



Test Monitoring Center

6555 Penn Avenue
Pittsburgh, PA 15206-4489
(412) 365-1000

MEMORANDUM: 03-094
DATE: October 1, 2003
TO: Warren Totten, Chairman, Cummins Surveillance Panel
FROM: Jeff Clark
SUBJECT: M11 Calibration Testing for the October 2003 ASTM Report Period

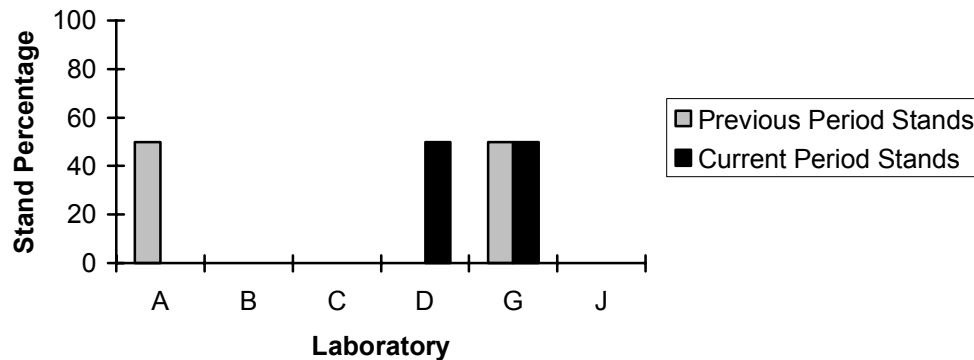
The following is a summary of M11 reference oil tests completed during the October 2003 ASTM report period, which began on April 1, 2003 and ended on September 30, 2003.

Lab / Stand Distribution:

	Reporting Data	Calibrated as of 9/30/03
Number of Laboratories	2	2
Number of Stands	2	2

The following chart shows the laboratory / stand distribution for tests completed this report period:

Laboratory / Stand Distribution



The following summarizes the status of the reference oil tests completed this ASTM report period:

Test Status	TMC Validity Code	Number of Tests
Operationally and Statistically Acceptable	AC	2
Failed LTMS Acceptance Criteria	OC	0
Operationally Invalid	LC	1
Aborted	XC	0
Total		3

The operationally invalid test was due to missing the soot window.

Severity and Precision:

Figures 1, 2, and 3 (attached) show the current industry EWMA severity, EWMA precision, and cumsum charts for Crosshead Weight Loss (CWL), Filter Plugging Delta P (FPD), and Average Sludge Rating (ASR). CWL is currently in control. FPD is in an industry action alarm for EWMA severity in the mild direction. This appears to be the continuation of a long-term mild trend that began in early 2000. ASR is in an industry warning alarm for EWMA severity in the mild direction. This also appears to be a long-term trend that began at the same time as the FPD mild trend. Low-test activity makes it difficult to offer further comment regarding the meaning of these trends.

Precision, as estimated by the pooled standard deviation, is shown in the table below. Precision estimates are presented on an annual basis. However, any conclusions drawn from a comparison of these precision estimates are of little value due to the reduced number of degrees of freedom. Please note, that the degrees of freedom (df) equals $\Sigma(n \text{ observations per oil} - 1)$.

M11 Pooled Precision by Year

Parameter	1998	1999	2000	2001	2002	2003
df	18	10	6	4	2	2
CWL	1.31	0.74	1.72	0.90	0.85	0.68
FPD*	0.31	0.29	0.36	0.18	0.17	0.37
ASR	0.29	0.20	0.23	0.30	0.21	0.20

*Transformed Units.

Reference Oils and Hardware:

The following table shows the current M11 reference oil test targets:

M11 Reference Oil Test Targets

Parameter	Oil	N	Mean (cSt)	S
CWL	1005-1	30	4.5300	1.3190
FPD	1005-1	30	4.8061	0.2935
ASR	1005-1	30	8.4000	0.2250

A new crosshead design was introduced into production for the M11 engine in 1999. Use of the new crossheads was approved in April 1999 following a series of tests, both candidate and calibration, that were run with both types of crossheads. These split tests showed no significant difference in wear between the crosshead designs. However, once M11 testing began on the new crossheads, a severity shift occurred that led to the introduction of a correction factor for CWL, as shown in the table below.

Parameter	Correction Factor (mg)	Effective Date
CWL	-1.8250	20000307

A new rocker arm design has been introduced to the M11 as well. At the September 1999 meeting, the M11 Surveillance Panel approved a plan to run M11 tests using both styles of rocker arms. This study was similar to the one that was done for the new crosshead design. At the conclusion of the study, no significant difference was found in crosshead wear between the two populations of rocker arms. There was, though, a significant difference in the standard deviation between the two styles of rocker arms. This necessitated an update to the outlier screening criteria, which is covered in M11 Information Letter 02-1. Effective January 28, 2002, the new design rocker arms are approved for use in testing, using the updated outlier screening methodology.

Information Letters:

Information Letter 03-01 was issued on August 26, 2003. A revised new stand definition was the only item contained in this letter.

Quality Index:

No Quality Index deviations were issued this period. For the history of the M11 test, two Quality Index deviations have been issued.

TMC Laboratory Visits:

Two TMC laboratory visits were conducted this ASTM report period. The deficiencies noted are summarized in the table below.

Deficiency	Number of Labs
Process water return line fitting corroded at intercooler fitting	1
Instrumentation calibration ranges not bracketing operating range	2
Excessively large instrumentation calibration tolerances	1
Fuel temperature thermocouple improperly located	1

Memo 03-094

Page 4

Additional Information:

The M11 industry database, timeline, and alarm logs can be accessed on the TMC's web site at <http://www.astmtmc.cmu.edu>. Please contact the TMC if you have questions on accessing this information.

JAC/jac/mem03-094.jac.doc

Attachments

c: J.L. Zalar, TMC

F.M. Farber, TMC

M11 Surveillance Panel

<ftp://ftp.astmtmc.cmu.edu/docs/diesel/cummins/semiannualreports/M11-10-2003.pdf>

Distribution: Email

FIGURE 1
M11 INDUSTRY OPERATIONALLY VALID DATA

CROSSHEAD WEIGHT LOSS

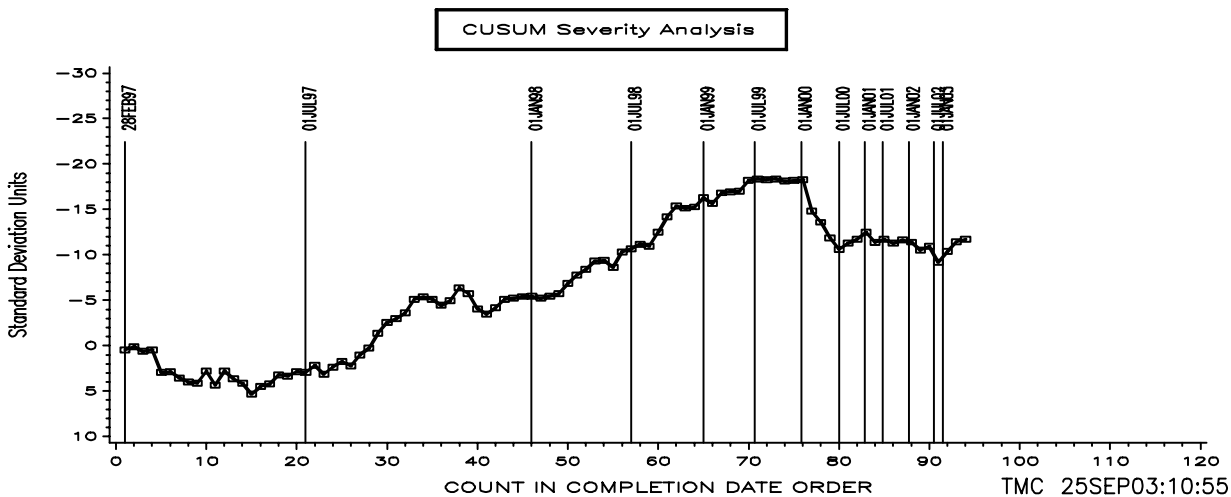
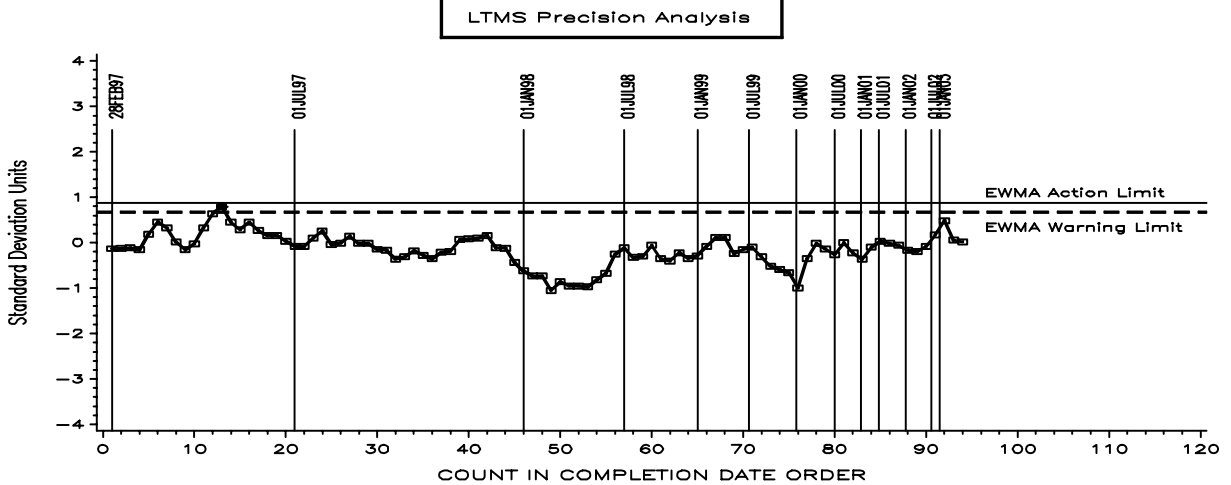
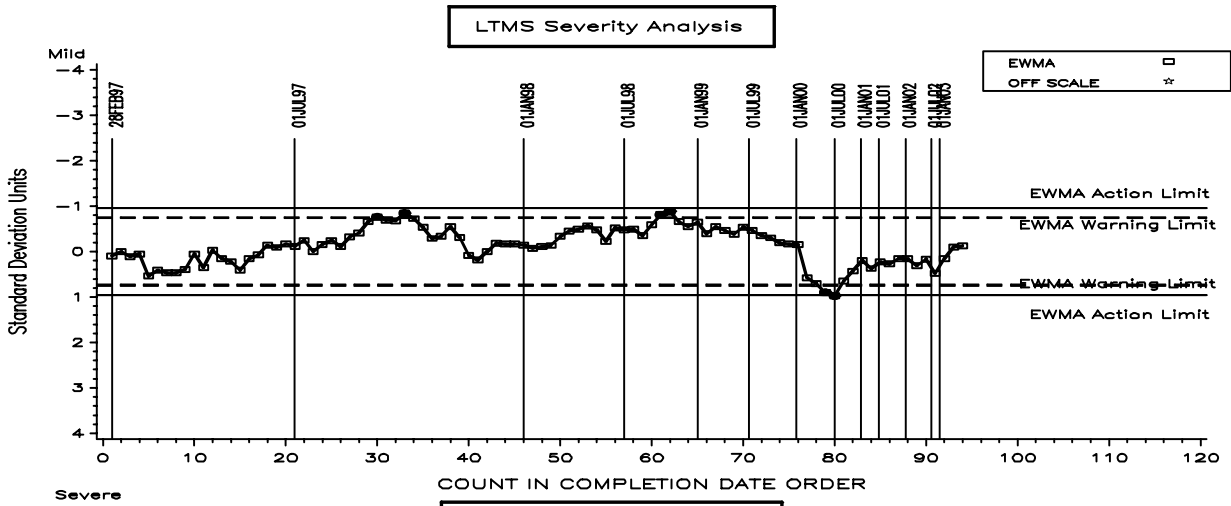


FIGURE 2
M11 INDUSTRY OPERATIONALLY VALID DATA

FILTER PLUGGING DELTA P

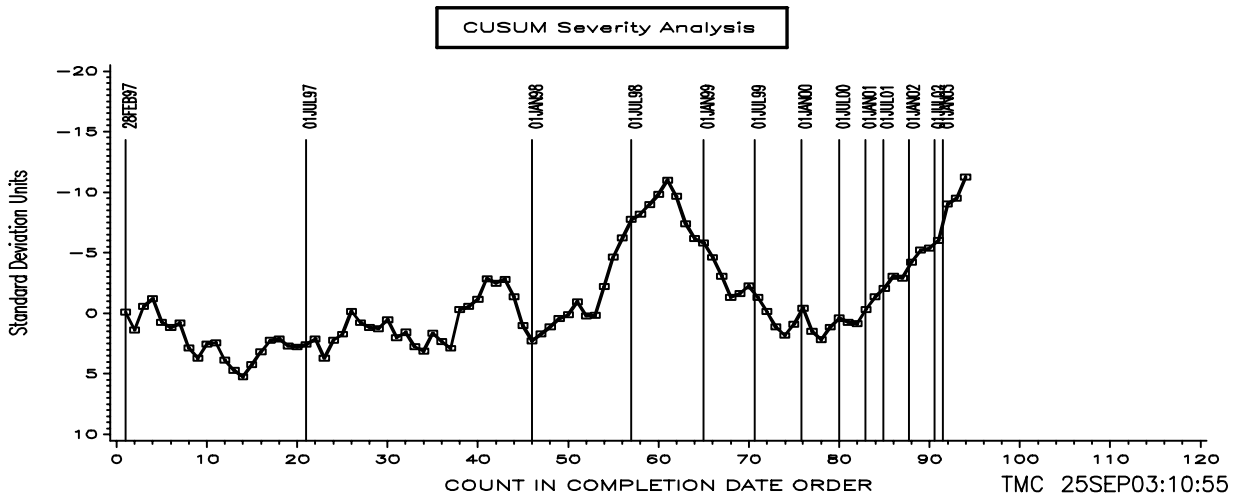
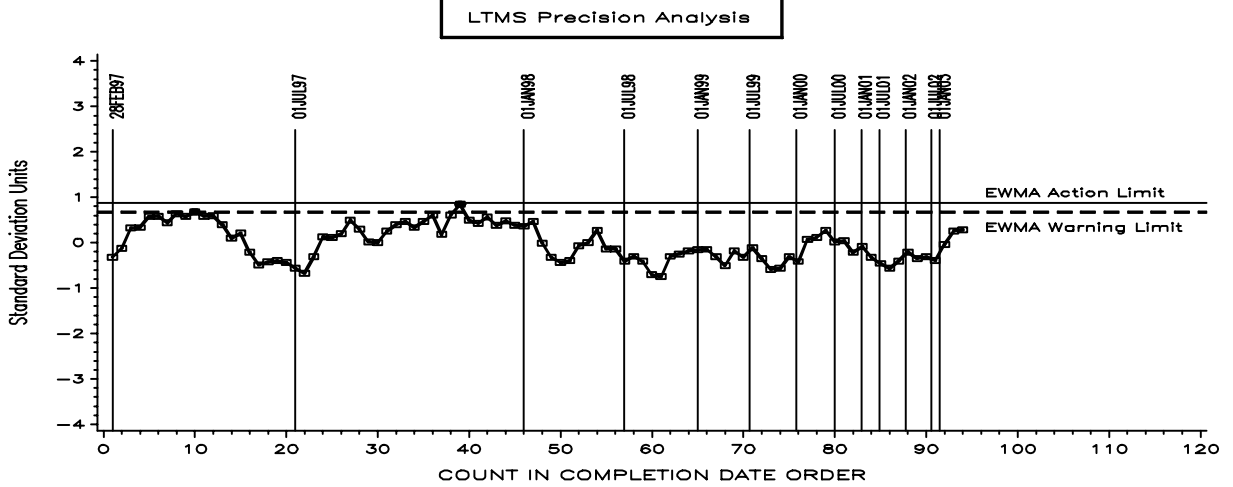
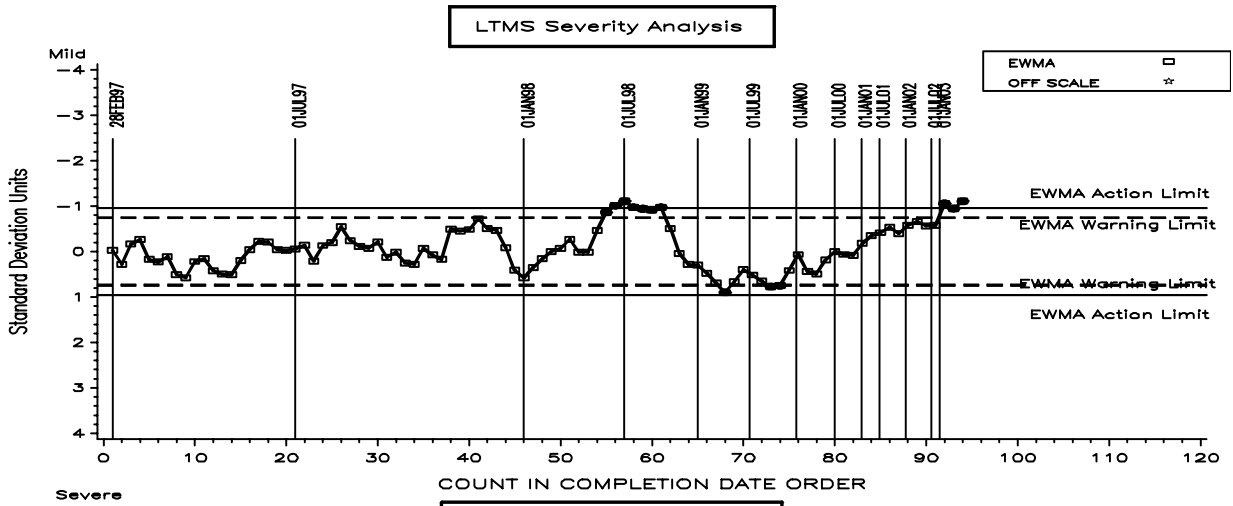


FIGURE 3
M11 INDUSTRY OPERATIONALLY VALID DATA

AVERAGE SLUDGE RATING

