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

May 28, 2002

Reply to: Frank Farber
ASTM Test Monitoring Center
6555 Penn Avenue
Pittsburgh, PA 15206
Phone: 412-365-1031
Fax: 412-365-1047
Email: fmf@astmtmc.cmu.edu

Unapproved Minutes of the May 16, 2002 Joint Sequence IIIF Surveillance Panel Meeting held in Detroit, Michigan

The meeting was called to order at 8:30 am by Stand-In Chairman Daryl Baumgartner. A membership list was circulated for members & guests to sign in. It's shown in Attachment 1.

<u>Agenda Review</u>
Ben Weber is Action & Motion recorder.

The Agenda was accepted as attached (Attachment 2).

<u>Membership Changes</u>
Tim Caudill will replace Carl Stephens.

Jim Carter replaces Gil Clark.

Meeting Minute Status
March 5, 2002 Approved.

Action Item Review from March 5, 2002 Meeting

Action #1: TMC and Bill Nahumck will make changes to the IIIFHD Report forms and Procedure. A new IIIFHD report packet was issued. This tasked was completed.

Action Item #2: O&H will investigate the oil and temp control system including the OHT3F-081-1 one-piece oil filter adapter fitting. Get sump temperature data from OHT 7 tests. O&H panel will be making a recommendation this meeting to improve the system. This task is completed.

Action Item # 3: O&H Panel will continue deriving solutions to the variations in the Kundinger Fluid Control Racks. This task is on-going and will be addressed by the O& H panel over the next ASTM period.

TMC Sequence IIIF Semi-Annual Report
See TMC ftp site for report : ftp://astmtmc.cmu.edu/docs/gas/sequenceiii/semiannualreports/

Average delta/s results are as follows:

Industry Severity Summary			
Parameter	Average Δ/s	Pooled standard deviation (degrees of freedom)	Average Δ, in reported units
PVIS	0.122	0.024 (df=17)	24.9% Viscosity Increase[1]
APV	0.006	0.229 (df=17)	0.001 merits
WPD	-0.578	0.637 (df=17)	-0.37 merits
PV60	0.610	0.198 (df=17)	37.9 % Viscosity Increase

[1] At the GF-3 Pass Limit of 275% Viscosity Increase

In general Viscosity Increase Severity and Precision for most of the period were in control. There were no alarms this period.

Average Weighted Piston Deposit indicated several severe severity alarms around January however, has since returned to in control conditions. Investigations indicate that this severe trend coincided with the introduction of 1006-2. Initial targets on 1006-2 will need to be updated when 10 tests are received. Precision was in control during the entire period. The TMC analysis of piston deposit data reference data indicated that lab differences exists for Groove 3 ratings across all labs and oils. The TMC was tasked with reviewing recent rating workshop data to determine if rater differences could explain these differences. Aside from this observation the reference oil data did not show any evidence of problems. However, the TMC will continue to monitor the situation.

APV was in is control for both severity and precision this report period.

Two failing reference oil tests for the period failed due to severe SACLW performance. No explanation for the severe SACLW results has been found at this time. Investigations into Sequence IIIF wear performance are ongoing but to date no solutions to the problem have been found.

A review of Percent Viscosity Increase at 60 Hours shows that the industry has been consistently mild of target on this parameter since it's introduction into the test. The TMC suggested a review of the targets was in order. The Surveillance Panel did not take any action on this item. This parameter is not a pass-fail parameter for the Sequence IIIF test and is only used for the Sequence IIIFHD test.

Reference oil 1006 targets have been updated at 35 data points.
Reference oil 433-1 targets were updated at 11 tests.
Reference oil 1006-2 targets were introduced based on 5 tests.

Reference oil 1008-1 will need to be introduced. The surveillance panel approved the introduction of 1008-1 using existing 1008 targets. Reference Oil 1008-1 targets will be established once five operationally valid tests are received. Motioned by Dwight Bowden/Michael Kasimirsky. Approved 13-0-0 (approve/oppose/waive)

Reference oil 1009 (new category 5W30 reference oil) introduction will be based upon TMC's ability to schedule simultaneous calibration tests. No formal vote taken – panel consensus.

QI Deviations: There was one QI Deviation for the period. There have been 22 deviations from the QI Limits since the test was introduced in June of 2000. The lone QI Deviation written this period was due to a negative QI result on engine load. The test experienced a few short periods of erratic control that resulted in a final QI value of –0.041 for the test. No cause for the periods of erratic control was found in the laboratory's investigation of the problem. The TMC's opinion of this test was that the operational conditions of this test did not deviate enough from the expected norm to cause it to be considered invalid. If this test were used to recalculate U & L values for this parameter, in all likelihood this test would result in the same U & L limits after the new limits were rounded according to past practice. However, the laboratory was urged to strive to improve it's control capabilities so that this problem did not recur in the future.

The TMC reported no hardware changes were made this period.

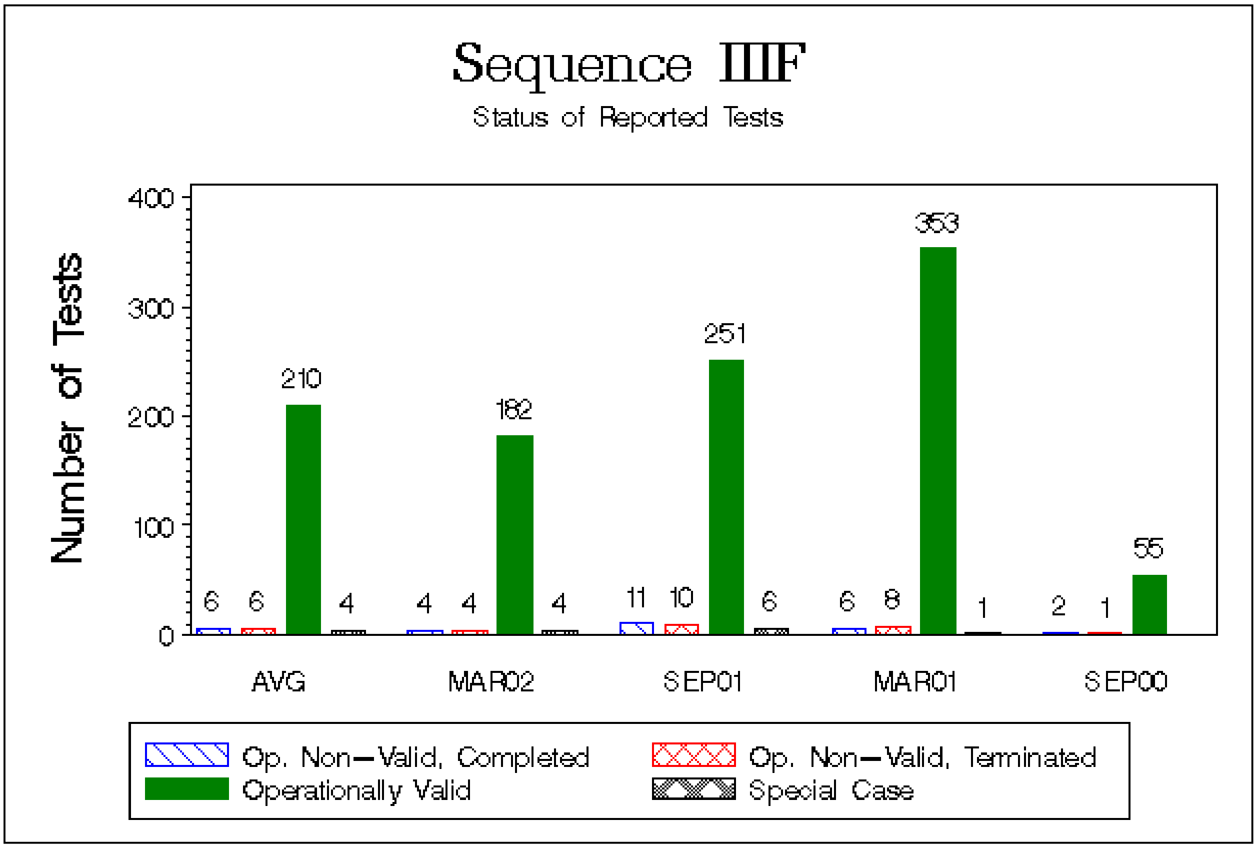
<u>LDRTF Report</u>
Scott Parke of the TMC has been tasked with leading the Light-Duty Rating Task Force. Because of the concern over severe Sequence IIIF WPD results the panel agreed to have a specific Sequence IIIF workshop prior to running the Sequence IIIG matrix. However, because of the aggressive schedule of starting the IIIG matrix the panel felt that having a workshop during the October timeframe may be more realistic. Under Sequence IIIG the panel agreed that a rater teleconference call should be conducted to address IIIG rating issues.

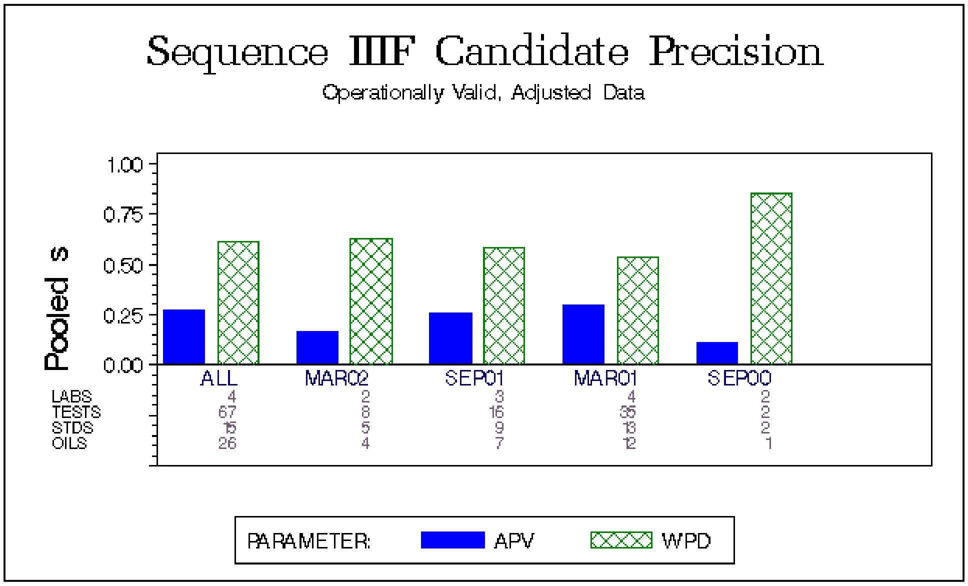
RSI Report

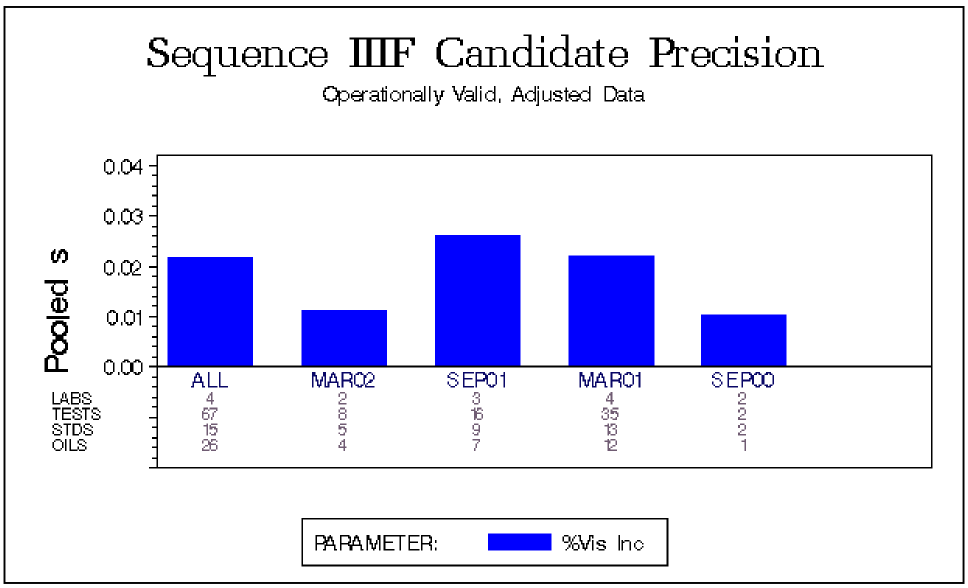
RSI Sequence IIIF Semi-Annual Report
Six-Month Period Ending March 31, 2002

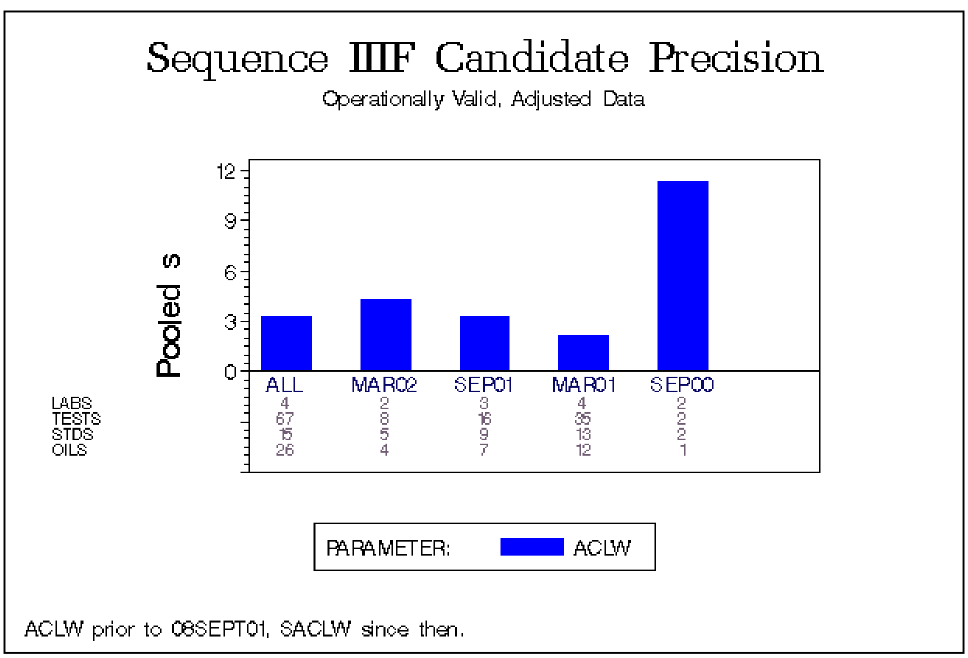
STATUS OF REPORTED TESTS		
STATUS	**N**	**PERCENT**
Operationally Non-Valid, Terminated	4	2.1%
Operationally Non-Valid, Completed	4	2.1%
Operationally Valid	182	93.8%
Special Case	4	2.1%
Total Reported Tests	*194*	*100.0%*
CAUSES FOR LOST TESTS	N	
Oil Consumption	1	
Control Problems	6	
Sponsor Request	1	

SEQUENCE IIIF PRECISION		
COMPONENTS OF REPLICATED DATA BASE	N	
Number of Tests	8	
Number of Oils	4	
Number of Labs	2	
Number of Stands	5	
Number of Severity Adjusted Avg C+L Wear Tests	0	
Number of Severity Adjusted Avg Piston Varnish Tests	0	
Number of Severity Adjusted % Vis Inc. Tests	0	
Number of Severity Adjusted Weighted Piston Deposit Tests	4	
VARIABLE	Pooled s	R
Percent Vis Increase, Adjusted	0.011	0.031
Avg Piston Varnish, Adjusted	0.162	0.454
Weighted Piston Deposits, Adjusted	0.630	1.763
Avg Cam + Lifter Wear, Adjusted	4.309	12.065
Percent Vis Increase, Non-Adjusted	0.011	0.031
Avg Piston Varnish, Non-Adjusted	0.162	0.454
Weighted Piston Deposits, Non-Adjusted	0.622	1.741
Avg Cam + Lifter Wear, Non-Adjusted	4.309	12.065


Sequence IIIF
Status of Reported Tests
Number of Tests
400
300
200
100
0
6
6
210
4
4
4
182
4
11
10
251
6
6
8
353
1
2
1
55
AVG
MAR02
SEP01
MAR01
SEP00
Op. Non-Valid, Completed
Op. Non-Valid, Terminated
Operationally Valid
Special Case


Sequence IIIF Candidate Precision
Operationally Valid, Adjusted Data
Pooled s
1.00
0.75
0.50
0.25
0.00
ALL
MAR02
SEP01
MAR01
SEP00
LABS 4 2 3 4 2
TESTS 67 8 16 35 2
STDS 15 5 9 13 2
OILS 26 4 7 12 1
PARAMETER: APV WPD


Sequence IIIF Candidate Precision
Operationally Valid, Adjusted Data
Pooled s
0.04
0.03
0.02
0.01
0.00
ALL
MAR02
SEP01
MAR01
SEP00
LABS 4 2 3 4 2
TESTS 67 8 16 35 2
STDS 15 5 9 13 2
OILS 26 4 7 12 1
PARAMETER: %Vis Inc


Sequence IIIF Candidate Precision
Operationally Valid, Adjusted Data
Pooled s
12
9
6
3
0
ALL
MAR02
SEP01
MAR01
SEP00
LABS 4 2 3 4 2
TESTS 67 8 16 35 2
STDS 15 5 9 13 2
OILS 26 4 7 12 1
PARAMETER: ACLW
ACLW prior to 08SEPT01, SACLW since then.

Fuel Supplier Report

Jim Carter presented fuel batch analysis sheets for Detroit and Channelview distribution terminals for EEE fuel batches (Attachments 3 and 4, respectively). Note, that batches shipped from Channelview and Detroit are initially blended together at Channelview. EPA will be tentatively lowering and adding a window of ~25-35 ppm on sulfur soon. This will change the product for EPA emissions work. So supply of Sequence IIIF fuel (Product Code HF003) from Detroit will cease around September 2002 because of limited tankage and only will be available from Channelview. The product for Sequence IIIF testing will still be Product Code HF003. Detroit inventory 263,292, Channelview inventory 50,932. Report was accepted.

CPD Report

The following information was distributed by Dwight Bowden as the CPD report:

1.) Rejections from 02/28/2002 to 05/01/2002:

Oil Coolers
Oxidation, 8 Pieces
Material replaced

2.) Technical Memos Issued

None for period
(Last - Technical Memo 6, Dated 11/20/01)

3.) Batch Code Changes

None for period

GM Motorsport Report

The following information was distributed by Sid Clark.

GM Raceshop :

Sequence Test Part Inventory

Part #	Description	Qty. in Stock	Comments
24502241	Front Cover	60	
24502168	Crankshaft	198	
24501696	Connecting Rod	627	5000 pcs. On order
24502260	Cylinder Head	369	1188 castings in stock
24502286	Engine Block	67	186 castings on order

- Rejected materials
  - –1 Crankshaft for nicks, corrosion
- Returned materials
  - –4 Cylinder heads for failed exhaust seats
    - •2 run in IIIG testing
    - •2 run in IIIF testing (double length)
      - –Processing dates;
        - »Jan. Oct. 2001 Jan. Feb. 2002

Cylinder Head Returns Investigative actions:

- 2 Heads returned to Schwartz for Inspection
- 1 Head sent to Federal Mogul for inspection
- Raceshop directed to perform 100% visual inspection on all outgoing materials

To date;
Schwartz machine is still installing seats with 0.002" – 0.004" interference fit
Federal Mogul confirms no changes in materials or processing
Inspected heads show no signs of cracked seat pockets or other distress outside of high valve seat recession (intake and exhaust)

Cylinder heads will be 100% visual inspected by GM Race Shop prior to shipment to catch potential exhaust valve seat problems.

Report Accepted.

<u>O & H Report</u>

Pat Lang presented Attachment 5.

The O & H panel recommended using a modified oil filter adapter that utilizes a circular orifice(0.5" ID) as opposed to the current hex-shaped orifice. This part removes an internal restriction in the oil flow to the oil filter compared to the previous part. The data shows that this part does not affect oil temperature and also shows that the oil pressure delta has been reduced with this part.

Pat then presented the revised external oil bypass system that the O & H panel has been developing to eliminate the oil temperature control problems laboratories have been experiencing when the filter goes into bypass mode. This revised system moves the existing bypass valve to a new, external part that is downstream of the oil cooler. This allows the stand to maintain oil temperature control even if the oil filter is plugged or the system is operating in bypass mode.

Motion (Pat Lang/Sid Clark) Introduce the OHT External Oil Bypass System and modified Oil Filter Adapter into the Sequence IIIF test. Install a thermocouple in the external system to monitor the temperature differentials to detect bypass operation. No reporting of this additional temperature data is required. If bypass is detected, a note in the comments section of the test report shall be made. This change does not affect the current guidelines for oil cooler or oil filter replacement during a test. This change must be in place by 6/1/02. The motion passed 13-0-0.

Labs are to monitor the use of the system and report back to the O & H panel by August 1 on standardization suggestions during filter bypass conditions.

Pat presented results from the cylinder head round robin where six labs participated. The evaluation was done a three different deflections where the highest difference on any single load was 12.5 lbf and the average difference was 7 lbf. Based upon this review the O & H panel felt there were no laboratory head calibration problems. However, the TMC was requested to review this process during the next round of lab visits.

Other O &H Topics:

Flush cart modifications to prevent casting sand recirculation will be completed by August 15, 2002.

Fluid control rack specification documentation will be completed June 15, 2002.

One item of note was the use of Type 1 and Type 2 solvents in the Sequence IIIF test. More work on this issue needs to be completed.

Clarifications to the cylinder honing “zeroing” procedure in the assembly manual is expected to be completed by June 15, 2002.

Batch Concept/Hardware recommendations still need to be implemented.

Investigations into random exhaust valve seat failures/valve recessions problems will be followed-up next report period.

O&H Report accepted.

<u>Status Of Wear Investigation</u>

Three negatives have been received on the Sequence IIIF Information Letter ballot (Attachments 6-8) concerning the phosphate camshaft. Gordon Farnsworth stated that he agreed with Bob Olree’s second comment on the ballot that the phosphate camshaft appears to eliminate wear discrimination on the available data. The available data was on the heavier Sequence IIIG valve springs. Charlie Leverett motioned that the information letter be withdrawn. Vote was: 12-1-0.

<u>Sequence IIIG Development Update</u>

Sid Clark presented attachment 9. Concern over tempering of the camshaft in the engine was discussed. GM noted that their investigation of several metallurgical studies on several camshafts indicates that there is no known metallurgy issues that would suggest a camshaft problem.

Sid then reviewed some of the IIIG vs IIIF diiferences:

Sequence IIIG has the following:

Phosphate Camshaft
205 lb valve springs
Piston Ring Gapping Strategy (0.025" Top, 0.042 2nd)
OHT external oil filter bypass
OHT 0.5" ID oil filter adapter
Spark Plugs (possibly colder range)
100 hour test length
20 hour oil levels
Coolant temp 115 deg c
Oil temp 150 deg c
Inlet Air temp 35 deg c
Torque 250 Nm

GM recommends releasing the Sequence IIIG for preliminary testing.

Bob Olree presented an alternative piston deposit weighting factor scheme (Attachment 10).

Crown Land=	0.2
Lands (2&3) =	0.2
Grooves1-3=	0.1
Undercrown=	0.1.

These weighting factors weight the upper part of the piston heavier than the current Sequence IIIF factors and include the crown land that is currently not part of the WPD. Piston Skirt Varnish will remain a separate item. The panel did not vote to modify the current weighting factors. This was left as an unresolved item.

GM also stated that it believes that 100 hours is appropriate for oxidation severity and recommends that this length be used for the Sequence IIIG (Attachment 11). However, to be certain that the *IIIG* is twice as severe as the IIIF, GM felt that the test length may require 120 test hours. Further evaluation of this issue will occur after the matrix is run.

Update from GF-4 Matrix Design Task Force Report

Don Marn's presentation is Attachment 12. Don is the GF-4 Matrix Design Task Force leader. John Zalar (TMC) will be the matrix project manager.

Scope: Is to select matrix formulations and determine a testing plan.
Objective: Design Test Matrix, determine test precision and LTMS limits. BOI and VGRA may also be addressed.

The surveillance panel will need to set pre-matrix requirements for matrix test labs and offer some feedback to the Matrix Design Task Force on desired reference oil viscosity grades and number of potential reference oils.

A tentative August 1 matrix start date has been stated. The number of matrix tests needed could be as high as 40 tests depending on oil selection. Proposed matrix design requires 4 tests per stand. Both dependent and independent labs are to be included. Number of tests/oil has not yet been determined.

Don requested feedback from the Sequence III panel on several items from his presentation. The panel feedback is captured on subsequent pages.

The Precision Matrix for ASTM Test Methods

Mike McMillan's presentation is Attachment 13. GM's opinion is that the ASTM matrix should be focused on precision not base oil interchange and viscosity grade read across. GM felt that each stand should run 2 'true reference oils' of which bracket the pass/fail performance limits. The matrix should ideally consist of three oils that bracket each parameter being measured by the test method. GM sees no need to fund and conduct a formal matrix. GM's position is that precision data should be obtained through normal stand calibration.

ACC Template Update

Jennifer Van Mullekom's presentation is Attachment 14. The ACC template will be updated as work progresses.

Sequence IIIG Pre-Matrix Items

TMC was tasked with contacting non-calibrated Sequence IIIF labs that are interested in being part of the IIIG matrix to see if they can meet Sequence IIIG matrix participation requirements. Labs are to communicate to Don Marn (LZ) their intent to be in the matrix and number of stands by June 1. A rater conference call is to be held to review crown land flaking prior to the start of the matrix (GM, TMC and LDRTF are to take the lead on this item).

Sequence IIIG Matrix Participation Requirements

After much discussion the following was agreed upon:

1. GM will pick three oils to demonstrate discrimination on pass/fail parameters by June 1. Note, all oils need not discriminate on all parameters.

2. Matrix labs will need to have been TMC calibrated laboratories prior to running the demonstration oils.

3. By June 30, 2002 the demonstration oils will need to be completed at each matrix lab. It is anticipated that 3 discrimination oils are to be run such that two operationally valid tests are obtained per oil. Motioned by Dwight Bowden. Seconded by Dave Glaenzer. Vote: 12-1-0.

Matrix Design Feedback Items

The panel recommends to the Matrix Design Task Force that a minimum of three oils be chosen for the matrix that could be used as reference oils. These oils should cover two viscosity grades. Motioned approved 12-1-0.

The panel voted on the following Sequence IIIG matrix calibration requirements: The first stand in a lab requires 2 operationally valid *reference oil* tests and is to be in control after the second run. Subsequent stands in a lab only require two operationally valid *reference oil* tests. Stand is calibrated with no alarms after the last matrix test run. Thom Smith motioned. Vote: 3-1-9.

IIIG Development Items

Labs are instructed to save EOT samples for additional post test analysis if needed.

Drain Oil Request

Chris May on behalf of the ASTM Section D02.07C requested Sequence IIIF/IIIG EOT drain oil samples. The panel agreed that this was a worthwhile activity and member labs were asked to comply with the request. The chair was going to contact Chris for additional details.

Data Dictionary Review

Charlie Leverett requested that the Sequence IIIFHD report packet be modified to remove lifter designations from report forms. Motioned by Charlie. Approved by consensus.

Also the TMC was requested to report severity adjustments for Viscosity Increase to six decimal places to labs after their LTMS review. The request was made to provide compatibility with the current Sequence IIIF data dictionary mnemonic lengths.

ASTM Sequence IIIF Standard

GM and TMC to review latest draft copy and resubmit to facilitator

Review Scope and Objectives

Objectives are below:

Assembly Manual Revision System	November 2002
Fluid Rack System Clarification	June 2002
Issue Draft 5 of IIIF Test Method	Done
Resolution of unexplained IIIF Wear	November 2002
Revise IIIF ASTM Standard	August 2002
Develop Sequence IIIG Test	July 2002
Introduce GF-3 Category Oil	November 2002
Revised Oil Cooling System	Done

New Business

None

Motions & Action Items

Motions & Action Items
Sequence IIIF Surveillance Panel
May 16, 2002

As Recorded at the Meeting by Ben Weber

1. Previous meeting minutes accepted as written.
2. TMC report accepted as presented with the noted precision and severity shifts for some parameters like WPD.
3. Test labs should review the groove piston ratings to see if there is any precision improvements that can be made, or if this measurement is difficult to accurately perform. One suggestion at the meeting concerned cleaning of the pistons. Dual ratings have been taking place at some of the test labs, and rating differences have not been a problem.
4. [Dwight B & Mike K] 1008-1 will be brought into the system using the older 1008 targets during normal calibration testing. Targets will be reviewed after 5 tests, then updated at 10, 20 & 30. Passed unanimously.
5. TMC will check into the possibility of coordinating the introduction of 1009 during a given time period that is acceptable to all test labs.
6. The group agreed that the next light-duty rating workshop should be held during the October timeframe . It was left open for later discussion about having a workshop before the next scheduled fall workshop. Scott Parke of the TMC will coordinate these future workshops for both heavy- and light-duty ratings.

7. The RSI report was accepted as presented.
8. The fuel supplier report was accepted as presented. By September 2002 EEE HF003 fuel for the IIIF, which will now be different than the new EPA fuel in terms of sulfur limits (approx. 25 – 35 ppm for the EPA version), will all come from their Houston location in Channelview, Texas. The fuel supplier will review sulfur levels from previous batches over the last few years to see where the sulfur maximum has been and possibly determine a specification or range for EEE HF003. Most of the sulfur levels have been around 10-15 ppm for the EEE HF003 fuel.
9. CPD OHT report was accepted as presented.
10. CPD GM Motorsports report was accepted as presented. GM will continue to investigate the valve seat recession problems.
11. [Pat L & Sid Clark] Accept the OHT external oil bypass system in conjunction with the 0.500" oil filter adapter and specified thermocouple for use in the IIIF test. Place a note in the comments section of the test report when the bypass occurs and at what test hours. Use of this system does not change the current guidelines outlined in the IIIF procedure for changing the oil filter and cooler during a test. Effective June 1, 2002. Passed unanimously.
12. Labs will experiment with the external oil bypass system and report back to the O&H panel about standardization on what to do when you go into bypass by August 2002.
13. TMC will review the head calibration data and technique during their next lab visits.
14. The test labs need to notify the O&H chair on what type of solvent specification they are using. Bob Rumford expressed interest in helping the O&H chair with this task.
15. [Charlie L & Dwight B] The Sequence III surveillance panel recommends that the Information Letter concerning the use of the MnP coating in IIIF testing be withdrawn. The vote was 12-0-1.
16. The SP decided that IIIG lab visits and a IIIG engine build workshop is not required at this time due to the very similar nature of the IIIG to the IIIF test method.
17. IIIG WPD ratings should be done using the current method and a new method proposed by GM listed below. There is some concern about chipping of the thin carbon on the crown land. It was suggested that the raters get together and discuss GM's proposal and any other IIIG rating concerns via teleconference mentioned below.
    - Crown land at 0.2
    - 2nd land at 0.2
    - 3rd land at 0.2
    - 1st groove at 0.1
    - 2nd groove at 0.1
    - 3rd Groove at 0.1
    - Under-crown at 0.1
18. The SP is interested in seeing as much IIIG development data as possible like individual cam lobe wear data, etc. It was decided to e-mail the membership whatever extra data can be distributed to the SP.
19. [Sid C & Dwight B] The IIIG test sponsor report was accepted as presented with the above items noted.
20. [Dwight B & Dave G] Current labs will need to run one demonstration IIIG test to prove initial performance prior to any formal matrix testing. PerkinElmer and SwRI are exempt from this requirement due to their development work. This demonstration run needs to be completed by June 30, 2002. ILSAC will define the oil by June 1, 2002. The labs are to communicate to Don Marn, chair of the Matrix Design Task Force, by June 1, 2002 their intention to comply with these requirements. The SP will convene once all the data is complete and determine if acceptability has been achieved. Passed unanimously.
21. [Charlie L & Dwight B] The Surveillance Panel recommends to the MDTF that at a minimum, 3 oils will be used and at least two viscosity oils. ILSAC will choose these oils. Passed unanimously.

22. [Thom Smith & Tom Boschart] For calibrated IIIF laboratories, the 2-2 testing protocol will be used in the matrix. The vote was 3 for, 0 against, and 9 waives. This is a passing motion using the simple majority rule for Surveillance Panels.
23. The Memorandum of Agreement will need to be adjusted and reviewed to be in agreement with the decisions made by the Sequence III Surveillance Panel.
24. The SP or Matrix Design Task Force will need to discuss the proper quantity of oils blended to cover the future use of any of these oils as potential reference oils without having to go through a re-blend right after the matrix testing is complete.
25. TMC and GM will expedite the release of the IIIG test method and assembly manual. The target is to have this completed by the first week in June 2002.
26. The TMC will coordinate a IIIG rating teleconference by mid-June 2002.
27. The IIIG test labs will need to continue to measure MRV and CCS on EOT oil samples.
28. The test labs are also requested to send any of their IIIF EOT reference samples to Chris May of ASTM Section D02.07C by June 15, 2002. The sample size needed will be clarified later by Daryl B.
29. IIIF test method still needs to be completed as an ASTM standard.
30. [Charlie L & Dwight B] Remove the lifter designations from the IIIFHD test report. Passed unanimously.
31. [Charlie L & Dwight B] The TMC will start using 6 decimal places for the viscosity increase severity adjustment on their LTMS calibration sheets. Passed unanimously.

A motion for adjournment was made and accepted at 4:30 pm.

Attachment 1
Page 1
Reference

ASTM SEQUENCE IIIF LIST

May 16, 2002 **Detroit, Michigan**

NAME / ADDRESS	PHONE / FAX / E-MAIL		SIGNATURE
Ed Altman Ethyl Petroleum Additives, Inc. P.O. Box 2158 Richmond, VA 23218-2158 USA	804-788-5279 804-788-6358 ed_altman@ethyl.com	[ ] IIIF SURV PANEL [x] IIIF MAILING LIST [x] O&H SUBPANEL [ ] O&H Mailing List	Present (signed)
Beto Araiza Test Engineering, Inc. 12718 Cimarron Path #102 San Antonio, TX 78249 USA	210-690-1958 210-690-1959 baraiza@~~testeng.com~~ TEI-Net. Com	[x] IIIF SURV PANEL [ ] IIIF MAILING LIST [x] O&H SUBPANEL [ ] O&H Mailing List	Present (signed)
Zack Bishop Oronite Global Technology 4502 Centerview Drive Suite 210 San Antonio, TX 78228 USA	210-731-5605 210-731-5699 zrbi@chevron.com DROP FROM LIST. T.F.	[ ] IIIF SURV PANEL [x] IIIF MAILING LIST [ ] O&H SUBPANEL [x] O&H Mailing List	Present ______
Dwight H. Bowden OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 USA	440-354-7007 440-354-7080 dhbowden@ohtech.com	[x] IIIF SURV PANEL [ ] IIIF MAILING LIST [x] O&H SUBPANEL [ ] O&H Mailing List	Present (signed)
Donald Bryant The Lubrizol Corporation 28400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2159 440-943-9004 debr@lubrizol.com	[ ] IIIF SURV PANEL [x] IIIF MAILING LIST [ ] O&H SUBPANEL [x] O&H Mailing List	Present ______

Attachment	1
Page	2
Reference	

ASTM SEQUENCE IIIF LIST

May 16, 2002 **Detroit, Michigan**

NAME / ADDRESS	PHONE / FAX / E-MAIL		SIGNATURE
Don Burnett ChevronPhillips Chemical Compan Chevron Tower 1301 McKinney Street Suite 2130 Houston, TX 77010-3030 USA	713-289-4859 713-289-4865 burnede@cpchem.com	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present
William A. Buscher, Jr. Texaco Inc. P.O. Box 112 Hopewell Jct, NY 12533 USA	845-897-8069 845-897-8069 buschwa@aol.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☐ O&H SUBPANEL ☑ O&H Mailing List	Present
James Carter Hialtermann Products 3520 Okemos Rd. Suite #6-176 Okemos, MI USA	517-347-3021 517-347-1024 JECarter@dow.com	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present J. E. Carter
Timothy L. Caudill Ashland Oil Inc. 22nd & Front Streets Ashland, KY 41101 USA	606-329-5708 606-329-3009 tlcaudill@ashland.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present Timothy Caudill
Sid Clark GM Powertrain General Motors Corporation Mail Code 480-106-160 30500 Mound Rd. Warren, MI 48090-9055 USA	810-986-1929 810-986-2094 sidney.l.clark@gm.com Test Sponsor Rep	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present Sid

Attachment	1
Page	3
Reference	

ASTM SEQUENCE IIIF LIST

May 16, 2002 Detroit, Michigan

NAME / ADDRESS	PHONE / FAX / E-MAIL		SIGNATURE
Francis R. Duffey DaimlerChrysler 800 Chrysler Road CIMS 482-00-13 Auburn Hills, MI 48236-2757 USA	248-576-7476 248-576-7490 fd13@daimlerchrysler.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present
Frank Farber ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 USA	412-365-1030 412-365-1047 fmf@astmtmc.cmu.edu	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present [signature]
Gordon R. Farnsworth Infineum P.O. Box 735 Linden, NJ 07036 USA	908-474-3351 908-474-3637 gordon.farnsworth@infineum.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☐ O&H SUBPANEL ☑ O&H Mailing List	Present [signature]
Frank Fernandez ~~Oronite Global Technology~~ Chevron Oronite 4502 Centerview Drive Suite 210 San Antonio, TX 78228 USA	210-731-5603 210-731-5699 ~~ffer@chevron.com~~ ffer@chevrontexaco.com PCEOCP Chair	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present [signature]
David L. Glaenzer Ethyl Petroleum Additives, Inc. 500 Spring Street P.O. Box 2158 Richmond, VA 23218-2158 USA	804-788-5214 804-788-6358 dave_glaenzer@ethyl.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☐ O&H SUBPANEL ☑ O&H Mailing List	Present [signature]

Attachment 1
Page 4
Reference

ASTM SEQUENCE IIIF LIST

May 16, 2002 Detroit, Michigan

NAME / ADDRESS	PHONE / FAX / E-MAIL		SIGNATURE
Larry Hamilton The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2326 440-347-4096 ldha@lubrizol.com	☐ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present
Barry J. Jecewski Ford Motor Company 21500 Oakwood Boulevard POEE Building, MD #34 P.O. Box 2053 Dearborn, MI 48121-2053 USA	313-594-6943 303-845-0613 bjecewsk@ford.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present
Michael T. Kasimirsky ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 USA	412-365-1033 412-365-1047 mtk@astmtmc.cmu.cdu	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present
Brian Kundinger Kundinger Controls 1771 Harmon Road Auburn Hills, MI 48326 USA	248-391-6100 248-391-6900 bkundinger@kundnger.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present
Patrick Lai Imperial Oil Limited 453 Christina Street Research Department P.O. Box 3022 Sarnia, Ontario N7T7MI CANADA	519-339-5611 519-339-5866 patrick.k.lai@esso.com	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present

Attachment	1
Page	5
Reference	

ASTM SEQUENCE IIIF LIST

May 16, 2002 Detroit, Michigan

NAME / ADDRESS	PHONE / FAX / E-MAIL		SIGNATURE
Patrick Lang Southwest Research Institute 6220 Culebra Road P.O. Box 28510 San Antonio, TX 78228 USA	210-522-2820 210-684-7523 plang@swri.edu O&H Subpanel Chairman	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present [signature]
Charlie Leverett PerkinElmer Automotive Research, 5404 Bandera Road San Antonio, TX 78238 USA	210-647-9422 210-523-4607 charlie.leverett@perkinelmer.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present [signature]
Vince Livoti Ciba Specialty Chemicals 540 White Plains Road P.O. Box 2005 Tarrytown, NY 10591-9005 USA	914-785-4494 914-785-4249 vincent.livoti@cibasc.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present
Mike McMillan GM R&D Center Building 1-6 Chemical & Environmental Science 12 Mile & Mound Roads Warren, MI 48090-9057 USA	810-986-1935 810-986-2094 micheal.l.mcmillan@gm.com	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☑ O&H Mailing List	Present
John Moffa Castrol International Technology Centre Whitchurch Reading, RG8 7QR ENGLAND	00441189765263 00441189~~841131~~ 841095 ~~John_Moffa@burmahcastrol.com~~ Moffaj@castrol.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present [signature]

Attachment	1
Page	6
Reference	

ASTM SEQUENCE IIIF LIST

May 16, 2002 Detroit, Michigan

NAME / ADDRESS	PHONE / FAX / E-MAIL		SIGNATURE
Alfredo Montez Chevron Oronite 4502 Centerview Drive #210 San Antonio, TX 78228 USA	210-731-5604 210-731-5694 AMMN@chevron.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present AM
Mark Mosher ExxonMobil ~~Mobil Technology Company~~ Billingsport Road Paulsboro, NJ 08066 USA	856-224-2132 856-224-3628 mark.r.mosher@exxonmobil.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present MRM
William M. Nahumck The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2596 440-347-4096 wmn@lubrizol.com Surveillance Panel Chair	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☑ O&H SUBPANEL ☐ O&H Mailing List	Present Rep. by [signature]
Rick Oliver Registration Services Inc. 2805 Beverly Drive Flower Mound, TX 75022 USA	972-724-2136 210-341-4038 crickoliver@attbi.com	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present CW
Robert Olree GM Powertrain 30500 Mound Road m/c 480-106-160 Warren, MI 48090-9055 USA	810-947-0069 810-986-2094 robert.olree@gm.com	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☑ O&H Mailing List	Present

Attachment	1
Page	7
Reference	

ASTM SEQUENCE IIIF LIST

May 16, 2002 Detroit, Michigan

NAME / ADDRESS	PHONE / FAX / E-MAIL		SIGNATURE
Robert H. Rumford Specified Fuels & Chemicals, LLC 1201South Sheldon Road Channelview, TX 77530-0429 USA	281-457-2768 281-457-1469 rhrumford@~~specified1.com~~ dow.com	☑ IIIF SURV PANEL ☐ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present
Jim Rutherford Chevron 100 Chevron Way Richmond, CA 94802 USA	510-242-3410 510-242-1930 jaru@chevron.com	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present
Philip R. Scinto The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 USA	440-347-2161 440-347-9031 prs@lubrizol.com	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present
Ben Weber Southwest Research Institute 6220 Culebra Road P.O. Box 28510 San Antonio, TX 78228 USA	210-522-5911 210-684-7530 bweber@swri.edu Sub-Committee D02.B01 Chair	☐ IIIF SURV PANEL ☑ IIIF MAILING LIST ☐ O&H SUBPANEL ☐ O&H Mailing List	Present

SEQUENCE IIIF SURVEILLANCE PANEL MEETING
GUEST LIST
May 16, 2002
Detroit, Michigan

Attachment 1
Page 8
Reference

NAME/ADDRESS	PHONE/FAX/EMAIL	SIGNATURE
John Shipinski TOYOTA 1588 Woodridge	734-995-3754/5971 shipinski@ttc-usa.com	
Jennifer Van Mullekom The Lubrizol Corp 29400 Lakeland Blvd Wickliffe OH 44092	(440) 347 2603 F: (440) 347 2014	jwhf@lubrizol.com
Tom Boschert ETHYL CORP	248-350-0640 248-350-0020	TOM_BOSCHERT@ETHYL.COM
Tom Smith THE VALVOLINE COMPANY P.O. BOX 14000 LEXINGTON KY 40509-1400	859 357-2766 859 357-2176 trsmith@ashland.com	
CLIFF VENIER PENNZOIL-QUAKER STATE P.O. BOX 7569 THE WOODLANDS, TX 77387-7569	281-363-8060 281-363-8002 CLIFFORD.VENIER@PZLQS.com	Cliff
Alex Boffa Oronite 100 Chevron Way Richmond CA 94802	510 242 5220 abof@ChevronTexaco.com	Alex Boffa
Jo Martinez Chevron Oronite Company 100 Chevron Way Richmond, CA 94802	(510) 242 5563 (510) 242 1930 jogm@chevrontexaco.com (Please include me in the email list. Thanks!)	JMartinez

SEQUENCE IIIF SURVEILLANCE PANEL MEETING
GUEST LIST
May 16, 2002
Detroit, Michigan

Page 1
Reference 9

NAME/ADDRESS	PHONE/FAX/EMAIL	SIGNATURE
L. D. Hamilton 29400 Lakeland Blvd Wickliffe OH 44092	440/347-2326	[signature]
B. D. Domonkos The Lubrizol Corp. 29400 Lakeland Blvd. Wickliffe, OH 44092	440 347-2624 bdd@lubrizol.com	[signature] B. D. Domonkos
Bob Olree GM PowerTrain M/C 480-106-160 30500 Mound Rd Warren MI 48090-9055	586-947-0069	[signature]
Vic Kersey Valvoline Ashland KY	(606) 329-5964 (606) 329-3009 FAX VCKERSEY@Ashland.com	[signature]
Jack Kelley Lubrizol Wickliffe, OH 44092	440 347-1638 Jack@lubrizol.com	[signature] J Kelley
Jason H. Bowden OH Technologies, Inc. P.O. Box 5039 Mentor, OH 44061-5039	440-354-7007 440-354-7080 jhbowden@ohtech.com	[signature]

AGENDA
SEQUENCE IIIF SURVEILLANCE PANEL MEETING
Detroit, Michigan
May 16, 2002

Attachment	2
Page	1
Reference	

1. APPOINTMENT OF RECORDER OF ACTIONS/MOTIONS
2. AGENDA REVIEW
3. MEMBERSHIP CHANGES
4. APPROVAL OF MINUTES FROM March 5, 2002
   (Available for viewing at the TMC website)
5. REVIEW OF ACTION ITEMS

SEQUENCE IIIF

1. TMC TEST STATUS UPDATE – MIKE KASIMIRSKY
   - A. Highlights of the LTMS Control Charts
   - B. Introduction of RO1009?
2. RSI REPORT – Rick Oliver
3. FUEL SUPPLIER REPORT
4. CPD SUPPLIER REPORTS
   - A. OHT
   - B. GM MOTORSPORTS
5. O&H SUBPANEL REPORT – PAT LANG
   - A. Change to new OHT oil filter adapter part
   - B. External oil filter adapter bypass
   - C. Cylinder Head RR Review
6. STATUS OF THE WEAR INVESTIGATION
   - A. Ballot Status
7. SEQUENCE IIIG DEVELOPMENT UPDATE – SID CLARK
   - A. Is the test ready for a Precision Matrix?
   - B. Available test results
   - C. IIIG specific test parts/equipment
   - D. Rebuild workshop
   - E. Piston ratings
   - F. Used Oil Requirements
   - G. ACC Template Update - Jennifer Van Mullekom
   - H. Need written procedure
8. OLD BUSINESS
   - A. Review of Scope & Objectives
   - B. Status of ASTM Standard – Sid Clark
9. NEW BUSINESS
   - A. Drain Oil Request from Chris May, Section D02.07C

ADJOURNMENT

Detroit

Attachment	3
Page	1
Reference	

PRODUCT: **EEE Unleaded Gasoline**
PRODUCT CODE: **HF003**

Batch No.:	02D-04	02D-02	01D-24
Tank No.:	106	105	106
Analysis Date:	4/15/2002	2/28/2002	1/3/2002

TEST	METHOD	UNITS	FED Specs		HALTERMANN Specs			RESULTS	RESULTS	RESULTS
			MIN	MAX	MIN	TARGET	MAX			
Distillation - IBP	ASTM D86	°F	75	95	75		95	90	85	85
5%		°F						116	117	120
10%		°F	120	135	120		135	130	130	132
20%		°F						151	149	154
30%		°F						175	172	178
40%		°F						202	198	204
50%		°F	200	230	200		230	221	219	223
60%		°F						232	229	234
70%		°F						241	239	246
80%		°F						258	257	265
90%		°F	305	325	305		325	312	311	320
95%		°F						333	334	341
Distillation - EP		°F		415			415	389	385	399
Recovery		vol %				Report		97.6	98.6	98.0
Residue		vol %				Report		1.0	1.0	1.0
Loss		vol %				Report		1.4	0.4	1.0
Gravity	ASTM D4052	°API	58.7	61.2	58.7		61.2	58.9	59.2	59.4
Density	ASTM D4052	kg/l			0.734		0.744	0.743	0.741	0.741
Reid Vapor Pressure	ASTM D323	psi	8.7	9.2	8.7		9.2	9.1	9.1	9.2
Reid Vapor Pressure	ASTM D5191	psi				Report		9.00	9.10	9.10
Carbon	ASTM D3343	wt fraction				Report		0.8660	0.8650	0.8651
Carbon	ASTM E191	wt fraction				Report		0.8663	0.8648	0.8639
Hydrogen	ASTM E191	wt fraction				Report		0.1322	0.1309	0.1330
Hydrogen/Carbon ratio	ASTM E191	mole/mole				Report		1.818	1.816	1.834
Oxygen	ASTM D4815	wt %					0.05	<0.05	<0.05	<0.05
Sulfur	ASTM D5453	ppm		1000			1000	5	8	11
Sulfur	ASTM D2622	wt%		0.1		Report		<0.001	<0.001	0.0015
Lead	ASTM D3237	g/gal		0.05			0.01	<0.01	<0.01	<0.01
Phosphorous	ASTM D3231	g/gal		0.005			0.005	<0.0008	<0.0008	<0.0008
Composition, aromatics	ASTM D1319	vol %		35.0			35.0	29.7	27.5	28.0
Composition, olefins	ASTM D1319	vol %		10.0			10.0	0.6	1.0	0.6
Composition, saturates	ASTM D1319	vol %				Report		69.7	71.5	71.4
Particulate matter	ASTM D5452	mg/l					1	0.7	0.6	0.6
Oxidation Stability	ASTM D525	minutes			240			>1000	>1000	>1000
Copper Corrosion	ASTM D130						1	1	1	1
Gum content, washed	ASTM D381	mg/100mls					5	1	1	1
Fuel Economy Numerator/C Density	ASTM E191				2401		2441	2436	2429	#REF!
C Factor	ASTM E191					Report		1.0033	0.9983	#REF!
Research Octane Number	ASTM D2699		93.0		96.0			97.8	97.0	96.8
Motor Octane Number	ASTM D2700					Report		88.6	87.6	88.4
Sensitivity			7.5		7.5			9.2	9.4	8.4
Net Heating Value, btu/lb	ASTM D3338	btu/lb				Report		#REF!	#REF!	18490
Net Heating Value, btu/lb	ASTM D240	btu/lb				Report		18485	18452	18350
Color	VISUAL	1.75 ptb				Report				

Channelview

Attachment	4
Page	1
Reference	

PRODUCT: **EEE Unleaded Gasoline**
PRODUCT CODE: **HF003**

Batch No.:	02C-06	02C-05	02C-03
Tank No.:	2012	2012	2012
Analysis Date:	4/18/2002	4/4/2002	2/20/2002

TEST	METHOD	UNITS	FED Specs		HALTERMANN Specs			RESULTS	RESULTS	RESULTS
			MIN	MAX	MIN	TARGET	MAX			
Distillation - IBP	ASTM D86	°F	75	95	75		95	86	89	85
5%		°F						113	113	114
10%		°F	120	135	120		135	127	128	127
20%		°F						148	150	148
30%		°F						173	173	171
40%		°F						201	199	199
50%		°F	200	230	200		230	221	220	220
60%		°F						231	233	230
70%		°F						242	244	240
80%		°F						261	261	259
90%		°F	305	325	305		325	317	315	315
95%		°F						334	334	332
Distillation - EP		°F		415			415	392	393	386
Recovery		vol %				Report		97.5	97.0	98.0
Residue		vol %				Report		1.0	1.0	1.0
Loss		vol %				Report		1.5	2.0	1.0
Gravity	ASTM D4052	°API	58.7	61.2	58.7		61.2	59.1	59.5	59.3
Density	ASTM D4052	kg/l			0.734		0.744	0.742	0.741	0.741
Reid Vapor Pressure	ASTM D323	psi	8.7	9.2	8.7		9.2	9.2	9.2	9.1
Reid Vapor Pressure	ASTM D5191	psi				Report		9.20	9.20	9.10
Carbon	ASTM D3343	wt fraction				Report		0.0000	0.0000	0.8650
Carbon	ASTM E191	wt fraction				Report		0.8629	0.8645	0.8633
Hydrogen	ASTM E191	wt fraction				Report		0.1331	0.1314	0.1316
Hydrogen/Carbon ratio	ASTM E191	mole/mole				Report		1.838	1.811	1.816
Oxygen	ASTM D4815	wt %					0.05	<0.05	<0.05	<0.05
Sulfur	ASTM D5453	ppm		1000			1000	5	5	5
Sulfur	ASTM D2622	wt%		0.1		Report		<0.001	<0.001	<0.001
Lead	ASTM D3237	g/gal		0.05			0.01	<0.01	<0.01	<0.01
Phosphorous	ASTM D3231	g/gal		0.005			0.005	<0.0008	<0.0008	<0.0008
Composition, aromatics	ASTM D1319	vol %		35.0			35.0	30.6	28.6	29.1
Composition, olefins	ASTM D1319	vol %		10.0			10.0	0.4	0.4	0.9
Composition, saturates	ASTM D1319	vol %				Report		69.0	71.0	70.0
Particulate matter	ASTM D5452	mg/l					1	0.5	0.5	0.7
Oxidation Stability	ASTM D525	minutes			240			>1000	>1000	>1000
Copper Corrosion	ASTM D130						1	1	1	1
Gum content, washed	ASTM D381	mg/100mls					5	2	1	1
Fuel Economy Numerator/C Density	ASTM E191				2401		2441	2429	2429	2429
C Factor	ASTM E191					Report		1.0019	0.9983	0.9983
Research Octane Number	ASTM D2699		93.0		96.0			97.8	97.6	97.5
Motor Octane Number	ASTM D2700					Report		88.3	88.6	88.3
Sensitivity			7.5		7.5			9.5	9.0	9.2
Net Heating Value, btu/lb	ASTM D3338	btu/lb				Report		0	0	0
Net Heating Value, btu/lb	ASTM D240	btu/lb				Report		18394	18482	18435
Color	VISUAL	1.75 ptb				Report		Red	Red	Red

Attachment 5
Page 1
Reference

Sequence IIIF O&H Report

Presented by: Patrick Lang
May 16, 2002
Detroit, Michigan

Current Activities

- Modified OHT oil filter adapter w/0.500 inch internal diameter
  - Reduced flow restriction
  - Data supports that adapter does not affect oil temperature.
  - Data shows that the oil pressure delta is reduced.

IIIF O&H Report 5/16/02 2

Current Activities (cont'd)

- External oil filter bypass system
  - Had concerns that the current IIIF/IIIG system could be in partial oil filter bypass and we were not aware of it.
  - OH Technologies designed a system that moves the bypass valve external to allow gauging (temp, press and flow).
  - System uses the stock GM differential pressure valve.

IIIF O&H Report 5/16/02 3

Attachment	5
Page	2
Reference	

External Bypass (cont'd)

- Forces oil to pass through the cooler even if you are in a bypass mode.
- Performance checked on OHT and GM sponsored full length IIIG testing.
- Testing suggests that we are NOT in partial bypass during normal operation.
- System offers the advantage of maintaining temperature control if in a bypass mode.

IIIF O&H Report 5/16/02 4

MOTION

- Accept the OHT external oil bypass system in conjunction with the 0.500" oil filter adapter for use in the IIIF test. Use of this system does not change the current guidelines outlined in the IIIF procedure for changing the oil filter and cooler during a test. Motion is effective June 1, 2002.

IIIF O&H Report 5/16/02 5

Current Activities (cont'd)

- Cylinder head round-robin
  - Six labs participated
  - Assessment done at three different valve deflections
  - The highest difference (max -min) on any single position was 12.5 lbs.
  - The average difference across all positions was 7 lbs.

IIIF O&H Report 5/16/02 6

Attachment	5
Page	3
Reference	

O & H To-Do List

- Recommend changes to the flush cart to help prevent the recirculation of casting sand during the flush; complete by August 15, 2002
- Work with test developer to add the final touches on the documentation for the fluid control rack specification for incorporation into the procedure; complete by June 15, 2002.

IIIF O&H Report 5/16/02 7

To -Do (cont'd)

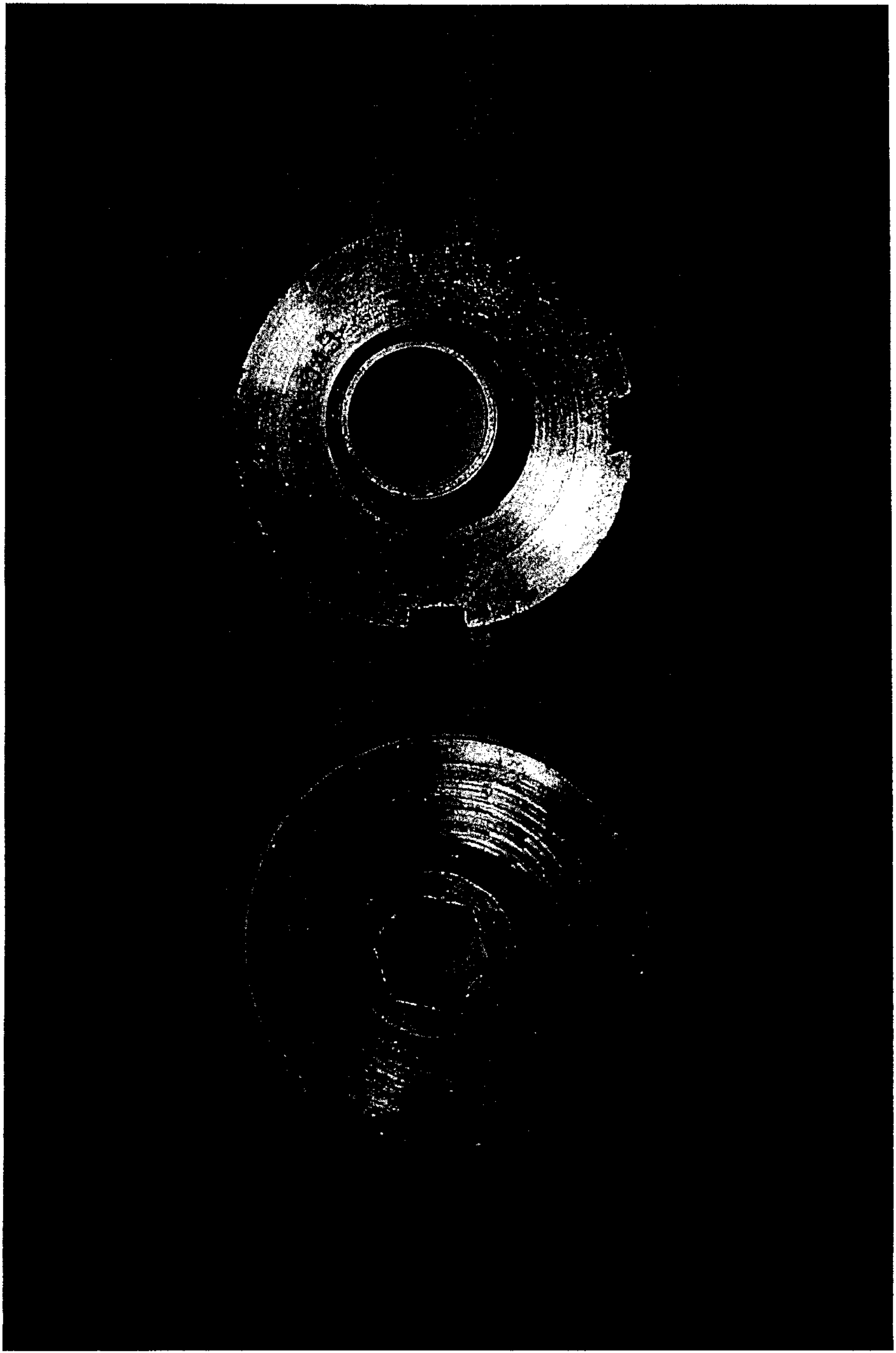
- Clarify honing machine "zeroing" procedure in the assembly manual; complete by June 15, 2002
- Batch Concept/Hardware Control Task Force to generate Info. Letter 60 type document.
- Investigate random exhaust valve seat failures/valve recession.

IIIF O&H Report 5/16/02 8

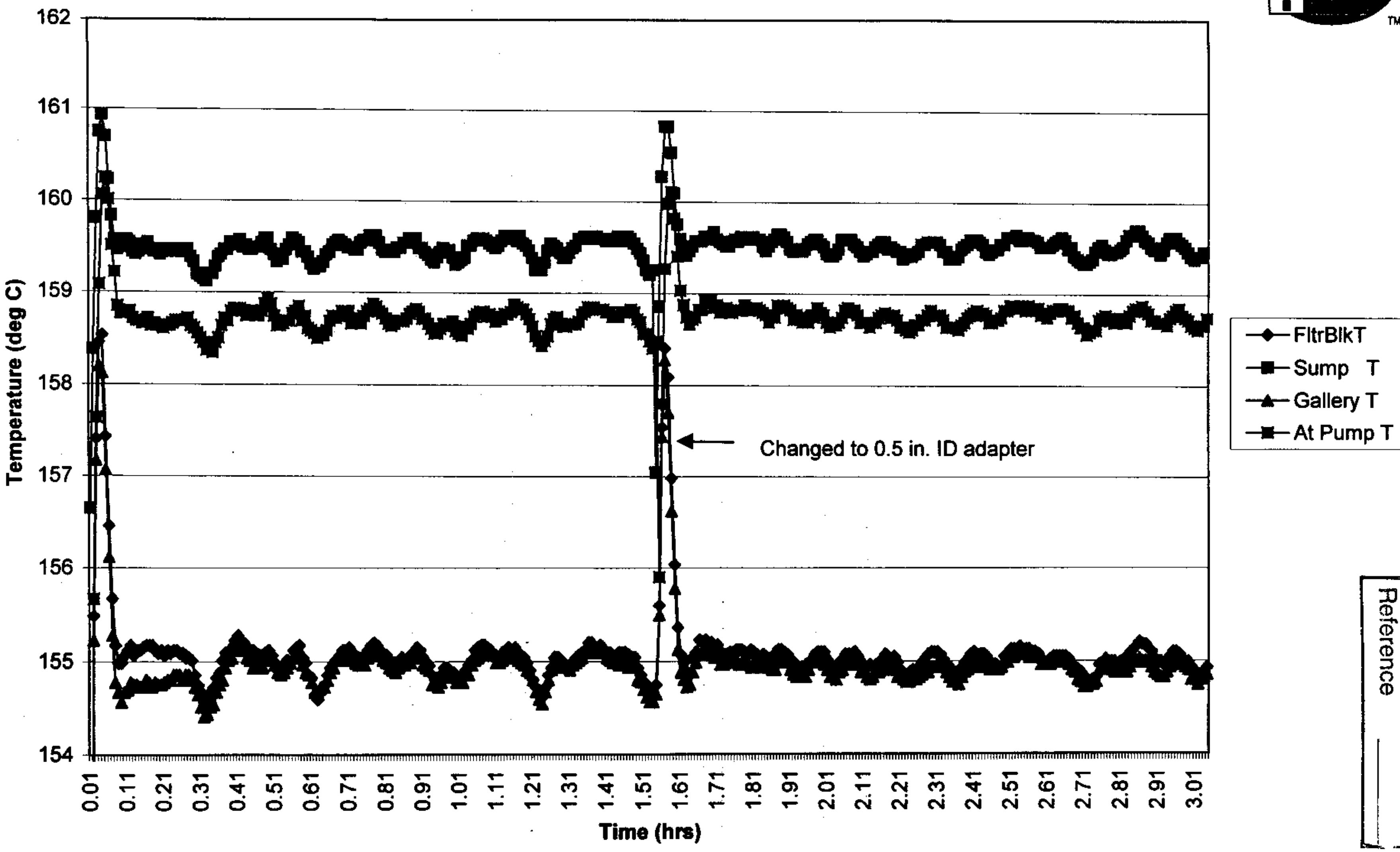
To-Do (cont'd)

- Solvent specification in IIIF procedure
  - Industry looking to settle on one type of solvent that can be used on both gas and diesel testing.
  - Push is towards specifying Type 2, flash point of approximately 140 deg. F
  - IIIF procedure states to use Type 1, flash point of approximately 104 deg. F
  - Need to solicit IIIF labs to determine what is currently being used.

IIIF O&H Report 5/16/02 9



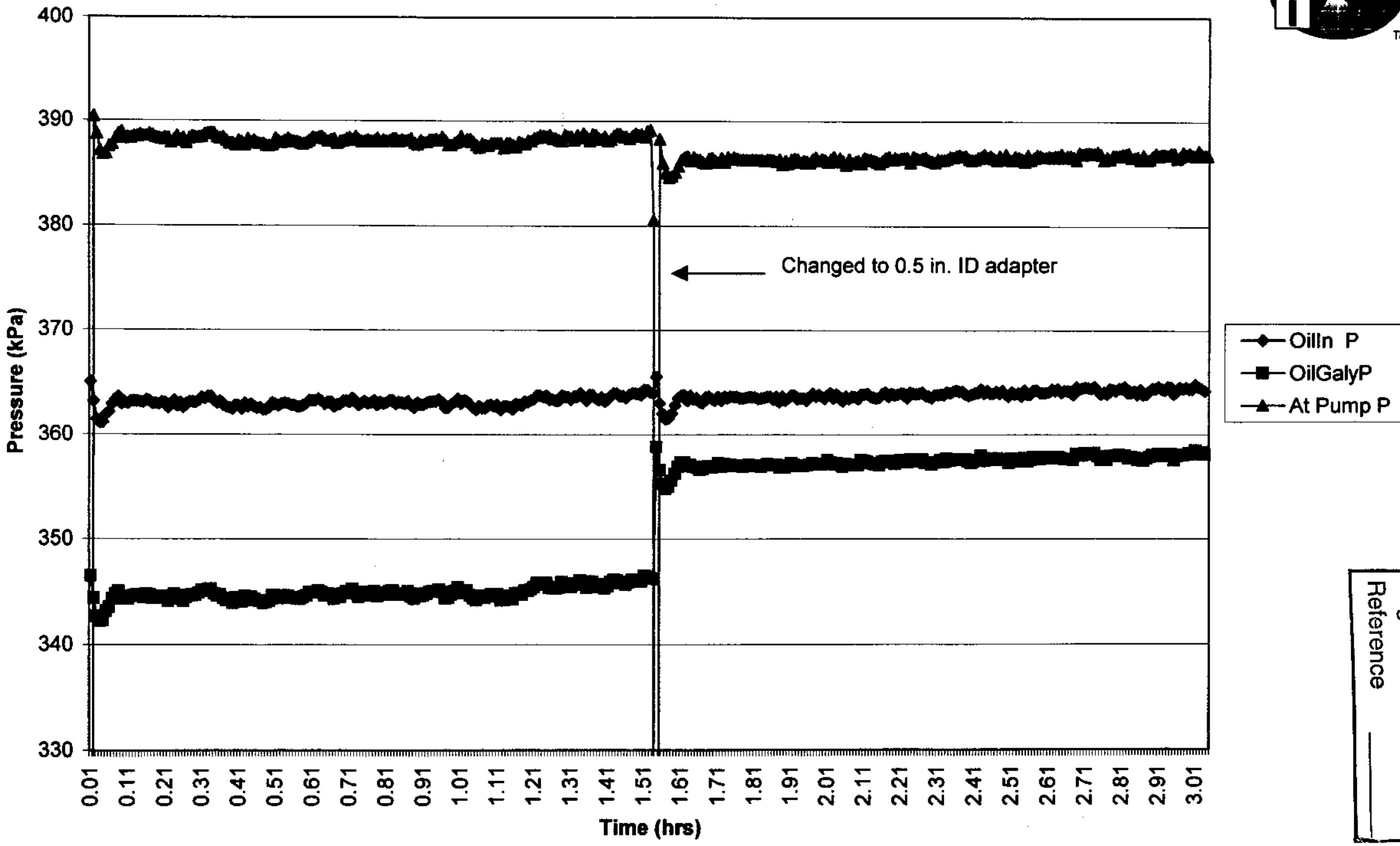
OHT Revised 2-Piece Oil Filter Adapter (0.5 in. ID)



Attachment	5
Page	5
Reference	

PML 4/19/02

OHT Revised 2-Piece Oil Filter Adapter (0.5 in. ID)



Attachment 5
Page 6
Reference

Attachment 5
Page 7
Reference

IIIF Round-Robin Cylinder Head Results

LAB	A	B	C	D	E	F					
Travel	*0.360*	*0.360*	*0.360*	*0.360*	*0.360*	*0.360*	Max	Min	Avg	Std Dev	Max - min
1 IN,	182.0	184.5	182.3	184	178	177.4	184.5	177.4	181.4	3.0	7.1
2 EX.	162.4	165.7	163.3	167	161.9	162.6	167.0	161.9	163.8	2.1	5.1
3 IN.	96.2	97.6	97.2	95	95	96.9	97.6	95.0	96.3	1.1	2.6
4 EX.	133.6	134.9	132.8	136	133.3	132.9	136.0	132.8	133.9	1.3	3.2
5 IN.	186.3	187.0	183.4	190	182.5	180.6	190.0	180.6	185.0	3.4	9.4
6 EX	165.9	171.0	163.0	171	163.5	163	171.0	163.0	166.2	3.8	8.0
										Average	5.9
LAB	A	B	C	D	E	F					
Travel	*0.375*	*0.375*	*0.375*	*0.375*	*0.375*	*0.375*	Max	Min	Avg	Std Dev	Max - min
1 IN,	188.5	190.4	188.3	190	184.7	181.6	190.4	181.6	187.3	3.4	8.8
2 EX.	167.2	171.2	168.3	173	166.9	167.4	173.0	166.9	169.0	2.5	6.1
3 IN.	98.6	100.1	99.5	96	97.7	99.2	100.1	96.0	98.5	1.5	4.1
4 EX.	137.8	139.0	137.1	142	135.8	136.5	142.0	135.8	138.0	2.2	6.2
5 IN.	192.5	193.0	188.0	198	187.9	185.5	198.0	185.5	190.8	4.6	12.5
6 EX	171.1	175.6	168.0	175	170	168	175.6	168.0	171.3	3.3	7.6
										Average	7.6
LAB	A	B	C	D	E	F					
Travel	*0.390*	*0.390*	*0.390*	*0.390*	*0.390*	*0.390*	Max	Min	Avg	Std Dev	Max - min
1 IN,	192.9	195.8	193.5	190	189.7	185.9	195.8	185.9	191.3	3.5	9.9
2 EX.	171.4	176.0	172.7	178	172.9	171.9	178.0	171.4	173.8	2.6	6.6
3 IN.	101.4	102.3	101.9	97	99.9	101.5	102.3	97.0	100.7	2.0	5.3
4 EX.	142.2	143.0	141.0	146	140	140.6	146.0	140.0	142.1	2.2	6.0
5 IN.	197.2	198.7	193.5	190	193.2	190.6	198.7	190.0	193.9	3.5	8.7
6 EX	176.0	181.0	172.9	181	174	172.2	181.0	172.2	176.2	3.9	8.8
										Average	7.6

6

Page 1

Reference

Negative

Date: 4/24/02

Ballot Number: D02.B0 (02-03) Close Date: MAY 08, 2002

Item Number: 002 PROPOSED SEQUENCE IIIF INFORMATION LETTER 02-X TECHNICAL CONTACT: JOHN L ZALAR (412) 365-1005 (REFERENCE Z9452Z)

Member's Name: ROBERT M OLREE

Address: 136 ECKFORD
TROY MI 48098

Phone Nr: 8109470069 Fax Nr: 8109862094

Email Address: Robert.Olree@GM.com

Comment:

My negative is based upon two issues:

1) Only one standard IIIF test was run with a phosphated camshaft on an oil that was expected to generate a failing result. It did not fail.

2) Supporting data run under non-standard test conditions using IIIG valve springs also indicated
that phosphating the camshaft eliminates wear discrimination.

All of the above indicats that phosphating the camshafts eliminates the ability of the Sequence IIIF Test to discriminate wear.

Attachment	7
Page	1
Reference	

Negative

Date:	5/10/02		
Ballot Number:	D02.B0 (02-03)	Close Date:	MAY 08, 2002
Item Number:	002 PROPOSED SEQUENCE IIIF INFORMATION LETTER 02-X TECHNICAL CONTACT: JOHN L ZALAR (412) 365-1005 (REFERENCE Z9452Z)		
Member's Name:	MICHAEL J RILEY		
Address:	2848 WAKEFIELD DR CANTON MI 48188		
Phone Nr:	3133903059	Fax Nr:	3138453169
Email Address:	MRILEY2@FORD.COM		

Comment:

Ford votes negative because the manganese-phosphate coated camshaft is expected to change the IIIF tests ability to evaluate engine oil wear.

Attachment	8
Page	1
Reference	

Negative

Date: 4/19/02

Ballot Number: D02.B0 (02-03) Close Date: MAY 08, 2002

Item Number: 002 PROPOSED SEQUENCE IIIF INFORMATION LETTER 02-X
TECHNICAL CONTACT: JOHN L ZALAR (412) 365-1005
(REFERENCE Z9452Z)

Member's Name: MICHAEL L MC MILLAN

Address: GENERAL MOTORS CORP
R&D CNTR/BLDG 1-6
30500 MOUND RD-MC 480-106-160
WARREN MI 48090

Phone Nr: 8109861935 Fax Nr: 8109862094

Email Address: MICHAEL.L.MCMILLAN@GM.COM

Comment:

1. Insufficient data were presented at the Surveillance Panel meeting where the decision was made to issue this letter. Only one Sequence IIF test was run with a phosphated camshaft. That run was on an oil containing only 0.03% phosphorus, and would have been expected to produce high wear. It did not. Four other tests were run under non-standard IIIF test conditions with higher load springs. These tests again showed no discrimination between the 0.03% phosphorus oil and oils 433-1 and 1006-2. Because of the lack of IIIF data under standard test conditions, and because the data obtained under non-standard conditions indicates that phosphating the camshaft eliminates wear discrimination, we believe it is premature to issue this information letter.

Sequence IIIG Development Update

Sid Clark

May 16, 2002

Attachment 9
Page 1
Reference

Attachment 9
Page 2
Reference

Sequence IIIG Development Data

STUCK RINGS REVISED GAPPING

Lab/Run#	Viscosity	Test Oil	Spring Load	Cam ID	Oil Bar	Fe @ Initial	% Vis. Inc.	Avg. Wear	WPD	PSV	Oil Cons.
SR/01	5W-30	433-1	180	MB	No	21	6467	132	2.21	7.87	4.43
SR/02	5W-30	433-1	180	MB	No	4	287	28	2.62	7.96	3.85
PE/01	5W-30	433-1	180	MB	No	5	130	37	2.82	8.32	4.09
SR/03	5W-30	403 Reformulated	180	MB	No	4	TVTM	14	1.6	8.2	TVTM
SR/04	5W-30	1006 Reformulated	180	MB	No	6	1077	27	2.36	8.62	3.61 @ 80h
SR/05	5W-30	0.03 Phos.	180	MB	No	17	105	105	3.92	8.4	3.74
SR/06	5W-30	0.03 Phos.	180	MB	No	16	156	267	2.85	7.79	3.7
PE/02	5W-30	0.05 Phos.	180	MB	No	3	130	26	3.16	8.69	3.78
PE/03	5W-30	0.05 Phos.	205	MB	No	19	133	153	3.32	8.52	3.99
PE/04	5W-30	0.095 Phos.	205	MB	No	4	176	16	3.23	8.84	4.55
SR/07	0W-30	GM-1	205	MB	No	5	106	57	4.64	9.17	2.71
PE/05	5W-20	Proto-type GF-4	205	MB	No	5	110	53	2.64	7.52	4.47 @ 77.8h
PE/06	5W-20	GF-3	205	MB	No	29	149	337	2.16	7.18	4.66 @ 76.8h
SR/08	5W-20	GF-3	205	MB	No	42	587	270	2.52	7.53	4.63
PE/07	5W-30	0.03 Phos.	205	MB	No	1	5601	483	2.52	8.76	4.98
SR/09	5W-30	0.03 Phos.	205	MK	Yes	4	293	49.6	3.27	8.48	4.12
SR/10	5W-30	0.095 Phos.	205	MK	Yes	5	173	11.7	3.3	8.8	4.3
SR/11	5W-20	Proto-type GF-4	205	MK	Yes	N/A	N/A	N/A	N/A	N/A	N/A
PE/08	5W-30	0.03 Phos.	205	MK/P	No	9	170	51.3	3.53	9.07	3.78
SR/12	5W-20	Proto-type GF-4	205	Pro 55	Yes	17	92	71	2.74	7.27	3.92
PE/09	5W-20	Proto-type GF-4	205	MK/P	No	9	102	57.2	2.53	7.74	3.78
SR/13	5W-20	Proto-type GF-4	205	MK/P	No	9	88	38.5	2.79	7.94	3.95
PE/10	5W-30	0.095 Phos.	205	MK/P	No	6	166	17.6	3.35	9.45	3.35
PE/11	10W-30	GF-3	205	MK/P	No	10	175	17.6	3.24	8.21	3.4
SR/14	5W-20	Reference 538	205	MK/P	No	9	118	12.8	3.5	9.16	4.2

Sequence IIIG Tests with Phosphated Camshafts

Lab/Run#	Viscosity	Test Oil	% Vis. Inc.	Avg. Wear	WPD	PSV	Oil Cons.
PE/08	5W-30	0.03 Phos.	170	51.3	3.53	9.07	3.78
PE/09	5W-20	Proto-type GF-4	102	57.2	2.53	7.74	3.78
PE/10	5W-30	0.095 Phos.	166	17.6	3.35	9.45	6.09
PE/11	10W-30	GF-3	175	17.6	3.24	8.21	3.4
SR/13	5W-20	Proto-type GF-4	88	38.5	2.79	7.94	3.95
SR/14	5W-20	GF-3 TMC Ref. 538	118	12.8	3.5	9.16	4.2

Attachment 9
Page 3
Reference

IIIG / IIIF Hardware Differences

- Manganese phosphate coated camshaft
- 205 lb. valve springs
- Piston rings (gapping strategy)
- OHT external oil filter bypass system
- OHT large "ID" oil filter adapters
- Spark plugs
  - Currently investigating colder heat range

IIIG vs IIIF Test Conditions

- Test length 100h vs 80h
- 20h levels vs 10h
  - (5500ml initial with 472 ml additions)
- Coolant temp 115°C vs 122 °C
- Oil temp 150 °C vs 155 °C
- Inlet air temp 35 °C vs 27 °C
- 250 Nm vs 200Nm @ 3600 RPM
- Rings .025 Top .042 2nd vs .042 / .038

Attachment 9
Page 5
Reference

Sequence IIIG Development

- Next Steps;
  - Release test for preliminary testing
  - Outline Precision Matrix requirements
  - Write Research Report
  - Revise IIIF Operating Procedure & Assembly Manual to reflect IIIG testing requirements

Attachment	9
Page	6
Reference	

Attachment	10
Page	1
Reference	

DISCUSSION

ALTERNATIVE PISTON DEPOSIT WEIGHTING FACTORS

GM Powertrain is concerned that the crown land is not comprehended in the current ratings.

Possible alternative weighting factors:

Crown Land	0.2	1st Groove	0.1
2nd Land	0.2	2nd Groove	0.1
3rd Land	0.2	3rd Groove	0.1
Under Crown	0.1		

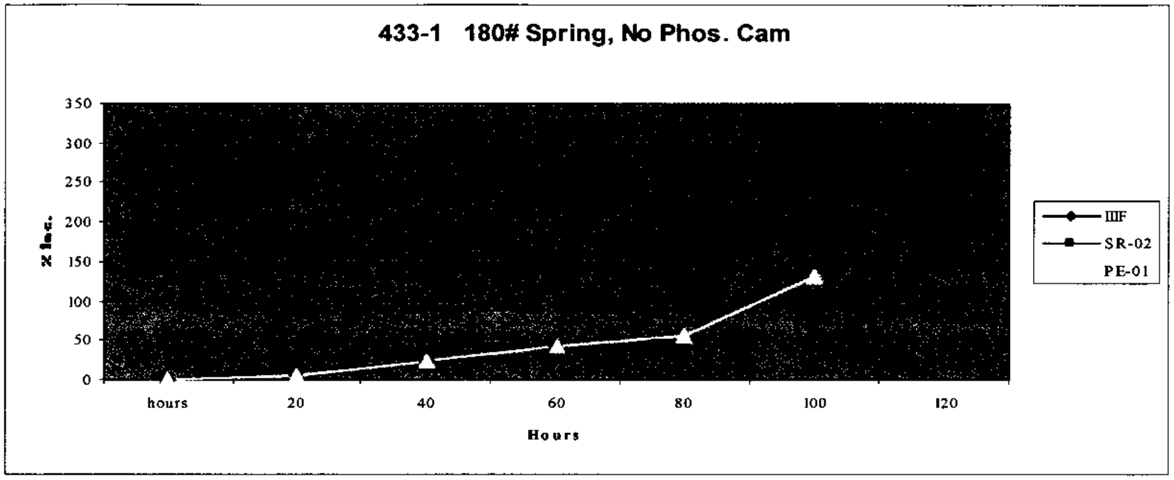
For example:

Lab/Run#	WPD OLD	WPD NEW
SR/6	2.85	2.43
SR/7	4.64	3.47
SR/8	2.52	2.01
SR/9	3.27	2.38
SR/10	3.31	2.47
SR/12	2.74	2.10
SR/13	2.79	1.79
SR/14	3.50	2.35

Piston skirt varnish (PSC) would remain a separate limit.

Bob Olree

Is the Test Long Enough ?



	IR Oxidation	IR Nitration
IIIF	230	15
SR-2	3767	290
PE-1	964	120

- Similar results to SR-2 were obtained on a 5W-20 GF-3+ oil (run outside GPSII Development Group)
- To be certain that the IIIG test is twice as severe as the IIIF in oxidation severity, may require a 120 hour test

Attachment 11
Page 1
Reference

LUBRIZOL

Fluid technologies for a better world™

GF-4 Matrix Design Task Force

Report to Sequence IIIG Surveillance Panel

Crowne Plaza Hotel
Detroit Michigan
May 16, 2001

Attachment	12
Page	1
Reference	

LUBRIZOL

GF-4 Matrix Design Task Force

- **SCOPE**
  - GF-4 Testing Matrix Design
    - Select Formulations to be Used
    - Determine a Testing Plan
- **OBJECTIVE**
  - Design Test Matrix (For New GF-4 Tests) to Provide:
    - Test Precision and LTMS Limits
    - BOI and VGRA
      - may be addressed
      - Direction from ASTM PCEOCP, ILSAC, API and ACC
- **MATRIX PROJECT MANAGER**
  - John Zalar (TMC) (Accepted)

Attachment 12
Page 2
Reference

GF-4 Matrix Design Task Force

- ILSAC / API / ACC Input
  - Design Assumptions
    - BOI and VGRA from GF-3 May be Adopted
    - May need supplemental VGRA
    - Use Three Technologies
    - Maximum Two New Tests
      - Sequence IIIG and Sequence VIC
- Assumptions Relating to Matrix Design
  - Testing Capacity
    - Seven Labs and Ten Test Positions
  - Minimum Number of Formulations
    - Dictated by Sequence IIIG (Three to Six Oils?)

Attachment 12
Page 3
Reference

LUBRIZOL

GF-4 Matrix Testing

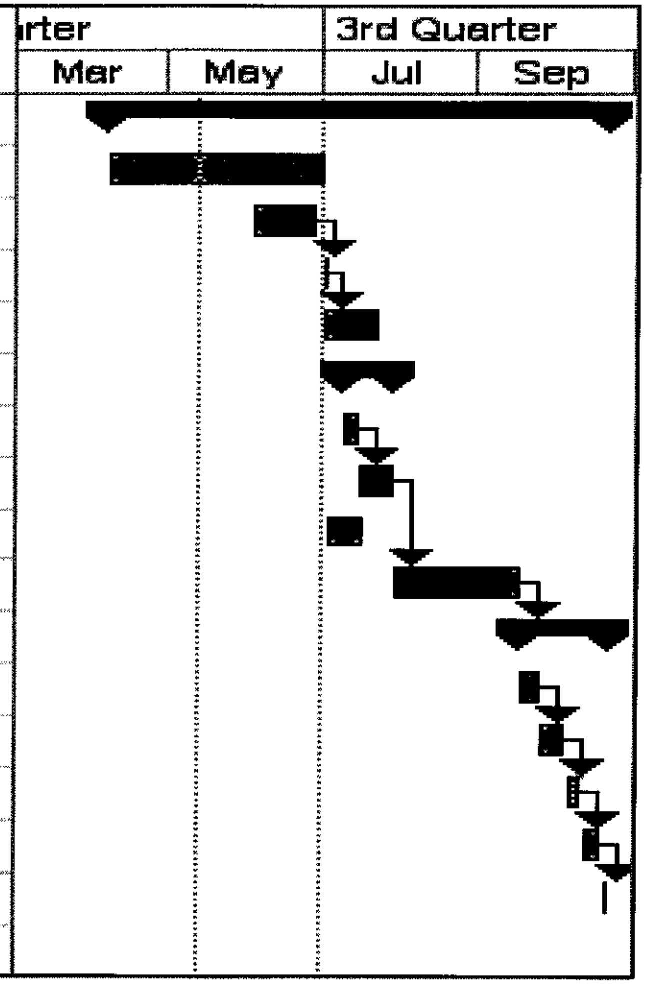
- SEQUENCE IIIG

Attachment 12
Page 4
Reference ____

LUBRIZOL

PROPOSED IIIG MATRIX TIMELINE

ID	Indicators	Task Name
1		**Seq. IIIG**
2	▦	Finish Test development
3	▦	Matrix Design
4		Hardware Distribution
5		Lab Demo of Discrimation
6		**Ref. Oil Validation**
7	▦	Ref. Oil Selection
8		Ref. Oil Blending and Dist.
9	▦	Lab visits
10		Run Matrix
11		**Analysis and Consensus**
12		Statistical analysis
13		Write Report
14		Surv. Panel Review
15		PCEOCP Review
16		PCEOCP Recommendation
17		



Attachment 12
Page 5
Reference

PROPOSED IIIG MATRIX

Assumptions (To be confirmed)

Number of Labs --		7
Independent --	2	
Dependent --	5	
Number of Stands --		10
Stand Calibration Protocol --		3/2
Number of Tests / Stand --		4
Number of Formulations --		TBD
Number of Technologies		3
Number of Base Oils		1 (Slate)
Number of Viscosity Grades		2 or 3?
Number of Tests / Oil		TBD

PROPOSED IIIG MATRIX

Next Steps?

- Next GF-4 MDTF Meeting - - -
  - - - Today / Here / Next
- Future Decisions Based on Input from Sequence IIIG Task Group
- Be Aware of Timeline Needs & Constraints!
- We need your help !

Attachment	12
Page	7
Reference	

The Precision Matrix for ASTM Test Methods

BOI And/Or VGRA Included?

Attachment 13
Page 2
Reference

The Role of ASTM

- ASTM develops test methods with precision statements as a mandatory part of the test method
- BOI and VGRA issues are outside the domain of ASTM
- Therefore, the Surveillance Panel should focus on precision and not BOI or VGRA issues

The Goals of the ASTM *Precision* Matrix

1. First and foremost is to judge the performance of an ASTM Test Stand in terms of stand severity and precision
2. Determine stand-to-stand severity and precision within a laboratory
3. Determine laboratory-to-laboratory precision and severity differences

Determination of Test Stand Severity and Precision

- In the past, this has been done by running a minimum of two 'true' reference oils in each stand
  - This would ***not*** include running a reference oil in a different viscosity grade or base oil
- Thus, each test stand in the precision matrix would run, at a minimum, two 'true' reference oils.

Attachment 13
Page 4
Reference

The Goals of the Reference Oils (or Calibration Oils)

- Ideally, three oils would be selected that bracket the pass/fail performance limit of each parameter being measured by the test method
- It may include more than 3 oils, but 5 seems to much, and 1 is not enough
- And ideally, the reference oils should closely represent the chemistries that the test method is trying to measure

Summary

- The ASTM Surveillance Panels should focus on the *precision* requirements of any proposed matrix
- BOI and VGRA is not a function of ASTM
  - Funding for BOI and VGRA is not a function of ASTM
  - Any BOI and/or VGRA matrix can not compromise the precision matrix

Attachment	13
Page	6
Reference	

Conclusion

Based on these requirements,

- GM sees no need to fund and conduct a formal precision matrix
- Sufficient data to establish all precision parameters should be obtained through normal calibration of referenced stands

Attachment	14
Page	1
Reference	

ADDENDUM K1

DRAFT
TEMPLATE CHECKLIST

Purpose

The Checklist for Comparing Tests to the Template is used to assess progress in new engine test development against the Code Acceptance Criteria and Action Plans. The checklist is updated periodically during the course of test development and is provided to, and discussed with, the appropriate ASTM test development task force.

The rating scale for comparing test development to the Template is as follows:

A -- Completed

B -- In Progress

C -- Planned

D -- No Action

Test Name Sequence IIIG   Assessment Date____

American Chemistry Council Code of Practice
Appendix K - Template for Acceptance of New Tests

Attachment	14
Page	2
Reference	

A. Precision, Discrimination and Parameter Independence

A.1 Precision $E_p = d_p/Spp$, $E_p \geq 1.0$ for all pass/fail parameters
d_p = Smallest difference of practical importance
Spp = Pooled standard deviation at target level of performance

Parameter	dp	Spp	Ep	≥1.0?
Viscosity Increase (%)				
Viscosity Increase (%)				
WPD				
APV				
ACLW				
OC				

Comments:

A survey was not performed for Oil Consumption

A.2 Discrimination

For each test parameter in A.1, at least one of the oils used in proof-of-concept testing, matrix testing, or calibration testing must be statistically significantly different from at least one of the remaining oils. This difference must be in the correct direction, i.e., a poor oil should not test out as significantly better than a good oil. Significant difference may be declared with a p-value of 10% or less. Multiple comparison techniques (Tukey, Scheffe, Bonferroni, etc.) for the least-square means of the oils are preferred comparison techniques and should be stated in the analysis. Note that these least-squares means are not necessarily proposed LTMS targets.

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

Comments:

Attachment	14
Page	3
Reference	

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

Attachment	14
Page	4
Reference	

B. Severity and Precision Control Charting

Requirements

B.1 Is an LTMS for reference oil tests in place which is consistent with CMA Code Appendix A? __C__

B.2 Are appropriate data transforms applied to test results? __C__

Comments: *Inverse Square Root is used for Viscosity Increase.*

C. Interpretation of Multiple Tests

Requirements

C.1 Is a suitable system in place to handle repeat tests on a candidate oil? __C__
Type: MTAC

C.2 Has a method for the determination and handling of outlier results been defined? __C__

Comments:

D. Action Plan

D.1 Reference Oils

Do the majority of reference oils represent current technology? __C__

Are the majority of reference oils of passing or borderline pass/fail performance? __C__

Recommended Approaches

D.1.1 Is reference oil supply and distribution handled through an independent organization? __C__

D.1.2 Is a quality control plan defined and in place? __C__

D.1.3 Is a turnover plan defined/in place to ensure uninterrupted supply of reference oil and an orderly transition to reblends? __A__

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

Attachment	14
Page	5
Reference	

Recommended Approaches

D.3.1 Is the fuel specified and the supplier(s) identified? __A__

Specified Fuels, EEE.

Is a process in place to monitor fuel stability over time? __A__

Specified Fuels sampling.

Are approval guidelines in place for fuel certification? __A__

FTP Certification process

D.3.2 If the test fuel is treated as a critical part of the test procedure: Is an approval plan and severity monitoring plan for each fuel batch in place? __A__

FTP Certification process

Is a quality control plan defined and in place to assure long term quality of the fuel? __A__

FTP Certification process

Is a turnover plan defined, in place and demonstrated to ensure uninterrupted supply of fuel? __A__

FTP Certification process turnover plan

Comments: *The impact of fuel batch changes has been assumed to be non-critical.*

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action

D.5.5 Are routine rater workshops conducted/planned? __C__

Comments:

D.6 Calibration, Monitoring and Surveillance

Recommended Approaches

D.6.1 Is a process in place for independent monitoring of severity and precision with an action plan for maintaining calibration of all laboratories? __C__

D.6.2 Are stand, lab, and industry reference oil control charts of all pass/fail criteria parameters used to judge calibration status? __C__

D.6.3 Does the specified calibration test interval allow no more than 15 non-reference oil test between successful calibration tests? __C__

D.6.4 Is an industry surveillance panel in place? __C__

Comments:

D.7 Guidelines for Read Across

Recommended Approaches

D.7.1 Is a plan defined to establish data for development of BOI and VGRA? __C__

D.7.2 Has VGRA and BOI data been summarized and included in the technical report in D.4.1? __C__

Comments:

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action