



Test Monitoring Center

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MEMORANDUM: 02-088
DATE: October 8, 2002
TO: Warren Totten, Chairman, Cummins Surveillance Panel
FROM: Jeff Clark
SUBJECT: M11EGR Calibration Testing for the October 2002 ASTM Report Period

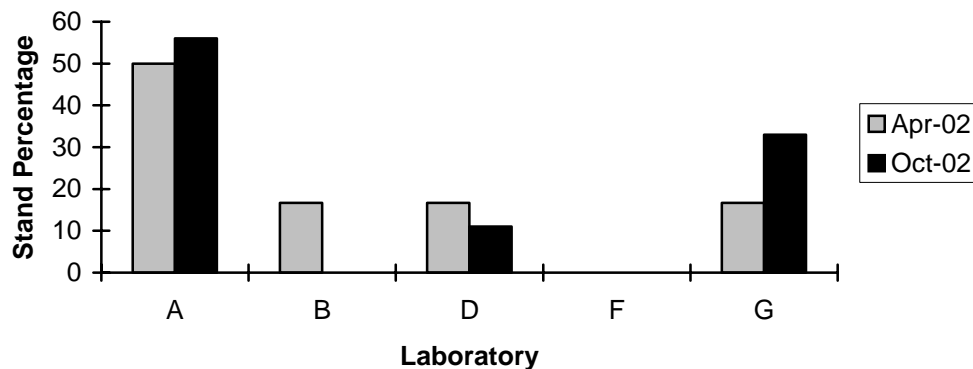
The following is a summary of M11EGR reference oil tests completed during the October 2002 ASTM report period, which began on April 1, 2002 and ended on September 30, 2002.

Lab / Stand Distribution:

	Reporting Data	Calibrated as of 9/30/02
Number of Laboratories	3	3
Number of Stands	9	9

The figure below shows the M11EGR laboratory / stand distribution for tests completed this report period:

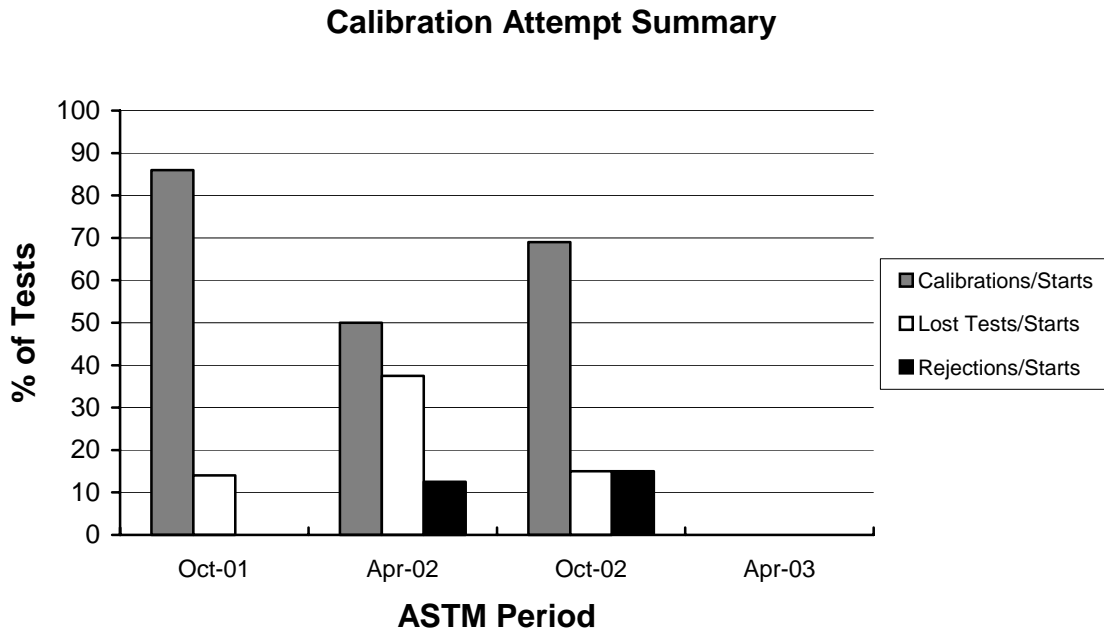
Laboratory / Stand Distribution



The table below summarizes the status of the reference oil tests reported to the TMC this ASTM report period:

Test Status	TMC Validity Code	Number of Tests
Acceptable Calibration Test	AC	9
Failed Calibration Test (LTMS Criteria)	OC	2
Operationally Invalid Calibration Test	LC	1
Aborted Calibration Test	XC	1
Total		13

Calibrations per start, lost tests per start and rejections per start rates are summarized in the figure below:

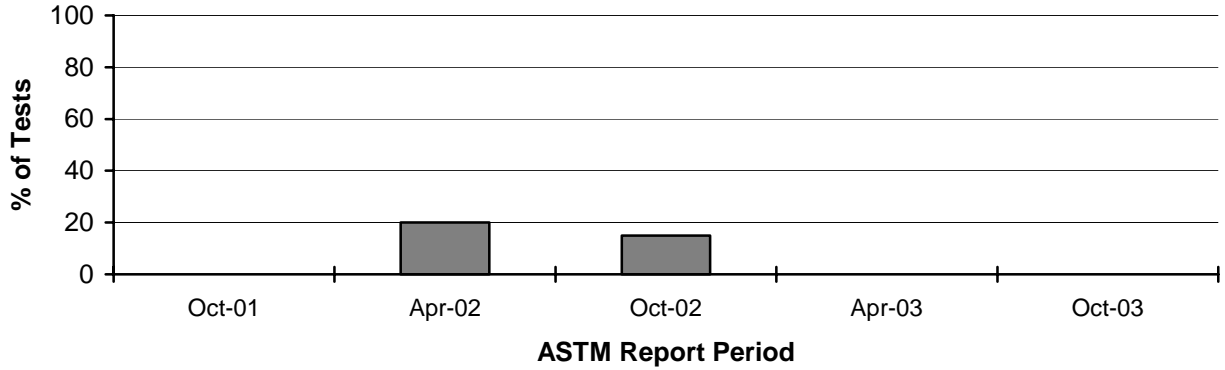


Compared to the previous period, the calibrations per start rate has increased, the lost tests per start rate has decreased, and the rejections per start rate has remained relatively steady. A detailed list of reasons tests failed the acceptance criteria (OC validity) is shown in Table 1. Table 2 lists the operationally invalid tests (LC validity) and Table 3 lists the aborted tests (XC validity).

LTMS Acceptance Criteria / Stand Alarms:

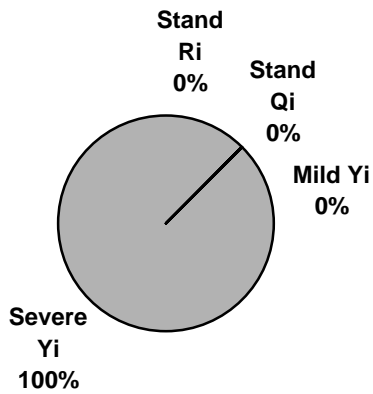
The following figure shows the percentage of operationally valid tests that failed the LTMS acceptance criteria (TMC validity code = OC) for recent ASTM report periods:

Tests Failing LTMS Acceptance Criteria

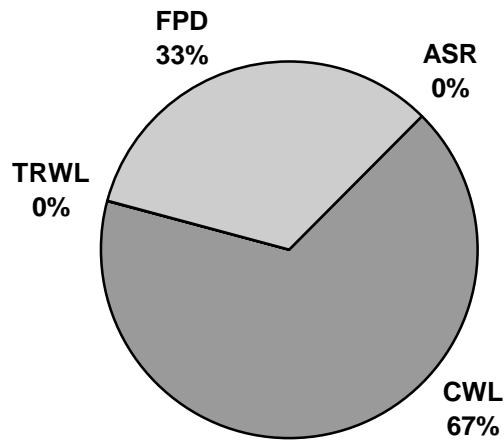


There were three LTMS stand alarms, spread across two tests, for the current period. The following figures show the alarm and parameter distributions:

Distribution of LTMS Stand Alarms



Distribution of Stand Alarms by Parameter



No LTMS deviations were issued this period. No LTMS deviations have been issued during the history of the M11EGR.

Severity and Precision:

Figure 1 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Crosshead Weight Loss (CWL). CWL is currently in control. For a history of CWL industry alarms, refer to the industry alarm log shown in Table 4.

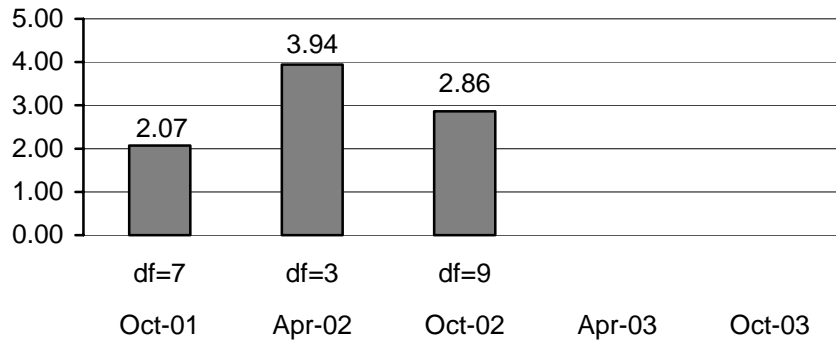
Figure 2 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Average Sludge Rating (ASR). ASR is currently in control. For a history of ASR industry alarms, refer to the industry alarm log shown in Table 5.

Figure 3 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Filter Plugging Delta P (FPD). FPD is currently in control. For a history of FPD industry alarms, refer to the industry alarm log shown in Table 6.

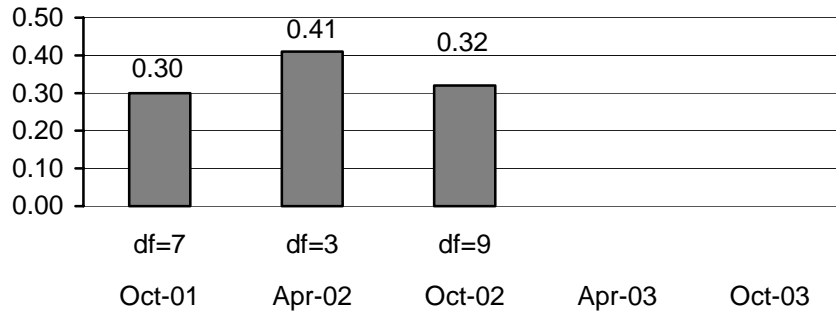
Figure 4 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Top Ring Weight Loss (TRWL). TRWL is currently in control. For a history of TRWL industry alarms, refer to the industry alarm log shown in Table 7.

Precision, as estimated by the pooled standard deviation, is shown in the following figures. For comparison purposes, the TMC will continue to report precision by ASTM period.

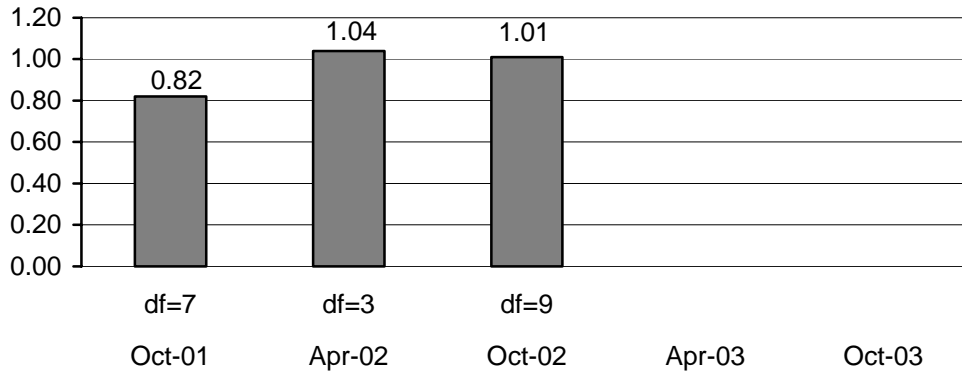
Crosshead Weight Loss Pooled Precision



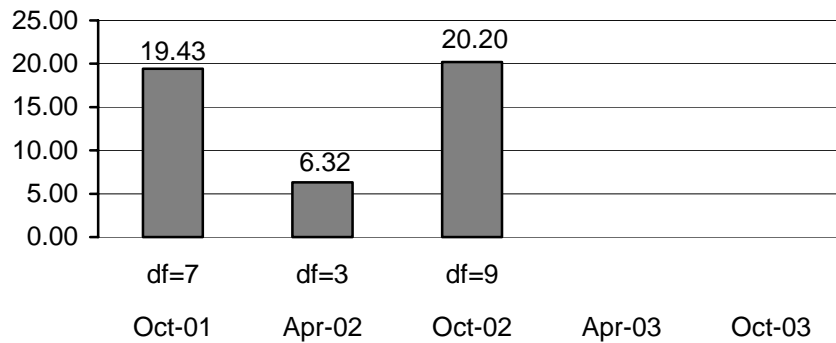
Average Sludge Rating Pooled Precision



Filter Plugging Delta P Pooled Precision



Top Ring Weight Loss Pooled Precision



Compared to the previous period, CWL and ASR show improvement in precision, FPD has remained steady, and TRWL shows significant degradation. In all four cases though, precision is within historical levels. The apparent TRWL degradation may be due to very few degrees of freedom during the previous period. Please note, that the degrees of freedom (df) equals $\Sigma(n \text{ observations per oil} - 1)$.

Reference Oils:

The current reference oil test targets are shown below:

Oils	N*	Parameter	Mean (cSt)	S
830-2	10	CWL	13.0	3.0
		ASR	8.30	0.35
		FPD	11.7505	1.0140
		TRWL	131.3	21.1

* Targets based using both 830-1 and 830-2 results.

Once 10 tests have been completed on oil 830-2, the TMC will provide a target update for surveillance panel consideration.

Information Letters:

No information letters were issued this period.

TMC Laboratory Visits:

No TMC laboratory visits were conducted this ASTM period.

Quality Index:

Quality Index has not yet been implemented for the M11EGR. The M11EGR O&H group has reviewed industry capability for the M11EGR control parameters. Based on this review, the TMC will be submitting a Quality Index proposal for surveillance panel consideration.

Additional Information:

Table 8 contains the M11EGR Timeline, which details changes to the test since its inception.

The M11EGR database can be accessed on the TMC's homepage. If you have any questions on how to access this information, contact the TMC.

JAC/jac/mem02-088.jac.doc

Attachments

c: J.L. Zalar, TMC
F.M. Farber, TMC
Cummins Surveillance Panel
<ftp://ftp.astmtmc.cmu.edu/docs/diesel/cummins/semiannualreports/M11EGR-10-2002.pdf>

Distribution: Email

Table 1
Summary of Reasons for Rejected Tests

	No. of Tests
Crosshead Weight Loss, Mild	1
Crosshead Weight Loss, Mild and Filter Plugging Delta P, Severe	1

Table 2
Summary of Reasons for Invalid Tests

	No. of Tests
Completely plugged oil filter, changed prior to 250 hours	1

Table 3
Summary of Reasons for Aborted Tests

	No. of Tests
Projected to miss soot window	1

FIGURE 1

M11EGR INDUSTRY OPERATIONALLY VALID DATA

CROSSHEAD WEIGHT LOSS

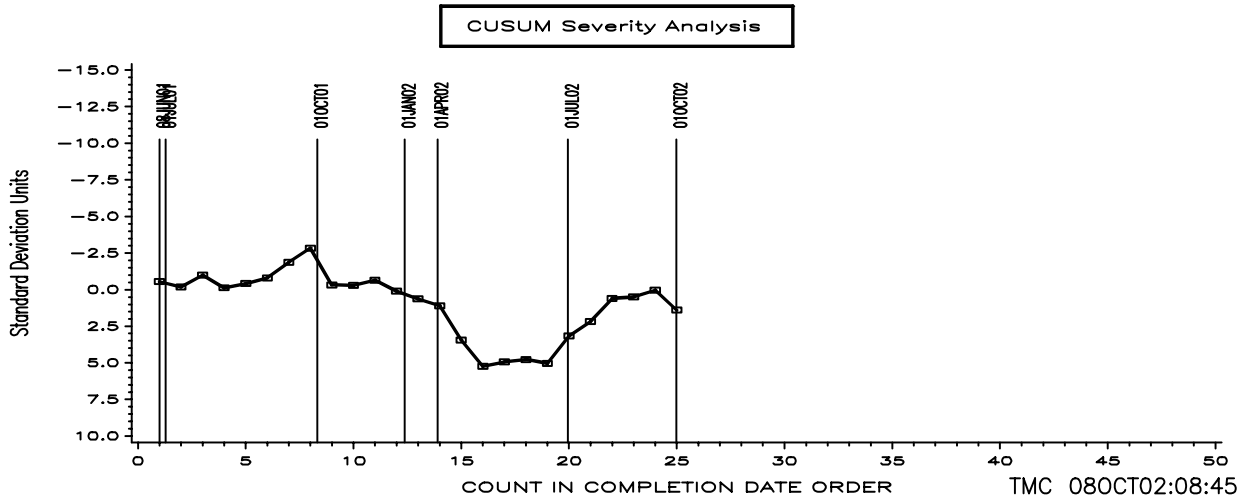
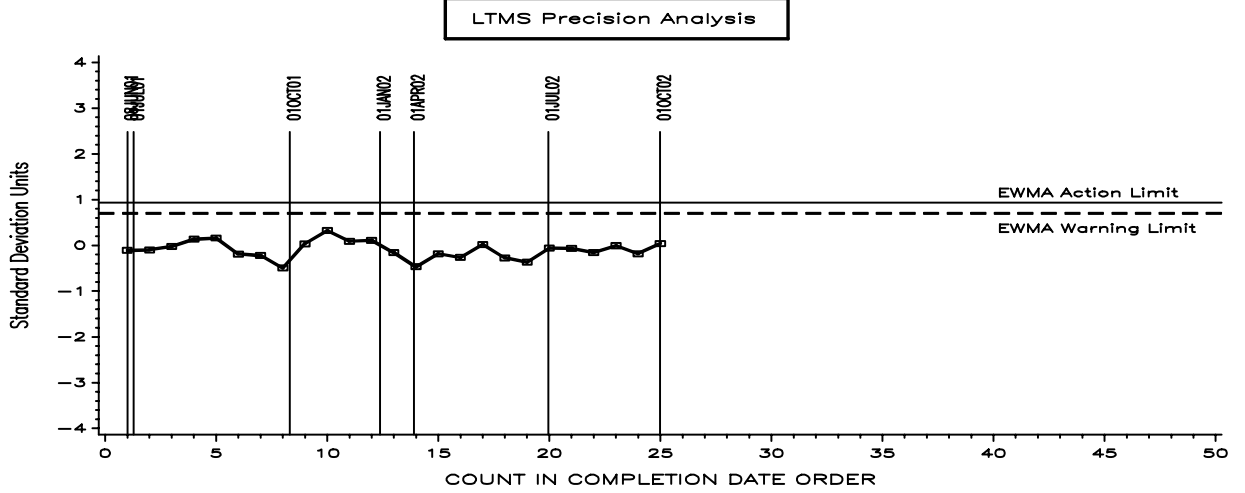
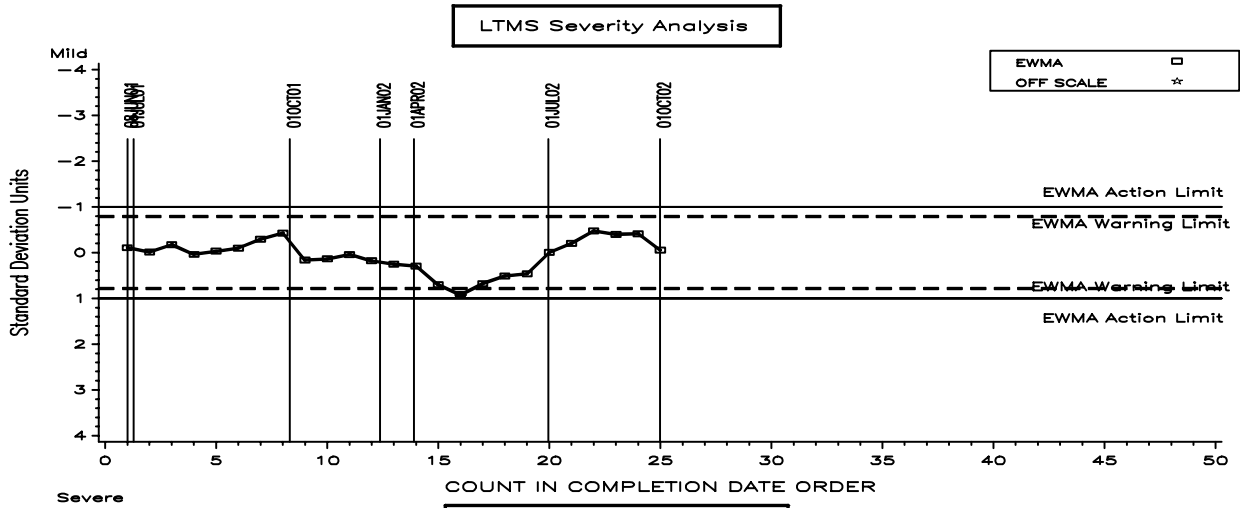


TABLE 4

CROSSHEAD WEIGHT LOSS INDUSTRY ALARM LOG

April 20, 2002 to May 2, 2002 (Severity Warning, severe direction)

A one-test excursion occurs. No industry related problem.

Updated 10/8/02

FIGURE 2
M11EGR INDUSTRY OPERATIONALLY VALID DATA

AVG SLUDGE RATING

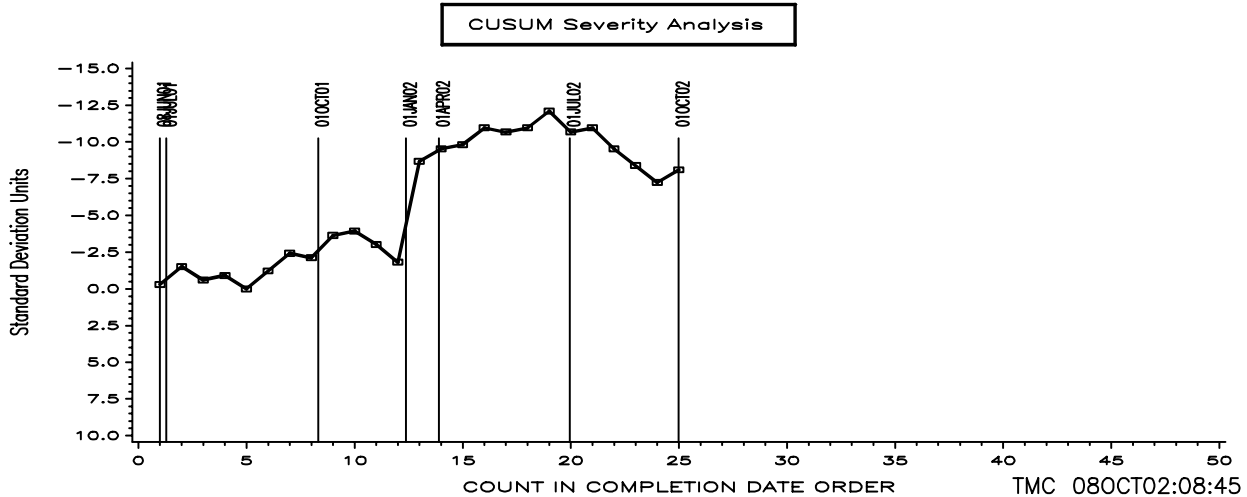
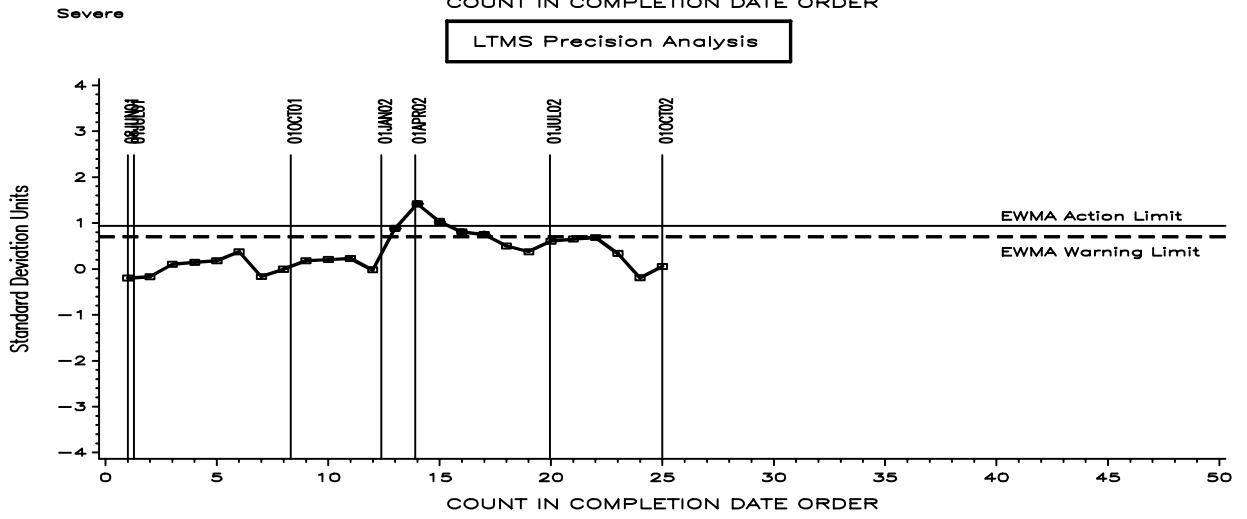
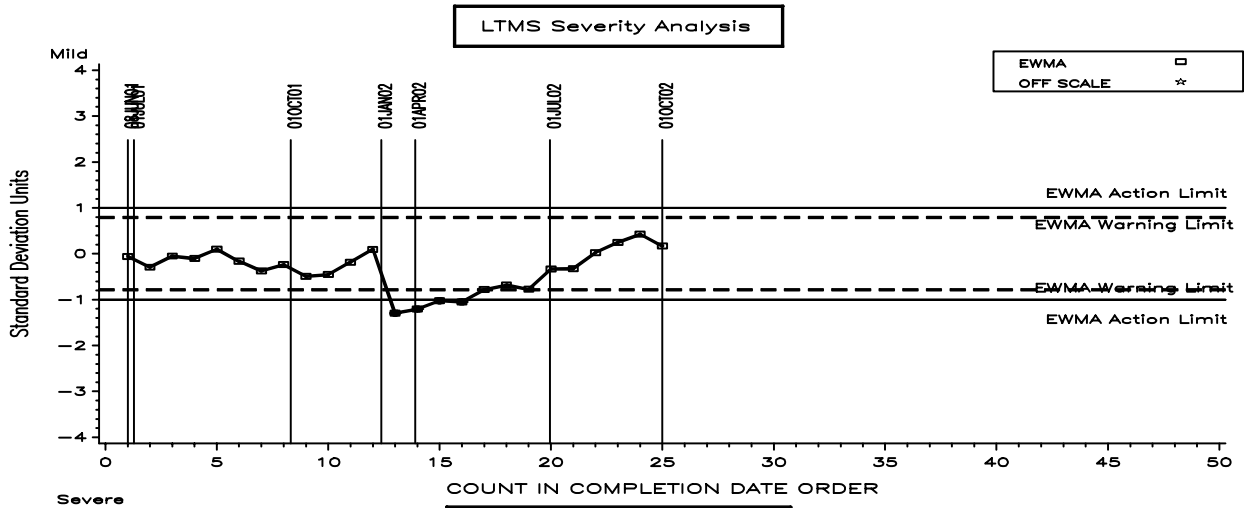


TABLE 5

AVERAGE SLUDGE RATING INDUSTRY ALARM LOG

February 3, 2002 to June 16, 2002 (Severity, severe direction; Precision)

Five consecutive tests exceed severity and precision limits. These alarms appear to have been caused by one extremely severe result on a stand that did not successfully calibrate. The alarms cleared with no action taken.

Updated 10/8/02

FIGURE 3
M11EGR INDUSTRY OPERATIONALLY VALID DATA

FILTER PLUGGING DELTA P

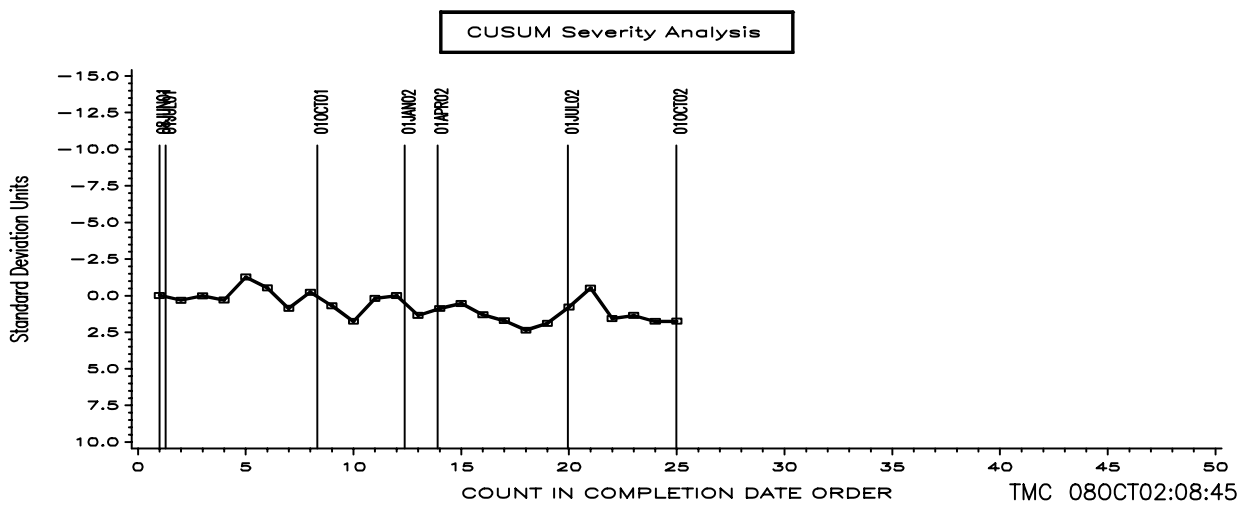
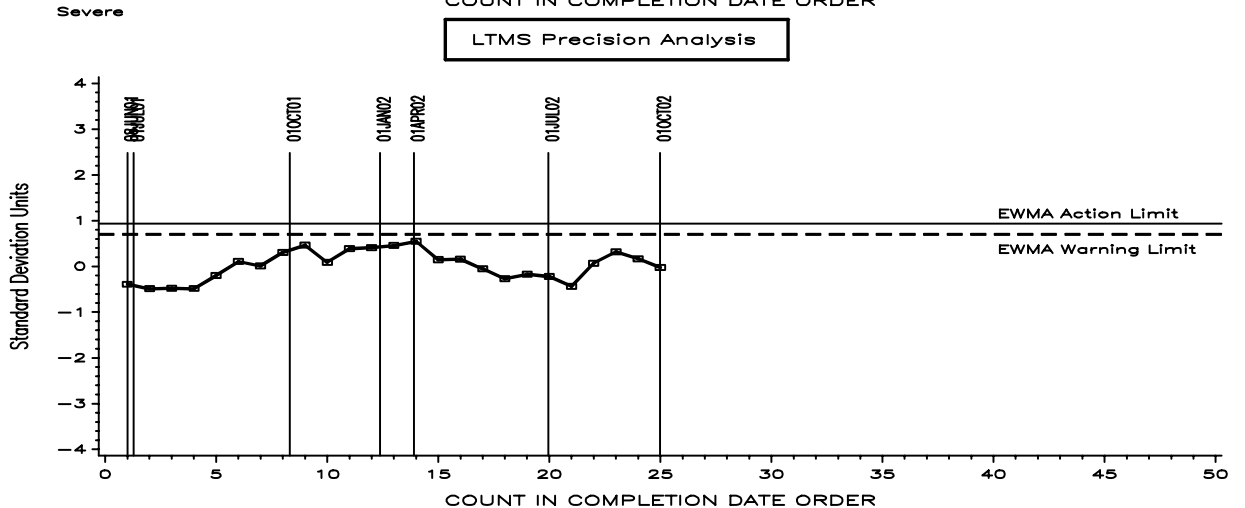
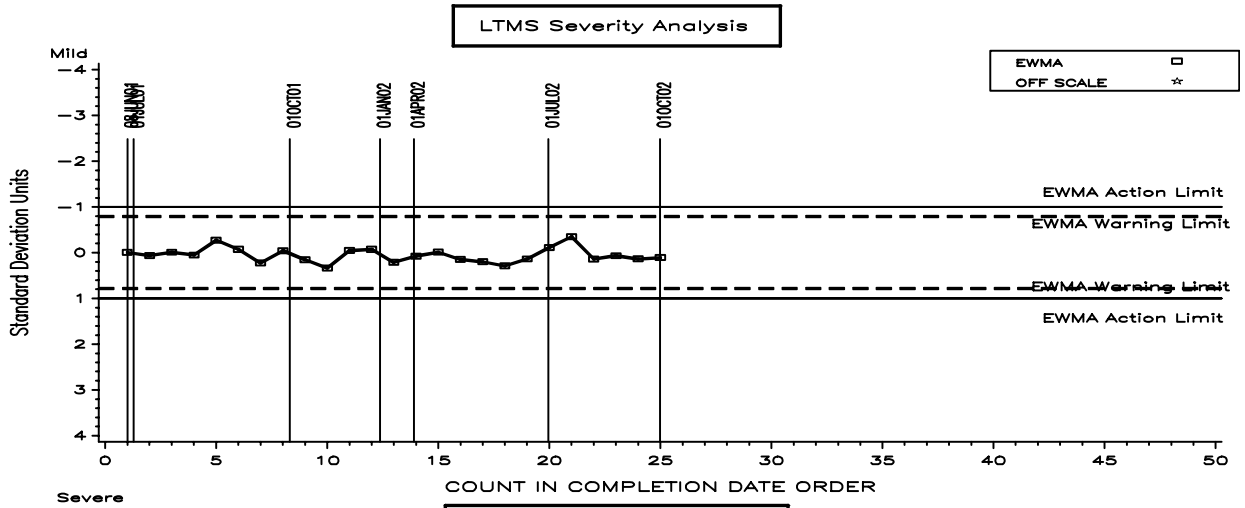


TABLE 6

FILTER PLUGGING DELTA P INDUSTRY ALARM LOG

No alarms have occurred.

Updated 10/8/02

FIGURE 4
M11EGR INDUSTRY OPERATIONALLY VALID DATA
TOP RING WEIGHT LOSS

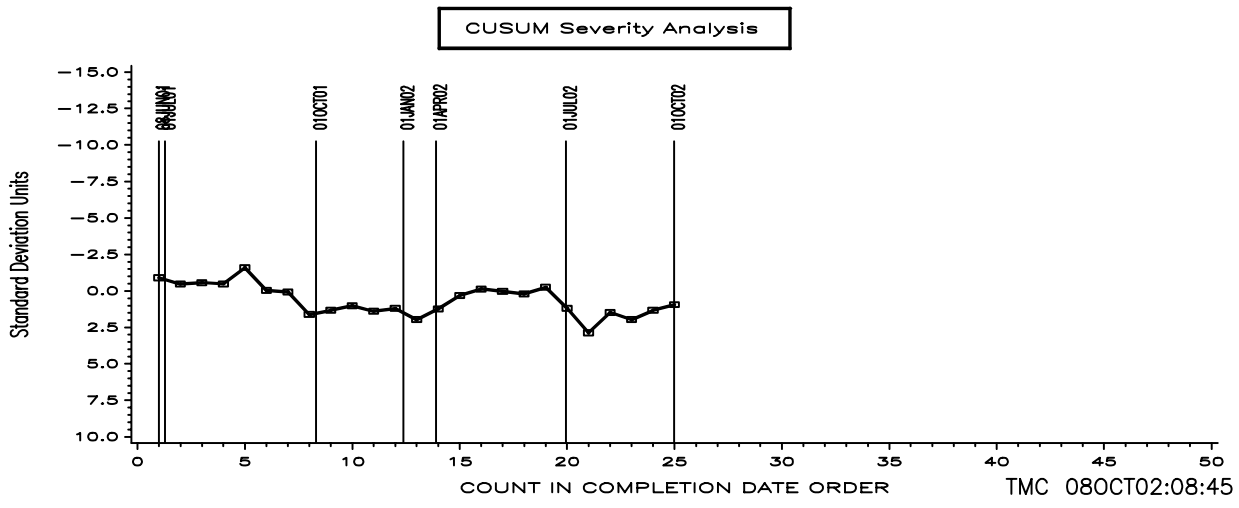
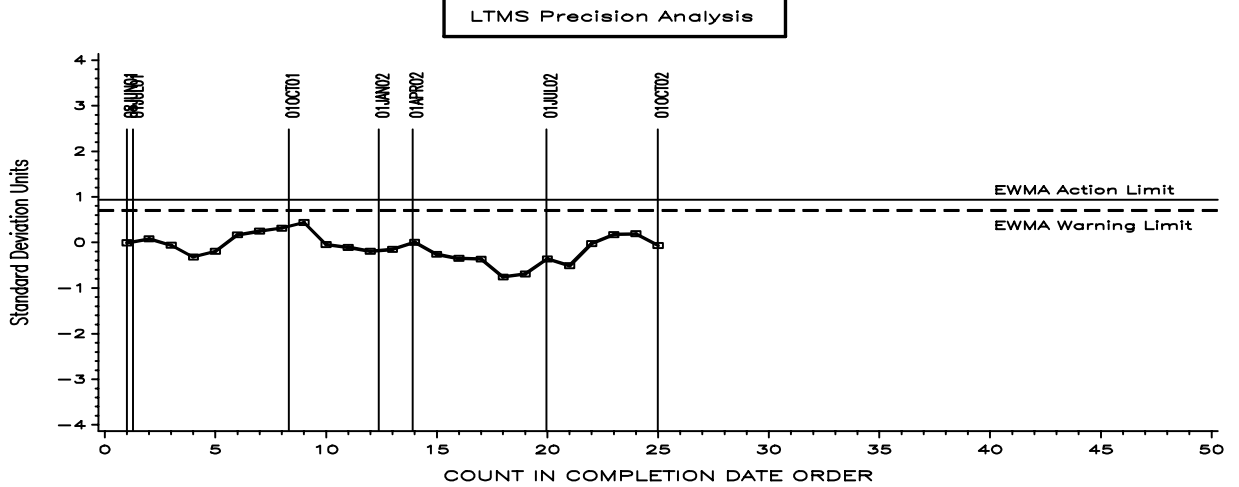
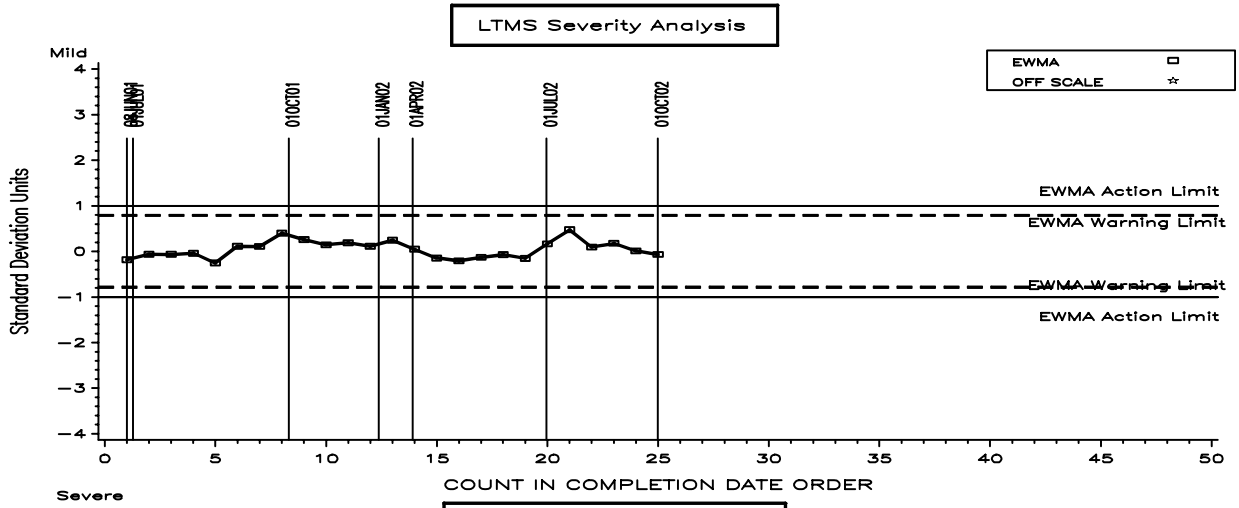


TABLE 7

TOP RING WEIGHT LOSS INDUSTRY ALARM LOG

No alarms have occurred.

Updated 10/8/02

TABLE 8
M11EGR TIMELINE

Date	Info. Letter	Event
20001207		BEGINNING OF PC-9 MATRIX
20010618		INTRODUCTION OF OIL FILTERS WITH HOT MELT BEAD
20010623		COMPLETION OF PC-9 MATRIX
20010820		LTMS IMPLEMENTED
20020203		REFERENCE OIL 830-1 INTRODUCED
20020221	02-01	BEADED OIL FILTER CORRECTION FACTOR OF +3.15 (TRANSFORMED UNITS) IMPLEMENTED FOR OIL FILTER PLUGGING
20020308		PROCEDURE DRAFT 5 ISSUED
20020616		REFERENCE OIL 830-2 INTRODUCED
20020830		TEST TARGETS UPDATED FOR OIL 830-2, BASED ON DATA FROM BOTH 830-1 AND 830-2