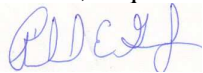




Test Monitoring Center

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

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

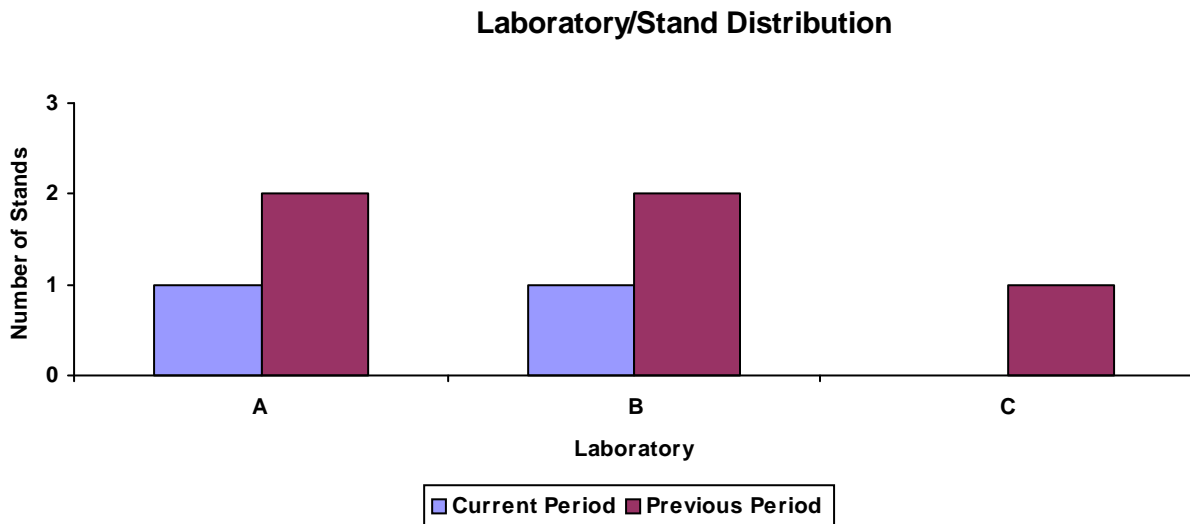
Memorandum: 10-006
Date: April 7, 2010
To: Charlie Leverett, Chairman, Sequence VI Surveillance Panel
From: Richard E. Grundza 
Subject: Sequence VIB Semiannual Report: October 1, 2009 through March 31, 2010

The following is a summary of Sequence VIB reference tests that were reported to the Test Monitoring Center during the period October 1, 2009 through March 31, 2010.

Lab/Stand Distribution

	Reporting Data	Calibrated as of March 31, 2010
Number of Laboratories:	2	1
Number of Test Stand/Engines:	2	1

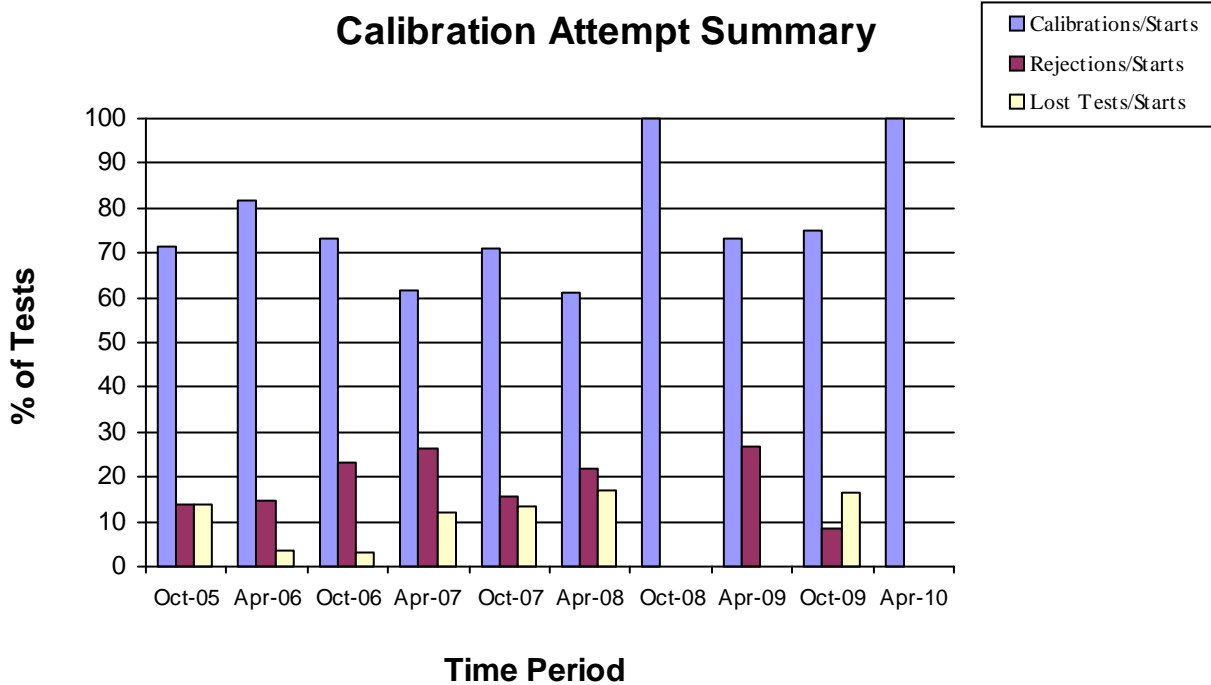
The following chart shows the laboratory/stand distribution:



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	4
Total		4

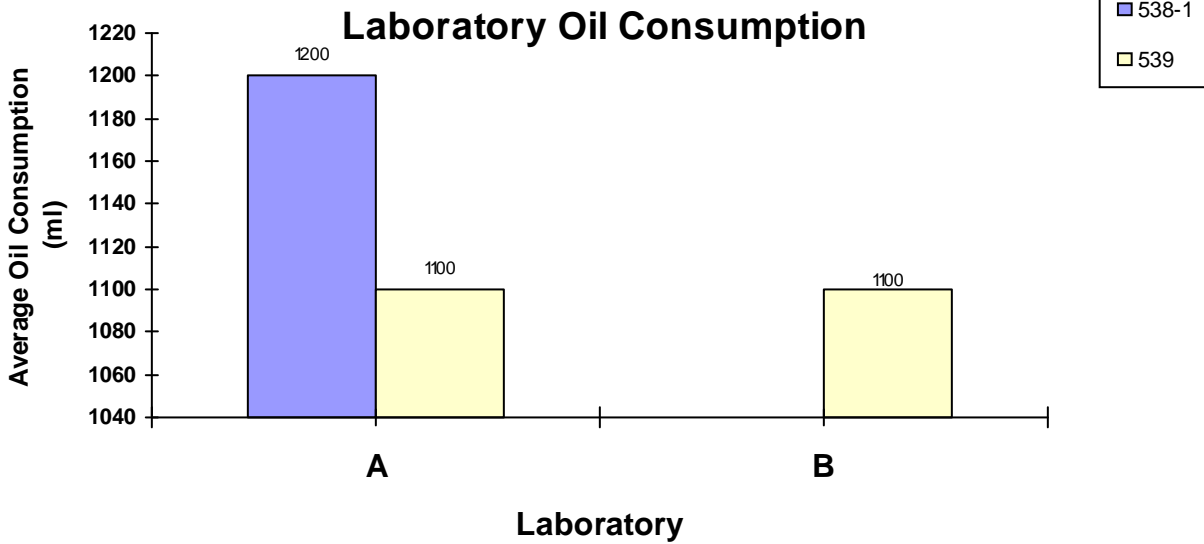
Calibrations per start, lost tests per start and rejection per start rates are summarized below:



The calibration per start rate was 100% this period, with no rejected or lost tests.

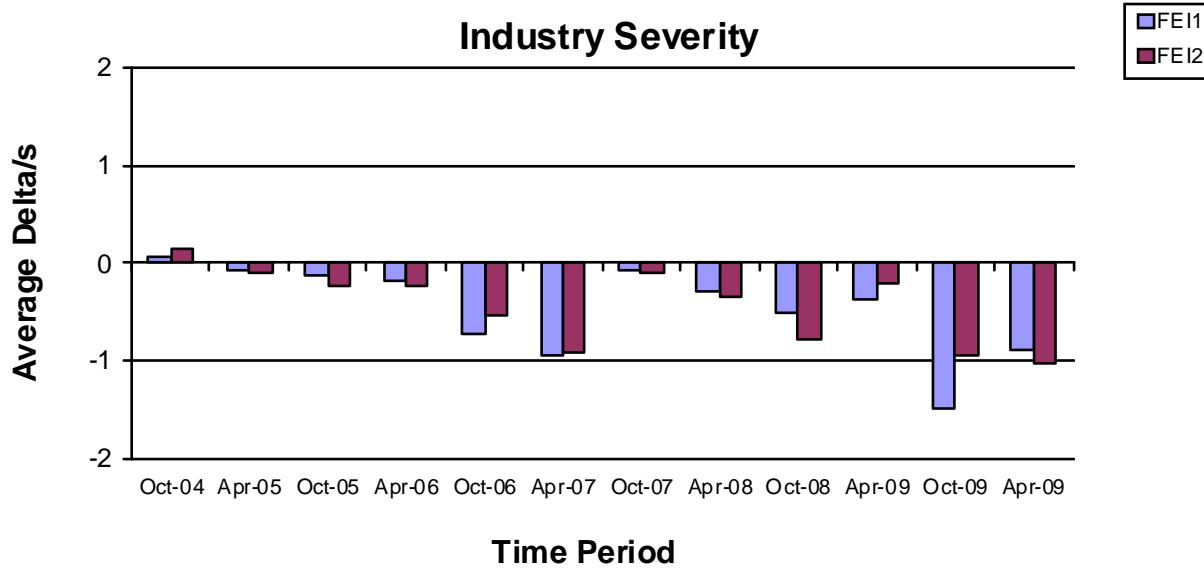
There were no LTMS Deviations generated this report period. No LTMS deviations have been generated to date.

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

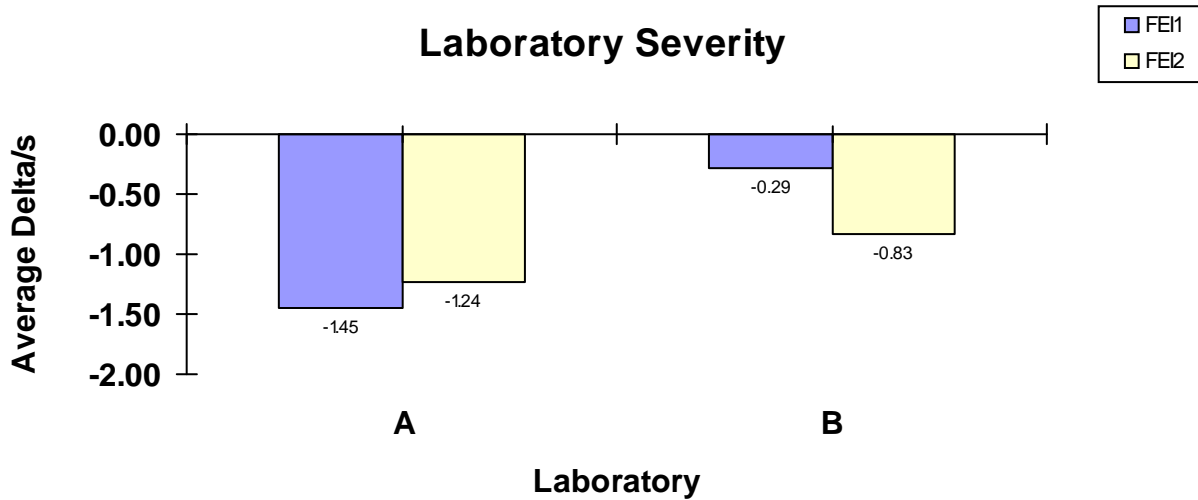


Severity and Precision Analysis

The industry mean Δ/s for FEI1 and FEI2, for this report period is -0.88 and -1.04, respectively. Both FEI1 and FEI2 trended severe for the period.

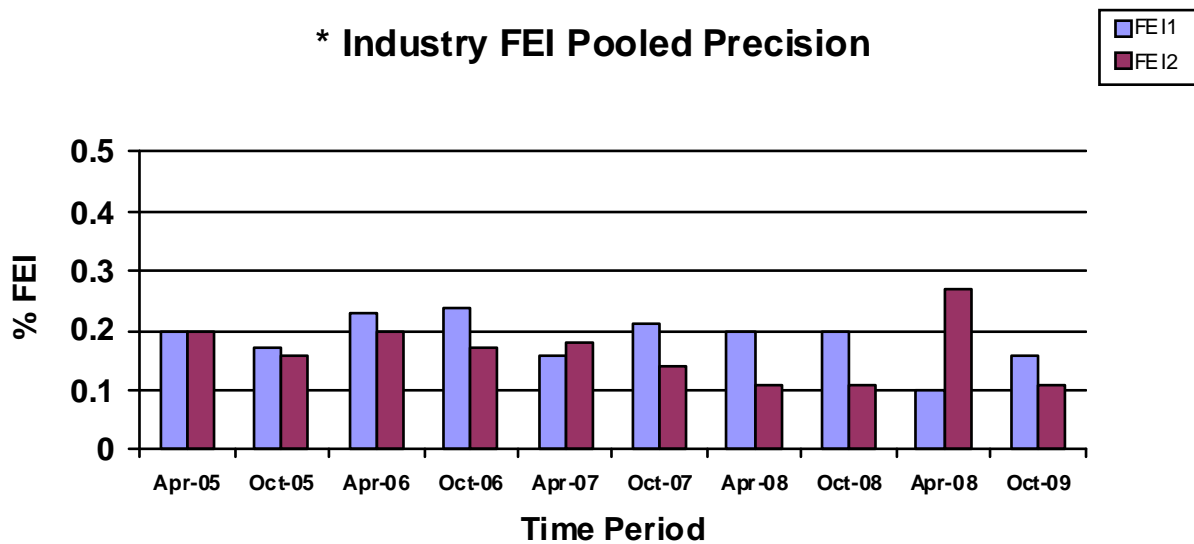


Shown below is a summary of the average FEI Δ/s for all laboratories reporting data this report period.



Due to limited data, precision estimates for FEI1 and FEI2 were not generated for this period. Precision estimates for the previous period are 0.11 and 0.12.

* Industry FEI Pooled Precision



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

FEI1

Figure 1 shows the industry control charts for the last twenty tests. Severity control chart has been in alarm the entire period. Precision has been in control for the period. The summation delta/s plot shows the severe trend which began last period continuing through the current period. It should be noted that both engines reporting data have reported severe results. Figure 2 charts all industry results.

FEI2

Figure 3 shows the industry control charts for the last twenty tests. Severity has been alarm for the period. Precision has been in control for the period. The summation delta/s plot shows industry trending severe.

Like FEI1, both engines reporting data have been severe and the severe trend is a continuation of the trend which began during the previous period. Figure 4 charts all industry results.

Lab Visits

No Sequence VIB visits were conducted this period.

Information Letters

No information letters were issued this period.

Reference Oils

LAB	538	538-1	539
A	0	2	2
B	0	2	1
C	0	0	2
D	0	3	2
F	0	2	1
G	0	1	1
TMC	0	70	153

REG/reg

Attachments

c: F. M. Farber, TMC
J. A. Clark, TMC
Sequence VID Surveillance Panel
<ftp://astmtmc.cmu.edu/docs/gas/sequenceiv/semiannualreports/VIB-04-2010.pdf>

Distribution: Electronic Mail

Sequence VIB Semiannual Report
List of Attachments

- Table 1 is the Sequence VIB Timeline.
- Figure 1 graphically presents the Industry control charts for FEI1 for the last 20 test results.
- Figure 2 graphically presents the Industry control charts for FEI1.
- Figure 3 graphically presents the Industry control charts for FEI2 for the last 20 test results.
- Figure 4 graphically presents the Industry control charts for FEI2.

Sequence VIB Timeline

Date	Item Changed	Information Letter
19990809	Reference oil 1006 targets updated	
19990809	Reference oil 1007 targets updated	
19990809	Reference oil 1008 targets updated	
19990924	Calibration requirements	99-1
19990924	Alternative Cooling system	99-1
19990924	Fuel injection flow procedure	99-1
19990924	Requirement for use of maintenance log	99-1
19990924	Coolant flow measurement device calibration revision	99-1
19990924	Preparation procedure for oil charge	99-1
19990924	Recording compression pressures	99-1
19990924	Ignition timing checks	99-1
19990924	Valve stem seal replacements	99-1
19990924	Alternative Racor oil filter (LFS-62) use approved	99-1
19990924	Engine serial number added to report	99-1
19991015	Invalid test BC shift limits of -0.5 to 0.8% added	99-2
19991015	Tests terminated due to an FEI result are not permitted	99-2
19991015	Section 11.5.17.3 deleted – Manual data logging no longer required	99-2
19991015	Exhaust back pressure calibration prior to calibration test added	99-2
19991015	Instrumentation calibration requirements	99-2
19991015	Use of Eaton 37KW (50hp) dry gap dynamometer approved	99-2
19991015	New flush oil (BCFHD) and flush oil procedure	99-2
19991015	Micro motion model CMF010 mass flow meter approved	99-2
19991015	Kinematic viscosity measurements on new reference oils permitted	99-2
19991015	Report form editorial change for LABVALID made	99-2
19990924	Valve stem seal revised part number	99-3
20000207	Oil sight glass calibration	00-1
20000207	Revised Figure A2.22 – Oil Level Marker Ruler	00-1
20000207	Revised flush effectiveness procedure	00-1
20000207	Coolant flush procedure	00-1
20000207	Oil consumption validity interpretation	00-1
20000207	Load cell temperature specification	00-1
20000410	Valve Spring Replacement	00-2
20000524	Eliminate Baseline Shift Criteria	00-3
20000601	Maximum Allowable Oil Consumption Test Limit	00-3
20000601	Oil Sample Location Defined	00-3
20000601	Revised Blow-by and Crankcase Ventilation System	00-3
20000807	Fuel Injector Calibration Flow Rate Specification Added	00-3
20000807	Dynamometer Replacement During a test is not permitted	00-3
20000807	Engine Break-in Stand Requirements	00-3
20000807	Removal of Ford Wiring Harness Diagram	00-3
20000807	Addition of Alternative Injector Wiring Harness Part Numbers	00-3
20000807	Addition of Alternative HEGO Sensor Part Numbers	00-3
20000807	Addition of Alternative Throttle Body Adapter Part Number	00-3
20000807	Visteon EEC Control Module	00-3
20000901	Barometric Pressure added to report packet as record only	00-3

Sequence VIB Timeline

Date	Item Changed	Information Letter
20000801	A Task Force Was Appointed by the VIB Surveillance Panel to Address Lab To Lab Differences with Oil Consumption and FEI Severity. Information Letter 00-4 was a result of the Lab Visit Discrepancies.	
20000915	Increase Oil Charge to 6.0 Liters	00-4
20000915	Revise Oil Level/Sight Glass Calibration Procedure	00-4
20000915	Oil Pan Oil Level Requirement	00-4
20001116	Reduced Calibration Frequency	01-1
20001117	Validity Interpretation During BSFC Measurement Cycle	01-1
20001117	Reporting Stage Restarts or Any Test Time Deviations	01-1
20001117	Alternate HEGO Sensor Part Number	01-1
20001117	Revisions to New Engine Cyclic Break-in	01-1
20010301	Revisions to Test Length Calculation and Reporting Format	01-1
20010301	Additional Oil Analysis Requirements	01-1
20010822	Allowed Timing Chain Tensioner with Subsequent Reference Oil Test	01-2
20010822	Defined Maximum Total Test Length as 150 h	01-2
20010822	Defined Off Test Time and Allows No More Than 2 h of Off Time During Phase I and II Aging	01-2
20010822	Added Reference to Ford 543 Engine Assembly Manual	01-2
20010822	Refined Oil Analysis Procedure for HTHS, CCS Viscosity, Friction Coefficient by HFRR, Fuel Dilution and Infrared for Oxidation & Nitration	01-2
20010822	Correction of Company Suppliers in X1.3 and X1.19	01-2
20011005	Pressurization of Engine Coolant System to 69±13.8 kPa	01-3
20011005	Deleted Requirement to Measure Blowby	01-3
20011005	Revised Load Cell Temperature Delta for 3°C to 6°C in 6.4.2.3	01-3
20011005	Corrected Fuel Supplier Name and Address in Section 7.2 and Footnote 15	01-3
20011129	Added Provisions for VIBSJ Test	01-4
20011207	Revised AFR limits from 14.25:1 - 15.25:1 to 14.00:1 – 15.00:1	01-5
20020405	Allowed Replacement of Timing Chain as Part of Tensioner Assembly	02-1
20020405	Revised Procedure to Require Viscosity Measurements for Both Reference and Non Reference Oils	02-1
20020712	Reference oil 538 targets updated (n=20)	
20021016	Reference oil 538 targets updated (n=30)	
20021114	Reference oil 1008-1 initial targets generated (n=10)	
20030327	Updated Test Method D6837 to incorporate info letter 02-1 and remove remedial statements	03-1
20030521	Reference oil 1008-1 initial targets generated (n=20)	
20030618	Dropped requirements to monitor HTHS, CCS, FC by HFRR and INI and INO	03-2
20030703	Reference oil 1008-1 initial targets generated (n=30)	
20040101	Added reference to fuel spec, replaced Aliphatic Naphtha with Type II Class C solvent	03-3
20040130	Added addition micromotion transducers to test method, revised calibration requirements for oil heat exchanger thermocouple and made editorial changes relating to precision statements.	04-1
20040802	Added MotorCraft AGSF32FM to test method	04-2

Sequence VIB Timeline

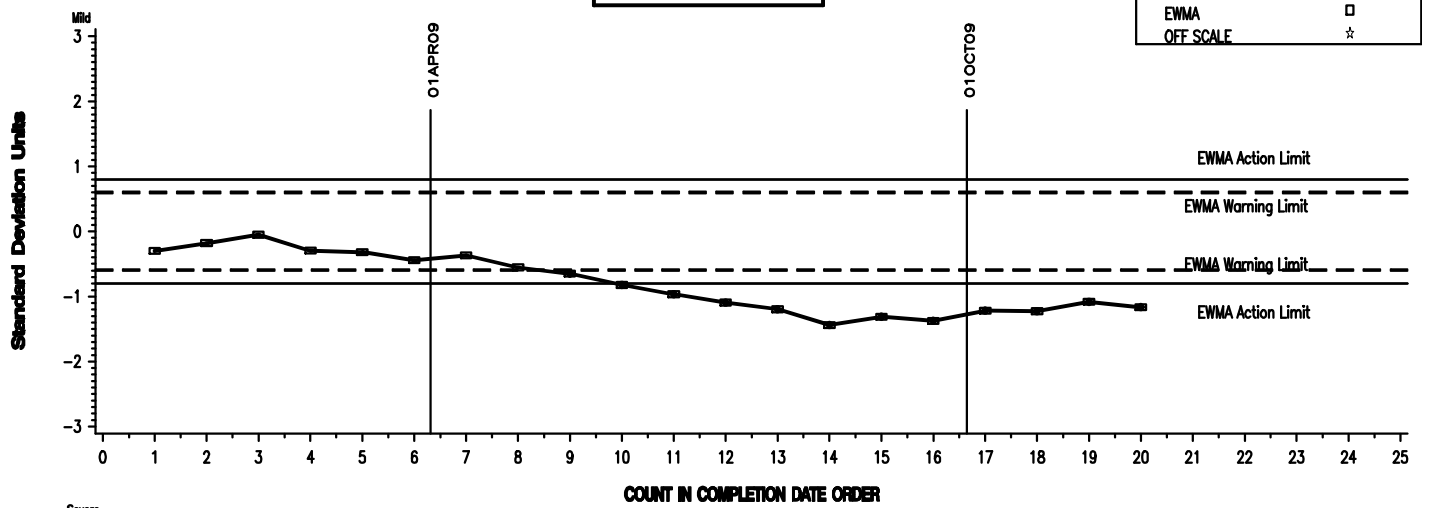
Date	Item Changed	Information Letter
20040802	Added rear crankshaft seal to parts allowed to be replaced on engine	04-2
20040802	Made editorial changes to precision statement	04-2
20040921	Changed Z_0 calculation to be the average of first shewhart acceptable through and including second acceptable reference test to initialize stand charts. Also excluded any unacceptable shewhart results, prior to the first acceptable result on a new stand/engine from control charts.	
20041001	Revised stand/engine calibration requirements to include engine test hours	04-3
20041001	Change calibration frequency for fuel flow, speed, AFR and EBP to prior to a reference sequence.	04-3
20041001	Decreased calibration frequency for coolant flow, thermocouple & temperature measurement systems and other instrumentation to every six months	04-3
20041115	Added provisions for external coolant flush cart	04-4
20041214	Clarified Requirement for solvent meeting ASTM D235, Type II, Class C to meet Type II, Class C requirements for Aromatic content, Color and Flash point only.	04-5
20050719	Added Throttle body F3PZ-9E926NA to test method	05-1
20070805	Added Spark Plug SP432	07-1
20071115	Initial targets, reference oil 538-1 (N=7)	
20071203	Initial targets, reference oil 539 (N=7)	
20080103	Target update, reference oil 539 (N=10)	
20080205	Target update, reference oil 538-1 (N=10)	
20081016	Removed LFS-55 oil filter housing from test method	08-1
20081222	Corrected Table 3 load cell temperature	08-2
20090211	Target update, reference oil 538-1 (N=20)	
20090326	Target update, reference oil 539 (N=20)	
20090818	Deleted requirement to send hard copy of final reports to the TMC	09-1

SEQUENCE VIB INDUSTRY OPERATIONALLY VALID DATA

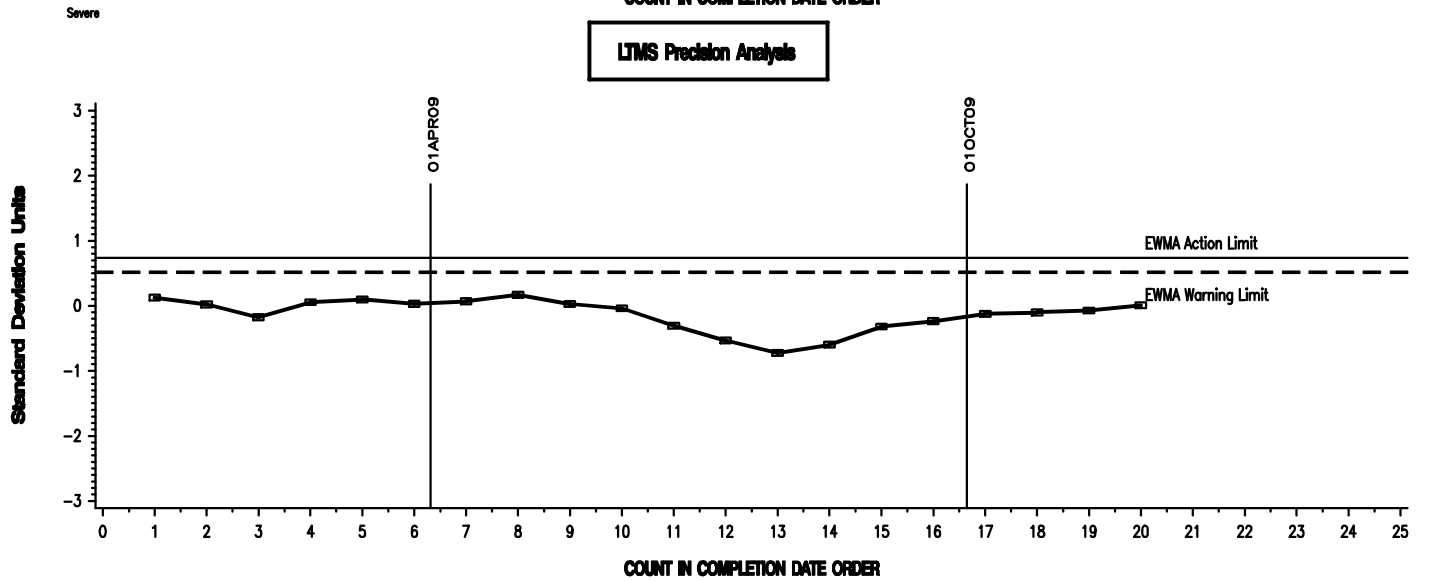
Figure 1

FBI FINAL RESULT PHASE I (%)

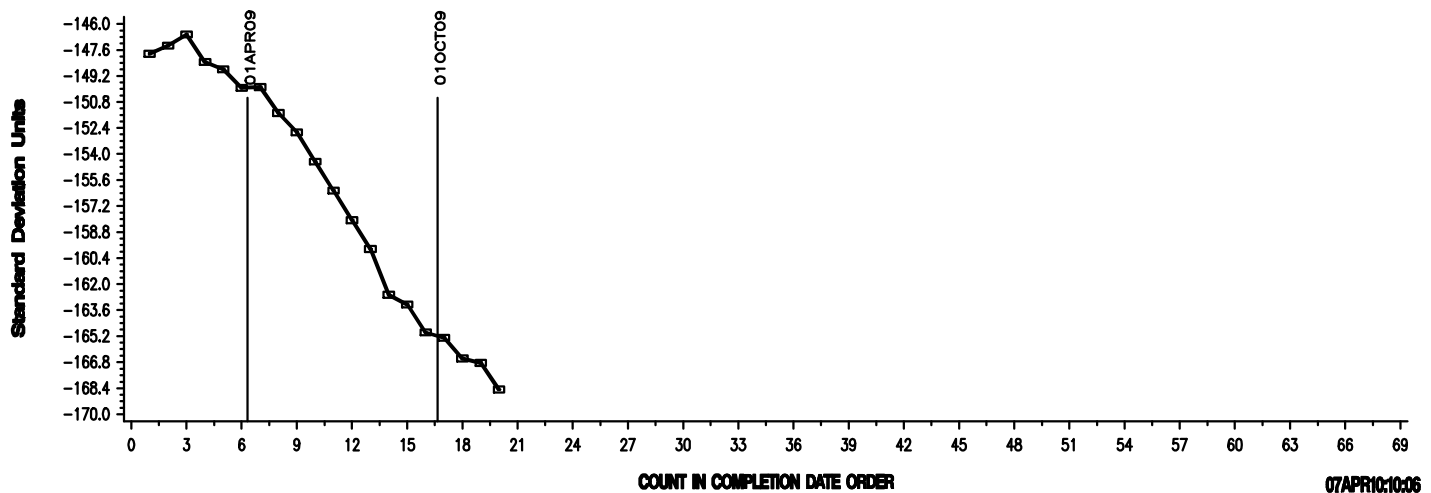
LTMS Severity Analysis



LTMS Precision Analysis



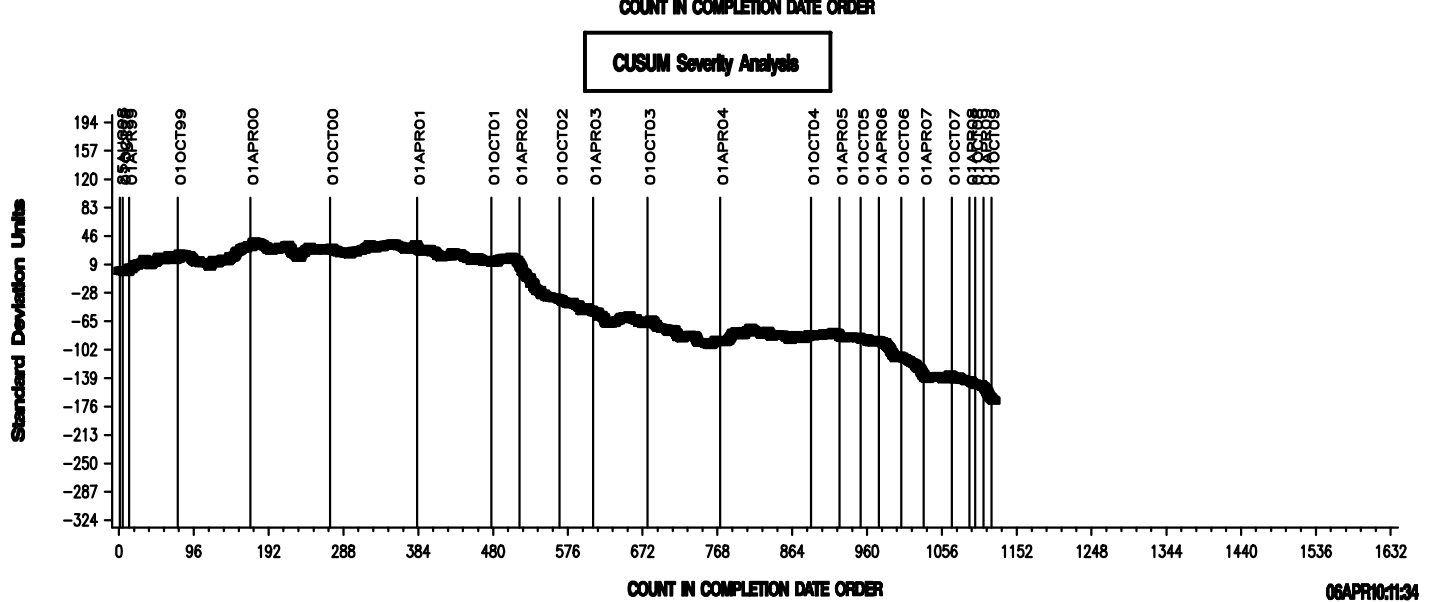
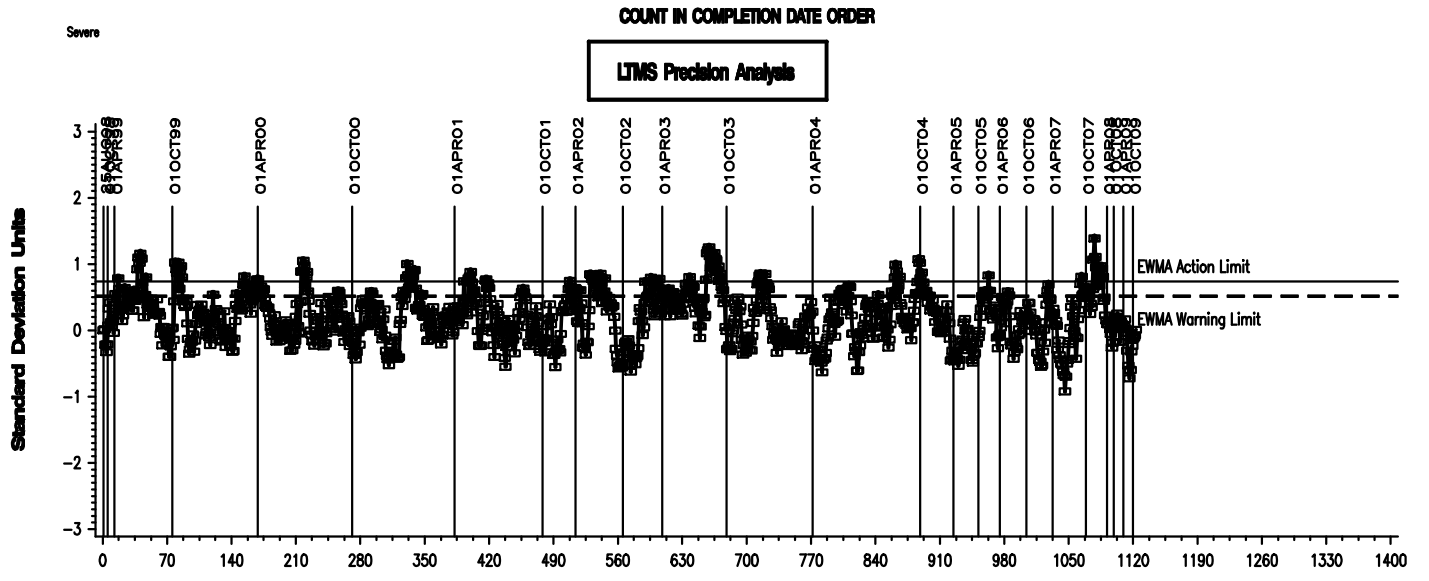
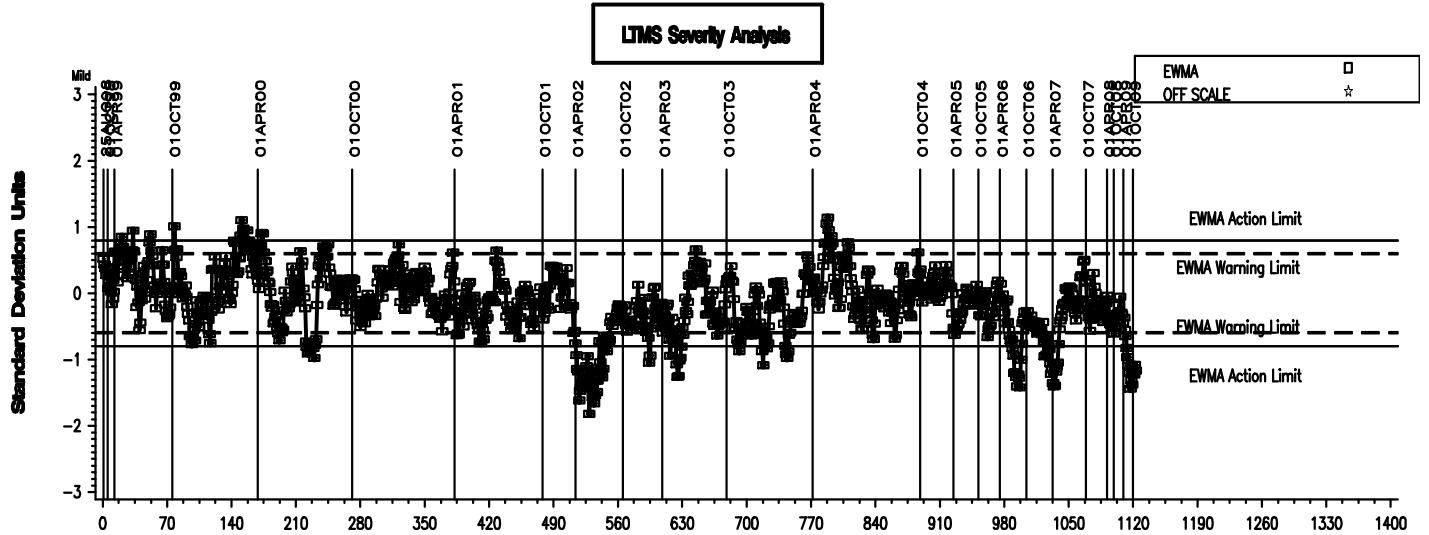
CUSUM Severity Analysis



SEQUENCE VIB INDUSTRY OPERATIONALLY VALID DATA

Figure 2

FEI FINAL RESULT PHASE I (%)

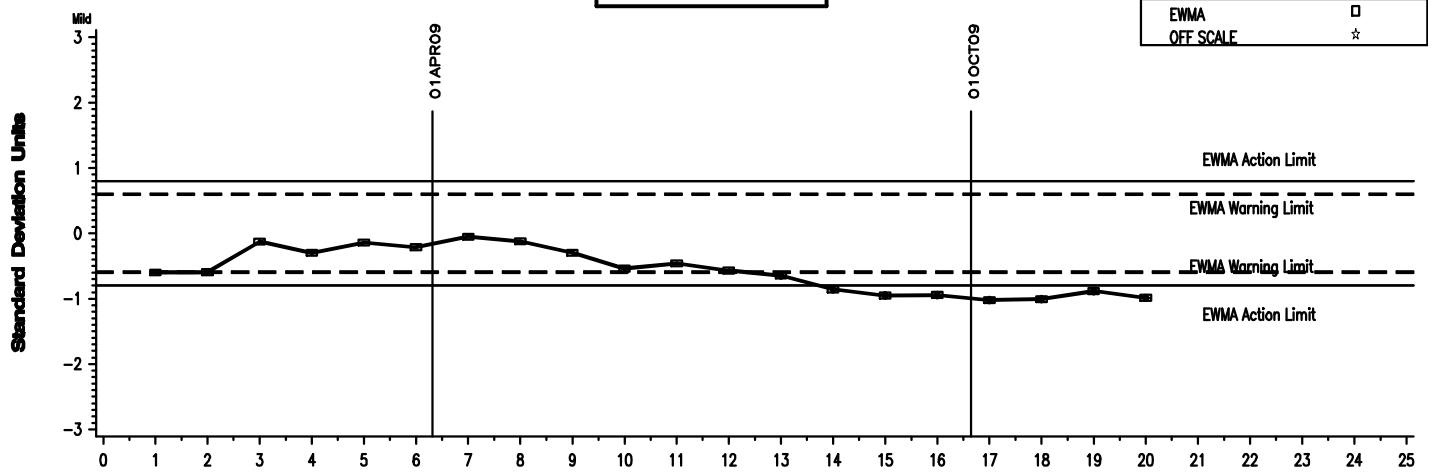


SEQUENCE VIB INDUSTRY OPERATIONALLY VALID DATA

Figure 3

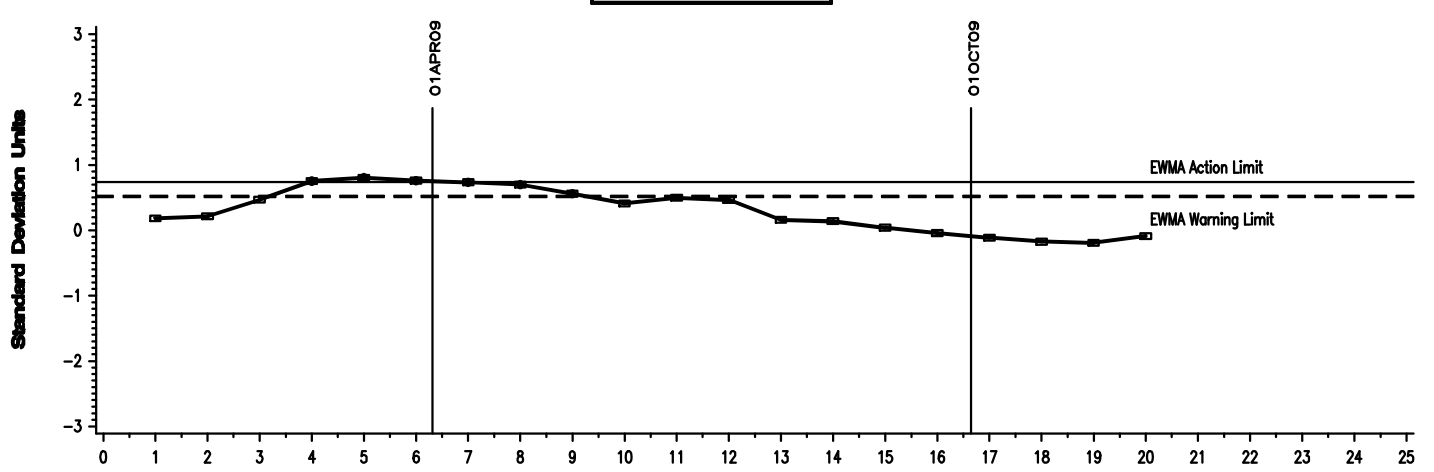
FBI FINAL RESULT PHASE II (%)

LTMS Severity Analysis



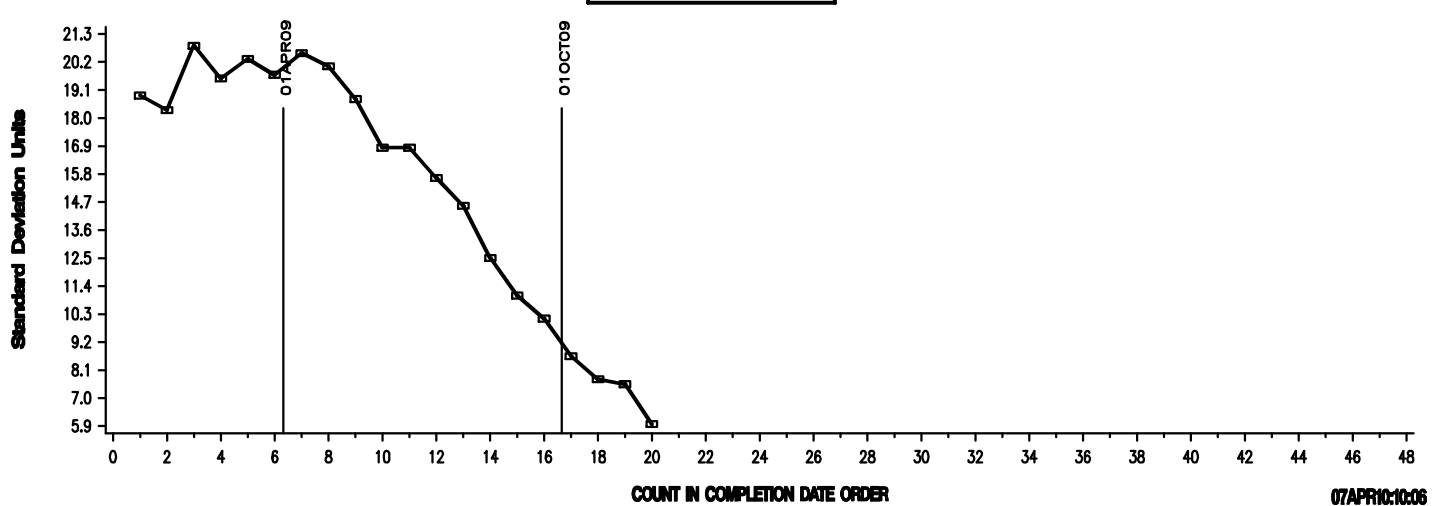
COUNT IN COMPLETION DATE ORDER

LTMS Precision Analysis



COUNT IN COMPLETION DATE ORDER

CUSUM Severity Analysis



SEQUENCE VIB INDUSTRY OPERATIONALLY VALID DATA

Figure 4

FEI FINAL RESULT PHASE II (%)

