

**From:** [Salgueiro, Bob](#)  
**To:** ["michael.l.alessi@exxonmobil.com"](#); ["Athey Allison"](#); ["bermadl@cpchem.com"](#); [msutherland@tei-net.com](#); [Boese, Doyle](#); ["Bob.Campbell@AftonChemical.com"](#); ["bradley.carter@intertek.com"](#); ["riccardo.conti@exxonmobil.com"](#); [Fetterman, Pat](#); [Gutzwiller, James](#); ["jmccord@swri.org"](#); ["kjohnson@swri.org"](#); [Ritchie, Andrew](#); [Santos, Elisa](#); ["greg.shank@volvo.com"](#); ["msutherland@tei-net.com"](#); ["vanscj@cpchem.com"](#); ["robert.warden@swri.org"](#); ["christian.porter@aftonchemical.com"](#); ["jecarter@haltermann.com"](#); [Jeff Clark](#); ["nicholas.secue@lubrizol.com"](#); ["michael.conrad@lubrizol.com"](#); [Sean A. Moyer](#); [Matasic, James \(James.Matasic@lubrizol.com\)](#); [Rutherford, Jim \(JARU\) \(JARU@chevron.com\)](#); [Bishop, Zack \(zbishop@tei-net.com\)](#); [Rich Grundza](#); [chris.castanien@gmail.com](#); [Cauley, Chris \(Chris.Cauley@volvo.com\)](#); [Steve Kennedy \(steven.kennedy@exxonmobil.com\)](#); [Jim Moritz Intertek](#); [scott.richards@swri.org](#)  
**Subject:** Mack Surveillance Panel Meeting Minutes - March 4, 2014  
**Date:** Saturday, March 08, 2014 7:33:48 AM  
**Attachments:** [Valve Stem Failure 022414.pdf](#)  
[T12 ref data 2-24-14.xlsx](#)  
[140305 Mack SP Agenda.docx](#)  
[Mack CPD Update 2-27-2014.pdf](#)  
[07 Mack T-12 Ring Analysis 2014-03-04.pdf](#)

---

Good morning everyone,

Please find the minutes below of the March 4<sup>th</sup> meeting held by the Mack Surveillance Panel. Please feel free to let me know if there are any changes or revisions needed. Thanks.

## Mack Surveillance Panel Meeting

ExxonMobil Paulsboro Technical Center, Paulsboro NJ

March 4, 2014

### Attendees:

Bob Campbell	Afton
Christian Porter	Afton
Mark Cooper	Chevron Oronite
Jim Rutherford*	Chevron Oronite
Chris Castanien	Castanien Consulting
Riccardo Conti	ExxonMobil
Jim Carter	Haltermann
Pat Fetterman	Infineum
Bob Salgueiro	Infineum
Elisa Santos*	Infineum
Jim Moritz	Intertek
Jim Matasic	Lubrizol
Bob Warden	SwRI
Mark Sutherland	TEI
Sean Moyer	TMC
Greg Shank	Volvo/Mack
Allison Athey*	Volvo/Mack
Luke Irvin**	Volvo/Mack

\*Participated via telecom

\*\*Participated via telecom until 1:50PM.

The meeting was called to order at 1:15PM EDT by chair Mark Cooper who reviewed the agenda.

**CPD Update** - Mark Sutherland, TEI.

**T-12 Injector** production is being limited by BOSCH to 30/month. TEI is stock piling them and has 120 currently. The **"Starship" Oil Filter Centrifuge Housing** is no longer available, local salvage yards and TEI are both out of stock. The surveillance panel needs to move to another housing. Moritz (IAR) suggested one option filter housing has a boss to install the thermocouple. Campbell (AFTN) asked how much flow is routed to the centrifuge? The Starship housing was preferred because it had an extra support brace to the block which help reduce their failure due to vibration. Moritz (IAR) will advise on which housing to use. Covert Manufacturing produced **Connecting Rods** for the Mack T-12/T-11 tests. However, there is a slight offset on the center of big end of the rod causing a bearing crush issue. Rod rejection rate at TEI is ~25%. The prior inspector at Covert Manufacturing left the company. Covert Manufacturing has a new one and TEI is working with him to resolve this issue. Federal Mogul has produced 250+ **New Piston Crowns** to new tighter tolerances. This is a pilot batch equivalent to about 40 tests worth of pistons. TEI inquired about getting a larger batch of 3000 pistons and Federal Mogul Prototype Center said they could do that but would tie up their machines for about 1 month. Pistons will be machined at FM prototype Center where many more measurements above and beyond what is normal production to control these pistons to extra tight tolerances. These pistons are cut based on measurements from the crown, while previously they were cut measuring from the pin bores. TEI needs 120 days lead time for next order. The **T-11 small turbo** order of 22 turbos is supposed to arrive this week. All the **"V" batch cylinder liners** are at TEI now, with 3500 in stock.

**Critical Part Inventory Update:**

**Piston crowns** – 588 left ~100 kits worth. 250 new pistons from FMPC should arrive in March.

**Piston skirts** – TEI is observing pin holes in the skirts and rejecting them, but still have 1870 left.

**2<sup>nd</sup> Piston rings** – TEI recently rejected 240 2<sup>nd</sup> rings that are warped.

**Con Rod Bearings** – TEI is rejecting many due to poor packaging which is resulting in damage during shipping. TEI is working with supplier to resolve.

**Miscellaneous Parts Issues** – Small Turbos and Oil filter housing (see above). Mack T-11 and T-12 new bare blocks are at REMACK but being sold only as part of a long block kit. Campbell (AFTN) asked Shank if he could assist in helping obtain bear blocks from REMACK vs having to purchase long blocks. Athey (VLVO) will look into this.

Volvo **piston rings** supplier is dialoging but doesn't know what to do differently with the rings. Cooper (ORO) asked if the rings could be made to tighter tolerance? The barrel face changed, porosity was skewed to one side vs other to see if makes a difference. Campbell (AFTN) don't run new crowns without new rings, if the rings are going to change as well. Salgueiro (INF) shared the Ring Analysis data at the request of Volvo/Mack. If TEI can get the print of the rings, they can pursue manufacturing them at a different supplier.

ACTION: Shank (VLVO) will try to get the print. Sutherland (TEI) confirmed barrel rise spec range is 1 to 2 thousands difference. Castanien (CAST) asked if we use a different supplier could we wind up with different metallurgy, coatings, etc?

**Valve Issues** – Richard Page (SWRI) made a presentation on Metallurgical Analysis of failed valve.

Fracture occurred 0.16" above the machined transition on the valve. The Surface of the fracture was significantly damaged from the failure leaving only small undamaged recessed regions for analysis. It was not possible to examine the initiation sites, the role of possible defects, or growth regions. An examination of the small recessed regions and observed fatigue striations present are indicative of a high cycle fatigue fracture. An analysis performed on the fractured valve and on valves from the same batch as the fractured valve revealed the presence of large carbides. The blocky carbides were absent on the valve from the "good" batch. The large carbides are present across the surface of the valves and could serve as initiation points for failure. A spectroscopy of the blocky carbides showed they were rich in Niobium. The grain structure was recrystallized on the surface of the valve stem from the fractured batch while the valve from the "good" batch had a very elongated grain structure, indicating a difference in heat treatment of the valves. Volvo has reviewed the presentation with their valve supplier Mahle. It's unclear whether the carbides or the niobium are the cause of the failure. There are no non-destructive methods of analysis to determine the niobium or carbide presence before using the valves. The analysis from Mahle in Gothenburg should identify the issue and get it resolved, the problem is what to do in the meantime with the current valves? AFTN suggested reusing old valves if they still work. SwRI suggested analyzing a couple from a batch to qualify a batch. There should be more information available from Mahle by next week.

ACTION: Shank (VLVO) will determine what the codes for the valves mean (10 28 13).

ACTION: Warden (SWRI) will continue to explore non-destructive screening analysis methods

ACTION: Shank (VLVO) will report back on Mahle's findings on the valve analysis.

**T-8 injection pumps** – Test method says to buy them brand new but they are no longer available brand new. The SP needs to change the test method to allow use of rebuilt pumps. Conti (XOM) the reason for only buying new pumps from one source may have been that they needed to be sent to a specific rebuilder for calibration.

**MOTION: Jim Moritz (IAR) motioned and Bob Warden (SRWI) seconded to change the wording of T-8/8E test procedure to test procedure to allow the use of rebuilt fuel pumps.**

Approve – 10

Oppose – 0

Waive – 0

Fetterman (INF) asked if for consistency would it be better to go though only TEI? Campbell (AFTN) T-8 pumps drift from day one so if there's a way to drive consistency it might be better.

**MOTION: Pat Fetterman (INF) made a motion and Bob Campbell (AFTN) Seconded – Motion to use TEI as supplier for T-8 injection pump.**

Approve – 8

Oppose – 0

Waive -2 (TMC, TEI)

**Severity Adjustments** have been frozen since TUXO hardware – Do we unfreeze them or keep them at pre-TUXO hardware values? TMC says results are trending steadily, TRWL may be moving

around. Moyer (TMC) presented control charts for the T-12. Matasic (LZ) shared raw and corrected values for the T-12 parameters 0-300 Pb was steady, 250-300 Pb was steady TRWL was about the same, CLW seems to have come down a little with VUXO, Oil consumption has step changed higher in severity, but correction factors seems to bring in the data back down to the 2006-09 timeframe. The correction factors seem to work for the reference oil TMC-821l but do are they translating over to candidate tests? A key concern is that test may be different than it was before. Campbell (AFTN) suggested Jim Rutherford take another look at the correction factors to ensure they are still appropriate. Campbell (AFTN) asked would EMA let the T-12 drop because liner wear is no longer an issue? Shank (VLVO) replied that today Volvo/Mack would want to carry on with the test.

### **Additional flexibility Mack T-12A**

Currently, per the test procedure, there are limitations to run T-12A's (flush & run) separately from T-12A's that are measured during full length T-12s. Warden (SWRI) was asking how resolve the scenario where a lab runs a T-12 and T-12A, then pulls that engine off the stand, runs another engine for 5 "flush and run" T-12As, and afterward, changes that engine out to continue running full length T-12s with T-12As. Any of the T-12As as part of the full length T-12s would be invalid because the calibration period was used up on that stand with the "flush & run" T-12As. Severity applies to a stand not an engine. Labs can run 5 flush and runs before having to recalibrate. Is it allowable to run a flush and run engine pull it out then run a T-12 engine. Matasic (LZ) suggested giving two stand designations one for T-12 and one for flush and run so they could be tracked by TMC separately.

ACTION: Moyer (TMC) to compare the SA's or MRVs generated between Mack T-10 and T-10As for differences. Campbell (AFTN) A visual inspection of T-11A data seemed flat.

Concern is that after 5 flush and run results, following with T-12/T-12As a lab can't generate a valid T-12A because they used up the calibration period? Need a distinction between flush and runs and T-12As. No one in the panel objected to the concept. Warden (SWRI) will continue to work on the wording for changing the test procedure.

Matasic (LZ) brought up few weeks ago he had problems with his engine running, he replaced the pumps. He asked if new fuel pumps are still available or just remanufactured pumps. IAR and SwRI didn't know which pumps they had.

Warden (SWRI) – Wanted to add additional sensors to protect their engines and to know if the SP had any issue with them using this sensor. The Di-electric value seems to change with Pb and Cu levels to predict when a rod bearing is about to fail. No one raised any objections.

Warden (SWRI) – bringing up limitation in test procedure to only use referenced blocks for candidates. Clarification the test procedure says new engines with new EGR kits needs to be referenced. But an replacement block is not considered a new engine.

**MOTION: Bob Warden (SWRI) motioned and Jim Matasic (LZ) seconded to remove the requirement from Section 11.5.2.1. of the T-12 test procedure that new engine and EGR kit requires a reference.**

Approve – 9  
Oppose – 0  
Waive – 1 (TMC)

The Mack Surveillance Panel Meeting adjourned at 4:51PM.

Respectfully submitted,

**Bob Salgueiro**

Industry Liaison Advisor

Infineum USA L.P. 1900 East Linden Avenue Linden NJ 07036 USA

Office: 908-474-2492 Fax: 908-474-3637 Mobile: 908-358-8742 E-mail: [Bob.Salgueiro@Infineum.com](mailto:Bob.Salgueiro@Infineum.com)



Please consider the environment before printing this e-mail.

*This note and any attachments may contain Infineum confidential or proprietary information. If you are an unintended recipient: (i) place no reliance on the information contained herein; (ii) do not disclose, distribute, or duplicate any information from this note; and (iii) please contact the sender.*

--

This message was scanned by ESVA and is believed to be clean.

[Click here to report this message as spam.](#)