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

MEMORANDUM: 03-114

DATE: November 7, 2003

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

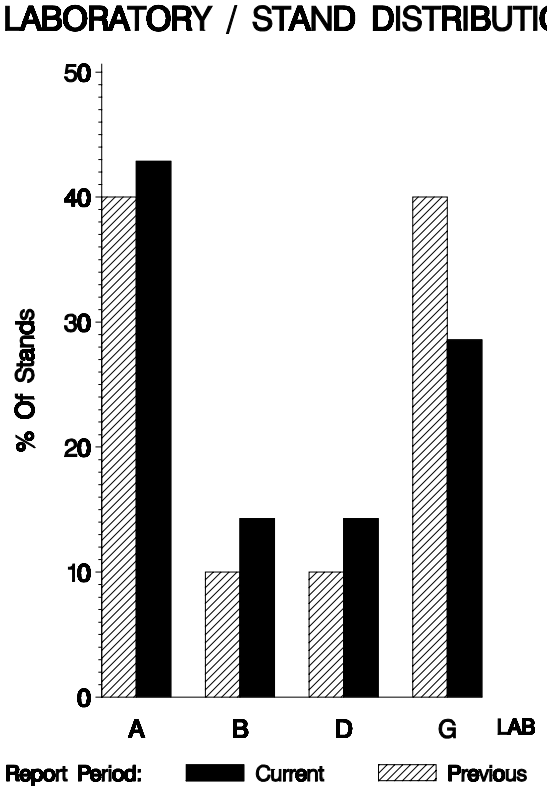
FROM: Scott Parke

SUBJECT: 1P Testing from April 1, 2003 through September 30, 2003

Eight calibration tests were reported to the Test Monitoring Center during the period from April 1, 2003 through September 30, 2003. The data from these tests are shown on page 7. Following is a summary of testing activity this period.

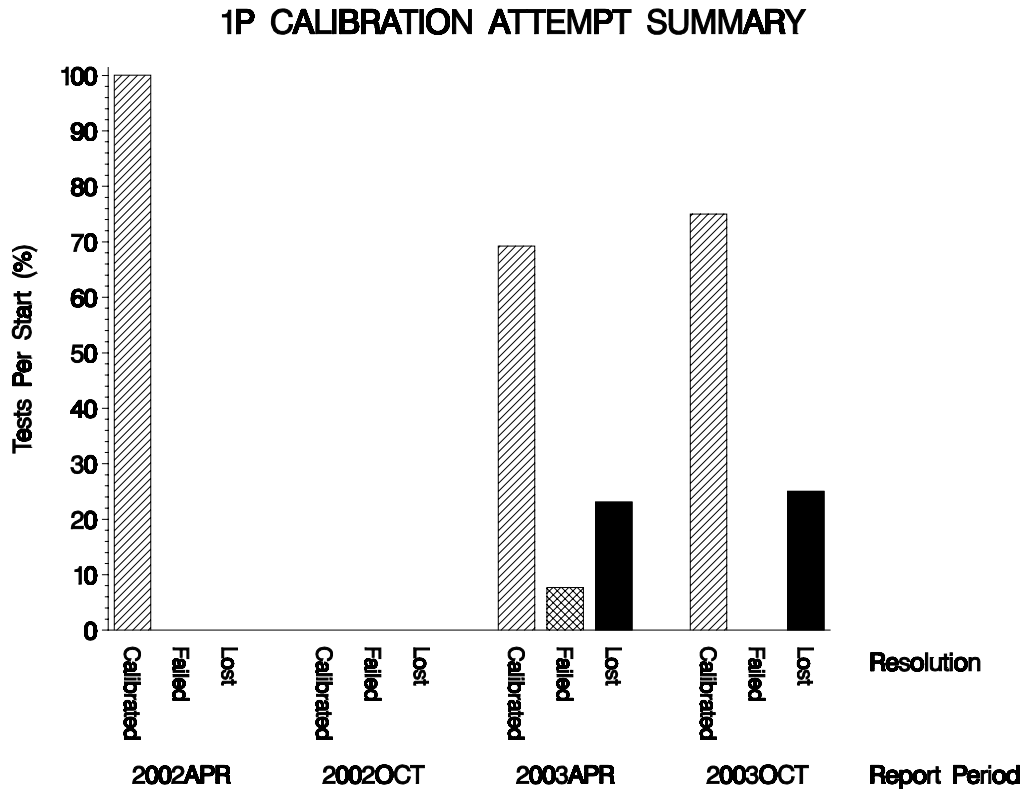
	Reporting Data	Calibrated on 9-30-03
Number of Labs	4	4
Number of Stands	7	6

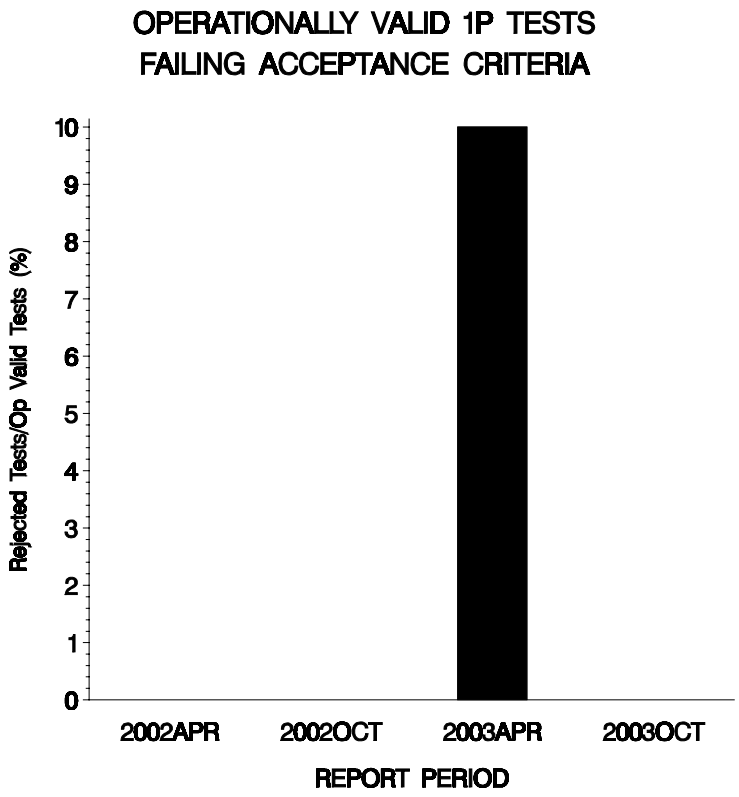
Stands reporting data this period were distributed as shown below:



Test Distribution by Oil and Validity

				Totals	
		1004-3	**1005-1**	Last Period	This Period
Accepted for Calibration	AC	4	2	9	6
Rejected Mild	OC	0	0	0	0
Rejected Severe	OC	0	0	1	0
Rejected for EWMA Precision	OC	0	0	0	0
Rejected for Shewhart Precision	OC	0	0	0	0
Operationally Invalid (lab)	LC	0	0	0	0
Operationally Invalid (lab/TMC)	RC	0	0	0	0
Aborted Calibration	XC	1	1	3	2
Total		5	3	13	8

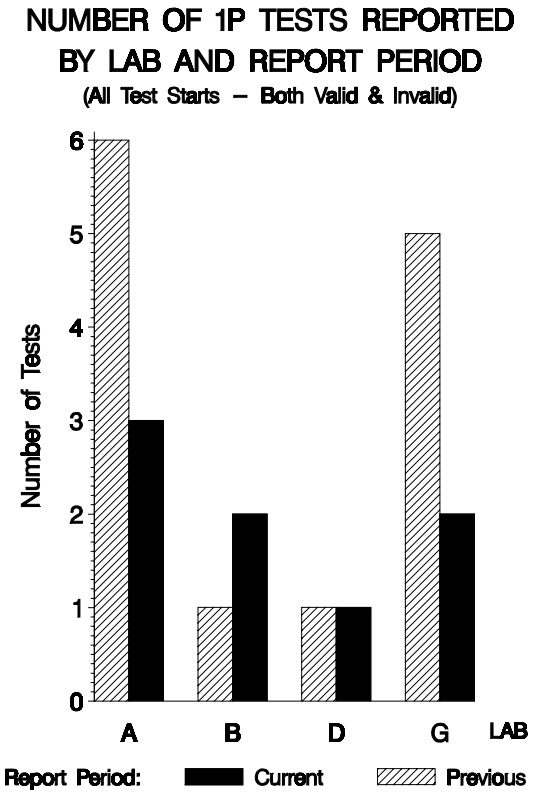




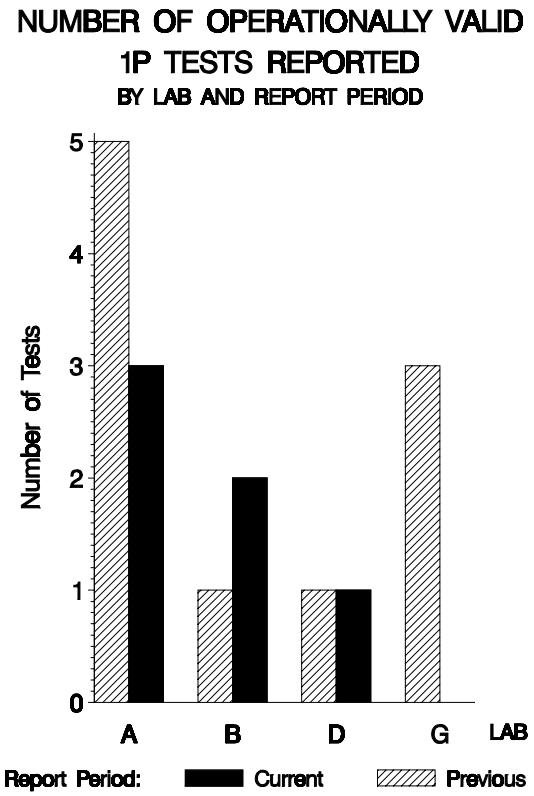
The above chart shows the percentage of failed but operationally valid tests. No tests failed this report period.

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

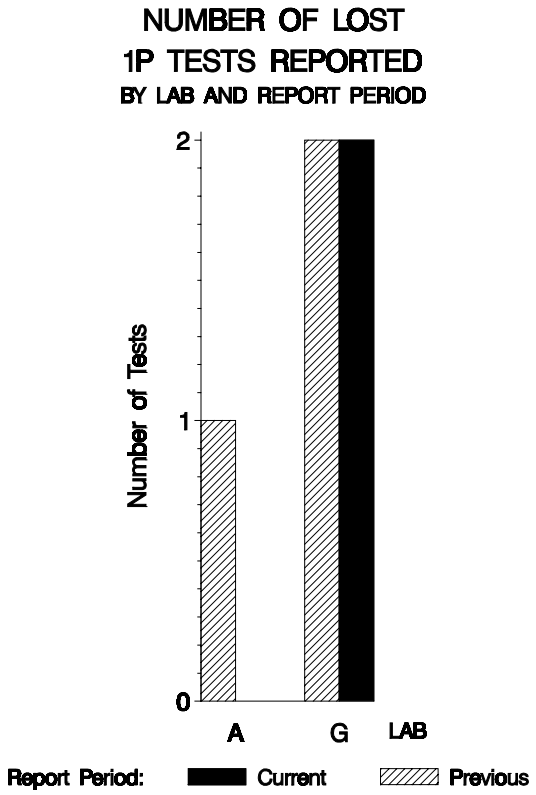
By lab, the tests run this report period were distributed as shown below:



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

	1004-3			1005-1			Total		
Lab	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%
A	0	2	0	0	1	0	0	3	0
B	0	2	0				0	2	0
D				0	1	0	0	1	0
G	1	1	100	1	1	100	2	2	100
Total	1	3	33	1	3	33	2	8	25

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

Causes for Lost Tests

			Oil		Validity			Loss Rate		
Lab	Cause		1004-3	1005-1	LC	RC	XC	Lost	Starts	%
G	High oil consumption at 225 h.		●				●	2	2	100%
	High oil consumption at 90 h.			●			●			
		Lost	1	1	0	0	2			
		Starts	8	8	8	8	8			
		%	13%	13%	0%	0%	25%			

Average Δ/s by Lab						
Lab	n	TGC	WDP	TLC	OC*	EOTOC*
A	3	0.211	0.135	0.675	0.966	0.800
B	2	-0.240	-0.748	0.076	0.344	-0.237
D	1	-0.665	-0.089	0.865	0.626	0.899
Industry	6	-0.085	-0.197	0.507	0.702	0.471

* Transformed

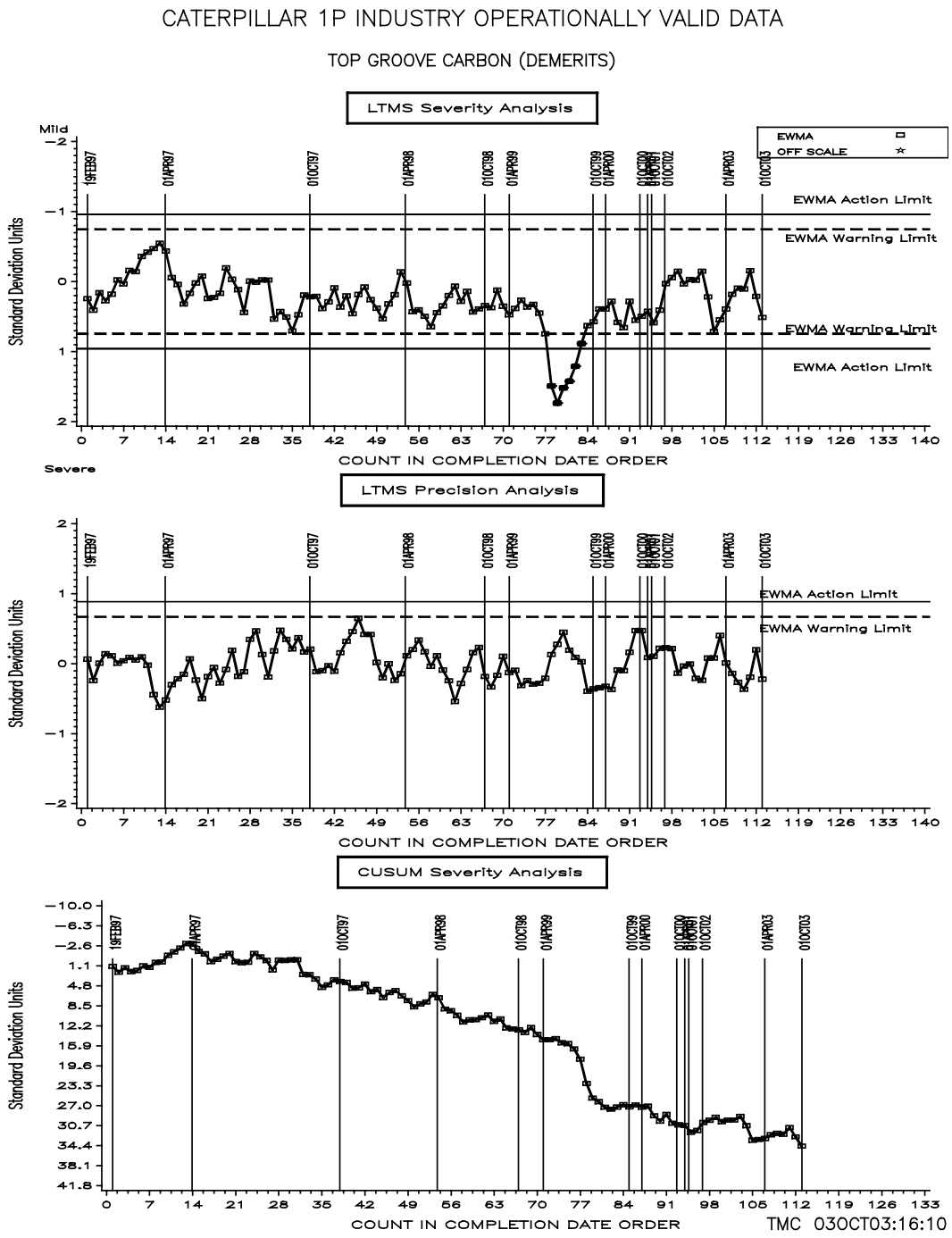
DATA FROM ALL OPERATIONALLY VALID TESTS REPORTED THIS PERIOD:

LTMS DATE	LAB	STAND	OIL	TG	WD	TL	OC	ETOC	TGYI	WDYI	TLYI	OCYI	ETOCYI
20030407	B	2	1004-3	27.75	298.5	28.50	6.5	6.2	-0.224	-0.366	0.029	0.123	-0.434
20030419	D	2A	1005-1	23.50	280.2	42.25	7.9	7.9	-0.665	-0.089	0.865	0.626	0.899
20030506	B	2	1004-3	27.50	254.5	29.75	7.5	7.6	-0.256	-1.130	0.124	0.565	-0.041
20030901	A	8	1004-3	30.75	313.3	51.50	11.1	13.2	0.164	-0.109	1.778	1.775	1.026
20030906	A	2	1004-3	20.00	252.0	19.00	6.9	7.0	-1.225	-1.174	-0.694	0.307	-0.200
20030919	A	5	1005-1	41.75	382.5	43.25	8.4	11.2	1.693	1.688	0.941	0.816	1.573

DISCUSSION OF INDUSTRY PERFORMANCE OVER THIS PERIOD

TGC:

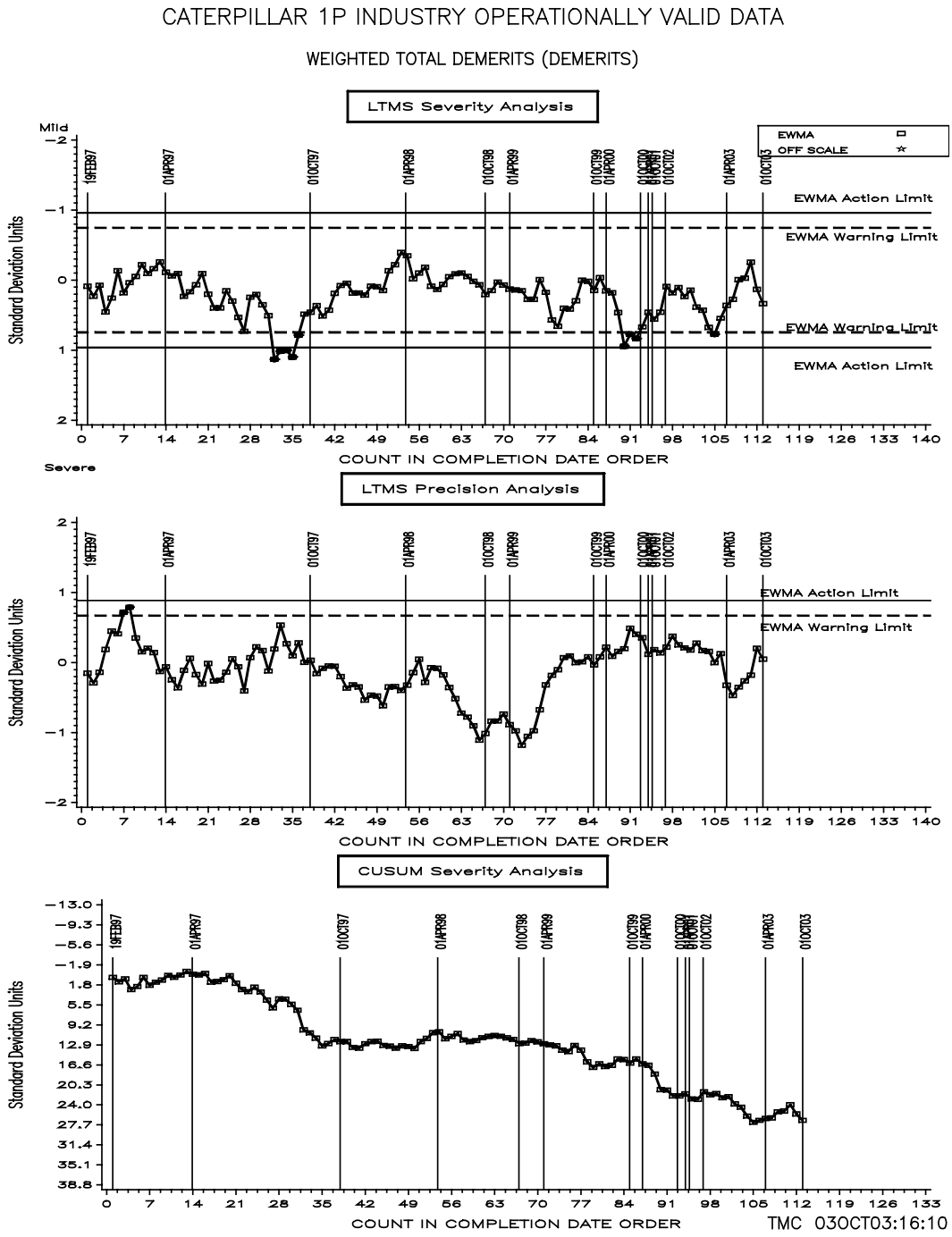
The average Yi reported this period was -0.085 (see table on previous page). Using the homogeneous dataset standard deviation for TGC (7.74 demerits) to compute an average Δ yields -0.66 demerits mild. Severity and precision remained within acceptable limits throughout this period.



Shown above is the LTMS/Cusum plot for TGC.

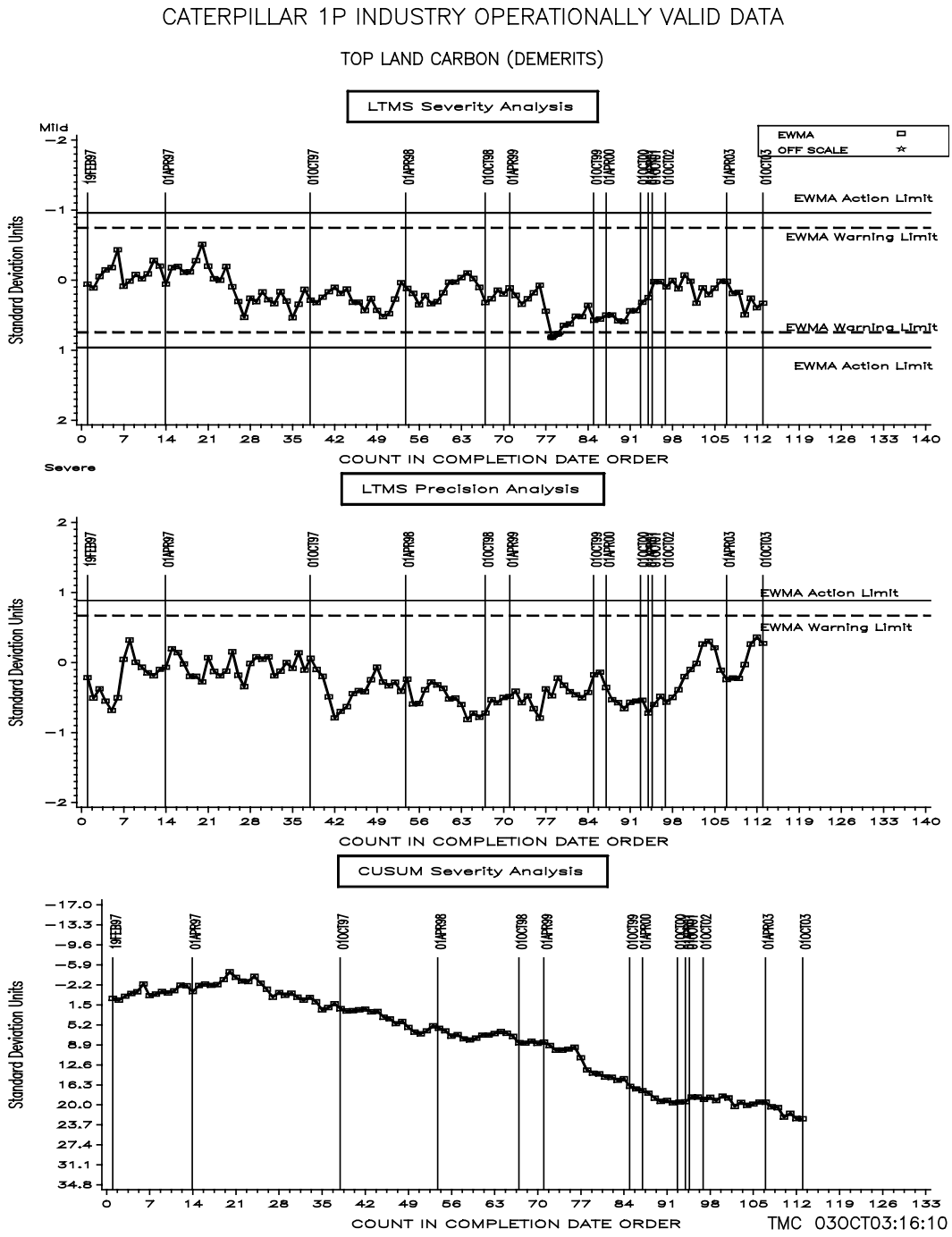
WDP:

The average Yi reported for WDP this period was -0.197 mild (see table on page 7). The homogeneous dataset standard deviation of 57.6 converts this to -11.35 demerits. Severity and precision remained within acceptable limits. The LTMS/Cusum plot is shown below.



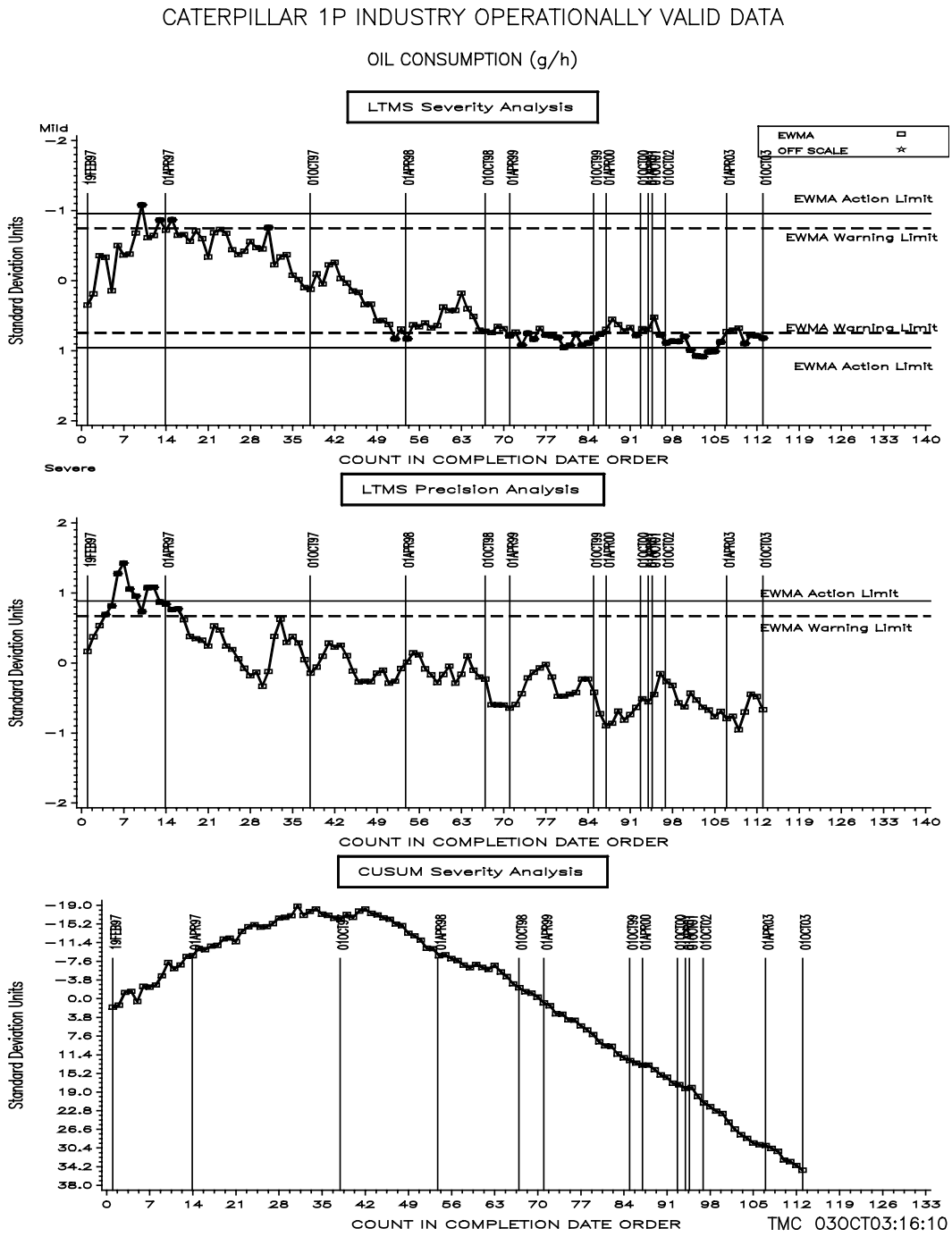
TLC:

The average TLC Yi reported this period was 0.507 (see table on page 7). Using the homogeneous dataset standard deviation of 13.15 to compute an average delta yields 6.67 severe. TLC remained within both severity and precision limits. The LTMS/Cusum chart is shown below.



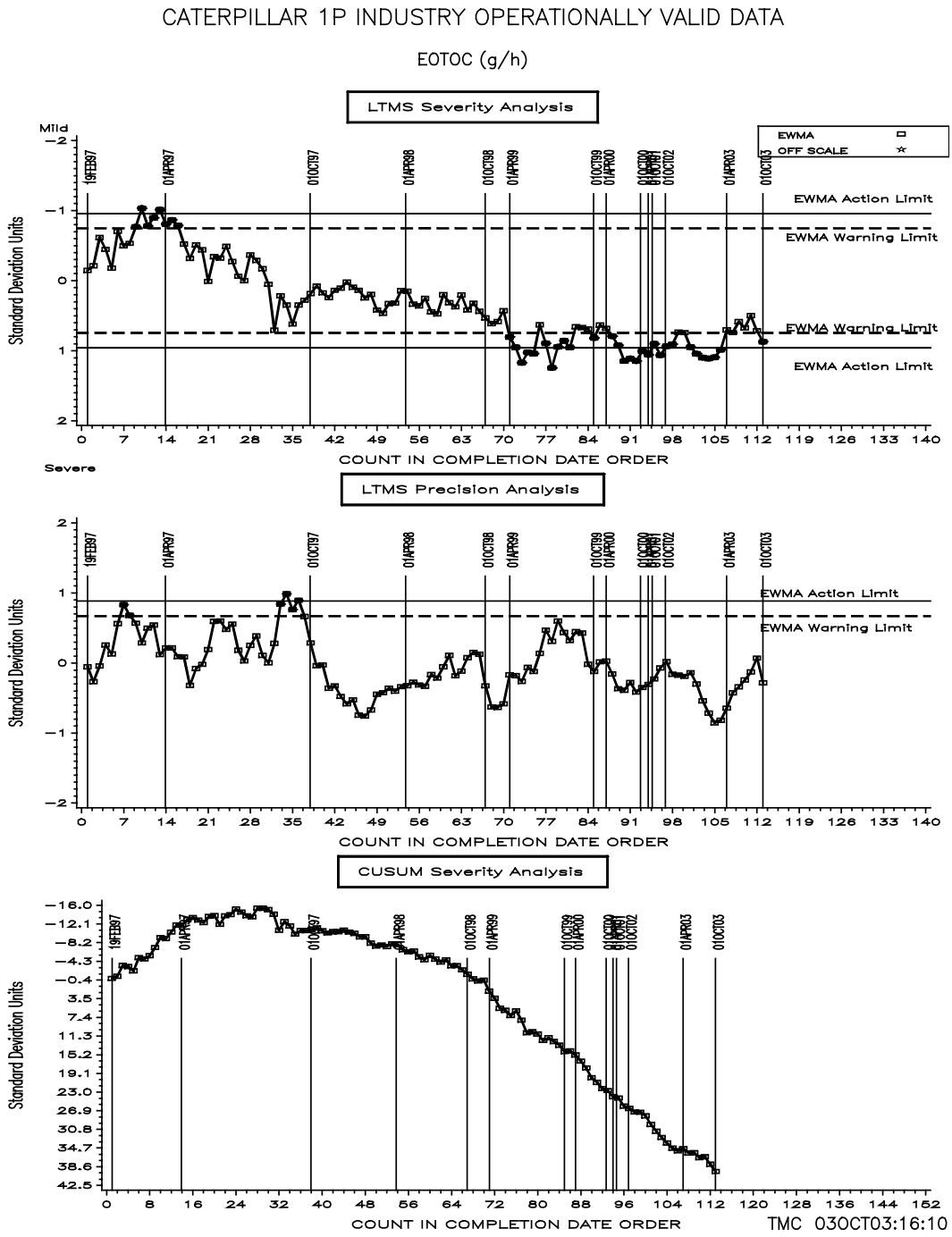
Oil Consumption (OC):

The average transformed OC Yi this period was 0.702 (see table on page 7). Computing an average transformed delta using the homogeneous dataset standard deviation of 0.3238 gives 0.2273. Back-transforming this value gives 1.26 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.



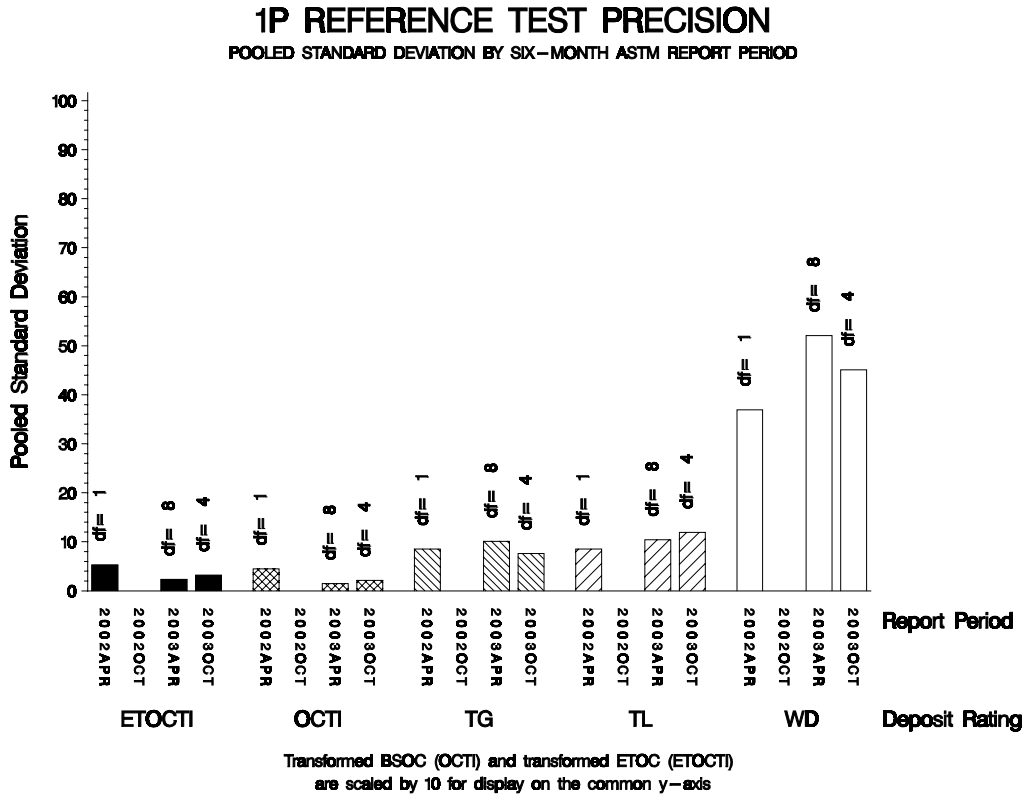
EOT Oil Consumption (ETOC):

The average transformed ETOC Yi this period was 0.471 (see table on page 7) which, using the homogeneous dataset standard deviation of 0.5177, converts to 0.2438 which back-transforms to 1.28 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.



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.



QUALITY INDEX:

No Quality Index Deviations were written this period. A total of eight QI Deviations have been written for the 1P test.

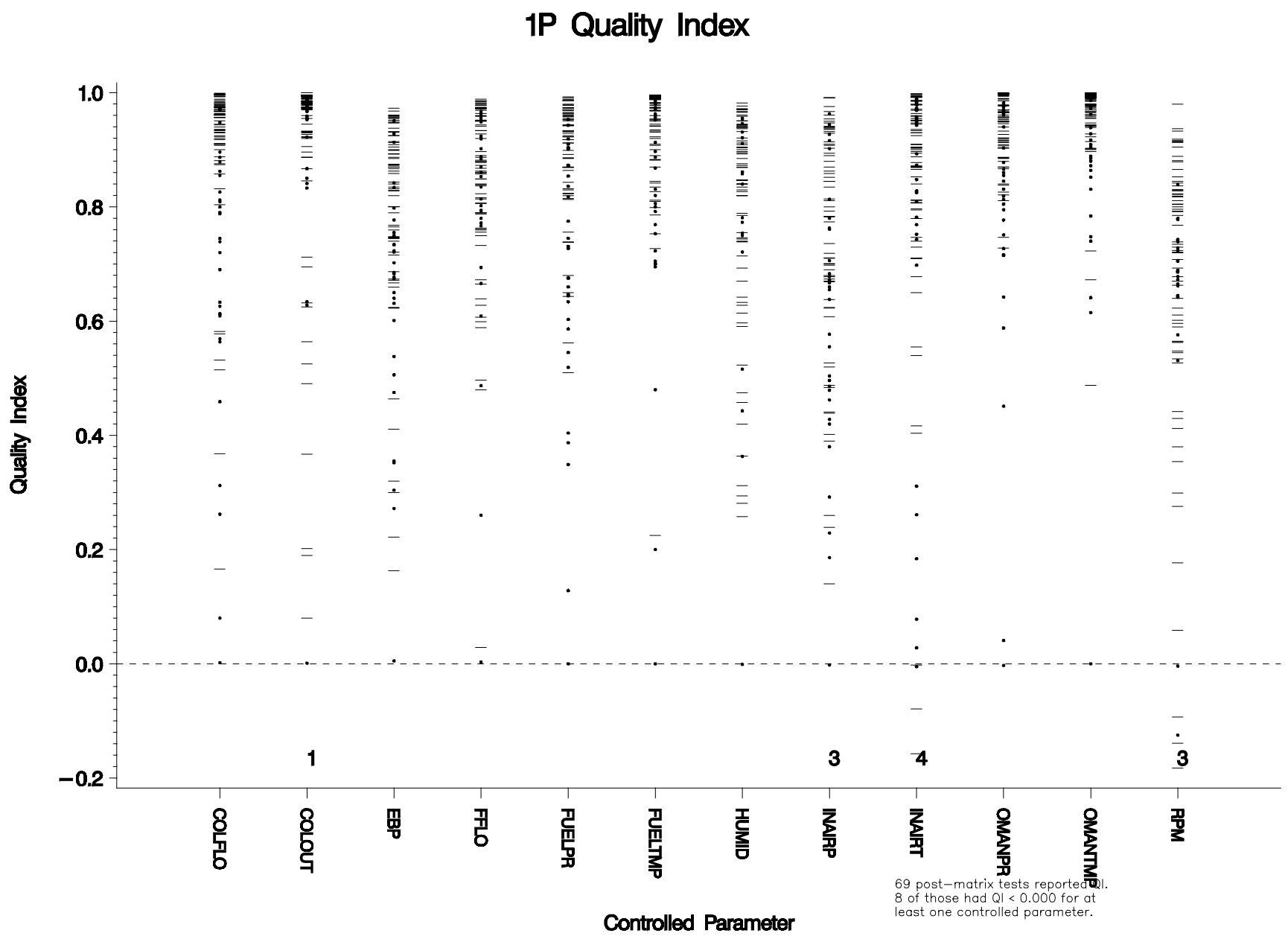
The first three were written for tests from a lab experiencing QI implementation problems during the installation of new control hardware in February of 1998 (the QI requirements were implemented in January of 1998). The fourth was for the same lab while again installing the same hardware on another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

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



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:

		@ TMC	
Oil	Cans @ Labs	Cans	Gallons
1004-3	6	90	1353
1005	0	4	67
1005-1	6	3	52
1005-2	0	100	1511
Total	12	197	2983

* 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. All of these oils are also used in the other diesel test areas. TMC has acquired a reblend of 1005 (1005-2) and will begin shipping it soon.

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

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

Total number of re-rates requested	0
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

LAB VISITS:
One 1P lab visit was completed during this report period. Three data acquisition points were found to be mislocated (two thermocouples and one pressure transducer). None of these were likely to have a significant impact on the measurements taken. The lab will be making corrections at the completion of the currently running test.

INFORMATION LETTERS:
No information letters were issued this report period.

FUEL BATCH APPROVAL:
During this period, the following fuel batches were approved for testing: RE0521LS10 and RG2421LS10.

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/astm1003.doc/mem03-114.sdp.doc
c: J. L. Zalar
F. M. Farber
Abdul Cassim, Caterpillar
Chuck Dutart, Caterpillar
Single Cylinder Diesel Surveillance Panel
ftp://ftp.astmtmc.cmu.edu/docs/diesel/scote/semiannualreports/1p-10-2003.pdf

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