VH Operational Data Review | MINUTES

Revision Date *5/11/2017 8:35:00 PM*

Relevant Test:	Sequence VH
Note Taker:	Chris Mileti
Meeting Date:	05-02-2017
Lubrizol Attendees:	CHTM, JABS
Comments:	Meeting to discuss strategy for upcoming Sequence VH Precision Matrix operational data review.

1. DISCUSSION:

a) Opening Comments from A. Ritchie:

i) The purpose of this meeting is to develop a strategy for the review of the remaining Precision Matrix operational data.

ii) ***The following tests have been completed:***

(1) *Afton* – 4 tests
(2) *Intertek* – 8 tests
(3) *Southwest* – 5 tests
  (a) Their data will be posted to the TMC website by May 3rd.
  (b) TMC will then need to review SWRI's QI calculations.
(4) *Ashland* – 3 tests

b) Update from Ashland:

i) The first test that they submitted (REO1009) is valid.
ii) The second test that they submitted (REO940) had to be invalidated because the rocker arm cover coolant temperature was out of limits for 30%-40% of the test.
iii) The third test that they submitted (repeat of REO940) had to be invalidated because the fuel dilution was unusually low.
  (1) They were unable to identify this problem immediately because of the delay in getting the oil analysis results.
  (2) The fuel dilution returned to expected levels after they replaced the ECM (which was approximately 4-5 years old).
  (3) The original ECM appears to have been commanding an incorrect spark timing:
    (a) *Stage 1* ~ 16°
    (b) *Stage 2* ~ 26°
    (c) *Stage 3* ~ 90°
  (4) Ashland has requested additional ECM's from the other labs.
iv) They are now running their REO1011 Precision Matrix test.
v) The severity of Ashland's earlier prove-out tests was similar to the severity of the other development labs.
vi) Ashland is willing to redistribute their remaining Precision Matrix tests to the other labs.

c) Two Options for the Remaining Precision Matrix Tests (A. Ritchie):

i) There are currently (20) completed/valid tests from (3) separate labs.
   (1) The original goal was to have (24) completed/valid tests from (4) separate labs.
ii) As a result, the Sequence VH Precision Matrix currently meets the minimum requirement of (6) valid tests for each of the (3) reference oils.
iii) ***Comments from D. Boese:***
   (1) These (20) tests are sufficient to perform a statistical analysis on the dataset.
   (2) The (1) additional valid test result from Ashland will not provide any statistical benefit.

d) Comments from D. Boese Regarding the Precision Matrix Data:

i) The sludge discrimination looks good.
ii) The varnish discrimination is clear statistically but not visually.
   (1) The varnish ratings calculated using 50% of the piston skirt show better discrimination than the varnish ratings calculated with the full piston skirt.
iii) Oil screen clogging also shows statistical discrimination.
iv) ***Comments from Afton:***
   (1) It is very possible that the severity level of this test will shift with subsequent fuel batches.
   (2) The sludge generated during a VH test is darker and more liquid than the sludge generated during a VG test.
      (a) This allows the sludgy oil to drain off of the cylinder head more easily.
      (b) This, in turn, could be impacting oil screen clogging.
v) ***Comments from SWRI:***
   (1) They agreed with Afton that the sludge is more liquid with the VH test.
   (2) They speculate that this could be due to higher fuel dilution with the VH engine.
   (3) They also noted that the difference in sludge severity between the left-side and right-side cylinder head (with the VH engine) is the opposite of what it was with the VG engine.

e) Oil Screen Clogging:

i) ***Comments from Lubrizol:***
   (1) Lubrizol is leery of keeping oil screen clogging as a pass/fail parameter.
   (2) OSC has historically been heavily influenced by fuel batch.
      (a) This is best illustrated by the wildly different OSC industry correction factors needed for the last few batches of fuel.
ii) ***Comments from Intertek:***
   (1) Intertek has been studying the behavior of the OSC parameter with the VH engine.
   (2) They found that the OSC parameter can become lower if the oil screen is allowed to sit for a period of time.
      (a) It is almost as if the oil film dissipates.
iii) ***Afton Comments:***
   (1) The Intertek findings clearly indicate that the procedure should be updated to specify a time window in which the oil screen must be rated.
   (2) Unfortunately, specifying a window of time does have a downside.
      (a) What does a lab due if the test ends on a Friday but the Raters are not available until the following Monday?

f) Forward Action Plan:

i) The TMC will conduct a review of the QI calculations by May 9th.
ii) The engineers and statisticians can then conduct an operational data review on (or after) May 9th.
iii) Ideally, the statisticians would be given a validated dataset by May 19th (or earlier).
iv) It will take the statisticians approximately 1-month to review the data and make a recommendation regarding an LTMS system.

(1) Boese noted that LTMS2 will be used for the Sequence VH test.

v) Andy Ritchie will then recommend to the Surveillance Panel (around June 19th) that the Sequence VH be submitted for approval as an ASTM test.

g) Discussion about Sequence VH ECM's:

i) There was a discussion regarding whether each lab should be required to have the capability to monitor ECM/ECU data.

ii) Unfortunately, it is difficult to read data from these older ECM units.

iii) The labs could install a spark box on their stands to monitor ignition timing.

(1) Lubrizol uses a system called the IGTM2000.

(2) It costs approximately $3600 per unit.

Action Items	Person responsible	Completion Date

Follow-up Notes/Updates:	Initials	Date Added