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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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June 9, 2005

Reply to: Frank M. Farber
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Pittsburgh, PA 15206
Phone: 412-365-1030
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Unapproved Minutes of the May 19, 2005
Sequence VG Surveillance Panel Meeting
Held in Tunkhannock, PA

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Chairman Farnsworth called the meeting to order at 9:02am. The Agenda was passed out and reviewed. *{The Agenda is shown in Attachment 1.}*

Membership Changes – Andy Ritchie replaces Gordon Farnsworth. *{A Membership list, which was circulated at the meeting, is shown in Attachment 2.}*

Motion & Action Item Recorder – Bill Buscher is the Motion & Action Item recorder for this meeting.

Approval of 11/16/04 Meeting Minutes – The minutes for the 11/16/04 meeting were approved unanimously and without comment.

Review of Action Items – The action items from the last meeting were reviewed in detail. *{A copy of those Action Items is shown in Attachment 3.}* 4 items completed.

Fuel Supply Report – Jim Carter reported fuel usage as shown on Attachment 4. The last 5 fuel batches are shown in Attachment 4. RVP is on the low end and has been bumped up by the addition of isobutane and isopentane (see attachment). Jim agreed to supply labs contact information about determining remaining quantities of existing fuel.

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Test Sponsor Report – No Test Sponsor report was given. Sequence VG engines may be available for \$1500 + core charge from Ford dealerships. TMC is to survey labs for part needs to maintain inventories to 2009+. TEI should be included on the survey to maintain head inventories.

TMC Report – Due to time constraints, Rich Grundza did not present the TMC report at the Chairman's request. His full report can be reviewed at the following link:

<ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencev/semiannualreports/vg-4-2005.pdf>

The current reference oil trends are shown below:

Parameter	Average Δ/s	Shift	Direction
RAC	0.439	0.1	Mild
AES	0.553	0.4	Mild
APV	-0.536	-0.13	Severe
AEV	-0.145	-0.03	On Target
OSCR	-0.452	-7.0	Mild

RSI Report – There were no questions regarding the emailed report.

O&H Report – The only comment noted was that OHT dipsticks need to go in the correct oil dipstick tube apparently there was some issue with this last period.

Review Rate & Report Items – The chair presented emails (Attachment 5) regarding the ACC analysis of Rate & Report items (pin wear and ring gap increase). In addition to the ACC analysis, the TMC was requested by ACC to analyze ACC supplied candidate test data. Based on the ACC and TMC analyses, ACC PAPTG has concluded that pin wear and gap increase are not parameters that can be used to effectively measure candidate oil performance in the VG and requested that they be removed as rate and report parameters.

Mike Riley presented Attachment 6, which was based on VG and field test data, that also concluded that follower pin and ring gap increase should be removed as rate and report parameters.

As a result of this information, Bill Buscher motioned and Jerry Bryce seconded, that follower pin wear and ring gap increase are to be removed as rate and report parameters. The motioned passed.

Operational Data Review – Dan Worcester presented Attachment 7. After some debate, it was agreed that 'If a test exceeds 2 hours of lost electronic data the test is operationally invalid'. An information letter will be written.

Fuel Batch Approval - Rich Grundza presented Attachment 8. Infienum had also done an analysis (not presented at the meeting) on the fuel batch and concluded similar results to the TMC. The analysis indicated that the new fuel batch was severe on AES, RAC, APV and AEV. To use the new fuel, correction factors would need to be implemented. A motion was made to accept the TMC's correction factors and the use of the new fuel batch. The vote tallied one negative. After some additional discussion, it was decided to revisit the topic on the following Tuesday in hopes of resolving the negative. The final conclusion, post-meeting, was to letter ballot the information letter

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before moving ahead with the correction factors. Report forms will be modified to include superscripts so that users will understand that the appropriate correction was applied.

The panel also discussed whether the fuel supplier would supply the fuel recipe to TMC for future use. At this point the fuel supplier has not complied. The panel was disappointed that the replacement fuel batch was not made available prior to depleting the current fuel batch.

New fuel batch is to be added to a laboratory's fuel tank when the current fuel level is below 10% of the final fuel mixture's total volume.

Dwight Bowden motioned and Dave Glaenzer seconded that tests are to be run on only one fuel batch.

Test Precision Procedure – Frank Farber presented Attachment 9. The recommendation was to update the test procedure with the LTMS severity adjustment standard deviations and use the test precision calculation procedure as outlined on the attachment. The panel approved this recommendation.

Sequence IIIG LTMS Implementation – Ben Weber is to compile a list of pros and cons of the Sequence IIIG LTMS system for panel review.

OSCRLG Issue – The panel reviewed a letter sent by Mike Pansza the CRC workshop coordinator (Attachment 10). The panel agreed that the test method wording regarding oil screen clogging needed to be clarified so that oil screen clogging does not include debris. Section 13.4.1.3 of the test method will be revised via information letter.

Scope and Objectives – Chairman Farnsworth presented the Scope and Objectives of the Sequence VG Surveillance Panel for review (Attachment 11). The objectives were modified as shown.

Old Business – There was no old business.

New Business – There was no new business.

One last note – This meeting marked the end of an era for the Sequence VG Surveillance Panel. Our dedicated and never at a loss for words chairman is stepping down and passing the chairmanship on to Andy Ritchie. After 28 years of unending service to the Sequence V group Gordon is moving on to a well earned retirement. We all wish him well and thank him for his relentless pursuit of accomplishing the objectives of the panel and the sharing of his memorable adventures. To Gordon, we say "Thank You" and to Andy, "Welcome Aboard". Gordon, you will have to get use to the picture.

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The meeting was adjourned at 5:20 pm.

Motions and Action Items

As Recorded at the Meeting by Bill Buscher

1. Motion – Approval of Minutes for 11/16/04. Approved without changes.
Dwight Bowden / Bill Buscher III / Passed unanimously
2. Action Item – Jim Carter will supply Dow contact information to the laboratories for acquiring information on remaining allocations of the current SVG2 fuel batch.
3. Action Item – The TMC will survey the laboratories on what Sequence VG parts they would be interested in purchasing if Ford Power Products would be willing to issue an additional parts solicitation. Dan Worcester and Bill Buscher will generate a parts list and forward it to the TMC for this survey.
4. Action Item – Mike Riley to contact Ford Power Products and TEI to evaluate the potential of offering an additional Sequence VG parts solicitation and an additional Sequence VG cylinder head build.
5. Motion – Discontinue the requirement for the roller follower pin wear and ring gap increase rate and report items from the Sequence VG test procedure. Effective 05/19/05.
Bill Buscher III / Jerry Brys / Passed unanimously
6. Motion – Modify the Sequence VG test procedure to state if a test has greater than 2 hours of lost electronic data acquisition on any controlled parameter, the test will be considered operationally invalid.
Dan Worcester / Bill Buscher III / Passed unanimously
7. Motion – Use the linear regression correction equation $(2.175 + AES)/1.192$ for AES, the linear regression correction equation $((RAC + 0.627)/1.040)$ for RAC, a fixed correction factor +0.19 for AEV, a fixed correction factor +0.54 for APV and no correction factor for OSCR as industry correction factors to be applied to all tests conducted using the new Haltermann SVG2 fuel (batch number TA1921LS15). These temporary industry correction factors will be reviewed and finalized when 5 tests are available on reference oils 1009, 1006-2 and 925-3.
Dwight Bowden / Mike Riley / 7 For 1 Against 2 Waive
Final vote will be updated Tuesday 05/24/05.

8. Action Item – Include superscripts on test report form defining the industry correction factors that will be applied to all tests conducted using the new Haltermann SVG2 fuel (batch number TA1921LS15).
9. Motion – New fuel batch will be only added to a laboratory's fuel tank when the current fuel level is below 10% of the final fuel mixture's total volume.

Dwight Bowden / Dave Glaenzer / Passed unanimously

10. Motion – Update the test method precision statement in D6593 to reflect LTMS SA standard deviations.

Frank Farber / Dan Worcester / Passed unanimously






11. Action Item – Chairman of the LTMS, Ben Weber to investigate the pros and cons of the new IIIG LTMS system and study how well it could potentially be applied to the VG. Report back to the group by the November meeting.
12. Motion – Modify Sequence VG test procedure section 13.4.1.3 to state: "Determine the percentage of the total screen opening that is obstructed with sludge. Determine the percentage of the total screen opening that is obstructed with debris."
Rich Grundza / Dave Glaenzer / Passed unanimously


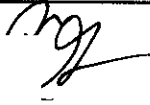

Agenda
 Sequence VG Surveillance Panel
 May 19, 2005
 2:00PM – 5:00PM
Tunkhannock, Pennsylvania

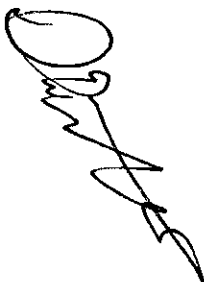
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|--|------------------------------------|
| 1. Chairman comments | |
| 2. Attendance sign-in sheet distribution | |
| 3. Membership changes | |
| 4. Motion and Action recorders | |
| 5. Approval of minutes for November 16, 2004 | All |
| 6. Review action Items from last meeting | G. Farnsworth |
| 7. Test Sponsor report | M. Riley |
| 8. TMC Report
- Any questions regarding semi-annual TMC report | Rich Grundza |
| 9. RSI report
- any questions regarding semi-annual RSI report | Bill Mahoney |
| 10. Fuel Supply report
- Projected life of current batch
- Reblend approval & establish severity
adjustments required | Rich Grundza
James Carter |
| 11. Operational and Hardware items | All |
| 12. Review Rate & Report items analysis
Take action – keep or remove from VG | Gordon Farnsworth/
Rich Grundza |
| 13. VG data collection guidelines | Dan Worchester |
| 14. Test Precision calculation guideline proposal
under TGC review | Frank Farber |

- | | |
|---|--------------|
| 15. Discussion of IIIG type LTMS | Bill Buscher |
| 16. Clarify definition of oil screen clogging
Per CRC proposal | Rich Grundza |
| 17. Review Scope & Objectives | All |
| 18. Old Business | All |
| 19. New Business | All |
| 20. Adjourn | |

Membership
ASTM Sequence VG Surveillance Panel

Name	Company-Address-Phone-Fax-Email	Signature	Voting Member
Altman, Ed	Afton Chemical Company 500 Spring Street Richmond, VA 23218-2158 Phone: Fax: 804-788-6358 Email: ed.altman@aftonchemical.com		Yes
Bowden, Dwight	OH Technologies, Inc 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 Phone: 440-354-7007 Fax: 440-354-7080 Email: dhwbowden@ohtech.com		Yes
Brys, Jerome	The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 Phone: 440-347-2631 Fax: 440-347-4096 Email: jabs@lubrizol.com		Yes
Buck, Ron	Test Engineering, Inc 12718 Cimarron Path San Antonio, TX 78249 Phone: 210-877-0221 Fax: 210-690-1959 Email: rbuck@tei-net.com		Yes
Buscher, William	SouthWest Research Institute P.O. Drawer 28510 San Antonio, TX 78228-0510 Phone: 210-522-6802 Fax: 210-684-7523 Email: wbuscher@swri.edu		Yes
Carter, James	Dow 2296 Hulett Road Okemo, MI 48864 Phone: 517-347-3021 Fax: 517-347-1024 Email: jecarter@dow.com		Yes







Caudill, Timothy	Vavoline 22 nd and Front Streets Ashland, KY 41101 Phone: 606-329-1960 ext. 5708 Fax: 606-329-3009 Email: tlcaudill@ashland.com		Yes
Clark, Sid	GM Engine Engineering Bld. 823 Joslyn Road Mail Code 483-730-322 Pontiac, MI 48340-2920 Phone: 248-857-9959 Fax: Email: Sidney.l.clark@GM.com		Yes
Farnsworth, Gordon	Infineum USA L.P. 1900 East Linden Avenue P.O. Box 735 Linden, NJ 07036 Phone: 570-934-2776 Fax: 570-934-0141 Email: Gordon.farnsworth@infineum.com		Yes 
Grundza, Rich	ASTM Test Monitoring Center 6555 Pen ^{A1} Attachment 2 Pittsburg Phone: 412-365-1031 Fax: 412-365-1045 Email: reg@astmtmc.cmu.edu		Yes
Riley, Mike	Ford Motor Company 21500 Oakwood Boulevard POEE Building, Mail Drop #44 Dearborn, MI 48124-4091 Phone: 313-390-3059 Fax: 313-845-3169 Email: mriley2@ford.com		Yes
Sutherland, Mark	Chevron Oronite Company, LLC 4502 Centerview Drive Suite 210 San Antonio, TX 78228 Phone: 210-731-5621 Fax: 210-731-5699 Email: msut@chevrontexaco.com		Yes

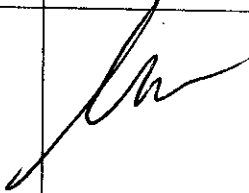

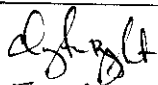
Worcester, Dan	PerkinElmer Fluid Sciences 5404 Bandera Road San Antonio, TX 78238 Phone: 210-523-4659 Fax: 210-523-4607 Email: dan.worcester@perkinelmer.com		Yes
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DAVID GLAENZER
Doyle Boese

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Name	Company-Address-Phone-Fax-Email	Signature	Voting Member
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Name	Company-Address-Phone-Fax-Email	Signature	Voting Member
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Ben Webber	SWRI 210-522-5911 bwebber@swri.edu	BW	No
JASON Bowden	OH Technologies, Inc. 440-354-7007 jlbowden@ohotech.com	J.A.B.	NO
ADAM DOWDEN	" adbowden@ohotech.com		NO
CLAYTON KNIGHT	CKNIGHT@TEC-Net.com	 FOR RON BUCK	No YES
Todd Dvorak	Afton Chemical 500 Spring Street Richmond, VA 804-788-6367 todd.dvorak@aftonchemical.com	TMD	NO

— OVER

Action Items

1. Update severity adjustment standard deviations in the LTMS based upon all operationally valid test results for oils 1006, 1006-2, 1007 and 1009. Add this text to the LTMS document. Done
2. TMC to send fuel certification matrix test results to surveillance panel members as they become available. Done – posted on TMC web site.
3. Fuel supplier to evaluate fuel sales records for the past 2.5 years and allocate remaining fuel sales of current fuel batch to the laboratories on this basis. Done
4. The mineral spirits requirement will only require that the aromatic content, flash point and color requirements of ASTM D 235, Type II, Class C solvent must be met. Laboratories will use the Certificate of Analysis documentation for each batch to verify that these requirements have been met. Done – Info letter 04-4.



SEQUENCE VG FUEL REPORT

May 12, 2005

ORIGINAL BATCH	
SALEABLE GALLONS AT HALTERMANN PRODUCTS	21,800
GALLONS SHIPPED 6 MONTH PERIOD 11/1/04 thru 5-12-05	66,667
AVERAGE USAGE PER MONTH	10,499
NUMBER OF TESTS SUPPORTED BY PRESENT INVENTORY	15
NUMBER OF MONTHS OF INVENTORY ON HAND	2

NEW BATCH	
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SALEABLE GALLONS AT HALTERMANN PR

Farnsworth, Gordon

From: Farnsworth, Gordon
Sent: Monday, April 18, 2005 12:28 PM
To: Farnsworth, Gordon
Subject: FW: Sequence VG: Analysis of Rate and Report Parameters

From: Farnsworth, Gordon
Sent: Tuesday, April 12, 2005 9:10 AM
To: Bill Buscher Jr. (E-mail); Bill Mahoney (Mahoney-ERC@netcommander.com); Bud Hyndman (E-mail); Dan Worcester (E-mail); dave.glaezer@aftonchemical.com; Dennis W. Florkowski (E-mail); Dwight Bowden (E-mail); Ed Altman (ed.altman@aftonchemical.com); Frank Farber (E-mail); Irwin Goldblatt (E-mail); James Carter (E-mail); Jerry Brys (E-mail); Mark Sutherland (msut@chevrontexaco.com); mriley2@ford.com; Patrick Lai (E-mail); Rich Grundza (E-mail); Robert Rumford (E-mail); Ron Buck (E-mail); Sid Clark (E-mail); Stacy Bond (E-mail); Timothy Caudill (E-mail); Timothy Miranda (Timothy.Miranda@BP.com); William Buscher III (E-mail)
Cc: Ritchie, Andrew
Subject: FW: Sequence VG: Analysis of Rate and Report Parameters

The ACC has just circulated and analysis they had performed on Sequence VG roller pin wear and ring gap increase in response to the VG surveillance panel request for candidate data on these parameters for industry analysis. You will recall that we have discussed the continuing need for these rate and report item at several past meetings. The topic will be again reviewed at our May 19, 2005 meeting and we must reach resolution on retaining or removing these rate and report parameters. The full ACC summary and TMC analyses are attached for your review. In short the ACC believes these rate and report items should be removed from the sequence VG in the future. The following quote is from the end of the ACC summary attached.

"Based on these two analyses, ACC PAPTG has concluded that Pin Wear and Gap Increase are not parameters that can be used effectively to measure candidate oil performance in the Sequence VG test and therefore we request they be removed as rate and report parameters. "

From: Evans, Joan
Sent: Monday, April 11, 2005 2:53 PM
To: mriley2@ford.com
Cc: Farnsworth, Gordon; Doug_Anderson@americanchemistry.com
Subject: Sequence VG: Analysis of Rate and Report Parameters

Dear Mike:

The ASTM Sequence V Surveillance Panel requested data from ACC to help form a data-based decision on the rate and report parameters in the Sequence VG test. ACC released individual candidate test data in a blind coded manner for the period of January 1, 2004 to January 1, 2005 to the ASTM Test Monitoring Center (TMC) for its analysis of roller pin wear and ring gap increase. The TMC's summary and analysis is attached in the file entitled "ACC Analysis.pdf" and dated March 15, 2005.

ACC PAPTG then submitted to the TMC the original candidate data set assembled in 2003 to study the rate and report parameters in the Sequence VG and asked TMC to analyze the total data set available for a more thorough analysis and understanding of the data. This summary is attached in the file entitled "ACC Analysis2.pdf" dated March 30, 2005.

A complete summary is detailed in each of the reports by the TMC. Analysis of both data sets yields the following conclusions:

- There are significant differences in pin wear and gap increase among viscosity grades.

- There are no significant differences in pin wear or gap increase among the phosphorus categories.

Review of just the "GF-4 dataset" (i.e. candidates run during 1/1/04-1/1/05), shows that there were no significant differences in pin wear or gap increase between tests passing the VG and tests failing the VG. When the total combined data set was analyzed, significant differences were found in gap increase among tests passing the VG compared to tests failing the VG. It is important to recognize that, although the gap increase parameters show a significant effect vs. pass:fail when using the combined database, these parameters do not appear to be useful for setting pass:fail limits due to what is essentially complete overlap of the data.

Based on these two analyses, ACC PAPTG has concluded that Pin Wear and Gap Increase are not parameters that can be used effectively to measure candidate oil performance in the Sequence VG test and therefore we request they be removed as rate and report parameters. WE look forward to Ford and the Surveillance panel reviewing these analyses. If you have any questions or concerns, please contact Doug Anderson, the ACC PAPTG Panel Manager at 703-741-5616 or Doug_Anderson@americanchemistry.com.

Sincerely,

Joan

Joan M Evans
ACC PAPTG Chair



ACC Analysis.pdf
(501 KB)



ACC Analysis 2.pdf
(754 KB)

Sequence VG Report Rate & Report Items

**ASTM Sequence VG Surveillance Panel Meeting
Shadowbrook Inn, Tunkhannock, PA
May 19, 2005**

**Mike Riley
Fuels and Lubricants Engineering**



VG Rate & Report Wear Study

- 1. VE / VG wear comparison of reference oils.**
- 2. VG comparison to NYC taxi field test at 100K miles (SAE 2002-01-2680 coauthored with Ethyl Petroleum Additives, Inc. and Delphi).**
- 3. VG evaluation of SAE 30, API SA oil with negligible additives.**
- 4. VG evaluation of 5W-20 prototype GF-4 oil with 0.05% P and 1/2 detergent.**



VE / VG Wear Comparison of Reference Oils

Test Description:

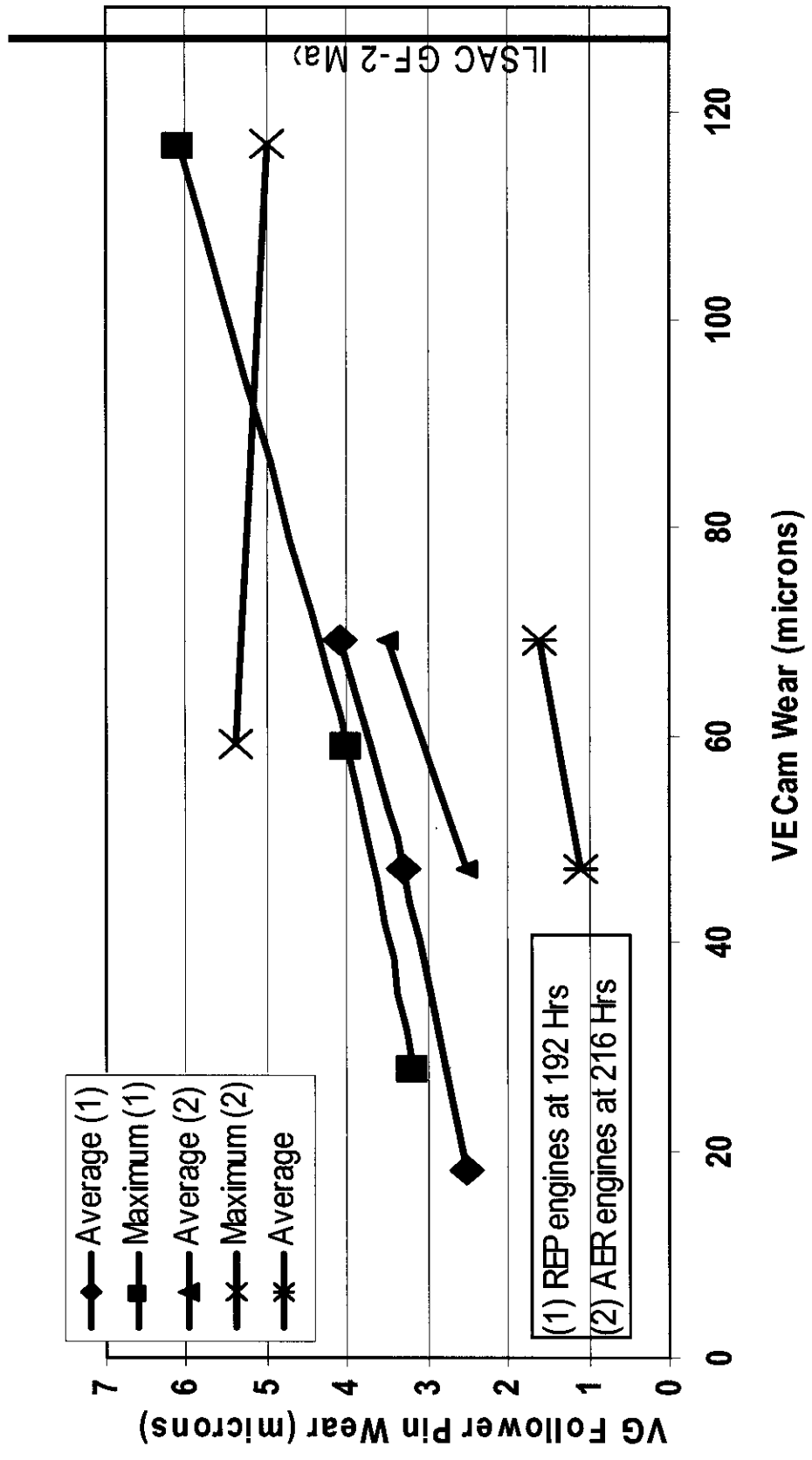
- **Maximum and average VG follower pin wear and VE cam wear of reference oils were compared during VG test development.**
- **Ford Romeo Engine Plant (REP) and AER engines were tested.**

Conclusion:

VG follower pin wear directionally relates to VE cam wear.



VE / VG Wear Comparison Reference Oils



Field Test Compared to VG Results

Test Description:

NYC Taxi Field Test -

- 1999 Ford Crown Vic 4.6L 2V (4/oil) vehicles accumulated 100K miles with 3K and 5K mile oil drains.
- 5W-30 Oils:
 - 1) 0.10% P, no detergent
 - 2) GF-2, 0.10% P, Ca detergent
- Engine Inspections: 2 per oil

VG Tests -

Both tests terminated at 144 hours because non-detergent oil had test complications.

Conclusion:

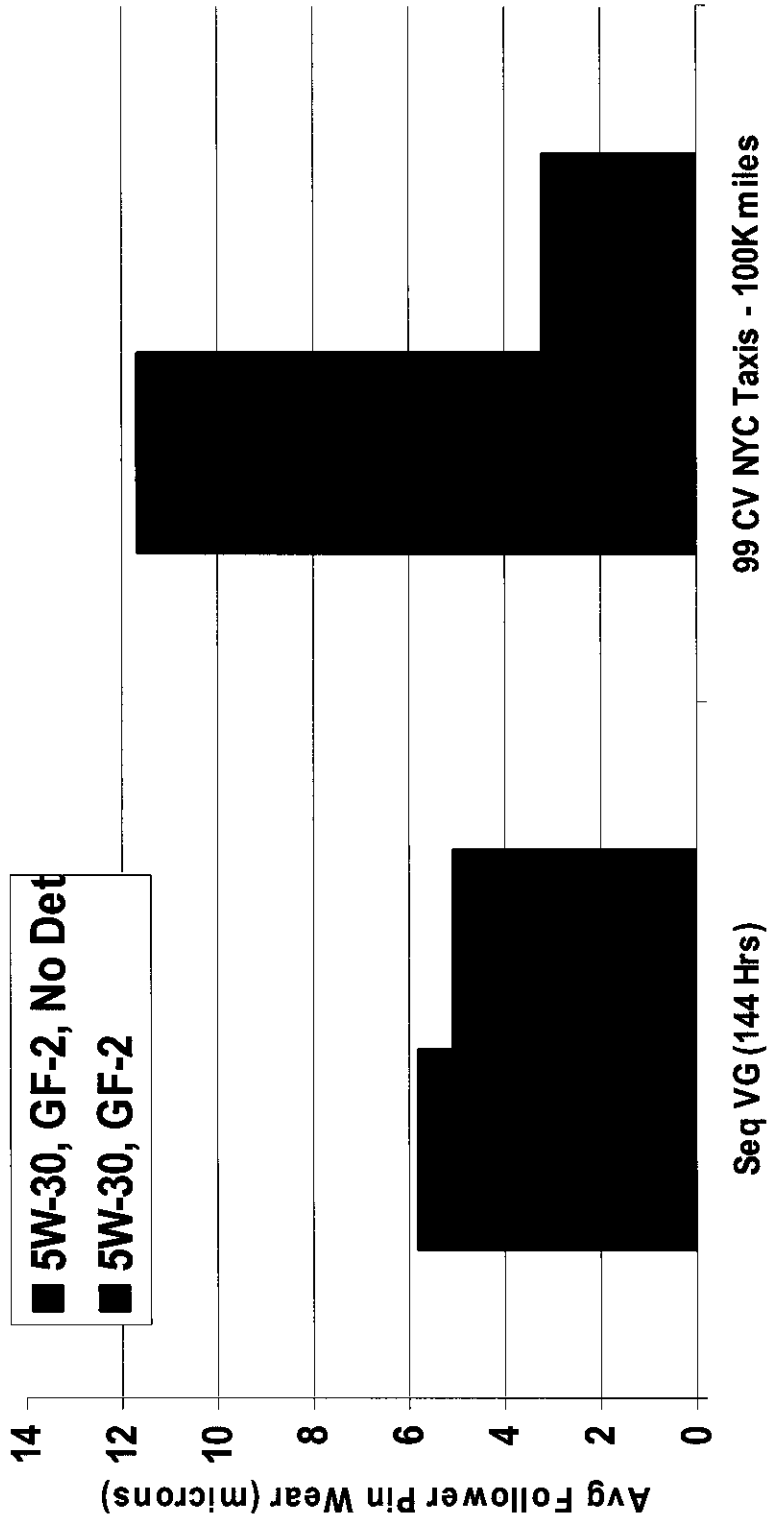
- VG follower pin and ring gap wear were directionally related to field test of 2 oils, although much greater differences occurred in field test.
- AES of VG and AEV of field test were worse with non-detergent oil, whereas AEV of VG and AES of field test were not significantly different.



VG and Field 4.6L 2V Follower Pin Wear

Average Intake and Exhaust of All Cylinders

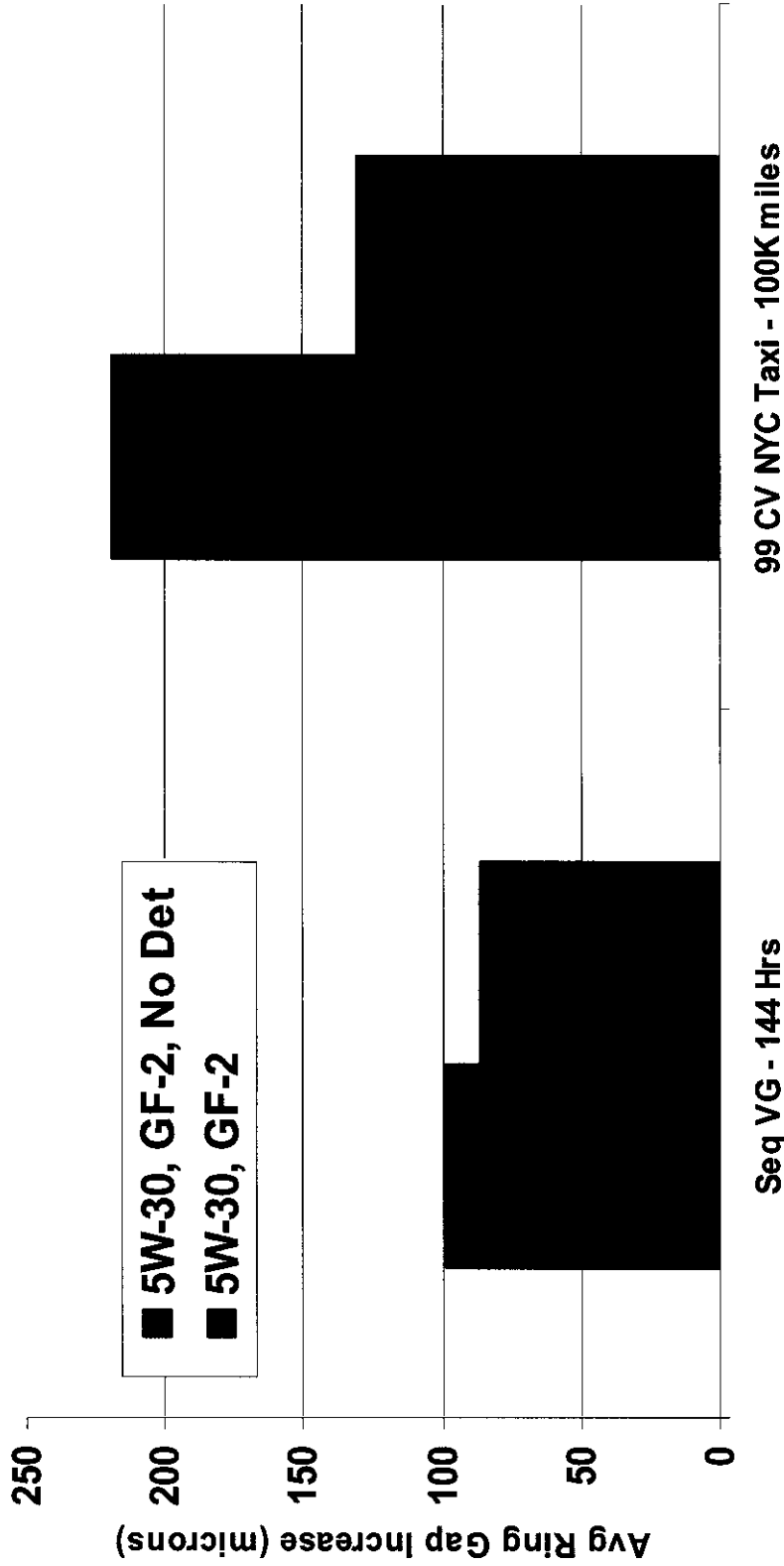
3K and 5K Mile Oil Changes



VG and Field 4.6L 2V Top Ring Gap Increase

Average of All Cylinders

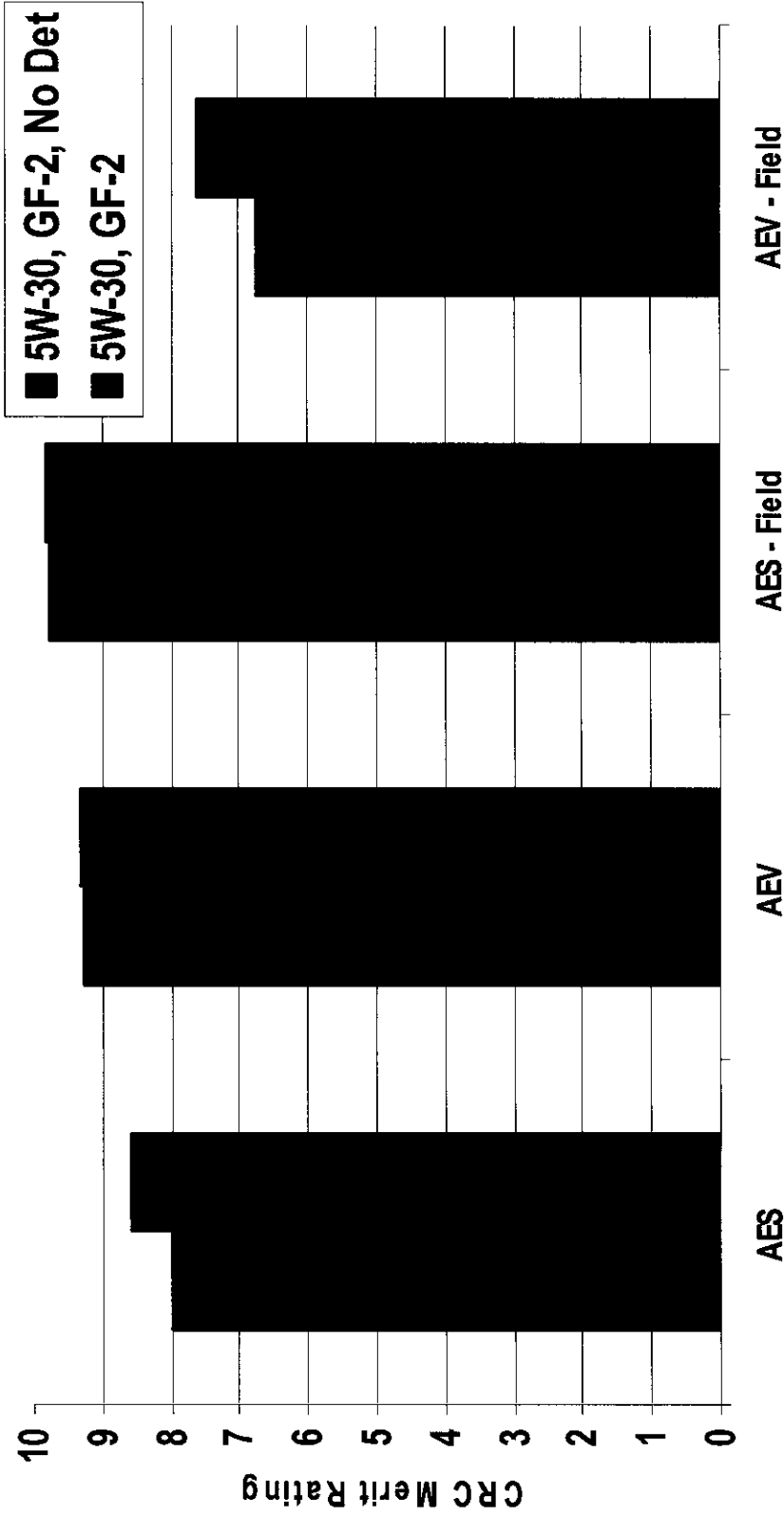
3K and 5K Mile Oil Changes



Seq VG and Field 4.6L 2V Sludge and Varnish Ratings

1999 Crown Vic NYC Taxis at 100K Miles

3K and 5K Mile Oil Changes



AES

AEV

AES - Field

AEV - Field

Sequence VG - 144 Hrs



Evaluation of API SA Oil

Test Description:

- API SA, SAE 30 oil
- Purchased at San Antonio auto parts store
- Additive chemicals at "0" hours of VG test were 8 ppm P, 4 ppm Ca, <1 ppm Mg and <1 ppm Zn.

Conclusions:

- IVA result was 182 microns cam wear (GF-3 = 120 max).
- VG AES was 5.04 and AEV was 7.9 after 168 hours (GF-3/GF-4 AES = 7.8 min and AEV = 8.9 min).
- VG follower pin wear was 2.1 microns, which was not expected and lower than most other oils tested.
- VG ring gap increase was a little higher than other oils tested.



VG Evaluation of Low Detergent Oil

Test Description:

- Prototype GF-4 oil with 0.05% P and 1/2 detergent formulated to accelerate sludge formation.
- Conduct VG test to determine sludging tendency.

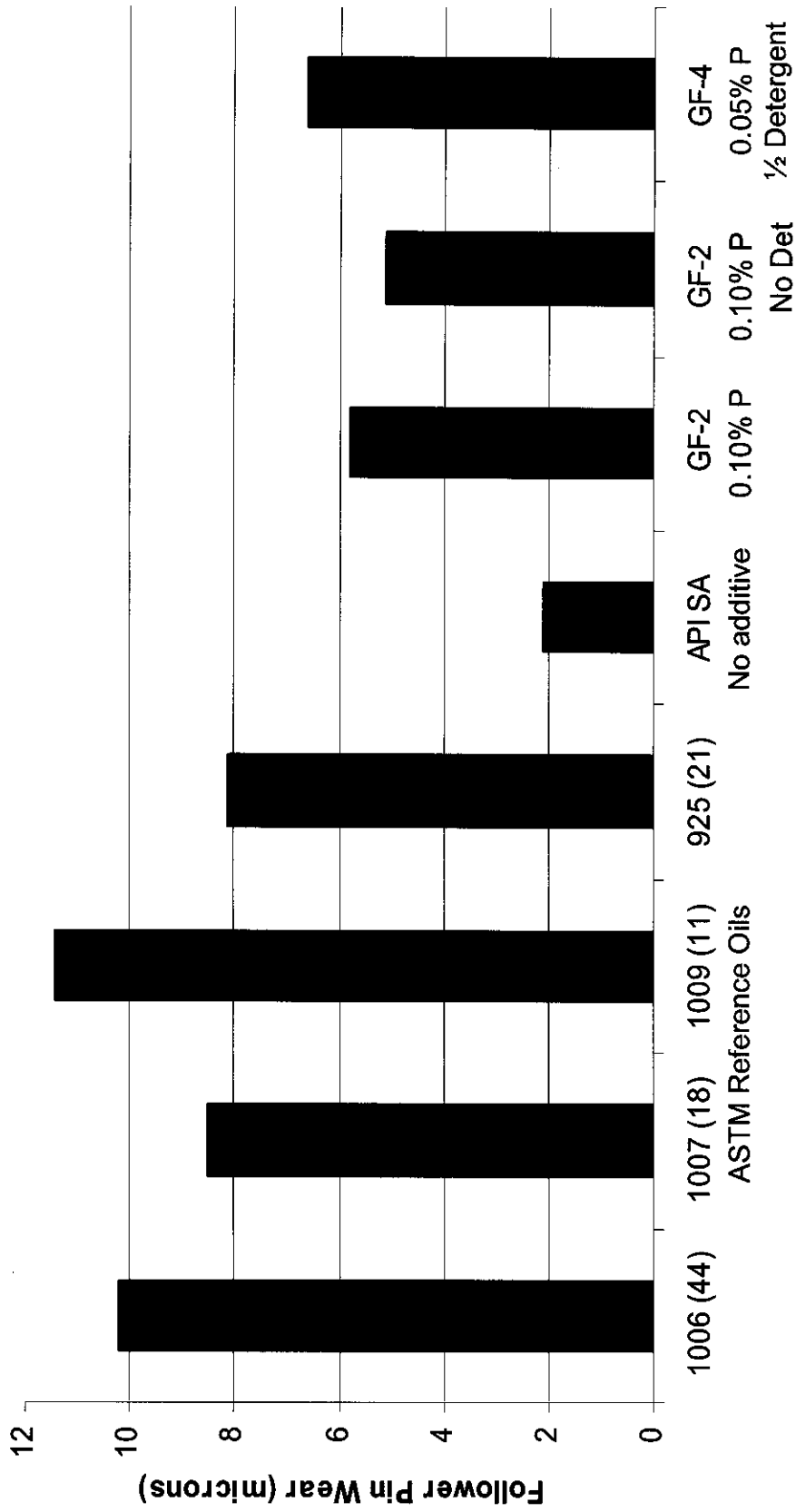
Conclusion:

- Failed GF-4 with AES = 6.6, AEV = 8.5.
- VG ring gap increase was a little higher than other oils tested.
- VG follower pin wear was 6.6 microns, which was lower than the average of 4 reference oils and higher than other oils in this study.



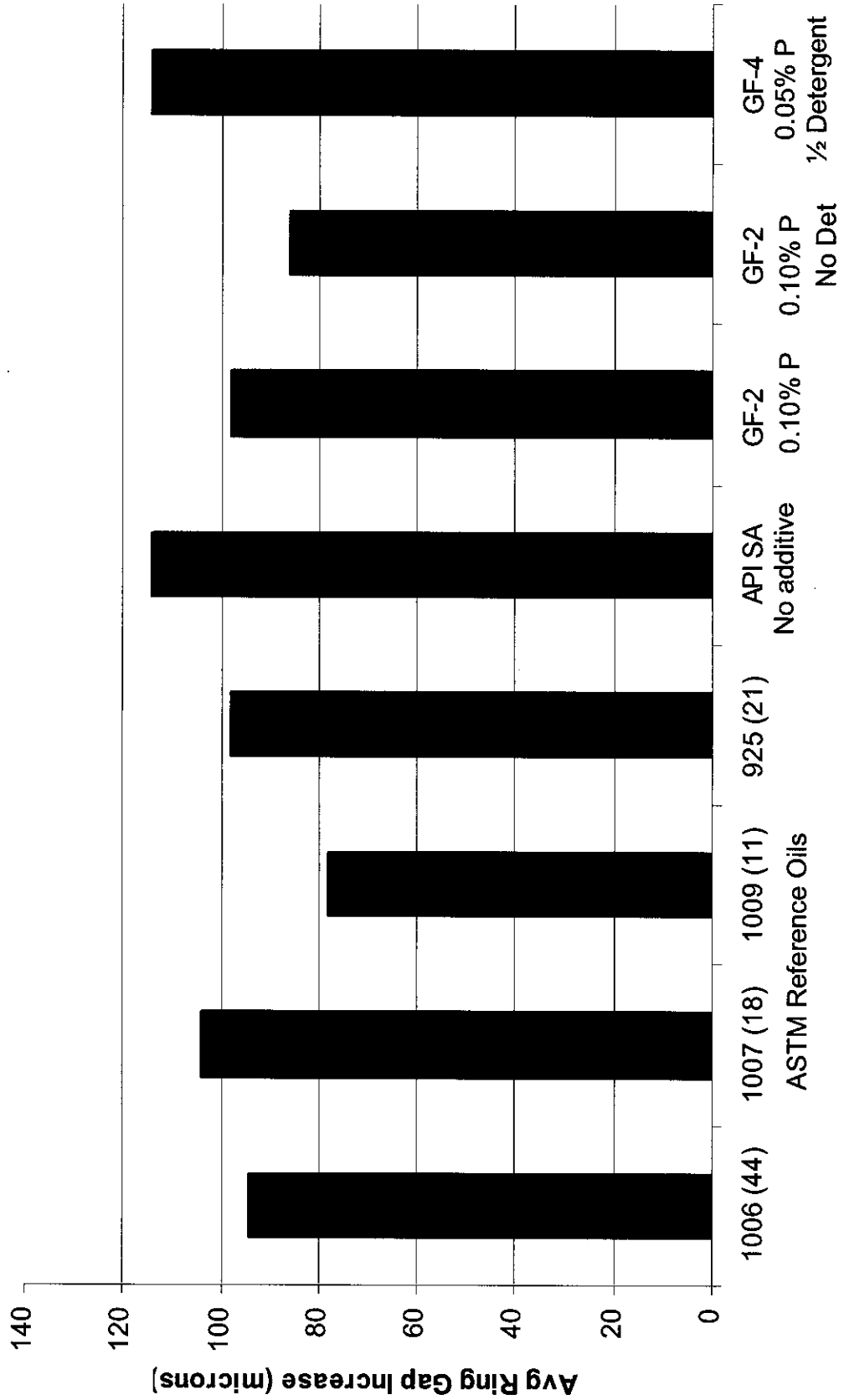
VG Follower Pin Wear

Average Intake and Exhaust of #8 Cylinder



VG 4.6L 2V Top Ring Gap Increase

Average of #1 and #8 Cylinders



Conclusions

1. Early VE cam and VG follower pin wear comparison of reference oils suggested correlation existed.
2. VG follower pin and ring gap wear directionally related to NYC taxi field test results at 100K miles, although field test differences were much greater evaluating oils with and without detergent.
3. VG evaluation of SAE 30, API SA oil with negligible additives had less follower pin wear than most oils tested.
4. VG evaluation of prototype GF-4 oil with 0.05% P and $\frac{1}{2}$ detergent exhibited typical follower pin and ring gap wear.



Recommendations

1. **Ford agrees to discontinuing Sequence VG rate and report of follower pin and ring gap increase because they had limited response to lower quality oils in this study.**
2. **Industry efforts should continue to provide acceptable wear protection for GF-5. The requirements of the JAMA chain wear test is expected to contribute towards this objective.**



“Who Wants To Be A Retiree”

Question for Gordon: What is best approach for rate and report items of VG test?

- A) Continue current approach including all cylinders preferred by additive suppliers!!**
- B) Add rate & report for chain, bore, and bearing wear now to improve performance of GF-4 and GF-5 oils.**
- C) Establish SP task force chaired by Gordon to study rate & report items needed for GF-5.**
- D) Discontinue rate and report of follower pin and ring gap wear so Gordon can resign SP Chairman and retire with less stress and best of health.**



VG PRESENTATION

05.19.05

VG SURVEILLANCE PANEL IN THE COUNTRY

LOST DATA ON VG TEST

- Diesel procedures [I used the 1P as a guide line] allow up to 4 hours of missing data and a test is still valid.
- Wording is:
 - If a test has greater than 4 hours without data acquisition on any controlled parameter, the test will be considered operationally invalid.
- Recommend a motion to add this to the VG.

Oil Add Calculations

- Current procedure does not show calculations for 216.
- I have modified my manual data log to take those numbers, and added a note to each test in the comments section.
- No other action should be required.

Sequence VG Fuel Batch Approval Program Analysis

R. Grundza
May 6, 2005

Program Summary

- 8 tests from 2 labs
- 2 runs in each lab on oil 1006-2 = 4
- 1 run in each lab on oil 1009 = 2
- 1 run in each lab on oil 925-3 = 2
- Total = 8

An additional run was conducted on 1006-2

This data point was also used in data analysis

Summary of Results

Lab	IND	AES	RAC	AEV	APV	OSCR
A	1006-2	8.27	9.30	8.64	7.90	0
G	1006-2	7.30	8.62	9	7.97	13
G	1006-2	8.23	9.31	8.88	7.93	4
A	1006-2	8.23	9.16	9.17	8.25	3
G	1006-2	8.63	9.19	9	7.98	0
A	925-3	5.36	7.15	8.76	6.94	10
G	925-3	5.8	6.99	8.66	6.96	23
A	1009	7.44	9.09	8.89	7.57	4
G	1009	7.17	9.22	8.8	7.28	25

Summary of Results (cont)

- AES, RAC, AEV and APV all significantly different from target. OSCR did not test as significantly different.

	Average	Delta	Delta/s
AES	-0.64	-1.32	-1.32
RAC	-0.26	-1.37	-1.37
AEV	-0.19	-1.88	-1.88
APV	-0.47	-2.70	-2.70
OSCR	-0.22	-0.36	-0.36

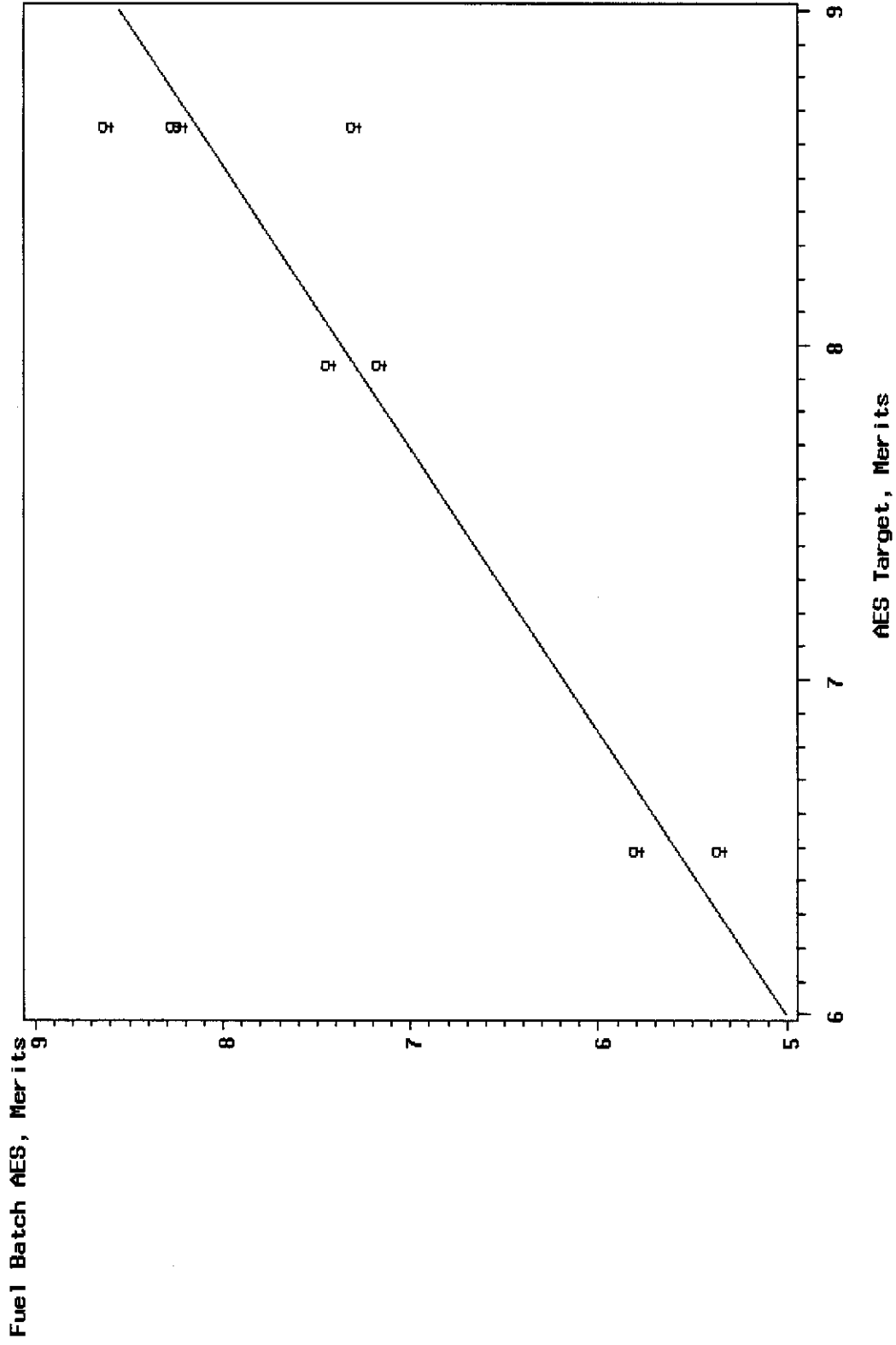
Correction Approach

- Evaluated Linear Regression
- For AES correction equation is
$$\text{AES}_{\text{corrected}} = (2.175 + \text{AES})/1.192$$
- For RAC correction equation is
$$\text{RAC}_{\text{corrected}} = (\text{RAC} + 0.627)/1.041$$
- For AEV correction equation is
$$\text{AEV}_{\text{corrected}} = (\text{AEV} - 5.735)/0.346$$
- For APV correction equation is
$$\text{APV}_{\text{corrected}} = (\text{APV} - 0.365)/0.898$$

See plots

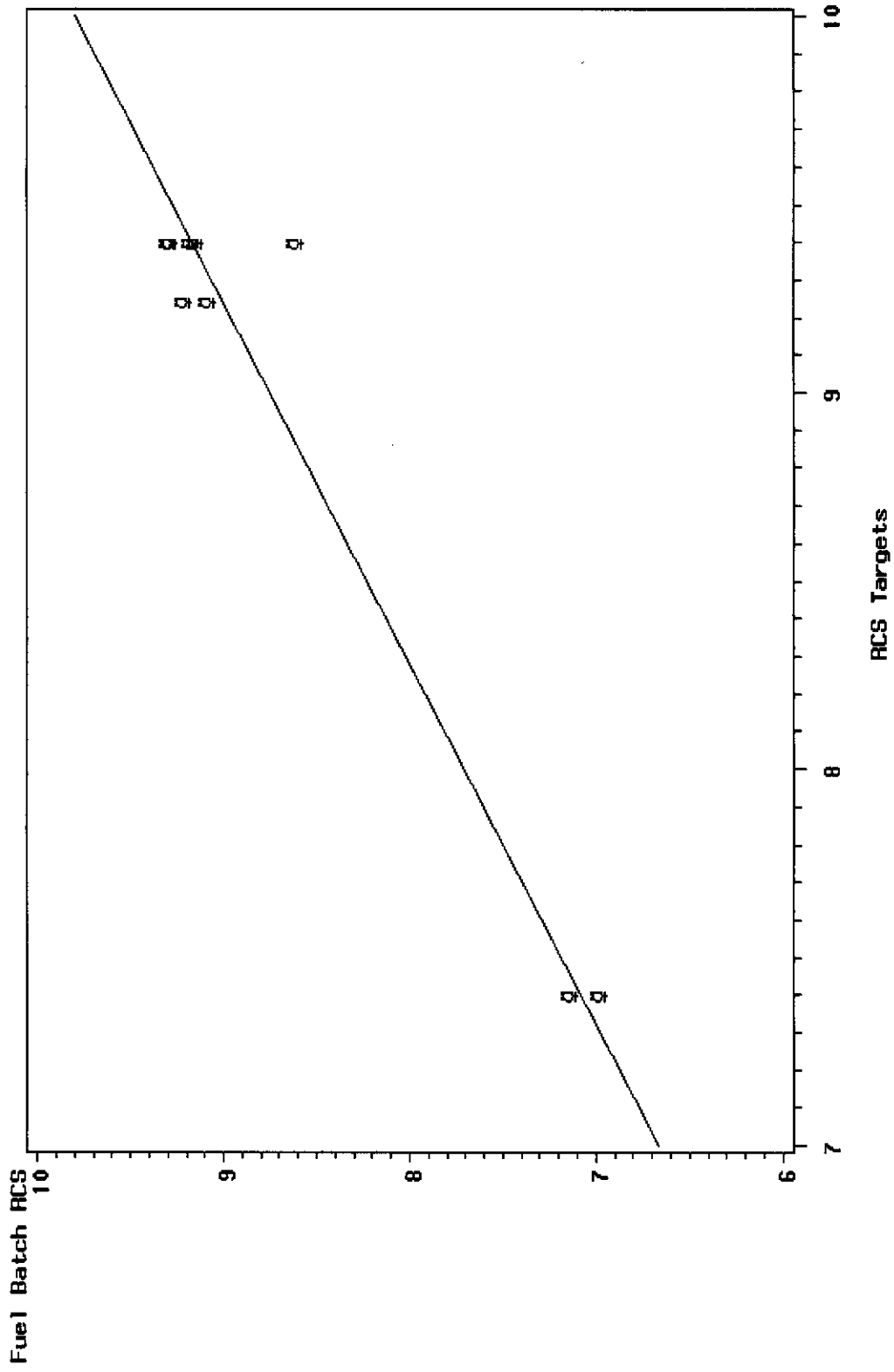
Sequence VG

Plot of Fuel Program Results Versus Targets



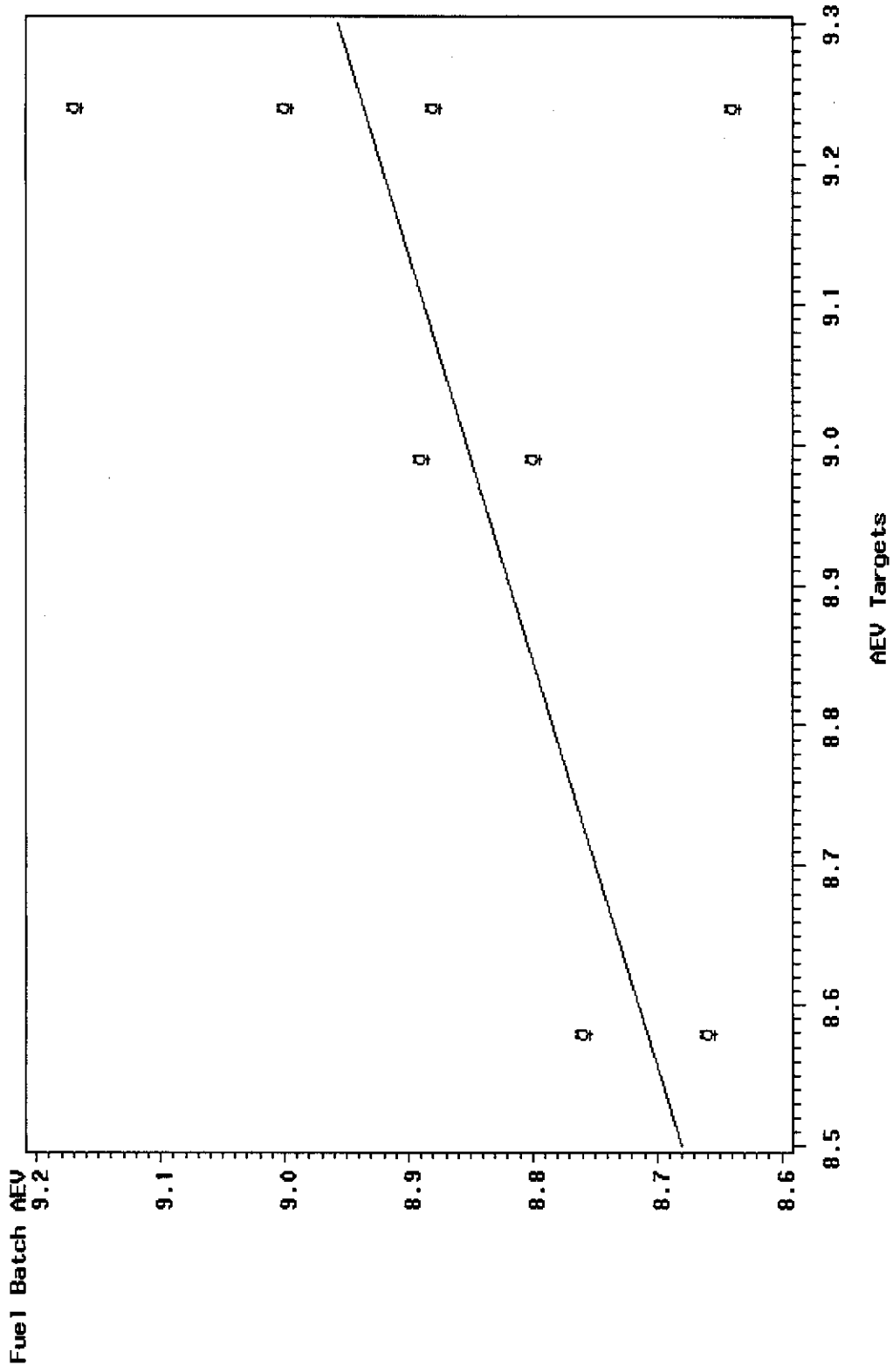
Sequence VG

Plot of Fuel Program Results Versus Targets



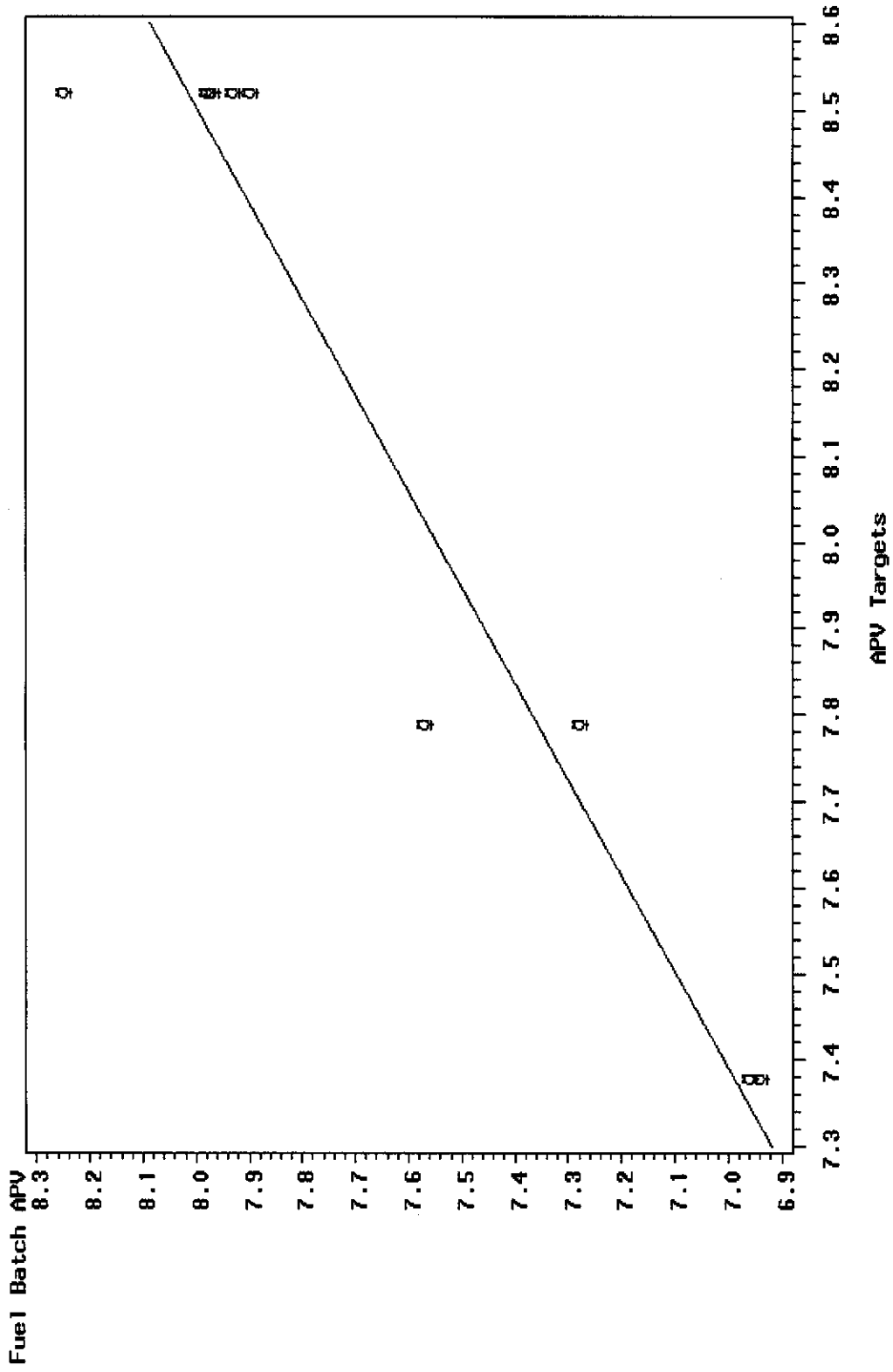
Sequence VG

Plot of Fuel Program Results Versus Targets



Sequence VG

Plot of Fuel Program Results Versus Targets



Correction Approach

- Evaluated Fixed Correction Factor
- For AES correction is
Average delta/s * pooled s $-1.32 * 0.45 = -0.59$
- For RAC correction is
Average delta/s * pooled s $-1.37 * 0.24 = -0.33$
- For AEV correction is
Average delta/s * pooled s $-1.88 * 0.1 = -0.19$
- For APV correction is
Average delta/s * pooled s $-2.70 * 0.2 = -0.54$

Since batch is severe, signs are changed and correction factor is added to result

Impact of Correction Factor

Parameter	Mean Oil 1009	Fixed Correction	Regression Correction	Target
AES	7.31	7.90	7.95	7.94
RAC	9.16	9.49	9.40	9.29
AEV	8.84	9.03	8.98	8.99
APV	7.42	8.40	7.86	7.79

Impact of Correction Factor

Parameter	Mean	Fixed Correction	Regression Correction	Target
AES	5.58	6.17	6.51	6.51
RAC	7.07	7.40	7.40	7.40
AEV	8.71	8.90	8.59	8.58
APV	6.95	7.49	7.33	7.38

Impact of Correction Factor

Parameter	Mean	Fixed	Regression	Target
	Oil 1006-2	Correction	Correction	
AES	8.13	8.72	8.65	8.65
RAC	9.12	9.45	9.36	9.40
AEV	8.90	9.09	9.15	9.24
APV	8.0	8.54	8.51	8.52

Effectiveness of Correction Factor

- AES regression appears to do a good job at the pass limit and works well at the other two levels.
- RAC , AEV and APV regression equation also appear to work fairly well at all performance levels.

Summary

- Fuel Batch severe of target for all parameters except OSCR. OSCR not statistically significant
- Linear correction for AES appears to correct oils at pass limit back to target level within 0.01 merits other oils corrected back to target.
- Regression equation correction also appears to work well for APV, AEV and RAC, but because of limited range, fixed corrections more appropriate for APV and AEV

TGC Test Precision Ballot Review

May 2005

Ballot Issuance

- Technical Guidance Committee Chairman Gordon Farnsworth emailed TGC membership a unanimous consent ballot on 2/3/2005
 - TGC membership : Surveillance Panel Chairs
 - Close date of ballot was March 1, 2005
 - Negatives were received
 - Motion was not implemented

Ballot Subject

- Attached is a proposal from the TMC for "Test Precision Reporting Guidelines". As chairman of the ASTM TGC I will instruct the TMC to adopt this practice on March 1, 2005 unless I receive other input from any TGC member.
- The ASTM TMC has proposed a standard methodology for calculating and updating the test precision listed in the various Sequence test procedures (see attached). This proposal is complementary to the recently issued LTMS appendix G "Guidelines for developing Reference Oil Targets and Severity Adjustment Deviations - B.01 & B.02 Tests" that the TGC approved via e-mail.

Test Precision Reporting Guidelines

As test targets are updated or a need arises to update test method precision statements the TMC will be working with each surveillance panel to identify which reference oils should be used in the Severity Adjustment standard deviation calculation. The recommendation from the TMC is to use reference oil(s) that are as close to the pass limit as possible. In some test areas, only one oil may be used. Other test areas may use multiple oils depending on the available oils and number of pass fail parameters. As always it will be the surveillance panel who will ultimately decide the oil(s) selection.

To be consistent on the precision value that is provided to the industry, the TMC will be updating test method Intermediate Precision standard deviation with the same value that is used for the SA standard deviation. Data to be used for this calculation will be severity adjusted and pooled by oil and lab. The test method Reproducibility standard deviation will then be based on the same data set and pooled by oil.

The only time the test method precision values will be changed is when the SA std. dev. is updated. And this of course will occur according to the recently accepted LTMS guidelines. As mentioned above, the surveillance panels can always intervene and make changes as they see fit.

Background

- At the December 2004 ASTM meeting D02.B advised that test method precision statements are to be reviewed/updated on an annual basis
- The TMC was aware that inconsistencies existed in how test precision was being reported

Background (continued)

- TMC developed guidelines for updating test method precision values
- TMC forwarded the guidelines to the TGC Chairman for his review
- TGC ballot was subsequently released

Sequence VG Status

	Test Method	LTMS SA Std. Dev.
Oils	925-3, 1006, 1006-2, 1007, 1008 & 1009	1006, 1006-2, 1007 & 1009
AES	0.59 ¹	0.45
RCS	0.40 ¹	0.25
AEV	0.14 ¹	0.10
APV	0.25 ¹	0.20
OSCRNSLG	1.095 ¹	0.793

¹ Precision as of December 31, 2003

Reproducibility

- Reproducibility will be calculated from same data set as Intermediate Precision.

**COORDINATING RESEARCH COUNCIL, INC.**

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May 5, 2005

CRC Project No. CM-139-05

To the Sequence VG Surveillance Panel

During the 2004 CRC Gasoline Engine Deposits Workshop last spring the participants held a lengthy discussion regarding VG oil screen clogging ratings. A recommendation was made to the VG Surveillance Panel that the following wording be added to ASTM D 6593:

Label as sludge all matter present on the oil screen that is not *immediately* recognizable as debris. Label all matter of indeterminate composition as sludge.

This recommendation has not yet been implemented. Section 13.4 of D 6593 does not make the status of debris clear. In fact, section 13.4.1.3 reads, "Determine the percentage of the total screen opening that is obstructed with sludge *and* debris." [emphasis added]. To the casual reader, this implies that *both* sludge *and* debris are considered together in determining the oil screen clogging result for the test. This is not the case. Clogging due to sludge is a pass/fail parameter of the test; clogging due to debris is *not*. This lack of clarity will have a significant impact on test results; any clogging incorrectly labeled debris will give a misleadingly mild result.

At the recently concluded 2005 rating workshop, oil screen sludge ratings ranged from 5% to 48% *on the same part*. Debris rating showed the same spread (4% to 50%). Once raters were reminded of the "*immediately* recognizable" criteria, the ratings, of course, improved. This exercise made clear that 1) there *is* a problem, 2) implementing the CRC recommended oil screen sludge clogging definition will correct it.

Sincerely,

Michael T. Pansza
CRC Workshop Coordinator

ASTM SEQUENCE V SURVEILLANCE PANEL

SCOPE AND OBJECTIVES

SCOPE

The Sequence V Surveillance Panel is responsible for the surveillance and continued improvement of the Sequence VG test documented in ASTM Standard D6593 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. Industry transition to new engine hardware batches will be monitored and redistribution of existing hardware facilitated to accomplish uniform industry implementation. 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, oil screen plugging, oil ring clogging and ring sticking.

Objectives

1. Future engine supply plan
2. Review temporary fuel severity corrections when 5 tests are available on all three oils – 925-3, 1009, 1006-2

Target Date

Nov., 2005

Nov. 2005

G. R. FARNSWORTH, Chairman
Sequence VG Surveillance Panel

Updated May 19, 2005
Tunkhannock, Pennsylvania