LDEOC/EOEC SURVEILLANCE PANEL

A LDEOC/EOEC conference call was held on 7-21-21, at 9 am Central Standard Time. The following esteemed members were on the call:

Joe Franklin - Intertek
Mike Birke – SwRI
Doyle Boese – Infineum
Vince Donndelinger - Lubrizol
Robert Stockwell – Oronite
Becky Grinfield – SwRI
Kai Malyska - ISP
Jeff Clark – TMC
Gefei Wu – Valvoline
Kimberly Gutierrez - Intertek
Dennis Gaal – ExxonMobil
Jason Bowden – OHT
Laura Birnbauer – Chevron
Jo Martinez – Chevron
Charles Nystrom - SwRI

The purpose of the call was to discuss the negative vote cast by Robert Stockwell on the recent motion to approve an industry correction factor of -1.82 for EOEC nitrile volume change for the following two reasons:

- CK-4 and FA-4 category stated near the middle of a 12-year stable time in the life of this test.
- The limits for Volume Change are (-3,+5) and an ICF of -1.82 is a 23% change to the limits; Oronite views this as changing the API category.

Per Robert's presentation (attached), the volume data has been steady from 2009 and on, and the use of a large ICF is not ideal in this case. He asserts some other option for correcting the severe bias should be considered. In his presentation the proposed path forward is to use Option 1 from Doyle's 2019 RR presentation. Option 1 uses the simple means of independent samples from the round robin. The vote at the time was to use option 2, which uses the means of independent samples from the round robin taking into account realized industry bias based on 1006 round robin means. Mike Birke commented, looking at the data, it is apparent that some sort of correction/ICP should have been implemented in 2009, addressing it now without a technical justification seems out of place, albeit understandable. Robert stated given the performance of 1006 was more severe in the round robin that SL107, more weight should be given to SL107 results when establishing an ICF. Doyle stated that targets are always set for new fluids back to the severity when the test was established, and that to change and have it relative to a different severity is counter to that premise. Discussion turned to how D4485 has some spec limits which are tied back to the reference oil and that the spec has no reference to SL107, only oil 1006, which very few labs still have in inventory. As it relates to the specification limits, Doyle suggested the OEMs should be consulted on how to proceed. Joe Franklin suggested contacting the OEMS and send them both Robert and Doyle's presentations as background information. Additionally, invite them to the next SP teleconference for input on a path forward. Joe also proposed a motion to place the ICF on hold, pending the outcome of the next meeting. The motion passed unanimously.

There were no other comments, and the meeting adjourned at 9:45 am.

Chevron Oronite

EOECN SL107 Targets

Robert Stockwell
July 21, 2021

ADDING UP

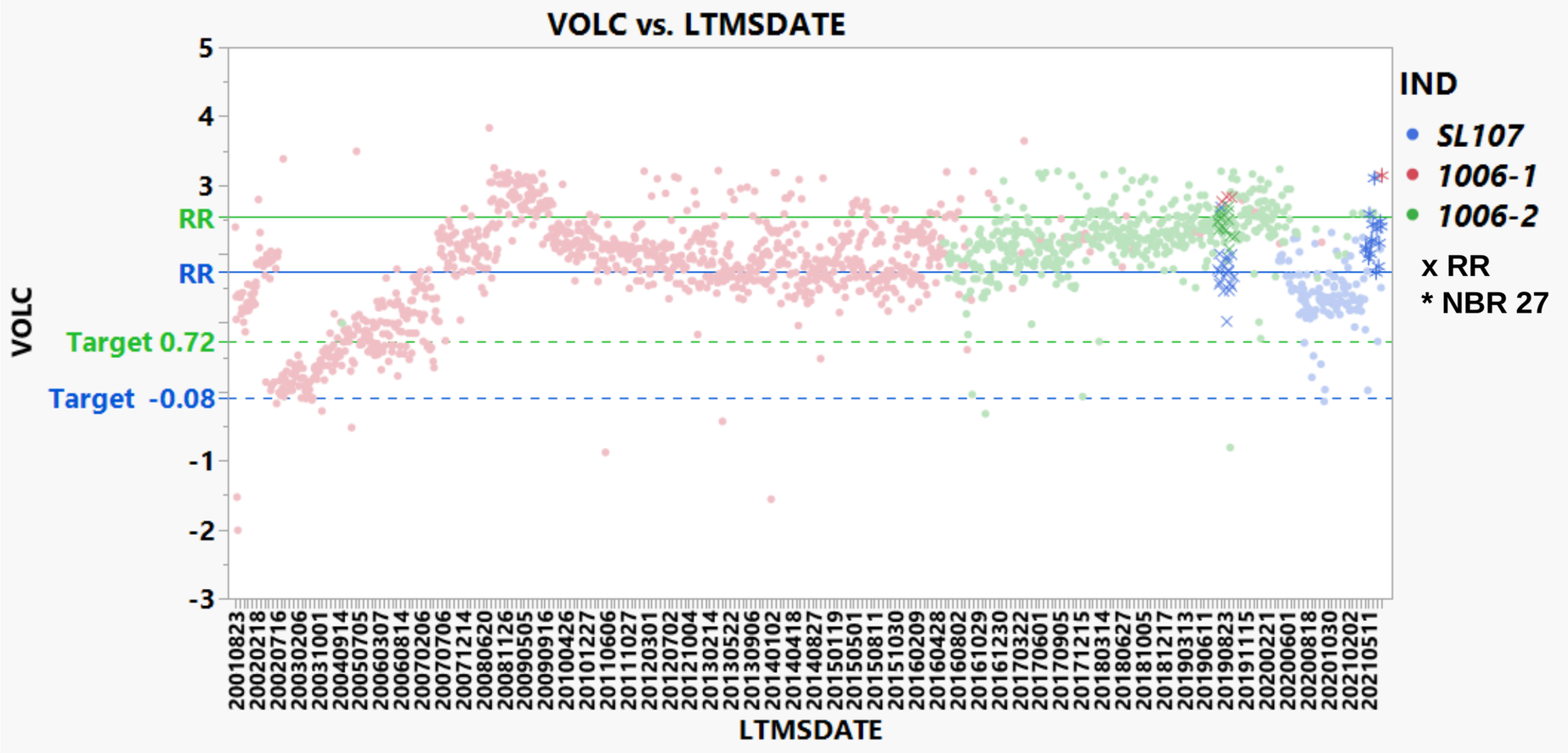
Background

- The Engine Oil Elastomer Compatibility Surveillance Panel approved the implementation of an ICF (-1.82) to the Volume Change results obtained in tests run on Heavy Duty Nitrile elastomer material on July 1, 2021

- Oronite waived on the motion after it was agreed that there will be a 14-day delay before the change was implemented

- Upon consideration of the data and the circumstances of the proposed change, Oronite will be voting negative for two reasons:
  - CK-4 and FA-4 category started near the middle of a 12-year stable time in the life of this test
  - The limits for Volume Change are (-3, +5) and an ICF of -1.82 is a 23% change to the limits; Oronite views this as changing the API category

Path Forward



- VOLC for SL107 was significantly lower than 1006 based on the Round Robin (RR) data
- This indicates that the performance and probably the behavior of this oil doesn't need to be tied to 1006
- The recent batch 27 is closer to the RR data

Path Forward

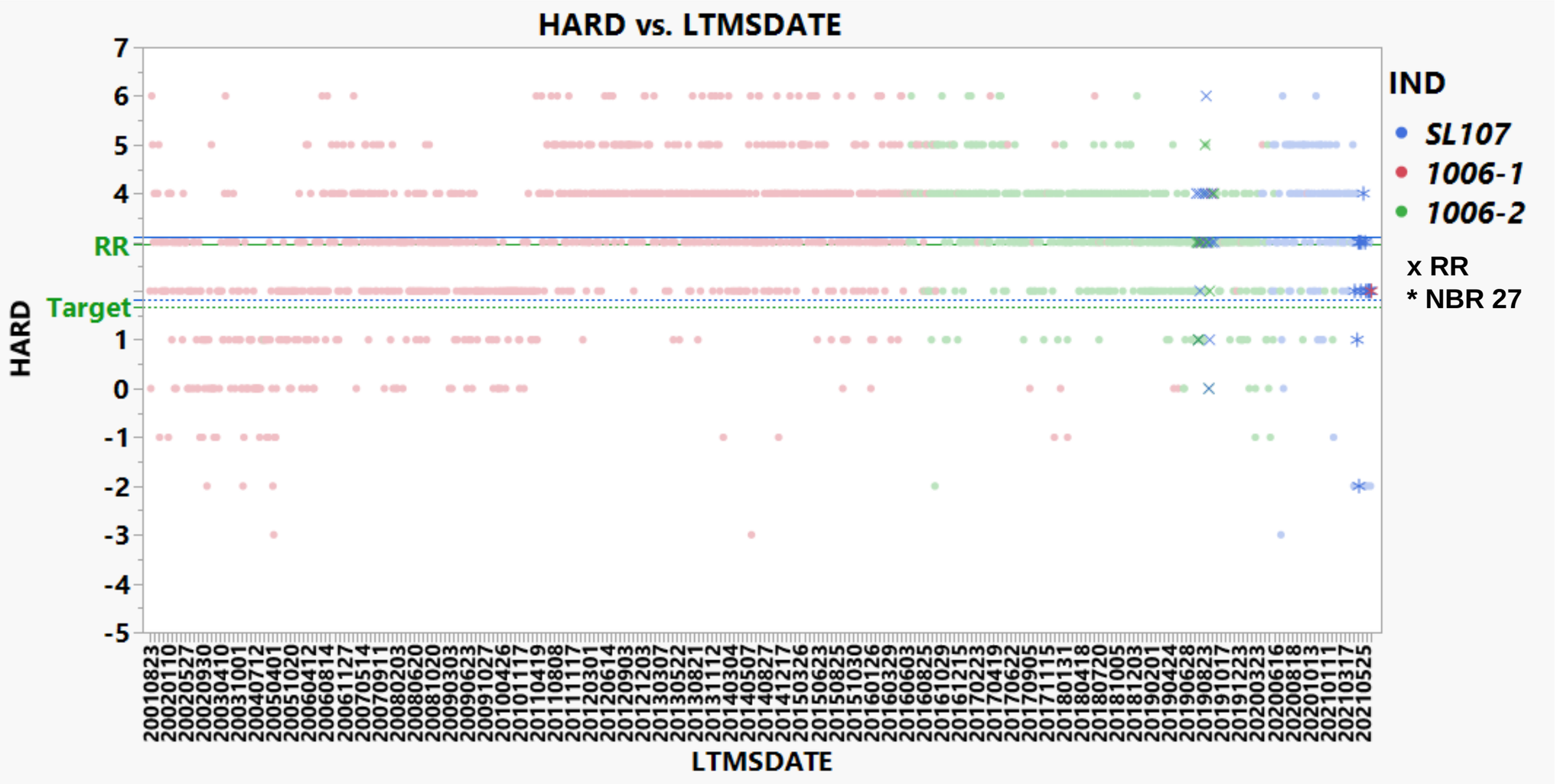
- Propose SL107 target means for EOECN as reported in Dec 2019 RR data analysis, Option 1 SL107 Targets.

Option 1 SL107 Targets

Parameter	EOECF	EOECN	EOECP	EOECS	EOECV
VOLC	0.48	1.74	1.76	33.54	18.83
HARD	8.76	3.11	0.80	-22.19	-9.01
TENS	-71.56	-5.80	2.89	-31.46	-16.57
ELON	-65.71	-35.07	-13.37	-22.00	-34.43
Parameter	LDEOCA	LDEOCF	LDEOCN	LDEOCP	LDEOCS
VOLC	23.72	0.66	1.36	1.80	33.46
HARD	-13.18	4.55	-1.37	-1.49	-22.59
TENS	-20.52	-56.66	3.27	0.15	-32.26

Appendix

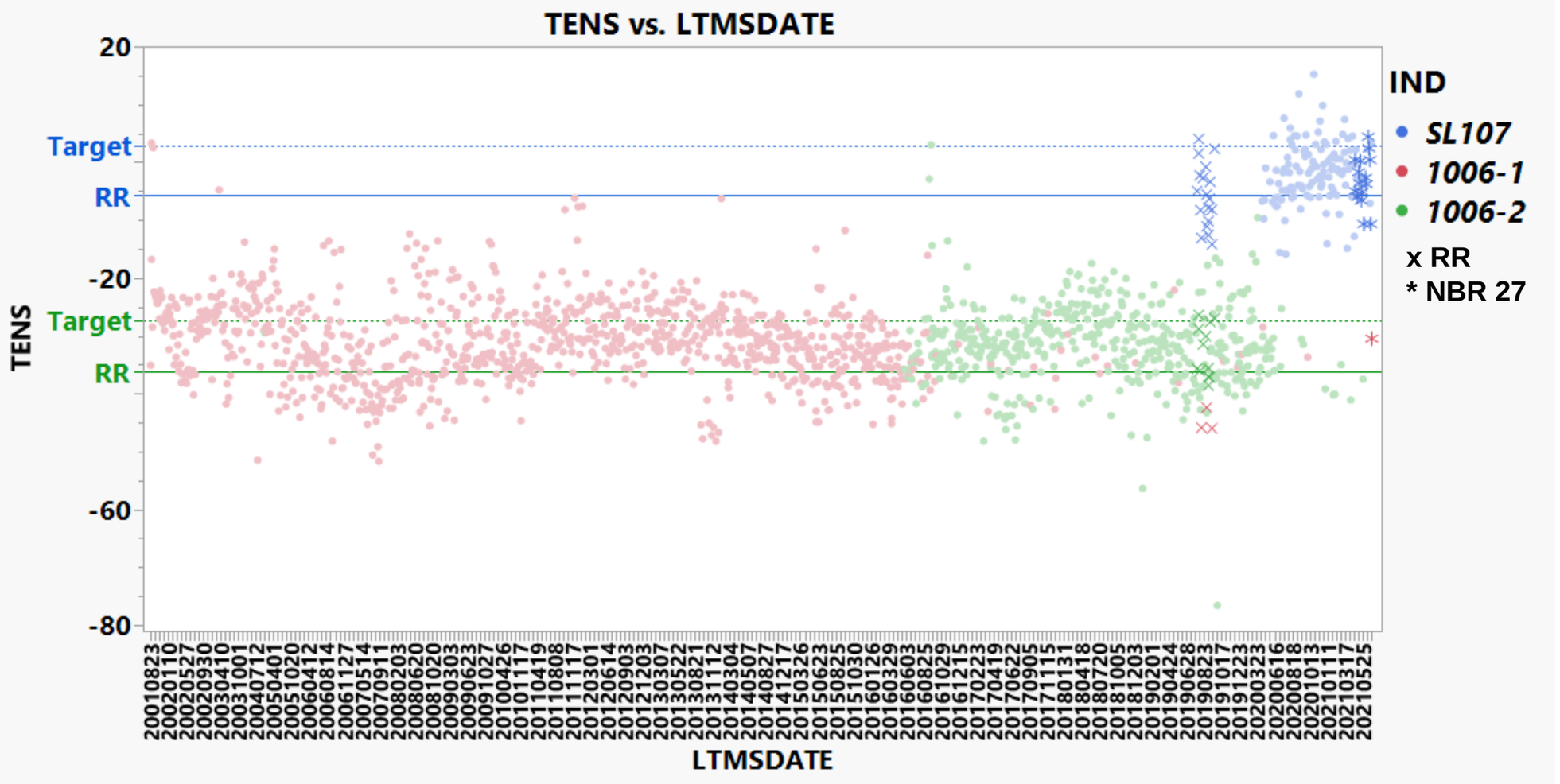
Hardness Change



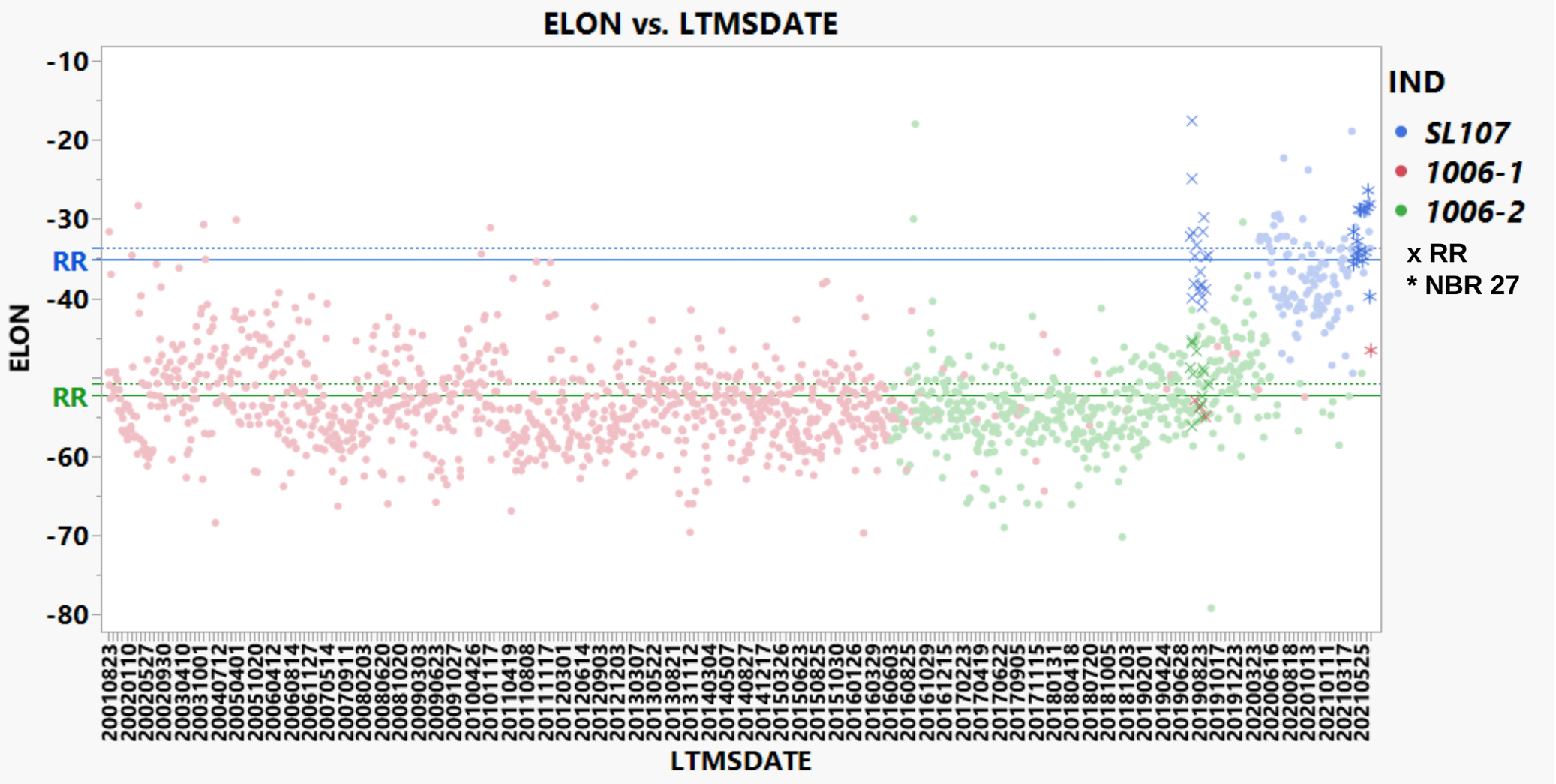
Chevron Oronite

ADDING UP

Tensile Strength Change



Elongation at Break Change



Chevron Oronite

ADDING UP