A Program of ASTM International

Test Monitoring Center

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412-365-1000

Memorandum: 09-041

Date: October 2, 2009

To: Fred Gerhart, Chairman, Sequence VIII Surveillance Panel

From: Richard E. Grundza

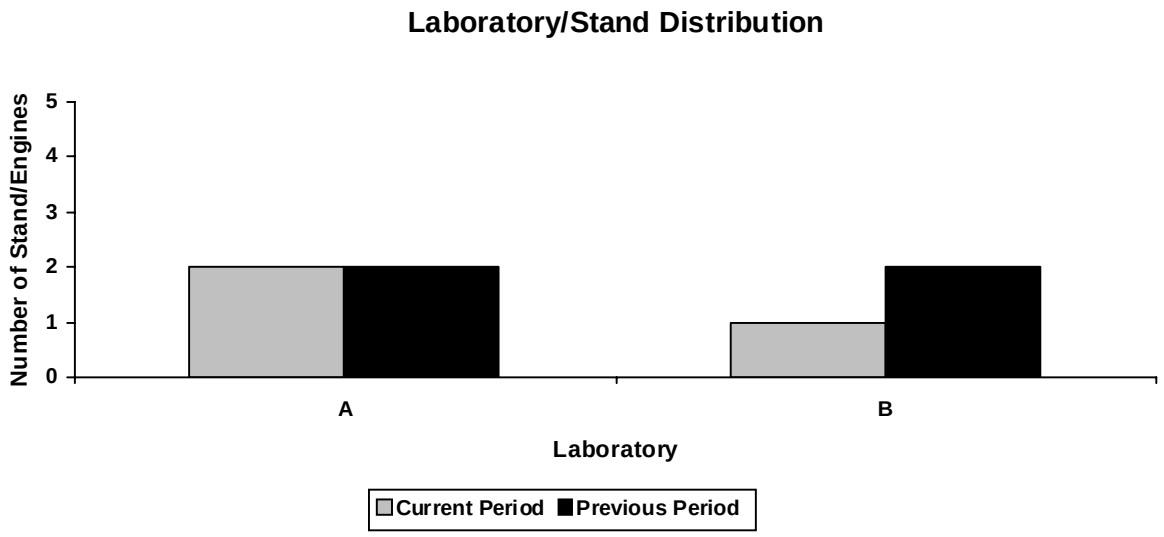
Subject: Sequence VIII Semiannual Report: April 1, 2009 to September 30, 2009

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, 2009 to September 30, 2009.

Lab/Stand Distribution

	Reporting Data	Calibrated as of September 30, 2009
Number of Laboratories:	2	1
Number of Stand/Engine Combinations:	3	2

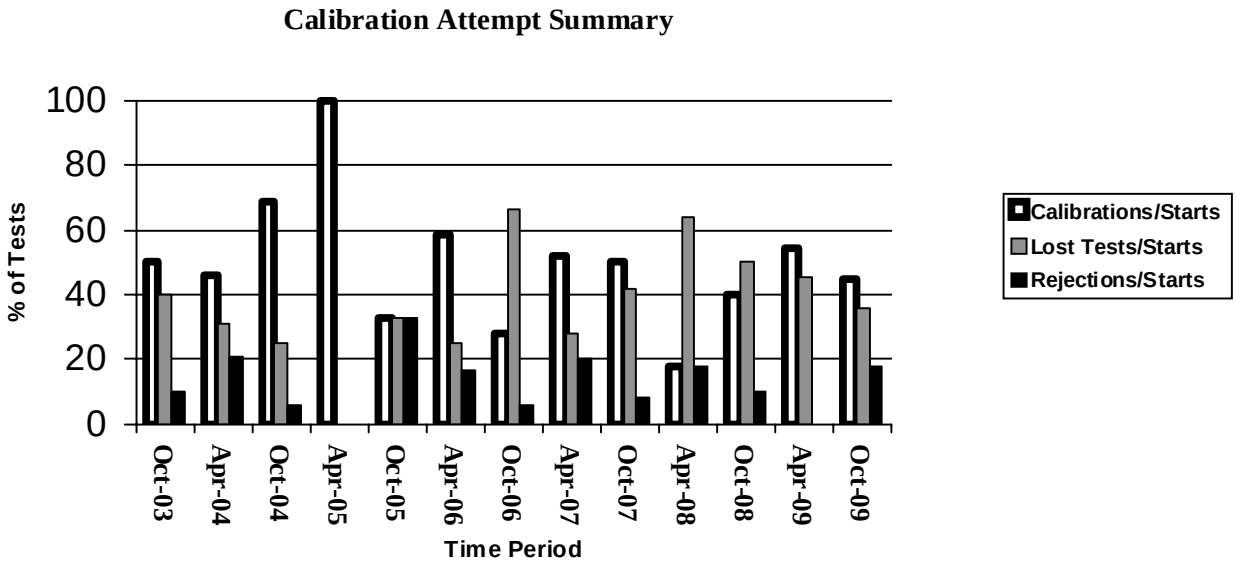
The following chart shows the laboratory/stand distribution:

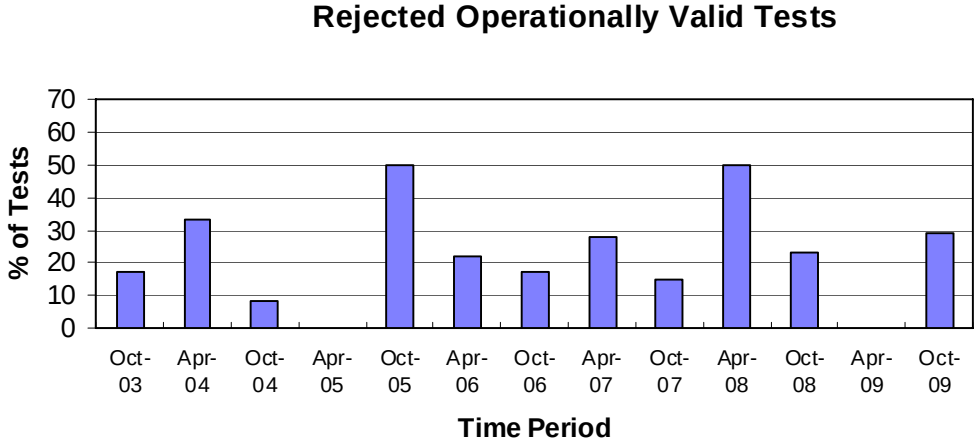


The following summarizes the status of the reference oil tests reported to the TMC:

Calibration Start Outcomes	TMC Validity Code	No. of Tests
Operationally and statistically acceptable	AC	5
Operationally invalid (laboratory judgment)	LC	4
Operationally valid, statistically unacceptable	OC	2
Aborted donated test	XG	1
Operationally valid acceptable donated test	AG	1
Total		13

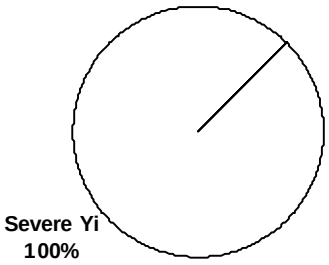
Calibrations per start, lost tests per start and rejection rates are summarized below:



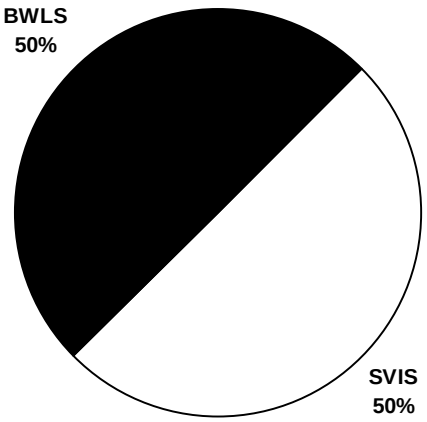


Two tests failed this report period. One test was severe on stripped viscosity increase while a second test was severe on bearing weight loss.

Distribution of LTMS Stand Alarms



Distribution of Stand Alarms by Parameter



There were no LTMS Deviations this period. There have been three deviations from the LTMS to date.

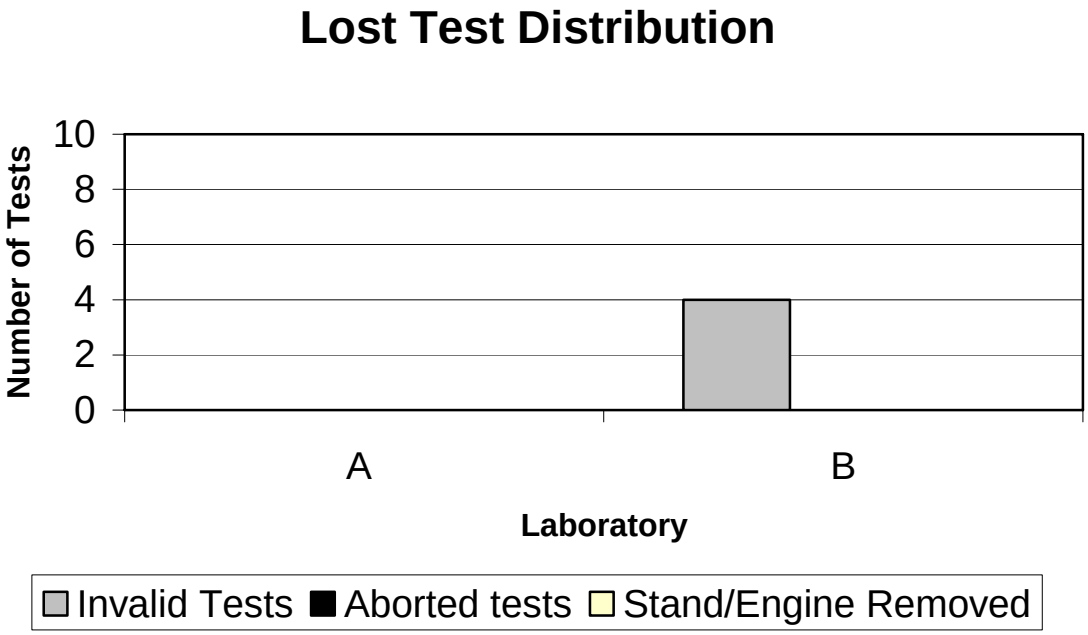
No lab visits were conducted by the TMC this period.

Lost Test Summary

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

Reasons for Lost Test(s)	Number
High mechanical wear	4

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



There were two donated tests this report period. Both tests were run on the 01-09 bearing batch. One test was aborted due to an oil leak, while the second test was found to be acceptable.

Information Letters

One information letter was issued this period. Information Letter 09-1 was issued 5-28-2009. Item(s) changed with this information letter are documented in the VIII timeline (Table 7).

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 values 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	0.679	4.67 (df=5)	3.17 mg
SVIS	0.891	0.092 (df=5)	0.08 cSt

Average Δ/s by Laboratory		
Lab	BWL	SVIS
A	0.142	0.590
B	2.021	1.643

Bearing Weight Loss (BWL)

The industry control charts for severity were in control for most of the period, sounding severe warning alarms with the last two tests completed this period. Precision charts were in control for the period (see Figure 1).

The Industry BWL mean Δ/s is 0.679 severe for this report period (see Figure 3). This equates to a shift of 3.17 mg in reported units. The pooled standard deviation for the period is 4.67 mg (see Figure 4), which has degraded with respect to the previous period and compares well with historical estimates.

Stripped Viscosity (SVIS)

The industry control chart for severity began the period in control, but went into mild warning alarm with the last two tests reported during the period. Precision was in control for the period (see Figure 2).

The Industry SVIS mean Δ/s is 0.891 mild for this report period (see Figure 5), and equates to a shift of 0.08 cSt in reported units. The pooled standard deviation for the period is 0.092 cSt (see Figure 6), which has degraded with respect to the previous period and is comparable to historical performance.

Hardware

Four tests were conducted on the 01-09 bearings. One laboratory has successfully calibrated on these bearings.

TMC Memoranda

No TMC Memoranda were generated this report period.

Reference Oils

Oil	TMC Inventory, In gallons	TMC Inventory, In tests	Laboratory Inventory, in tests	Estimated Life
704-1	254	127	3	5+ years
1006	41	20	1	3 months[1]
1006-2	4,050	2,025	4	3+ years[1]
1009	561	280	4	3+ years[1]

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

REG/reg

Attachments

c: J. A. Clark, TMC
Sequence VIII Surveillance Panel
ftp://ftp.astmtmc.cmu.edu/docs/gas/sequenceviii/semiannualreports/VIII-10-2009.pdf

Distribution: Electronic Mail

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.

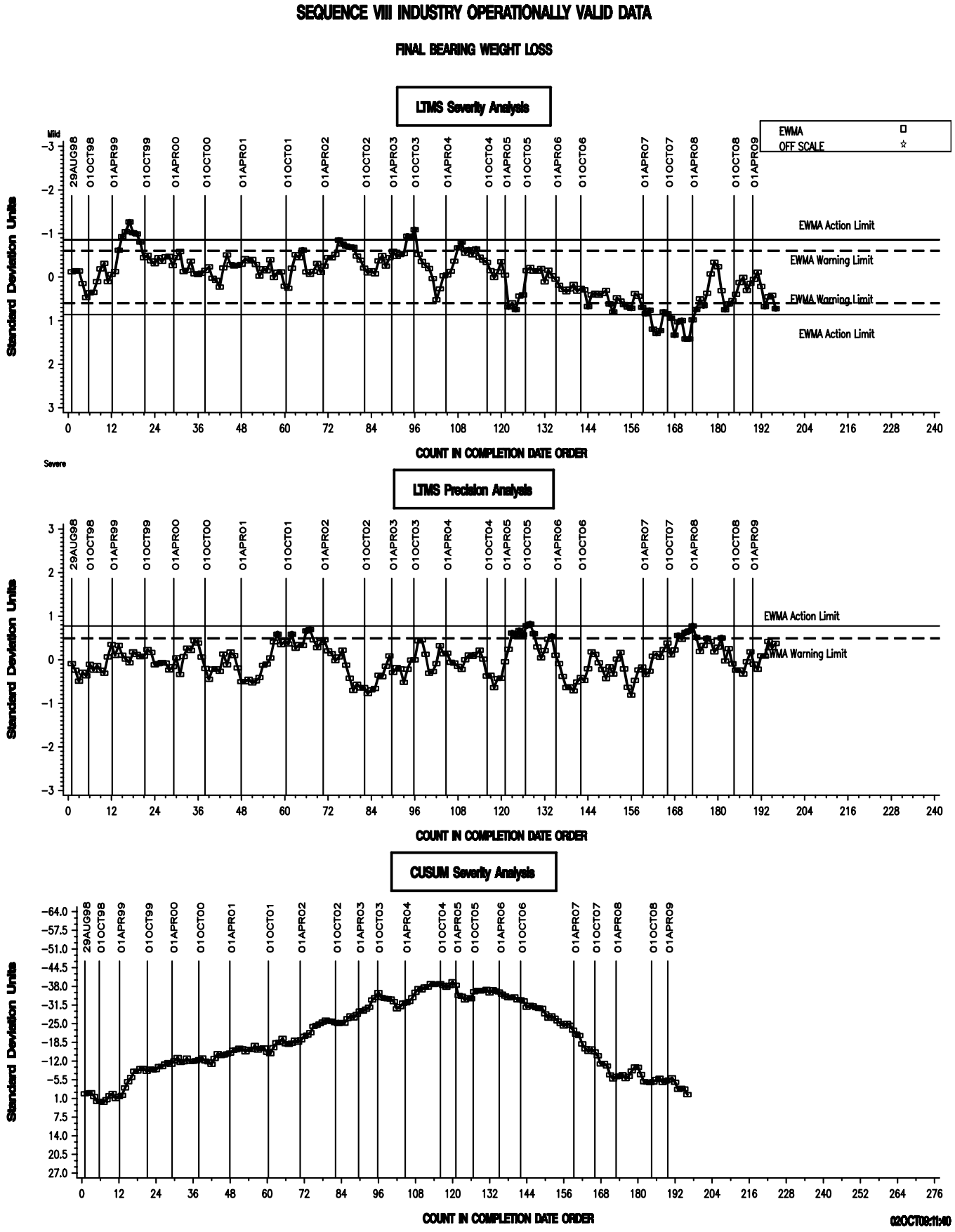
- Figure 4 graphically presents a historic perspective for BWL pooled standard deviations by report period.

- 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 is the Sequence VIII Timeline, created to track changes in test hardware and operations.

Figure 1


SEQUENCE VIII INDUSTRY OPERATIONALLY VALID DATA
FINAL BEARING WEIGHT LOSS
LTMS Severity Analysis
Mild
Severe
EWMA
OFF SCALE
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
LTMS Precision Analysis
CUSUM Severity Analysis
29AUG98
01OCT98
01APR99
01OCT99
01APR00
01OCT00
01APR01
01OCT01
01APR02
01OCT02
01APR03
01OCT03
01APR04
01OCT04
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01APR08
01OCT08
01APR09
02OCT08:11:40

Figure 2

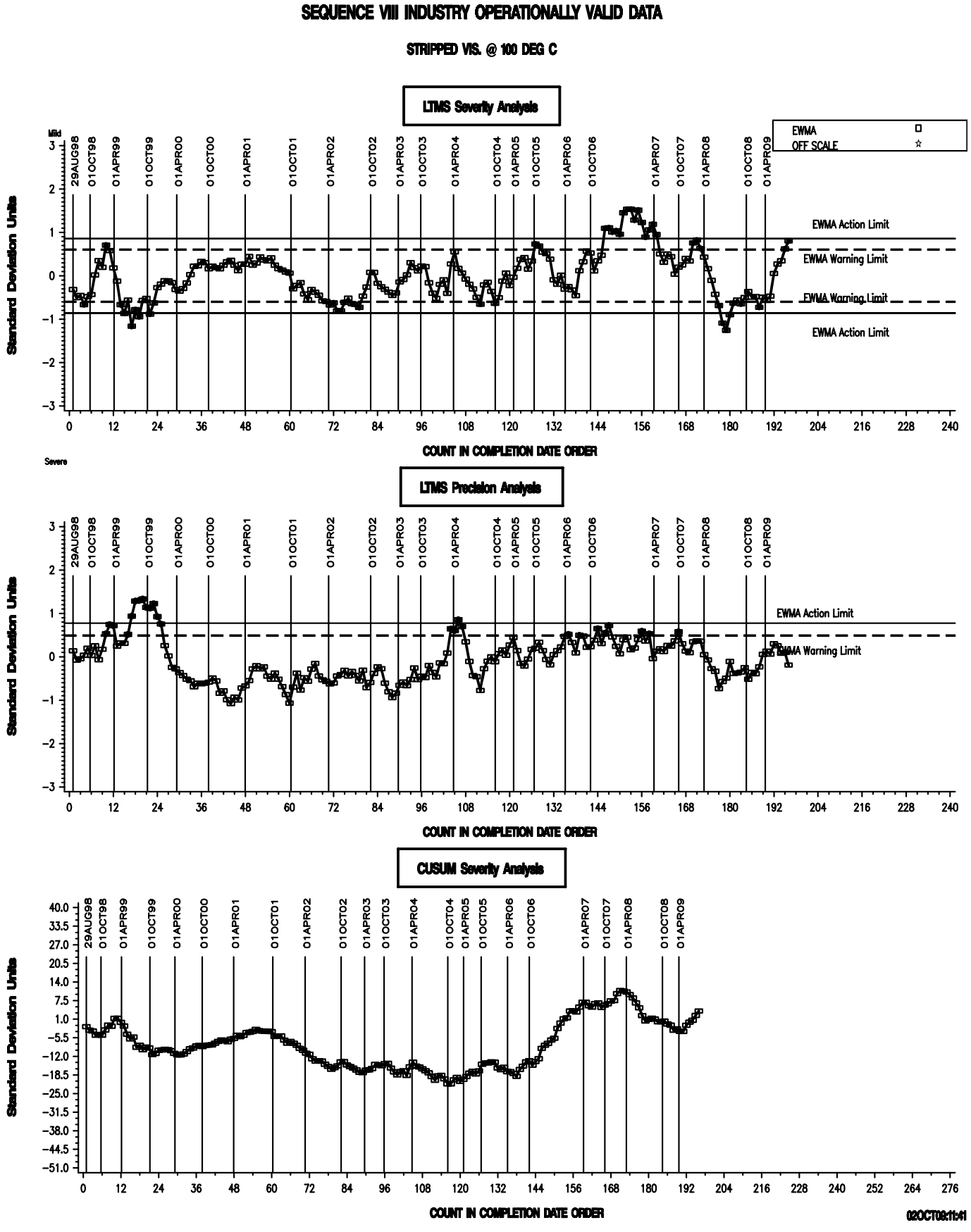
SEQUENCE VIII INDUSTRY OPERATIONALLY VALID DATA
STRIPPED VIS. @ 100 DEG C
LTMS Severity Analysis
Mild
EWMA
OFF SCALE
EWMA Action Limit
EWMA Warning Limit
EWMA Warning Limit
EWMA Action Limit
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
LTMS Precision Analysis
Severe
EWMA Action Limit
EWMA Warning Limit
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
CUSUM Severity Analysis
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
02OCT09:11:41

Figure 3 - Sequence VIII Reference Oil Data
Bearing Weight Loss

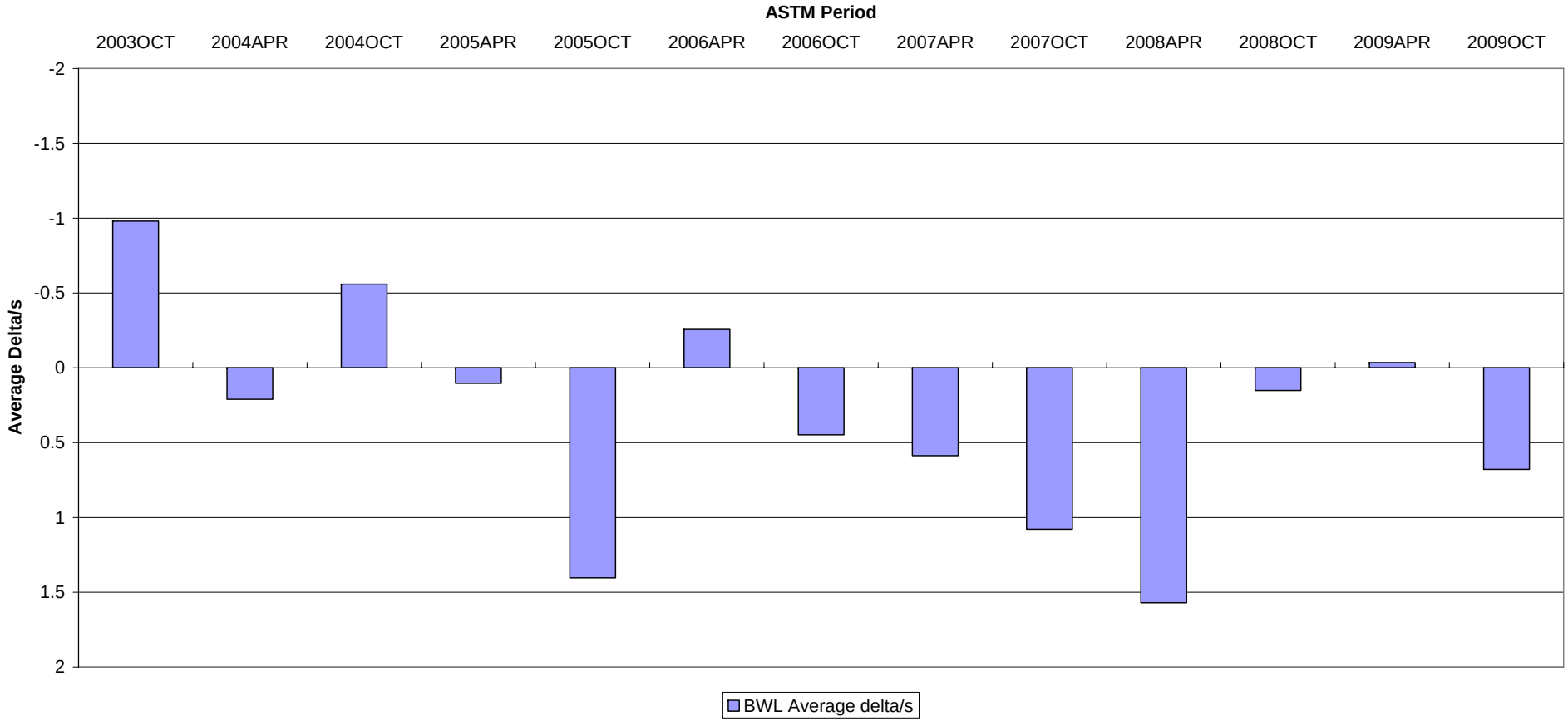

Figure 4 - Sequence VIII Reference Oil Data
Bearing Weight Loss

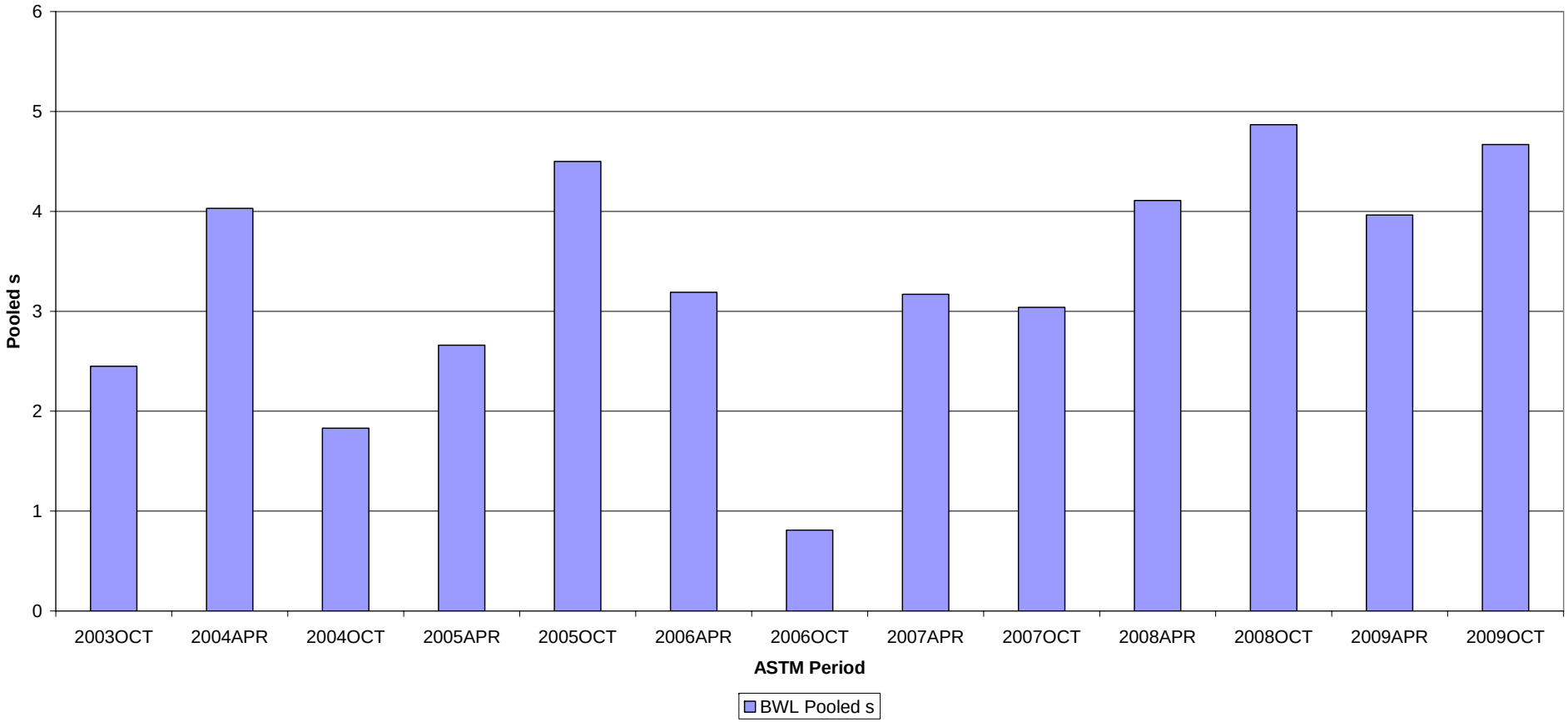

Figure 5 - Sequence VIII Reference Oil Data
Stripped Viscosity

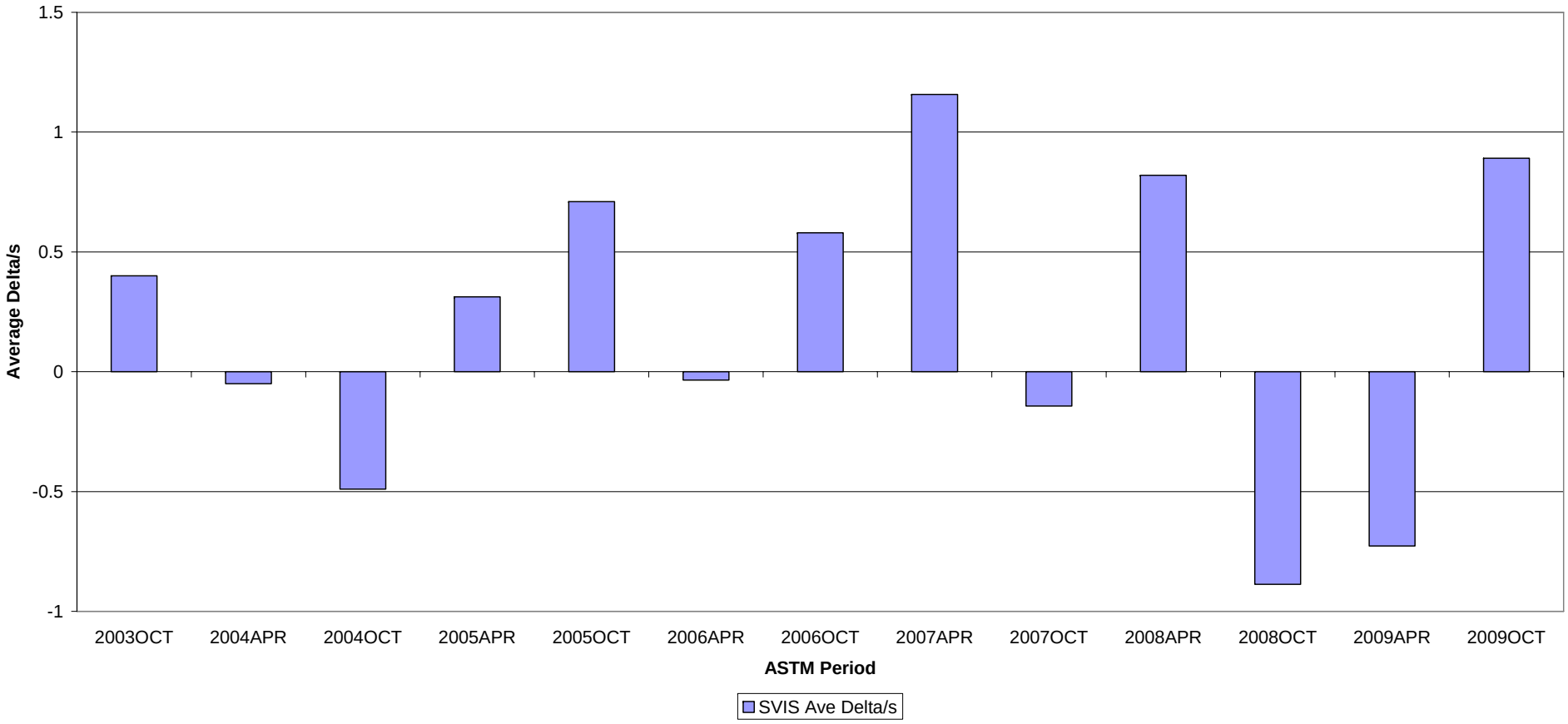

Figure 6 - Sequence VIII Reference Oil Data
Stripped Viscosity

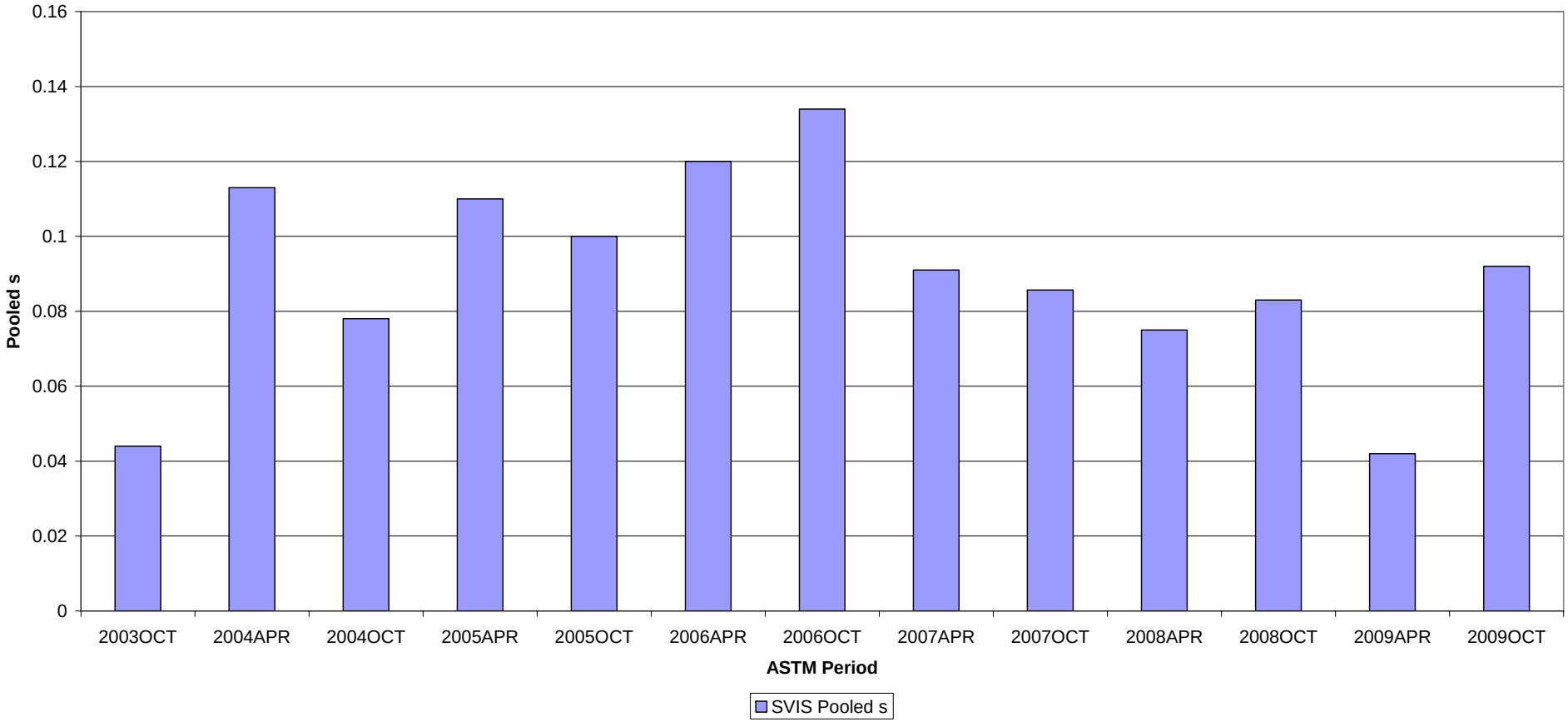

Figure 7 - Sequence VIII Timeline		
Date	**Topic**	**Information Letter**
2/10/1999	NEW PISTON RING BATCH APPROVED FOR USE IN SEQUENCE VIII TESTING	00-1
4/16/1999	DRAFT 3.1 OF THE SEQUENCE VIII TEST PROCEDURE ISSUED	99-1
5/19/1999	REMOVAL OF RING BATCH REPORTING REQUIREMENTS	00-1
5/19/1999	NEW OIL FILTER (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
6/15/2002	REVISED STAY-IN-GRADE PROCEDURE IMPLEMENTED	02-1
11/18/2002	EDITORIAL REVISIONS TO D6709-01	02-2
1/1/2004	NEWINERAL SPIRITS SPECIFICATION	03-1
1/26/04	BILLET CRANKSHAFT APPROVED FOR USE IN SEQUENCE VIII TESTING	
12/9/2004	CLARIFIED SOLVENT SPECIFICATION	04-1
12/9/2004	REVISED FUEL FLOW SPECIFICATION	04-1
12/9/2004	REQUIREMENTS FOR BUILDS WITH OVERSIZE PISTONS	04-1
6/23/05	DELETED ROCKER COVER INLET TEMPERATURE AND PRESSURE SENSORS, UPDATED PRECISION STATEMENT	05-1
9/20/06	FIRST TEST ON 03-06 BEARINGS	
10/24/06	REVISED BEARING CLEANING PROCEDURE IN ANNEX A9	06-1
3/12/07	TARGET UPDATE, REFERENCE OIL 1006-2	
5/15/08	ADDED RESERVIOR TO ROCKER COVER INLET	08-1
6/12/08	CLARIFIED HARDWARE REUSE GUIDELINES	08-2
5/28/09	DELETED REQUIREMENT TO SEND HARD COPY REPORT TO TMC	09-1
5/28/09	ADDED REQUIREMENT TO REPORT ALL RESULTS FROM REFERNCE OIL TESTS TO TMC	09-1