



Test Monitoring Center

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MEMORANDUM: 10-056

DATE: November 22, 2010

TO: Mark Cooper, Chairman, Mack Test Surveillance Panel

FROM: Jeff Clark

SUBJECT: T-8/T-8E, T-10A, T-11, and T-12 Calibration Testing for the October 2010 ASTM Report Period

The following is a summary of T-8/T-8E, T-10A, T-11, and T-12 reference oil tests completed during the October 2010 ASTM report period, which began on April 1, 2010 and ended on September 30, 2010.

Test Status	TMC Validity Code	Number of Tests			
		T-8/T-8E	T-10A	T-11	T-12
Acceptable Calibration Test	AC	1	1	4	0
Failed Calibration Test (LTMS Criteria)	OC	1	0	0	2
Operationally Invalid Test	LC	1	0	0	1
Aborted	XC	3	0	0	4
Donated	AG	0	0	2	0
Non-blind	NN	0	0	3	0
Total		6	1	9	7

All three aborted T-8/T-8E tests were projected to miss the soot window. The invalid T-8/T-8E missed the soot window and the failed test was due to mild Viscosity Increase at 3.8% Soot.

Two T-11 tests (AG validity) were donated runs on an adjusted PC-9 fuel blend as part of an ongoing investigation of T-11 severity. Three non-blind T-11 tests (NN validity) were also run as part of this investigation; two tests were extended length runs and one was run on PC-10 fuel.

The two failed T-12 tests were due to mild cylinder liner wear. One T-12 test was invalidated due to multiple problems, including an incorrect oil addition and the test running 25 minutes too long. Two T-12's were aborted due to high oil consumption, one due to excessive blowby, and one due to a valve stem failure.

T-8 Severity:

Viscosity Increase at 3.8% Soot (VI38), Relative Viscosity at 4.8% Soot, 50% Loss (RV48), and Relative Viscosity at 4.8% Soot, 100% Loss (RV2) are all currently in industry alarm in the mild direction, the result of a mild trend that may have begun as early as April 2009. Figures 1, 2, and 3 (attached) show the current industry EWMA severity, EWMA precision, and cusum charts for VI38, RV48, and RV2, respectively.

T-10A Severity:

MRV Viscosity (MRV) is currently within control chart limits. Since January 2006, MRV has been trending an average of 0.65 Δ /s severe, which is approximately 330 cP. Figure 4 (attached) shows the current industry EWMA severity and cusum charts for MRV.

T-11 Severity:

Soot at 12 cSt Viscosity Increase (SOOT) and Soot at 15 cSt Viscosity Increase (SOOT5) are in severity alarm in the mild direction. The surveillance panel's investigation has identified test fuel as the driver of the mild trends, and the panel is currently working on introducing a new test fuel. MRV Viscosity (MRV) and Soot at 4 cSt Viscosity Increase (SOOT4), are currently within control chart limits. Figures 5 through 8 (attached) show the current industry EWMA severity, EWMA precision, and cusum charts for SOOT, MRV, SOOT4, and SOOT5, respectively.

T-12 Severity:

Delta PB @ EOT (PB), Top Ring Weight Loss (TRWL), and Delta PB 250 – 300 Hours (PB2) are all currently within control chart limits. Cylinder Liner Wear (CLW) is in an industry severity alarm in the mild direction. Oil Consumption (OC) is currently in an industry precision alarm. While the low volume of test activity makes it difficult to offer commentary for most parameters, it is apparent that CLW is trending mild. The surveillance panel is currently working to introduce new hardware into the test, and the CLW mild trend is included in this effort. Figures 9 through 13 (attached) show the current industry EWMA severity, EWMA precision, and cusum charts for PB, CLW, TRWL, OC, and PB2, respectively.

Reference Test Precision Estimates:

Precision estimates, and any relevant commentary, will be provided on an annual basis in the sections below. Please note that due to low testing frequency, precision estimates are not available for the T-10A.

The 2009 T-8/T-8E precision estimates show slight improvement compared to 2007. It is difficult to compare with 2006 when the T-8/T-8E was using oil 1004-3 instead of 1005-2. Due to low activity levels, estimates are not available for 2008 and 2010.

T-8 / T-8E Precision Estimates

Parameter	2006	2007	2008	2009	2010
df	4	4	N/A	6	N/A
VI38	0.83	0.71	N/A	0.67	N/A
RV48	0.51	0.09	N/A	0.07	N/A
RV2	0.57	0.11	N/A	0.07	N/a

To date, the 2010 T-11 precision estimates show improvement for all parameters as compared to 2009.

T-11 Precision Estimates

Parameter	2006	2007	2008	2009	2010
df	17	9	16	8	6
SOOT	0.22	0.18	0.18	0.31	0.27
MRV	1251	820	967	938	889
SOOT4	0.22	0.32	0.33	0.27	0.10
SOOT5	0.23	0.18	0.18	0.25	0.21

The T-12 2009 precision estimates show some degradation for PB, CLW, and PB2. TRWL and OC precision show improvement and both are more precise than historical levels. Due to low activity levels, no estimates of precision are yet available for 2010.

T-12 Precision Estimates

Parameter	2005	2006	2007	2008	2009
df	21	11	6	7	3
PB (ln units)	0.252	0.2030	0.274	0.164	0.193
CLW	3.9	3.8	3.1	2.7	5.7
TRWL	28.4	28.6	33.4	18.2	13.9
OC (ln units)	0.080	0.087	0.086	0.090	0.052
PB2 (ln units)	0.344	0.321	0.321	0.238	0.477

Reference Oil Supply:

The following table shows current reference oil inventories. Based upon these levels, no action regarding reference oil supply is necessary at this time.

Reference Oil Inventory and Estimated Life

Oil	Tests	TMC Inventory ^A	Lab Inventory ^B	Estimated Life ^C
820-3	T-10A, T-11	867	5	3 years
821-1	T-12	223	6	1.5 years
1005-3	T-8/T-8E ^D	1527	4	5+ years

^AInventories are expressed in gallons.

^BActive laboratories.

^ETime estimate is based on most recent activity levels.

^DThe T-8/T-8E shares reference oils with other tests. Activity levels of all tests are taken into account in the estimated life of the reference oils.

Information Letters:

Four information letters were issued this ASTM period and they are shown in the table below.

Test	IL Number	Issue Date	Topic
T-8	10-2, Seq. 18	August 23, 2010	Critical parts supplier information update
T-11	10-2, Seq. 8	August 23, 2010	Critical parts supplier information update
T-12	10-2, Seq. 6	August 23, 2010	Addition of T-12A test to D7422
T-12	10-3, Seq. 7	August 23, 2010	Critical parts supplier information update

TMC Laboratory Visits:

No laboratory visits were conducted this period.

Quality Index:

No QI deviations were issued this report period.

Additional Information:

The T-8/T-8E, T-10A, T-11, and T-12 databases, timelines, and alarm logs can be accessed from the links in the table below. If you have any questions about this information, please contact the TMC.

Mack Surveillance Panel Information Links

Test Area	Information Link
T-8/T-8E	ftp://ftp.astmtmc.cmu.edu/refdata/diesel/t8/data/
T-10A	ftp://ftp.astmtmc.cmu.edu/refdata/diesel/t10a/data/
T-11	ftp://ftp.astmtmc.cmu.edu/refdata/diesel/t11/data/
T-12	ftp://ftp.astmtmc.cmu.edu/refdata/diesel/t12/data/

JAC/jac/mem10-056.jac.doc

Attachments

c: F.M. Farber, TMC

Mack Surveillance Panel

<ftp://ftp.astmtmc.cmu.edu/docs/diesel/mack/semiannualreports/MACK-10-2010.pdf>

Distribution: Email

FIGURE 1
T-8/T-8E INDUSTRY OPERATIONALLY VALID DATA
VISCOSITY INCREASE AT 3.8% SOOT

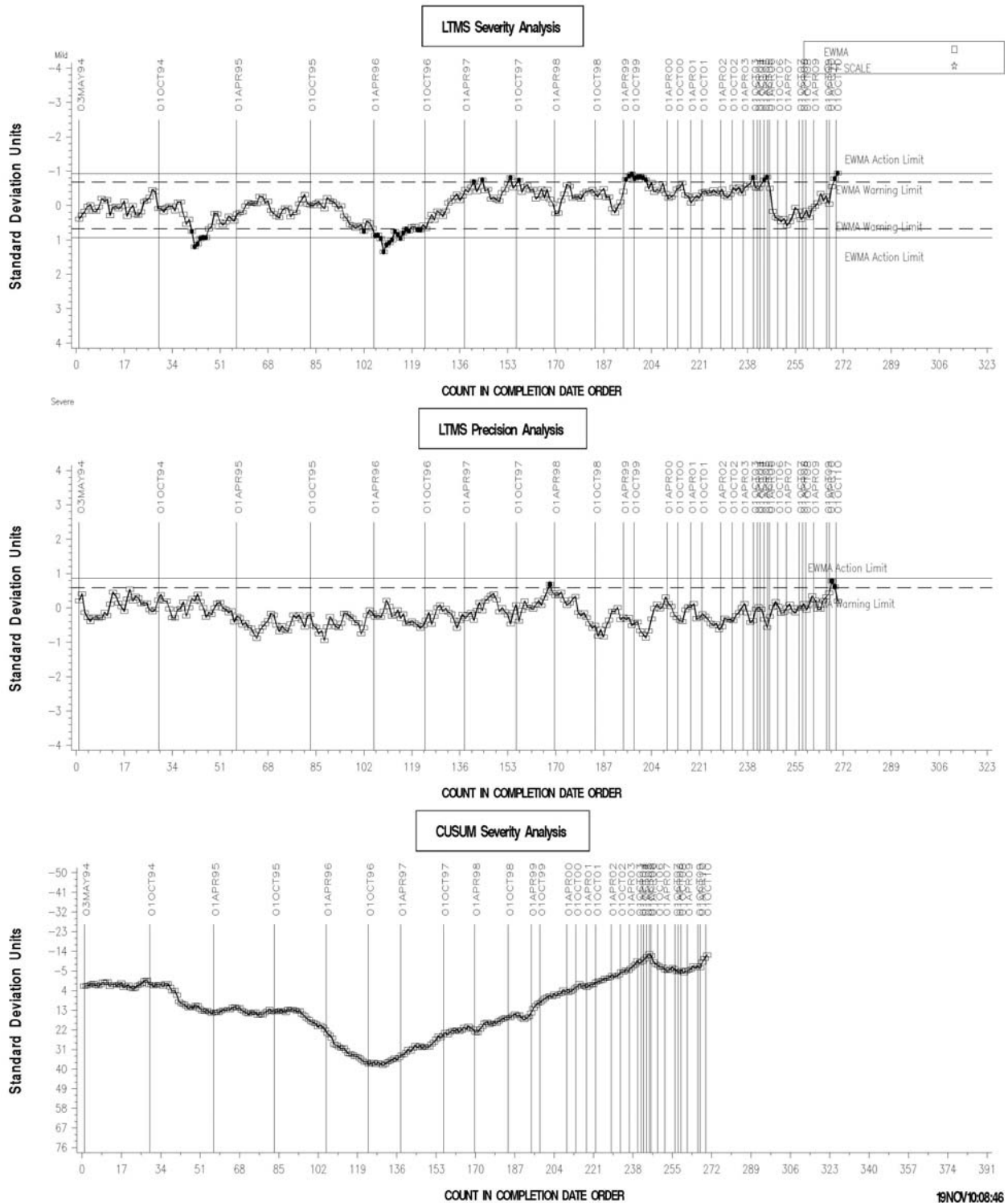


FIGURE 2
T-8/T-8E INDUSTRY OPERATIONALLY VALID DATA
RELATIVE VISCOSITY AT 4.8% (50% LOSS)

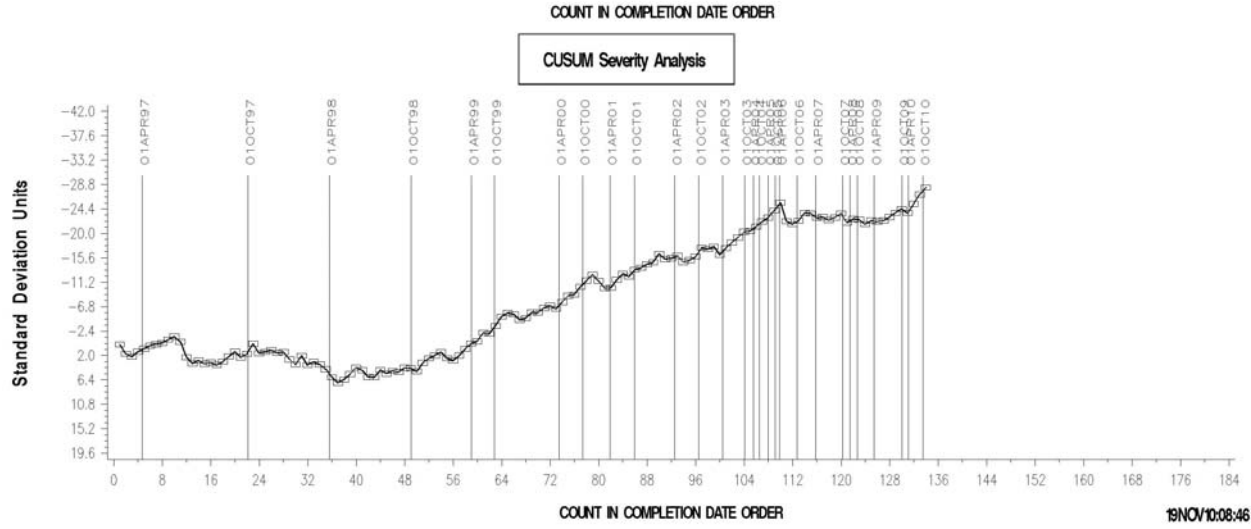
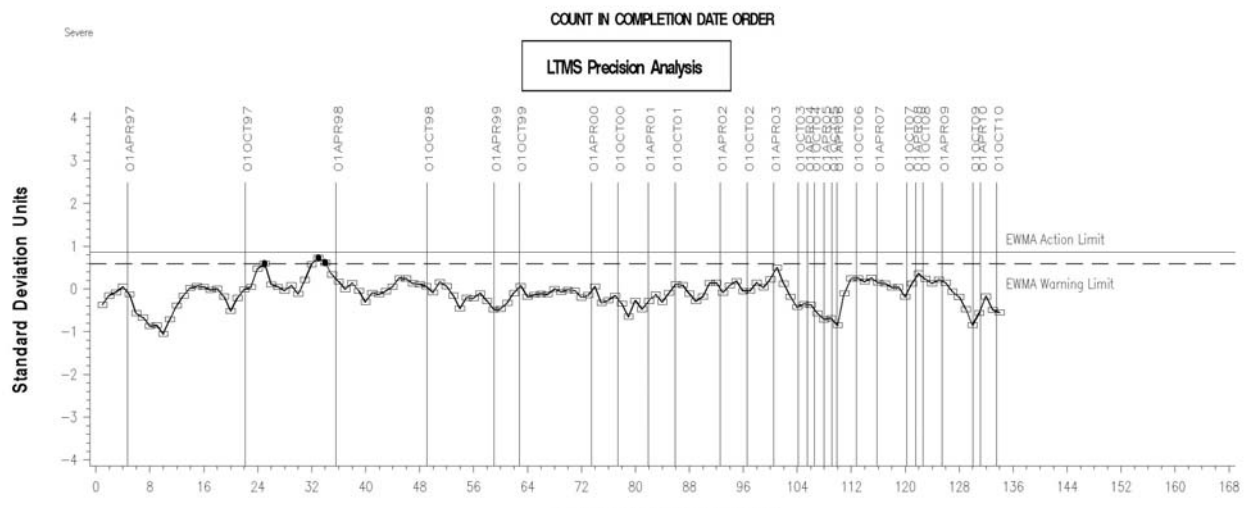
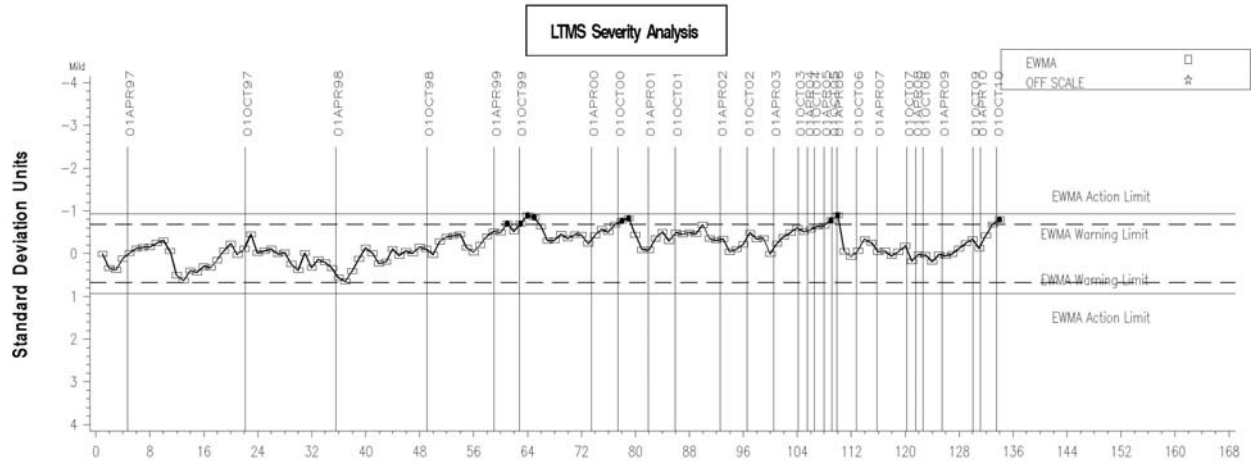


FIGURE 3
T-8/T-8E INDUSTRY OPERATIONALLY VALID DATA
RELATIVE VISCOSITY AT 4.8% (100% LOSS)

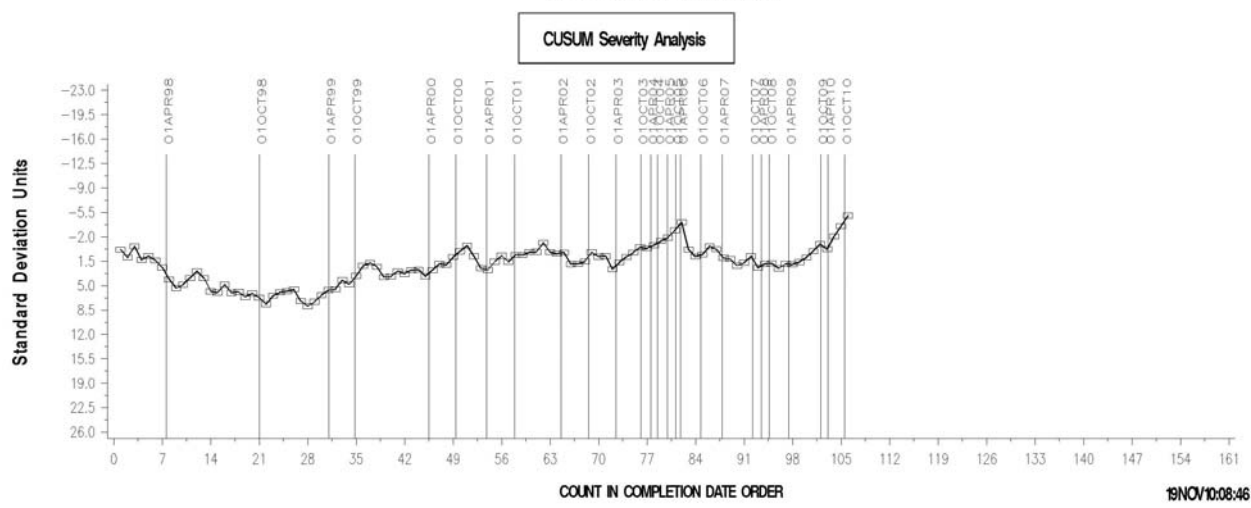
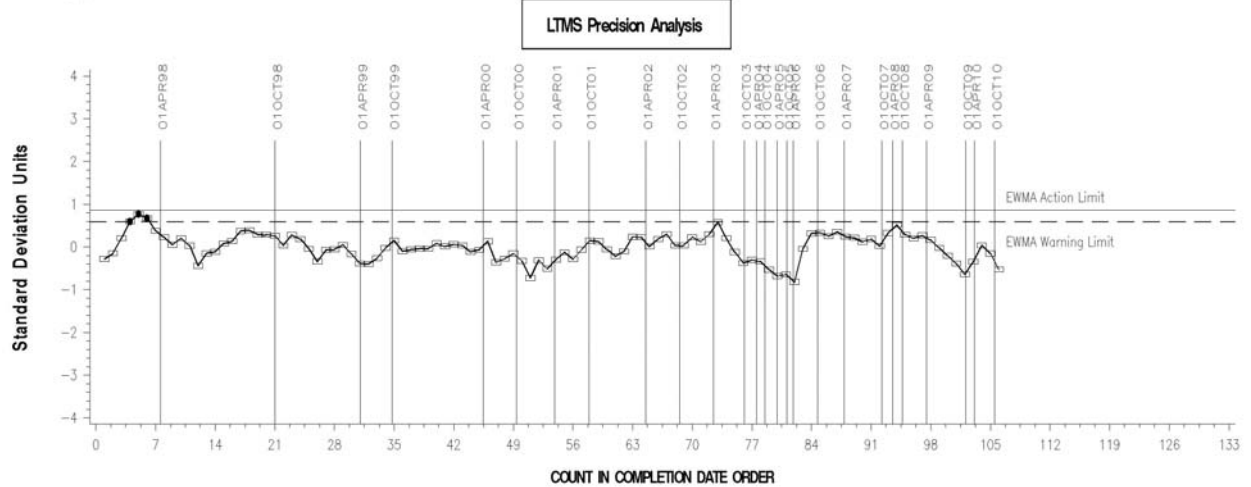
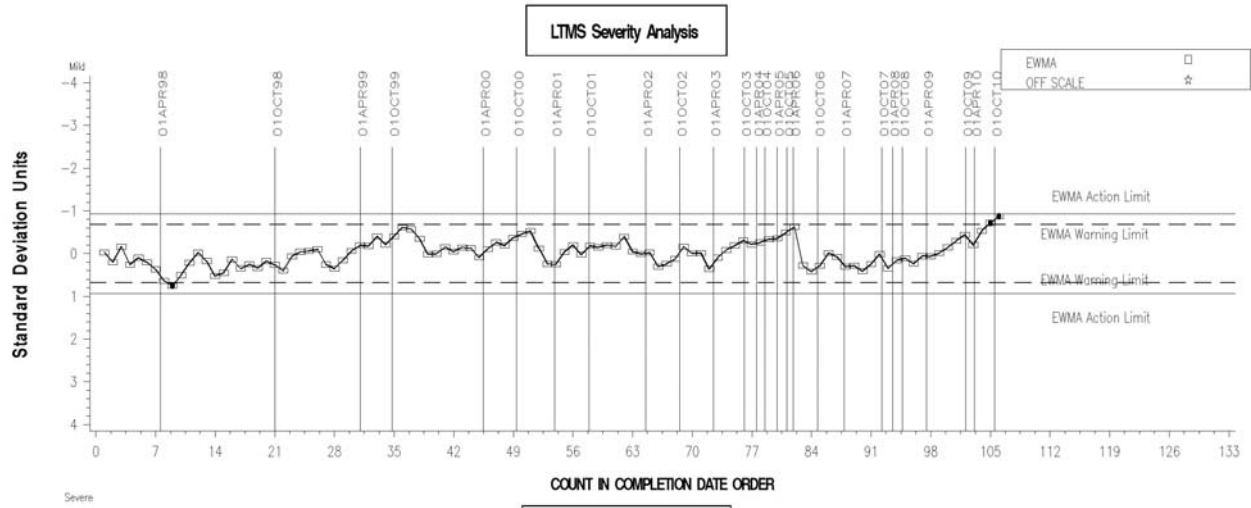


FIGURE 4
T10A INDUSTRY OPERATIONALLY VALID DATA



MRV VISCOSITY @ 75H

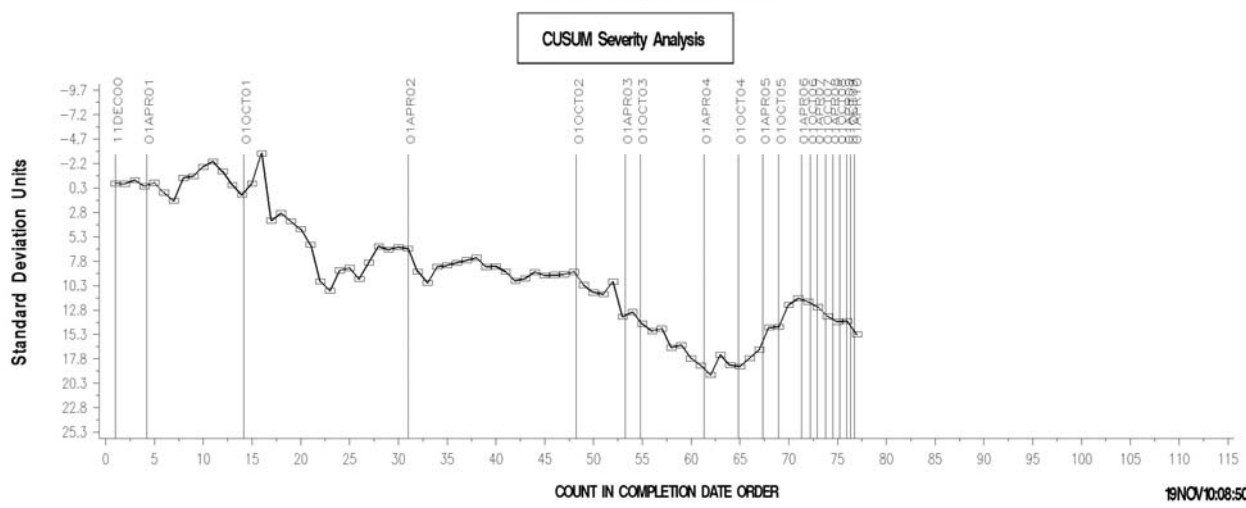
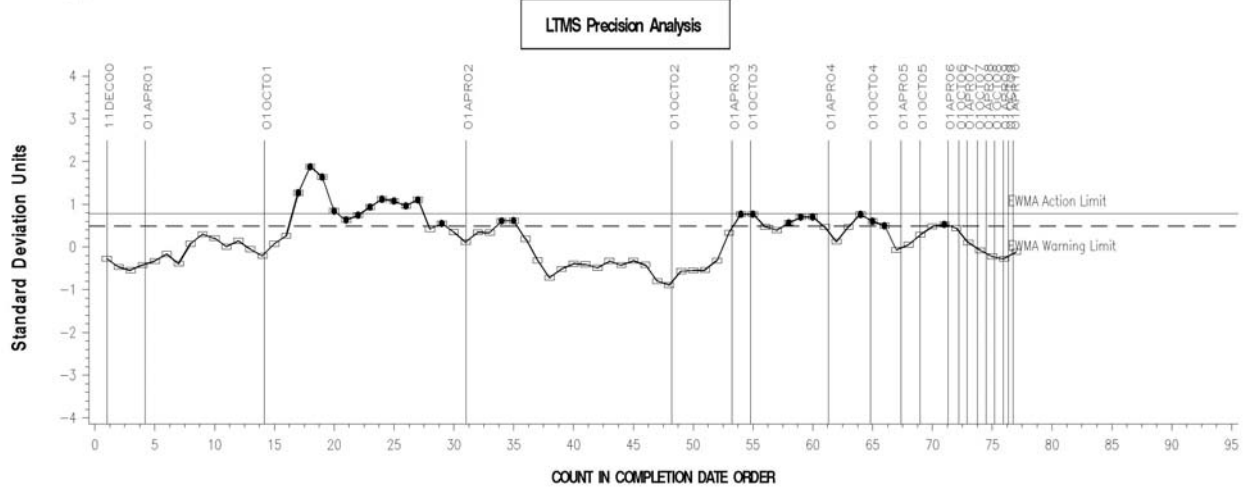
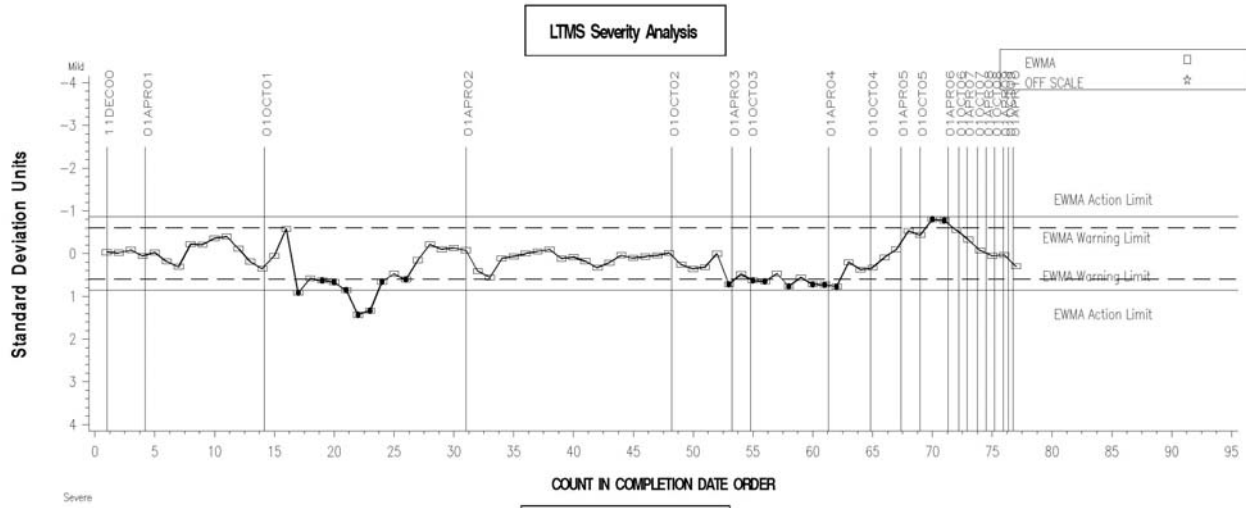


FIGURE 5
T-11 INDUSTRY OPERATIONALLY VALID DATA



SOOT AT 12 cSt

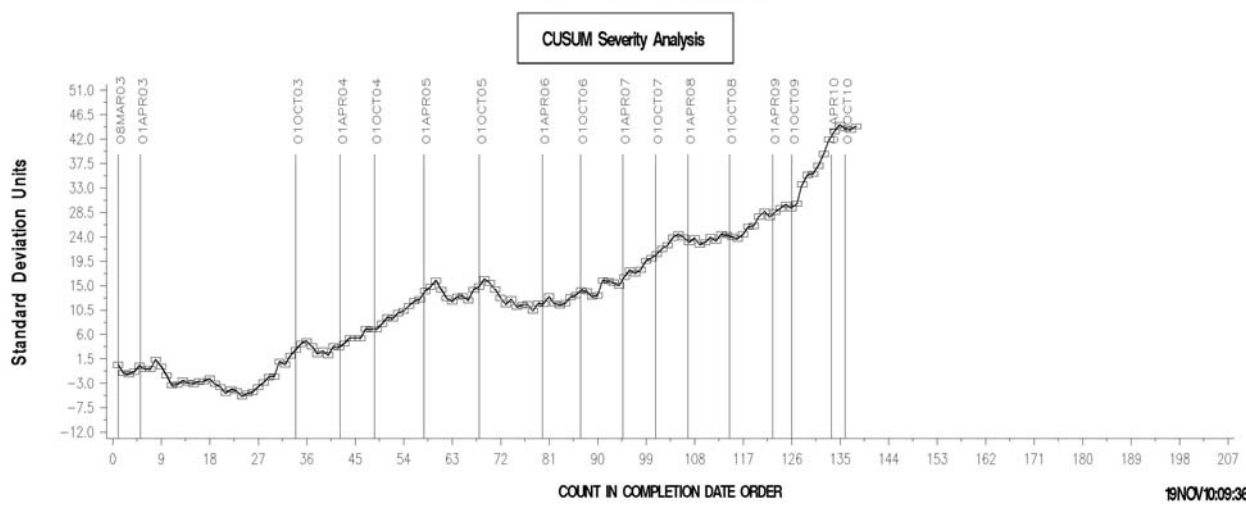
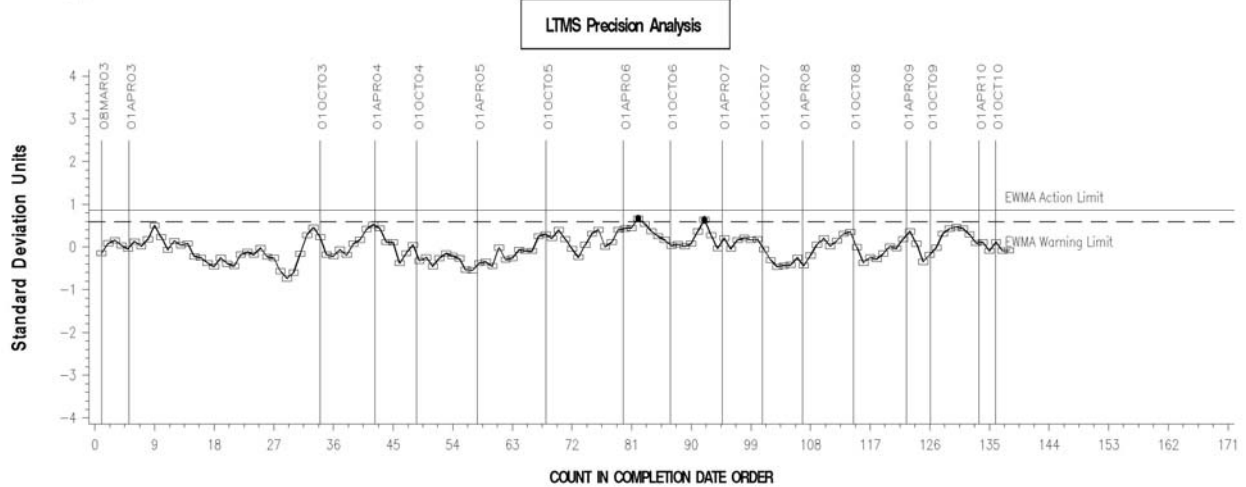
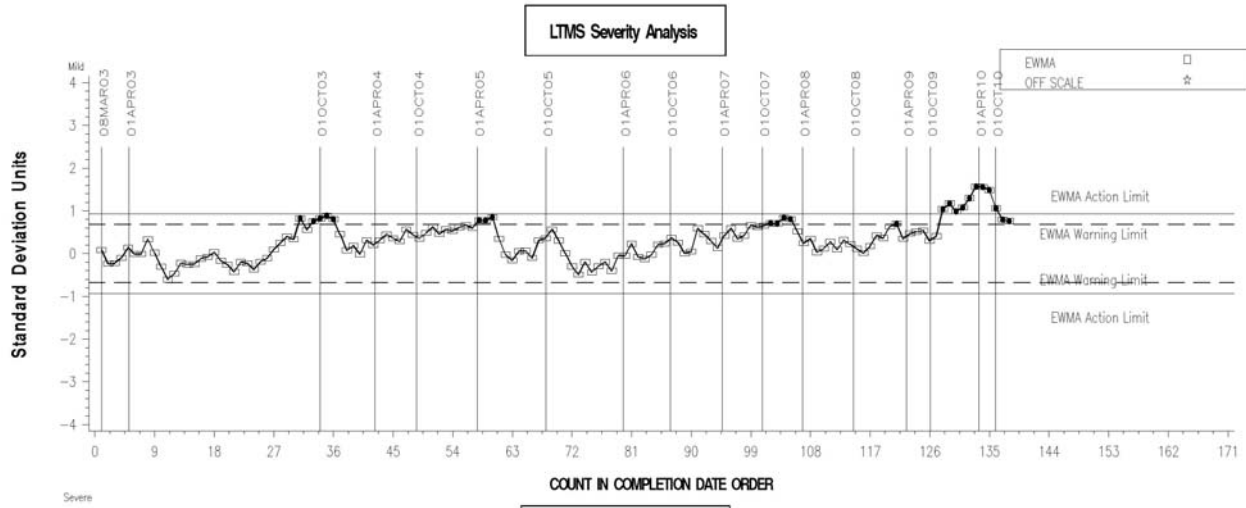


FIGURE 6
T-11 INDUSTRY OPERATIONALLY VALID DATA



MRV VISCOSITY

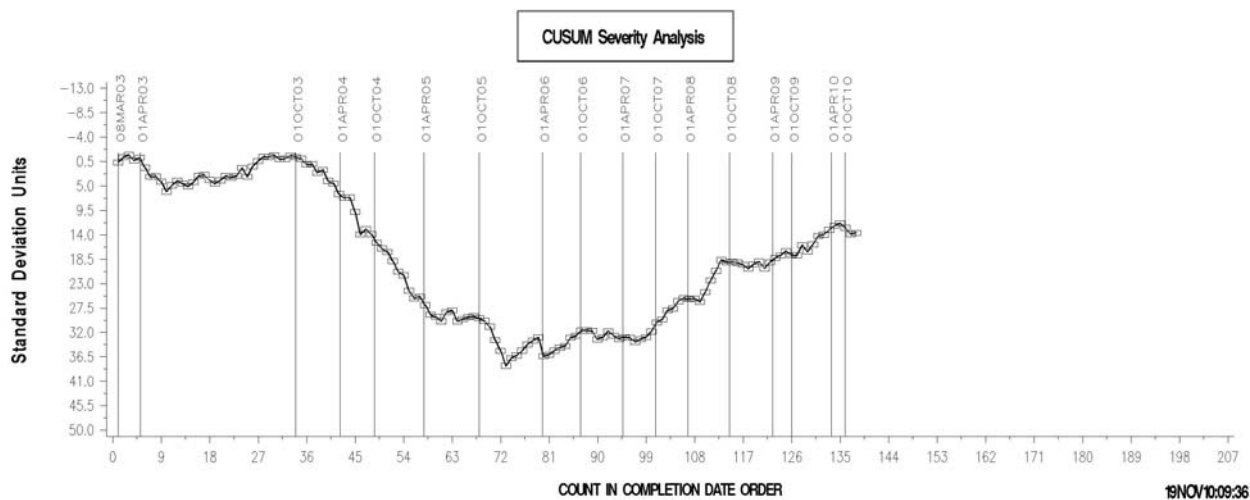
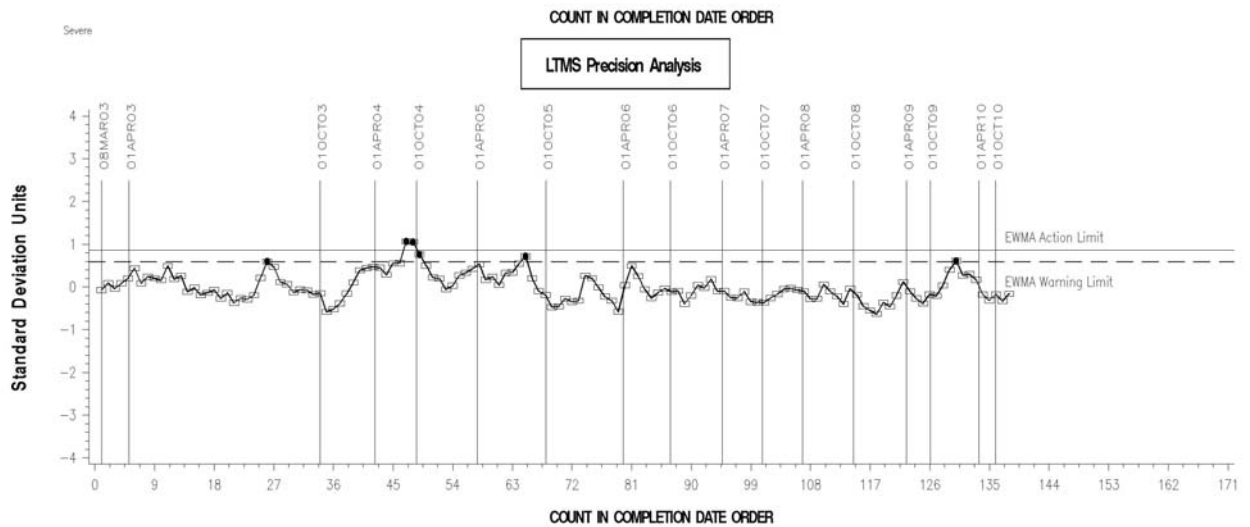
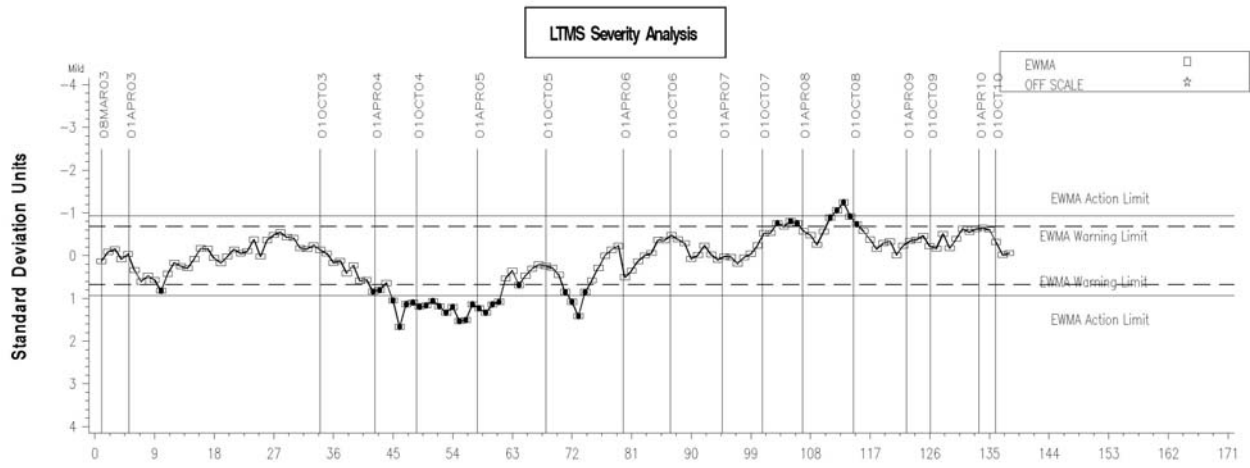


FIGURE 7
T-11 INDUSTRY OPERATIONALLY VALID DATA



SOOT @ 4 cSt - FINAL RESULT

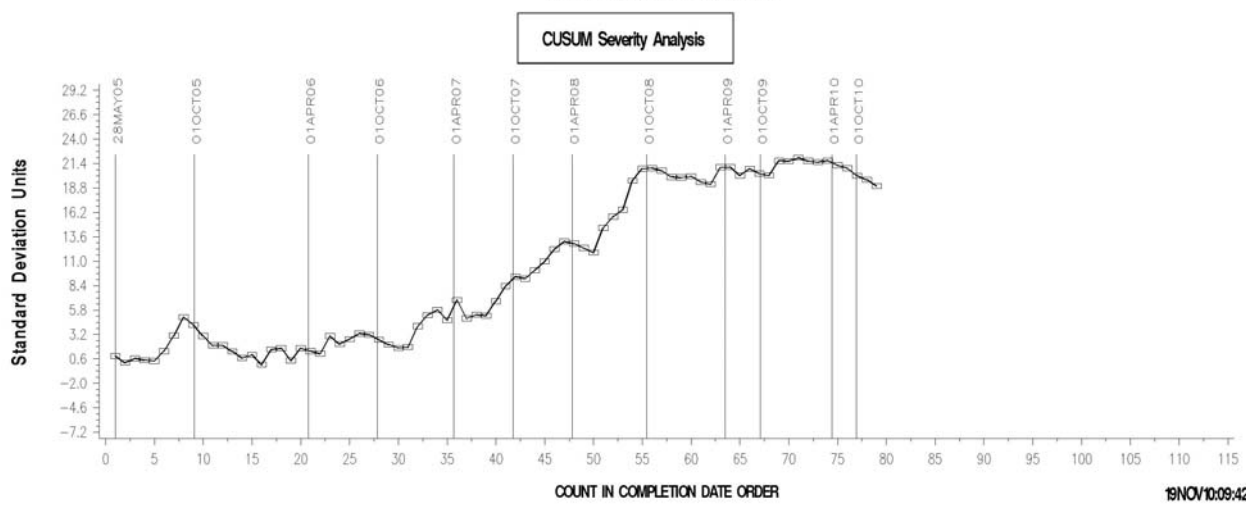
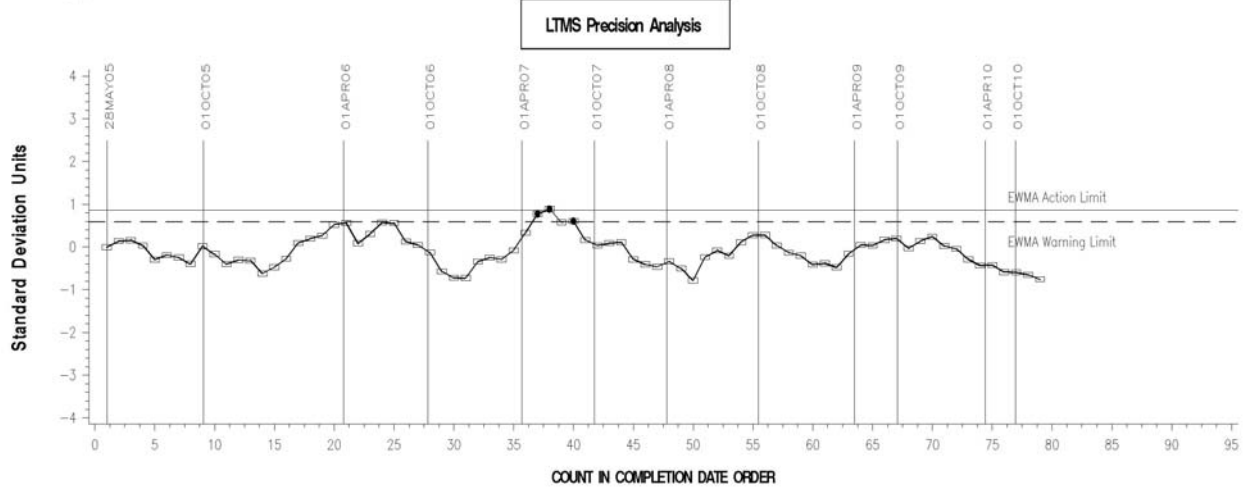
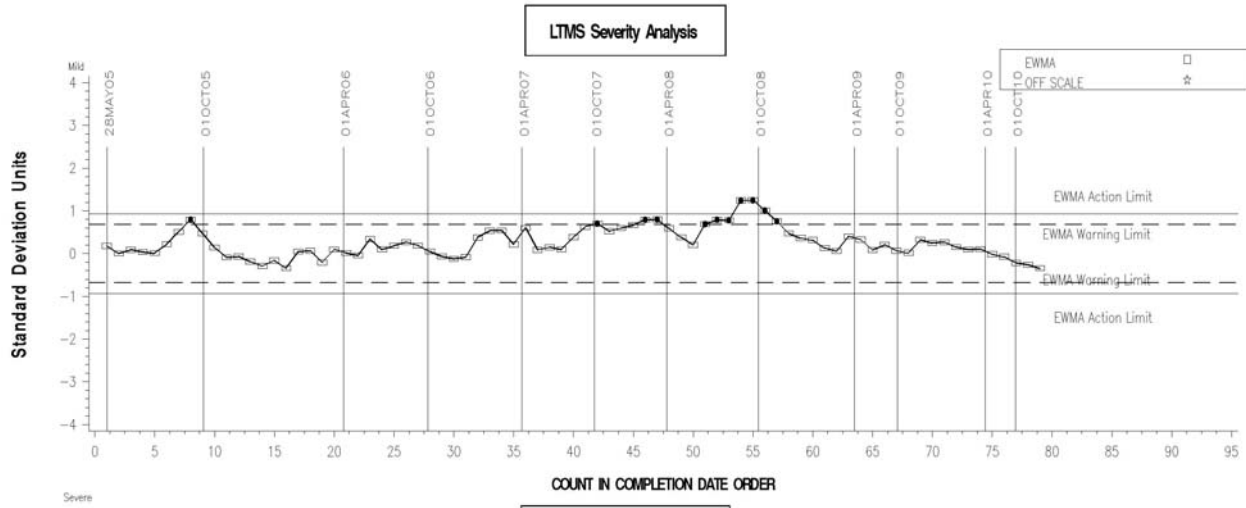


FIGURE 8
T-11 INDUSTRY OPERATIONALLY VALID DATA

SOOT @ 15 cSt - FINAL RESULT

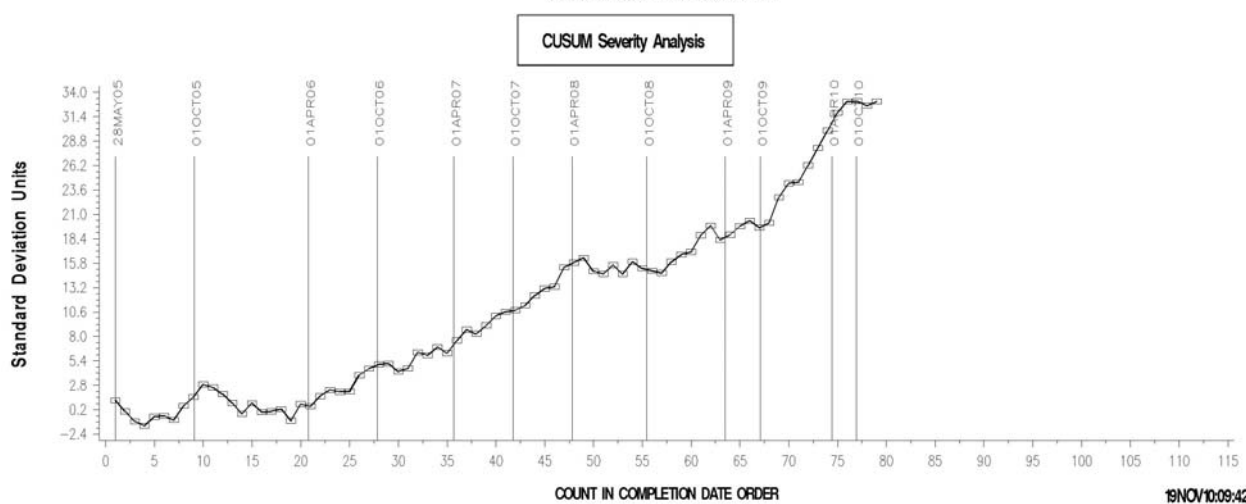
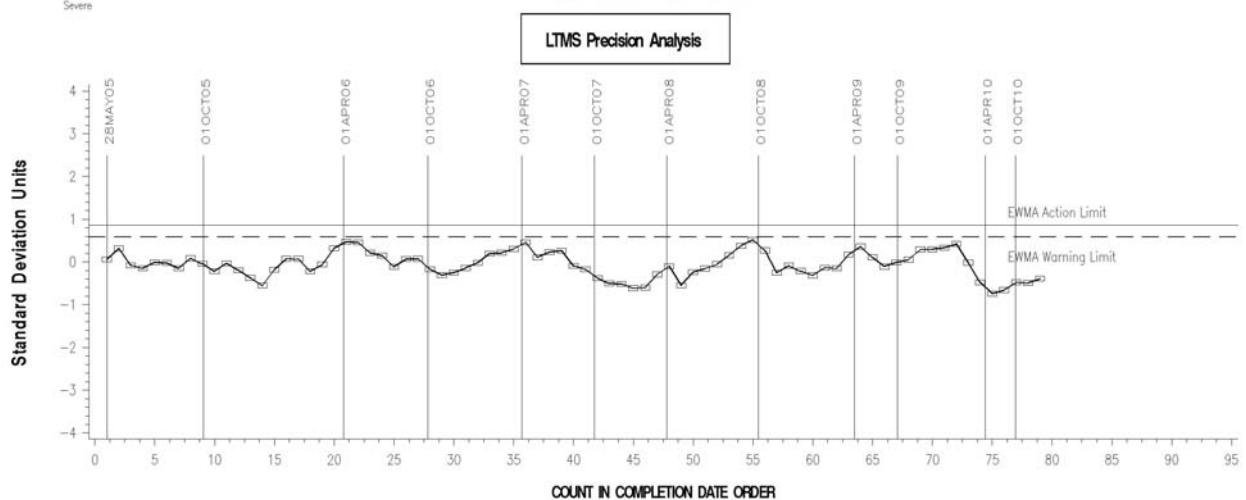
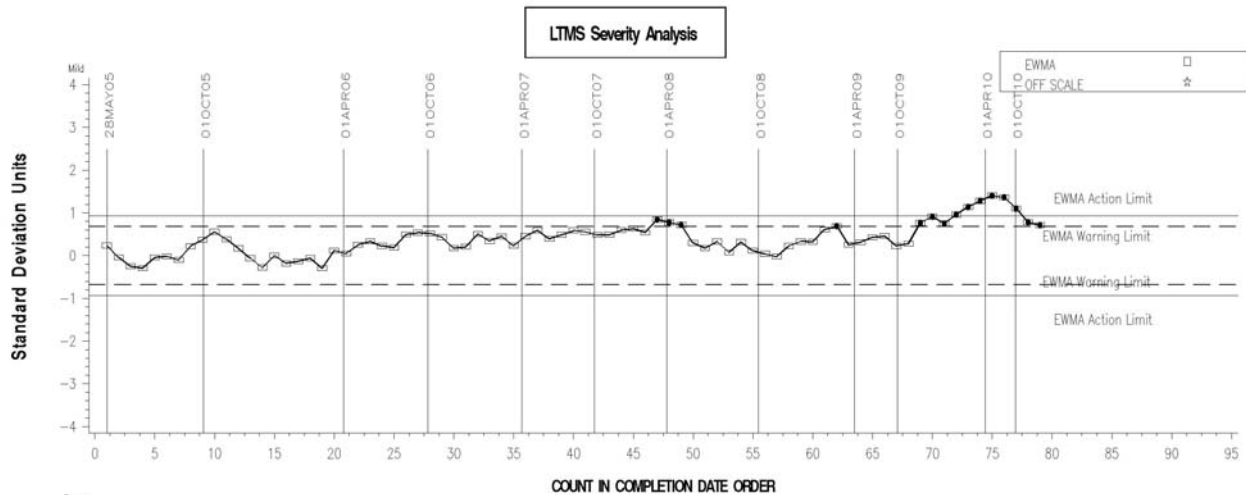


FIGURE 9
MACK T-12 INDUSTRY OPERATIONALLY VALID DATA



DELTA PB @ EOT (PB)

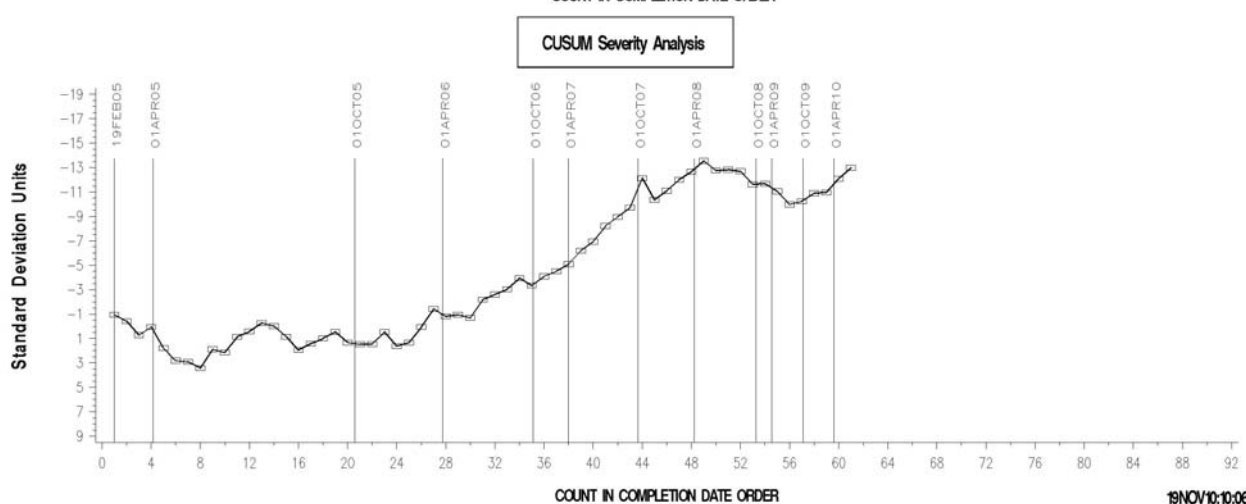
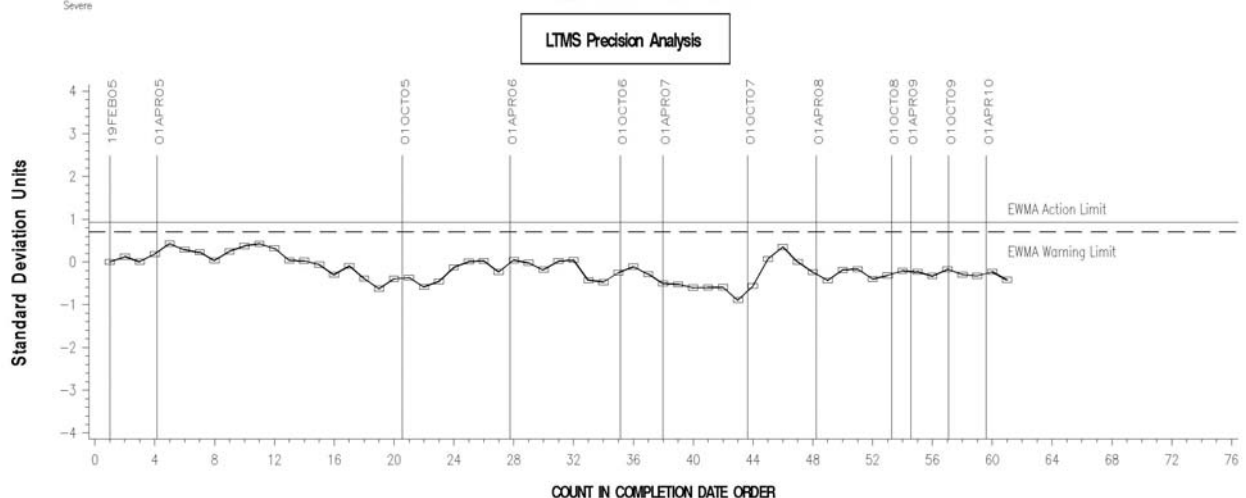
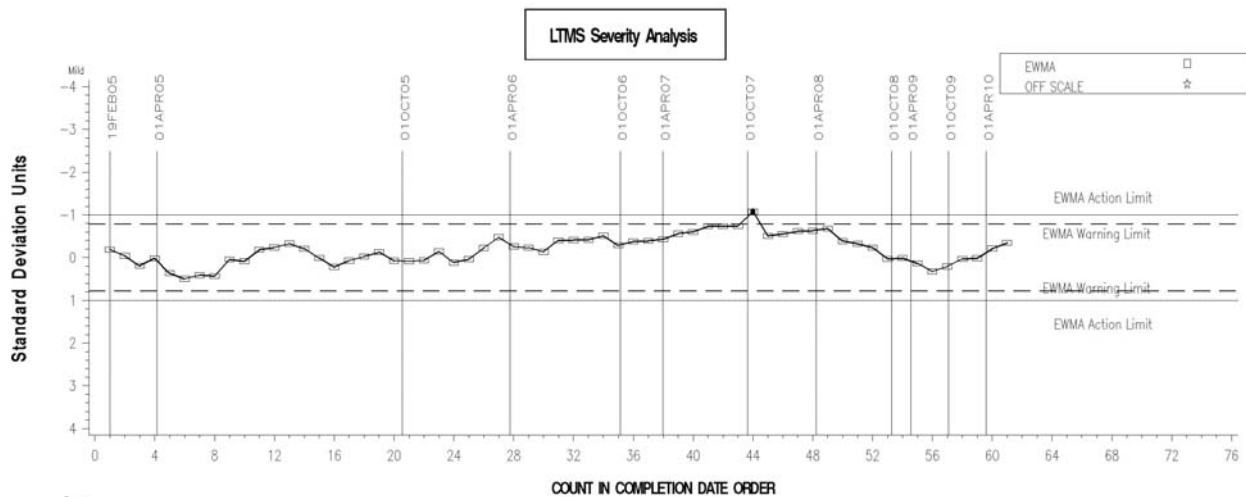


FIGURE 10
MACK T-12 INDUSTRY OPERATIONALLY VALID DATA
AVG. CYLINDER LINER WEAR (CLW)

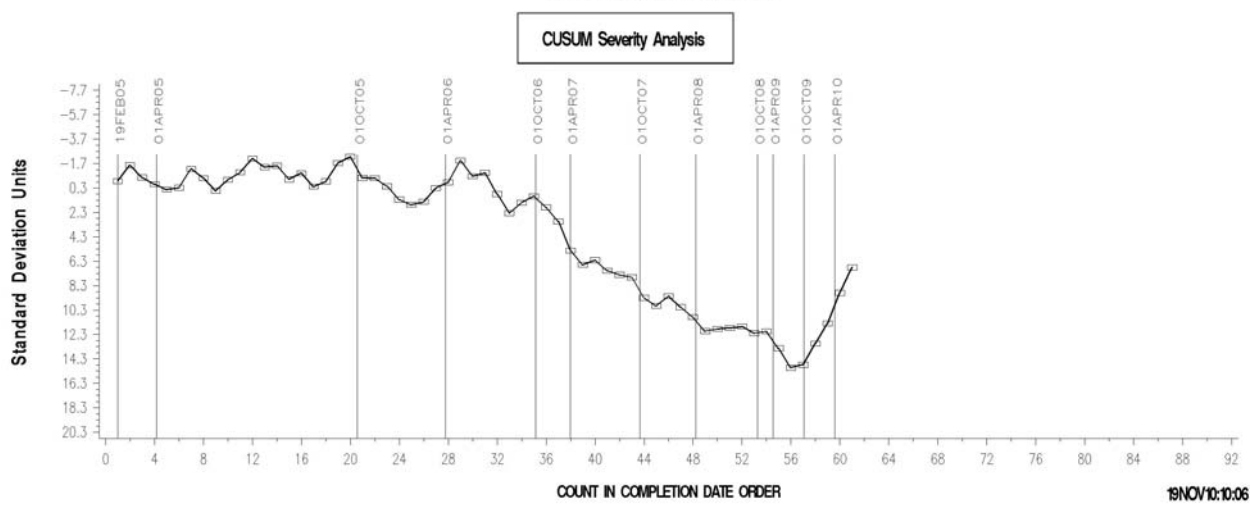
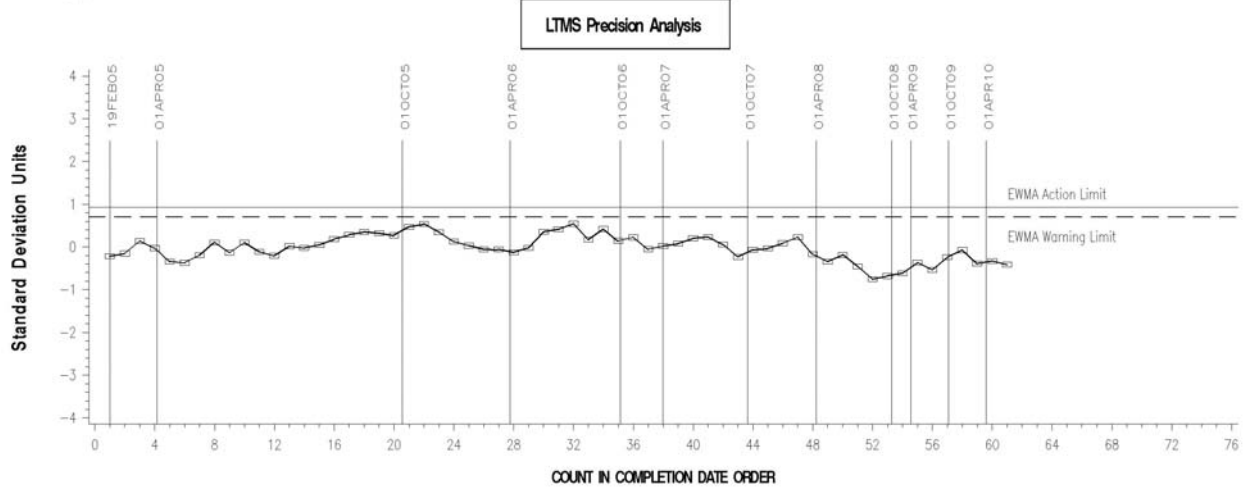
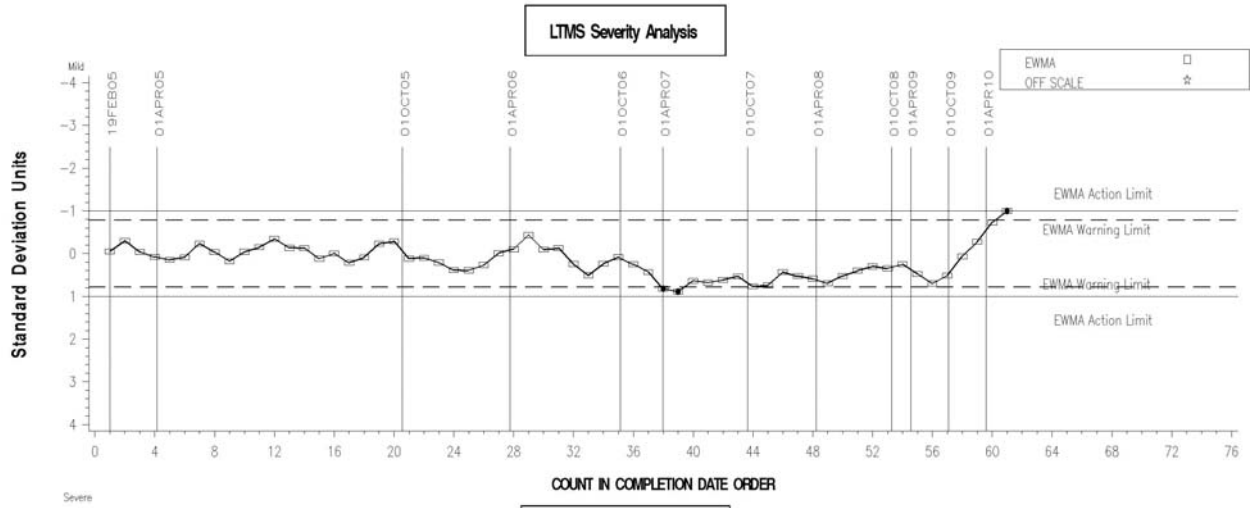


FIGURE 11
MACK T-12 INDUSTRY OPERATIONALLY VALID DATA



AVG. TOP RING WEIGHT LOSS (TRWL)

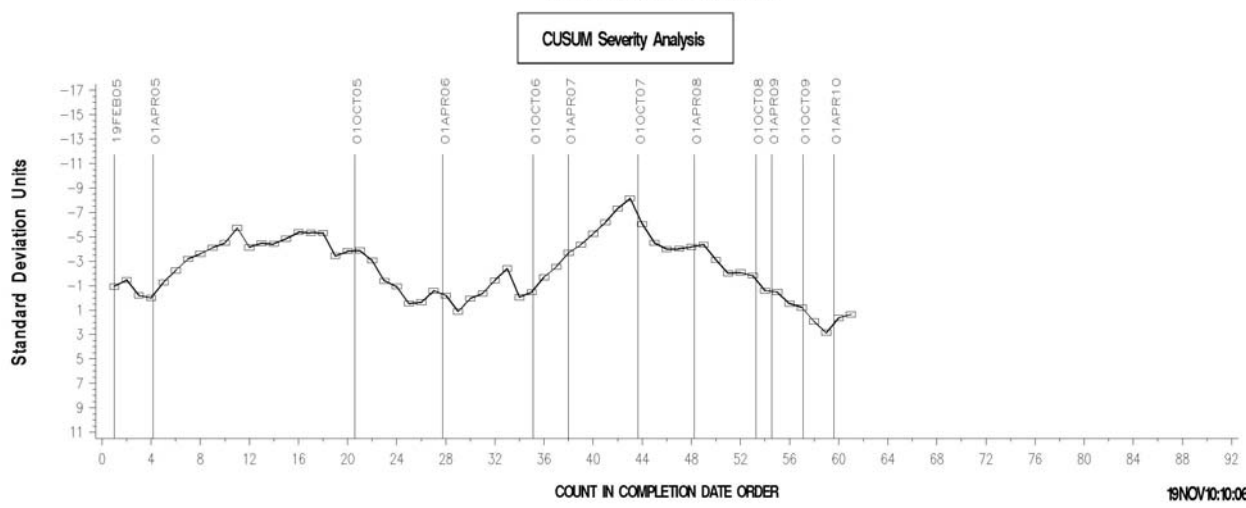
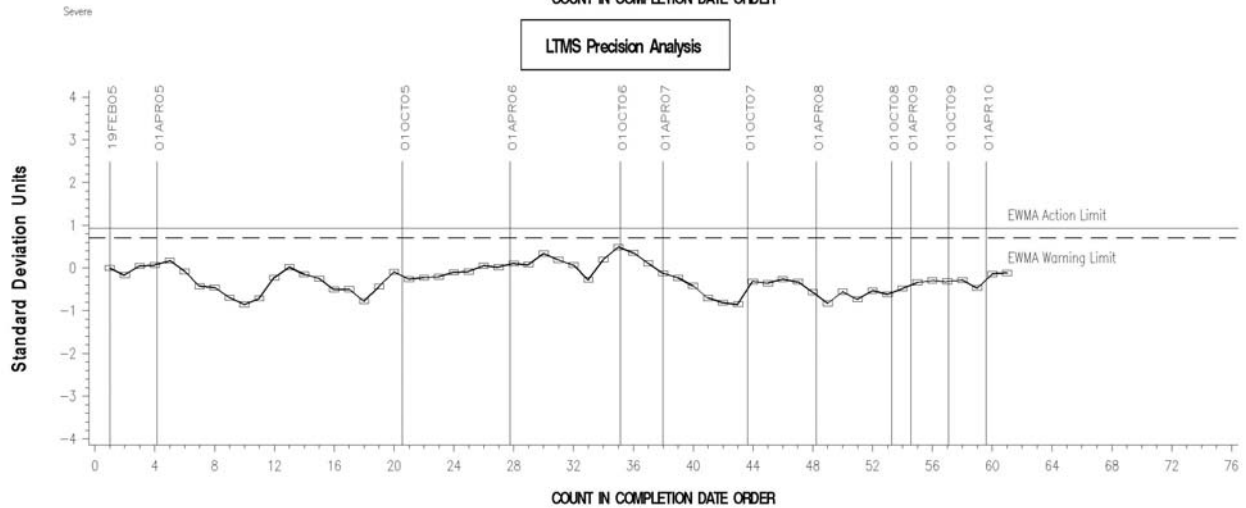
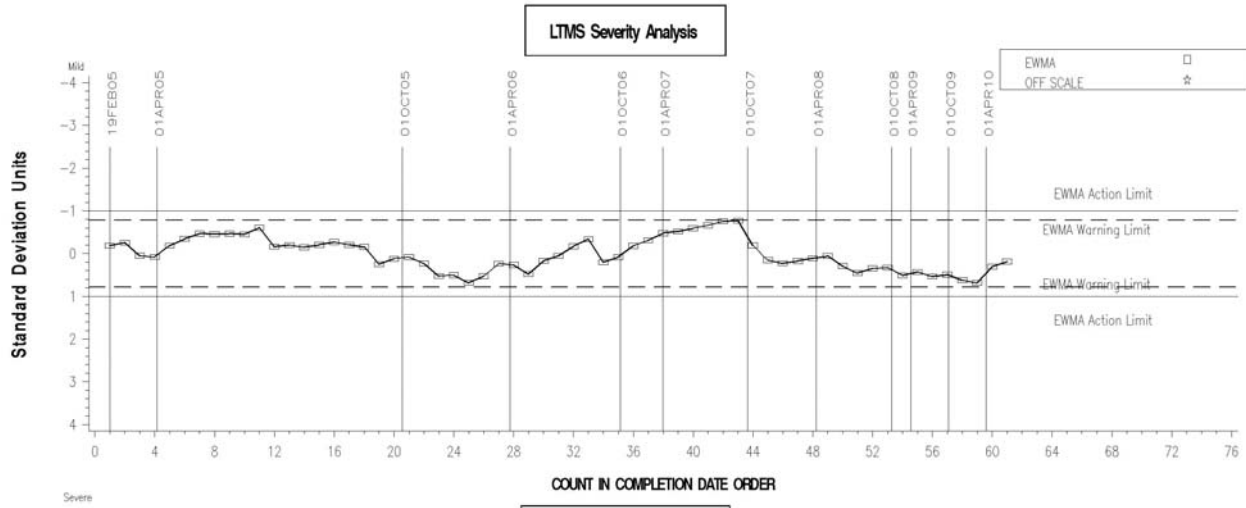


FIGURE 12
MACK T-12 INDUSTRY OPERATIONALLY VALID DATA



OIL CONSUMPTION (OC)

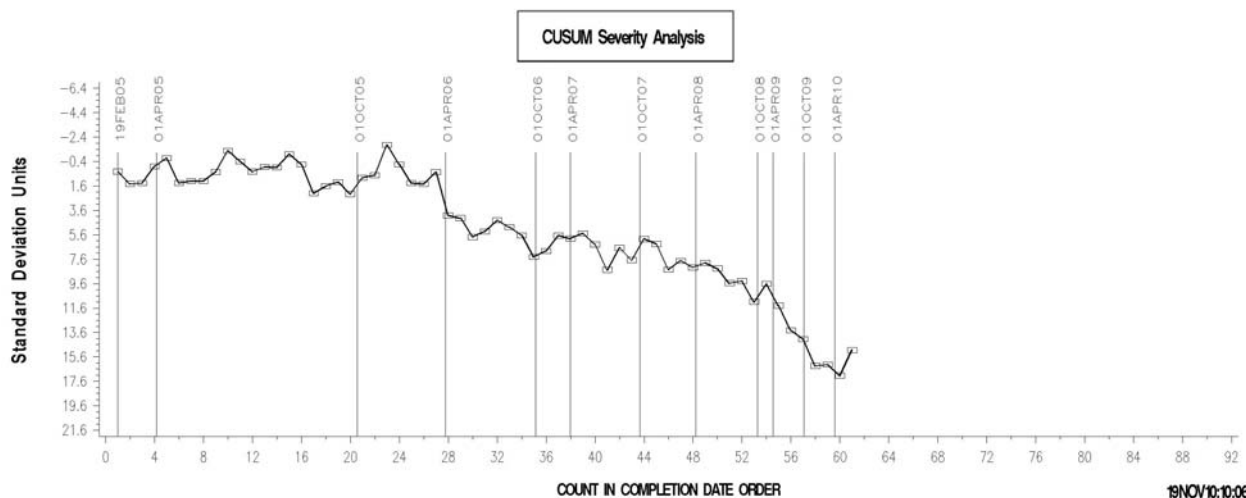
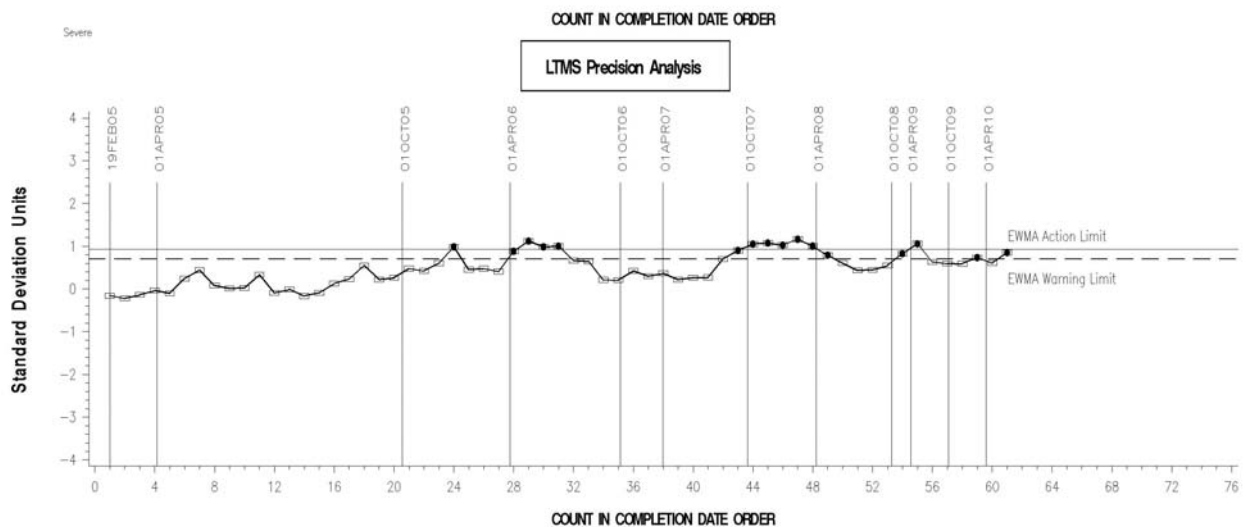
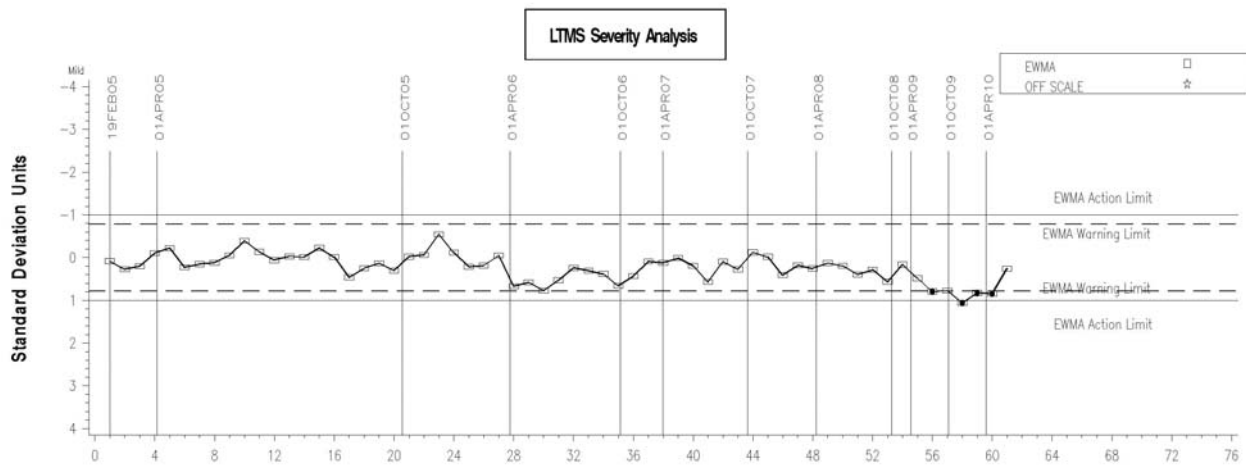


FIGURE 13
MACK T-12 INDUSTRY OPERATIONALLY VALID DATA



DELTA PB 250-300H (PB2)

