Sequence V Surveillance Panel Meeting
May 23rd, 2022 2 PM EST, via Webex

Roll Call:

Afton:	B. Campbell, B. Maddock
BP:	J. Agudelo
ExxonMobil:	A. Meier, A. Montufar
Ford:	M. Deegan, R. Zdrodowski
General Motors:	B. Cosgrove, M. Hopp, N. Siebert
Haltermann:	P. Tumati
HCS Group:	I. Gabrel
Infineum:	D. Boese, C. Laufer, A. Ritchie (Chair)
Intertek:	A. Lopez
Lubrizol:	A. Stevens
OHT:	J. Bowden
Oronite:	J. Martinez, R. Stockwell
Shell:	J. Hsu
SwRI:	D. Engstrom, T. Kostan, M. Lochte
TEI:	D. Lanctot
TMC:	R. Grundza
Valvoline:	A. Savant

Meeting Summary:
Haltermann confirmed the new fuel batch will be ready for testing by last week of May. After much discussion, the Surveillance Panel agreed on the oils to be tested in Run 1 (see table below). The group reviewed TMC's update re: RO 940 RAC target and will reconvene next week to discuss best path forward.

Lab	SwRI		IAR		Afton
Stand	1	2	1	2	1
Run 1	1011	940 (first test)	940 (first test)	1011	940 (wait for SA labs to complete 940s)

Open Actions:
1. From March 26th, 2021 meeting: **Lab engineers** to meet to investigate severity shifts (share operational data, build data, ratings, etc.). The TF has been productive and meeting frequently.
2. From Sept 9th, 2021meeting: **Statisticians Group** led by Doyle Boese (Infineum) to provide update around potential ways to improve current lab-based system. Interim recommendation is to not adopt a stand-based system.
3. From Sept 9th, 2021 meeting: **Haltermann** to report monthly inventory via email to V SP. Monthly updates are being provided.
4. From Nov 29th, 2021 meeting: **Haltermann** to include extra column in fuels data to indicate which fuel goes with which test.
5. From February 10th, 2022 meeting: **The VH Task Force** to assess number of parts remaining as it relates to the life of the test.

6. From February 10th, 2022 meeting: **Haltermann** to report average time it takes for them to respond back to the labs with RVP data.
7. From February 10th, 2022 meeting: The **VH Task Force** to discuss the lab responsibility to measure the fuel parameters as received (section 8.2) vs the use of the CoA.
8. From May 16th, 2022 meeting: **Bob Campbell** and **Andrew Stevens** to consider if their labs, Afton and Lubrizol respectively, would be willing to participate in helping Angela come up with a more realistic forecast number for the VH.
9. From May 16th, 2022 meeting: **TMC** to generate new RAC target using the 7 valid, chartable RO 940 data points plus the 14 additional RO 940 results run on the same DJ fuel batch.
10. From May 23rd, 2022 meeting: **Haltermann** to communicate the fuel status through the next few weeks. Ex: Labs need to know delivery dates so they can make sure clean tanks are ready.
11. From May 23rd, 2022 meeting: **IAR, SwRI, and Afton labs** to let group know about stand options (as per Amol Savant's comments from prior meeting, see page 4 of May 16th minutes)
12. From May 23rd, 2022 meeting: **Haltermann** to coordinate with the labs to collect RVP data of the new fuel.

Next call: Thursday, June 2nd, 2022 at 11 AM EST via Webex

Meeting Details:

Minutes from previous meeting have been posted:
https://www.astmtmc.org/ftp/docs/gas/sequencev/minutes/VMinutes20220516ConferenceCall.pdf

Agenda:
- Fuel matrix planning
- Follow up from TMC re: the RAC item and RO 940 RAC target (see Action #9 above)

Fuel Matrix planning:

The Chair shared the table below summarizing the previous matrix and the one which is expected to be run with the upcoming new fuel batch. The new matrix is much heavier on the 'borderline' oil 931 (effectively +3 compared with the number of 1009 tests last time out) and lighter on the number of 'strong' oil 1011 (-3) tests:

	Run 1						Run 2						Run 3				
LAB	A		G		D		A		G		D		A		G		D
Last 2 Matrices	940	1011	940	1011	940	REVIEW	940	940	1011	1011	1011	REVIEW	1011	1009	1009	940	1009
Proposed matrix	1011	940	940	931	940	REVIEW	940	940	931	931	931	REVIEW	931	931	1011	940	1011

Bob Campbell (Afton) commented we might need less 940 (to ensure it makes sludge) and more 931/1011 (to know how the new fuel performs near relevant industry limits) and proposed three 940 tests, six 931 tests, six 1011 tests.

Doyle Boese (Infineum) questioned what happens if 2 of the 3 tests with 940 produce sludge and 1 test does not. Bob mirrored the comment to 1011: what happens if 2 labs produce clean engines and 1 lab produces a dirty engine. In the end, Bob furthered, we can adjust the plan accordingly but we probably should not be using 6 tests for 940.

Al Lopez (Intertek) shared the test matrix below from the fuel contract. He pointed out that the run order would be determined by the statisticians. Also not set in stone is what we test after the first row. He recommended that after the first row and ensuring the test can generate sludge and clean engines with 940 and 1011 respectively, we hand over to the statisticians to make recommendations on the next testing.

Table 3 – Test Matrix

Lab	Southwest		Intertek		Afton
Stand	1	2	1	2	1
Run 1	1011	940	940	931	940
Run 2	940	940	931	931	931
Run 3	931	931	1011	940	1011

Note: Reference oil run order will be determined by statistical group.

The Chair solicited comments from the statisticians:

- Doyle Boese (Infineum) suggested one 1011, one 931, three 940 tests, hold off on runs 2 and 3 until we see results from run 1.
- Jo Martinez (Oronite) proposed to swap out 931 with 1011 so we could have a stronger mean for 1011 to compare with 940.
- Travis Kostan (SwRI) suggested 940 and 1011 runs in the first run.
- Bob Campbell (Afton) thinks two 1011s and three 940s is fine, but he pointed out the timing concerns and to make sure we can move quickly from run 1 to run 2.

Prasad Tumati (Haltermann) confirmed that the new fuel would be ready by last week of May. And the labs (Intertek, SwRI, and Afton) all confirmed they can start testing the fuel is received. The Chair asked Prasad to overcommunicate in the next 2-3 weeks re: the fuel status. The Chair also raised Amol Savant's (Valvoline) point from last meeting (see page 4 of May 16th meeting minutes) re: stand selection; he asked the labs to be ready to let the group know what he options are. And to the RVP comments raised at several prior meetings, the Chair asked that Haltermann coordinate with the labs to collect RVP measurements of the fuel.

After further discussion, the group agreed on the following Run 1:

Lab	SwRI		IAR		Afton
Stand	1	2	1	2	1
Run 1	1011	940 (first test)	940 (first test)	1011	940 (wait for SA labs to complete 940s)

RAC Target Update (see appendix for full slide deck "940 Update.pptx"):

- Rich Grundza (TMC) shared what we agreed to review from the prior meeting. 21 tests from DJ fuel batch were used to calculate RAC target.

RAC Target Calculation

- Used all results on 940 from DJ0121NX10 fuel batch for a total of 21tests.
- Targets would be $\bar{X}$ of 0.8041 and s = 0.234, in merit units the mean would be 7.77 compared to the current mean of 7.50
- For comparison purposes, the following charts show the current means and s in transformed units, separate industry charts with existing targets and new targets and an overlay the same EWMA charts

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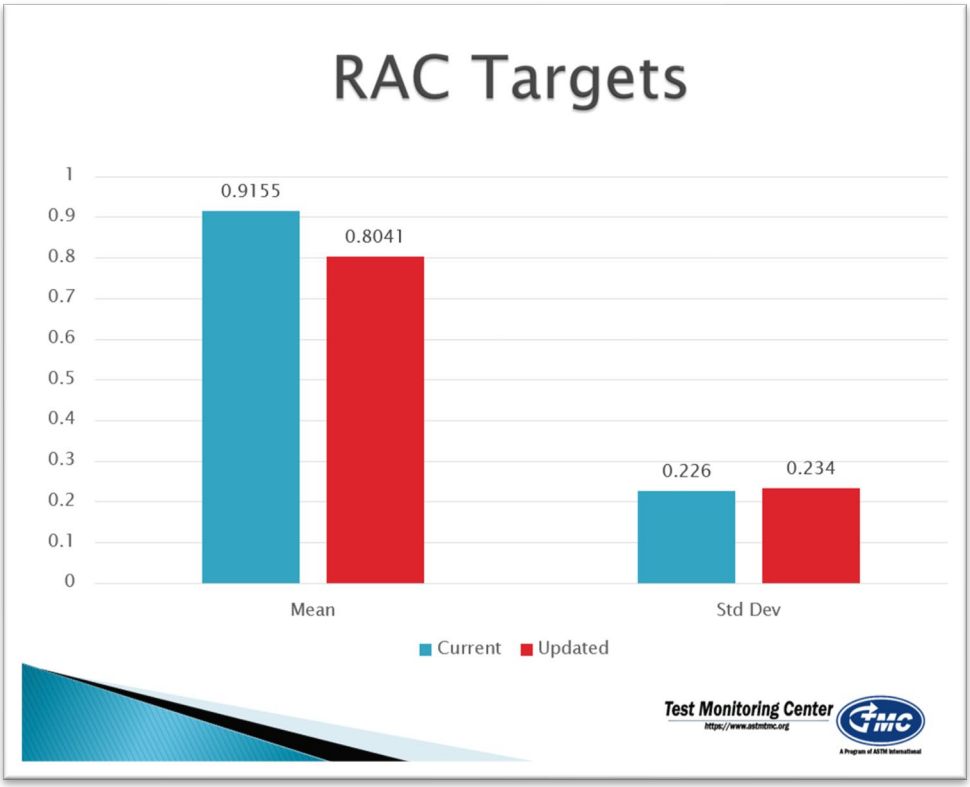
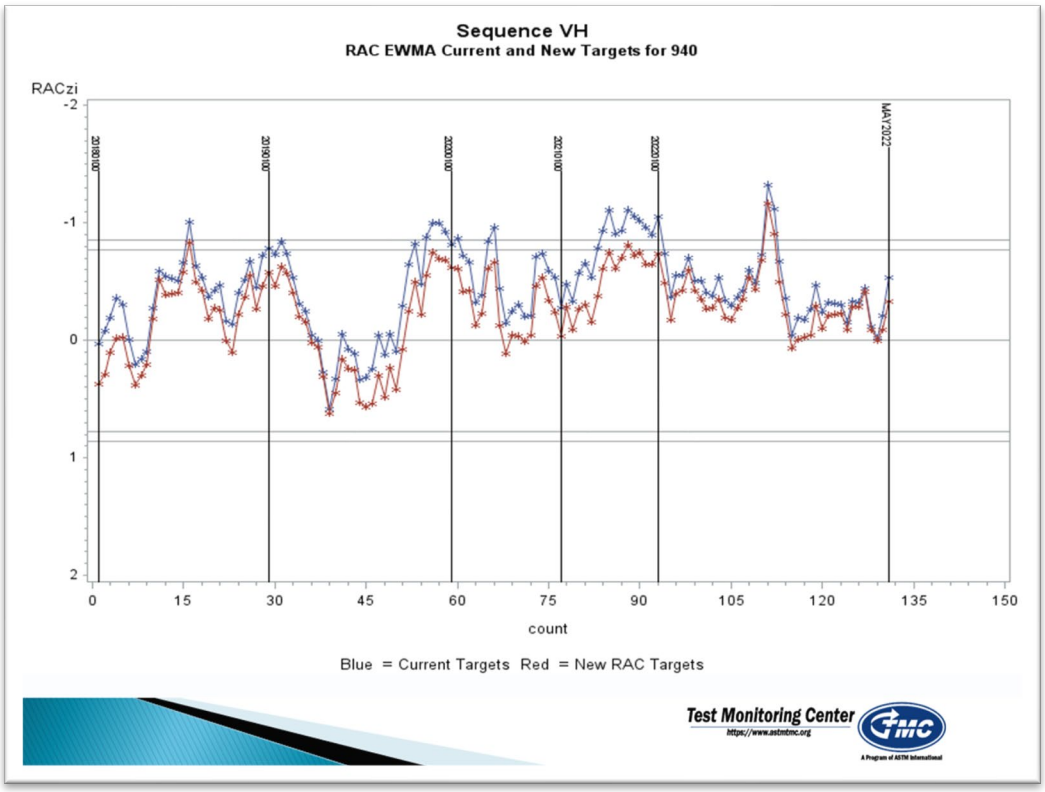
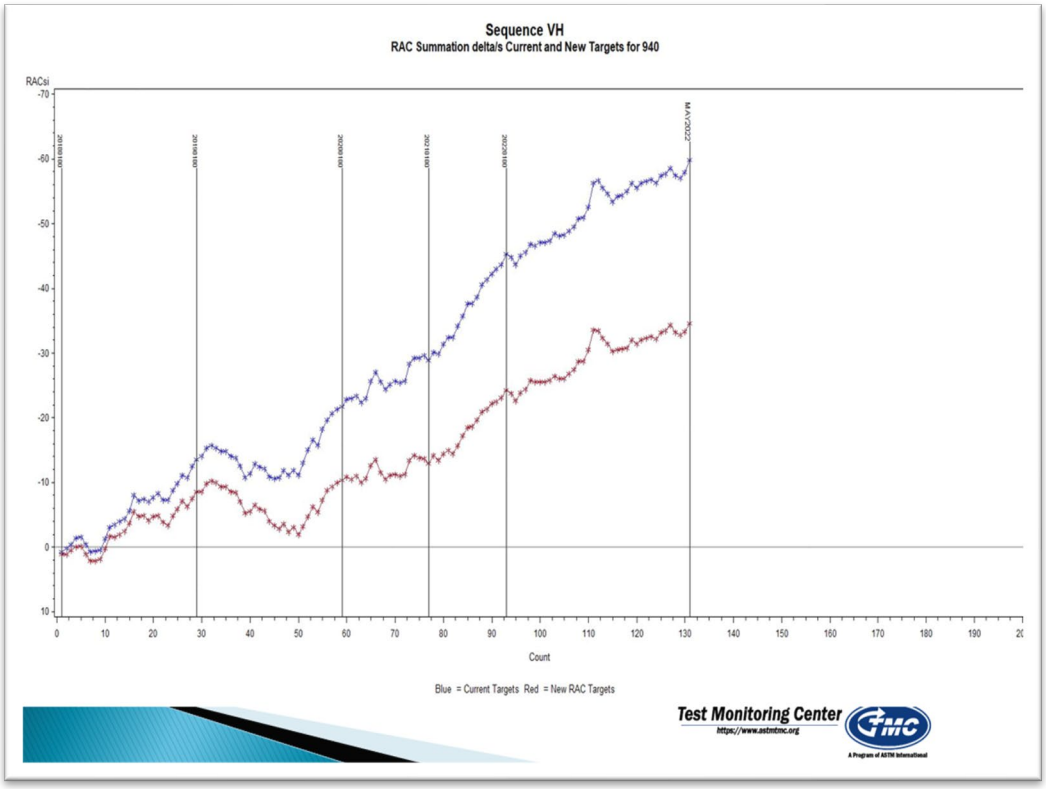
- The following chart shows a comparison of the targets, in transformed units. The mean is lower which means it's higher when converted back. The standard deviations were about the same.



- The two plots below show the industry control charts with (red) and without (blue) the updated 940 target applied. The number of alarms in the EWMA chart decrease dramatically. The CUSUM plot still shows a mild upward trend. Before the fuel batch was changed (test 54), there were two datapoints showing a mild RAC trend.





Rich Grundza (TMC) moved that we adopt the update mean and standard deviation for RAC for RO 940 of 0.8041 and of 0.234 respectively.

- Andrew Stevens (Lubrizol) asked why we are talking about resetting targets instead of using a correction factor? The industry has historically been against resetting targets. Al Lopez (Intertek) explained that updating the targets is appropriate here because we'll be using those targets in our observations of the new fuel with the known targets of the oil. If we go into the fuel matrix with the wrong targets, we're in danger of doing the same thing again. Amol Savant (Valvoline) added that the analysis was done across all the oils and only the target for RO 940 was found to have an issue.
- Mike Deegan (Ford) asked if we adjust the RAC targets, would this have an impact on AES? Rich replied no; we average all the sludge parameters in merit units for AES but we chart and judge RAC in transformed units. Doyle Boese (Infineum) explained that part of the issue with RAC vs AES was that the alignment of the labs in terms of severity. Labs aligned differently on AES than they did on RAC.
- Al Lopez (Intertek) reiterated that we need accurate oil targets as we go into the next batch of fuel. Doyle Boese (Infineum) added that one situation that's caused by not changing the target is the historical error in the severity adjustment will continue for a while because it lags. But if we back calculate now, we get back to a more proper severity adjustment right away. Bob Campbell (Afton) agreed that we need the right targets to judge the new fuel.
- Mike Deegan (Ford) asked if we could spend some time to think about this more before making a decision. Nathan Siebert (General Motors) agreed and said we

need time to really think about this and come back with thoughts/opinions before voting on anything today.

The Chair said this group will reconvene next week to discuss path forward. Rich Grundza (TMC) added that whatever is decided will not be an Information Letter, but rather an LTMS item.

Meeting adjourned at 3:11 PM EST.

Appendix: “940 Update.pptx”

940 Update.pptx

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RAC Target Update

May 23, 2022

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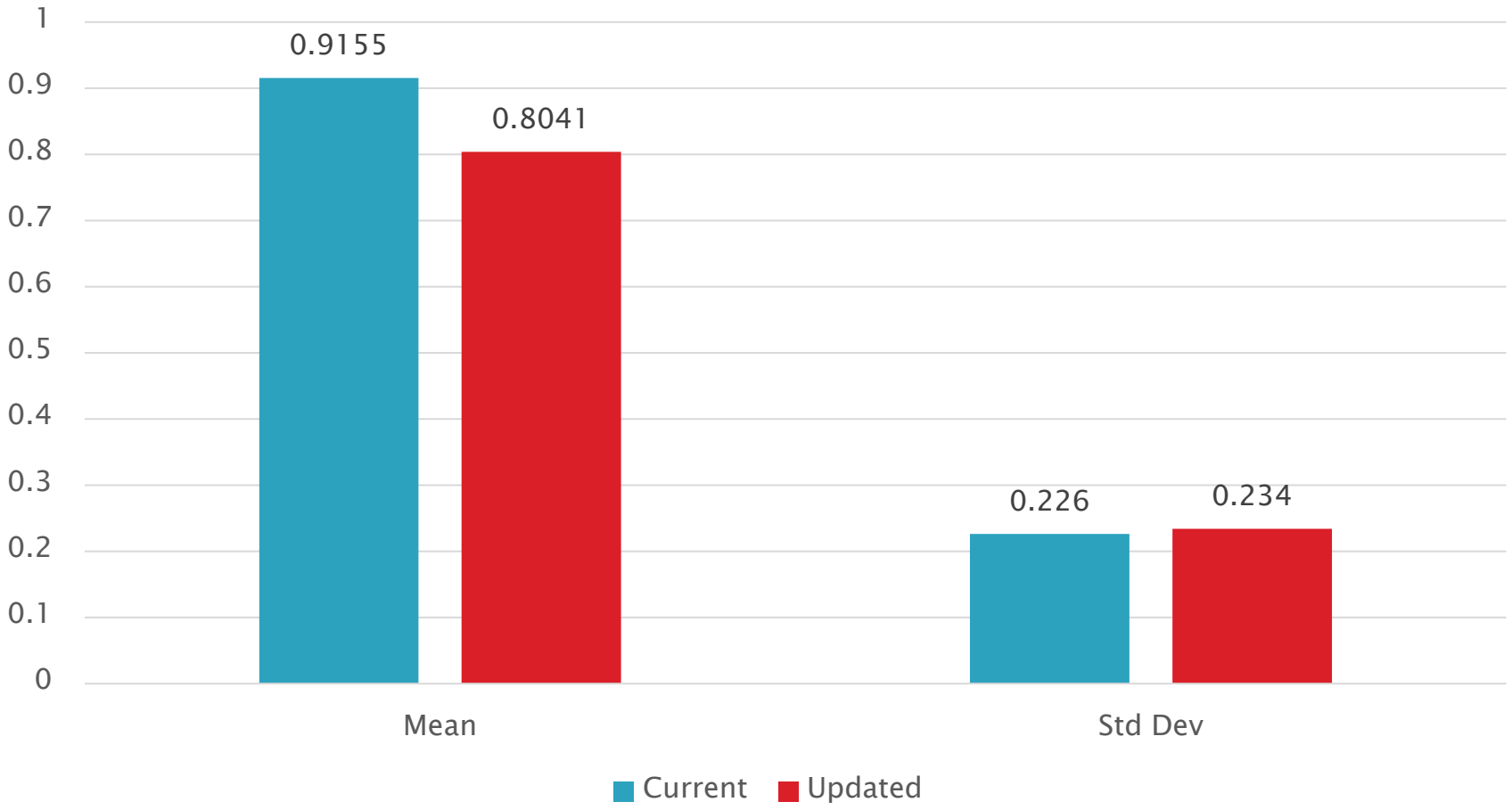
RAC Targets



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SEQUENCE VH INDUSTRY OPERATIONALLY VALID DATA
EWMA and CUSUM With New Targets
AVERAGE ROCKER COVER SLUDGE

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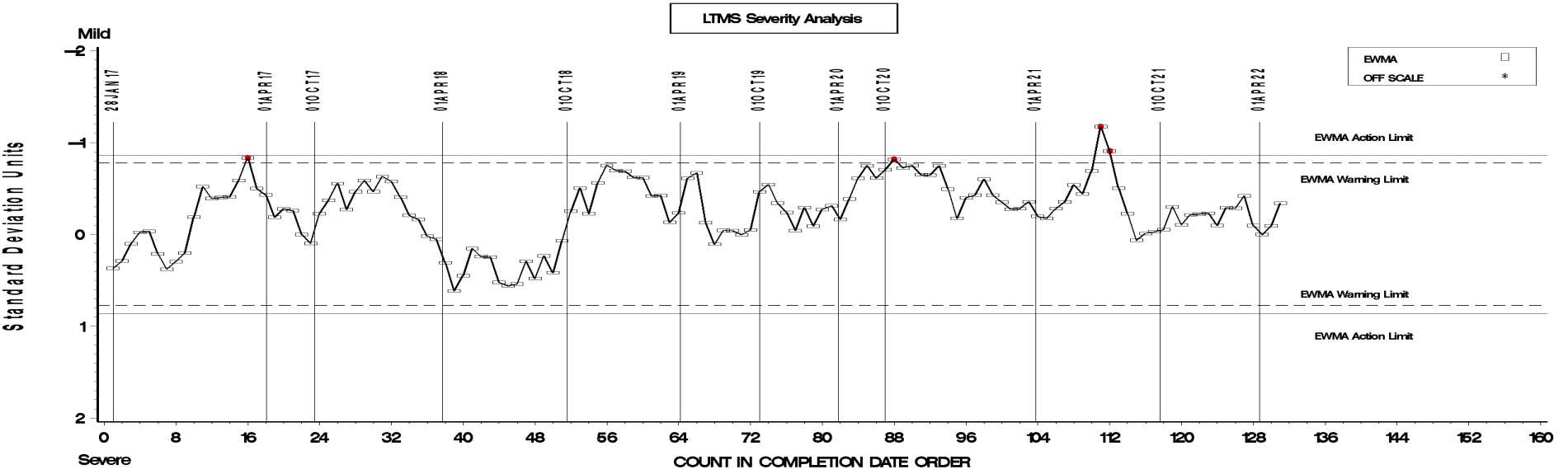

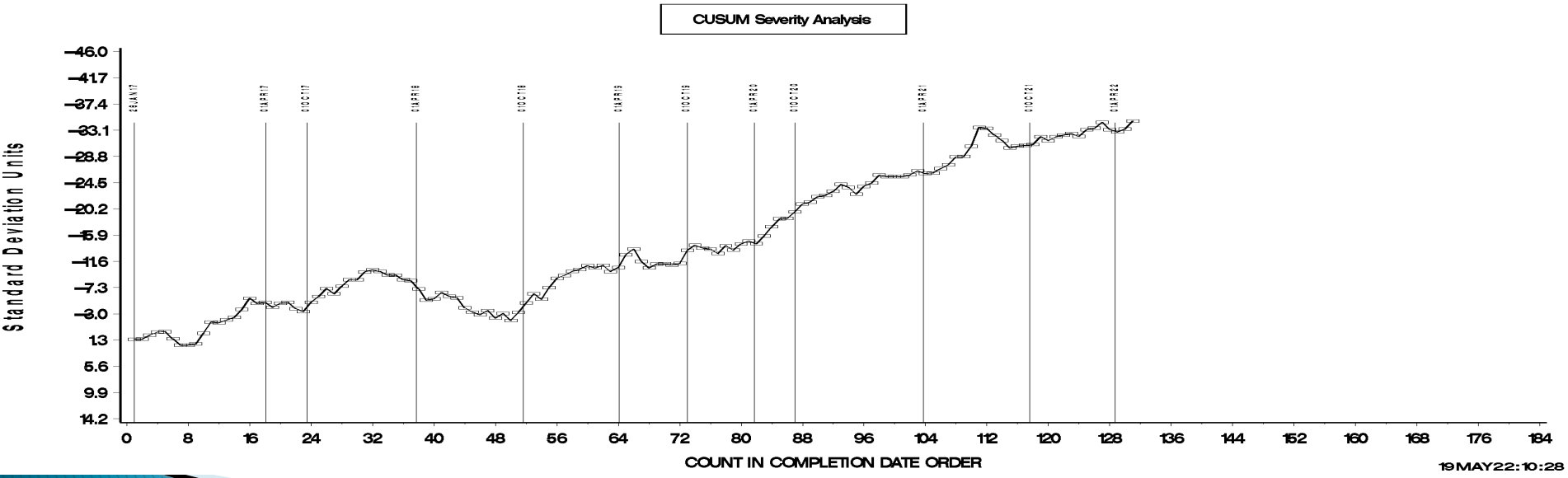

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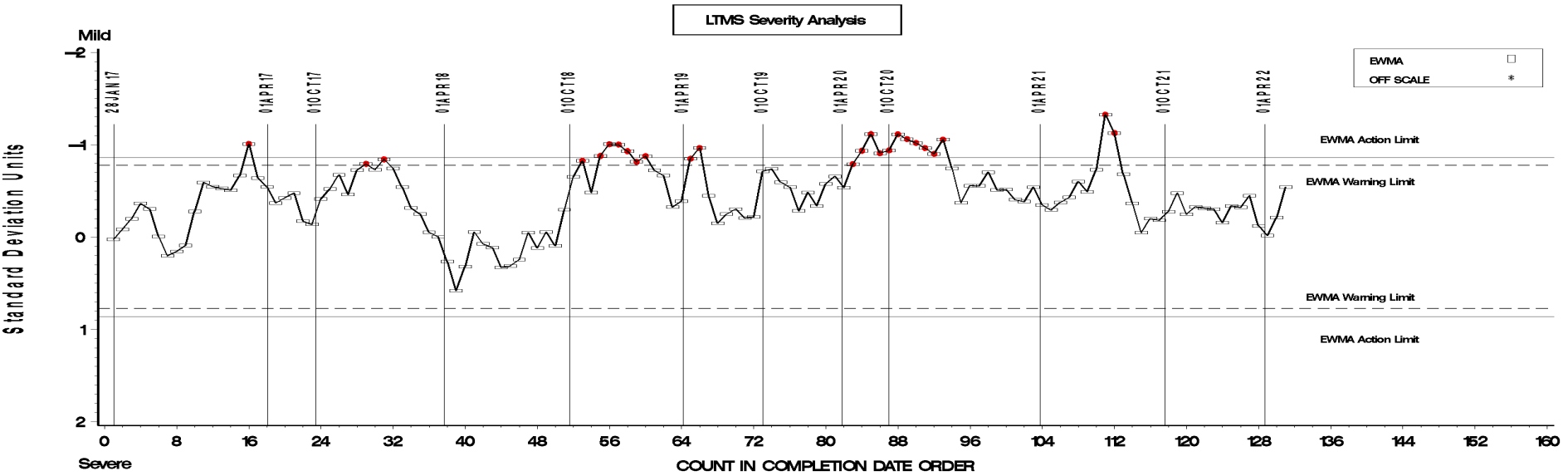
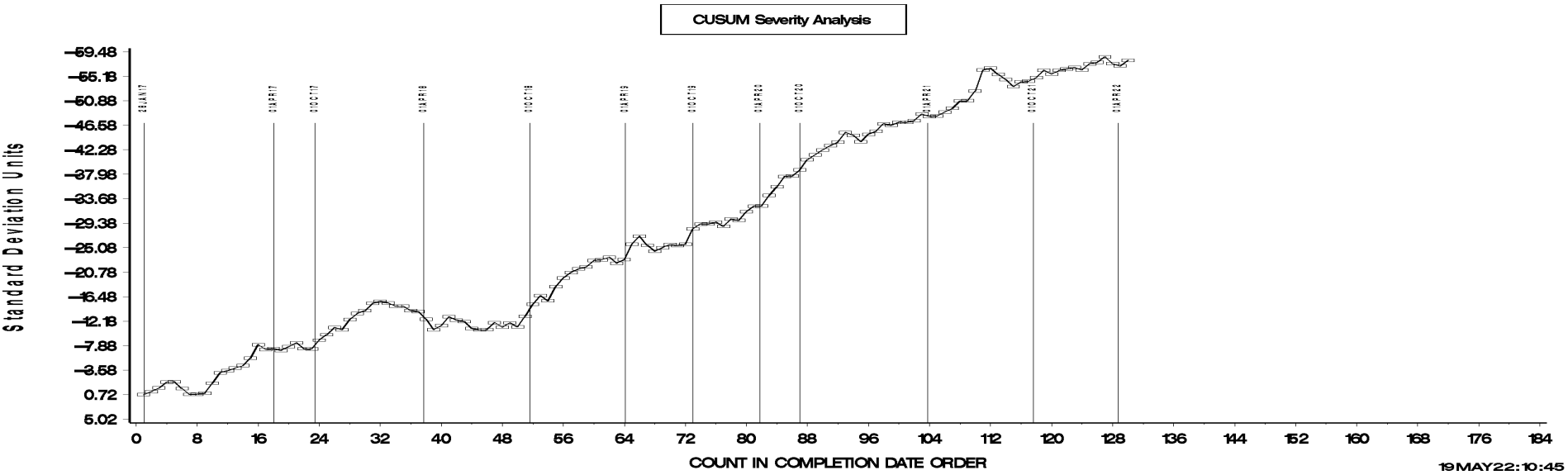
SEQUENCE VH INDUSTRY OPERATIONALLY VALID DATA
Existing Targets
AVERAGE ROCKER COVER SLUDGE





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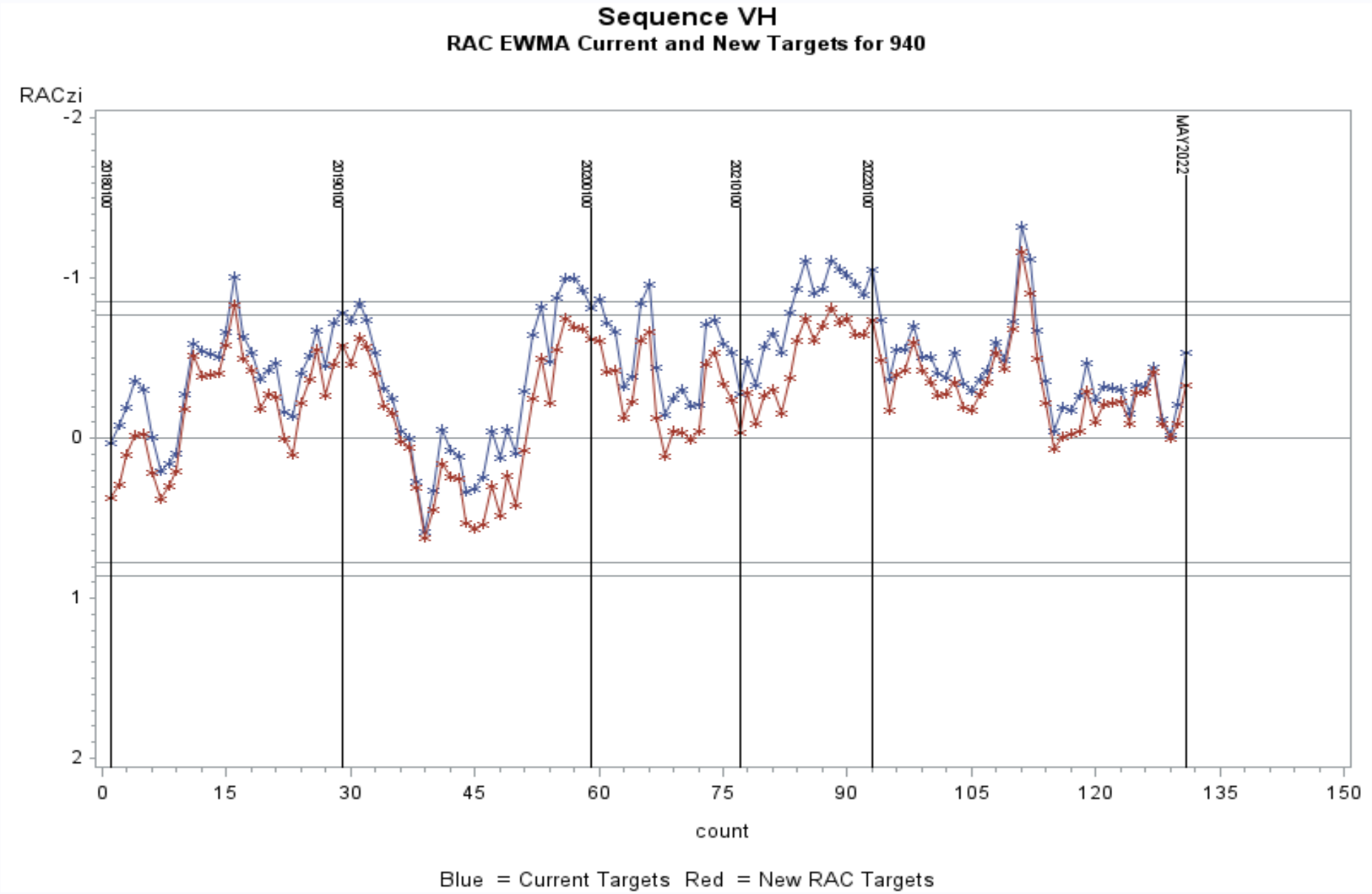
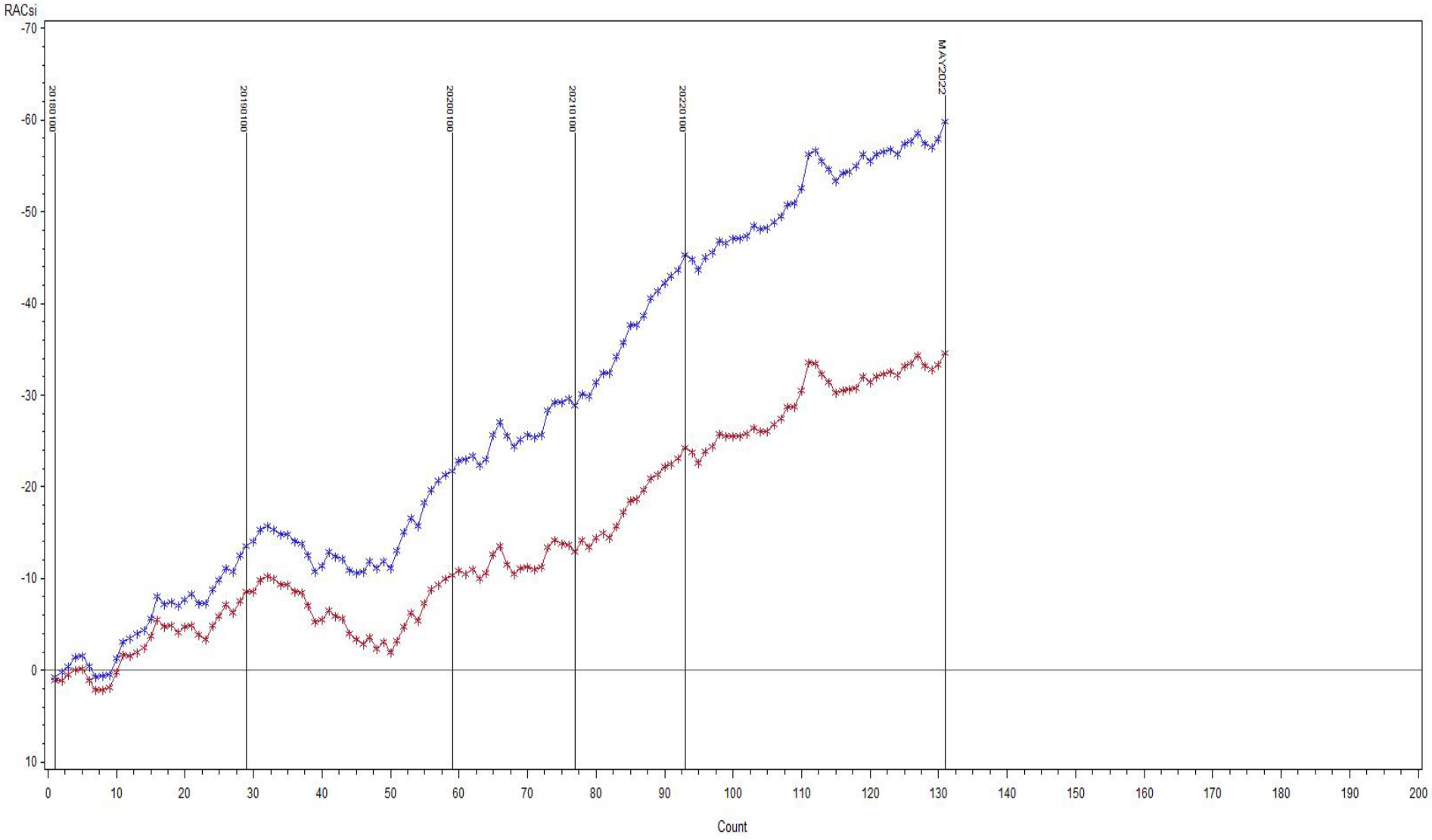

Sequence VH
RAC EWMA Current and New Targets for 940
RACzi
-2
-1
0
1
2
20180100
20190100
20200100
20210100
20220100
MAY2022
0
15
30
45
60
75
90
105
120
135
150
count
Blue = Current Targets Red = New RAC Targets

Sequence VH

RAC Summation delta/s Current and New Targets for 940



Blue = Current Targets Red = New RAC Targets

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