




Test Monitoring Center

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

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

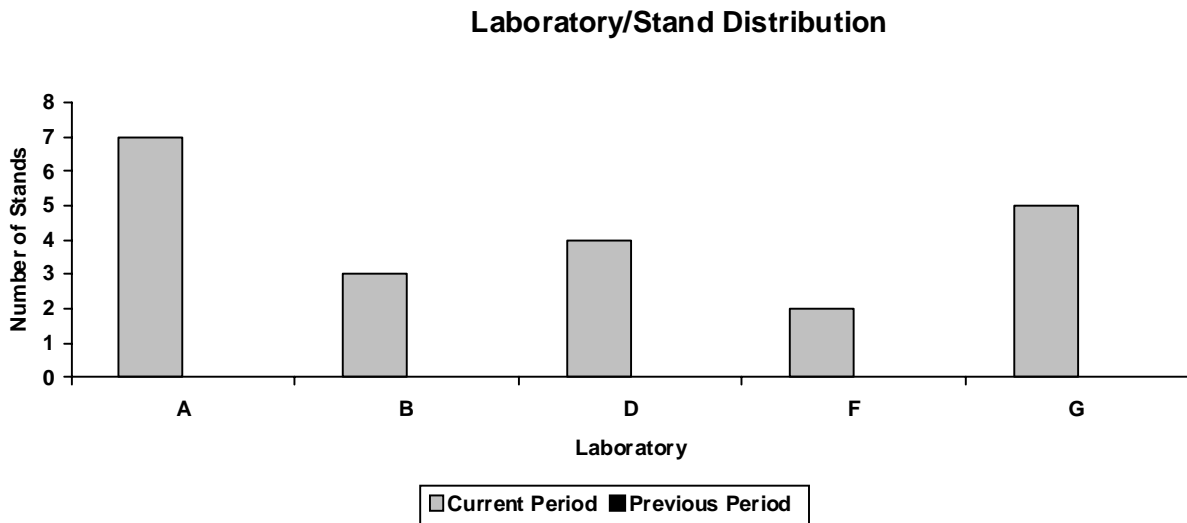
Memorandum: 09-048
Date: October 21, 2009
To: Charlie Leverett, Chairman, Sequence VI Surveillance Panel
From: Richard E. Grundza 
Subject: Sequence VID Semiannual Report: April 1, 2009 through September 30, 2009

The following is a summary of Sequence VID reference tests that were reported to the Test Monitoring Center during the period April 1, 2009 through September 30, 2009. Since this is the first semiannual report, the previous period data is the matrix data and is presented for comparison purposes.

Lab/Stand Distribution

	Reporting Data	Calibrated as of September 30, 2009
Number of Laboratories:	5	4
Number of Test Stand/Engines:	21	14

The following chart shows the laboratory/stand distribution:

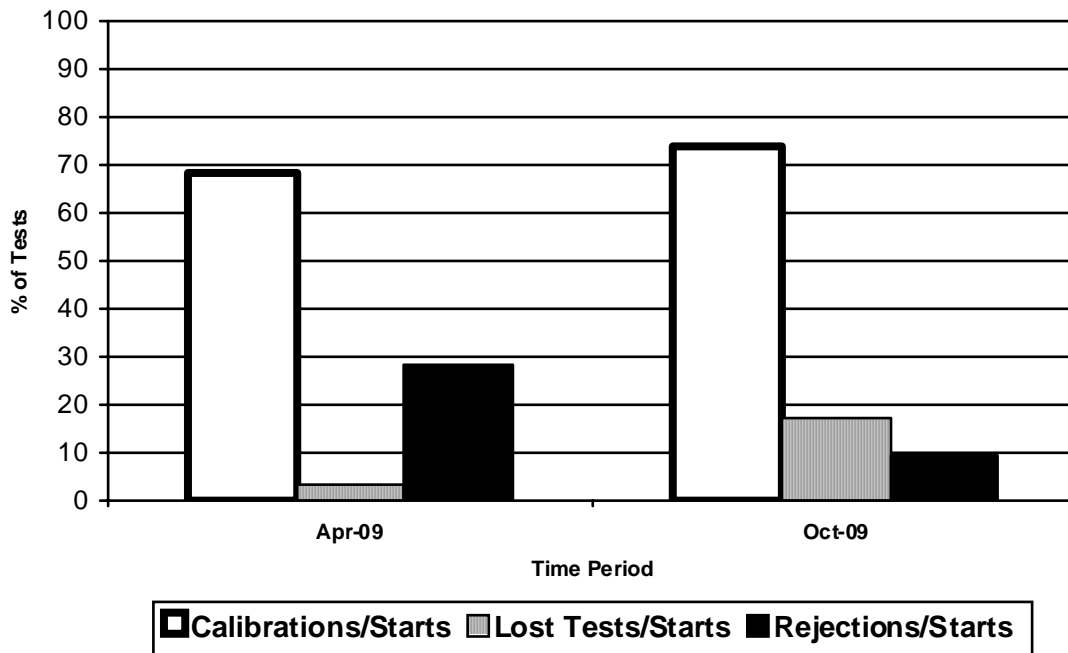


The following summarizes the status of the reference oil tests reported to the TMC:

Calibration Start Outcomes	TMC Validity Codes	No. of Tests
Operationally and Statistically Acceptable	AC	51
Operationally Valid, Statistically Unacceptable	OC	6
Operationally Invalid, Laboratory Judgement	LC	6
Aborted Calibration Attempt	XC	1
Engine Abandoned	MC	5
Total		69

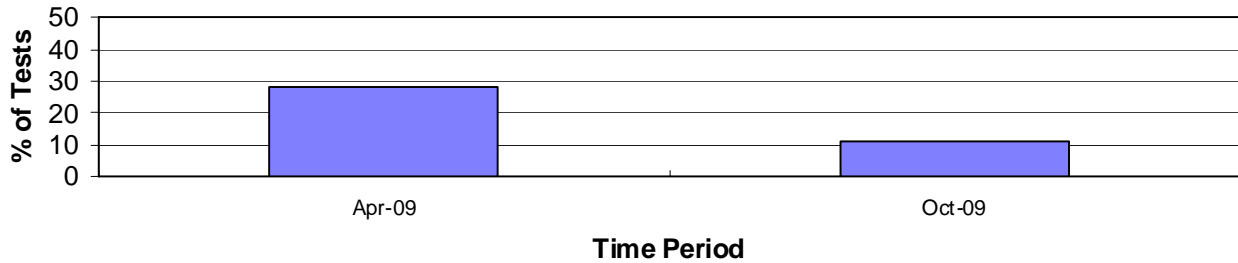
Calibrations per start, lost tests per start and rejection per start rates are summarized below:

Calibration Attempt Summary



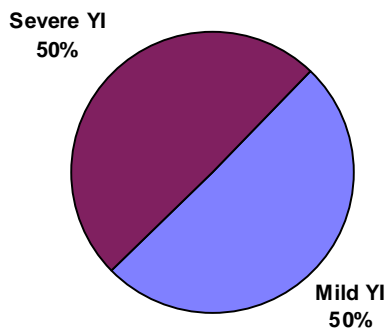
The calibration per start rate has increased since last period. The lost test per start rate has increased since last period. The rejected test per start rate has decreased this period.

Rejected Test Rate for Operationally Valid Tests

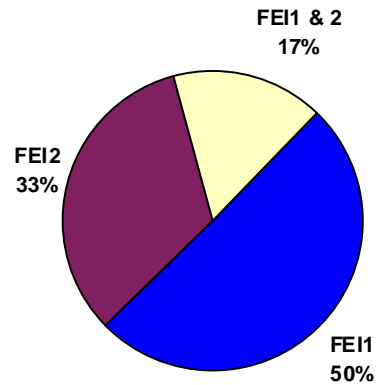


Six tests failed acceptance criteria. The following charts summarize the reasons and breakdown by parameter for the failed tests:

Distribution of LTMS Stand Alarms



Distribution of Stand Alarms by Parameter



Of the six tests, two failed for FEI1 in the mild direction, two failed FEI2 in the severe direction. One test failed FEI1 in the severe direction and the remaining test failed both parameters in the mild direction.

There were no LTMS Deviations written this period

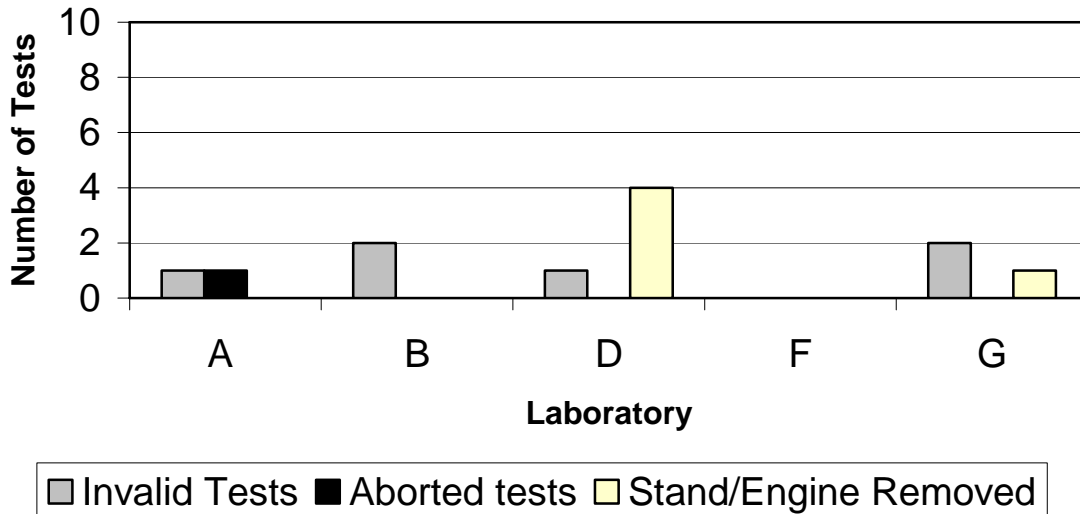
Lost Test Summary

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

Reasons for Lost Test(s)	Number
Excessive shutdowns	1
Flushed the wrong oil into the engine	1
Exhaust backpressure out of spec, BL before 2, stage 1 and 2	1
No voltage to ECM and coils	1
Phase II aging coolant temperature out of spec.	1
BL before 1 versus BL before 2 >0.4 (procedure limit), BL before 3 not run.	1
Fuel leak	1

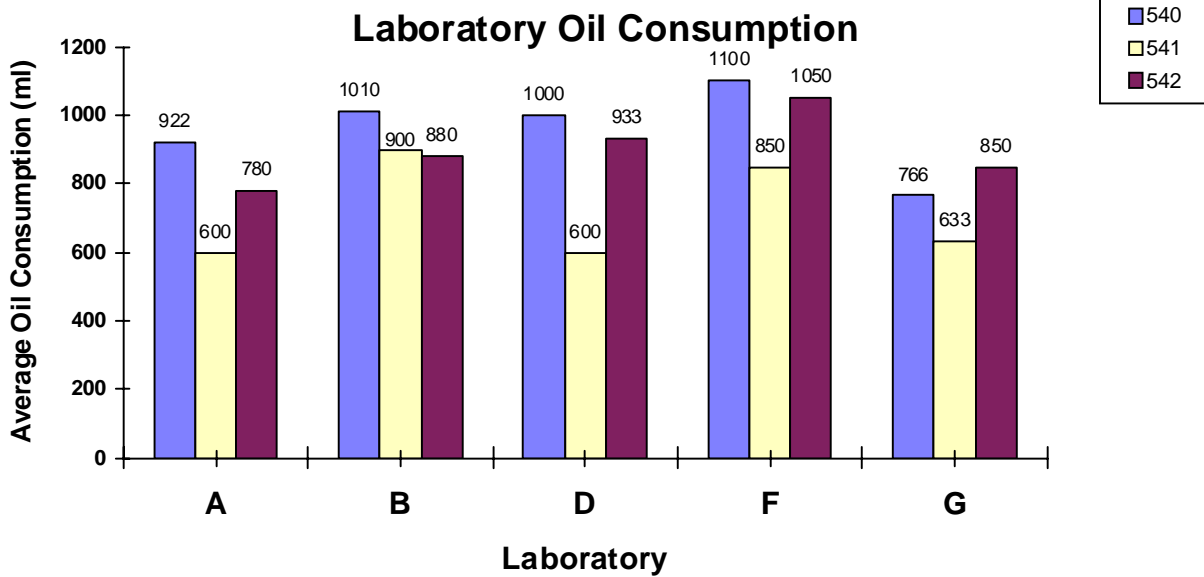
Aborts and operationally invalid tests, reported by laboratory, are summarized in the following chart:

Lost Test Distribution



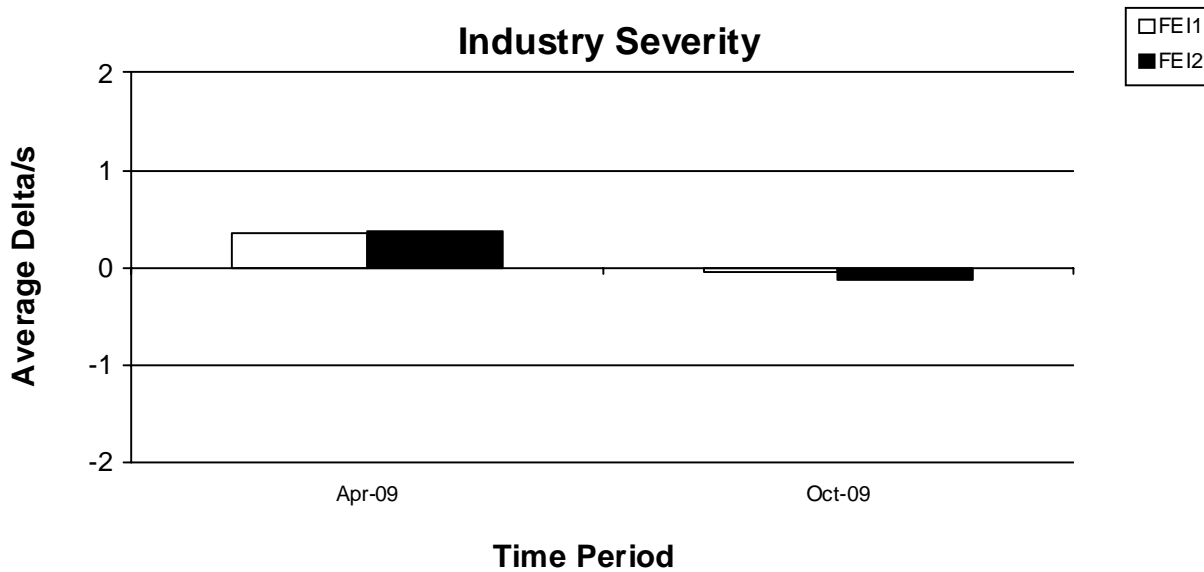
Tests listed as engine abandoned were calibration attempts on engines which did not calibrate and were removed from the LTMS without ever having been calibrated. A total of five results from two labs, representing two engines were removed this period.

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

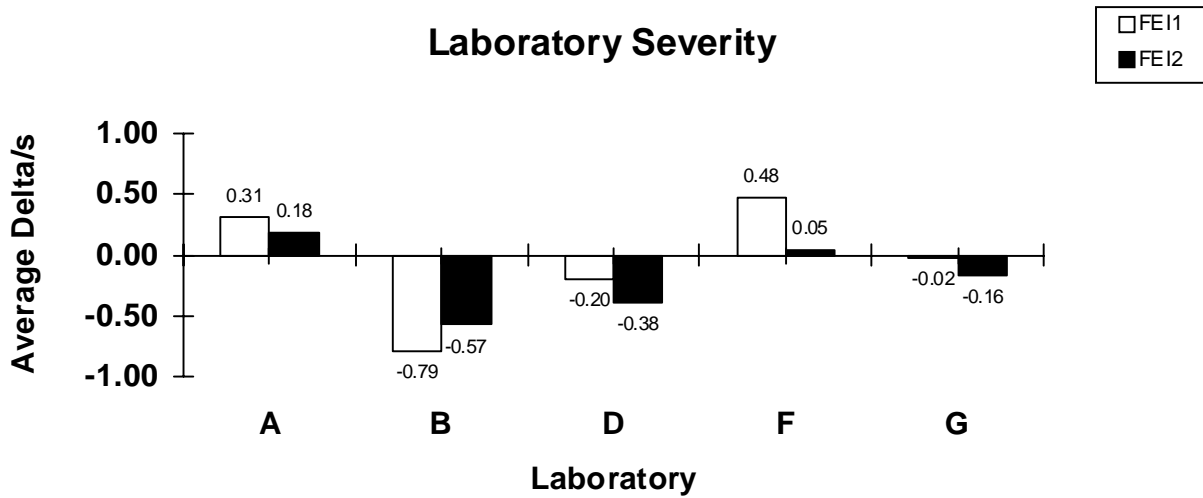


Severity and Precision Analysis

The industry mean Δ/s for FEI1 and FEI2, for this report period is -0.044 and -0.127, respectively. FEI1 was on or near target for the period, while FEI2 trended slightly severe for the period.

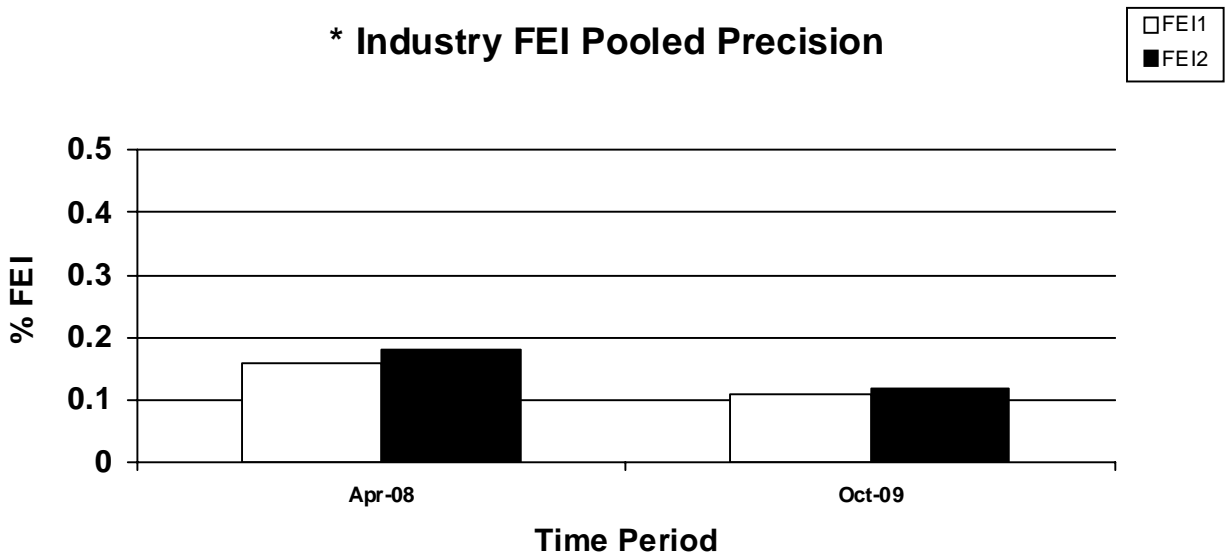


Shown below is a summary of the average FEI Δ/s for all laboratories reporting data this report period.



Precision estimates for FEI1 and FEI2 are 0.11 and 0.12. 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. Severity, with the exception of a warning alarm at the beginning of the period, was in control for the period. Precision began the period in warning alarm, but has been in control for most of the period. The summation delta/s plot shows industry severity on or near target.

FEI2

Figure 2 shows the industry control charts. Severity, with the exception of a few warning alarms at the beginning of the period, was in control for the period. Precision began the period in warning alarm, but has been in control for most of the period. The summation delta/s plot shows industry trending slightly severe.

Lab Visits

Three lab visits were conducted this period. No discrepancies were identified during two of these visits. During a third visit, incorrect engine coolant inlet thermocouple insertion depth, wrong oil heater thermocouple size and unapproved coolant pressure transducer were noted.

Information Letters

Information Letters 09-1 was issued this period. The subject of this information letter can be found in the Industry Timeline, Figure 3.

Reference Oils

Oil	TMC Inventory, in gallons	TMC Inventory, in tests (4gal/test)	Laboratory Inventory, in tests	Estimated life
540	865	133	5	3+ years
541	371	74	8	3+ years
542	865	133	12	3+ years

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-10-2009.pdf>

Distribution: Electronic Mail

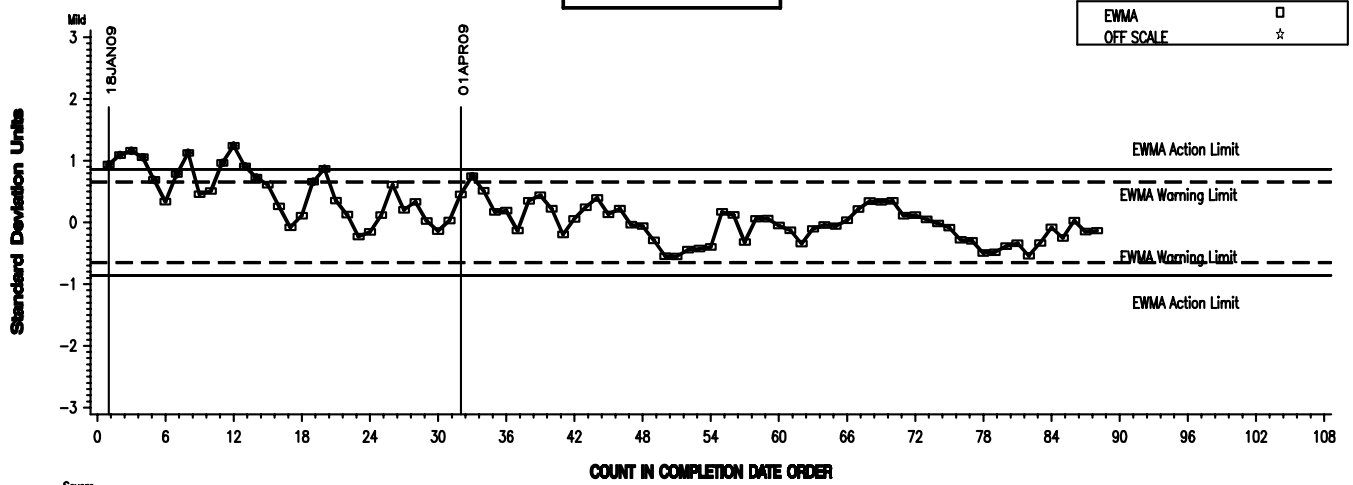
List of Figures

- 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.

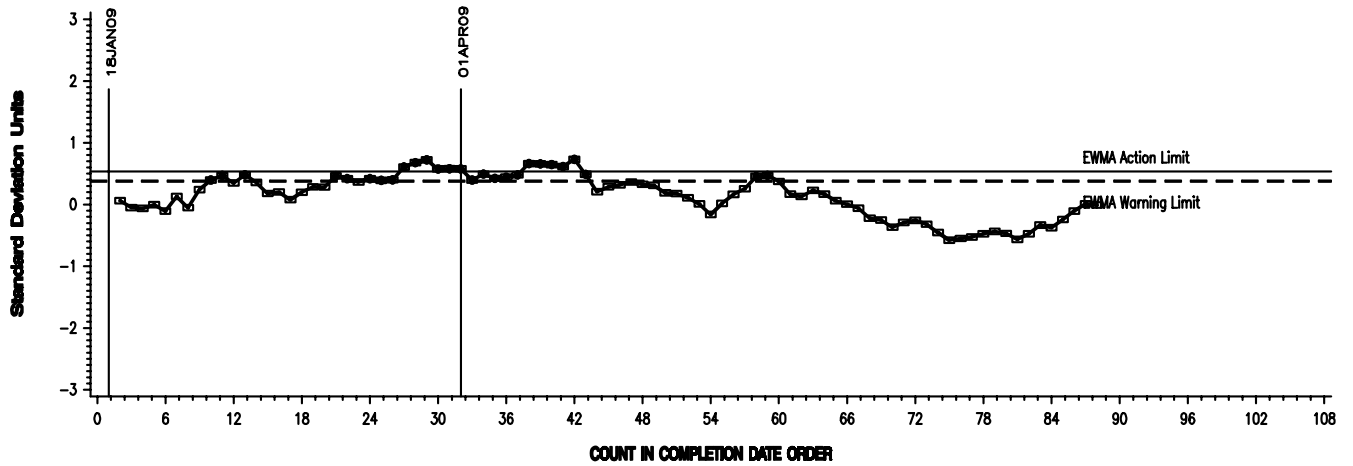
Figure 1
SEQUENCE VID INDUSTRY OPERATIONALLY VALID DATA

FEI FINAL RESULT PHASE I

LTMS Severity Analysis



LTMS Precision Analysis



CUSUM Severity Analysis

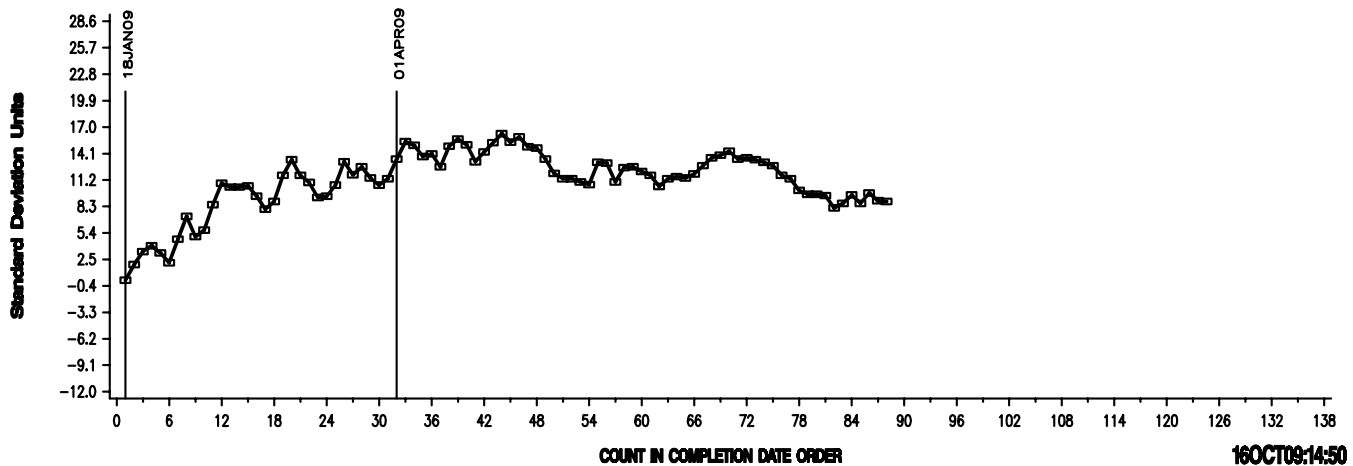
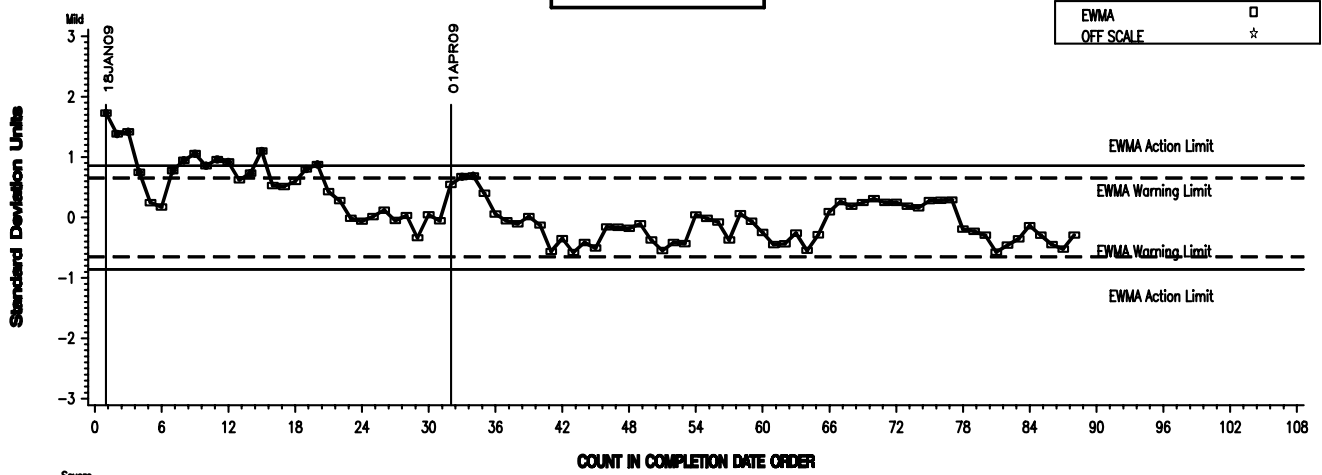


Figure 2

SEQUENCE VID INDUSTRY OPERATIONALLY VALID DATA

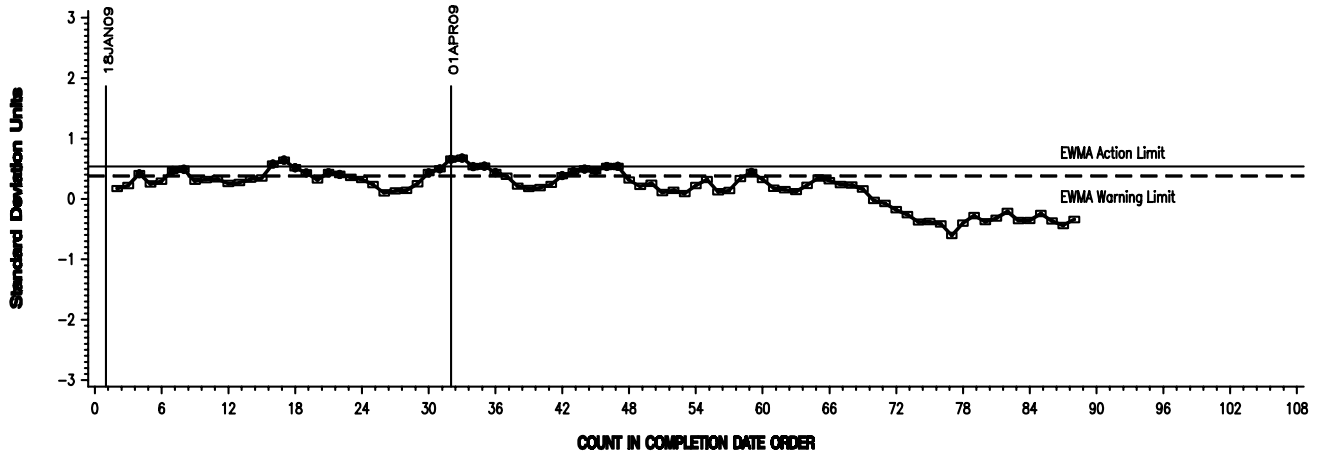
FEJ FINAL RESULT PHASE II

LTMS Severity Analysis



COUNT IN COMPLETION DATE ORDER

LTMS Precision Analysis



COUNT IN COMPLETION DATE ORDER

CUSUM Severity Analysis

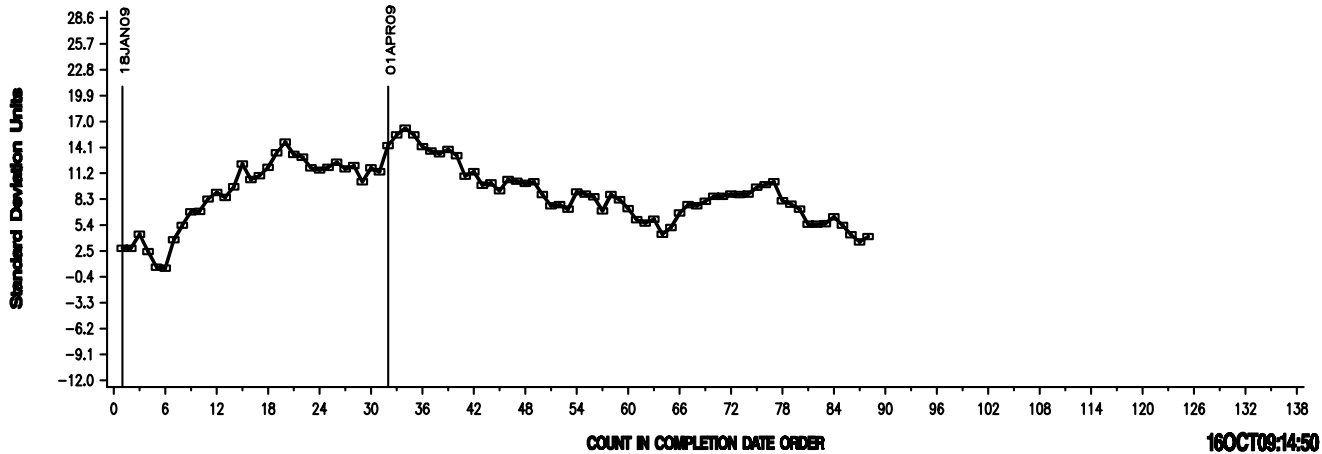


Figure 3 - Sequence VID Timeline		
Date	Topic	Information Letter
20090112	START OF MATRIX TESTING	
20090412	COMPLETION OF MATRIX TESTING	
20090422	SURVEILLANCE PANEL RECOMMENDS TEST ACCEPTABLE TO CLASSIFICATION PANEL, REFERENCE OIL TARGETS ACCEPTED.	
20090513	SEQUENCE VID TEST LTMS ESTABLISHED BY SURVEILLANCE 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	