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Originally Issued: November 21, 2008

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Unapproved Minutes of the November 12, 20087
Sequence III Surveillance Panel Meeting
held in Warren, MI

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The meeting was called to order at 10:00 am by Chairman Bill Buscher.

Agenda Review

Pat Lang is Action & Motion recorder.

The Agenda was accepted as shown on attachment 1.

Membership Changes

Bruce Matthews of GM has been added to the membership list. A sign in sheet listing all attendees is included as attachment 2.

Meeting Minute Status

The May 6, 2008 meeting minutes were approved by the surveillance panel.

Review of Action Items from Last Meeting

Motions and Action Items

As Recorded at the Meeting by Pat Lang

1. Action Item – Surveillance panel chairman to request that the chairman of LTMS, Ben Weber, schedule a meeting to conduct a comprehensive review of the different LTMS systems utilized by the PCMO test types and their pros and cons.
Open. Is this still needed? Yes. Will change the LTMS task force chair from Ben Weber to Dan Worcester.
2. Action Item – Surveillance panel members to solicit their companies for potential GF-5 calibration oils.
Open. To-date, TMC has not been approached by any suppliers.
3. Motion – Remove “Most Recent Reference Oil Test History” table from Form 4 of the Sequence IVA test report and associated data from the Sequence IVA data dictionary. Note that this data is still available from other data sources.

Bill Buscher /Rich Grundza / Passed Unanimously

Done. TMC Report Packet Revision Notice issued on June 20, 2008.

4. Action Item – Chairman to report to ILSAC and ILSAC/Oil Chairman that a new Nissan Japan contact has been assigned to the Sequence IVA Test. In addition, chairman will report that we are still in a hardware availability situation.
Done.
5. Action Item – Chairman to contact Scott Gehring by phone to stress the severity of the hardware availability situation. If Scott’s response is not acceptable, the chairman will schedule a conference call with the SP and Scott Gehring.
Done. Conference call determined unnecessary.

6. Action Item – Chairman to contact both the Nissan Japan and Nissan North America representatives to verify who is the proper person to contact regarding hardware procurement and current hardware availability situation.
Done. Scott Gehring of NNA is our point of contact.
7. Action Item – If the hardware is not available by July 1, 2008, the Surveillance Panel to consider meeting with Scott Gehring to discuss the severity of the situation.
Done. Meeting determined unnecessary.
8. Action Item – Chairman to schedule a metrology workshop and an engine build workshop at Southwest Research to occur prior to November 2008.
Open. Plan to discuss tentative dates at today's meeting. Schedule for 1/6/09 – 1/7/09.

Fuel Supplier Report

Jim Carter of Haltermann gave the fuel suppliers report. Three batches of fuel have been blended during the report period and due to the small quantities being used, it is Haltermann's intention to blend small batches as needed. A question was asked whether EEE fuel can be used instead of the KA24E fuel. Some members were under the impression that this fuel was simply dyed EEE fuel. Both Bill Buscher and Jim Carter explained that this is not the case and this fuel is a variant of the VG fuel and was dyed to designate it from the VG and EEE fuels. Al Lopez commented that his lab has seen lower fuel dilution than other labs and wondered if there could be a batch affect. After some discussion, the group agreed on an action item, that under the guidance of the TGC, create a test fuel task force to include TMC, fuel supplier, and SP chairmen. This group will investigate best practices/methods for determining if the test fuel is changing.

Test Monitoring Center Report

A copy of the Test Monitoring Center Report is available at the TMC website. Rich also provided an updated report, which is included as attachment 3. There were comments about the current mild alarm and Bill noted that early on in the test, approximately late on his analysis regarding possible causes to the shift to on target results. Bill Buscher commented that early on in the test in the 1999 – 2000 time frame, the test had drifted mild. The mild trend was corrected by adding the jacketed rocker arm cover. Since then, ACW has been primarily in control, with some alarms. Rich concluded that no one component or process can be shown to have caused the return to on or near target results in the summation delta/s plots for average camshaft wear.

ACC Monitoring Agency Report

A copy of the report is available at the ACC Monitoring Agency website. No update was provided

Hardware Report

Bill Buscher presented a hardware update, which is included as attachment 4. The 2007 kits were delivered in May 2008. One lab was shorted 44 kits, but no others were shorted. 2008 order has been submitted and delivery is expected in March or April, 2009. Bill has been informed that the oil cooler is no longer available and the distributor, thought to be no longer available may no be available. Labs will need to order sufficient parts in 2009 as this may need to carry them through the life of GF-5, or 1015. The TMC was given an action item to survey the industry to determine how many parts are available by lab and batch, and to further identify by cam and rocker arm batch, as well as how many oil cooler and distributors are available. Bill noted that the 2007 cams do not have the batch code on the cams, but it is marked on the kit box. Andy Ritchie suggested that anticipated # of GF-5 tests be added to the survey. Jim Linden will try and make Nissan aware of the parts issues through contacts in ILSAC oil Committee.

Test Severity

Al Lopez of Intertek summarized his reference and testing history. Al had been mild since 2006, but in March of 2008, became so mild he could no longer calibrate with either reference oil 1006-2 or 1007. A copy of Al's presentation is included as attachment 5. Al had varied hardware, test conditions, stand items and has had little or no success in getting results near target. There were many discussions on mild results and at least one other laboratory had experienced a similar problem. This laboratory gave up after twenty tests and removed its IVA stand. Al made a motion to form a task force to attempt to resolve the laboratory severity issues. Al also agreed to chair this task force.

Scope and Objectives

The panel reviewed the current scope and objectives and revised accordingly. Revised scope and objectives are below.

ASTM Sequence IVA Surveillance Panel

Scope and Objectives

Scope

The Sequence IVA Surveillance Panel is responsible for the surveillance and continued improvement of the Sequence IVA test documented in Test Method D 6891 as updated by the Information Letter system. Data on test precision and laboratory versus field correlation will be solicited and evaluated at least every six months. Improvements in wear measurement technique, test operation, test monitoring and test validation will be accomplished through continual communication with the Test Sponsor and Parts Distributor, ASTM Test Monitoring Center, ASTM Committee D02.B0.01 and the ASTM Passenger Car Engine Oil Classification Panel. Actions to improve the process will be recommended when deemed appropriate based on input from the proceeding. The Panel will review development and correlation of updated test procedures with previous test procedures. This process will provide a suitable test procedure for evaluating an automotive lubricant's effect on controlling cam lobe wear for overhead valvetrain equipped engines with sliding cam followers.

Objectives

Target Date

- | | |
|---------------------------------------|---------------------|
| 1. Conduct 2009 metrology workshop | <i>January 2009</i> |
| 2. Conduct 2009 round robin | <i>May 2009</i> |
| 3. Conduct 2009 engine build workshop | <i>January 2009</i> |

4. Ensure a secure supply of Nissan KA24E hardware is available to accommodate testing through GF-5, anticipating the need for additional parts solicitations from Nissan. *On-going*
5. Monitor the progress of the comprehensive review of the different LTMS systems utilized by the PCMO test types and their pros and cons. *May 2009*
6. Task force to study ACW severity shifts and identify potential causes. *January 2009*

William A. Buscher III, Chairman
Sequence IVA Surveillance Panel

Updated: Nov 2008

A listing of the action items from this meeting are included as attachment 6.

There were two items of new business. The panel agreed to a motion to direct laboratories to report all data on tests run to full length, with descriptive comments on why the test was invalid. The panel also agreed to revise Section 6.3.1.4 to require QI calculations be adjusted for Bad Quality or Missing data in accordance with the DACA II guidelines, available on the TMC website.

The meeting was adjourned at 12:20 pm.

Sequence IVA Surveillance Panel


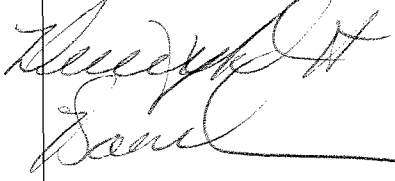
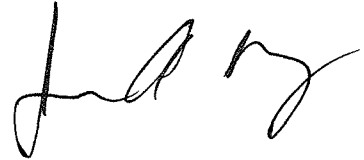




Warren, MI
GM Technical Center
November 12, 2008
10:00 a.m. - 12:00 p.m.

A G E N D A

1. Chairman comments
2. Attendance sign-in sheet distribution
3. Membership changes
4. Motion and Action recorders
5. Approval of minutes for 5/7/2008 All
6. Review action items from last meeting Buscher
7. Fuel supplier report – KA24E Green Fuel Carter
8. TMC report Grundza
9. ACC report Farber
10. Test hardware report Buscher
11. Review Scope & Objectives All
12. Old business
13. New business
14. Next meeting
15. Adjourn


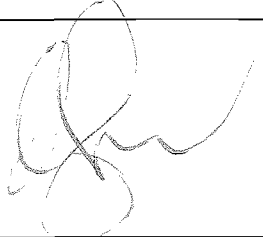

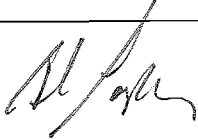

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November 12, 2008

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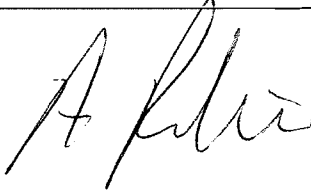
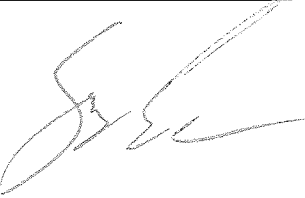

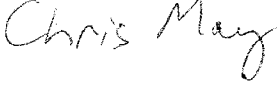


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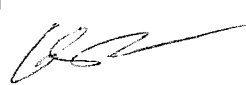
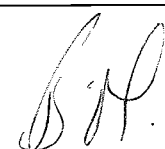
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ASTM IVA SURVEILLANCE PANEL

November 12, 2008

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Sequence IVA Update

November 12, 2008



Sequence IVA Update

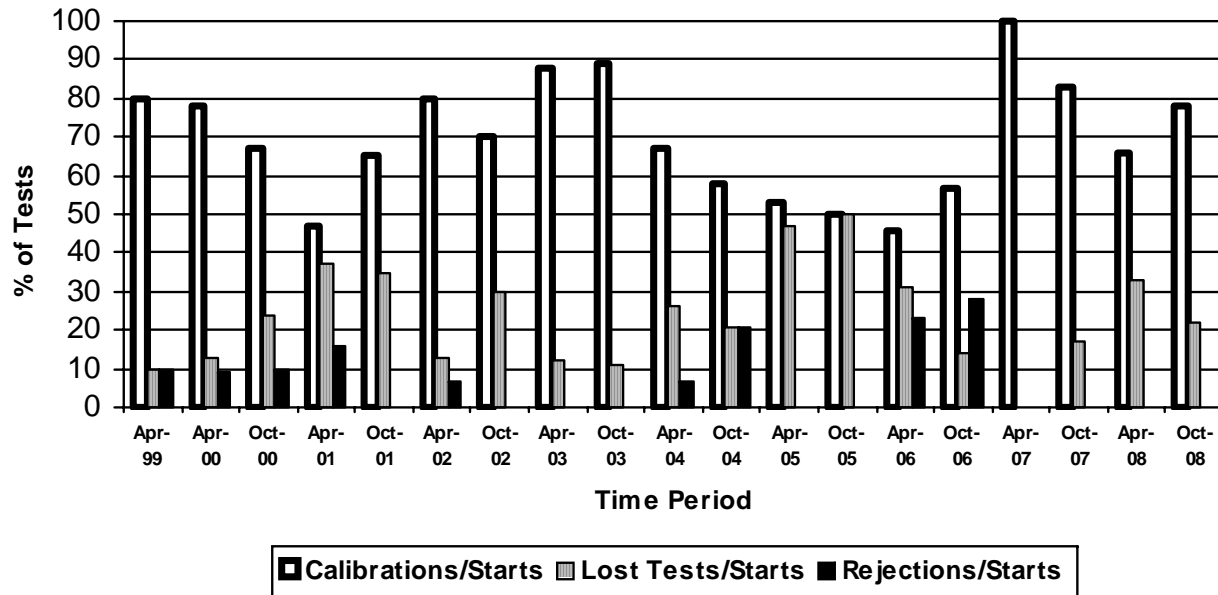
- Five stands at two labs calibrated as of today
- Calibration per start has increased, lost and rejected test rates decreased.
- Industry currently in severity warning alarm and precision action alarm



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Calibration Start Outcomes	TMC Validity Codes	No. of Tests
Operationally and Statistically Acceptable	AC	7
Operationally Invalid, Laboratory Judgement	LC	2
Total		9

Calibration Attempt Summary



Industry Severity Summary

Parameter	Average Δ/s	Pooled standard deviation (degrees of freedom)	Average Δ , in micrometers
ACW	0.415	6.317 (df=3)	2.62 μm

ACW Results, by Laboratory

Laboratory	Average Δ/s
A	0.606
B	N/A
C	N/A
F	-0.728

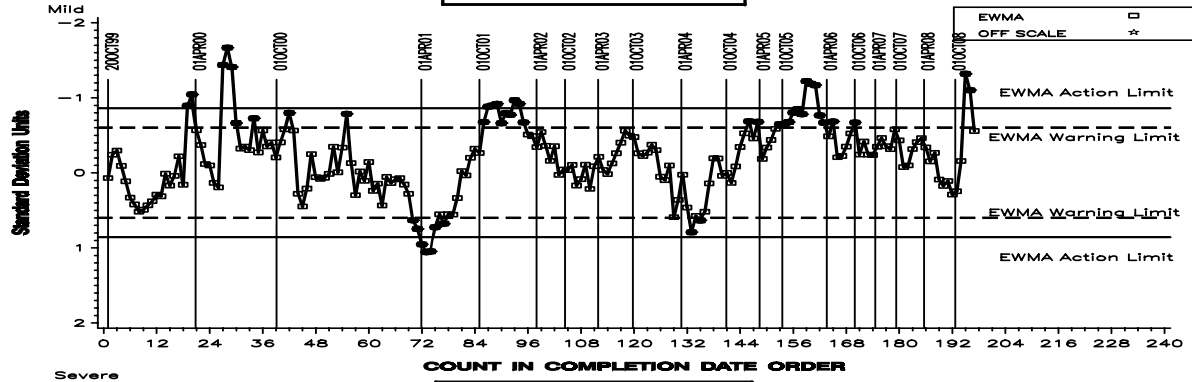


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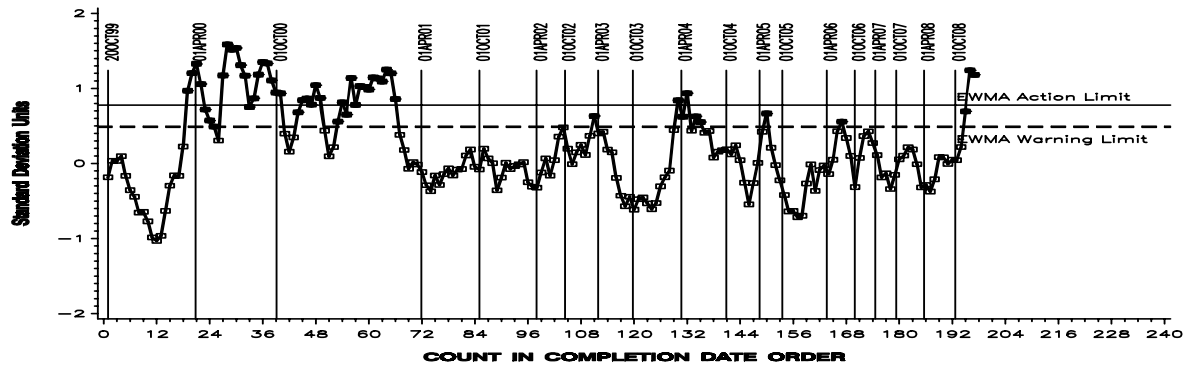
SEQUENCE IVA INDUSTRY OPERATIONALLY VALID DATA

AVERAGE CAM WEAR

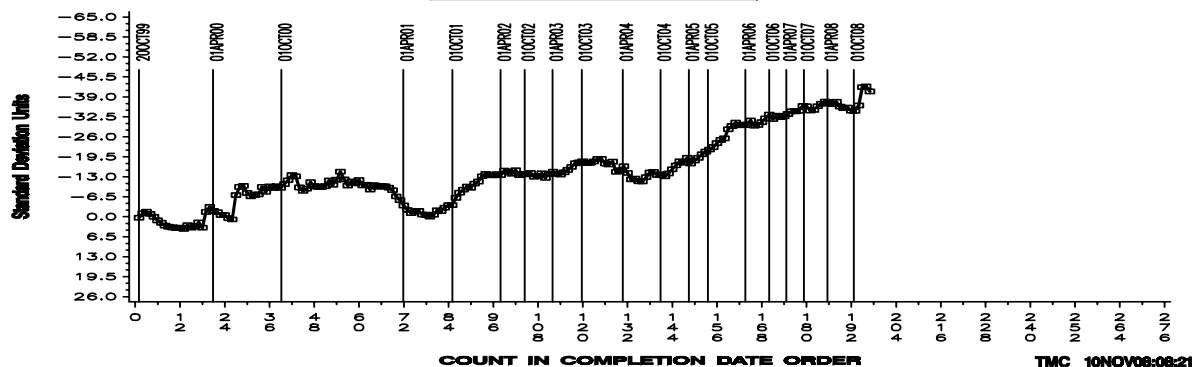
LTMS Severity Analysis



LTMS Precision Analysis



CUSUM Severity Analysis

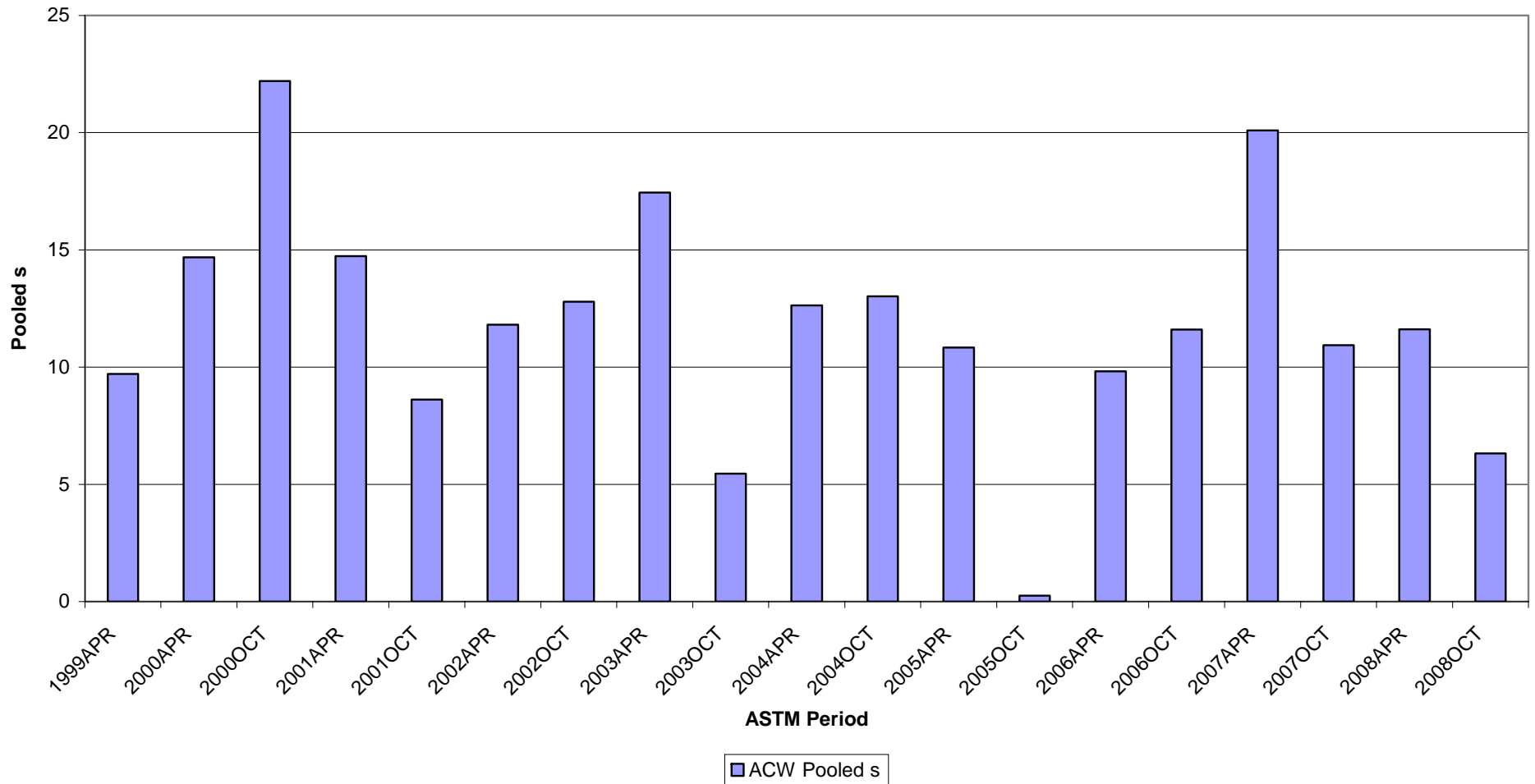


TMC 10NOV08:08:21



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Figure 3 - Sequence IVA Reference Oil Data
Average Camshaft Wear



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Other issues

- No information letters



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Test Hardware Report

- Hardware Status:
 - No shortage of test hardware.
 - Industry currently using mixture of 2003, 2005, 2007 and 2008 test kits.
 - 2007 Nissan parts order was delivered in May – September 2008.
 - Large orders were placed by multiple labs.
 - Multiple camshaft and rocker arm lots were received.
 - One lab was shorted 44 test kits.



Test Hardware Report

- Hardware Status Cont'd:
 - 2008 Nissan parts order has been submitted in September 2008. Parts scheduled to be delivered in March/April 2009.
 - Oil Cooler no longer available.
 - Some Test Stand Kit components no longer available.
 - Large order(s) placed by one or more labs.
 - A final Nissan parts solicitation expected sometime in 2009.

Intertek Automotive Research

Sequence IVA
Mild Severity Shift Summary
11/12/08
Al Lopez

Historical Timeline

- Intertek Calibration status expired 03/23/08.
- The lab has been trending mild since 2006
- In 2008 we have been unsuccessful in calibration attempts due to a substantial mild shift in severity.
- About 50 experimental tests have been conducted the past 10 months in an attempt to increase cam wear.

Experimental Efforts

- First a thorough fundamental check and verification of stand calibration, and operation was done. Have found everything within procedure.
- After repeated mild results, experimentation began in March 08.
- The initial strategy was to move single variables to observe wear sensitivity. (timing, spring tension, etc.)
- Lack of response prompted more drastic variation of the procedure in attempts to make cam wear.

Test Results

#	Test	EOT	Comment	Cam Batch	Oil Code	ACW (um)	Yi
1	01-357	02/23/08		03	1007	47.57	-2.45
2	01-358	03/02/08		05	1006-2	22.74	-7.661
3	01-358A	03/10/08		05	1006-2	19.88	-7.981
4	02-321A	03/16/08	Undamped driveline	05	1006-2	22.57	-7.680
5	02-322B	03/23/08		05	1006-2	31.74	-6.653
6	01-358B	04/01/08		02	1006-2	28.32	-7.036
7	01-358C	04/07/08		03	1006-2	27.68	-7.108
8	01-358D	04/17/08		96	1006-2	38.68	-5.876
9	01-358E	04/30/08	Pcv restrictions	96	1006-2	37.44	-6.015
10	02-321D	05/02/08	Pcv restrictions	05	1007	23.89	-3.953
11	01-358G	05/18/08	EF411 installation	07	1006-2	30.66	-6.774
12	02-321F	05/25/08	Matched injectors	07	1006-2	32.58	-6.559
13	02-321G	06/01/08	26 nm ramp load	07	1006-2	30.84	-6.754
14	02-321H	06/08/08	12 l/m RAC airflow	07	1006-2	38.07	-5.944
15	01-358H	06/18/08	New engine	07	1006-2	52.73	-4.302
16	02-321I	06/21/08	8 l/m RAC air flow	07	1006-2	31.59	-6.670
17	01-358I	06/24/08	SWRI fuel	07	1006-2	51.8	-4.406

Test Results

#	Test	EOT	Comment	Cam Batch	Oil Code	ACW (um)	Yi
18	01-358J	07/05/08	Jagged speed ramps	07	1006-2	49.24	-4.693
19	02-321J	07/05/08	Borrowed engine	07	1007	37.91	-3.042
20	01-358K	07/20/08	15A power, hi inertia	07	1006-2	48.29	-4.800
21	01-358L	07/29/08	Lo oil temp 2 deg	07	1006-2	37.69	-5.987
22	02-322	08/03/08	New engine, hi inertia	07	1007	38.86	-2.981
23	01-358M	08/10/08	Slow ramps, lo timing	07	1007	39.24	-2.956
24	02-322A	08/14/08	Gapped rings	07	1007	37.59	-3.063
25	01-358N	08/23/08	New dyno, fuel add	05	1007	28.64	-3.644
26	02-322B	08/22/08	15 timing, fuel add	05	1007	29.85	-3.566
27	02-322C	08/27/08	Lo temps 2 deg, hi flow	05	1007	32.69	-3.381
28	01-358O	08/28/08	program, coolant pr	05	1007	29.35	-3.598
29	02-322D	09/08/08	Detergent oil flush	05	1007	26.29	-3.797
30	01-358P	09/08/08	Coolant change, fuel lo	05	1007	27.26	-3.734
31	02-322E	09/14/08	Lo 5 deg oil, coolant	05	1007	21.59	-4.102
32	01-358Q	09/16/08	Hi 5 deg oil, coolant	05	1007	31.09	-3.485
33	02-322F	09/28/08	Over gapped rings	02	1007	26.57	-3.779
34	01-359	09/29/08	New hd, coolant type	07	1007	37.71	-3.055

Test Results

#	Test	EOT	Comment	Cam Batch	Oil Code	ACW (um)	Yi
35	01-359A	10/06/08	EBP LO, Fresh air mod	07	1006-2	29.51	-6.903
36	02-322G	10/12/08	EBP LO	02	1007	24.38	-3.921
37	01-359B	10/18/08	Swirl on, NOX doubled	03	1006-2	21.5	-7.800
38	02-322H	10/18/08	Swirl on	03	1006-2	21.98	-7.746
39	01-359C	10/25/08	Pos cc press, swirl	02	1006-2	33.20	-6.489
40	02-322I	10/24/08	EF411	03	EF411	43.44	NA
41	01-360	10/28/08	Live ref, mods from lab visit	07	1006-2	37.88	-5.965

List of Variables Manipulated

- Ignition timing
- Coolant temperature
- Oil Temperature
- Coolant flow
- Blowby (increased ring gaps)
- Driveline Inertia
- RAC air flow
- Backpressure
- Load
- Nox via swirl control
- Fuel pressure
- Fuel temperature
- PCV flow
- Oil flow
- Ramp rates
- Ambient air

Hardware Used / Replaced

- Cam Batches (07, 05, 03, 02, 96)
- Fuel Batches (4)
- Heads (old and new cc'd chambers)
- Engine blocks (Japan vs Mexico castings)
- Fuel injectors (flowed and matched)
- Dedicated power supply for the ignition
- Driveline damping (damped and undamped)
- Dyno change (oiler back to greaser)
- Intake manifolds, exhaust , TB, O2 sensors, distributors, coils, transistors,
- Fuel pumps, Heat exchangers

Additional Efforts

- Oil Thermocouple Insertion depth
- Cam installation with EF411 vs. candidate oil
- Coolant charge (60/40 mix and different brands)
- Complete harness pin-out and reference voltage check
- Oil analysis for H₂O, Nitration, and Oxidation
- PCM changes
- Removed and flushed RAC
- Replaced heat exchangers
- Detergent oil flush

Inter-Lab Activity

- May: visit from lab mechanic for cam installation
- October: visited calibrated lab and exchanged stand set up and data
- November: SWRI offered a used expired engine. We are under negotiations.
- Intertek is committed to offering this test to it's customers. Hardware supply available through GF5.
- Propose Task Force
 - **Mild severity shift study**
 - **Interactive exchange of data**

Sequence IVA Surveillance Panel

November 12, 2008

10:00AM – 12:00PM

GM Technical Center

Warren, MI

Motions and Action Items

As Recorded at the Meeting by Pat Lang

1. Action Item – Chairman to request that the LTMS task force chairman, Dan Worcester, schedule a meeting in January 2009 to conduct a comprehensive review of the different LTMS systems utilized by the PCMO test types and their pros and cons.
2. Action Item – Will look for some assistance from ILSAC chair to acquire additional reference oils meeting the Surveillance Panel's objectives.
3. Action Item – Chairman to conduct a metrology and engine build workshop at Southwest Research Institute on January 6 and 7, 2009.
4. Action Item - Under guidance of the TGC, create a test fuel task force to include TMC, fuel supplier, and SP chairmen. This group will investigate best practices/methods for determining if the test fuel is changing.
5. Action Item – TMC to issue a survey to test labs to determine the quantity of all Nissan parts on hand and how many parts have been ordered in the 2008 solicitation. Survey to including cam and rocker arm batch codes and corresponding quantities, and information on which cam batches have been proven out. Also include an estimate of how many tests labs need for GF-5. Completion date of December 1, 2008.
6. Action Item – Chairman to contact Nissan North America to determine the availability of parts for the current and future orders (single cam batches, all lab orders to be filled 100%, etc.), and to obtain details on what the camshaft and rocker arm batches identify (a date for casting/machining/packaging, one or more manufacturing plants, etc.).
7. Motion – Form a Sequence IVA ACW severity task force to investigate mild severity trends observed at one or more laboratories. Al Lopez to be the chairman of the task force.

Al Lopez / Dwight Bowden / Passed Unanimously

8. Motion – All Sequence IVA tests run to completion should report all data, no matter what the reported validity is. Descriptive comments to be included for all reported invalid tests.

Al Lopez / Rich Grundza / Passed Unanimously

9. Motion – Change section 6.3.1.4 of the Sequence IVA test procedure to include references to DACA II on how to process bad quality data.

Rich Grundza / Bill Buscher / Passed Unanimously