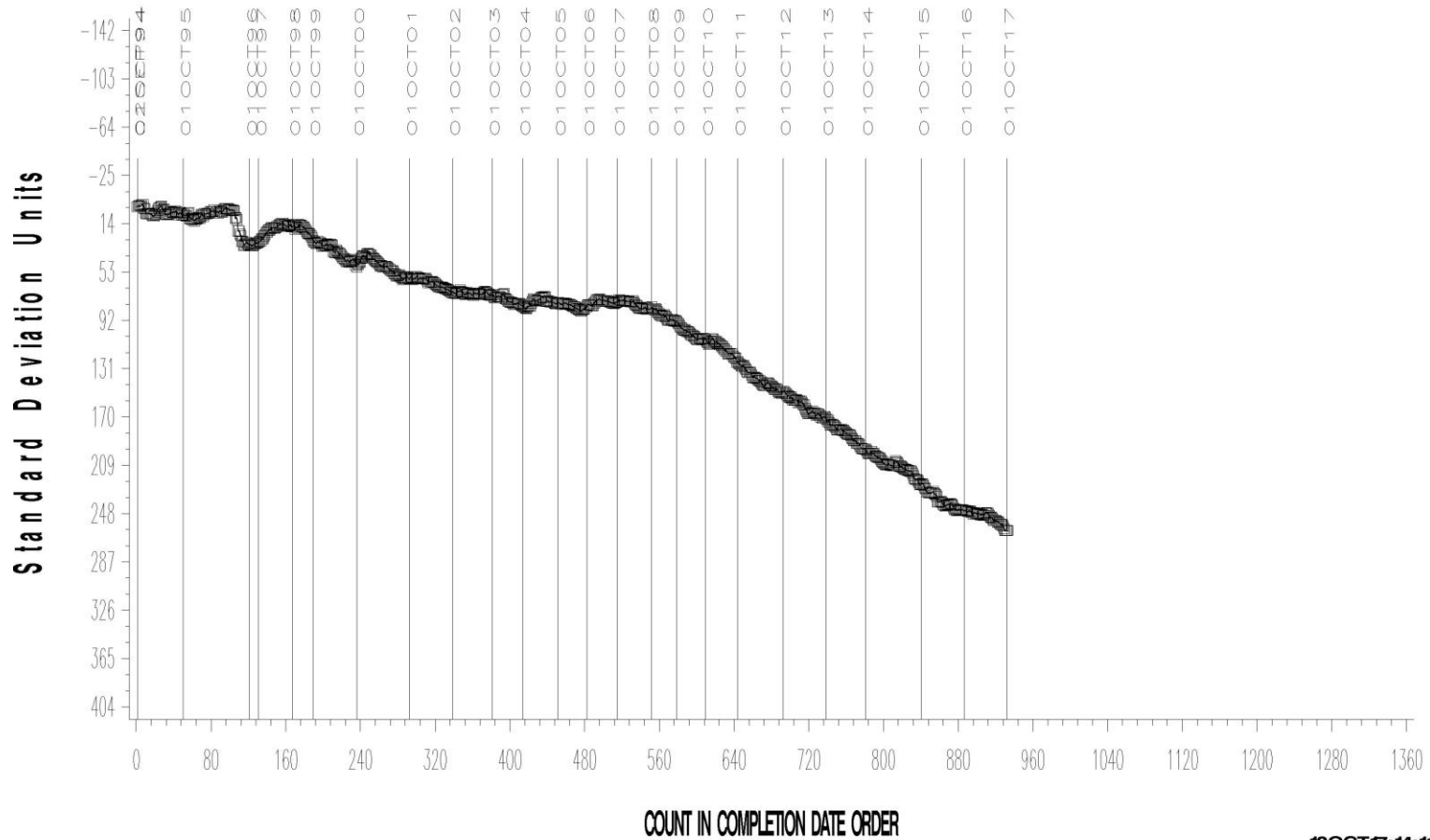


# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL TOLUENE INSOLUBLES

CUSUM Severity Analysis



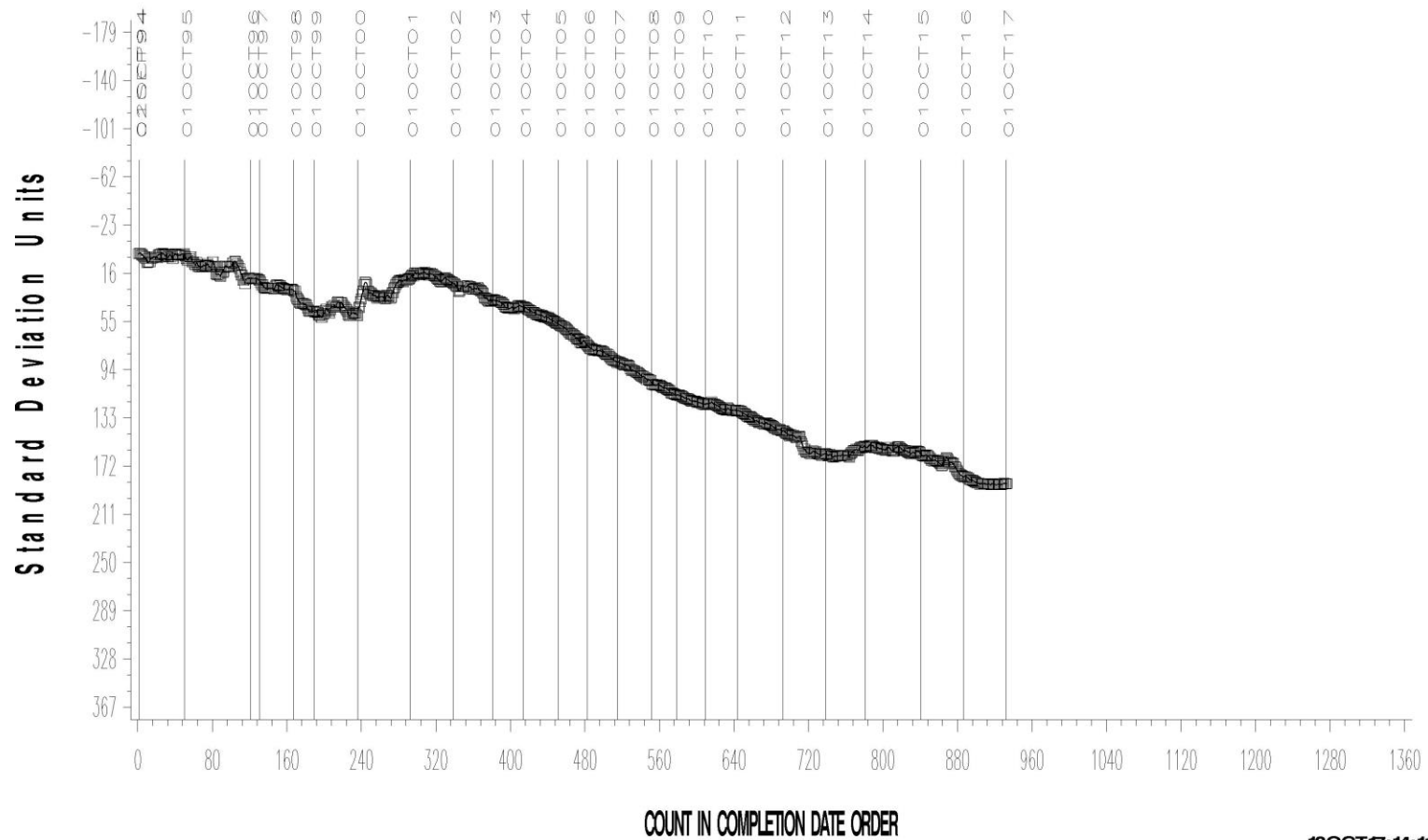
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# L-60-1 (D5704)

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL VISCOSITY INCREASE

CUSUM Severity Analysis



18OCT17:14:11

# L-60-1 (D5704)

## TIMELINE ADDITIONS

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

# L-60-1 (D5704)

## LAB VISITS

One L-60-1 lab visit was conducted this period. All of the aspects of test conduct examined were found to be in compliance with the documented test procedures.

## INFORMATION LETTERS

No information letters were issued this period.

# L-60-1 (D5704)

## STATUS OF REFERENCE OIL SUPPLY

Oil	Cans @ Labs	@ TMC	
		Cans	Gallons
148-1	14	415	25.9
151-2	0	0	0.0
155-1	15	2935	183.5
Total	29	3350	209.4

A reblend of 151-2 (151-3) was acquired by TMC in 1999 but has since been consumed in other test types. That oil was then replaced by 155 which is also now depleted. A 155 reblend (155-1) is on hand at TMC. The surveillance panel has asked that the TMC reserve a portion of that oil for L-60-1 testing. The TMC quantity shown for this oil is for that reserved portion. A separate quantity of 186 gallons is available for use in other gear testing.

Four hundred and twenty tests of oil 148-1 remain in TMC inventory; however, this is only 26 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.