A Program of ASTM International

Test Monitoring Center

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

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

Memorandum: 11-006

Date: April 28, 2011

To: Fred Gerhart, Chairman, Sequence VIII Surveillance Panel

From: Richard E. Grundza

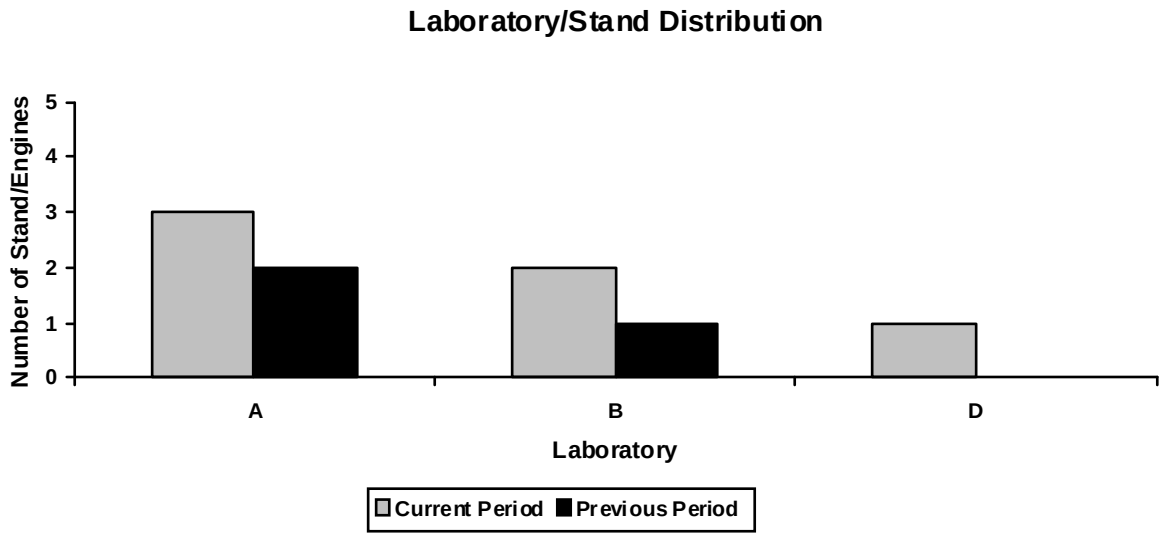
Subject: Sequence VIII Semiannual Report: October 1, 2010 to March 31, 2011

The following is a summary of Sequence VIII reference oil tests that were reported to the Test Monitoring Center during the period from October 1, 2010 to March 31, 2011.

Lab/Stand Distribution

	Reporting Data	Calibrated as of March 31, 2011
Number of Laboratories:	3	3
Number of Stand/Engine Combinations:	6	4

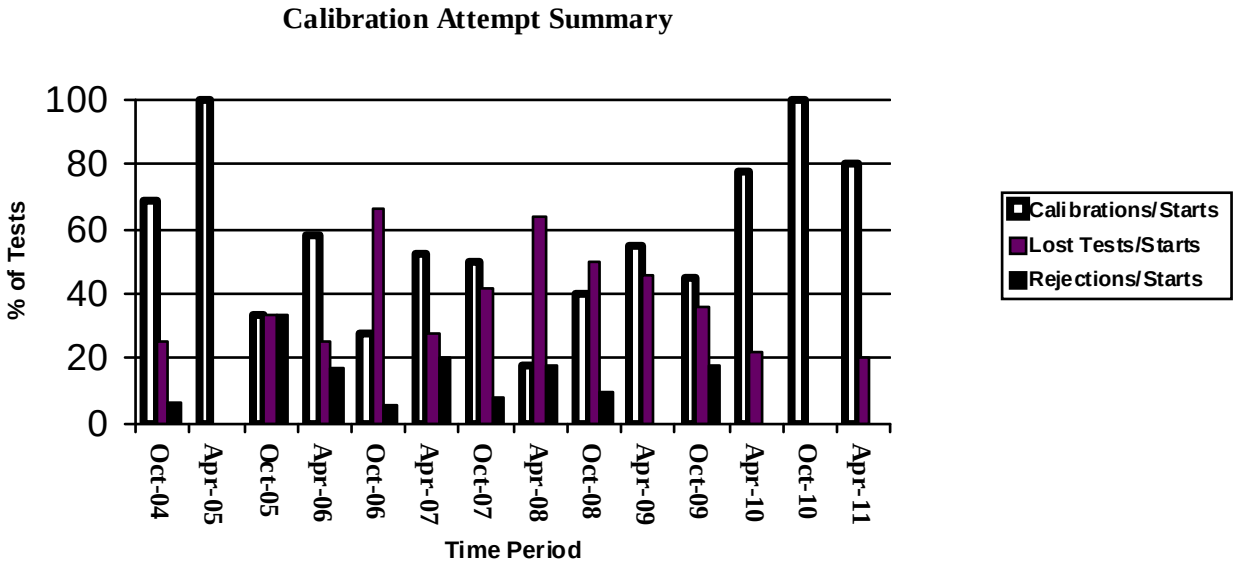
The following chart shows the laboratory/stand distribution:



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	12
Operationally Invalid, Lab Determination	LC	2
Aborted	XC	1
Shakedown	NN	1
Total		16

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



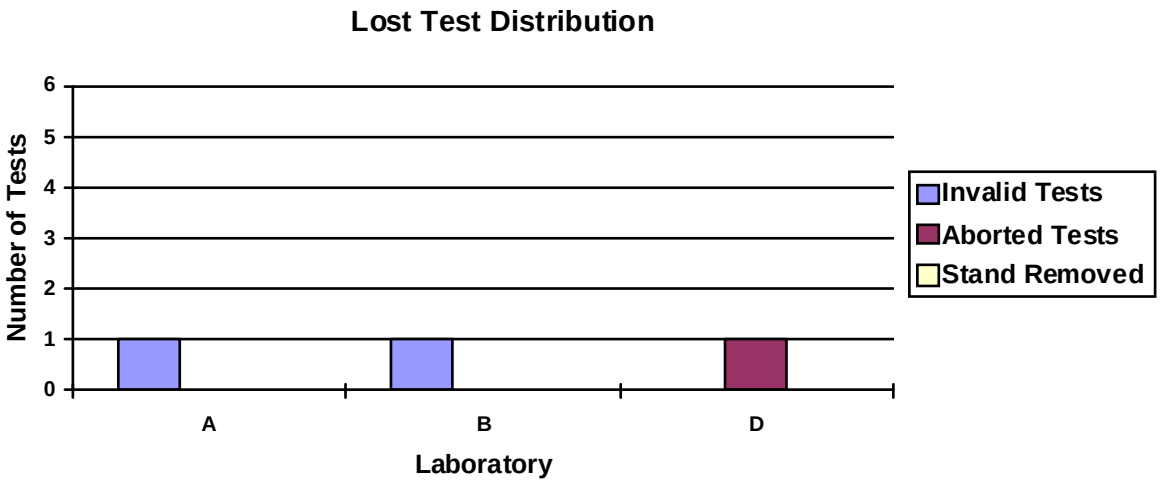
The calibration per start rate has decreased this period and the lost test per start rate has increased this period compared to last period. There were no failing tests this report period. Overall this period is comparable to historic periods.

In addition to the normal reference tests, a nonblind shakedown test using reference oil 1006-2 was reported this period. This test was run to evaluate Batch 09-10 bearings.

Two tests were declared operationally invalid by the laboratory; one test was aborted. The reasons for operationally invalid and aborted tests are tabulated below:

Reason	Number of Tests
Failed Coolant Pump (Aborted)	1
High Mechanical Wear (Invalid by Lab)	2

Aborted and operationally invalid tests by laboratory are summarized with the following chart:



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.

Information Letters

There were no information letters issued this period (see Figure 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	-0.268	3.678 (df=10)	-0.99 mg
SVIS	0.094	0.257 (df=10)	0.02 cSt

Average Δ/s by Laboratory		
Lab	BWL	SVIS
A	0.681	1.420
B	-0.835	0.159
D	0.292	-1.123

Bearing Weight Loss (BWL)

The industry control charts for severity and precision were in control for the period (see Figure 1).

The Industry BWL mean Δ/s is -0.268 for this report period (see Figure 3). This equates to a shift of -0.99 mg in reported units. The pooled standard deviation for the period is 3.68 mg (see Figure 4), which has degraded slightly with respect to the previous period and compares well with historical estimates.

Stripped Viscosity (SVIS)

With the exception of two warning alarms at the beginning of the period, the industry control chart for severity was in control. Precision was in control for the period (see Figure 2).

The Industry SVIS mean Δ/s, at 0.094, was on or near target for this report period (see Figure 5), and equates to a shift of 0.02 cSt in reported units. The pooled standard deviation for the period is 0.26 cSt (see Figure 6), which has degraded with respect to the previous period and historical performance.

Hardware

One laboratory has successfully referenced on the 09-10 bearings. With the exception of these two tests, all other tests were run on the 01-09 Bearings.

TMC Memoranda

No TMC Memoranda were generated this report period.

Reference Oils

Oil	Original Blend, in gallons	TMC Inventory, in gallons	Quantity Used past six months	TMC Inventory, in tests	Laboratory Inventory, in tests	Estimated life
704-1	935	224	14	112	4	5+ years
1006	5500	38	0	19	1	3 months[1]
1006-2	5500	3860	93	1930	2	3+ years[1]
1009	1100	448	60	224	3	3+ years

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

REG/reg

Attachments

c: F.M. Farber, TMC
J. A. Clark, TMC
Sequence VIII Surveillance Panel
ftp://ftp.astmtmc.cmu.edu/docs/gas/sequenceviii/semiannualreports/VIII-04-2011.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

A Program of ASTM International

FINAL BEARING WEIGHT LOSS

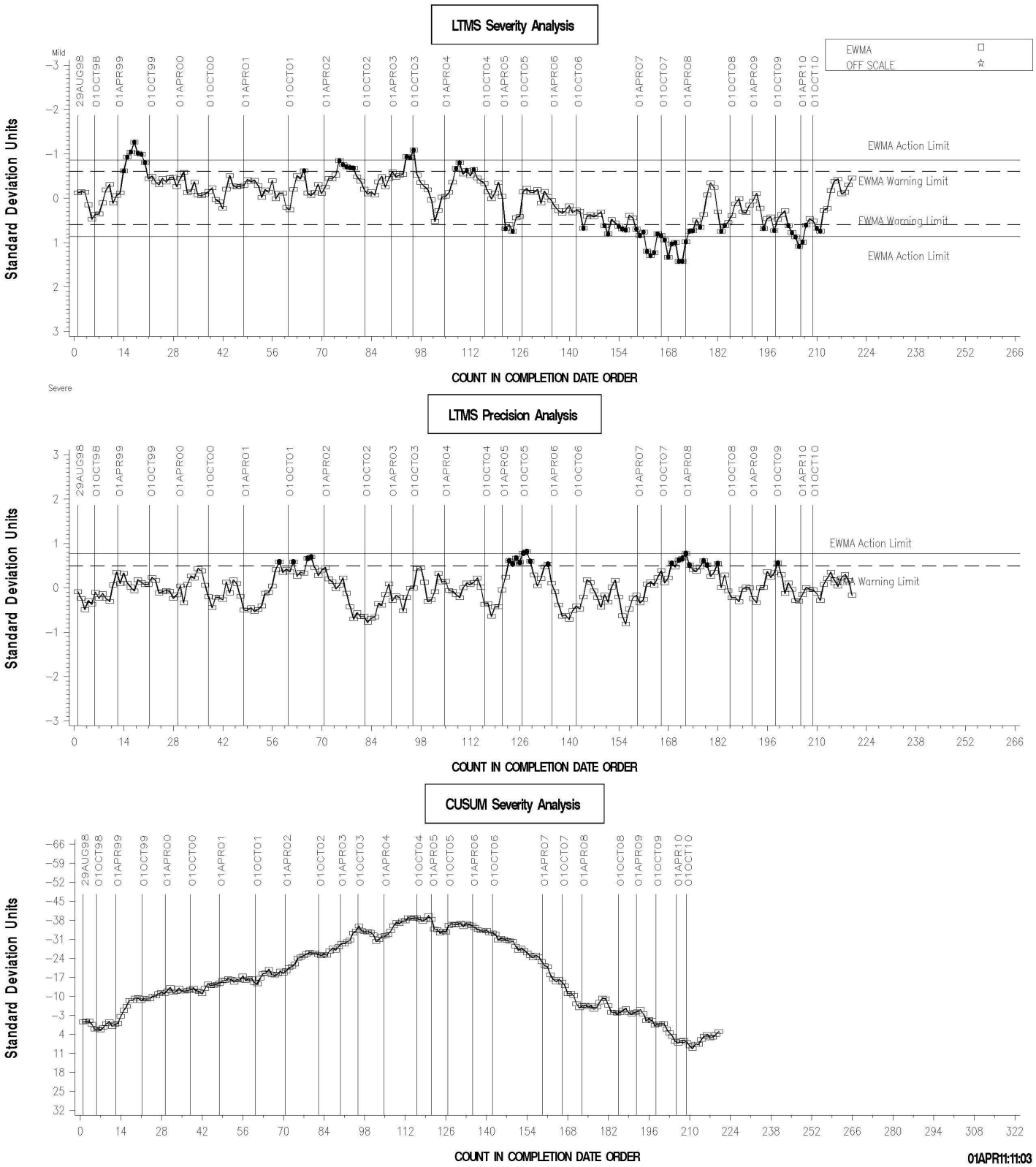


Figure 2

SEQUENCE VIII INDUSTRY OPERATIONALLY VALID DATA

A Program of ASTM International

STRIPPED VIS. @ 100 DEG C

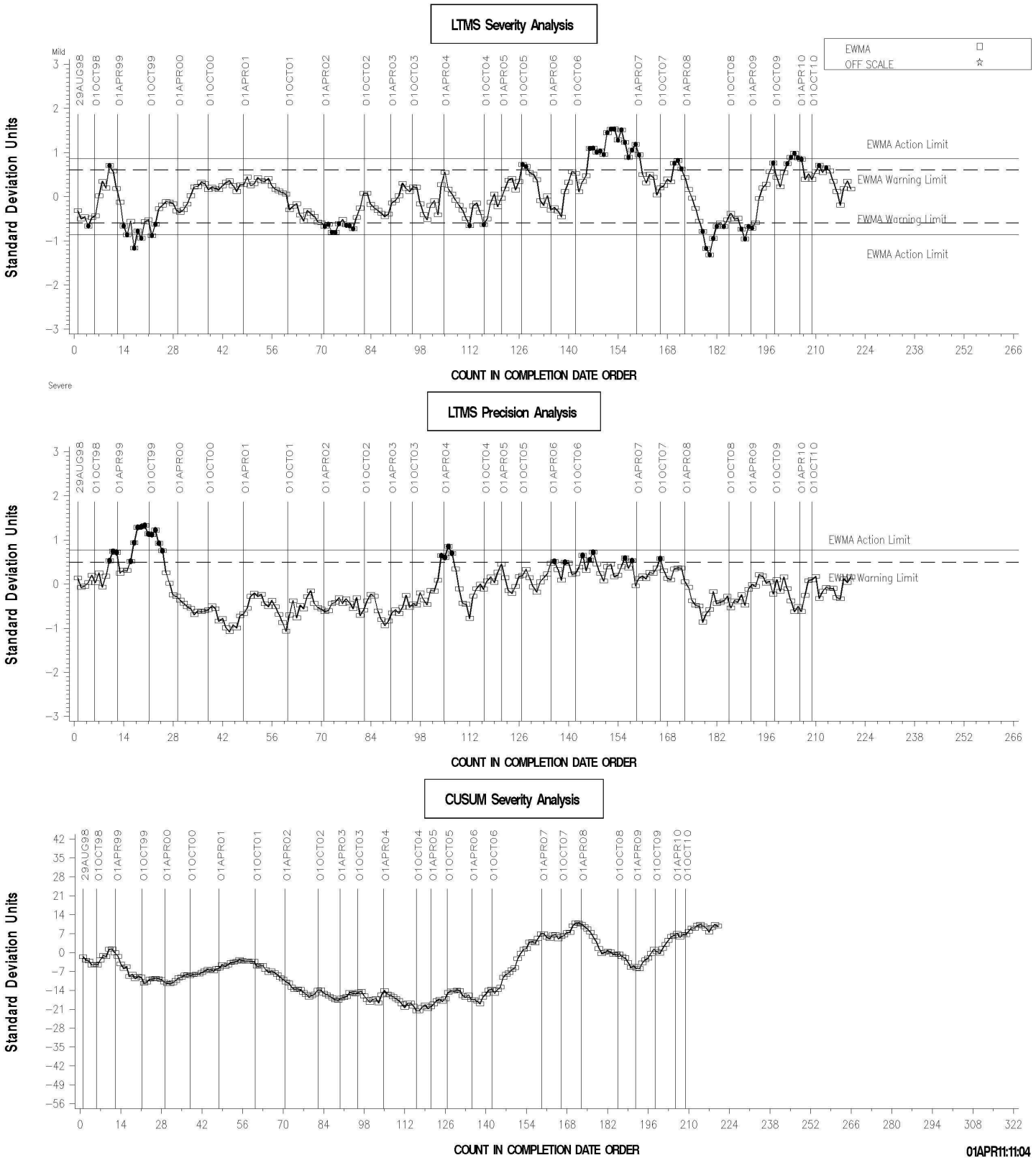


Figure 3 - Sequence VIII Reference Oil Data
Bearing Weight loss

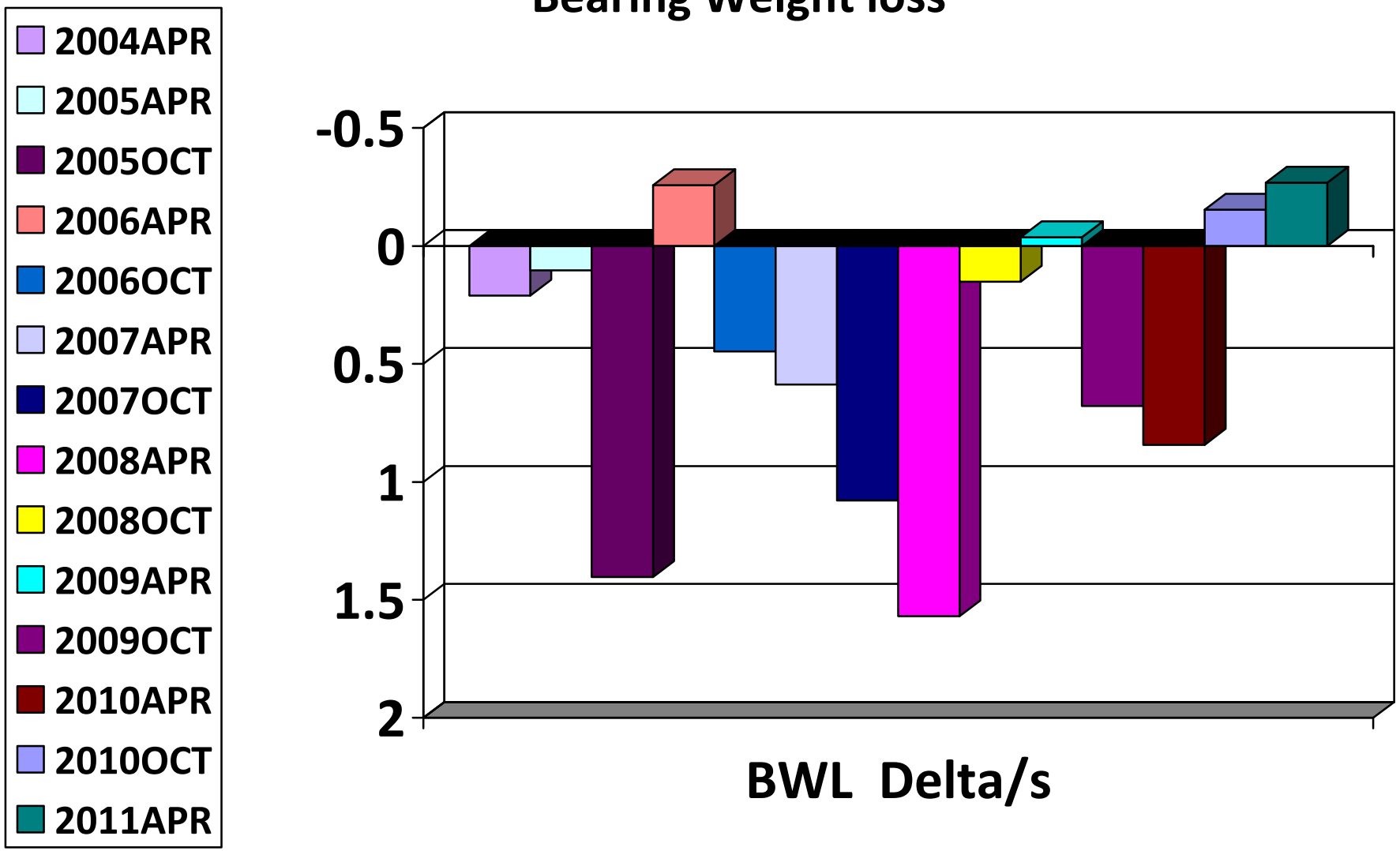


Figure 4 Sequence VIII Reference Oil Data Bearing Weight Loss

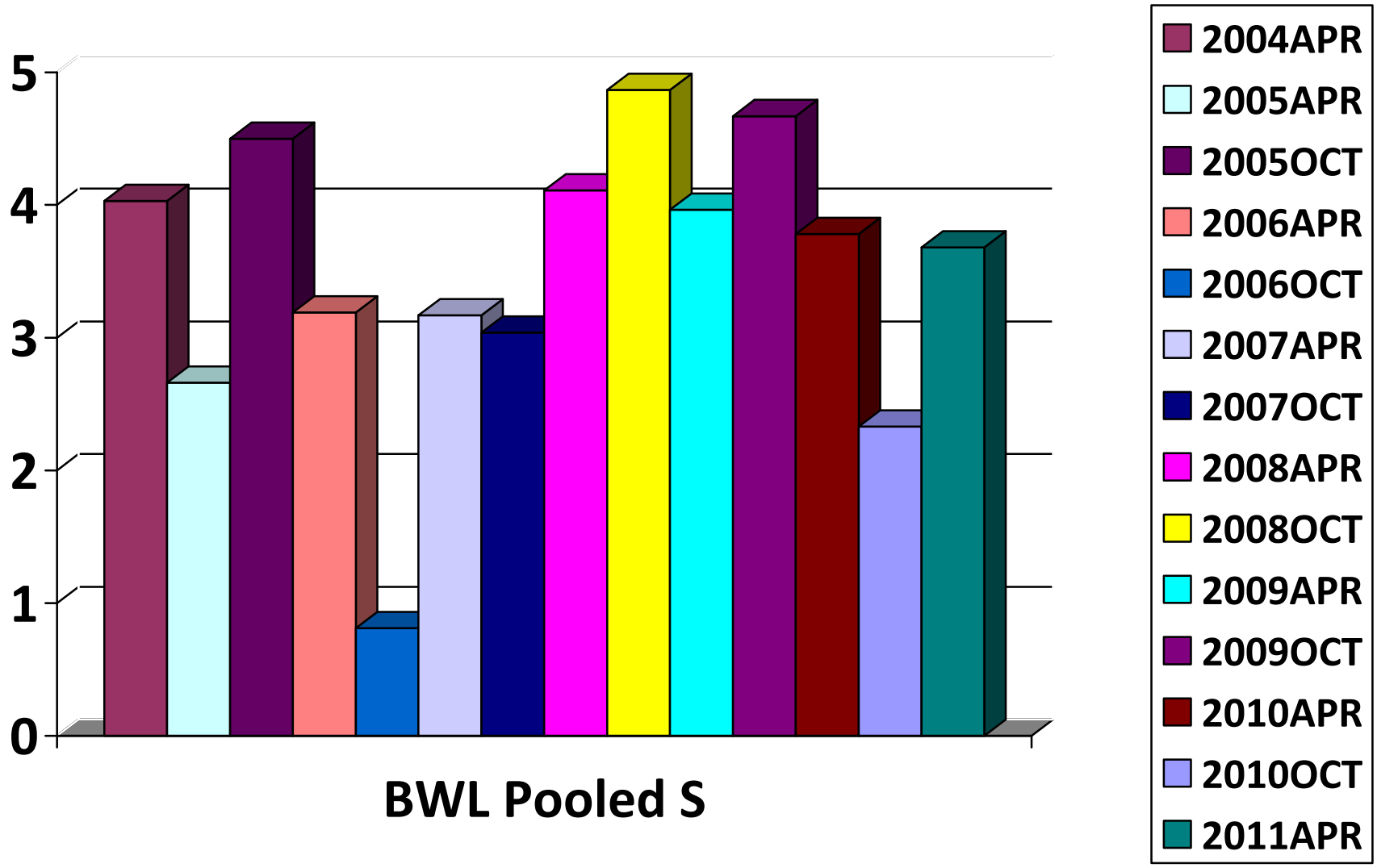
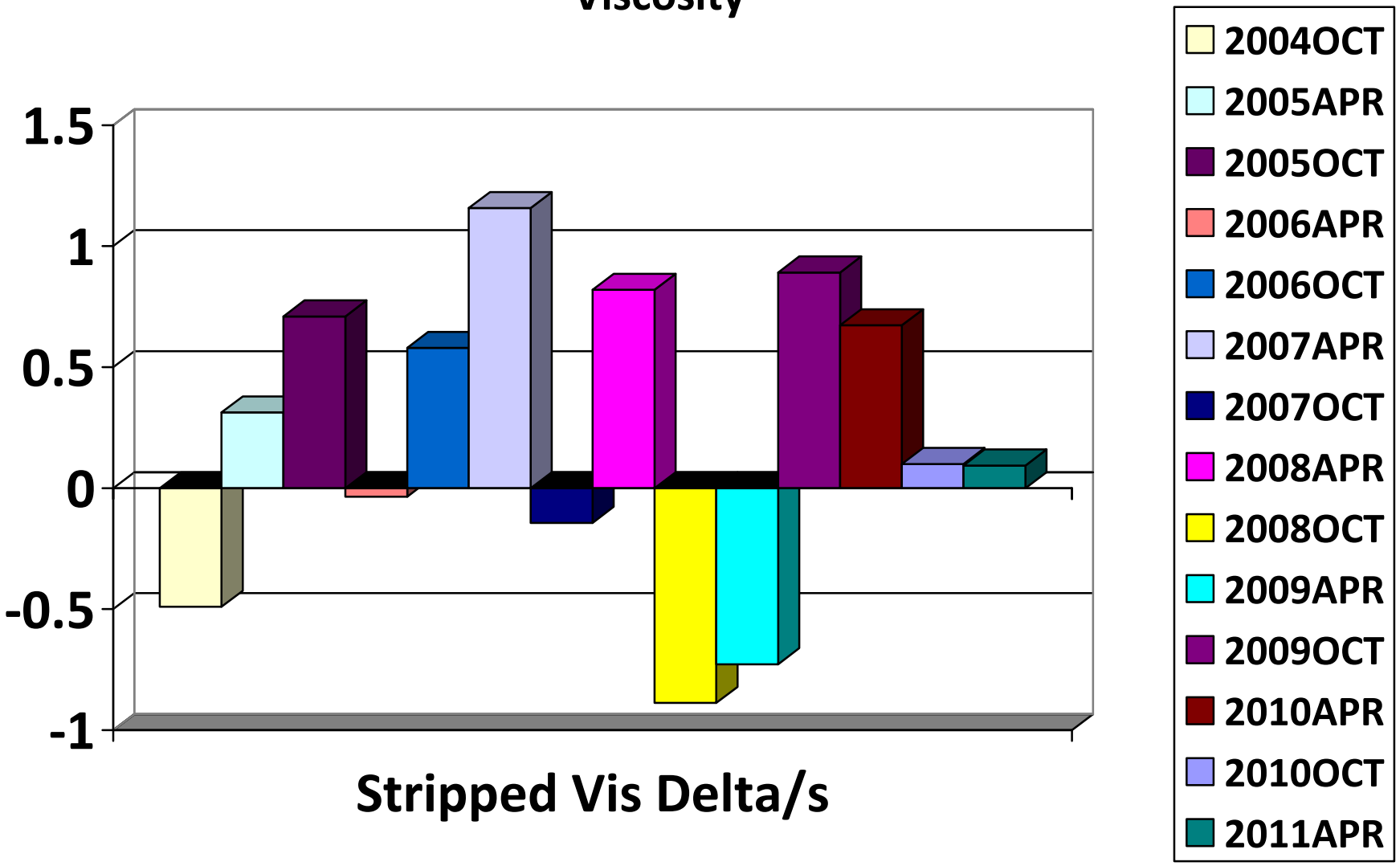


Figure 5 - Sequence VIII Reference Oil Data Stripped Viscosity



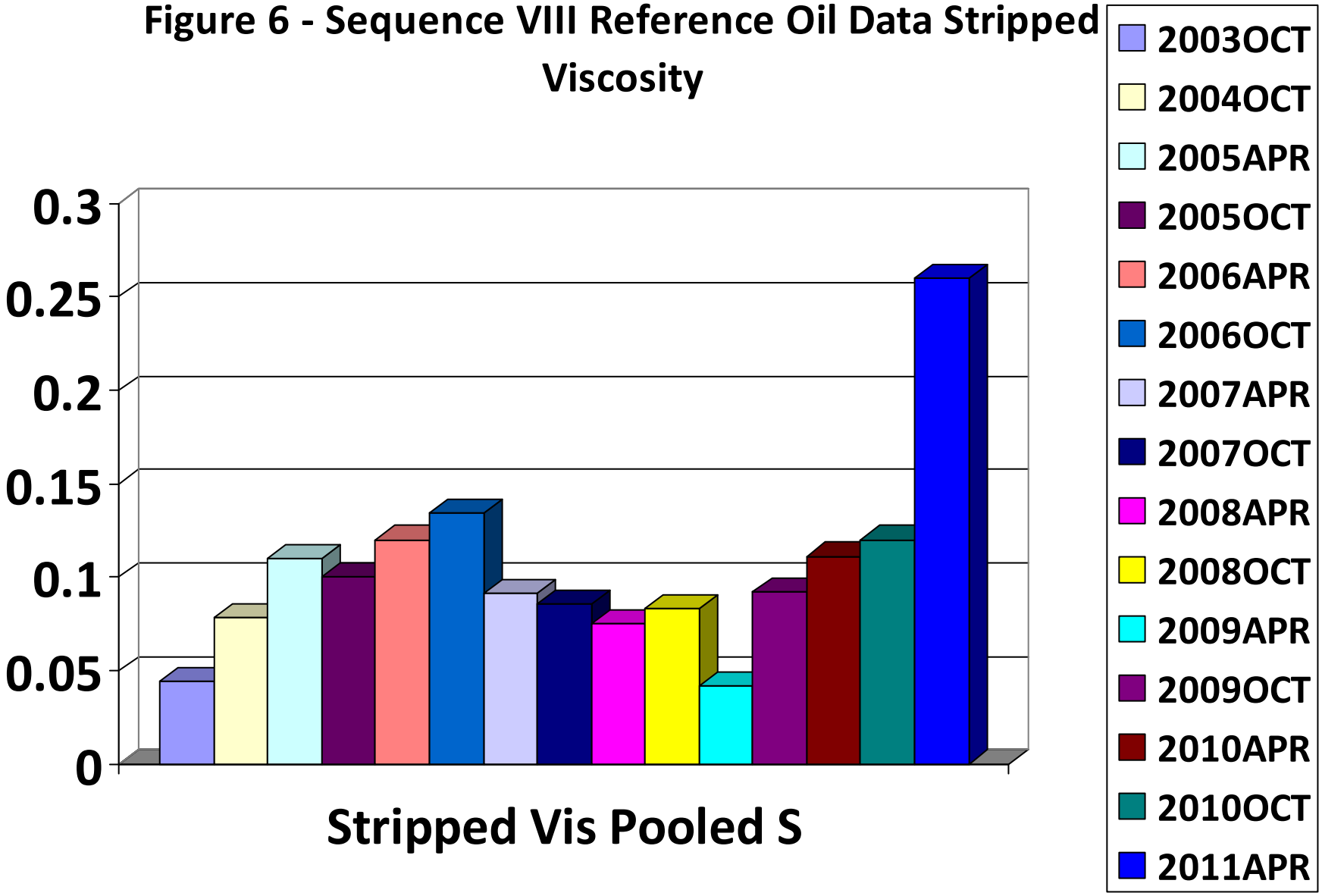


Figure 6 - Sequence VIII Reference Oil Data Stripped Viscosity
0.3
0.25
0.2
0.15
0.1
0.05
0
Stripped Vis Pooled S
2003OCT
2004OCT
2005APR
2005OCT
2006APR
2006OCT
2007APR
2007OCT
2008APR
2008OCT
2009APR
2009OCT
2010APR
2010OCT
2011APR

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
11/18/09	ADDED RACOR HOUSING LFS-55 TO TEST METHOD	09-2
5/20/10	ADDED 0W OIL TO TEMPERATURE SPECIFICATION	10-1
3/27/11	FIRST TEST ON 09-10 BEARINGS	