



Test Monitoring Center

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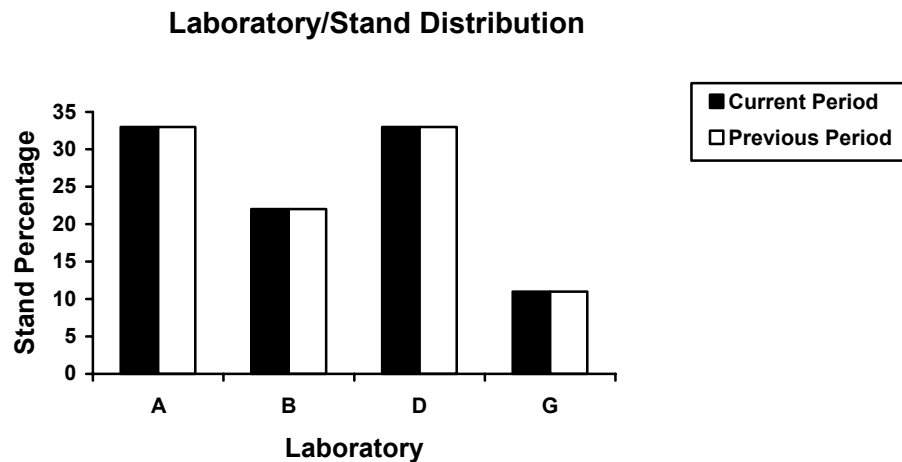
MEMORANDUM: 02-019
DATE: April 16, 2002
TO: Jerry Gropp, Chairman, L-60-1 Surveillance Panel
FROM: Donald Lind
SUBJECT: L-60-1 Reference Test Status from October 1, 2001 through March 31, 2002

The following is a summary of the L-60-1 reference oil tests that were reported to the Test Monitoring Center during the period October 1, 2001 through March 31, 2002.

Lab/Stand Distribution

	Reporting Data	Calibrated as of 3/31/02
Number of Laboratories	4	3
Number of Stands	9	5

The following chart shows the laboratory/stand distribution:

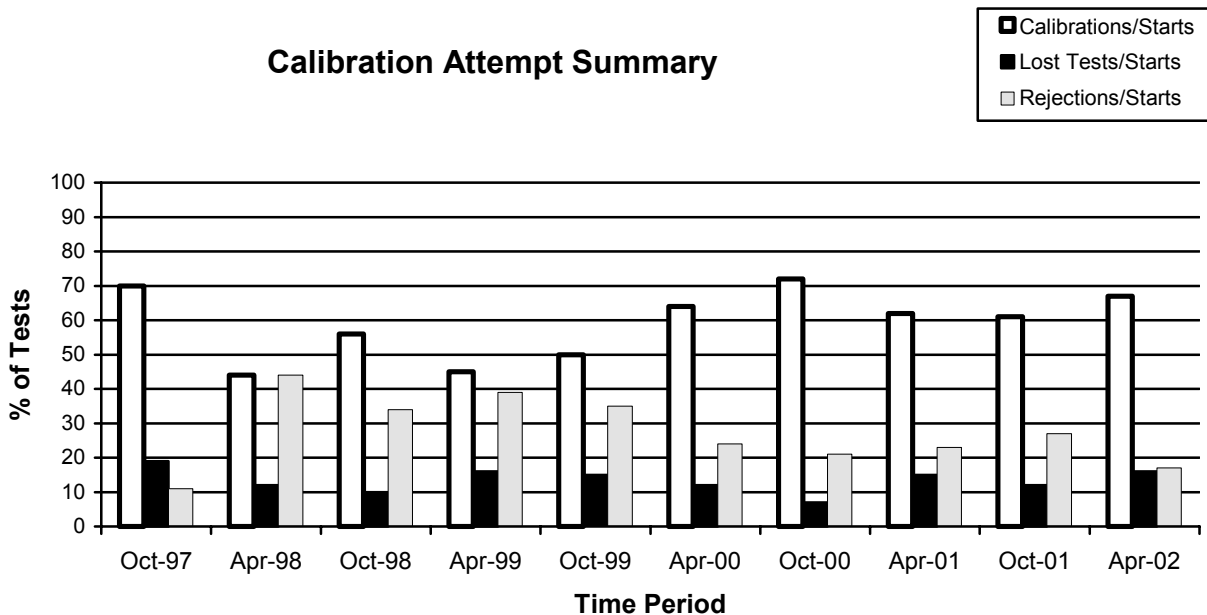


The following summarizes the status of the reference oil tests reported to the TMC:

	TMC Validity Codes	No. of Tests
Operationally and Statistically Acceptable	AC	16
Statistically Invalid Calibration Test	OC	4
Operationally Invalid, Laboratory Judgment	LC	3
Operationally Invalid, (Laboratory & TMC Judgment)	RC	0
Aborted	XC	1
Total		24

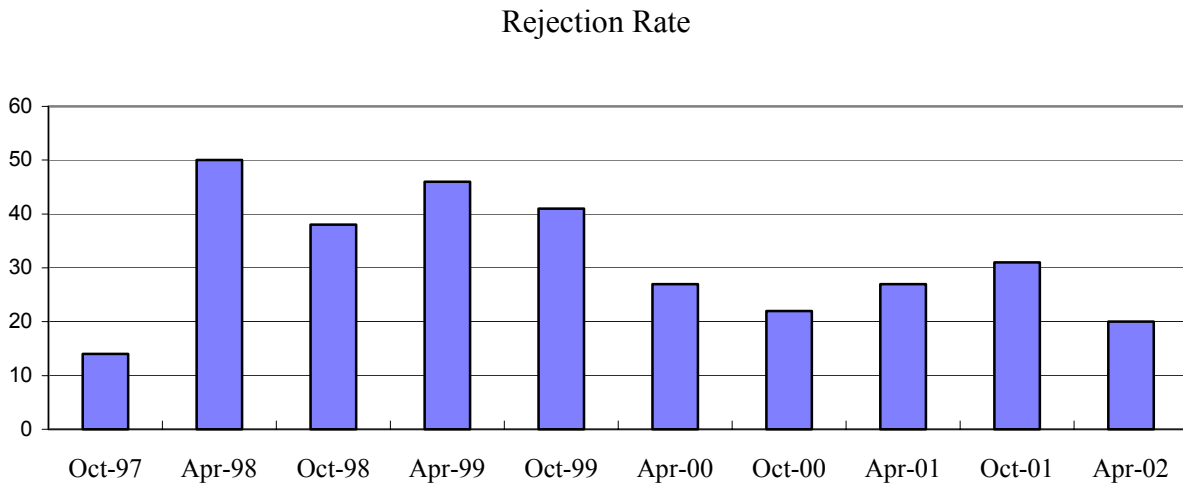
Additionally there were 8 tests conducted this report period. Two tests were conducted to evaluate test stands and six tests were conducted to evaluate reference oil 148-1.

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



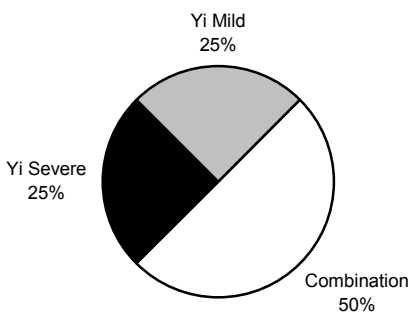
The calibration per start rate and lost test per start rate have increased when compared to the previous period. The rejected test per start rate has decreased with respect to the previous period.

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

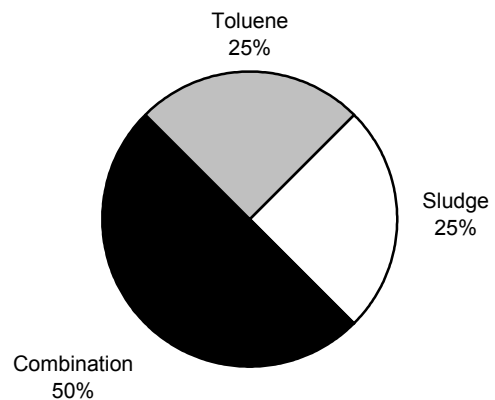


A detailed list of reasons tests failed the acceptance criteria is shown in Table 1. The following charts summarize these reasons with a breakdown by parameter of the failed tests:

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.

There were four lost tests reported this period. Lab B and G had one invalid test each, Lab D had one invalid test and one aborted test. 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
Stand Instrument Calibrations Were Not Completed	1
Air Flow Control Problem	1
Exceeded Oil Weight Loss Requirement	2

Severity and Precision

For this period, the mean delta/s was 0.026 severe (0.39 merits) for Viscosity Increase, 0.025 severe (0.06 merits) for Pentane Insolubles, 0.064 severe (0.10 merits) for Toluene Insolubles, -0.874 severe (-0.81 merits) for Average Carbon/Varnish and -0.191 severe (-0.02 merits) for Average Sludge. Below are tables illustrating laboratory severity and pooled s:

Laboratory Severity for This Report Period					
Lab	Viscosity	Pentane	Toluene	Carbon Varnish	Sludge
A	0.01	-0.30	-0.52	-0.74	-0.58
B	0.17	0.05	0.71	-0.98	-0.64
D	0.00	0.15	0.18	-0.85	-0.02
G	-0.34	0.34	-1.32	-1.22	2.43

Pooled Standard Deviation Table			
Parameter	Report Period Pooled s (All Oils)	Historical Pooled s (All Oils)	Pooled s Values Used for Severity Adjustment Calculations
Viscosity	0.09	0.15	0.15
Pentane	0.32	0.37	0.73
Toluene	0.43	0.49	0.75
Carbon Varnish	0.22	0.42	0.45
Sludge	0.11	0.23	0.16

Industry Control Charts

Figures 1 through 5 show the industry control charts through March 31, 2002. The industry alarms triggered this report period are detailed below.

Pentane Insolubles

There were no industry EWMA severity or precision alarms this report period.

Toluene Insolubles

There were no industry EWMA severity or precision alarms this report period.

Viscosity Increase

There were no industry EWMA severity or precision alarms this report period.

Sludge

There were no industry EWMA severity or precision alarms this report period.

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

At the last L60-1 Surveillance Panel meeting, the panel requested the TMC to note any operations and stand differences between laboratories as well as any procedural discrepancies during the TMC lab visits. There were four lab visits conducted this report period. A list of the lab differences and procedural discrepancies are listed in Table 3.

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	288
133	6	5	4	0	1696
143	0	0	0	0	0
148	3	3	0	3	0
148-1	2	2	7	0	816
151-2	9	9	7	7	*
151-3	4	4	6	2	**

* 20 Gallons (Multiple test area usage)

** 527 Gallons (Multiple test area usage)

Attachments

c: L-60/L-60-1 Surveillance Panel

<ftp://ftp.astmtmc.cmu.edu/docs/gear/l601/semiannualreports/l601-04-2002.pdf>

distribution: email

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.

Table 3 is a List of Lab Differences and Procedural Discrepancies.

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.

Table 1
Summary of Reasons for Rejected Tests

Reasons	No. of Tests
Mild Average Sludge	1
Severe Toluene Insolubles	1
Mild Pentane and Toluene Insolubles	1
Stand EWMA Precision Alarm Pentane Insolubles & Severe Carbon Varnish	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	

Table 3
L-60-1 LAB DIFFERENCES

- Oven Box
 - Oven covers vary in weight (8 – 32 lbs.)
 - Oven heater blower output varies

- Lab Ventilation System
 - Ventilation varies from lab to lab

- Warm-up
 - Warm-up temperatures varies from stand to stand and lab to lab
 - PID control tuning varies from stand to stand and lab to lab

- Gear Preparation differences
 - Silicon paper
 - Gear surface
 - Preparation time
 - Preparation method

- Rating Scales
 - Three different rating scales are used to rate carbon varnish

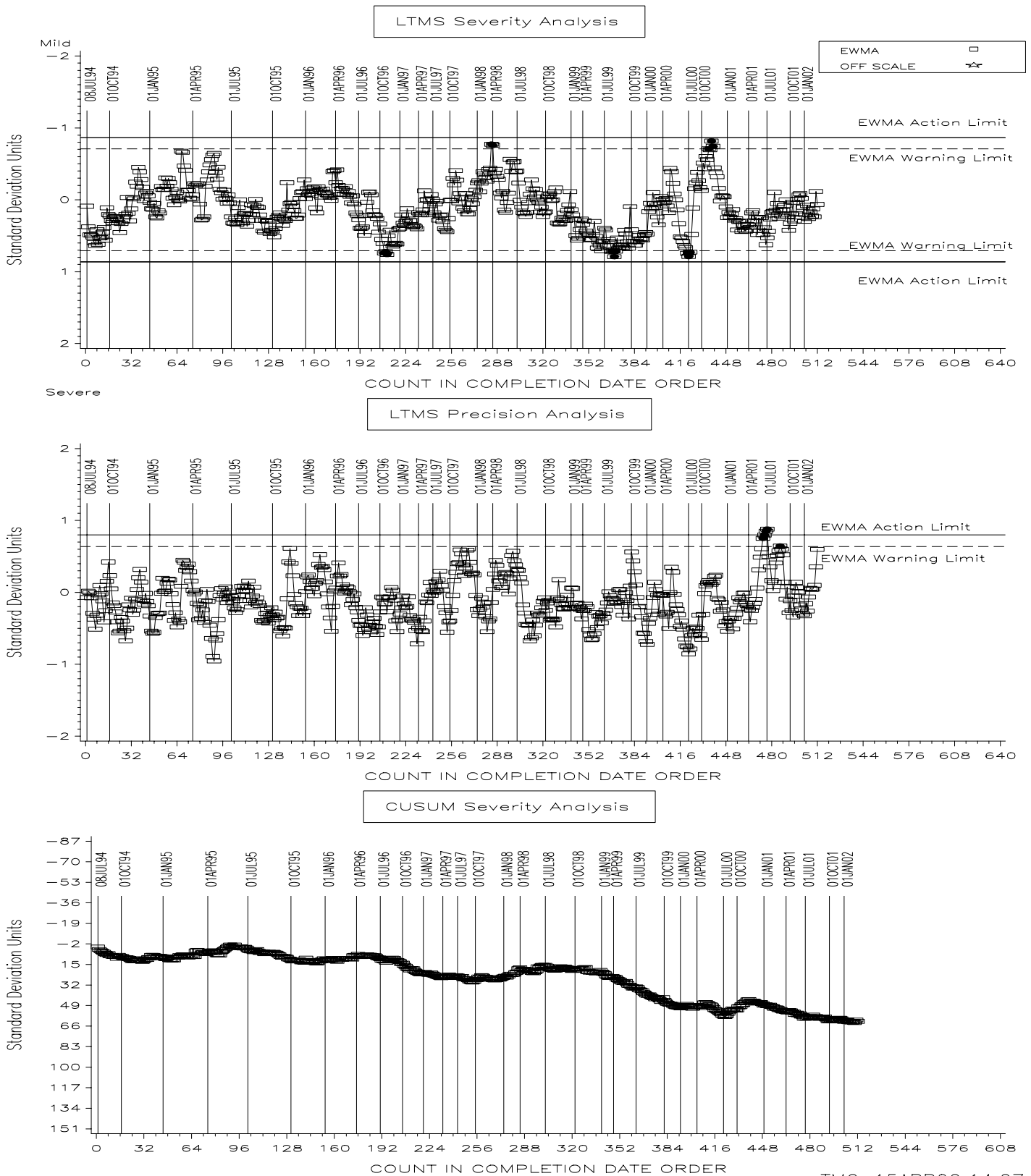
- Instrument Calibrations
 - Calibrations for gear speed, alternator output, and blower output varies from prior to each reference oil test to not at all after the initial check.

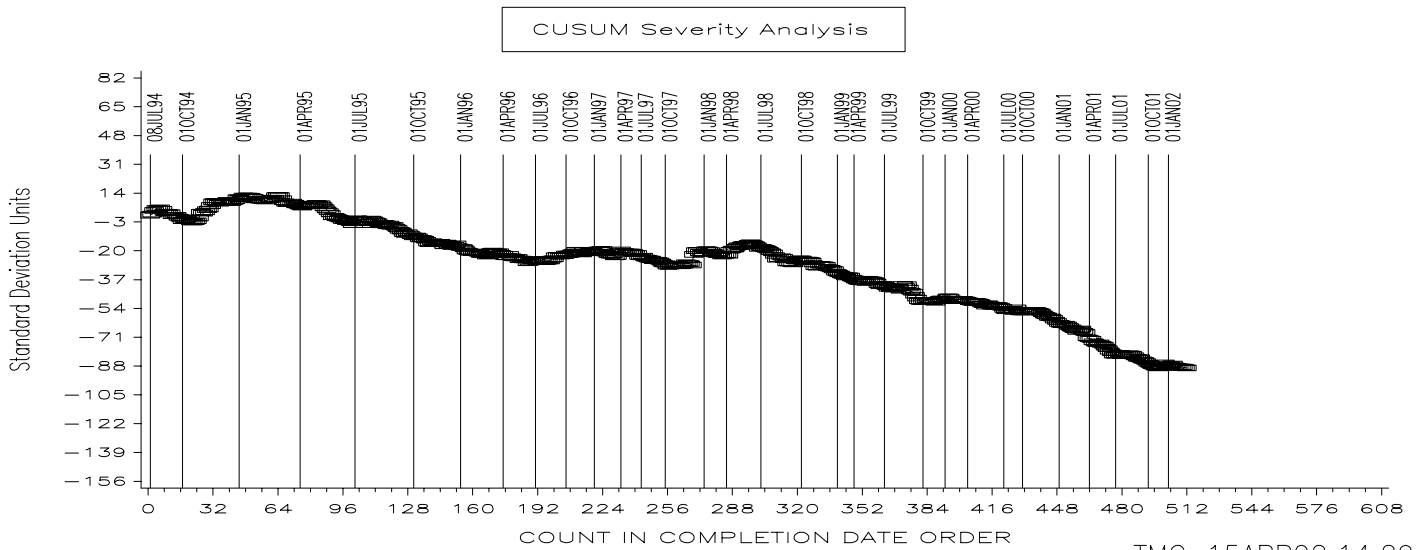
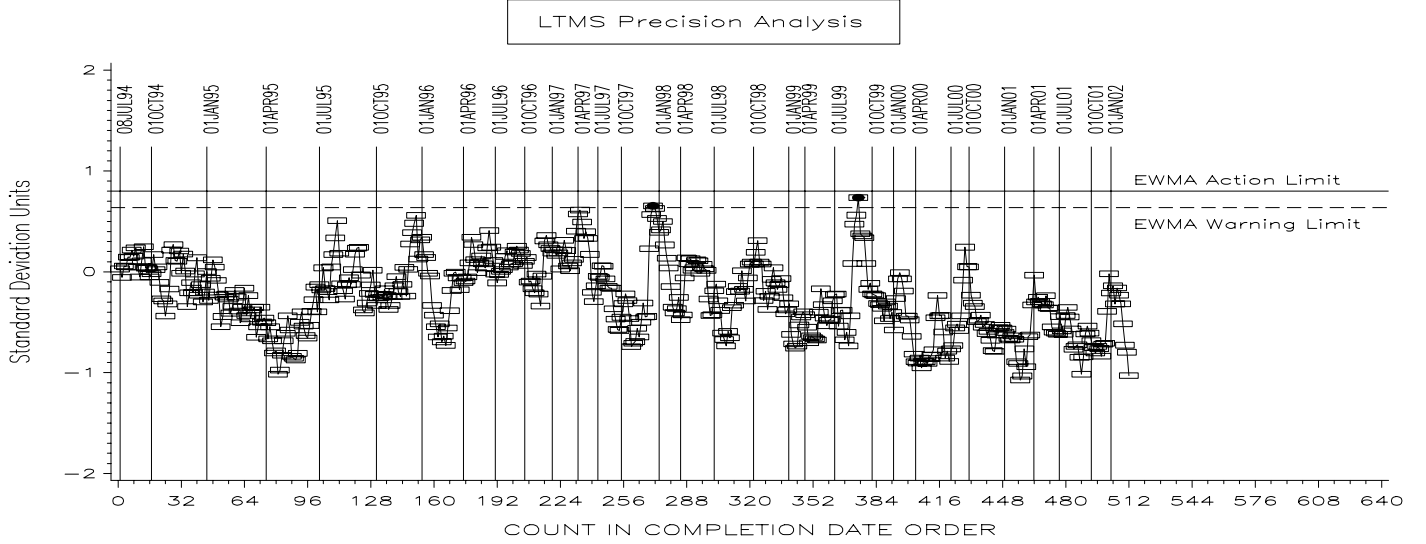
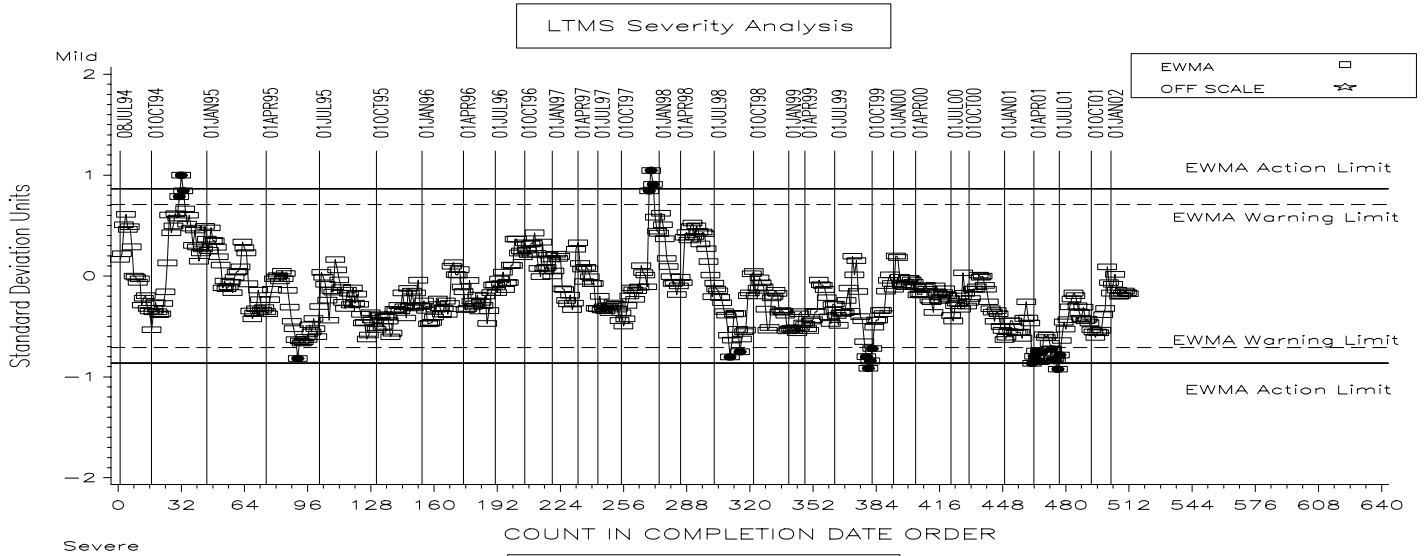
- Lip Seals
 - Two different types of lip seals used.
 - Seals are installed differently.

L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL PENTANE (% Weight)

Figure 1





L-60-1 INDUSTRY OPERATIONALLY VALID DATA

REFERENCE FINAL TOLUENE (% WEIGHT)

Figure 3

