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

Memorandum: 00-159

Date: November 8, 2000

To: Zack Bishop, Chairman, Sequence VIII Surveillance Panel

From: Michael T. Kasimirsky

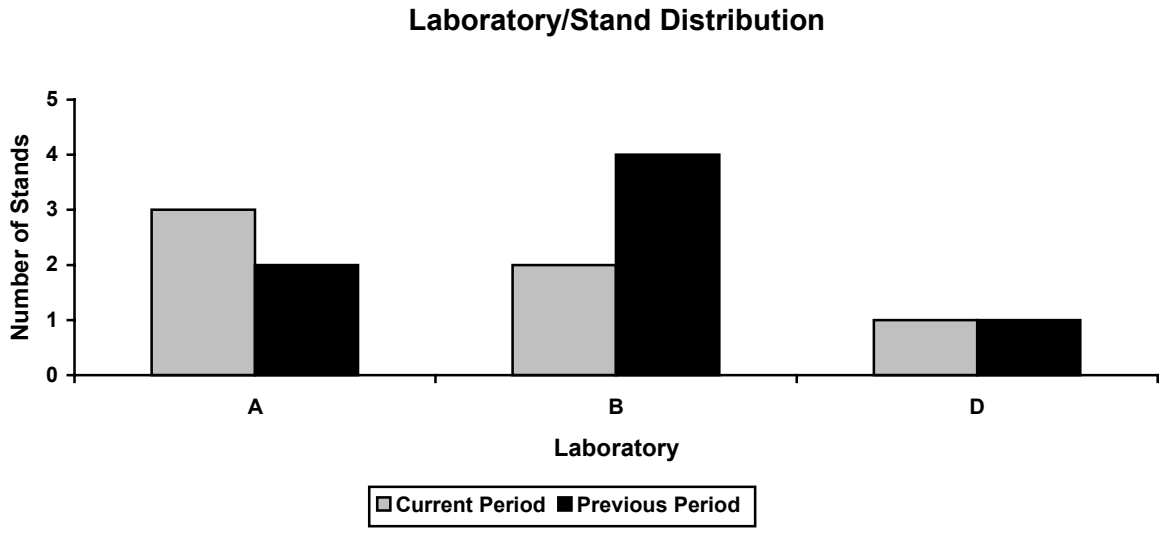
Subject: Sequence VIII Semiannual Report: April 1, 2000 to September 30, 2000

The following is a summary of Sequence VIII reference oil tests that were reported to the Test Monitoring Center during the period from April 1, 2000 to September 30, 2000.

Lab/Stand Distribution

	Reporting Data	Calibrated as of September 30, 2000
Number of Laboratories:	3	3
Number of Stand/Engine Combinations:	6	4

The following chart shows the laboratory/stand distribution:

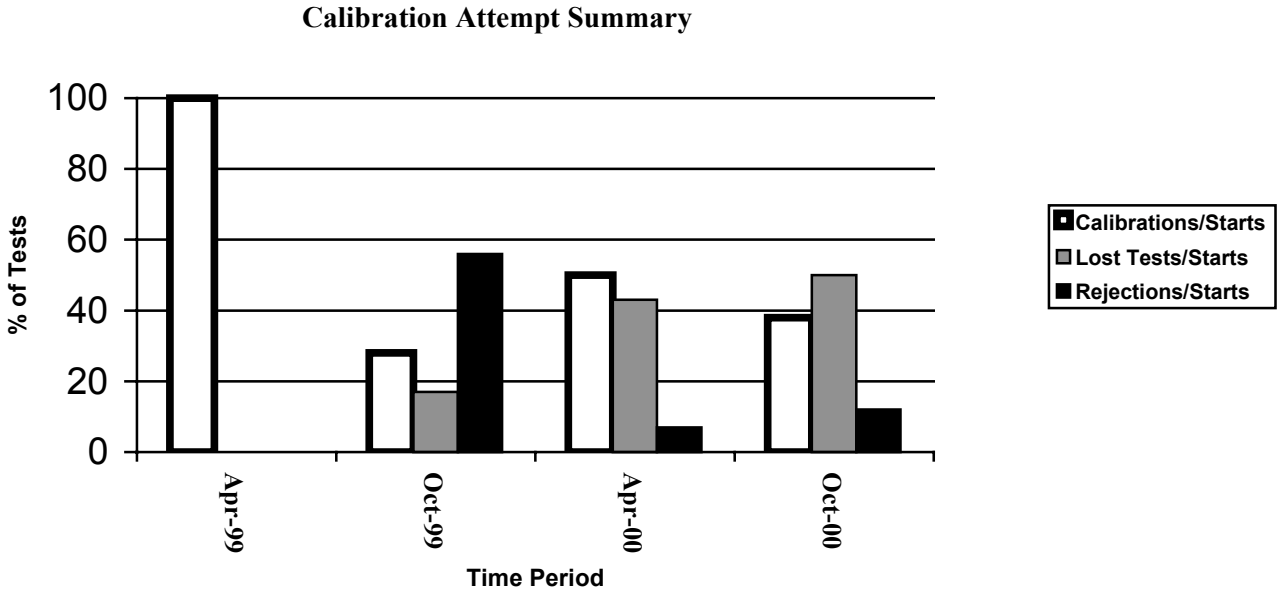


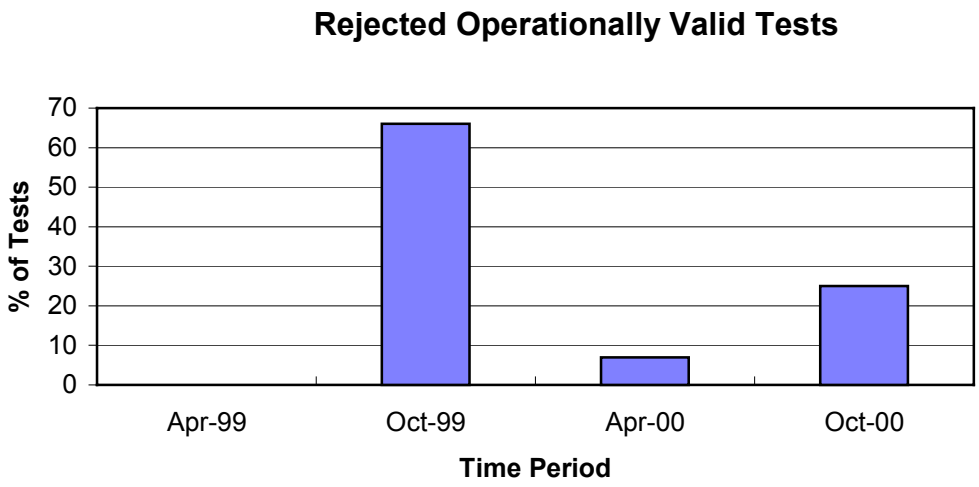
The following summarizes the status of the reference oil tests reported to the TMC:

Calibration Start Outcomes	TMC Validity Code	No. of Tests
Operationally and Statistically Acceptable	AC	6
Failed Acceptance Criteria	OC	2
Stand/Engine failed to successfully calibrate, engine abandoned and data pulled	MC	0
Operationally Invalid (Laboratory Judgment)	LC	5
Operationally Invalid (Laboratory & TMC Judgment)	RC	0
Aborted	XC	3
Total		16

Donated & Industry Support Outcomes	TMC Validity Code	No. of Tests
none		
Total		0

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



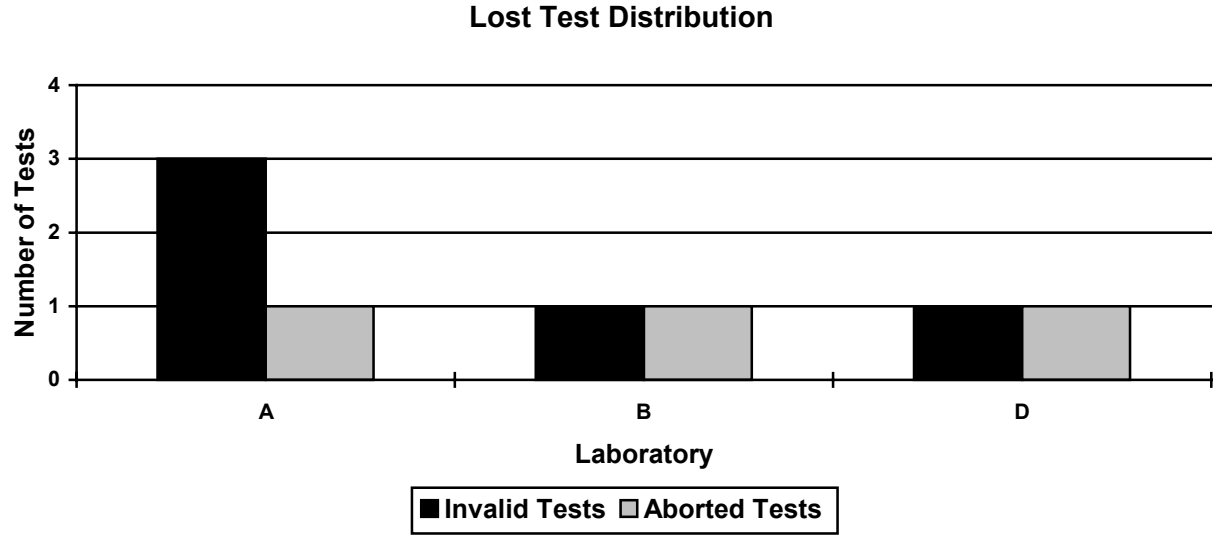


Two tests failed this period, both for EWMA Stand Precision Alarms.

There were no LTMS Deviations this period. There have been no deviations from the LTMS since its introduction in 1999.

Lost Test Summary

Of the eight tests lost for the period: two were lost due to mechanical bearing wear, one due to instrumentation error, one due to rocker cover calibration error, one due to a head gasket failure, one due to an oil spill, one due to oil gallery deviation percentage, and one due to engine coolant out temperature deviation percentage. Aborts and Operationally Invalid tests by laboratory are summarized with the following chart:



Information Letters

Information Letter No. 00-1, Sequence No. 2, dated June 1, 2000, was issued this period and covered the following topics: New Piston Ring Set & Revised Reporting Requirements, New Oil Filter, Revised Test Parts Source, and a Piston Cleaning Procedure for Reusing Pistons.

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 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
BWL	-0.15	3.60 (df=6)	-0.5 mg
SVIS	0.35	0.059 (df=6)	0.02 cSt

Average Δ/s by Laboratory		
Lab	BWL	SVIS
A	-0.02	0.11
B	-0.19	0.47
D	-0.21	0.18

Bearing Weight Loss (BWL)

The Industry BWL mean Δ/s is -0.15 mild for this report (see Figure 3). This equates to a shift of -0.5 mg in reported units. The pooled standard deviation for the period is 3.60 mg (see Figure 4). The industry has been within limits for the period for both severity and precision (see Figure 1).

Stripped Viscosity (SVIS)

The Industry SVIS mean Δ/s is 0.35 mild for this report (see Figure 5). This equates to a shift of 0.02 in reported units. The pooled standard deviation for the period is 0.059 cSt (see Figure 6). The industry has been within limits for both severity and precision for the period (see Figure 2).

Hardware

There were no hardware changes for the period.

Reference Oils

Oil	TMC Inventory, In gallons	TMC Inventory, In tests	Laboratory Inventory, in tests	Estimated Life
704-1	526	263	7	10+ years[1]
1006	1,552	776	6	10+ years[1]

[1] Multiple test area reference oil; total TMC inventory shown

MTK/mtk

Attachments

c: F. M. Farber, TMC
Sequence VIII Surveillance Panel
ftp://tmc.astm.cmri.cmu.edu/docs/gas/sequenceviii/semiannualreports/VIII-10-2000.pdf

List of Figures

- Figure 1 graphically presents the Industry control charts for BWL and also the CUSUM delta/s plot (by count in completion date order) of bearing weight loss for operationally valid tests.

- Figure 2 graphically presents the Industry control charts for SVIS and also the CUSUM delta/s plot (by count in completion date order) of bearing weight loss for operationally valid tests.

- Figure 3 graphically presents a historic perspective for BWL mean delta/s by report period.

- Figure 4 graphically presents a historic perspective for BWL pooled standard deviations by report period.

- Figure 5 graphically presents a historic perspective for SVIS mean delta/s by report period.

- Figure 6 graphically presents a historic perspective for SVIS pooled standard deviations by report period.

- Figure 7 graphically presents a comparison of Total Bearing Weight Loss (Delta/s) vs. the amount of lead content, in ppm, in the bearing storage oil.

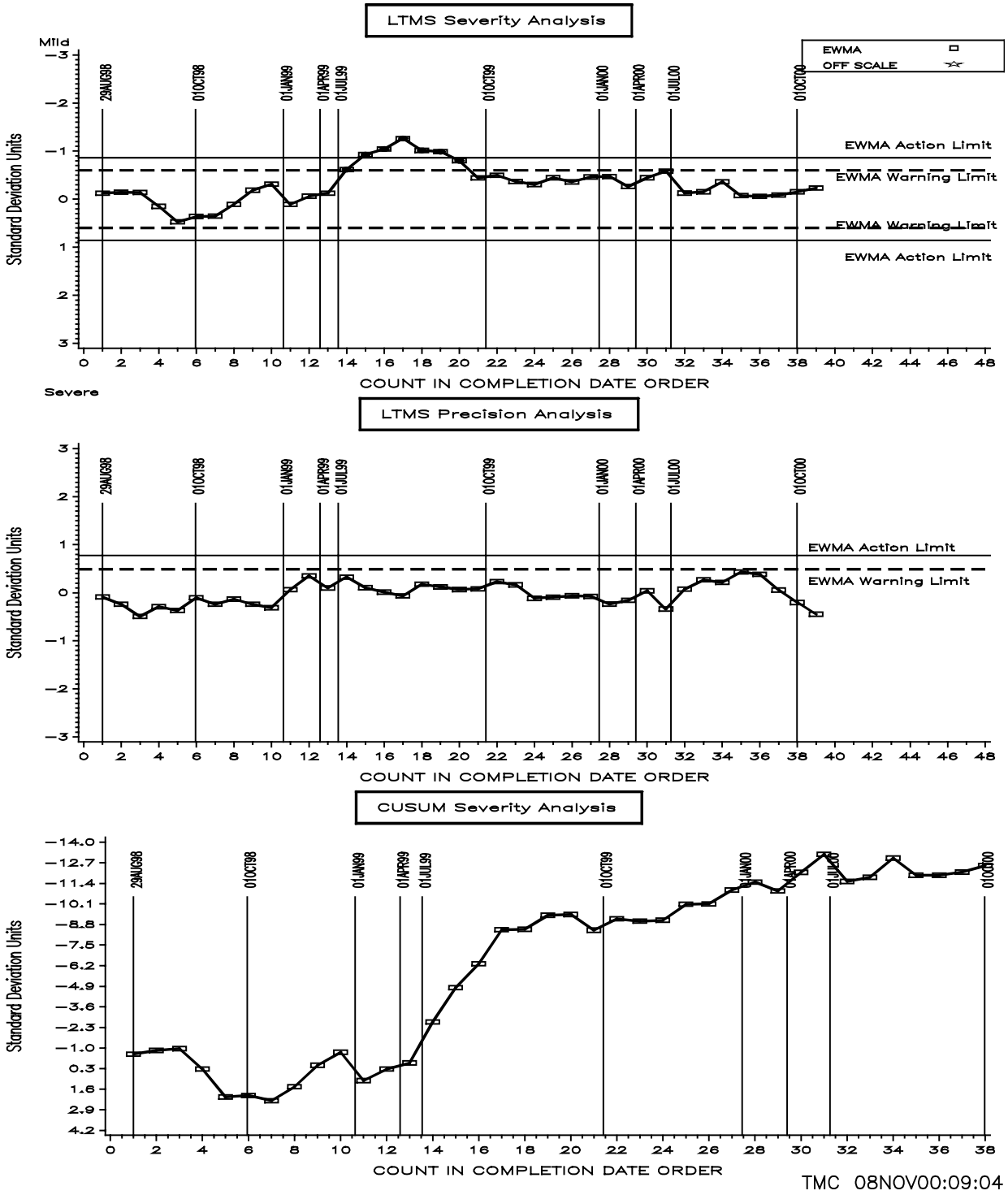
- Figure 8 graphically presents the amount of lead content, in ppm, in the bearing storage oil by completion date order (Sequence VIII and L-38 data combined).

- Figure 9 is the Sequence VIII Timeline, created to track changes in test hardware and operations, current through November 8, 2000.

SEQUENCE VIII INDUSTRY OPERATIONALLY VALID DATA

FINAL BEARING WEIGHT LOSS

Figure 1



SEQUENCE VIII INDUSTRY OPERATIONALLY VALID DATA

STRIPPED VIS. @ 100 DEG C

Figure 2

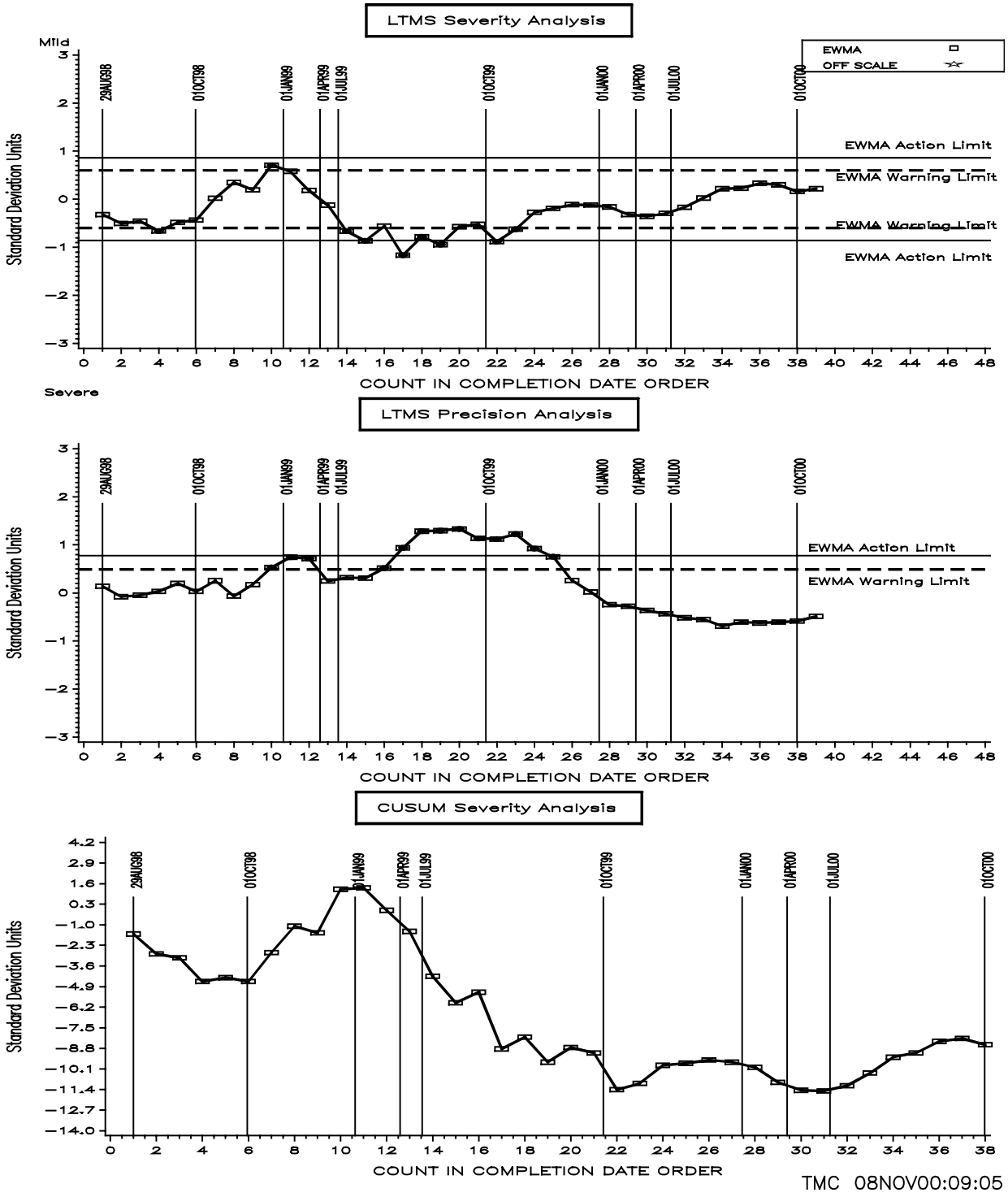


Figure 3 - Sequence VIII Reference Oil Data
Bearing Weight Loss

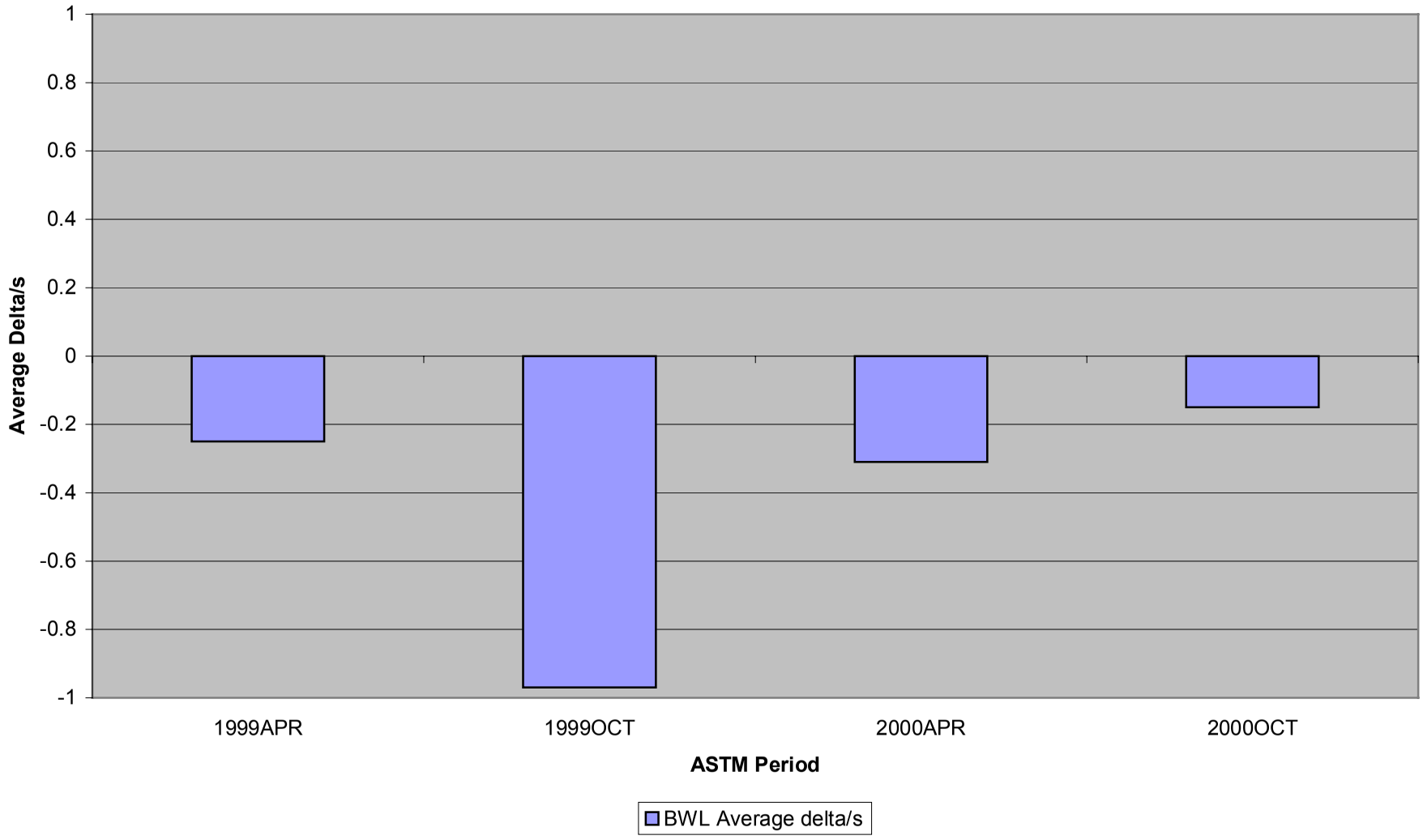


Figure 4 - Sequence VIII Reference Oil Data
Bearing Weight Loss

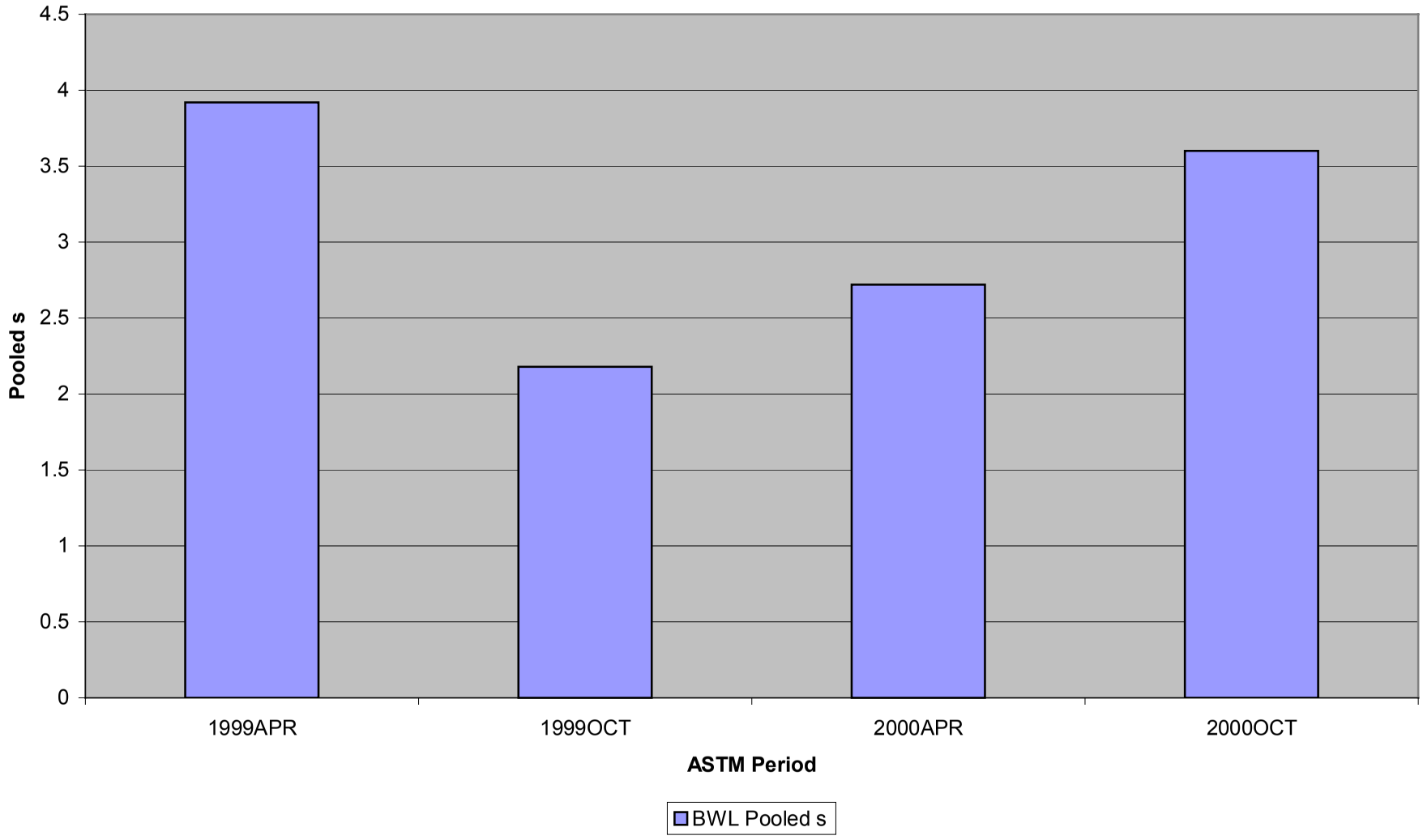


Figure 5 - Sequence VIII Reference Oil Data
Stripped Viscosity

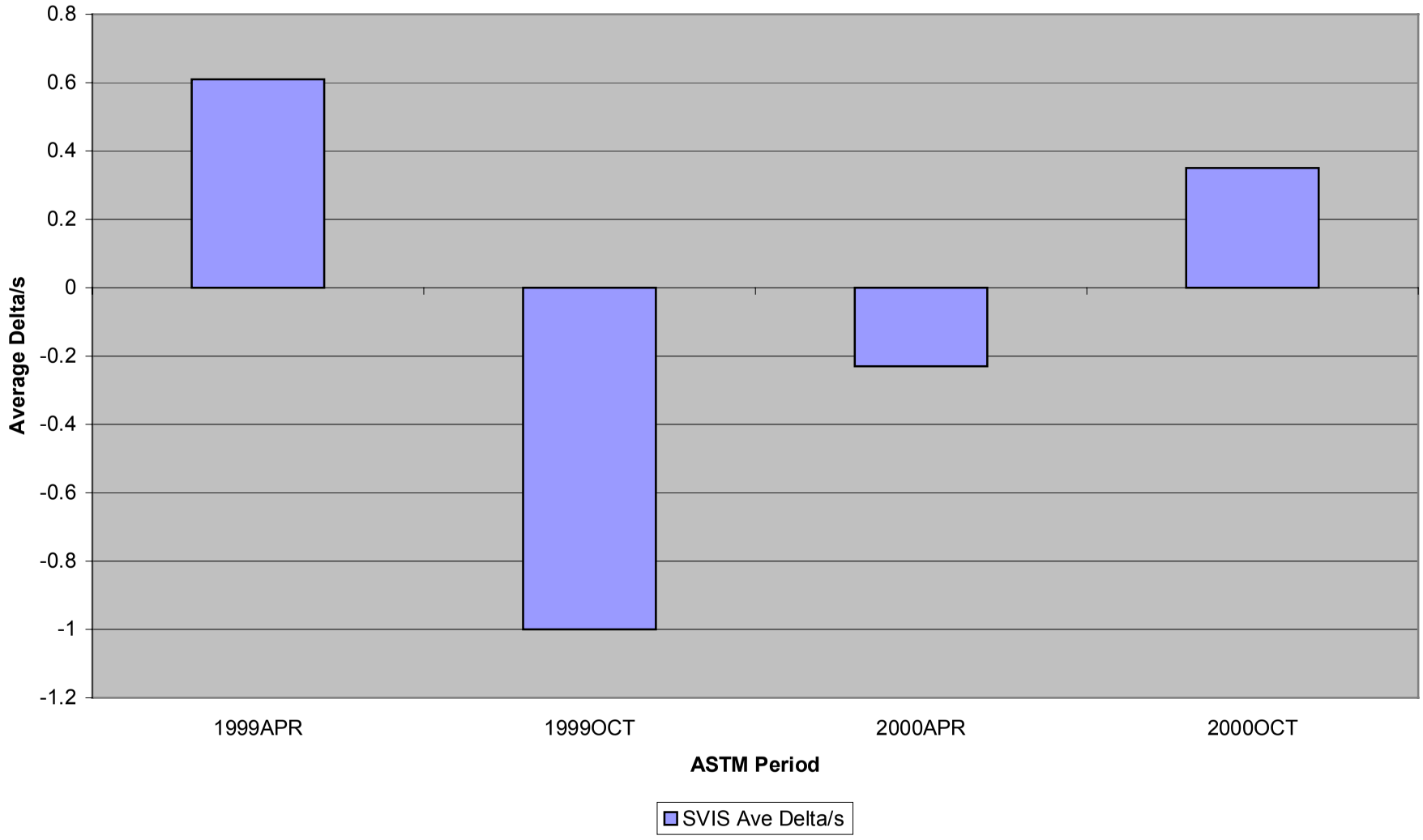
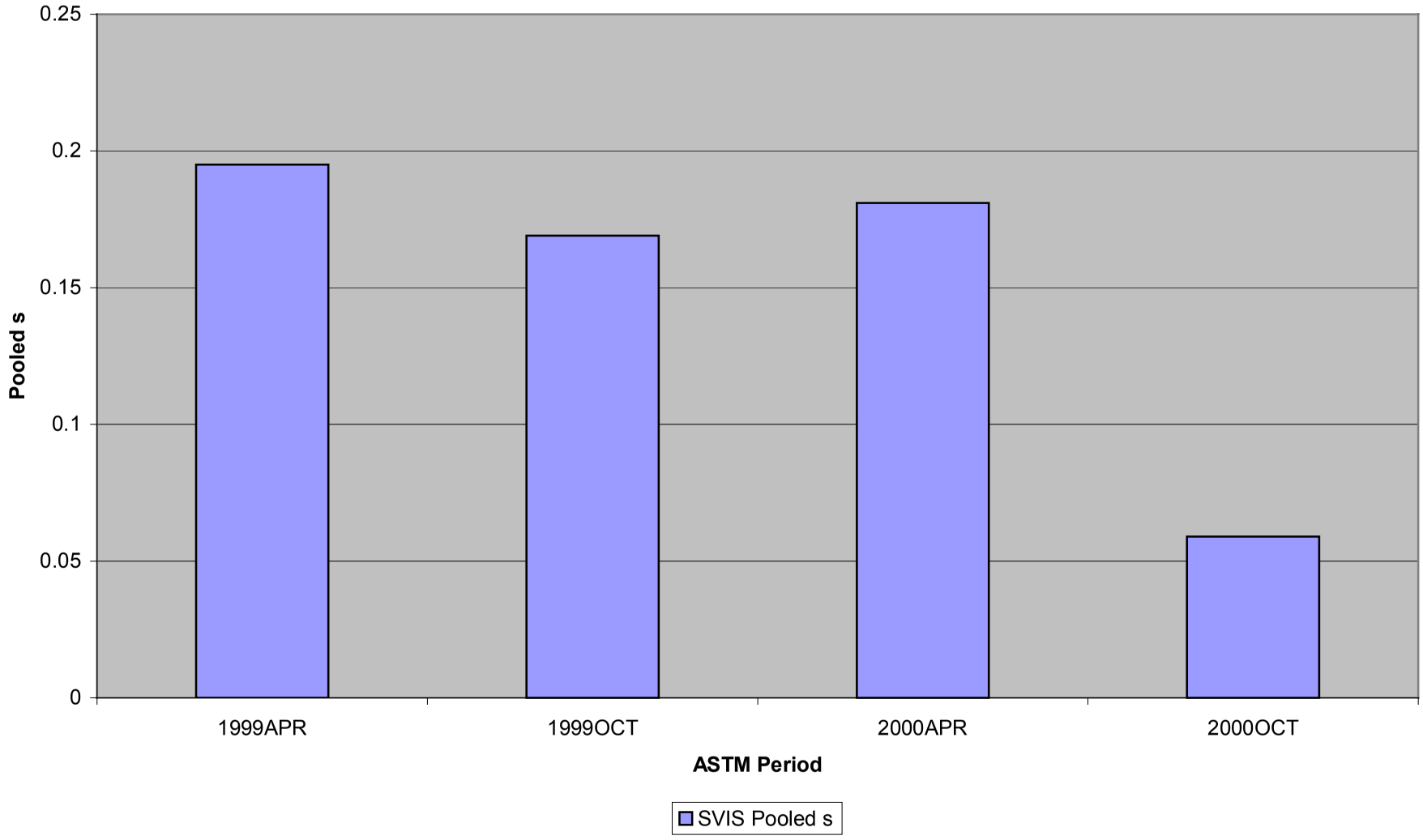


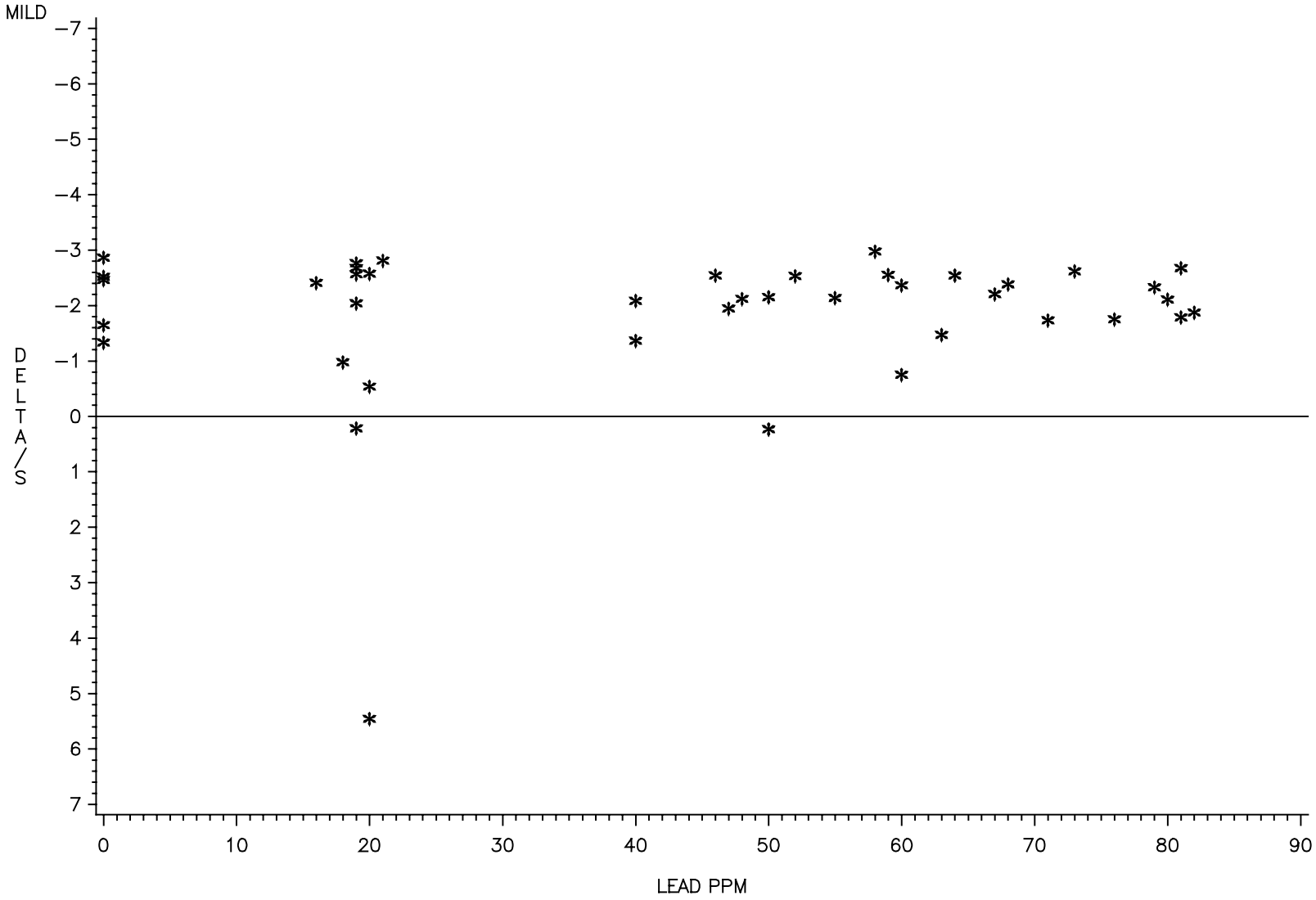
Figure 6 - Sequence VIII Reference Oil Data
Stripped Viscosity



SEQUENCE VIII TBWL DELTA/S vs LEAD PPM

FIGURE 7

September 1, 1994 through September 30, 2000



(*) BEARING BATCH 11/93

BEARING OIL STORAGE LEAD PPM vs COMPLETION DATE

September 1, 1994 through September 30, 2000

FIGURE 8

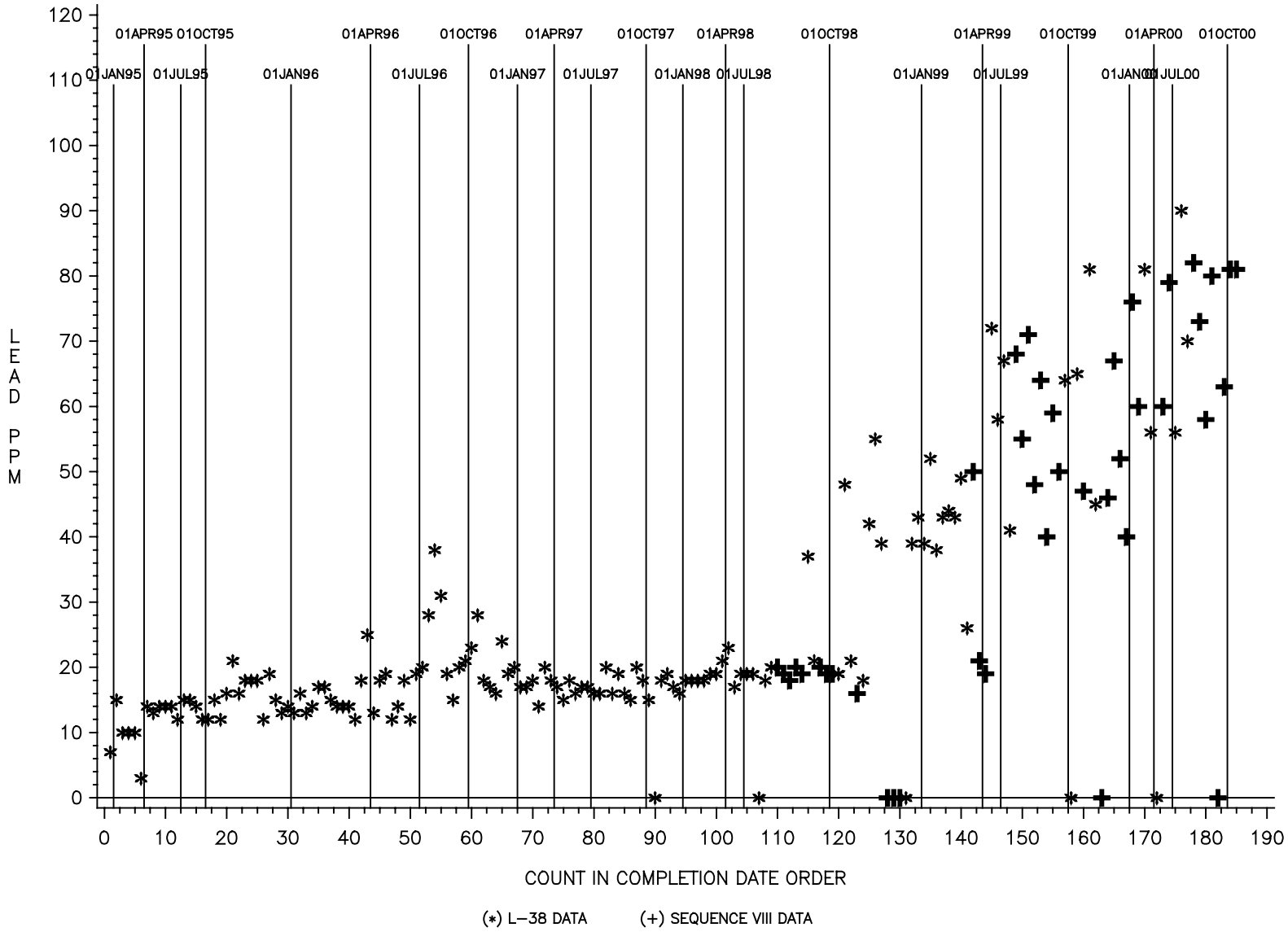


Figure 9 - Sequence VIII Timeline		
Date	**Topic**	**Information Letter**
4/16/1999	DRAFT 3.1 OF THE SEQUENCE VIII TEST PROCEDURE ISSUED	99-1
2/10/1999	REMOVAL OF RING BATCH REPORTING REQUIREMENTS	00-1
5/19/1999	NEW OIL FILTER (RAYCOR LFS-62) IMPLEMENTED INTO TESTING	00-1
11/16/1999	TEST ENGINEERING INC. NEW TEST PARTS SUPPLIER	00-1
1/28/2000	PISTON CLEANING PROCEDURE FOR REUSING PISTONS IN SEQUENCE VIII TESTING	00-1