



Test Monitoring Center

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(412) 365-1000

MEMORANDUM: 06-040

DATE: May 24, 2006

TO: James McCord,
Chairman, Single Cylinder Diesel Surveillance Panel

FROM: Scott Parke

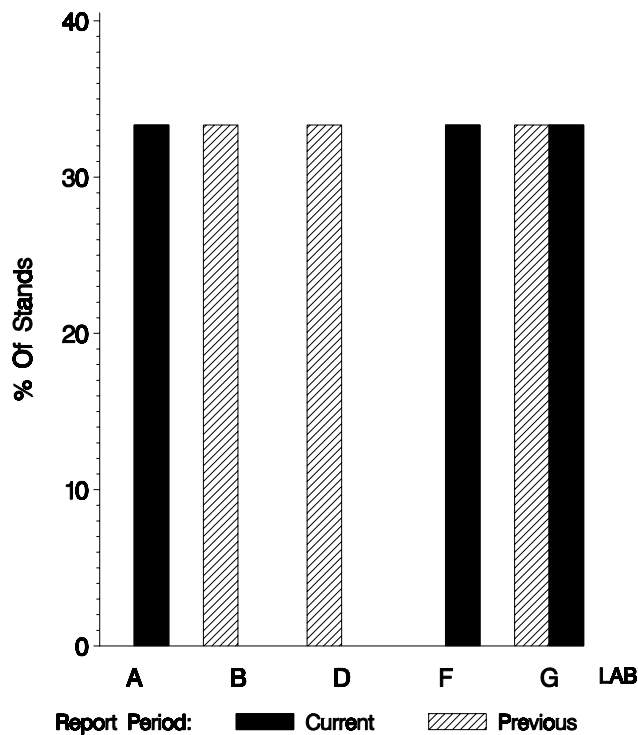
SUBJECT: 1P Testing from October 1, 2005 through March 31, 2006

Four calibration tests were reported to the Test Monitoring Center during the period from October 1, 2005 through March 31, 2006. The data from the operationally valid tests is shown on page 7. Following is a summary of testing activity this period.

	Reporting Data	Calibrated on 3-31-06
Number of Labs	3	5
Number of Stands	3	5

Stands reporting data this period were distributed as shown below:

1P LABORATORY / STAND DISTRIBUTION

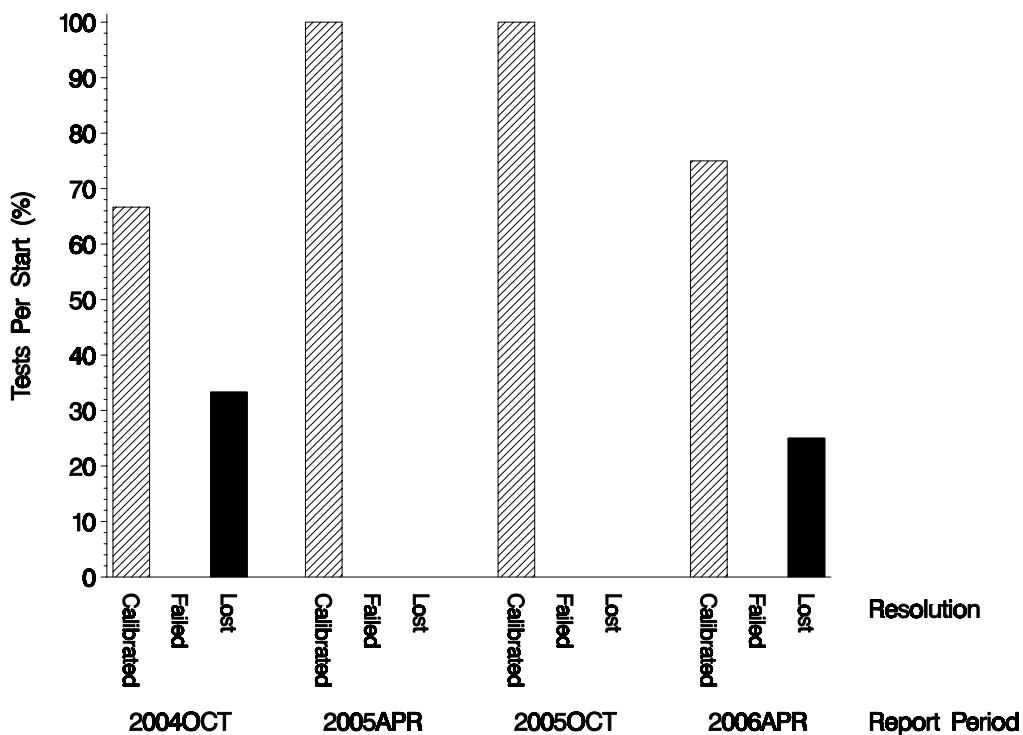


Test Distribution by Oil and Validity

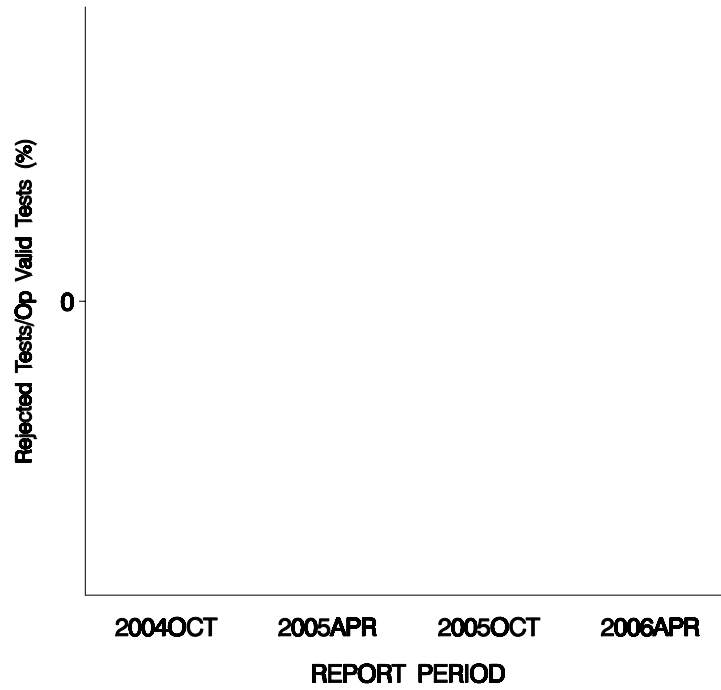
			Totals				
			1004-3	1005-1	1005-2	Last Period	This Period
Accepted for Calibration	AC		2	0	1	3	3
Rejected Mild	OC		0	0	0	0	0
Rejected Severe	OC		0	0	0	0	0
*Rejected for EWMA Precision	OC		0	0	0	0	0
*Rejected for Shewhart Precision	OC		0	0	0	0	0
Operationally Invalid (lab)	LC		0	0	0	0	0
Operationally Invalid (lab/TMC)	RC		0	0	0	0	0
Aborted Calibration	XC		0	0	1	0	1
Total			2	0	2	3	4

*During a January 23, 2006 teleconference, the Surveillance Panel elected to remove precision as a rejection criteria. Instead, the test report will now include a checkbox for use in instances where a candidate test was run in a stand that produced a precision alarm on its reference run.

1P CALIBRATION ATTEMPT SUMMARY



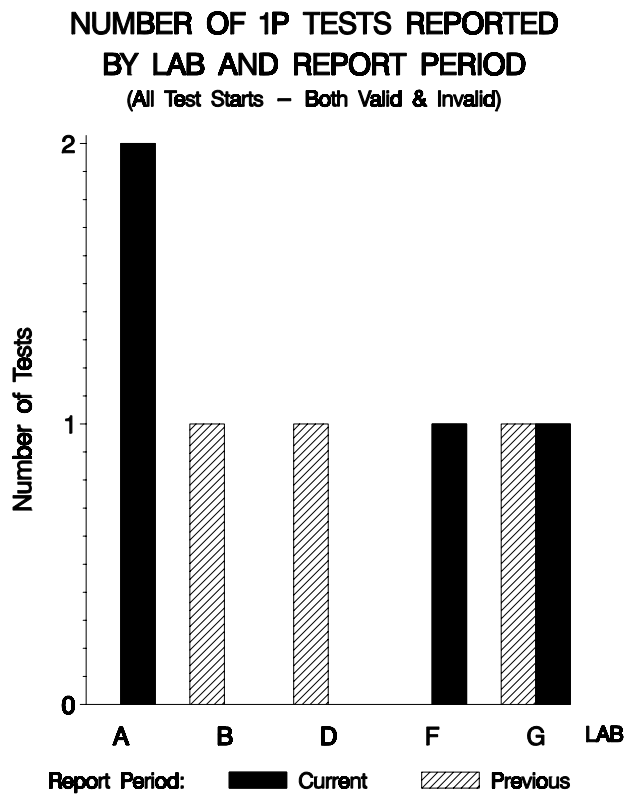
**OPERATIONALLY VALID 1P TESTS
FAILING ACCEPTANCE CRITERIA**



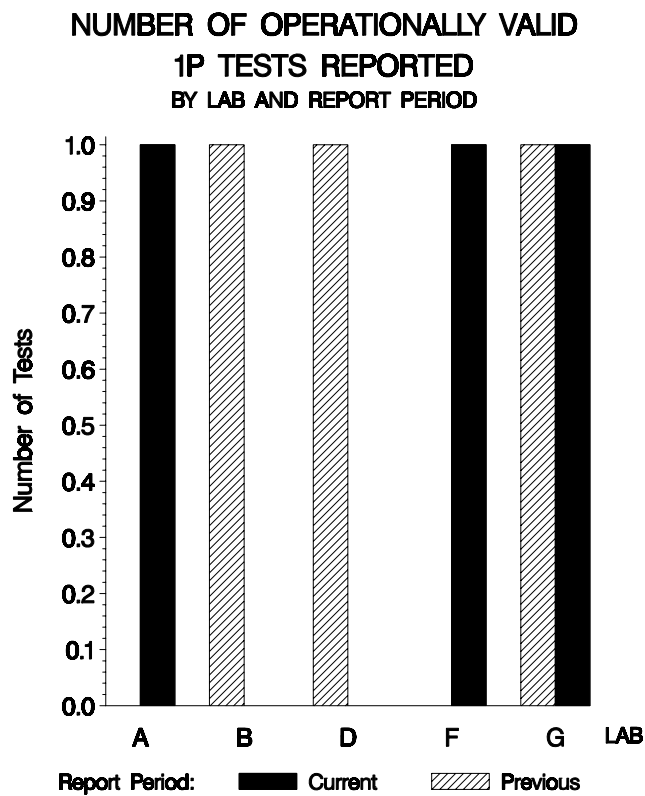
The above chart shows the percentage of failed but operationally valid tests. No tests failed this period; the last failing test completed in March of 2003.

No LTMS deviations were written this period (none have ever been written for this test).

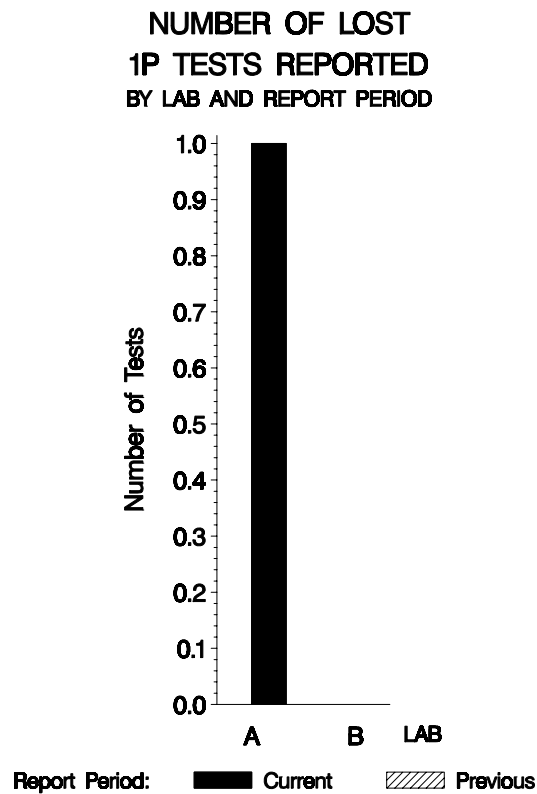
By lab, the tests run this report period were distributed as shown below:



With all operationally invalid tests removed, the distribution looks like this:



And the by-lab distribution of lost tests:



Lost Tests per Start by Oil and Lab

Lab	1004-3			1005-1			1005-2			Total		
	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%
A							1	2	50	1	2	50
F	0	1	0							0	1	0
G	0	1	0							0	1	0
Total	0	2	0				1	2	50	1	4	25

Lost tests are those that were either aborted, rejected by lab, or operationally invalid.

Causes for Lost Tests

Lab	Cause	Oil			Validity			Loss Rate		
		1004-3	1005-1	1005-2	LC	RC	XC	Lost	Starts	%
A	Piston scuff at 329 hours.			●			●	1	2	50%
	Lost	0	0	1	0	0	1			
	Starts	2	0	2	4	4	4			
	%	0%	0%	0%	0%	0%	25%			

Average Δ /s by Lab						
Lab	n	TGC	WDP	TLC	OC*	EOTOC*
A	1	1.370	1.231	1.606	1.475	1.785
F	1	-0.030	0.241	0.390	1.574	0.691
G	1	-0.191	0.595	0.960	0.840	0.565
Industry	3	0.383	0.689	0.986	1.297	1.014

* Transformed

DATA FROM ALL OPERATIONALLY VALID TESTS REPORTED THIS PERIOD:

LTMS

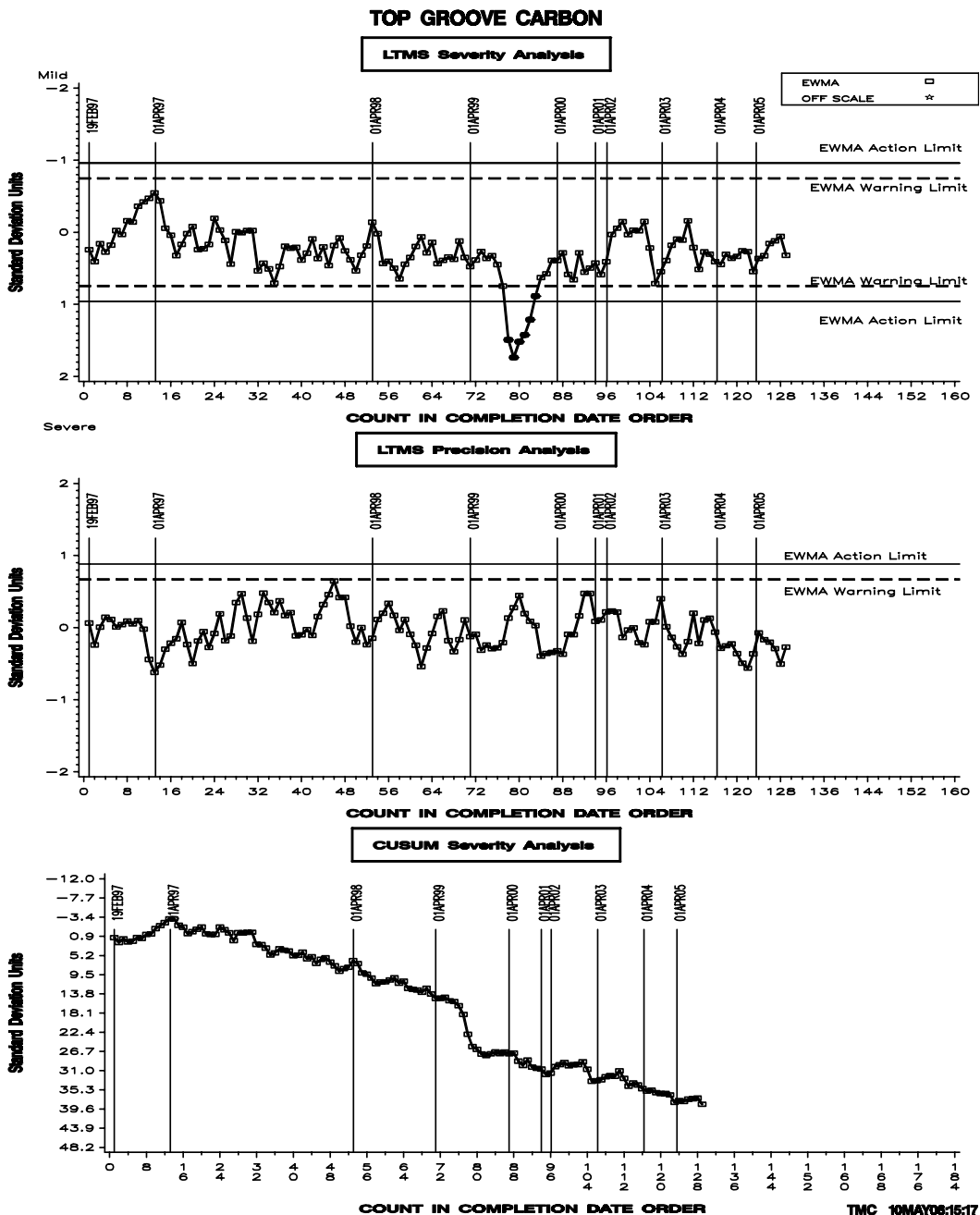
DATE	LAB	STAND	OIL	TG	WD	TL	OC	ETOC	TGYI	WDYI	TLYI	OCYI	ETOCYI
20051014	F	2	1004-3	29.25	333.5	33.25	10.4	11.1	-0.030	0.241	0.390	1.574	0.691
20051127	G	1	1004-3	28.00	353.9	40.75	8.2	10.4	-0.191	0.595	0.960	0.840	0.565
20060123	A	5	1005-2	39.25	356.2	52.00	10.4	12.5	1.370	1.231	1.606	1.475	1.785

DISCUSSION OF INDUSTRY PERFORMANCE OVER THIS PERIOD

TGC:

The average Y_i reported this period was 0.383 (see table on previous page). Using the homogeneous dataset standard deviation for TGC (7.74 demerits) to compute an average Δ yields 2.96 demerits severe. Severity and precision remained within acceptable limits throughout this period.

CATERPILLAR 1P INDUSTRY OPERATIONALLY VALID DATA

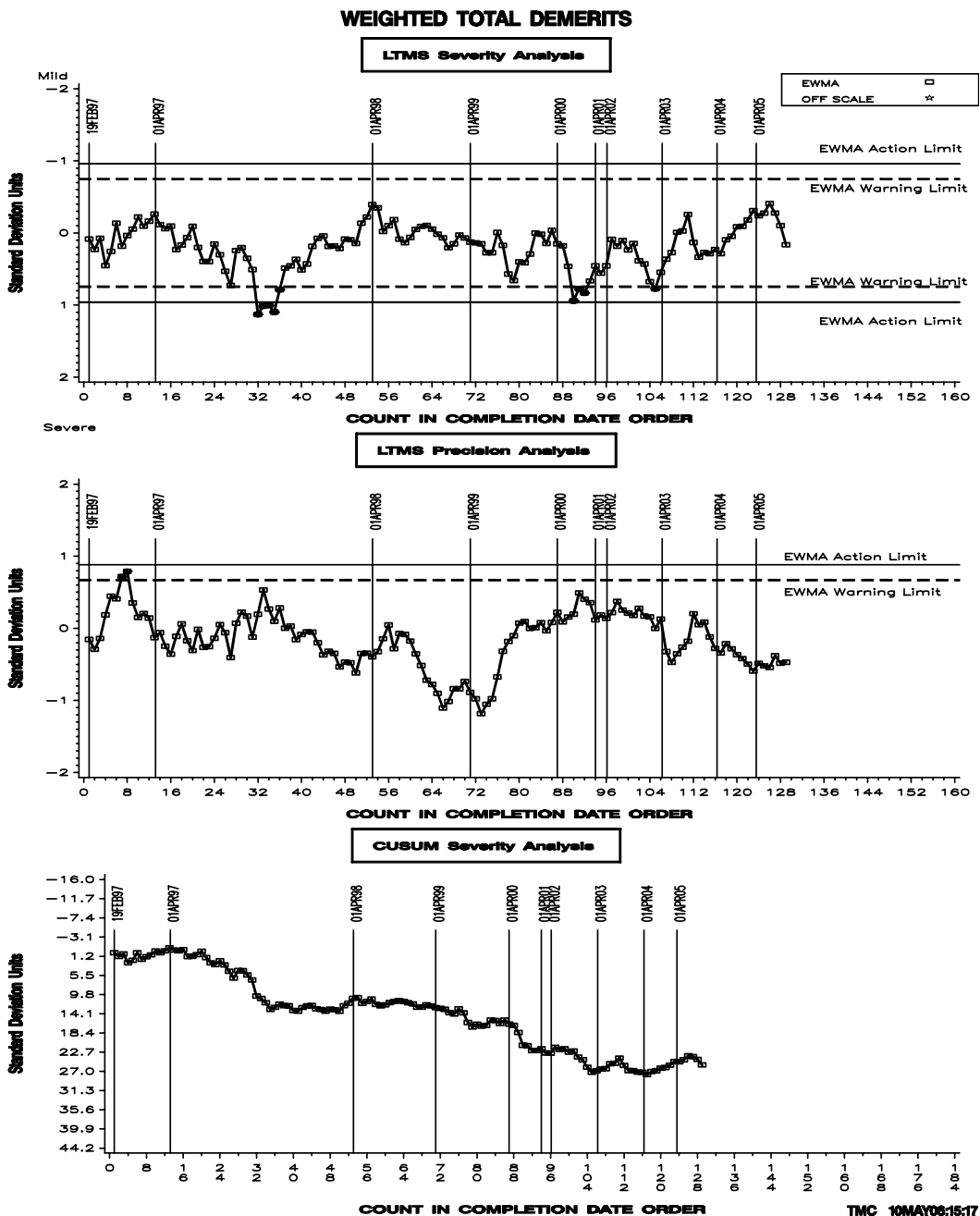


Shown above is the LTMS/Cusum plot for TGC.

WDP:

The average Y_i reported for WDP this period was 0.689 severe (see table on page 7). The homogeneous dataset standard deviation of 57.6 converts this to 39.69 demerits. Severity and precision remained within acceptable limits. The LTMS/Cusum plot is shown below.

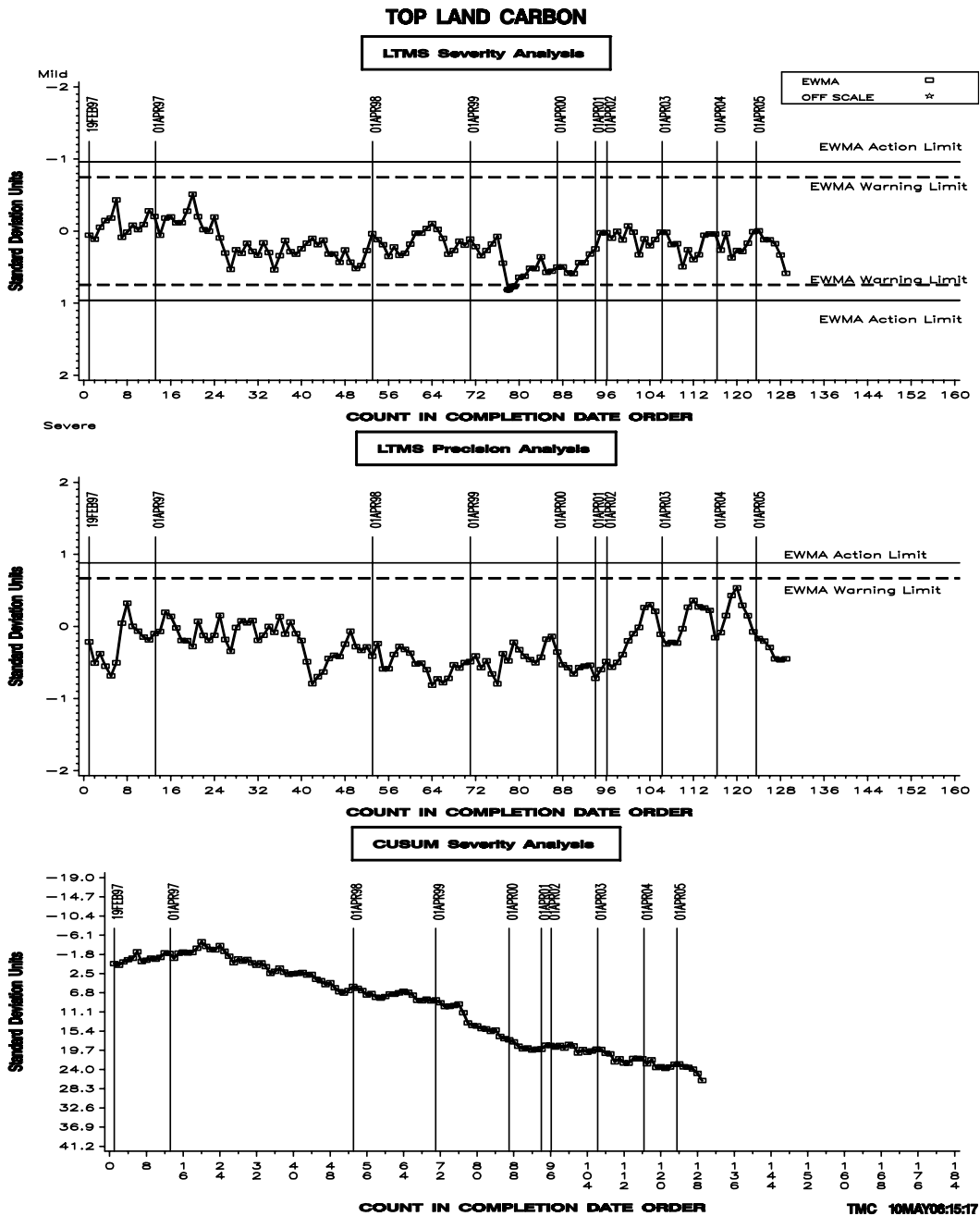
CATERPILLAR 1P INDUSTRY OPERATIONALLY VALID DATA



TLC:

The average TLC Yi reported this period was 0.986 (see table on page 7). Using the homogeneous dataset standard deviation of 13.15 to compute an average delta yields 12.97 severe. TLC remained within both severity and precision limits. The LTMS/Cusum chart is shown below.

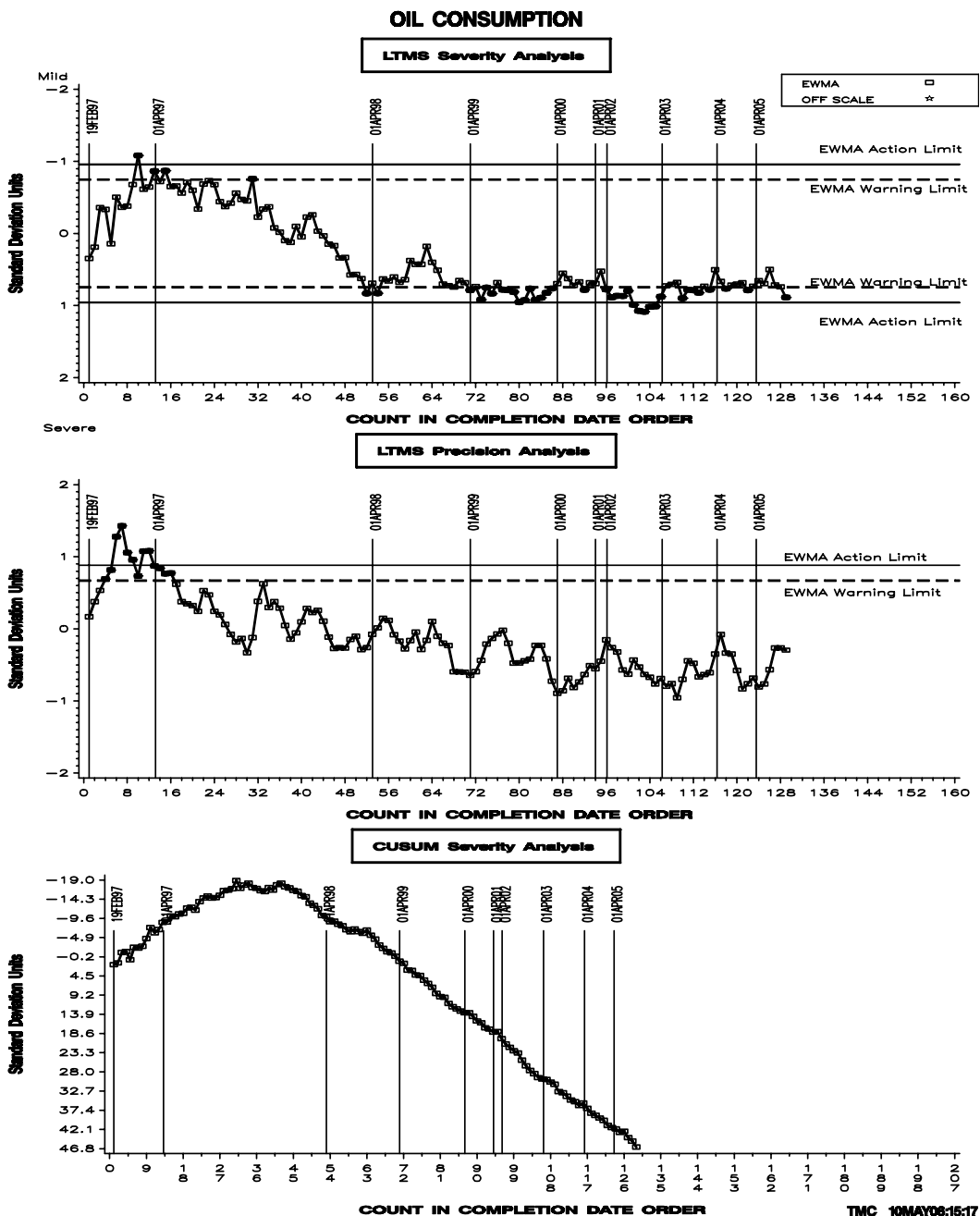
CATERPILLAR 1P INDUSTRY OPERATIONALLY VALID DATA



Oil Consumption (OC):

The average transformed OC Y_i this period was 1.297 (see table on page 7). Computing an average transformed delta using the homogeneous dataset standard deviation of 0.3238 gives 0.4200. Back-transforming this value gives 1.52 g/h severe. This parameter has been severe since the completion of the matrix. Precision remained within acceptable limits. The LTMS/Cusum plot for OC is shown below.

CATERPILLAR 1P INDUSTRY OPERATIONALLY VALID DATA

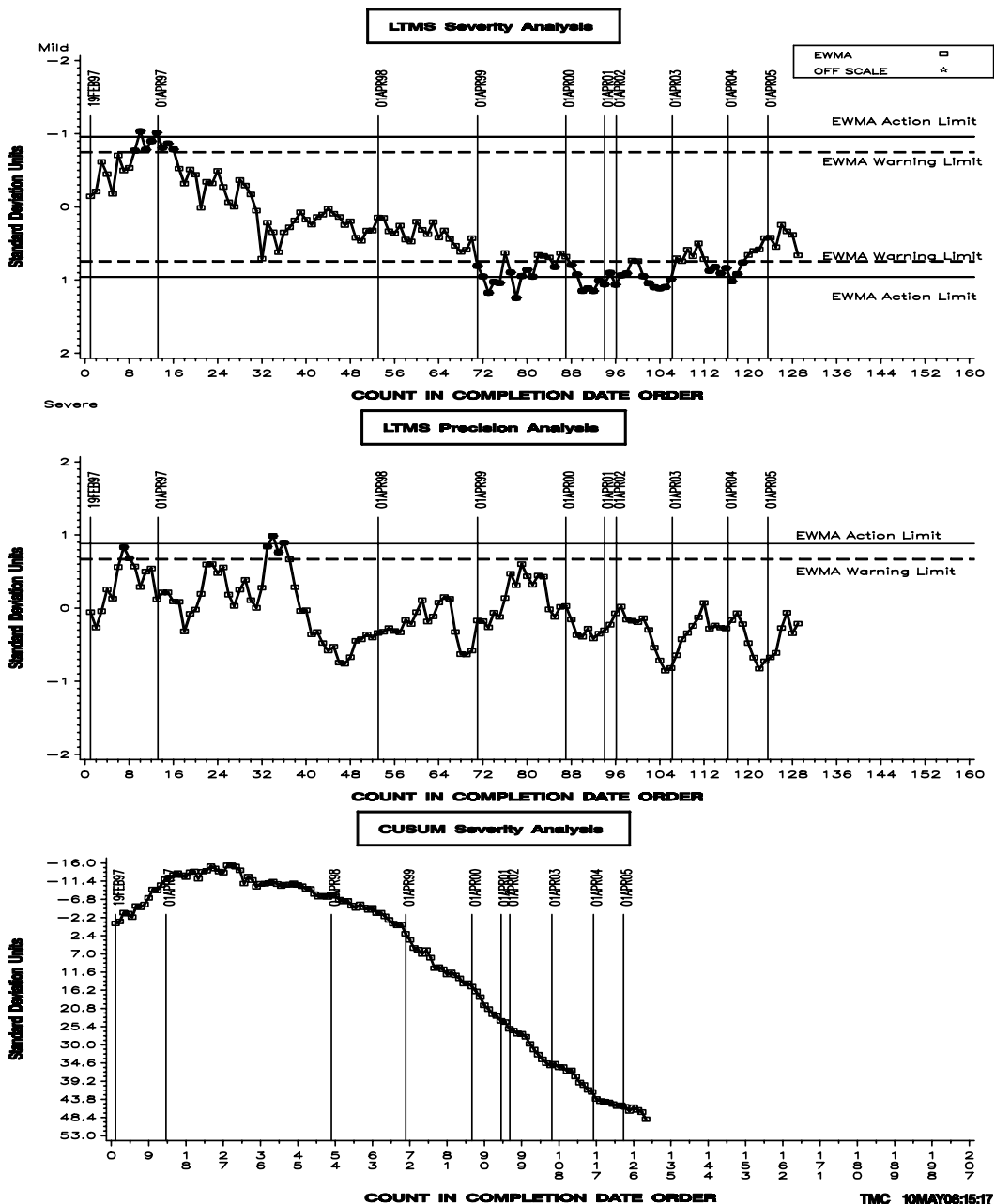


EOT Oil Consumption (ETOC):

The average transformed ETOC Y_i this period was 1.014 (see table on page 7) which, using the homogeneous dataset standard deviation of 0.5177, converts to 0.5249 which back-transforms to 1.69 g/h. As with average oil consumption, ETOC has been severe since the end of the matrix. Precision remained within acceptable limits. The LTMS/Cusum plot for ETOC is shown below.

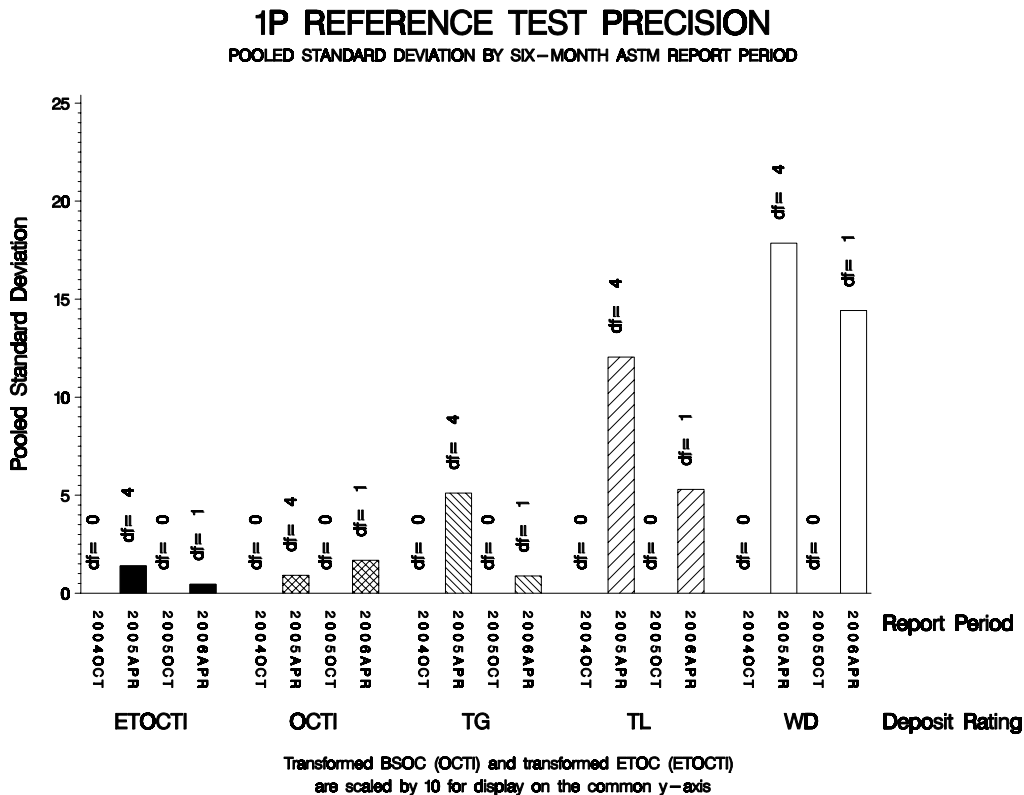
CATERPILLAR 1P INDUSTRY OPERATIONALLY VALID DATA

EOTOC



POOLED S:

Shown below is a bar chart comparing the pooled s values for the 1P test parameters over the last four report periods. Please note that the values for oil consumption (OCTI) and end of test oil consumption (ETOCTI) have been multiplied by 10 to allow these parameters to be shown on the same plot as the other parameters. Where degrees of freedom equal zero, no bars are shown. This will occur where only one test was reported or where multiple tests are reported but all are on different oils.



QUALITY INDEX:

One Quality Index Deviation was written this period bringing the total written for the 1P test to nine.

The first three Quality Index Deviations were written for tests from a lab experiencing QI implementation problems during the installation of new control hardware in February of 1998 (the QI requirements were implemented in January of 1998). The fourth was for the same lab while again installing the same hardware on another stand in May of 1998.

The fifth and sixth were written when a lab experienced a lab-wide catastrophic failure of the air handling system that caused an instantaneous loss of air pressure in June of 1998.

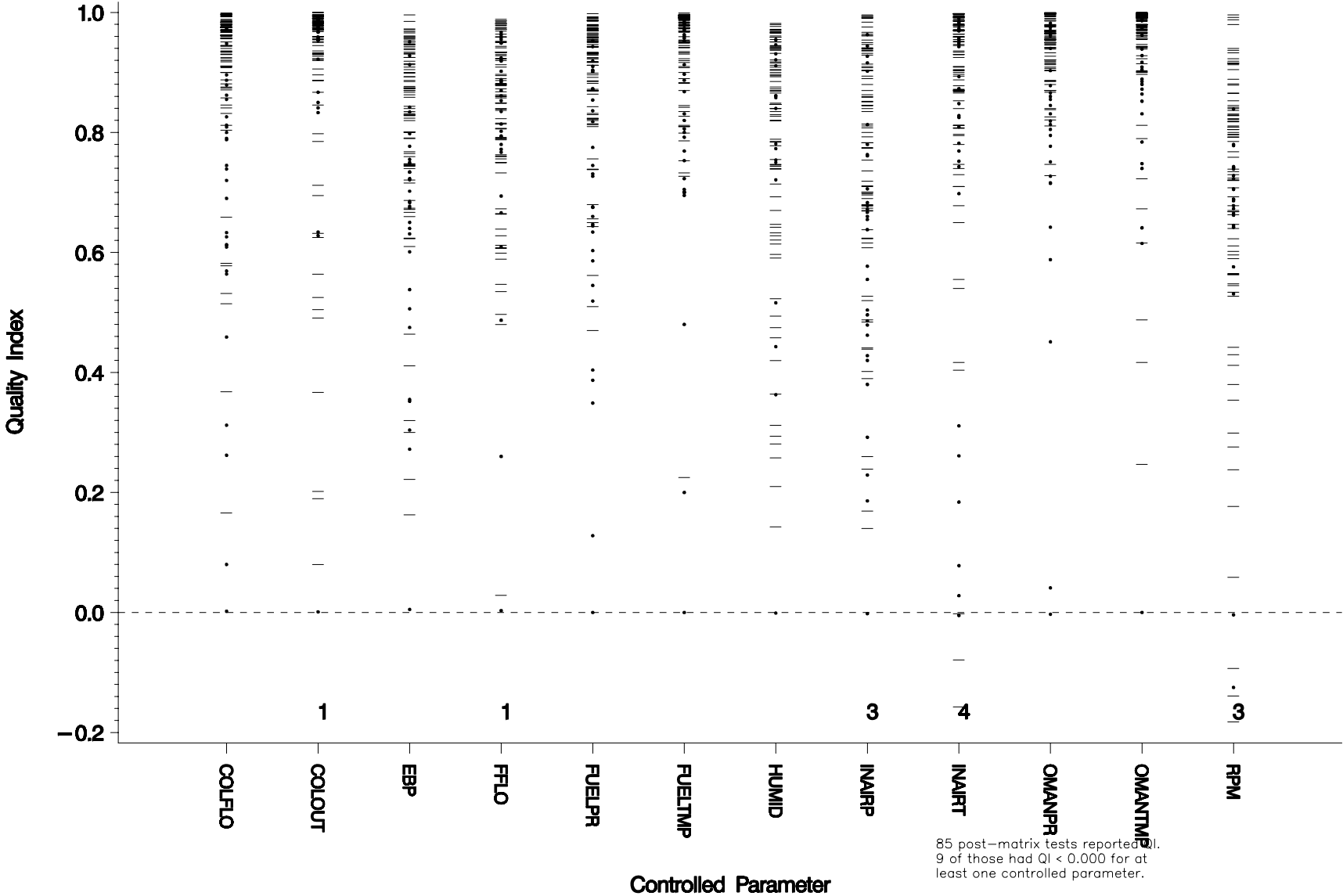
The seventh was due to a valve failure (caught and corrected within one hour) that caused an off spec coolant out temperature for a test reported in August of 1999.

The eighth was written in May of 2000 when a lab's air handling system was disrupted by the direct inlet-to-exhaust airflow path provided by the EGR cooler on an adjacent 1Q stand. Until 1Q control strategies were revised, unexpected 1Q shutdowns caused air pressure spikes throughout the lab.

The Deviation written this period was for a lab that had indications of fuel flow disruption caused by the sudden loss of a pump at the fuel tank farm due to flooding caused by heavy rain. The loss of fuel pressure affected the fuel flow readings but was determined not to have effected engine operation.

Shown on the following page is a plot showing all QI's reported to date for all controlled parameters.

1P Quality Index



Figures along the horizontal axis indicate the number of post-matrix tests where QI < 0.000
 Dots represent matrix tests; dashes represent post-matrix tests

STATUS OF REFERENCE OIL SUPPLY:

At the end of this report period, the testing oil supply stood as outlined in the following table:

Oil	Cans @ Labs	@ TMC	
		Cans	Gallons
1004-3	8	12	181
1005	0	2	39
1005-1	0	0	4
1005-2	8	83	1251
Total	16	97	1475

* Future reblends of oils marked with an asterisk are not obtainable by TMC.

Be aware that this table presumes that all of each of these oils is dedicated to the 1P test area. This is not the case; all of these oils are also used in other diesel test areas.

TIMELINE OF SIGNIFICANT EVENTS IN THE LIFE OF THE 1P TEST:

Effective Date	Info Letter	
19970219		START OF 1P MATRIX
19970604		LAST 1P MATRIX TEST
19980924	98-1	SPEC AND CALIBRATION PROCEDURE FOR OIL WEIGH SCALE PUMPS ADDED
19980924	98-1	BRAIDED STAINLESS STEEL/TEFLON HOSES REQUIRED FOR WEIGH SCALE
19980924	98-1	PRE-TEST LINER CLEANING - USE ONLY EF-411 FOR RUST PREVENTION
19980924	98-1	INSTRUCTIONS FOR VALIDITY DECLARATION
19980924	98-1	RATING VERIFICATION REQUIRED
19980924	98-1	REVISIONS TO THERMOCOUPLE SPECIFICATIONS - DIAMETER SPEC REMOVED
19980924	98-1	DUMMY INLET AIR HEATERS PERMITTED
19980924	98-1	INSTRUCTIONS FOR GROUPING AND ROUNDING PISTON AREAS FOR RATING
19980924	98-1	REPORT FORM AND DATA DICTIONARY CHANGES
19990419	99-1	TEST STAND INSTRUMENTATION CALIBRATION REQUIREMENTS
19990419	99-1	VISUAL INSPECTION OF INTAKE AIR BARRELS
19990419	99-1	RE-CALIBRATION REQUIREMENTS WHEN CRANK IS REMOVED
19990419	99-1	USE OF MOBIL EF-411 AS BUILD-UP/FLUSHING OIL
20031121	03-1	NICKEL-PLATED OIL COOLER APPROVED FOR USE
20031121	03-1	DATA DICTIONARY AND REPORT FORMS (VERSION=20031105) DD AND FORMS SEPARATED FROM THE STANDARD
20040924		FIRST PC-9 FUEL TEST
20050321	05-1	PC-9 FUEL REPLACES LSRD4 AND SEVERAL EDITORIAL CHANGES

RATING:

No 1P re-rates were required during this report period. The table below summarizes the re-rates for this report period:

Rating Re-rate Summary	
Number of tests where lab rating was changed	0
Number of tests where referee rating was changed	0
Number of tests where no changes were made	0
Total number of re-rates requested	<u>0</u>

LAB VISITS:

No 1P lab visits were completed during this report period.

INFORMATION LETTERS:

No information letters were issued during this report period

FUEL BATCH APPROVAL:

During this period, no new fuel batches were approved for testing.

SUMMARY

- Over the course of this report period, TGC, WD, and TLC remained within acceptable severity limits. OC (and ETOC) have been severe since the completion of the matrix.
- Precision for all parameters remained within acceptable limits throughout this report period.

SDP/sdp/astm0406.doc/mem06-040.sdp.doc

c: J. L. Zalar
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Single Cylinder Diesel Surveillance Panel
<ftp://ftp.astmtmc.cmu.edu/docs/diesel/scote/semiannualreports/1p-04-2006.pdf>

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