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INTERNATIONAL
Standards Worldwide

COMMITTEE D02 ON PETROLEUM PRODUCTS, LIQUID FUELS, AND LUBRICANTS

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Originally Issued: November XX , 2024

Reply to: Richard Grundza
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Unapproved Minutes of the November 19, 2024
Sequence IV Surveillance Panel Meeting.

The meeting was called to order by Chairman Buscher at 10:00 AM Central Time.

A copy of the agenda is included as attachment 1.

A list of attendees is included as attachment 2.

Minutes from the 7/17/24 meeting were approved by voice vote.

The panel discussed the status of the Sequence IVA test. Hardware for approximately 47 builds remain and sufficient quantities of reference oil are available to allow for calibration. Test activity is about one test per month. Once there are approximately 12 tests left, CLOG will contact interested users of the test to see if some variant of the IVB or other test can be used to replace the IVA. Haltermann gave an update on fuel availability and status of a new blend of the KA24E "Green" fuel, which was blended in July. Approximately 29,000 gallons are in inventory, in rail cars, at Haltermann. The panel also reviewed the CPD report. Batch H intake cams and Batch K exhaust cams have been used in the most recent reference tests. All the hardware supplier updates are included as attachment 3.

The panel heard from TMC regarding oil availability. Current oils are at least at a 4 year supply. Bill asked if the TMC could see if both reference oils 1011-1 and 300-1 could be reblended. The Director of the TMC has contacted all suppliers of reference oils and determined that reblends may be available for both of these oils for the foreseeable future. The panel reviewed the IVA and IVB sections of the TMC semiannual report (https://www.astmtmc.org/ftp/docs/gas/B01SemiAnnualReports/semiannualreports/B01%20SemiAnnual%20Report%20-%20OCT%202024.pdf). The panel also reviewed a number of plots generated by the TMC looking at trends by oil, fuel batch, cam batch as well as lab severity, in an effort to identify what may have caused the severity shift. These plots are included as attachment 4. The group also briefly discussed information letters and was informed that requirement to segregate engines which ran oils less than 0W-16 for use only with less than 0W-16 oils, which was thought to be in the procedure was actually a check box on the ACC forms and this item has been addressed. The other procedural items were addressed with information letter 24-2.

The panel reviewed the action items from the previous meeting (see attachment 5). A metrology workshop is planned for early 2025, when test activity may be lower. The group also discussed several items that came up since the panel met in July. The group discussed the use of 1012 for the extended break in oil and agreed to only require 2 flushes when running an extended break in as this is consuming a large portion of this reference oil, which cannot be reblended. The group discussed changes to the oil consumption limit and agreed to keep the current limit for the foreseeable future. The panel was informed by the supplier that both the fuel pump and oil filter used for the IVB test stand are no longer available and alternate pumps and filters are being pursued. The group was informed that the Keyence VR-3000 is going out of production and service parts will no longer be available once current inventories are depleted. It was suggested that a VR-6000, the replacement analyzer, be made available for the 2025 metrology workshop.

Scope and Objectives were presented and are included as attachment 6.

Attachment 7 includes the motion and action items recorded during this meeting.

The next meeting will be at the call of the chair.

Attachment 1

Sequence IV Surveillance Panel

San Antonio, TX
SwRI – Building 209
November 19, 2024
10:00 a.m. - 12:00 p.m. Central Time

A G E N D A

1. Chairman comments.
2. Attendance sign-in sheet distribution.
3. Membership changes.
4. Approval of minutes for July 17, 2024.
5. July 17, 2024 action item review.
6. Sequence IVA status report.
7. Fuel supplier status report.
8. CPD inventory status report.
9. TMC report.
10. Sequence IVB industry severity trends.
11. Sequence IVB items:
    i. Extended break-in oil.
    ii. Oil consumption limit.
    iii. Stand hardware replacements (fuel pump, fuel filter).
    iv. Keyence equipment replacement.
12. Review scope & objectives.
13. Old business.
14. New business.
15. Next meeting.
16. Adjourn.

MEMBERSHIP

SEQUENCE IV SURVEILLANCE PANEL

November 19, 2024

NAME	COMPANY-ADDRESS-PHONE-FAX-EMAIL	SIGNATURE
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MEMBERSHIP

SEQUENCE IV SURVEILLANCE PANEL

November 19, 2024

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Joe Anthony	Company: Infineum Phone No.: 210 612-9895 Cell No.: Email:	
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	Company: Phone No.: Cell No.: Email:	

NON-MEMBER MAILING LIST

SEQUENCE IV SURVEILLANCE PANEL

November 19, 2024

NAME	COMPANY-ADDRESS-PHONE-FAX-EMAIL	SIGNATURE
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NON-MEMBER MAILING LIST

SEQUENCE IV SURVEILLANCE PANEL

November 19, 2024

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Lopez, Al	Intertek Automotive Research Phone No.: Cell No.: Email:	
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Rohlfing, Andrew	Afton Chemical Corporation Phone No.: Cell No.: Email:	
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NON-MEMBER MAILING LIST

SEQUENCE IV SURVEILLANCE PANEL

November 19, 2024

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Makarucha, Paul	Company: Phone No.: Infineum Cell No.: Email:	
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Cushing, Tim	Company: GM Phone No.: Cell No.: Email:	
	Company: Phone No.: Cell No.: Email:	
	Company: Phone No.: Cell No.: Email:	
	Company: Phone No.: Cell No.: Email:	

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SEQUENCE IV SURVEILLANCE PANEL

November 19, 2024

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Seq. IVB Inventory Status Report
As of October 31, 2024

For presentation to:

Seq. IV Surveillance Panel

November 19, 2024

1. Seq. IVB Engine Inventory Life Estimates (Based on Industry Wide Consumption Rates)

Remaining Engine Inventory Life (Based on 5 Year Industry Wide Consumption Rate)	
OHTIVB-16000-2 Engine Assembly	7.75 Years
Including Engine Component Build-Out	11.92 Years

*Includes highest yearly consumption rate (2018-2019)

Remaining Engine Inventory Life (Based on 2 Year Average Industry Wide Consumption Rate)	
Current OHTIVB-16000-2 Engine Assembly	8.09 Years
Including Engine Component Build-Out	12.43 Years

Remaining Engine Inventory Life (Based on 1 Year Industry Wide Consumption Rate)	
OHTIVB-16000-2 Engine Assembly	8.09 Years
Including Engine Component Build-Out	12.43 Years

Comments:

- At the time of this estimate, the supplier anticipates engine consumption rates to remain the same or slightly increase.
- The supplier has also acquired enough ancillary engine kit materials (OHTIVB-103-1) to match our engine inventory.

2. Seq. IVB Intake and Exhaust Camshaft Inventory Life Estimates (Based on Industry Wide Consumption Rates)

Remaining Camshaft Inventory Life (Based on 5 Year Average Industry Wide Consumption Rate)	
Seq. IVB Intake Camshaft	15.86 Years
Seq. IVB Exhaust Camshaft	18.50 Years

*Includes highest yearly consumption rate (2018-2019)

Remaining Camshaft Inventory Life (Based on 2 Year Average Industry Wide Consumption Rate)	
Seq. IVB Intake Camshaft	15.52 Years
Seq. IVB Exhaust Camshaft	20.09 Years

Remaining Camshaft Inventory Life (Based on 1 Year Industry Wide Consumption Rate)	
Seq. IVB Intake Camshaft	15.34 Years
Seq. IVB Exhaust Camshaft	17.89 Years

Comments:

- At the time of this estimate, the supplier anticipates camshaft consumption rates to remain the same or slightly increase.
- The supplier has also acquired enough camshaft test kit (OHTIVB-102-1) materials to match our camshaft inventory.

3. Seq. IVB Test Lifters Inventory Life Estimates (Based on Industry Wide Consumption Rates)

Remaining Lifter Inventory Life (Based on Average Industry Wide Consumption Rate)	
Minimum Inventory Life of any Given Lifter Size (5 Year Consumption Rate)	>17 Years
Minimum Inventory Life of any Given Lifter Size (2 Year Consumption Rate)	>17 Years
Minimum Inventory Life of any Given Lifter Size (1 Year Consumption Rate)	>17 Years

- There are 25 individual lifter grades (sizes). The remaining lifter inventory life estimate indicates the earliest depletion of any given lifter grade.
- At the time of this estimate, the supplier anticipates lifter consumption rates to remain the same.

Attachment 4

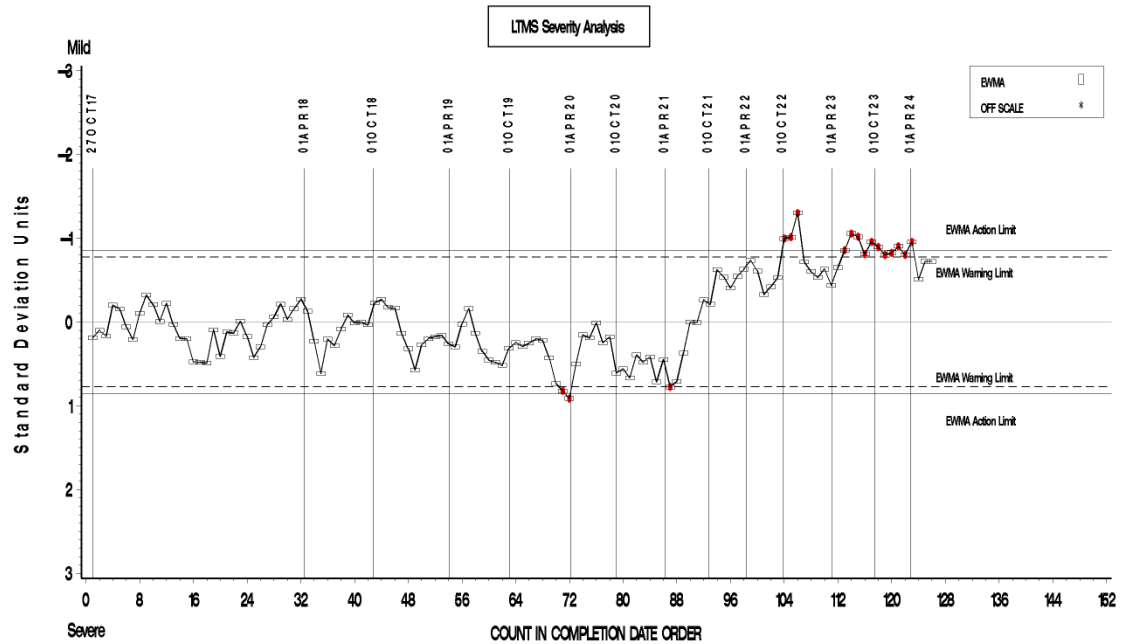
IVB Severity

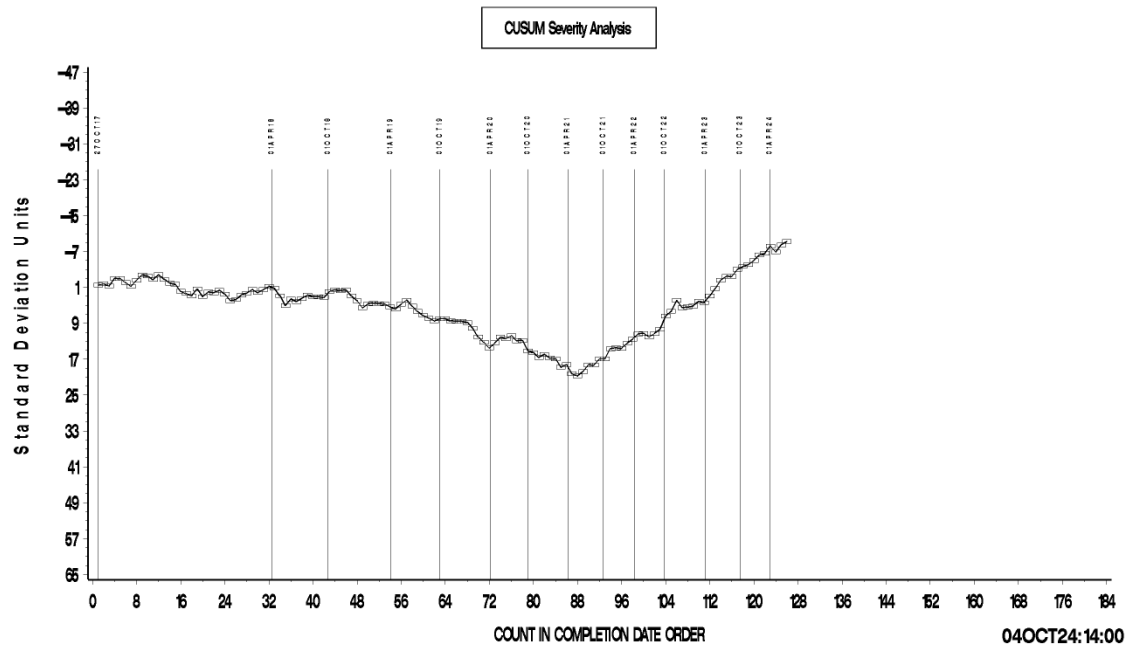
- Both AVLI and FE have been trending mild since mid 2021
- All oils seem to follow same trend but shift in RO300 is about a year later.
- Batches F and G appear to be milder for both parameters

SEQUENCE IVB INDUSTRY OPERATIONALLY VALID DATA

A Program of ASTM International

AVERAGE VOLUME LOSS BY KEYENCE INTAKE Final





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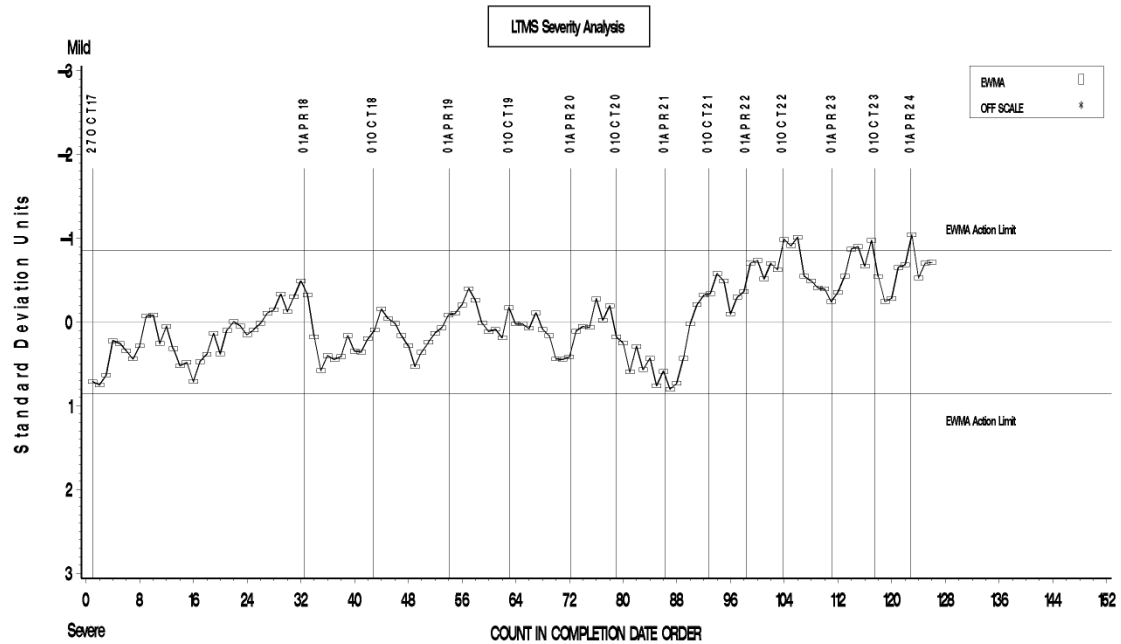
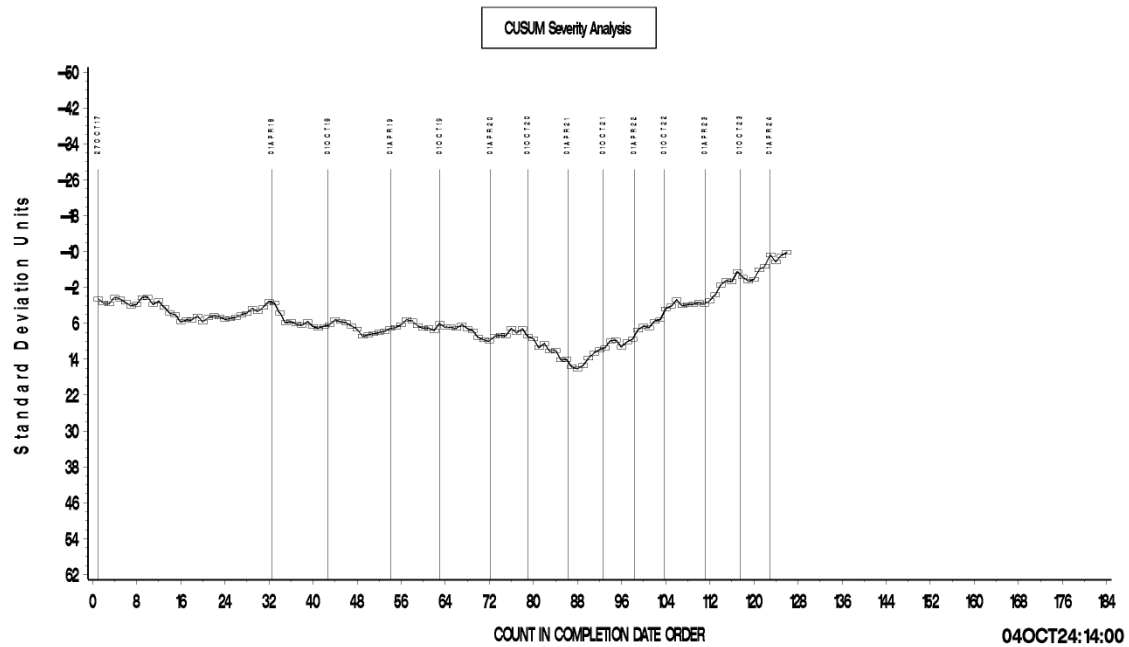
A Program of ASTM International

END OF TEST FE FINAL Severity Adjusted RESULT





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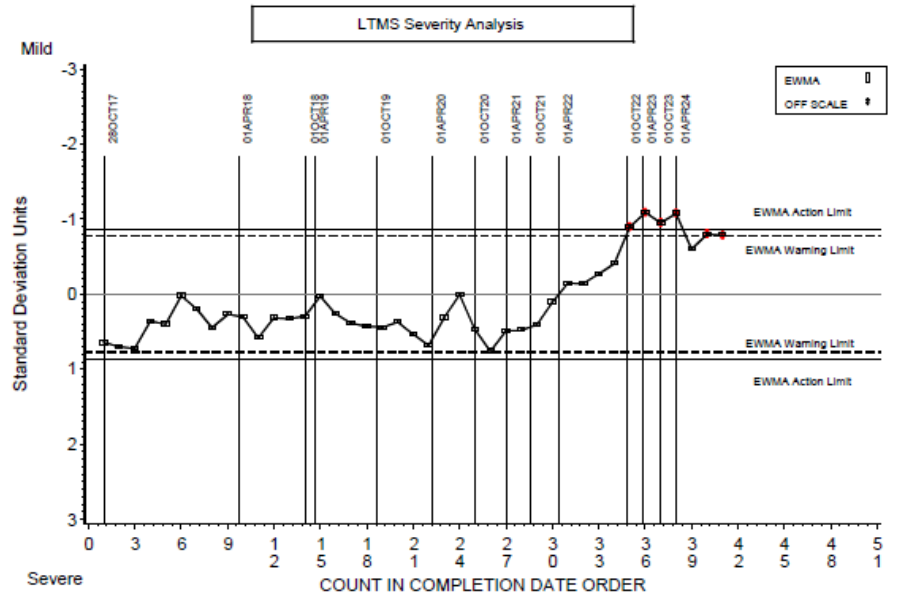
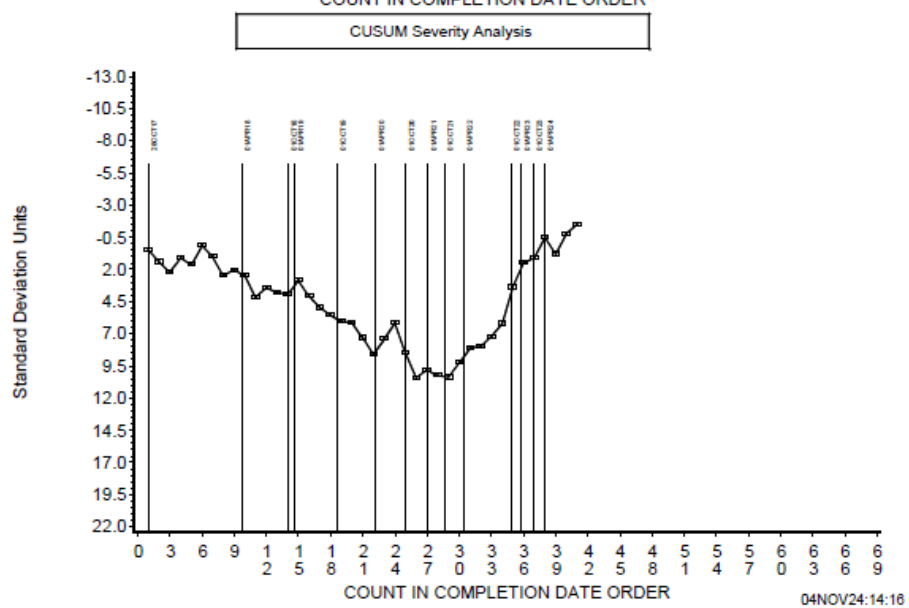
RO 1011 Blends
AVERAGE VOLUME LOSS BY KEYENCE INTAKE Final





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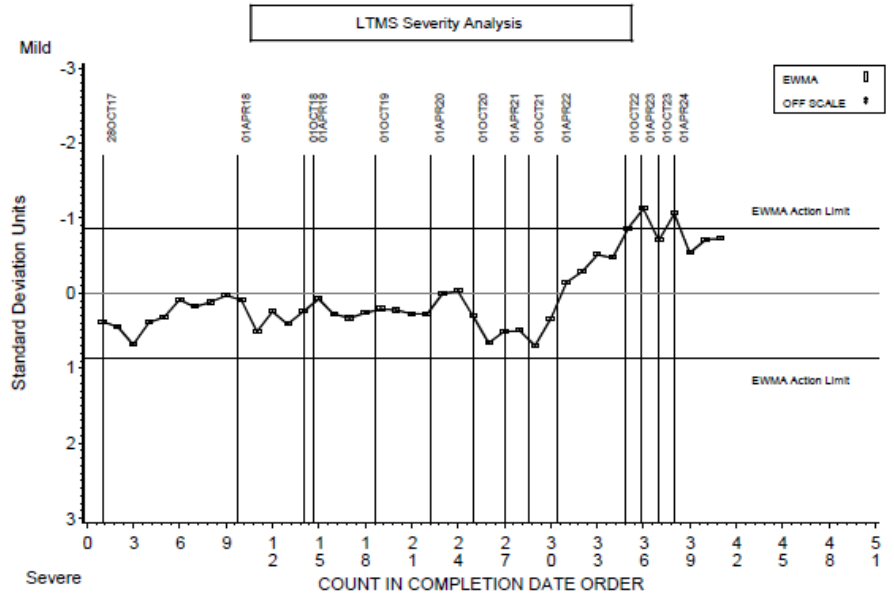
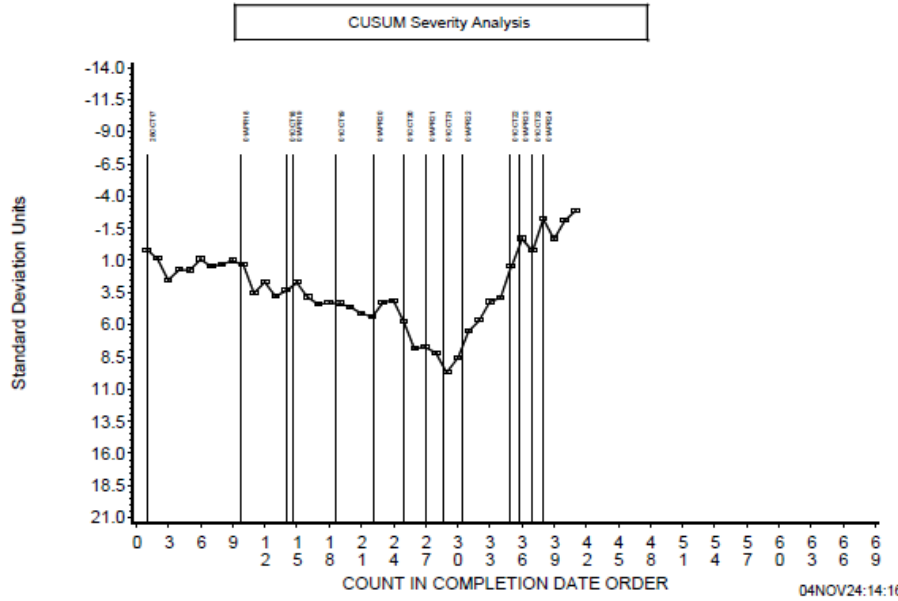
RO 1011 Blends
END OF TEST FE FINAL Severity Adjusted RESULT





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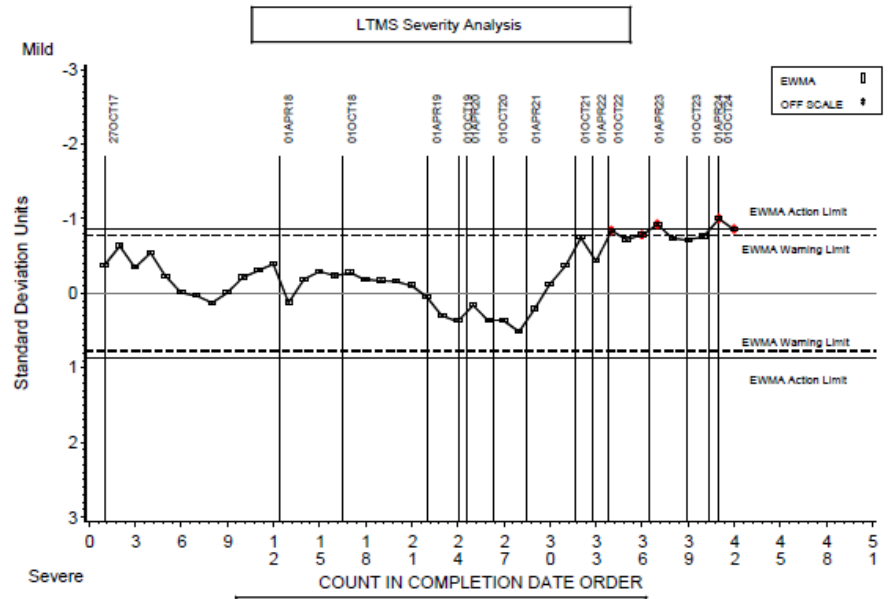
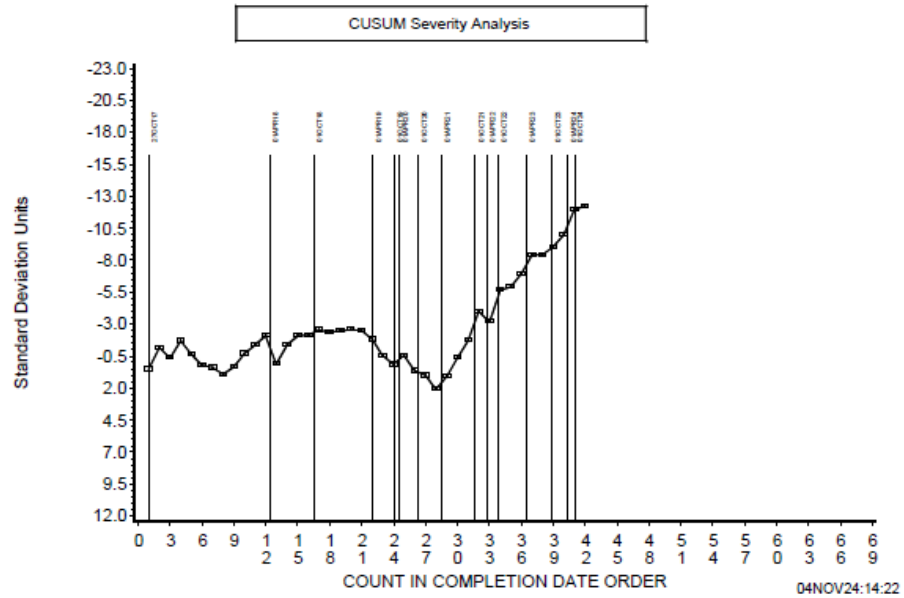
IND 1012 Only
AVERAGE VOLUME LOSS BY KEYENCE INTAKE Final





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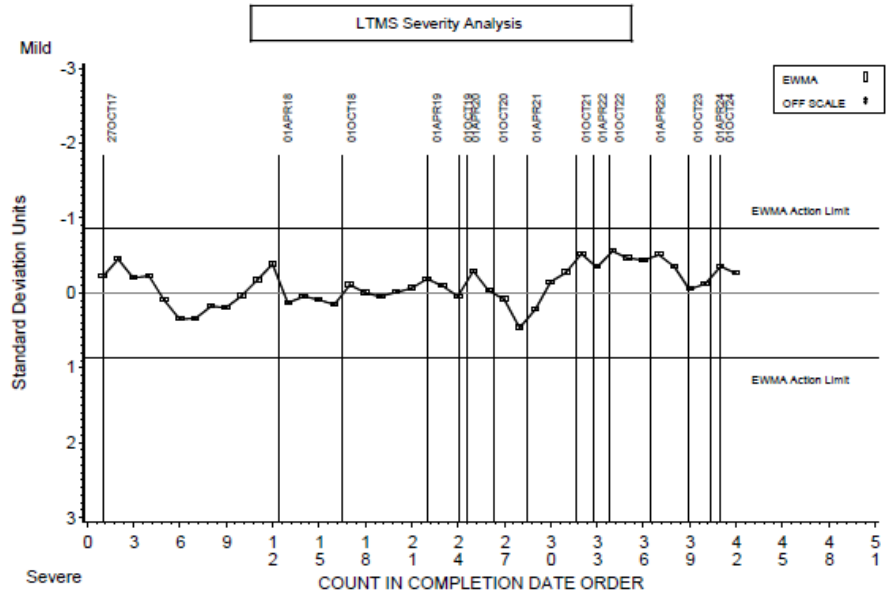

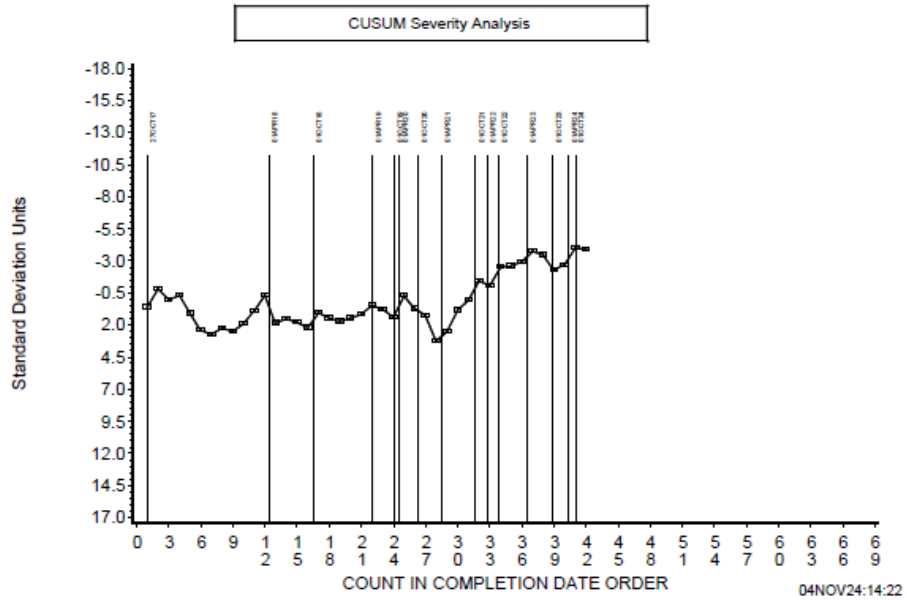

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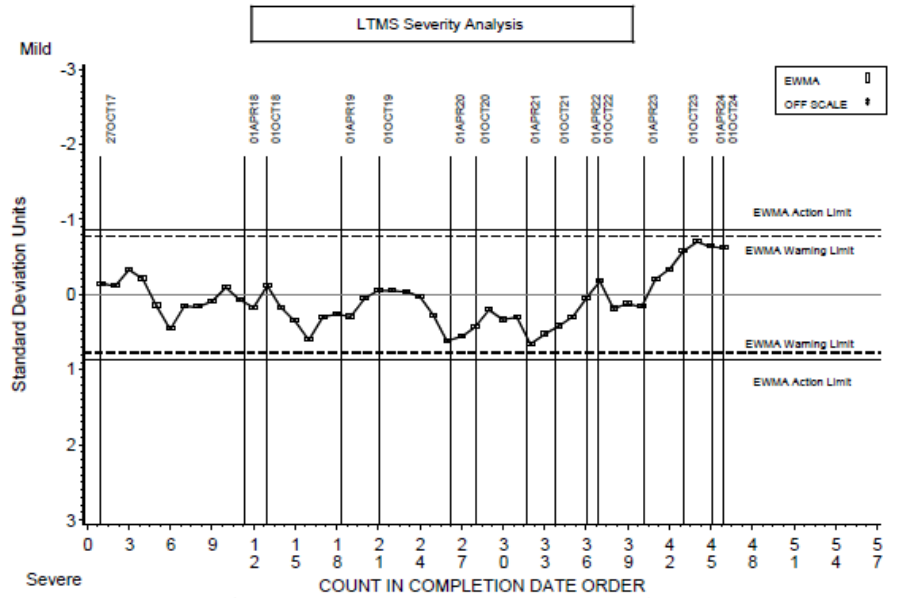
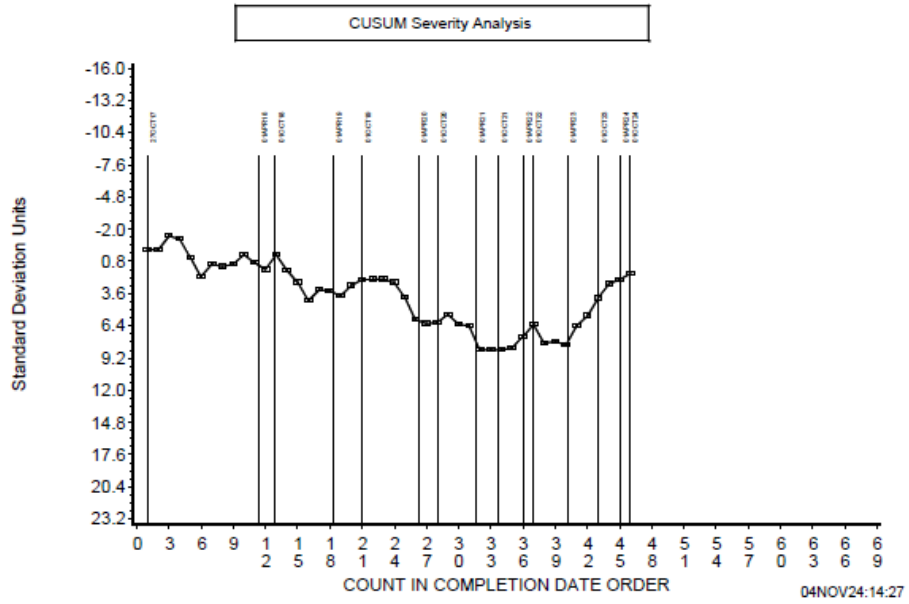
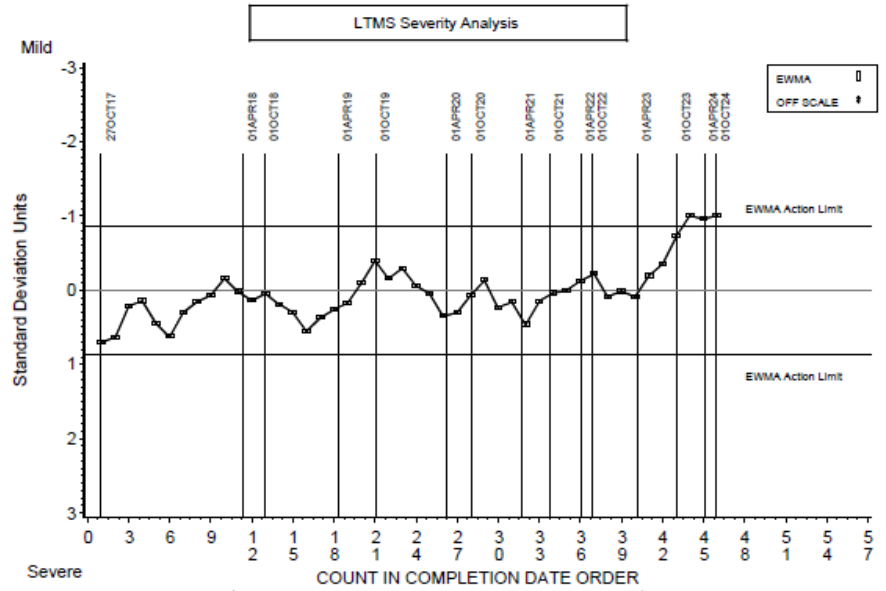
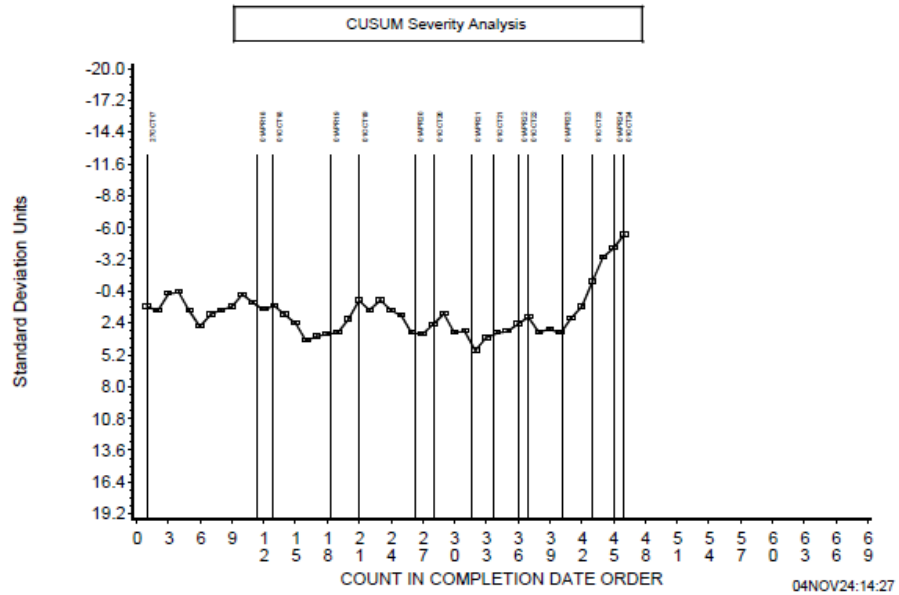
Oil 300 blends
AVERAGE VOLUME LOSS BY KEYENCE INTAKE Final



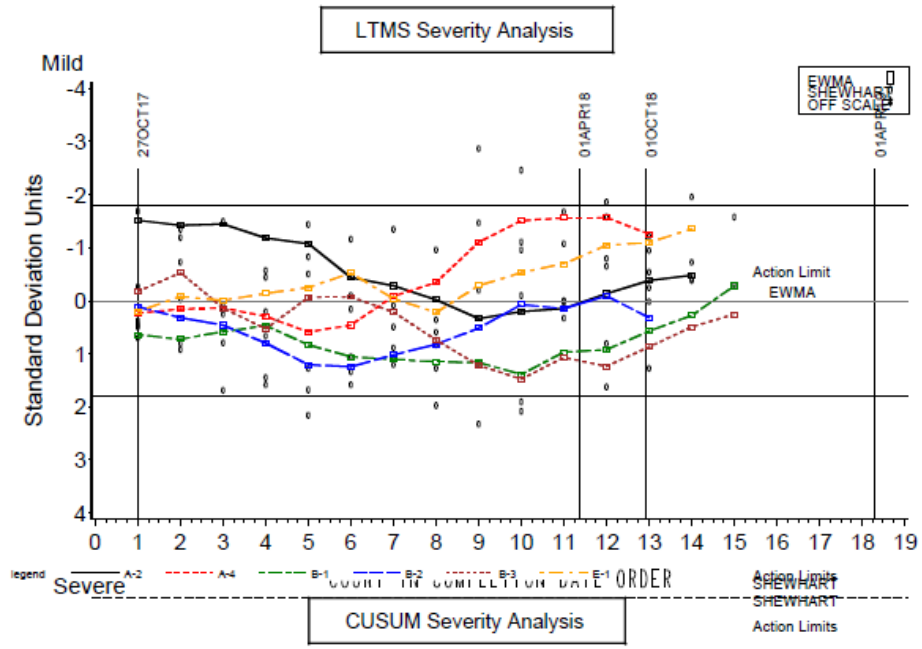


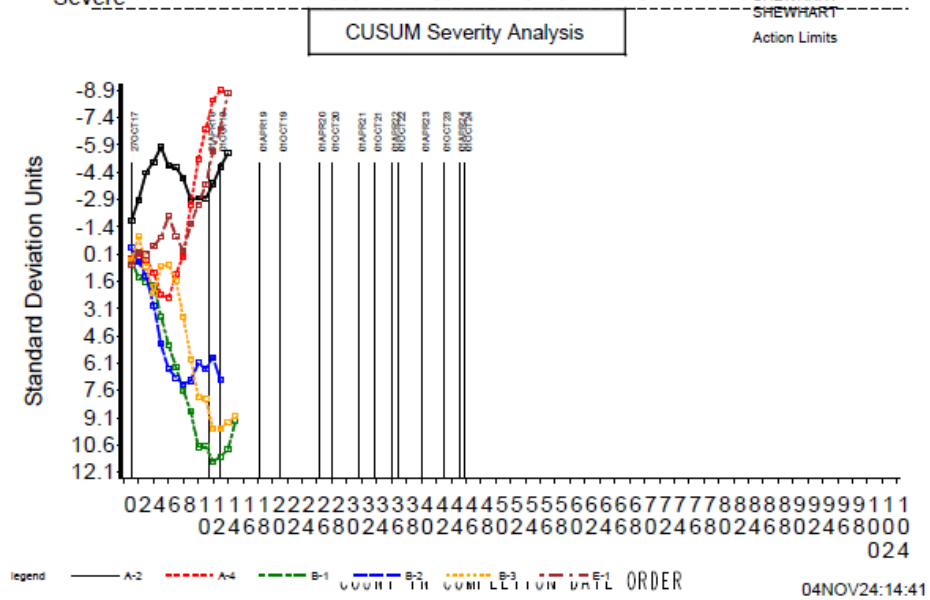
SEQUENCE IVB INDUSTRY OPERATIONALLY VALID DATA
Oil 300 blends
END OF TEST FE FINAL Severity Adjusted RESULT



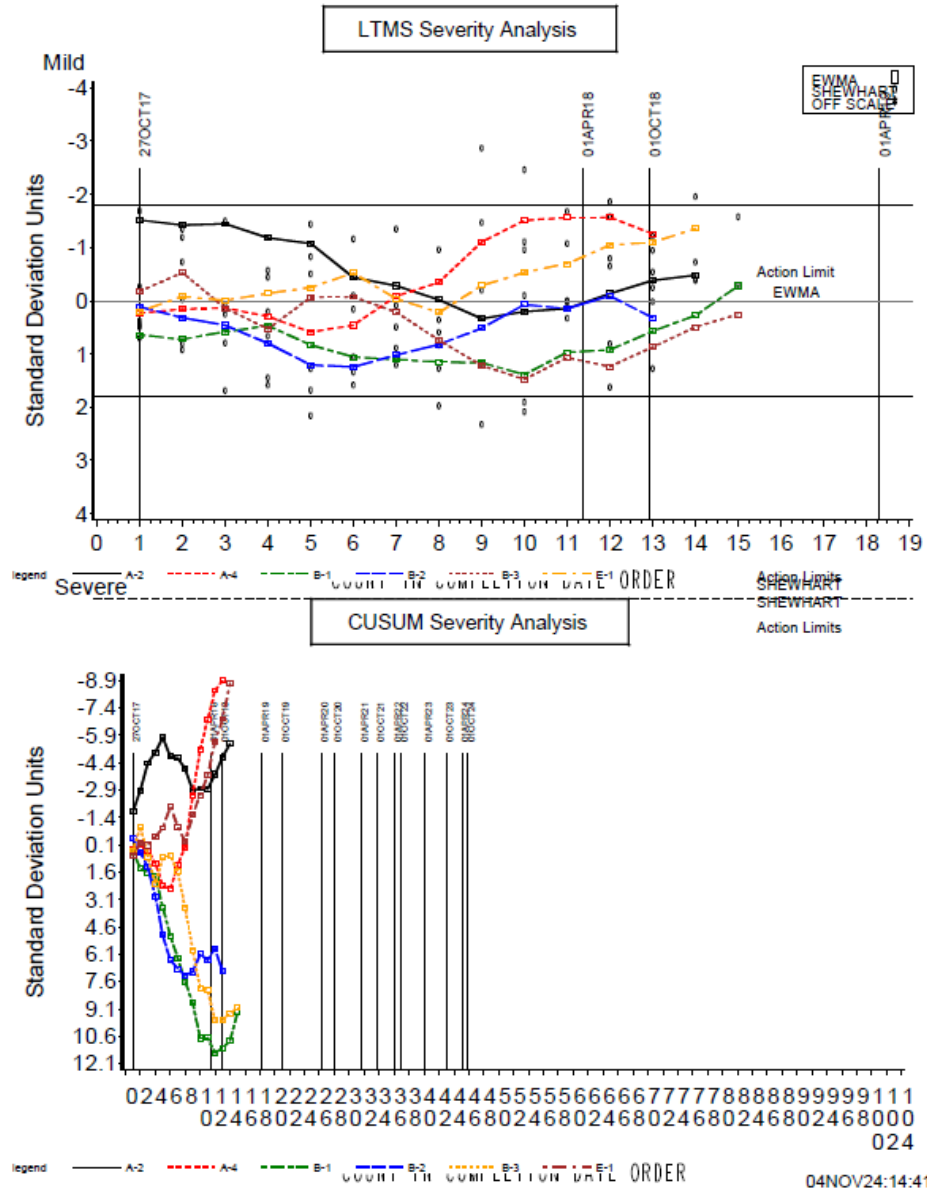


SEQUENCE IVB APPARATUS OPERATIONALLY VALID DAT.
Only active stands in last year
AVERAGE VOLUME LOSS BY KEYENCE INTAKE Final

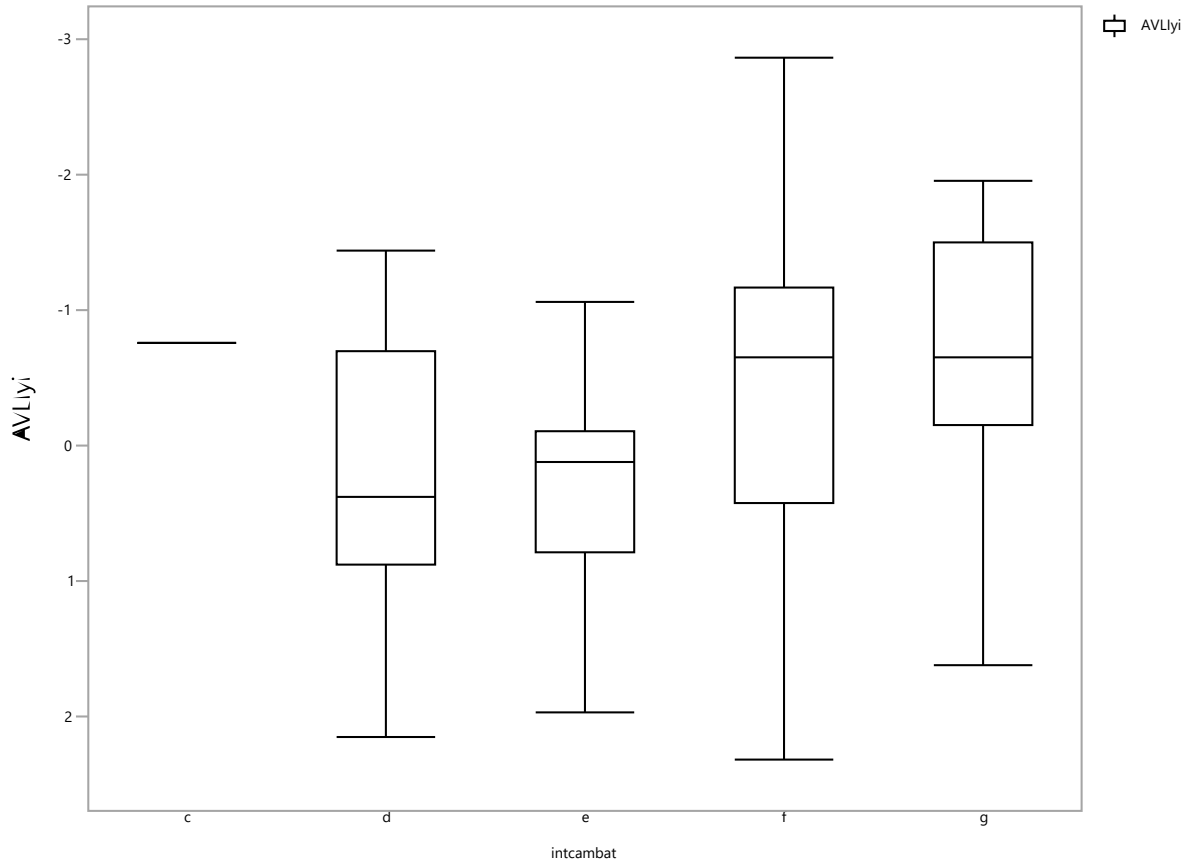




SEQUENCE IVB APPARATUS OPERATIONALLY VALID DAT.
Only active stands in last year
AVERAGE VOLUME LOSS BY KEYENCE INTAKE Final

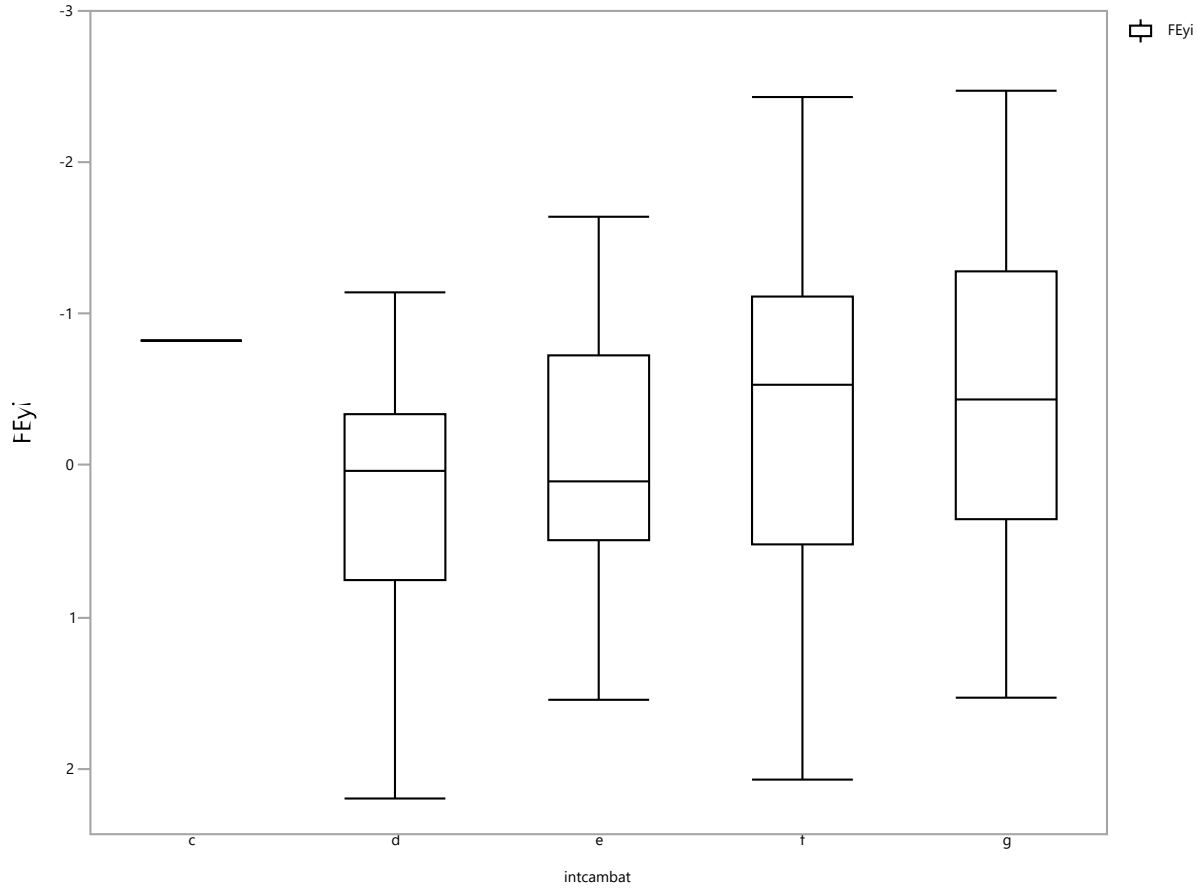


AVLIyi vs. intcambat



Graph Builder

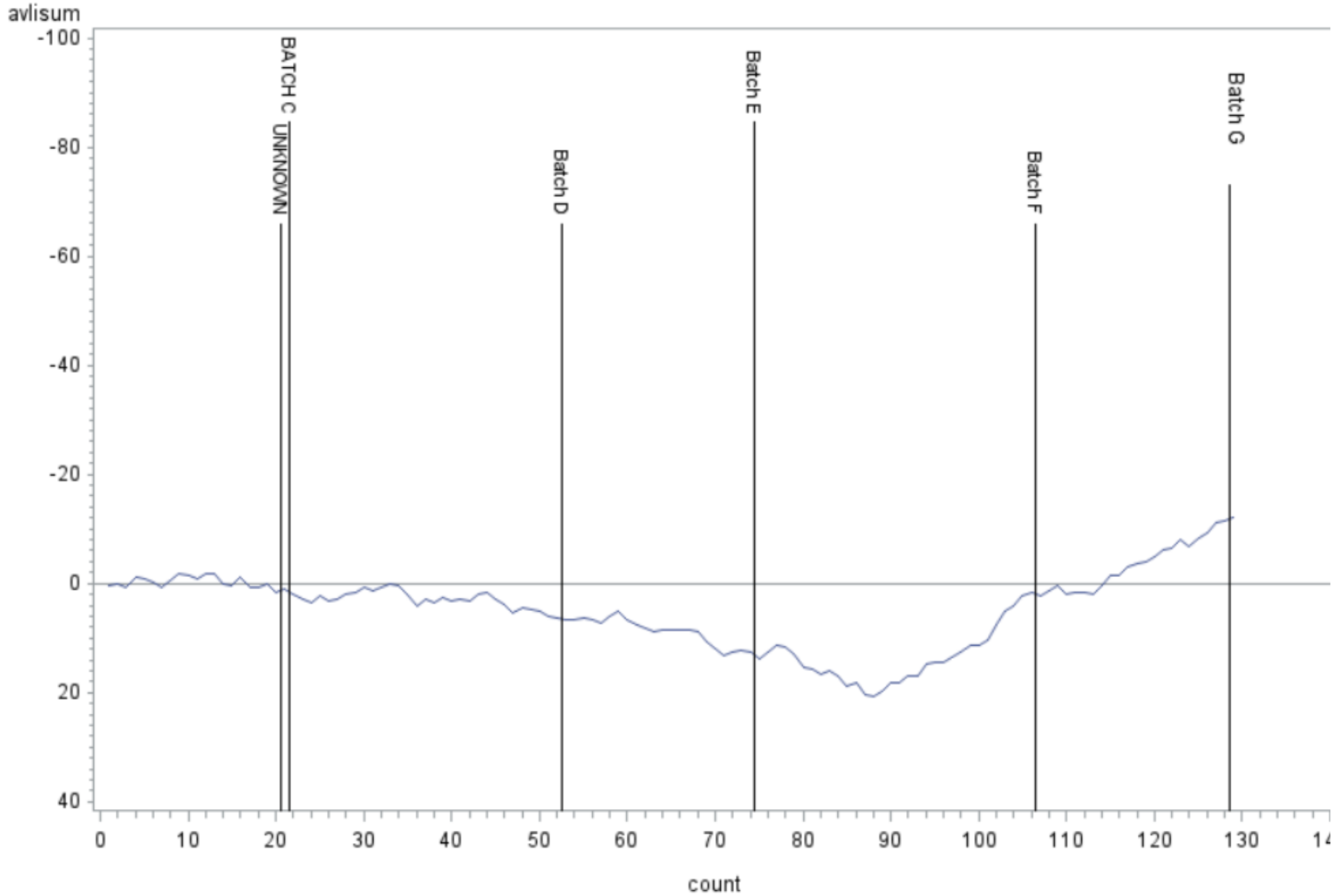
FEyi vs. intcambat

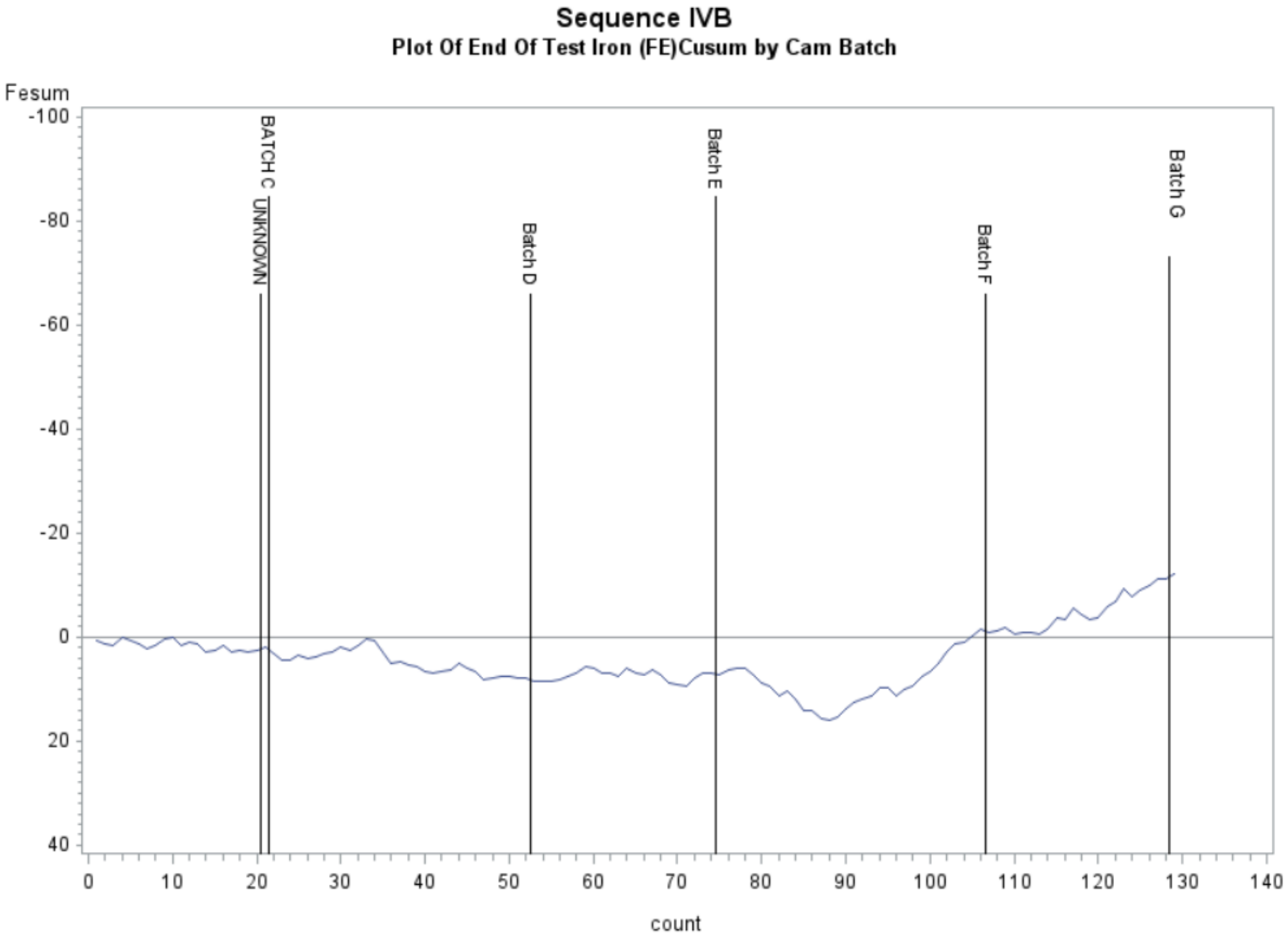


Graph Builder

Sequence IVB

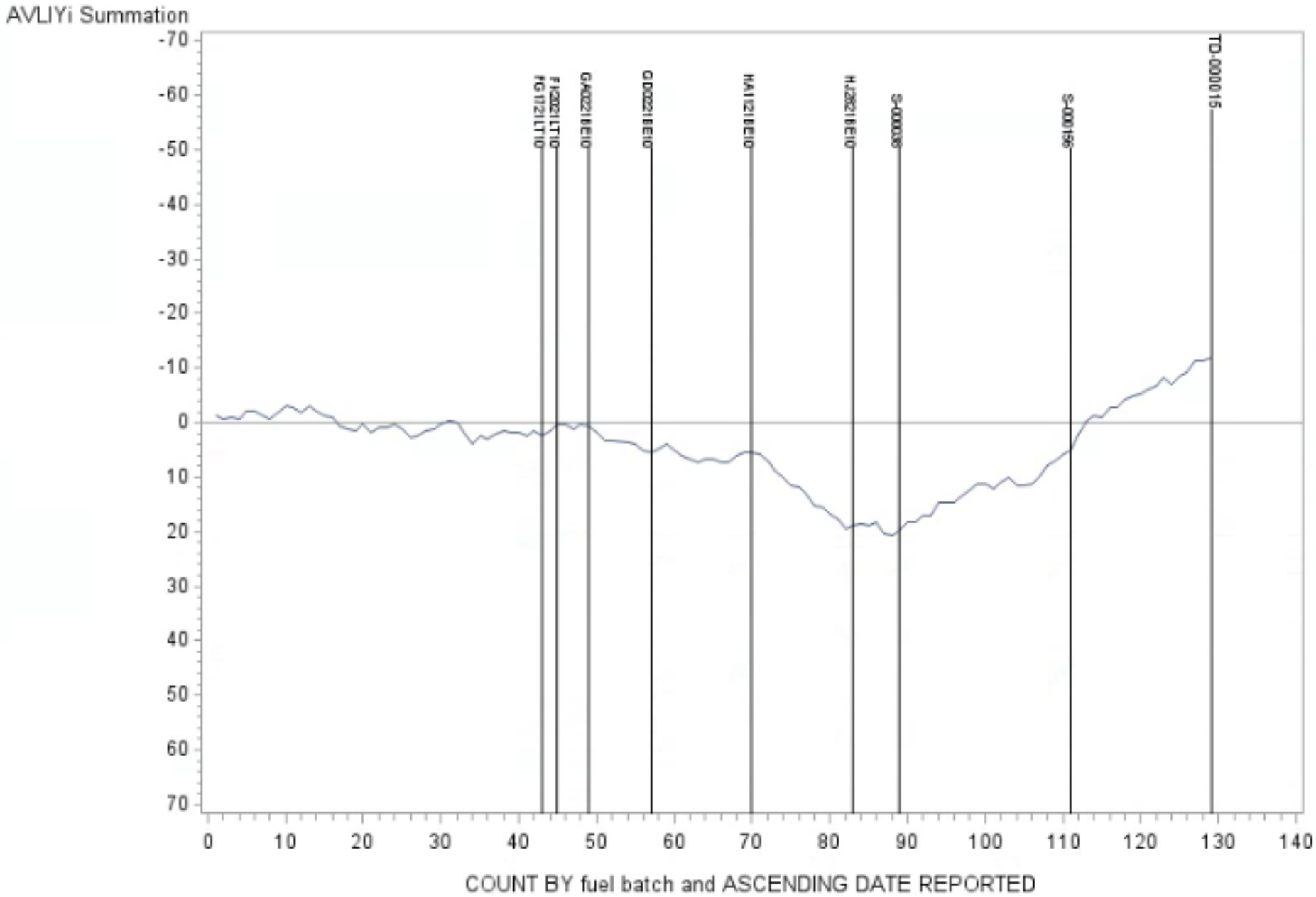
Plot Of Average Volume Loss Intake Cusum by Cam Batch




Sequence IVB
Plot Of End Of Test Iron (FE)Cusum by Cam Batch
Fesum
-100
-80
-60
-40
-20
0
20
40
BATCH C UNKNOWN
Batch D
Batch E
Batch F
Batch G
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
count

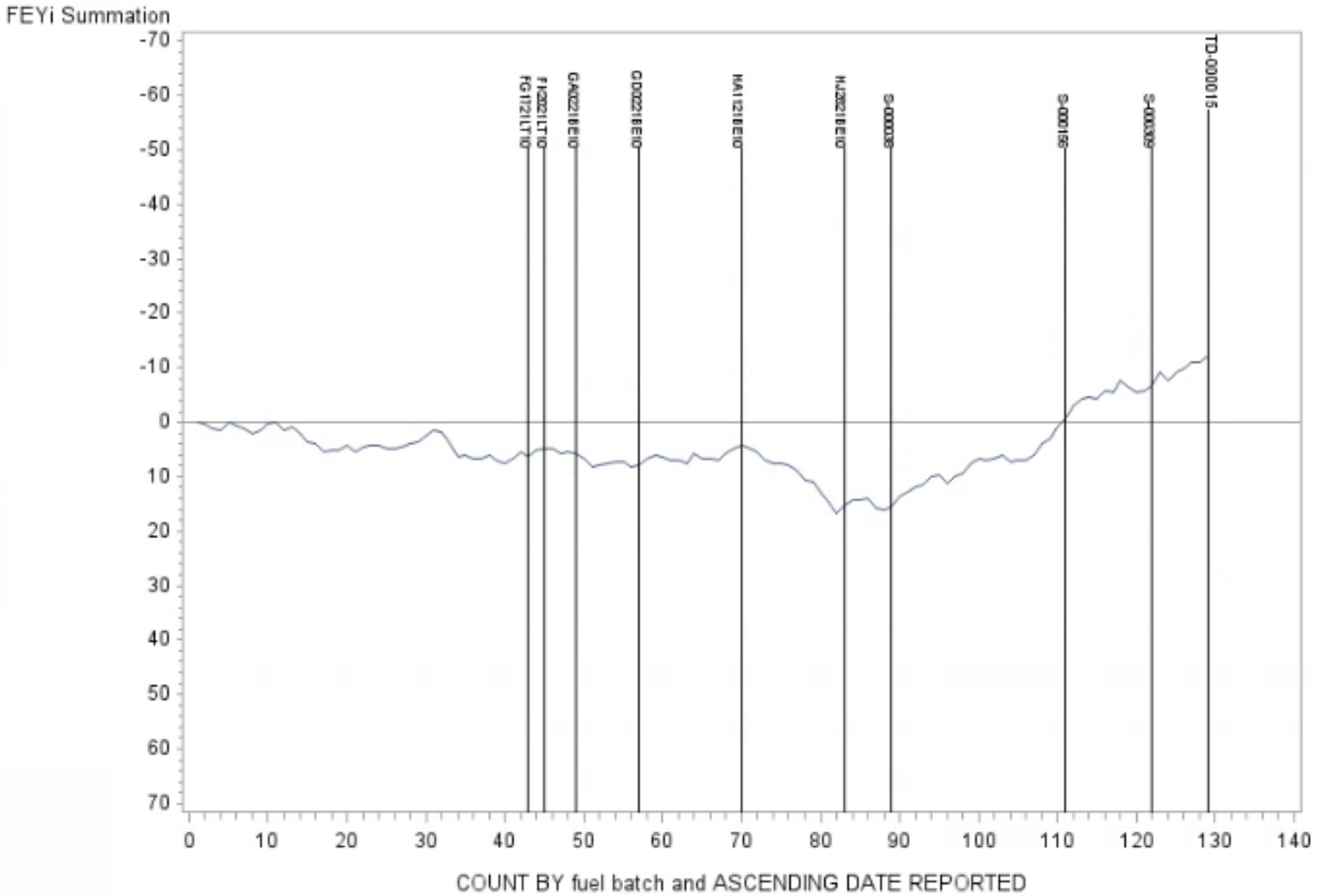
Sequence IVB

Summation Delta/s by Fuel Batch

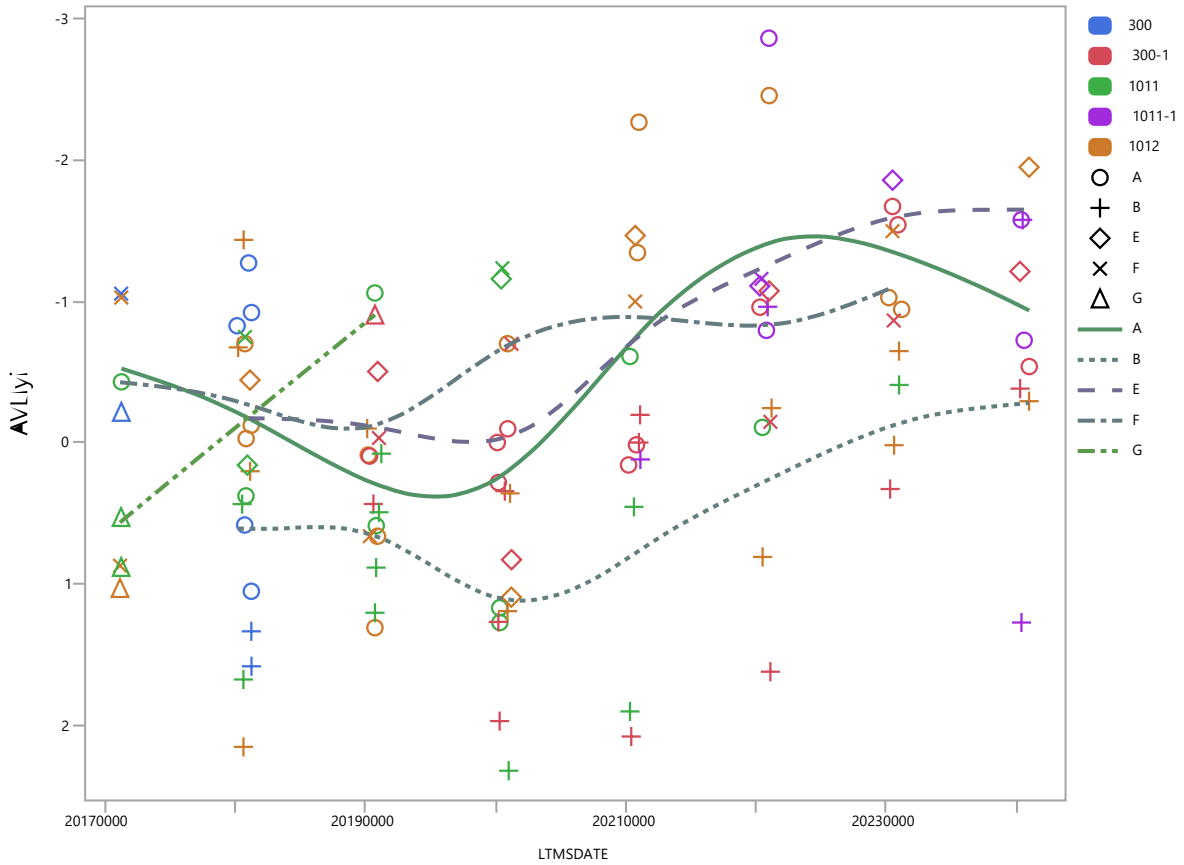


Sequence IVB

Summation Delta/s by Fuel Batch

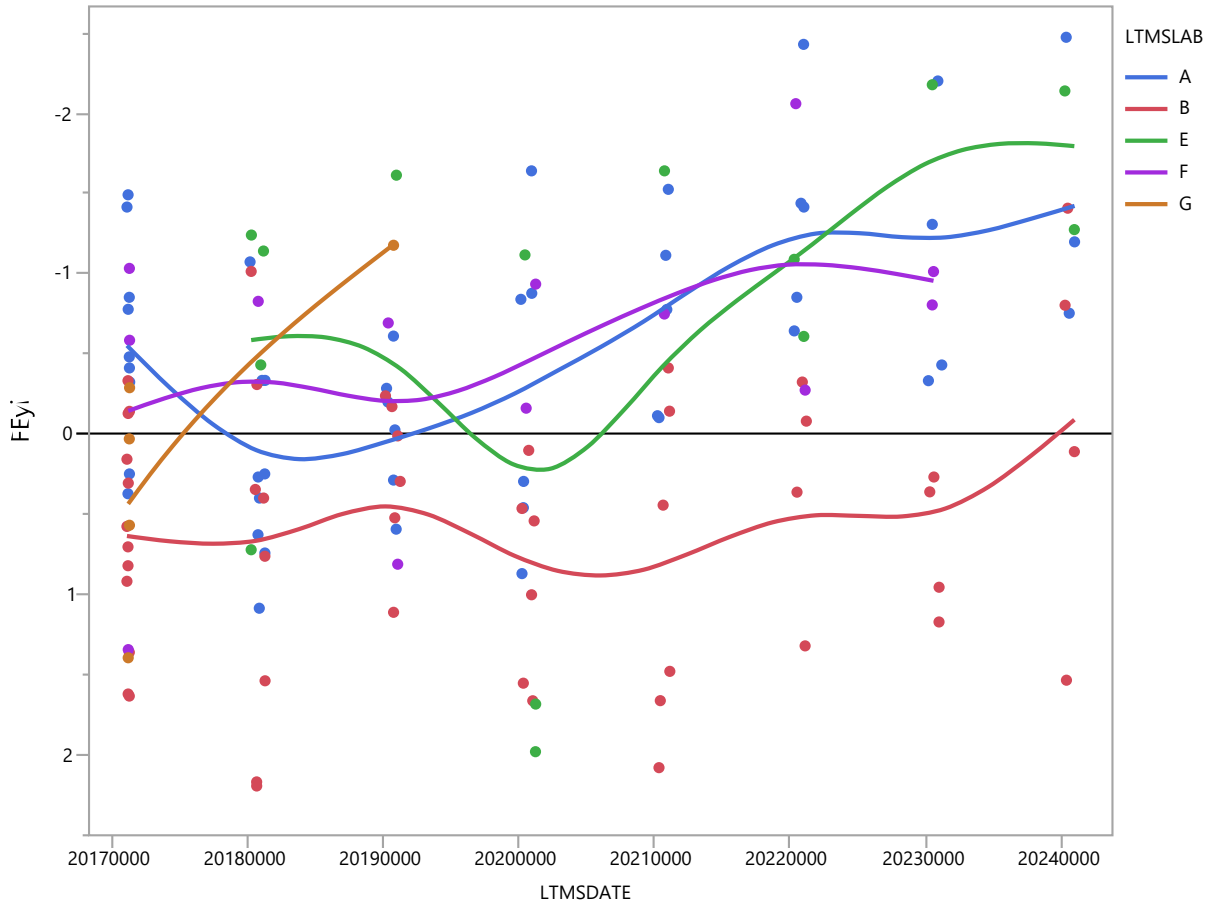


AVLIyi vs. LTMSDATE



Graph Builder

FEyi vs. LTMSDATE



Graph Builder

Sequence IV Surveillance Panel
July 17, 2024
10:00 a.m. - 12:00 p.m. Central Time
Microsoft Teams Meeting

Motions and Action Items
As Recorded at the Meeting by Bill Buscher

1. Action Item – TMC to verify with the reference oil 300 and 1011 suppliers, that these oils can be re-blended in the future.
   Status?

2. Motion – The Sequence IV Surveillance Panel approves revision to the Sequence IVB test procedure (D8350) to eliminate the requirement to segregate test engines for high viscosity (≥ 0W-16) and low viscosity (< 0W-16) test oils. Effective 7/31/2024.
   Andrew Rohlfing / Robert Stockwell / Passed 6 – 0 – 5
   Completed. Addressed by ACC.

3. Motion – The Sequence IV Surveillance Panel approves revision to the Sequence IVB test procedure (D8350) annex **A5. Camshaft and Lifter Measurements** to add the following wording:
   A.5.4.4 *The special case of the intake/exhaust lifter average mass loss being negative* – In this case, record 0.0 mg as the average mass loss result on Form 4 and Form 9.
   NOTE X – The minimum intake/exhaust lifter average mass loss result that will be considered for this method is 0.0 mg so this value replaces any value that is < 0 mg.
   A.5.4.4.1 Comment on Form 13 (Test Comments) that the original result has been replaced by 0.0 mg because the mass loss result was negative.
   A.5.10.4 *The special case of the intake/exhaust camshaft average heel to toe wear being negative* – In this case, record 0.0 µm as the average wear result on Form 4 and Form 9.
   NOTE X – The minimum intake/exhaust camshaft average heel to toe wear result that will be considered for this method is 0.0 µm so this value replaces any value that is < 0 µm.
   A.5.10.4.1 Comment on Form 13 (Test Comments) that the original result has been replaced by 0.0 micrometer because the wear result was negative.
   Bill Buscher / Rich Grundza / Passed 10 – 0 – 1
   Completed. Test procedure has been updated.

4. Motion – The Sequence IV Surveillance Panel approves revision to the Sequence IVB test procedure (D8350) annex **A6. Keyence VR-3000 Setup and Measurement Procedure** to add the following wording:
   A.6.8.5 *The special case of the intake/exhaust lifter average Keyence volume loss being negative* – In this case, record 0.00 mm^3 as the average volume loss result on Form 4 and Form 9.
   NOTE X – The minimum intake/exhaust lifter average Keyence volume loss result that will be considered for this method is 0.00 mm^3 so this value replaces any value that is < 0 mm^3.
   A.6.8.5.1 Comment on Form 13 (Test Comments) that the original result has been replaced by 0.00 mm^3 because the volume loss result was negative.
   Bill Buscher / Rich Grundza / Passed 10 – 0 – 1
   Completed. Test procedure has been updated.

5. Action Item – Lubrizol to develop a system to bypass the ECT resistor at engine start to richen the AFR and eliminate cold start issues.
   Status?

ASTM Sequence IV Surveillance Panel

Scope and Objectives

Scope

The Sequence IV Surveillance Panel is responsible for the surveillance and continued improvement of the Sequence IVA test documented in Test Method D 6891 and the Sequence IVB test documented in Test Method D 8350, both as updated by the Information Letter system. Data on test precision and laboratory versus field correlation will be solicited and evaluated at least every six months. Improvements in wear measurement technique, test operation, test monitoring and test validation will be accomplished through continual communication with the Test Sponsors and Parts Distributors, ASTM Test Monitoring Center, ASTM Committee D02.B0.01 and the ASTM Passenger Car Engine Oil Classification Panel. Actions to improve the process will be recommended when deemed appropriate based on input from the proceeding. The Panel will review development and correlation of updated test procedures with previous test procedures. This process will provide a suitable test procedure for evaluating an automotive lubricant's effect on controlling valve train wear and overall engine wear for overhead valve train equipped engines with sliding followers or lifters.

Objectives	Target Date
1. Preserve Sequence IVA test hardware to maintain test availability for legacy specifications.	*On-going*
2. Maintain acceptable test hardware for the life of the Sequence IVB test.	*On-going*
3. Maintain acceptable test fuel for the life of both the Sequence IVA and Sequence IVB tests.	*On-going*
4. Maintain reference oil supply for the life of both the Sequence IVA and Sequence IVB tests.	*On-going*
5. Continue active monitoring of test severity and precision for both the Sequence IVA and Sequence IVB tests.	*On-going*
6. Maintain an on-going timeline / events list for the Sequence IVB test.	*On-going*

William A. Buscher III, Chairman
Sequence IV Surveillance Panel

Updated: Nov. 2024

Sequence IV Surveillance Panel
November 19, 2024
10:00 a.m. - 12:00 p.m. Central Time
San Antonio, TX
SwRI – Building 209

Motions and Action Items
As Recorded at the Meeting by Bill Buscher

1. Motion – The Sequence IV Surveillance Panel approves revision to the Sequence IVB test procedure (D8350) to reduce the required number of flushes from 4 to 2 for the new engine extended break-in. Effective 11/19/2024.
   Robert Stockwell / Pat Lang / Passed 7 – 0 – 7

2. Action Item – Surveillance Panel chair to inquire with REO 1012 supplier if a similar oil could be manufactured and supplied for future new engine extended break-in use.

3. Motion – The Sequence IV Surveillance Panel approves revision to the Sequence IVB test procedure (D8350) to change exceeding the 1000 gram oil consumption limit from invalid (I) to noninterpretable (N). Effective 11/19/2024.
   Bill Buscher / Khaled Rais / **Tabled for review**

4. Action Item – Labs to review oil consumption trends to review prior to voting on above motion.

5. Action Item – Surveillance Panel chair to invite a Keyence representative to our upcoming metrology workshop.