Sequence III Surveillance Panel
Teleconference Meeting Minutes

Wednesday August 29, 2019 10:00 – 12:00 EST

Agenda

As the host, I have not in the past and will not in the future record any ASTM meeting and there are no "authorized persons" that may record an ASTM meeting. As a reminder to everyone the recording of ASTM meetings is prohibited.

1.0) Attendance

See attachment 1

2.0) Chairman Comments

Change to forms passed unanimously.

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3.0) Approval of minutes

3.1) Minutes from 8/29/2019 Meeting – approved unanimously.

4.0) IIIH Action Items

4.1) IIIH Hardware Update (Batch 7 rings) – Bowden

No new update from Jason other than summarizing the status of BC7 rings, and that BC6 supply is depleted. Ready to move on to BC7.

Also briefly discussed was fuel supply. Fuel update by Prasad: ran out of fuel at Nixon, new Nixon 400k gal batch ready next week. Ed suggest that Haltermann send out notice when fuel running low, suggests monthly or quarterly volume updates. Prasad agreed.

Review of test results on BC7 rings: (see attachment 2)

BC-7 ring data analysis by Todd:

- 4 results reported on 434-3 from 4 labs
- No significant diff in WPD and PVIS, or PRET
- Blowby data is similar to BC5 and BC6

Rich – commented that all data charted, and would have calibrated the stands.

Motion to introduce ring batch BC7: Jason, 2nd by Ed

Wording: "As of 10/4/2019 all stands can begin using BC7 on FIFO basis exhausting BC6 first, no referencing required for stands to begin using."

No waives, no negatives, and passes unanimously.

Todd to examine new data as it comes in.

Motion regarding LTMS by Rich: "Tests which ran approval will be charted with LTMS date of Oct 8, 2019 and SA will be applied to candidates starting after that date."

Second by Robert Stockwell. No waives. No negatives. Passed unanimously.

Additional comment by Rich - TMC to adjust calibration periods to address early reference for stands that ran BC7 rings approval tests.

Jason reported that two years usage are expected on BC7 rings, surveys to go out to labs in Dec for forecasting next year.

4.2) Zi Alarm discussion – Grundza / Stockwell

Rich presented information regarding PVIS and RO436, which is recently trending mild based on CUSUM. Similar to 434, but stabilized for last several months. RO 438 seems to be behaving a little better (but has higher std dev). The cause of the mild results is unknown at this time.

4.3) Other Topics

Alternate fuel update by Ankit – to go with matrix design with 3 labs, 3 stands (9 tests). Some additional details to determine at next meeting. Ed Altman asked Jason for expected supply of BC5 pistons. BC5 pistons were procured as a 5 year supply.
Laura Birmbauer asked when latest version of report forms would be available, Rich Grundza indicated they are in the middle of Beta testing and should be available to labs for use in roughly three weeks

5.0) Old Business

None.

6.0) New Business

None.

7.0) Review / Update Scope and Objectives

Not reviewed.

8.0) Next Meeting

Tentatively scheduled for November 14, 2019.

9.0) Meeting Adjourned

10:51 a.m.

ASTM Sequence III Surveillance Panel (21 Voting members) date: 10-4-2019

Name/Address	Phone/Fax/Email		Signature
Jorge Agudelo	jorge.agudelo@bp.com	Voting Member	Present_____
✓ Ed Altman	ed.altman@aftonchemical.com	Voting Member	Present_____
✓ Jason Bowden	jhbowden@ohtech.com	Voting Member	Present_____
✓ Ian Elliott Robert	IanElliott@chevron.com	Voting Member	Present_____
✓ Richard Grundza	reg@astmtmc.cmu.edu	Voting Member	Present_____
✓ Jeff Hsu, PE	j.hsu@shell.com	Voting Member	Present_____
Teri Kowalski	teri.kowalski@toyota.com	Voting Member	Present_____
✓ Dan Lanctot	dlanctot@tei-net.com	Voting Member	Present_____
✓ Patrick Lang ~~Andrii~~	plang@swri.org	Voting Member	Present_____
✓ Dave Passmore called 2 times	dpassmore@imtsind.com	Voting Member	Present_____
✓ Michael Raney	michael.p.raney@gm.com	Voting Member	Present_____
✓ Andrew Ritchie Wants	andrew.ritchie@infineum.com	Voting Member	Present_____
✓ Ron Romano	rromano@ford.com	Voting Member	Present_____
Cliff Salvesen	clifford.r.salvesen@exxonmobil.com	Voting Member	Present_____
✓ Amol Savant	acsavant@valvoline.com	Voting Member	Present_____
✓ Addison Schweitzer	addison.schweitzer@intertek.com	Voting Member	Present_____
Scott Stap	scott.stap@tgidirect.com	Voting Member	Present_____
✓ George Szappanos	george.szappanos@lubrizol.com	Voting Member	Present_____
✓ Haiying Tang	HT146@chrysler.com	Voting Member	Present_____
✓ Prasad Tumati	ptumati@jhaltermann.com	Voting Member	Present_____

Stand Ltrs Date Oct 8, 2019
Ignore DC-Trinso

ASTM Sequence III Surveillance Panel (21 Voting members) date:

	Name/Address	Phone/Fax/Email		Signature
	William Anderson	Bill.Anderson@AftonChemical.com	N-V Member	Present_____
	Ricardo Affinito	affinito@chevron.com	N-V Member	Present_____
	Robert Bacchi	robert.bacchi@basf.com	N-V Member	Present_____
✓	Jeff Betz	jbetz@IMTSIND.com	N-V Member	Present_____
✓	Laura Birnbaumer	labi@chevron.com	N-V Member	Present_____
✓	Doyle Boese	doyle.boese@infineum.com	N-V Member	Present_____
	Adam Bowden	adbowden@ohtech.com	N-V Member	Present_____
	Dwight H. Bowden	dhbowden@ohtech.com	N-V Member	Present_____
	Matt Bowden	mjbowden@ohtech.com	N-V Member	Present_____
	Jerome A. Brys	jerome.brys@lubrizol.com	N-V Member	Present_____
	Jessica Buchanan	jessica.buchanan@lubrizol.com	N-V Member	Present_____
	Bill Buscher III	william.buscher@intertek.com	N-V Member	Present_____
	Bob Campbell	bob.campbell@aftonchemical.com	N-V Member	Present_____
	Domingo Carreon	domingo.carreon@intertek.com	N-V Member	Present_____
✓	Jim Carter	jcarter@gageproducts.com	N-V Member	Present_____
	Chris Castanien	chris.castanien@neste.com	N-V Member	Present_____
	Timothy L. Caudill	tlcaudill@ashland.com	N-V Member	Present_____
	Martin Chadwick	martin.chadwick@intertek.com	N-V Member	Present_____
✓	Ankit Chaudhry	ankit.chaudhry@swri.org	N-V Member	Present_____
	Jeff Clark	jac@astmtmc.cmu.edu	N-V Member	Present_____
✓	Sid Clark	sidney.clark@swri.org	N-V Member	Present_____
	Tim Cushing	timothy.cushing@gm.com	N-V Member	Present_____
	Phil Davies	daviesjp@bp.com	N-V Member	Present_____
	Lisa Dingwell	Lisa.Dingwell@AftonChemical.com	N-V Member	Present_____
✓	Todd Dvorak	todd.dvorak@aftonchemical.com	N-V Member	Present_____
	Frank Farber	fmf@astmtmc.cmu.edu	N-V Member	Present_____
	Joe Franklin	joe.franklin@intertek.com	N-V Member	Present_____
	Rolfe Hartley	rolfehartley@gmail.com	N-V Member	Present_____

4/23/19

✓ Richard Blakeley 6m

ASTM Sequence III Surveillance Panel (21 Voting members) date:

Name/Address	Phone/Fax/Email		Signature
Karin E. Haumann	karin.haumann@shell.com	N-V Member	Present_____
Jason Holmes	jason.holmes@basf.com	N-V Member	Present_____
✓ Tracey King	Tking@h-c-s-group.com	N-V Member	Present_____
Travis Kostan	travis.kostan@swri.org	N-V Member	Present_____
Walter Lerche	walt.lerche@gm.com	N-V Member	Present_____
✓ Charlie Leverett	charlie.leverett@yahoo.com	N-V Member	Present_____
Michael Lochte	Michael.lochte@swri.org	N-V Member	Present_____
Jo Martinez	JoMartinez@chevron.com	N-V Member	Present_____
James Matasic	james.matasic@lubrizol.com	N-V Member	Present_____
Mike McMillan	mmcmillan123@comcast.net	N-V Member	Present_____
Kevin O'Malley	kevin.omalley@lubrizol.com	N-V Member	Present_____
Mark Overaker	mhoveraker@jhaltermann.com	N-V Member	Present_____
Christian Porter	christian.porter@aftonchemical.com	N-V Member	Present_____
Scott Rajala	srajala@ilacorp.com	N-V Member	Present_____
Bob Salgueiro	bob.salgueiro@infineum.net	N-V Member	Present_____
✓ Elisa Santos	elisa.santos@infineum.com	N-V Member	Present_____
Hirano Satoshi	satoshi_hirano_aa@mail.toyota.co.jp	N-V Member	Present_____
Philip R. Scinto	prs@lubrizol.com	N-V Member	Present_____
Robert Stockwell	robert.stockwell@chevron.com	N-V Member	Present_____
Chris Taylor	pslservicesinc@gmail.com	N-V Member	Present_____
Jonathan VanScoyoc	VANSCJ@cpchem.com	N-V Member	Present_____
Ben Weber	bweber1@sat.rr.com	N-V Member	Present_____
Angela Willis	angela.willis@willisadvancedconsulting.com	N-V Member	Present_____
Zhang, Yue	Yue.Zhang@Lubrizol.com	N-V Member	Present_____

Updated 20170905, 20180105 added Domingo, 20180122 removed Terry Bates, 20180130 removed Bob Olree, 20180212 removed Rutherford, 20180511 removed Heimrich, Johnson, 20180724 Removed Lindholm, Farnsworth, 20180820 removed Andrews, 20181217 added Birnbaumer, King, changed Willis email, 20190102 removed Greg Shank, 20190122 updated Taylor email, added Zhang, 20190423 added VanScoyoc, 20190425 update Castanien email,

 Ben Mattar 4/23/19

Attachment 2

IIIH BC7 Rings Data Review

By: Todd Dvorak

Date: 10-03-19

IIIH BC7 Rings Data Review

Executive Summary

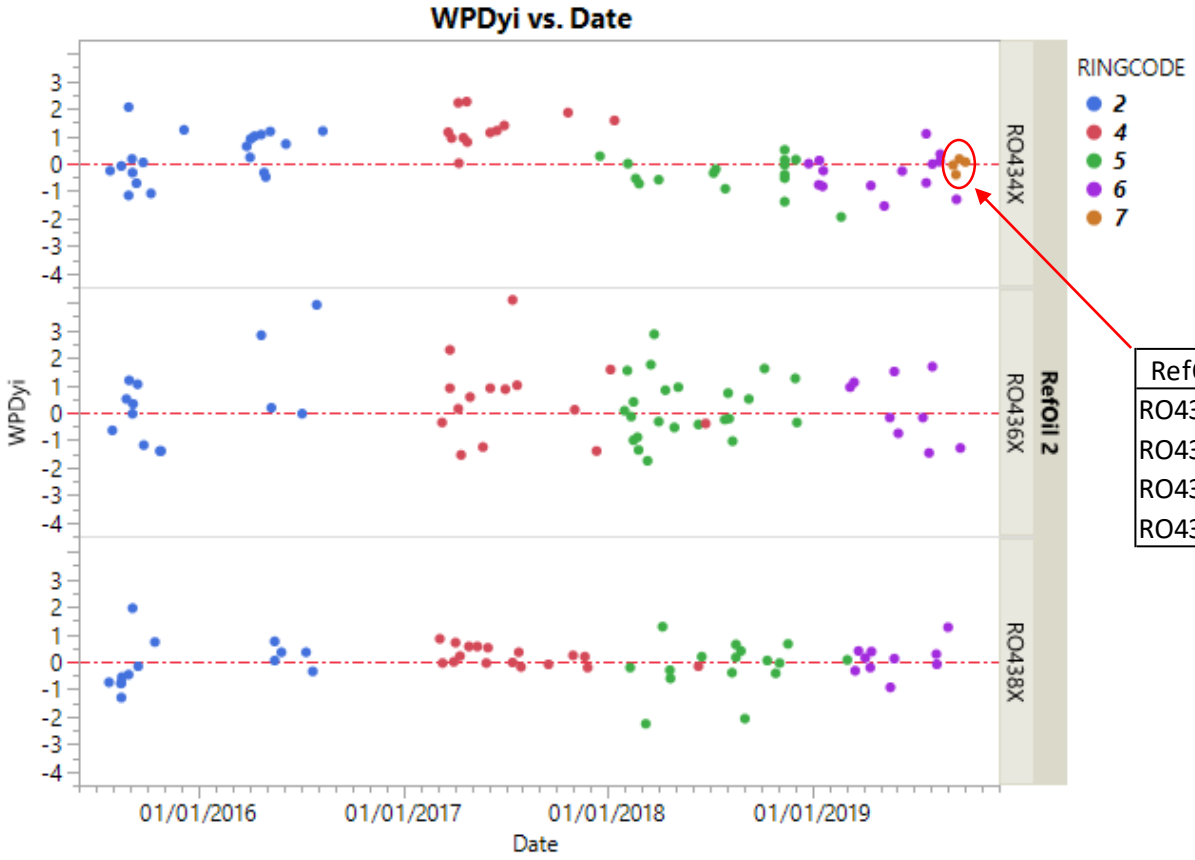
- Analysis data included (4) BC7 ring test results with RO434-3, exclusively
  - BC3 Pistons and Ring data was excluded from analysis due to severity shift associated with this hardware batch
- Analysis of WPD data:
  - No significant difference in WPD test results for contrasts relating to BC7 piston rings
- Analysis of TPVIS data:
  - No significant difference in TPVIS test results for contrasts relating to BC7 piston rings
- Analysis of PHOS data:
  - No significant difference in PHOS test results for BC7 piston rings
- Hourly blow-by data for BC7 is similar to BC5 and BC6 piston/ring test data

IIIH BC7 Rings Data Review

- **Purpose of analysis is to review available chartable data for Batch 7 Piston Rings**
  - Analysis data set included:
    - All chartable data (PM & PostPM)
    - Piston batch hardware: 2, 4, 5, 6 *(excluded batch 3)*
    - Ring batch hardware: 2, 4, 5, 6, 7 *(excluded batch 3)*
      - *N = 4 results on BC7 rings from labs A, B, D, and G (TPVIS & WPD)*
      - *N = 3 results on BC7 rings from labs A, D, and G (PHOS)*
    - Analysis data set includes (183) test results for WPD and TPVIS and (182) results for PHOS

IIIH BC7 Rings Data Review

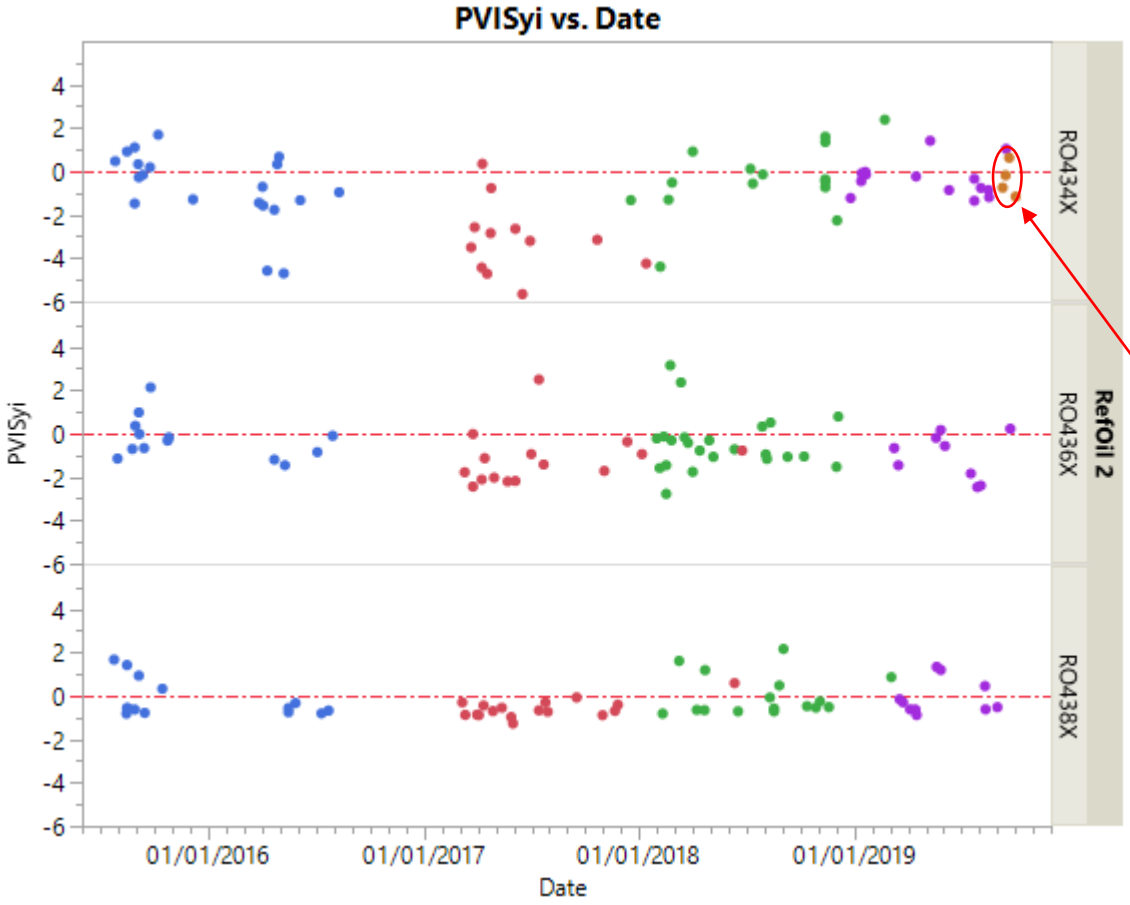
- **Plot of WPD Yi parameter indicates that test results for BC7 rings are less than ±0.5 stdev from target**



RefOil	TESTKEY	LTMSLAB	WPDyi
RO434-3	145836-IIIH	G	-0.06
RO434-3	142708-IIIH	D	-0.40
RO434-3	142715-IIIH	A	0.17
RO434-3	142711-IIIH	B	0.06

IIIH BC7 Rings Data Review

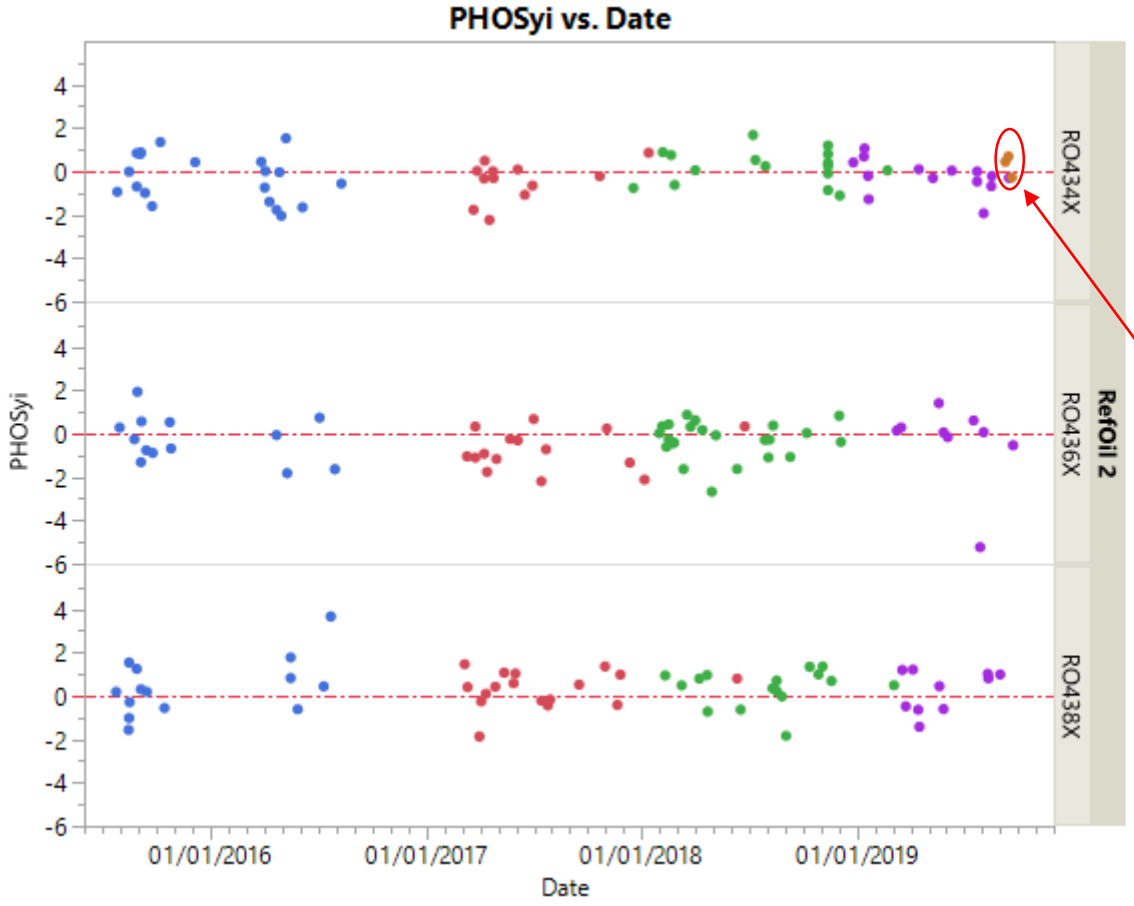
- **Plot of PVIS Yi parameter indicates that test results for BC7 rings are approximately ±1 stdev from target**



RefOil	TESTKEY	LTMSLAB	PVISyi
RO434-3	145836-IIIH	G	-0.74
RO434-3	142708-IIIH	D	-0.18
RO434-3	142715-IIIH	A	0.63
RO434-3	142711-IIIH	B	-1.16

IIIH BC7 Rings Data Review

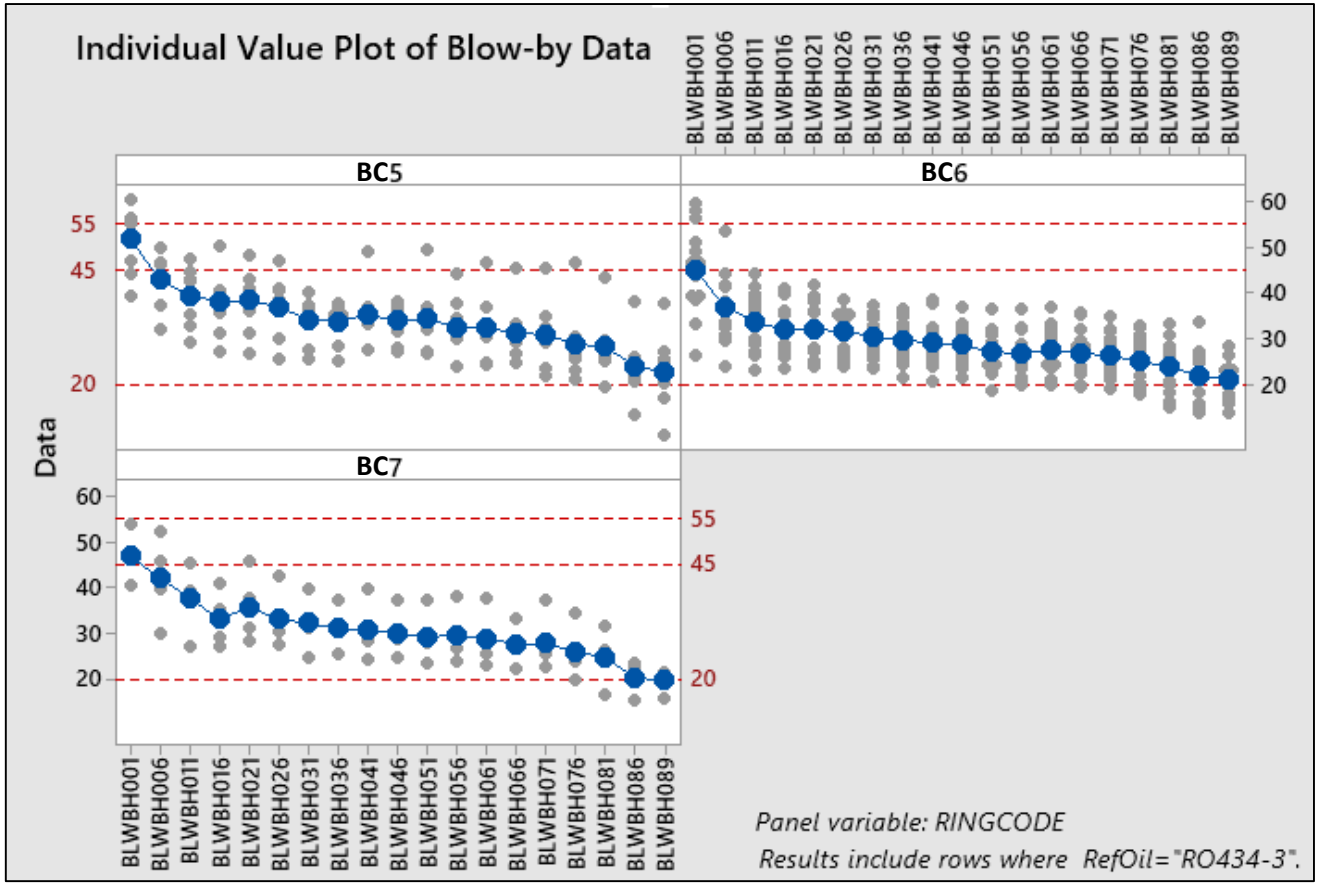
- **Plot of PHOS Yi parameter indicates that test results for BC7 rings are less than ±1 stdev from target**



RefOil	TESTKEY	LTMSLAB	PHOSyi
RO434-3	145836-IIIH	G	0.45
RO434-3	142708-IIIH	D	0.70
RO434-3	142715-IIIH	A	-0.27
RO434-3	142711-IIIH	B	

IIIH BC7 Rings Data Review

- **Plot of hourly blow-by data indicates similar results for BC7 as compared to BC6 & BC5 rings *(RO434-3)***



RINGCODE	BC5	BC6	BC7
Mean(BLWBH001)	51.9	45.3	46.9
Mean(BLWBH006)	42.9	37.0	42.1
Mean(BLWBH011)	39.5	33.7	37.8
Mean(BLWBH016)	38.0	31.9	33.1
Mean(BLWBH021)	38.4	32.1	35.6
Mean(BLWBH026)	36.8	31.5	33.2
Mean(BLWBH031)	34.2	30.5	32.2
Mean(BLWBH036)	33.7	29.6	31.0
Mean(BLWBH041)	35.2	29.1	30.6
Mean(BLWBH046)	33.8	28.5	30.0
Mean(BLWBH051)	34.4	27.1	29.3
Mean(BLWBH056)	32.3	26.7	29.6
Mean(BLWBH061)	32.2	27.5	28.8
Mean(BLWBH066)	31.3	26.8	27.6
Mean(BLWBH071)	30.8	26.2	27.8
Mean(BLWBH076)	28.8	25.0	25.9
Mean(BLWBH081)	28.1	23.7	24.7
Mean(BLWBH086)	23.9	21.8	20.3
Mean(BLWBH089)	22.6	20.9	19.6

IIIH BC7 Rings Data Review

WPD Data Analysis (w/o BC3 Piston data):

- No significant difference in WPD for at this time for BC7 ring contrasts
  - ***Caution*** - small sample size (n = 4) for BC7 with RO434-3

Response WPD

Whole Model

Actual by Predicted Plot | Effect Summary | Lack Of Fit | Residual by Predicted Plot

Summary of Fit

RSquare	0.655784
RSquare Adj	0.5932
Root Mean Square Error	0.403204
Mean of Response	4.224645
Observations (or Sum Wgts)	183

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	28	47.698192	1.70351	10.4784
Error	154	25.036360	0.16257	Prob > F
C. Total	182	72.734552		<.0001*

Parameter Estimates

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
RefOil	4	4	36.067661	55.4635	<.0001*
LTMSLAB	5	5	2.498838	3.0741	0.0113*
LTMSAPP[LTMSLAB]	14	14	1.445623	0.6352	0.8325
Phase_RingBatch	5	5	3.120217	3.8385	0.0026*

RefOil | LTMSLAB | LTMSAPP[LTMSLAB]

Phase_RingBatch

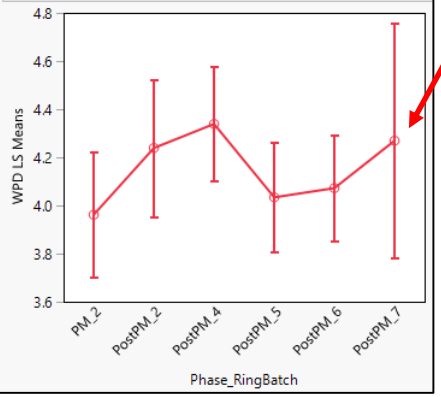
Leverage Plot

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
PM_2	3.9621840	0.13076139	4.06444
PostPM_2	4.2393041	0.14407861	4.50550
PostPM_4	4.3392320	0.11975928	4.45318
PostPM_5	4.0341586	0.11436393	4.12600
PostPM_6	4.0727416	0.11166529	4.05788
PostPM_7	4.2698215	0.24673135	4.12000

LSMeans Differences Tukey HSD

Least Squares Means Plot



LSMeans Differences Tukey HSD

α= 0.050 Q= 2.88594

LSMean[j]

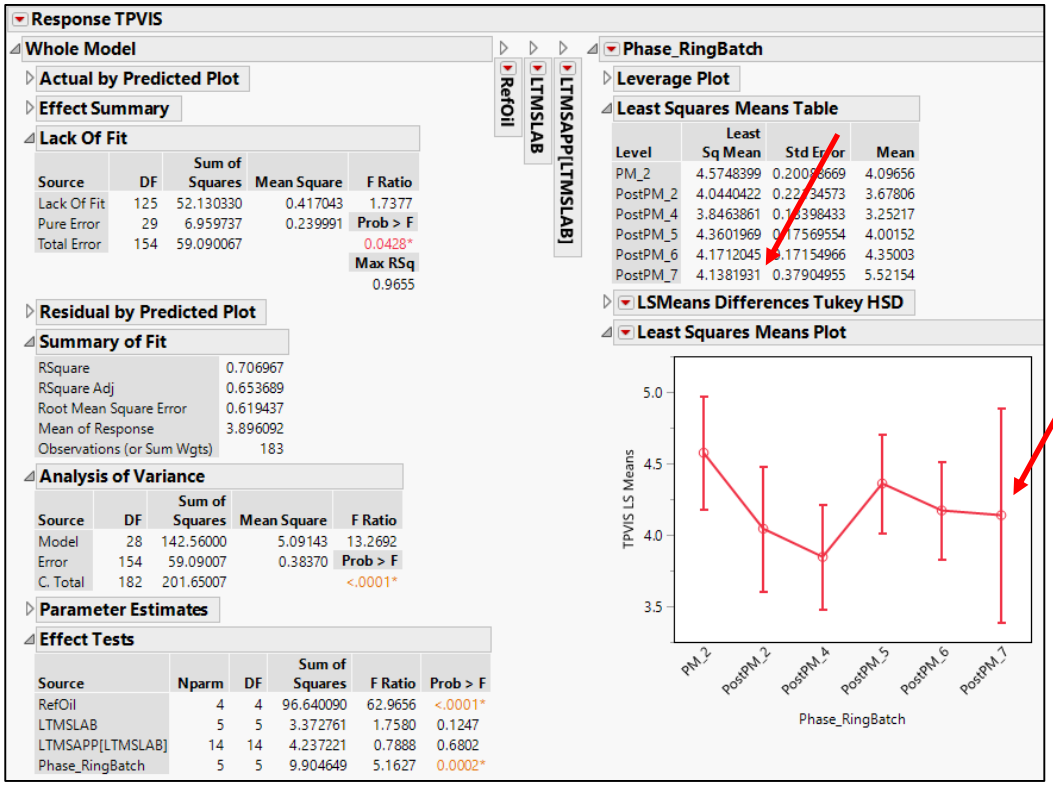
Mean[i]-Mean[j] / Std Err Dif / Lower CL Dif / Upper CL Dif	PM_2	PostPM_2	PostPM_4	PostPM_5	PostPM_6	PostPM_7
PM_2	0	-0.2771	-0.377	-0.072	-0.1106	-0.3076
	0	0.13013	0.10706	0.11113	0.12741	0.2519
	0	-0.6527	-0.686	-0.3927	-0.4783	-1.0346
	0	0.09843	-0.0681	0.24873	0.25715	0.41932
PostPM_2	0.27712	0	-0.0999	0.20515	0.16656	-0.0305
	0.13013	0	0.12325	0.12861	0.14404	0.26062
	-0.0984	0	-0.4556	-0.166	-0.2491	-0.7827
	0.65267	0	0.25578	0.57632	0.58224	0.72163
PostPM_4	0.37705	0.09993	0	0.30507	0.26649	0.06941
	0.10706	0.12325	0	0.09053	0.10988	0.24251
	0.06808	-0.2558	0	0.04381	-0.0506	-0.6305
	0.68602	0.45563	0	0.56633	0.58359	0.76927
PostPM_5	0.07197	-0.2051	-0.3051	0	-0.0386	-0.2357
	0.11113	0.12861	0.09053	0	0.0985	0.23423
	-0.2487	-0.5763	-0.5663	0	-0.3229	-0.9116
	0.39268	0.16603	-0.0438	0	0.24569	0.44031
PostPM_6	0.11056	-0.1666	-0.2665	0.03858	0	-0.1971
	0.12741	0.14404	0.10988	0.0985	0	0.22958
	-0.2571	-0.5822	-0.5836	-0.2457	0	-0.8596
	0.47826	0.24911	0.05061	0.32286	0	0.46547
PostPM_7	0.30764	0.03052	-0.0694	0.23566	0.19708	0
	0.2519	0.26062	0.24251	0.23423	0.22958	0
	-0.4193	-0.7216	-0.7693	-0.4403	-0.4655	0
	1.03459	0.78266	0.63045	0.91164	0.85963	0

LSMean[i]

IIIH BC7 Rings Data Review

TPVIS Data Analysis (w/o BC3 Piston data):

- No significant difference in TPVIS for at this time for BC7 ring contrasts
  - **Caution** - small sample size (n = 4) for BC7 with RO434-3



Response TPVIS

Whole Model

Actual by Predicted Plot

Effect Summary

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	125	52.130330	0.417043	1.7377
Pure Error	29	6.959737	0.239991	Prob > F
Total Error	154	59.090067		0.0428*
				Max RSq
				0.9655

Residual by Predicted Plot

Summary of Fit

RSquare	0.706967
RSquare Adj	0.653689
Root Mean Square Error	0.619437
Mean of Response	3.896092
Observations (or Sum Wgts)	183

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	28	142.56000	5.09143	13.2692
Error	154	59.09007	0.38370	Prob > F
C. Total	182	201.65007		<.0001*

Parameter Estimates

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
RefOil	4	4	96.640090	62.9656	<.0001*
LTMSLAB	5	5	3.372761	1.7580	0.1247
LTMSAPP[LTMSLAB]	14	14	4.237221	0.7888	0.6802
Phase_RingBatch	5	5	9.904649	5.1627	0.0002*

RefOil | LTMSLAB | LTMSAPP[LTMSLAB]

Phase_RingBatch

Leverage Plot

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
PM_2	4.5748399	0.20083669	4.09656
PostPM_2	4.0440422	0.22134573	3.67806
PostPM_4	3.8463861	0.18398433	3.25217
PostPM_5	4.3601969	0.17569554	4.00152
PostPM_6	4.1712045	0.17154966	4.35003
PostPM_7	4.1381931	0.37904955	5.52154

LSMeans Differences Tukey HSD

Least Squares Means Plot

LSMeans Differences Tukey HSD

α= 0.050 Q= 2.88594

LSMean[j]

Mean[i]-Mean[j] / Std Err Dif / Lower CL Dif / Upper CL Dif	PM_2	PostPM_2	PostPM_4	PostPM_5	PostPM_6	PostPM_7
PM_2	0	0.5308	0.72845	0.21464	0.40364	0.43665
	0	0.19992	0.16447	0.17072	0.19574	0.38698
	0	-0.0461	0.25379	-0.278	-0.1613	-0.6802
	0	1.10774	1.20312	0.70733	0.96853	1.55346
PostPM_2	-0.5308	0	0.19766	-0.3162	-0.1272	-0.0942
	0.19992	0	0.18935	0.19759	0.22128	0.40039
	-1.1077	0	-0.3488	-0.8864	-0.7658	-1.2497
	0.04615	0	0.74412	0.25407	0.51144	1.06135
PostPM_4	-0.7285	-0.1977	0	-0.5138	-0.3248	-0.2918
	0.16447	0.18935	0	0.13908	0.1688	0.37256
	-1.2031	-0.7441	0	-0.9152	-0.812	-1.367
	-0.2538	0.34881	0	-0.1124	0.16234	0.78338
PostPM_5	-0.2146	0.31615	0.51381	0	0.18899	0.222
	0.17072	0.19759	0.13908	0	0.15133	0.35984
	-0.7073	-0.2541	0.11244	0	-0.2477	-0.8165
	0.27805	0.88638	0.91518	0	0.62572	1.26049
PostPM_6	-0.4036	0.12716	0.32482	-0.189	0	0.03301
	0.19574	0.22128	0.1688	0.15133	0	0.3527
	-0.9685	-0.5114	-0.1623	-0.6257	0	-0.9849
	0.16126	0.76576	0.81197	0.24774	0	1.05088
PostPM_7	-0.4366	0.09415	0.29181	-0.222	-0.033	0
	0.38698	0.40039	0.37256	0.35984	0.3527	0
	-1.5535	-1.0614	-0.7834	-1.2605	-1.0509	0
	0.68016	1.24966	1.36699	0.81648	0.98486	0

LSMean[i]

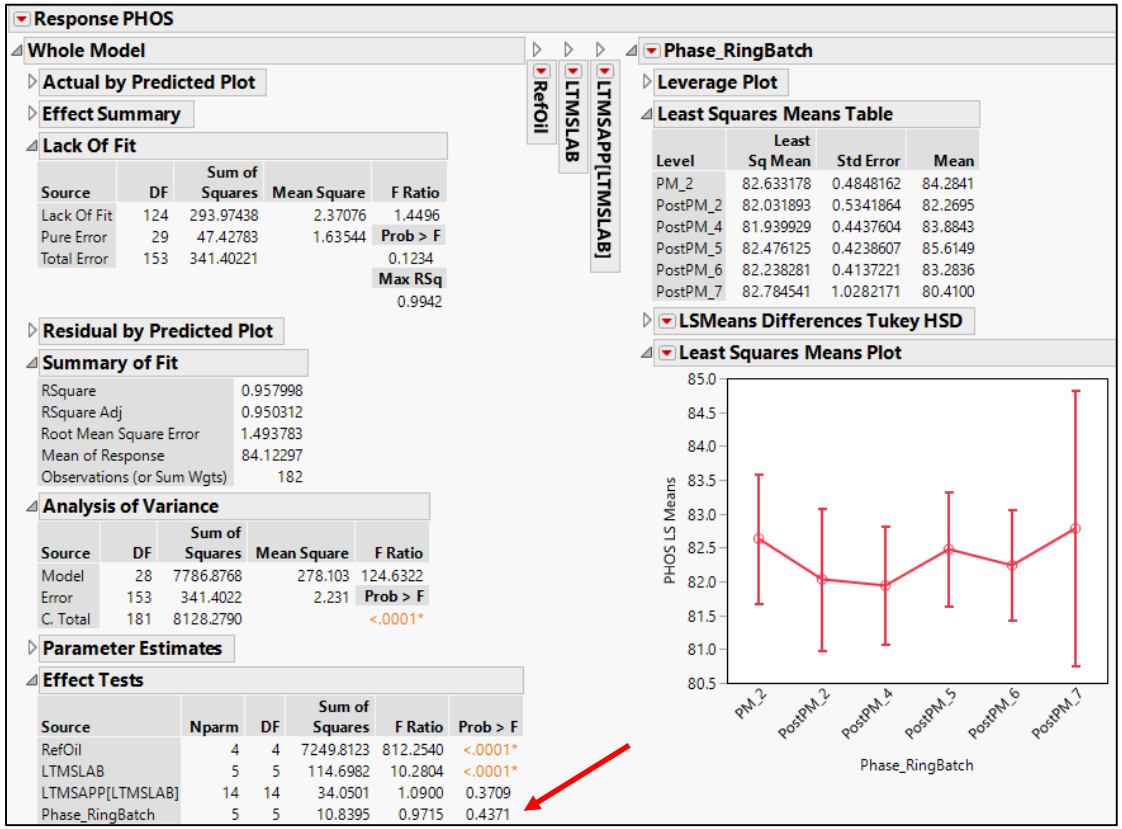
Afton CHEMICAL

Passion for Solutions™

IIIH BC7 Rings Data Review

PHOS Data Analysis (w/o BC3 Piston data):

- No significant difference in PHOS at this time for BC7 rings
  - ***Caution*** - small sample size (n = 3) for BC7 with RO434-3



Response PHOS

Whole Model

Actual by Predicted Plot

Effect Summary

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	124	293.97438	2.37076	1.4496
Pure Error	29	47.42783	1.63544	Prob > F
Total Error	153	341.40221		0.1234
				Max RSq
				0.9942

Residual by Predicted Plot

Summary of Fit

RSquare	0.957998
RSquare Adj	0.950312
Root Mean Square Error	1.493783
Mean of Response	84.12297
Observations (or Sum Wgts)	182

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	28	7786.8768	278.103	124.6322
Error	153	341.4022	2.231	Prob > F
C. Total	181	8128.2790		<.0001*

Parameter Estimates

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
RefOil	4	4	7249.8123	812.2540	<.0001*
LTMSLAB	5	5	114.6982	10.2804	<.0001*
LTMSAPP[LTMSLAB]	14	14	34.0501	1.0900	0.3709
Phase_RingBatch	5	5	10.8395	0.9715	0.4371

RefOil

LTMSLAB

LTMSAPP[LTMSLAB]

Phase_RingBatch

Leverage Plot

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
PM_2	82.633178	0.4848162	84.2841
PostPM_2	82.031893	0.5341864	82.2695
PostPM_4	81.939929	0.4437604	83.8843
PostPM_5	82.476125	0.4238607	85.6149
PostPM_6	82.238281	0.4137221	83.2836
PostPM_7	82.784541	1.0282171	80.4100

LSMeans Differences Tukey HSD

Least Squares Means Plot