

Sequence VH Surveillance Panel Meeting

Teams

Wednesday, October 8, 2025, 11:00 am – 11:45 am EDT

1.0) Attendance

Afton:	B. Campbell, B. Madock, A. Stone
BP	B. Hochkeppel
Exxon	L. Salvi
Ford:	M. Deegan
GM:	K. Zreik
Haltermann Solutions:	E. Hennessey, I. Mathur
IMTS:	S. Clark
Infineum:	J. Anthony, T. Dvorak
Intertek:	A. Lopez
Lubrizol:	T. Catanese
OHT:	J. Bowden
Oronite:	R. Stockwell
Shell:	S. Demel
SwRI:	D. Engstrom, T. Kostan, M. Lochte
TMC:	S. Moyer, B. Transue, W. Venhoff
TEI:	D. Lanctot

2.0) Executive Summary

- M-batch precision matrix results were reviewed
- Labs may calibrate their other stands while waiting for M-batch approval
- Statisticians will commence data review in anticipation of the final test results by October 22

3.0) Approval of Minutes

Meeting minutes from 9/22/2025 approved without comment

4.0) Review of the 3rd and Last Row of the Fuel Precision Matrix from Lab G and Lab D

- Afton shared the attached presentation summarizing the lab bias investigation and available M-batch results
- IAR shared the precision matrix results by lab in the following tables,

Lab A		Oil	AES	Yi	RCS	Yi	AEV	Yi	APV	Yi	OSCR	FD AVG	Oil Add
	A	931	8.84	1.400	9.38	-1.236	9.04	0.233	8.12	-0.383	1	12.10	730
	A	931	9.12	1.870	9.3	-1.020	9.02	0.170	8.22	-0.220	1	12.30	
	A	1011-1	9.47	1.820	9.6	-2.010	9.52	0.430	8.96	0.420	1	13.00	
	A	1011-1											
	A	931											
			avg	1.697		-1.422		0.278		-0.061		12.47	
Lab D		Oil	AES	Yi	RCS	Yi	AEV	Yi	APV	Yi	OSCR	FD AVG	Oil Add
	D	931	7.92	-0.133	9.13	-0.643	8.7	-0.900	7.94	-0.683	80	15.60	925
	D	1011-1	8.75	0.561	9.46	-0.451	9.43	0.000	8.64	-0.667	6	16.40	814
	D	931	7.95	-0.083	8.95	-0.314	8.85	-0.400	7.98	-0.617	80		689
			avg	0.115		-0.469		-0.433		-0.656		16.00	
Lab G		Oil	AES	Yi	RCS	Yi	AEV	Yi	APV	Yi	OSCR	FD AVG	Oil Add
	G	1011-1	8.71	0.491	9.42	-0.080	9.47	0.190	9.08	0.250	2	15.90	793
	G	1011-1	8.3	-0.228	9.4	0.097	9.68	1.190	9.24	0.583	2	16.69	500
	G	931	7.87	-0.217	8.86	-0.170	8.9	-0.233	7.64	-1.183	65	16.86	940
	G	1011-1	8.68	0.439	9.34	0.592	9.62	0.905	9.05	0.188	7	17.23	243
	G	931	7.9	-0.167	9.14	-0.663	9.14	0.567	8.29	-0.100	7	15.41	521
			avg	0.064		-0.045		0.524		-0.052		16.42	

- The results show good discrimination between RO 931 and RO1011-1
- Lab G and Lab D results are < 1 standard deviation of all rated parameters
- Lab A tests are mild of sludge targets and close to varnish targets

5.0) Results of Lab A's Piston-to-Bore Clearance Experiment

- Lab A completed an experiment VH test with larger piston-to-bore clearance than Lab A's previous target
 - AES was about the same as previous testing
 - APV was less severe and closer to target

6.0) Reference other VH stands while Waiting for Precision Matrix Approval

- Labs asked if they could start referencing stands with M-batch fuel before the completion of the M-batch fuel approval.
- TMC explained that this is acceptable as it similar to HW referencing during running changes.
- A motion was not required for approval

7.0) Statistical Analysis

- Stats group was asked to start working with the M-batch precision matrix results that have been received to date to determine if ICFs for this fuel batch will be required and, if so, the value the ICF for each parameter with the following assumptions,
 - Lab A's last 2 results are similar to previous Lab A results
 - Lab A's last 2 results are similar to Lab G's results

8.0) Fuel Supply

- Haltermann asked all labs to put their fuel orders in as soon as they have an estimate of quantities and timing.

9.0) Meeting Adjourned

- Meeting adjourned at 11:45 am EDT
- The next meeting will be held after receiving the final precision matrix results, which is estimated to be October 22, 2025.



M-000054-3 Fuel Approval Matrix

October 7th, 2025

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M-000054-3 Fuel Approval Matrix

Jan-25

- M-000054 batch was too mild with two 940 results
- M-000054-1 pilot batch too severe with two 940 results
- M-000054-2 too severe with a 931 and 1011-1 result

Lab A & G match severity & FD

Jun-25

- M-000054-2a fuel dilution study at Lab A modifies the batch to 15% FD

- M-000054-3 pilot batch row 1
- M-000054-3 big batch row 2
 - Lab A averages 12.7% mild results,
 - Labs G & D average 16.7% on-target results

Lab bias returns

Oct-25

- Engine Swap Experiment with Lab A & G
 - Build differences in skirt clearance and surface finish
- M-000054-3 row 3
 - Lab D & G complete
 - Lab A in progress

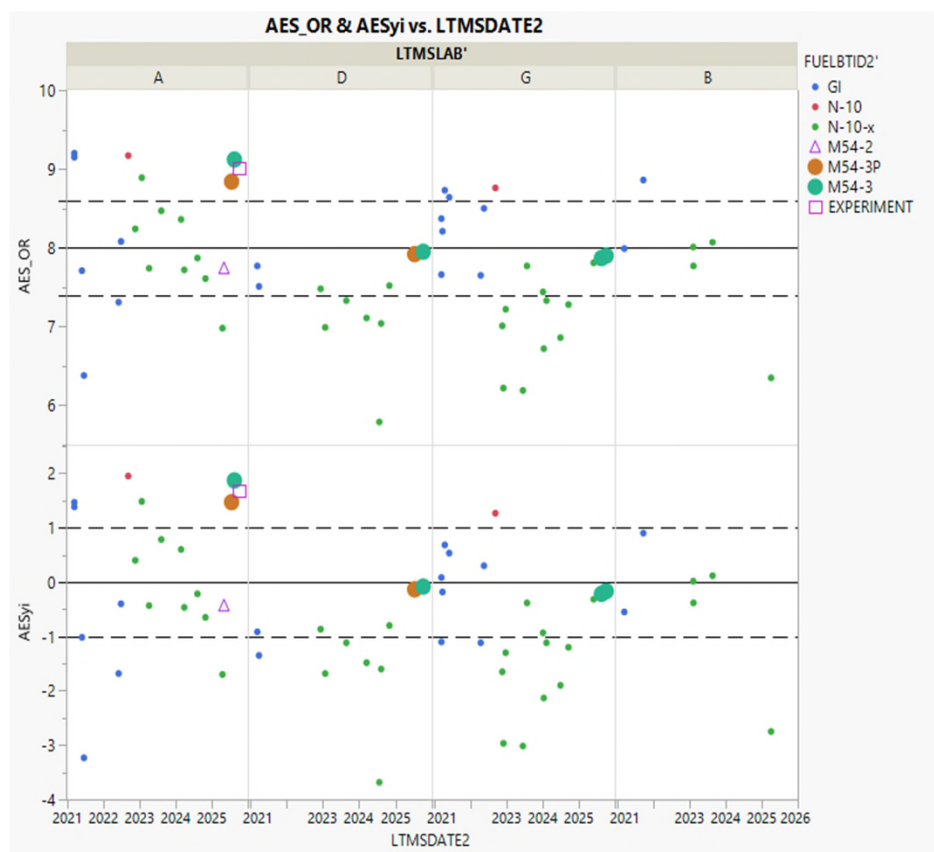
A1	A2	G1	G2	D
940 (175651)	931 (193861)	940 (175644)	1011-1 (191485)	931 (190601)
931 (193862)	1011-1 (193857)	1011-1 (199200)	931 (191483)	1011-1 (190602)
1011-1	931	931 (TBD)	1011-1 (TBD)	931 (193864)

M-000054-3 Fuel Approval Matrix



		Oil	AES	Yi	RCS	Yi	AEV	Yi	APV	Yi	OSCR	FD AVG	Oil Add
Pilot Blend Test	G	1011-1	8.71	0.491	9.42	-0.080	9.47	0.190	9.08	0.250	2	15.90	793
	D	931	7.92	-0.133	9.13	-0.643	8.7	-0.900	7.94	-0.683	80	15.60	925
	A	931	8.84	1.400	9.38	-1.236	9.04	0.233	8.12	-0.383	1	12.10	730
Final Blend	D	1011-1	8.75	0.561	9.46	-0.451	9.43	0.000	8.64	-0.667	6	16.40	814
	G	1011-1	8.3	-0.228	9.4	0.097	9.68	1.190	9.24	0.583	2	16.69	500
	A	931	9.12	1.870	9.3	-1.020	9.02	0.170	8.22	-0.220	1	12.30	
	A	1011-1	9.47	1.820	9.6	-2.010	9.52	0.430	8.96	0.420	1	13.00	
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	G	1011-1	8.68	0.439	9.34	0.592	9.62	0.905	9.05	0.188	7		
	G	931	7.9	-0.167	9.14	-0.663	9.14	0.567	8.29	-0.100	7		
	A												
	A												
			avg	0.523		-0.536		0.196		-0.219			

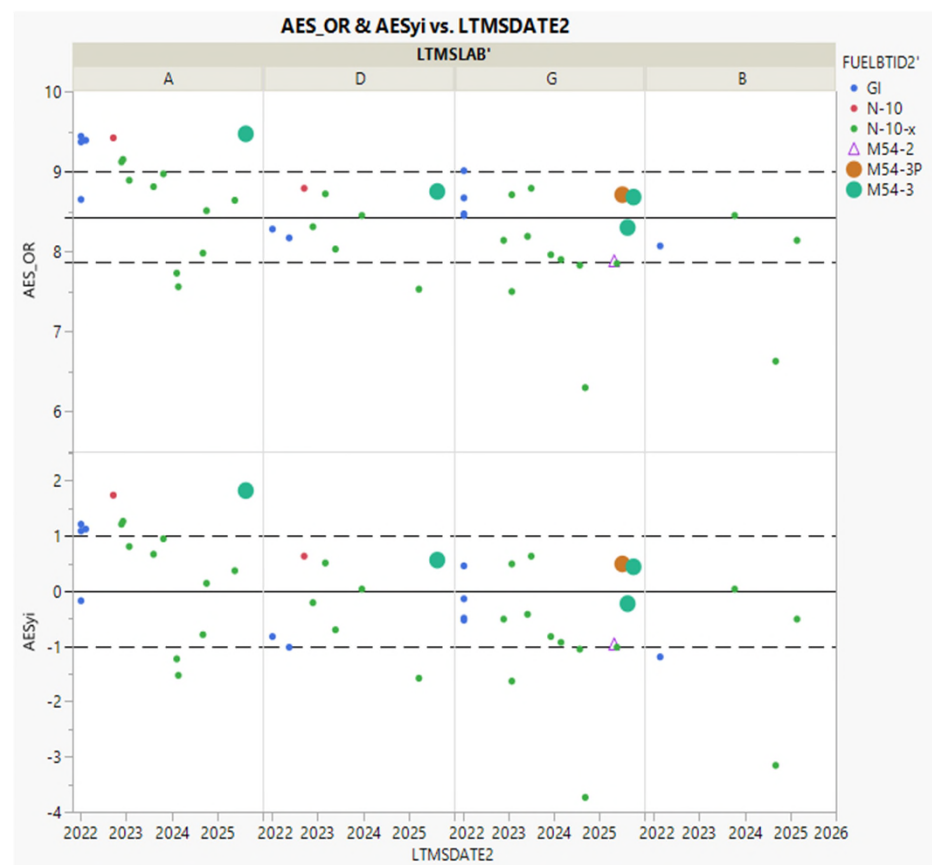
M-000054-3 Fuel Approval Matrix - AES



931

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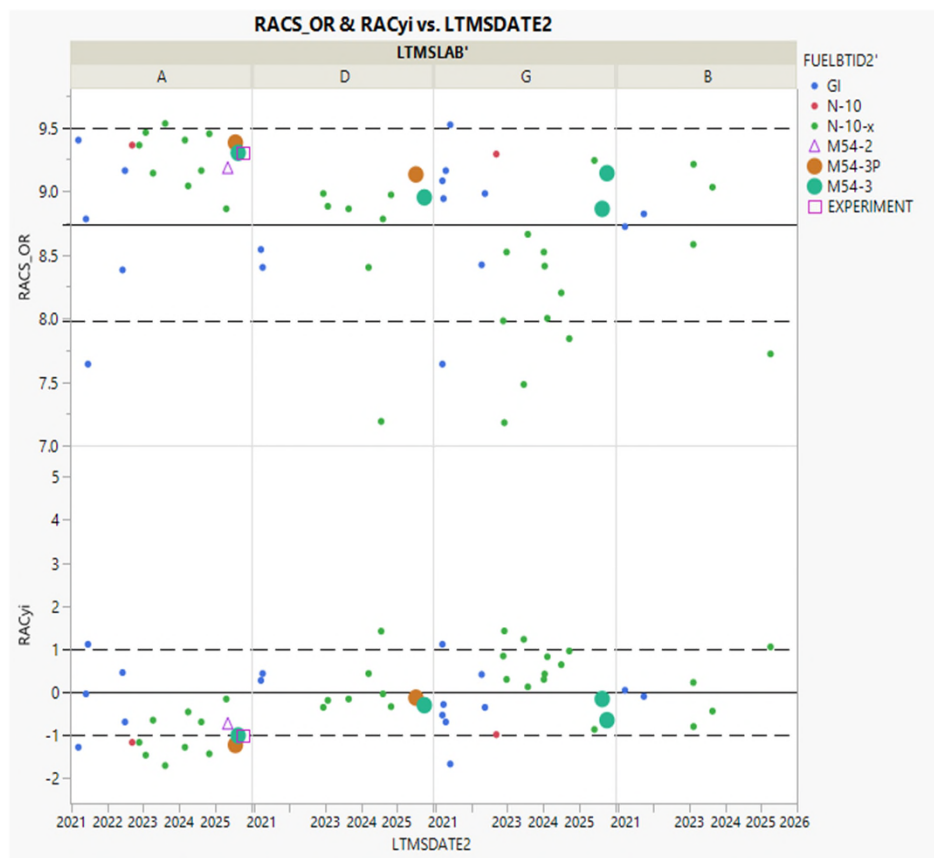
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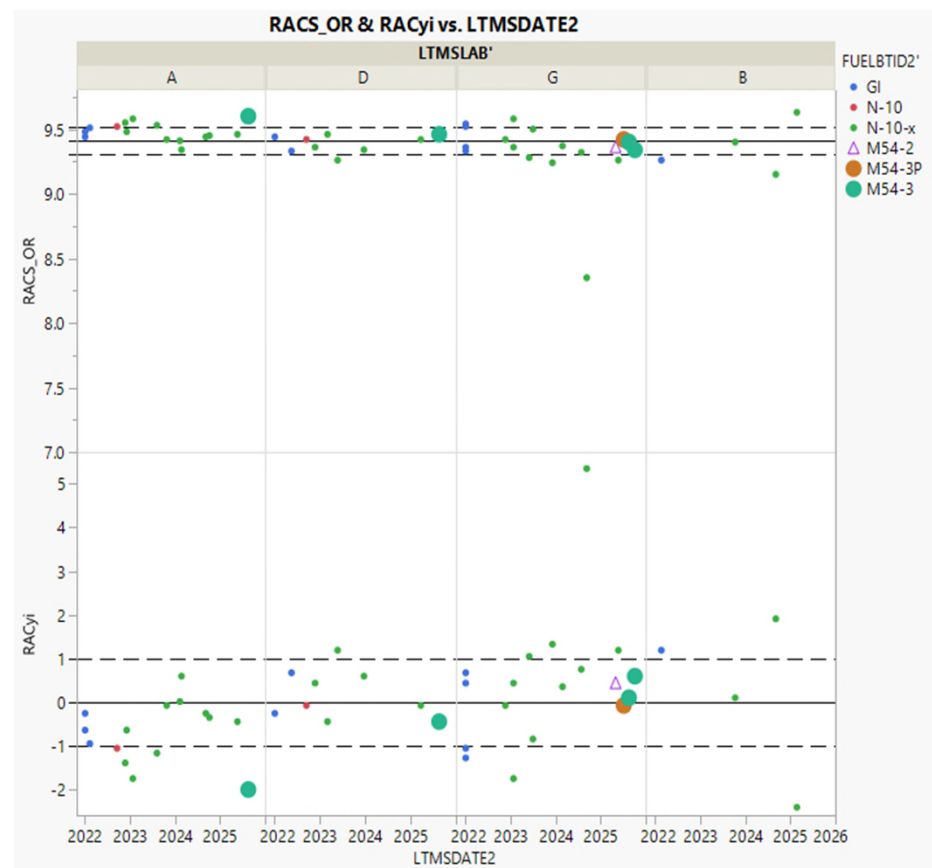
M-000054-3 Fuel Approval Matrix - RAC



931

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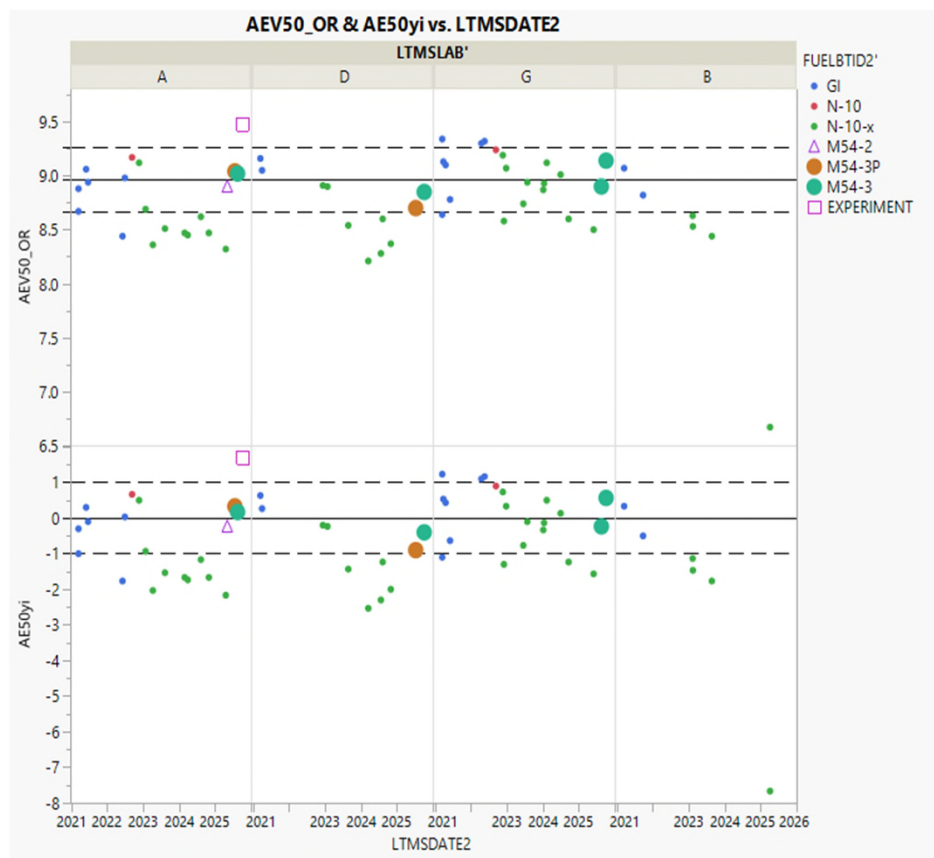
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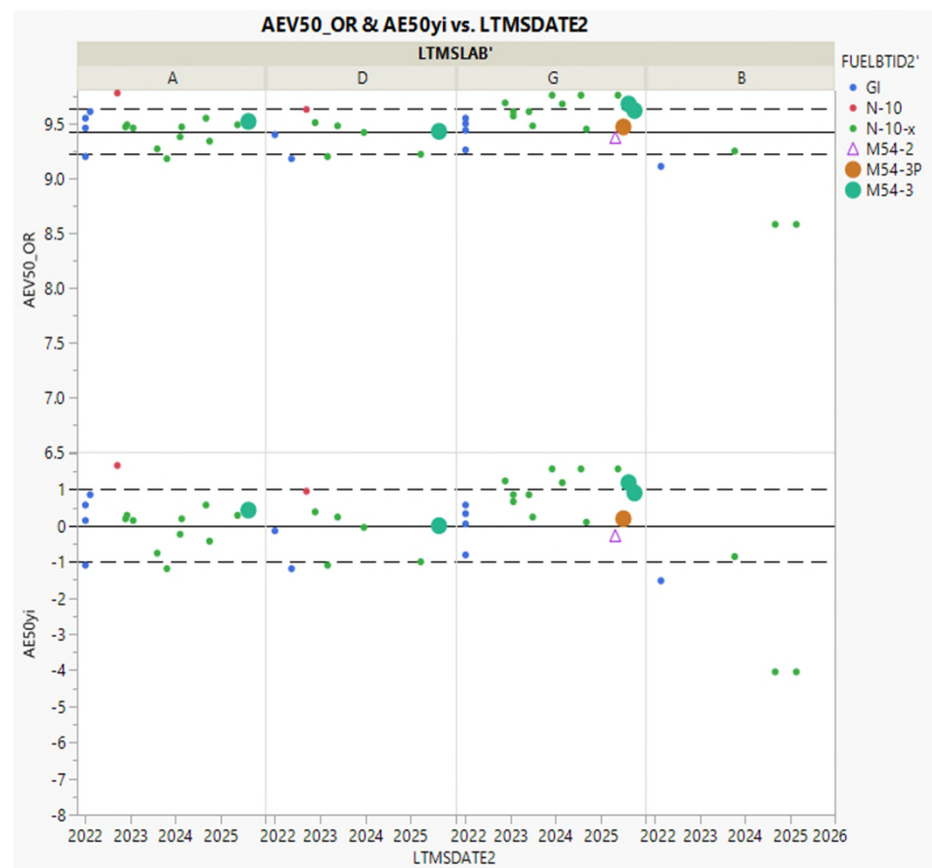
M-000054-3 Fuel Approval Matrix - AEV



931

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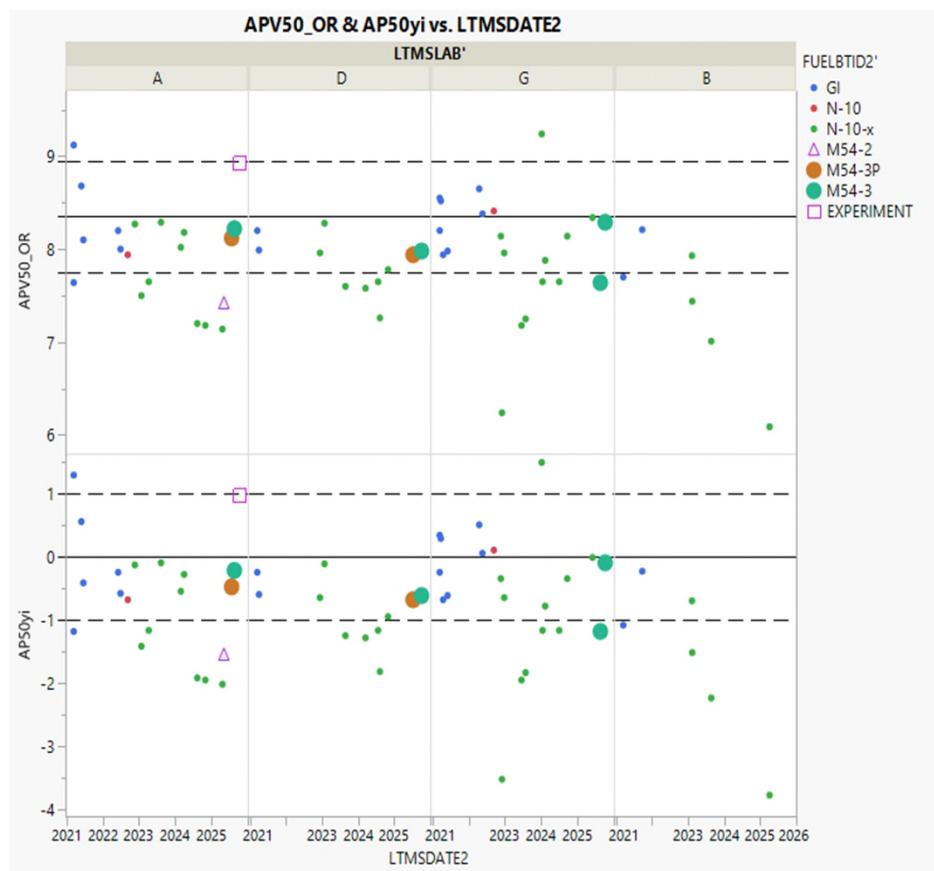
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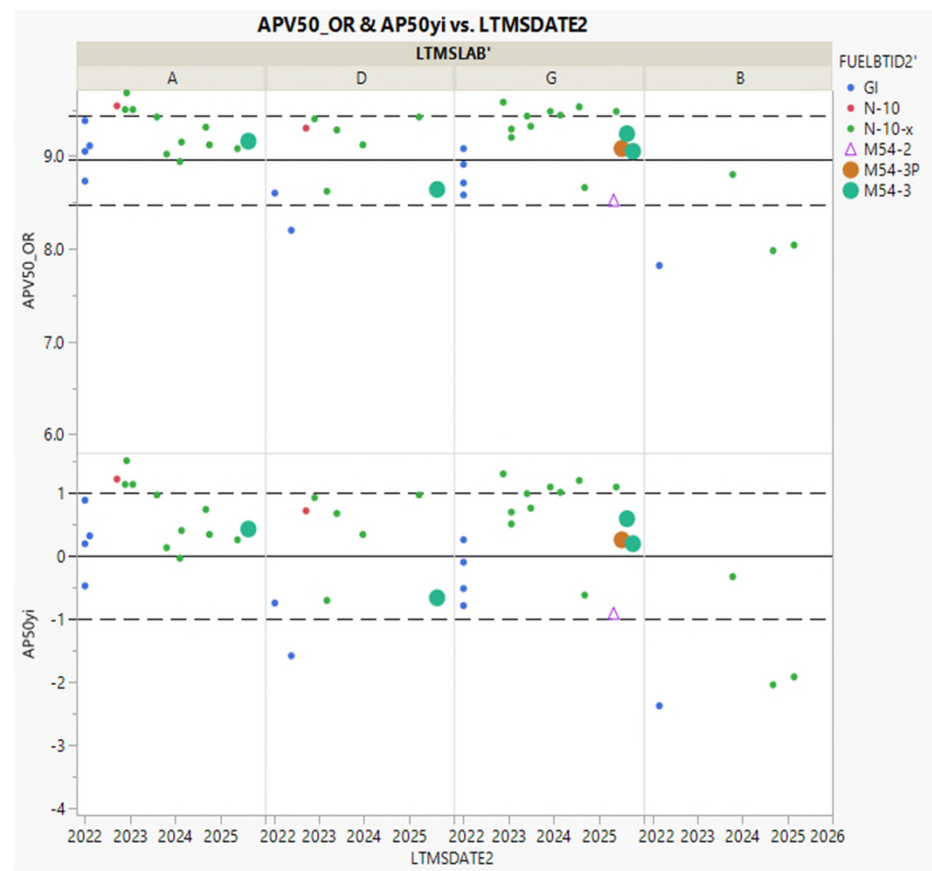
M-000054-3 Fuel Approval Matrix - APV



931

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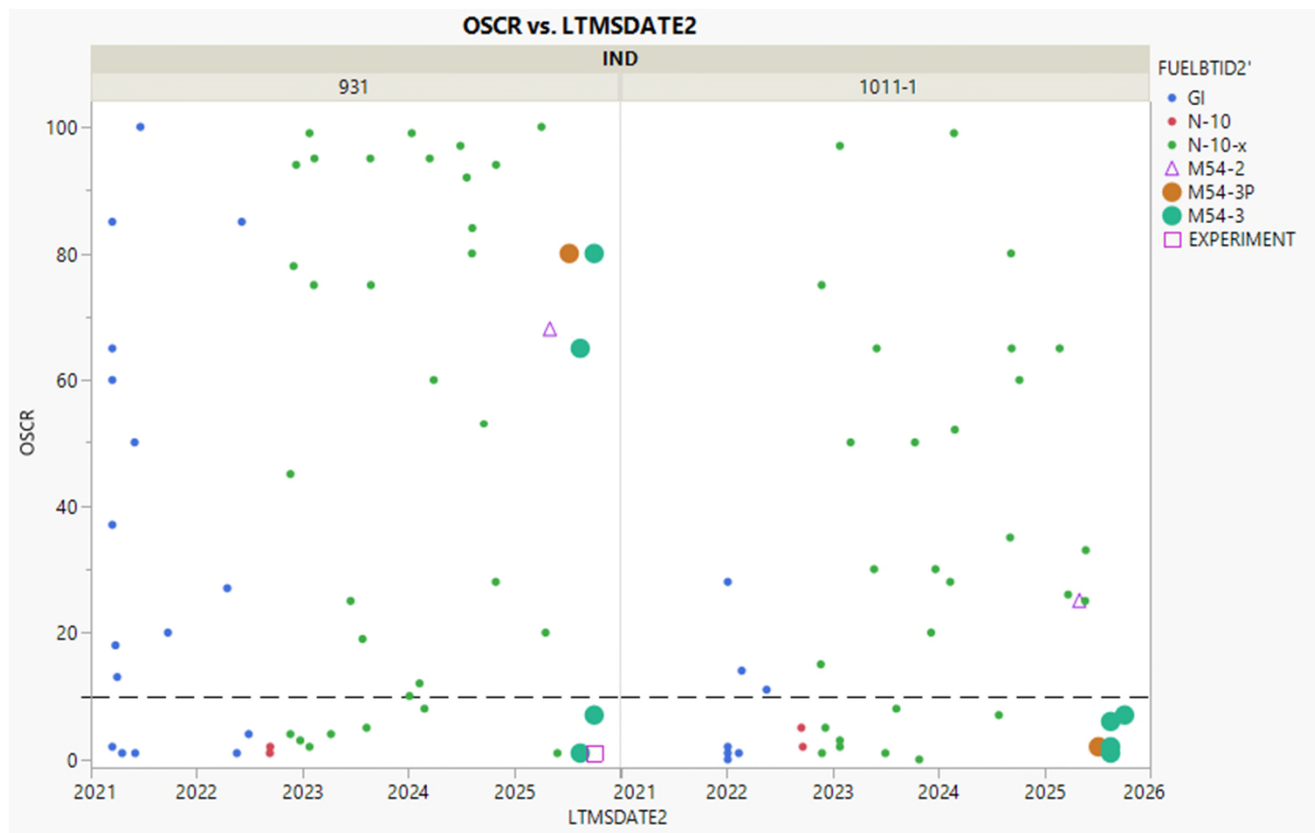
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M-000054-3 Fuel Approval Matrix - OSCR



M-000054-3 Fuel Approval Matrix – Fuel Dilution

