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COMMITTEE D02 ON PETROLEUM PRODUCTS, LIQUID FUELS, AND LUBRICANTS

Issued: 11.05.2019

Reply to: Dan Worcester
Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78238
Phone: 210.522.2405
Email: dworcester@swri.org

These are the unapproved minutes of the 10.25.2019 Sequence VI Conference Call.

The meeting was called to order at 1:05 PM Central Time by Chair Andrew Stevens.

1.0 The Agenda is Attachment 1.
2.0 Roll Call. Attendance is Attachment 2. There were no member changes.

3.0 Old Business

3.1 The minutes for the 10.02.2019 call were approved unanimously.

3.2 Those minutes are posted on the TMC site.

3.3 Dan Worcester presented a possible motion to change the method to clean new cylinder heads. That motion is included at Attachment 3.

3.3.1 There was discussion about parts storage. The heads and short block are stored as kits, but the right cylinder heads were made at a later time to meet the industry needs for build kits.

3.3.2 SwRI has had two engines fail for sticking lifters. Intertek has also had one engine with a similar problem. This may be a lab specific problem. There are concerns about changing the procedure. The motion was tabled and SwRI and other labs will gather more data.

3.4 Rich discussed the baseline and flush oil supply.

3.4.1 TMC has some of each oil. There will be an industry survey to re-distribute those oils. The goal is to supply labs with a quantity for 1.5 years.

3.4.2 It will take about a year to make a new blend once started.

ACTION: Labs will review their supply for 1.5 years of testing.

3.5 There was discussion on approval for an alternate fuel supplied.

3.5.1 0.75 Sigma was approved at the last call. Slide 12 was discussed again and that presentation is included as Attachment 4.

Travis: Slide 12 shows actual pass limits on current data [real numbers]. 2.5 sigma seems reasonable.

Andrew: 2.5 sigma is proposed.

Rich: If labs have fuel capacity, they could calibrate a stand or stands on each fuel.

Pat: Labs could use either or both suppliers. Data over time would give equivalence.

Ron: Ron felt it should be all or none and labs should select. This would avoid the issue of selecting fuels and stands that might supply preferred results.

Motion: Recommend to the Surveillance Panel the alternate supplier method be added to a procedure annex by information letter.
Adrian Alfonso, Ben second. 7 yes, 5 waive, 3 no. The motion passed.

Action: An e-ballot will be sent out approve the procedure changes due to the negative votes.

4.0 New Business

4.1 Rich requested approval to generate an information letter to define FEI Sum and test precision.

Motion: Recommend to the Surveillance Panel an information letter is approved for FEI Sum and test precision.
Rich Grundza, Andrew second. The motion passed unanimous.

The meeting adjourned at 2:50 PM Central Time.

Sequence VI Surveillance Panel Call Meeting Agenda
October 25, 2019 @ 2:00-3:30 EST

Webex Meeting Details Below Agenda

1. Roll Call (start 2:05 EST)

1.1. SP Membership changes and additions

2. Old Business

2.1	Approve meeting minutes from 10/2 call	Andrew Stevens
2.2	Head cleaning procedure discussion	Dan Worcester
2.3	Baseline and flush oil supply discussion	Rich/Panel
2.3	Discussion about standards for introducing a new fuel supplier	Panel

3. New Business

3.1	None unless issues raised by panel on call	Panel

4. Next Meeting

4.1. SP Meeting: TBD

5. Meeting Adjourned

Meeting Information

Meeting link:
https://lubrizol-1586.my.webex.com/lubrizol-1586.my/j.php?MTID=m111d6a241962494ccb8a07f05d650bb7
Meeting number:
621 261 119
Password:
RmfwzFEy
Host key:
914952

More ways to join

Join by video system
Dial 621261119@lubrizol-1586.my.webex.com
You can also dial 173.243.2.68 and enter your meeting number.
Join by phone
+1-510-338-9438 USA Toll
Access code: 621 261 119
Global call-in numbers

Appendix

A.1 Motion from Dan Worcester:

Recommend to the Surveillance Panel the following change to the new cylinder head cleaning procedure:

> A17.1.2 The lab can remove cam, lifters, rollers, stem seals and valves. Soak the cams, lifters, rollers and valves in solvent for 15 min to 30 min and repeat spray with solvent. This process can be repeated. The cylinder head can soak in ultrasonic cleaner or solvent. Verify the Corrosion Protective Coating (CPC) is removed from the parts. Re-assemble the head with new valve stem seals if the parts were removed. Two iterations of the soaking process have been found to be sufficient.

ASTM SEQUENCE VI

Name	Email	Company	Attend

VOTING MEMBERS

Adrian Alfonso	Adrian.Alfonso@intertek.com	Intertek	ATTEND
Jason Bowden	jhbowden@ohtech.com	OHT	MATT
Kevin Brodwater	KBrodwater@chevron.com	Chevron	JO
Jim Carter	jcarter@gageproducts.com	Gage	ATTEND
Aleise Gauer	aleise.gauer@gm.com	GM	ATTEND
Rich Grundza	reg@astmtmc.cmu.edu	TMC	ATTEND
Jeff Hsu	j.hsu@shell.com	Shell	
Teri Kowalski	Teri.Kowalski@tema.toyota.com	Toyota	
Tracey King	TKing@h-c-s-group.com	CS Group	ATTEND
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Andrew Stevens	andrew.stevens@Lubrizol.com	Lubrizol	ATTEND
Haiying Tang	HT146@Chrysler.com	Chrysler	
Prasad Tumati	ptumati@jhaltermann.com	Haltermann	ATTEND
Dan Worcester	Dan.Worcester@swri.org	SwRI	ATTEND

ASTM SEQUENCE VI

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Tony Jang	Tony Jang@Lubrizol.com	Lubrizol	
Joe Gleason	Jog1@lubrizol.com	Lubrizol	
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Dwight Bowden	dhbowden@ohtech.com	OHT	
Matt Bowden	mjbowden@ohtech.com	OHT	ATTEND
Ricardo Affinito	affinito@chevron.com	Oronite	
Ian Elliot	IanElliott@chevron.com	Oronite	
Jo Martinez	jogm@chevron.com	Oronite	ATTEND
Robert Stockwell	rsto@chevron.com	Oronite	
Don Smolenski	Donald.Smolenski@gmail.com	Strategic	

ASTM SEQUENCE VI

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Patrick Lang	Patrick.Lang@swRI.org	SwRI	ATTEND
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Timothy Caudill	Tlcaudill@valvoline.com	Valvoline	
Thom Smith	trsmith@valvoline.com	Valvoline	
Hap Thompson	Hapjthom@aol.com	VIx Facilitator	
Chris Taylor	Chris.Taylor@vpracingfuels.com	VP Racing Fuels	

ASTM SEQUENCE VI

Name	Email	Company	Attend

MOTION:				
Adrian Alfonso	APPROVE			
Jason Bowden [Matt]	WAIVE			
Kevin Brodwater [Jo]	APPROVE			
Jim Carter	WAIVE			
Aleise Gauer	NO			
Rich Grundza	WAIVE			
Jeff Hsu				
Teri Kowalski				
Tracey King	APPROVE			
Dan Lanctot	WAIVE			
Ben Maddock	APPROVE			
Brianne Hockkeppel				
Andy Ritchie [Doyle]	APPROVE			
Ron Romano	NO			
Clifford Salvesen				
Amol Savant	WAIVE			
Andrew Stevens	APPROVE			
Haiying Tang				
Prasad Tumati	NO			
Dan Worcester	APPROVE			
	7 Y, 5 W, 3 N			

ASTM SEQUENCE VI

Name	Email	Company	Attend

MOTION:				
Adrian Alfonso				
Jason Bowden				
Kevin Brodwater				
Jim Carter				
Aleise Gauer				
Rich Grundza				
Jeff Hsu				
Teri Kowalski				
Tracey King				
Dan Lanctot				
Ben Maddock				
Brianne Hockkeppel				
Andy Ritchie				
Ron Romano				
Clifford Salvesen				
Amol Savant				
Andrew Stevens				
Haiying Tang				
Prasad Tumati				
Dan Worcester				

MOTION: Recommend to the Surveillance Panel the following change to the new cylinder head cleaning procedure:

A17.1.2 The lab can remove cam, lifters, rollers, stem seals and valves. Soak the cams, lifters, rollers and valves in solvent for 15 min to 30 min and repeat spray with solvent. This process can be repeated. The cylinder head can soak in ultrasonic cleaner or solvent. Verify the Corrosion Protective Coating (CPC) is removed from the parts. Re-assemble the head with new valve stem seals if the parts were removed. Two iterations of the soaking process have been found to be sufficient.

Dan Worcester

Sequence VI Alternate Fuel Supplier Testing Stopping Criteria

Statistics Sub-Group

August 01, 2019

Statistics Sub-Group

- Jo Martinez, Chevron Oronite
- Richard Grundza, TMC
- Todd Dvorak, Afton
- Travis Kostan, SwRI

Recap – Test Design Requirements

The following test design requirements have been agreed upon by the group:

Test Design Requirements:

Test using reference oil 1010-1 on a minimum of two engines, using the first four runs of each engine's valid test life per the following procedure:

- Current Fuel = "Fuel A"
- Potential Alternative Supplier Fuel = "Fuel B"
- Run Order #1, Engine #1 – Break in with Fuel A, then test Fuel A – Fuel B – Fuel A – Fuel B
- Run Order #2, Engine #2 – Break in with Fuel B, then test Fuel B – Fuel A – Fuel B – Fuel A

- If the statistical stopping criteria has not been met after Engine #2, continue testing on additional engines, alternating between run order #1, and run order #2, until the stopping criteria has been met.
- All testing shall be conducted in a single lab and on a single stand.

Recap – Stopping Criteria Questions

To help determine what the statistical stopping criteria should be, the group should consider:

1. What does the group want the potential fuel to show? Is it…
   a) that the potential fuel results are within a specified tolerance of the current fuel results?
   b) that the potential fuel results are within a specified tolerance of the reference oil target?
   c) a combination of a) and b) ?
   d) other criteria?
2. What are the acceptable tolerances for the differences in #1 that are deemed important?

Selected, but the group was reconsidering the need for criteria b.

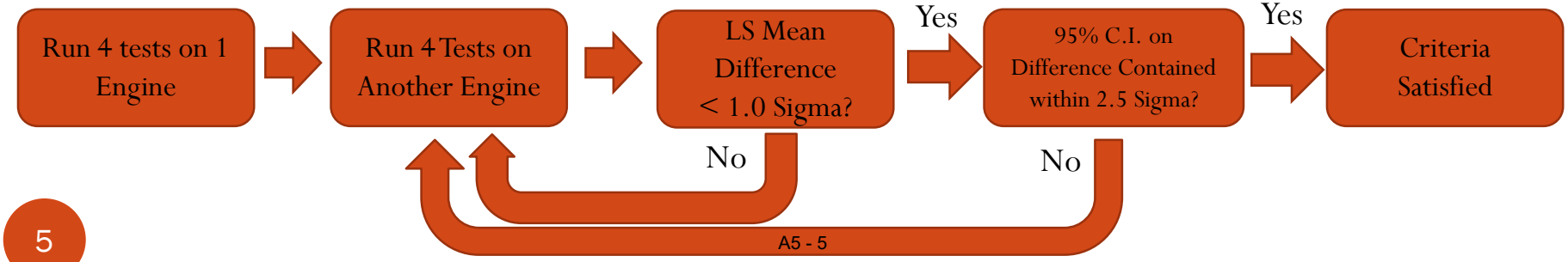
Criteria A Tolerances

a) **that the potential fuel results are within a specified tolerance of the current fuel results?**

What are the acceptable tolerances?

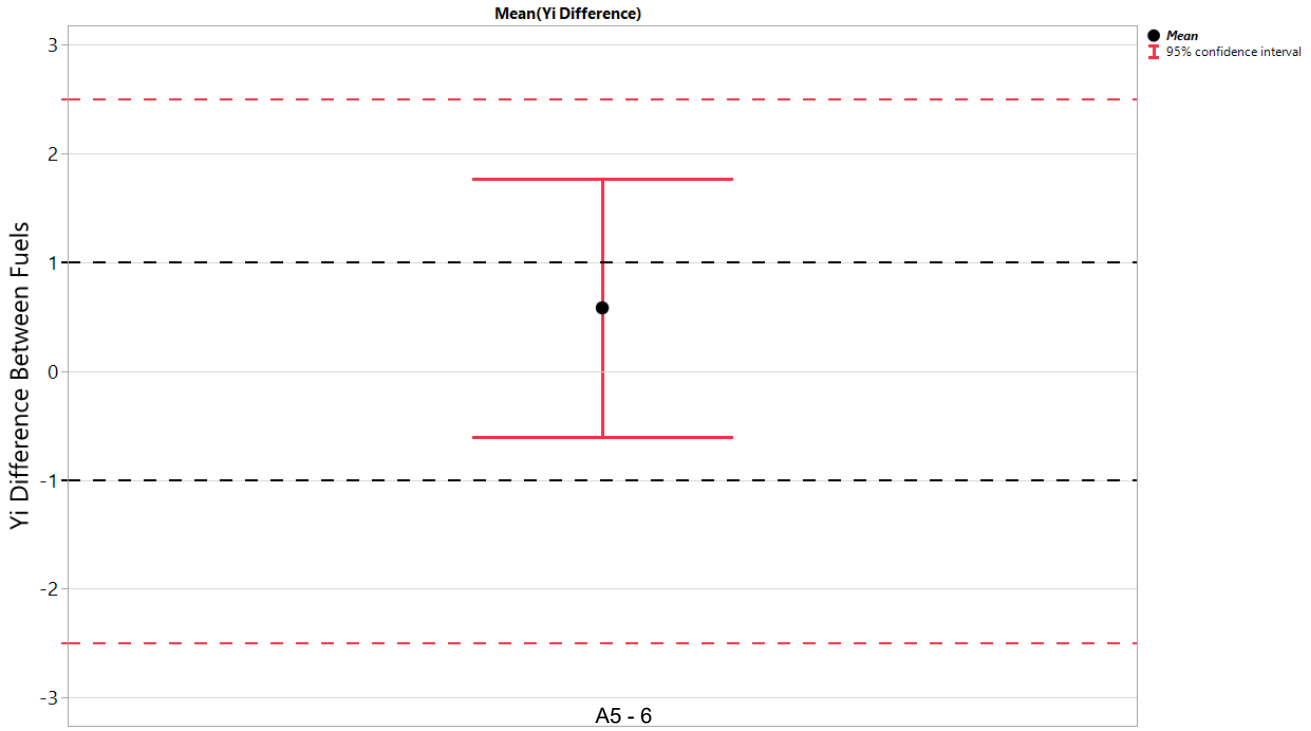
The statistics group recommends as a staring place for discussion the following tolerances for Criteria A. These tolerances would be judged based on an ANOVA model using the Yi values as the response variable (these are already in standard deviation units)

1. The estimate of the difference between fuels is less than 1 standard deviation.
2. No part of a 95% confidence interval of the difference between fuels exceeds 2.5 sigma.



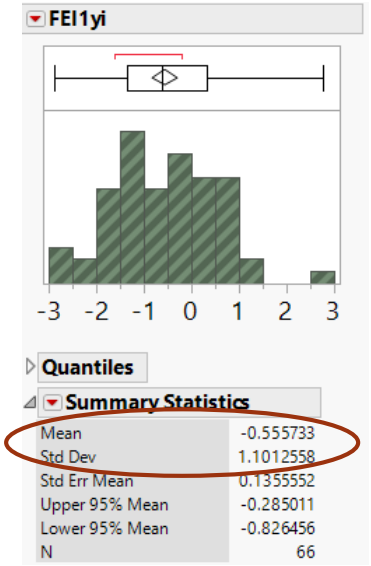
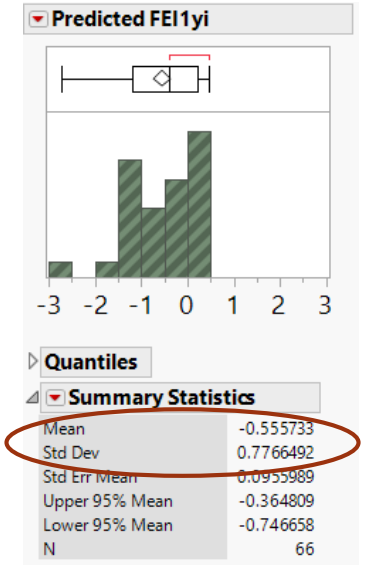
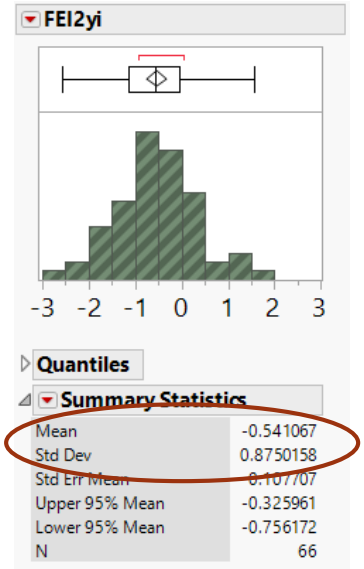
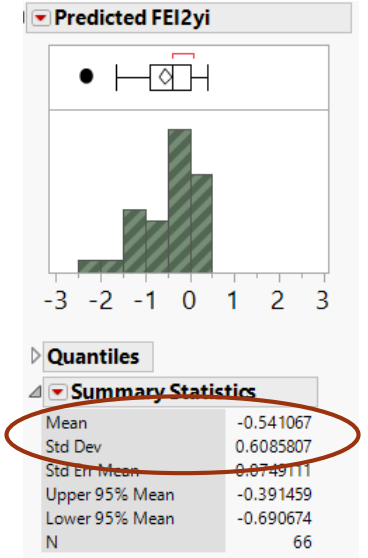
Visualization of Stopping Criteria

1. The estimate of the difference between fuels is less than 1 standard deviation.
   - The black dot is the estimate of the fuel difference and cannot exceed the black dashed lines.
2. No part of a 95% confidence interval of the difference between fuels exceeds 2.5 sigma.
   - The confidence interval has a 95% probability of capturing the true difference between fuels. We should have at least 95% confidence the fuel difference is less than 2.5 sigma (the red dashed lines).

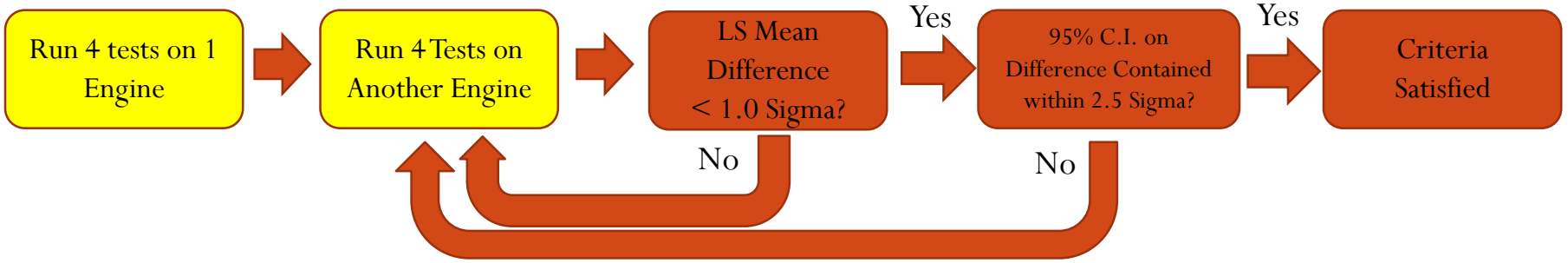


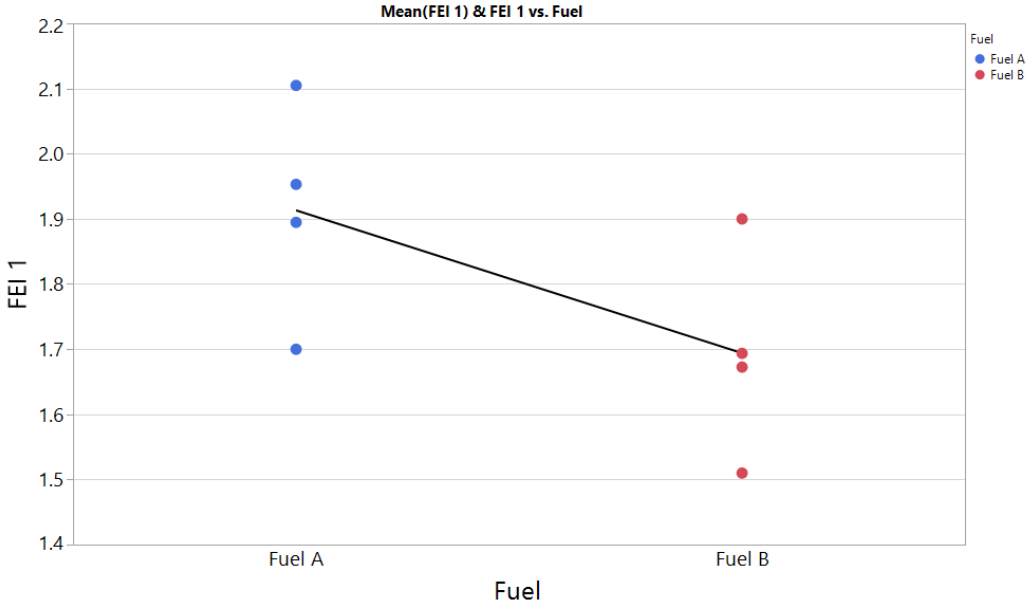
Distribution of 1010-1 Yi Results

- Data includes 2 years of 1010-1 results from stands which had at least 2 tests after filtering for TMC validity codes AC and OC.
- The across lab Yi standard deviation is expected to be near one, since this is a normalized value. This across lab data does appear close to this value. The data also shows that the 1010-1 Yi results within a single stand are showing considerably less deviation than across labs, about 0.25 sigma less.

	Across Labs	Adjusted for Lab-Stand
FEI 1 Yi		
FEI 2 Yi		

Example FEI 1 After 2 Engines

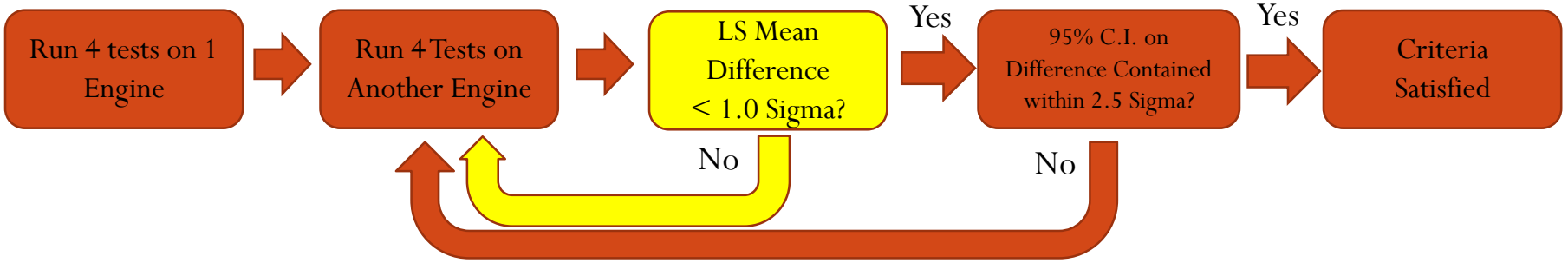


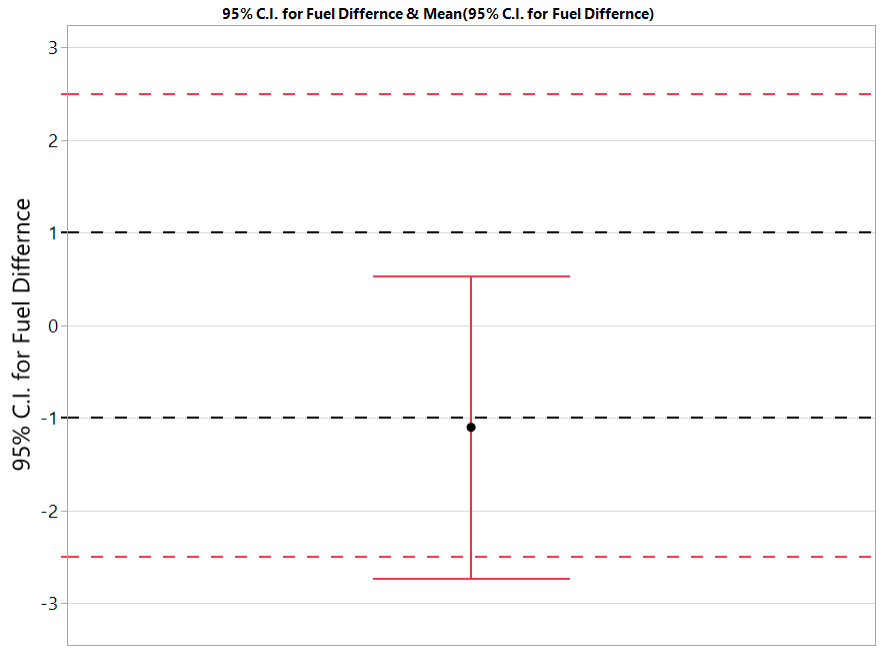


Fuel A FEI 1 Avg.	Fuel B FEI 1 Avg.	Diff.
1.91	1.69	0.22

Fuel	Engine	FEI 1	FEI 1 Yi
Fuel A	Engine #1	1.89	-0.03
Fuel A	Engine #1	1.70	-1.01
Fuel A	Engine #2	2.10	1.03
Fuel A	Engine #2	1.95	0.27
Fuel B	Engine #1	1.67	-1.14
Fuel B	Engine #1	1.90	0.00
Fuel B	Engine #2	1.51	-1.96
Fuel B	Engine #2	1.69	-1.04

Example FEI 1 After 2 Engines



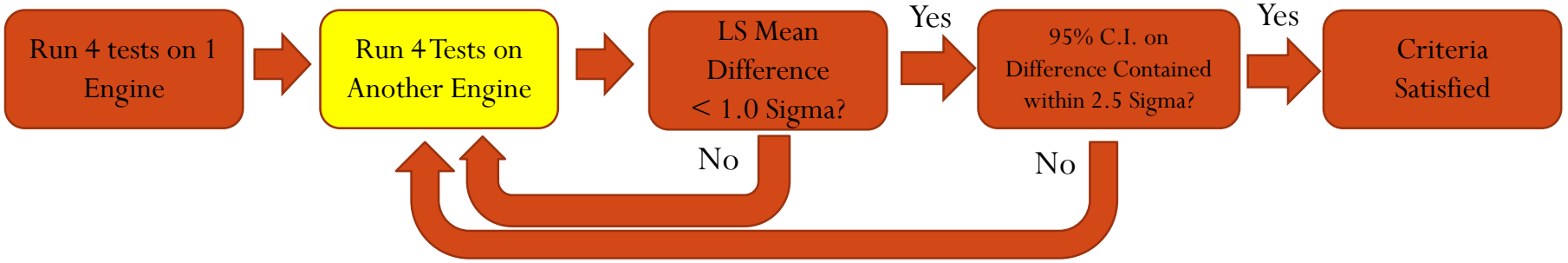


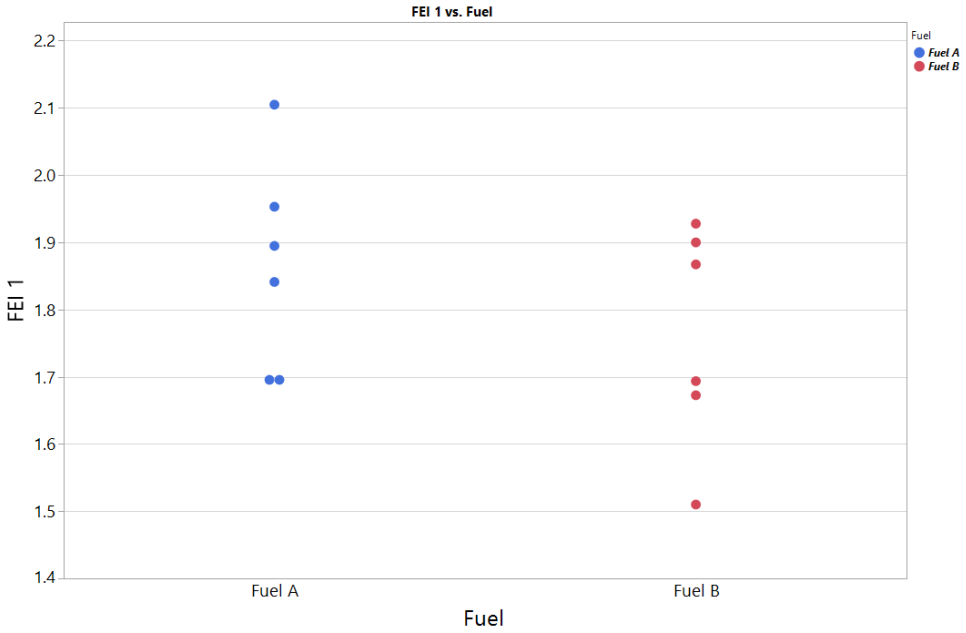
FEI 1 Yi ~ Engine + Fuel

LS Mean Yi Fuel A	LS Mean Yi Fuel B	LS Mean Yi Difference
0.07	-1.03	-1.10

95% C.I. Lower	95% C.I. Upper
-2.73	0.53

Example FEI 1 After 3 Engines

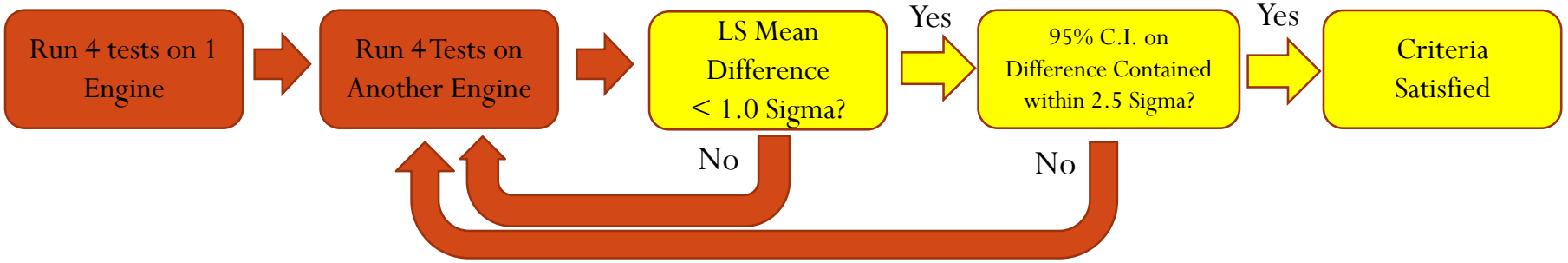


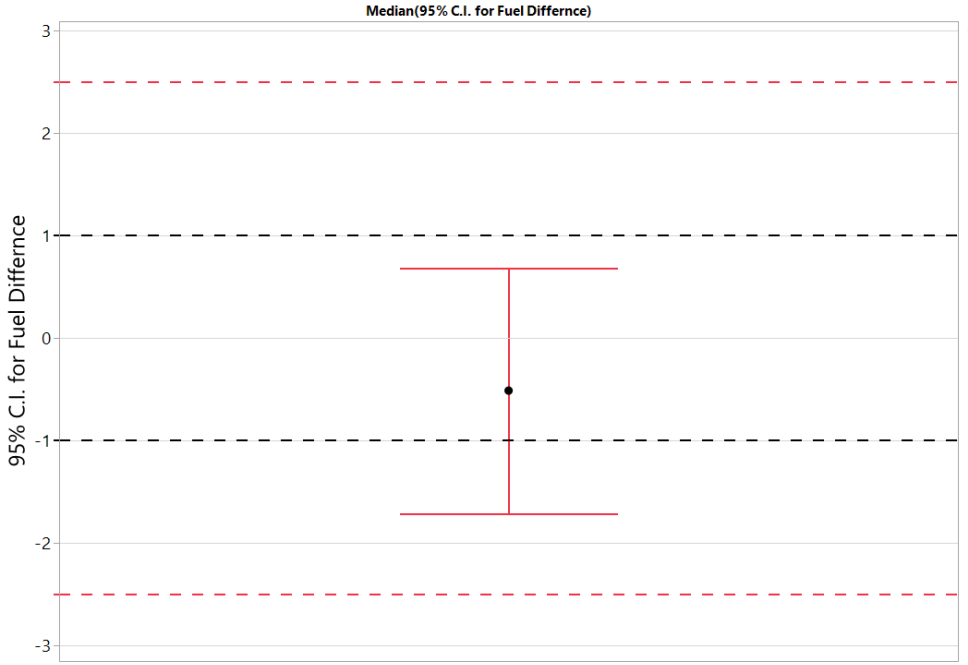


Fuel A FEI 1 Avg.	Fuel A FEI 1 Avg.
1.86	1.76

Fuel	Engine	FEI 1	FEI 1 Yi
Fuel A	Engine #1	1.89	-0.03
Fuel A	Engine #1	1.70	-1.01
Fuel A	Engine #2	2.10	1.03
Fuel A	Engine #2	1.95	0.27
Fuel A	Engine #3	1.69	-1.04
Fuel A	Engine #3	1.84	-0.30
Fuel B	Engine #1	1.67	-1.14
Fuel B	Engine #1	1.90	0.00
Fuel B	Engine #2	1.51	-1.96
Fuel B	Engine #2	1.69	-1.04
Fuel B	Engine #3	1.87	-0.16
Fuel B	Engine #3	1.93	0.14

Example FEI 1 After 3 Engines





FEI 1 Yi ~ Engine + Fuel

LS Mean Yi Fuel A	LS Mean Yi Fuel B	LS Mean Yi Difference
-0.18	-0.69	-0.51

95% C.I. Lower	95% C.I. Upper
-1.71	0.68

Probability of Meeting the Criteria Tolerances

-Assuming Zero Fuel Difference and Yi Standard Deviation =1.0

P(Average Fuel Difference) < Various Sigma, Assuming Zero Actual Fuel Difference

# of Engines	P(Estimate < 0.5 Sigma) if Fuel Difference is Zero	P(Estimate < 0.75 Sigma) if Fuel Difference is Zero	P(Estimate < 1.0 Sigma) if Fuel Difference is Zero	P(Estimate < 1.25 Sigma) if Fuel Difference is Zero
2	0.52	0.71	0.84	0.92
3	0.61	0.81	0.92	0.97
4	0.68	0.87	0.95	0.99
5	0.74	0.91	0.97	0.99

P(CI Width within Various Sigma), Assuming Zero Actual Fuel Difference

# of Engines	P(CI Width within 1.5 Sigma) if Fuel Difference is Zero	P(CI Width within 2.0 Sigma) if Fuel Difference is Zero	P(CI Width within 2.5 Sigma) if Fuel Difference is Zero	P(CI Width within 3.0 Sigma) if Fuel Difference is Zero
2	-0.35	0.20	0.67	0.91
3	0.23	0.75	0.96	1.00
4	0.58	0.93	0.99	1.00
5	0.77	0.98	1.00	1.00