Sequence V Surveillance Panel Meeting
December 21st, 2020 10 AM EST

Roll Call:

Afton:	Not present
BP:	J. Agudelo
Ford:	R. Romano, M Deegan
Haltermann:	P. Tumati, Q. Dunford
Infineum:	D. Boese, C. Laufer, A. Ritchie (Chair)
Intertek:	A. Lopez
Lubrizol:	J. Brys
Haltermann Carless	T. King
Oronite:	R. Stockwell
SwRI:	A. Chaudhry, T. Kostan, P. Lang, D. Engstrom, M. Lochte
TMC:	R. Grundza
Willis Advanced Consulting:	A. Willis

Meeting Details:

Minutes from the previous 3 Sequence V calls were unanimously approved (R.Romano/J. Brys)

November 30th Sequence VH Minutes

December 7th Sequence VH Minutes

December 14th Sequence VH Minutes

The Surveillance Panel reconvened to review the same 3 subject items:

1) Approval of fuel scoping test requirements
2) Parts inventory for VH to provide an updated projection for the life of the Sequence VH.
3) Plans for the SP to review the possible operational and/or hardware causes for the recent RACS and AES mild shifts which triggered a number of VH test key alarms.

Regarding the vote on the fuel scoping requirements from 12/14 , P.Tumati reported that Haltermann was withdrawing their negative vote and casting it as a waive instead. The vote is now unanimous, and the resolution can proceed to be issued as an Information Letter.

Chair Ritchie reported that he had contacted Tracey King (HCS Group) and communicated the decision of the SP that 5 scoping VH test results are required to demonstrate a technical capability to blend a Sequence VH fuel. The contract process must be completed by Feb 15th, and the large batch supply would need to be approved and introduced by November. HCS will report their intentions at the next SP call on January 11th. He also reported that he had contacted the new contract Chair Mike Lochte and communicated that the panel requests for the new contract to be resolved by Feb 15th.

Rich Grundza reported that the 5 calibrated labs have reported parts inventories for 288 runs (2 labs!), 350, 400 and 78 tests which totals about half that we started with. The two San Antonio

labs would be the first to run out of VH parts estimated at 4yrs (IAR) and 5 yrs. (SwRI), while the dependent labs probably have more than they need for the life of GF-6 projected to around 2027. Ron Romano reported that he was still waiting for Federal Mogul is call him back about supplying more pistons - Mahle said they'll make the rings. Bishop has a number of VH blocks they are prepared to supply. Outlook is optimistic to find the additional VH parts needed for the life of GF-6. The VH will not be considered as a test for GF-7 and a new test development effort should be expected to start in the next year or so.

Moving into 2021 the 6th test on 931 should be completed with many of the current stand calibration extensions due to expire in early 2021.

The group agreed that they should study the possible reasons for the mild sludge severity shift as a matter of some urgency. To make a start, the group reviewed the attached TMC Industry control charts. From around October 2018, AES shows a barbell pattern with a mild trend rising into alarm, dropping back and then rising again to the recent series of further mild alarms. Ron commented that the RAC looks to have trended mild well before AES and before the new batch of fuel came in, so it doesn't look like the fuel alone is responsible for the sludge severity shifts. Angela asked about the control of humidity levels and the possibility of seasonality effects. Andy and Ron offered that they had never seen seasonality shifts in the Sequence V sludge results.

Ron offered that April 2020 looked like a good time to start looking at operational data pre- and post- that date and asked if there were any known shifts made by the labs around that time.

Al commented about how 1011 had recently shifted really mild and suggested that the allowed regapping of the rings might be a pattern to be looked at connected to the very mild 1011 results

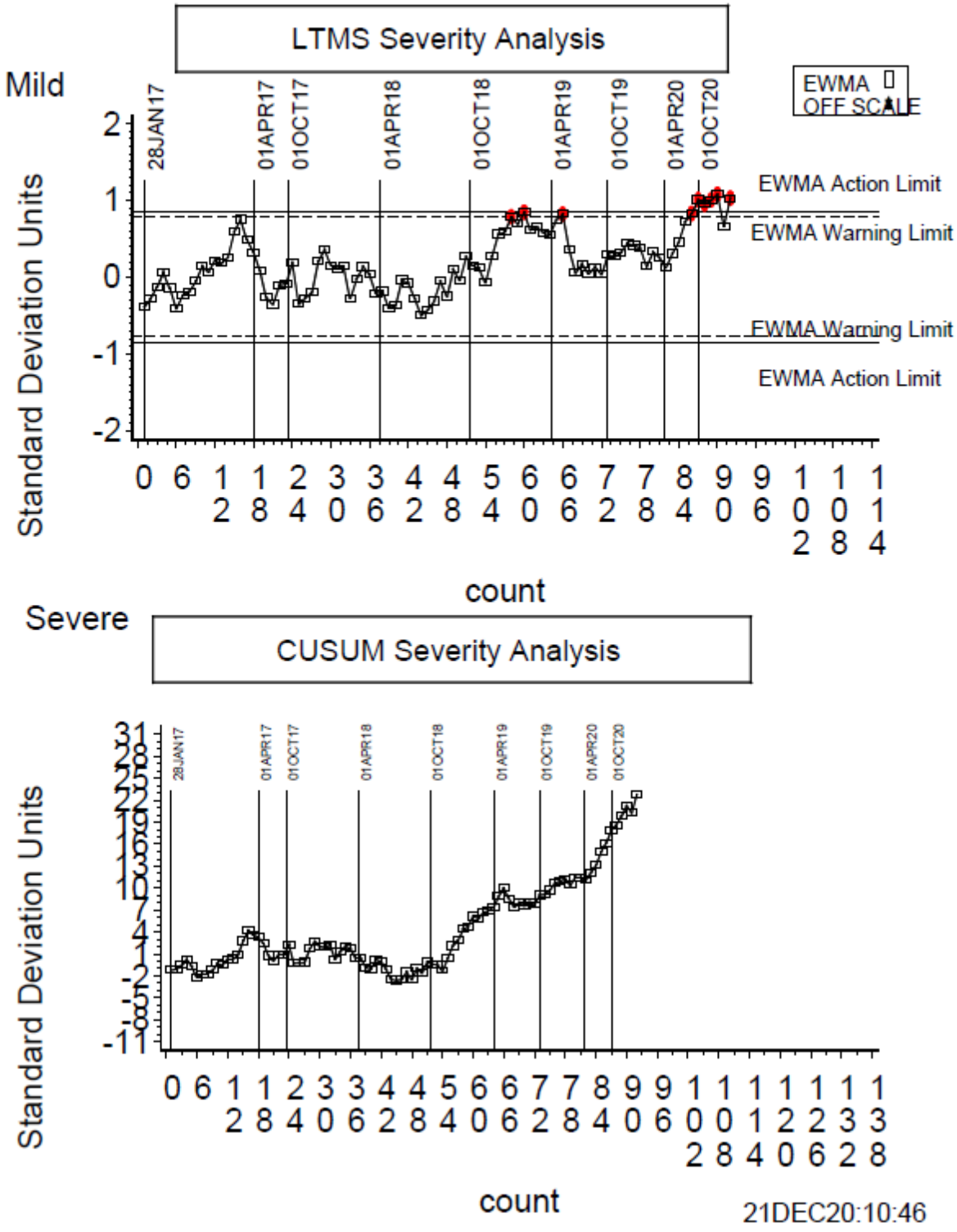
Angela suggested we look at trends as it pertains to test usage. Andy commented that the fuel batch might be older than any other previous batch, but Ron thought the fuel is likely not that much older because the VH testing rate has been high since the inception of the test. Prasad agreed to look at the lifetimes of the most recent batches of fuel.

At the end of the call, Chair Ritchie noted that this was Ron’s last Sequence V call and thanked him on behalf of the panel for his leadership, his hard work and most of all, the friendship he gave to the group over so many years. The panel members echoed these sentiments including Ron! The panel agreed that when the pandemic cleared, that it would convene in Detroit to give Ron the proper sendoff he so richly deserves. We’ll meet again!

Appended: AES and RAC Industry Charts from TMC

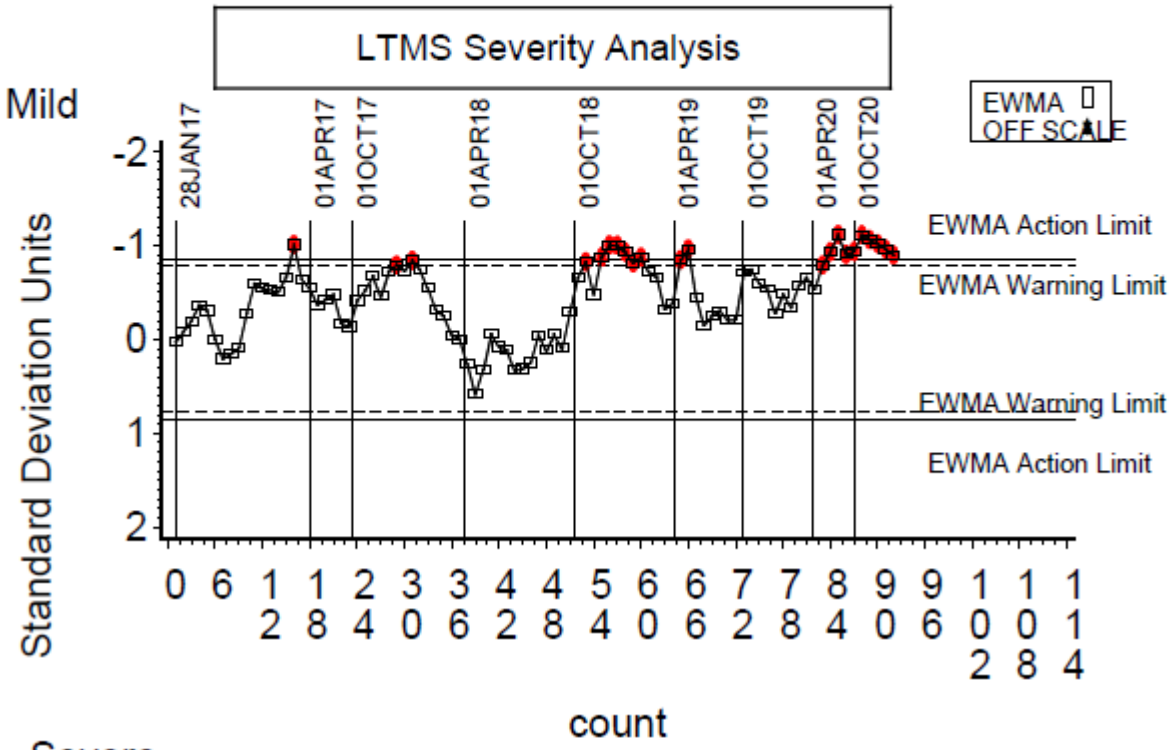
SEQUENCE VH INDUSTRY OPERATIONALLY VAL A

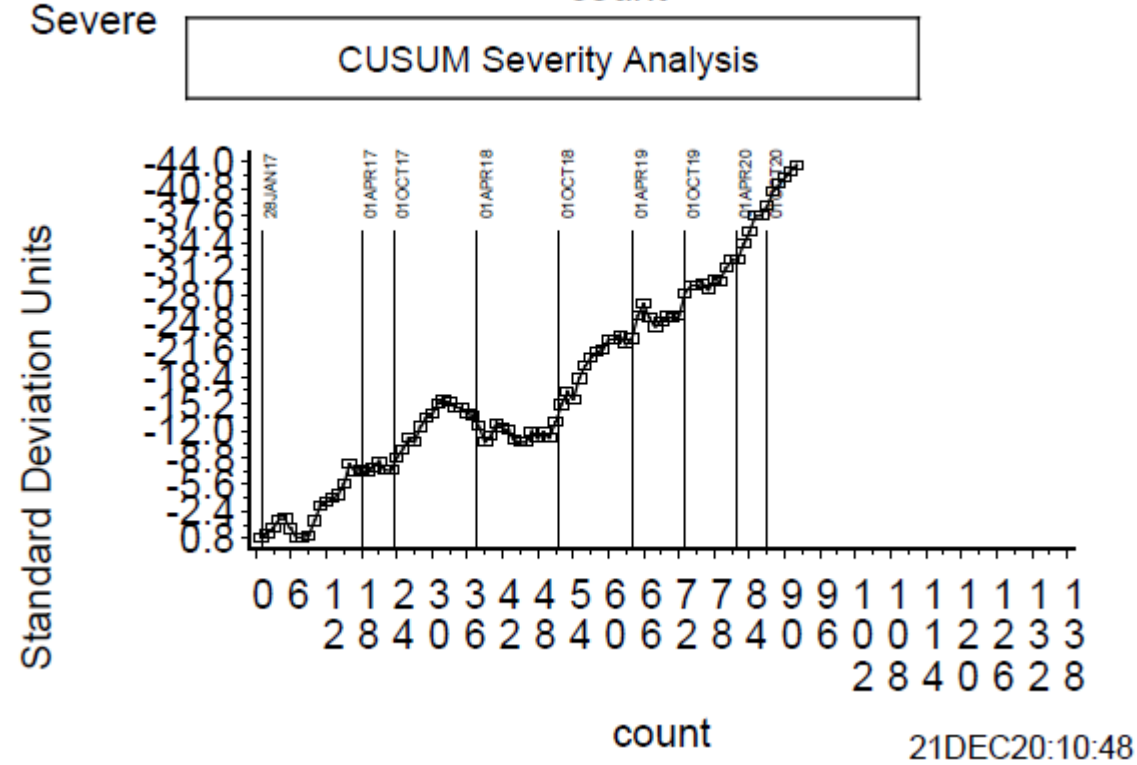
AVERAGE ENGINE SLUDGE



SEQUENCE VH INDUSTRY OPERATIONALLY VAL A

AVERAGE ROCKER COVER SLUDGE





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