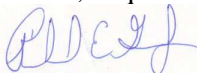




Test Monitoring Center

Carnegie Mellon University
6555 Penn Avenue, Pittsburgh, PA 15206, USA

<http://astmtmc.cmu.edu>
412-365-1000

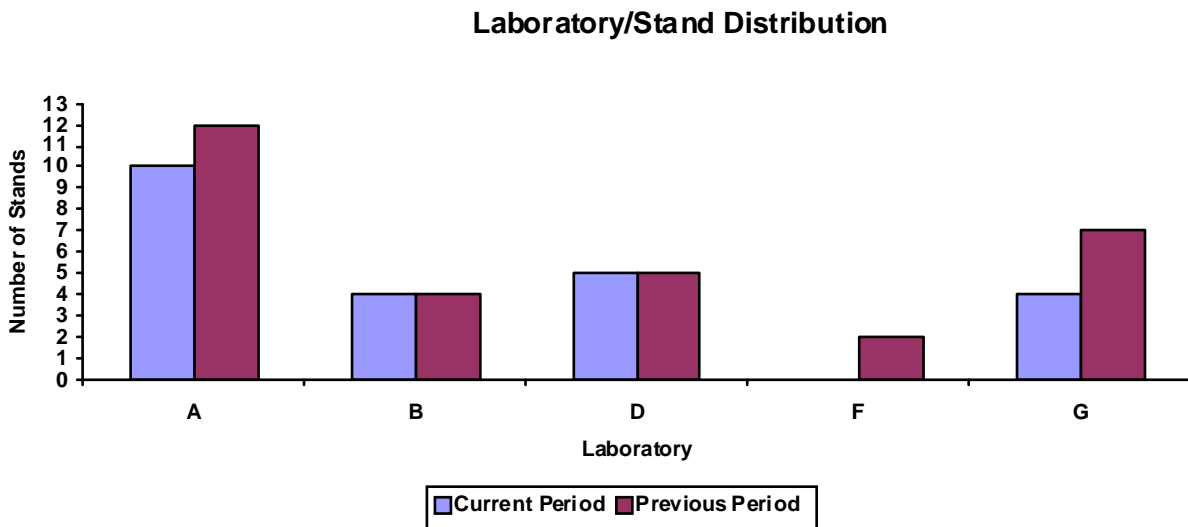
Memorandum: 10-043
 Date: October 25, 2010
 To: Charlie Leverett, Chairman, Sequence VI Surveillance Panel
 From: Richard E. Grundza 
 Subject: Sequence VID Semiannual Report: April 1, 2010 through September 30, 2010

The following is a summary of Sequence VID reference tests that were reported to the Test Monitoring Center during the period April 1, 2010 through September 30, 2010.

Lab/Stand Distribution

	Reporting Data	Calibrated as of September 30, 2010
Number of Laboratories:	4	4
Number of Test Stand/Engines:	23	11

The following chart shows the laboratory/stand distribution:

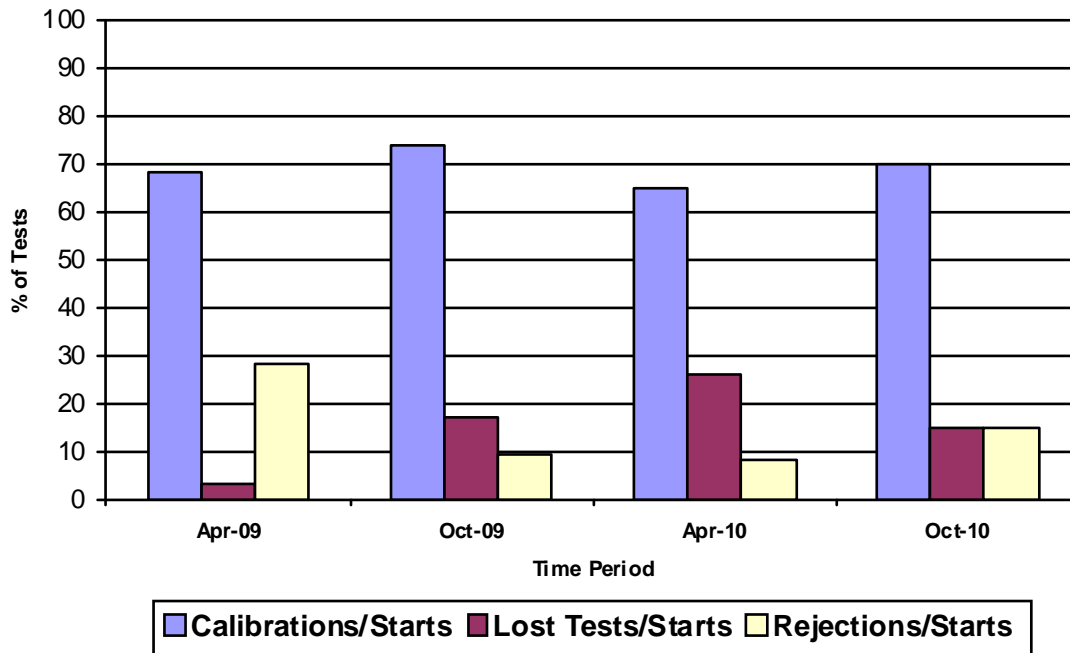


The following summarizes the status of the reference oil tests reported to the TMC:

Calibration Start Outcomes	TMC Validity Codes	No. of Tests
Operationally and Statistically Acceptable	AC	43
Operationally Valid Donated Test	AG	3
Operationally Valid, Statistically Unacceptable	OC	9
Operationally Invalid, Laboratory Judgment	LC	3
Aborted Calibration Attempt	XC	3
Engine Abandoned	MC	3
Total		64

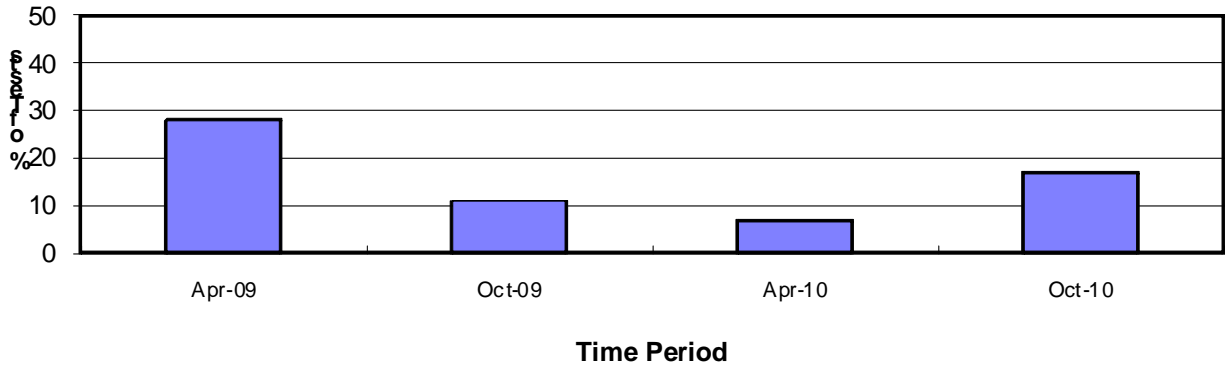
Calibrations per start, lost tests per start and rejection per start rates are summarized below:

Calibration Attempt Summary



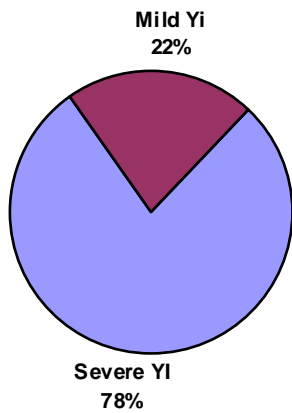
The calibration per start rate has increased since last period. The lost test per start rate has decreased since last period. The rejected test per start rate has increased this period. The decrease in lost tests is primarily due the much smaller number of engines that were abandoned.

Rejected Test Rate for Operationally Valid Tests

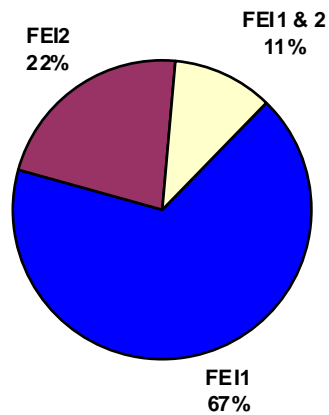


Nine tests failed acceptance criteria. The following charts summarize the reasons and breakdown by parameter for the failed tests:

Distribution of LTMS Stand Alarms



Distribution of Stand Alarms by Parameter



Of the nine tests, five failed for FEI1 in the severe direction, two failed FEI2 in the severe direction, one test failed FEI1 in the mild direction and one test failed both parameters in the mild direction.

There were no LTMS Deviations written this period. There has been one deviation written to date.

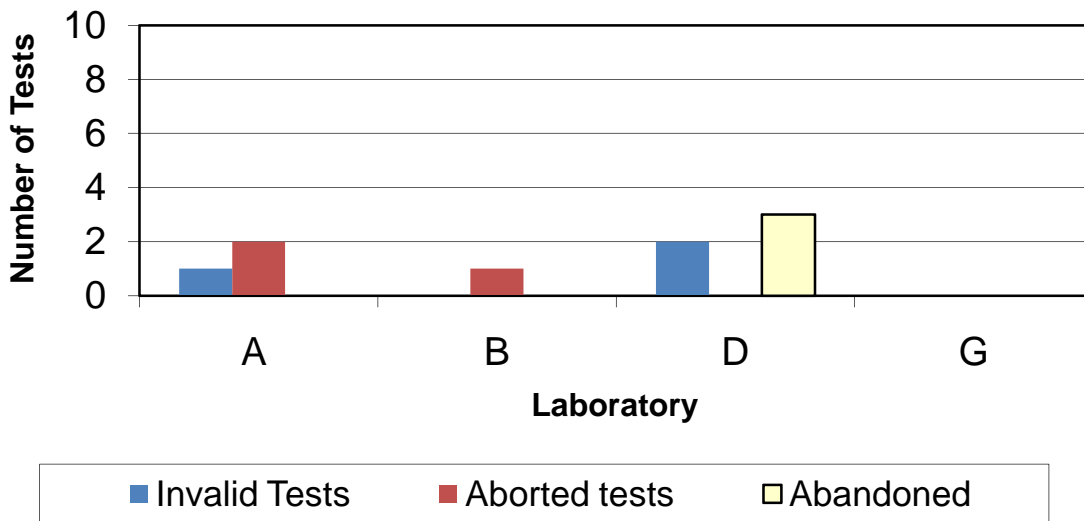
Lost Test Summary

Six tests were lost this period. The reasons for the lost tests are tabulated below:

Reasons for Lost Test(s)	Number
Load Cell Shift	1
Improper Thermocouple Insertion Depth	1
Broken Exhaust Manifold	1
Fuel Leak	1
Fuel Injector Failure	1
Missed Samples for EOT Viscosity	1

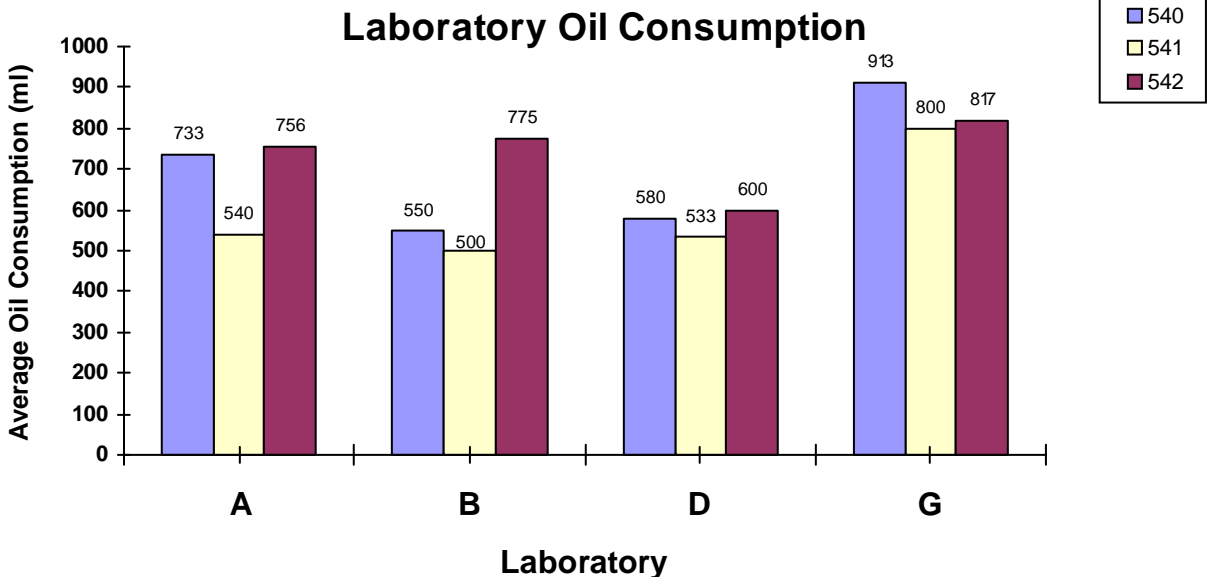
Aborts and operationally invalid tests, reported by laboratory, are summarized in the following chart:

Lost Test Distribution



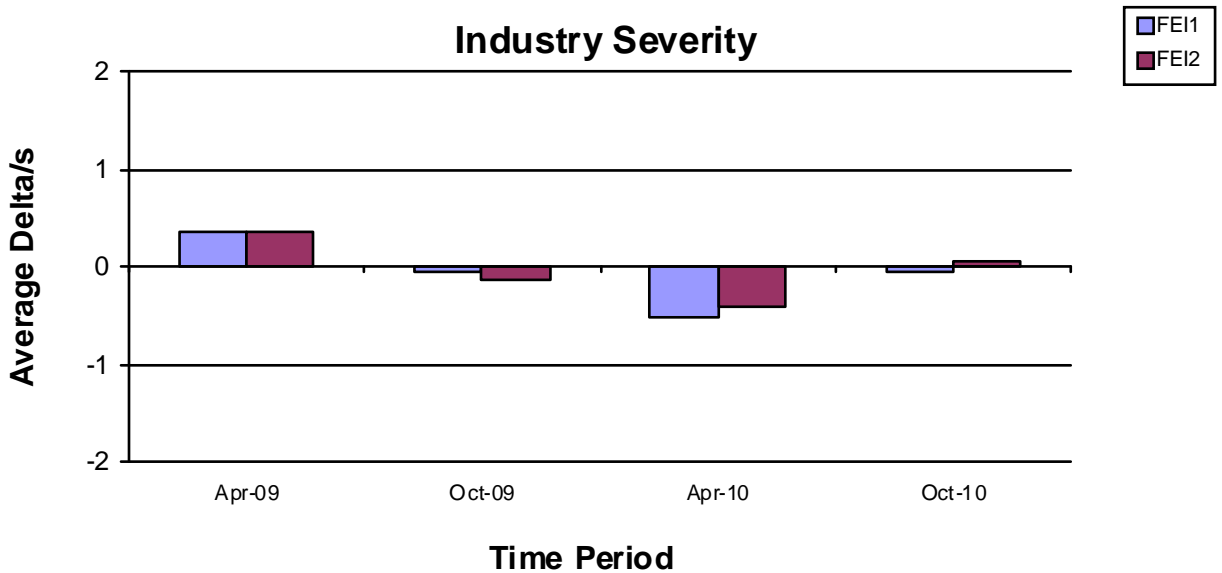
Tests listed as engine abandoned were calibration attempts on engines which did not calibrate and were removed from the LTMS without ever having been calibrated. A total of three results from one lab, representing one engine were removed this period.

The average oil consumption values by oil and laboratory are depicted graphically below

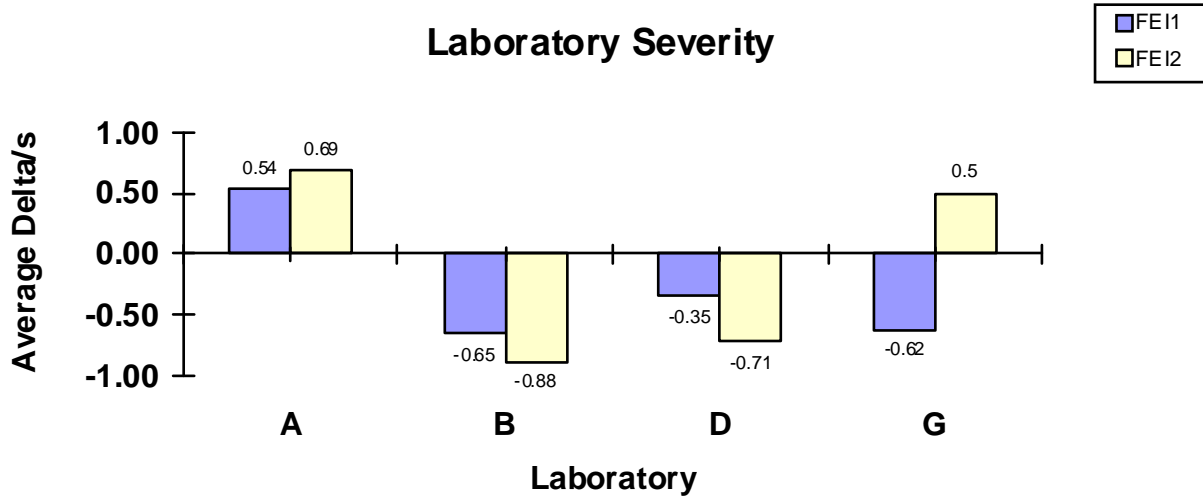


Severity and Precision Analysis

The industry mean Δ/s for FEI1 and FEI2, for this report period is -0.05 and 0.06, respectively. Both parameters were on or near target for this report period.

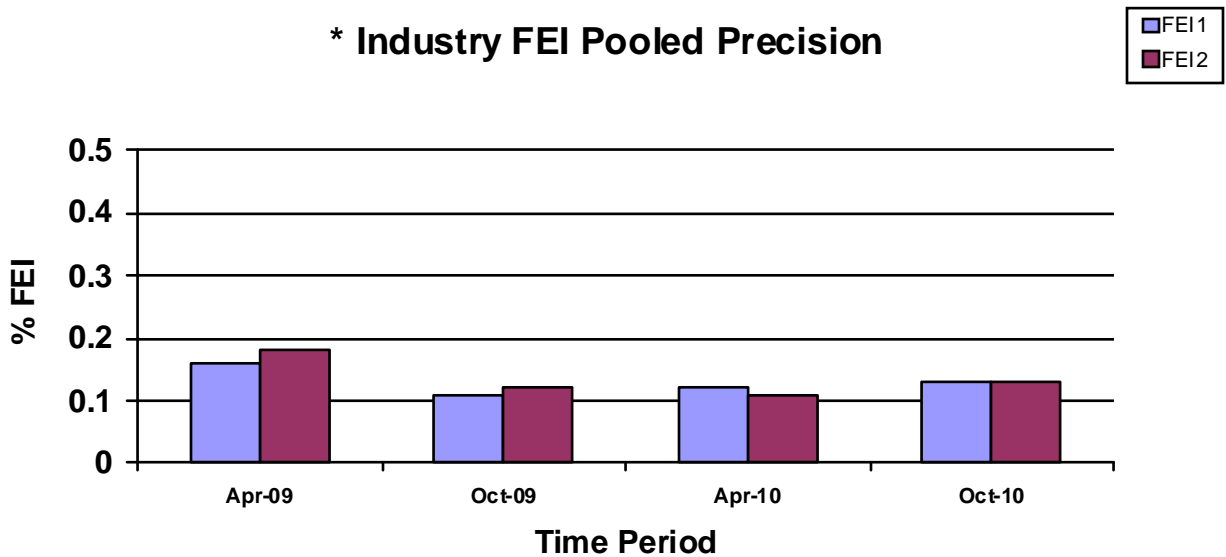


Shown below is a summary of the average FEI Δ/s for all laboratories reporting data this report period.



Precision estimates for FEI1 and FEI2 are 0.13 and 0.13. Precision for FEI1 and FEI2 has changed little when compared to the previous period.

* Industry FEI Pooled Precision



*Precision estimates are calculated by pooling oil and stand/engine combination.

FEI1

Figure 1 shows the industry control charts. With the exception of two severe warning and two mild action alarms, severity was in control during the report period. Precision charts show a series of warning and action alarms early in the period with the precision chart in control for most of the period. With an average delta/s of -0.05, severity was on or near target for the period.

FEI2

Figure 2 shows the industry control charts. Severity began the period in control, but experienced two periods of warning and action alarms, before ending the period in control. The precision chart began the period in control, but has been in warning alarm since about midway through the period. The summation delta/s plot, with an average delta/s of 0.06, shows industry trending on or near target.

Lab Visits

Four lab visits were conducted this period. During one visit, discrepancies were noted with the fuel to micromotion thermocouple location and the location of the exhaust pressure and gas probes. Discrepancies identified during a second visit included an incorrect type of solenoid valve for valves 150A, 150C, 150D and 150E and incorrect insertion depth on the engine coolant outlet thermocouple. No discrepancies were noted during the other visits.

Information Letters

Information Letters 10-2, 10-3 and 10-4 were issued this period. The subject of these information letters can be found in the Industry Timeline, Figure 3.

Reference Oils

Oil	TMC Inventory, in gallons	TMC Inventory, in tests (5 gal/test)	Laboratory Inventory, in tests	Estimated life
540	540	108	12	2+ years
541	141	28	7	<2 years
542	590	118	13	2+ years

Three donated tests were reported during this period. These tests were run to generate targets for reference oil 1010.

REG/reg

Attachments

c: F. M. Farber, TMC
 J. A. Clark, TMC
 Sequence VID Surveillance Panel
<ftp://astmtmc.cmu.edu/docs/gas/sequenceiv/semiannualreports/VID-10-2010.pdf>

Distribution: Electronic Mail

List of Figures

- Figure 1 graphically presents the Industry control charts for FEI1 and also the CUSUM delta/s plot (by count in completion date order) of FEI1 for operationally valid tests.
- Figure 2 graphically presents Industry control charts for FEI2 and also the CUSUM delta/s plot (by count in completion date order) of FEI2 for operationally valid tests.
- Figure 3 is the Sequence VID Timeline, created to track changes in test hardware and operations.

Figure 1
SEQUENCE VID INDUSTRY OPERATIONALLY VALID DATA

FBI FINAL RESULT PHASE I

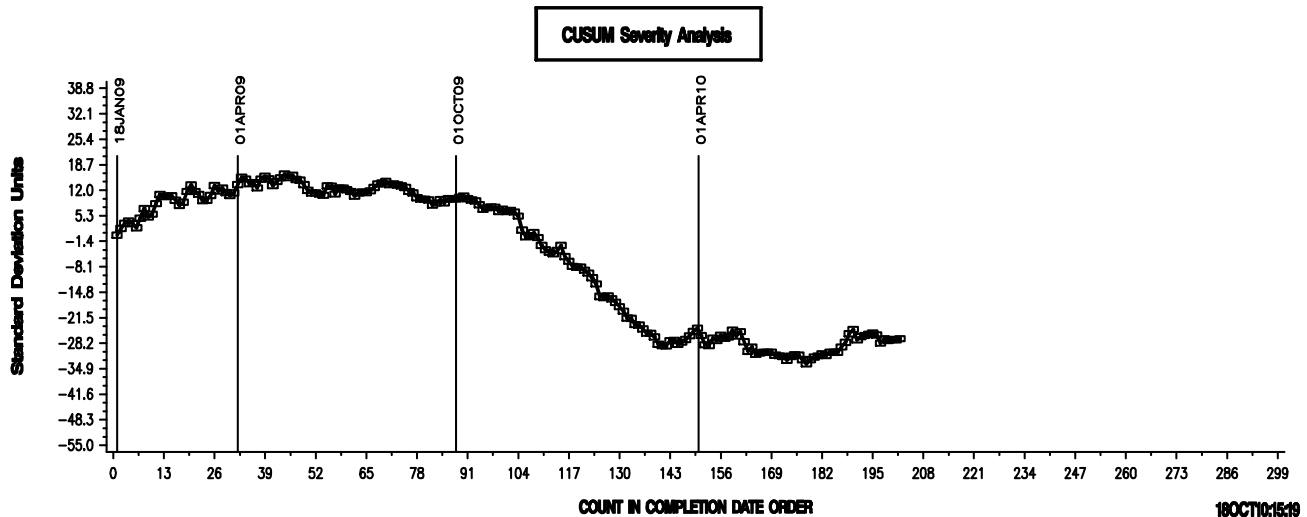
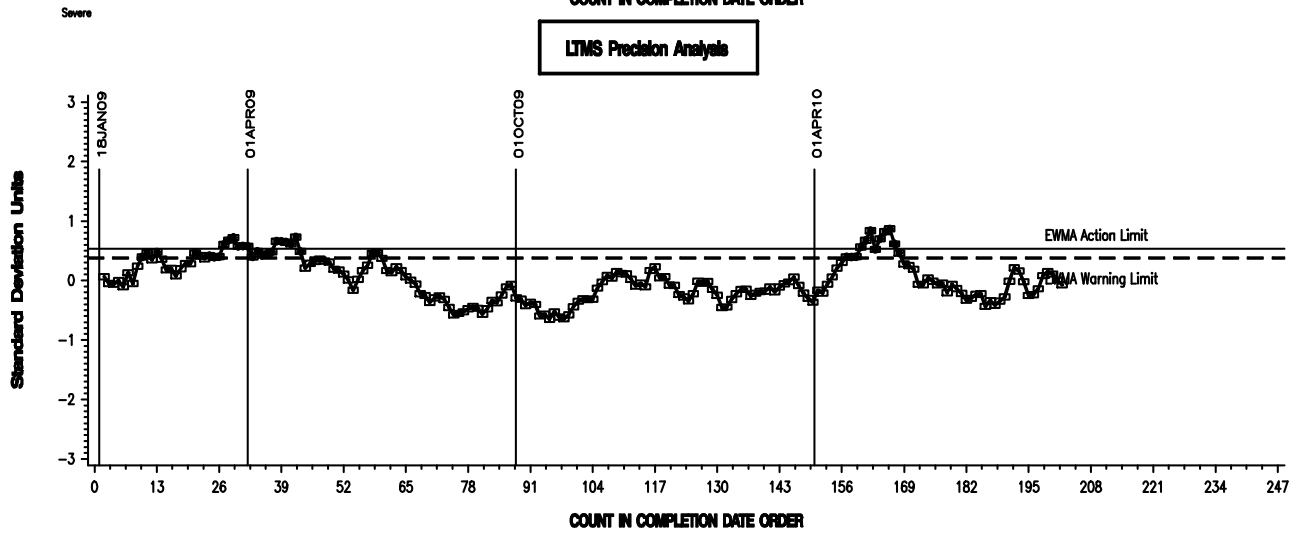
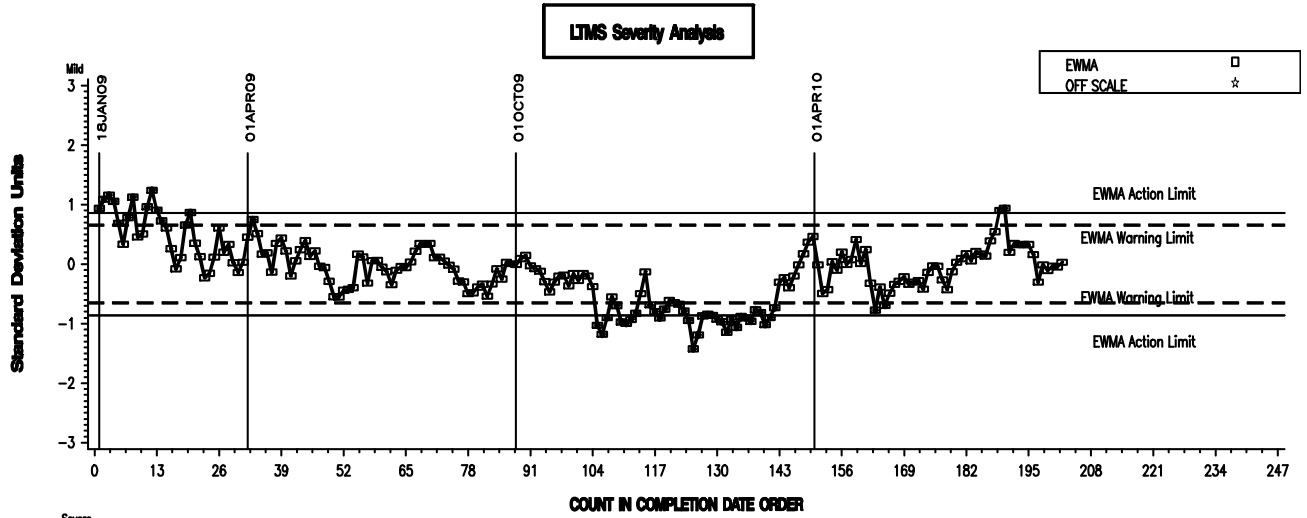


Figure 2

SEQUENCE VID INDUSTRY OPERATIONALLY VALID DATA

FEI FINAL RESULT PHASE II

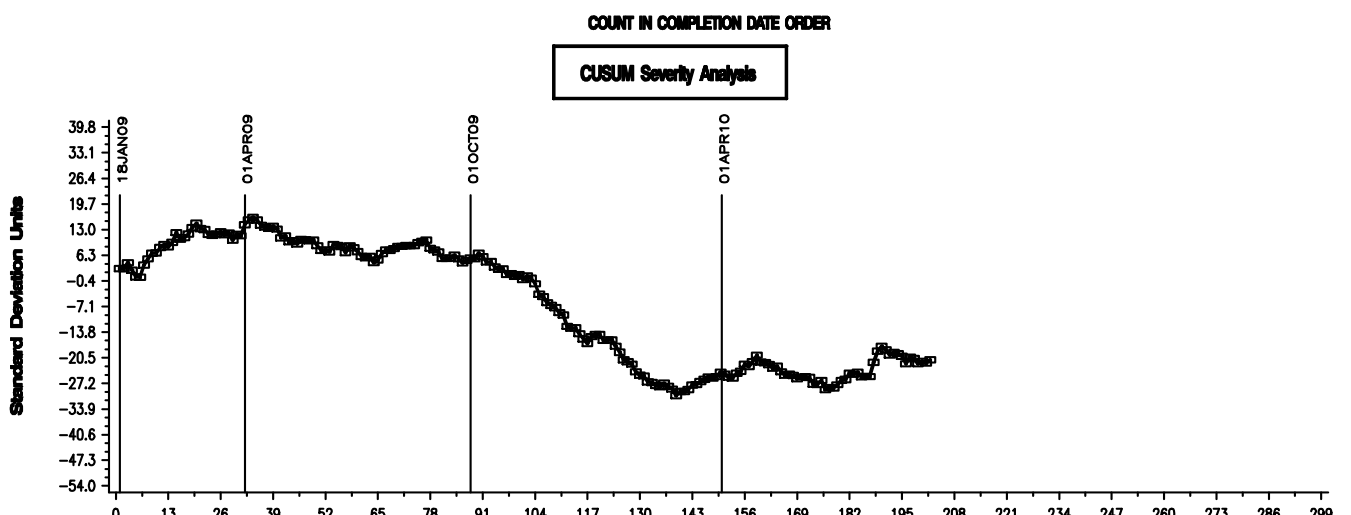
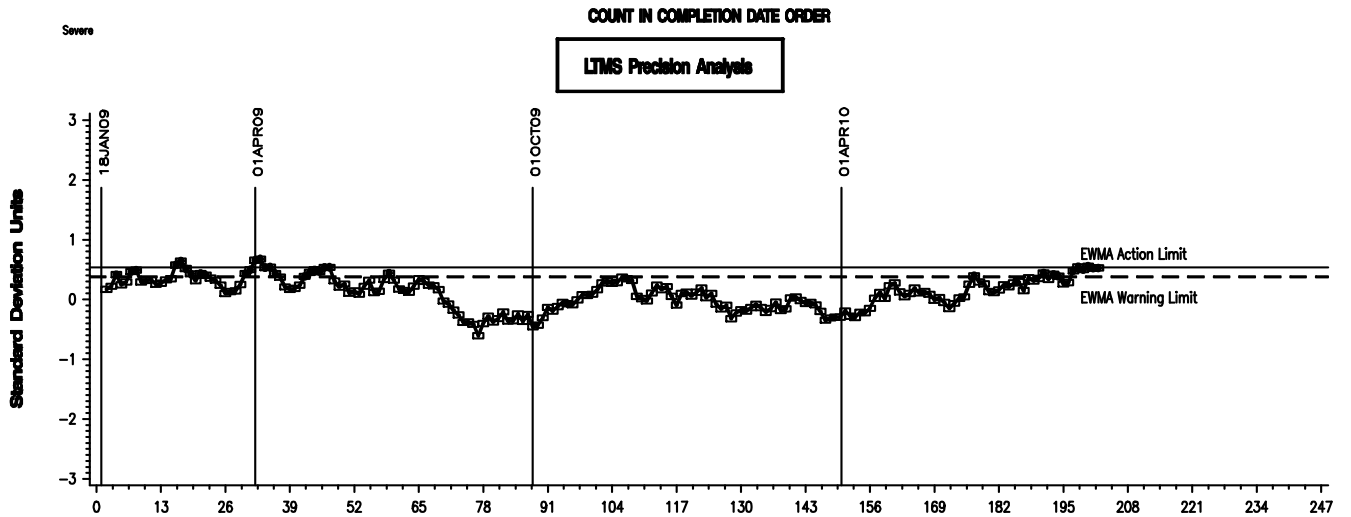
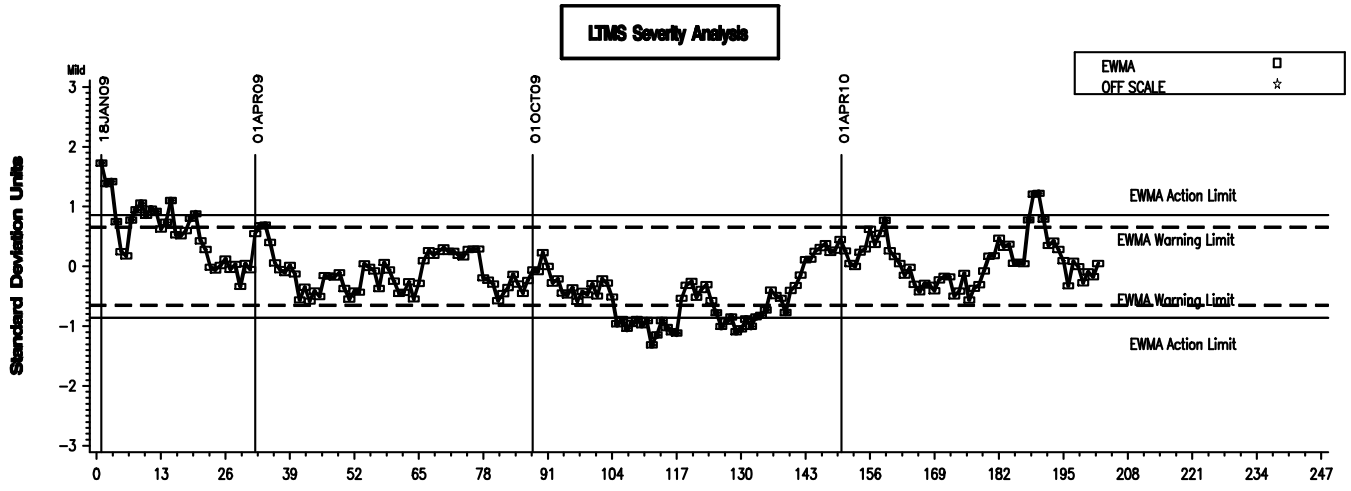


Figure 3 - Sequence VID Timeline		
Date	Topic	Information Letter
20090112	START OF MATRIX TESTING	
20090412	COMPLETION OF MATRIX TESTING	
20090422	SURVEILLANCE PANEL RECOMMENDS TEST ACCEPTABLE TO CLASSIFICATION PANEL, REFERENCE OIL TARGETS ACCEPTED.	
20090513	SEQUENCE VID TEST LTMS ESTABLISHED BY SURVEILLANCE PANEL	
20090527	REVISED STAND ENGINE CALIBRATION REQUIREMENTS	09-1
20090527	ADDED ENGINE HOUR ADJUSTMENT	09-1
20090527	ADDED PRECISION STATEMENT TO TEST PROCEDURE	09-1
20090603	CALIBRATION STATUS GRANTED TO STAND/ENGINE COMBINATIONS	
20091203	UPDATED STANDARD DEVIATIONS FOR CHARTING AND SA'S	
20091214	ADJUSTED CALIBRATION PERIODS	09-2
20091214	CORRECTED/REVISED VALVE IDENTIFICATION	09-2
20091214	ADDRESSED HOW TO DOCUMENT FUEL BATCH WHEN MORE THAN ONE BATCH IS IN THE TANK USED FOR TESTING	09-2
20100119	INCREASE ALLOWABLE DOWNTIME TO 18 HOURS	10-1
20100521	CHANGE IN COOLANT FLOW PRESSURE TRANSDUCER	10-2
20100521	ALLOW USE OF SMALL (<35 L/s) FANS TO COOL KNOCK AND O ₂ SENSORS	10-2
20100521	ADD MANIFOLD ABSOLUTE PRESSURE (MAP) to BREAK IN TRACES	10-2
20100521	UPDATED LOAD CELL SUPPLIER INFO In APPENDIX X1	10-2
20100720	ADJUSTED CALIBRATION PERIODS	10-3
20100720	CORRECTED/REVISED VALVE IDENTIFICATION FOR SOLENOID VALVES IN OIL SYSTEM	10-3
20100818	REVISED LOCATION OF FUEL TO FUEL RAIL THERMOCOUPLE	10-4
20100818	ADDED TEMPERATURE DRIFT SPEC FOR LOAD CELL POWER SUPPLY	10-4
20100818	CORRECTED AMOUNT OF BL OIL USED FOR A TYPICAL TEST	10-4