Mack T13 Taskforce Meeting – 9/3/14 Exxon Mobil Technology Center

Mark Sutherland – TEI
Robert Warden – SwIR
Jose Starling – SwRI
Jim Moritz – Intertek
Bob Campbell – Afton
Christan Porter – Afton
Jim Matasic – Lubrizol
Kevin O'Malley – Lubrizol
Mike Conrad - Lubrizol
Mike Alessi – Exxon Mobil
Riccardo Conti – Exxon Mobil
Greg Shank – Volvo
Pat Fetterman – Infineum
Sean Moyer – TMC
Jim Rutherford – Chevron
Mark Cooper - Chevron
Bob Salgueiro (Phone) – Infineum
Jim Gutzwiller (Phone) – Infineum
Elisa Santos (Phone) – Infineum
Mrugesh Patel – Exxon Mobil
Sarah Parker – Exxon Mobil

Lab Tour:
Exxon provide discussion on their method of transferring VISION data from the ccp (ECM) into the data acquisition system so that it was properly time stamped and synced. They are using an internal VISION driver and mail slot messaging to make this happen

Action Item (Warden): Set up teleconference with automation/IT staff from each lab to discuss transference of VISION data to acquisition systems.

Matrix Testing Hardware:
Are we using the right test kits? Mark Sutherland indicated that there were a few parts that we shouldn't use. He will check what kit numbers started with the **batch A liners** that we should use. It should also be on the paperwork that came with the kit. First kit to have the bearings was kit 88 and liners 93. These should be the ones to build the matrix engines with.

Rod bearing batch was received. Surface roughness varies quite a bit, from 5microns to 30 microns. TEI is screening out the rough ones, about 60% is rough. Volvo is looking for surface bearing spec. Jim Moritz commented that the back side is pretty rough as well.

Rings; some have shown a staining. TEI is screening, but if we see them don't use them. Reject rate: ~50%

Cam thrust bearings; some old style have been showing up, should only be using the new style. Older style has a notch by the feed hole. Do not use these.

Volvo does not anticipate any upcoming hardware changes to the engine parts.

Matrix Prep Timeline:
Greg hopes that the MOA is signed by API today. When signed, it will go out to the other trade associations and the test labs after that. Oil is at all of the labs, but TMC is holding on oil assignments for the MOA to be signed. Sean was unsure if this was complete signing, or partial. We also may have a slight delay on implementing the VISION to data acquisition transfer. The feeling was that it would not be worth stalling the matrix.

The timeline to get the MOA signed is a bit unclear. The final version may not have been sent out to all parties interested for review by various legal groups. It's anticipated that it will have to be reviewed again due to edits from the last round of feedback.
UPDATE: Signed by API and being shipped out to the labs.

Final discussion was to aim for starting the week of the 15th, somewhat based on the rebuild requirements of the engines with incorrect hardware kits.

T13 Report Forms:

Volvo Ratings page will stay for now, although the labs are not trained to rate on the method.

Form4: No updates yet since we don't know what the test criteria are yet
Form5: We will develop QI values after the matrix testing
Form6: Targets to be developed after the matrix test
Form7: Rod bearing weight loss form will be the same. Same outlier methodology as the T12 since the n-size is the same.
Form8: Main bearing weights will remain the same. Main bearing batch ID removed
Form9: Ring weight loss to remain the same

Chem data: Keep it all for now; we may change after the matrix
MRV100: has been removed

Liner Surface summary: if we are no longer getting the data from TEI for each liner, we need to change the form to reflect what data we do have. If we are going to have pre-test measurements, would we want them to come from the same place? Mark Sutherland is checking to determine if the liners are serialized and the data can be sent to TMC on all liners that have gone out. For now, labs will not send anything on this form, but it will be left in for now.
Mark found the data; taking average of 4 places on the liner for surface finish. Data can be provided

Liner wear steps: keep doing what we're doing and report the 1s and 2s.

Downtime: No changes

Hardware: Each liner and each ring has its own cylinder number. Should we just use the test kit number to define the parts? Everything but the turbo, cylinder head, and injectors come in the kit. The rest of

the part number requirements on the page don't really need to be there. The TEI test kit number should be there. **The cylinder ID table will move to the individual component metrology pages for liners, bearings, and rings.**

Kit number moves to page one in the box where stand hours were

Test count should move to header page

Remove stand hours (ENHOURS) from test number, replace with test kit; STAND-STRUN-ENGINE-Kit#
Kit defined numerically, 4 digit field

Form20: Bore polish removed and ring riding going to be removed

Piston ratings; use the T12 method (required for the matrix) and add back in the piston rating report forms. Remove all Volvo ratings for now.

VISION Data
SwRI se_AirInletTemp value was a flat 30. This is a different parameter from the boost temp, which should have been 78. No one is really sure where this is measured from. IARs value was in the mid 40s, but appeared to move enough that it is not a flattened reading. Some other tests showed the same air inlet and boost temperatures.

It was recalled that the PGN that contains the ambient air temp also contains a value for the inlet air temp. Labs are checking on what they're doing.

Riccardo was to check with Kevin as to what impact this might have.

The difference in oil pressure seen in the vision data was not alarmingly high to Volvo's internal engine guys. We seem to see two distinct populations and don't think that the vis grade was the major driver.

T-13 OC Calculations
Don't break up the interval if there is no sample taken. For the 24 hour periods between sample/add, remove the first hour and regress the rest of the 23 hours. Weigh averages as with the T-12 method for shutdowns, removing one hour after each. Later in the test when going to 12-hour sample intervals, combine the two 12 hour intervals between an oil addition. For the test average, combine everything after the first 24 hour period. We may need to add a page within the test report to have OC rate by 24 hour period.

Greg indicates that OC rate is likely to be a pass fail parameter.

Sensor Response Times
There is a table for the T12 that has a response time requirement for various parameters. Riccardo showed this table and it was generally felt that it would be appropriate to move forward with for the T13. The only addition to this table was the torque response time of 3seconds. Referring back to the DACA II report, but no one could find it on the TMC website. It was later determined that it provided guidance on how to measure system response for torque, but not a time.

The Sequence3 limits of .6 on torque and .1 on RPM were considered to be unreasonable.

Crank Case Pressure
Discussion was on if we should put a target, a range, or a suggested value. It was determined to try and target -0.3 to 0.3 kPa.

Procedure
It was determined to try and review the procedure at the call for data acquisition.

T13 Critical Parts
Parts to have TEI maintain a stock of at the request of the Task Force will be discussed at the call for data acquisition.