

MEMORANDUM: 07-067

DATE: October 24, 2007

TO: Mark Cooper, Chairman, Mack Test Surveillance Panel

FROM: Jeff Clark

SUBJECT: T-12 Calibration Testing for the October 2007 ASTM Report Period

The following is a summary of T-12 reference oil tests completed during the October 2007 ASTM report period, which began on April 1, 2007 and ended on September 30, 2007.

Test Status	TMC Validity Code	Number of Tests
Acceptable Calibration Test	AC	5
Failed Calibration Test (LTMS Criteria)	OC	1
Operationally Invalid Test	LC	0
Aborted Test	XC	1
Total		7

One test failed due to severe cylinder liner wear. One test was aborted due to improper oil leveling at 200 hours.

Severity and Precision:

Figure 1 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Delta PB at EOT (PB). PB is currently within control chart limits. However, for this period, PB is trending an average of 0.87 Δ/s mild. This is equivalent to 0.251 natural log units or approximately 5.5 ppm at the CJ-4 Mack Merit Anchor of 25 ppm.

Figure 2 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Cylinder Liner Wear (CLW). CLW is currently within control chart limits. For this period, CLW is trending and average of 0.76 Δ/s severe. This is equivalent to 2.6 microns.

Figure 3 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Top Ring Weight Loss (TRWL). TRWL is currently within control chart limits. For this period, TRWL is trending an average of 0.93 Δ/s mild. This is equivalent to 23.1 mg.

Figure 4 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Oil Consumption (OC). OC is currently in a precision warning alarm. For this period, OC is trending an average of 0.33 Δ/s severe. This is equivalent to 0.020 natural log units or approximately 1.3 g/h at the CJ-4 Mack Merit Anchor of 65 g/h.

Figure 5 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Delta PB 250 – 300 Hours (PB2). PB2 is currently within control chart limits. For this period, PB2 is trending an average of 0.46 Δ/s mild. This is equivalent to 0.167 natural log units or approximately 1.5 ppm at the CJ-4 Mack Merit Anchor of 10 ppm.

Precision estimates will be presented on an annual basis, in the table below. The precision estimate for 2005 was primarily generated from PC-10 Matrix or concurrent reference test results. The preliminary estimates for 2006 are comparable to 2005, with the exception of PB precision which shows some improvement. The precision estimate for 2007 is preliminary and will be updated in future reports.

T-12 Precision Estimates

Parameter	2005	2006	2007	2008
Df	21	12	5	
PB (ln units)	0.259	0.203	0.141	
CLW	3.87	3.78	3.14	
TRWL	28.4	28.6	5.67	
OC (ln units)	0.080	0.084	0.106	
PB2 (ln units)	0.344	0.321	0.187	

Reference Oils:

The current reference oil test targets are shown below:

Oils	N	Parameter	Mean (cSt)	S
821 (PC10E)	6	PB	3.259	0.288
		CLW	15.1	3.4
		TRWL	66.4	24.9
		OC	4.083	0.061
		PB2	2.251	0.363

The TMC is out of oil 821 and is awaiting a reblend. The table below shows the current supply of reference oil.

Oils	TMC Inventory (gallons)	Lab Inventory (# of samples)	Estimated Life (years)
821	--	3	< 3 months**

**Some labs are already out of reference oil.

Information Letters:

Information Letter 07-2, Sequence No. 2, was issued May 3, 2007. This letter added Appendix X1 which details the calculation of T-10 Merits using T-12 test results.

TMC Laboratory Visits:

No TMC laboratory visits were conducted this ASTM period

Additional Information:

The T-12 Timeline is attached as Figure 6.

The T-12 database and alarm logs can be accessed on the TMC's homepage. If you have any questions on how to access this information, contact the TMC.

JAC/jac/mem07-067.jac.doc

Attachments

c: J.L. Zalar, TMC
F.M. Farber, TMC
Mack Test Surveillance Panel
<ftp://ftp.astmtmc.cmu.edu/docs/diesel/mack/semiannualreports/T-12/T12-10-2007.pdf>

Distribution: Email

FIGURE 1
MACK T-12 INDUSTRY OPERATIONALLY VALID DATA

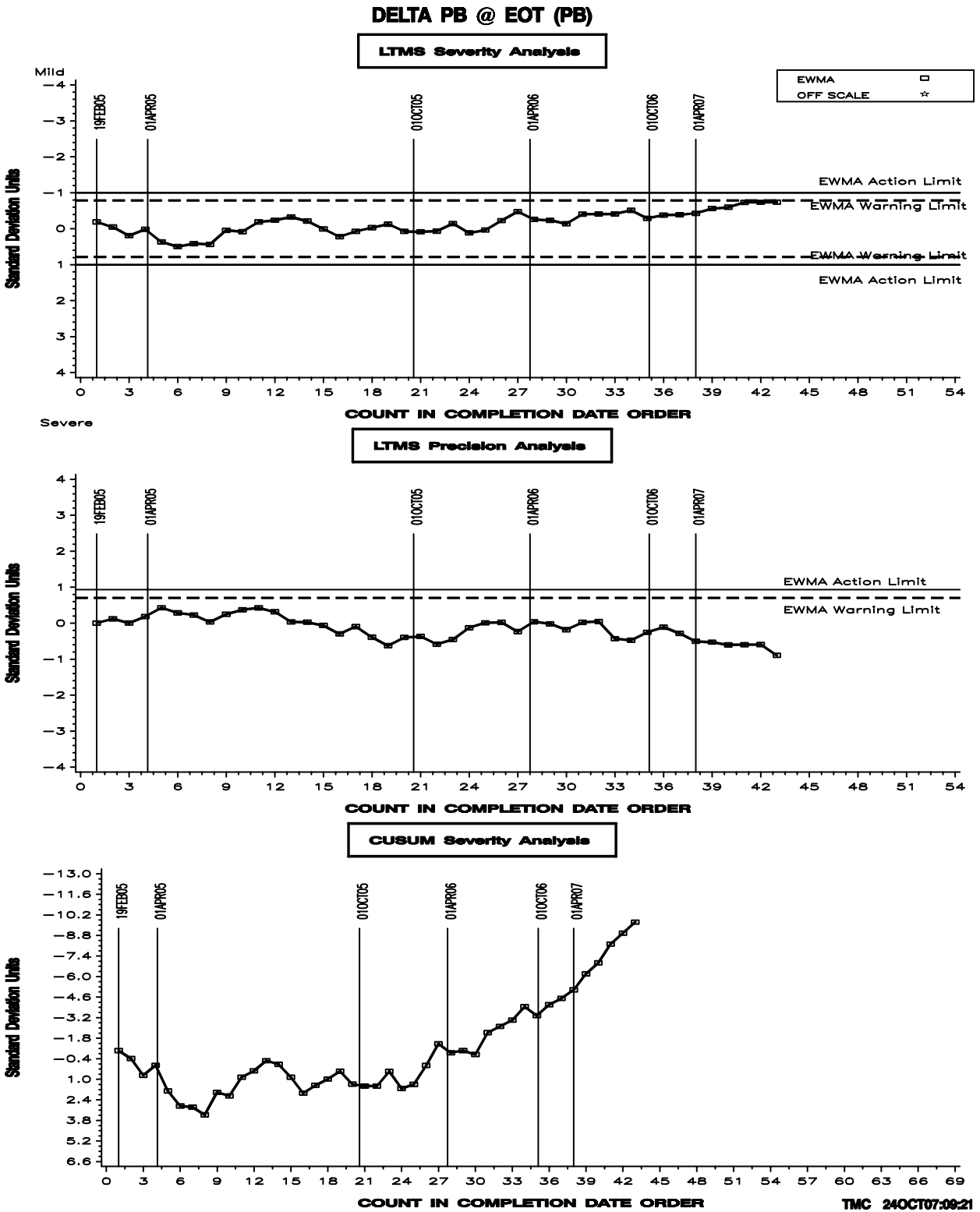


FIGURE 2 MACK T-12 INDUSTRY OPERATIONALLY VALID DATA

AVG. CYLINDER LINER WEAR (CLW)

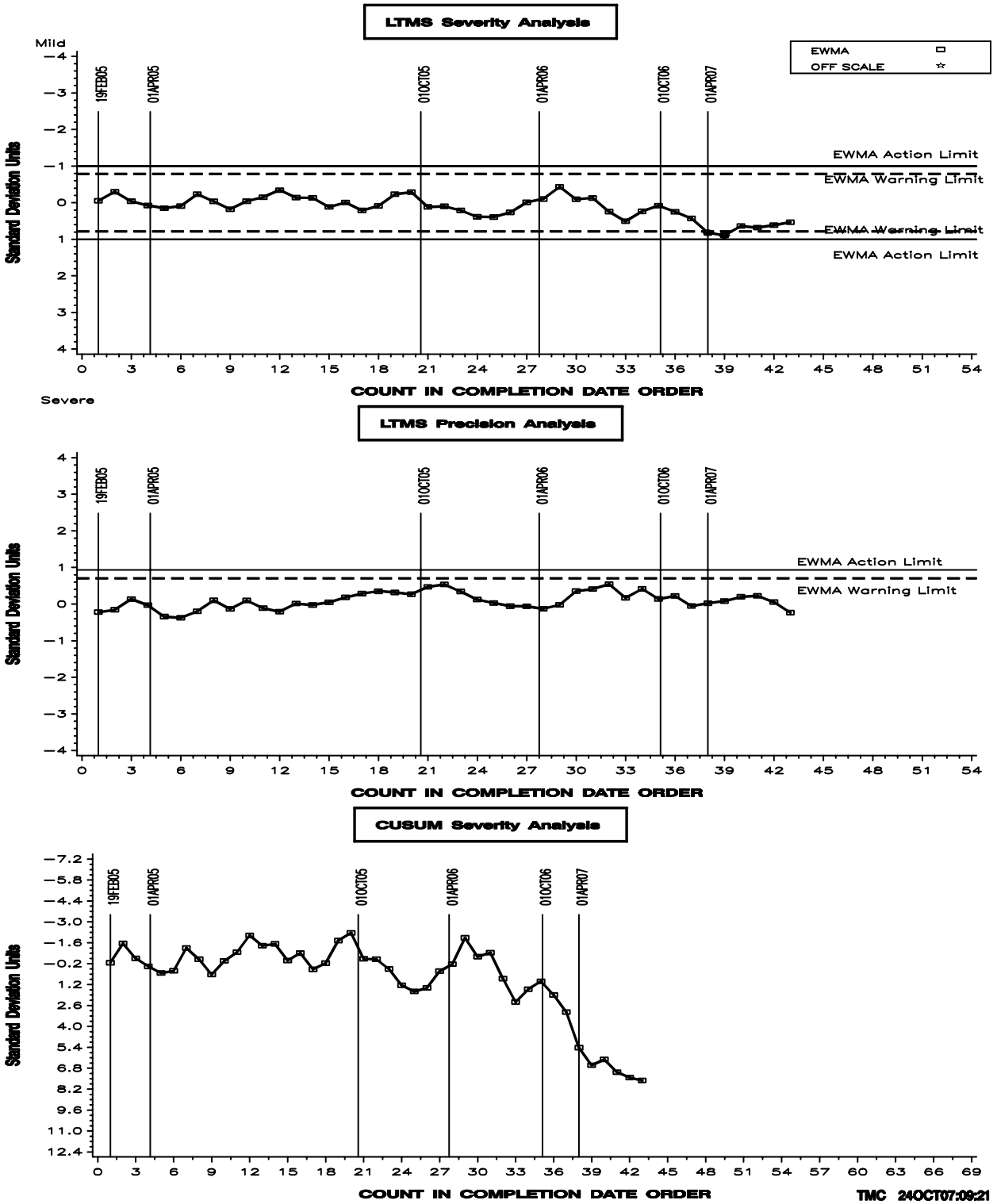


FIGURE 3 MACK T-12 INDUSTRY OPERATIONALLY VALID DATA

AVG. TOP RING WEIGHT LOSS (TRWL)

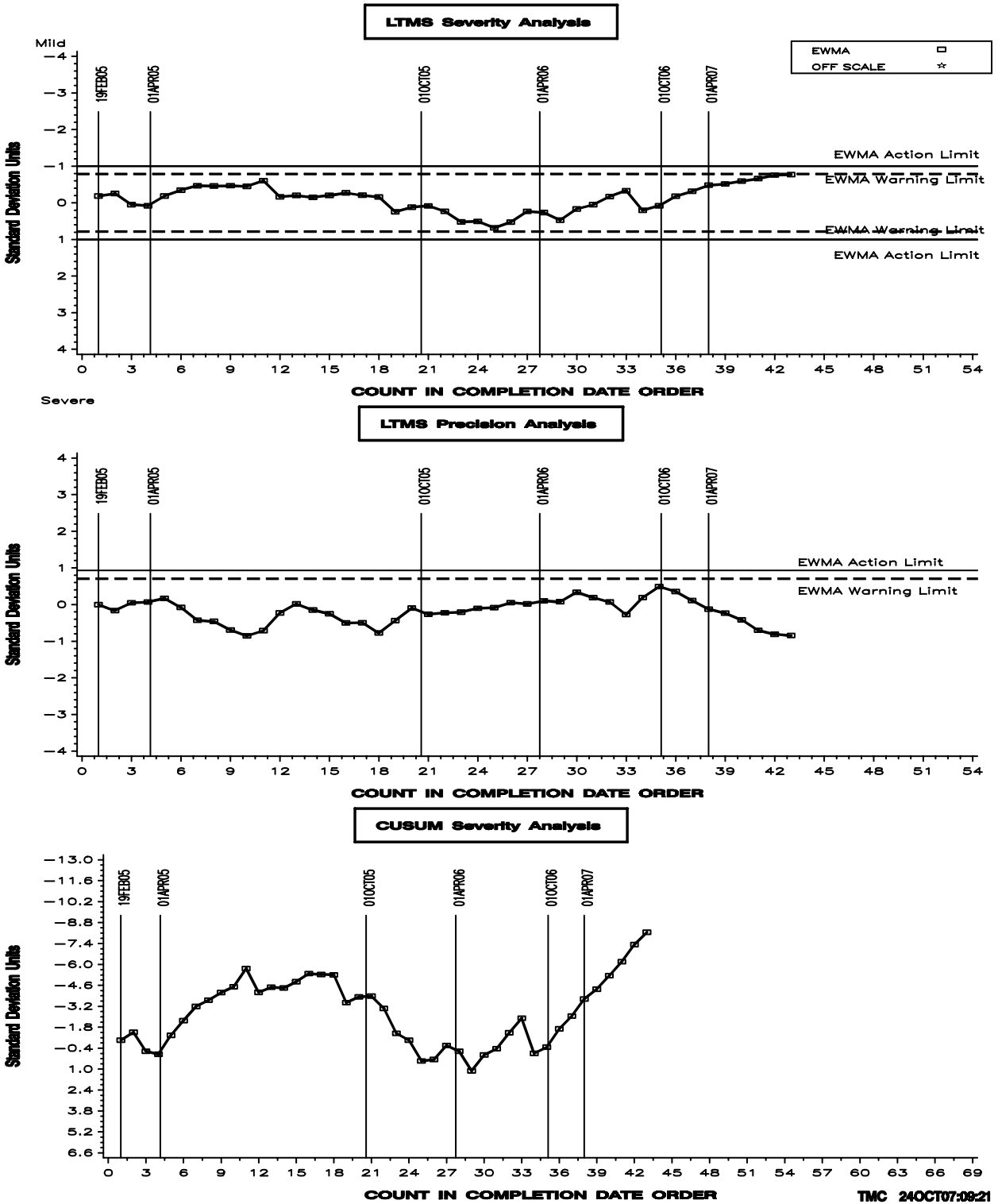


FIGURE 4
MACK T-12 INDUSTRY OPERATIONALLY VALID DATA

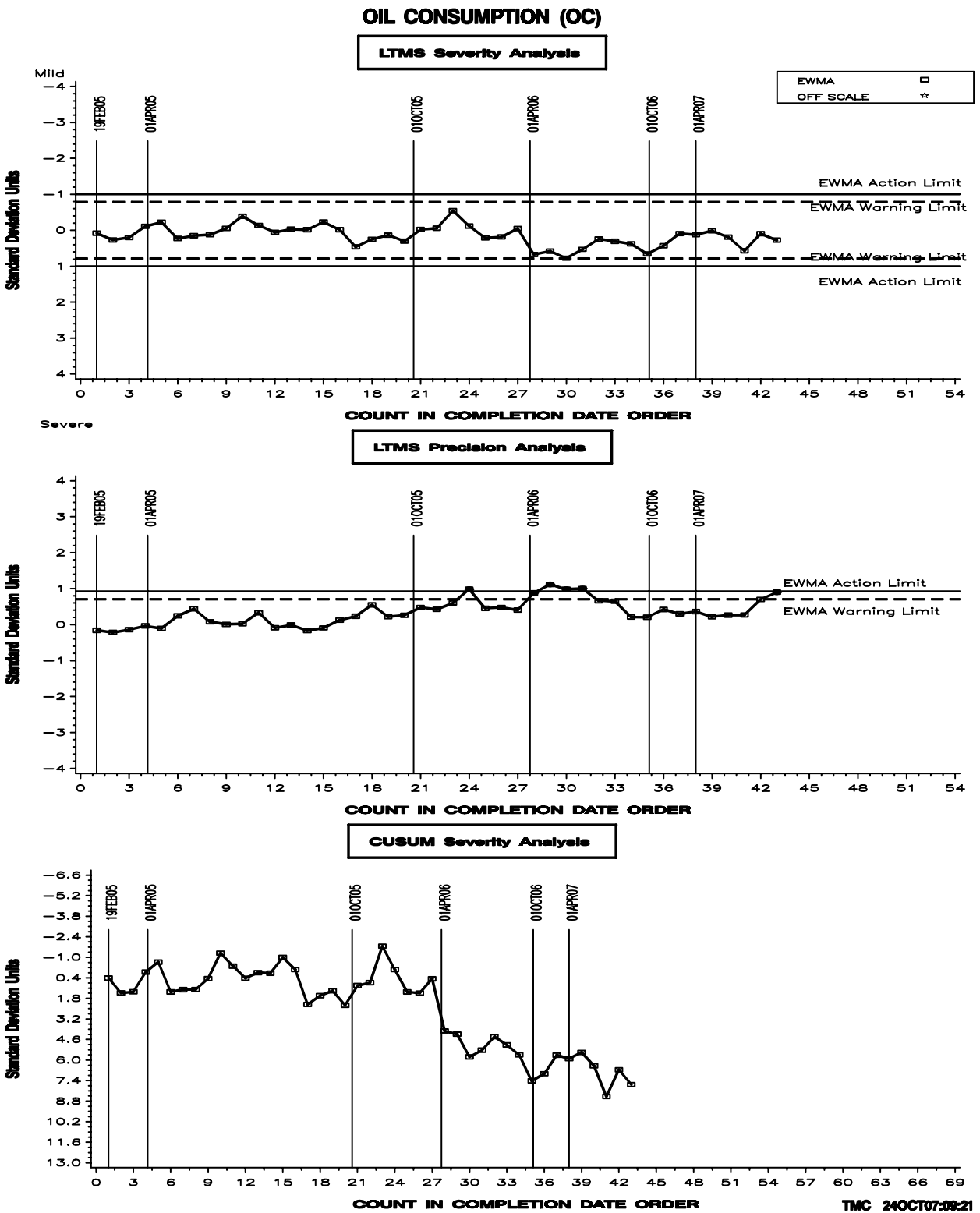


FIGURE 5
MACK T-12 INDUSTRY OPERATIONALLY VALID DATA

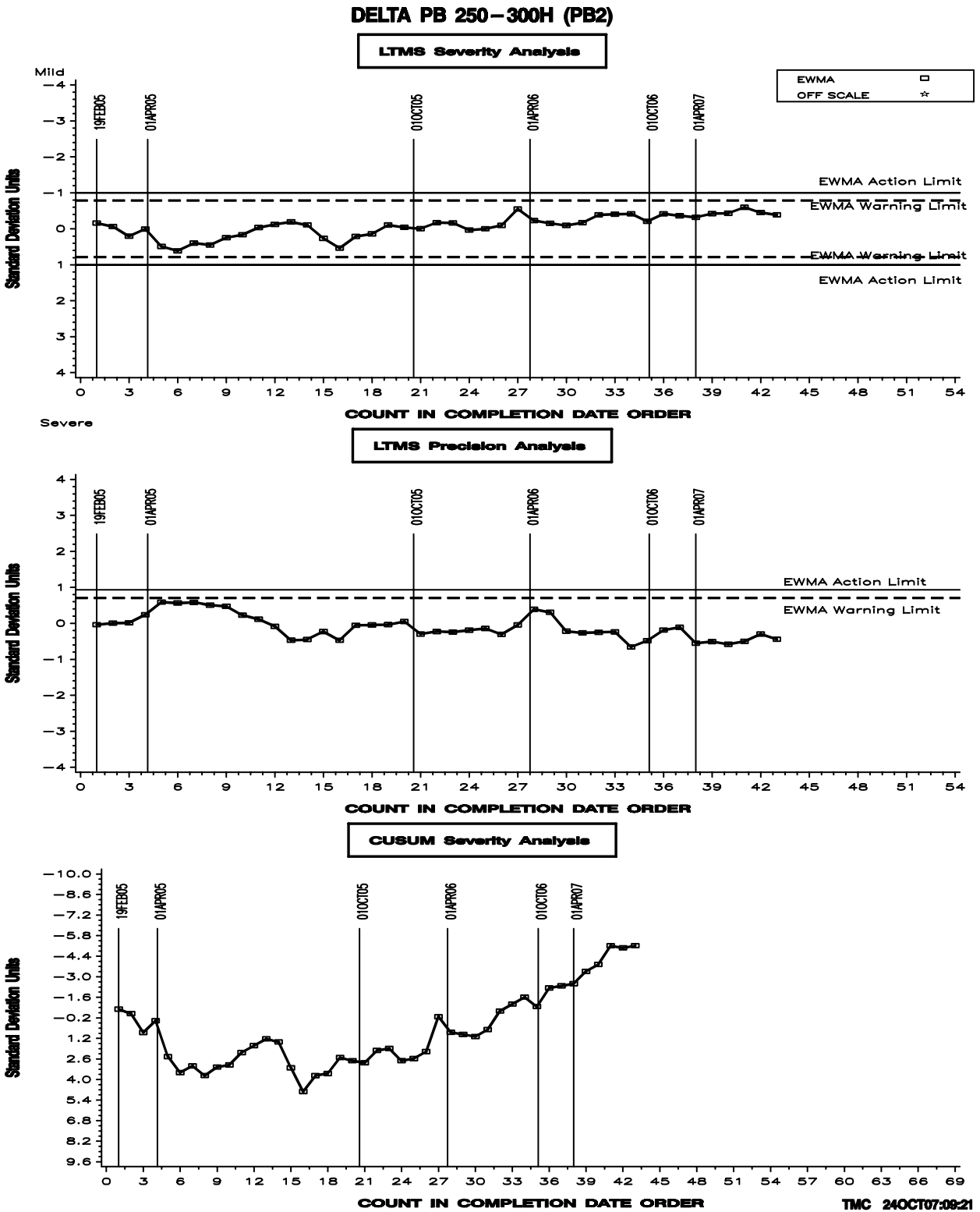


FIGURE 6

T12 Timeline

13:05 Friday, May 18, 2007 1

Obs	effective_date	info_letter_number	event
1	20041028		PROCEDURE DRAFT NO. 1 ISSUED
2	20041119		PROCEDURE DRAFT NO. 2 ISSUED
3	20050324		PROCEDURE DRAFT NO. 3 ISSUED
4	20050426		PROCEDURE DRAFT NO. 4 ISSUED
5	20050429		BEGINNING OF PC-10 MATRIX
6	20050525		PROCEDURE DRAFT NO. 5 ISSUED
7	20050613		'NEW' RING BATCH INTRODUCED
8	20050911		COMPLETION OF PC-10 MATRIX
9	20051116		INTAKE MANIFOLD PRESSURE SPECIFICATION: PHASEII 307 +/- 5 kPa. EXHAUST CO2 NON-CONTROLLED.
10	20051205		LTMS IMPLEMENTED
11	20060308		PROCEDURE DRAFT NO. 6 ISSUED
12	20060410		PROCEDURE DRAFT NO. 6A ISSUED
13	20060512		PROCEDURE DRAFT NO. 7 ISSUED
14	20060713		PROCEDURE DRAFT NO. 8 ISSUED
15	20070130		PROCEDURE DRAFT NO. 9 ISSUED
16	20070201	07-1	D 129 removed as fuel sulfur measurement.
17	20070201	07-1	Piston deposits dropped from test procedure.
18	20070201	07-1	Valve guide reaming procedure updated.
19	20070201	07-1	Quality Index approved for determining operational validity.
20	20070501		PROCEDURE DRAFT NO. 10 ISSUED
21	20070503	07-2	Appendix X1 T-10 Mack Merit Calculations Using T-12 Test results added to test procedure.