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

MEMORANDUM: 08-048

DATE: October 16, 2008

TO: Charlie Leverett, Chairman, Sequence VIB Surveillance Panel

FROM: Richard Grundza

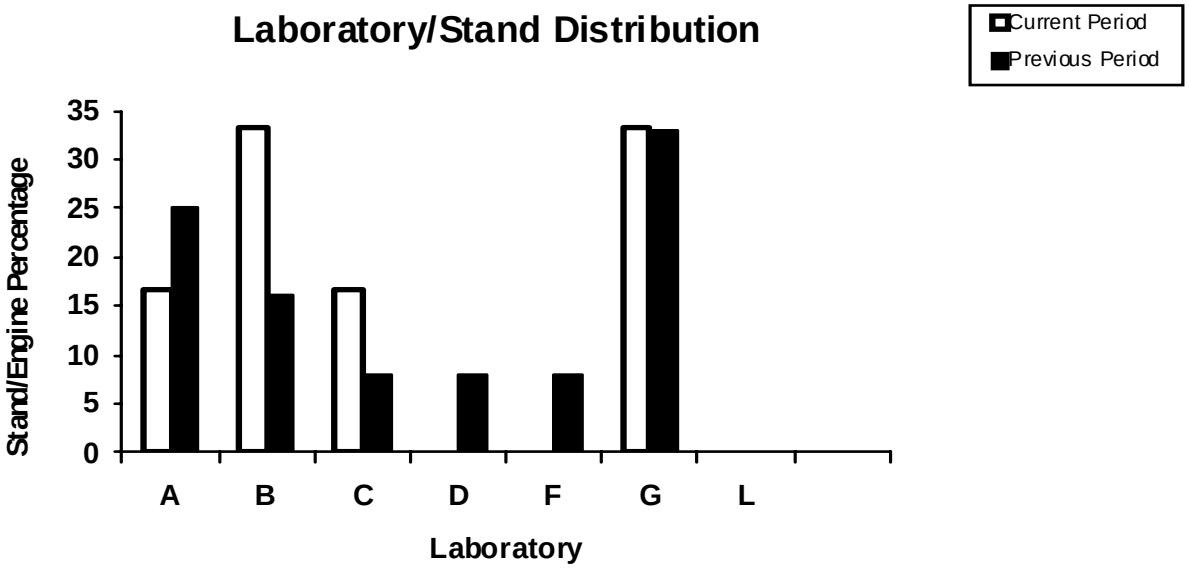
SUBJECT: Sequence VIB Test Results from April 1, 2008 through September 30, 2008

The following is a summary of Sequence VIB reference tests that were reported to the Test Monitoring Center during the period April 1, 2008 through September 30, 2008.

Lab and Stand Summary

	Reported Data During Period	Calibrated as of 09/30/2008
Laboratories	4	4
Stand/Engine Combinations	6	5

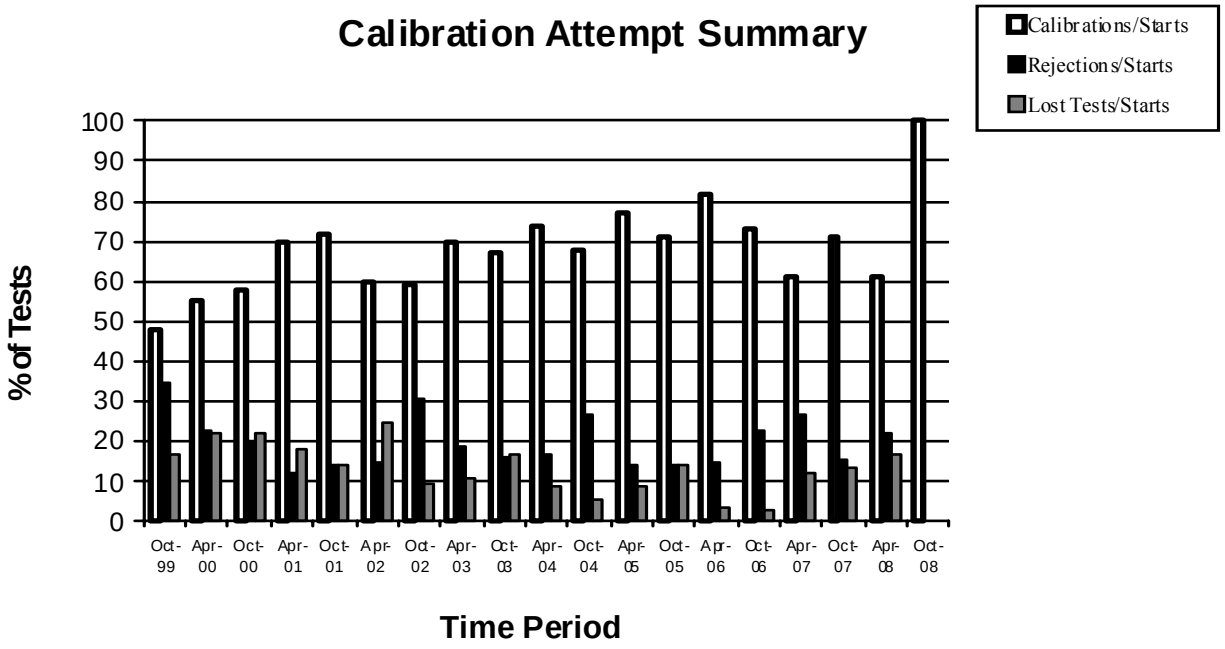
The following chart shows the laboratory stand/engine distribution for data reported during this report period:



The following summarizes the status of the reference oil tests reported to the TMC this report period.

	TMC Validity Codes	No. of Tests
Operationally and Statistically Acceptable	AC	7
Total		7

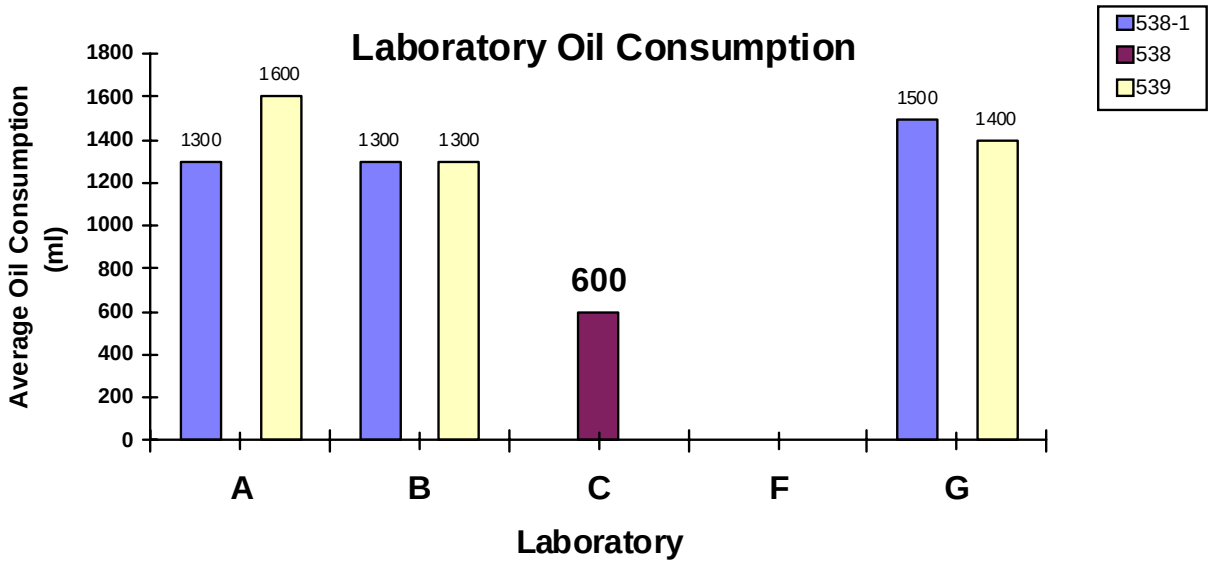
Attempted calibration tests are depicted graphically below by report period:



The calibration per start rate is the highest ever achieved and there were no lost or rejected tests. Rates for all parameters compare well with previous periods.

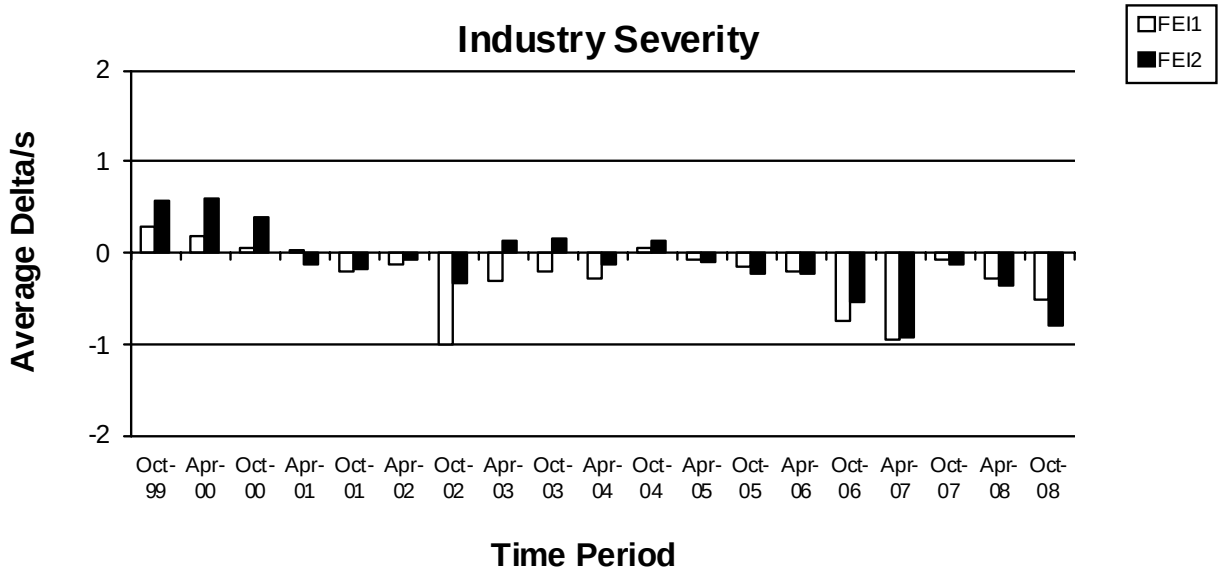
There were no rejected tests this period. There has not been an LTMS deviation written for Sequence VIB to date.

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

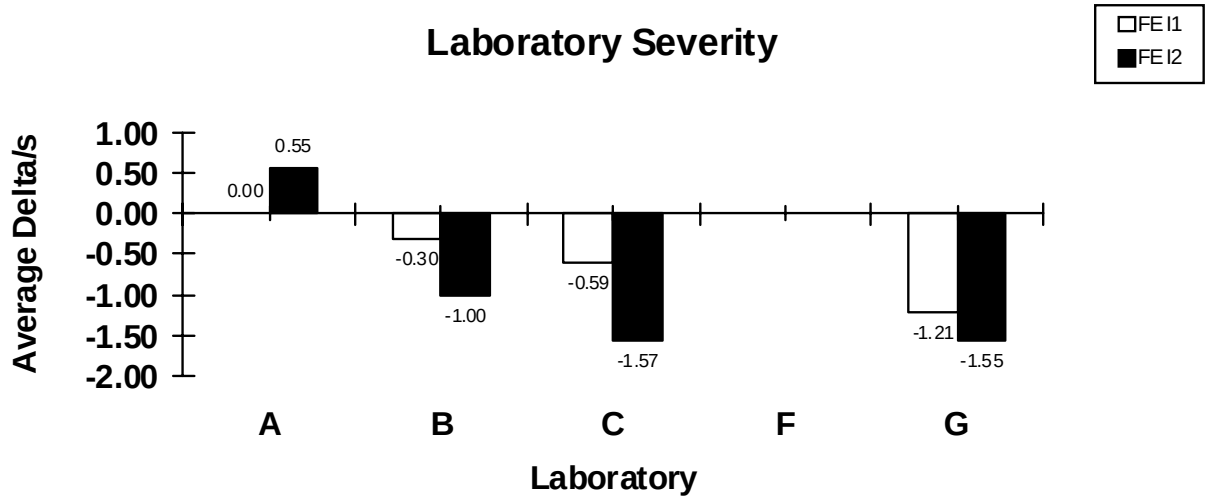


TEST SEVERITY AND PRECISION

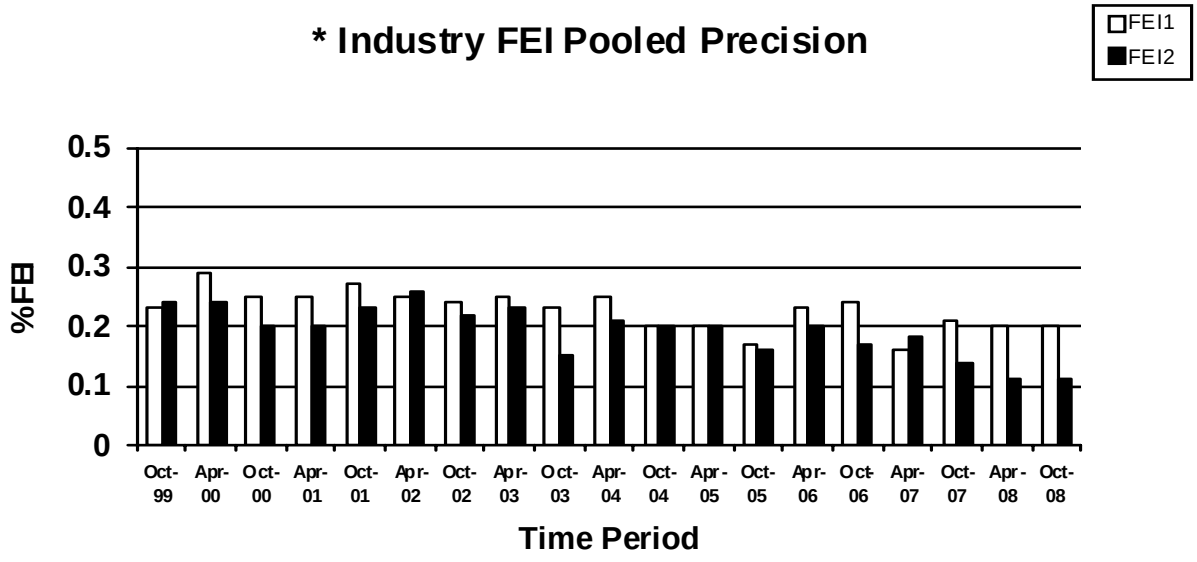
The industry mean Δ/s for FEI1 and FEI2, for this report period are -0.51 and -0.80, respectively. FEI1 and FEI2 both were severe of target for the period.



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



Due to the limited amount of data points reported this period, industry precision estimates for FEI1 and FEI2 for this report period are the estimates from the previous period. There are not sufficient replicate results on stand/engine combinations and oils to be able to generate precision estimates comparable to the previous period. When precision estimated are pooled by oil only, precision for FEI1 and FEI2 are 0.15 and 0.26, which are comparable to historical estimates for these parameters.



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

INDUSTRY CONTROL CHARTS

FEI1

Figure 1(last 40 test results) shows FEI1 severity and precision in control for the period. Figure 2 shows the entire industry chart.

FEI2

Figure 3 (the last 40 test results) shows that with the exception of one test, severity has been in action or warning alarm the entire period. Precision was in alarm for most of the period, coming out of alarm with the last two tests reported in the period. Figure 4 shows the entire industry chart. There does not appear to be one lab or stand/engine combination which is unduly influencing the severity control charts. The precision occurring through most of the period, appears to have been triggered by one mild test, 1.714 Δ/s from target, reported between severe results. The severe results were -1.714 and -1.571 Δ/s from target, respectively. The three results were from different lab/stand/engine combinations.

REFERENCE OILS

The following table quantifies reference oils by the number of tests remaining at the TMC and each laboratory. Sequence VIB reference oils are shipped in quantities of 5 gallons per test.

LAB	538	538-1	539	1006	1007	1008	1008-1
A	0	1	0	0	0	0	1
B	0	1	2	0	1	0	1
C	0	0	1	0	0	0	1
D	0	1	2	0	0	0	2
F	0	2	1	0	3	0	2
G	0	0	1	0	0	0	2
L	0	1	2	0	5	0	2
TMC	0	86	167	0	*	**	***

* 397 gallons (Multiple test area usage)
** 29 gallons (Multiple test area usage)
*** 1100 gallons (Multiple test area usage)

INFORMATION LETTERS

No information letters were issued this period.

LAB VISITS

Four lab visits were conducted by the Test Monitoring Center this report period.

REG/reg

Attachments

c: Sequence VIB Surveillance Panel
Sequence VIB Test Engineers
ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/semiannualreports/vib-10-2008.pdf

Sequence VIB Semiannual Report
List of Attachments

-- Table 1 is a historic statistical summary for reference oils through September 30, 2008.

-- Table 1A is a statistical summary for reference oils for the current report period.

-- Table 2 is a summary of lost tests due to operationally invalid, aborted, or abandoned engines.

-- Table 3 is the Sequence VIB Timeline.

-- Figure 1 graphically present the Industry control charts for FEI1 for the last 40 test results.

-- Figure 2 graphically present the Industry control charts for FEI1.

-- Figure 3 graphically present the Industry control charts for FEI2 for the last 40 test results.

-- Figure 4 graphically present the Industry control charts for FEI2.

TABLE 1

SEQUENCE VIB
OPERATIONALLY VALID DATA SET
DATA PRIOR TO 10/01/08

OIL CODE 1006

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
236	FEI1	1.40	0.29	0.61 - 2.50
236	FEI2	0.52	0.27	-.36 - 1.23

OIL CODE 1007

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
92	FEI1	0.75	0.30	0.24 - 2.11
92	FEI2	0.45	0.27	-.55 - 1.25

OIL CODE 1008

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
245	FEI1	1.82	0.24	1.18 - 2.47
245	FEI2	1.24	0.21	0.58 - 1.74

OIL CODE 1008-1

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
236	FEI1	1.91	0.25	1.24 - 2.88
236	FEI2	1.26	0.20	0.52 - 1.95

OIL CODE 538

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
271	FEI1	1.84	0.29	0.86 - 2.67
271	FEI2	1.55	0.24	0.93 - 2.32

OIL CODE 538-1

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
10	FEI1	1.95	0.19	1.65 - 2.18
10	FEI2	1.24	0.20	0.91 - 1.63

OIL CODE 539

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
8	FEI1	0.78	0.24	0.54 - 1.23
8	FEI2	0.44	0.24	0.05 – 0.76

1098 TOTAL

TABLE 1A

SEQUENCE VIB
OPERATIONALLY VALID DATA SET
DATA FROM 04/01/08 THRU 09/30/08

OIL CODE 538

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
1	FEI1	1.76		1.76 – 1.76
1	FEI2	1.22		1.22 - 1.22

OIL CODE 538-1

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
3	FEI1	2.04	0.16	1.86 - 2.15
3	FEI2	1.26	0.12	1.17 - 1.40

OIL CODE 539

N	TEST PARAMETER	MEAN	s	REPORTED RANGE
3	FEI1	0.67	0.14	0.54 - 0.82
3	FEI2	0.37	0.35	0.05 – 0.74

7 TOTAL

Table 2

Lost Tests Summary

Tests declared operationally invalid, aborted or lost due to abandoned engines are summarized below by laboratory, reason, number of lost tests, and percent of lost tests:

LAB	REASON	Tests Lost	% of Tests Lost
	No Lost tests this report period		

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	03-1
	remedial statements	
20030521	Reference oil 1008-1 initial targets generated (n=20)	
20030618	Dropped requirements to monitor HTHS, CCS, FC by HFRR and INI and	03-2
	INO	
20030703	Reference oil 1008-1 initial targets generated (n=30)	
20040101	Added reference to fuel spec, replaced Aliphatic Naphtha with Type II Class	03-3
	C solvent	
20040130	Added addition micromotion transducers to test method, revised calibration	04-1
	requirements for oil heat exchanger thermocouple and made editorial changes	
	relating to precision statements.	
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)	

SEQUENCE VIB INDUSTRY OPERATIONALLY VALID DATA

Last 40 Data Points

FEI FINAL RESULT PHASE I (%)

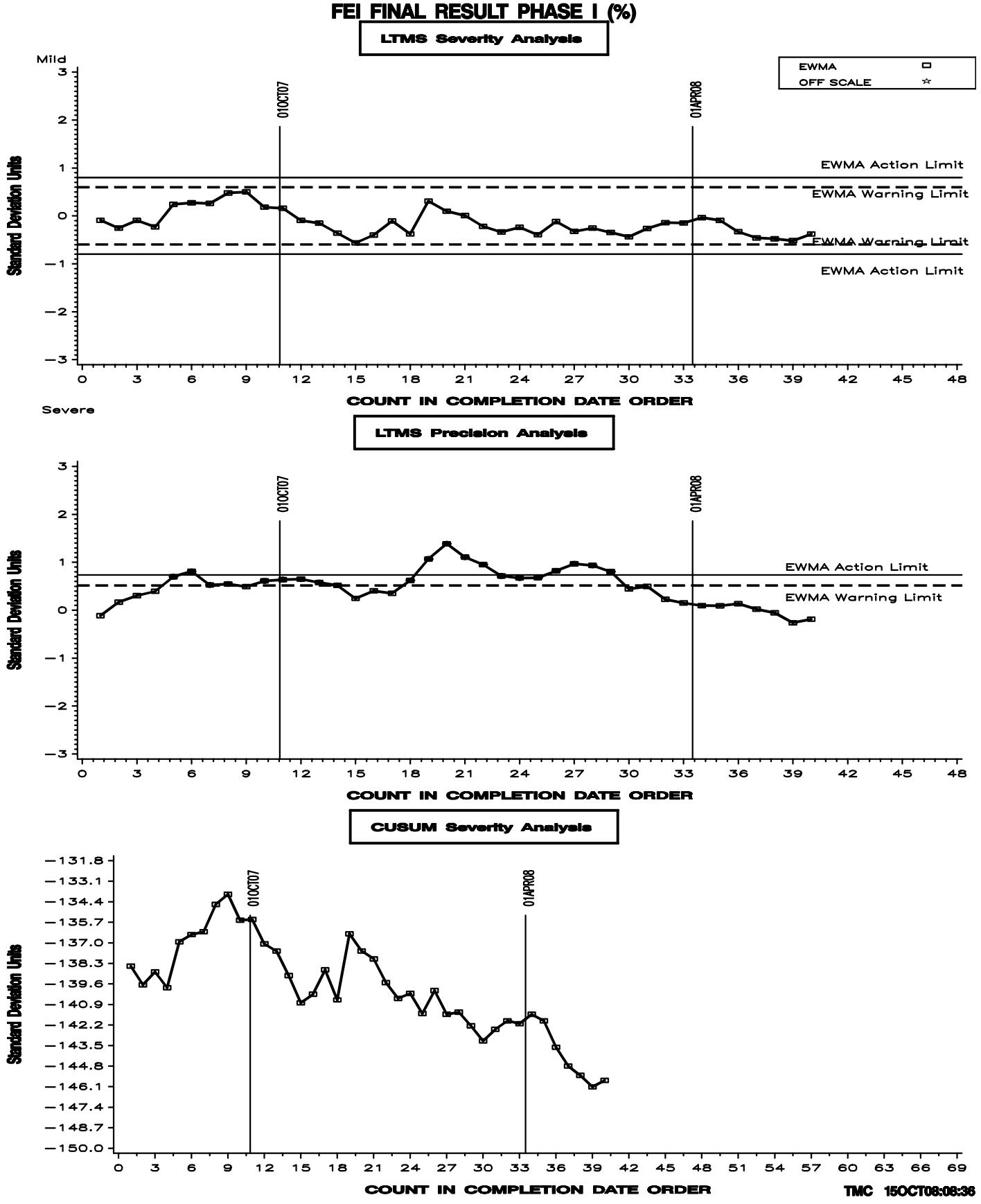
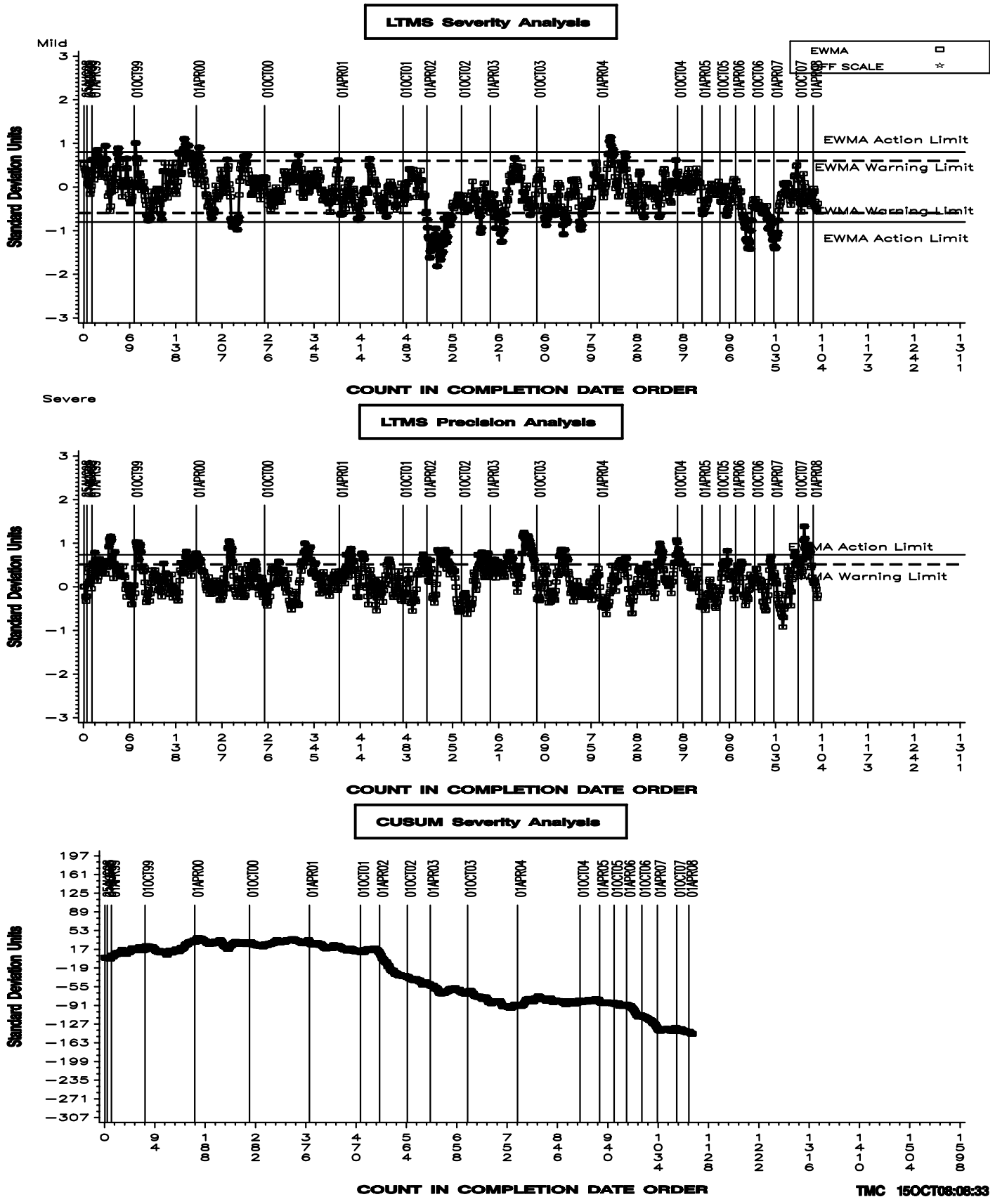


Figure 2

SEQUENCE VIB INDUSTRY OPERATIONALLY VALID DATA

FEI FINAL RESULT PHASE I (%)



SEQUENCE VIB INDUSTRY OPERATIONALLY VALID DATA

Figure 3

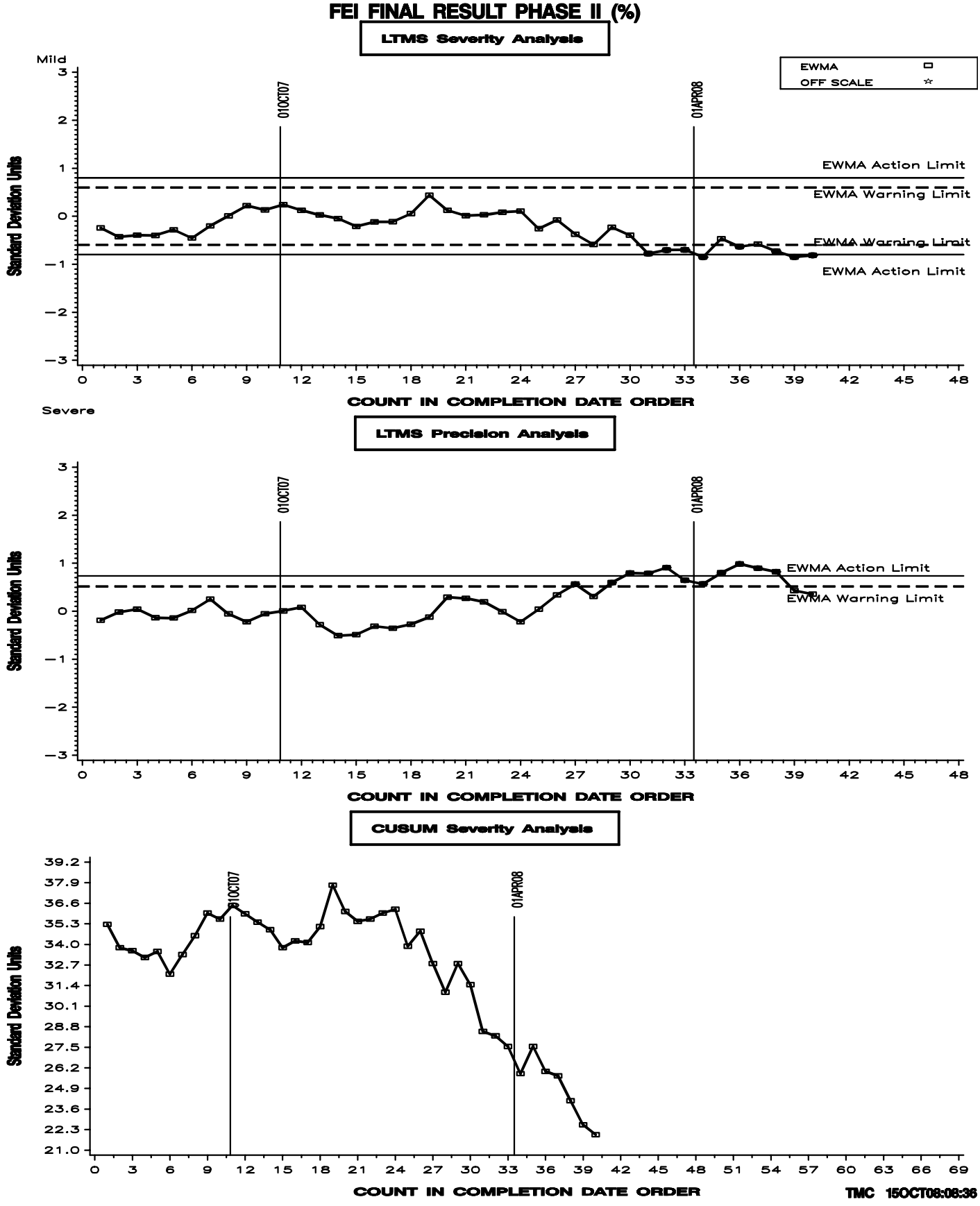


Figure 4

SEQUENCE VIB INDUSTRY OPERATIONALLY VALID DATA