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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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Unapproved Minutes of the January 8, 2009 Sequence IVA Task Force Meeting

The meeting called to order at 8:30 AM

A copy of the agenda is included as attachment 1.

A list of attendees is included as attachment 2. Dave Glaenzer of Afton, Tim Caudill and Adam Sworski of Ashland and Jason and Adam Bowden of OHT were in attendance via telecom.

A review of the industry status was conducted. Intertek is still unable to calibrate. Ashland changed cylinder heads on their engine and has seen mild results with reference oil 1006-2, using laboratory retains. Lubrizol indicated that they will be starting a calibration test shortly. Southwest Research has been attempting to bring in a new stand, 27. The first test on this stand was severe and was found to have incorrect ramps, exhaust backpressure problems, temperature control issues and ran EEE fuel. A second

test on 1006-2 yielded 50 um. The 3 way valve was found to be installed backwards. This situation was corrected and a third attempt using reference oil 1007 provided 40 um. The research valve for coolant control to the heat exchanger was installed on the inlet side. This situation has been corrected, but the laboratory feels that they have encountered a mild stand, and potentially a mild cam batch. A test on retains was attempted on stand 54 and appears severe giving 113 um wear. SR will be referencing there three calibrated stands in the next week or so and will be starting a reference in stand 27 shortly. Lubrizol is starting a reference on Monday. Intertek has been mild for sometime. Al reviewed the difference in stand and lab set up between SR and IAR. SR uses driveline damping, while IAR does not. SR has a 1/8 Whitey stainless steel valve to isolate while taking blowby measurements and use the IIIG cart for measurements. Other labs do not have this valve and use the VG cart to take blowby measurements.

Discussions on fuel were undertaken. Bill Buscher mentioned that SR stand 27 was severe when using EEE fuel and it was suggested that if the mild trend continues, use of EEE fuel might be an option. Rich Grundza pointed out that this fuel is a variant of EEE and Bill Buscher commented that it was doctored to get severity, but was essentially EEE. SR indicated that they have seen low RVP values but all other parameters were in specification.

Al Lopez suggested that the panel may wish to suspend the use of reference oil 1009. No formal action was taken on this. Al did point out that because this oil is very low in wear performance, correct SA's may not be calculated with this oil in a labs control charts.

Both SR and IAR indicated that they anticipate doing the engine swap in 2 – 3 weeks. Both will run 1006-2. Al will be installing an OHT wiring harness on the stand where the SR engine will be run. All components except the fuel rail and ECM will be swapped. Both labs will monitor the front cover fresh air flow on the engine swapped tests. It was also suggested that the Δt across the rocker cover be monitored to see if there maybe differences in heat transfer between the labs.

The following changes were reviewed by the group. The group agreed to submit the following changes for ballot electronically.
1. Remove the requirement to conduct valve spring free length and squareness of valve springs and to require vacuum checks of the cylinder head after assembly.
2. Begin to monitor fresh air flow to the front cover.
3. Begin monitoring RAC in and outlet temperatures
4. Advise industry to monitor long blocks for Mexico castings.
5. SR to provide schematic and equipment list to calculate the injector pulse width.
6. Pressurize the cooling system to 100 kPa, in a manner similar to VG and VIB.
7. Configure the PCV system similar to SR with the isolation valve and measure blowby using the IIIG cart.

Dyno load cell temperature was discussed. SR maintains the dyno load cell temperature with a blanket type heater at 46˚C. Dave Glaenzer suggested that combustion air could also be used, but the temperature would not be maintained at 46˚C. No formal action was taken to address load cell temperature control, but it was suggested that laboratories maintain a consistent temperature.

Attachment 3 is a powerpoint presentation identifying a number of items pertaining to iron levels and "brainstorming" by ExxonMobil and Lubrizol. Al noted on the iron plots that when his lab began to shift mild, iron began to go flat and the 25 hr results were lower that results from labs getting passing results. Bill commented that there is a strong correlation between EOT iron levels and EOT wear levels, with an r^2 of 0.97. The group then addressed items on the brainstorming lists. Changes in filters and media were reviewed and Bill indicated that to his knowledge there were none. Dave Glaenzer commented that scotch

brite should not be used for cleaning as it may introduce chemicals which are undesirable in lubricant testing. Concerns about potential carry over and adequacy of flushing procedures brought a comment from one member that reference oil 1007 may have some Magnesium carbonate carry over.

Other items addressed were review of the analytical results obtained from the test which ran EF-411. Rich commented that he received an email from Gordon Farnsworth regarding the Sulfur noted in the analysis. He reminded the group that EF-411 is an unadditized Group I base stock and no one should be alarmed that Sulfur was present. Al suggested that labs monitor NOx levels as many of the papers written regarding test development indicate that NOx is a key component with regards to severity. It was also suggested that exhaust blowers, used for cooling the O_2 sensor may vary in flow.

Al indicated the next meeting will be a teleconference in late January, once the engine swap results are available.

The group was to review IAR's test stands after the meeting.

There being no old or new business, meeting adjourned 11:40 AM

Attachment 1

Sequence IVA Task Force Meeting

San Antonio, TX
Intertek Automotive Research
January 8, 2009
8:30am – 5:00pm

AGENDA

1. Introductions
2. Attendance sign in sheet
3. Action Recorder
4. Status update.
    a. One calibrated lab.
    b. Underlying problem not captured by the procedure.
    c. Open discussion.
5. Update on engine exchange between SWRI and Intertek
6. 1009 Oil assignment suspension. (Recommendation to Panel)
7. Fresh Air Flow Comparison
    a. Meters installed for front cover
    b. Recommend measurement round robin
8. Review Iron Plots
9. Brainstorming Lists
    a. ExxonMobil
    b. Lubrizol
10. Action Plan Discussion
11. Adjourn

Sequence IVA Task Force Meeting

San Antonio, Tx
January 8th, 2009

Attendance Sheet

Name	Company	Signature
DAVID CAPRONI	ASHLAND	
BILL BUSCHER	SWRI	
Rich Grundza	ASTM TMC	
Mark Mosher	ExxonMobil	
Ray Seiz, JR	INFINEUM	
PAT COLBY	INFINEUM	
Greg Seman	Lubrizol	
Jorge Robles	Intertek	
ERIC LIN	SWRI	
AL LOPEZ	INTERTEK	

Attachment 3

Nissan Task Force
Meeting Agenda
01/08/09

- Review workshop findings.
  - Metrology
  - Head build
  - Cleaning
- Review Brainstorming Ideas
  - ExxonMobil
  - Lubrizol
- Review Iron Analysis
  - Greg Seman plots
  - Status of cam analysis that ran EF411
- Fresh Air Flow Comparison
- Action Items
- Adjourn

ExxonMobil (1)

- Compare used cam unworn lobe surfaces between labs
  - position of unworn surface
  - amount of unworn edge

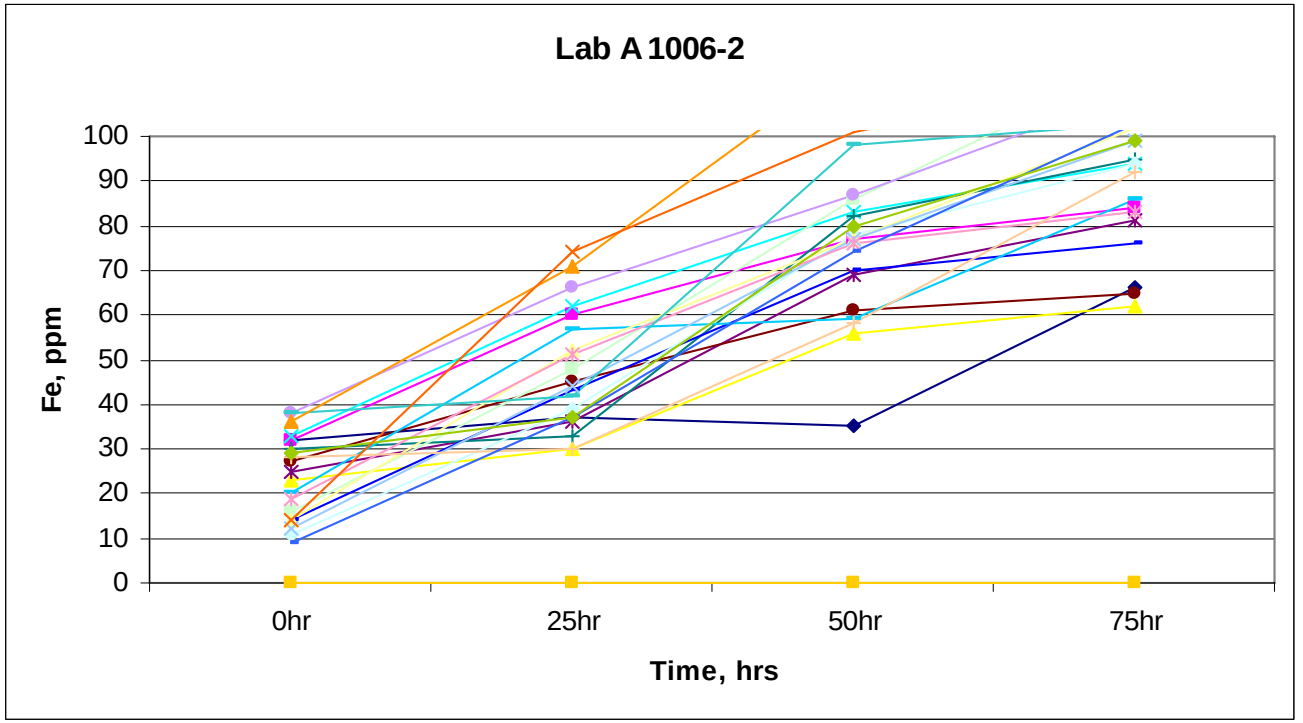
  ==> if different, this could indicate a relative position difference between cam/follower mating interface
- Compare installation/torque procedures for follower installation. Are same tools used between labs.
- Compare valve lash adjustment.
- Labs to swap engine builds (this is already planned). Fully dressed engines, including intake manifold, exhaust system, harness and ECM.
- Intertek could run two tests, the first one on one of the two active stands, the second one on the partially decommissioned stand that used to provide severe results.
- Compare ECU data between labs (if available, may require additional instrumentation)
- Compare valve train oil pressures and/or flows (probably require additional instrumentation)
- Compare follower geometries/hardness, are all followers supplied from single source?

ExxonMobil (2)

- Compare used filters for trapped particulates (size and type) between labs
- Measure/compare crankcase gas components between labs
- Identify additional temperature locations to monitor/compare (particularly valve train area)
- Compare orientation, location, air flow and face velocity of exhaust blower
- Compare configuration of deflectors shielding air current from blowing on oil pan and cylinder head
- Compare cleaning procedure of test kit, including solvent type and brand
- Compare torsional speeds of engine-dynamometer drive train (dyno inertia, engine flywheel inertia and driveshaft torsional stiffness)

Lubrizol

- Send cam that ran EF-411 and drain oil sample to LZ for analysis
- Check hardness and surface finish on followers and compare to early version followers.
- Check drain analyticals for items not normally monitored (TBN, TAN, etc)
- Check spring tensions on new springs vs. used springs. Check after one run, two run, etc.
- Have there been any oil filter manufacturing changes? Micron size, filter media, etc.
- Check spring rates hot and cold. Perhaps springs lose tension as they are heated.
- Try testing with an old batch of followers.
- Is the leveling out of iron during the test (rather than a linear increase) showing that the break-in used to be a much larger, longer factor?
- Are we getting a carryover of antiwear components that are embedding themselves in engine parts and releasing during the next test?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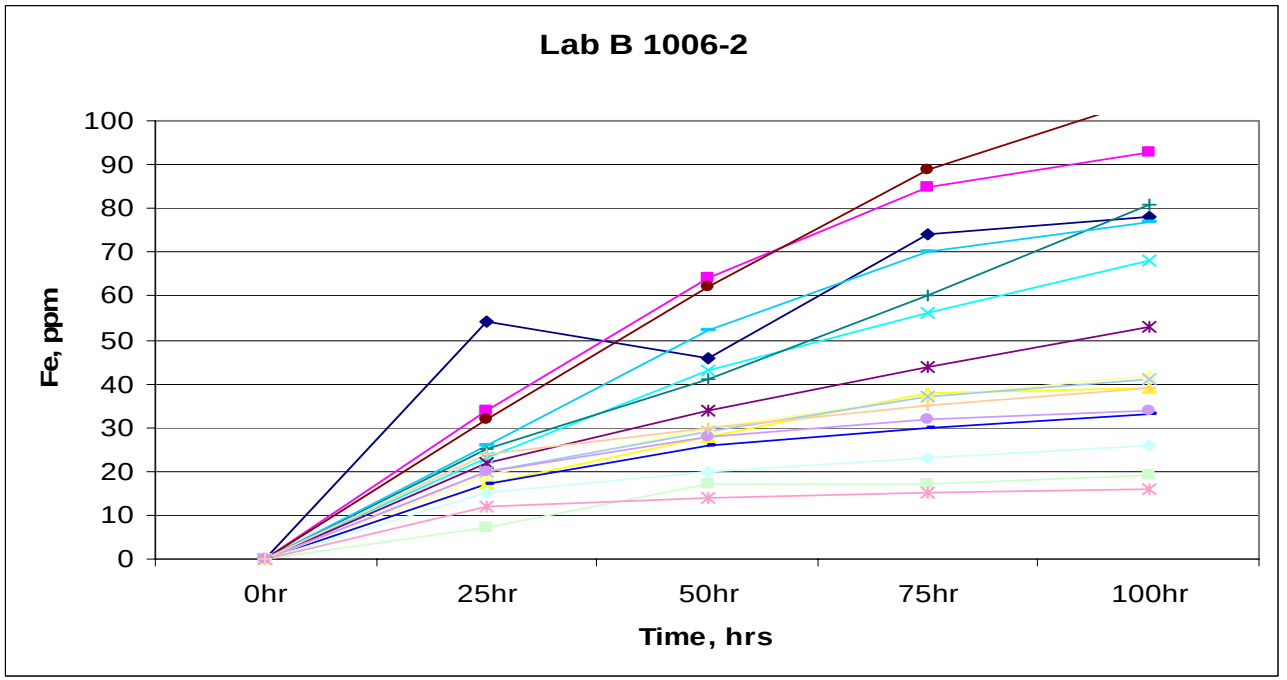
25hr
50hr
75hr
Time, hrs


Lab B 1006-2
Fe, ppm
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80
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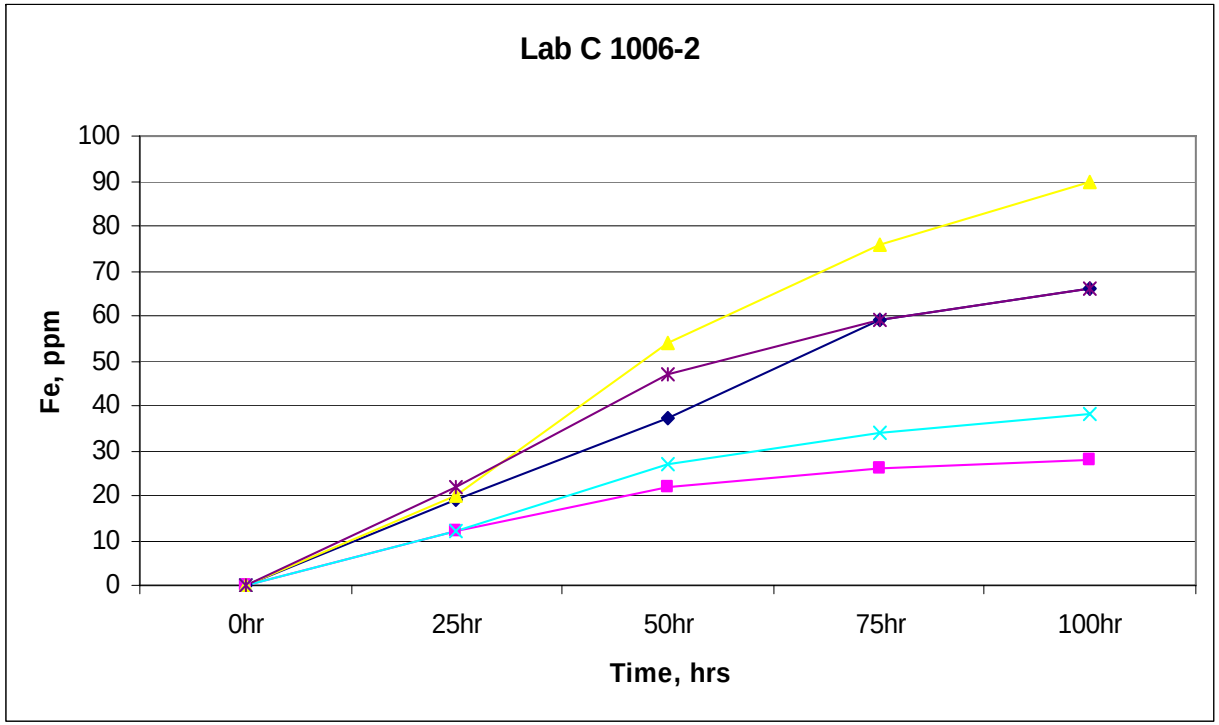
100hr
Time, hrs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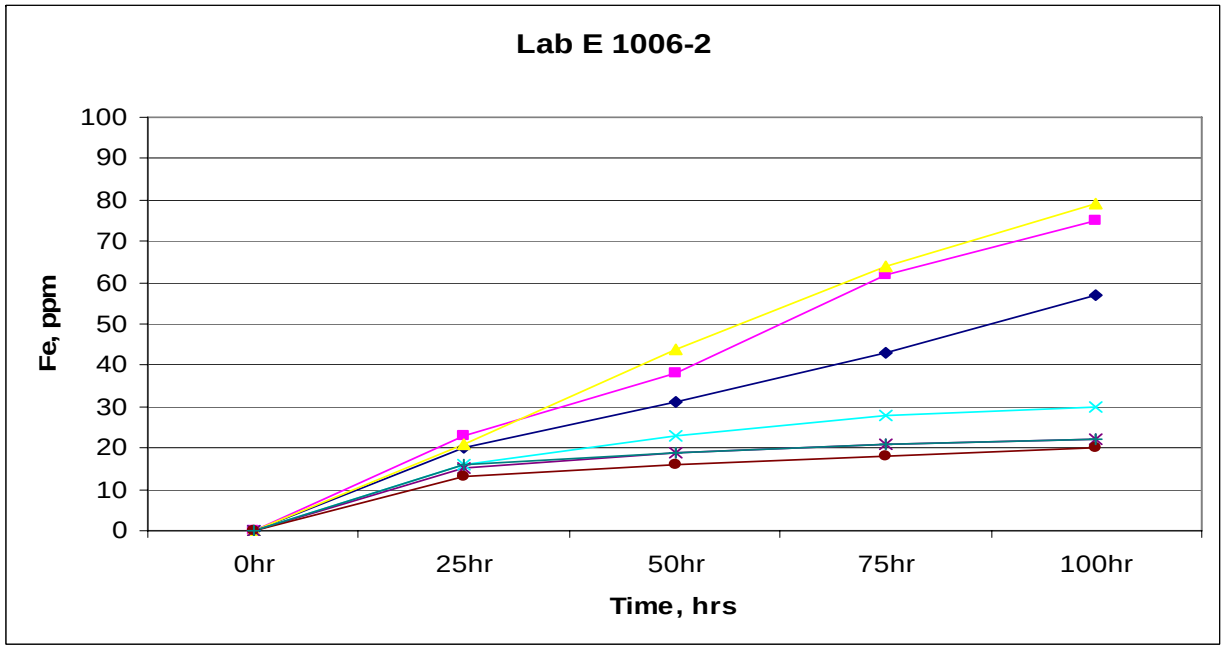
Time, hrs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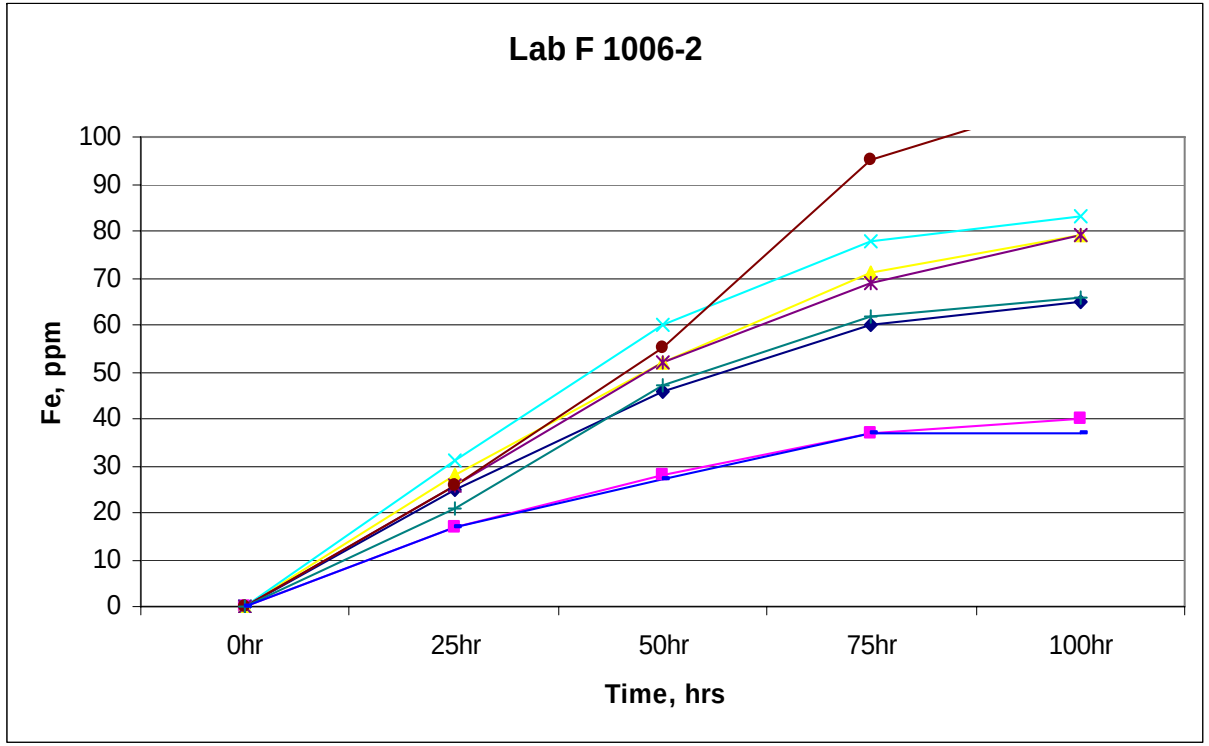
25hr
50hr
75hr
100hr
Time, hrs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Fe, ppm
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90
80
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50
40
30
20
10
0
0hr
25hr
50hr
75hr
100hr
Time, hrs

Fresh Air Flow

Intertek vs SWRI

Stage	Flow	SWRI	Intertek
1	To RAC	9.99	10.00
	To Fr. Cov	6.35	4.00
2	To RAC	10.00	10.00
	To Fr. Cov	7.57	5.70

PCV Flow

in Hg	SWRI	Intertek
4.4	50.11	49.3
7.4	48.98	40.5
17.7	28.59	28.3

> Recommend all labs measure flow to front cover

> Differences between labs may be due to pressure, leaks, or measurement error

> Severity consequences?