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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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February 4, 2003

Please forward any comments to:
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Unconfirmed Minutes from the ASTM Sequence VI Surveillance Panel Held in San Antonio, TX November 20, 2002

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Call to Order

Chairman Charlie Leverett opened the Surveillance Panel meeting. The agenda was distributed and is included as *Attachment #1*.

Action Item and Motion Recorder

Ben Weber of Southwest Research Institute, is the action item and motion recorder for this Surveillance Panel meeting. The motions and action items are included as *Attachment #2*.

Attendance Roster

The attendance roster is included as *Attachment #3*. Fifteen of seventeen voting members were present.

Membership Changes

Larry Hamilton is the voting member representing the Lubrizol Corporation for this meeting only. Bob Olree is the voting member representing General Motors Research & Development for this meeting only.

Approval of Minutes

The minutes for the May 2002 meeting were unanimously approved as posted on the TMC web site. Minutes are not mailed but are available at the TMC Web Site at: <ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/minutes/>

These minutes are in pdf format. Any questions concerning the access of these documents should be directed to TMC. Once these minutes are posted the secretary will inform all members and others currently on the mailing list by electronic mail of these postings. Please forward any changes that may occur to your electronic mail address to: <mailto:fgerhart@swri.org>

TMC Reports

Semi Annual Report

Rich Grundza presented the Semiannual Reports for the Sequence VIB. The Sequence VIB report for this period is included as *Attachment #4* and may also be found on the TMC web site at the following link: <ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/semiannualreports/>

A summary of this report is:

- **Laboratory/Stand Distribution**
Seven laboratories reported twenty-two stand/engine combinations during the report period. Six laboratories with thirteen stand/engine combinations are currently calibrated.
- **Reference Test Summary**

Calibration Start Outcomes	TMC Validity Code	No. of Tests
Operationally and Statistically Acceptable	AC	36
Failed Acceptance Criteria	OC	19
Operationally Invalid (Laboratory Judgment)	LC	3
Aborted	XC	3
Total		61

65% of the failures were on new engines

Second highest occurrence of lost tests since beginning of monitoring

- **LTMS stand alarms**
73% Severe YI
79% - FEI 1
Panel to be notified by S.P. chair when LTMS action alarms occur.

BC Verification Status - included as *Attachment #5*

One data point was repeated. Updated results indicate blend slightly less efficient than BC2 but it is acceptable.

Motion by Guy Stubbs and Seconded by Gordon Farnsworth - to accept BC5 verification runs as being acceptable for use. The motion passed with a unanimous vote.

1008-1 Update

10 data points with FEI1 and FEI2 slightly milder than the targets for 1008.

Category Reference Oil (539) Update

Ready to ship out. How to introduce?

Action Item – Charlie Leverett will coordinate with Rich Grundza to introduce 539 (the GF-3 10W30 category oil) throughout the testing laboratories.

D6837-02 Update

Should be issued Dec – Jan time frame.

RSI Report

Rick Oliver gave this report, a copy may be found in *Attachment #6*

Fifty-five tests were conducted during the reporting period. Of which, 34 were valid tests and seventeen tests were terminated by sponsor request. No replicate data was reported.

CPD Report

Beto Araiza gave this report and a copy may be found in *Attachment #7*.

40 engines built on Aug 5, 2002

Engine sequence numbers from 369-409

Terry Tait from Ford cam drive systems components was present for the build.

Tensioner oiling holes were carefully checked.

Simtest oil pressure average was 47.3 psi using 5w30 oil.

TMC reviewed and approved data.

Some tensioners have failed in the field on fleet test.

Next build about February 2003.

Old Business

a.) Action items – No active action items at this time.

b.) Engine supply discussion – estimate 100 engines will be needed for GF-4. Surveillance panel chair has received a draft proposal from AER.

Action Item - AER to supply a draft proposal to the Surveillance Panel for 100 additional engines to cover expected VIB usage for the life of GF-4.

New Business

- 1) Reference test used oil analysis – any merit? Analysis is costly and may not be providing data that is useful. ***Motion by Charlie Leverett and Seconded by Patrick Lei - to delete CCS, MRV, Fuel Dilution and HFFR used oil analysis on all future reference oil tests. Effective immediately. All were in favor except for one waive. Motion carried.***
- 2) Presentation by Guy Stubbs - Cam chain tensioner arm wear and high blowby in July 02 builds. Included as *Attachment #8*.
 - a) Tensioner on engine 57 had high wear with only 325 hours. Oil pressure in Stage 1 was 208 kPa. Squirt hole on tensioner was clear. Replacement arms don't appear to perform better. Engine 42 with 1747 hours (R0072315) versus Engine 51 with 1004 hours (R07072998). Discussion by panel – Chair queried panel when Guy first reported failure. No other failures were reported.

Could VIB test procedure conditions be responsible for failure modes? Oil pressure is driver for tension on chain guide.

Does surface finish on back of chain impact wear on chain guide?

Newer version of arms (2001) could be used if blocks could have an additional boss installed. AER is able to reclaim chain guides, arms, and chains on used engines from the field. These engines are high mileage and do not exhibit wear on these parts. New tensioners are installed. Squirt hole diameter is about 0.024 inches.

Blockage of the squirt hole may be responsible for failures.

One lab is able to pressurize their engines after each test and have noticed failures of tensioner. In each instance, the squirt hole has been found to be plugged by debris and can be cleared with a wire. However, subsequent failures on cleared tensioners still continue to occur at random.

One lab has experimented with increasing the squirt hole diameter to 0.049 inches and has had very good success. No clogging of these modified squirt holes. Oil pressure was reduced about 6% but did not impact the B.S.F.C. performance of the engine.

Pressure relief valve in the Racor filter may allow the engine to operate with unfiltered engine when starting the engine cold. This may explain why plugging still occurs on tensioners that have been cleared.

The current filter design does not contain any external bypass indicator.

The filter capacity may be too limited for the service required by the longer VIB test as compared to the VIA test length.

A bypass alarm kit is available for the filter. It is not a violation of the test procedure to use this bypass alarm kit.

Action Item – Charlie Leverett will get with Beto Ariza and David Wagner to put together a list of all the measurements that AER does for each engine build. The SP would like to see this list as soon as possible.

Action Item – Jason Bowden to send the Oberg tattle-tail information to the SP for possible use at the laboratories discretion.

Action Item – Berry Jecewski will see if there are any differences in the 2001 chain tensioner material versus what AER is using for the VIB engine builds.

Action Item – Berry Jecewski will verify the chain guide oiling orifice specification.

Action Item – Berry Jecewski to review any changes that might have occurred over the last couple of years in any of the components associated with the chain guides and oiling mechanisms.

- b) SwRI has had two engines from the July 02 build with high blowby – 34.3 L/min and 21.6 L/min. Both measurements were taken after completion of engine break-in. Typical blowby is 10 L/min. One engine was torn down and had wide ring gaps 0.023 inch and deep top ring groove pistons. Photograph of two different pistons appeared to be the same with exception of perhaps a mold number. The photograph of the pistons is included in the minutes as Attachment # 9.

Discussion by panel – piston batch has not changed. The ring gap is not checked during assembly. Rings are manufactured by Perfect Circle and used out of the box. Has TMC been requested to review build data on these high blowby engines?

Action item – Rich Grundza to review build data on these high blowby engines.

Action item – David Wagner to check to see what the differences are between S1 and S2 pistons.

Action Item – all laboratories to advise David Wagner of how their use of August 2002 engines turns out.

Action Item – David Wagner to notify Charlie Leverett of upcoming engine batch shipments to the laboratories.

Action Item – David Wagner to measure the ring gaps for the next engine builds.

Review of Scope and Objectives

The Scope and Objectives for this panel are shown in Attachment # 10.

Adjournment and Next Meeting

The next meeting will be at the call of the chairman. The meeting was adjourned

Attachment #1

Sequence VIB Surveillance Panel

November 20, 2002

San Antonio, TX

Agenda

- 1.) Welcome (Chairman)
- 2.) Attendance Sign-in sheet distributed (Fred)
- 3.) Membership changes and/or additions. (Fred)
- 4.) Minutes Approval from May 14th 02 meeting (Fred)
- 5.) TMC Report (Rich)
 - a.) Semi annual report
 - b.) BC Verification status
 - c.) 1008-1 update
 - d.) Category reference oil (539)
- 6.) RSI Report (Rick)
- 7.) Test Sponsor Report (Barry)
- 8.) CPD Report (Beto)
 - a.) July 2002 Build report
- 9.) Old Business
 - a.) Action Items
 - b.) Engine supply discussion
- 10.) New Business:
 - a.) Reference Test Used Oil Analysis, any merit?
 - b.) Presentation on cam chain tensioner arm wear and high blowby in July 02 build engines
(Guy Stubbs)
- 11.) Review of Scope and Objectives
- 12.) Adjournment

Attachment #2
Motions & Action Items
VIB Surveillance Panel
November 20, 2002
As Recorded at the Meeting by Ben Weber

- 3) [Guy S & Gordon F] Motion to accept BC5 verification runs as being acceptable for use. Passed unanimously.
- 4) Charlie L will coordinate with Rich G to introduce 539 (the GF-3 10W30 category oil) throughout the testing laboratories.
- 5) AER will be supplying a draft proposal to the Surveillance Panel for 100 additional engines to cover expected VIB usage for the life of GF-4.
- 6) [Charlie L & Patrick L] Motion to delete CCS, MRV, Fuel Dilution and HFFR used oil analysis on all future reference oil tests. Effective immediately. All were in favor except for one waive.
- 7) Charlie L will get with Beto A and David W to put together a list of all the measurements that AER does for each engine build. The SP would like to see this list as soon as possible.
- 8) Barry J will see if there were any differences in the 2001 chain tensioner material versus what AER is using for VIB engine builds.
- 9) Barry J will verify the chain guide oiling orifice specification.
- 10) Barry J will also review any other changes that might have occurred over the last couple of years in any of the components associated with the chain guides and oiling mechanisms.
- 11) Barry J reported that Ford has formed a task force to determine the root cause of the chain guide failures within 90 days.
- 12) Jason B will send the Oberg tattle-tail information to the SP for possible use at the lab's discretion.
- 13) Rich G will review the AER engine build data from Guy S's two engine failures.
- 14) David W will check to see what the differences are between S1 and S2 pistons.
- 15) David W requested that the other labs let him know how their use of August 2002 engines turns out.
- 16) David W will notify Charlie L of upcoming engine batch shipments to the labs.
- 17) David W will measure the ring gaps for the next engine builds.

Attachment #3

VOTING MEMBERSHIP			
NAME	ADDRESS	PHONE / FAX / E-MAIL	ATTENDANCE
ARIAZO, BETO	Test Engineering, Inc, 12718 Cimarron Path San Antonio, TX 78249	Phone: (210)690-1958 Fax: (210)690-1959 bariazo@TEI-NET.com	Present
BOWDEN, DWIGHT H.	OH Technologies, Inc. P.O. Box 5039 Mentor, OH 44061-5039	Phone: (440)354-7007 Fax: (440)354-7080 DHBOWDEN@OHTECH.COM	Present
CLARK, SID	General Motors Research & Development 30500 Mound Rd./MC 480-106-160 Warren, MI 48090-9055	Phone:(810)986-1929 Fax: (810)986-2094 sidney.l.clark@gm.com	Bob Olree for Sid Clark
CAUDILL, TIMOTHY	Ashland Inc. 22 nd & Front Sts. Ashland, KY 41101	Phone:(606)329-5708 Fax:(606)329-3009 TLCAUDILL@Ashland.Com	Present
DUFFY, F. R.	Chrysler CIMS 482-00-13 800 Chrysler Drive Auburn Hills, MI 48326-2757	Phone: (248)576-7476 Fax: (248)576-7490 FD13@chrysler.com	
FARNSWORTH, GORDON R.	Infineum USA L.P. P.O. Box 735 Linden, NJ 07036	Phone: (908)474-3351 Fax: (908)474-3637 gordon.farnsworth@infineum.com	Present
FERNER, MARK	Pennzoil Quaker State P.O. Box 7569 The Woodlands, TX 77387	Phone: (281)363-8190 Fax: (281)363-8092 or 8002 markferner@pzlqs.com	
GLAENZER, DAVID	Ethyl Petroleum Additives Inc. 500 Spring St. P.O. Box 2158 Richmond, VA 23218-2158	Phone: (804) 788-5214 Fax: (804) 788-6358 Dave_Glaenger@ethyl.com	Present
JECEWSKI, BARRY	Ford Motor Company 21500 Oakwood Blvd POEE Bldg. Rm. DR 167 MD 44 Dearborn, MI 48121-2053	Phone: (313)594-6943 Fax: (313)845-3169 bjecewsk@ford.com	Present
LAI, PATRICK	Imperial Oil Ltd. Of Canada P.O. Box 3022 Sarnia, ONT N7T8C8 CANADA	Phone: (519)339-5611 Fax: (519)339-5866 patrick.k.lai@esso.com	Present
LEVERETT, CHARLIE Surveillance Panel Chair	Perkin Elmer Automotive Research 5404 Bandera Road San Antonio, TX 78238	Phone: (210)647-9422 Fax: (210)523-4607 Charlie_Leverett@PerkinElmer.com	Present
GRUNDZA, RICH	ASTM TMC 6555 Penn Avenue Pittsburgh, PA 15206-4489	Phone: (412)365-1031 Fax: (412)365-1047 reg@tmc.astmtmc.cmu.edu	Present
MONTEZ, ALFREDO	ORONITE Technology Group 4502 Centerview Drive, Suite 210 San Antonio, Texas 78228	Phone: (210)731-5604 Fax: (210)731-5699 ammn@chevrontexaco.com	Present
MOSHER, MARK	ExxonMobil 600 Billingsport Road Paulsboro, NJ 08066	Phone: (856)224-2132 Fax: (856)224-3628 mark.r.mosher@exxonmobil.com	Present
STUBBS, GUY	Southwest Research Institute 6220 Culebra Rd. P.O. Drawer 28510 San Antonio, TX 78228-0510	Phone: (210)522-5039 Fax: (210)684-7523 gstubbs@swri.org	Present
VUJICA, JOSEPH	Lubrizol Corp. 29400 Lakeland Blvd. Wickliffe, OH 44092	Phone: (440) 347-2058 Fax: (440) 347-4096 jsvu@lubrizol.com	Larry Hamilton for Joseph Vujica
WALKER, DAVID	AER Manufacturing	Phone: (972) 417-3172 Fax: davidwalker@aermfg.com	Present

Attachment #3

NON VOTING MEMBERSHIP AND GUESTS			
NAME	ADDRESS	PHONE / FAX / E-MAIL	ATTENDANCE
BUSCHER JR., WILLIAM A.	Buscher Consulting P.O. Box 112 Hopewell Jct. NY 12533	Phone: (914)897-8069 Fax: (914)897-8069 BUSCHWA@AOL.COM	
CARTER, JIM	HALTERMAN 2296 Hulett Rd. Okemos, MI 48864	Phone: (517)347-4947 Fax: (517)347-1024 JECARTER@dow.com	Present
FARBER, FRANK	ASTM TMC 6555 Penn Avenue Pittsburgh, PA 15206-4489	Phone: (412)365-1030 Fax: (412)365-1047 fmf@tmc.astmtmc.cmu.edu	Present
FERNANDEZ, FRANK	Oronite Global Technology 4502 Centerview Dr., Suite 210 San Antonio, TX 78228	Phone: (210)731-5603 Fax: (210)731-5699 ffer@chevrontexaco.com	Present
GERHART, FRED Surveillance Panel Secretary	Southwest Research Institute 6220 Culebra Rd. P.O. Drawer 28510 San Antonio, TX 78228-0510	Phone: (210)522-3842 Fax: (210)684-7523 fgerhart@swri.org	Present
HAMILTON, LARRY	Lubrizol Corporation 29400 Lakeland Blvd. Wickliffe, OH 44092	Phone: (440)347-2326 ldha@lubrizol.com	Present -Voting for Joseph Vujica this meeting only
OLIVER, RICK	2805 Beverly Drive Flower Mound, TX 75022	Phone: (972)724-2136 crickoliver@home.com	Present
WEBER, BEN Motion and Action Items Recorder	Southwest Research Institute 6220 Culebra Rd. P.O. Drawer 28510 San Antonio, TX 78228-0510	Phone: (210)522-5911 Fax: (210)684-7523 mailto:bweber@swri.org	Present
Phil Scinto	Lubrizol 29400 Lakeland Blvd. Wickliffe, OH 44092	Phone: (440)347-2161 PRS@LUBRIZOL.COM	Present
Clayton Knight	Test Engineering, Inc. 12718 Cimarron Path San Antonio, TX 78249-3423	Phone: (210)690-1958 Cknight@TEI-NET.COM	Present
Jason H. Bowden	OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039	Phone: (440)354-7007 Fax: (440) 354-7080 Jhbowden@ohtech.com	Present
Tom Franklin	Perkin Elmer 5404 Bandera Rd. San Antonio, TX 78238	Phone: (210) 647-9446 Fax: (210) 523-4607 tom.franklin@perkinelmer.com	Present

Sequence VIB Surveillance Panel

November 20, 2002
San Antonio, TX

This report can be found on the TMC web site at
<ftp://ftp.astmtmc.cmu.edu/docs/gas/sequencevi/semiannualreports/vib-10-2002.pdf>

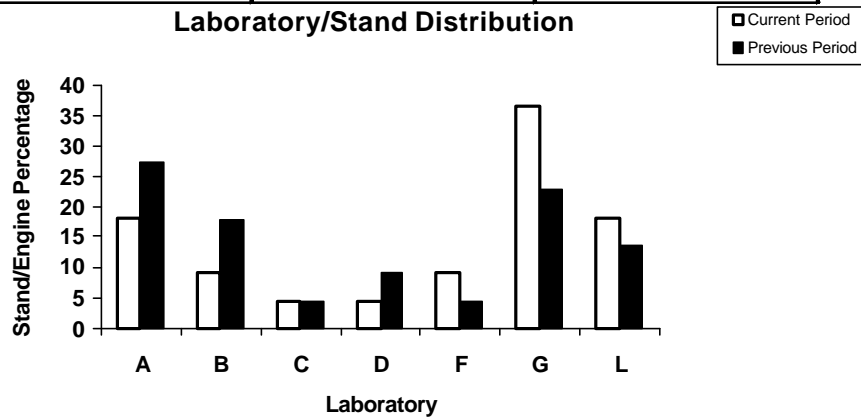
Test Monitoring Center

REG

Lab and Stand Summary

	Reported Data During Period	Calibrated as of 09/30/2002
Laboratories	7	4
Stand/Engine Combinations	22	9

Laboratory/Stand Distribution



Test Monitoring Center

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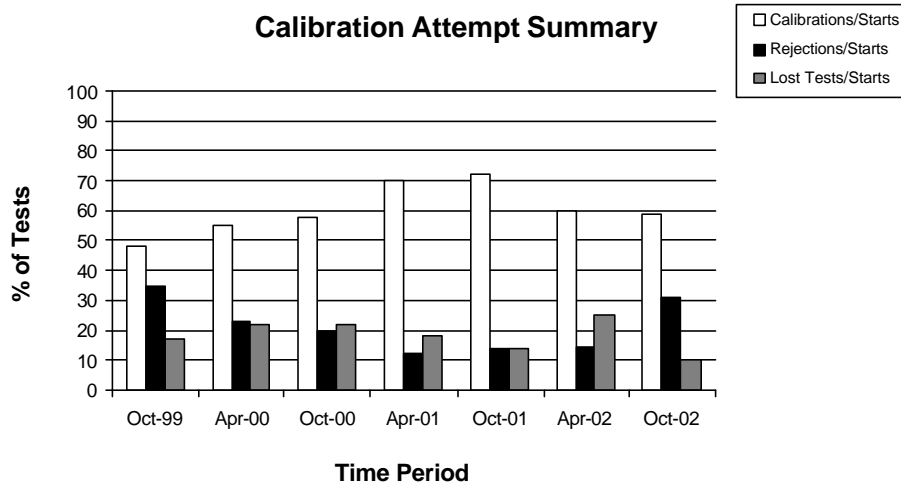
Reference Test Summary

	TMC Validity Codes	No. of Tests
Operationally and Statistically Acceptable	AC	56
Failed Acceptance Criteria	OC	19
Operationally Invalid (Laboratory Judgement)	LC	3
Aborted	XC	3
Total		61

Test Monitoring Center

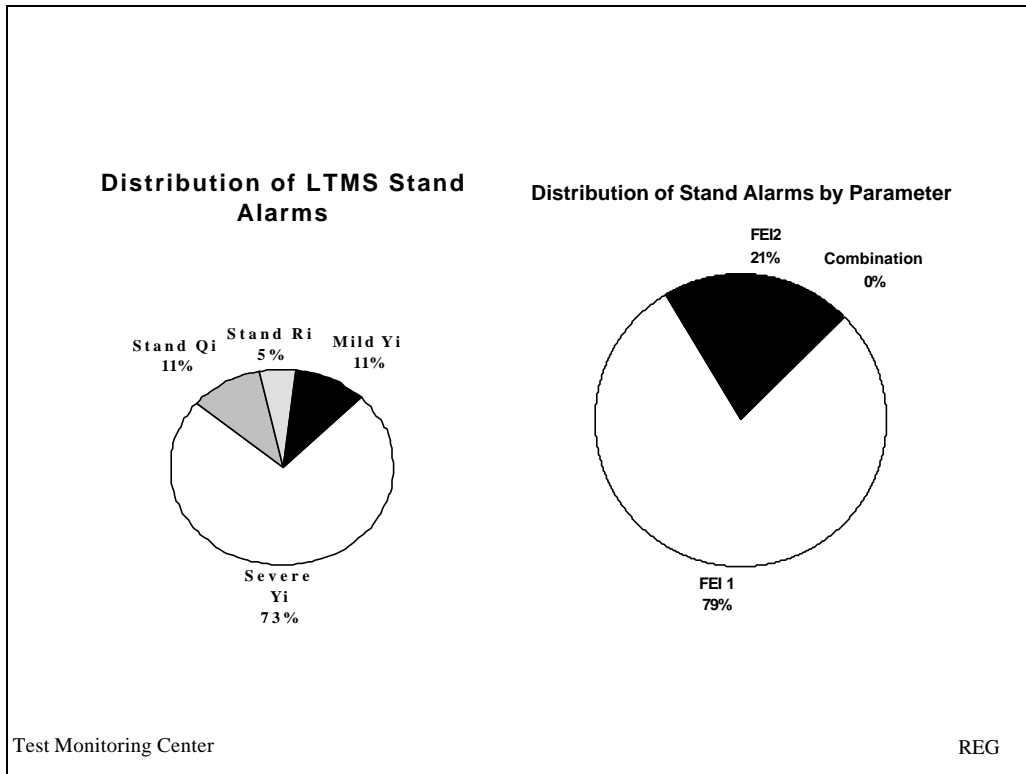
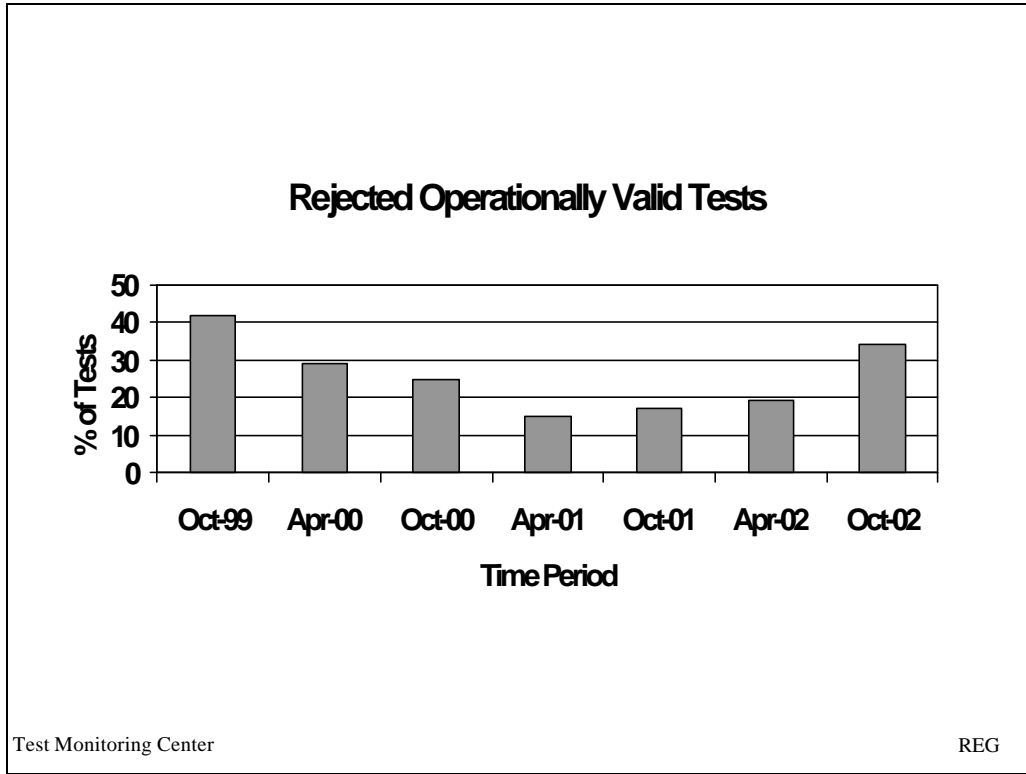
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Calibration Attempt Summary

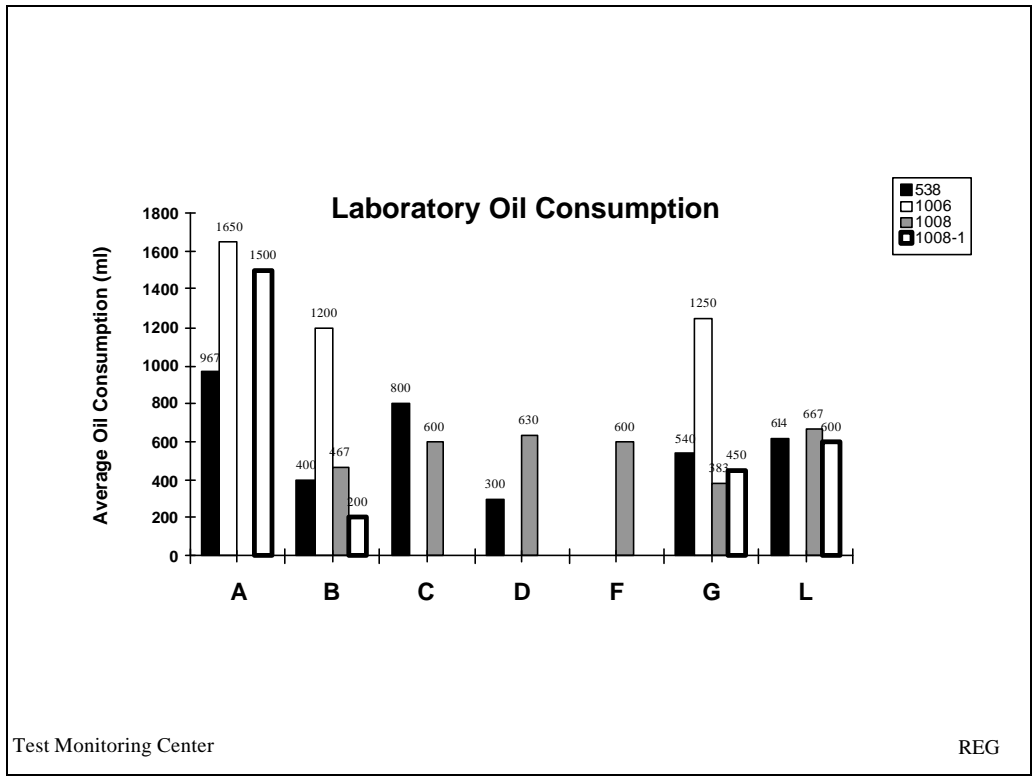
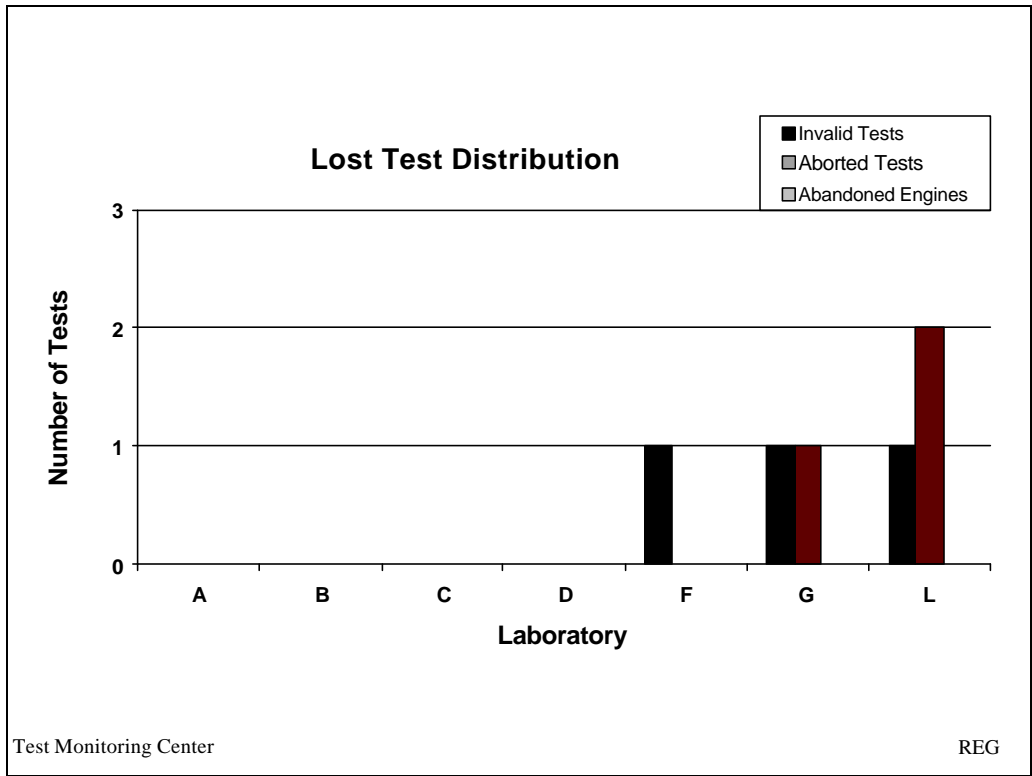


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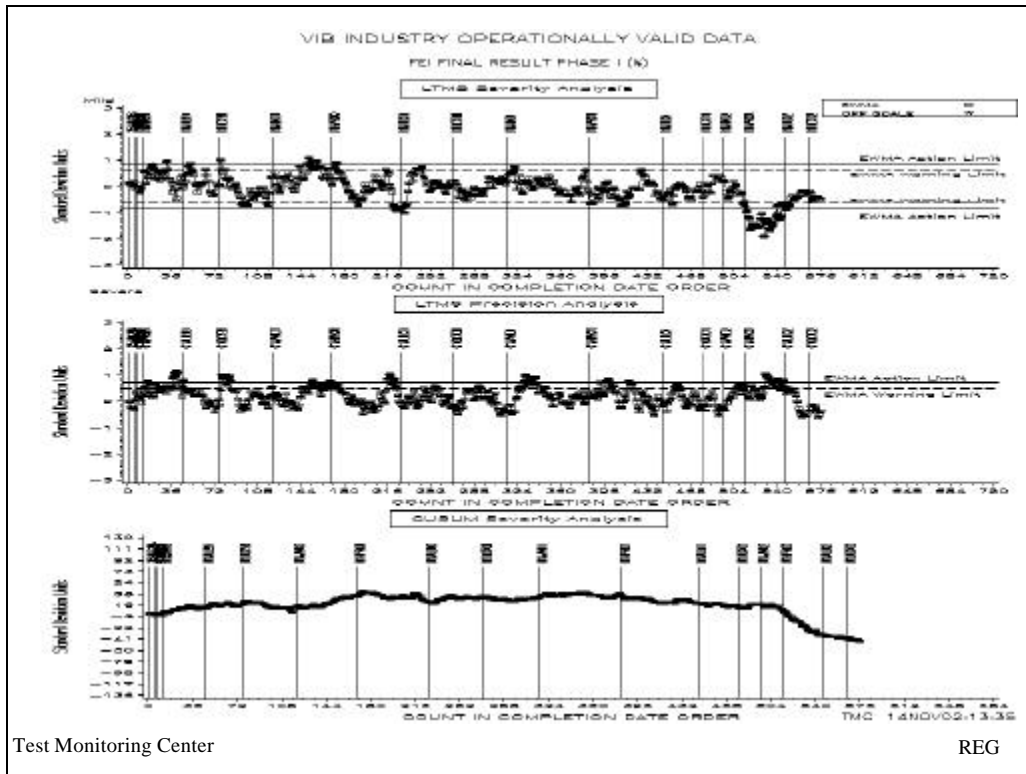
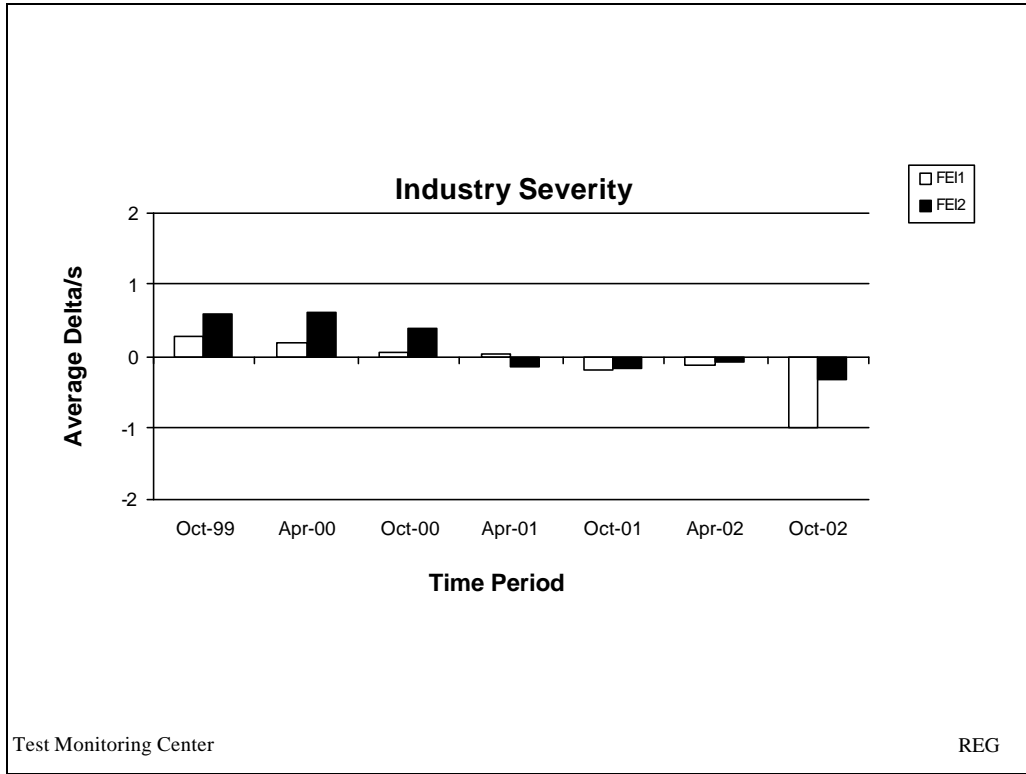
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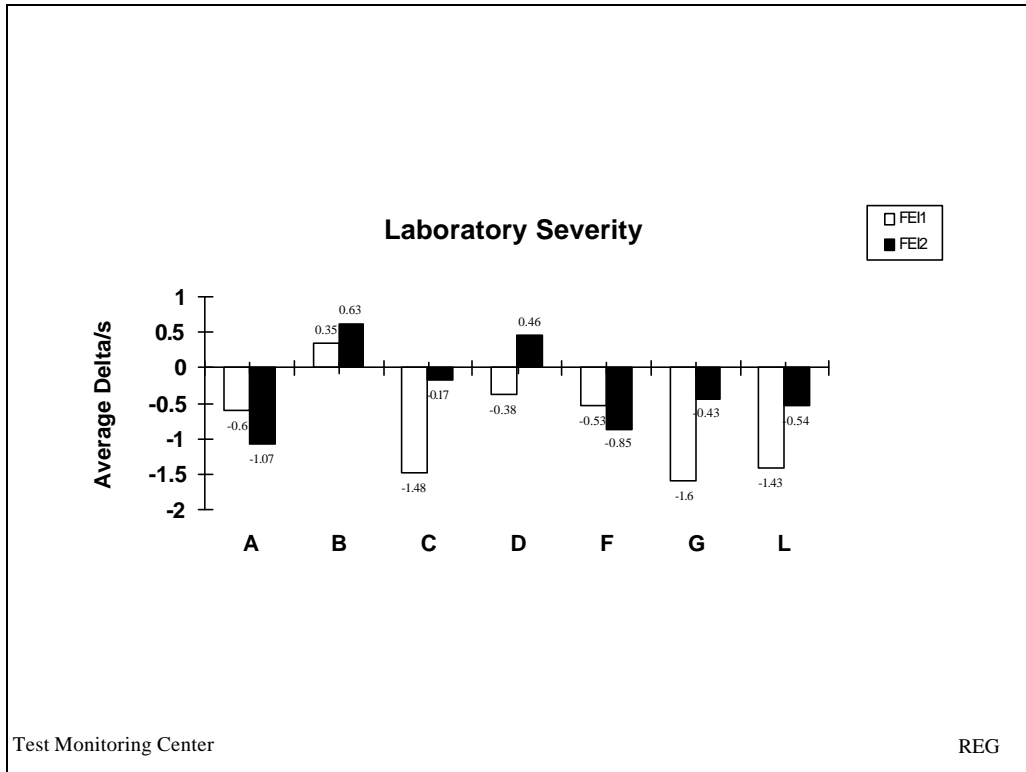
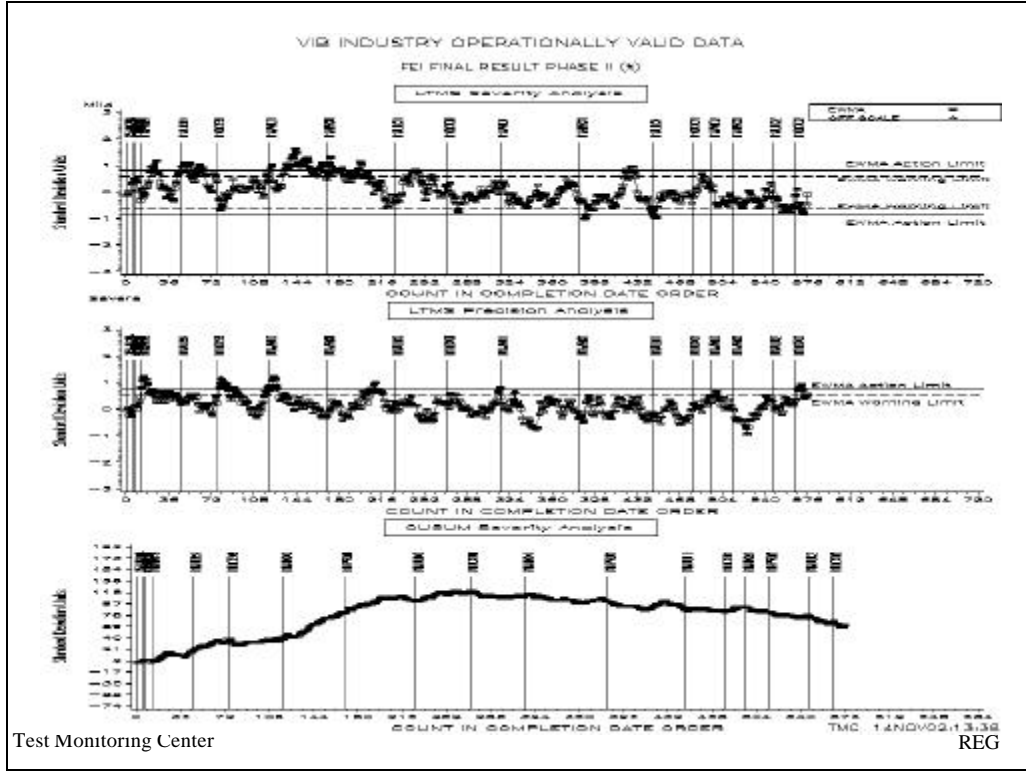
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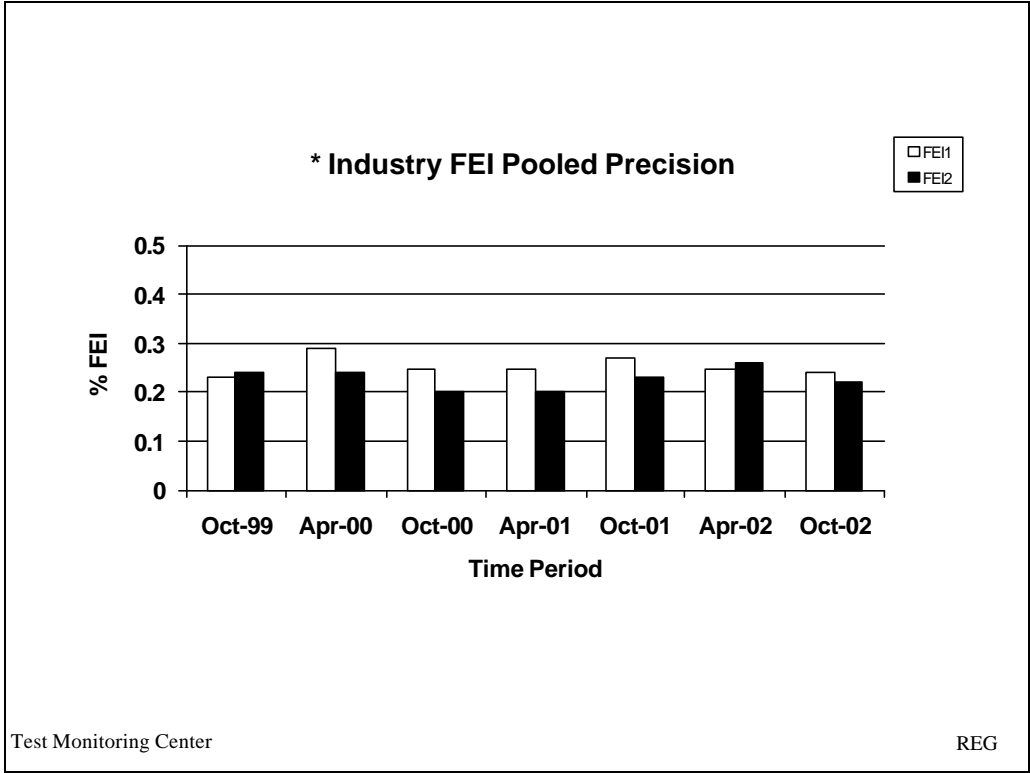
Attachment #4



Attachment #4



Attachment #4



SEQUENCE VIB REFERENCE OIL INVENTORY

Inventory Quantified By The Number Of Tests Remaining At Each Laboratory, And TMC
Sequence VIB reference oils are shipped in quantities of 5 gallons per test

LAB	538	539	1006	1006-2	1007	1008	1008-1
A	0	0	0	0	7	3	1
B	1	0	0	0	2	0	1
C	0	0	4	0	2	3	0
D	0	0	6	0	5	6	0
F	0	0	4	0	3	3	0
G	2	0	1	0	3	4	0
L	4	0	0	0	5	3	1
TMC	492	198	0	*	**	***	****

* 5,154 Gallons (Multiple test area usage)
 ** 504 Gallons (Multiple test area usage)
 *** 44 Gallons (Multiple test area usage)
 **** 2551 Gallons (Multiple test area usage)

Test Monitoring Center REG

Attachment #4

Reblends of reference oils 1006 (1006-2) and 1008 (1008-1) have been obtained.

The VIB panel elected not to introduce reference oil 1006-2 into the LTMS.

A total of 10 tests have been reported on reference oil 1008-1 to date. Targets generated and published (see Memo 02-116).

FEI1 Mean 1.95 1008 Mean 1.88

FEI2 Mean 1.30 1008 Mean 1.27

Test Monitoring Center

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Information Letters / Memos

- No Information Letters issued during the period.
- Memo 02-059 was issued July 11, 2002, updating targets for R.O. 538
- Another target update for R.O 538 was issued as memo 02-095, fixing 30 test targets.

Test Monitoring Center

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Attachment #4

LAB VISITS

During this report period the TMC visited five laboratories.

Test Monitoring Center

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Summary

- Severity for FEI1 and FEI2 were severe for this report period.
- FEI1 and FEI2 precision has shown little change when compared to the last report period.
- The percentage of calibrations per starts has decreased slightly this report period.
- The percentage of lost tests per starts has decreased this report period.
- The percentage of statistically rejected tests per starts has increased this report period.
- The percentage of operationally valid tests rejected statistically has increased this report period.

Test Monitoring Center

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Other TMC Items BC Blend

- Shipment to labs May 2002.
- Evaluation Testing Complete.
- Presentation on results forth coming.

Test Monitoring Center

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Other Oil Issues

- 1006-2, panel does not wish to introduce.
- 539 is available, need to ship to labs and plan to introduce
- 30 test targets published for 538. See memo 02-95
- 1008-1, ten test targets published, see memo 02- 116, updates at 20 and 30 tests.

Test Monitoring Center

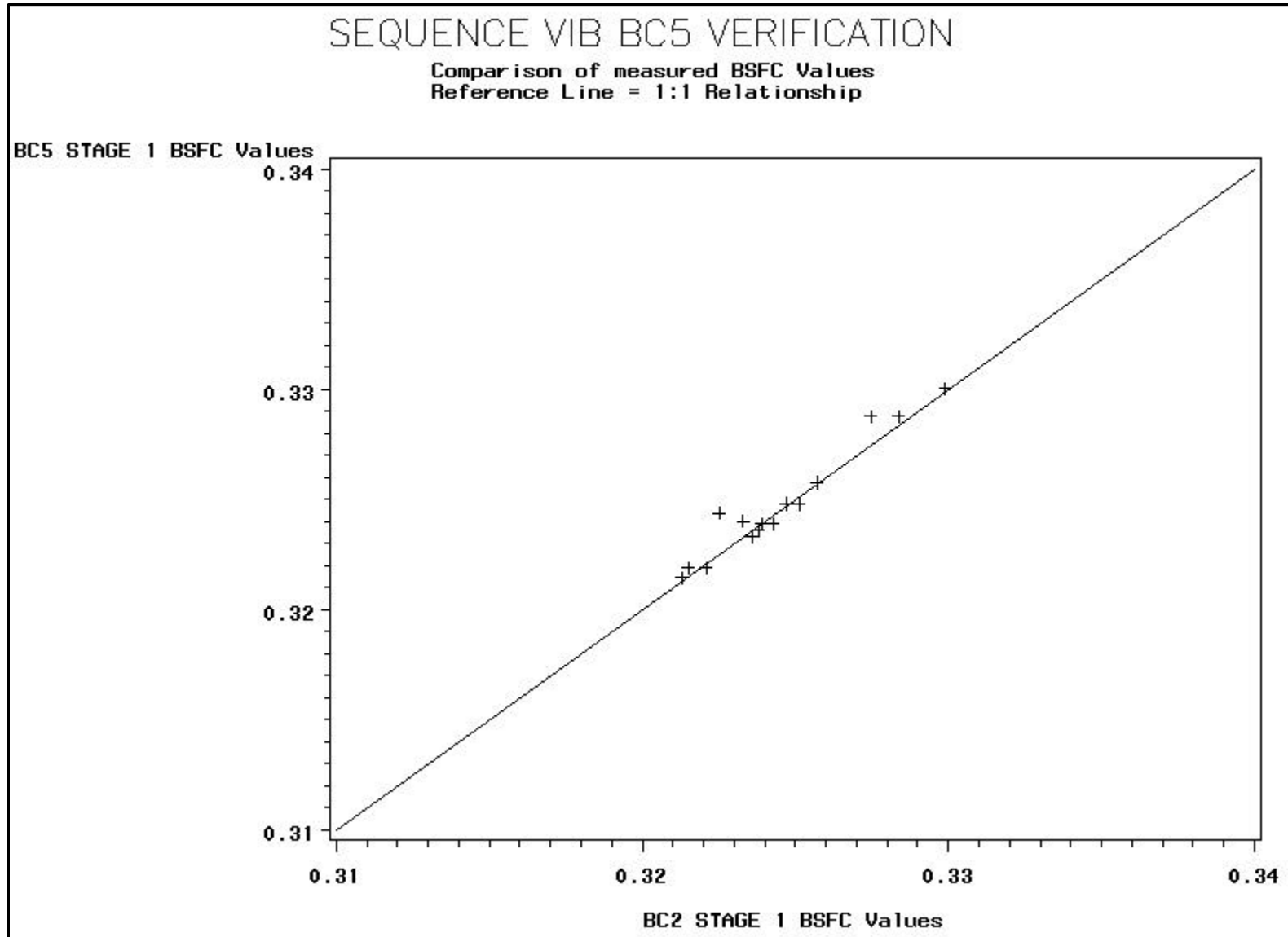
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Other Issues

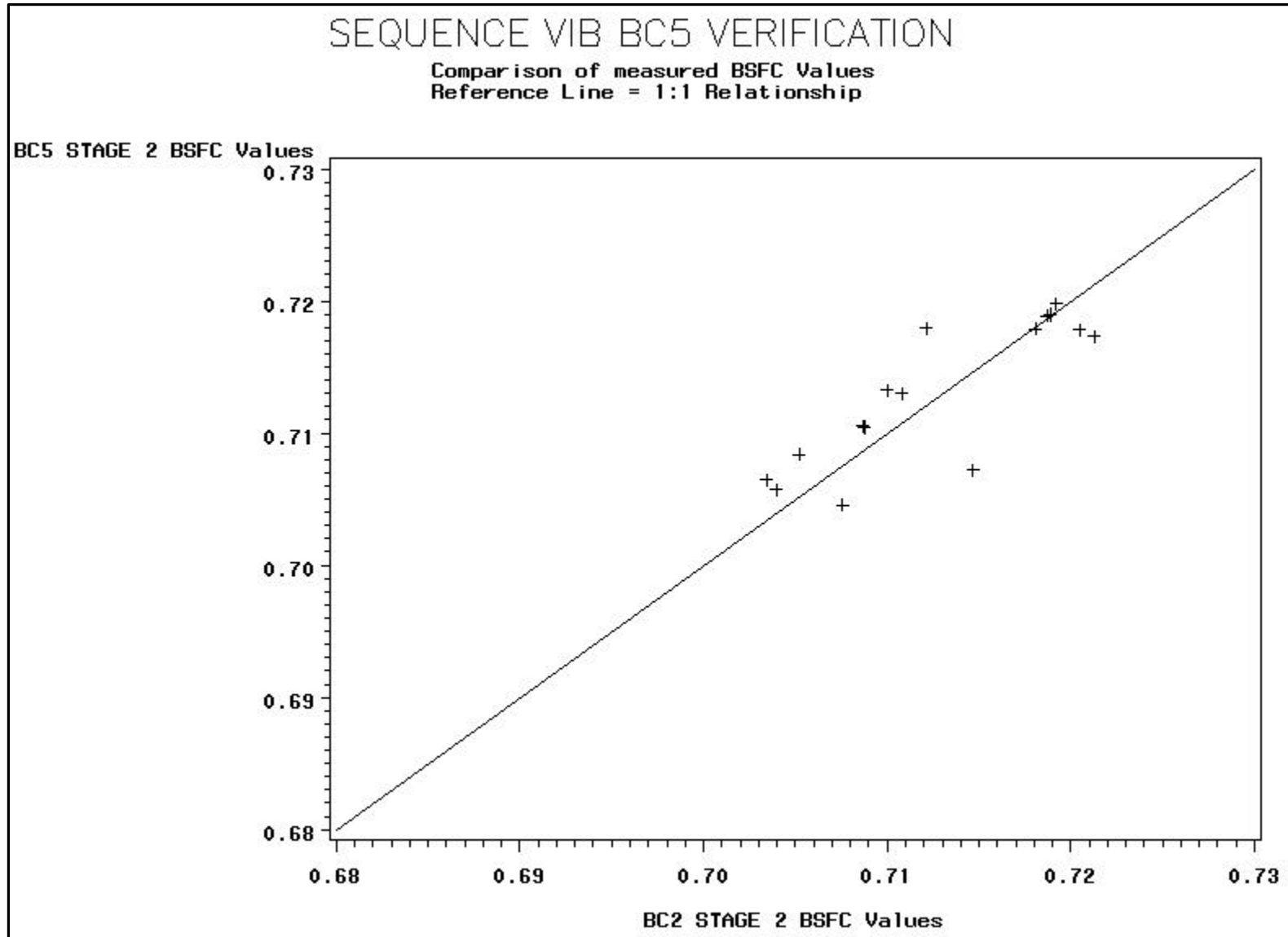
- D6837-02 Should be issued Dec – Jan Time Frame
- Need to issue info letter to bring up to date.
- Also, advised by Editorial, through Lyle Bowman that remedial statements need to be removed from method. Statements such as “flush eyes with water’ and ‘prevent entry into water sources’ in A6. Would like panel approval in advance to do this when standard is issued.

BC5 Approval Results

Attachment #5



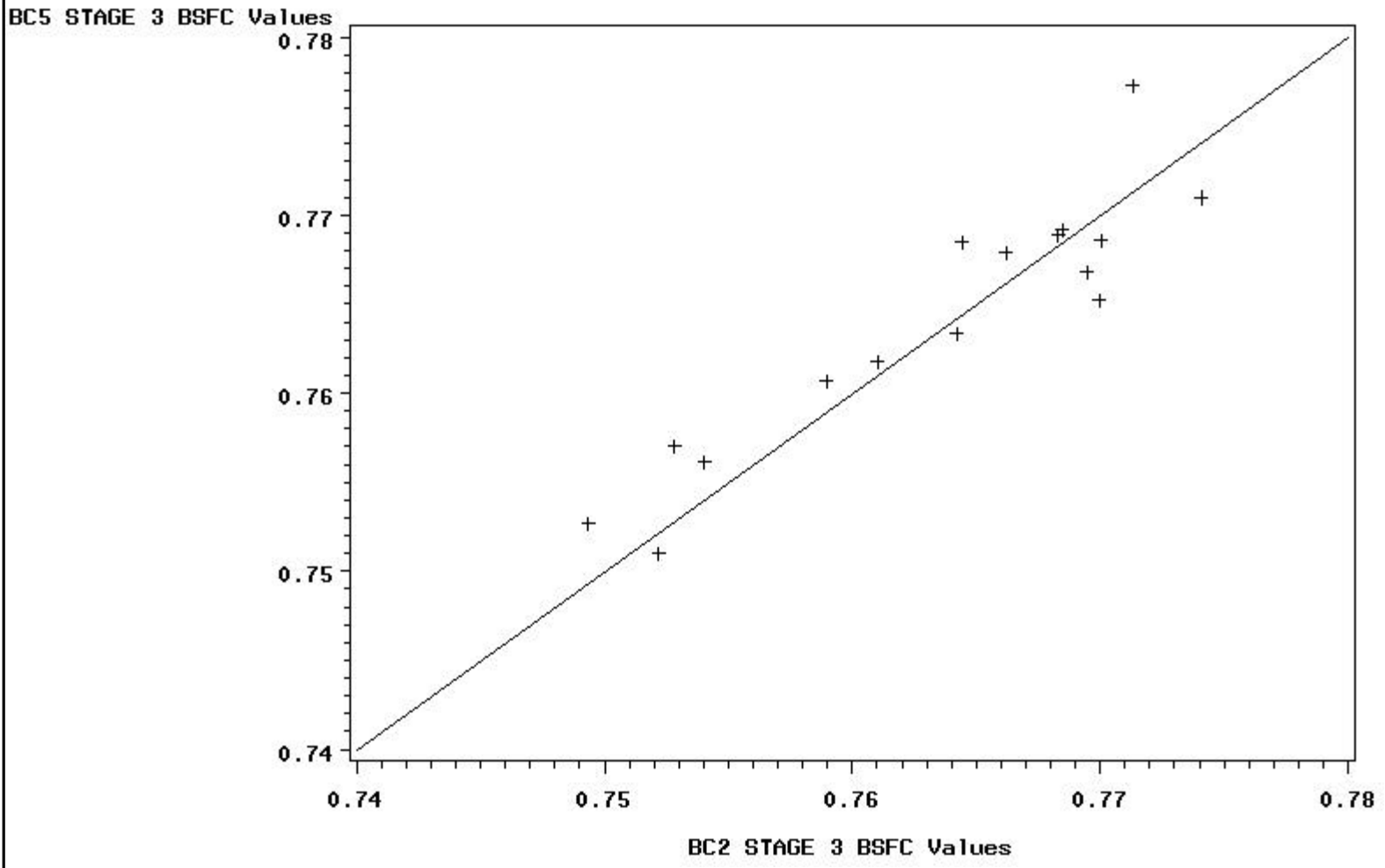
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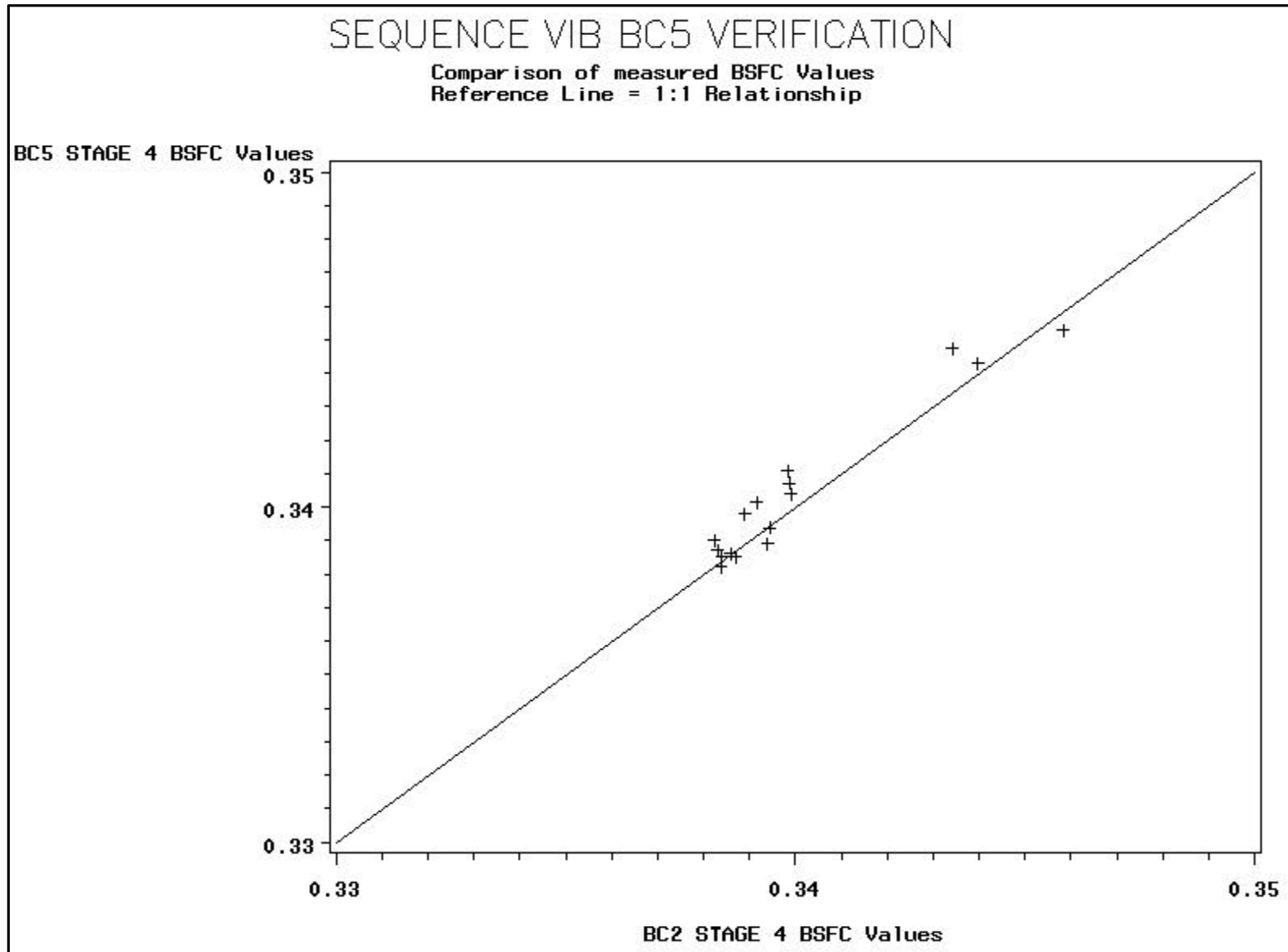
Attachment #5

SEQUENCE VIB BC5 VERIFICATION

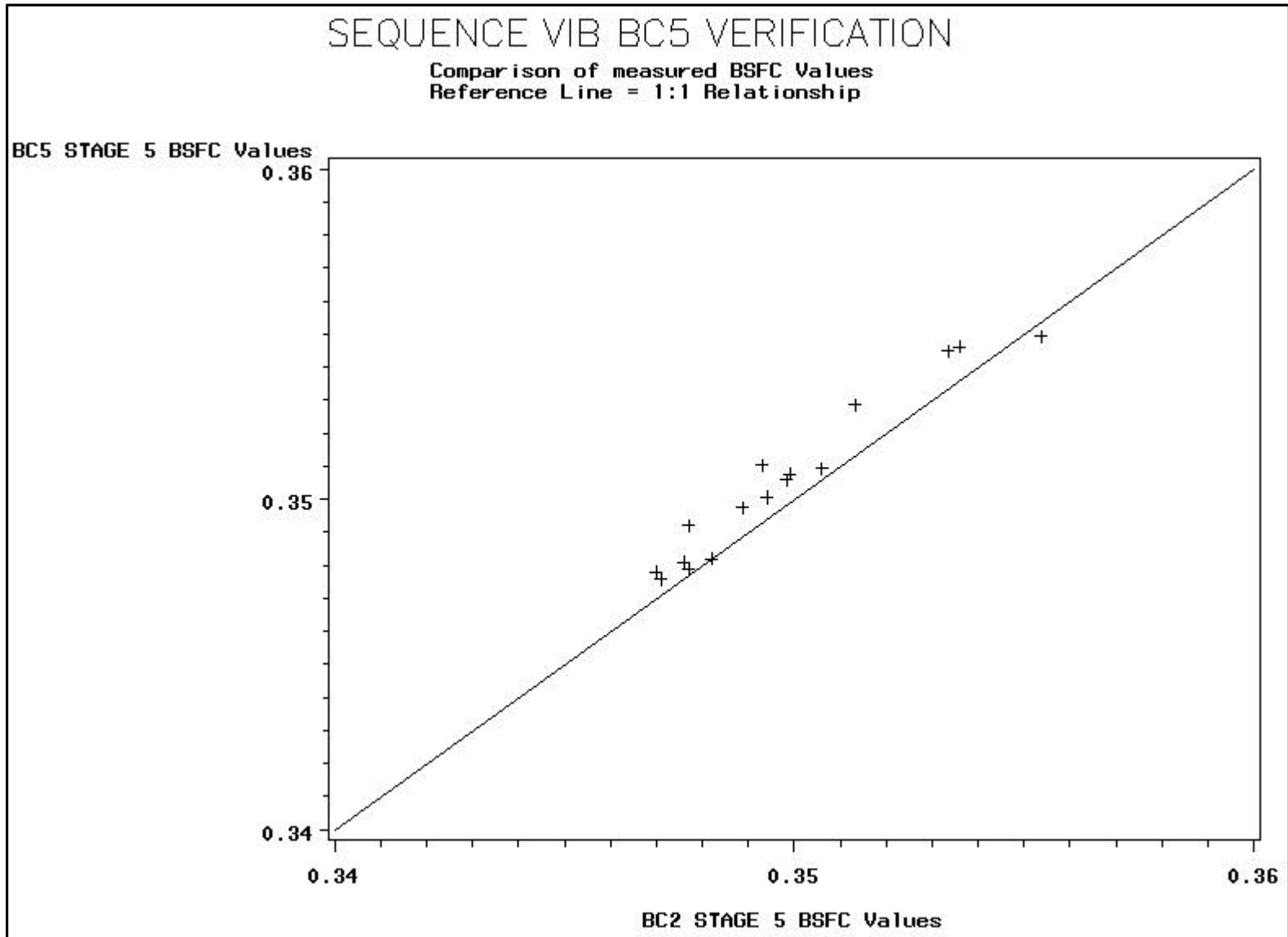
Comparison of measured BSFC Values
Reference Line = 1:1 Relationship



Attachment #5



Attachment #5



Attachment #5

SEQUENCE VIB BC5 VERIFICATION DATA

STAGE 1 BSFC DATA				STAGE 2 BSFC DATA				STAGE 3 BSFC DATA			
Lab	BC2	BC5	BC2 - BC5	Lab	BC2	BC5	BC2 - BC5	Lab	BC2	BC5	BC2 - BC5
G	0.3239	0.3239	0	G	0.71870	0.71890	-0.00020	G	0.77410	0.77710	-0.00300
G	0.3242	0.3239	0.0003	G	0.72050	0.71780	0.00270	G	0.77000	0.76520	0.00480
G	0.3233	0.324	-0.0007	G	0.71890	0.71900	-0.00010	G	0.76620	0.76790	-0.00170
G	0.3238	0.3236	0.0002	G	0.71920	0.71980	-0.00060	G	0.76850	0.76920	-0.00070
G	0.3233	0.324	-0.0007	G	0.72130	0.71730	0.00400	G	0.76830	0.76890	-0.00060
G	0.3236	0.3233	0.0003	G	0.71810	0.71790	0.00020	G	0.76950	0.76680	0.00270
B	0.32253	0.32437	-0.00184	B	0.71213	0.71792	-0.00579	B	0.77132	0.77728	-0.00596
B	0.32208	0.3219	0.00018	B	0.71080	0.71303	-0.00223	B	0.77005	0.76857	0.00148
B	0.3215	0.32187	-0.00037	B	0.70878	0.71048	-0.00170	B	0.76442	0.76847	-0.00405
B	0.3213	0.32143	-0.00013	B	0.70523	0.70840	-0.00317	B	0.76423	0.76337	0.00086
A	0.32747	0.32875	-0.00128	A	0.71467	0.70723	0.00744	A	0.75282	0.75705	-0.00423
A	0.3299	0.33005	-0.00015	A	0.71000	0.71330	-0.00330	A	0.76105	0.76177	-0.00072
A	0.32837	0.32878	-0.00041	A	0.71057	0.70868	0.00189	A	0.75898	0.76067	-0.00169
A	0.32472	0.3284	-0.00368	A	0.70400	0.70573	-0.00173	A	0.75403	0.75612	-0.00209
A	0.3257	0.32577	-0.00007	A	0.70345	0.70645	-0.00300	A	0.74935	0.75268	-0.00333
A	0.32512	0.32477	0.00035	A	0.70758	0.70457	0.00301	A	0.75218	0.75103	0.00115
Average			-0.00050	Average			-0.00016	Average			-0.00107
Std. Dev			0.00104	Std. Dev			0.00332	Std. Dev			0.00280

Attachment #5

				SEQUENCE VIB BC5 VERIFICATION DATA					
STAGE 4 BSFC DATA				STAGE 5 BSFC DATA					
Lab	BC2	BC5	BC2 - BC5	Lab	BC2	BC5	BC2 - BC5		
G	0.3389	0.3398	-0.0009	G	0.34770	0.34920	-0.00150		
G	0.3394	0.3389	0.0005	G	0.34820	0.34820	0.00000		
G	0.3386	0.3386	0	G	0.34760	0.34810	-0.00050		
G	0.3383	0.3387	-0.0004	G	0.34700	0.34780	-0.00080		
G	0.3384	0.3385	-0.0001	G	0.34710	0.34760	-0.00050		
G	0.3387	0.3385	0.0002	G	0.34770	0.34790	-0.00020		
B	0.33985	0.34108	-0.00123	B	0.35133	0.35285	-0.00152		
B	0.33945	0.33938	0.00007	B	0.35060	0.35093	-0.00033		
B	0.33823	0.33902	-0.00079	B	0.34990	0.35077	-0.00087		
B	0.33838	0.33822	0.00016	B	0.34942	0.35007	-0.00065		
A	0.34398	0.34428	-0.0003	A	0.35335	0.35448	-0.00113		
A	0.34585	0.34527	0.00058	A	0.35537	0.35492	0.00045		
A	0.34343	0.34473	-0.0013	A	0.35360	0.35462	-0.00102		
A	0.33987	0.34072	-0.00085	A	0.34983	0.35060	-0.00077		
A	0.33992	0.3404	-0.00048	A	0.34930	0.35102	-0.00172		
A	0.33917	0.34015	-0.00098	A	0.34887	0.34975	-0.00088		
	Average		-0.00036		Average		-0.00075		
	Std. Dev		0.00060		Std. Dev		0.00058		

VIB Paired Comparison BC2 and BC5

Variable	Mean	s	T value	Pr > t
Stage 1	-0.000269	0.000614	-1.75	0.1002
Stage 2	-0.000398	0.003302	-0.48	0.6371
Stage 3	-0.000686	0.002933	-0.94	0.3642
Stage 4	-0.000364	0.000597	-2.44	0.0278
Stage 5	-0.000746	0.00575	-5.19	0.0001

TMC Analysis

- TMC estimated the average difference between BC-2 and BC-5 (BC-2 minus BC-5) as -0.0005.
- This analysis did show significant stand effects, but further investigation indicated that the stand effects are primarily present in stage 3.

TMC Analysis (cont.)

- BC-2 versus BC-3 (BC-2 minus BC-3) -0.0003
- BC-2 versus BC-4 (BC-2 minus BC-4) +0.0003
- BC-2 versus BC-5 (BC-2 minus BC-5)
-0.0005

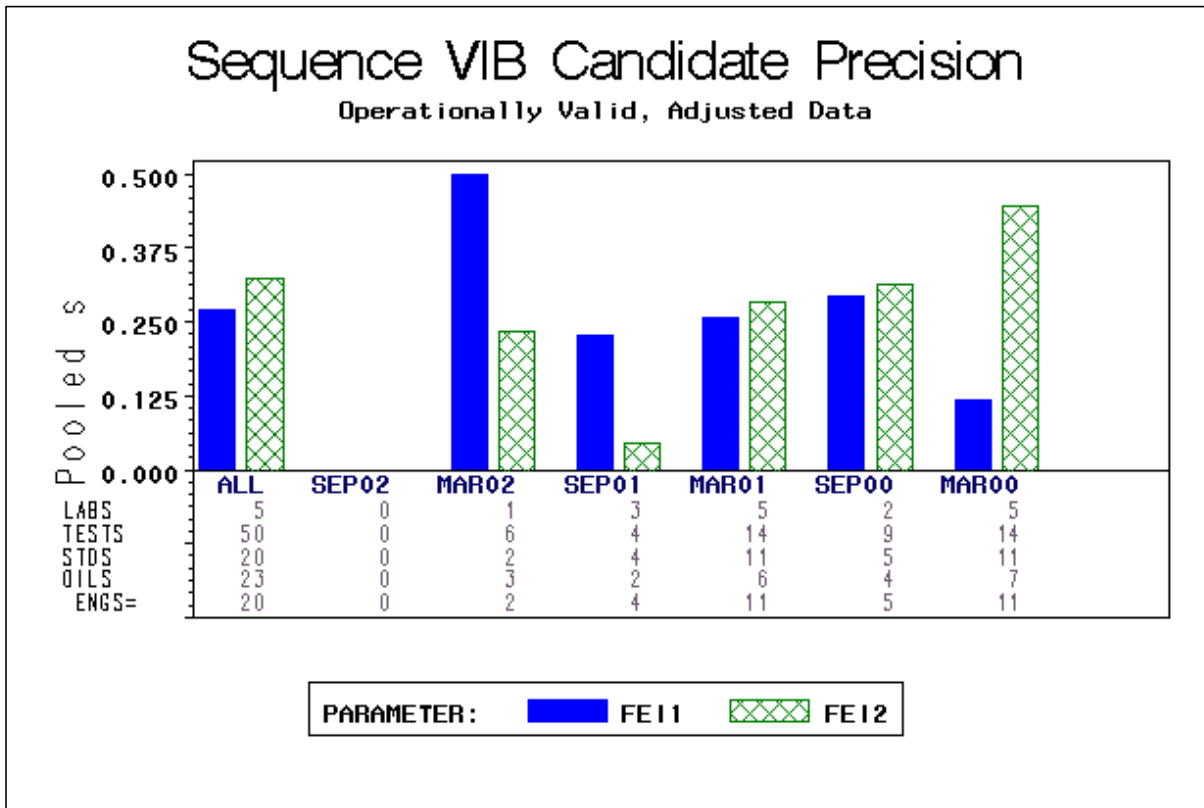
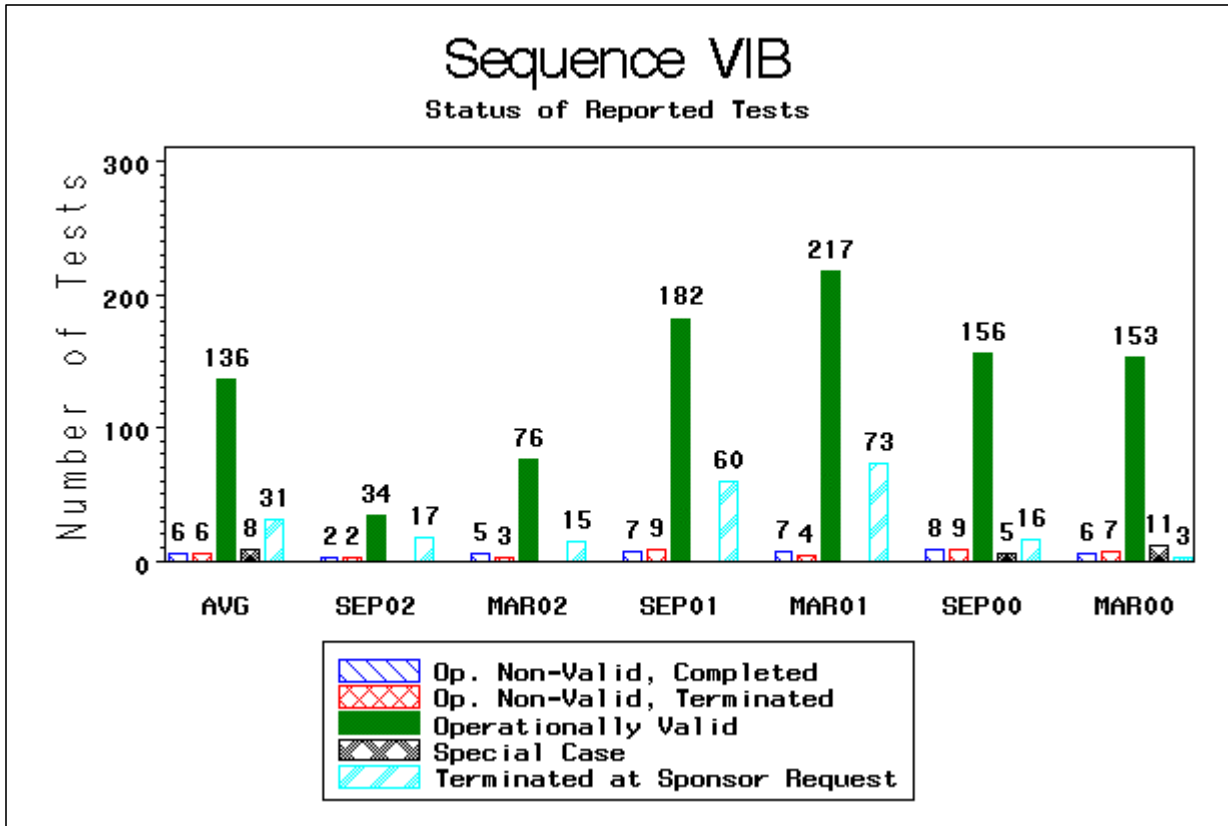
Blend slightly less fuel efficient than BC-2, but not out of line with what we have seen with previous blends.

Attachment #6

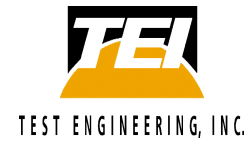
RSI Sequence VIB Semi-Annual Report
Six-Month Period Ending September 30, 2002

STATUS OF REPORTED TESTS		
STATUS	N	PERCENT
Operationally Non-Valid, Terminated	2	3.6%
Terminated at Sponsor Request	17	30.9%
Operationally Non-Valid, Completed	2	3.6%
Operationally Valid	34	61.8%
<i>Total Reported Tests</i>	<i>55</i>	<i>100.0%</i>
CAUSES FOR LOST TESTS		
		N
Oil Consumption	2	
Support Equipment Problems	1	
Oil Contamination	1	
Sponsor Request	17	

SEQUENCE VIB PRECISION		
COMPONENTS OF REPLICATED DATA BASE	N	
Number of Tests	No Replicate Data for this Report Period	



VIA/VIB Meeting
November 12, 2002
CPD Report

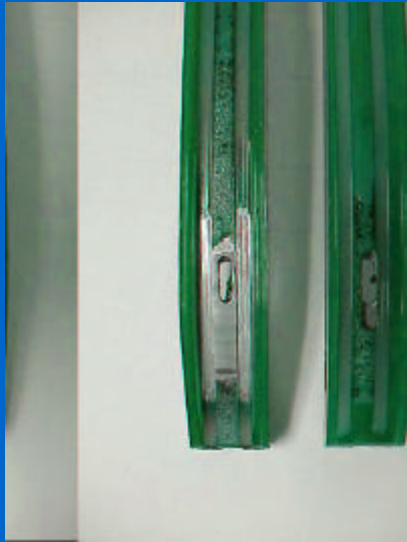


- 40 Engines Built on August 5, 2002
- Engine sequence numbers from 369 - 409
- Terry Tait from Ford 4.6/5.4/6.8L Cam Drive Systems Components B, V Engine Engineering
- Flash casting on Crankshafts
- Simtest Oil Pressure average 47.3 PSI
- TMC reviewed and approved data

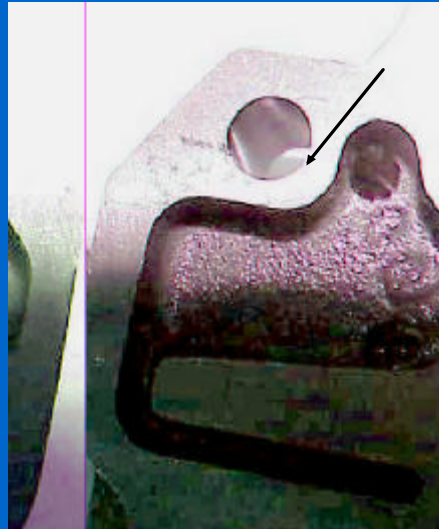


VIB Cam Chain Tensioner Arms

Engine 57, 325 total hours
R07166088



Squirt hole was clear



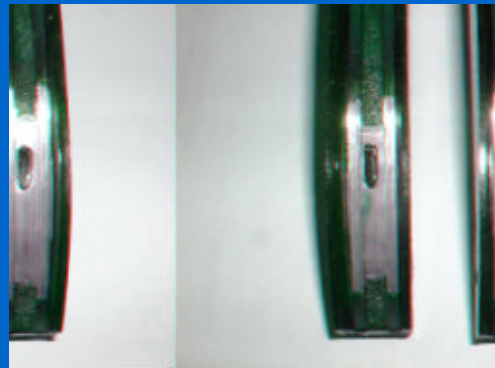
VIB Cam Chain Tensioner Arms

Both were "replacement arms"

Engine 47, 2866 total hours
R0072320



Engine 48, 3924 total hours
R0707322





VIB Cam Chain Tensioner Arms

Engine 42, 1747 total hours
R0072315



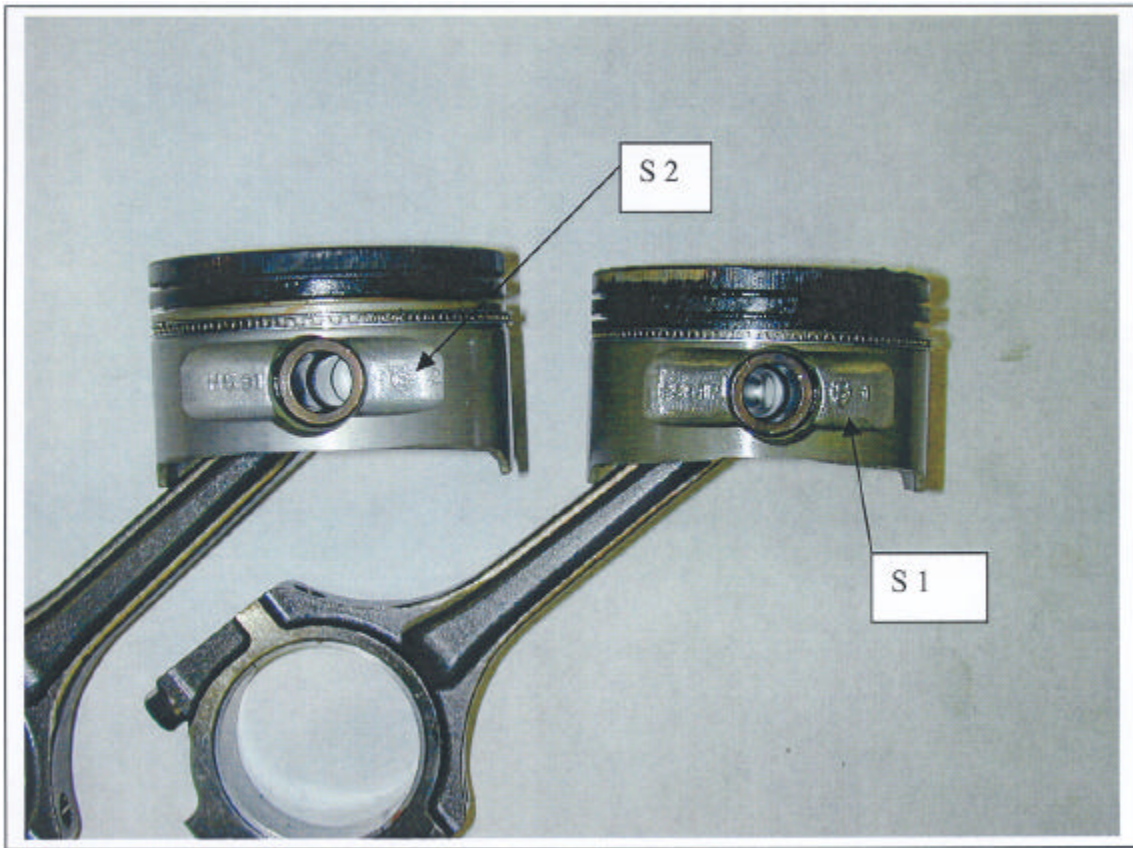
Engine 51, 1004 total hours
R07072998



High Blowby on July 2002 Engines

- Engine 57, RO7166088, 34.3 L/min after 200hrs breakin.
 - 0.023 Ring gaps and deep top ring groove pistons could be the cause.
- Engine RO7166079, 31.6 L/min at 1st hr, 21.6 L/min after 35hrs breakin.
- Typical blowby, at SwRI is 10 L/min.

Attachment # 9 – Piston Photograph



ASTM Sequence VIA / VIB Surveillance Panel Scope and Objectives

Scope:

The Sequence VIB Surveillance Panel is responsible for the surveillance and continued improvement of the Sequence VIB test documented in ASTM Standard DXXXX (currently Draft #5 Procedure) as each is 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 test operation test monitoring and test validation will be accomplished through continual communication with the Test Sponsor, ASTM Test Monitoring Center, Central Parts Distributor, ASTM B.O!, and the Passenger Car Engine Oil Classification Panel. Actions to improve the process will be recommended when deemed appropriate based on input from the aforementioned. The panel will review development and correlation of updated test procedures with previous test procedures. This process will provide the best possible test procedure for evaluating automotive lubricant performance with respect to the lubricant's ability to provide fuel economy benefits.

Objectives	Target Date
Define new hardware for future VIB testing (After current supply is exhausted)	05/03
Identify/ Incorporate 10W 30 into VIB LTMS	11/02
Complete and approve Batch 5 BC & BCFHD	05/02
If available introduce GF-3 oil into VIB LTMS	05/02
	11/02