Test Monitoring Center
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MEMORANDUM: 01-065

DATE: June 4, 2001

TO: Warren Totten, Chairman, L-10 Surveillance Task Force

FROM: Jeff Clark

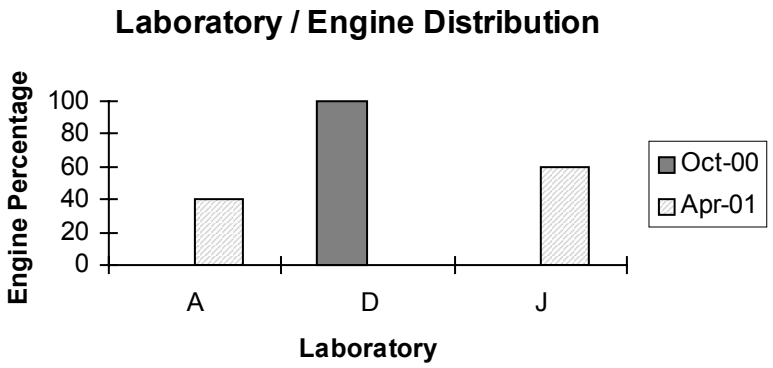
SUBJECT: L-10 Reference Testing for the April 2001 ASTM Report Period

The TMC began formal monitoring of the L-10 Injector Depositing Test on October 1, 2000. There were twenty L-10 reference tests completed during the April 2001 ASTM period, which began October 1, 2000 and ended March 31, 2001.

Lab / Engine Distribution:

	Reporting Data	Calibrated as of 3/31/01
Number of Laboratories	2	1
Number of Engines	5	2

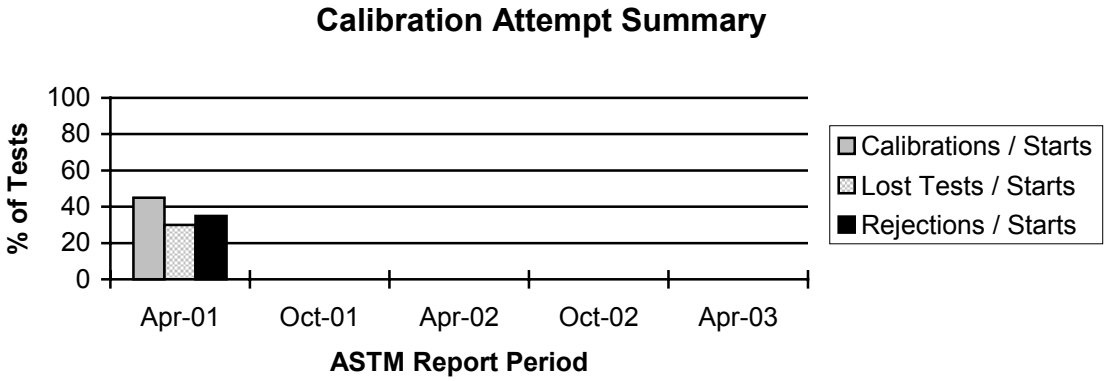
The following chart shows the laboratory / engine distribution:



The following summarizes the status of the reference oil tests reported to the TMC:

Test Description	TMC Validity Code	Number of Tests
Operationally and Statistically Acceptable	AC	9
Failed Acceptance Criteria	OC	7
Operationally Invalid	RC	4
Aborted	XC	0
Total		20

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



A detailed list of reasons tests failed the acceptance criteria is shown in Table 1. Table 2 lists the operationally invalid tests and Table 3 lists the aborted tests.

Severity and Precision:

Figure 1 (attached) shows the industry control and cusum charts for injector deposits. Since January 2001, the industry has trended an average of 2.93 □/s severe. This is equivalent to 9.20 demerits severe of target. However, this severe trend is almost entirely due to a single lab that, since January 2001, is running on average 3.42 □/s severe, which is equivalent to 10.74 demerits severe of target. Figure 2 shows the lab level control charts for the two labs that submitted reference tests this period.

The TMC will provide yearly pooled standard deviation as an estimate of test precision. The precision estimate for 2001 shows significant degradation compared to previous years. In all likelihood, this is not a true industry problem. Rather, it is due to the severity problems experienced by a single lab (refer to paragraph above). Additionally, the low frequency of testing for 2000 and 2001 prevents any meaningful comparison with 1999 precision levels. The 2001 precision will be updated again in future reports. Note, the degrees of freedom (df) equals Σ(no. obs. per oil - 1).

L-10 Injector Deposit Test Pooled Precision by Year

Parameter	1999 df = 17	2000 df = 3	2001 df = 4
Average Injector Deposits	3.62	2.15	8.80

Reference Fuels and Hardware:

The table below shows the current reference fuel targets. Note, IDTAD denotes the CAT 1K fuel additized with CRA-1, and NOAD denotes the unadditized CAT 1K fuel.

L-10 Injector Deposits Reference Fuel Targets

	N	Mean	Std. Dev.
IDTAD	20	12.4	3.14
NOAD	20	23.5	3.50

Cummins has indicated that L-10 injectors and engines will no longer be manufactured after September and December 2001, respectively. The L-10 Surveillance Task Force is planning a June 2001 conference call to consider the parts acquisition and life-of-test issues associated with these developments.

Additional Information:

Figure 3 is the L-10 Timeline which details changes to the L-10 test since the introduction of TMC 5000 as the standard crankcase fluid in October of 1997.

The L-10 database, as well as the current industry cusum and LTMS plots, may be accessed from the TMC home page at www.tmc.astm.cmri.cmu.edu.

JAC/jac/mem01-065.jac.doc

Attachments

c: J.L. Zalar, TMC
F.M. Farber, TMC
L-10 Surveillance Task Force
ftp://tmc.astm.cmri.cmu.edu/docs/diesel/l10/semiannualreports/L10-04-2001.pdf

Table 1
Summary of Reasons for Failed Tests

	No. of Tests
Severe on Injector Deposits	6
Feed port depositing (severe Injector Flow Loss)	1

Table 2
Summary of Reasons for Invalid Tests

	No. of Tests
Pre-test Injector Flow out of spec.	2
Pre-test Injector Top Stop Setting out of spec.	2

Table 1
Summary of Reasons for Aborted Tests

	No. of Tests
No aborted tests	-

Figure 1

L10 INDUSTRY OPERATIONALLY VALID DATA

FINAL RESULT AVG INJECTOR DEPOSITS (demerits)

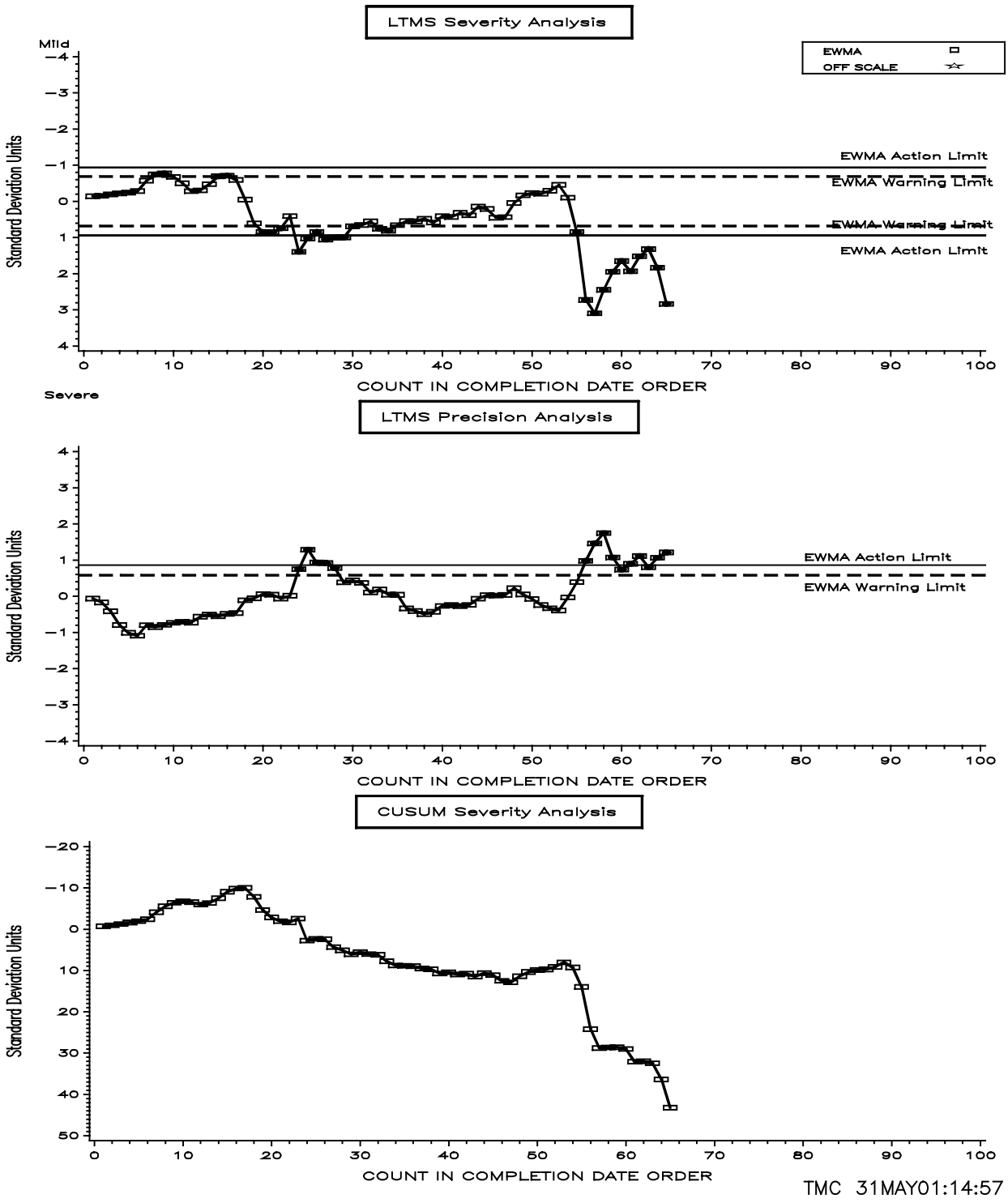


Figure 2

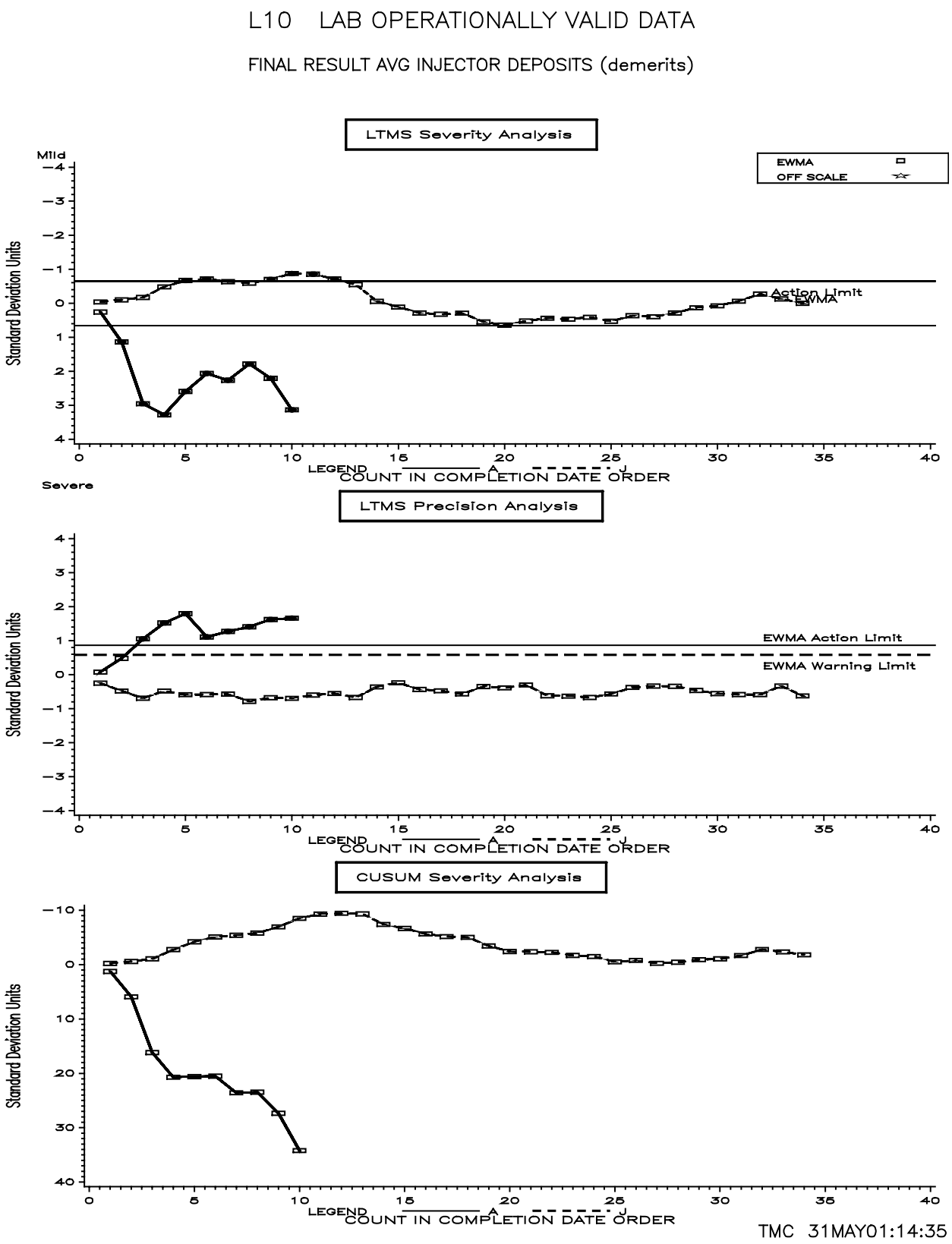

L10 LAB OPERATIONALLY VALID DATA
FINAL RESULT AVG INJECTOR DEPOSITS (demerits)
LTMS Severity Analysis
Mild
Severe
Standard Deviation Units
EWMA
OFF SCALE
Action Limit
EWMA
LEGEND
COUNT IN COMPLETION DATE ORDER
LTMS Precision Analysis
EWMA Action Limit
EWMA Warning Limit
CUSUM Severity Analysis
TMC 31MAY01:14:35

FIGURE 3
L-10 TIMELINE

Date	Information Letter	Topic
19971021		TMC 5000 INTRODUCED AS THE STANDARD CRANKCASE OIL.
19991006		TWENTY-TEST TARGETS IMPLEMENTED.
20001001		TMC BEGINS MONITORING TEST.