100 Barr Harbor Drive ■ PO Box C700 ■ West Conshohocken, PA 19428-2959
Telephone: 610-832-9500 ■ Fax: 610-832-9555 ■ e-mail: service@astm.org ■ Website: www.astm.org

Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

Chairman: W. JAMES BOVER, ExxonMobil Biomedical Sciences Inc, 1545 Route 22 East, PO Box 971, Annandale, NJ 08801-0971, (908) 730-1048, FAX: 908-730-1197, EMail: wjbover@erenj.com
First Vice Chairman: KENNETH O. HENDERSON, Cannon Instrument Co, PO Box 16, State College, PA 16804, (814) 353-8000, Ext: 0265, FAX: 814-353-8007, EMail: kenohenderson@worldnet.att.net
Second Vice Chairman: SALVATORE J. RAND, 221 Flamingo Drive, Fort Myers, FL 33908, (941) 481-4729, FAX: 941-481-4729
Secretary: MICHAEL A. COLLIER, Petroleum Analyzer Co LP, PO Box 206, Wilmington, IL 60481, (815) 458-0216, FAX: 815-458-0217, EMail: macvarlen@aol.com
Assistant Secretary: JANET L. LANE, ExxonMobil Research and Engineering, 600 Billingsport Rd, PO Box 480, Paulsboro, NJ 08066-0480, (856) 224-3302, FAX: 856-224-3616, EMail: janet_L_lane@email.mobil.com
Staff Manager: DAVID R. BRADLEY, (610) 832-9681, EMail: dbradley@astm.org

June 12, 2006

Reply to: Frank M. Farber
ASTM Test Monitoring Center
6555 Penn Avenue
Pittsburgh, PA 15206
Phone: 412-365-1030
Fax: 412-365-1047
Email: fmf@astmtmc.cmu.edu

Unapproved Minutes of the June 6, 2006
Sequence VG Surveillance Panel Meeting
Held in San Antonio, TX

This document is not an ASTM standard; it is under consideration within an ASTM technical committee but has not received all approvals required to become an ASTM standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of ASTM committee activities except with the approval of the chairman of the committee having jurisdiction and the president of the society. *Copyright ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.*

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

Membership Changes: A Membership list, which was circulated at the meeting, is shown in Attachment 2. Bob Rumford is retiring at the end of this month and will be replaced by Wayne Peterson. Mike Riley and Jim Azzouz (FORD) called in to the meeting at 11:00 am.
The Chairman commented that for future meetings a dial-in option would be made available for anyone who could not attend the meeting. Also, Mike Riley's land line has been disconnected and can only be reached by his cell phone number 313-805-0391.

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

Approval of 11/9/05 Meeting Minutes: The minutes for the meeting were approved unanimously and without comment.

Sequence VG Surveillance Panel Meeting
June 6, 2006
San Antonio, TX

Review of Action Items:

June 6 2006 review of November 9th 2005 ACTION ITEMS

Motions and Action Items as recorded at the meeting by Bill Buscher

1. Motion – Approval of Minutes for 05/19/05. Approved without changes.
   Andy Ritchie / Bill Buscher / Passed unanimously
   Done.

2. 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 SVGM2 fuel (batch number TA1921LS15).

NOTE: Carryover from May 2005 Surveillance Panel meeting.
Done. Contained in report revision VG-20050623.

3. 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.

NOTE: Carryover from May 2005 Surveillance Panel meeting.
In process. Waiting for additional feedback. Will send request for feedback to the ACC chairman.

4. Action Item – Bob Rumford will change the SVGM2 fuel Certificate of Analysis that accompanies fuel shipments to the laboratories to indicate the most recent tank analysis on the current fuel batch instead of the initial analysis on the current fuel batch.
   Done.

5. Motion – Change the Sequence VG test procedure as follows:
   Section 9.6.1.1 change to: "Suitable devices are available from the suppliers listed in X2.1."

   Section 9.6.1.2 change to: "Calibrate, zero and span the Horiba units per the Users Manual.

   Calibrations shall be done prior to a stand reference oil test. Calibrations are not required for the PLX

   devices."

   Section 9.6.1.1 delete: "No adjustments can be made to change the exhaust gas lambda." and change

   to: "Lambda values can be affected by the EEC, ignitions system, fuel injection, or vacuum leaks."

   Annex A3.16 change to: "Modify range for Lambda sensors from 102 to 152 mm (4 to 6 inches)."

Dan Worcester / Ed Altman / 10 For 0 Against 1 Waive
Done. Issued Information Letter No. 05-4 on December 9, 2005.

6. Action Item – Dan Worcester will research an acceptable replacement for the current oil breathers. Done. Labs discovered sufficient quantities of the current oil breathers on-hand, so that a replacement is no longer necessary.

7. Motion – VG rater is required to attend CRC Light-Duty Rating Workshop on an annual basis and generate data that meets CRC's definition of Blue, Red or White. If the rater is unable to attend a CRC Light-Duty Rating Workshop for causes beyond his/her control, the rater must attend the next CRC Workshop (which could be a Heavy-Duty Rating Workshop). If the rater does not attend the very next CRC Light-Duty/Heavy-Duty Rating Workshop, the rater is no longer able to rate VG reference oil or candidate oil tests until attending a CRC Light-Duty Rating Workshop. Effective with the next scheduled Light-Duty Rating Workshop. This applies only to varnish deposit rating. Rich Grundza / Dan Worcester / 11 For 0 Against 0 Waive
   Done. Issued Information Letter No. 05-4 on December 9, 2005.

8. Action Item – Ford Component Sales will research and develop a hardware procurement plan for GF-4 and GF-5 within the next 4 to 6 weeks.
   Done. Numerous conference calls and a face-to-face meeting were conducted in the past six months.

9. Action Item – Andy Ritchie to schedule a Surveillance Panel conference call for Tuesday January 10, 2006 at 10:00am CST to review Ford Component Sale's hardware procurement plan.
   Done. It was rescheduled on a different date.

10. Action Item – Ford Component Sales will investigate a replacement or the possibility of an additional production run for the current oil separator used for the Sequence VG test.
    Done. Labs discovered sufficient quantities of the current oil separators on-hand, so that a replacement is no longer necessary.

TMC Report –The full TMC report can be reviewed at the following link:

ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencev/semiannualreports/vg-04-2006.pdf

The current reference oil trends are shown below:

Parameter	Average Δ/s	Shift in Reported Units	Direction
RAC	0.21	0.06	Mild
AES	0.53	0.13	Mild
APV	0.70	0.13	Mild
AEV	0.56	0.05	Mild
OSCR	0.09	0.99	On Target

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

Note, both reference testing and non-reference testing has been low this ASTM report period.

No. of Reference Tests	No. of Non-reference Tests
15	37

Sequence VG Surveillance Panel Meeting
June 6, 2006
San Antonio, TX

Fuel Supplier Report - No fuel adjustments have been done to the fuel by Haltermann. Attachment 3 shows the fuel analysis done by Haltermann of its tanks plus samples supplied by laboratories of their tanks this report period. Not all labs are sending their samples to Haltermann for analysis and at the frequency required. The requirement is bimonthly analysis of laboratory fuel storage tanks. Labs are to send an email to Jim Carter requesting that Haltermann's fuel analysis results be sent to specific lab personnel so labs can review their results.

A fuel reblend is estimated to be needed around 2010. Blend stocks are not anticipated to change and are also shared with the Mercedes sludge test fuel. The fuel supplier recommends blending a small batch in 2009 followed by a small test matrix to check performance.

Test Sponsor Report - Solicitations have been sent for 0.5 mm over size ring sets. Numerous parts are not at the minimum purchase volume. Ford is willing to negotiate lower minimum purchase volumes however can not guarantee if its suppliers will cooperate. Purchasing of VG parts by laboratories for the build-out will be in stages. Labs are anticipating that 2007 will be a light year for testing so funds will be scarce for large part purchases. Ford noted that a risk exists on unique parts that may not be available if volumes are not sufficient to support production. Both parties acknowledged the risk of delaying future part purchases.

VG Camshaft Measurements -Bill Buscher presented Attachment 4. Southwest Research's data indicates that camshafts can be reused four times without showing any notable journal wear. Bill motioned, Dan Worcester seconded that camshafts can be used for up to 4 runs. Camshafts will be saved and stored at the labs after completing 4 runs, for potential future use for additional runs. Effective 06/06/06. Not presented at the meeting is Attachment 5 from Lubrizol supporting the Southwest Research data. Mike Riley was going to review the information and get back with the TMC concerning whether the information letter needed to be pre-balloted.

Correction Factor Update - Rich Grundza presented Attachment 6. A total of 22 tests have been received to date on the new fuel batch. No action was taken on updating correction factors. The TMC was instructed to begin assigning RO 1007 again. The correction factor will be reviewed with all available data at the next meeting.

Scope and Objectives – Chairman Ritchie presented the Scope and Objectives of the Sequence VG Surveillance Panel for review (Attachment 7). No changes to the scope were made. The objectives were modified as shown.

Old Business – There was no old business.

New Business – Attachment 8 was presented by Frank Farber. The attachment showed the results of the April 2006 CRC Light-Duty Rater Workshop.

Sequence VG Surveillance Panel Meeting
June 6, 2006
San Antonio, TX

Motions and Action Items

As Recorded at the Meeting by Bill Buscher

1. Motion – Approval of Minutes for 11/09/05. Approved without changes.
Andy Ritchie / Bill Buscher / Passed unanimously

2. 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. Ben will send a request for feedback to the ACC chairman, to obtain additional feedback for this investigation. Report back to the group by the November 2006 meeting.

NOTE: Carryover from May 2005 Surveillance Panel meeting.

3. Action Item – Labs to send an e-mail to Jim Carter at Haltermann indicating who should receive the analysis results for their monthly (run tanks) or bi-monthly (storage tanks) fuel tank samples. All fuel tank samples analyses will also be copied to the TMC to be kept in a confidential database.

4.Motion – Add the following wording to section 7.3 "Reusable Engine Parts" of the Sequence VG test procedure: Camshafts can be used for up to 4 runs. Camshafts will be saved and stored at the labs after completing 4 runs, for potential future use for additional runs. Effective 06/06/06.
Bill Buscher / Dan Worcester / 8 For 0 Against 3 Waive

5. Action Item – Labs to send any available camshaft wear data to Mike Riley at Ford for review to support camshaft reuse motion.

6. Action Item – TMC to assign reference oil 1007 for each lab's next reference test in order to generate data with reference oil 1007 on the new fuel batch. This data will supplement existing reference oil data on the new fuel batch for potentially updating the fuel correction factors.

The meeting was adjourned at 12:00 pm.

Attachment 1

Agenda
Sequence VG Surveillance Panel
June 6th 2006 9:00–12:00 noon
San Antonio

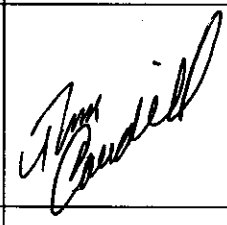
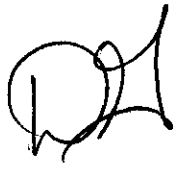
1. Chairman comments.	
2. Attendance sign-in distribution.	
3. Membership changes.	
4. Motion and Action recorders.	
5. Approval of minutes for November 9, 2005.	**All**
6. Review action items from last meeting.	**Andy Ritchie**
7. Test Sponsor report.	**Mike Riley**
8. TMC Report. **- Questions on semi-annual report.**	**Rich Grundza**
9. RSI Report. **- Questions on semi-annual report.**	**Bill Mahoney**
10. Fuel Supply Report.	**James Carter**
11. Operational and Hardware Items.	**All**
12. Parts Buy for GF-4 and GF-5	**All**
13. Review Scope and Objectives.	**All**
14. Old business	**All**
15. New business	**All**
16. Adjourn	

ATTACHMENT 2

MEMBERSHIP
ASTM SEQUENCE VG SURVEILLANCE PANEL

Name	Company-Address-Phone-Fax-Email	Signature	Voting Member
Araiazo, Beto	Test Engineering, Inc 12718 Cimarron Path San Antonio, TX 78249 Phone: 210-877-0222 Fax No: 210-690-1959 Email: baraiza@tei-net.com		Yes
Bendele, Larry	Southwest Research Institute P.O Drawer 28510 San Antonio, TX 78228-0510 Phone: 210-522-2824 Fax No: 210-684-7523 Email: lbendele@swri.edu		No
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 dhbowden@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 No: 210-690-1959 Email: rbuck@tei-net.com		No
Buscher, Bill A.	Buscher Consulting Services P.O. Box 112 Hopewell Junction NY 12533 Phone 845-897-8069 Fax 845-897-8069 Email: buschwa@aol.com		No
Buscher, William A	Southwest Research Institute P.O Drawer 28510 San Antonio, TX 78228-0510 Phone: 210-522-6802 Fax No: 210-684-7523 Email: wbuscher@swri.edu		Yes
Carter, James	Dow 2296 Hulett Road Okemo MI 48864		Yes

ATTACHMENT 2

	Phone: 517 347 3021 Fax: 517-347-1024 Email: jecarter@dow.com		
Caudill, Timothy	Valvoline 22nd and Front Streets Ashland KY 41101 Phone: 606-329-1960, ext 5708 Fax: 606-329-2044 Email: tlcaudill@ashland.com		Yes
Clark, Sid	GM Powertrain Mail Code 480-106-160 30500 Mound Road Warren, MI 48090-9055 Phone: 586-986-1929 Fax: 586-9986-2094 Email: Sidney.l.clark@gm.com		Yes
Farber, Frank	ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 Phone: 412-365-1030 Fax: 412-365-1045 Email: fmf@astmtmc.cmu.edu		No
Farnsworth, Gordon	Infineum USA L.P. 1900 East Linden Avenue P.O. Box 735 Linden NJ 07036-0536 Phone: 908-474-3351 Fax: 908-474-3637 Email: Gordon.Farnsworth@infineum.com		Yes
Florkowski, Dennis	DaimlerChrysler Corporation CIMS 482-00-13 800 Chrysler Drive East Auburn Hills, MI 48326-2757 Phone: 248-576-7477 Fax: 248-576-7490 Email: fd11@daimlerchrysler.com		Yes
Glaenzer, Dave	Afton Chemical Corporation 500 Spring Street Richmond VA 23218-2158 Phone: 804-788-5214 Fax: 804-788-6358 Email: dave.glaenzer@aftonchemical.com		~~Yes~~ NO Altman
Gomez, Redescal	Intevep S.A. Los Teques, Edo Miranda Adpo 76343 Caracas 1070-A Venezuela Phone: 9-011-582-9086754		

ATTACHMENT 2

	Fax: 9-011-582-9087723 Email: gomezriv@pdvsa.com		
Hyndman, C. W.	Roh Max USA 727 Norristown Road Spring House PA 19477 Email: charles.Hyndman@degussa.com		
Lai, Patrick S.	Imperial Oil Limited 453 Christina Street South Sarnia, Ontario N7T 8C8 Canada Phone: 519-339-5611 Fax: 519-339-5866 Email: Patrick.k.lai@esso.ca		No
Lopez, Al	PerkinElmer Fluid Sciences 5404 Bandera Road San Antonio, TX 78238 Phone: 210-647-9465 Fax: 210-523-4661 Email: al.lopez@perkinelmer.com		
Miranda, Timothy	BP Lubricants USA 1500 Valley Road Wayne, NJ 07470 Phone: 973-305-3334 Fax: 973-686-4039 Email: timothy.miranda@bp.com		Yes
Riley, Mike	Ford Motor Company 21500 Oakwood Boulevard POEE Building, Mail Drop #44 Dearborn, MI 48124-4091 Phone: 313 Fax: 313-845-3169 Email: mriley2@ford.com		Yes
Rumford, Robert	Dow 1201 Sheldon Road P.O. box 0429 Channelview TX 77530-0429 Phone: 832-376-2213 Fax: 281-457-1469 Email: rhrumford@dow.com		No
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
Walker, David	AER Manufacturing, Inc. P.O Box 979		

ATTACHMENT 2

	1605 Surveyor Boulevard Carrollton, TX 75006 Phone: 972-417-3182 Fax: 972-417-3165 Email: davidwalker@aermfg.com		
Worcester, Dan	Intertek AR 5404 Bandera Road San Antonio, TX 78238 Phone: 210-523-4659 Fax: 210-523-4607 Email: dan.Worcester@intertek.com		Yes
Grundza, Rich	ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 Phone: 412-365-1031 Fax: 412-365-1045 Email: reg@astmtmc.cmu.edu		Yes
	Mailing List		
Oliver, Rick	CMA Monitoring Agency 2805 Beverly Drive Flower Mound, TX 75022 Phone: (972) 724-2136 Fax: 210-341-4038 Email: crickoliver@attbi.com		
Goldblatt, Irwin	Technical Center 240 Centennial Avenue Piscataway, NJ 08854 3910 Phone: 732-980-3603 Fax: 973-686-4224 Email: Irwin.Goldblatt@bp.com		
Martinez, Jo	Chevron Oronite Co. LLC 100 Chevron Way Richmond, CA 94802 Phone: 510-242-5563 Email: jogm@chevron.com		No

Bowden, Andrew — OH TECHNOLOGIES, INC. P.O. BOX 5034 NEWARK OH 43058-5034 adbowden@ohtech.com 

Bowden, Jason — OH Technologies, Inc. 

Altman, Ed — Afton Chemical, 500 E. Spring St. Richmond VA 23219, 804-788-5279, Ed.Altman@AftonChemical.com  Yes

Ritchie 

PRODUCT: **SVGM2 Survey**

PRODUCT CODE: **HF295**

Company	**Haltermann**	**Haltermann**	**Haltermann**	**Haltermann**	SWR	Lubrizol	Lubrizol
Markings:	TF2221LS20	TF2221LS20	TF2221LS20	TF2221LS20	na	OS 156545	OS 156545
Markings:					na	na	na
Markings:	74	74	74	74	na	na	na
Dated:					na	na	na
Date received:	5/4/2006	4/5/2006	3/6/2006	2/3/2006	3/29/2006	5/15/2006	3/21/2006
Analysis date:	5/4/2006	4/5/2006	3/6/2006	2/3/2006	4/11/2006	5/19/2006	3/23/2006

TEST	METHOD	UNITS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS
Distillation - IBP	ASTM D86	°F	90	90	87	84	89	84	84
5%		°F	111	114	113	108	116	110	111
10%		°F	123	127	126	123	131	124	126
20%		°F	147	149	148	146	157	148	148
30%		°F	175	176	175	175	188	177	177
40%		°F	211	210	208	209	217	210	210
50%		°F	230	229	227	227	232	228	229
60%		°F	240	240	238	239	243	240	241
70%		°F	255	255	253	253	258	255	255
80%		°F	289	290	288	290	296	291	290
90%		°F	342	343	342	343	343	342	343
95%		°F	360	361	359	362	360	361	359
Distillation - EP		°F	414	421	419	417	407	417	409
Recovery		vol %	97.5	97.6	98.0	97.2	97.0	96.8	97.2
Residue		vol %	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Loss		vol %	1.5	1.4	1.0	1.8	2.0	2.2	1.8
Gravity	ASTM D4052	°API	57.2	57.1	57.2	57.3	56.0	57.0	57.2
Specific Gravity	ASTM D4052	-	0.750	0.750	0.750	0.750	0.760	0.7500	0.7490
Reid Vapor Pressure	ASTM D323	psi	8.8	8.8	8.9	9.0	8.3	8.8	8.9
Reid Vapor Pressure	ASTM D5191	psi	8.8	8.8	8.9	8.8	8.1	8.8	8.9
Existent gum, unwashed	ASTM D381	mg/100mls	1	1	1	1	1	1	1
Existent gum, washed	ASTM D381	mg/100mls	<1	<1	<1	<1	<1	<1	<1
APPROVED BY:			JAM	JCM	JCM	JCM	JAM	JM	JM

ATTACHMENT 3

PRODUCT: **SVGM2 Survey**

PRODUCT CODE: **HF295**

Company	Lubrizol	Lubrizol	Lubrizol
Markings:	OS 156545	OS 156545	OS 156545
Markings:	na	na	na
Markings:	na	na	na
Dated:	na	na	na
Date received:	2/6/2006	1/18/2006	12/23/2005
Analysis date:	2/7/2006	1/20/2006	12/27/2005

TEST	METHOD	UNITS	RESULTS	RESULTS	RESULTS
Distillation - IBP	ASTM D86	°F	89	91	89
5%		°F	112	120	114
10%		°F	126	136	131
20%		°F	148	163	158
30%		°F	176	194	190
40%		°F	209	221	218
50%		°F	228	234	232
60%		°F	240	244	242
70%		°F	253	260	258
80%		°F	288	301	296
90%		°F	342	344	343
95%		°F	359	361	358
Distillation - EP		°F	404	411	403
Recovery		vol %	97.4	97.7	96.9
Residue		vol %	1.0	1.0	1.0
Loss		vol %	1.6	1.3	2.1
Gravity	ASTM D4052	°API	57.2	55.6	55.9
Specific Gravity	ASTM D4052	-	0.7490	0.7560	0.7550
Reid Vapor Pressure	ASTM D323	psi	9.0	7.9	8.1
Reid Vapor Pressure	ASTM D5191	psi	8.9	7.9	8.1
Existent gum, unwashed	ASTM D381	mg/100mls	1	1	1
Existent gum, washed	ASTM D381	mg/100mls	<1	<1	<1

APPROVED BY: JM JM JM

ATTACHMENT 3

PRODUCT: **SVGM2 Survey**

PRODUCT CODE: **HF295**

Company	Afton	Afton	Afton	Afton
Markings:				
Markings:	TF2221LS20	TF2221LS20	TF2221LS20	TF2221LS20
Markings:	UST 5A	UST 5A	UST 5A	UST 5A
Dated:	n/a	n/a	n/a	n/a
Date received:	5/3/2006	3/30/2006	3/17/2006	1/27/2006
Analysis date:	5/18/2006	3/31/2006	3/20/2006	1/30/2006

TEST	METHOD	UNITS	RESULTS	RESULTS	RESULTS	RESULTS
Distillation - IBP	ASTM D86	°F	83	88	80	82
5%		°F	106	113	108	110
10%		°F	121	126	123	124
20%		°F	143	147	146	145
30%		°F	171	175	174	173
40%		°F	205	208	209	207
50%		°F	226	228	228	226
60%		°F	237	239	239	237
70%		°F	252	253	254	251
80%		°F	287	290	289	287
90%		°F	340	342	342	341
95%		°F	357	361	360	360
Distillation - EP		°F	408	419	413	408
Recovery		vol %	96.1	97.3	97.6	97.7
Residue		vol %	1.0	1.0	1.0	1.0
Loss		vol %	2.9	1.7	1.4	1.3
Gravity	ASTM D4052	°API	57.2	57.3	57.2	57.4
Specific Gravity	ASTM D4052	-	0.750	0.749	0.749	0.749
Reid Vapor Pressure	ASTM D323	psi	8.9	9.0	9.0	8.9
Reid Vapor Pressure	ASTM D5191	psi	8.9	9.0	8.9	9.1
Existent gum, unwashed	ASTM D381	mg/100mls	1	1	1	2
Existent gum, washed	ASTM D381	mg/100mls	<1	<1	<1	<1

APPROVED BY: HVD JM JM JM

ATTACHMENT 3

PRODUCT: **SVGM2 Survey**

PRODUCT CODE: **HF295**

Company	Ashland	Ashland	Ashland	Ashland	Ashland
Markings:	na	na	na	na	na
Markings:	na	na	na	na	na
Markings:	na	na	na	na	na
Dated:	na	na	na	na	na
Date received:	5/8/2006	4/3/2006	3/20/2006	3/8/2006	1/19/2006
Analysis date:	5/19/2006	4/11/2006	3/20/2006	3/9/2006	1/20/2006

TEST	METHOD	UNITS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS
Distillation - IBP	ASTM D86	°F	85	92	87	84	86
5%		°F	111	120	114	115	117
10%		°F	125	135	131	131	132
20%		°F	148	159	158	158	158
30%		°F	178	189	190	191	191
40%		°F	210	217	220	221	219
50%		°F	228	232	233	234	233
60%		°F	240	242	243	245	243
70%		°F	255	258	259	261	260
80%		°F	291	298	299	300	299
90%		°F	342	344	345	346	344
95%		°F	359	362	361	363	361
Distillation - EP		°F	414	425	407	408	405
Recovery		vol %	96.8	97.5	97.5	97.9	97.8
Residue		vol %	1.0	1.0	1.0	1.0	1.0
Loss		vol %	2.2	1.5	1.5	1.1	1.2
Gravity	ASTM D4052	°API	56.9	55.2	55.8	56.0	56.1
Specific Gravity	ASTM D4052	-	0.7510	0.7580	0.7550	0.7540	0.7540
Reid Vapor Pressure	ASTM D323	psi	8.8	7.3	8.2	8.3	8.4
Reid Vapor Pressure	ASTM D5191	psi	8.8	7.5	8.1	8.3	8.4
Existent gum, unwashed	ASTM D381	mg/100mls	1	1	1	2	1
Existent gum, washed	ASTM D381	mg/100mls	<1	<1	<1	<1	<1

APPROVED BY: JM JM JM JM JM

ATTACHMENT 3

Sequence VG Camshaft Measurements

Camshaft Bearing Journal Wear (mm)

Diameter (All): 26.936 - 26.962 mm

Hours	N Count	Side	Journal # 1	Journal # 2	Journal # 3	Journal # 4	Journal # 5	Journal # 6
648	1	Right	0.004	0.003	0.002	0.006	0.007	0.005
648	1	Left	0.000	0.004	0.007	0.004	0.007	0.003
432	2	Right	0.001	-0.002	0.014	0.001	0.001	-0.001
432	2	Left	0.003	0.002	0.005	0.005	0.005	0.008
216	6	Right	0.001	0.001	0.001	0.005	0.004	0.002
216	6	Left	0.001	0.003	0.004	0.004	0.003	0.001

ATTACHMENT 4

ATTACHMENT 4

Sequence VG Pre and Post Test Camshaft Measurements

Test Number: 5-8-84

Engine Number: R053-2

Total Hours: 648

Camshaft Bearing Bore Diameters (mm)

Bore Gauge Set: 27.000 mm

Diameter (All): 26.987 - 27.012 mm

	Journal #	1	2	3	4	5	6
SOT	Right	27.009	27.004	27.006	27.024	27.011	27.004
SOT	Left	27.014	27.000	27.013	27.005	27.002	27.006

Camshaft Bearing Journal Diameters (mm)

Diameter (All): 26.936 - 26.962 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.950	26.945	26.943	26.943	26.943	26.948
EOT	Right	26.946	26.942	26.941	26.937	26.936	26.943
Wear	**Right**	**0.004**	**0.003**	**0.002**	**0.006**	**0.007**	**0.005**
SOT	Left	26.943	26.944	26.945	26.942	26.941	26.945
EOT	Left	26.943	26.940	26.938	26.938	26.934	26.942
Wear	**Left**	**0.000**	**0.004**	**0.007**	**0.004**	**0.007**	**0.003**

Camshaft Bearing Clearances (mm)

Clearance: 0.025 - 0.076 mm

	Journal #	1	2	3	4	5	6
SOT	Right	0.059	0.059	0.063	0.081	0.068	0.056
EOT	Right	0.063	0.062	0.065	0.087	0.075	0.061
SOT	Left	0.071	0.056	0.068	0.063	0.061	0.061
EOT	Left	0.071	0.060	0.075	0.067	0.068	0.064

Camshaft Bow (inches)

SOT	Right	0.0013
SOT	Left	0.0008

Camshaft Serial Number

Right	1198R051201
Left	1173L051201

ATTACHMENT 4

Sequence VG Pre and Post Test Camshaft Measurements

Test Number: 10A-2-38

Total Hours: 432

Engine Number: R050-4

Camshaft Bearing Bore Diameters (mm)

Bore Gauge Set: 27.000 mm

Diameter (All): 26.987 - 27.012 mm

	Journal #	1	2	3	4	5	6
SOT	Right	27.001	26.994	27.001	27.001	26.994	27.001
SOT	Left	27.003	27.007	26.998	27.001	26.990	27.004

Camshaft Bearing Journal Diameters (mm)

Diameter (All): 26.936 - 26.962 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.949	26.943	26.942	26.941	26.940	26.943
EOT	Right	26.947	26.945	26.915	26.945	26.939	26.948
Wear	**Right**	**0.002**	**-0.002**	**0.027**	**-0.004**	**0.001**	**-0.005**
SOT	Left	26.944	26.943	26.944	26.941	26.941	26.945
EOT	Left	26.943	26.942	26.942	26.941	26.939	26.936
Wear	**Left**	**0.001**	**0.001**	**0.002**	**0.000**	**0.002**	**0.009**

Camshaft Bearing Clearances (mm)

Clearance: 0.025 - 0.076 mm

	Journal #	1	2	3	4	5	6
SOT	Right	0.052	0.051	0.059	0.060	0.054	0.058
EOT	Right	0.054	0.049	0.086	0.056	0.055	0.053
SOT	Left	0.059	0.064	0.054	0.060	0.049	0.059
EOT	Left	0.060	0.065	0.056	0.060	0.051	0.068

Camshaft Bow (inches)

SOT	Right	0.0002
SOT	Left	0.0008

Camshaft Serial Number

Right	1180R051201
Left	1069L050524

ATTACHMENT 4

Sequence VG Pre and Post Test Camshaft Measurements

Test Number: 6-25-92

Engine Number: R049-4B

Total Hours: 432

Camshaft Bearing Bore Diameters (mm)

Bore Gauge Set: 27.000 mm

Diameter (All): 26.987 - 27.012 mm

	Journal #	1	2	3	4	5	6
SOT	Right	27.001	27.020	27.036	27.009	27.010	27.036
SOT	Left	26.997	26.997	27.000	27.015	27.018	27.017

Camshaft Bearing Journal Diameters (mm)

Diameter (All): 26.936 - 26.962 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.949	26.943	26.947	26.943	26.939	26.946
EOT	Right	26.949	26.945	26.946	26.938	26.938	26.943
Wear	**Right**	**0.000**	**-0.002**	**0.001**	**0.005**	**0.001**	**0.003**
SOT	Left	26.939	26.940	26.939	26.940	26.941	26.942
EOT	Left	26.933	26.938	26.931	26.931	26.933	26.936
Wear	**Left**	**0.006**	**0.002**	**0.008**	**0.009**	**0.008**	**0.006**

Camshaft Bearing Clearances (mm)

Clearance: 0.025 - 0.076 mm

	Journal #	1	2	3	4	5	6
SOT	Right	0.052	0.077	0.089	0.066	0.071	0.090
EOT	Right	0.052	0.075	0.090	0.071	0.072	0.093
SOT	Left	0.058	0.057	0.061	0.075	0.077	0.075
EOT	Left	0.064	0.059	0.069	0.084	0.085	0.081

Camshaft Bow (inches)

SOT	Right	0.0008
SOT	Left	0.0005

Camshaft Serial Number

Right	1181R051201
Left	1101L050907

ATTACHMENT 4

Sequence VG Pre and Post Test Camshaft Measurements

Test Number: 4A-3-40

Engine Number: R052-3

Total Hours: 216

Camshaft Bearing Bore Diameters (mm)

Bore Gauge Set: 27.000 mm

Diameter (All): 26.987 - 27.012 mm

	Journal #	1	2	3	4	5	6
SOT	Right	27.002	27.007	26.998	26.990	26.994	27.006
SOT	Left	27.008	27.006	27.004	27.001	27.005	27.009

Camshaft Bearing Journal Diameters (mm)

Diameter (All): 26.936 - 26.962 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.951	26.947	26.942	26.942	26.940	26.945
EOT	Right	26.951	26.947	26.943	26.939	26.937	26.938
Wear	**Right**	**0.000**	**0.000**	**-0.001**	**0.003**	**0.003**	**0.007**
SOT	Left	26.939	26.943	26.945	26.943	26.940	26.942
EOT	Left	26.941	26.944	26.940	26.937	26.936	26.943
Wear	**Left**	**-0.002**	**-0.001**	**0.005**	**0.006**	**0.004**	**-0.001**

Camshaft Bearing Clearances (mm)

Clearance: 0.025 - 0.076 mm

	Journal #	1	2	3	4	5	6
SOT	Right	0.051	0.060	0.056	0.048	0.054	0.061
EOT	Right	0.051	0.060	0.055	0.051	0.057	0.068
SOT	Left	0.069	0.063	0.059	0.058	0.065	0.067
EOT	Left	0.067	0.062	0.064	0.064	0.069	0.066

Camshaft Bow (inches)

SOT	Right	0.0008
SOT	Left	0.0004

Camshaft Serial Number

Right	1178R051201
Left	1064L050324

ATTACHMENT 4

Sequence VG Pre and Post Test Camshaft Measurements

Test Number: 4A-2-39

Engine Number: R054-1

Total Hours: 216

Camshaft Bearing Bore Diameters (mm)

Bore Gauge Set: 27.000 mm

Diameter (All): 26.987 - 27.012 mm

	Journal #	1	2	3	4	5	6
SOT	Right	27.010	27.011	27.011	27.006	27.004	27.019
SOT	Left	26.994	26.990	26.988	26.988	26.984	26.982

Camshaft Bearing Journal Diameters (mm)

Diameter (All): 26.936 - 26.962 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.953	26.949	26.950	26.942	26.943	26.946
EOT	Right	26.949	26.948	26.947	26.938	26.936	26.945
Wear	**Right**	**0.004**	**0.001**	**0.003**	**0.004**	**0.007**	**0.001**
SOT	Left	26.945	26.945	26.942	26.942	26.939	26.944
EOT	Left	26.942	26.941	26.941	26.939	26.937	26.943
Wear	**Left**	**0.003**	**0.004**	**0.001**	**0.003**	**0.002**	**0.001**

Camshaft Bearing Clearances (mm)

Clearance: 0.025 - 0.076 mm

	Journal #	1	2	3	4	5	6
SOT	Right	0.057	0.062	0.061	0.064	0.061	0.073
EOT	Right	0.061	0.063	0.064	0.068	0.068	0.074
SOT	Left	0.049	0.045	0.046	0.046	0.045	0.038
EOT	Left	0.052	0.049	0.047	0.049	0.047	0.039

Camshaft Bow (inches)

SOT	Right	0.0010
SOT	Left	0.0007

Camshaft Serial Number

Right	1197R051201
Left	1066L050324

ATTACHMENT 4

Sequence VG Pre and Post Test Camshaft Measurements

Test Number: 10A-1-37

Engine Number: R051-3

Total Hours: 216

Camshaft Bearing Bore Diameters (mm)

Bore Gauge Set: 27.000 mm

Diameter (All): 26.987 - 27.012 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.950	26.989	26.999	26.988	26.990	26.984
SOT	Left	27.001	27.005	27.001	27.006	27.001	27.004

Camshaft Bearing Journal Diameters (mm)

Diameter (All): 26.936 - 26.962 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.939	26.940	26.948	26.944	26.942	26.937
EOT	Right	26.940	26.940	26.945	26.942	26.940	26.934
Wear	**Right**	**-0.001**	**0.000**	**0.003**	**0.002**	**0.002**	**0.003**
SOT	Left	26.948	26.948	26.945	26.944	26.945	26.947
EOT	Left	26.947	26.947	26.944	26.942	26.942	26.947
Wear	**Left**	**0.001**	**0.001**	**0.001**	**0.002**	**0.003**	**0.000**

Camshaft Bearing Clearances (mm)

Clearance: 0.025 - 0.076 mm

	Journal #	1	2	3	4	5	6
SOT	Right	0.011	0.049	0.051	0.044	0.048	0.047
EOT	Right	0.010	0.049	0.054	0.046	0.050	0.050
SOT	Left	0.053	0.057	0.056	0.062	0.056	0.057
EOT	Left	0.054	0.058	0.057	0.064	0.059	0.057

Camshaft Bow (inches)

SOT	Right	0.0009
SOT	Left	0.0000

Camshaft Serial Number

Right	1196R051201
Left	1168L051201

ATTACHMENT 4

Sequence VG Pre and Post Test Camshaft Measurements

Test Number: 10A-0-36

Engine Number: R050-3

Total Hours: 216

Camshaft Bearing Bore Diameters (mm)

Bore Gauge Set: 27.000 mm

Diameter (All): 26.987 - 27.012 mm

	Journal #	1	2	3	4	5	6
SOT	Right	27.020	27.002	27.022	27.033	27.023	27.028
SOT	Left	27.005	26.995	26.997	27.001	26.999	27.000

Camshaft Bearing Journal Diameters (mm)

Diameter (All): 26.936 - 26.962 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.948	26.947	26.945	26.943	26.943	26.942
EOT	Right	26.946	26.945	26.944	26.936	26.940	26.942
Wear	**Right**	**0.002**	**0.002**	**0.001**	**0.007**	**0.003**	**0.000**
SOT	Left	26.940	26.944	26.946	26.943	26.941	26.945
EOT	Left	26.938	26.939	26.941	26.936	26.937	26.941
Wear	**Left**	**0.002**	**0.005**	**0.005**	**0.007**	**0.004**	**0.004**

Camshaft Bearing Clearances (mm)

Clearance: 0.025 - 0.076 mm

	Journal #	1	2	3	4	5	6
SOT	Right	0.072	0.055	0.077	0.090	0.080	0.086
EOT	Right	0.074	0.057	0.078	0.097	0.083	0.086
SOT	Left	0.065	0.051	0.051	0.058	0.058	0.055
EOT	Left	0.067	0.056	0.056	0.065	0.062	0.059

Camshaft Bow (inches)

SOT	Right	0.0005
SOT	Left	0.0002

Camshaft Serial Number

Right	1187R051201
Left	1171L051201

ATTACHMENT 4

Sequence VG Pre and Post Test Camshaft Measurements

Test Number: 4A-0-37

Engine Number: R052-2

Total Hours: 216

Camshaft Bearing Bore Diameters (mm)

Bore Gauge Set: 27.000 mm

Diameter (All): 26.987 - 27.012 mm

	Journal #	1	2	3	4	5	6
SOT	Right	27.004	27.016	27.005	27.001	27.002	27.006
SOT	Left	27.022	27.007	27.004	27.001	27.012	27.000

Camshaft Bearing Journal Diameters (mm)

Diameter (All): 26.936 - 26.962 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.949	26.949	26.948	26.941	26.945	26.947
EOT	Right	26.951	26.950	26.948	26.931	26.938	26.947
Wear	**Right**	**-0.002**	**-0.001**	**0.000**	**0.010**	**0.007**	**0.000**
SOT	Left	26.943	26.944	26.940	26.939	26.943	26.946
EOT	Left	26.943	26.941	26.935	26.937	26.940	26.946
Wear	**Left**	**0.000**	**0.003**	**0.005**	**0.002**	**0.003**	**0.000**

Camshaft Bearing Clearances (mm)

Clearance: 0.025 - 0.076 mm

	Journal #	1	2	3	4	5	6
SOT	Right	0.055	0.067	0.057	0.060	0.057	0.059
EOT	Right	0.053	0.066	0.057	0.070	0.064	0.059
SOT	Left	0.079	0.063	0.064	0.062	0.069	0.054
EOT	Left	0.079	0.066	0.069	0.064	0.072	0.054

Camshaft Bow (inches)

SOT	Right	0.0005
SOT	Left	0.0006

Camshaft Serial Number

Right	1192R051201
Left	1096L050907

ATTACHMENT 4

Sequence VG Pre and Post Test Camshaft Measurements

Test Number: 10A-4-40

Engine Number: R054-2

Total Hours: 216

Camshaft Bearing Bore Diameters (mm)

Bore Gauge Set: 27.000 mm

Diameter (All): 26.987 - 27.012 mm

	Journal #	1	2	3	4	5	6
SOT	Right	27.000	26.999	27.001	26.997	27.001	27.001
SOT	Left	27.003	27.001	26.990	27.000	26.995	26.990

Camshaft Bearing Journal Diameters (mm)

Diameter (All): 26.936 - 26.962 mm

	Journal #	1	2	3	4	5	6
SOT	Right	26.950	26.947	26.946	26.940	26.943	26.947
EOT	Right	26.949	26.946	26.946	26.937	26.940	26.947
Wear	**Right**	**0.001**	**0.001**	**0.000**	**0.003**	**0.003**	**0.000**
SOT	Left	26.943	26.944	26.943	26.941	26.940	26.941
EOT	Left	26.942	26.941	26.939	26.937	26.938	26.940
Wear	**Left**	**0.001**	**0.003**	**0.004**	**0.004**	**0.002**	**0.001**

Camshaft Bearing Clearances (mm)

Clearance: 0.025 - 0.076 mm

	Journal #	1	2	3	4	5	6
SOT	Right	0.050	0.052	0.055	0.057	0.058	0.054
EOT	Right	0.051	0.053	0.055	0.060	0.061	0.054
SOT	Left	0.060	0.057	0.047	0.059	0.055	0.049
EOT	Left	0.061	0.060	0.051	0.063	0.057	0.050

Camshaft Bow (inches)

SOT	Right	0.0011
SOT	Left	0.0008

Camshaft Serial Number

Right	1191R051201
Left	1153L051201

Ford VG Camshaft Measurements

Left Camshaft

	Pretest Lobes	EOT Lobes	Difference	Pretest Journals	EOT Journals	Difference
1	2.1554	2.1553	**0.0001**	1.0610	1.0610	**0.0000**
2	2.1550	2.1550	**0.0000**	1.0610	1.0610	**0.0000**
3	2.1557	2.1557	**0.0000**	1.0611	1.0611	**0.0000**
4	2.1550	2.1550	**0.0000**	1.0610	1.0610	**0.0000**
5	2.1555	2.1555	**0.0000**	1.0610	1.0610	**0.0000**
6	2.1548	2.1548	**0.0000**	1.0611	1.0611	**0.0000**
7	2.1550	2.1550	**0.0000**			
8	2.1546	2.1546	**0.0000**			

SN 1073 L 050524

Right Camshaft

	Pretest Lobes	EOT Lobes	Difference	Pretest Journals	EOT Journals	Difference
1	2.1550	2.1550	**0.0000**	1.0610	1.0610	**0.0000**
2	2.1552	2.1552	**0.0000**	1.0609	1.0609	**0.0000**
3	2.1549	2.1549	**0.0000**	1.0609	1.0609	**0.0000**
4	2.1550	2.1550	**0.0000**	1.0607	1.0607	**0.0000**
5	2.1551	2.1550	**0.0001**	1.0608	1.0607	**0.0001**
6	2.1550	2.1550	**0.0000**	1.0610	1.0610	**0.0000**
7	2.1546	2.1545	**0.0001**			
8	2.1550	2.1550	**0.0000**			

SN 1182 R 051201

Engine 06029-1

All measurements are in Inches

Measured using snap-gage with preset at 2.1550"

.0001inch =2.54um or .00254 mm 25.4

Measurements below converted to Metric (mm)

Left Camshaft

	Pretest Lobes	EOT Lobes	Difference	Pretest Journals	EOT Journals	Difference
1	54.747	54.745	**0.003**	26.949	26.949	**0.000**
2	54.737	54.737	**0.000**	26.949	26.949	**0.000**
3	54.755	54.755	**0.000**	26.952	26.952	**0.000**
4	54.737	54.737	**0.000**	26.949	26.949	**0.000**
5	54.750	54.750	**0.000**	26.949	26.949	**0.000**
6	54.732	54.732	**0.000**	26.952	26.952	**0.000**
7	54.737	54.737	**0.000**			
8	54.727	54.727	**0.000**			

SN 1073 L 050524

Right Camshaft

	Pretest Lobes	EOT Lobes	Difference	Pretest Journals	EOT Journals	Difference
1.000	54.737	54.737	**0.000**	26.949	26.949	**0.000**
2.000	54.742	54.742	**0.000**	26.947	26.947	**0.000**
3.000	54.734	54.734	**0.000**	26.947	26.947	**0.000**
4.000	54.737	54.737	**0.000**	26.942	26.942	**0.000**
5.000	54.740	54.737	**0.003**	26.944	26.942	**0.003**
6.000	54.737	54.737	**0.000**	26.949	26.949	**0.000**
7.000	54.727	54.724	**0.003**			
8.000	54.737	54.737	**0.000**			

SN 1182 R 051201

ATTACHMENT 5

Sequence VG Fuel Batch Correction Factor Update

R. Grundza

June 6, 2006

ATTACHMENT 6

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

An additional run was conducted on 1006-2, bringing the Total to 9

Since Program

- 13 tests from 3 labs
- 2 run oil 1006-2
- 6 run on oil 1009
- 5 run on oil 925-3
- Total tests run = 22

ATTACHMENT 6

Summary of Uncorrected Results*

Lab	IND	AES	RAC	AEV	APV
A	1006-2	8.27	9.3	8.64	7.9
G	1006-2	7.3	8.62	9	7.97
G	1006-2	8.23	9.31	8.88	7.93
A	1006-2	8.23	9.16	9.17	8.25
G	1006-2	8.63	9.19	9	7.98
A	925-3	5.36	7.15	8.76	6.94
G	925-3	5.8	6.99	8.66	6.96
A	1009	7.44	9.09	8.89	7.57
G	1009	7.17	9.22	8.8	7.28
A	1009	5.98	8.86	8.78	7.35
D	1006-2	8.02	9.14	9.11	7.82
D	925-3	6.53	7.7	8.62	7.15
B	1009	8.20	9.36	8.85	7.22
D	1009	7.35	9.26	8.88	7.70
D	925-3	6.74	7.9	8.75	7.37
G	925-3	6	7.02	8.61	7.11
D	1009	7.53	9.21	8.89	7.73
G	1009	7.02	8.78	8.83	7.36
A	925-3	6.35	7.52	8.61	7
A	1009	6.67	8.91	8.61	7.29
B	1006-2	8.92	9.35	9.11	8.01
A	925-3	6.21	7.62	8.52	7.24

*Lab severity adjustments applied using candidate model

ATTACHMENT 6

Summary of Results (cont)

- AES, RAC, AEV and APV all significantly different from target. OSCR did not test as significantly different in fuel program, not analyzed for update.
-

Average	Delta	Delta/s
AES	-0.63	-1.06
RAC	-0.19	-0.93
AEV	-0.12	-1.20
APV	-0.40	-1.99

ATTACHMENT 6

Correction Approach

- Evaluated Linear Regression
- For AES correction equation is

  $AES_{corrected} = (AES-0.052)/0.952$
- For RAC correction equation is

  $RAC_{corrected} = (RAC - 0.8)/0.89$
- For AEV correction equation is

  $AEV_{corrected} = (AEV-4.464)/0.487$
- For APV correction equation is

  $APV_{corrected} = (APV-1.503)/0.761$

See plots

Previous Correction Equations

- For AES correction equation is

  $AES_{corrected} = (2.175 + AES)/1.192$
- For RAC correction equation is

  $RAC_{corrected} = (RAC + 0.627)/1.041$
- For AEV correction equation is

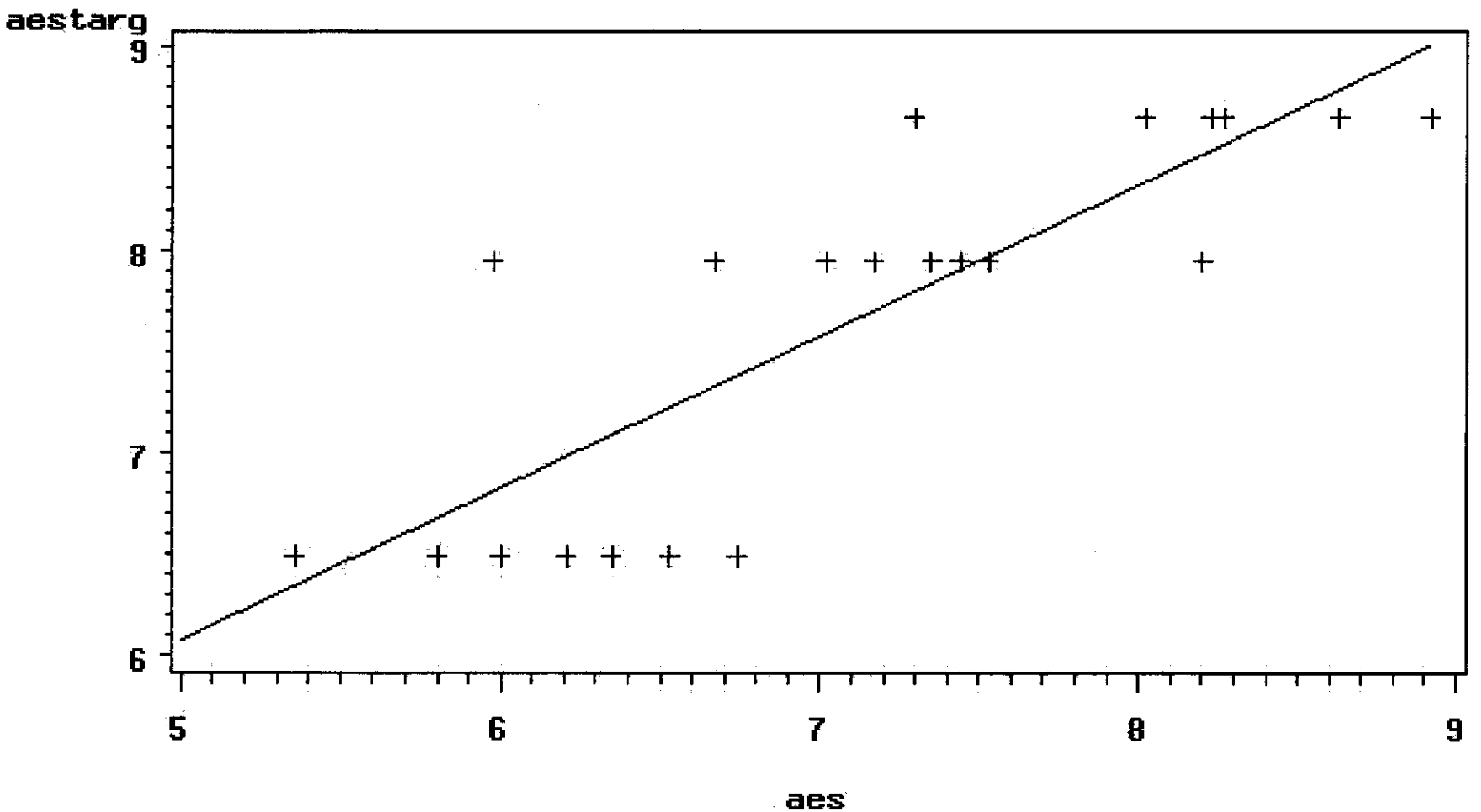
  $AEV_{corrected} = (AEV-5.735)/0.346$
- For APV correction equation is

  $APV_{corrected} = (APV-0.365)/0.898$

ATTACHMENT 6

Sequence VG

Plot of SA Adjusted AES versus AES Targets
Severe Result from Original Program Removed

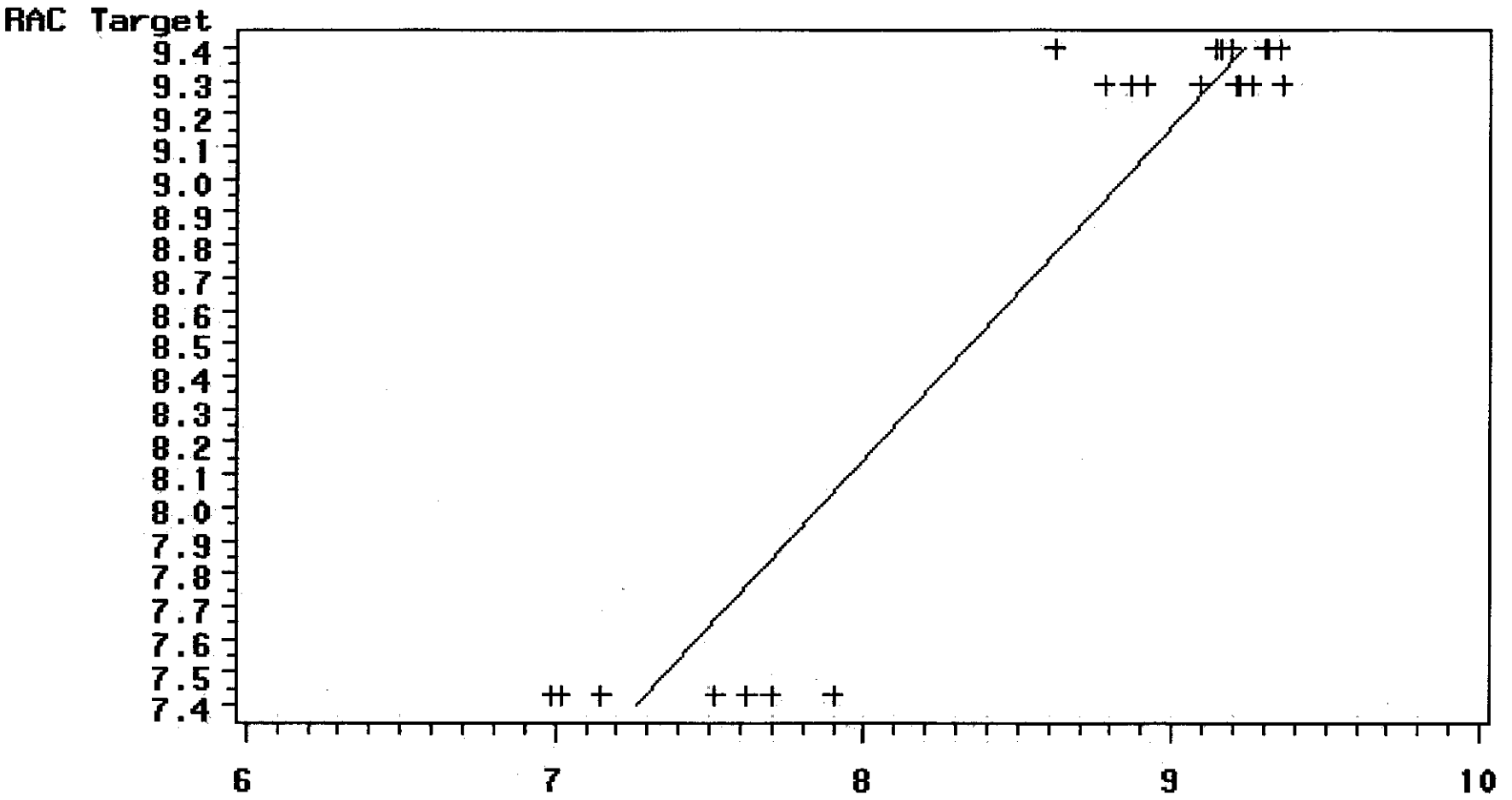


R square = 0.69

ATTACHMENT 6

Sequence VG

Plot of SA Adjusted RAC versus RAC Targets

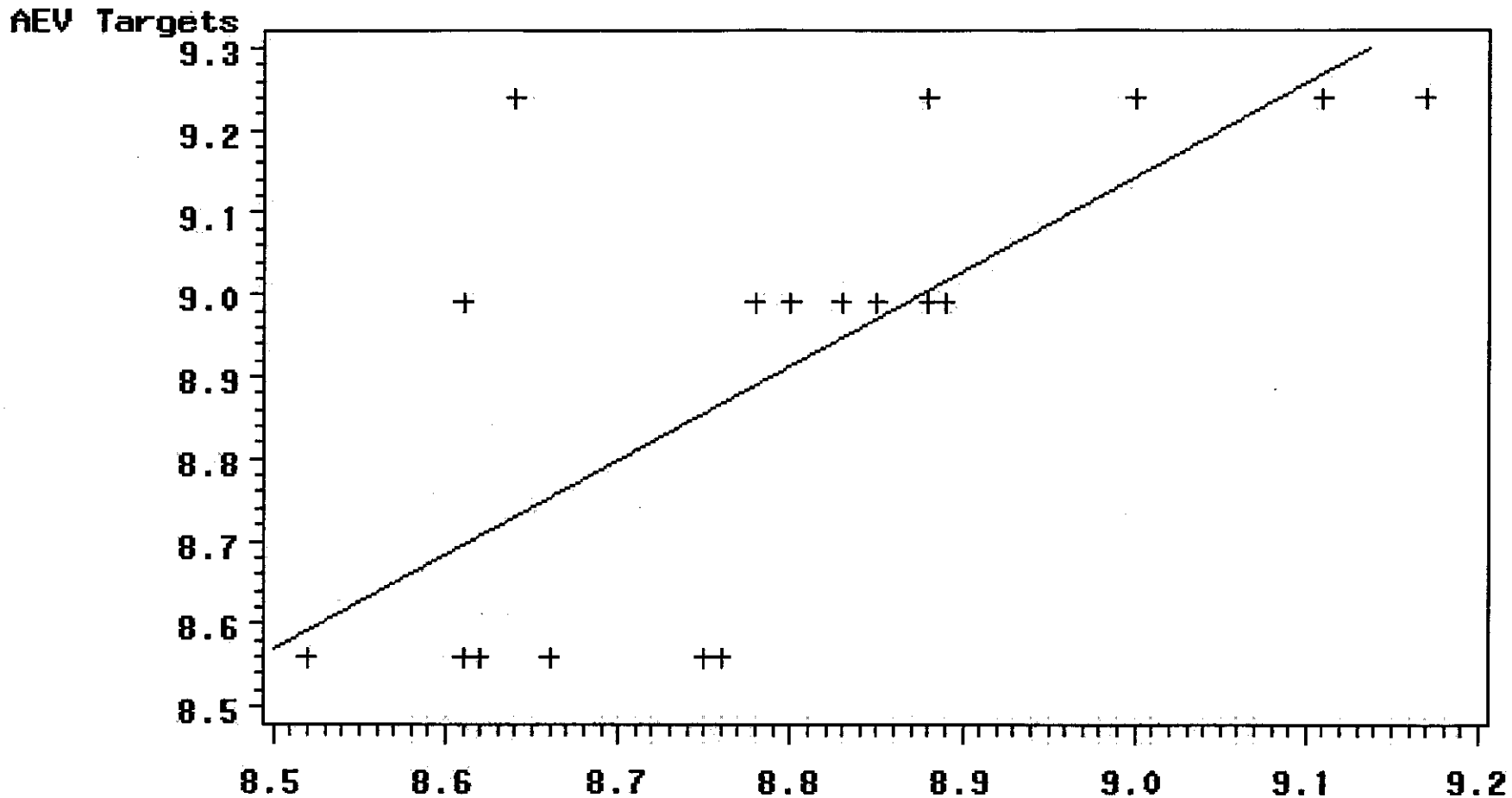


R square = 0.90

ATTACHMENT 6

Sequence VG

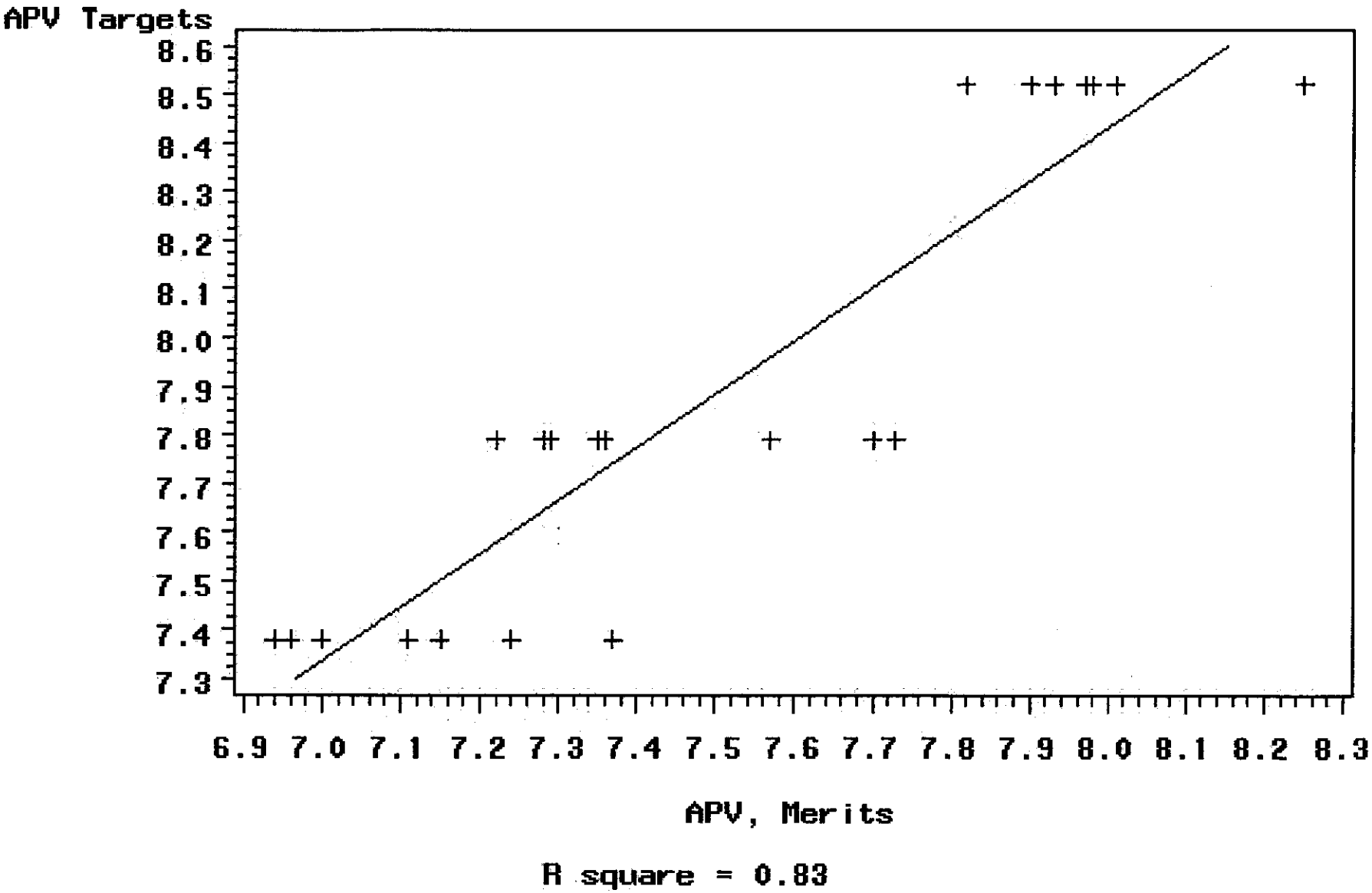
Plot of SA Adjusted AEV versus AEV Targets



R square = 0.56

ATTACHMENT 6

Plot of APV versus APV Targets



Attachment 6

Correction Approach

- Evaluated Fixed Correction Factor
- For AES correction is
  Average delta/s * pooled s -1.06 * 0.45 = -0.48
- For RAC correction is
  Average delta/s * pooled s -0.93 * 0.25 = -0.23
- For AEV correction is
  Average delta/s * pooled s -1.20 * 0.1 = -0.12
- For APV correction is
  Average delta/s * pooled s -1.99 * 0.2 = -0.40

Since batch is severe, signs are changed and correction factor is <u>added</u> to result

Previous Correction Factors

- 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

ATTACHMENT 6

Correction Factor Update

- The following tables compare the mean of the 21 results completed on the new fuel batch. Also tabulated are the mean results corrected by both previous and updated fixed and regression equation. The target values are also given for comparison purposes. Each set is tabulated by oil.

ATTACHMENT 6

Impact of Correction Factor

Parameter	Mean Oil 1009	Previous Fixed Correction Factor	Updated Fixed Correction Factor	Previous Regression correction	Updated Regression Correction	Target
AES	7.17	7.76	7.64	7.84	7.48	7.94
RAC	9.09	9.42	9.32	9.33	9.31	9.29
AEV	8.82	9.01	8.94	8.90	8.94	8.99
APV	7.44	7.98	7.84	7.87	7.80	7.79

ATTACHMENT 6

Impact of Correction Factor

Parameter	Mean Oil 925-3	Previous Fixed Correction Factor	Updated Fixed Correction Factor	Previous Regression correction	Updated Regression Correction	Target
AES	6.14	6.73	6.62	6.97	6.40	6.49
RAC	7.41	7.74	7.64	7.72	7.43	7.43
AEV	8.65	8.84	8.77	8.42	8.59	8.56
APV	7.11	7.65	7.51	7.51	7.37	7.38

ATTACHMENT 6

Impact of Correction Factor

Parameter	Mean Oil 1006-2	Previous Fixed Correction Factor	Updated Fixed Correction Factor	Previous Regression correction	Updated Regression Correction	Target
AES	8.11	8.73	8.59	8.63	8.59	8.65
RAC	9.12	9.45	9.35	9.34	9.32	9.40
AEV	8.96	9.15	9.08	9.34	9.23	9.24
APV	8.11	8.65	8.51	8.62	8.68	8.52

ATTACHMENT 9

Other Issues

- APV shift for oil 1006-2 is much larger than other two oils, -3.89 delta/s for 1006-2, -0.96 for 925-3 and -1.29 for 1009.
- Because of this difference for APV, transforms were investigated for all parameters except OSCR. No transformations appear to significantly improve the distribution or do a better job of normalizing the data.

ATTACHMENT 6

Summary

- Fuel Batch severe of target for all parameters except OSCR. OSCR not statistically significant in previous analysis, average Δ/s -0.01, again not significant.
- Severity shift for APV much larger with oil 1006-2 versus 1009 and 925-3.

ATTACHMENT 6

Attachment 7

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	Target Date
1. Ensure a secure supply of Ford 4.6L hardware is available to accommodate testing through GF-5, anticipating the need for additional parts solicitations from Ford.	On-going
2. Ensure a secure supply of SVGM2 fuel is available to accommodate testing through GF-5, anticipating the need for one additional batch of SVGM2 fuel to be blended.	On-going
3. Review fuel severity correction factors on all available data from oils 925-3, 1006-2, 1007 and 1009.	November 2006

Andy Ritchie, Chairman
Sequence VG Surveillance Panel

Updated June 6, 2006
San Antonio, TX

April 2-6, 2006

Light Duty Rating Workshop - Seq V Varnish

	Number of Parts Rated	-1 < yi ≤ 1	-2 < yi ≤ 2	-3 < yi ≤ 3	>3	Yi STD	Group
Adams, Pat	5	65.2%	100.0%	100.0%	0.0%	0.96	White
Cales, Jonathon	5	82.6%	100.0%	100.0%	0.0%	0.71	Red
Caproni, David	5	87.0%	100.0%	100.0%	0.0%	0.58	Blue
Castillo, George	5	95.7%	100.0%	100.0%	0.0%	0.62	Blue
Foecking, Brian	5	60.9%	100.0%	100.0%	0.0%	0.45	White
Garcia, Orlando	5	82.6%	95.7%	100.0%	0.0%	0.81	Red
Hills, Barry	5	43.5%	100.0%	100.0%	0.0%	0.24	Yellow
Kirkpatrick, John	5	39.1%	65.2%	95.7%	4.3%	1.72	Yellow
Kobrinetz, Jack	5	100.0%	100.0%	100.0%	0.0%	0.36	Blue
Lopez, Frank	5	65.2%	100.0%	100.0%	0.0%	0.92	White
Lowsky, John	5	65.2%	82.6%	95.7%	4.3%	1.16	Yellow
Pansza, Mike	5	91.3%	100.0%	100.0%	0.0%	0.67	Blue
Pawczuk, Greg	3	47.1%	88.2%	100.0%	0.0%	0.99	Yellow
Radonich, Pete	5	100.0%	100.0%	100.0%	0.0%	0.33	Blue
Ramirez, Robert	5	91.3%	100.0%	100.0%	0.0%	0.57	Blue
Rodriguez, Jesse	5	39.1%	69.6%	91.3%	8.7%	1.25	Yellow
Sanchez, Art	5	82.6%	100.0%	100.0%	0.0%	0.36	Red
Seiz, Ray	5	69.6%	87.0%	100.0%	0.0%	1.15	Yellow
Tschirhart, Garland	5	56.5%	100.0%	100.0%	0.0%	0.78	Yellow
Viera, Ralph	5	73.9%	95.7%	100.0%	0.0%	0.69	White
Yanchar, Paul	5	95.7%	100.0%	100.0%	0.0%	0.50	Blue

	Minimum Number of Parts Rated	Minimum Yi's within 1 STD of mean	Minimum Yi's within 2 STD of mean	Maximum Overall Yi STD	Group Total	
White	0	60%	90%	1.20	4	19%
Red	0	80%	95%	0.85	3	14%
Blue	0	85%	98%	0.75	7	33%
Yellow	-	-	-	-	7	33%

April 2-6, 2006

Light Duty Rating Workshop - Seq V Sludge

	Number of Parts Rated	-1 < yi ≤ 1	-2 < yi ≤ 2	-3 < yi ≤ 3	>3	Yi STD	Group
Adams, Pat	2	54.5%	90.9%	100.0%	0.0%	1.06	Yellow
Avis, Steve	2	72.7%	100.0%	100.0%	0.0%	0.79	White
Cales, Jonathon	2	72.7%	100.0%	100.0%	0.0%	0.75	White
Caproni, David	2	81.8%	100.0%	100.0%	0.0%	0.68	Red
Castillo, George	2	81.8%	100.0%	100.0%	0.0%	0.58	Red
Foecking, Brian	2	81.8%	100.0%	100.0%	0.0%	0.63	Red
Garcia, Orlando	2	81.8%	100.0%	100.0%	0.0%	0.65	Red
Hills, Barry	2	45.5%	81.8%	90.9%	9.1%	1.55	Yellow
Kirkpatrick, John	2	54.5%	72.7%	90.9%	9.1%	1.70	Yellow
Kobrinetz, Jack	2	63.6%	90.9%	100.0%	0.0%	0.84	White
Lopez, Frank	2	45.5%	100.0%	100.0%	0.0%	0.99	Yellow
Lowsky, John	2	63.6%	100.0%	100.0%	0.0%	0.79	White
Pansza, Mike	2	72.7%	90.9%	100.0%	0.0%	1.15	White
Pawczuk, Greg	1	88.9%	100.0%	100.0%	0.0%	0.64	Blue
Radonich, Pete	2	90.9%	100.0%	100.0%	0.0%	0.45	Blue
Ramirez, Robert	2	81.8%	100.0%	100.0%	0.0%	0.59	Red
Rodriguez, Jesse	2	81.8%	100.0%	100.0%	0.0%	0.72	Red
Sanchez, Art	2	45.5%	100.0%	100.0%	0.0%	0.63	Yellow
Seiz, Ray	2	72.7%	100.0%	100.0%	0.0%	0.91	White
Tschirhart, Garland	2	72.7%	81.8%	90.9%	9.1%	1.53	Yellow
Viera, Ralph	2	63.6%	100.0%	100.0%	0.0%	0.90	White
Yanchar, Paul	2	100.0%	100.0%	100.0%	0.0%	0.22	Blue

	Minimum Number of Parts Rated	Minimum Yi's within 1 STD of mean	Minimum Yi's within 2 STD of mean	Maximum Overall Yi STD	Group Total	
White	0	60%	90%	1.20	7	32%
Red	0	80%	95%	0.85	6	27%
Blue	0	85%	98%	0.75	3	14%
Yellow	-	-	-	-	6	27%