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Originally Issued: September 15, 2009
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Unapproved Minutes of the September 11, 2009 Sequence III Surveillance Panel Conference Call

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The meeting was called to order at 2:03 pm by Chairman Dave Glaenzer. A membership list (Attachment 1) was shows the members and guest who had called in for the meeting.

Agenda Review

The Agenda was accepted as shown on Attachment 2.

Meeting Minute Status

The minutes from the May 5th, 2009 meeting and July 17th, 2009 Teleconference were approved as distributed.

Action items from Previous Meeting(s)

AFR Task Force: Labs were asked to comment on their experience evaluating the proposed AFR system. Greg Seman has used this system exclusively on one stand and found it comparable to gas bench, but has little or no experience with the updated calibration. There was some disagreement about the scope and whether the intent was to standardize AFR measurements and control techniques between labs or whether this AFR measurement system was being used as a replacement or alternate system. Greg Seman expressed reservations about costs and reliability. Other labs had better reliability with different ECM systems. Greg Seman was tasked with developing a calibration procedure with input from other labs.

Additional Fuel analysis: Todd Dvorak has not completed, to be reviewed at next meeting.

Hardware Status/Updates: Dave Glaenzer will contact GM Racing, OHT, etc. to get accurate assessment for next meeting and will be contacting these parties early October.

Tightening Fuel Specs: The current specifications were reviewed by Haltermann and felt to be as tight as they could produce for most components, awaiting results of Todd's analysis. Ongoing.

Oil Filter with 25µm media: Manufacturer wants a purchase agreement upfront. Need Surveillance Panel approval to go forward. Filter change will require significant testing and cost increase maybe significant as well. No further action to be taken.

Old Business

WPD Task Force activities: Pat Lang provided an email update to Dave Glaenzer. The Task Force has looked at a number of items. However, the bulk of this work has been turned over to Statistical Working Group. Pat expects their report in a few weeks and will advise the panel accordingly.

Oil filter "Wormholing" issue: The consensus of the panel was that it is a sporadic occurrence and not an ongoing issue. However, Greg Seman indicated that he has noted a few occurrences of wormholing recently. The results of the TMC analysis will be presented at the November meeting. Greg Seman will draft wording for a potential information letter to allow filter replacement when wormholing conditions are observed for review and approval at the November meeting.

New Business

Definitions in ASTM Standards: Joe Franklin had requested that the panel review the proposal to reduce the number of definitions for the same term across multiple test methods. The panel agreed to reduction in definitions and Dave Glaenzer will advise Joe of the panel's concurrence.

Calibration Issues: The panel agreed that only verification of angle measurements for torque wrenches is required for a torque wrench calibration. The Sequence III tests use angle calibration during the torque sequence for main bearing caps, connecting rod bearing caps, balancer shaft gear and camshaft sprocket bolt. There is no NIST standard for angle, making calibration difficult, if not impossible. The panel also agreed to modify the test method(s) to require that applicable parameters of the honing machine be verified and adjusted by the honing machine manufacturer's representative **annually**.

Procedure/Assembly Manual Changes: The panel agreed to revise the assembly manual to address the following changes:

- 1) Measure ring gaps in the block, instead of in ring gauges.
- 2) Add **Kentmore** model J38196 (**available through local GM Parts Supplier**) as an alternate seal installation tool.
- 3) Allow reuse of the rear seal housing bolts, as long as they are serviceable.
- 4) Allow oiling of the main bearing cap bolt threads.
- 5) Delete the stud bolt from the front of the upper intake and allow use of a hex head bolt.

The panel also agreed to revise the test method to address the following items:

- 1) Add a tolerance of $\pm 10^{\circ}\text{C}$ for the parts washer water temperature specification.
- 2) Revise Section 9.9.5 to include the part numbers for the new head gaskets.
- 3) Delete Section 9.6.2, since the configuration of the cylinder heads does not allow this method to be used.
- 4) Revise test method and **assembly manual** to include new head bolt source/**part number**.
- 5) Update part list to include MAP sensor part number 12614973.

A summary of the detailed changes is included in attachment 3

Engine Build Workshop: Mark Mosher suggested an alternative which may allow a workshop to be conducted in the near future. Mark suggested that the workshop be held in one of the independent labs and ExxonMobil would reimburse the lab for the expenses incurred. The idea received favorable response, however, at least one lab said they could not spare the resources with the onset of the new category. Dave Glaenzer agreed to ask the independent labs if they would be willing to host a workshop under those arrangements, though he didn't think the independent labs would be able to accommodate the workshop. Dwight Bowden lent OHT's support to it as well.

Phosphorus Measurement Round Robin: It has been suggested that a measurement round robin might be in order for the Sequence IIIIGB test. The panel responded affirmatively to the concept. The surveillance panel chair will work with the TMC to obtain and distribute oil samples for this activity.

Next meeting is scheduled for November 18, 2009 at GM Research

The meeting was adjourned at 3:22 PM.

Attachment 1

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Sequence III Surveillance Panel

09/11/2009

14:00 EDT

Call-in Number is: (866) 817-9787

Participant Passcode: 2158089

Agenda

1.0) Roll Call

2.0) Approval of minutes

- 2.1) May 05, 2009 SP meeting in Warren, MI.
- 2.2) July 16, 2009 SP teleconference.

3.0) Action Item Review

- 3.1) Action Item – 05/05/09 Labs to continue to evaluate the AFR task force proposed calibration process. Are we ready to enact change? Open item.
- 3.2) Action Item – 05/05/09 Todd Dvorak to conduct one additional analysis on EEE fuel data and report to SP. Open item.
- 3.3) Action Item – 05/05/09 Chairman to start conducting semi-annual surveys of critical hardware at labs and at CPDs to evaluate when test might become unavailable due to hardware. On going.
- 3.4) Action Item – 05/05/09 Haltermann to investigate the possibility of tightening some of the EEE fuel specifications. Open item.
- 3.5) Action Item – 05/05/09 OHT will contact the oil filter supplier to discuss feasibility of providing oil filter with 25µm synthetic filter media. Done. Review OHT correspondence from 06/16/09.

4.) Old Business

- 4.1) WPD Task Force activities
- 4.2) Oil filter “Wormholing” issue.

5.) New Business

5.1) Definitions in ASTM Standards

Please review attachment from Mr. Joe Franklin. ASTM is striving to reduce the number of definitions for the same term across multiple test methods. We are asked to concur on the changes detailed.

5.2) Calibration Issues

One lab has expended considerable effort attempting to secure an NIST traceable calibration for angle guage. They request that we add a comment into the procedure or assembly manuals that angle for these torque wrenches only needs to be verified. We use angle calibration during the torque sequence for main bearing caps, connecting rod bearing caps, balancer shaft gear and camshaft sprocket bolt.

Required that honing machine be calibrated by Sunnen technician. Need to define calibration period. Recommend 2 years.

5.3) Editorial Issues (Can we handle all of these with one motion?)

Measurement of ring gap. Assembly manual requires use of ring gauges. Some labs measure in block. Has been discussed in past. Measurement in block is probably the only accurate measurement of actual gap. Minutes from 06/06/06 state that measurement should be in block with check in gauge to verify manufacturer gapped properly. Need to update assembly manual.

Installation of rear main seal. Assembly manual requires GM R&D Seal Installation Tool. Need to add acceptable alternative.

Rear Cover Installation. Requires the use of new bolts. No need to use up a bolt that may become obsolete. Reuse recommended.

Upper Intake Installation. Assembly manual requires use of a studded bolt. Studded bolt has no purpose for use. Need to allow regular bolt.

Use of oil on main bearing cap bolts. Assembly manual says "do not oil threads". D7320 Section 9.7.4.1 says "Apply build-up oil to the threads and to the surfaces of the bolts that contact the main bearing caps". Surveillance Panel meeting minutes from 11/07/07 state that oil should be used. Need to correct assembly manual.

IIIG procedure needs to have tolerance added to section 9.5.3.1 (2), parts washer water temperature. Suggest $\pm 10^{\circ}\text{C}$.

IIIG procedure section 9.9.5 needs to be updated with correct part numbers for right and left cylinder head gaskets. Update procedure with correct numbers.

IIIG procedure section 9.6.2 requires the use of a brush to clean core sand. I am told that this is not possible and is a carry-over from the IIIE procedure. Recommend rewording of section.

Any updates needed due to change of head bolt source?

Larry Hamilton reports a change in part number for MAP sensor. Old number 9359409, new number 12614973. Related to change in seal. Any update needed?

5.4) Mark Mosher would like to discuss an alternate means of conducting an engine builder workshop.

5.5) It has been suggested that it would be appropriate to conduct a round robin to see if differences exist in phosphorus measurement for IIIGB test. Discussion?

6.) Next Meeting

6.1) November 18, 2009 at GM R&D in Warren, Michigan

7.) Meeting Adjourned

Listing of Changes requested to Procedure and Build Manual

Angle calibration on torque wrenches – I have attempted to find a company that can supply a NIST traceable calibration for angle. Most people within the Seq. Ill industry I have talked to on this subject believed they were getting this from Snap-On but after many discussions I have had with Snap-On “ it has been concluded they are not a certified calibration Lab for angle calibration.

I have talked to additional Calibration Labs and have not found any with this capability.

The note below was my attempt to go through NIST.GOV to obtain additional information from the official government lab and as you can see from the response they do not have this capability either.

I would like to request that we add a comment into the procedure or assembly manual that Angle for these torque wrenches only needs to be verified.

1.) According to Section 2 Sheet 10 of the Engine Assembly Manual, CV-616 Hone Machine, states that the machine must be calibrated by a qualified Sunnen Technician.

- The machine has been calibrated by Sunnen Technician
- Currently, no defined calibration interval has been established in the procedure.
- **Action Required: SP needs to determine the calibration interval, I assume Rich has got all the calibrations?**

2.) According to the Piston Ring Installation & Clearance- Section 3 Sheet 8 of the Engine Assembly Manual, you have to check the ring gap by using OHTF-050, 051, and 052 Ring Gage.

- There has been some discrepancy on this in the past. Some Labs measure in the block. I believe this was discussed and should have been changed in the manual, I believe it is the only accurate method of gauging actual gap.

SP minutes show the following was approved 06/06/06 Attachment 5 item 14) Piston Ring Gaps Piston ring gap should be checked in the cylinder bore as stated in the draft. The engine assembly manual should be revised to state this requirement. A reminder to labs that ring gaps should also be checked in the ring standards to confirm that the supplier is gapping them properly.

- **Action Required: Assembly manual needs to be updated to reflect gap in the bore is the documented measurement, if this is within the specification we should not have to check in gauge.**

3.) According to the Front cover bolt placement (Section 4 Sheet 8) section of the Engine Assembly Manual, “install rear main lip seal using GM R&D supplied installation tool and light duty bench press until seal bottoms in housing”.

- **Action Required: SP needs to determine if the Kent Moore J38196 is an acceptable alternative and add to the manual, I do not believe GM will be supplying the tool referred to as the “R&D supplied installation tool” any more.**

4.) According to the Rear Cover Installation (Section 4 Sheet 10) section of the Engine Assembly Manual, “install new bolts for each run”.

- Action Required: SP needs to determine if it is really necessary that new bolts be installed, in the current situation these bolts may be available limited quantities in the near future.

5.) According to the Upper Intake Installation- Section 6 Sheet 8 of the Engine Assembly Manual, one studed bolt PN 24502453 is required for installation.

- Action Required: SP needs to determine if it is really necessary the studed bolt be used or allow the non-studded (PN 24505205), the studed bolt (PN 24502453) has no purpose in our application.

6.) There is a disagreement between the assembly manual and the governing procedure.

- Assembly Manual: Section 3 Sheet 6 says “do not oil threads”
- Governing Procedure: 9.7.4.1 says to “apply build-up oil to the threads and to the surfaces of the bolt that contact the main bearing caps”.

SP minutes from 11/07/07 state: 3. Action Item – Sid Clark will ask the GM fastener engineer if labs should continue to use oil on the threads

Of used main cap bolts during engine assembly for honing. Done. Decided to continue to lightly oil as per the assembly manual.

- Action Required: Both documents need to be revised to state the decision above.

(Head Build) IIIG Procedure (9.5.3.1 (2)) Head Cleaning

- Requirement: the bath used to clean the Heads shall have a water temperature of 60°C (140°F)
- Requested we add a tolerance of ± 5 or 10°C

(Engine Build) There is a discrepancy between the part numbers on the gaskets and the part numbers on the procedure (9.9.5).

- Procedure calls for Left Head Gasket PN 2450381, actual PN is 24503802.
- Procedure calls for Right Head Gasket PN 24503802, actual PN is 2450381
- Action: Correct procedure

Head Build) IIIG Procedure (9.6.2) Head Cleaning

- Requirement: Using a 10-mm wire brush, extending two-thirds the length of the cylinder head from freeze plug hole to freeze plug hole, clean all core sand and casting slag from the cylinder heads to ensure unrestrained coolant flow.
- Observation: According to the mechanic, this has never been done before because it is impossible to do.