



Test Monitoring Center

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

Memorandum: 03-108

Date: October 23, 2003

To: William M. Nahumck, Chairman, Sequence III Surveillance Panel

From: Michael T. Kasimirsky *Michael T. Kasimirsky*

Subject: Sequence IIIG Semiannual Report: April 1, 2003 through September 30, 2003

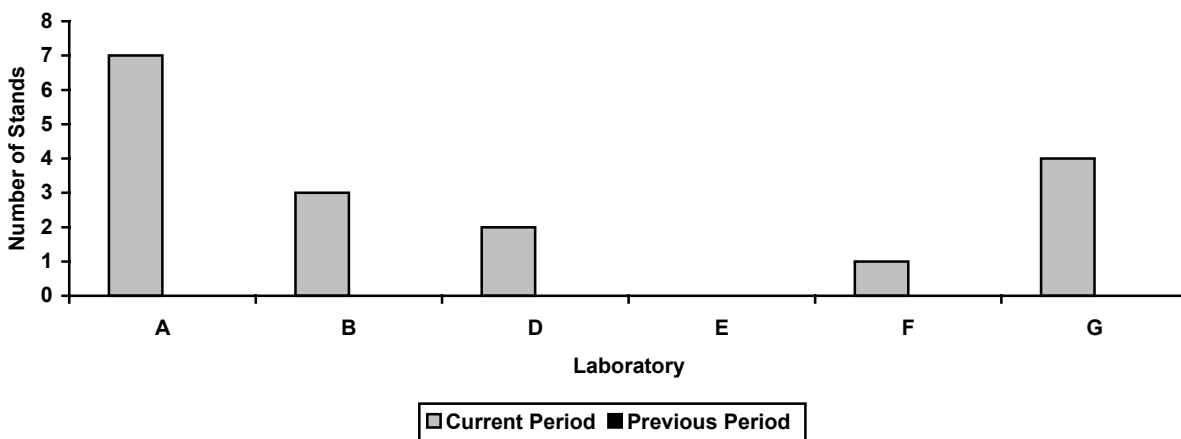
The following is a summary of Sequence IIIG reference tests that were reported to the Test Monitoring Center during the period April 1, 2003 through September 30, 2003.

Lab/Stand Distribution

	Reporting Data	Calibrated as of September 30, 2003
Number of Laboratories:	5	5
Number of Test Stands:	17	16

The following chart shows the laboratory/stand distribution:

Laboratory/Stand Distribution



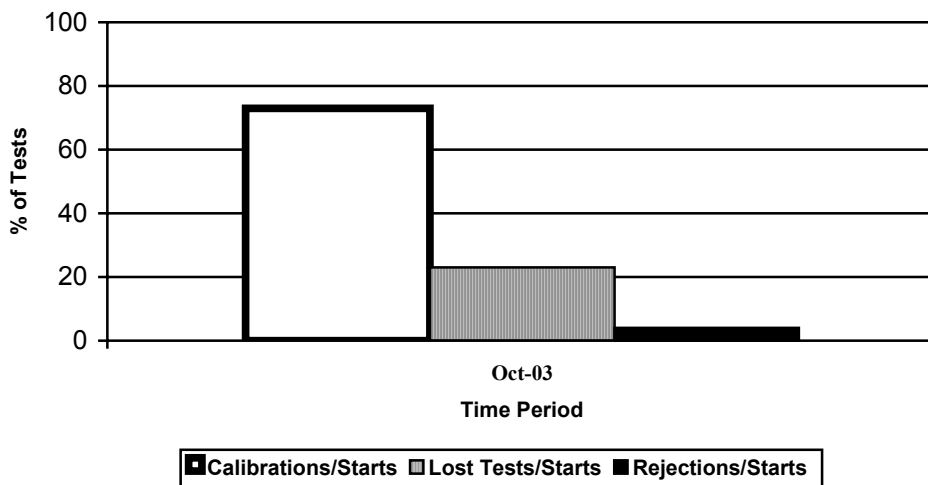
The following summarizes the status of the reference oil tests reported to the TMC:

Calibration Start Outcomes	TMC Validity Codes	No. of Tests
Acceptable Matrix Test	AO	24
Unacceptable Matrix Test	OO	1
Invalid Matrix Test	LO	3
Operationally and Statistically Acceptable	AC	17
Failed Acceptance Criteria	OC	1
Operationally Invalid (Laboratory Judgment)	LC	9
Operationally Invalid (Lab & TMC Judgment)	RC	0
Stand Failed Reference Sequence – data pulled	MC	0
Aborted	XC	1
Total		56

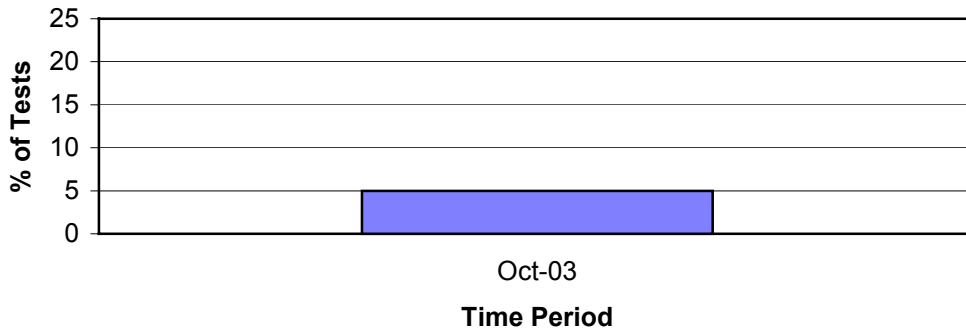
Donated & Industry Support Outcomes	TMC Validity Codes	No. of Tests
Decoded Oil Tests	NN	1
Total		1

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

Calibration Attempt Summary

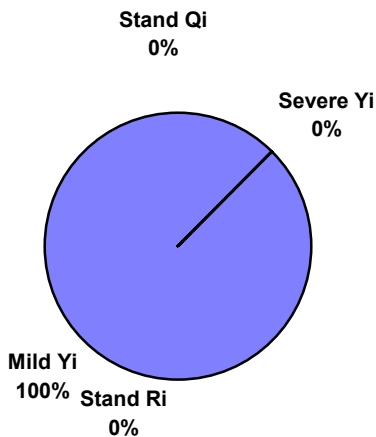


Rejected Test Rate for Operationally Valid Tests

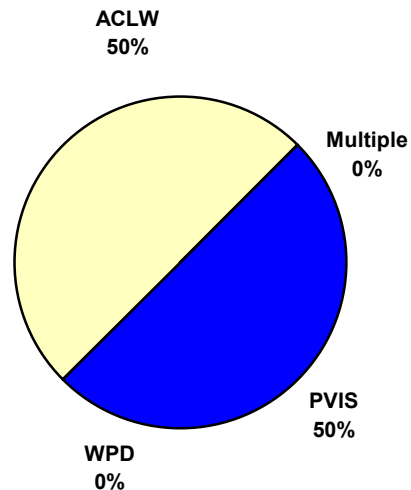


There were two failing tests for the period. The following charts summarize the reasons and breakdown by parameter for the failed test:

Distribution of LTMS Stand Alarms



Distribution of Stand Alarms by Parameter



There were no LTMS Deviations written this period. There have been no deviations from the LTMS since its introduction in August of 2003.

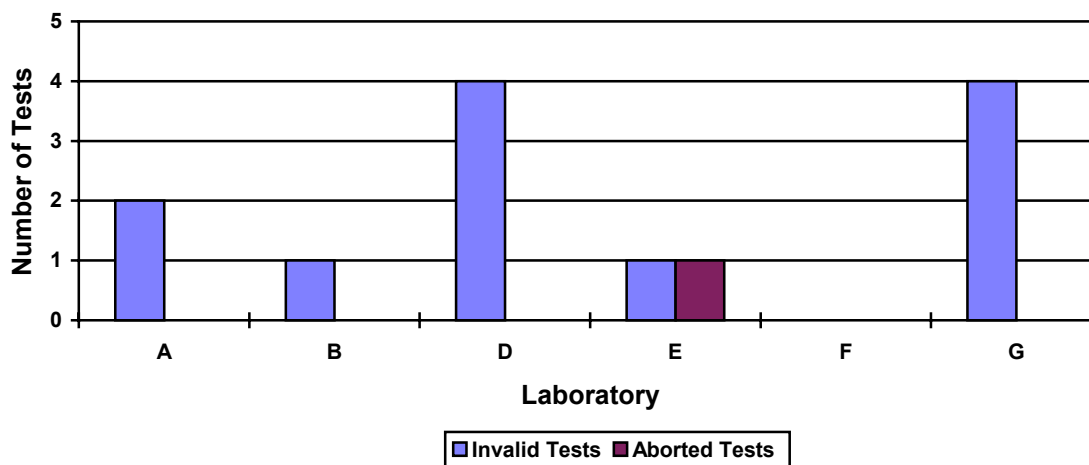
Five Sequence IIIG lab visits were performed this period, four in conjunction with the Test Developer in preparation for running the Sequence IIIG GF-4 Matrix. No significant problems were found.

Lost Test Summary

Thirteen tests were lost this period. The reasons for the lost tests are shown in the following table:

Lab	Reason for Lost Test	Number of Tests	Breakdown of Tests (LC/RC/XC/LO)
A	Connecting Rod Bearing Failure	1	2/0/0/0
	Balance Shaft Bearing Failure	1	
B	Power Supply Failure	1	1/0/0/0
D	Wrong Honing Load	3	4/0/0/0
	5.8L Oil Charge	1	
E	Exhaust Manifold Coolant Leak	1	1/0/1/0
	Lost Oil Charge	1	
G	Oil Leak	1	3/0/0/1
	Unexplained High Oil Consumption	1	
	Bad EBP Valve – Scored Cylinder	1	
	Broken Piston Ring	1	

Lost Test Distribution



Information Letters

Sequence IIIG Information Letter No. 03-1, Sequence No. 1, was issued during the period on August 19, 2003, and contained the Draft Sequence IIIG Test Procedure.

Sequence IIIG Information Letter No. 03-2, Sequence No. 2, was issued during the period on September 9, 2003, and contained Revised Valve Spring Load Specifications.

Sequence IIIG Information Letter No. 03-3, Sequence No. 3, was issued during the period on September 23, 2003, and contained the Revised Test Numbering Methodology.

Severity and Precision Analysis

Below is a summary of the average Δ/s , pooled standard deviation, and average Δ in reported units for the tests reported during this period. Also below is a summary of the average Δ/s value, by parameter, for all laboratories reporting data during this period.

Industry Severity Summary			
Parameter	Average Δ/s	Pooled standard deviation (degrees of freedom)	Average Δ , in reported units
PVIS	-0.056	0.313 (df=40)	-2.6% Viscosity Increase ¹
WPD	-0.026	0.703 (df=40)	-0.02 Merits
ACLW	-0.085	0.186 (df=40)	-0.9 μm^2

¹ At the proposed GF-4 Pass Limit of 150% Viscosity Increase

² At the proposed GF-4 Pass Limit of 60 μm

Average Δ/s Results, by Laboratory			
Laboratory	PVIS	WPD	ACLW
A	-0.26	0.05	-0.07
B	-0.64	0.22	0.04
D	-0.03	-0.02	-0.67
E	-	-	-
F	-0.60	1.11	-0.50
G	0.46	-0.41	0.00

Percent Viscosity Increase (PVIS)

The industry was within limits for severity during the period and exceeded the B1 Precision Limit for one test during the period (see Figure 1). The average Δ/s value is shown in Figure 4 and the pooled standard deviation for the period is shown in Figure 7.

Weighted Piston Deposits (WPD)

The industry was within limits for both severity and precision during the period (see Figure 2). The average Δ/s value is shown in Figure 5 and the pooled standard deviation for the period is shown in Figure 8.

Average Camshaft-plus-Lifter Wear (ACLW)

The industry was within limits for precision during the period and exceeded the EWMA Severity Mild Warning Limit for one test during the period (see Figure 1). The average Δ/s value is shown in Figure 6 and the pooled standard deviation for the period is shown in Figure 9.

QI Deviations

There were no QI Deviations written this period. There have been no QI Deviations written since the test was introduced in August of 2003.

Hardware

No hardware changes were made this period.

Reference Oils

Oil	TMC Inventory, in gallons	TMC Inventory, in tests (4 gal/test)	Laboratory Inventory, in tests	Estimated life
434	332	83	12	3+ years
435	409	102	15	3+ years
438	828	207	19	3+ years

MTK/mtk

Attachments

c: F. M. Farber, TMC
Sequence III Surveillance Panel
<ftp://astmtmc.cmu.edu/docs/gas/sequenceiii/semiannualreports/IIIG-10-2003.pdf>

Distribution: Electronic Mail

List of Figures

- Figures 1, 2, and 3 are EWMA severity and precision control charts and also the CUSUM Δ/s plots of PVIS, WPD, and ACLW, annotated with date lines, using the same data set as the EWMA severity and precision control charts. Transformed units are used, when appropriate.
- Figures 4, 5, and 6 are bar charts of average Δ/s , by report period, for PVIS, WPD, and ACLW.
- Figures 7, 8, and 9 are bar charts of pooled standard deviation, by report period, for PVIS, WPD, and ACLW.
- Figure 10 is the Sequence IIIG Timeline.

Figure 1

SEQUENCE III G INDUSTRY OPERATIONALLY VALID DATA

VISCOSITY INCREASE

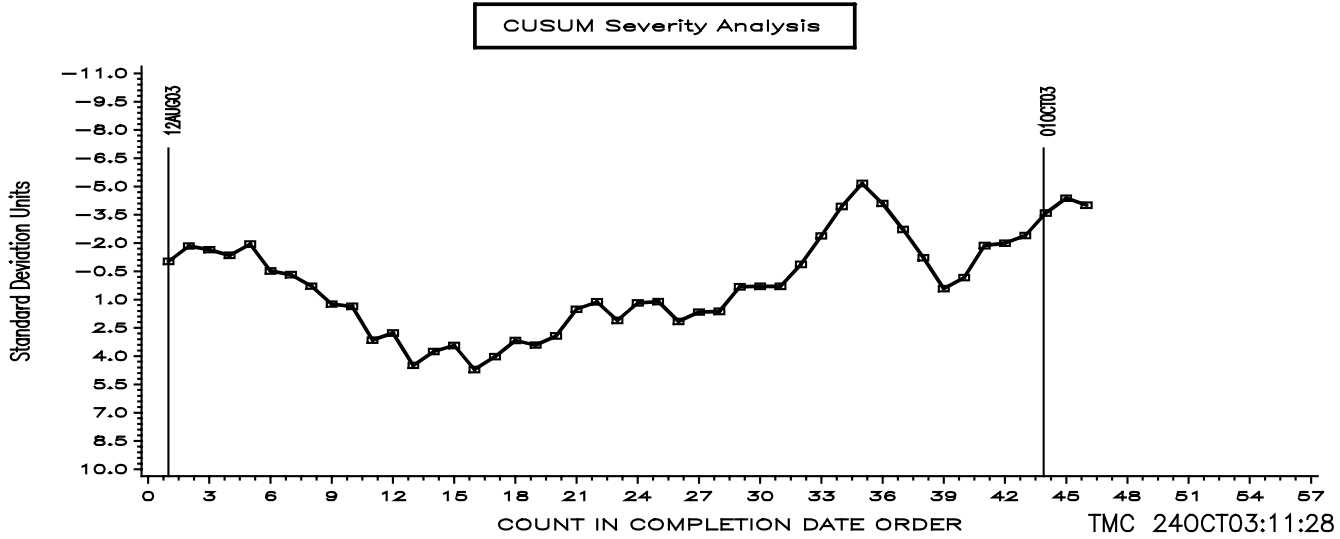
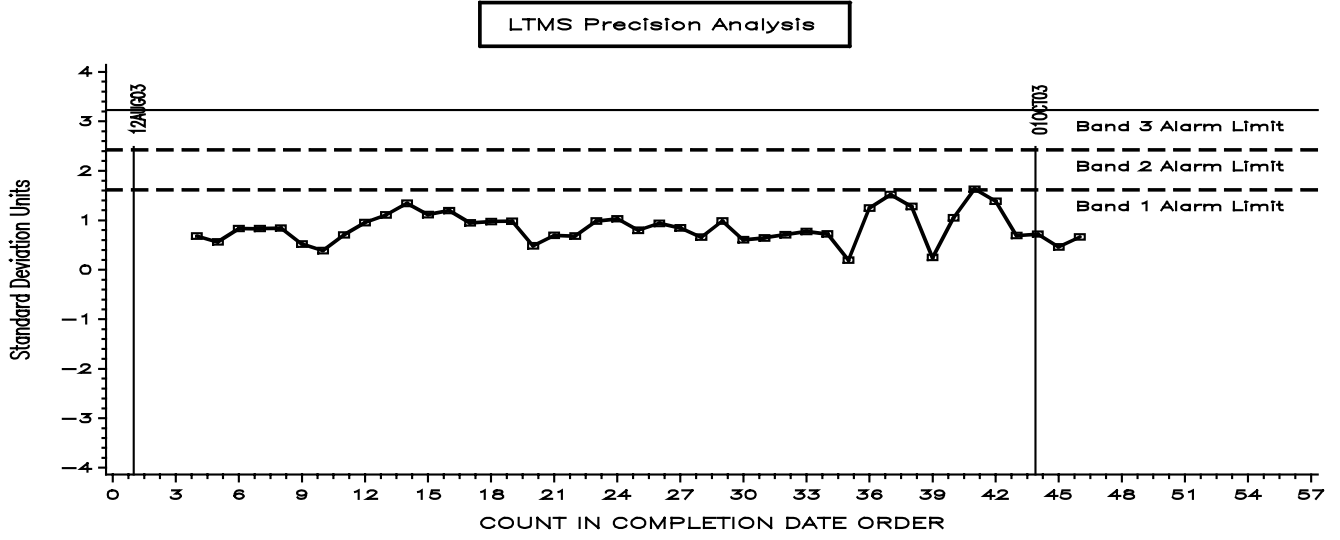
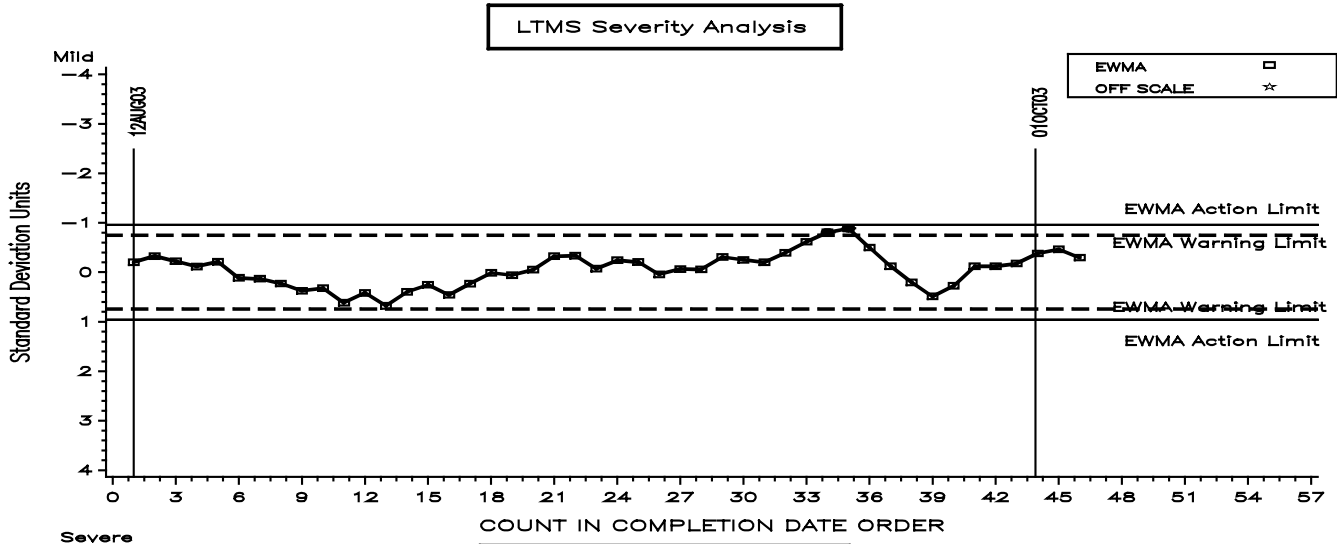


Figure 2

SEQUENCE IIIG INDUSTRY OPERATIONALLY VALID DATA

AVERAGE WEIGHTED PISTON DEPOSITS

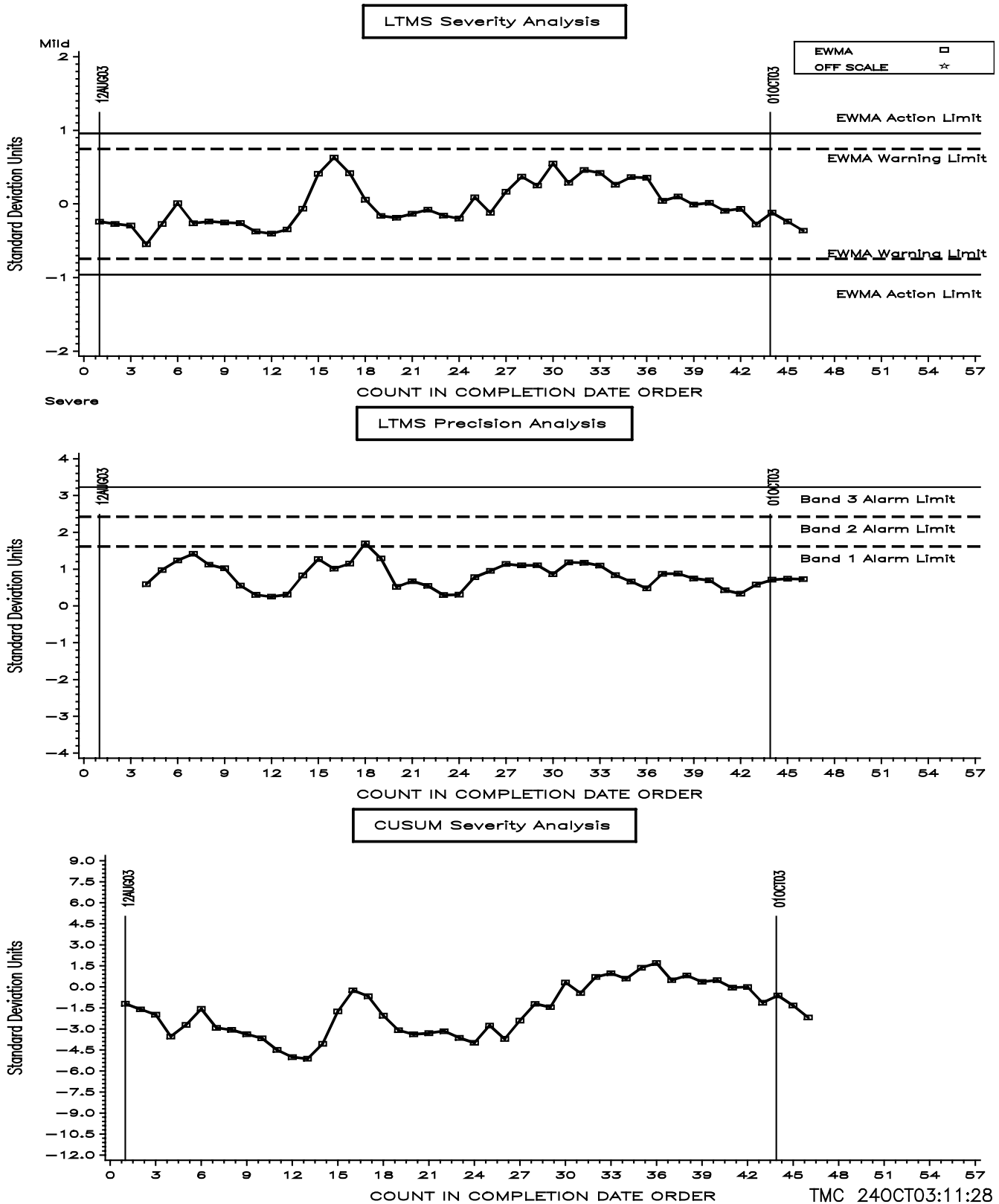
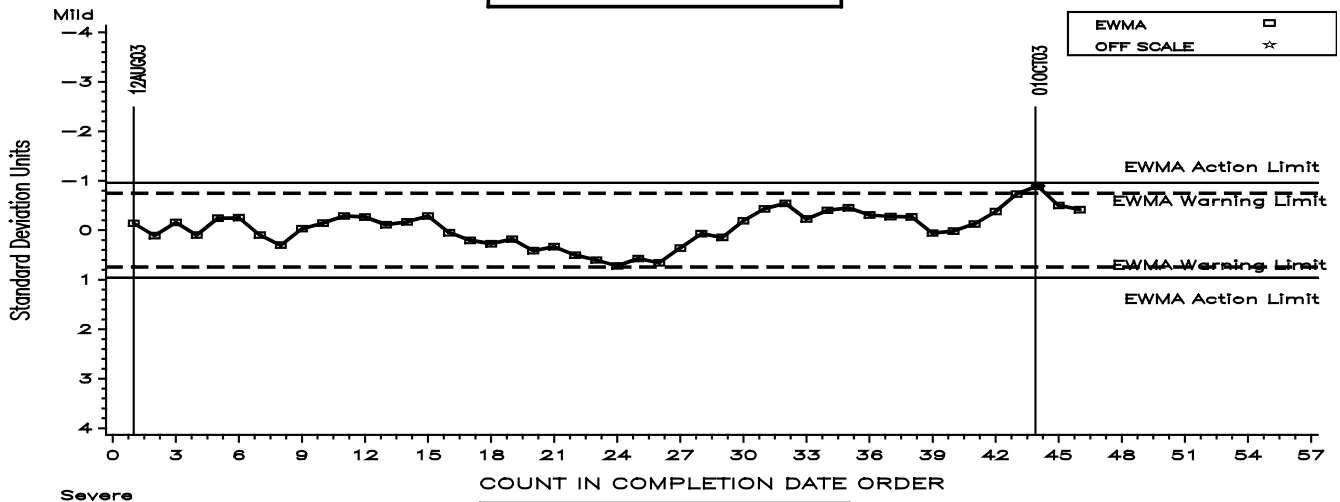


Figure 3

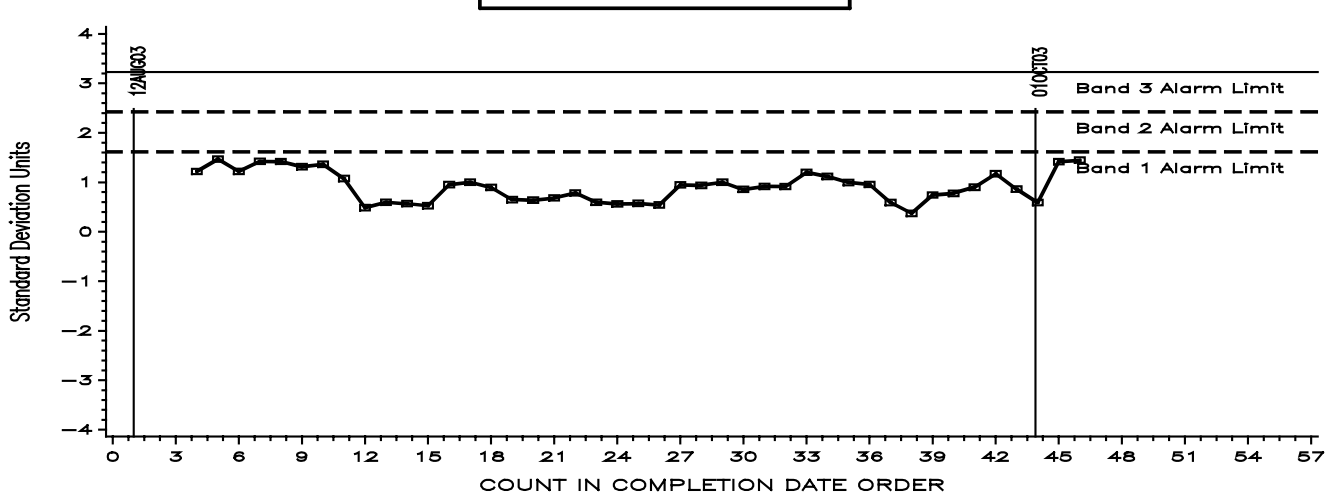
SEQUENCE III G INDUSTRY OPERATIONALLY VALID DATA

AVERAGE CAM + LIFTER WEAR

LTMS Severity Analysis



LTMS Precision Analysis



CUSUM Severity Analysis

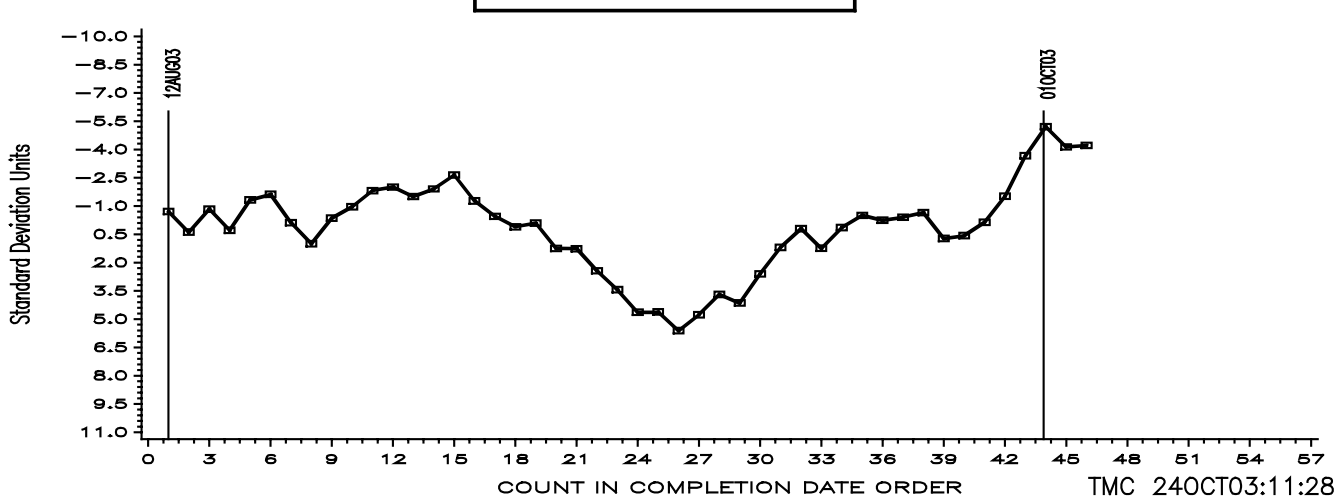


Figure 4 - Percent Viscosity Increase, Average Delta/s

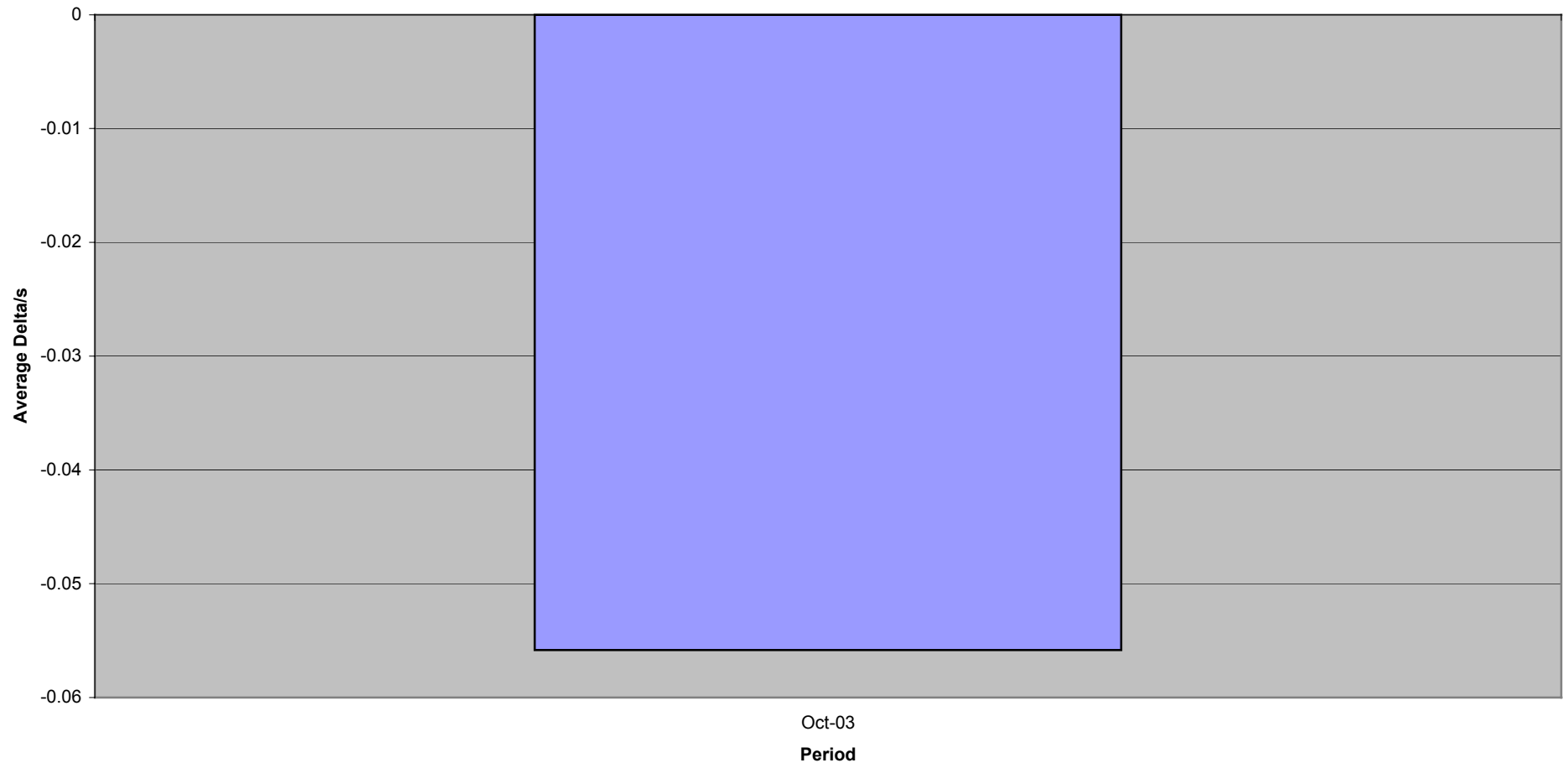


Figure 5 - Weighted Piston Deposits, Average Delta/s

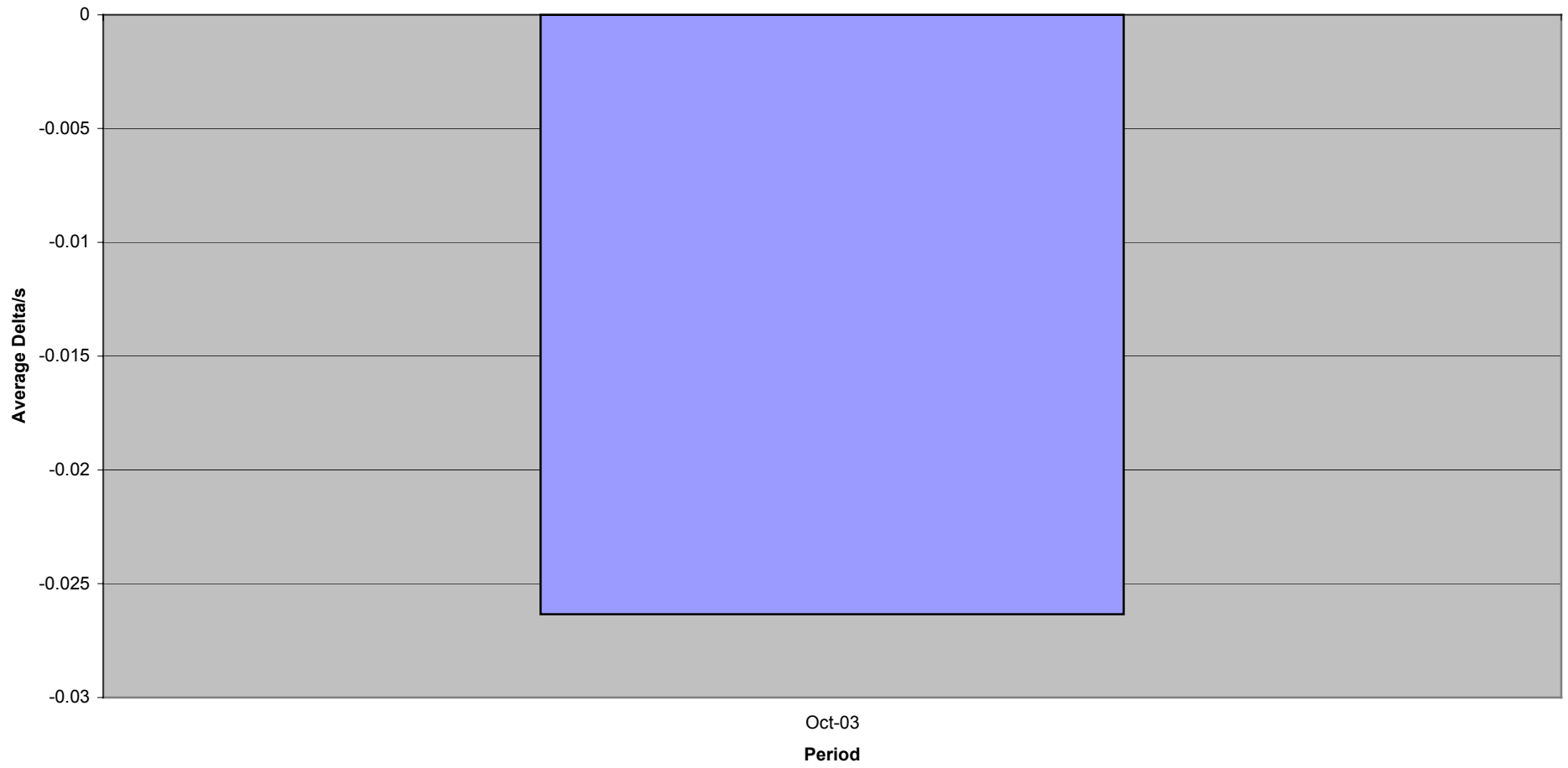


Figure 6 - Average Camshaft plus Lifter Wear, Average Delta/s

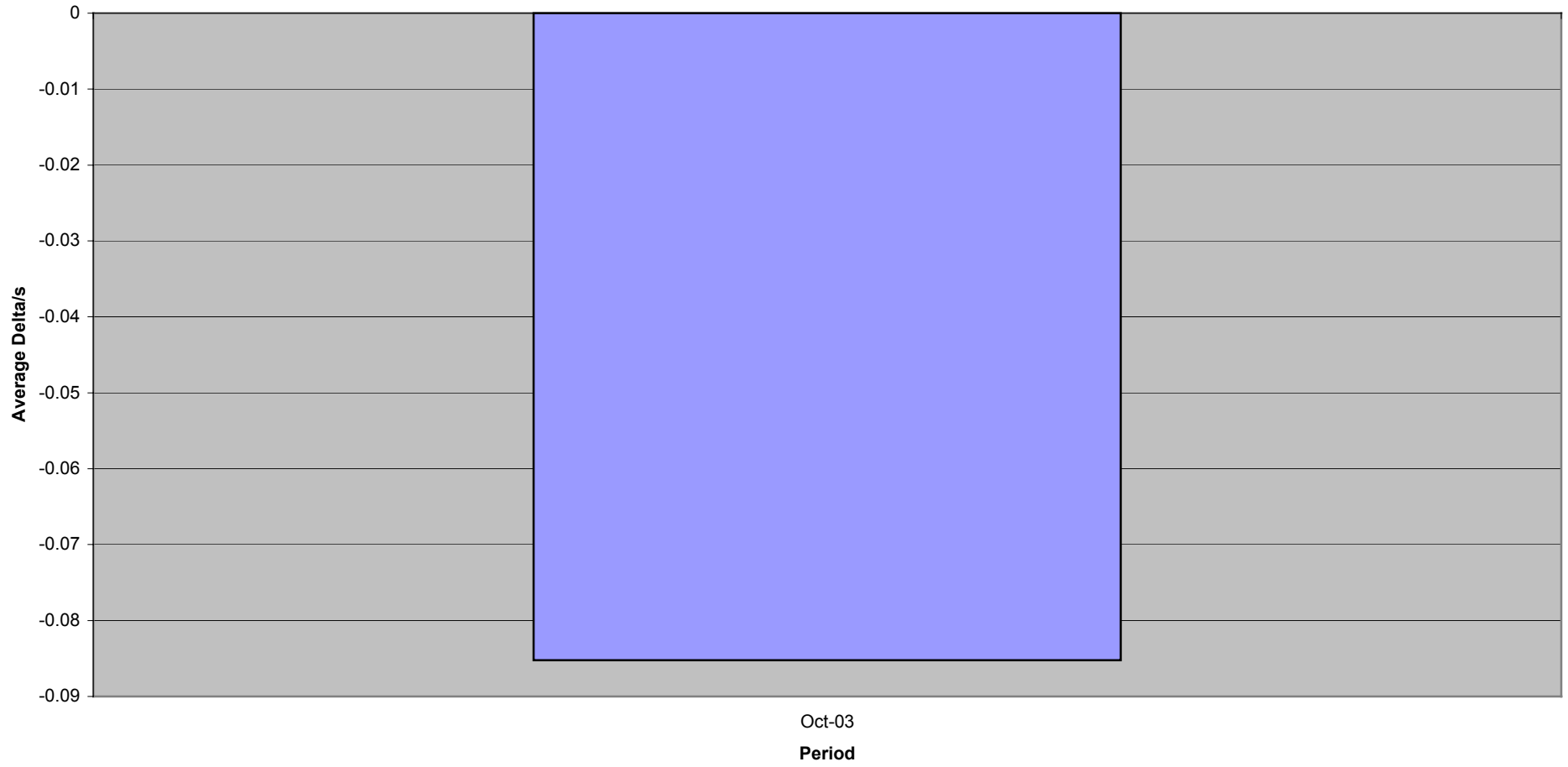


Figure 7 - Percent Viscosity Increase, Pooled Standard Deviation

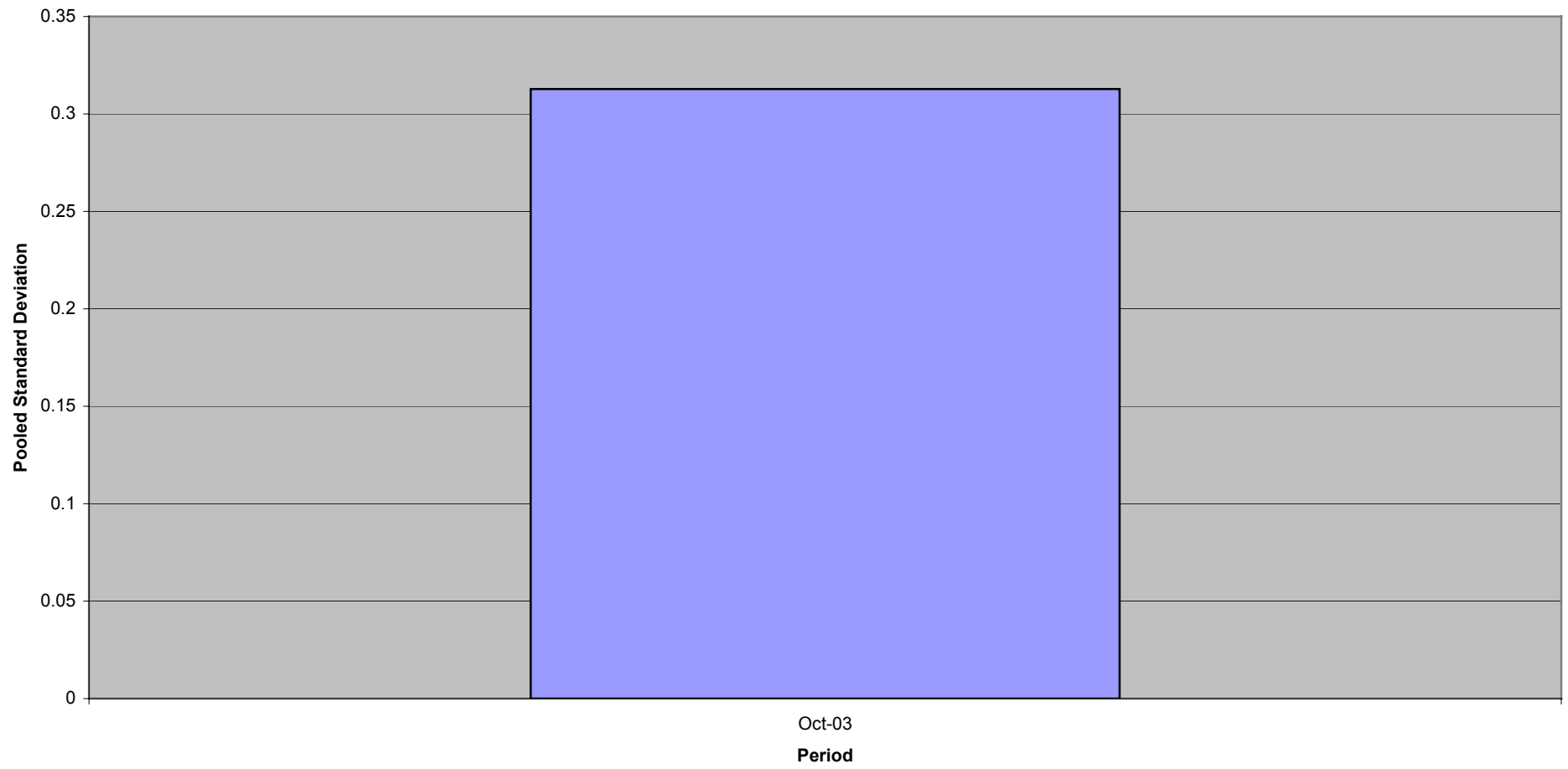


Figure 8 - Weighted Piston Deposits, Pooled Standard Deviation

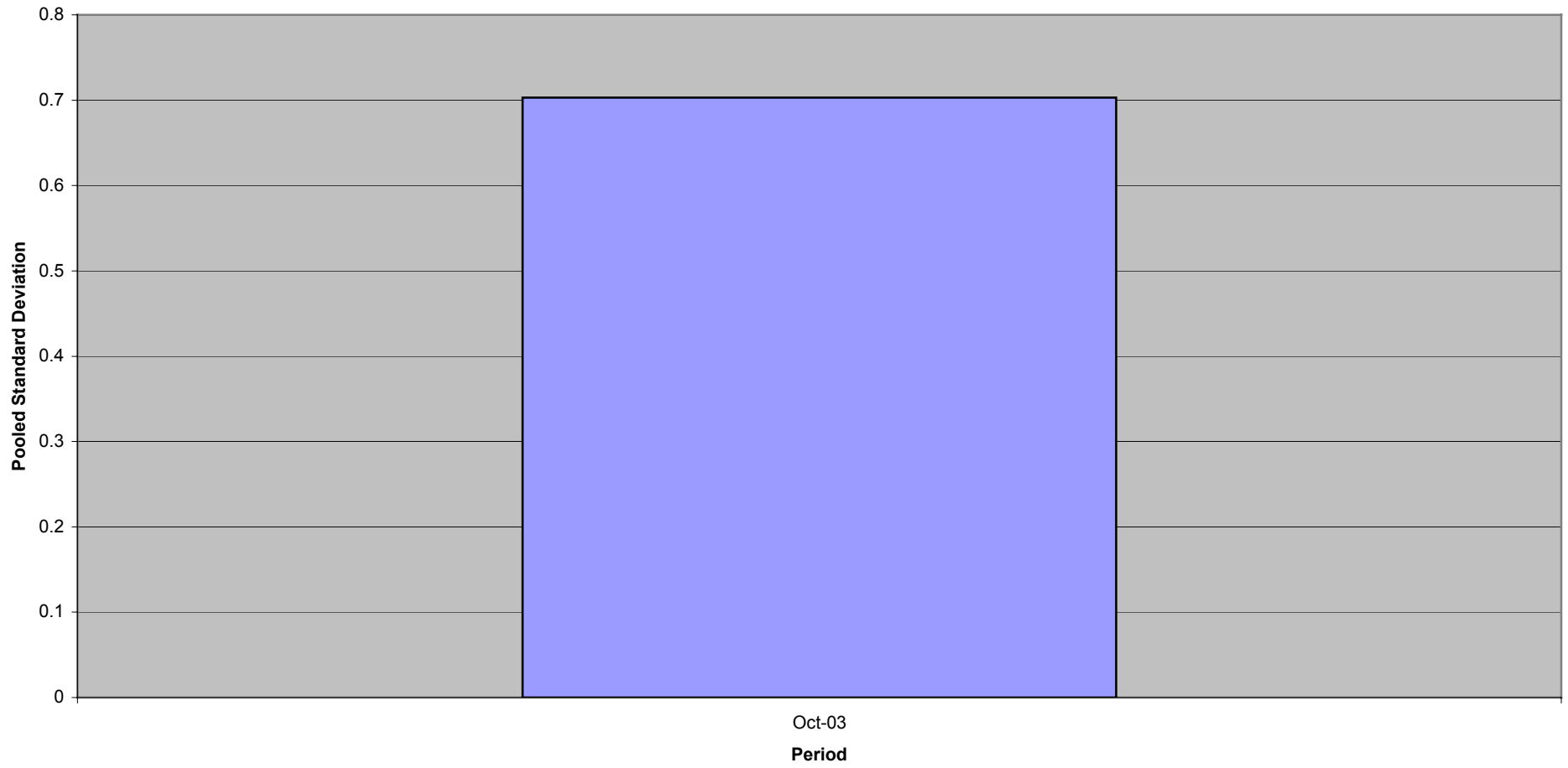


Figure 9 - Average Camshaft plus Lifter Wear, Pooled Standard Deviation

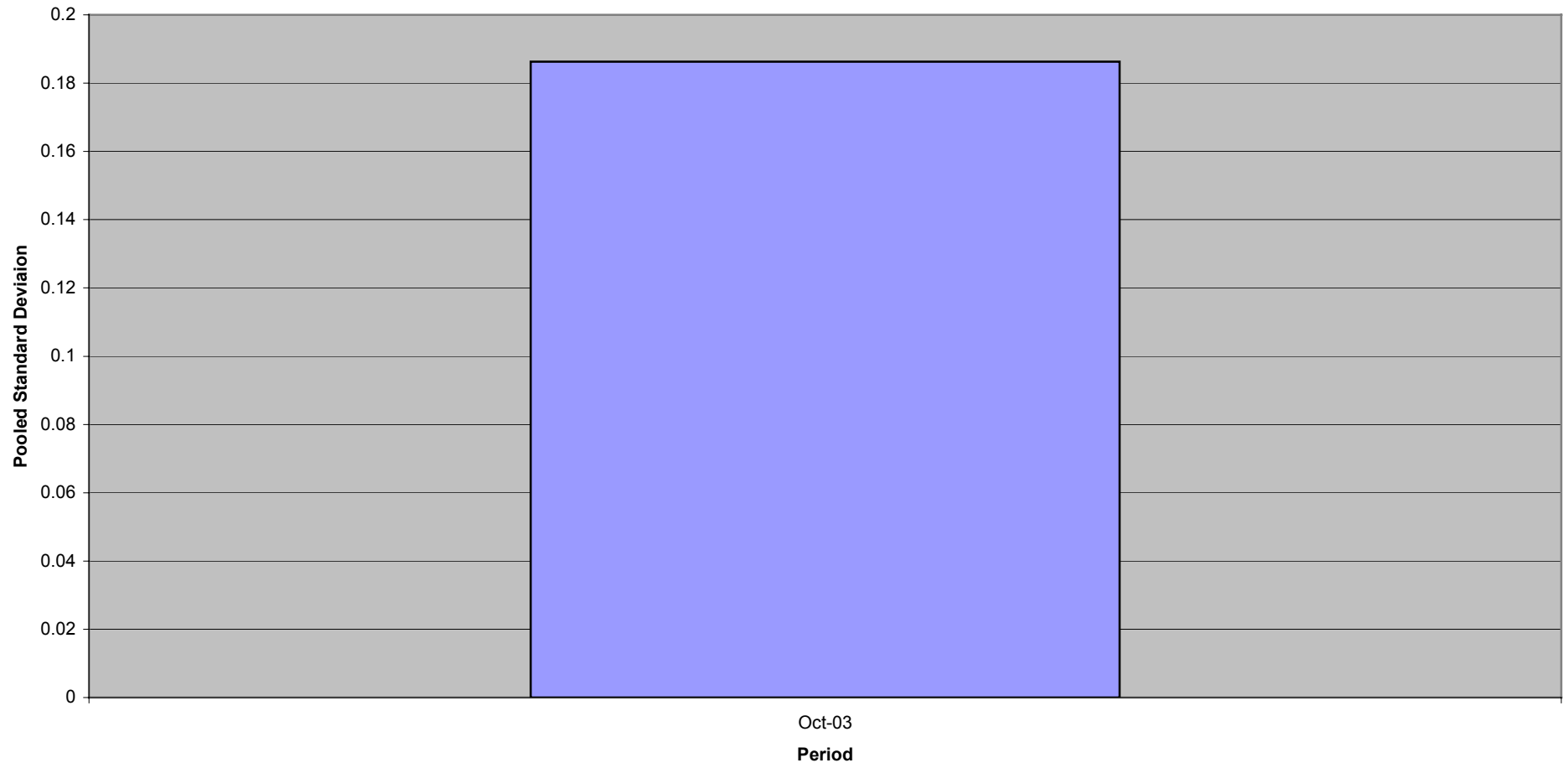


Figure 10 – Sequence IIIG Timeline

Date	Topic	Information Letter
8/19/03	Draft Sequence IIIG Test Procedure Issued	03-1
9/9/03	Revised Valve Spring Load Specifications	03-2
9/23/03	Revised Test Numbering Methodology	03-3