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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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February 14, 2001

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UNCONFIRMED MINUTES OF THE ASTM SEQUENCE V SURVEILLANCE PANEL MEETING

Held in San Antonio, TX On November 16, 2000

1. Call to Order

1.1 The meeting of the Sequence V Surveillance Panel was called to order by the Chairman, Gordon Farnsworth at 7:59 AM. An attendance list is shown as Attachment 1. There were 31 signed members and guests present. SwRI sponsored the meeting, and provided lunch.

1.2 For membership changes, John Moffa will replace Steve Handy for Castrol.

1.3 Brent Shoffner agreed to record motions and action items. The Agenda and Motions/Actions lists are Attachment 2.

Motion: *Accept the minutes from the last meeting [May 24, 2000].*
Dwight Bowden moved, Bill Buscher III., second.
Motion Passed: *Unanimous*

1.4 There was discussion on removing the redundant rating parameters, but Mike Riley wants to see all the data.
1.5 There will be a mini-blend for the next VG fuel batch.

2. Action Items From Previous Meeting

2.1 The VG pass limits for SJ oils will be the same as GF-3.
2.2 1006 has a reblend, and there would be new targets set for this batch.
2.3 The O&H Panel will develop measurement procedures for top ring gap increase, cylinder bore wear, and cam follower roll pin wear.
2.4 Ford will update the status of the Romeo blocks and heads and related mating parts.

3. Action Items From This Meeting

3.1 Reaffirmed that the API SJ equivalent limits of the Sequence VG are the same as the SL limits.
3.2 Consensus of the Panel: Adopt the recommended reference oil 1007 and 1006 LTMS targets and standard deviations as presented by Richard Grundza. Effective for all tests that will complete on or after 11/17/00.
3.3 If the ASTM Subcommittee B drops Sequence VG parameter(s) for D4485 GF-3/SL (as redundant), the LTMS control chart actions will be suspended for reference oil tests that complete on or after the D4485 effective date for the VG parameters.
3.4 The TMC will calculate the VG statistics for reference oils 1006 and 1007 using a data set without the tests from the "severe stands" (previously identified by the TMC).
3.5 Hand blend the Sequence VG fuel about 9 months prior to the projected Sequence VG fuel batch depletion.
3.6 Establish the number of Sequence VG tests and the reference oils required to validate the hand blend.
3.7 Follow up with ChevronPhillips regarding the following analytical trends on the "J" fuel in the main storage tank:
Gums
Final Boiling Point
Induction Minutes to Break
3.8 Strongly suggest a Sequence V Operations and Hardware Sequence V Subpanel Meeting this year to discuss the introduction of the new hardware and associated procedural changes.
3.9 Consider a Builder's Workshop if honing and other build changes are involved in the new part release.
3.10 The TMC should not assign reference oil 925-3 for new stands.
3.11 At a Sequence V Surveillance Panel Meeting in approximately 6 months consider the elimination of the following analytical measurements from the Sequence VG procedure if no one has studied the data:
Pentane Insolubles
Total Base Number (TBN)

Viscosity at 100C

4. TMC Reference Oil Report (VE and VG) Rich Grundza

4.1 For VE, there were 13 tests at 5 labs, and 7 calibrated stands in 4 labs.
4.2 4 were not acceptable, 1 invalid, and 1 abort.
4.3 ftp://tmc.astm.cmri.cmu.edu/docs/gas/sequencev/semiannual reports/vg-10-2000.pdf
4.4 Recent tests have been severe on varnish and sludge parameters, but severe tests were at one lab on different oils.
4.5 Wear was in warning alarm, but the severe results cleared that, and two recent 927 runs were on target.
4.6 For VG, there were 30 tests in 19 stands at 4 labs.
4.7 6 tests were not acceptable, but the reject rate is typical.
4.8 There was a severity shift that was stand related, but the problem has been corrected.
4.9 4 of 30 tests required Qi deviations. This is lower than normal.
4.10 Targets for 1006 and 1007 could be set with 29 tests. The old and new targets were presented. A consensus decision was made to adopt the new targets, but the targets will be calculated with some severe stand data removed. Any EOT after 11/17/2000 will use the new targets. See Attachment 4 for old and new targets.
4.11 There was discussion on how the redundant rated parameters [PAS, RCS] to be considered for removal would be handled. The parts could continue to be rated but not held to a band for pass limits.

Motion: *Accept the TMC report.*
Rich Grundza moved; Bill Buscher III, second.
Motion Passed: Unanimous

5. RSI Report Rick Oliver

5.1 See Attachment 4 for details and graphs. Read and review the VE data.
5.2 The VG data will be actively monitored, and on the web site in December
5.3 There were 75 candidate tests run, 4 invalids, and limited replicate data
5.4 There was discussion of a possible VE severity shift. Due to the reduced testing level, the block size is 5, not 21. The chart showed a higher failure rate on OSC, and a significant severe shift for AES and RCS.
5.5 VG correlation was also presented. It shows a higher pass rate and great correlation for AES and RCS with an R^2 of 0.9. R^2 for AEV and PSV is 0.71.

Motion: *Accept the RSI report.*
Rick Oliver moved; Bill Buscher III, second
Motion Passed: *Unanimous*

6. Reference Oils and Fuels Subpanel Report **Brent Shoffner**

6.1 There are 158,000 gallons of VE fuel. This could last several years at current testing levels. It was blended in 1994 and has not shown deterioration, but the gums have decreased. This may be because a new lab is doing it.

6.2 There are 800,000 gallons of VG fuel, with 60,000 gallons at the labs. This would run about 1200 tests, and may require a reblend next summer, depending on test levels.

6.3 Haltermann included some fuel test data included with the ROF report as Attachment 5.

7. Test Sponsor Report **Mile Riley**

7.1 See Attachment 6 for details.

7.2 Romeo has selected 2000 2000 model 4.6 litre engines.

7.3 There will be a mini-matrix for the new blocks and heads from Romeo. There would be two builds at 0.25 and 0.50 mm oversizes. Minor hardware and procedure changes would be needed, but sludge and varnish results are comparable to current AER engines.

7.4 All labs will attempt to start on the new parts at the same time. A solicitation would take place in Q2 of 2001, and the new hardware would cover about 6 years of testing.

7.5 There was a request for the release of the test data on the new engines, and a question whether GF-4 was considered. It was.

7.6 There was also discussion on the redundant rated parameters. PCEOCP will have a ballot on this issue in December.

Motion #1

Dwight Bowden / Richard Grundza

The Operations and Hardware Subpanel, working with the Ford Motor Company, will design a matrix to prove out new hardware and other associated changes. Expedite the process.
Solicit support from laboratories and industry statisticians. The Sequence V Operations and Hardware Subpanel Chairman will keep the Surveillance Panel advised of the status of the project.

Passed 17 for / 0 against / 0 waives
(Note an Objective was also added in the Scope and Objectives with a completion date of March 2001)

Motion: *Approve the test sponsor report..*
Mike Riley moved; Brent Shoffner, second.
Motion: ***Unanimous***

8. Operation and Hardware Report **Jim Moritz**

8.1 See Attachment 7.

8.2 The dipstick correlation data looked acceptable.

8.3 Reported precision and the values rounded for Qi calculations should be based on the data dictionary.
8.4 The dipstick correlation data looked acceptable.
8.5 Reported precision and the values rounded for Qi calculations should be based on the data dictionary.
8.6 A roll pin measurement method was presented.
8.7 Ethyl gave a presentation on a method to measure the roll pin wear related to field data, included as Attachment 8.
8.8 There is an action item to put control trim pots on the wiring harness for AFR control.
8.9 A recommendation was made to remove ring groove chamfer measurements and Stage 1 blowby. There were some minor wording changes for Rocker Cover ramps, and a clarification of the ring gap wording.
8.10 There was also a recommendation to use 1.0% O_2 instead of 0.5%, and to widen the flow limits on injectors.

Motion #2
Jim Moritz/Dwight Bowden
Motion to remove the dipstick correlation procedure (section 12.1.1) and replace it with the common table presented using 21 grams/millimeter.
Effective 2/1/2001
Passed 14/0/1

Motion #3
Jim Moritz/Carl Stephens
Motion to reduce the temperature and pressure instrumentation calibration frequency from 90 days to prior to stand calibration for both Sequence VE and Sequence VG. Continue to require all instrumentation calibrations prior to stand calibration.
Effective 2/1/2001
Passed 14/0/1

Motion #4
Jim Moritz/Bill Buscher III
Motion to approve the procedures for Roller Pin Step Wear measurement, Top Ring Gap measurement, and using the Oil Screen Blowing Device as presented.
Effective 2/1/2001
Passed 14/0/1

Motion #5
Jim Moritz/Dave Glaenzer
One motion for the following:

- To define the recorded data value precision as that in the data dictionary for the average value of that parameter and include summary table in the procedure.
- To remove the requirement to measure the ring groove chamfer.

- To remove the taking and recording the Stage 1 Blowby values.
- To modify the wording of the Stage 3 to Stage 1 Rocker Cover Temperature ramp from "29C within 15+/- 2 minutes" to "29C within 17 minutes".
- To correct an error in the procedure by removing the requirement that the top ring gap is larger than the 2nd ring gap. The gap delta of 0.002" would stay.
- To remove the requirement to have 0.5% oxygen span gas.

Effective 2/1/2001
Passed 13/0/2

Motion #6
Jim Moritz/Carl Stephens
Motion to adjust the fuel injector flow limits from 188 to 198mL to 188 to 203mL.
Passed 13/0/2

Motion: *Approve the O&H report.*
Dwight Bowden moved; Gary Tietze, second.
Motion: ***Unanimous***

9. Light Duty Rating Task Force **Zack Bishop**

9.1 See Attachment 9.
9.2 There were no test specific workshops in 2000.
9.3 The Rater Calibration Task Force will use a gear test as a template.

10. Rate and Report Data **Gordon Farnsworth**

10.1 The data does show some oil discrimination.
10.2 There was discussion on having TMC will add reference oil 200, and field-tested "GF-4" oils.
10.3 It was recommended to continue to take roller pin wear.
10.4 This data has not been reviewed, but may be considered critical with a new engine coming on line as a comparison.

Motion #7
Irwin Goldblatt / Bill Buscher II
Recommend to the ASTM Passenger Car Engine Oil Classification Panel to revise D4485 by letter ballot and the Sequence VG procedure (Information Letter) to eliminate the following rate and report parameters:

Ring Gap Increase Cylinder Bore Wear
Oil Ring Clogging PCV Measurement

Revise the data dictionary accordingly.

Passed 7 in favor / 2 against / 7 waives

11. Scope and Objectives **Gordon Farnsworth**

11.1 These were updated for this meeting. See Attachment10.
11.2 VG/VE correlation and rate and report were taken off.
11.3 Fuel blend timing was changed to Jan, 2002.
11.4 A new engine equivalency test was added with a March, 2001 target date.

Motion #8
Greg Guinther / Dwight Bowden
Remove the Sequence VE phase out objective from the Sequence V Surveillance Panel Scope and Objectives.
Unanimous

12. Old Business

12.1 There were no issues.

13. New Business

13.1 There was a question from API on oil screen clogging, included as Attachment 11.
13.2 There were some TMC issues, included as Attachment 12. D1744 should be replaced with D6304; the quality index wording needs to be clarified for negative Qi on tests.
13.3 925-3 is running on several reference tests at labs. It will not be used for new stands.
13.4 There was interest in removing pentane insolubles, viscosity at 100 degrees C, and TBN from the EOT oil requirements. The motion to do so was withdrawn, and will be considered at a later meeting.

Motion #9
Greg Guinther / Dwight Bowden
The Sequence V Surveillance Panel recommends that ASTM Subcommittee B recommend to the American Petroleum Institute (API) that, with respect to the Sequence VE in SJ, oil screen clogging not be monitored for after-market audits.
Passed 13 for / 0 against / 3 waives

Motion #10
Dave Glaenzer / Rich Grundza
Replace the ASTM D1744 procedure with D6304 in the Sequence VE and VG procedures. Effective 2/1/2001.
Unanimous

Motion #11
Rich Grundza / Jim Moritz
Remove the reference to the to ASTM “Subcommittee D02.B Standard Guide for Test Hardware Control in ASTM D02.B Test Methods and Practices” from the Sequence VG procedure.
Unanimous

Motion #12
Brent Shoffner / Dwight Bowden
Assign reference oil 925-3 approximately 33% of the time.
Passed 9 for / 0 against / 7 waives

Motion #13
Dave Glaenzer / Carl Stephens
Remove the requirement for the following analytical measurements from the Sequence VG procedure:

Pentane Insolubles
Total Base Number (TBN)
Viscosity at 100C
Effective Date: 2/1/2001

This motion was withdrawn.

14. Adjournment

Adjourn at 1:25 PM
Motion Passed: *Unanimous*

ATTACHMENT 2

Agenda
Sequence VE/VG Surveillance Panel
November 16, 2000
8:00AM – Noon
San Antonio, Texas

1. Approval of minutes for May 24, 2000 meeting	
2. Membership changes	
3. Motion and Action recorders	
4. Review action Items from last meeting	G. Farnsworth
5. TMC Reference Oil Report (VE and VG)	R. Grundza
6. RSI Candidate Status & Precision Report	C. R. Oliver
7. Fuels supply and reblend status (VE and VG) - Status of mini batch reblend	Shoffner/Rumford
8. VE and VG Test Developer Report	M. Riley
9. VE and VG O&H Report	J. Moritz
10. Light Duty Rating Task Force	Z. Bishop
11. Analysis of rate and report data – do we support continuing to collect this information??	All
12. Scope and Objectives	All
13. Old Business	
14. New Business	
* API question on Oil Screen Clogging	ALL
* Replacement of D1744 with D6304 * Wording of VG section 14.9 "Quality Index" * Monitoring of PSV & RACS	R. Grundza
* Need for used oil analyses	D. Glaenzer
15. Adjourn	

Sequence V Surveillance Panel
San Antonio, Texas
November 16, 2000

Motions

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Solicit support from laboratories and industry statisticians
The Sequence V Operations and Hardware Subpanel Chairman will keep the Surveillance Panel advised of the status of the project.

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Remove the requirement for the following analytical measurements from the Sequence VG procedure:

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Total Base Number (TBN)
Viscosity at 100C
Effective Date: 2/1/2001

This motion was withdrawn

Action Items

1. Reaffirm that the API SJ equivalent limits of the Sequence VG are the same as the SL limits.
2. Consensus of the Panel: Adopt the recommended reference oil 1007 and 1006 LTMS targets and standard deviations as presented by Richard Grundza. Effective for all tests that complete on or after 11/17/00.
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   Final Boiling Point
   Induction Minutes to Break
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    Pentane Insolubles
    Total Base Number (TBN)
    Viscosity at 100C

RSI Report to the Sequence VE Surveillance Panel On Seq. VE Test Severity

November 16, 2000

Rick Oliver

Registration Systems, Inc.
American Chemistry Council (ACC) Monitoring Agency

Proactive Monitoring of Sequence Tests by RSI

- The Exponentially Weighted Moving Average (EWMA) of various pass/fail test parameters for tests covered by the American Chemistry Council (ACC) Code of Practice are plotted to detect consistent changes in test severity over time.
- EWMA is weighted average of the difference between candidate test results and estimates of the true performance of levels or targets for the candidates.
- Refer to the RSI Web Site for more details.

Data Plotted

- Candidate test results are divided into blocks of data sized to produce about two EWMA test data points per month.
- The size of data blocks ranges from 5 to 21 candidate test results depending on the volume of candidate testing in the test.
- For the Seq. VE Test the data block was set at 21 tests.
- Only the medium data point for each block of data is plotted.

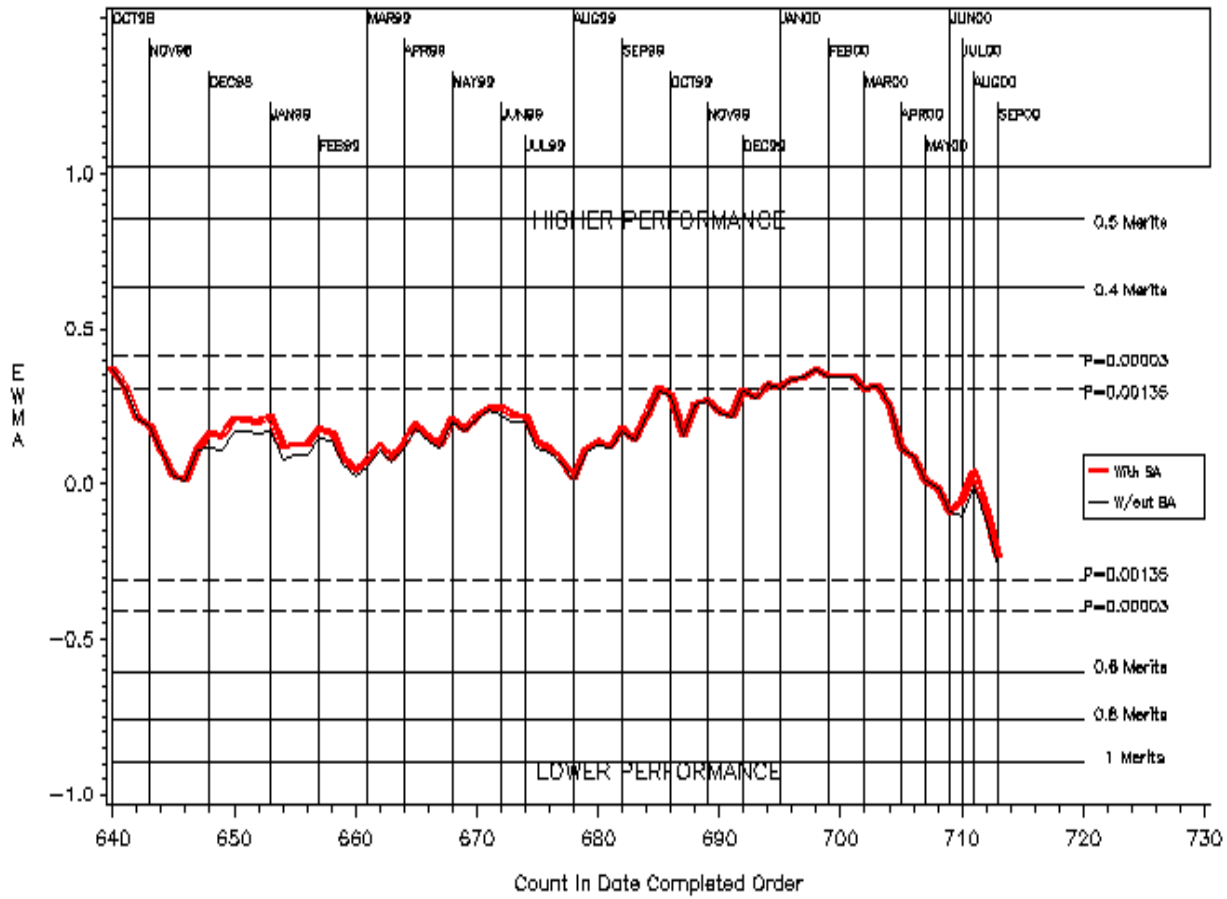
Seq. VE reduced testing volumes has resulted in:

- No EWMA data points being added to the Proactive Monitoring Charts since May 2000.
- Concern that the Seq. VE Test might have shifted severe in the period of time since the last EWMA data point was plotted for May 2000.

RSI undertook a limited investigation to determine if the Seq. VE candidate data indicated that a shift in test severity had occurred.

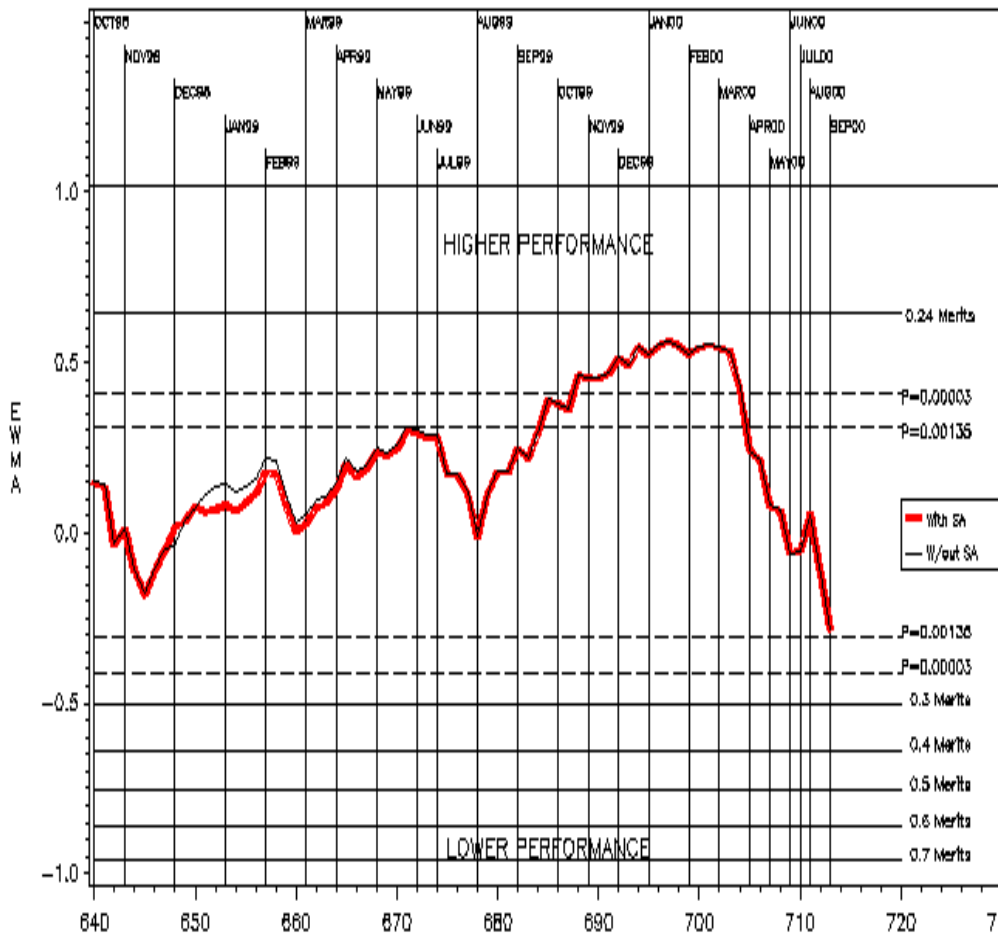
- Reduced data block size of 5 was used to generate additional EWMA data points.

Seq. VE Rocker Cover Sludge Relative Performance
Data Block Size 5



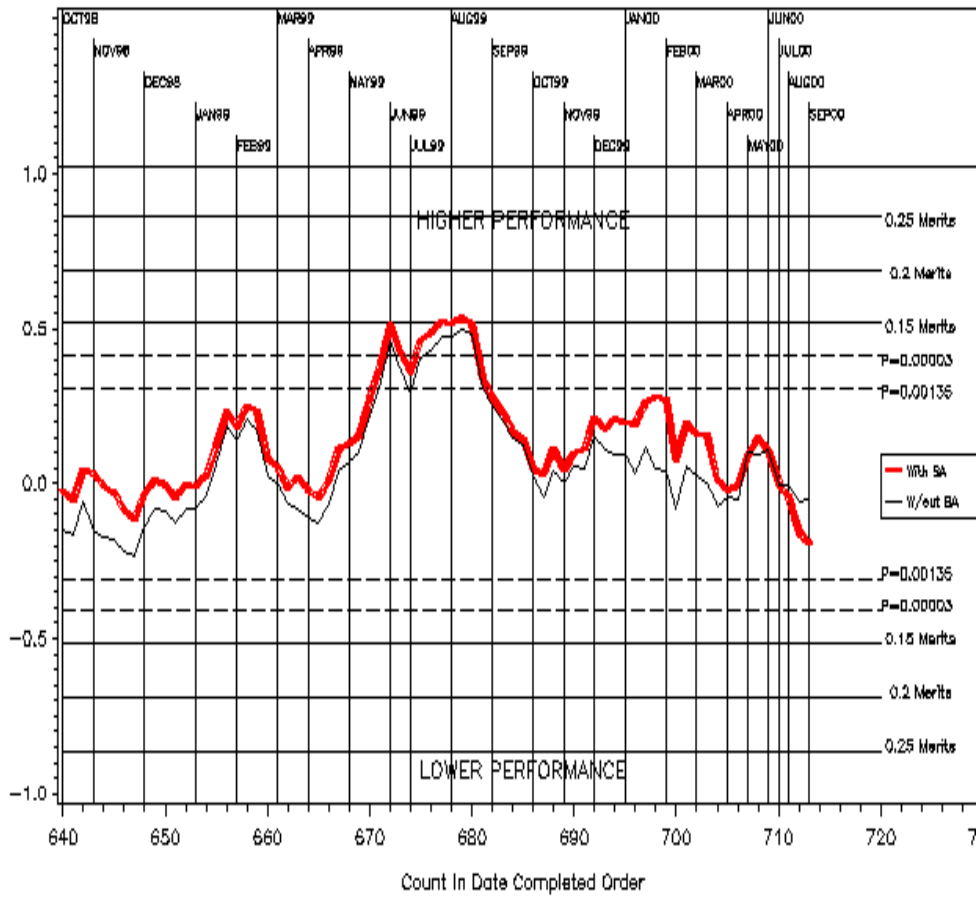
Registration Systems, Inc.
American Chemistry Council (ACC) Monitoring Agency

Seq. VE Average Engine Sludge Relative Performance
Data Block Size 5



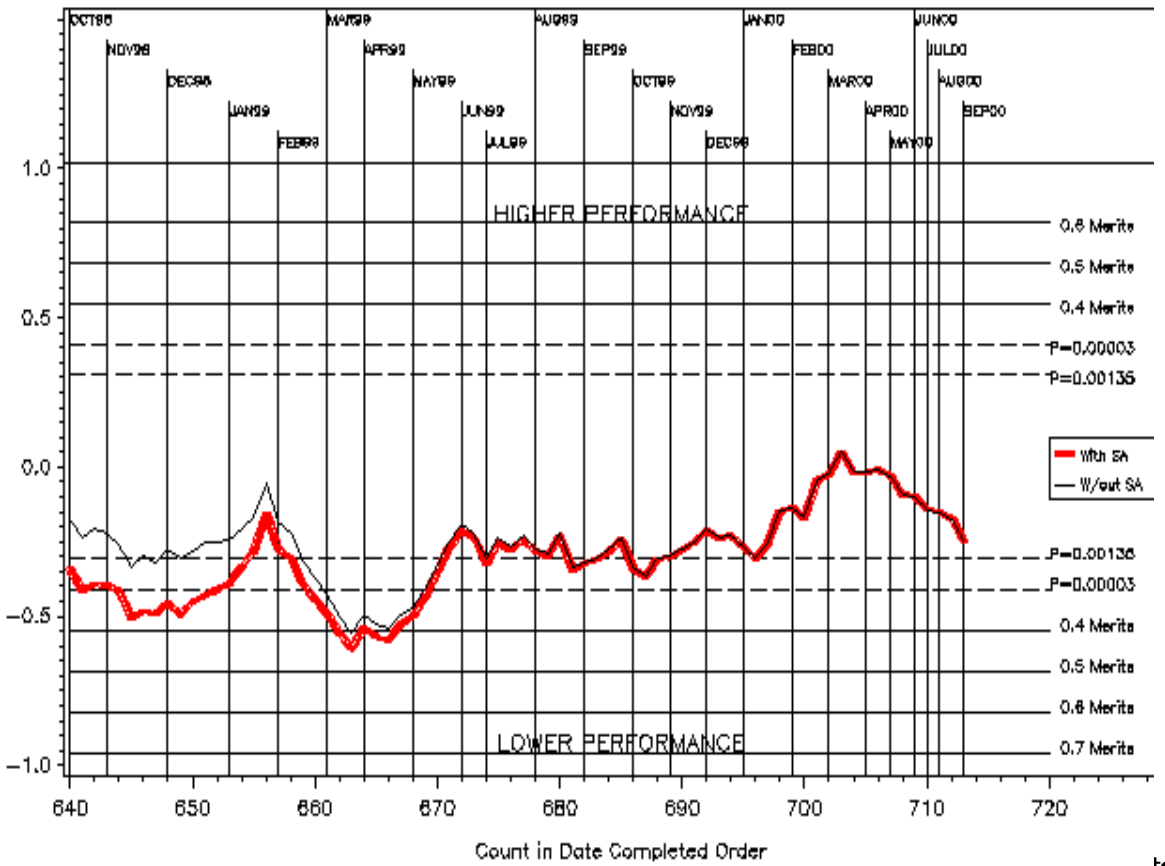
Registration Systems, Inc.
American Chemistry Council (ACC) Monitoring Agency

Seq. VE Avg. Piston Skirt Varnish Relative Performance
Data Block Size 5

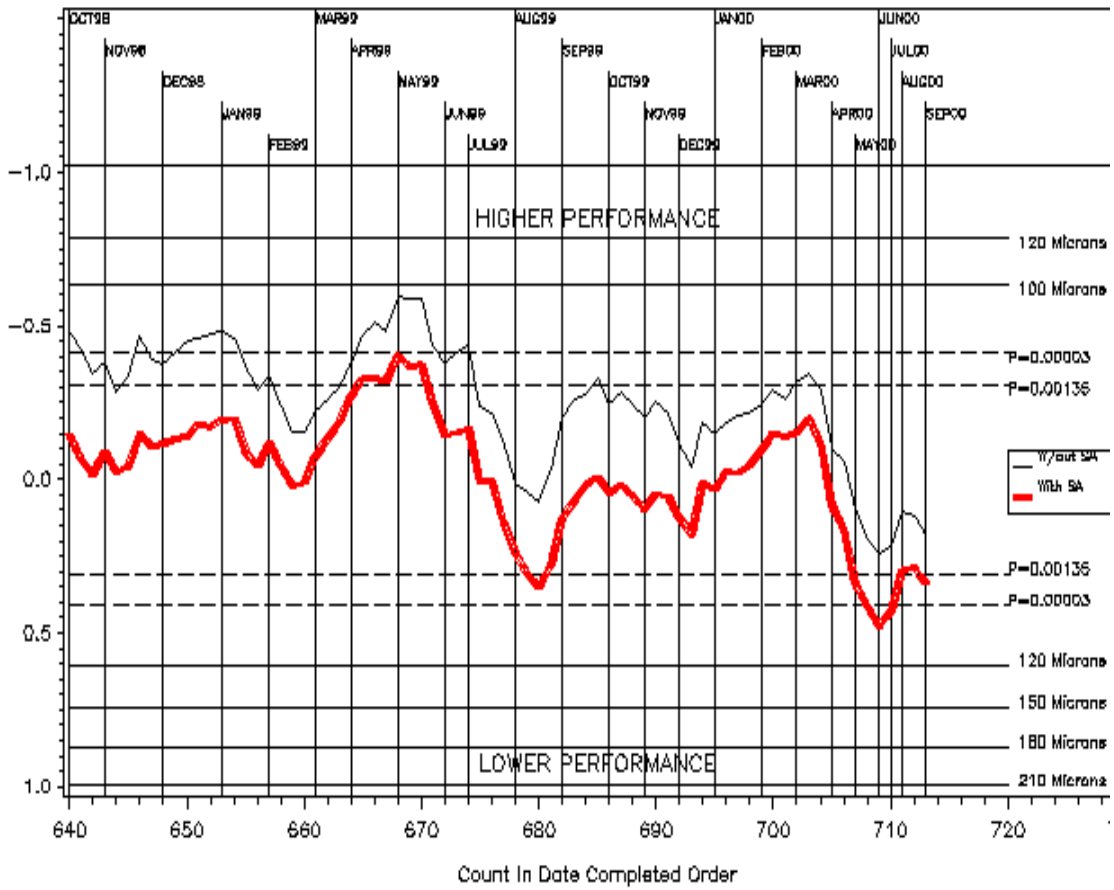


Registration Systems, Inc.
American Chemistry Council (ACC) Monitoring Agency

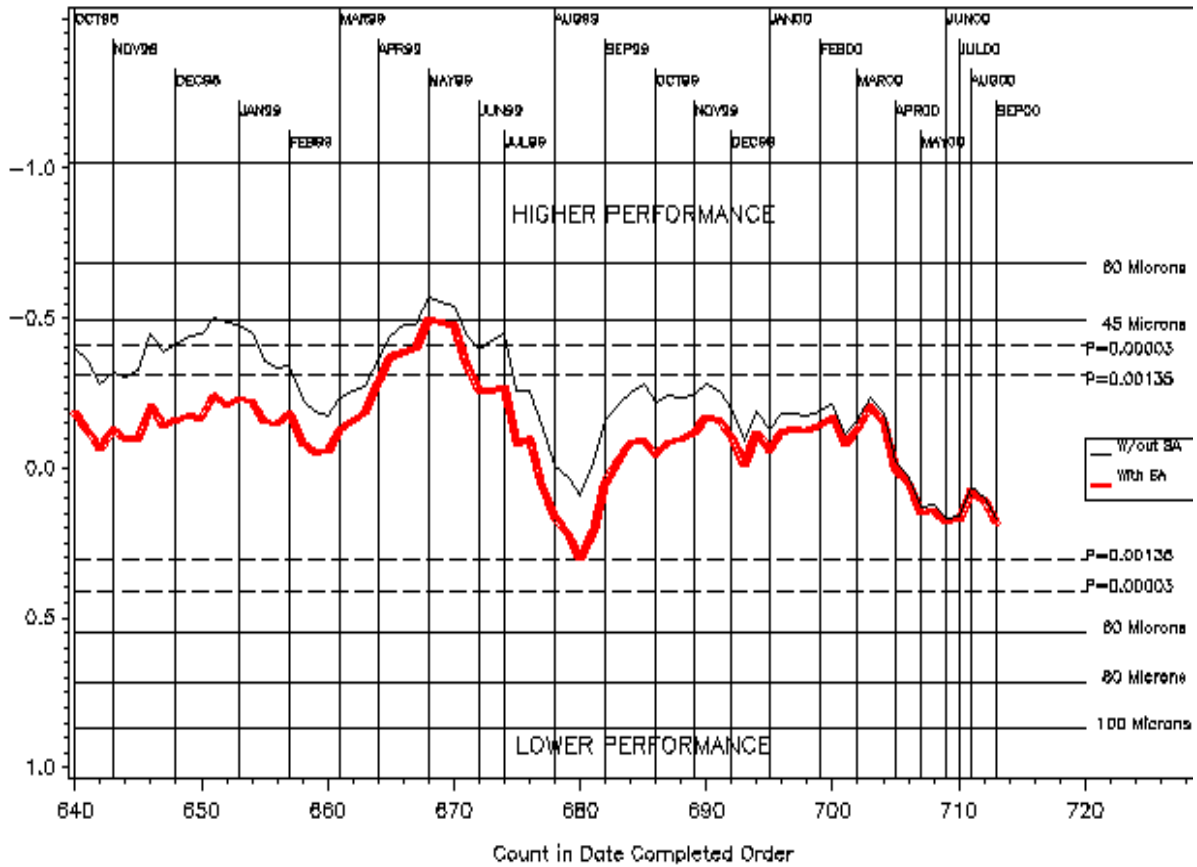
Seq. VE Average Engine Varnish Relative Performance
Data Block Size 5



Seq. VE Max. Cam Wear Relative Performance
Data Block Size 5



Seq. VE Max. Cam Wear Relative Performance
Data Block Size 5



Seq. VE . Oil Screen Clogging
Data Block Size 5

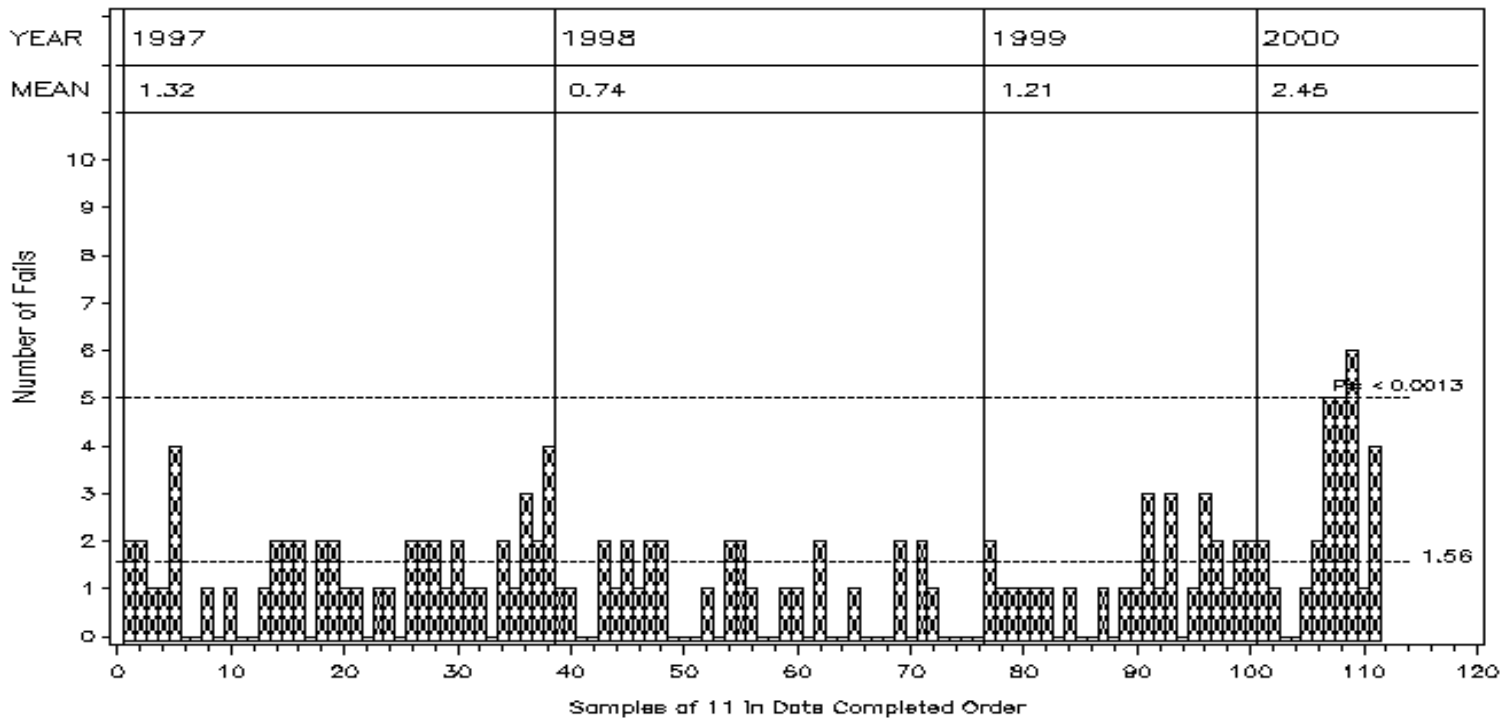


Table 1 Seq. AES Vs RCS VG Correlation Data
All Valid, Interpretable Data Through 12/06/00 (Severity Adjustment Applied)

OBS.	AES	RCS	OBS.	AES	RCS	OBS.	AES	RCS
1	5.31	6.68	49	9.24	9.24	97	9.01	9.56
2	4.76	7.03	50	7.26	9.25	98	9.03	9.56
3	6.21	7.35	51	8.96	9.25	99	9.33	9.56
4	6.79	7.62	52	8.01	9.27	100	9.19	9.58
5	6.13	7.73	53	8.40	9.27	101	9.22	9.63
6	6.32	8.00	54	9.16	9.27	102	9.07	9.64
7	6.60	8.16	55	9.29	9.27	103	9.47	9.64
8	6.42	8.26	56	7.47	9.29	104	9.23	9.68
9	6.94	8.30	57	7.77	9.29	105	9.28	9.68
10	7.27	8.36	58	7.91	9.29	106	9.40	9.68
11	7.67	8.38	59	9.22	9.30	107	9.43	9.69
12	6.91	8.46	60	7.47	9.31	108	9.21	9.72
13	6.77	8.49	61	8.67	9.31	109	9.23	9.76
14	7.14	8.49	62	8.85	9.31	110	9.60	9.80
15	6.91	8.57	63	7.87	9.32	111	9.85	9.81
16	8.13	8.60	64	8.57	9.32	112	9.90	9.89
17	6.12	8.62	65	8.59	9.32	113	9.98	9.89
18	6.34	8.64	66	7.87	9.33	114	10.00	9.94
19	6.85	8.65	67	8.25	9.33	115	10.00	9.96
20	7.71	8.67	68	8.69	9.33	116	9.83	10.00
21	9.11	8.67	69	9.20	9.33			
22	6.90	8.72	70	8.68	9.34			
23	8.93	8.72	71	8.82	9.34			
24	8.68	8.77	72	8.35	9.35			
25	8.61	8.78	73	8.97	9.36			
26	6.95	8.85	74	7.14	9.38			
27	7.49	8.95	75	8.38	9.38			
28	8.01	8.95	76	8.70	9.38			
29	7.47	8.97	77	9.08	9.38			
30	8.61	8.98	78	9.25	9.38			
31	7.83	9.01	79	9.33	9.38			
32	8.92	9.02	80	8.13	9.40			
33	6.34	9.03	81	8.56	9.42			
34	7.76	9.04	82	9.03	9.42			
35	7.83	9.04	83	8.34	9.43			
36	7.46	9.08	84	8.93	9.43			
37	8.32	9.11	85	8.84	9.46			
38	7.90	9.12	86	8.49	9.48			
39	8.14	9.12	87	8.90	9.48			
40	8.43	9.12	88	9.30	9.48			
41	7.82	9.13	89	10.0	9.48			
42	8.70	9.13	90	9.03	9.50			
43	7.87	9.14	91	8.71	9.52			
44	8.22	9.18	92	8.96	9.52			
45	8.32	9.19	93	9.05	9.52			
46	9.19	9.19	94	9.36	9.52			
47	7.60	9.24	95	8.83	9.53			
48	8.84	9.24	96	9.33	9.53			

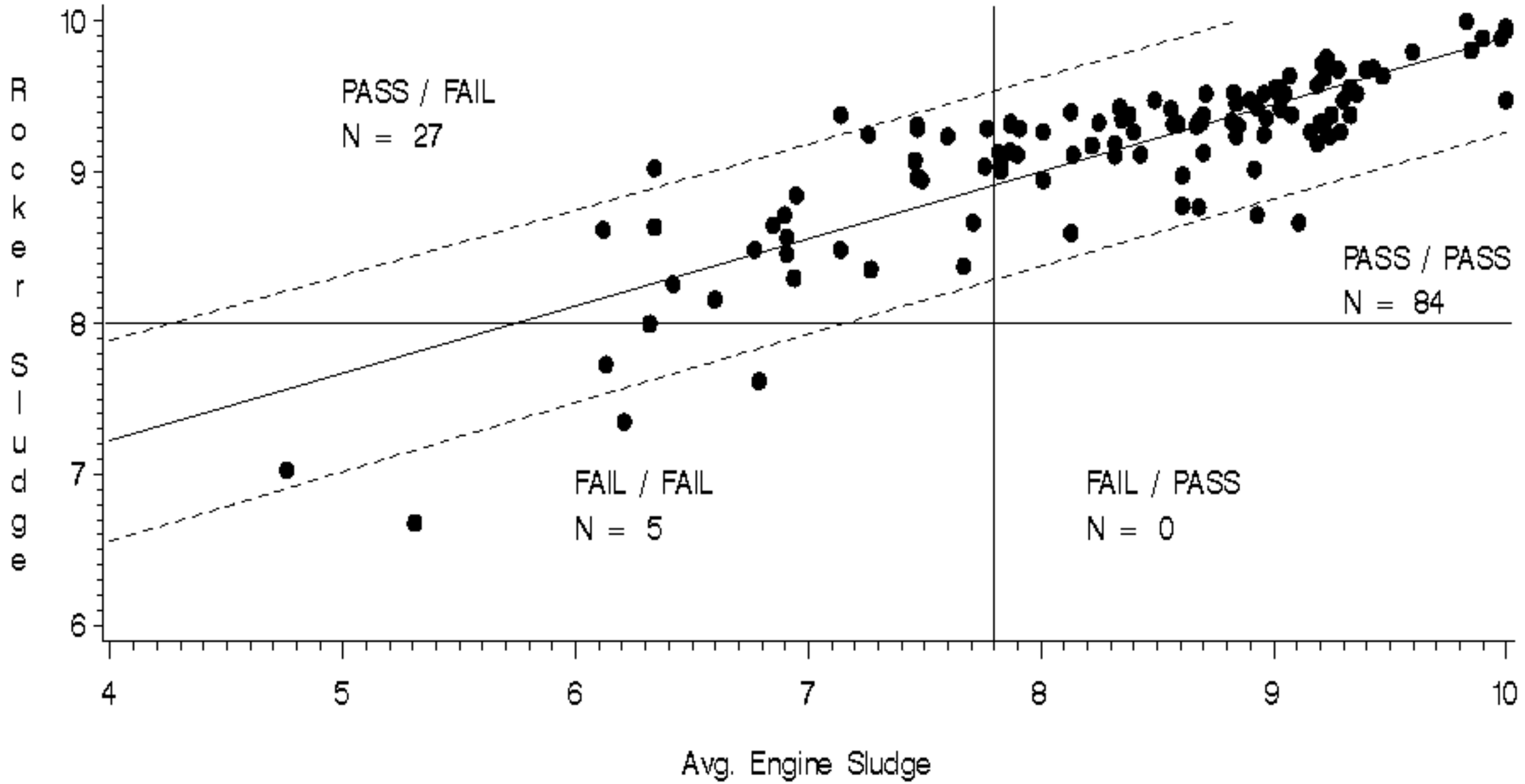
Table 2 Seq. VG AEV Vs APV Correlation Data

All Valid, Interpretable Data Through 12/06/00 (Severity Adjustment Applied)

OBS	AEV	APV	OBS	AEV	APV	OBS	AEV	APV
1	8.83	7.11	48	9.14	8.28	95	8.94	8.70
2	8.87	7.12	49	9.25	8.29	96	9.42	8.72
3	8.65	7.14	50	9.16	8.30	97	9.29	8.75
4	8.54	7.30	51	9.28	8.30	98	9.41	8.78
5	9.09	7.52	52	9.10	8.31	99	9.23	8.79
6	8.99	7.53	53	9.25	8.32	100	9.34	8.81
7	9.00	7.57	54	9.16	8.33	101	9.36	8.81
8	9.05	7.58	55	9.24	8.34	102	9.21	8.82
9	9.05	7.65	56	9.31	8.34	103	9.37	8.82
10	8.93	7.72	57	9.00	8.36	104	9.43	8.84
11	8.96	7.75	58	9.28	8.36	105	9.45	8.85
12	8.94	7.80	59	9.27	8.37	106	9.44	8.87
13	9.01	7.82	60	9.13	8.38	107	9.42	8.95
14	9.07	7.83	61	8.69	8.38	108	9.23	8.95
15	9.04	7.90	62	9.16	8.40	109	9.48	9.04
16	9.11	7.91	63	9.20	8.40	110	9.49	9.06
17	9.00	7.95	64	9.34	8.41	111	9.64	9.14
18	9.19	7.96	65	9.31	8.41	112	9.57	9.16
19	8.99	7.97	66	9.22	8.41	113	9.55	9.16
20	8.87	7.98	67	9.13	8.42	114	9.66	9.23
21	9.18	7.98	68	9.24	8.43	115	9.55	9.30
22	9.01	8.01	69	9.29	8.46	116	9.44	9.38
23	9.08	8.02	70	9.32	8.49			
24	9.10	8.03	71	9.23	8.50			
25	9.17	8.03	72	9.26	8.50			
26	9.01	8.07	73	9.04	8.51			
27	8.94	8.08	74	9.19	8.51			
28	8.92	8.09	75	9.36	8.52			
29	9.14	8.13	76	9.16	8.53			
30	8.73	8.14	77	9.30	8.53			
31	9.26	8.15	78	9.36	8.53			
32	8.85	8.16	79	9.21	8.54			
33	9.09	8.16	80	9.30	8.55			
34	9.20	8.17	81	9.28	8.57			
35	9.04	8.18	82	9.13	8.58			
36	9.21	8.18	83	9.33	8.58			
37	9.18	8.18	84	9.11	8.59			
38	8.90	8.19	85	9.30	8.60			
39	9.04	8.19	86	9.37	8.61			
40	8.83	8.20	87	9.33	8.62			
41	9.13	8.22	88	9.26	8.63			
42	9.10	8.22	89	9.24	8.63			
43	9.05	8.23	90	9.46	8.63			
44	9.28	8.23	91	9.35	8.64			
45	9.03	8.24	92	9.18	8.68			
46	9.06	8.28	93	9.31	8.69			
47	9.16	8.28	94	9.39	8.69			

Seq. VG Rocker Sludge vs. Average Engine Sludge Correlation

Pearson Correlation Coefficient = 0.837



Valid, Interpretable through 12/06/00 w/SA applied.

Regression line plus 95% CL brackets for individual predicted values.

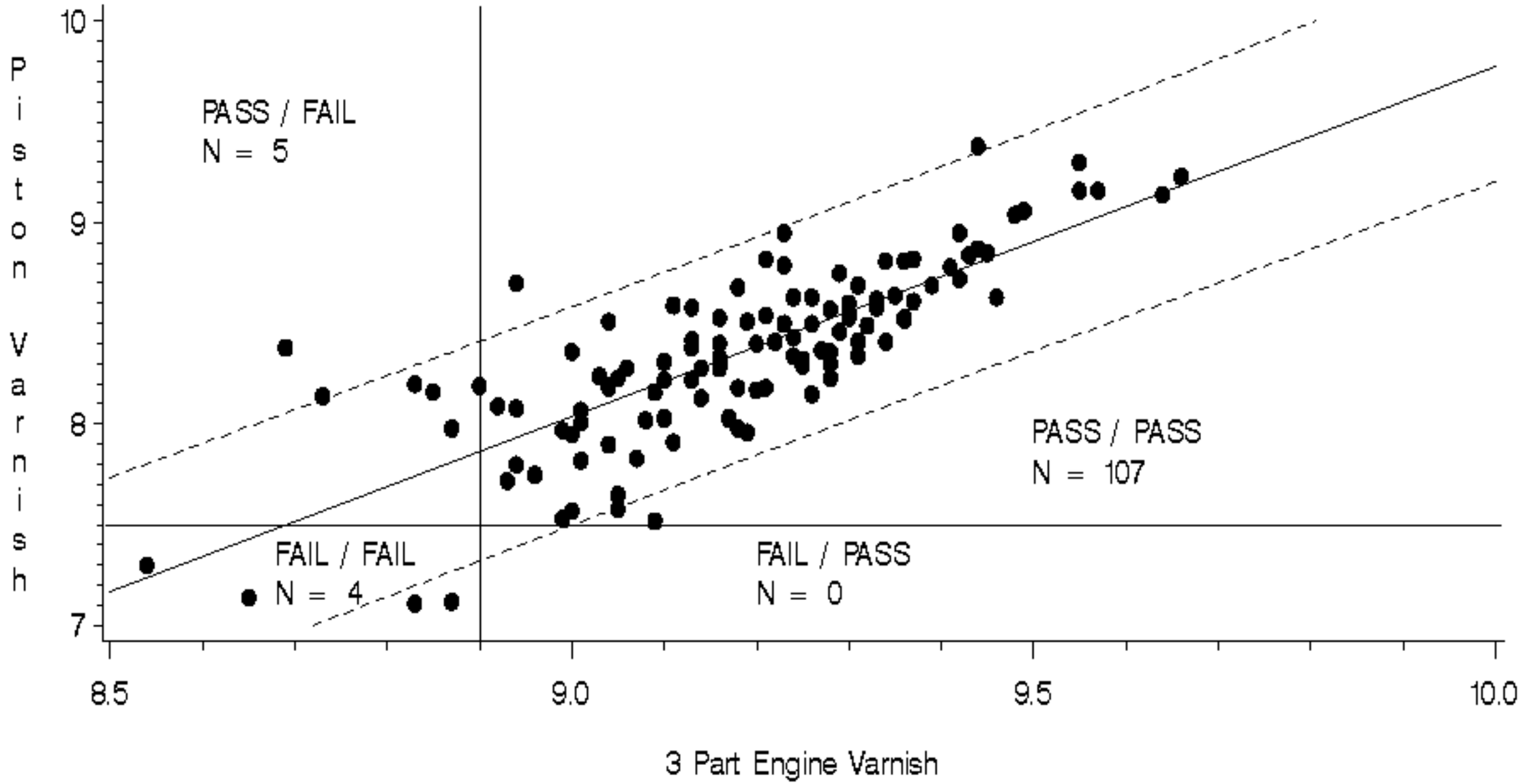
Wednesday, 06DEC00

Registration Systems, Inc.

ACC Monitoring Agency

Seq. VG Piston Varnish vs. 3 Part Engine Varnish Correlation

Pearson Correlation Coefficient = 0.794



Valid, Interpretable through 12/06/00 w/SA applied.

Regression line plus 95% CL brackets for individual predicted values.

Wednesday, 06DEC00

Registration Systems, Inc.

ACC Monitoring Agency

Sequence V Reference Oils and Fuels Report

Brent Shoffner 11/16/00

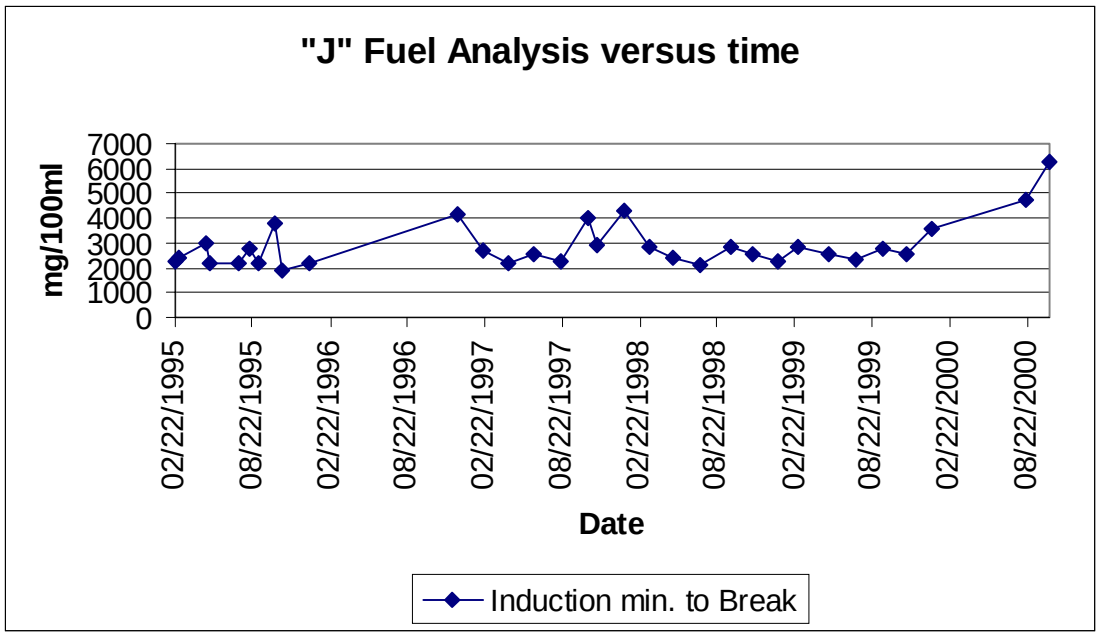
- **Phillips "J" Fuel**

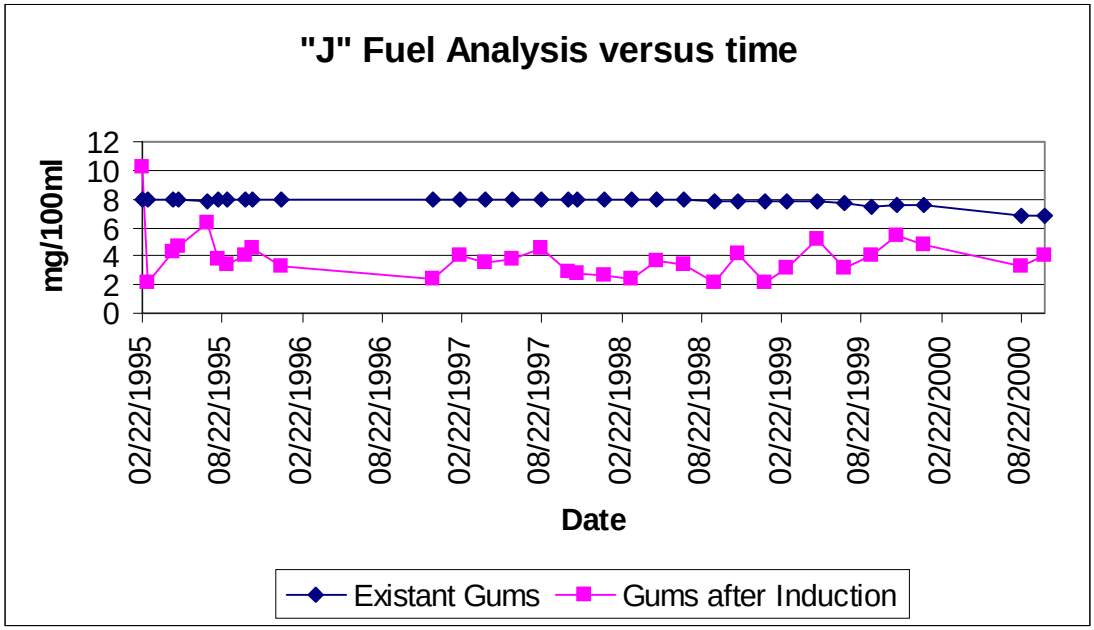
  - Quantity in storage at ChevronPhillips 158K gallons
    Fuel at the laboratories 50K gallons
    Total "J" fuel 208K gallons
    Assume 7% used for other tests (15K) gallons
    "J" fuel for VE testing 193K gallons

    Approx. # of VE tests remaining 300 tests

  - **Batch 43 "J" Fuel Aging**
    The batch was blended in 1994
    The latest analysis of the fuel in the ChevronPhillips storage tank indicates that it *has not* "deteriorated".

	Analysis Date	
Parameter	**02/22/1995**	**10/13/2000**
API Gravity	54.2	52.8
Initial Boiling Point (F)	100	101
10%	130	135
50%	217	225
90%	329	332
Final Boiling Point (F)	427	442
Reid Vapor Pressure (psi)	8.0	6.8
Existant Gums (mg/100ml)	1.2	2.2
Gums after induction (mg/100ml)	10.2	4.0
Induction minutes to Break	2280	6240


"J" Fuel Analysis versus time
mg/100ml
7000
6000
5000
4000
3000
2000
1000
0
02/22/1995
08/22/1995
02/22/1996
08/22/1996
02/22/1997
08/22/1997
02/22/1998
08/22/1998
02/22/1999
08/22/1999
02/22/2000
08/22/2000
Date
Induction min. to Break


"J" Fuel Analysis versus time
mg/100ml
12
10
8
6
4
2
0
02/22/1995
08/22/1995
02/22/1996
08/22/1996
02/22/1997
08/22/1997
02/22/1998
08/22/1998
02/22/1999
08/22/1999
02/22/2000
08/22/2000
Date
Existant Gums
Gums after Induction

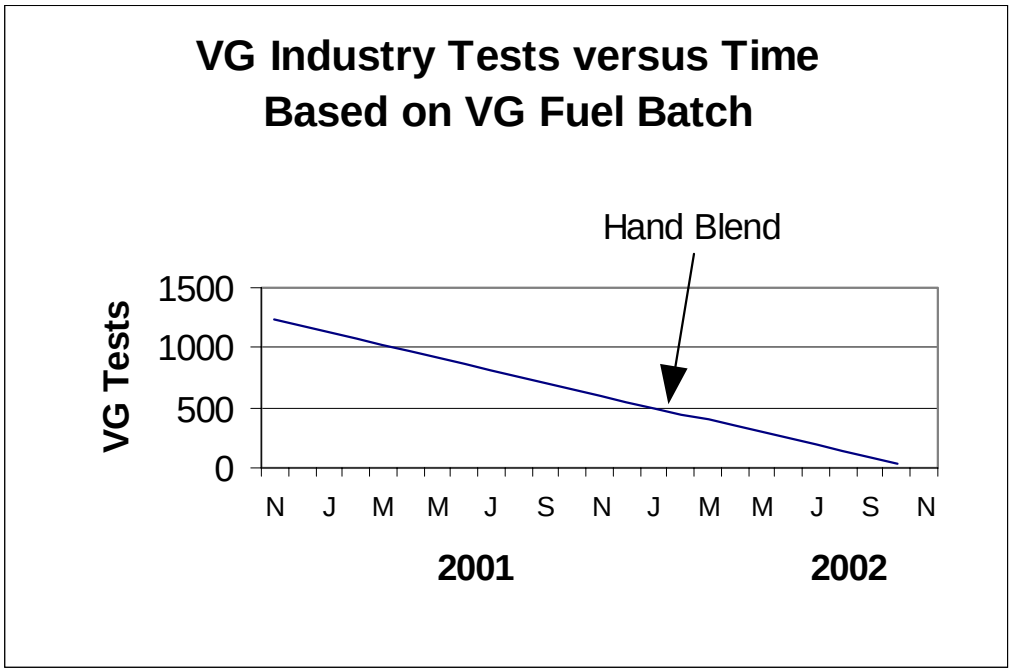
VG Fuel

- The detailed analyticals from the storage tank are being sent to the TMC.

- Quantity in storage at Haltermann 794K gallons
  Fuel at the laboratories 66K gallons
  Total "VG" fuel 860K gallons

  Approx. # of VG tests (700 gal/test) 1230 tests

- Recommend "hand blend" 6-9 months prior to projected outage.



- **VG Fuel**

  - **Labs should have fuel sample containers from Specified**
  - **There are 920K gallons in storage at Specified.**
  - **1300 VG tests plus fuel at the labs**
  - **Assuming 25 stands in the industry and 12 days per test:**

    - ✓ **Approximately 1 ¾ years supply at capacity**

  - **Recommend holding of on the hand validation blend**

PRODUCT INFORMATION

Haltermann

T (281) 457-2768 F (281) 457-1469

PRODUCT:	**Batch No.:**	9906416	9906416
SVGM2	**TMC No.:**	n/a	n/a
	TMO No.:	n/a	n/a
PRODUCT CODE:	**Tank No.:**	74	74
HF295	**Analysis Date:**	10/10/00	9/12/00

TEST	UNITS	RESULTS	RESULTS	RESULTS
Distillation - IBP	°F		90	90
5%	°F		113	115
10%	°F		127	128
20%	°F		153	152
30%	°F		179	180
40%	°F		213	213
50%	°F		230	232
60%	°F		242	243
70%	°F		256	257
80%	°F		292	291
90%	°F		343	343
95%	°F		358	358
Distillation - EP	°F		400	389
Recovery	vol %		98.0	97.8
Residue	vol %		1.0	1.0
Loss	vol %		1.0	1.2
Gravity	°API		57.1	57.0
Specific Gravity	-		0.750	0.750
Reid Vapor Pressure	psi		9.0	9.0
Reid Vapor Pressure	psi		9.1	9.0
Sulfur	wt %		<0.015	<0.015
Lead	g/gal		<0.01	<0.01
Existent gum, washed	mg/100mls		<1	<1

Sequence VG Test Report

ASTM Sequence VE / VG Surveillance Panel Meeting

San Antonio, Texas

November 16, 2000

Mike Riley

Ford Motor Company

Fuels and Lubricants Engineering

New VG Engine

- Ford Romeo Engine Plant supplied 2,000 2000 Model Year 4.6L 2V engines.

- Current plans include 2 tests/block at 0.25 and 0.50 mm oversized cylinder bores to provide consistent bore surface finishes. All labs should plan on standardizing their cylinder boring and honing equipment.

- Several tests conducted with new engines indicate sludge and varnish deposits are comparable to AER built engines with minor hardware and procedure changes.

- Solicitation to distribute all 2,000 new engines and kits will be made 2nd quarter 2001 to assure engines are available a few months before testing is expected to start late 2001/early 2002.

- Assuming use of new engines starts 1/1/2002, 2 tests/block and 650 VG tests/year should meet VG test needs for about 6 years.

M. Riley
Ford Motor Company
Fuels and Lubricants Eng

Estimated VG Engine Availability and Test Plans
TMC Survey Taken October 2000

Lab	Test Stands	Engines * Available	Expected 2000 CY Tests	Expected 2001 CY Tests	Engines 1/1/2002
A	9	225	60	250	-25
B	3	98	24	85	+13
C	1	19	0	15	+4
D	3	70	65	95	-25
G	9	310	85	180	+130
Total	25	722	234	625	+97

* Assumes total of 703 engines ordered from AER are included and none used for 2000 CY Tests.

M. Riley
Ford Motor Company
Fuels and Lubricants Eng

Sequence V Operations & Hardware Report to the Sequence V Surveillance Panel; November 16, 2000

1. A meeting was held July 25, 2000 at Southwest Research Institute.

2. The standardized dipstick correlation table was discussed and most agreed that 21 grams/millimeter is appropriate to use for all stands. The data shows slope differences of 19 gm/mm to 25 gm/mm. The spread of 6 gm/mm is less than ¼ of an ounce of oil. The labs have compared the proposed table to their own. Section 12.1.1 dipstick correlation would be removed and replaced with a common table.

3. The data value precision used for QI calculations was agreed to be the data dictionary precision for each parameter. That is, the precision of the average of the parameter.

4. The 90 day calibration requirement for temperatures and pressures was proposed to be removed (for VE also). The procedure would still require all calibrations prior to stand calibration.

5. Proposed procedures for the Roller Pin measurement, the Top Ring Gap measurement, and the Oil Screen Blowing technique were adopted.

6. Fuel and AFR control trim potentiometers installed in wiring harness was made an action item for resolution.

7. Recommendations to remove the ring groove chamfer measurement and to remove Stage 1 Blowby measurements were adopted. Also, the wording for the Rocker Cover temperature ramp from Stage 3 to Stage 1 should be modified from “15 +/- 2 minutes” to say “within 17 minutes”. Both stages run at 29’C. The Panel also suggests removing the ring gap delta requirement that the top ring gap be greater than the 2nd ring gap (which was a typo from the original development). The delta of 0.002” would stay.

8. New items since the meeting: Remove the requirement to have 0.5% Oxygen span gas and use 1.0% Oxygen span gas for all stages, and adjust the fuel injector flow limits from 188 to 198 mL to 188 to 203 mL. The injectors actually flow in that range now that there is more data.

Jim Moritz
Chairman

Operations and Hardware Motions:

1. Motion to remove the dipstick correlation procedure (section 12.1.1) and replace it with the common table presented using 21 grams/millimeter.

   Jim Moritz/

2. Motion to reduce the temperature and pressure instrumentation calibration frequency from 90 days to prior to stand calibration for both Sequence VE and Sequence VG. Continue to require all instrumentation calibrations prior to stand calibration.

   Jim Moritz/

3. Motion to approve the procedures for Roller Pin Step Wear measurement, Top Ring Gap measurement, and using the Oil Screen Blowing Device as presented.

   Jim Moritz/

4. One motion for the following:

- To define the recorded data value precision as that in the data dictionary for the average value of that parameter and include summary table in the procedure.
- To remove the requirement to measure the ring groove chamfer.
- To remove the taking and recording the Stage 1 Blowby values.
- To modify the wording of the Stage 3 to Stage 1 Rocker Cover Temperature ramp from “29’C within 15+/- 2 minutes” to “29’C within 17 minutes”.
- To correct an error in the procedure by removing the requirement that the top ring gap be larger than the 2nd ring gap. The gap delta of 0.002” would stay.
- To remove the requirement to have 0.5% oxygen span gas.

Jim Moritz/

5. Motion to adjust the fuel injector flow limits from 188 to 198mL to 188 to 203mL.
   Jim Moritz/

Proposed VG Roller Pin Step Wear Measurement

Procedure:

1. Label one end of the roller pin with position in engine; 8I, 8E.
2. Label opposite end of roller pin with an arrow indicating the top of the rocker and position of the measurement.
3. Using a vise to hold the rocker, punch pins with 5mm (3/16") diameter punch from rockers.
4. Clean pins to remove oil and sludge.
5. Measure wear step on pins using a surface finish analyzer.
   A. Setup machine following the manufacturer's instructions for measuring the depth of the wear.
   B. Wear step measurement.
      1. Place roller pin in a V-block for measurement. WITH ARROW UP
      2. Lower stylus on to roller pin and center horizontally.
      3. Set Travel points so stylus will transverse the length of the worn surface, starting on a unworn surface at one end and completing its trace on the unworn surface at the opposite end. Note: Position stylus to start and finish on an area between the worn surface and the area that was pressed into the rocker body.
      4. Take a Trace.
   C. Evaluate Measurement.
      1. Position the Evaluation Length Lines to bracket the displayed wear step so the measurement will only evaluate the wear step. MAXIMUM DEPTH
6. Perform above steps for both pins.

Proposed Top Ring Gap Increase:

13.7.2 Using the top rings from cylinders #1 & #8, clean the ring ends thoroughly and measure the ring gap after the rings have been installed in the master ring bore. (see 7.5.5). Calculate the ring gap increase. Compensate for any ring gap adjustments made during the test.

7.5.5 *Piston Ring Master Bore*—Use the master bore to measure Top Ring Gap Increase. The bore size shall be 90.70 +/- 0.03 mm.

Proposed Oil Screen Blowing Technique

Regulate air pressure to 130 +/- 10 kPa (18.85 +/- 1.45 psi). Connect device to screen. Allow air to flow for 5-10 seconds. Remove device and rate.

VG

Parameter	Lab				Recommended
	G	J*	B	A	
Speed	7.2	4.0	6.1	4.0	5.0
Power	5.2	11.9	4.1	5.2	6.2
Humidity	5.2	11.8	4.1	5.2	5.1
Temperature	5.2	11.8	4.1 (5.2 colout)	5.2	5.1
Man.Abs. Pressure	5.2	11.8	4.1	5.2	5.1
Intake Air Pressure	4.2	11.9	5.3	3.1	6.3
Exh. Backpressure	6.2	11.7	6.2	5.1	6.1
Cool. Out Pressure	4.1	11.8	5.2	4.1	6.1
Coolant Flow	5.2	11.8	5.2	4.1	6.1

* resolutions are a function of transferring data between software packages

IVA

Parameter	Lab					Rec.
	G	J	B	A	K	
Speed	7.2	4.0	7.2	4.0	4.0	
Torque	5.2	4.1	5.2	5.2	4.1	
Temperature	5.2	5.2	5.2	4.1 (5.2 colout)	4.1 (oil gal ?)	
Humidity	5.2	5.2	5.2	4.1	4.1	
Intake Air Pressure	4.2	5.3	4.2	5.3	4.2	
Exhaust Backpress.	6.2	6.2	6.2	5.1	6.2	
Coolant Flow	5.2	5.2	5.2	4.1	4.1	

IIIF

Parameter	G	A	Recommended
Speed	7.2	4.0	
Load	6.2	3.0	
Air Fuel Ratio	5.2	4.1	
Temperature	4.1 (6.2 oil filter block)	5.1	
Pressure	4.2	3.1 (4.2 intake air)	
Oil Cooler Flow	5.2	4.1	
Condenser Flow	6.2	4.1	
Coolant Flow	5.1	6.2	

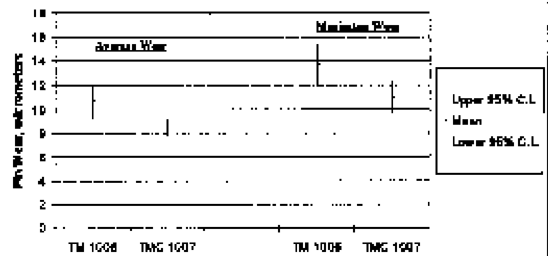
ATTACHMENT 8

Observations Regarding the Evaluation of Wear in the Ford 4.6L SOHC V8 Valvetrain

ASTM Sequence VG Surveillance Panel Meeting
16 November 2000
San Antonio, TX

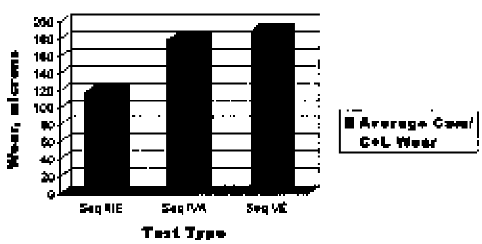
Ethyl

Sequence VG Roller Finger Follower Pin Wear on ASTM TMC 1006 & TMC 1007



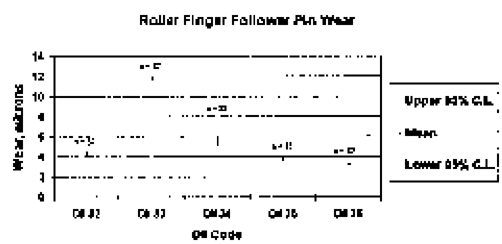
Ethyl

Relative Cam/C+L Wear Performance of TMC 200



Ethyl

Midtown Taxi Catalyst Durability Test Roller Finger Follower Pin Wear (4.6L SOHC V8)



Ethyl

Recommendations

- Continue to collect Rate and Report data on roller follower pin wear.
- Consider adding TMC 200 as a Sequence VG reference oil.
- Consider accepting a field-tested pair of oils for future use as 'GF-4' reference oils.

ATTACHMENT 9

ASTM Light Duty Rating Task Force
Report to Sequence V Surveillance Panel
November 16, 2000
Embassy Suites Hotel – San Antonio, Texas

- **Annual CRC Rating Workshop recently held in San Antonio (Sep 2000)**
- **No ASTM "Test Specific" Workshops were held in 2000**
- **Rater Calibration Task Force Update:**

  Working with TMC and Task Force Members to define a plan for implementing a Calibration Process for industry use in Gasoline and Diesel test areas. Gear test area currently has a plan that can possibly be used as a template in our design effort.

Zack Bishop
ASTM Light Duty Rating Task Force Leader

ASTM SEQUENCE VE SURVEILLANCE PANEL

SCOPE:

The Sequence V Surveillance Panel is responsible for the surveillance and continued improvement of the Sequence VE test documented in ASTM Standard D5302-92 and VG ASTM Standard (XXXX) as updated by the Information Letter System. Data on test precision and laboratory versus field correlation will be solicited and evaluated at least every six months. Improvements in rating technique, test operation, test monitoring and test validation will be accomplished through continual communication with the Test Sponsor, ASTM Test Monitoring Center, ASTM BO.01, Passenger Car Engine Oil Classification Panel, ASTM Light Duty Rating Task Force, ASTM Committee B0.01, CMA Monitoring Agency and CRC Motor Rating Methods Group. Actions to improve the process will be recommended when deemed appropriate based on input from the preceding. Development and correlation of updated test procedures with previous test procedures will be reviewed by the panel. This process will provide the best possible test procedure for evaluating automotive lubricant performance with respect to the lubricant's ability to prevent engine sludge, engine varnish, cam lobe wear, oil screen plugging, oil ring clogging and ring sticking.

Sequence V Objectives

Objective	Target Date
1. Update VG/VE correlation for PCEOCP	GONE ~~May 2000~~
2. Review need for VG rate and report items	GONE ~~Nov. 2000~~
3. Establish VG fuel reblend confirmation trial timing	JAN. 2002 ~~Oct. 2000~~
4. Phase out of VE issues and Terminate VE Monitoring	June 2001
5. Approval testing of next VG fuel reblend	Dec. 2001
* NEW ENGINE EQUIVALENCY TEST	MAR. 2001

Updated November 16, 2000
San Antonio, Texas

ATTACHMENT 11

API OIL Screen Clogging Question

Oil screen clogging is a pass fail criteria for SJ. It is not monitored and there are no statistics kept on that parameter. Here is the problem: API samples and tests products, on a few samples each year we run an engine test. The criteria for acceptance is that the oil meet the SJ limits including the 95% C.I.. The 95% C.I. is calculated using standard deviation data from TMC.

How should we treat an OSC value greater than 20%?
This can happen two ways.

1. **All other parameters are met within the 95% C.I.**

2. **One or more of the parameters do not meet SJ limits including the 95% C.I.**

We would appreciate any guidance you and the Seq. V surveillance panel can offer.

R. C. (Dick) Clark
Products Associate
American Petroleum Institute

Note: I have informed Dick that I would put this on the Nov. 16 Seq. V panel agenda for discussion but that any offical response from ASTM to API will come from Tech B. I will report the outcome of todays discussion to Tech B-1 and B in December.

Other TMC Items

4 tests started last week on 925-3

Expect results to be 5-6 merits AES, 7-8 merits RAC, 8.9 to 9.0 AEV, 7 -8 merits APV and OSCR of 23 to 98%. Use as a discrimination oil (10%) or normal reference (33.3%)

Some VG standard (D 6593) editorial issues

QI Deviations

- Section A2.5.6 and 2.5.6 need revised to be congruent with 14.9 (0.000)
- Suggested Rewording of A2.5.7 and 14.9 as follows:

2.5.7 If the end of test quality index value is below 0.000, conduct an engineering view of the test operations. Engineering review will normally conducted by the test boratory, Test Monitoring Center and may include other industry experts. Engineering view may extend to other operational parameters in order to evaluate the extent and agnitude of the operational deviation and its impact on test operation. Document the sults of the engineering review.