



# Test Monitoring Center

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MEMORANDUM: 04-027  
DATE: April 13, 2004  
TO: Wim Van Dam, Chairman, Mack Surveillance Panel  
FROM: Jeff Clark  
SUBJECT: T-11 Calibration Testing for the April 2004 ASTM Report Period

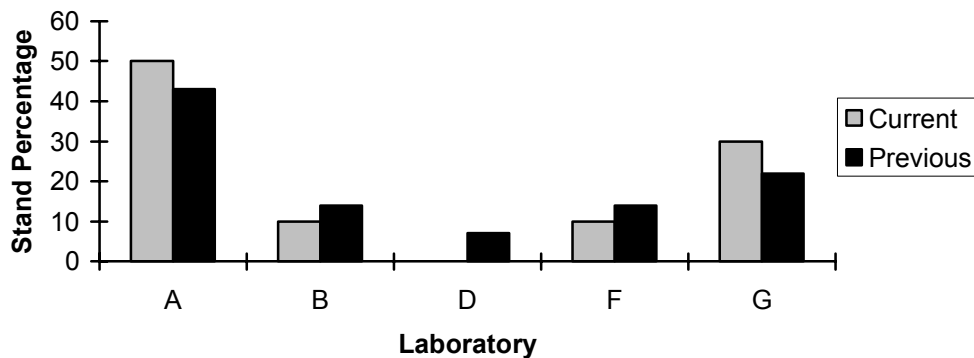
The following is a summary of T-11 reference oil tests completed during the April 2004 ASTM report period, which began on October 1, 2003 and ended on March 31, 2004.

### Lab / Stand Distribution:

	Reporting Data	Calibrated as of 3/31/04
Number of Laboratories	4	4
Number of Stands	10	9

The figure below shows the T-11 laboratory / stand distribution for tests completed the current and previous report periods:

### Laboratory / Stand Distribution

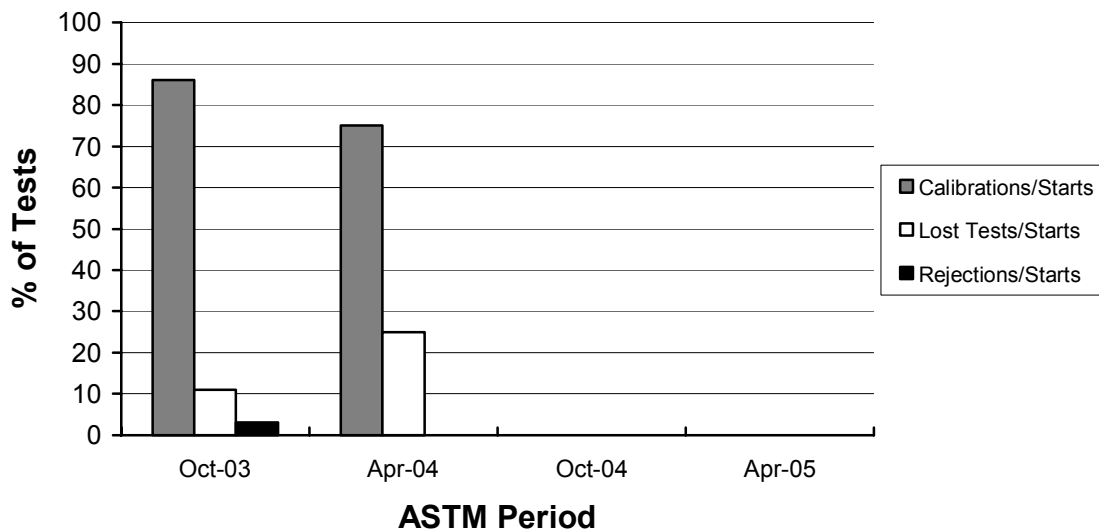


The table below summarizes the status of the reference oil tests reported to the TMC this ASTM report period:

Test Status	TMC Validity Code	Number of T-11 Tests
Acceptable Calibration Test	AC	9
Failed Calibration Test (LTMS Criteria)	OC	0
Operationally Invalid Calibration Test	LC	1
Aborted Calibration Test	XC	2
Total		12

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

### Calibration Attempt Summary

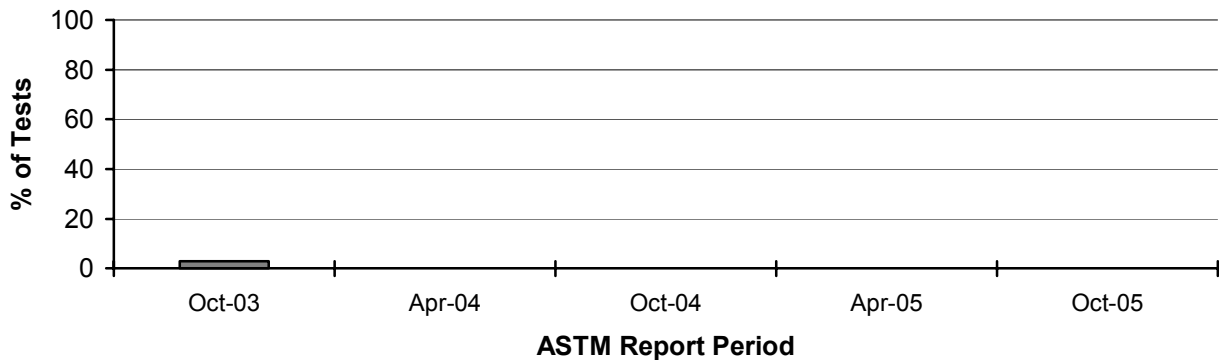


A detailed list of reasons tests failed the acceptance criteria (OC validity) is shown in Table 1. Table 2 lists the operationally invalid tests (LC validity) and Table 3 lists the aborted tests (XC validity).

#### 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 no SOOT LTMS stand alarms for the current period. Please note, the MRV LTMS does not monitor stand alarms. MRV is monitored only for determining laboratory severity adjustments. No LTMS deviations were issued this period. No LTMS deviations have been issued during the history of the T-11.

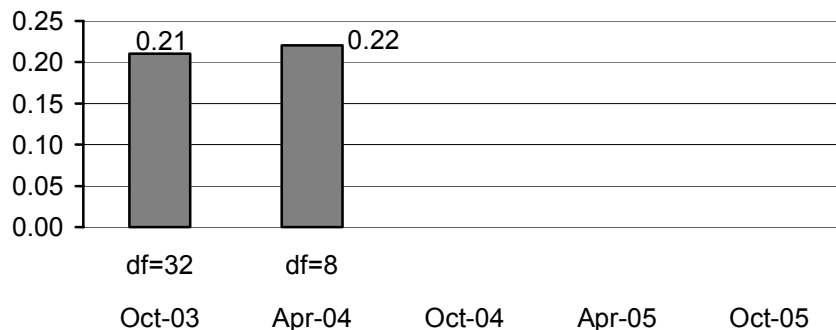
Severity and Precision:

Figure 1 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for Soot at 12 cSt Viscosity Increase (SOOT). SOOT is currently in control. For this period, SOOT is trending an average of 0.17 Δ/s mild, which is approximately 0.04 SOOT %. For a history of SOOT industry alarms, refer to the industry alarm log shown in Table 4.

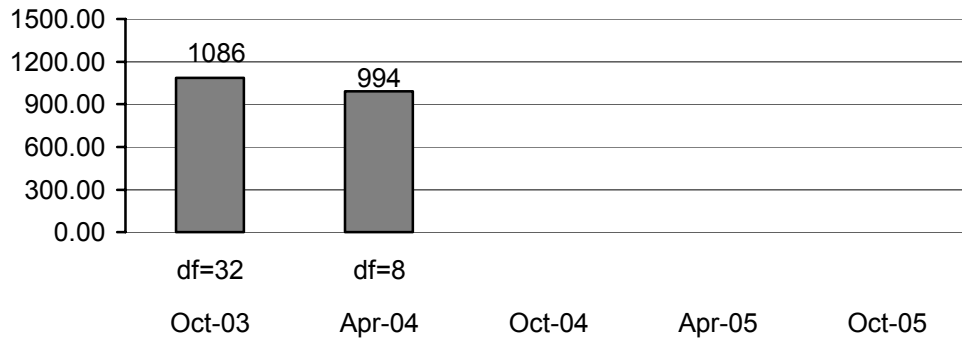
Figure 2 (attached) shows the current industry EWMA severity, EWMA precision, and cusum charts for MRV Viscosity (MRV). MRV is currently in an industry warning alarm for severity in the severe direction. For this period MRV is trending an average of 0.79 Δ/s severe, which is approximately 866 cP. For a history of MRV industry alarms, refer to the industry alarm log shown in Table 5.

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. Precision for both SOOT and MRV is comparable to the previous period.

### SOOT Pooled Precision



### MRV Viscosity Pooled Precision



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:

Oil	N	Parameter	Mean (cSt)	s
820-2	32	SOOT	5.78	0.21
		MRV	14969	1097

#### Information Letters:

No information letters were issued this ASTM period.

#### TMC Laboratory Visits:

One TMC laboratory visits was conducted this ASTM period. No deficiencies were noted.

#### Quality Index:

No Quality Index deviations were issued this ASTM period. For the history of the T-11, no Quality Index deviations have been issued.

#### Additional Information:

Table 6 contains the T-11 Timeline which details changes to the test since its inception.

The T-11 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/mem04-027.jac.doc

Attachments

c: J.L. Zalar, TMC  
F.M. Farber, TMC  
Mack Surveillance Panel  
<ftp://ftp.astmtmc.cmu.edu/docs/diesel/mack/semiannualreports/T11-04-2004.pdf>

Distribution: Email

**Table 1**  
**Summary of Reasons for Rejected Tests**

	No. of Tests
No rejected test	-

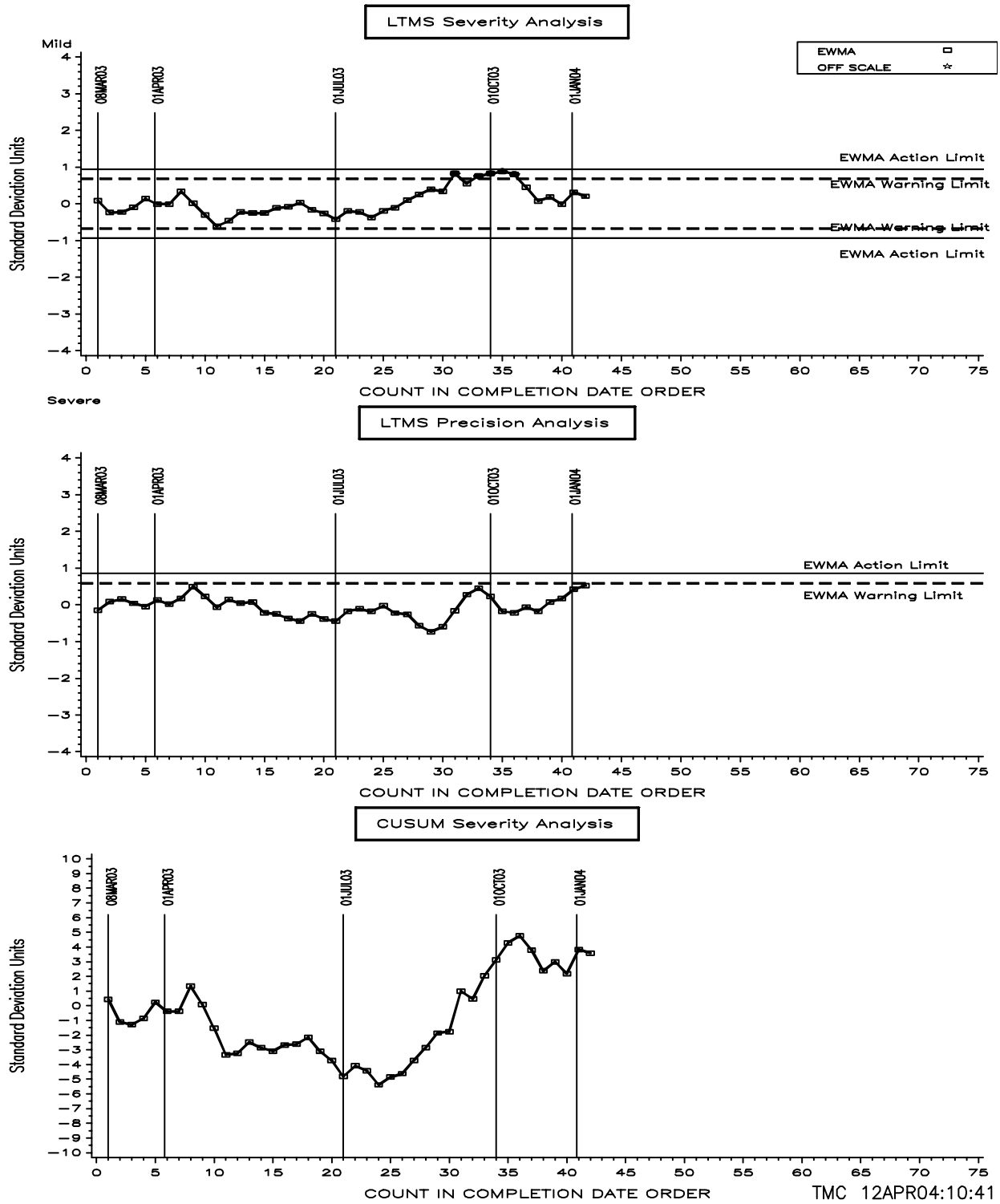
**Table 2**  
**Summary of Reasons for Invalid Tests**

	No. of Tests
Turbocharger failure	1

**Table 3**  
**Summary of Reasons for Aborted Tests**

	No. of Tests
Excessive oil leak	1
High oil consumption	1

**FIGURE 1**  
T-11 INDUSTRY OPERATIONALLY VALID DATA  
SOOT AT 12 cSt



**TABLE 4**  
**SOOT AT 12 cSt INDUSTRY ALARM LOG**

**April 26, 2003 to April 29, 2003 (Precision)**

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

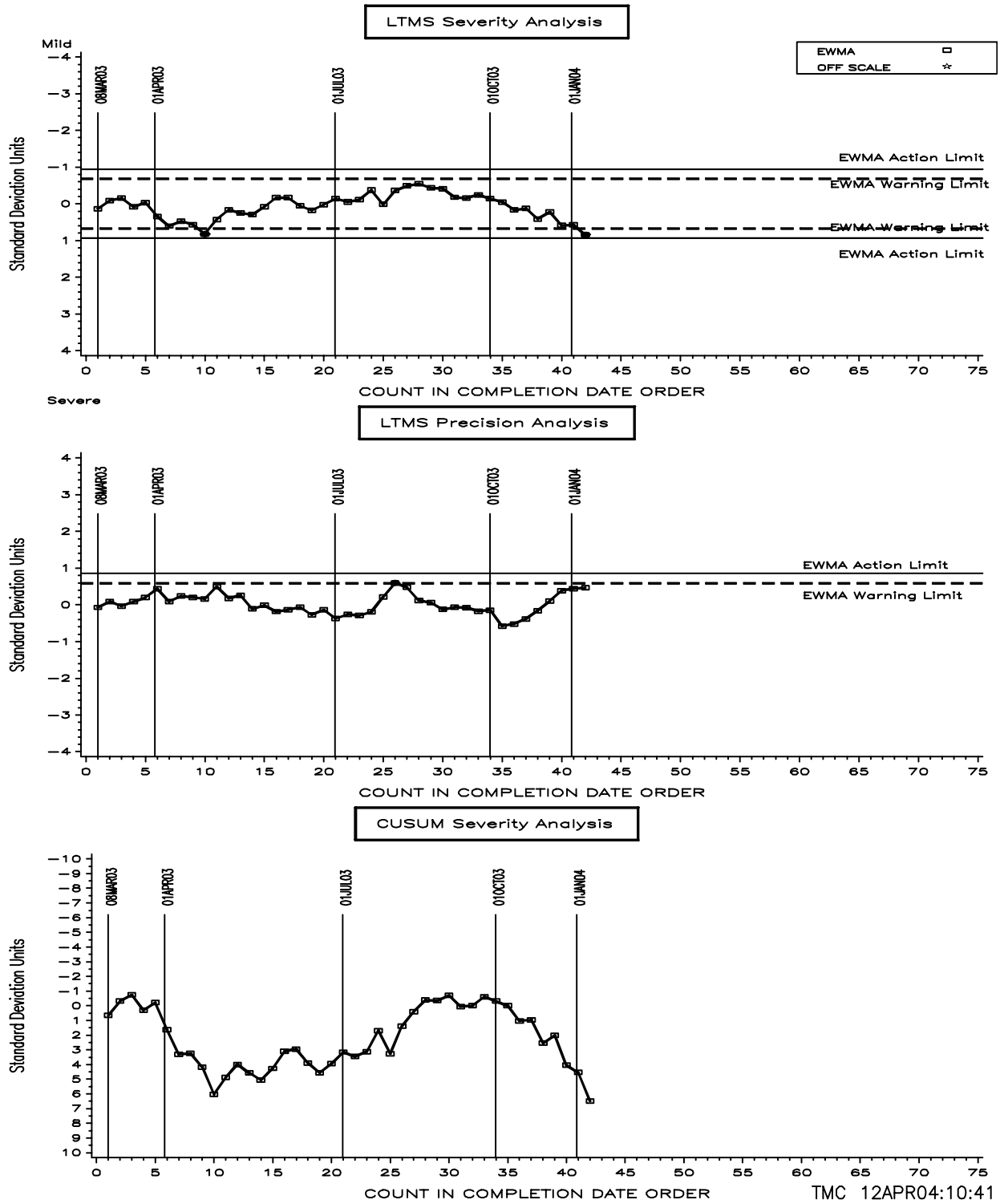
**August 11, 2003 to November 3, 2003 (Severity, Mild direction)**

Five of six tests trigger an industry warning alarm. No cause was apparent and the alarm cleared without any action being taken by the surveillance panel.

Updated 4/12/04



**FIGURE 2**  
T-11 INDUSTRY OPERATIONALLY VALID DATA  
MRV VISCOSITY



**TABLE 5**  
**MRV VISCOSITY INDUSTRY ALARM LOG**

**April 26, 2003 to April 29, 2003 (Severity, Severe direction)**

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

**July 19, 2003 to July 21, 2003 (Precision)**

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

**March 16, 2004 to Date (Severity, Severe direction)**

A one-test excursion occurs. No indication yet if this is a true industry alarm.

Updated 4/12/04

## TABLE 6

### *T11 Timeline*

08:26 Monday, April 12, 2004 1

Obs	effective_date	info_letter_number	event
1	20030221		Draft 1 of test procedure issued
2	20030303		Oil sump configuration specified
3	20030313		Draft 2 of test procedure issued
4	20030422		Oil sample location specified as the pre-oil filter pressure port
5	20030709		Draft 3 of test procedure issued
6	20030714		Calibration period set to six months or six tests (1512 test hours)
7	20030717		Draft 4 of test procedure issued
8	20030821		Oil consumption limit of 65 g/hr maximum, using 25-h to EOT regression slope
9	20030821		LTMS implemented
10	20030905		Third soot window moved from EOT to 228 hours
11	20030918		Draft 5 of test procedure issued
12	20030923		Report Forms and Data Dictionary Version 20030819
13	20031205		Report Forms and Data Dictionary Version 20031029
14	20040415		Intake Manifold Pressure specification set to 140 kPa minimum.