



Test Monitoring Center

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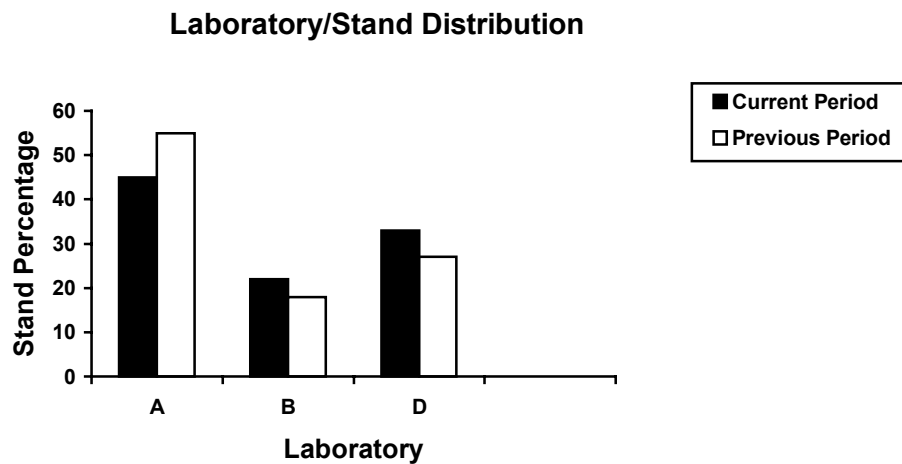
MEMORANDUM: 00-146
DATE: October 23, 2000
TO: Jerry Gropp, Chairman, L-60-1 Surveillance Panel
FROM: Donald Lind
SUBJECT: L-60-1 Reference Test Status from April 1, 2000 through September 30, 2000

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, 2000 through September 30, 2000.

Lab/Stand Distribution

	Reporting Data	Calibrated as of 9/30/00
Number of Laboratories	3	3
Number of Stands	9	7

The following chart shows the laboratory/stand distribution:

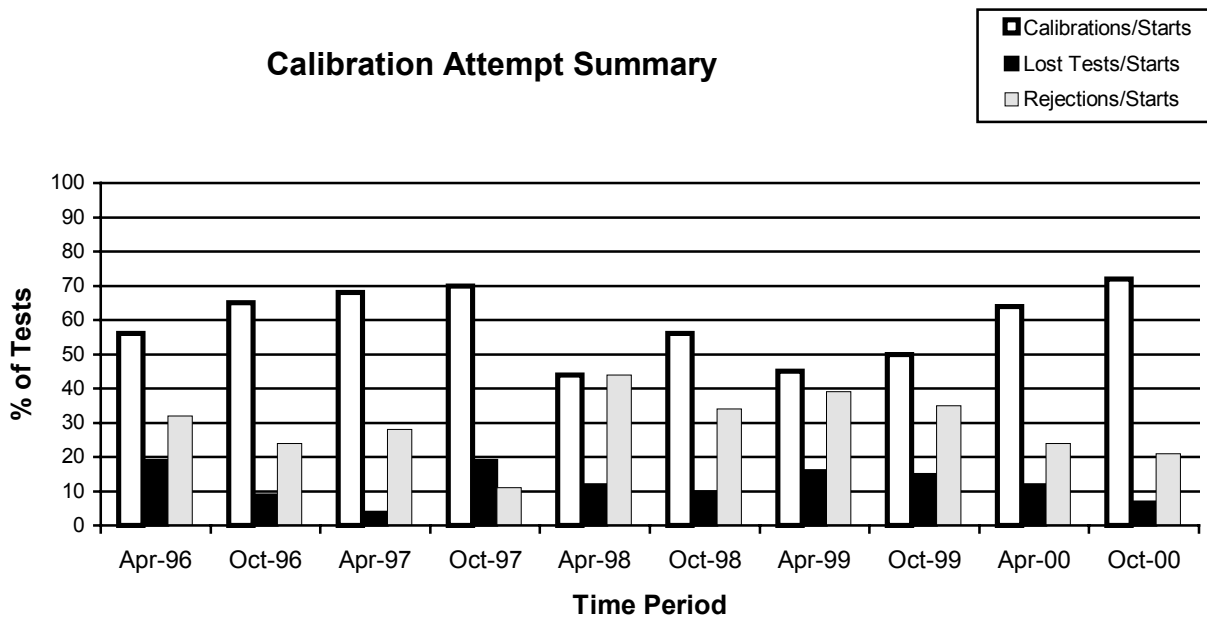


The following summarizes the status of the reference oil tests reported to the TMC:

	TMC Validity Codes	No. of Tests
Operationally and Statistically Acceptable	AC	21
Statistically Invalid Calibration Test	OC	6
Operationally Invalid, Laboratory Judgment	LC	0
Operationally Invalid, (Laboratory & TMC Judgment)	RC	1
Aborted	XC	1
Total		29

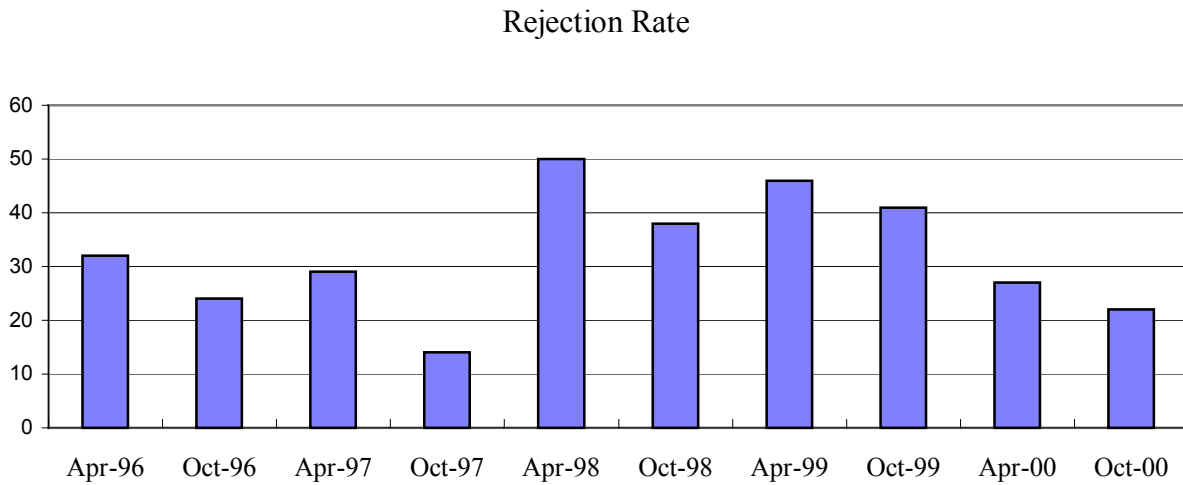
Additionally there were 8 tests conducted to develop statistics for reference oils 133 and 151-2. There was also one test conducted to evaluate a test stand.

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



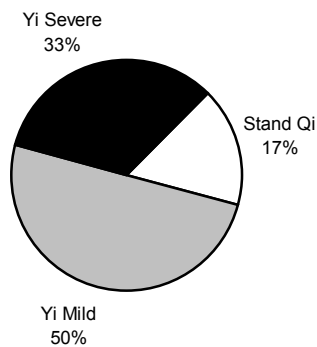
The calibration per start rate has increased when compared to the previous period. The rejected test per start and lost test per start rates have decreased with respect to the previous period.

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

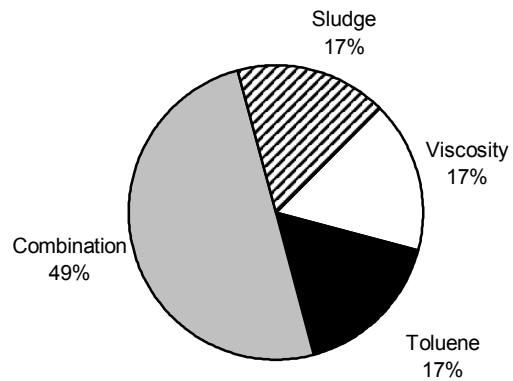


A detailed list of reasons tests failed the acceptance criteria is shown in Table 1. The following charts summarize these reasons with a breakdown by parameter of the failed tests:

Distribution of LTMS Stand Alarms

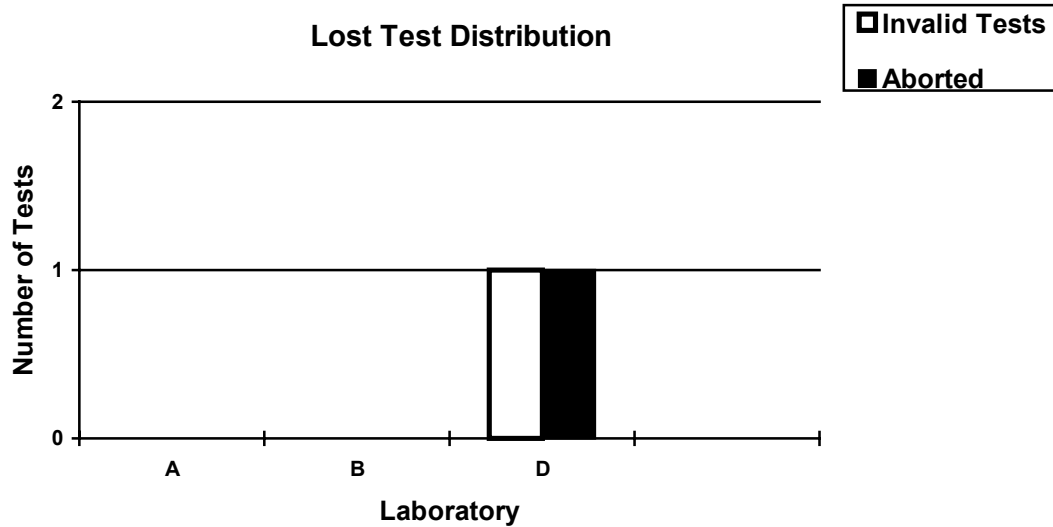


Distribution of Stand Alarms by Parameter



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

A detailed list of reasons for aborted and operationally invalid tests is shown in Table 2. The following chart summarizes the lost test distribution by lab:



Severity and Precision

For this period, the mean delta/s was 0.258 severe (3.95 merits) for Viscosity Increase, 0.129 severe (0.30 merits) for Pentane Insolubles, 0.485 severe (0.88 merits) for Toluene Insolubles, -0.535 severe (-0.48 merits) for Average Carbon/Varnish and -0.259 severe (-0.03 merits) for Average Sludge. Pooled s values are shown in the following table.

Pooled Standard Deviation Table ¹

Parameter	Current Period		Historical Pooled s (all oils)
	Std. Dev. - SA ²	Pooled s (all oils)	
Viscosity	0.230 ³	0.169	0.149
Pentane	0.503 ⁴	0.397	0.390
Toluene	0.690 ⁴	0.554	0.506
Carbon/Var.	0.204 ⁵	0.203	0.417
Sludge	0.123 ⁵	0.210	0.241

¹ All values are in transformed units

² Standard Deviations shown are based on oils used to compute standard deviations which are used for severity adjustments

³ Reference Oils 131-3, 131-4 & 143

⁴ Reference Oils 131-3 & 131-4

⁵ Reference Oils 143 & 148

Industry Control Charts

Figures 1 through 5 show the industry control charts through September 30, 2000. The industry alarms triggered this report period are detailed below.

Pentane Insolubles

There were three industry EWMA severity warning alarms this report period. The alarms were not caused by any one lab, stand or reference oil.

Toluene Insolubles

There were eight industry EWMA severity alarms this report period (five warning and three action) and one industry EWMA precision warning alarm this report period. The alarms were not caused by any one lab, stand or reference oil.

Viscosity Increase

There were five industry EWMA severity alarms this report period (three warning and two action). The alarms appear to be caused by one lab (Lab D). The alarms are cleared after removing the test results of lab D for this report period (Figure 6).

Sludge

There were no alarms this report period.

Carbon Varnish

There were four industry EWMA severity warning alarms this report period. The alarms were not caused by any one lab, stand or reference oil.

TMC Lab Visits

There were two lab visits this report period with no 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	TMC
131-3	0	9	0	0
131-4	4	9	1	296
133	5	1	3	1724
148	7	6	8	119
151-2	3	0	0	*
151-3	4	4	6	**

* 28 Gallons (Multiple test area usage)

** 674 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/l601-10-2000.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 Summarizes the Reasons for Aborted and Operationally Invalid Tests.

Table 3 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 Viscosity Increase Excluding the Test Results From Lab D for This Report Period.

Table 1
Summary of Reasons for Rejected Tests

Reasons	No. of Tests
Severe Toluene Insolubles	1
Severe Viscosity Increase	1
Mild Sludge	1
Mild Pentane and Toluene Insolubles	1
Mild Pentane and Toluene Insolubles, Mild Viscosity Increase	1
Stand EWMA Precision Warning (Viscosity Increase and Pentane Insolubles)	1

Table 2
Summary of Reasons for Aborted and Operationally Invalid Tests

Reasons	No. of Tests
Defective DC Load Pick-up	1
Exceeded Warm-up Time	1

Table 3

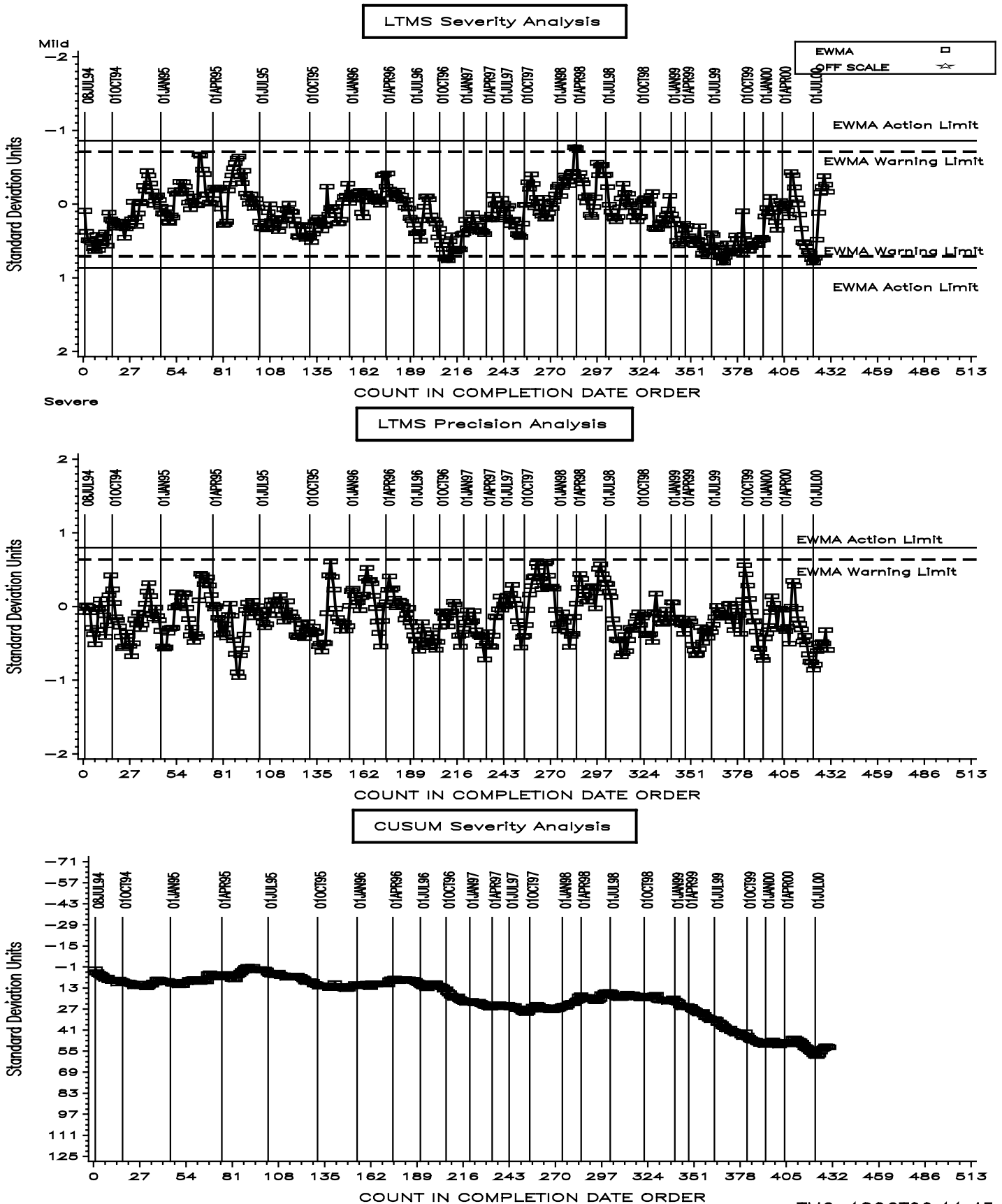
L-60-1 Timeline

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)

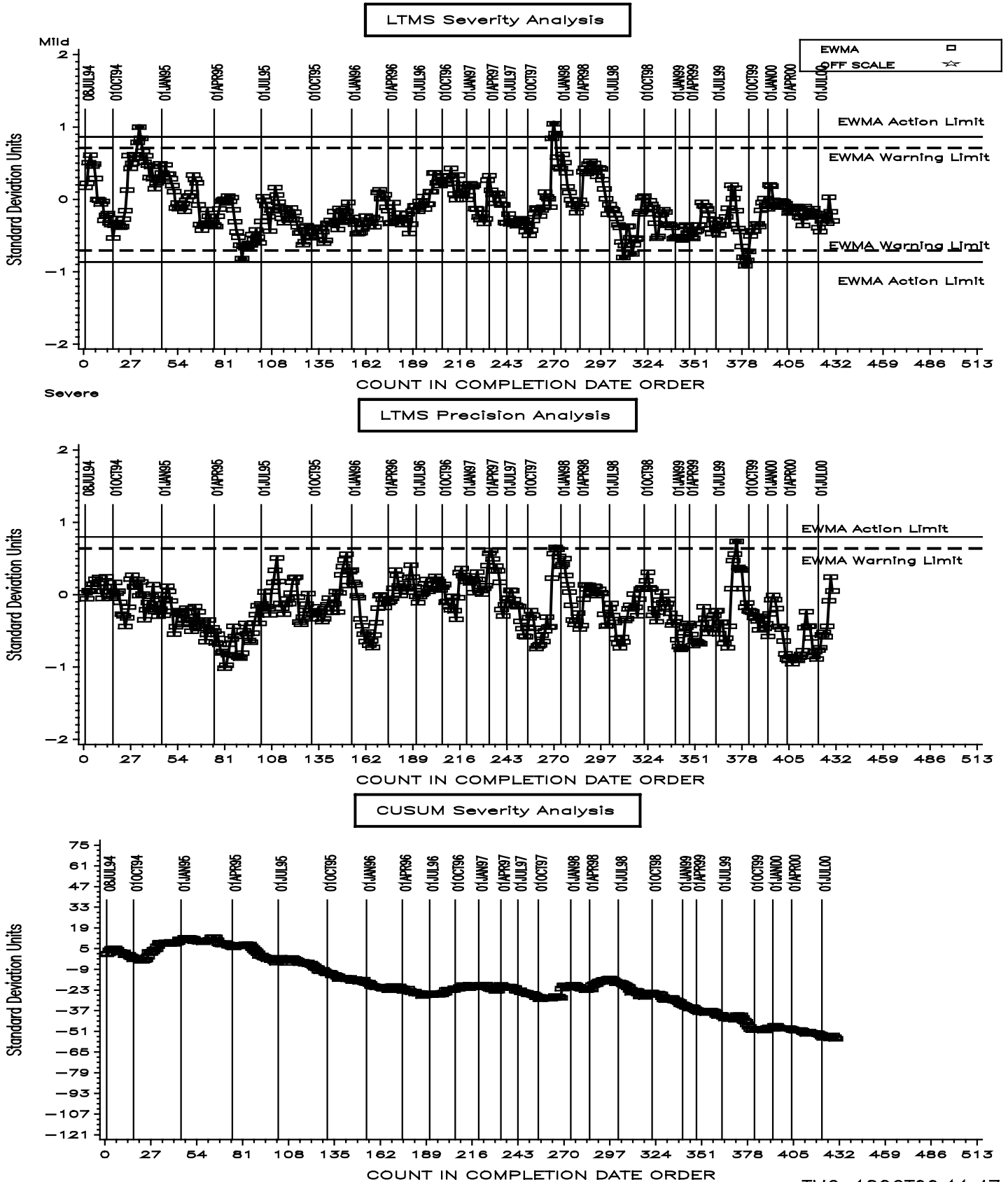
Figure 1



L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL SLUDGE (MERITS)

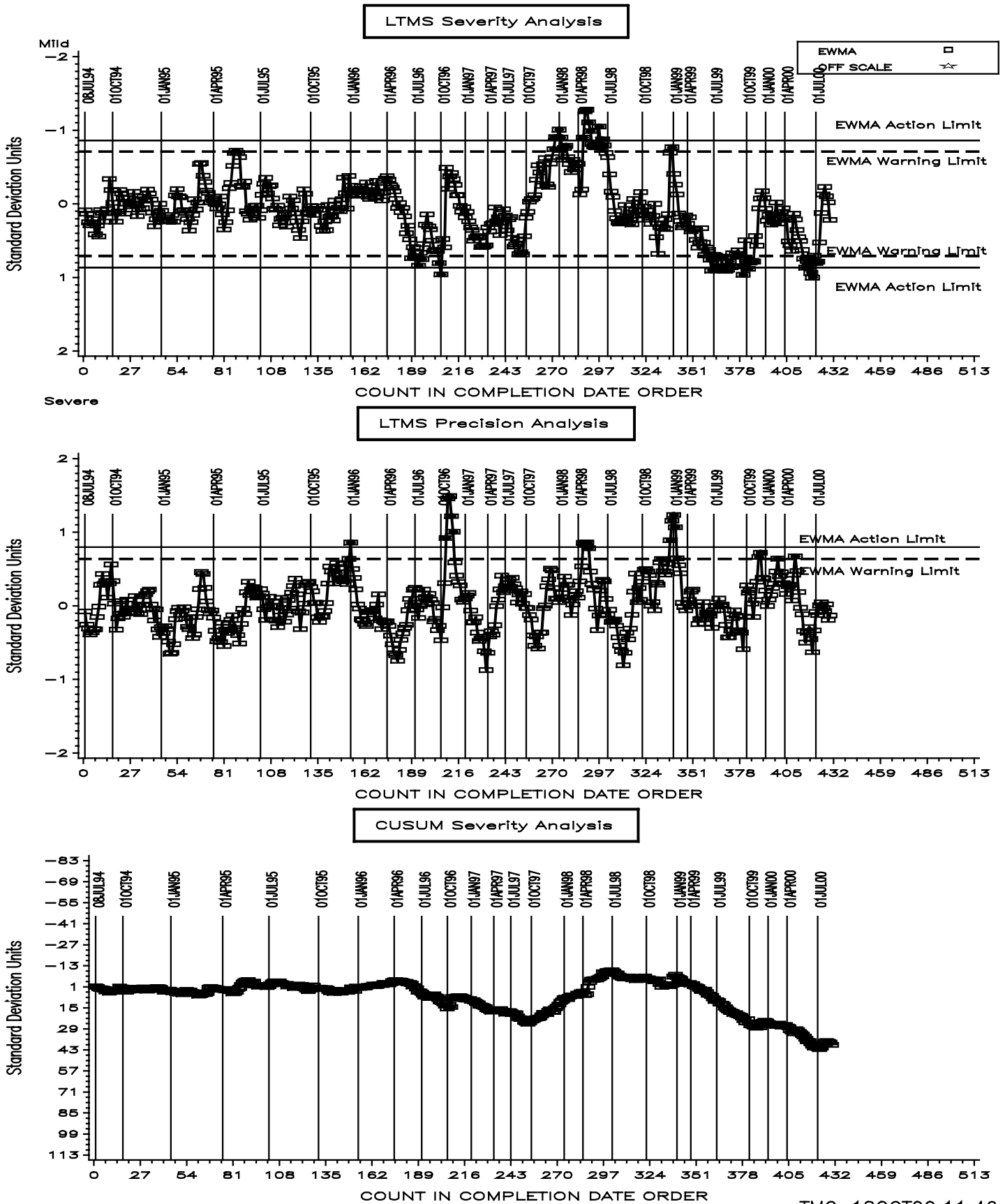
Figure 2

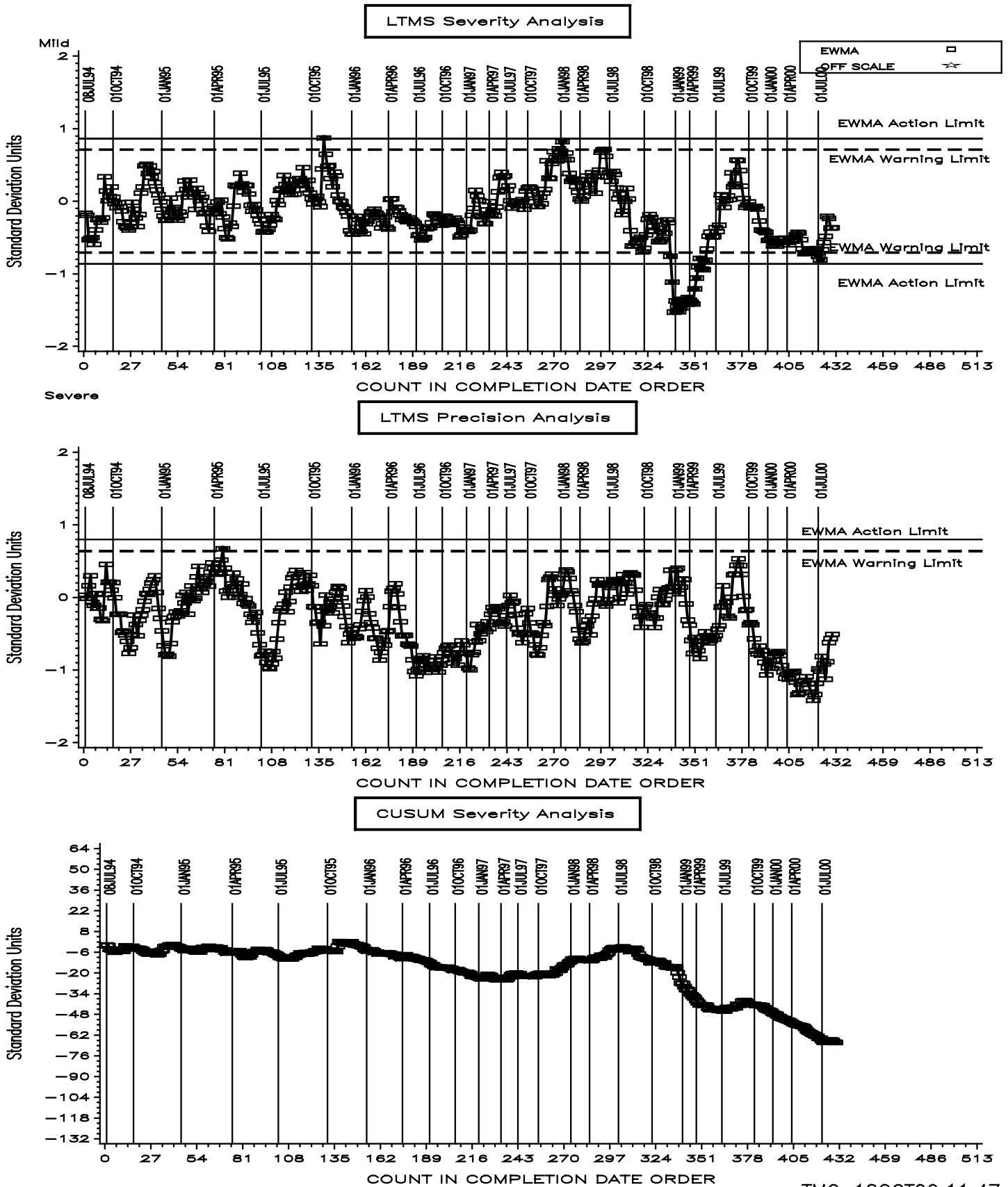


L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL TOLUENE (% WEIGHT)

Figure 3

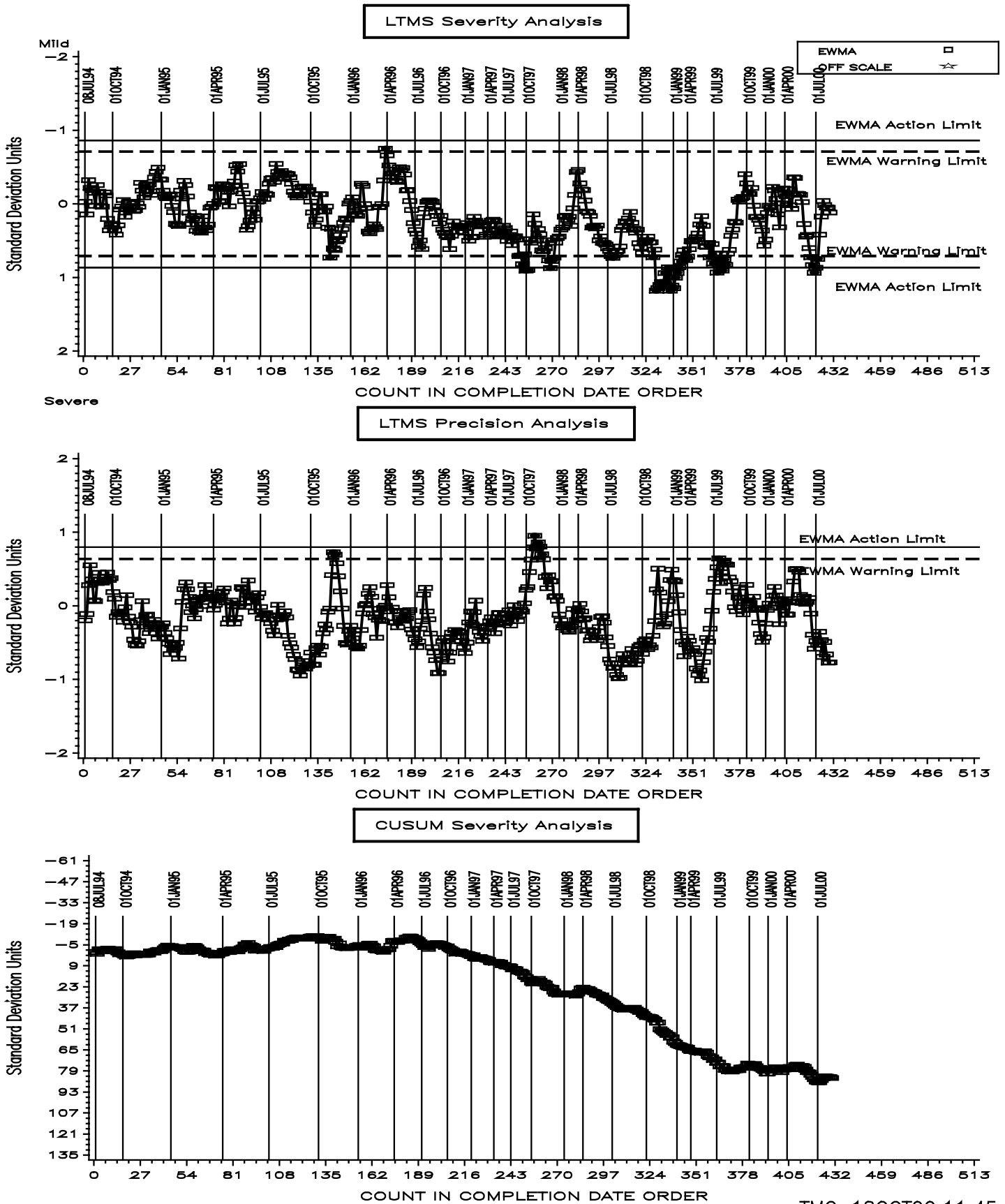




L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL VISCOSITY (% INCREASE)

Figure 5



L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL VISCOSITY (% INCREASE)

Figure 6

