Sequence VH Surveillance Panel Meeting

Teams

Wednesday April 9, 2025, 9:00 am – 11:00 am EST

1.0) Attendance

Afton:	B. Campbell, B. Maddock, A. Stone
BP:	B. Hochkeppel
Exxon	H. Marie, L. Salvi
Ford:	M. Deegan, R. Zdrodowski
GM:	T. Cushing
Haltermann Carless:	W. Hairston
Haltermann Solutions:	I. Mathur
IMTS:	S. Clark, D. Passmore
Infineum:	J. Anthony, T. Dvorak
Intertek:	J. Franklin, A. Lopez
Lubrizol:	T. Catanese
OHT:	J. Bowden
Oronite:	R. Stockwell
Shell:	J. Hsu
SwRI:	D. Engstrom, T. Kostan, M. Lochte
TMC:	D. Beck
TEI:	D. Lanctot
Toyota:	V. Deshpande

2.0) Approval of Minutes

- March 4, 2025 meeting minutes voice-approved

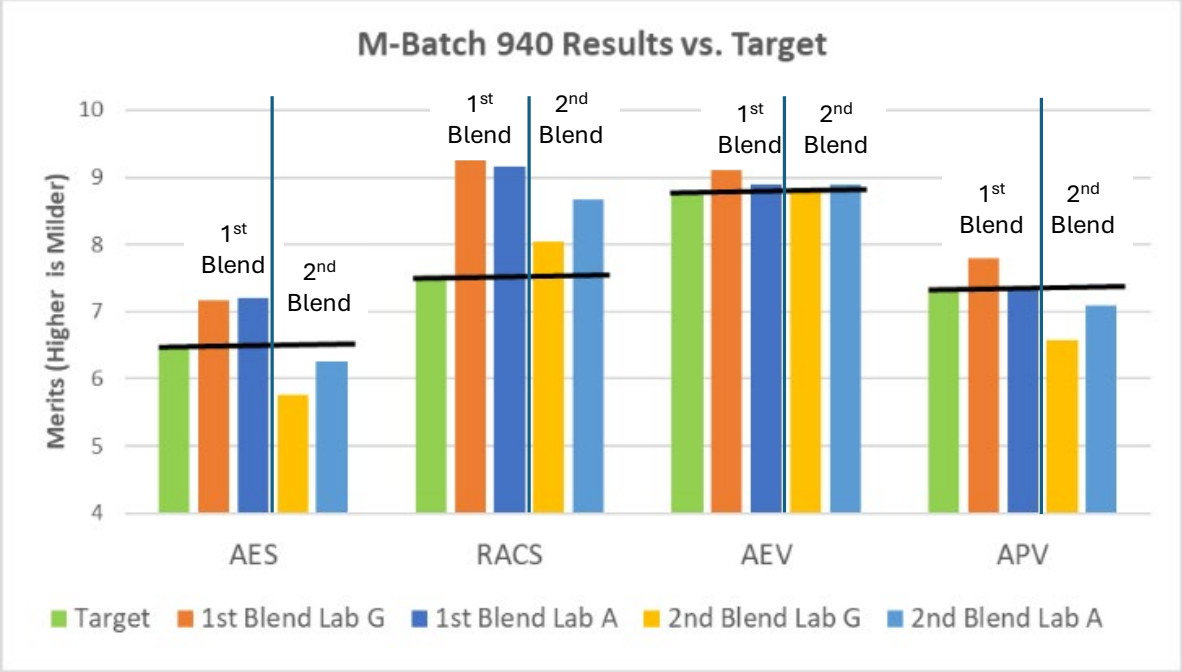
3.0) Fuel Supply Update

3.1) N-Batch Inventory:

- 32,000 gallons which is about 3 months of testing

3.0) M-Batch Precision Matrix

3.1) M-000054-1 test results



Description	AES	RACS	ln(10-RAC)	AEV	APV
	Target				
	6.47	7.77	0.8041	8.77	7.35
	M-000054				
1st Blend Lab G	7.17	9.26	-0.3011	9.10	7.80
1st Blend Lab A	7.21	9.16	-0.1744	8.89	7.36
Std. Dev. Lab G	1.43		4.72	0.67	0.92
Std. Dev. Lab A	1.51		4.18	0.24	0.02
	M-000054-1				
2nd Blend Lab G	5.76	8.04	0.6729	8.79	6.57
2nd Blend Lab A	6.25	8.67	0.2852	8.90	7.10
Std. Dev. Lab G	-1.45		-0.56	0.04	-1.59
Std. Dev. Lab A	-0.45		-2.22	0.27	-0.51

Note: Standard deviations > abs(1.5) are in red

3.2) Fuel Dilution Discussion

- Afton presented fuel dilution LTMS results from the last 4 fuel batches (see attached presentation)
- Afton proposed targeting the average of M-000054 and M-000054-1and to continue the fuel matrix tests without repeating RO 940 tests, again
- IAR is concerned about the fuel dilution being 20% vs. the expected 15% for both RO 940 tests
- SwRI asked if the fuel dilution measure could be an artifact of the fuel components added to the adjustment batch
- IAR believes 20% is accurate due to the viscosity and oil level measurements
    - There was significant drop in viscosity
    - First oil add was at 144 hours
- IAR asked Haltermann if the fuel could be adjusted to maintain the severity with less fuel dilution
- IAR suggested observing this fuel on RO's 931 and 1011-1 oils
    - If the sludge and varnish results are close to target, accept the high fuel dilution values
    - If not, re-adjust the fuel and repeat the tests
- SwRI commented that varnish was on target and AES was within 1.5 standard deviations of target
    - AES is within expected range for a non-linear test
- Haltermann believes the fuel dilution can be reduced, but it may reduce severity of the test results
- Afton stated fuel dilution values of 20% risks changing the test
- Haltermann explained that fuel dilution values are not defined in the VH procedure and fuel dilution does not correlate to test performance
- IAR recommended making severity decisions on the active ROs 931 and 1011-1 instead of RO 940, which was tested to validate sludge production

3.3) M000054 fuel adjustment discussion

- Haltermann went through the attached presentation to explain how the fuel was adjusted in the tank before adding additional components to the pilot batch
    - Higher washed and unwashed gums
    - Heavier fuel components
    - The result is 97.1% of M000054 with 2.9% of the adjustment cocktail in the full tank and add 0.3% of a different component to pilot batch that was shipped to the labs as M000054-1
- Toyota asked if both the 2.9% and 0.3% added sludge producing compounds
- Haltermann stated the components added the tank big batch were mostly to produce sludge and the 0.3% added to the pilot batch mostly increased fuel dilution.

3.4) Fuel dilution vs. severity discussion

- M000054-1 AES was more severe than the SP believed was acceptable (RACS was mild, AEV and APV were on target)
- The high fuel dilution value was the major SP complaint about M000054-1
- There was a discussion about shutting the next tests with M000054-XX down before completion if the FD48 value was higher than 20%
    - IAR was for shutting the tests down early in the interest of saving time if high dilution was the rejection criteria
    - Oronite, Afton, Infineum, SwRI were for letting the test finish due to the expense of starting the test and getting more data from the fuel
    - IAR deferred to the rest of the group to finish the tests, regardless of the preliminary fuel dilution numbers

3.5) M000054-XX precision matrix test plan

- Afton asked if Lab D is waiting until the Lab A RO931 and Lab G RO1011-1 tests are completed and approved
    - The Chair and Ford requested IAR, SwRI, and Afton to run a test on M000054-XX
    - IAR recommended we should run complete tests G2 1011-1 and A2 931, review the data before deciding on running more precision matrix tests
    - No consensus on Afton running a test for the first row of the test matrix

Motion by I. Mathur makes a motion to test the full batch, M000054-XX, as Runs A2 931, G2 1011-1
Motion Seconded by A. Lopez

Chair calls for a vote:

Afton:	B. Maddock	Approve
Exxon:	L. Salvi	Approve
Ford:	R. Zdrodowski for M. Deegan	Approve
GM:	T. Cushing	Not present
Haltermann:	I. Mathur for E. Hennessy	Approve
IMTS:	D. Passmore	Not present
Infineum:	J. Anthony	Approve
Intertek:	A. Lopez	Approve
Lubrizol:	T. Catanese	Approve
OHT:	J. Bowden	Waive
Oronite:	R. Stockwell	Approve
Shell:	J. Hsu	Approve
SwRI:	D. Engstrom	Approve
TMC:	D. Beck	Waive
Toyota:	V. Despande	Not present

Motion carries with 10 Approve and 2 Waive votes

Precision Matrix with Lab B

A1	A2	G1	G2	D	B
940	931	940	1011-1	1011-1	931
1011-1	1011-1	931	931	931	1011-1
931	-	1011-1	-	1011-1	931

Precision Matrix without Lab B

A1	A2	G1	G2	D
940	931	940	1011-1	931
931	1011-1	1011-1	931	1011-1
1011-1	931	931	1011-1	931

3.6) M000054-XX test schedule

- Haltermann has M-000054-XX fuel blended
  - Fuel will be delivered when Lab A and Lab G are ready to accept the deliveries
  - Lab A and Lab G requested 2,000 gallons each, which is good for 2 VH tests each
- Afton does not want the pilot batch fuel to be picked up from the labs is not returned to the M000054-XX fuel tank
  - Oronite agrees that the fuel is not to be put back in the tank after any fuel from the tank is delivered for testing
- Haltermann will give Lab A and Lab G directions on how to dispose of the remaining pilot batch fuel

3.7) M-Batch Fuel Precision Matrix Test Dates

- Batch M-000054: RO940 Lab A (176849-VH) and Lab G (176844-VH) January, 2025
- Batch M-000054-1: RO940 Lab A (TBD) and Lab G (175644-VH) April, 2025
- Batch M-000054-XX: RO931 Lab A, RO1011-1 Lab G mid-April 2025

4.0) <u>Old Business</u>

- Lab B failed the latest VH calibration test
- Lab B is going to pay for their VH tests on the M-batch fuel and offer the data for the precision matrix even if the stand is not calibrated
- SwRI believes that Lab B data from an uncalibrated stand can be included if the data meets statistical requirements

5.0) New Business

W. Hairston has joined Haltermann Carless and will send his contact information to the SP when his email is assigned

6.0) Meeting Adjourned

- Meeting adjourned at 10:45 am EST
- The next meeting will be scheduled after Lab A and Lab G have scheduled M000054-XX tests

LTMS Plots

April 9th 2025

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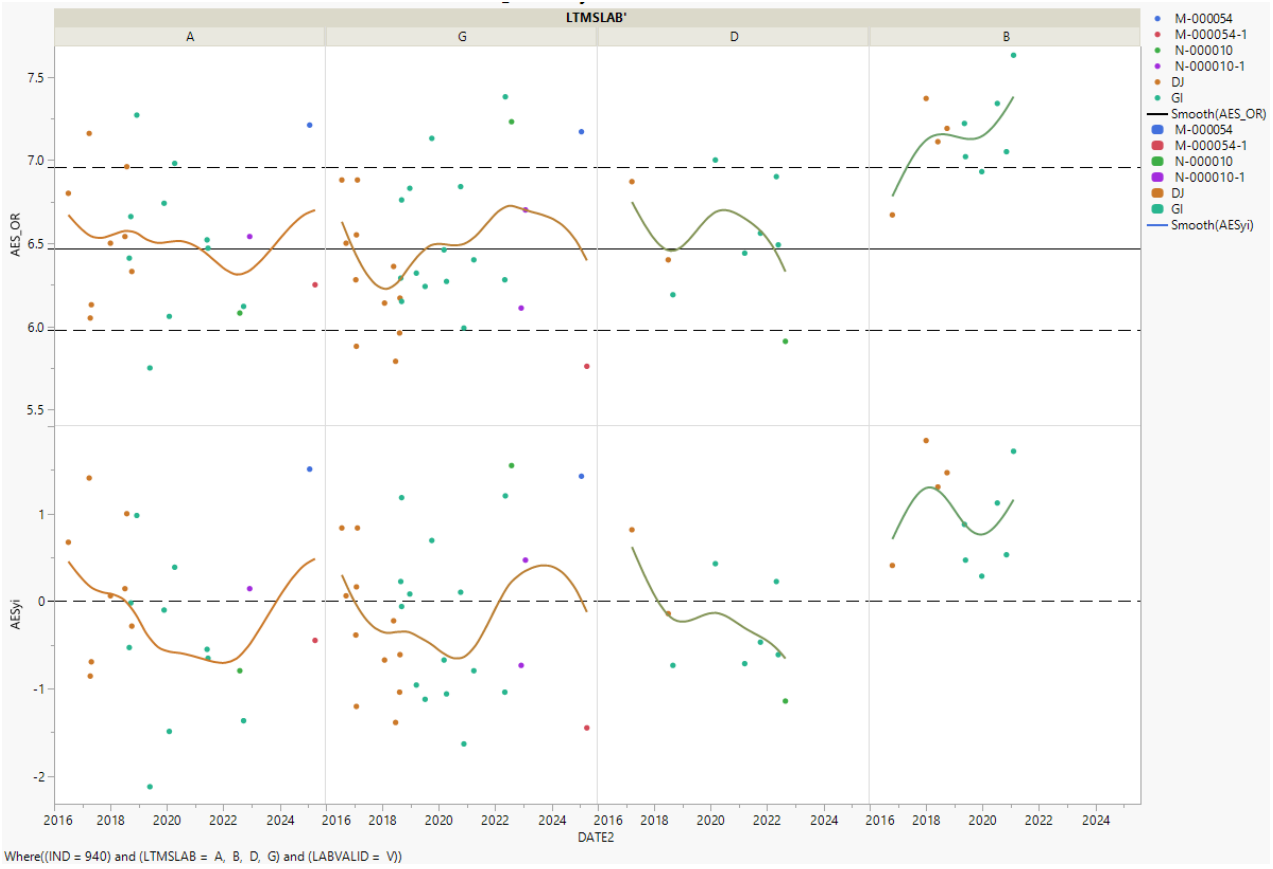
VH M-000054-1 Fuel Approval Matrix - AES 940 only



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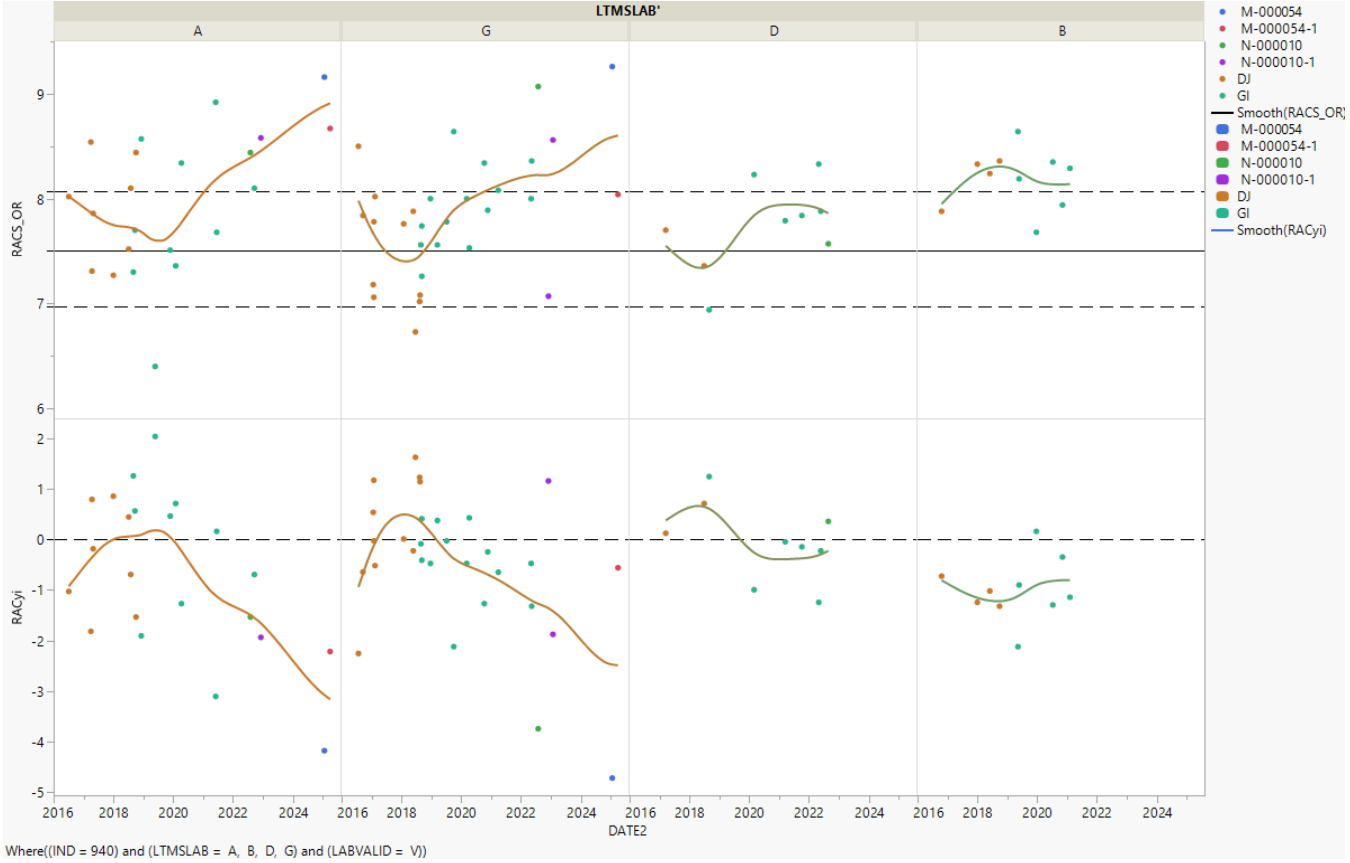
VH M-000054-1 Fuel Approval Matrix - RAC 940 only



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VH M-000054-1 Fuel Approval Matrix - AEV 940 only

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VH M-000054-1 Fuel Approval Matrix – APV 940 only

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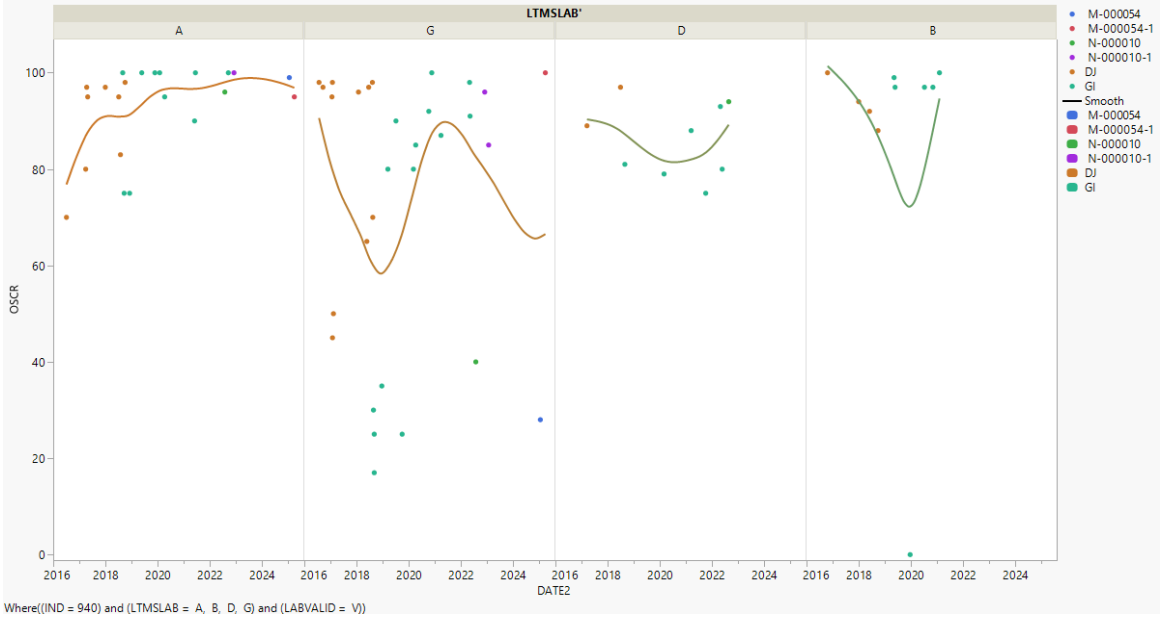
VH M-000054-1 Fuel Approval Matrix – OSCR 940 only



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Summary

- Critical Parameters after fuel batch adjustment
  - AES: close but slightly severe
  - RAC: directionally correct but mild of target
  - AEV: on-target
  - APV: on-target, slightly severe

- Suggestion:
  - Given the known severity drift observed over previous batches, reject this pilot batch
  - Split the difference on M-000054 and M-000054-1
  - Apply it to the full batch
  - Continue with the rest of the matrix with 931 and 1011 only

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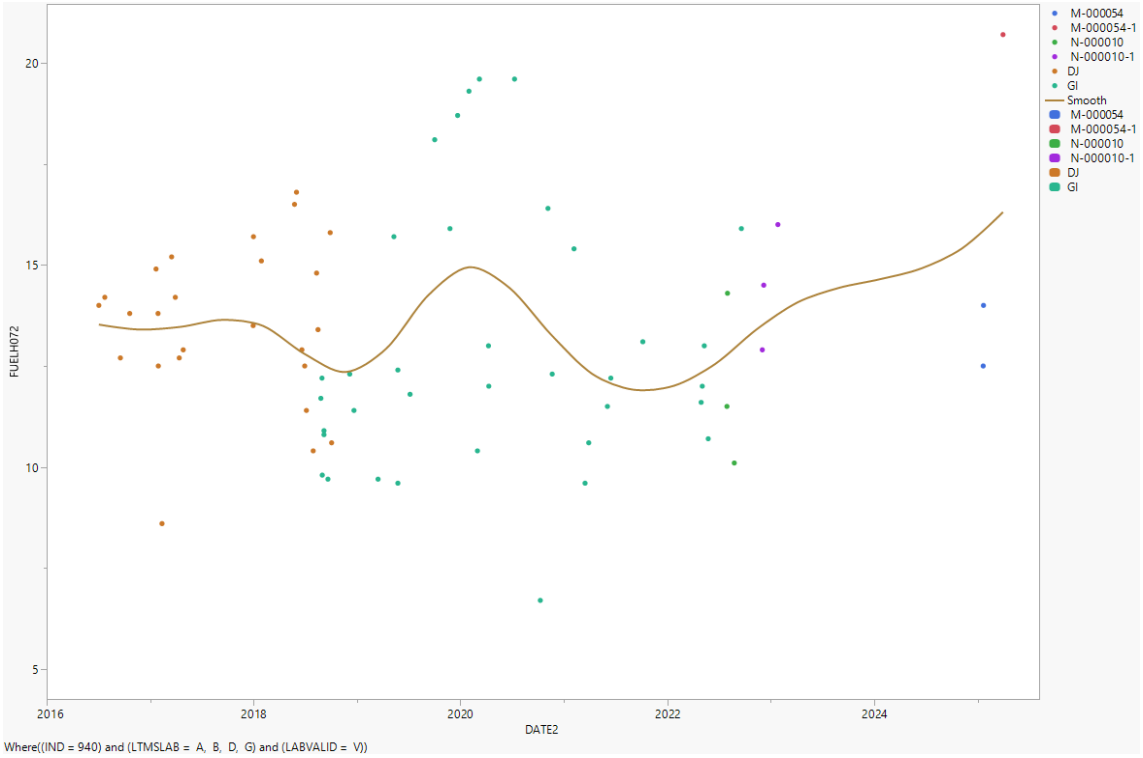
72-hour fuel dilution over time – 940 only



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HF295 Adjustment.

Panel meeting

April 9th 2025

Indresh Mathur

Haltermann Solutions

Monument Renewables & Fuels

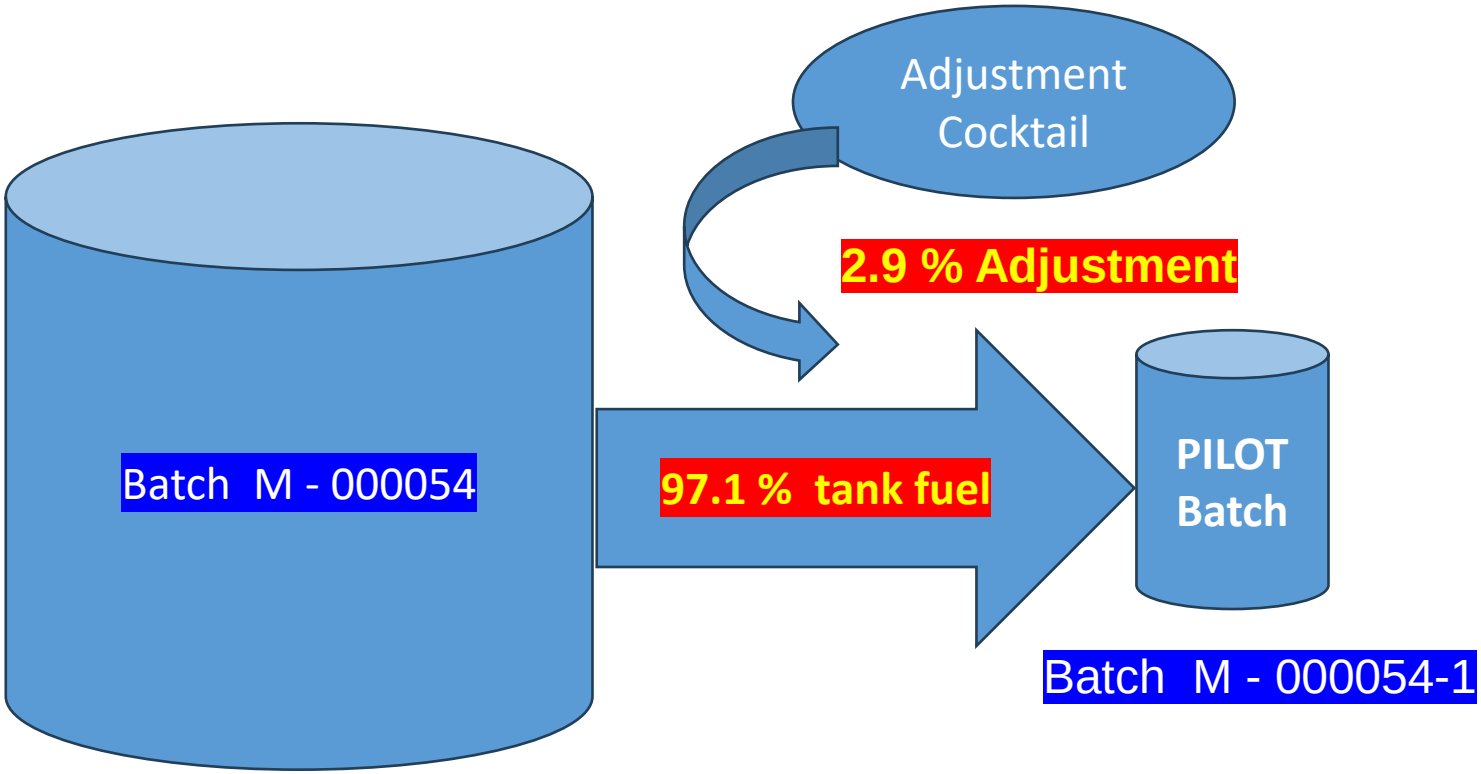
Houston, TX

Monument Chemical

haltermannsolutions

PRODUCT:	SVGM2	Batch No.:	M-000054-1 / M-000054
PRODUCT CODE:	HF0295	Tank No.:	MGNX10100 / 70-1
		Date:	3/13/2025 / 1/2/2025

TEST	METHOD	UNITS	SPEC. MIN	SPEC. TARGET	SPEC. MAX	RESULTS	RESULTS
Distillation - IBP	ASTM D86[2]	°C	22.2		35.0	31.4	29.1
5%		°C				44.1	42.5
10%		°C	48.9		57.2	52.5	50.8
20%		°C				66.4	64.1
30%		°C				83.0	80.6
40%		°C				99.8	97.6
50%		°C	98.9		115.2	110.2	108.6
60%		°C				118.0	115.3
70%		°C				128.5	124.3
80%		°C				154.6	145.8
90%		°C	162.8		176.7	176.4	172.9
95%		°C				184.6	180.6
Distillation - EP		°C	196.1		212.8	207.0	199.5
Recovery		vol %		Report		97.1	97.4
Residue		vol %			2.0	1.1	0.9
Loss		vol %		Report		1.8	1.7



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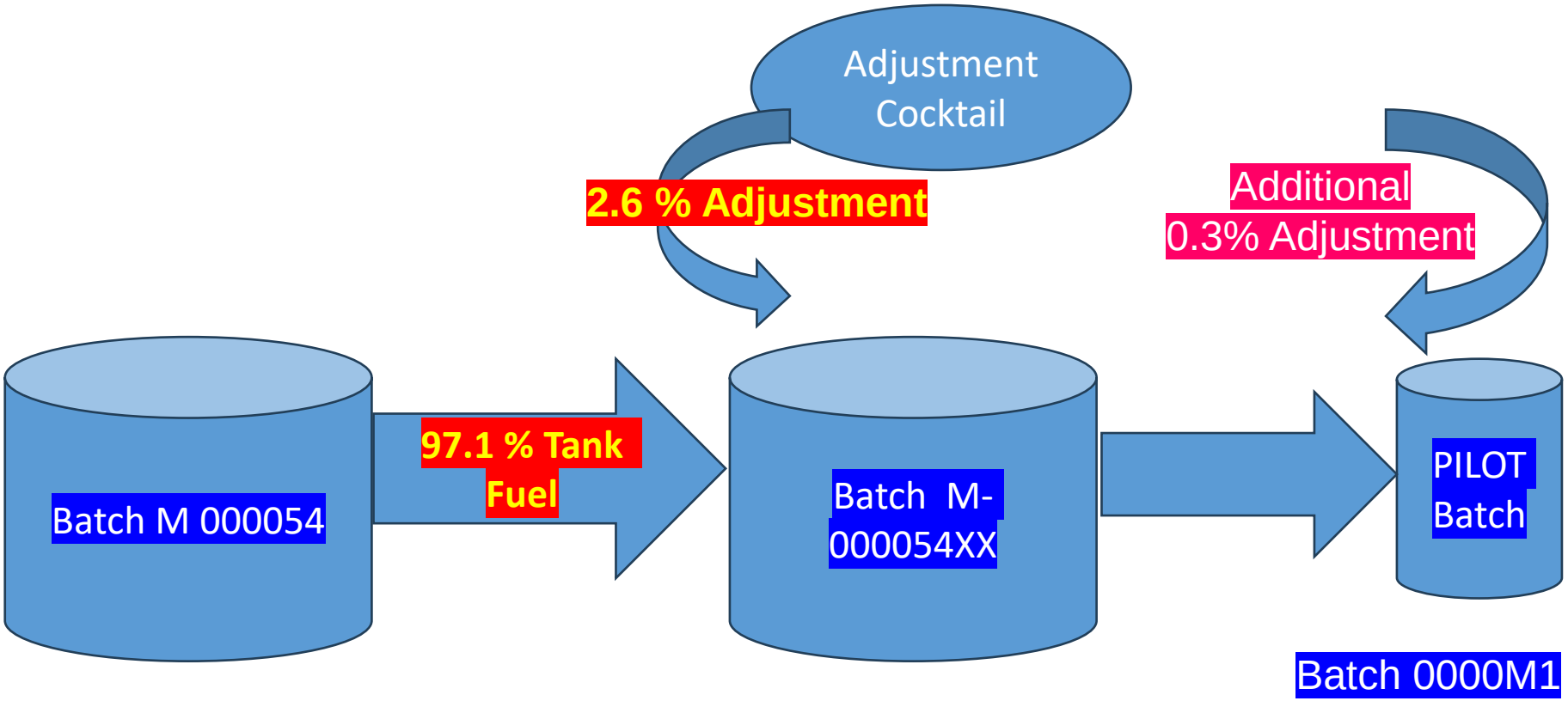

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