

## Sequence VIE/F Severity Review Task Force 8/31/2022

Scope:

The ASTM Sequence VI Surveillance Panel requested a Task Force be formed to review/explore the observed severity bias of the of the CUSUM chart for the Seq. VIE/F FEI2 parameter and potentially identify the factor(s) contributing to the FEI2 severity.

Objectives:

The Task Force will:

- Review available calibration data to determine a timeline of the severity bias.
- Review existing calibration data to identify individual factors that could influence the severity of the test:
  - Review conclusions/results from the FEI2 Severity TF formed in 2017.
  - Research individual labs severity.
  - Research individual engine/stand influence on the overall dataset.
    - If there is significant difference in labs performance, should group lab audits be completed with reps from each lab visiting all the labs?
  - Influence of calibration oils on labs severity.
    - Are all labs performing similar with the same RO?
    - Have there been a bias from one batch of RO to the next?
  - Potential bias due to fuel batch changes.
  - Potential bias due to hardware changes.

Below is the agenda for this meeting, if you have any additions, please send them to me and Cc this distribution.

- Roll Call and membership changes
- Approval of meeting minutes from 20220810.
- <https://www.astmtmc.org/ftp/docs/gas/sequencevi/minutes/Sequence%20VIEF%20Severity%20Task%20Force20220810.pdf> [astmtmc.org]
- **Review of action items**
- Doyle and Rich Grundza will work on a weight factor distribution study and present to the group next call. **Completed**
- New Business
  - Review VI Severity Plot Presentation prepared by Doyle and Rich.
    - Data analysis by lab with and without ICF indicates there was a shift in performance shortly after the Precision Matrix, however, the performance has been consistent and stable since then.
    - Similar conclusion from the analysis for each RO independently.
    - Labs appear to be severe of target but consistently in the same severe line.

- Group agrees the results of the analysis are representative of the current condition of the severity of the test and should be presented at the SP for further discussion.
- Old Business
  - FEI Severity Brainstorm/Root Cause Analysis.
    - Brainstorming using the Root Cause Tree Tool provided by Angela Willis.  
Brainstorming will be on hold until Weight Factor Analysis is completed.
- Action Items:
  - Doyle will complete same analysis on the VIF to be presented directly to the SP at the time the VIE is presented unless the results indicate there is a significant problem that should be addressed at the TF level.
  - Adrian, Rich, Andrew, and Doyle will work on presentation for the SP.
- Schedule for next conference call.
  - Next call will be TBD.

## Attendance Sheet

REPRESENTATIVE	COMPANY	VOTING MEMBER (x)	ATTENDED (Y/N)
Ben Maddock	AFTON	x	y
Rich Grundza	TMC	x	y
Doyle Boese	INFINEUM	x	Y
Andrew Stevens	LUBRIZOL		y
George Szappanos	LUBRIZOL	x	n
Robert Stockwell	ORONITE	x	y
Paul Rubas	EXXONMOBIL	x	n
Michael Deegan	FORD	x	n
Angela Willis	Willis Advanced Consulting	x	y
Adrian Alfonso	INTERTEK	x	y
Bill Buscher	INTERTEK		n
Izabela Gabrel	HALTERMANN CARLESS	x	n

Daniel Engstrom	SwRI	x	y
Christine Eickstead	SwRI		n

# *VIE Severity Analysis*

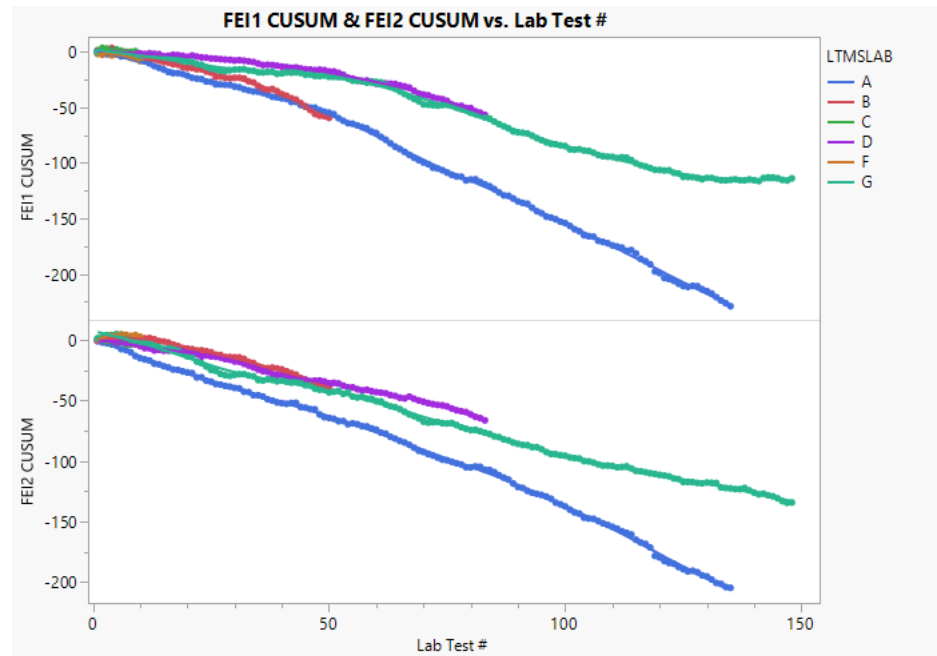
*D. Boese*

*August 23, 2022*

Performance you can rely on.

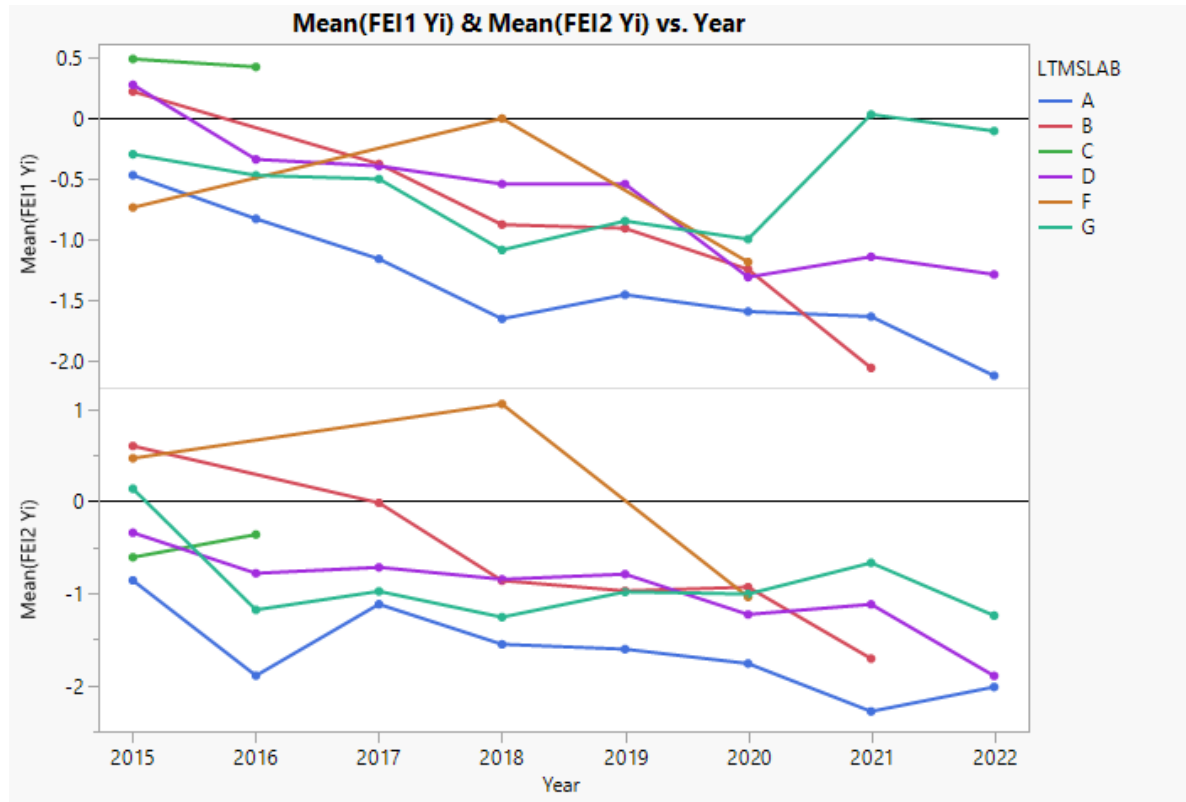


# Lab CUSUM Plots



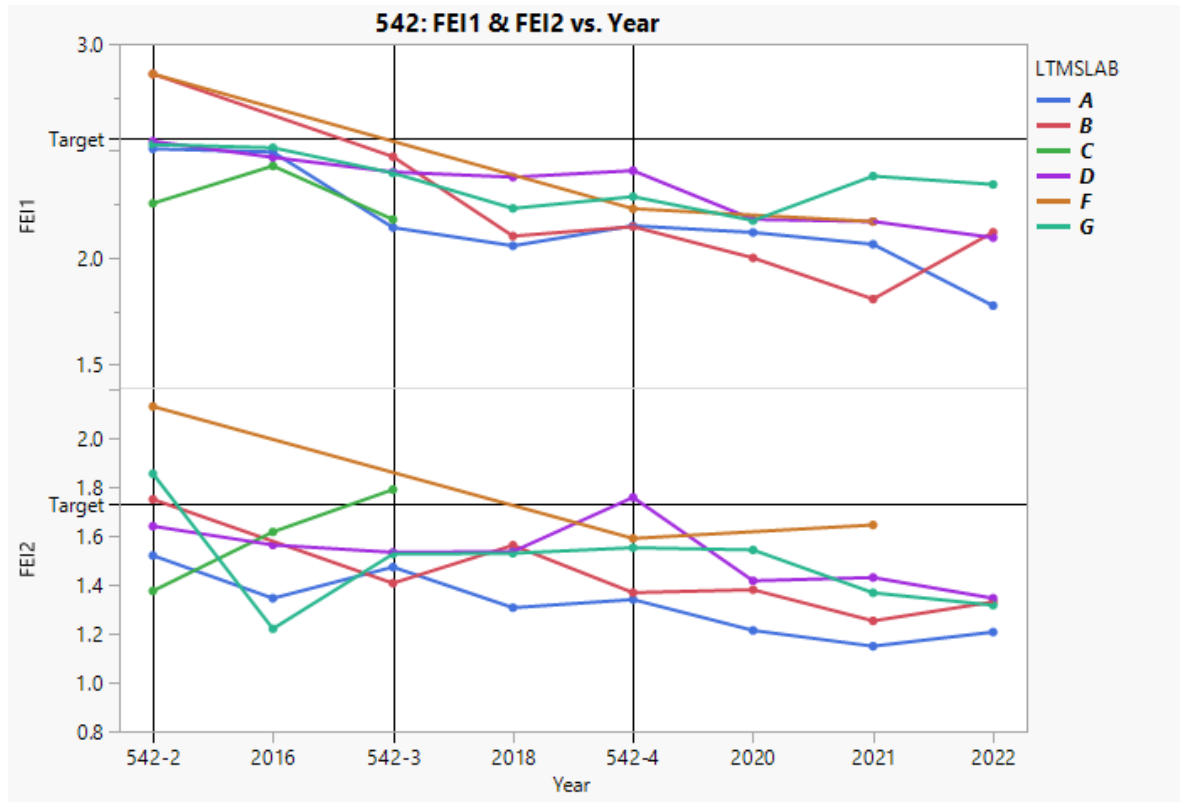
- CUSUM calculated **without ICFs**.
- None of the labs have mild CUSUMs.
- Most of the lab CUSUMs are linear though it appears as though Lab G has nearly horizontal FEI1 CUSUM for the last ~ 25 tests.
- For FEI1, Labs D and G have similar CUSUM slope as does Labs A and B.
- For FEI2, Labs B, D and G have similar CUSUM slopes.

# Average FEI1 and FEI2 Versus Year by Lab



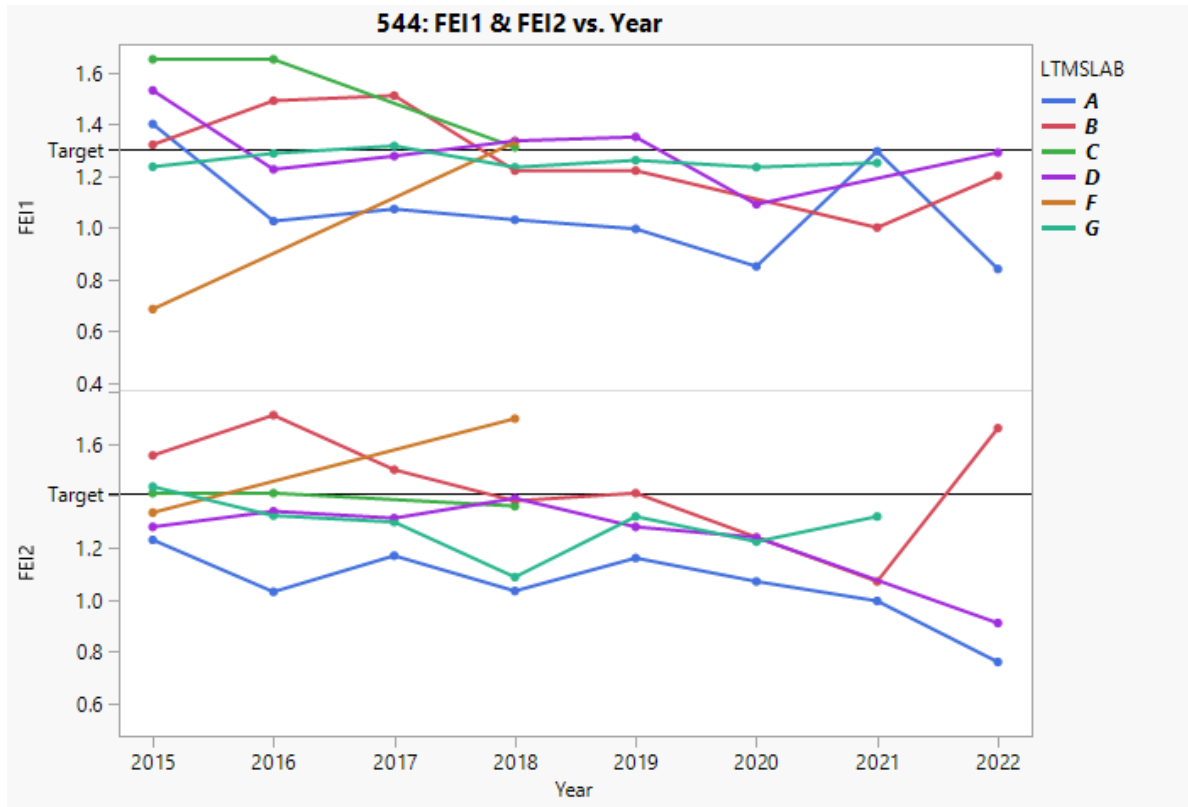
- Yi are calculated using original LTMS s.
- Yi do not include ICFs.
- Omitted means of less than 4 tests in a year.

# 542 without ICF



- FEIs are Engine Hour corrected with **no ICF**.
- F1 is combined into F.
- Vertical lines indicate the year a new blend was introduced. The average includes the previous blend.

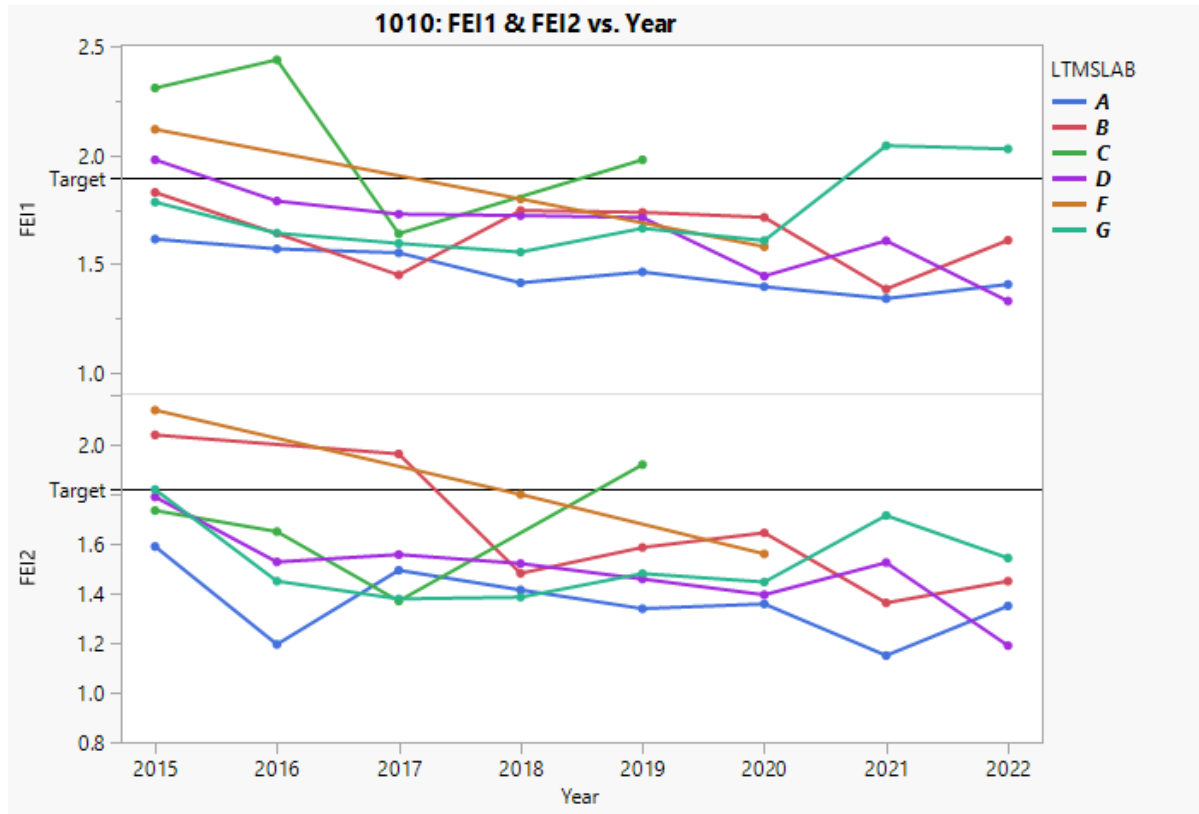
# 544 without ICF



- FEIs are Engine Hour corrected with **no ICF**.
- F1 is combined into F.

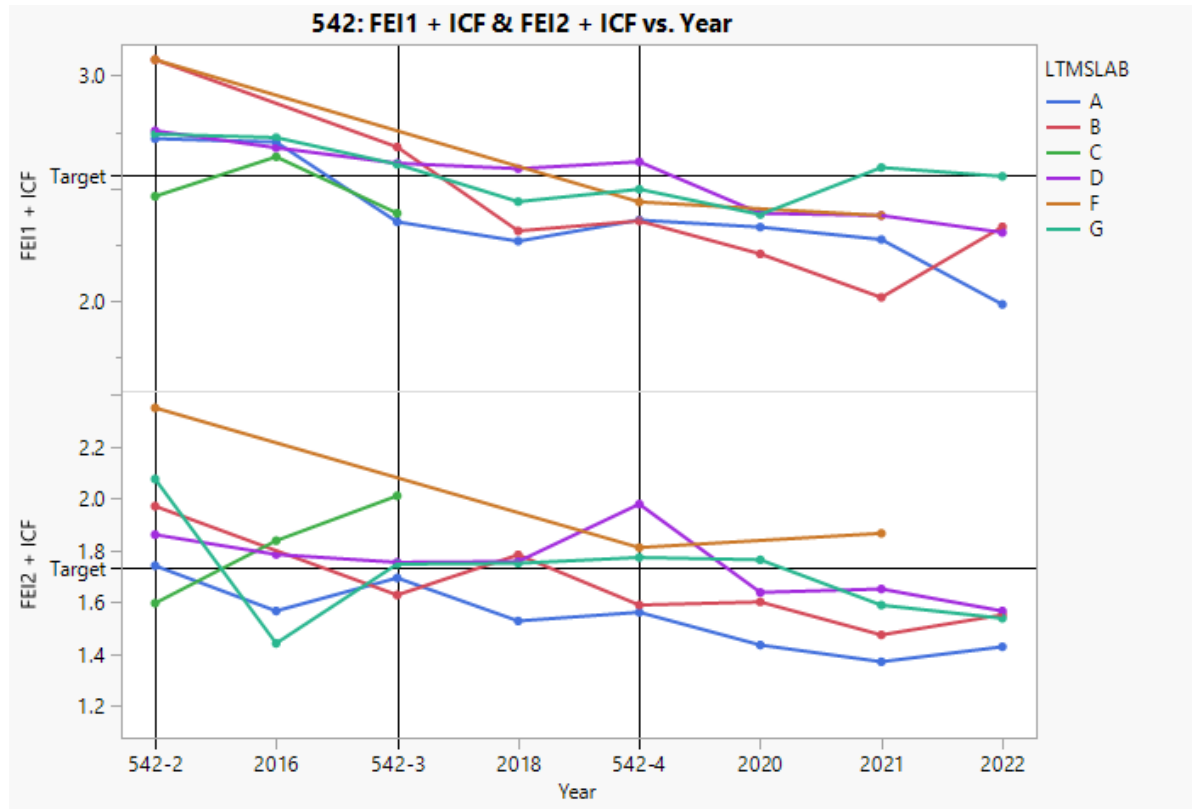


# 1010 without ICF

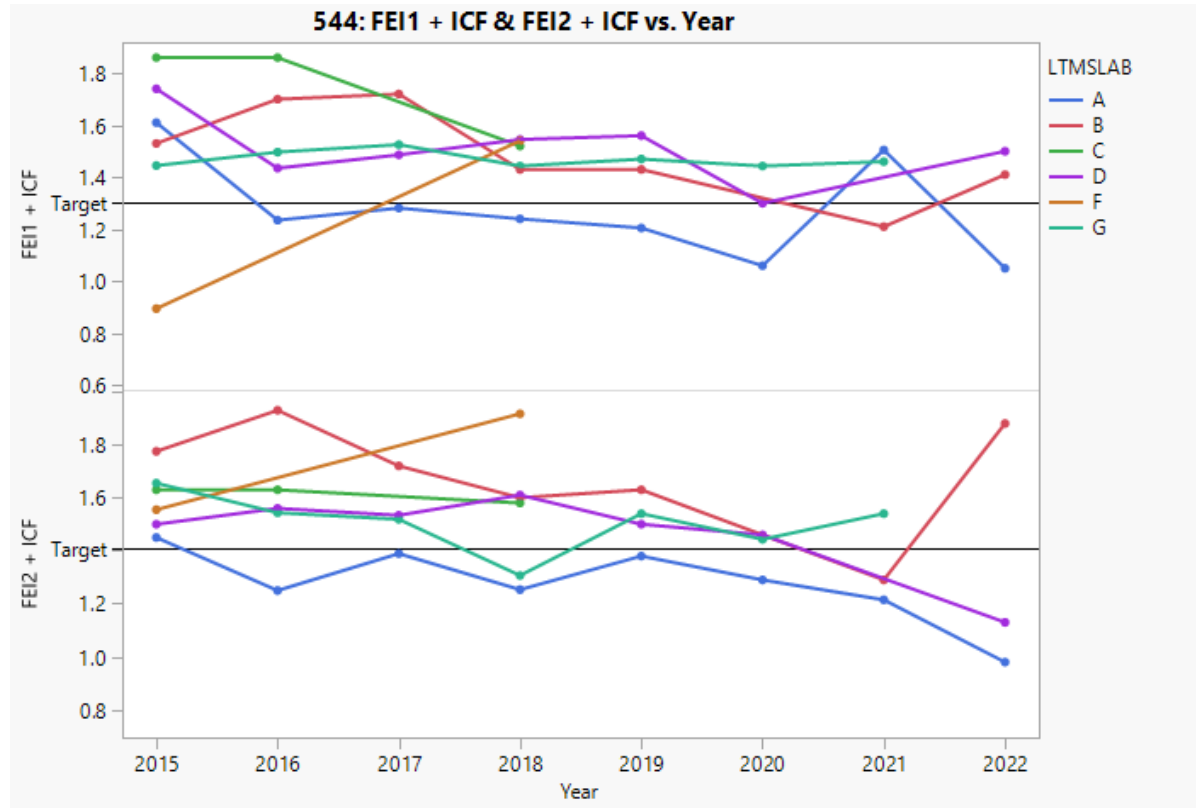


- FEIs are Engine Hour corrected with **no ICF**.
- F1 is combined into F.

# 542 with ICF

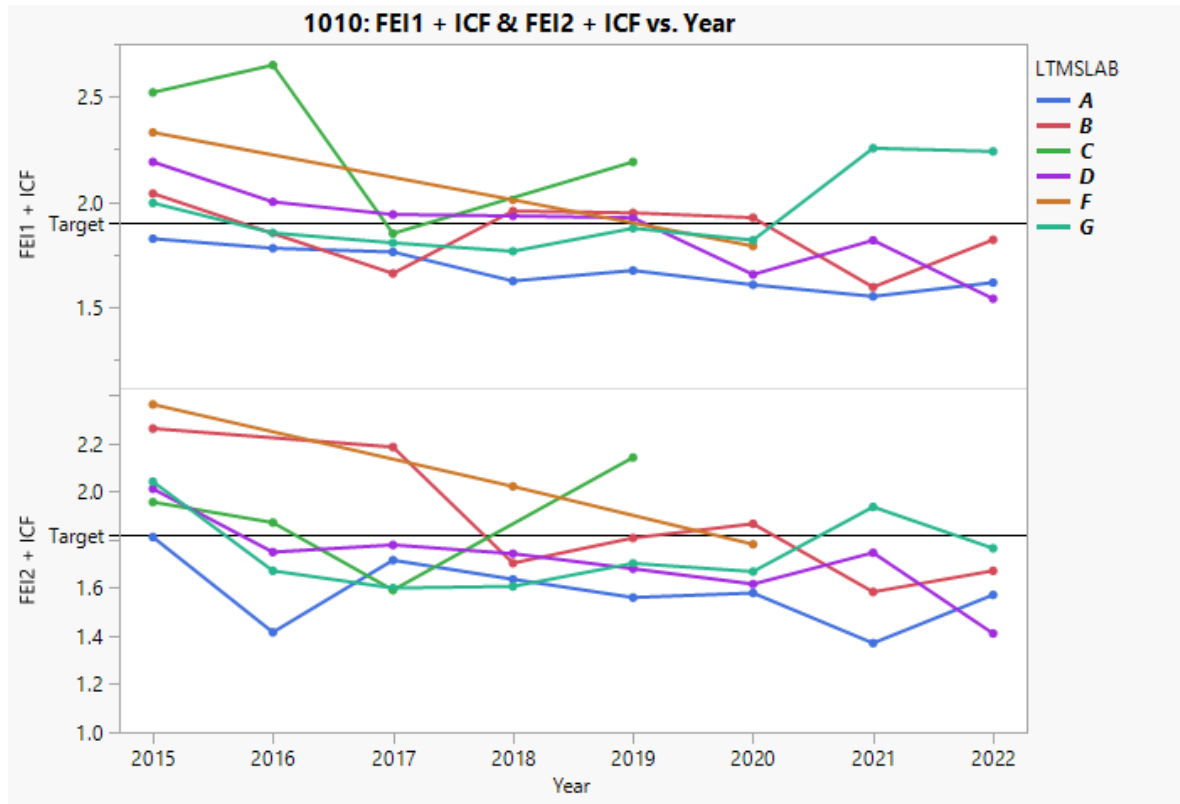


- FEIs are Engine Hour corrected with **ICF** added to all results whether done so in **LTMS** or not.
- F1 is combined into F.



- FEIs are Engine Hour corrected with **ICF** added to all results whether done so in **LTMS** or not.
- F1 is combined into F.

# 1010 with ICF



- FEIs are Engine Hour corrected with **ICF** added to all results whether done so in **LTMS** or not.
- F1 is combined into F.

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