



# Test Monitoring Center

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

MEMORANDUM: 07-078

DATE: November 26, 2007

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

FROM: Scott Parke

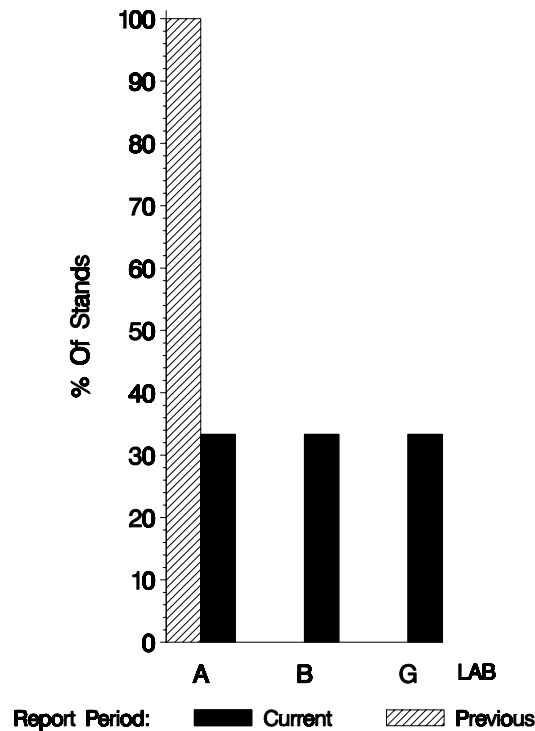
SUBJECT: 1K Testing from April 1, 2007 through September 30, 2007

Three calibration tests were reported to the Test Monitoring Center during the period from April 1, 2007 through September 30, 2007. 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 9-30-07
Number of Labs	3	3
Number of Stands	3	4

Stands reporting data this period were distributed as shown below:

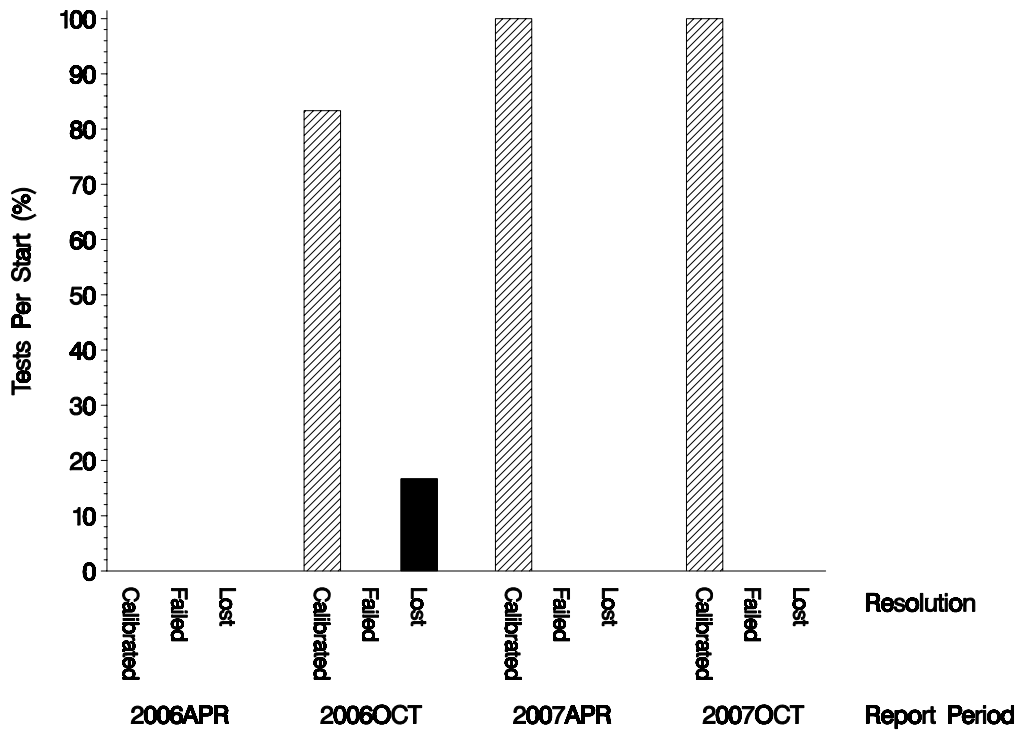
### 1K LABORATORY / STAND DISTRIBUTION



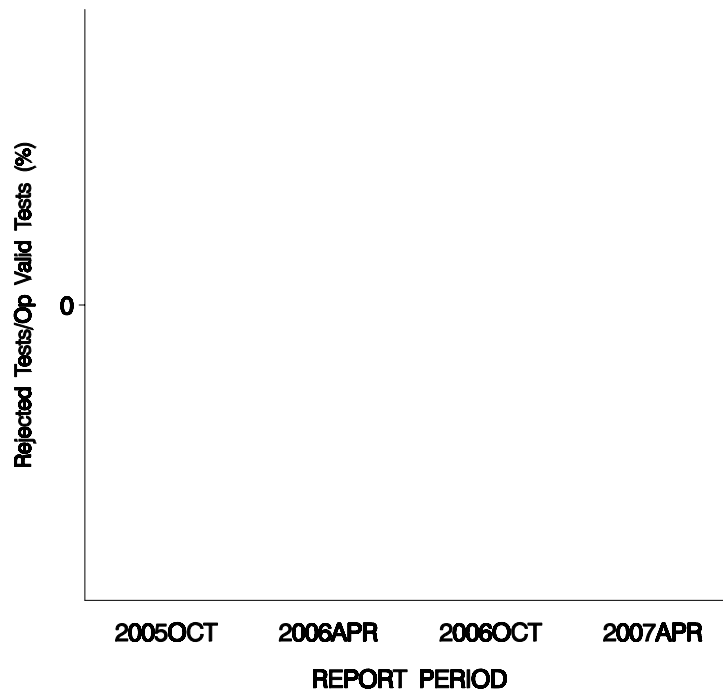
**Test Distribution by Oil and Validity**

						Totals	
		809-1	810-1	811-1	811-2	Last Period	This Period
Accepted for Calibration	AC	1	0	1	1	1	3
Rejected Mild	OC	0	0	0	0	0	0
Rejected Severe	OC	0	0	0	0	0	0
Operationally Invalid (lab)	LC	0	0	0	0	0	0
Operationally Invalid (lab/TMC)	RC	0	0	0	0	0	0
Aborted Calibration	XC	0	0	0	0	0	0
<b>Total</b>		<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>

**1K CALIBRATION ATTEMPT SUMMARY**



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



The above chart shows the percentage of failed but operationally valid tests. No tests have failed to meet the LTMS criteria since February of 2001.

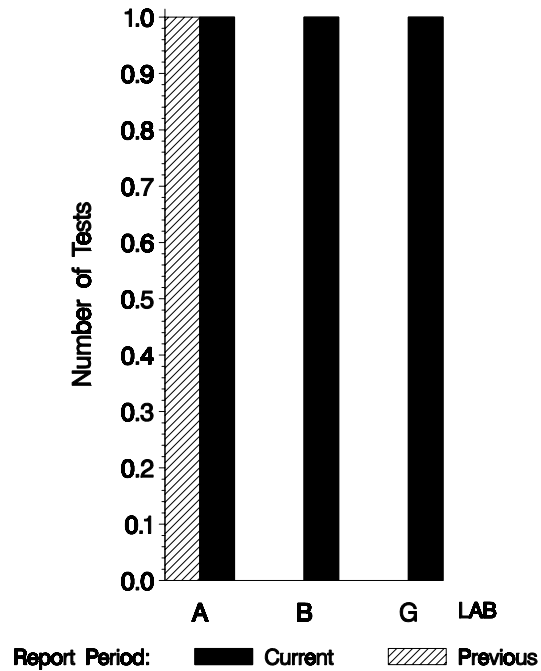
No LTMS deviations were written this period (none have ever been written for the 1K test).

No stands calibrated using reduced-K criteria this period.

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

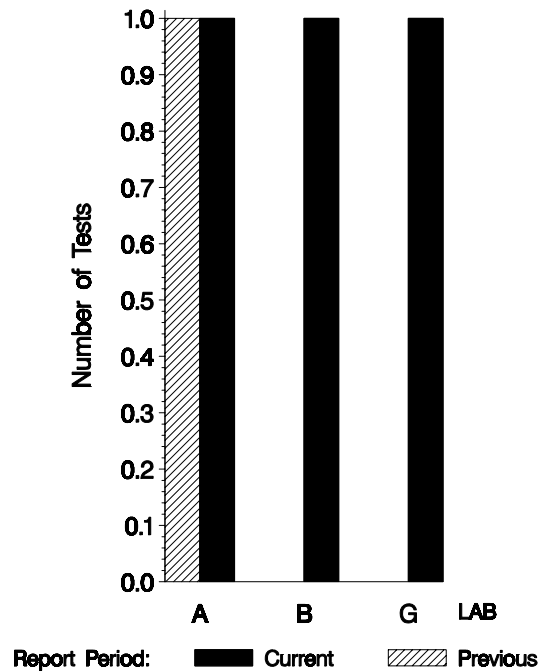
### NUMBER OF 1K TESTS REPORTED BY LAB AND REPORT PERIOD

(All Test Starts – Both Valid & Invalid)

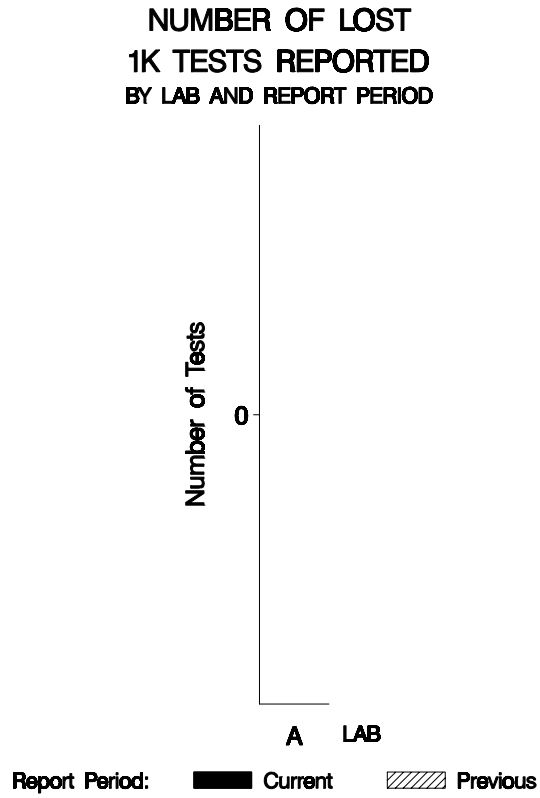


With all operationally invalid tests removed, the distribution looks like this:

### NUMBER OF OPERATIONALLY VALID 1K TESTS REPORTED BY LAB AND REPORT PERIOD



And the by-lab distribution of lost tests:



Lost Tests per Start by Oil and Lab

	809-1			810-2			811-1			811-2			Total		
Lab	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%
A	0	1	0										0	1	0
B							0	1	0				0	1	0
G										0	1	0		1	0
Total	0	1	0	0	0	0	0	1	0	0	1	0	0	3	0

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

Causes for Lost Tests

Lab	Cause	Oil				Validity				Loss Rate		
		809-1	810-2	811-1	811-2	LC	RC	XC	MC	Lost	Starts	%
	No tests were lost this report period.									0	0	0%
	Lost	0	0	0	0	0	0	0	0			
	Starts	0	0	0	1	1	1	1	1			
	%	0%	0%	0%	0%	0%	0%	0%	0%			

Average $\Delta$ /s by Lab						
Lab	n	TGF	WDK	TTLHC*	BSOC	EOTOC
A	1	0.159	0.601	-0.550	-0.331	-0.163
B	1	-0.801	1.275	-0.868	-1.000	-0.161
G	1	-1.163	-0.556	-0.868	-1.412	-0.500
Industry	3	-0.602	0.440	-0.762	-0.914	-0.275
809/809-1	1	0.159	0.601	-0.550	-0.331	-0.163

\* Transformed TLHC

DATA FROM ALL OPERATIONALLY VALID TESTS REPORTED THIS PERIOD:

**LTMS**

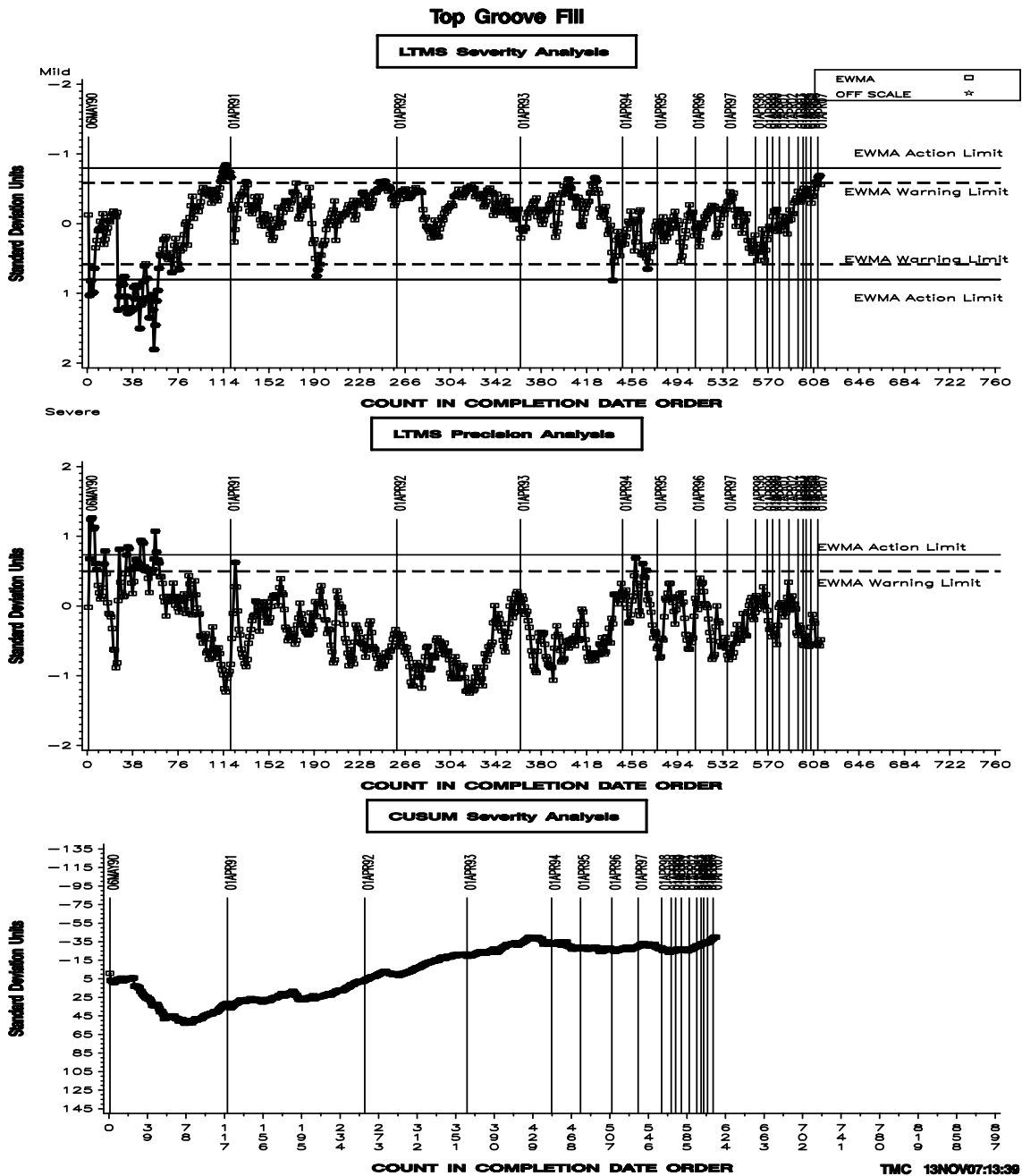
DATE	LAB	STAND	OIL	TG	WD	TL	OC	ETOC	TGYI	WDYI	TLYI	OCYI	ETOCYI
20070630	G	5	811-2	8	296.6	0	0.13	0.13	-1.163	-0.556	-0.868	-1.412	-0.500
20070721	B	12A	811-1	14	399.0	0	0.17	0.21	-0.801	1.275	-0.868	-1.000	-0.161
20070912	A	25	809-1	20	237.8	0	0.22	0.23	0.159	0.601	-0.550	-0.331	-0.163

DISCUSSION OF INDUSTRY PERFORMANCE OVER THIS PERIOD

TGF:

The average TGF Yi for the test reported this period (shown in the table on the previous page) was mild at -0.602. Using 809-1's test target standard deviation of 15.7 to compute an average  $\Delta$  yields 9% TGF mild.

**CATERPILLAR 1K INDUSTRY OPERATIONALLY VALID DATA**



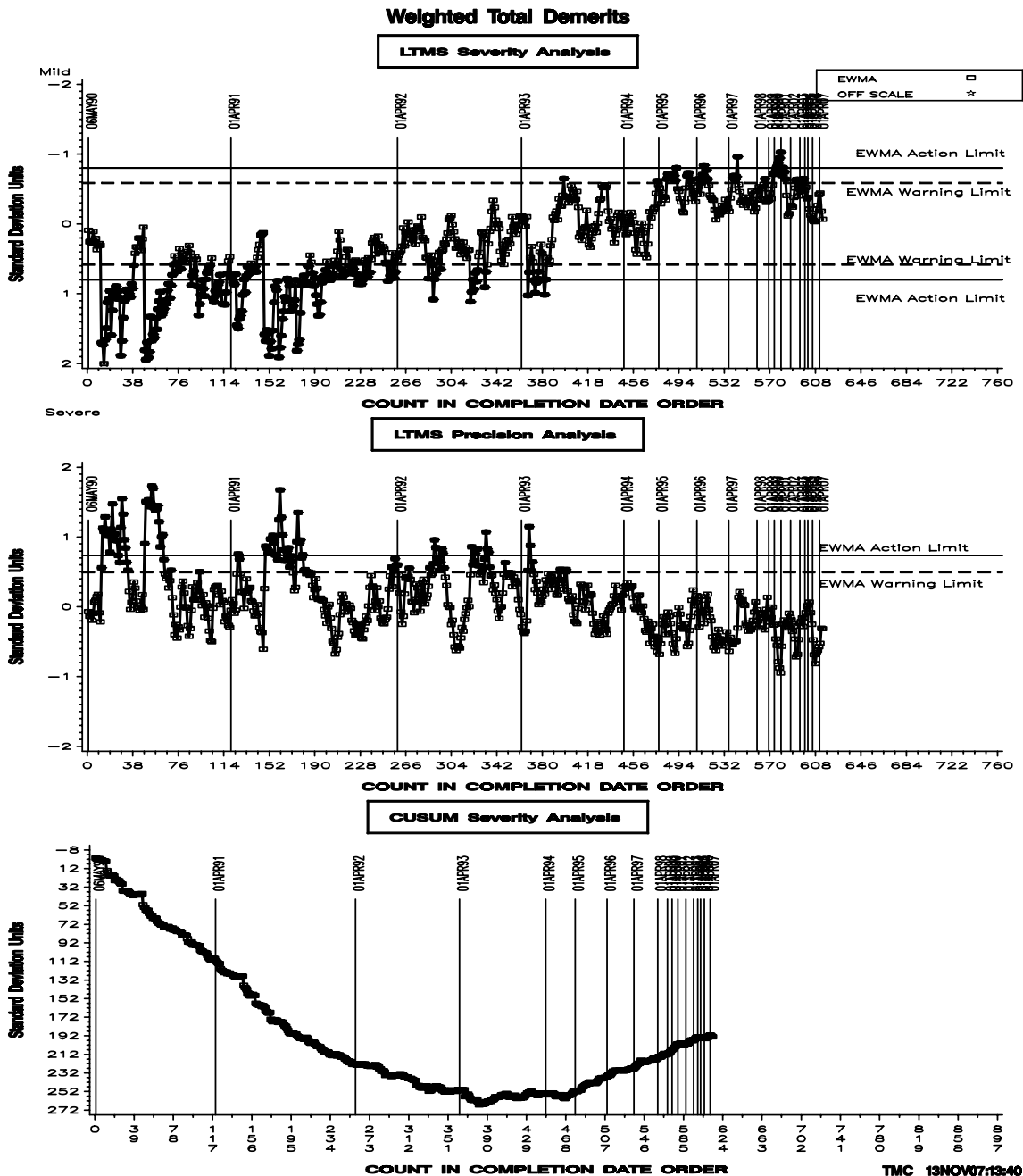
Shown above is the LTMS/Cusum plot for TGF. TGF remained within both severity and precision LTMS limits over this report period but continues its slight long-term mild trend.



WDK:

The average WDK result reported this period was slightly severe at 0.440 (see table on page 7). Using the target standard deviation for 809-1 (35.6) converts this to 15.7 demerits. The LTMS/Cusum plot is shown below. WDK severity and precision are currently well within limits.

### CATERPILLAR 1K INDUSTRY OPERATIONALLY VALID DATA

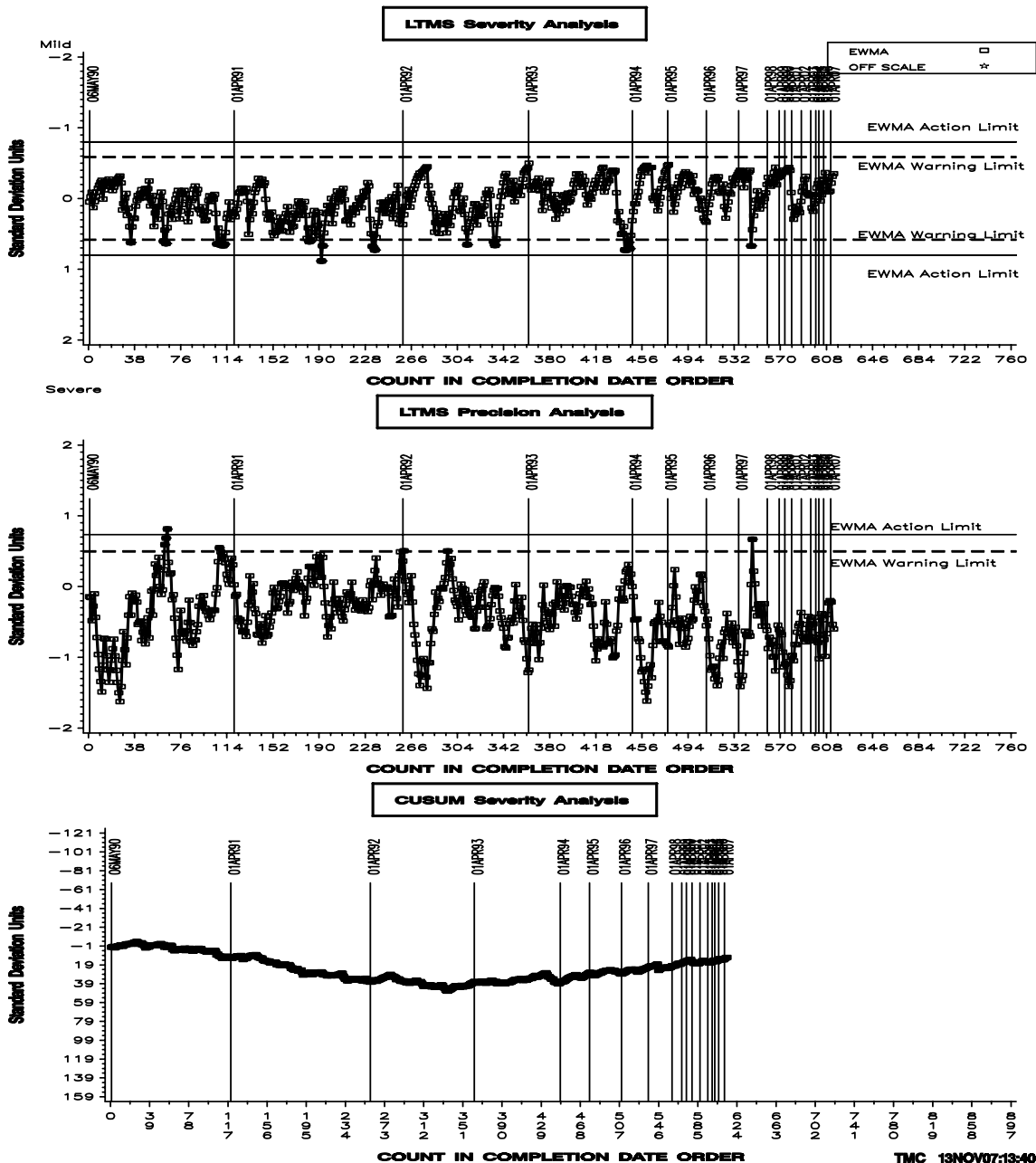


TLHC:

The average transformed TLHC  $Y_i$  reported this period was -0.762 (see table on page 7). Using the test target standard deviation of 1.1 from oil 809-1 to compute an average transformed delta yields 0.838. Back-transforming this value gives approximately 1% TLHC mild. Overall, this parameter has exhibited on-target performance for the life of this test.

**CATERPILLAR 1K INDUSTRY OPERATIONALLY VALID DATA**

**FINAL TRANSFORMED TOP LAND HEAVY CARBON**

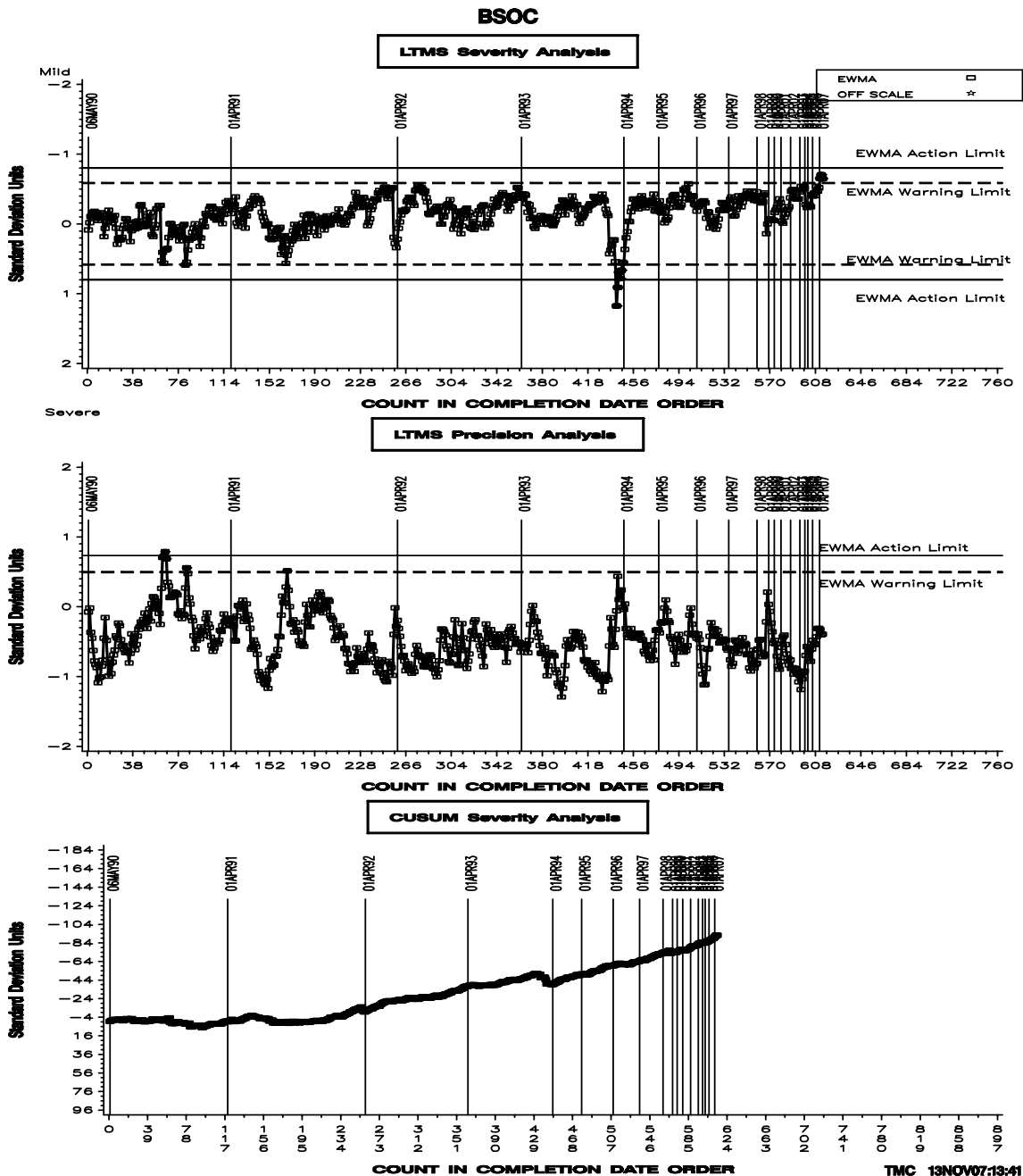


The LTMS/Cusum plot for transformed TLHC is shown above. Precision and severity were both within limits throughout this report period.

BSOC:

The average BSOC  $Y_i$  reported this period was -0.914. Computing a delta using the test target standard deviation of 0.145 for oil 809-1 gives 0.133 g/kWh mild. The LTMS/Cusum plot for BSOC is shown below. The Cusum plot indicates a slight but continuous mild trend throughout the life of the test.

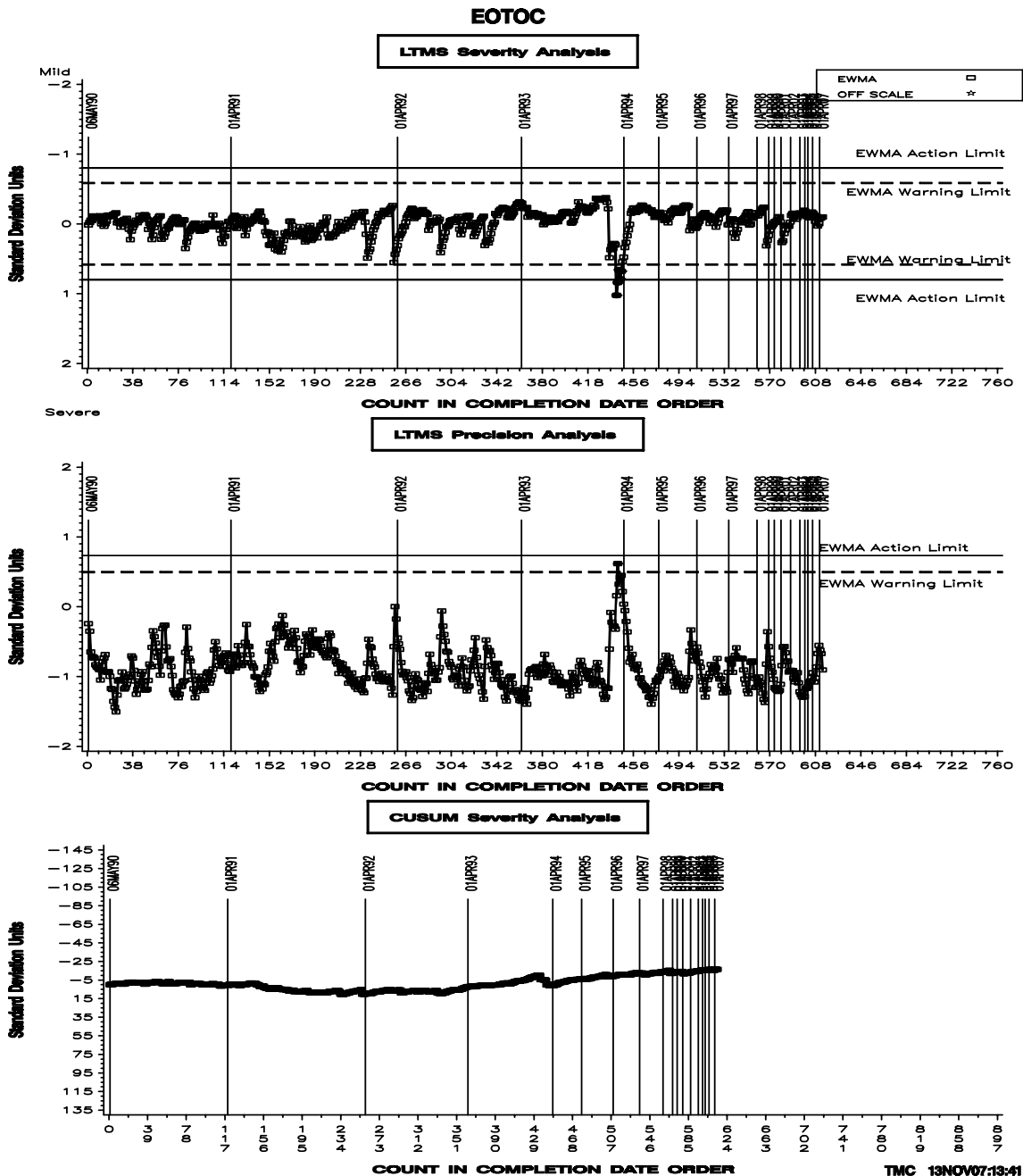
**CATERPILLAR 1K INDUSTRY OPERATIONALLY VALID DATA**



EOTOC:

EOTOC generally mirrors BSOC. The average EOTOC Yi result reported this period was -0.275 mild. Multiplying by the target standard deviation for 809-1 (0.332 g/kWh) gives an equivalent EOTOC of 0.09 g/kWh. The LTMS/Cusum plot for EOTOC is shown below.

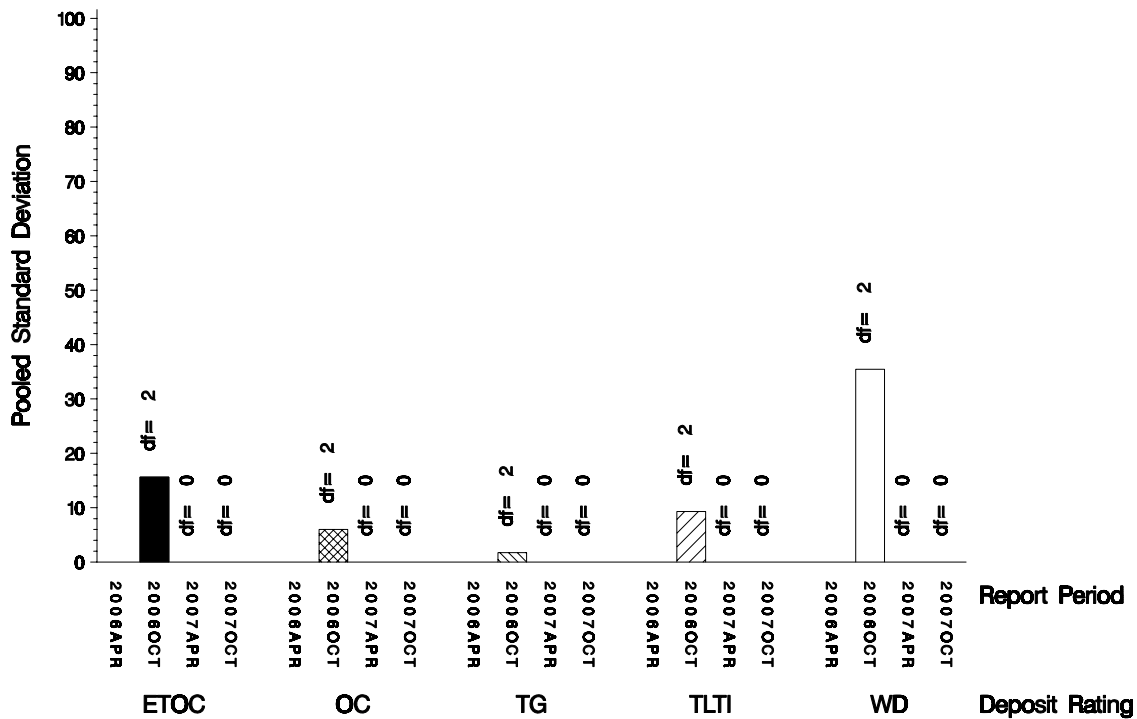
**CATERPILLAR 1K INDUSTRY OPERATIONALLY VALID DATA**



POOLED S:

Shown below is a bar chart comparing the pooled s values for the 1K test parameters over the last four report periods. Please note that the values for TLHC have been multiplied by 10 and the values for BSOC and EOTOC have been multiplied by 100 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 (such as this period). Periods showing no information had no tests reported (April 2006).

**1K REFERENCE TEST PRECISION**  
**POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD**



Transformed TLHC (TLI) is scaled by 10 for display on the common y-axis  
 BSOC (OC) and ETOC are scaled by 100 for display on the common y-axis

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
809	3	0	0
809-1	9	281	2808
810-2	9	360	3605
811-1	6	0	9
811-2	4	161	1561
<b>Total</b>	<b>31</b>	<b>802</b>	<b>7983</b>

\* 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 1K test area. All of these oils are also used in the 1N test area and 809-1 is used in several other test areas.

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

Effective Date	Info Letter	
19891002		START OF 1K TESTING
19900506		FIRST TEST FOR 1K CALIBRATION
19901215		FIRST USE OF 811-1
19910220		FIRST USE OF 810-1
19910407		LAST USE OF 811
19910710	2	INDUSTRY CORRECTION FACTORS FOR CANDIDATE TESTING
19910723		LAST USE OF 810
19910816		FIRST USE OF 809-1
19910927	1	INFORMATION LETTER 1 - REWRITTEN PROCEDURE
19911015	3	COOLING SYSTEM MODIFICATION
19911015	3	COOLANT BYPASS VALVE
19911015	3	CYLINDER LINER WEAR MEASUREMENT DEVICE
19911015	3	TEST FUEL NAME CHANGE
19911015	3	REPORT FORMS
19920601	4	CLOSED COOLING SYSTEM
19920601	4	PISTON PACKAGING FOR REFEREE RATING
19920601	4	MINERAL FREE WATER - DEFINITION
19920601	5	FLUSHING CART FLOW DIAGRAM
19920731	6	TEMPERATURE; PRESSURE AND SPEED STANDARD CALIBRATION TRACEABILITY
19920731	6	HUMIDITY MONITORING SYSTEM
19921015	7	FUEL INJECTION PUMP TIMING USING THE BUBBLE METHOD
19921015	7	PISTON RATER CALIBRATION
19921015	7	OIL SAMPLING FREQUENCY FOR USED OIL ANALYSIS
19930324	8	INTERNAL ENGINE PAINT AND SUPPLIER
19930702	9	CATERPILLAR BRAND COOLANT
19930708	10	PROCEDURE DISCLAIMER
19930708	10	CYLINDER HEAD COOLANT PASSAGE CLEANING
19930708	10	CRANKCASE PRESSURE INCREASE DURING BLOWBY MEASUREMENT
19930708	10	ACCEPTABLE CYLINDER HEAD/JUG ASSEMBLIES
19930708	10	RING GAP MEASUREMENT - FEELER GAUGES/TAPER GAUGE
19930708	10	PISTON POSITION DURING DOWNTIME
19930708	10	OIL CONSUMPTION CALCULATIONS
19930708	10	OIL CONSUMPTION CALCULATION AFTER SHUTDOWN
19930708	10	MISSING OR BAD TEST DATA
19930708	10	TYPOGRAPHICAL ERROR IN TABLE A12
19940101	11	TEST RUN NUMBERING
19940101	11	PISTON PHOTOGRAPHS
19940101	11	USE OF AN ALIGNMENT FIXTURE IN P-TUBE AIMING
19940101	11	LOCATION OF LINER SURFACE FINISH MEASUREMENTS
19940101	11	LOCATION OF LINER BORE DIAMETER MEASUREMENTS
19940101	11	ENGINE ROTATION SPEED DURING FLUSHING
19940101	11	ACCEPTABLE CYLINDER LINER PART NUMBERS
19940101	11	CALIBRATION FREQUENCY
19940102		CATERPILLAR COOLANT DEADLINE
19940301	12	OUTLIERS AS A TEST VALIDITY CRITERIA
19940301	12	INSTRUMENTATION CALIBRATION TOLERANCES AND TIME CONSTANTS
19940316	13	FUEL DILUTION AS AN OPERATIONAL VALIDITY CRITERION
19950403		LAST USE OF 809
19950531		LAST NON-DISCRIMINATION RUN ON 810-X
19950907		FIRST LTMS TEST
19960510	96-1	1K/1N DATA DICTIONARY AND REPORT FORMS (VERSION=19960304)
19960913	96-2	BETA TESTED 1K/1N DATA DICTIONARY AND REPORT FORMS (VERSION=19960913)
19961217		FIRST 810-X DISCRIMINATION RUN
19970320	97-1	USE OF LOW SULFUR FUEL FOR THE 1N TEST
19970320	97-1	ADDITION OF END OF TEST OIL CONSUMPTION (EOTOC) AS A REPORTED PARAMETER
19970320	97-1	ENGINE PARTS WARRANTY CLAIM PROCEDURE CHANGE
19970320	97-1	LTMS REQUIREMENTS FOR CALIBRATION
19970320	97-1	CLARIFICATION OF SPECIFICATION FOR HUMIDITY CALIBRATION
19970320	97-1	CLARIFICATION OF WHEN REFEREE RATINGS ARE REQUIRED
19970320	97-1	ADDITION OF DATA DICTIONARY AND REPORT FORMS TO THE PROCEDURE
19970320	97-1	TEST REPORTING DEADLINES
19970320	97-1	EXAMPLES FOR SEVERAL OF THE REPORT FORMS
19980101	98-1	FUEL SUPPLIER NAME CHANGE
19980101	98-1	FUEL SAMPLING REQUIREMENTS
19980101	98-1	REVISED ENGINE PARTS WARRANTY PROCEDURE & FORM
19980101	98-1	810-2 DISCRIMINATION RUNS RETURNED TO LTMS/CAL RUNS, CAL PD = 1YR
19980828	98-2	RATING WORKSHEET ADDED TO TEST REPORT AS FORM 4A
19981111	98-3	ADDED AREAS FOR CLEAN TO RATING SHEETS 5 & 5A
19990419	99-1	TEST STAND INSTRUMENTATION CALIBRATION REQUIREMENTS
19990419	99-1	COOLANT SYSTEM FLUSHING REQUIREMENTS
19990419	99-1	UPDATED INTAKE AIR FILTER 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
19990419	99-1	TIME ZONE FOR USE IN EOT REPORTING
19990419	99-1	EDITORIAL
20000101	00-1	810-X RUNS WILL OCCUR VOLUNTARILY ONCE PER YEAR

TIMELINE (continued):

Effective Date	Info Letter	
20020321	02-1	1K/1N DATA DICTIONARY AND REPORT FORMS (VERSION=20020107)
20030324		FIRST 811-2 TEST
20040223	04-1	1K/1N DATA DICTIONARY AND REPORT FORMS (VERSION=20040205) DD AND FORMS SEPARATED FROM THE STANDARD
20050321	04-1	VARIOUS 1N RELATED ITEMS AND EDITORIAL CHANGES
20050616		FIRST 1Y-3998 LINER TEST
20060617		FIRST SDTF2 FUEL TEST

RATING:

During this report period, no second referee ratings were requested. The table below summarizes the re-rates for this report period:

<b>Rating Re-rate Summary</b>	
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:

One 1K lab visits was completed. No significant deficiencies were noted.

INFORMATION LETTERS:

No information letters were issued this report period.

SUMMARY

- TGF, TLHC, BSOC, and EOTOC severity all remained within acceptable limits this period though TGF continues to show a slight long-term mild trend.
- Precision for all parameters remained within acceptable limits throughout this report period.

SDP/sdp/astm1007.doc/mem07-078.sdp.doc

c: J. L. Zalar  
F. M. Farber  
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<ftp://ftp.astmtmc.cmu.edu/docs/diesel/scote/semiannualreports/1k-10-2007.pdf>

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