A Program of ASTM International

Test Monitoring Center

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

MEMORANDUM: 16-044

DATE: November 21, 2016

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

FROM: Scott Parke

SUBJECT: L-60-1 Reference Oil Testing from April 1, 2016 through September 30, 2016

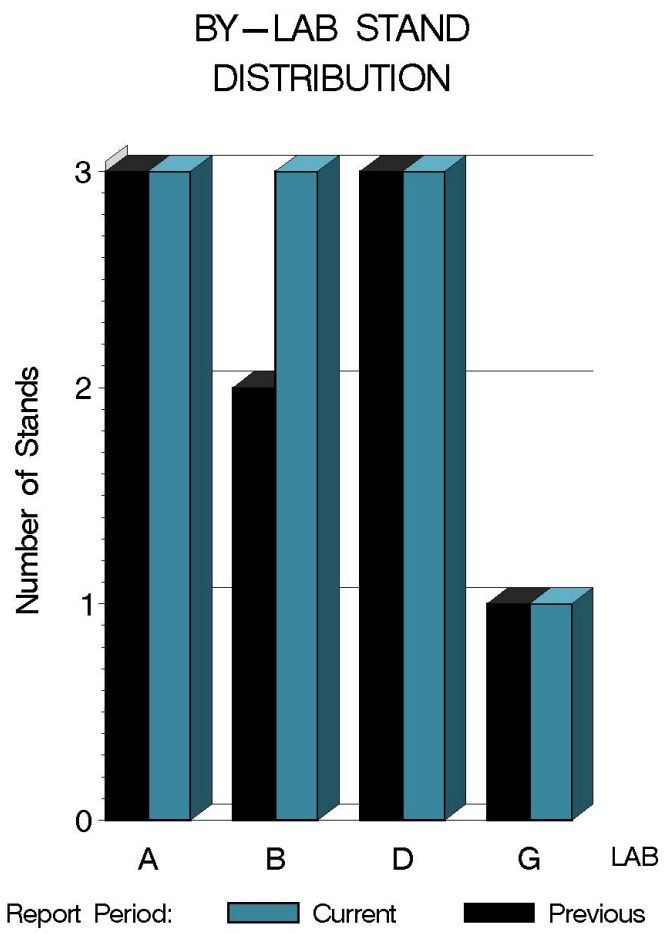
Attached is a summary of testing activity this period.

SDP/sdp/mem16-044.sdp.doc
cc: Frank Farber
Jeff Clark
L-60-1 Surveillance Panel
ftp://ftp.astmtmc.cmu.edu/docs/gear/l601/semiannualreports/l601-10-2016.pdf

Distribution: email

L-60-1 (D5704)

	Reporting Data	Calibrated on 9-30-16
Number of Labs	4	4
Number of Stands	10	9

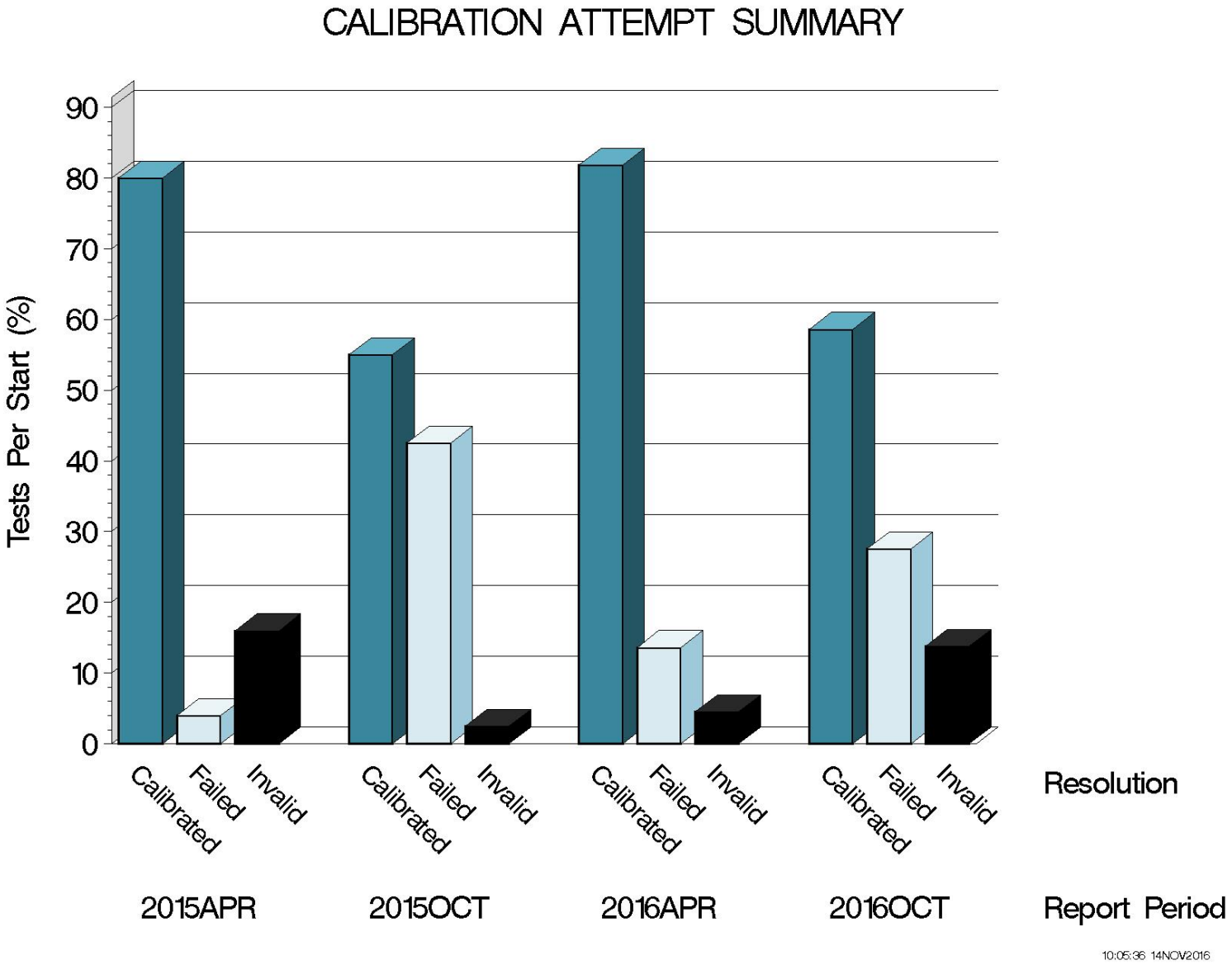


L-60-1 (D5704)

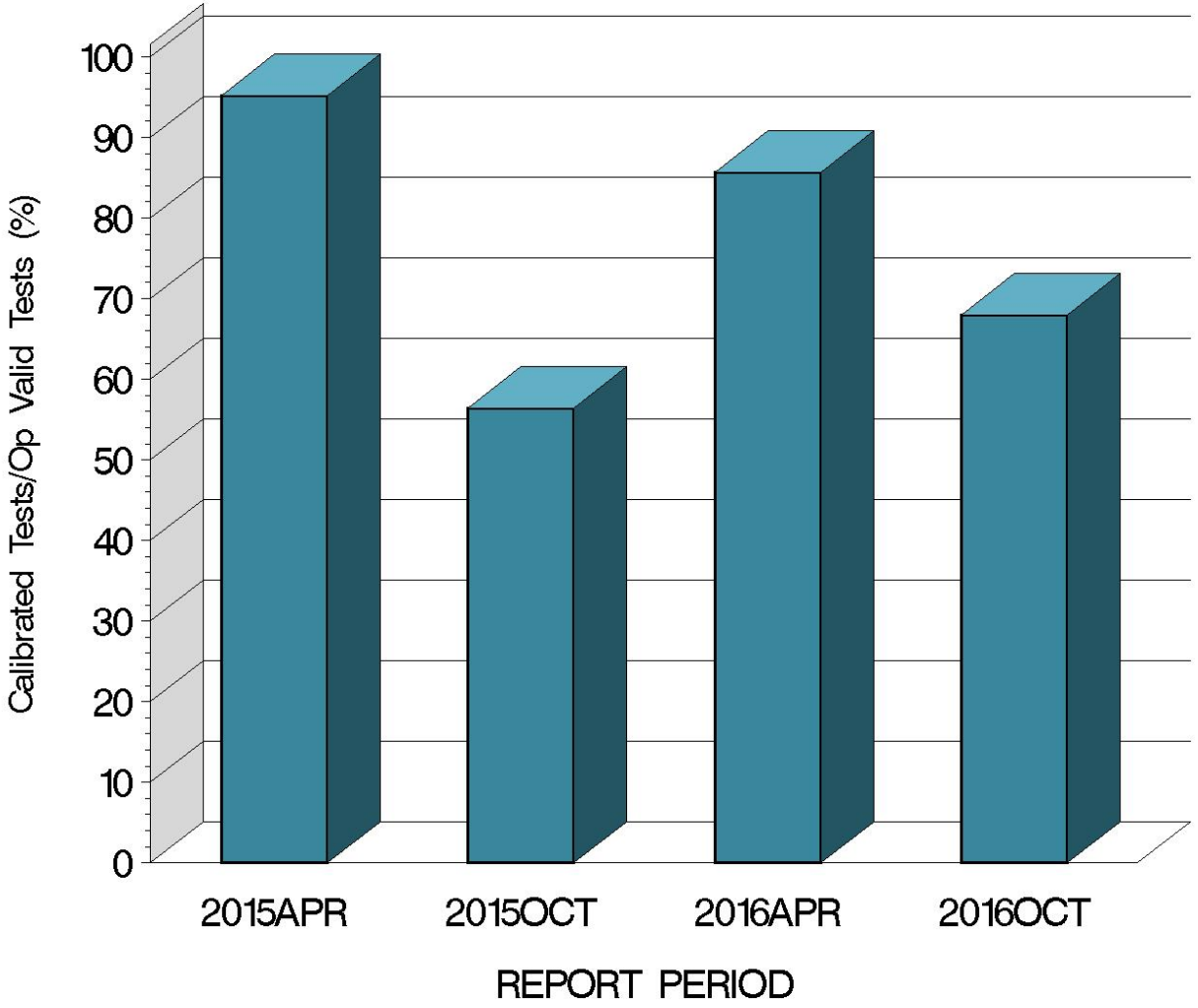
Test Distribution by Oil and Validity

		148-1	151-2	155-1	Totals	
					Last Period	This Period
Accepted for calibration	AC	8	0	9	20	17
Rejected (Mild)	OC	0	0	0	0	0
Rejected (Severe)	OC	1	0	5	1	6
Rejected (Combination)	OC	0	1	0	0	1
Rejected (Precision)	OC	1	0	0	3	1
Invalidated calibration	LC	1	0	1	0	2
Acceptable info run	NI	0	0	10	1	10
Unacceptable info run	MI	0	0	1	0	1
Aborted	XC	2	0	0	1	2
Total		13	1	26	26	40

L-60-1 (D5704)


CALIBRATION ATTEMPT SUMMARY
Tests Per Start (%)
90
80
70
60
50
40
30
20
10
0
Calibrated
Failed
Invalid
Resolution
2015APR
2015OCT
2016APR
2016OCT
Report Period
10:05:36 14NOV2016

L-60-1 (D5704)



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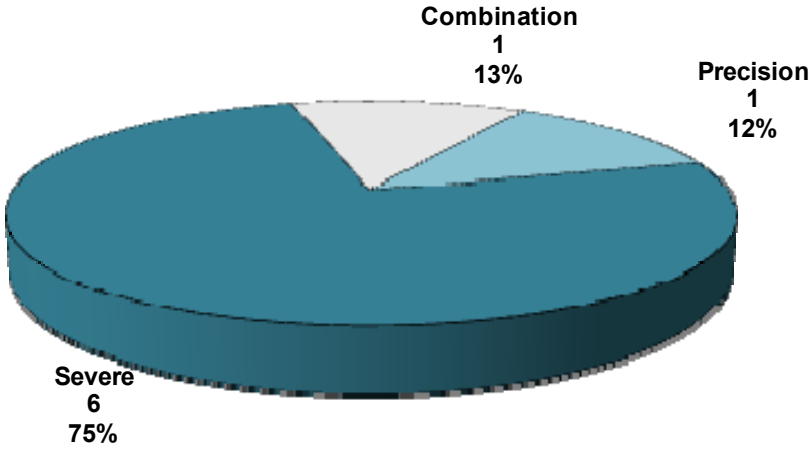
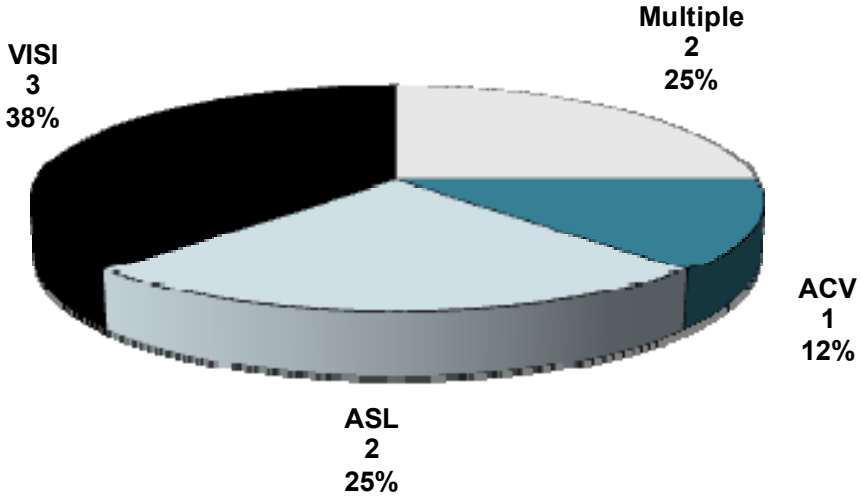
L-60-1 (D5704)

CAUSES FOR FAILED TESTS

By Alarm Type



By Parameter



L-60-1 (D5704)

CAUSES FOR LOST TESTS

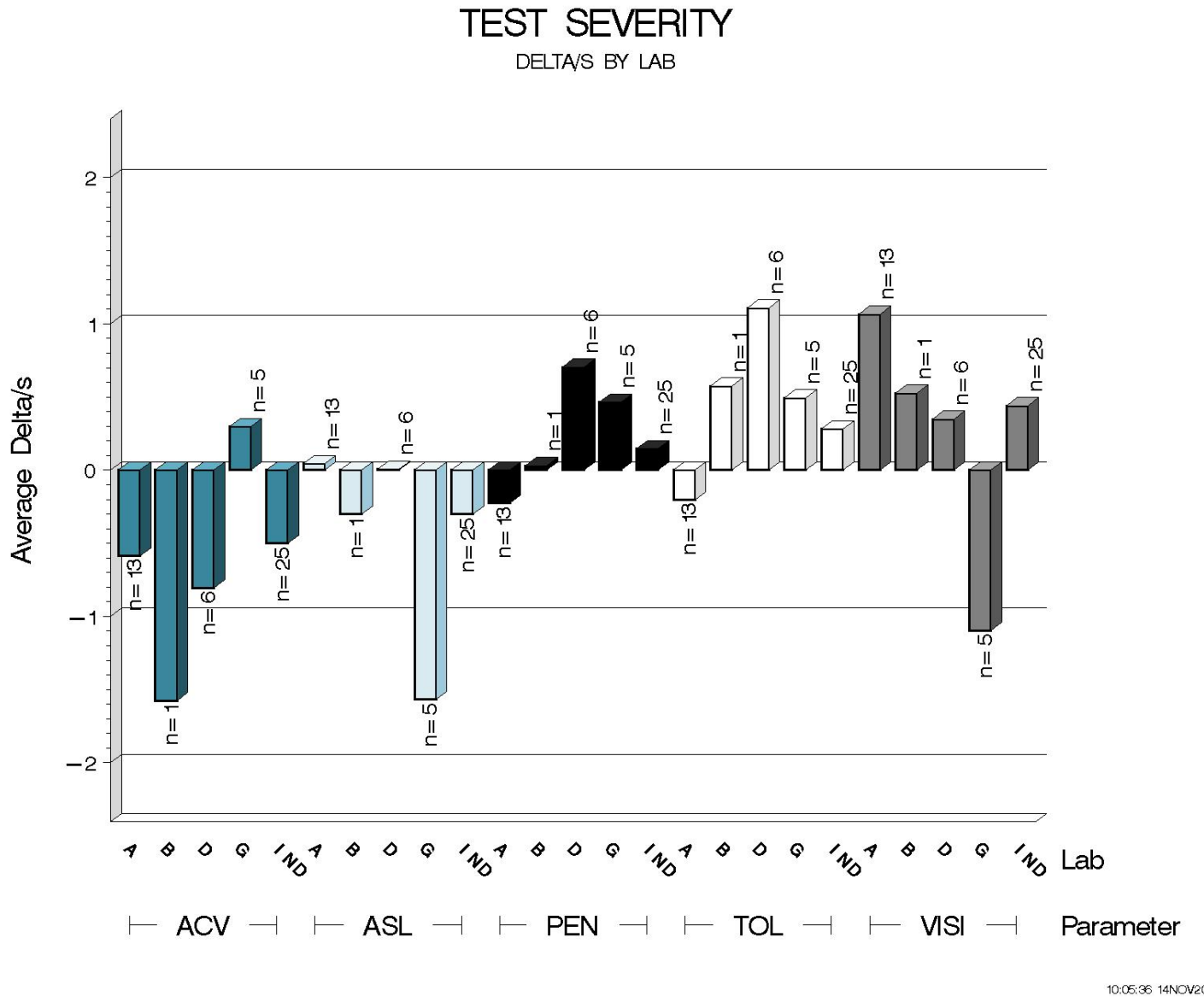
		Oil			Validity			Loss Rate		
Lab	Cause	148-1	151-2	155-1	MI	LC	XC	Lost	Starts	%
A	Excess oil loss at EOT	●				●		3	16	19%
	Abort at 9h due to loose drive belt	●					●			
	Oil leak at 33h	●					●			
B	Excess oil loss (shakedown run)			●	●			1	12	8%
G	Low air pressure			●		●		1	6	17%
	Lost	3	0	2	1	2	2			
	Starts	13	1	26	40	40	40			
	%	23%	0%	8%	3%	5%	5%			

L-60-1 (D5704)

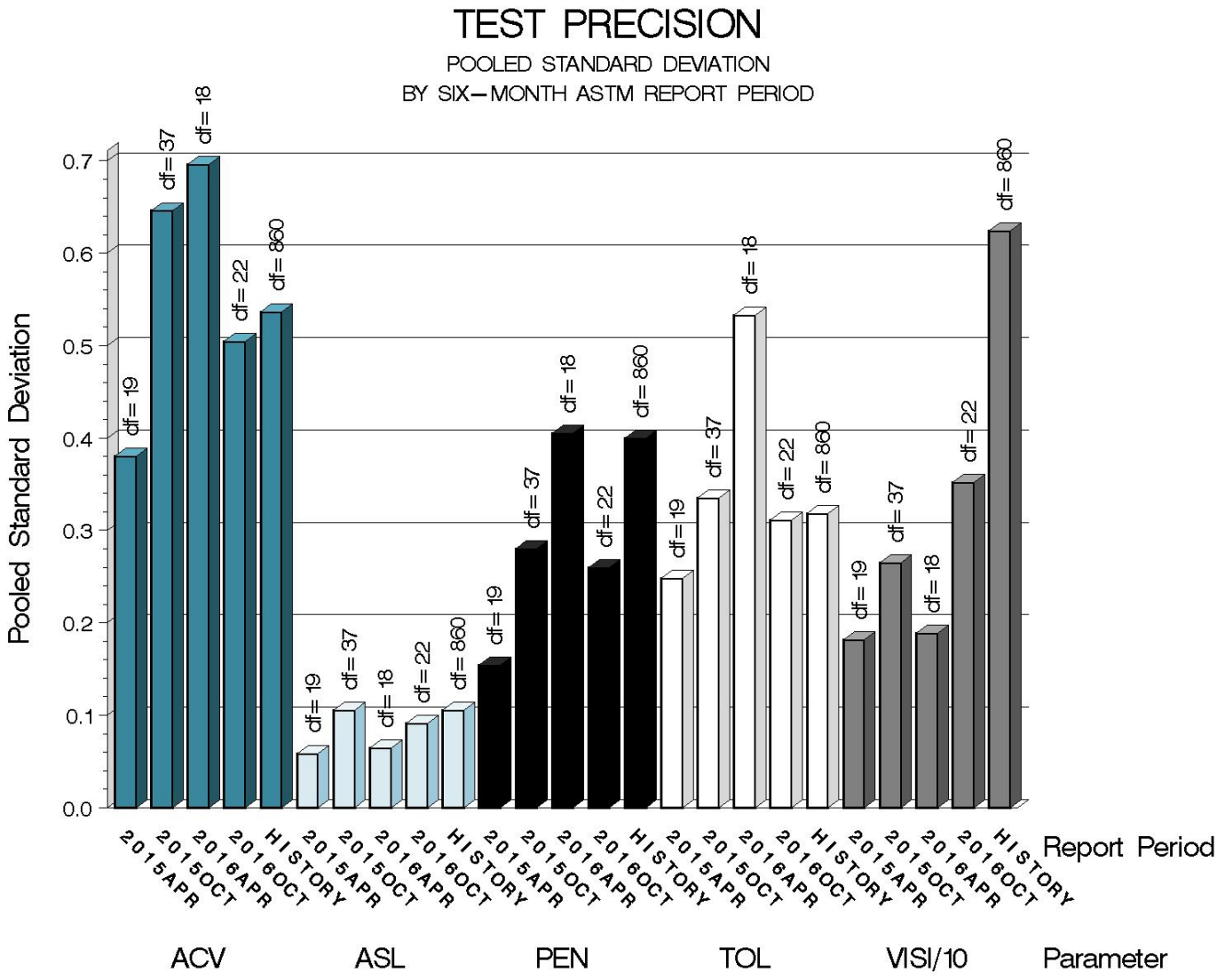
Average Δ/s by Lab						
Lab	**n**	**VISI**	**PEN**	**TOL**	**ACV**	**ASL**
A	13	1.067	-0.225	-0.203	-0.586	0.044
B	1	0.527	0.031	0.574	-1.577	-0.302
D	6	0.349	0.703	1.108	-0.806	0.007
G	5	-1.097	0.465	0.494	0.297	-1.568
Industry	25	0.440	0.146	0.282	-0.502	-0.301
Shift*	25	3.371%	0.060%	0.070%	-0.256 merit	-0.032 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
Average Delta/s
2
1
0
−1
−2
n= 13
n= 1
n= 6
n= 5
n= 25
n= 13
n= 1
n= 6
n= 5
n= 25
n= 13
n= 1
n= 6
n= 5
n= 25
n= 13
n= 1
n= 6
n= 5
n= 25
n= 13
n= 1
n= 6
n= 5
n= 25
A B D G IND A B D G IND A B D G IND A B D G IND A B D G IND
Lab
ACV
ASL
PEN
TOL
VISI
Parameter
10:05:36 14NOV2016

L-60-1 (D5704)



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

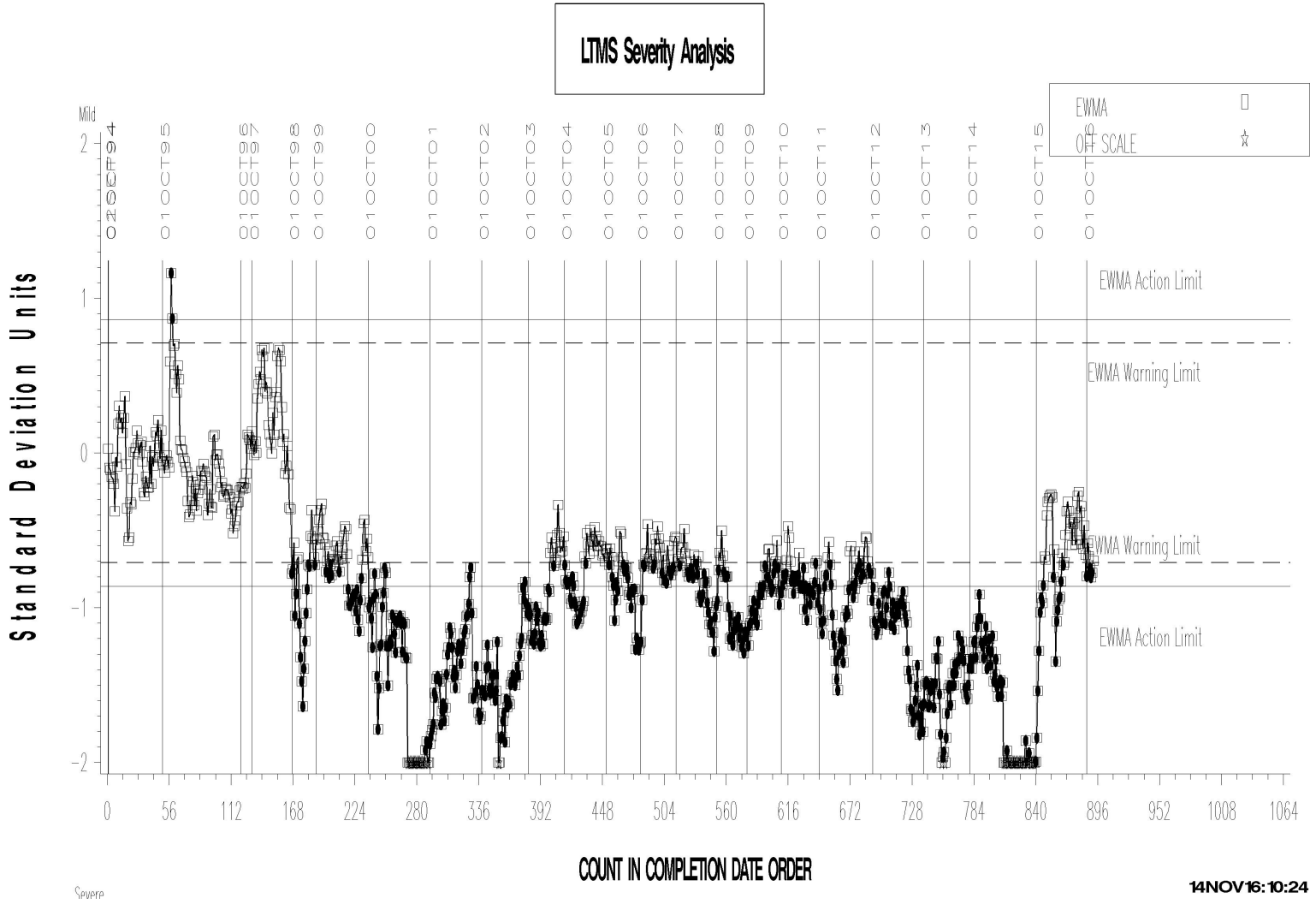
Severity
The Surveillance Panel enacted a correction factor for ACV on October 1, 2015 intended to return ACV to target. This correction has improved ACV severity, however the industry chart is currently exceeding the warning alarm limit. A string of 3 severe VISI results from lab A put that chart over the alarm limit for a time but it has since recovered. ASL,PEN, and TOL all showed acceptable control 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

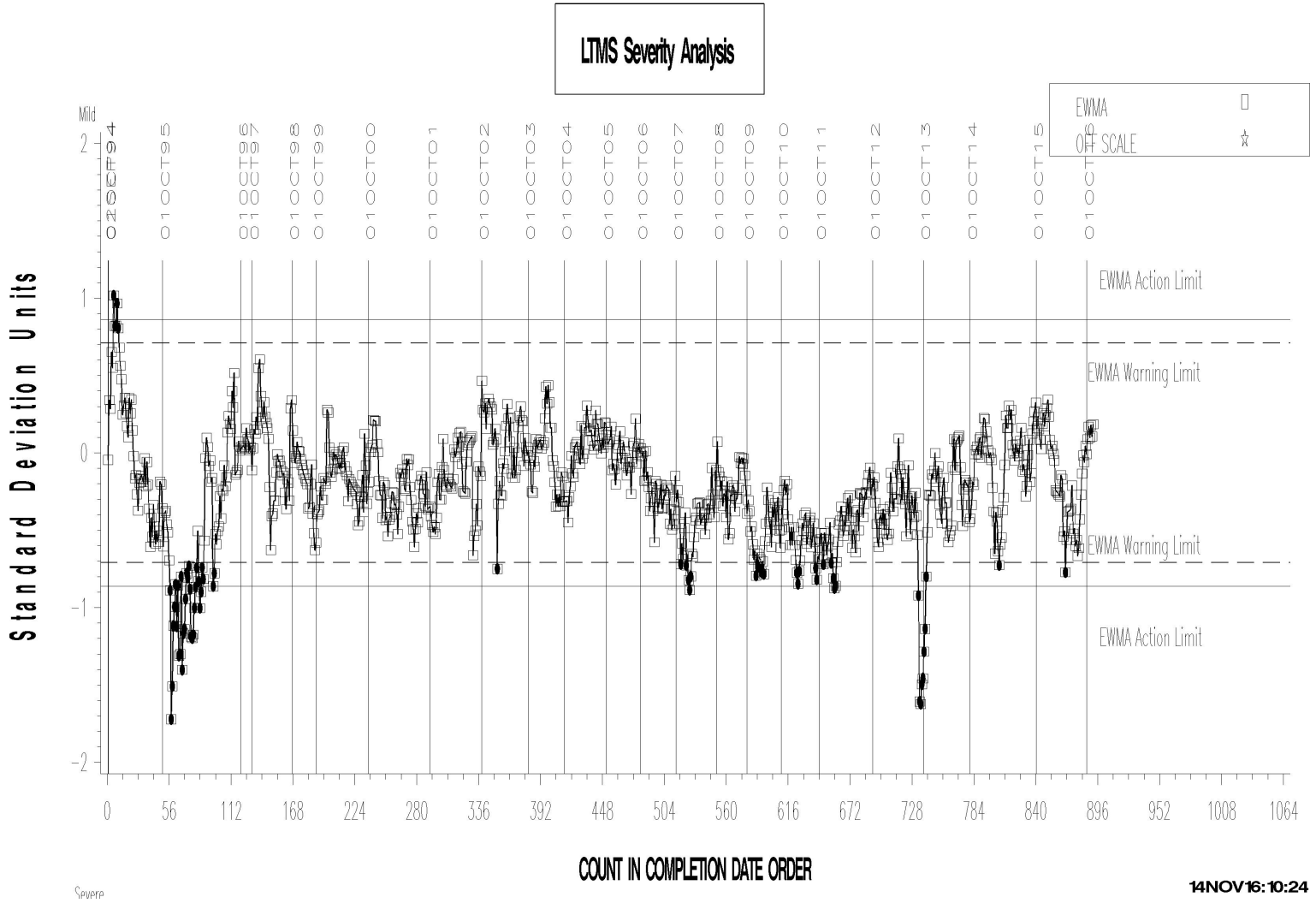
REF. FINAL AVERAGE CARBON/ VARNISH



L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

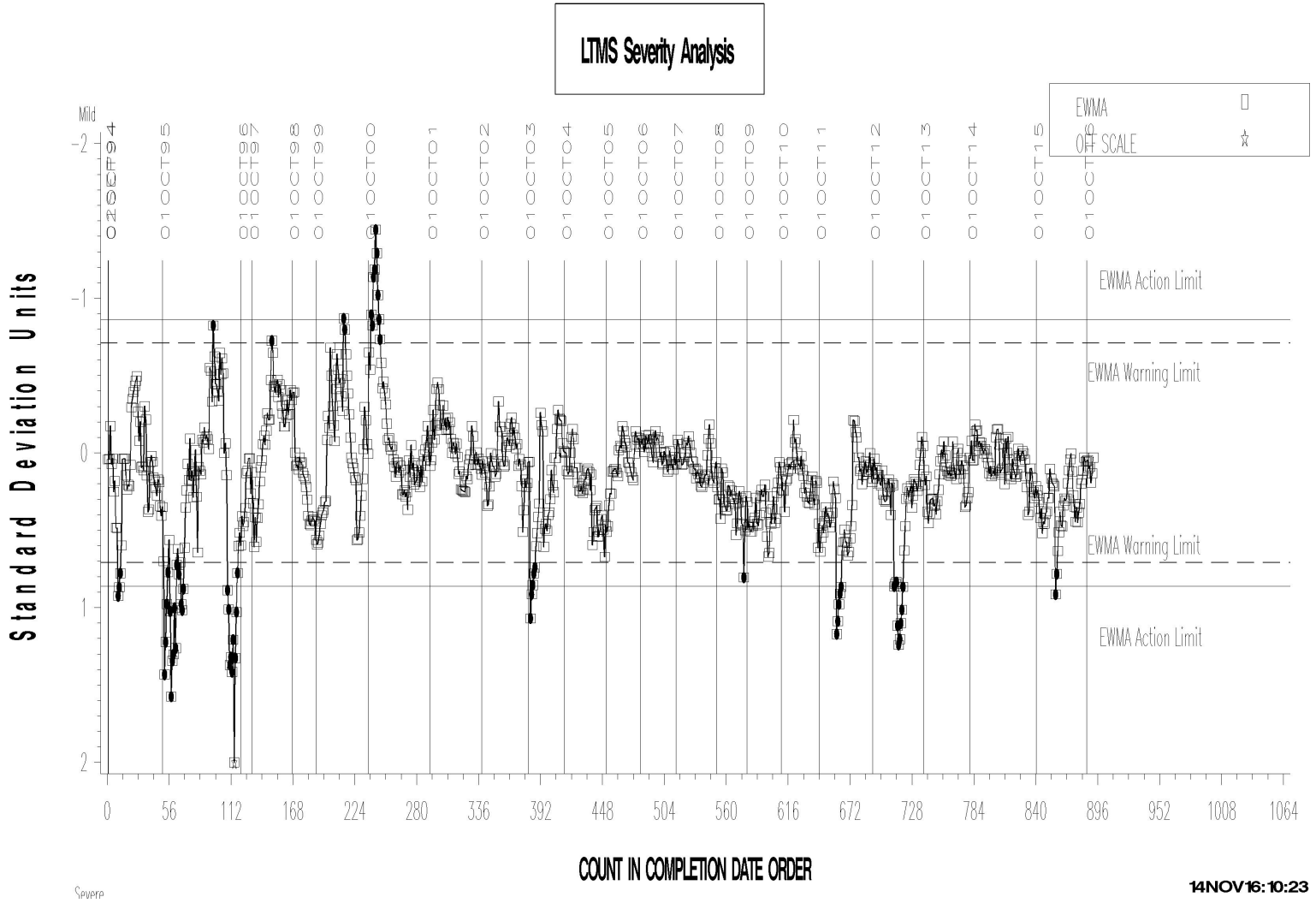
REF. FINAL AVERAGE SLUDGE



L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

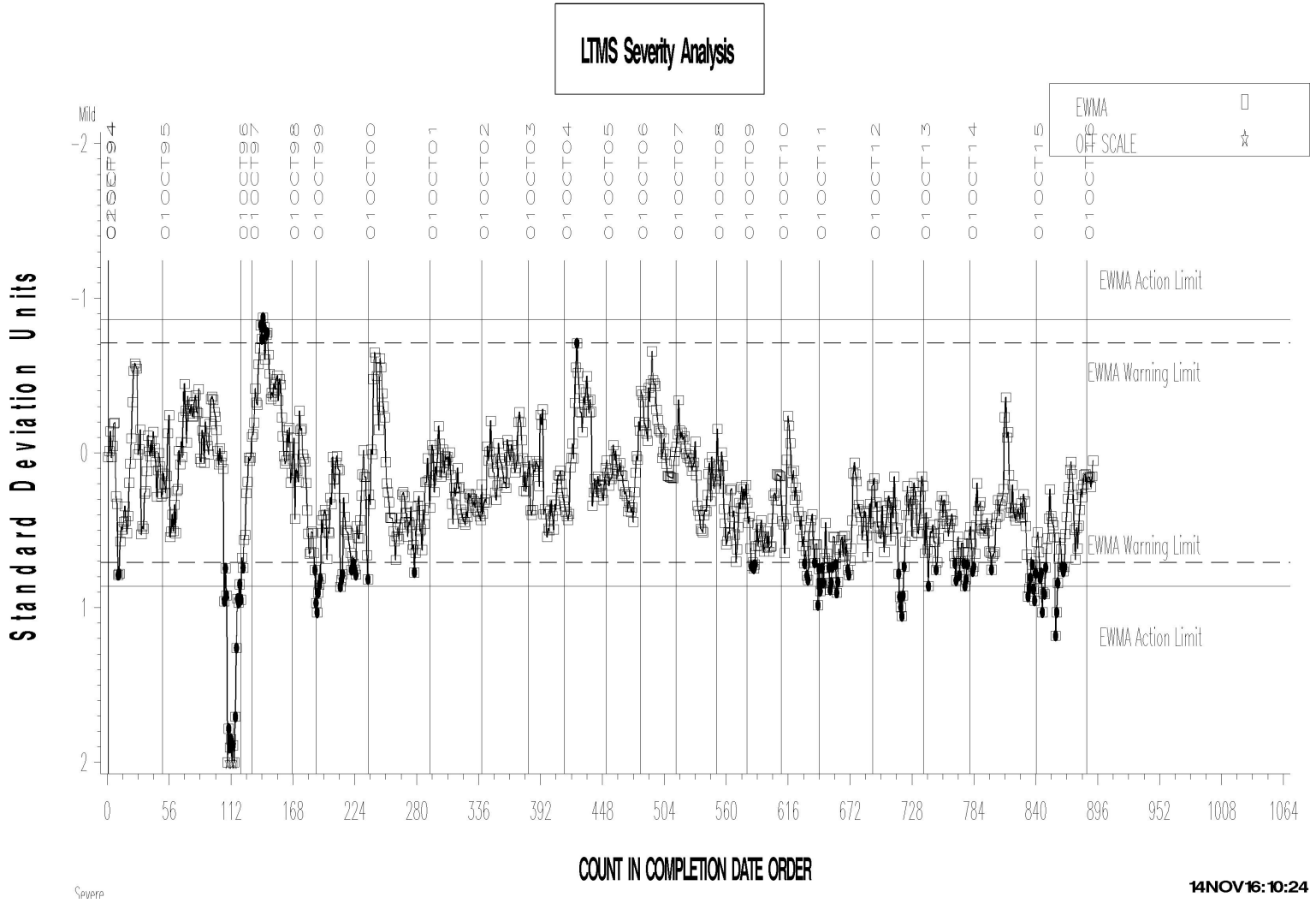
REF. FINAL PENTANE INSOLUBLES



L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

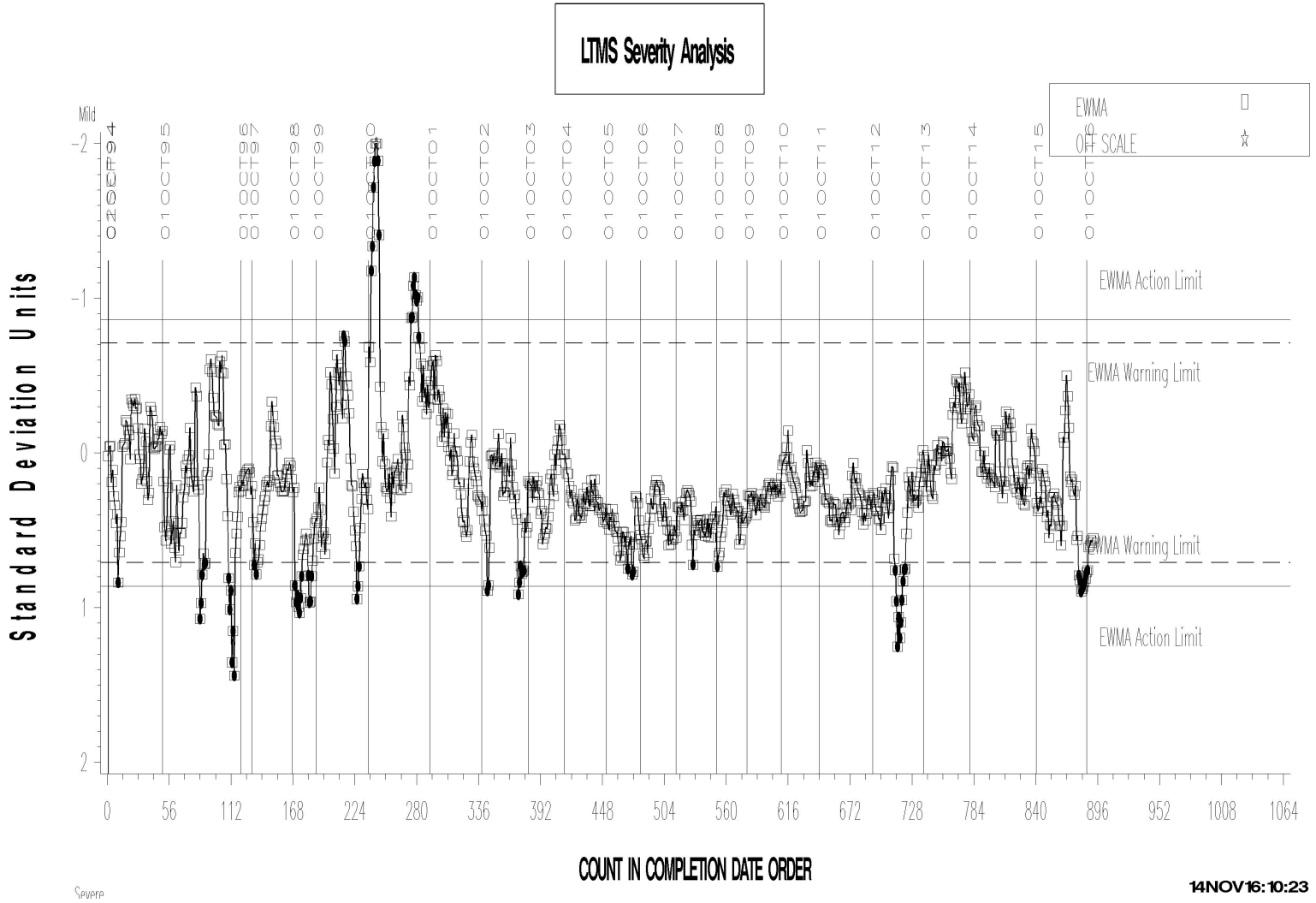
REF. FINAL TOLUENE INSOLUBLES



L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL VISCOSITY INCREASE

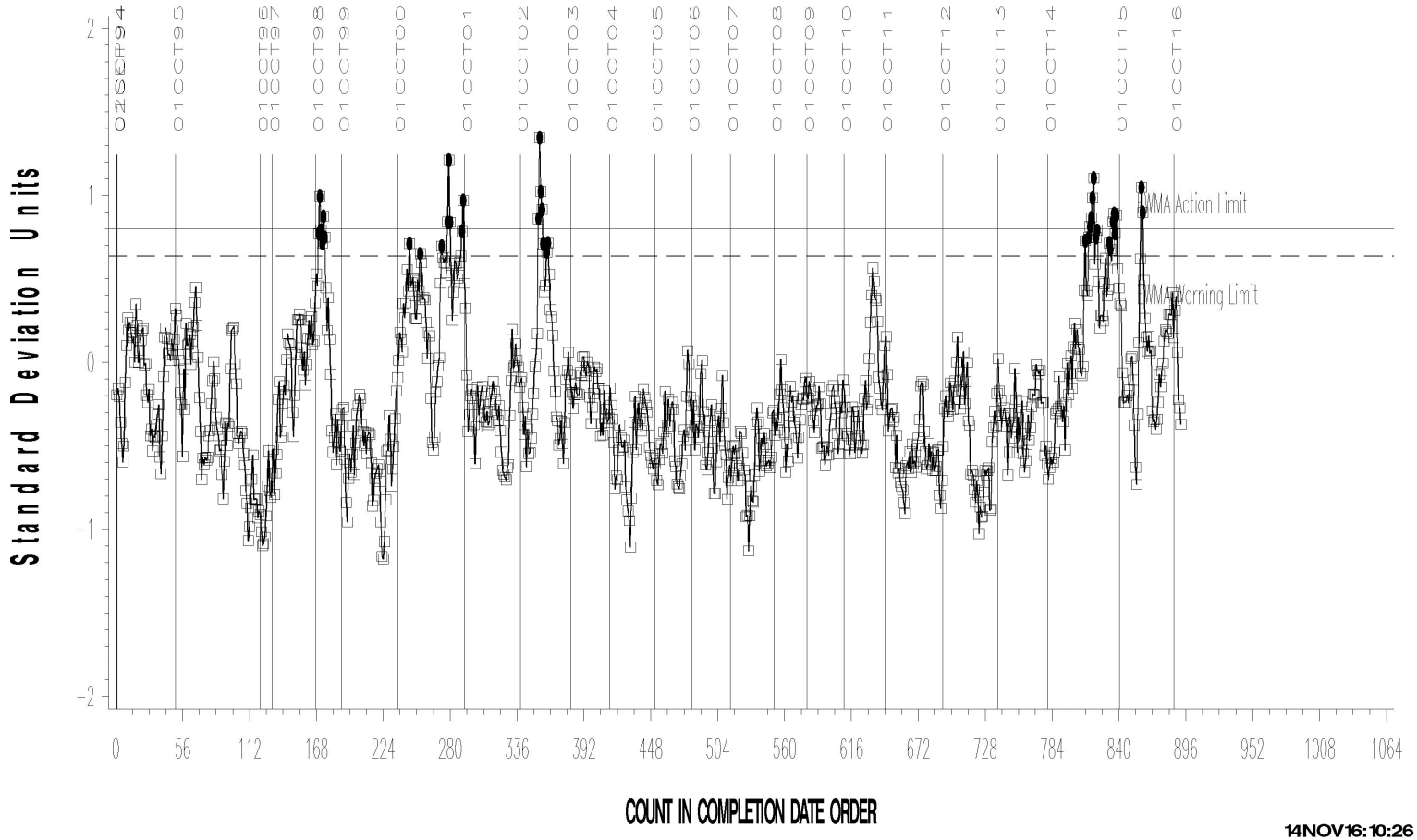


L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE CARBON/ VARNISH

LTMS Precision Analysis



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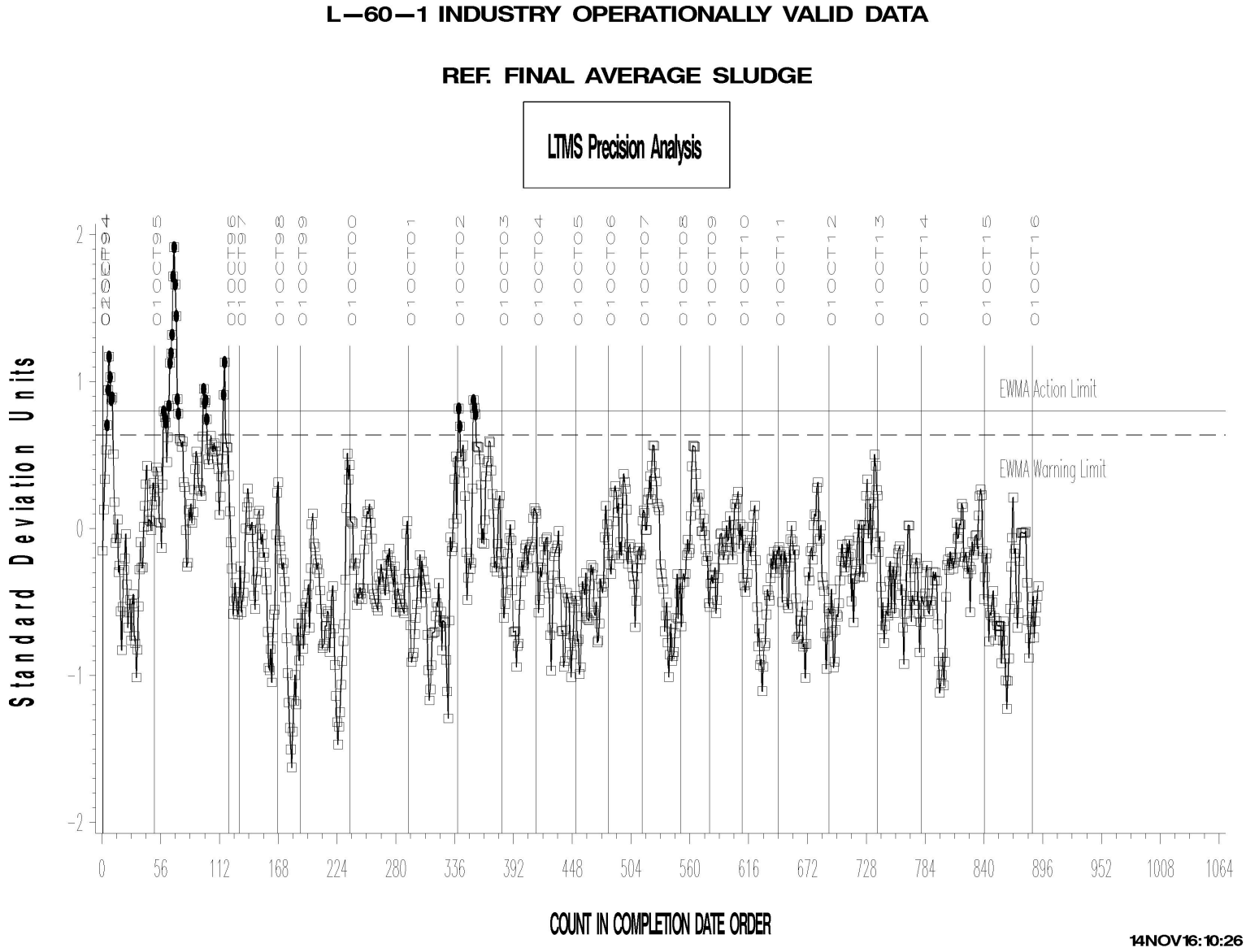
L-60-1 (D5704)


L—60—1 INDUSTRY OPERATIONALLY VALID DATA
REF. FINAL AVERAGE SLUDGE
LTMS Precision Analysis
Standard Deviation Units
EWMA Action Limit
EWMA Warning Limit
COUNT IN COMPLETION DATE ORDER
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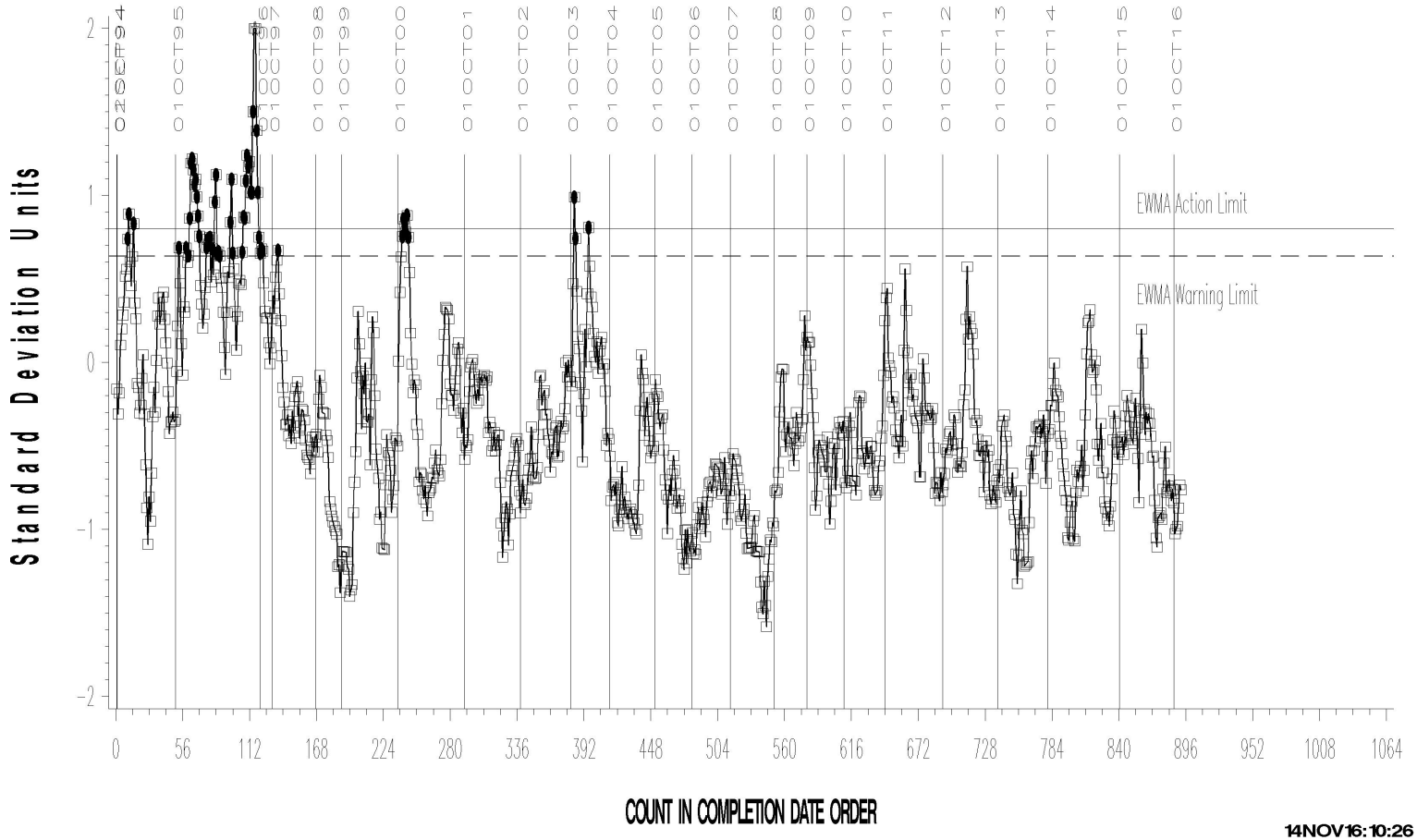
L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL PENTANE INSOLUBLES

LTMS Precision Analysis



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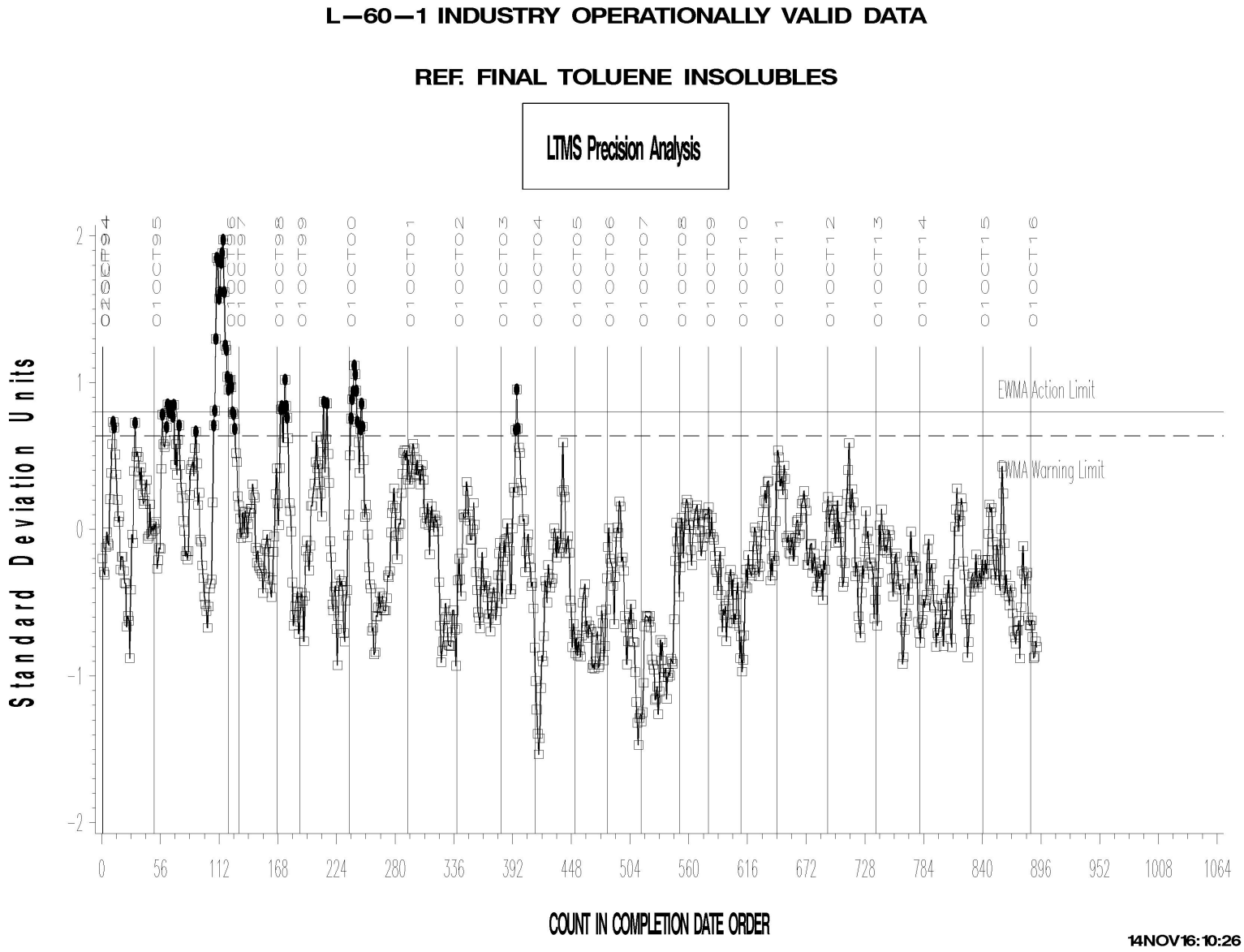
L-60-1 (D5704)


L—60—1 INDUSTRY OPERATIONALLY VALID DATA
REF. FINAL TOLUENE INSOLUBLES
LTMS Precision Analysis
Standard Deviation Units
2
1
0
−1
−2
EWMA Action Limit
EWMA Warning Limit
0
56
112
168
224
280
336
392
448
504
560
616
672
728
784
840
896
952
1008
1064
COUNT IN COMPLETION DATE ORDER
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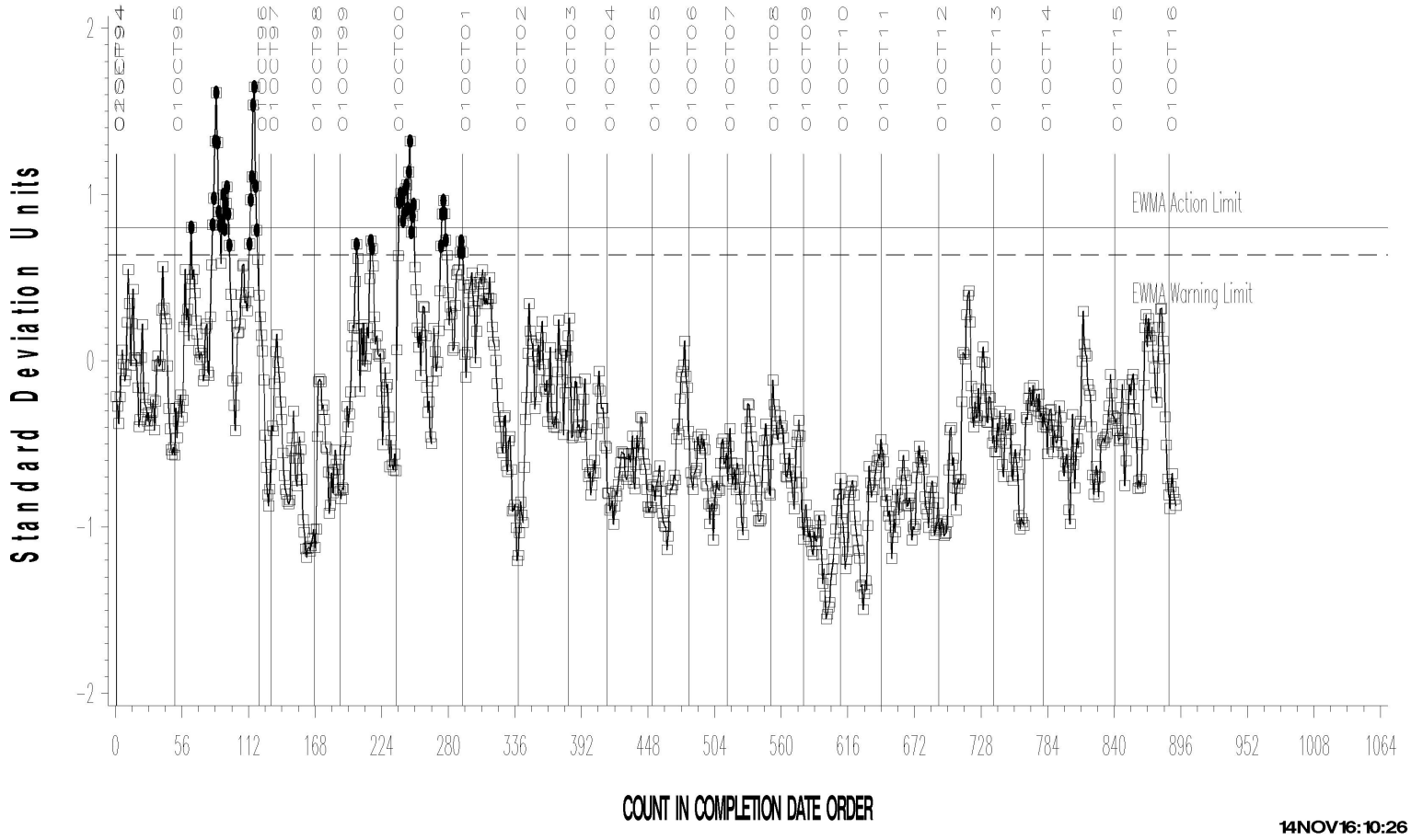
L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL VISCOSITY INCREASE

LTMS Precision Analysis



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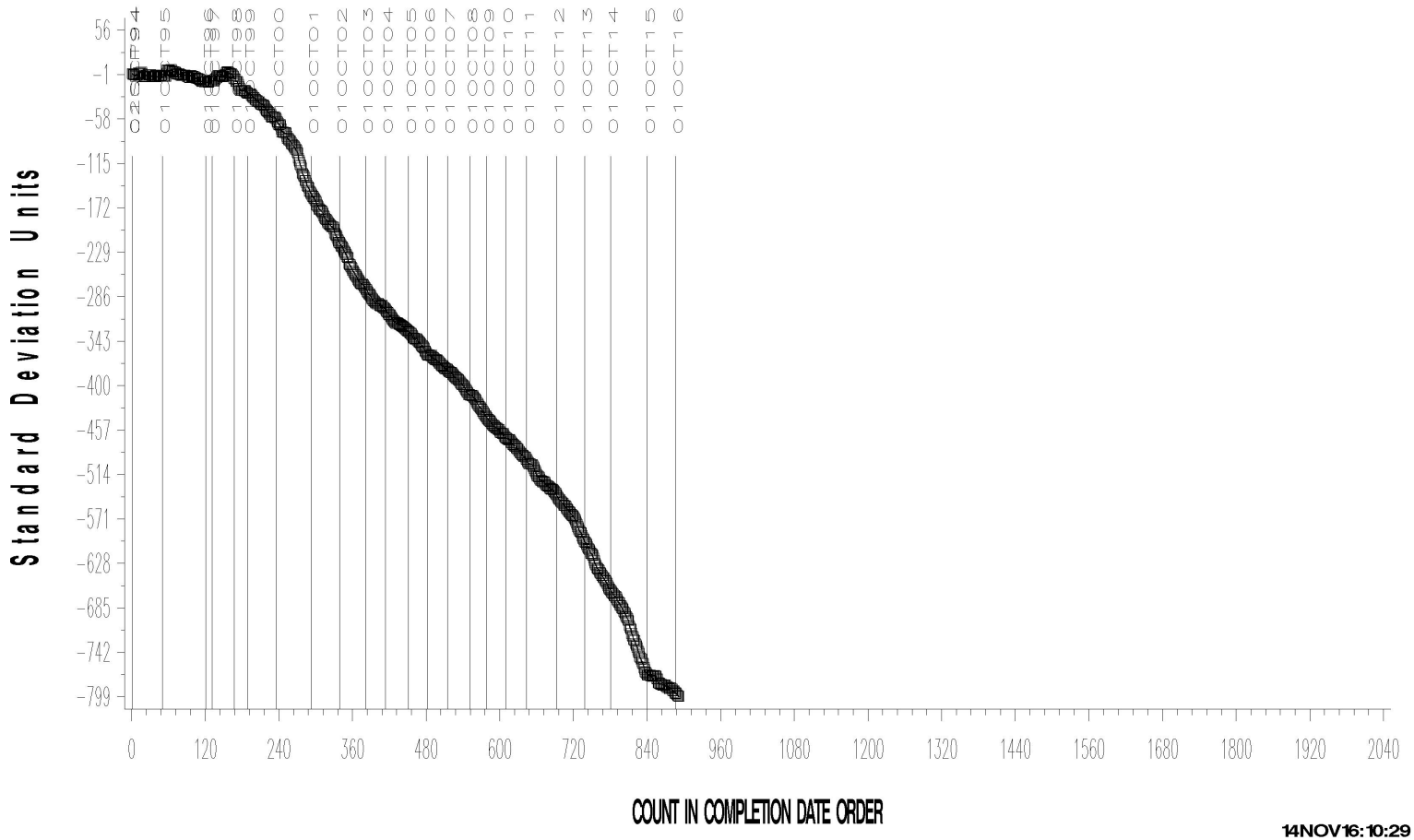
L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE CARBON/ VARNISH

CUSUM Severity Analysis



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L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL AVERAGE SLUDGE

CUSUM Severity Analysis

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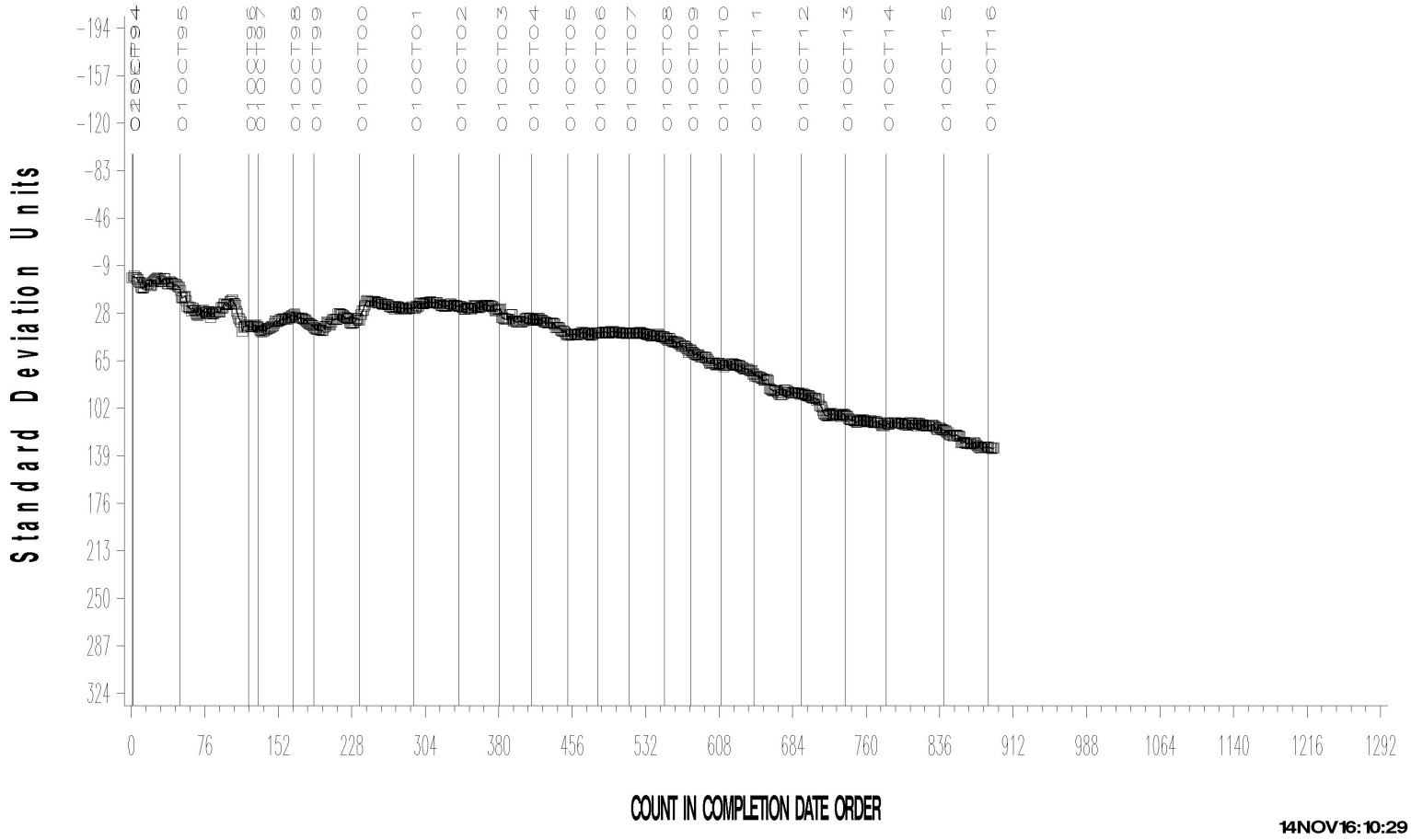
L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL PENTANE INSOLUBLES

CUSUM Severity Analysis



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L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL TOLUENE INSOLUBLES

CUSUM Severity Analysis

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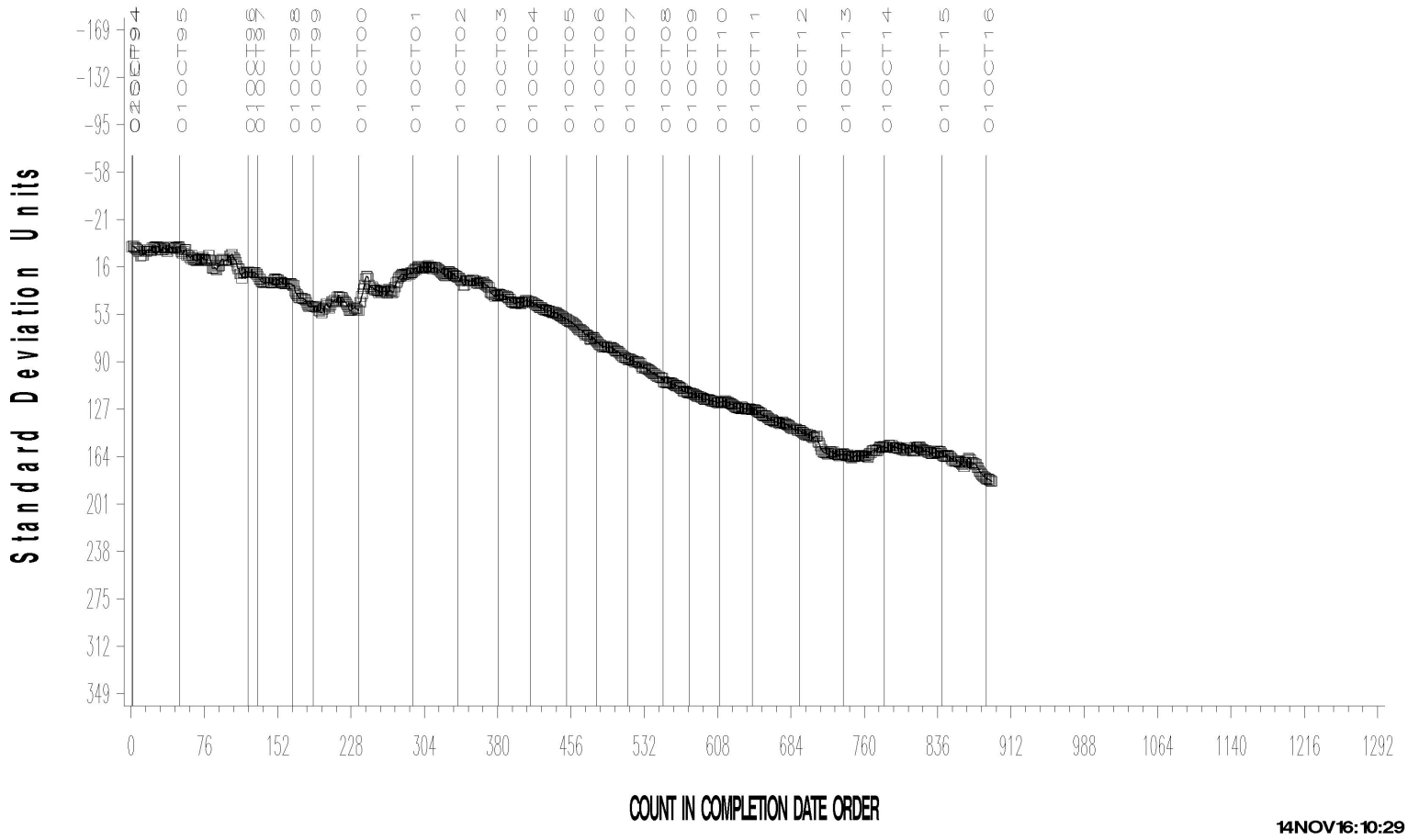
L-60-1 (D5704)

L—60—1 INDUSTRY OPERATIONALLY VALID DATA

REF. FINAL VISCOSITY INCREASE

CUSUM Severity Analysis



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L-60-1 (D5704)

TIMELINE ADDITIONS

Effective Date	Information Letter	Event
20160526	16-1	Clarification of how corrected test results are to be reported.

L-60-1 (D5704)

LAB VISITS

One L-60-1 lab visit was conducted this period. No procedural nonconformances were found.

INFORMATION LETTERS

Information Letter 16-1 was issued on May 26, 2016 to clarify how to handle test results where a correction factor causes the result to exceed the upper or lower range of the measurement scale.

L-60-1 (D5704)

STATUS OF REFERENCE OIL SUPPLY

		@ TMC	
Oil	Cans @ Labs	Cans	Gallons
148-1	20	435	27.2
151-2	0	0	0.0
155-1	22	624	39.0
Total	42	1059	66.2

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 197 gallons is available for use in other gear testing.

Four hundred and thirty five tests of oil 148-1 remain in TMC inventory; however, this is only 27 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.