Test Monitoring Center
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(412) 365-1000

MEMORANDUM: 01-129

DATE: October 16, 2001

TO: Jerry Gropp, Chairman, L-60-1 Surveillance Panel

FROM: Donald Lind

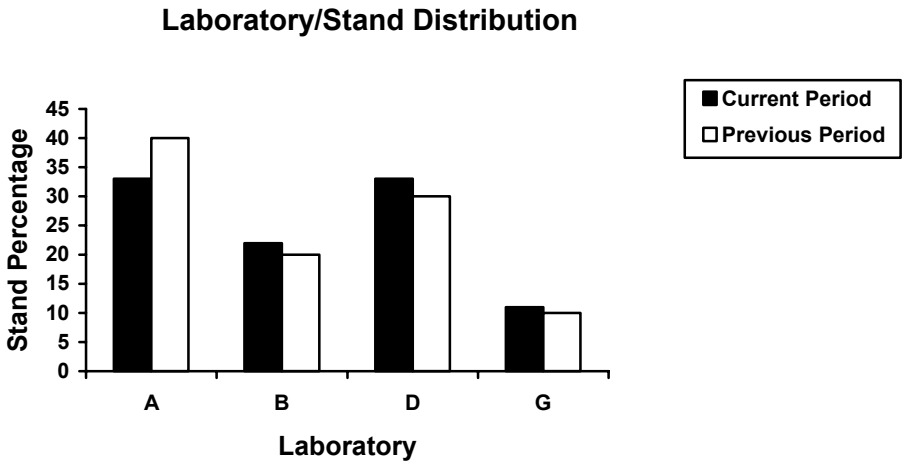
SUBJECT: L-60-1 Reference Test Status from April 1, 2001 through September 30, 2001

The following is a summary of the L-60-1 reference oil tests that were reported to the Test Monitoring Center during the period April 1, 2001 through September 30, 2001.

Lab/Stand Distribution

	Reporting Data	Calibrated as of 9/30/01
Number of Laboratories	4	4
Number of Stands	9	7

The following chart shows the laboratory/stand distribution:

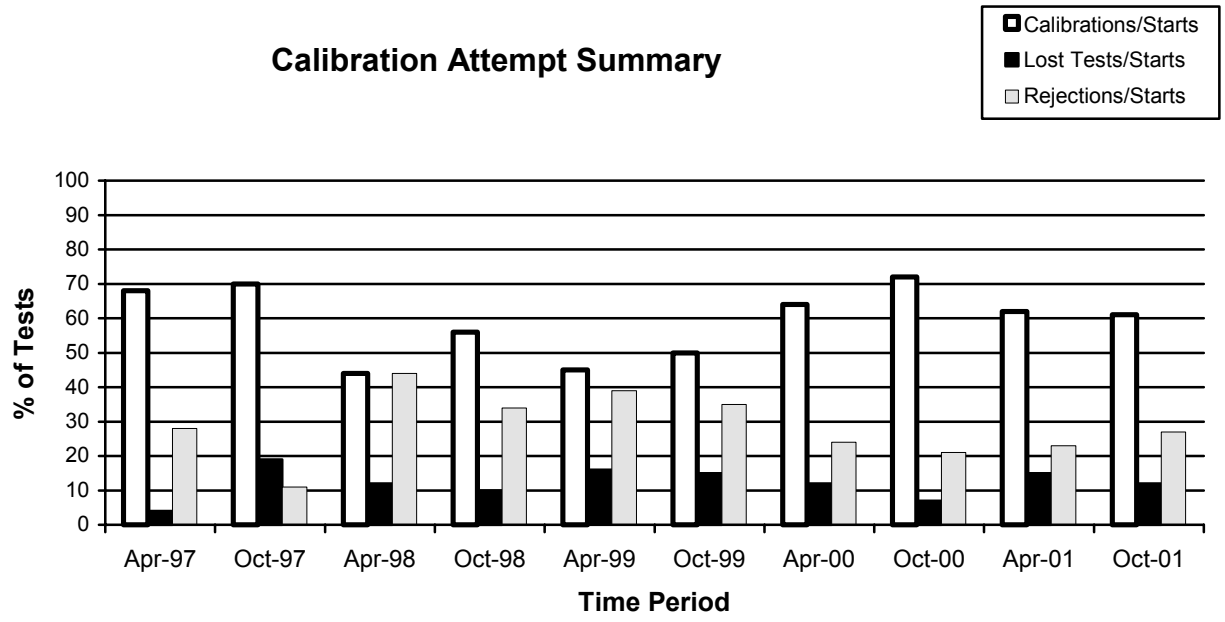


The following summarizes the status of the reference oil tests reported to the TMC:

	TMC Validity Codes	No. of Tests
Operationally and Statistically Acceptable	AC	20
Statistically Invalid Calibration Test	OC	9
Operationally Invalid, Laboratory Judgment	LC	4
Operationally Invalid, (Laboratory & TMC Judgment)	RC	0
Aborted	XC	0
Total		33

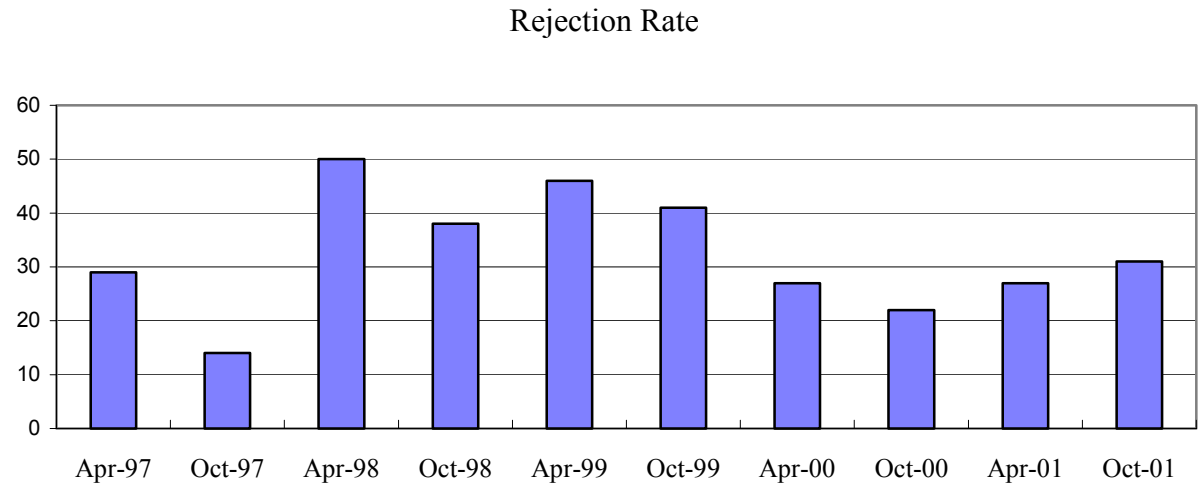
Additionally there were 7 tests conducted to evaluate test stands.

Calibrations per start, lost tests per start and rejection per start rates are summarized below:

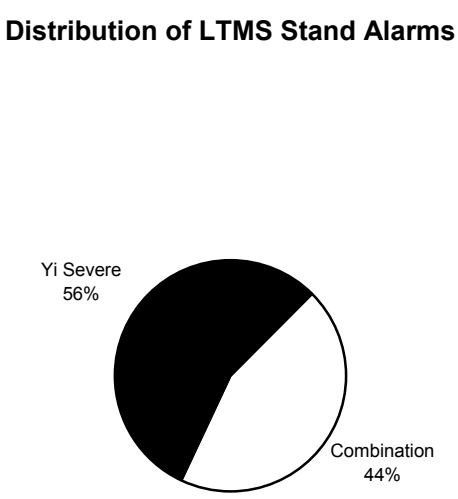


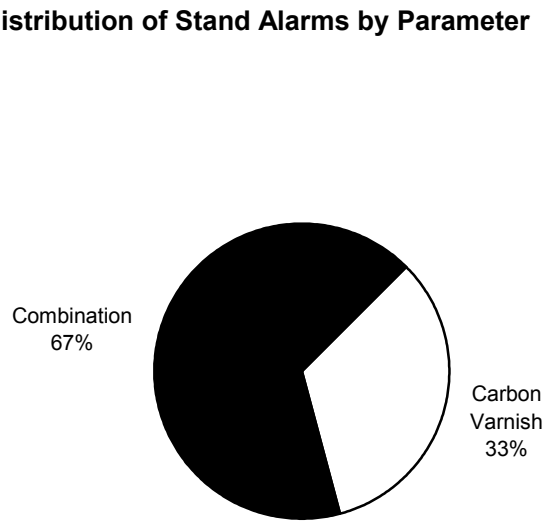
The calibration per start rate and lost test per start rate have decreased when compared to the previous period. The rejected test per start rate has increased with respect to the previous period.

The operationally valid statistically rejected test rate, as shown below, indicates an increase with respect to the previous period.



A detailed list of reasons tests failed the acceptance criteria is shown in Table 1. The following charts summarize these reasons with a breakdown by parameter of the failed tests:





No LTMS deviations were written this period. There have been no LTMS deviations written in previous report periods.

There were four lost tests reported this period. Lab A had one invalid test and Lab D had three invalid tests. A detailed list of reasons for aborted and operationally invalid tests is shown in the Table below:

Summary of Reasons for Aborted and Operationally Invalid Tests

Reasons	No. of Tests
Broken Heater Belt	1
Air Flow Control Problem	1
Analytical Tests not completed within the 48 Hour Requirement	1
Computer Problems	1

Severity and Precision

For this period, the mean delta/s was -0.443 severe (-6.43 merits) for Viscosity Increase, 0.280 severe (0.68 merits) for Pentane Insolubles, 0.366 severe (0.63 merits) for Toluene Insolubles, -1.425 severe (-1.38 merits) for Average Carbon/Varnish and -0.481 severe (-0.05 merits) for Average Sludge. Pooled s values for the current report period and historically are shown in the table below:

Pooled Standard Deviation Table [1]

Parameter	Report Period Pooled s (All Oils)	Historical Pooled s (All Oils)	Pooled s Values Used for Severity Adjustment Calculations
Viscosity	0.14	0.15	0.15
Pentane	0.18	0.38	0.73
Toluene	0.27	0.50	0.75
Carbon Varnish	0.41	0.41	0.45
Sludge	0.12	0.23	0.16

Industry Control Charts

Figures 1 through 5 show the industry control charts through September 30, 2001. The industry alarms triggered this report period are detailed below.

Pentane Insolubles

There were five industry EWMA precision alarms this report period (three warning and two action) as shown in Figure 1. The alarms appear to be caused by test results from Lab B. Alarms are cleared if Lab B data for this report period is removed as illustrated in Figure 6.

Toluene Insolubles

There were two industry EWMA severity warnings and four industry EWMA precision warnings this report period as shown in Figure 3. The alarms appear to be caused by test results from Lab B. Alarms are cleared if Lab B data for this report period is removed as illustrated in Figure 7.

Viscosity Increase

There were seven industry EWMA severity alarms this report period (five warning and two action) as shown if Figure 5. The alarms appear to be caused by test results from Lab B. Alarms are cleared if Lab B data for this report period is removed as illustrated in Figure 8.

Sludge

There were ten industry EWMA severity alarms this report period (nine warning and one action) as shown in Figure 2. The alarms could not be attributed to any one lab, stand, reference oil, or gear batch.

Carbon Varnish

There were numerous industry EWMA severity alarms this report period. The alarms could not be attributed to any one lab, stand, reference oil, or gear batch.

TMC Lab Visits

There were two lab visits conducted this report period with no procedural discrepancies to report.

Information Letters

There were no information letters issued this report period.

Reference Oil Status

The following is a listing of oils used for calibration testing along with the expected number of tests remaining at the Test Monitoring Center and at the testing laboratories. L-60-1 reference oils are shipped in quantities of 1/2 pint per test.

Oil	Number of Tests Remaining				
	Lab A	Lab B	Lab D	Lab G	TMC
131-3	0	9	0	0	0
131-4	4	9	1	2	296
133	6	5	4	0	1696
143	0	0	0	1	0
148	7	8	1	5	0
148-1	4	4	6	2	848
151-2	6	10	6	3	*
151-3	4	4	6	2	**

* 21 Gallons (Multiple test area usage)
** 543 Gallons (Multiple test area usage)

Attachments

c: L-60/L-60-1 Surveillance Panel
ftp://www.tmc.astm.cmri.cmu.edu/docs/gear/l601/semiannualreports/l601-10-2001.pdf

Listing of Tables and Figures Included as Part of This Report to the L-60-1 Surveillance Panel

Table 1 Summarizes the Reasons for Failed Tests.

Table 2 is the L-60-1 Industry Timeline.

Figure 1 is the Industry Control Chart for L-60-1 Pentane Insolubles.

Figure 2 is the Industry Control Chart for L-60-1 Average Sludge.

Figure 3 is the Industry Control Chart for L-60-1 Toluene.

Figure 4 is the Industry Control Chart for L-60-1 Carbon/Varnish.

Figure 5 is the Industry Control Chart for L-60-1 Viscosity Increase.

Figure 6 is the Industry Control Chart for L-60-1 Pentane Insolubles Excluding Lab B Data for This Report Period.

Figure 7 is the Industry Control Chart for L-60-1 Toluene Excluding Lab B Data for This Report Period.

Figure 8 is the Industry Control Chart for L-60-1 Viscosity Increase Excluding Lab B Data for This Report Period.

Table 1
Summary of Reasons for Rejected Tests

Reasons	No. of Tests
Severe Carbon Varnish	3
Severe Carbon Varnish & Mild Viscosity Increase	2
Severe Carbon Varnish, Severe Pentane Insolubles, & Severe Toluene Insolubles	1
Stand EWMA Precision Alarm Pentane Insolubles, Severe Pentane Insolubles, & Severe Toluene Insolubles	1
Severe Carbon Varnish & Severe Toluene Insolubles	1
Severe Carbon Varnish, Severe Pentane Insolubles, Severe Toluene Insolubles & Mild Viscosity Increase	1

Table 2

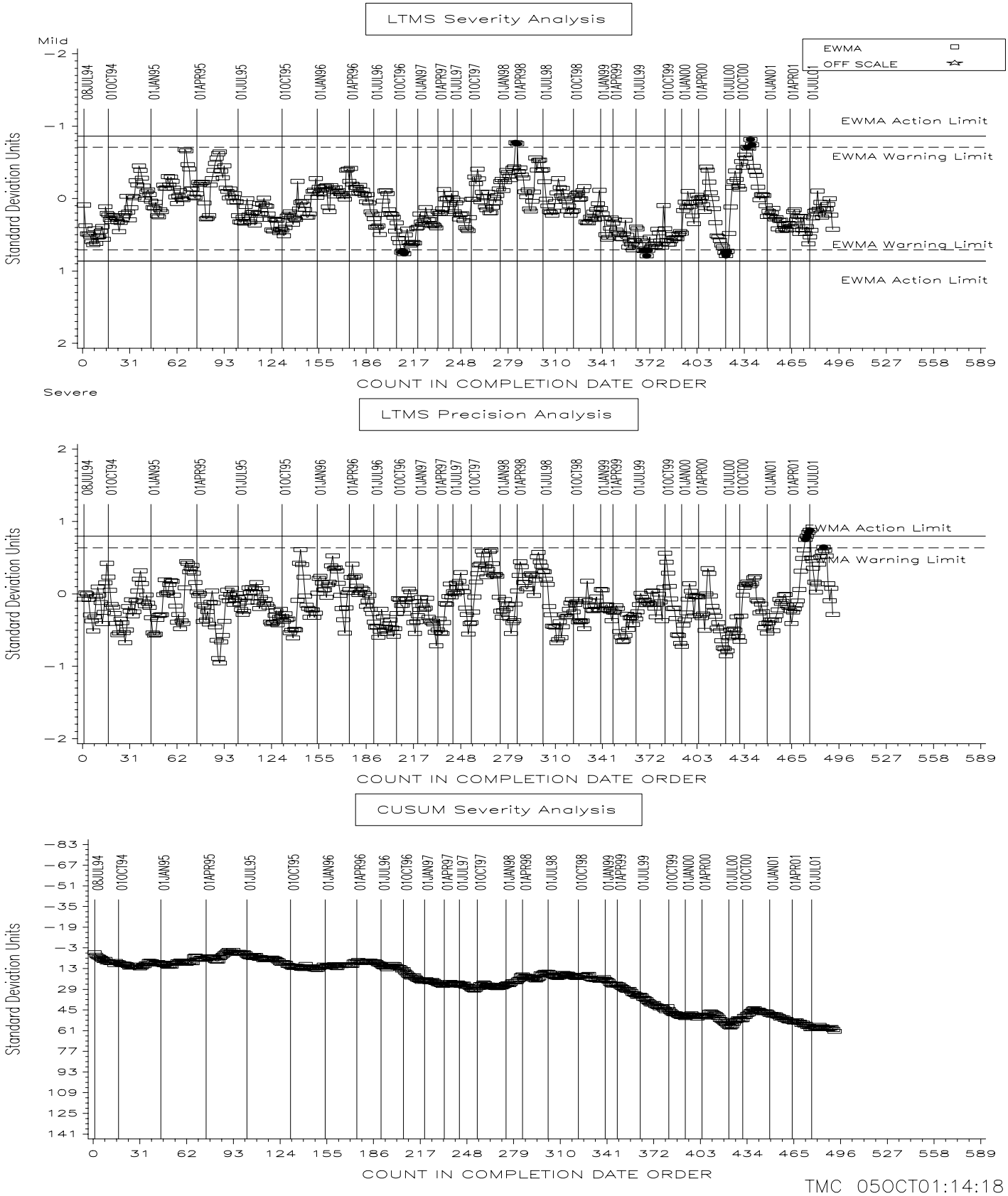
L-60-1 Timeline

Effective Date	Topic	IL#
19950901	Test Stand Motor Speed Change	95-1
19950901	Alternator Part Number Change	95-1
19950901	Air Box Heater Part Number Correction	95-1
19951115	Transforms./Correction Factors	95-1
19951103	Report Forms and Dictionary Version 19950912	95-1
19951026	Alternator Load Circuit Schematic Addition	95-2
19960122	Severity Adjustment Calculation Method	96-1
19960430	TMC One Page Addition	96-2
19960430	TMC New Address	96-2
19960531	Perfect Seal Gasket Maker Use	96-3
19960531	Gear Case Drawing (Lip Seal Use)	96-3
19960531	Report Forms and Dictionary Version 19960408	96-3
19970530	Added Percent Out Validity Criteria, Report Forms and Data Dictionary Changes (Version 19970411), Reporting of "Zero Value" Date	97-1
19970605	Revision of Primary Air Flow Spec, Removal of Air Pressure Specification	97-2
19970829	Added Average Air Box Temperature to Report Forms and Data Dictionary (Version 19970611)	97-2
19971107	Revised Precision and Bias Statement, Report Forms and Data Dictionary (Version 19970902)	97-3
19980612	Air Flow Calibration Requirement	98-1
19980623	Cleaning Agent Revision (Toluene)	98-2
19981123	Air Flow Calibration Requirement	98-3
19990100	Gear Problem (Manufacturer changed steel to lead-free metallurgy)	
19990101	Addition of CRC Gear Rating Workshop Training Requirement	98-3
19990215	Revised Gear Case Disassembly Procedure	99-1
19990301	Air Supply Line Note Addition	99-2
19990301	Data Logging Requirement	99-2
19990301	Strip Chart Requirement	99-2
19990301	Repeatability Term Change	99-2
19990609	Definition of Acceptable gears for testing due to severe ACV severity	99-3
19991016	Test Method for Pentane and Toluene Insolubles	99-4
20000427	Testing With Used Gears Discontinued	00-1
20000427	New Gear Batch 7-99 Introduced	

L–60–1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL PENTANE (% Weight)

Figure 1



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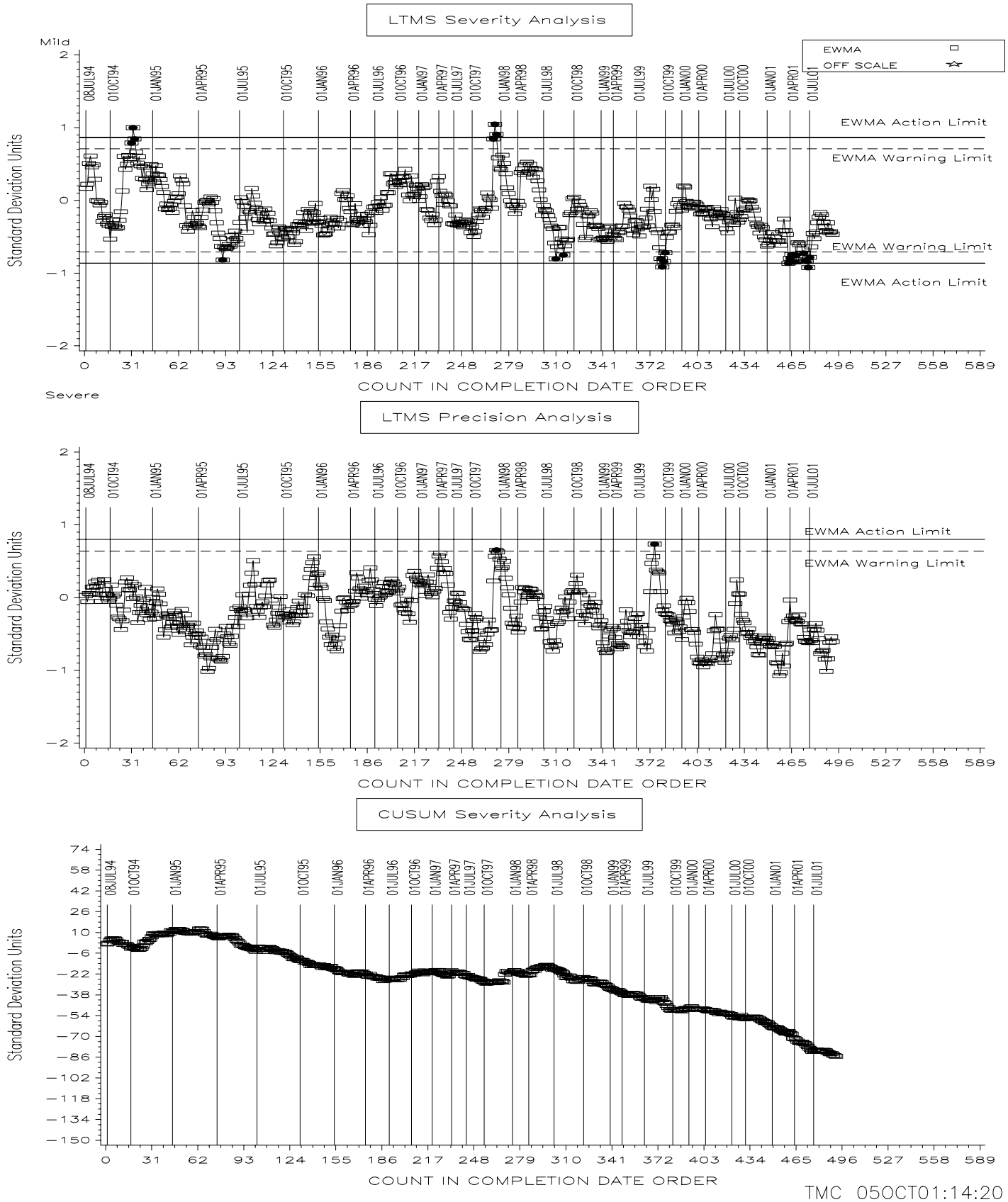
L–60–1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL SLUDGE (MERITS)

Figure 2



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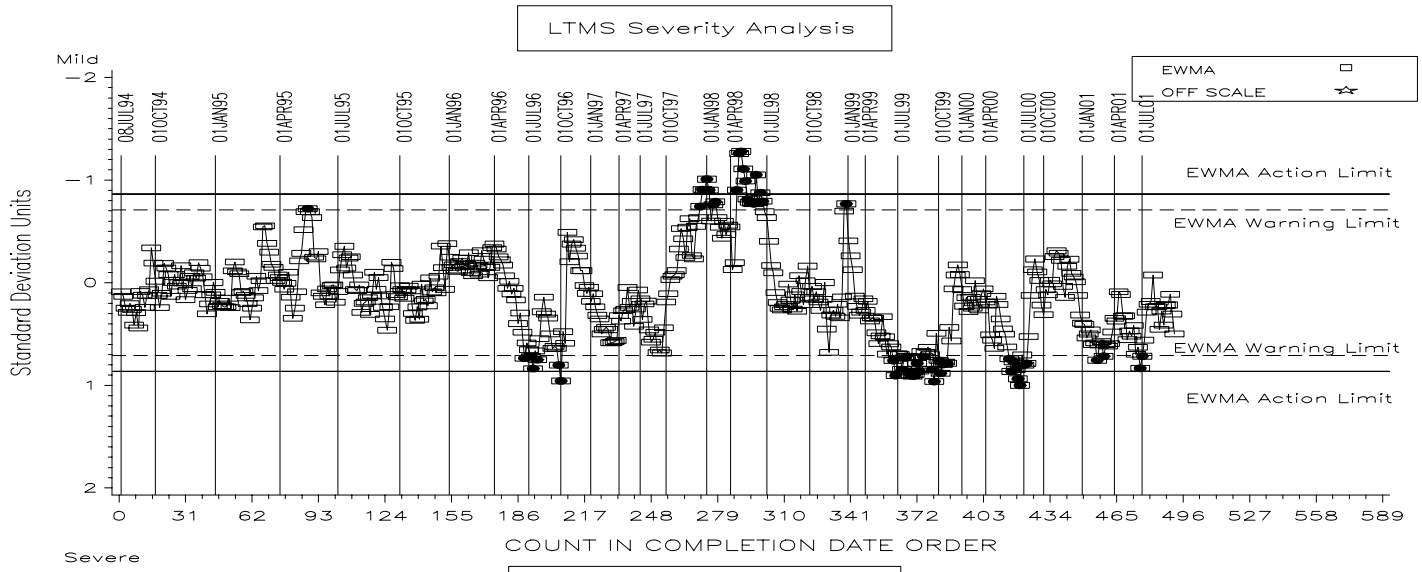
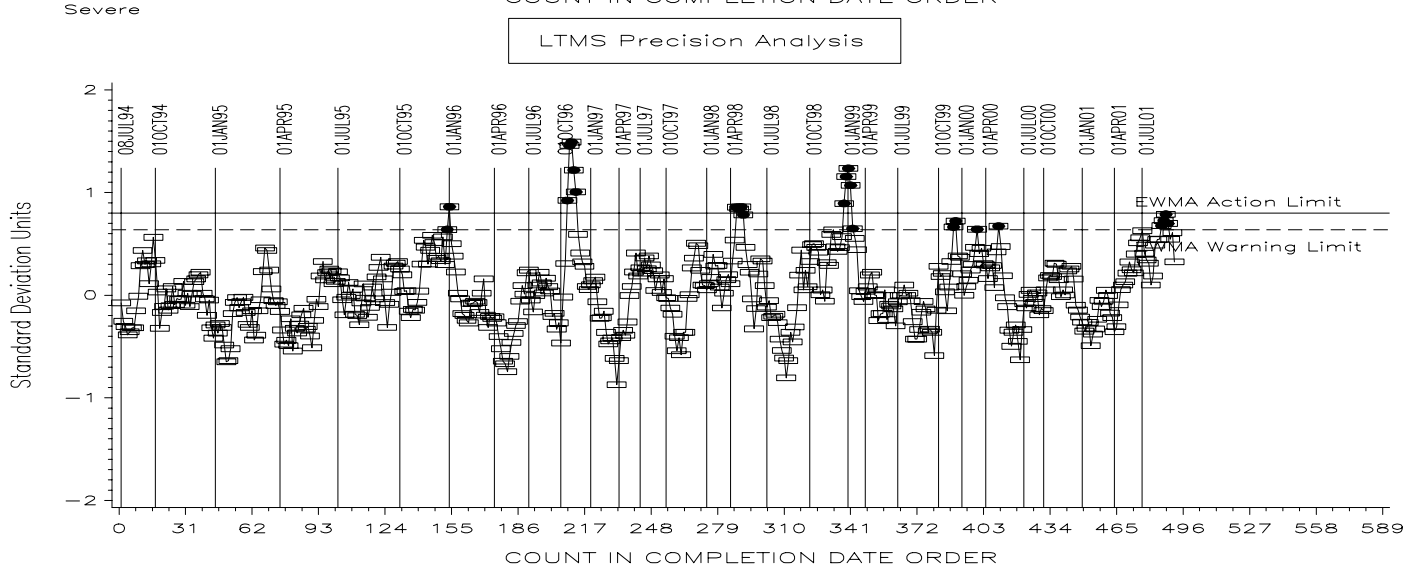
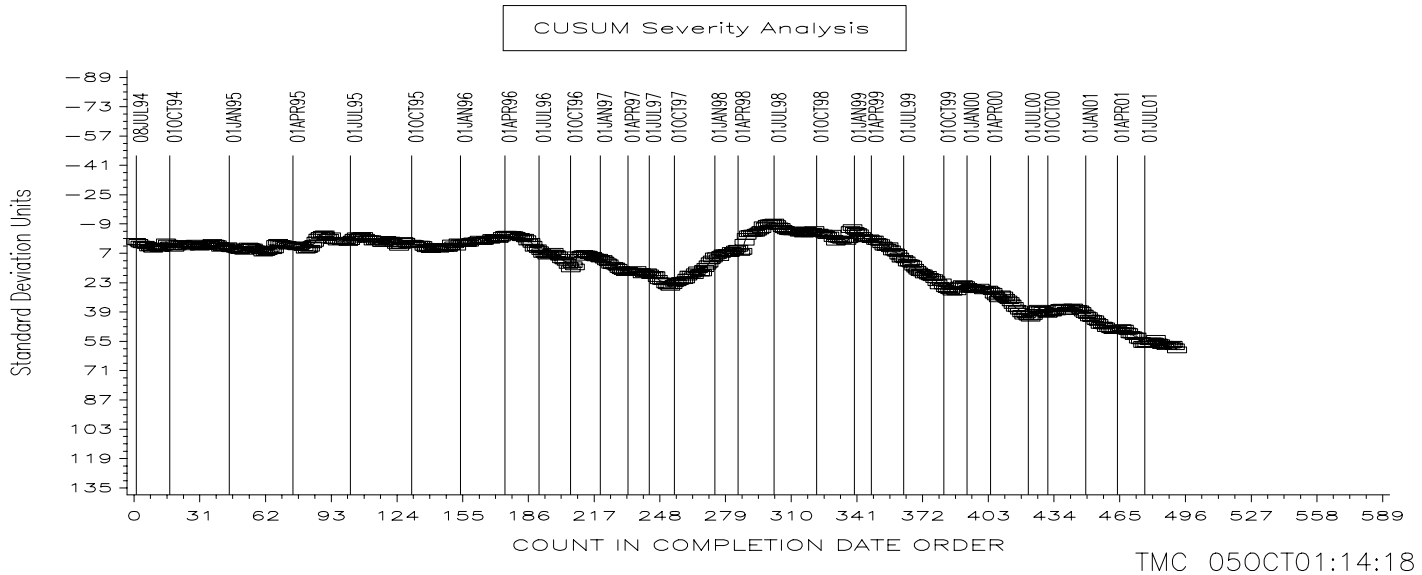
L–60–1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL TOLUENE (% WEIGHT)

Figure 3







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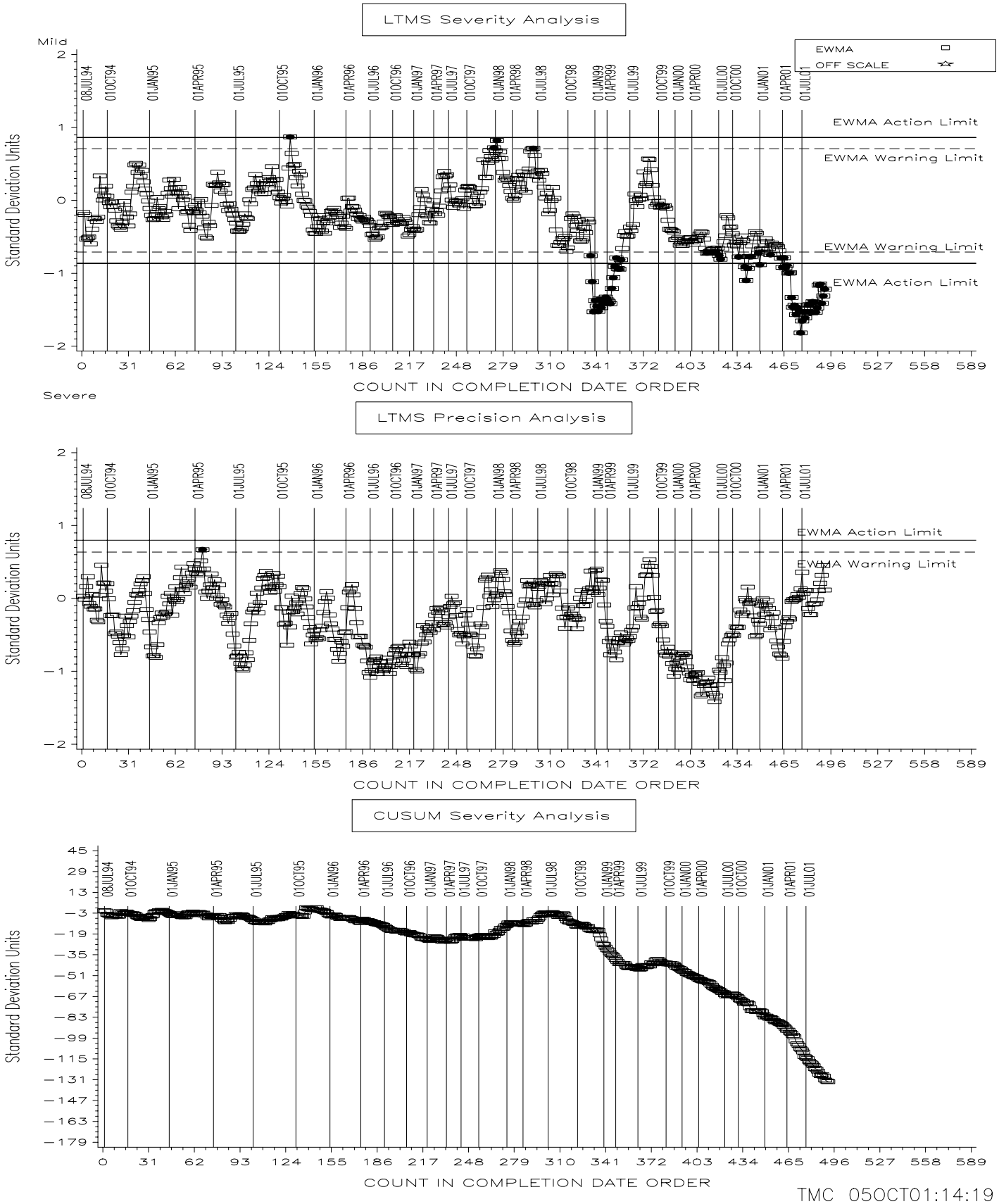
L–60–1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL CARBON VARNISH (MERITS)

Figure 4



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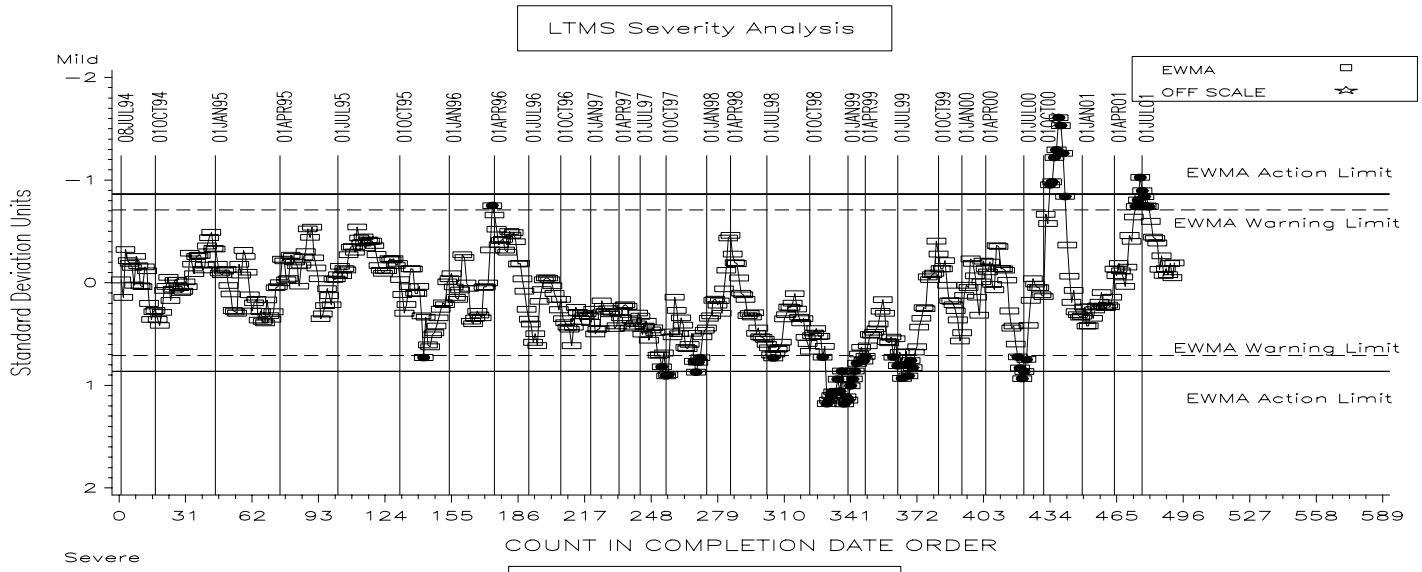
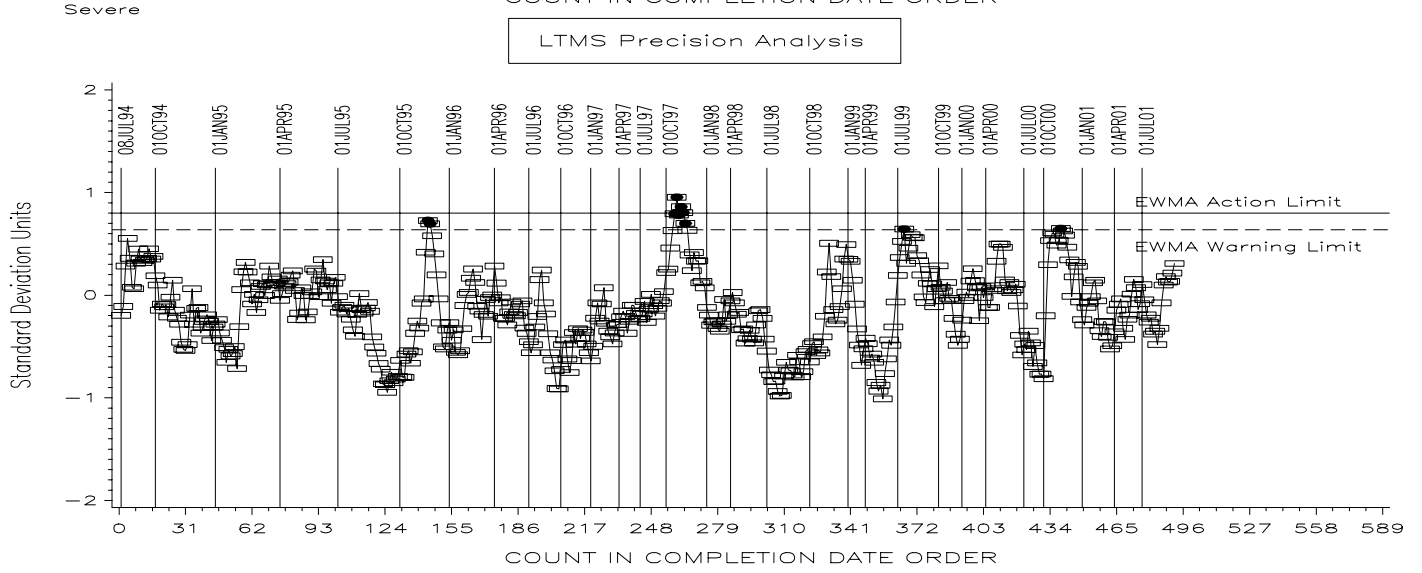
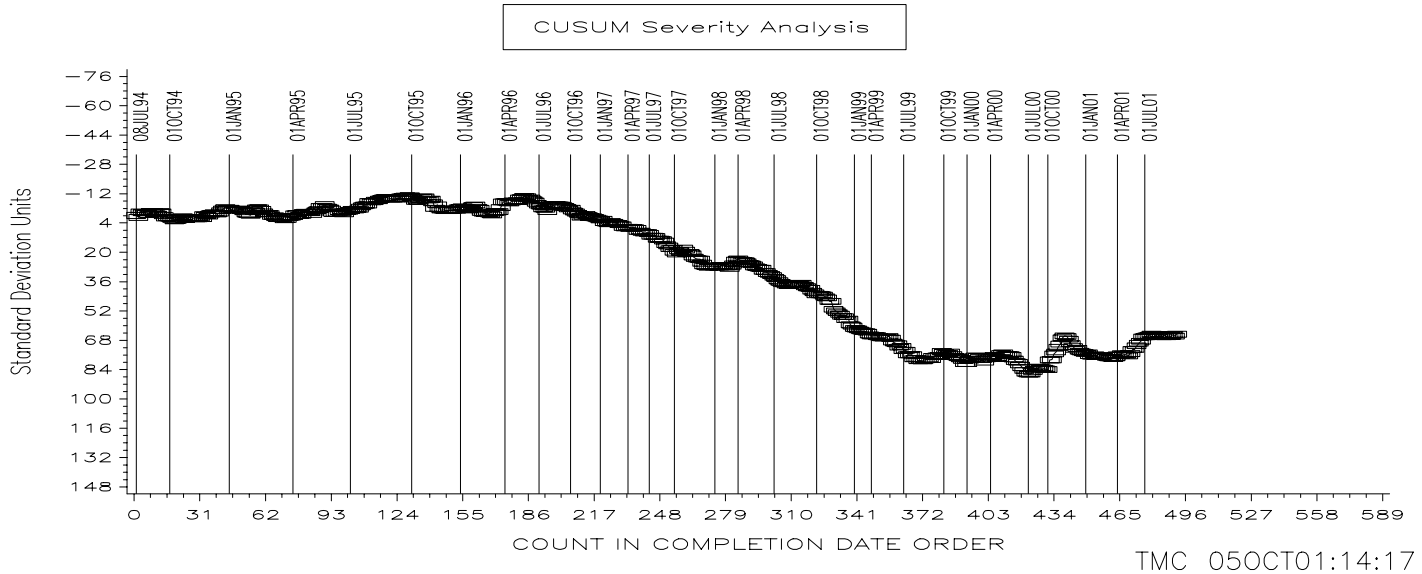
L–60–1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL VISCOSITY (% INCREASE)

Figure 5







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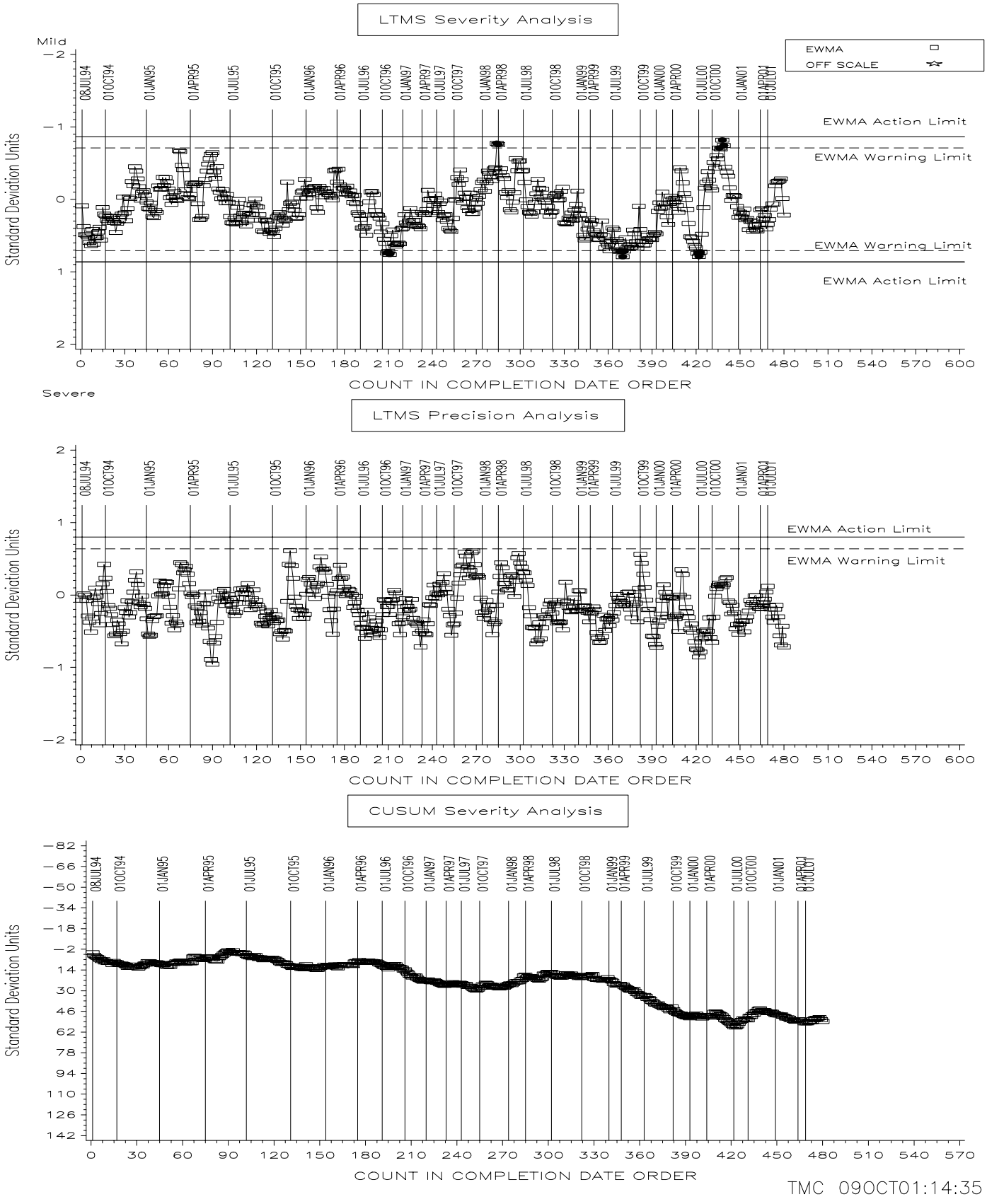
L–60–1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL PENTANE (% Weight)

Figure 6



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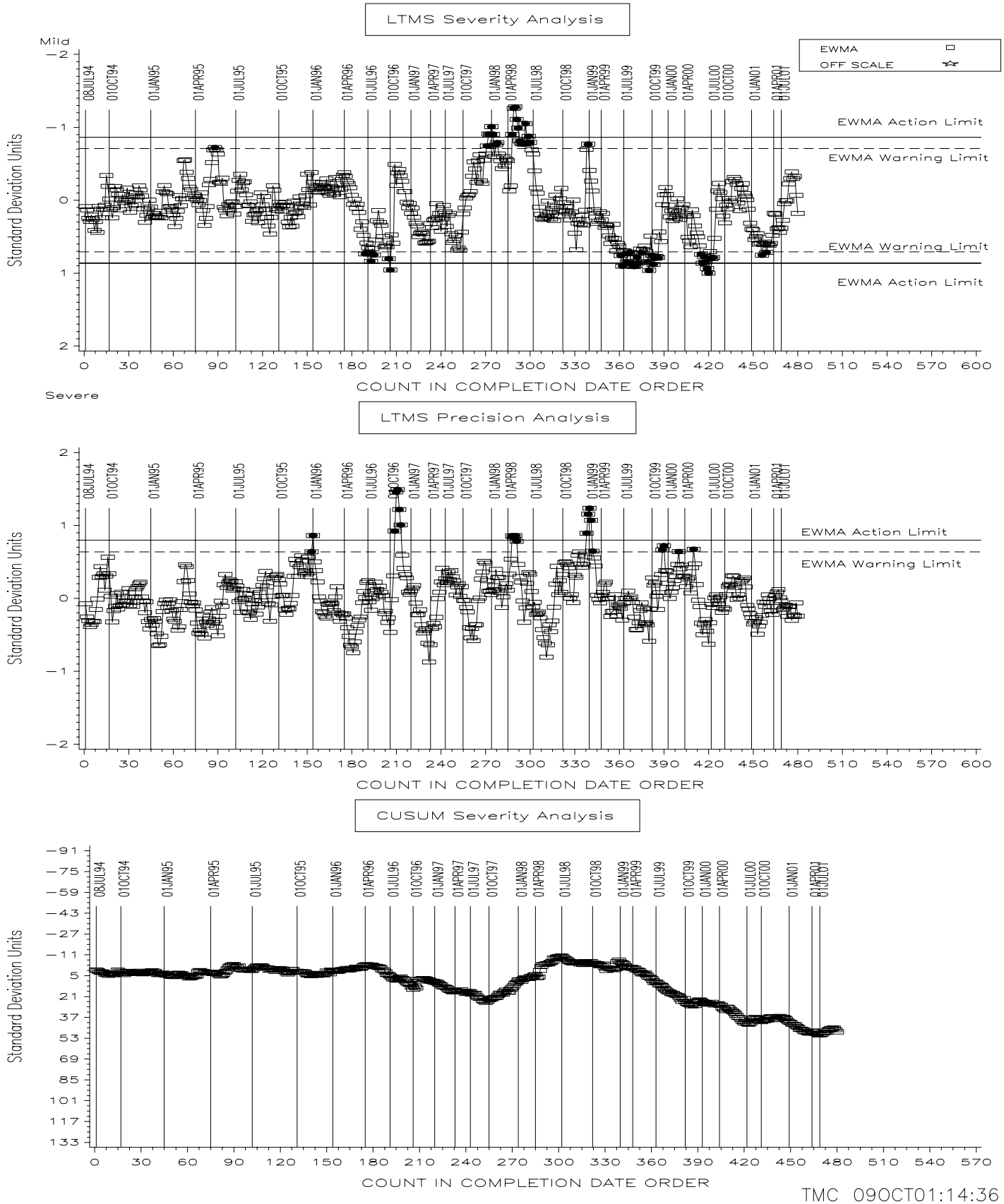
L–60–1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL TOLUENE (% WEIGHT)

Figure 7



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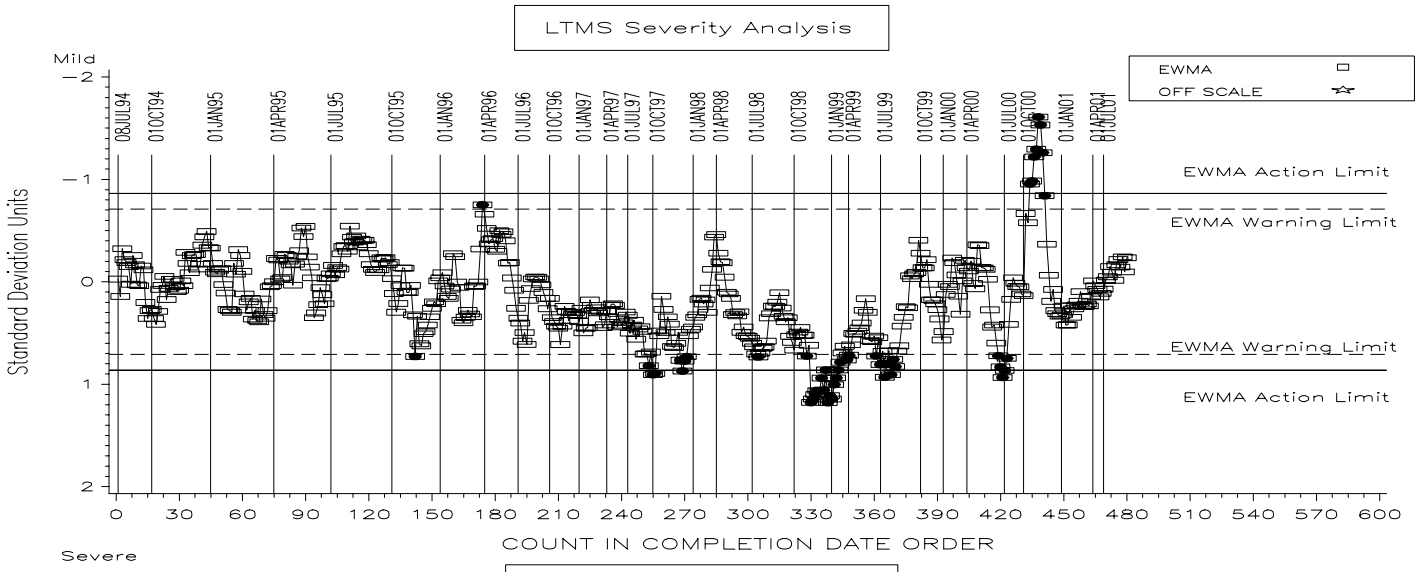
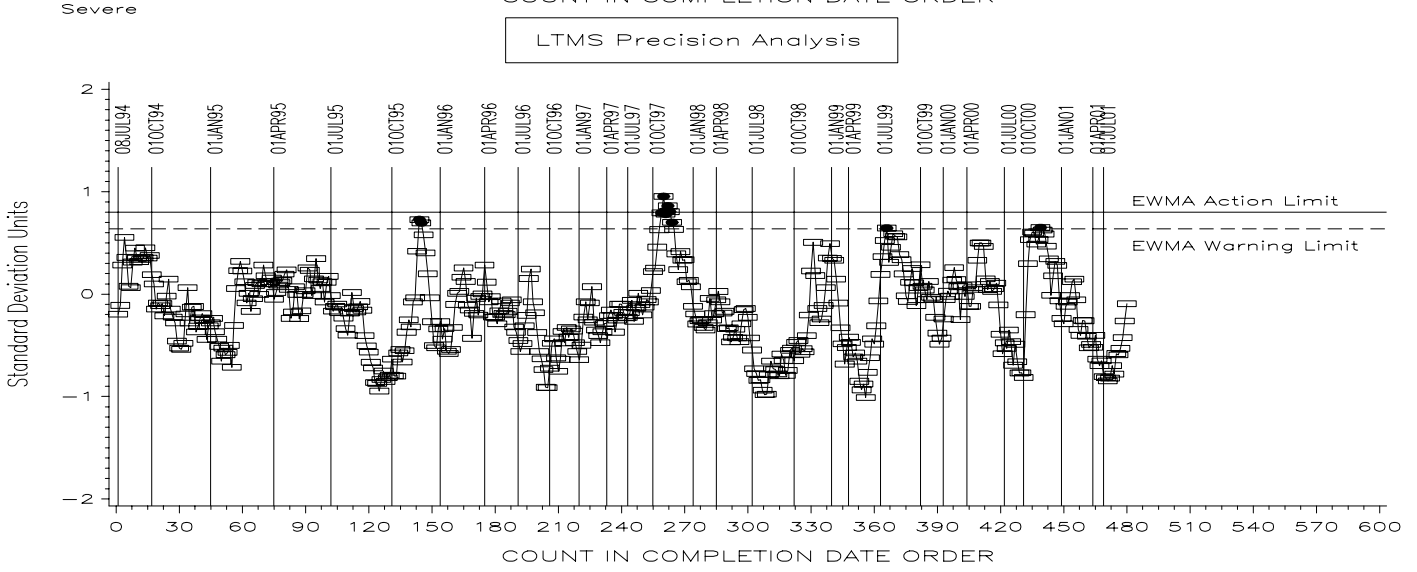
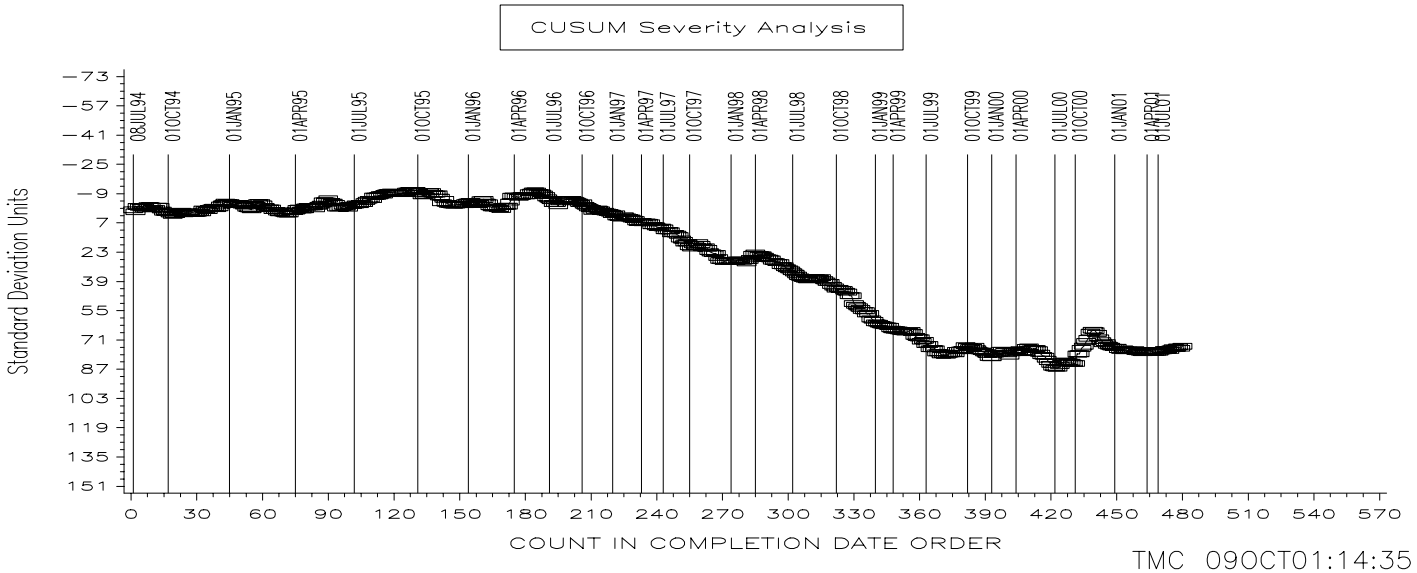
L–60–1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL VISCOSITY (% INCREASE)

Figure 8







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