LSPI Task Force Meeting
April 13, 2018

Agenda:

1. Roll Call
2. Overview of available piston types
3. Stats Group to present recommendation for introduction of BC pistons
4. Discussion/Action/Motions

Documents:

1. Sequence IX BC Piston Approval 041318.pdf

LSPI Task Force Voting Members

Name	Contact Info	Company	Attend
Felt Mounce **Voting Member**	Phone: (210) 522-5411 felt.mounce@swri.org	SwRI	Y
George Szappanos **Voting Member**	Phone: Greg.Miranda@Lubrizol.com	Lubrizol	Y
Adrian Alfonso **Voting Member**	Phone: (210) 838-0431 Adrian.Alfonso@Intertek.com	Intertek	Y
Amol Savant **Voting Member**	acsavant@valvoline.com	Valvoline	N
Ed Altman **Voting Member**	Phone: 804-788-5279 Ed.Altman@AftonChemical.com	Afton	Y
Robert Stockwell **Voting Member**	Phone: (210) 232-3188 Robert.stockwell@chevron.com	Chevron Oronite	Y
 Voting Member	Phone:	ExxonMobil	N
Andy Ritchie **Voting Member**	Phone: Andrew.Ritchie@Infineum.com	Infineum	Y
Jeff Hsu **Voting Member**	Phone: (281) 544-8619 j.hsu@shell.com	Shell	N
Preston Tarry **Voting Member**	Phone: Preston.Tarry@bp.com	BP	Y
Ron Romano **Voting Member**	Phone: (313) 845-4068 rromano@ford.com	Ford	Y
Voting Member	Phone:	General Motors	N
Teri Kowalski **Voting Member**	Phone: (734) 995-4032 Teri.Kowalski@tema.toyota.com	Toyota	N
Haiying Tang **Voting Member**	Phone: (248) 512-0593 HT146@Chrysler.com	Chrysler	N
Rich Grundza **Voting Member**	Phone: (412) 365-1034 reg@astmtmc.cmu.edu	TMC	Y
Dan Lanctot **Voting Member**	Phone: (210) 690-1958 dlanctot@tei-net.com	TEI	Y
Jason Bowden Proxy: Matt Bowden **Voting Member**	Phone: (440) 354-7007 jhbowden@ohtech.com	OHT	Y
Prasad **Voting Member**		Haltermann	Y
Timothy Hadaway **Voting Member**	Phone: +49 (0) 6341 991 4761 Timothy.Hadaway@apl-landau.de	APL	Y

Meeting Attendance

Name	Company
Ed Altman	Afton
Christian Müller	APL
Timothy Hadaway	APL
Preston Tarry	BP
Ian Elliott	Chevron Oronite
Jo Martinez	Chevron Oronite
Robert Stockwell	Chevron Oronite
Ron Romano	Ford
Prasad	Haltermann
Andy Ritchie	Infineum
Charlie Leverett	Infineum
Doyle Boese	Infineum
Adrian Alfonso	Intertek
Jason Soto	Intertek
George Szappanos	Lubrizol
Kevin O'Malley	Lubrizol
Matt Bowden	OHT
Felt Mounce	SwRI
Dan Lanctot	TEI
Rich Grundza	TMC

LSPI Task Force Meeting Minutes
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Actions

Action 1::	Stats group to provide alternate run order to have two "221" oils and two "222" oils in the first row.
Action 2	Ron to identify a borderline pass oil for possible testing on BB pistons for later comparison to testing on BC pistons.
Action 3	Stats group to analyze the reference data ran using BB pistons and compare to the original precision matrix.

Motions

1. Run matrix using BC pistons as recommended by the statistician group, shown below.
   a. Stats group to provide alternate run order to have two "221" oils and two "222" oils in the first row.

Run Order	A1	A2	B	G1	G2
1	222	220	222	220	221
2	220	221	221	222	222
3	221	222	220	221	220
4	221	220	221	222	221

Made by Al Lopez

Seconded: Ron Romano

Discussion:

Al – PM used new engines. How should we handle the new matrix?

Ron – We should use new engines.

Felt – We could use the engines that were originally used to evaluate BC pistons as two of the engines.

Al – We should look at the reference data on BB pistons to compare severity with age.

Al – Can we alter the matrix to allow another 221 first run on one of the A test stands.

Felt – What is the timing of running these tests?

    Al – IAR is ready to go now. Possible done in a month.

    Felt – SwRI could start running a single stand in 2 weeks.

    George – Might be able to start in 2-4 weeks.

Motion Passes unanimous by voice vote.

Sequence IX "BC" Piston Approval

Statistics Group

April 13, 2018

Statistics Group

- Doyle Boese, Infineum
- Jo Martinez, Chevron Oronite
- Kevin O'Malley, Lubrizol
- Martin Chadwick, Intertek
- Richard Grundza, TMC
- Lisa Dingwell, Afton
- Todd Dvorak, Afton
- Travis Kostan, SwRI

Background for IX "BC" Piston Approval

- Currently using "BB" pistons but will run out soon.

- "BC" pistons were tested last year by labs A and G and observed to have changed the severity of the test.

TESTKEY	LTMSLAB	LTMSAPP	IND	LTMSDATE	AVPIE	Sqrt(AVPIE+0.5)	AVPIEyi	ENGINEHR	HEADHRS	TESTNUM	COM1	COM2	COM3
126817-IX	G	1	220	20170518	2	1.5811	2.5507	100	175	62-0-195			2016 BC
127255-IX	A	2	220	20170620	1.25	1.3229	1.4857	79	79	2-3-16-84	INLETAIR	QI<0 ITC	2016 BC
			Avg 220		1.61	1.4520							
118370-IX	G	1	221	20170520	6	2.5495	-2.3064	121	199	62-0-196			2016 BC
124432-IX	A	2	221	20170616	7	2.7386	-1.7825	50	50	2-2-16-83			2016 BC
			Avg 221		6.49	2.6441							
126811-IX	G	1	222	20170509	19.75	4.5	0.8745	23	98	62-0-192			2016 BC
125586-IX	A	2	222	20170614	23.25	4.8734	2.2606	30	30	2-1-16-82			2016 BC
127793-IX	G	1	222	20170712	26.75	5.2202	3.5477	137	215	62-0-208		AVPIESEV	2016 BC
			Avg 222		23.16	4.8645							

Ref. Oil Target	Sqrt(AVPIE+0.5) Mean	AVPIE Mean	St. Dev
220	0.9626	0.43	0.2425
221	3.3819	10.94	0.3609
222	4.2644	17.69	0.2694

Severity differs by oil

- Raw LSPI data means by piston batch code (BB vs. BC) suggests a non-constant severity difference across the reference oils

Scatterplot of LSPI-BC vs LSPI-BB (PM)
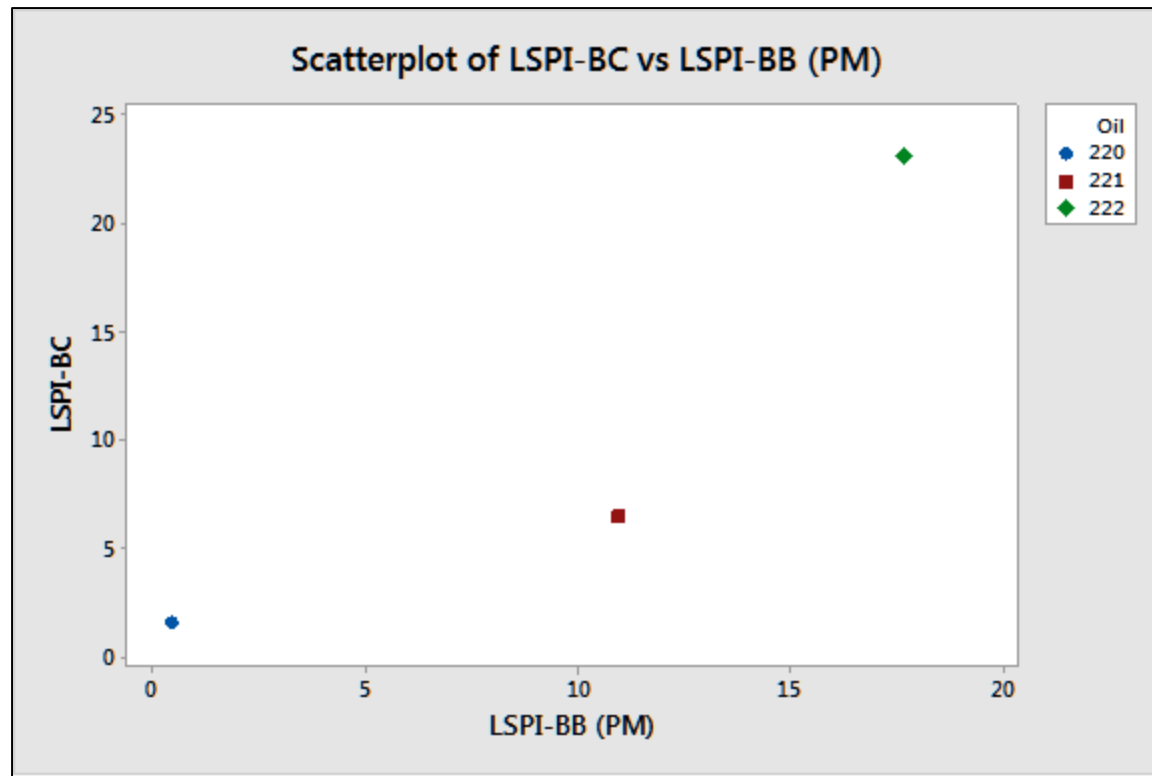
Options for Sequence IX "BC" Piston Approval

Surveillance Panel Options:

1. Run additional reference tests with BC pistons & use LTMS to generate Severity Adjustments
   - ***Not Recommended** – the test severity appears to differ by reference oil*

2. Run the following matrix and Statistics Group will analyze the data to determine if industry correction factor is appropriate.

Run Order	A1	A2	B	G1	G2
1	222	220	222	220	221
2	220	221	221	222	222
3	221	222	220	221	220
4	221	220	221	222	221

3. Run tests on a non-reference oil that is close to the pass/fail limit that has data on the "BB" piston.
   - Severity adjustment and/or correction factor may be determined from the non-reference oil data and/or a combination of 1 or more of the reference oils
   - This option may also require additional reference tests to generate an adequate data set for analysis