WALL RATING WORKING GROUP

Conference Call
June 10, 2020

CRRC ANTITRUST STATEMENT

Although the Cool Roof Rating Council is a broad-based 501 (c) 3 organization, it does include numerous competitors in the roofing industry and thus care must be taken to scrupulously abide by federal and state antitrust laws. As you know, the CRRC has in effect Antitrust Compliance Guidelines. Members should remember that antitrust compliance is important at all times whether at formed meetings such as this or in social settings. At this and other CRRC meetings participants should not discuss sensitive issues including pricing, profitability, payment terms, and allocating markets or customers or anything else recommended against in the antitrust guidelines.

TODAY'S AGENDA

Topic	Time
SR of paints with/without primer	25 min
Impact of Gloss on SR	10 min
Color Family	45 min
Wrap-up and next steps	5 min

GOAL OF TESTING

Observe differences in the SR of paint colors to better understand:

- Impact of substrate color with/without primer
- Impact of gloss within a product line
- 9 Color Family proposal
- Impact of natural and accelerated exposure

SUMMARY OF TESTING

- Impact of substrate color with/without primer
  - 10 specimens (5 colors)
- Impact of gloss within a product line
  - 16 specimens
- 9 Color Family proposal
  - 45 specimens
- Impact of natural and accelerated exposure
  - 102 specimens (3 manufacturers)

SOLAR REFLECTANCE OF PAINTS WITH/WITHOUT PRIMER

OVERVIEW OF CRRC TESTING

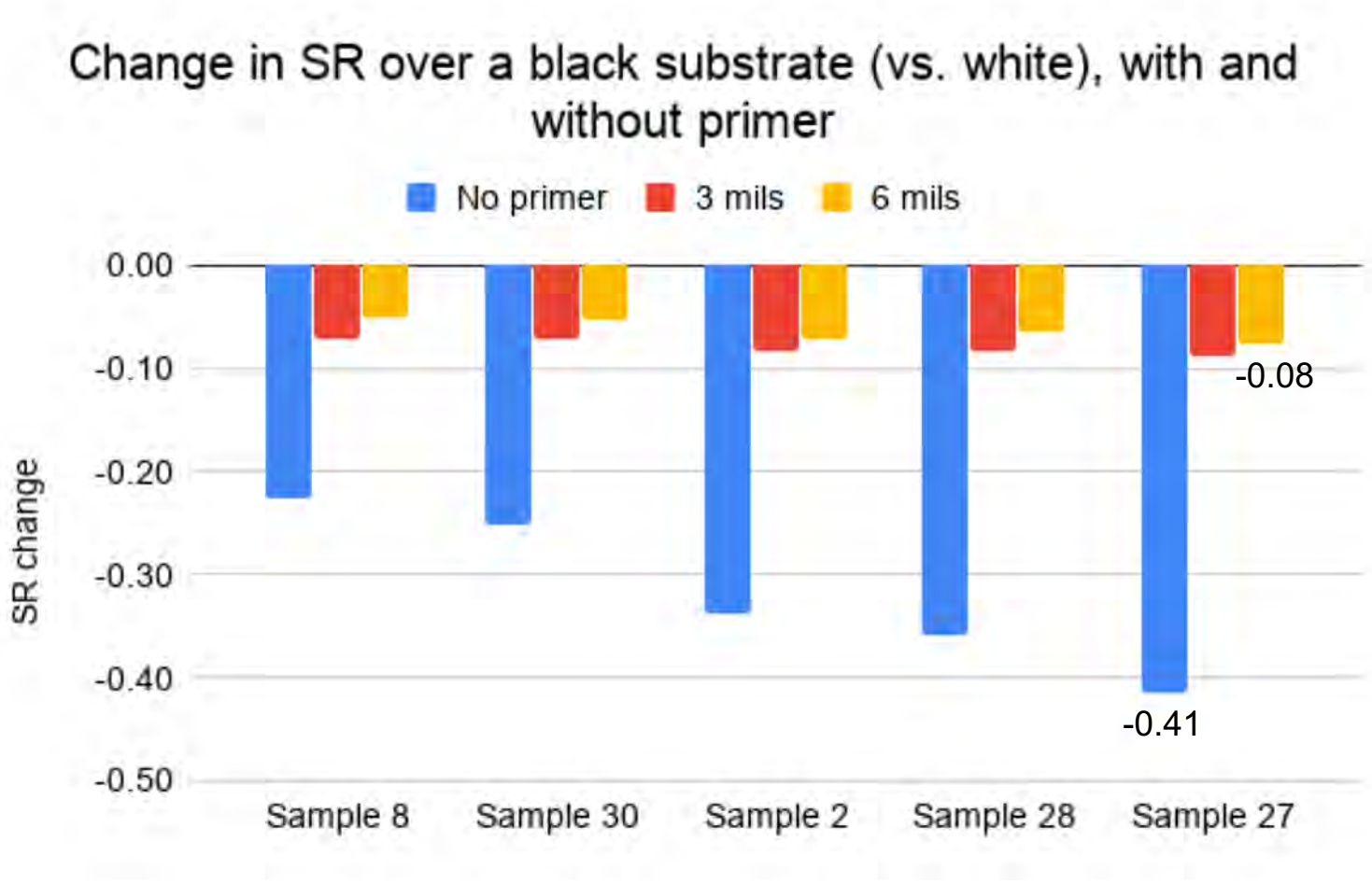
- SR testing of 45 colors using Leneta Opacity Chart
- Five products with largest SR difference over black vs. over white selected for testing with and without a primer

CRRC TESTING

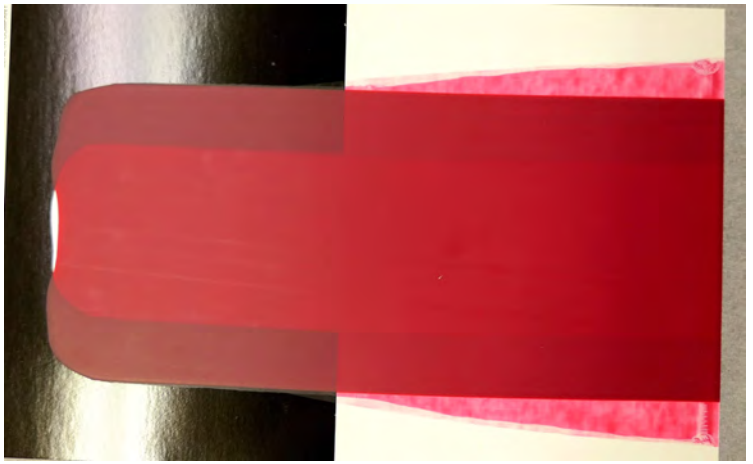
- Three specimens for each color:

Scenario	Primer thickness (WFT)	Coating thickness (drawdown)
1	None	3 mil
2	3 mils	3 mil
3	3 mils	6 mil

- Primer significantly decreases drop in SR over black vs. white



EXAMPLE: SAMPLE 27



	No primer	Primer + 3-mil drawdown	Primer + 6-mil drawdown
SR over white	0.50	0.51	0.48
SR over black	0.09	0.42	0.41

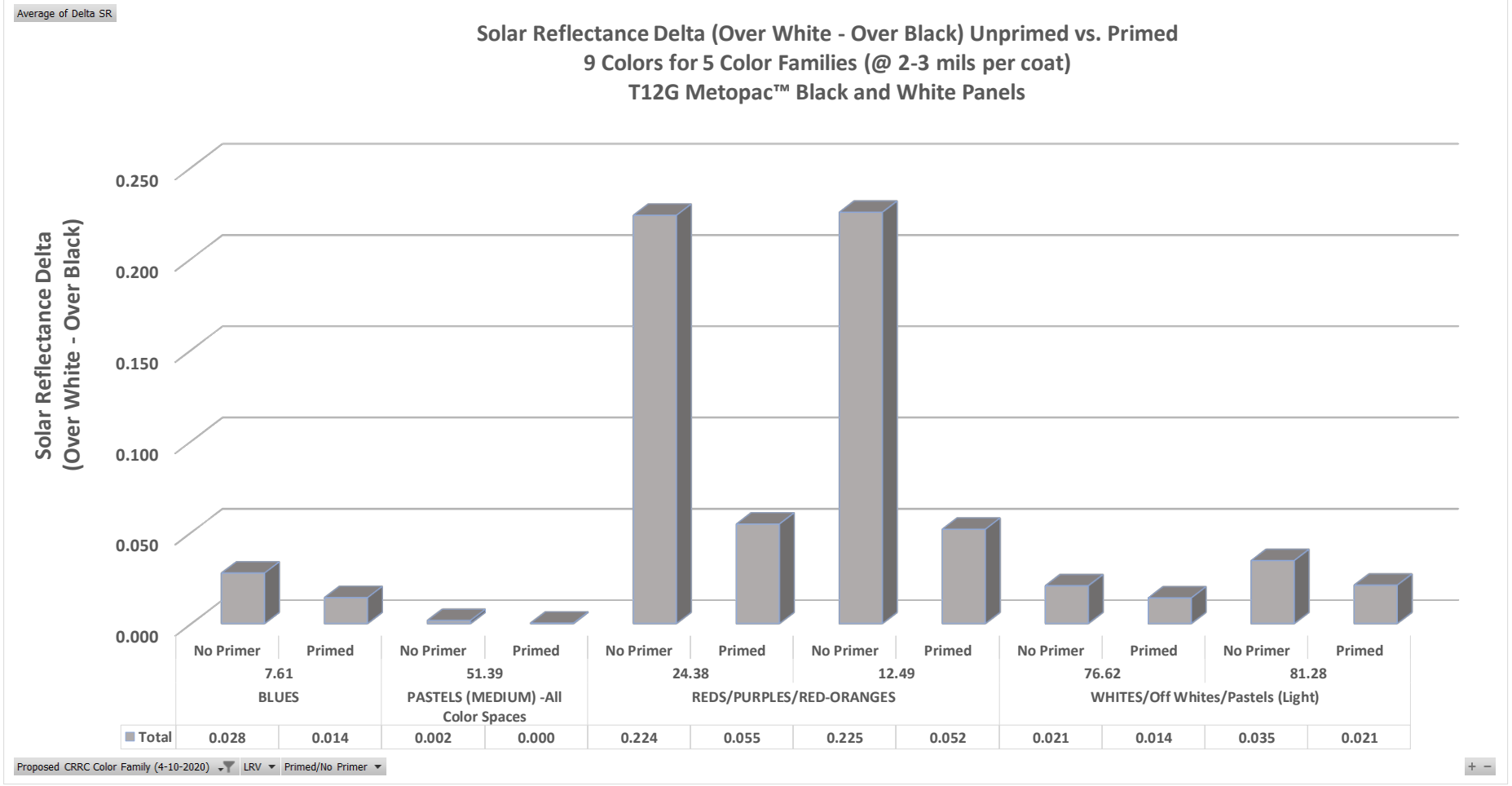
OVERVIEW OF TEMPO TESTING

- SR testing of 9 colors using T12G Metopac Black and White Panels
- Two specimens for each color:

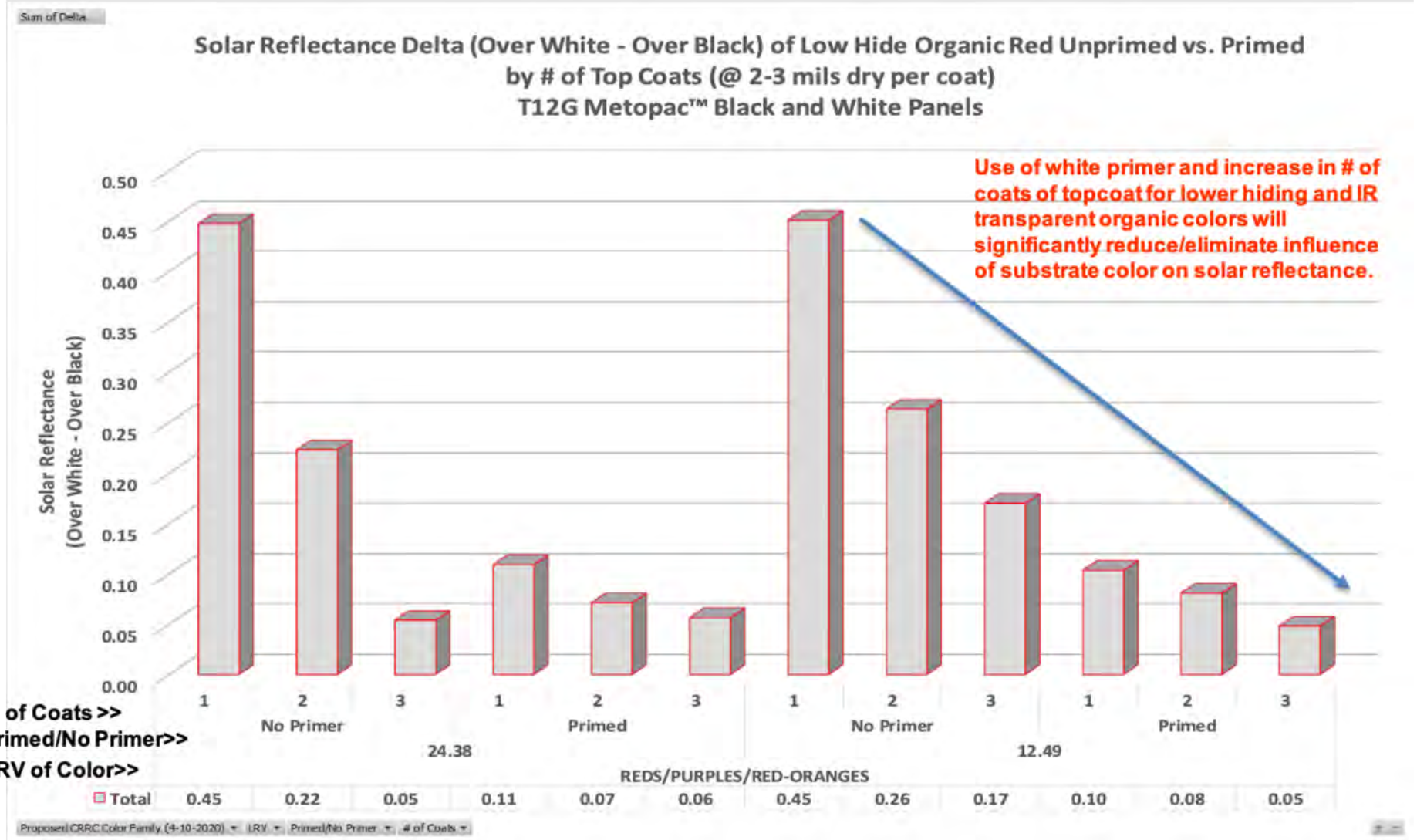
Scenario	Primer thickness (DFT)	Coating thickness (DFT)
1	None	3 mil
2	3 mils	3 mil

- Results consistent with CRRC findings

- Effect of substrate color decreases when applied over white primer
  - Magnitude is dependent on the color/pigment



- Effect of substrate color diminishes as number of top coats increases



CONCLUSIONS

- Most manufacturers specify use of a primer
- With a primer, SR variation due to substrate color is minimized
- Use of a darker substrate color will provide conservative values without over-penalizing participants

RECOMMENDATION

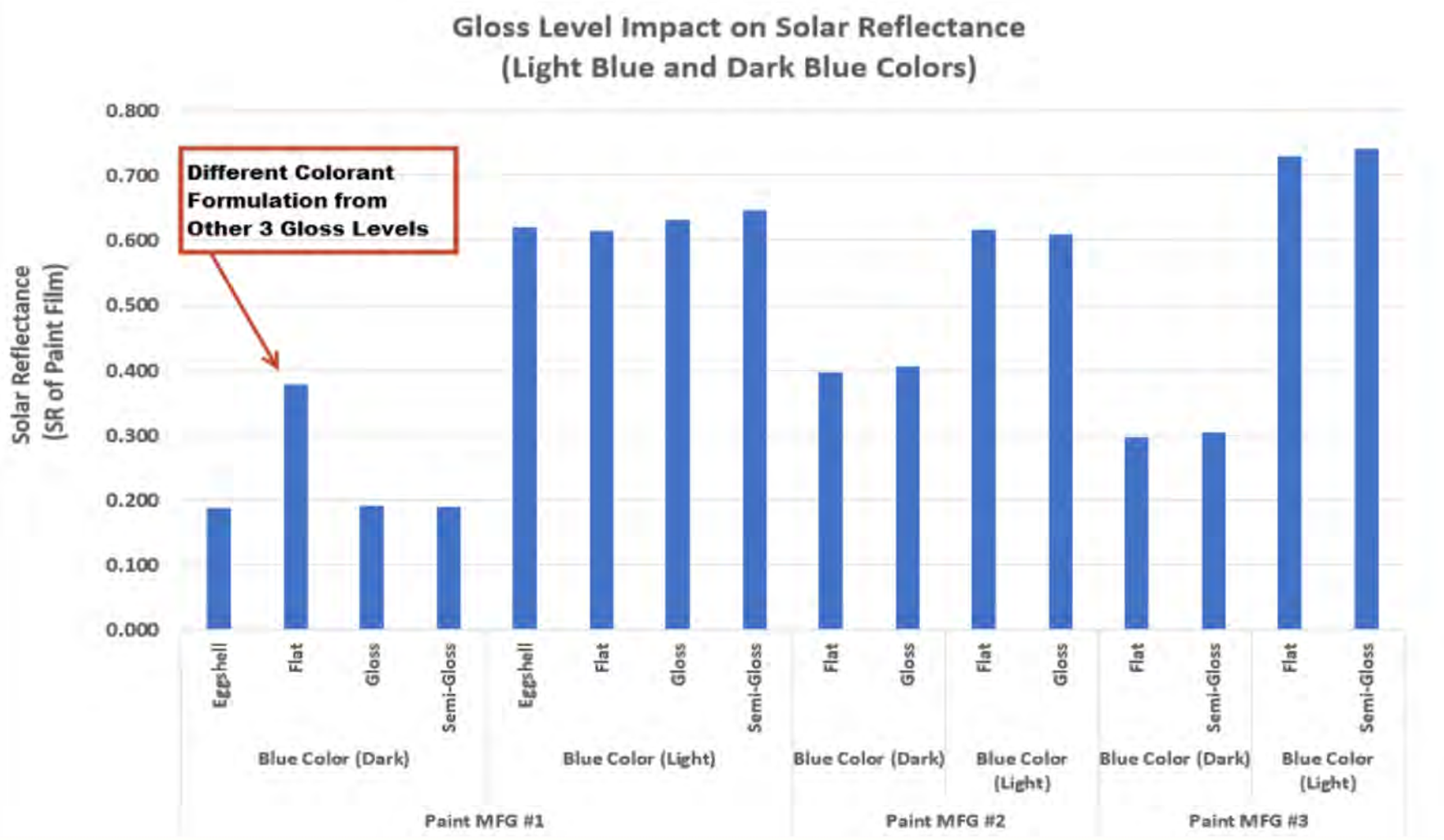
- Specify use of a dark substrate for wall ratings (SR < 0.10)
- Manufacturers may create specimens using primer thickness and topcoat thickness consistent with their product specifications

NEXT STEPS

- Feedback on recommendation?
- Next steps:
  - Determine a viable substrate option
  - Update the draft program manual

IMPACT OF GLOSS ON SOLAR REFLECTANCE

- Key takeaway: gloss does not significantly impact solar reflectance



COLOR FAMILY

BACKGROUND

- Architectural paint manufacturers offer thousands of colors
- Rating costs add up quickly:
  - Initial testing (lab fees)
  - CRRC rating fees
  - Weathering costs and aged testing (if applicable)
  - Annual CRRC renewal fees
- Directory could become overwhelming

COLOR FAMILY - ROOFS

- Roof rating Color Family program requires initial testing for every color
- Advantages:
  - Lower initial rating fee and CRRC renewals fee
  - No weathering/aged testing
- Trade-off:
  - Manufacturers must accept an assigned SR/TE value

COLOR FAMILY - WALLS

- Architectural coating products
- 9 color families
  - Assigned SR and TE values for each family
  - LRV and CIELAB ranges for each family
- Possibly a pastel color family
  - Similar LRV values, but different colors
    - Light blue [negative b*] vs. light yellow [positive b*]
    - Light green [negative a*] vs. light red [positive a*]

PROPOSED COLOR FAMILY PROGRAM (WALLS)

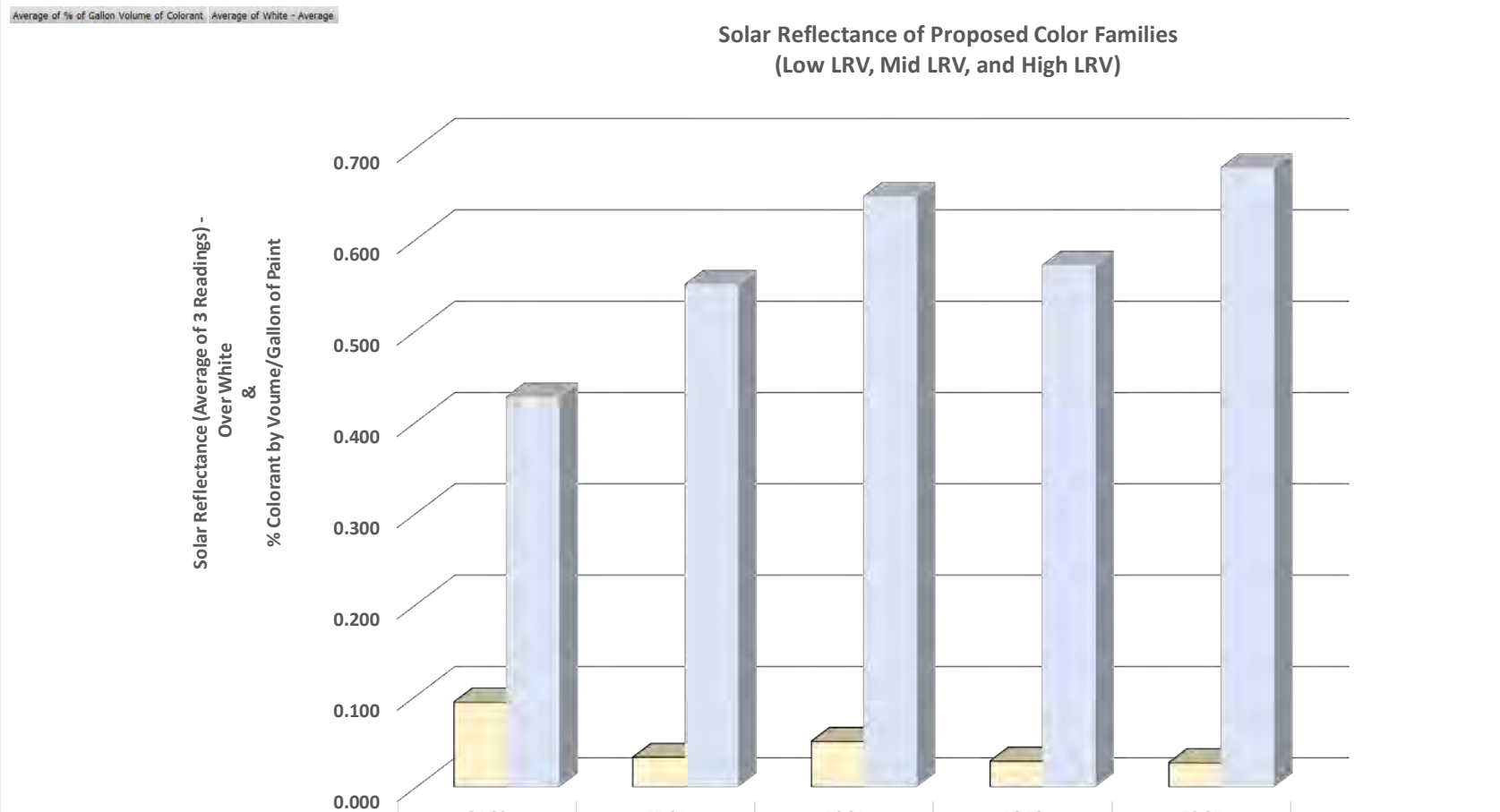
- Proposed color family specifications:

Color Family Name	LRV Range	L Range	Min of -a	Max of -a	Min of +a	Max of +a	Min of -b	Max of -b	Min of +b	Max of +b
Muted Dark Colors	0 to 14.99	0 to 45	-14.99	-0.001	0.00	19.99	-15.99	-0.001	0.00	24.99
Muted Medium Colors	15 to 35	45.01 to 65	-14.99	-0.001	0.00	19.99	-15.99	-0.001	0.00	24.99
Blues	4 to 35	25 to 65	-50.00	-0.001	0.00	19.99	-100.00	-16.00	n/a	n/a
Muted Yellows and Greens	15 to 45	25 to 65	-14.99	-0.001	0.00	19.99	n/a	n/a	25.00	49.99
Bright Yellows & Oranges	25 to 85	55 to 100	-50.00	-0.001	0.00	50.00	n/a	n/a	50.00	100.00
Greens	5 to 35	25 to 65	-100.00	-15.00	n/a	n/a	-15.99	-0.001	0.00	49.99
Reds & Purples	5 to 35	25 to 65	n/a	n/a	20.00	100.00	-40.00	-0.001	0.00	50.00
Pastels (Medium)	33 to 60	65.01 to 79.99	-50.00	-0.001	0.00	49.99	-35.00	-0.001	0.00	49.99
Pastels (Light)	54 to 100	80 to 100	-35.00	-0.001	0.00	35.00	-35.00	-0.001	0.00	49.99

TESTING OVERVIEW

- CRRC tested 45 color drawdowns on Leneta Opacity Charts
- Dunn-Edwards combined this data with LRV and pigment information

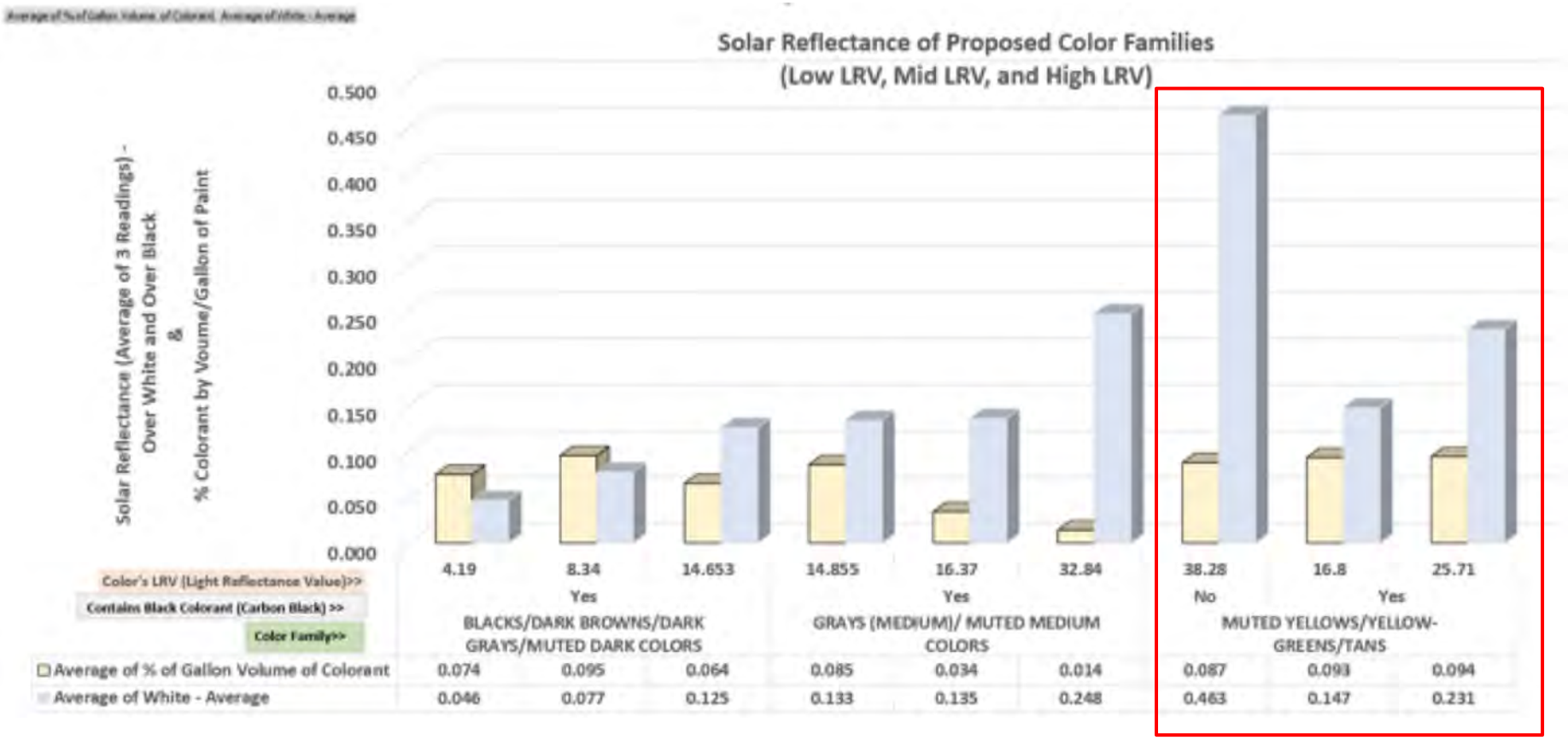
- Generally, if there is no carbon black:
  - Lowest LRV + most colorant = Lowest SR



Color's LRV (Light Reflectance Value)>>	34.93	55.05	56.31	56.78	72.25
Contains Black Colorant (Carbon Black) >>	No			No	
Color Family>>	PASTELS (MEDIUM) -All Color Spaces			WHITES/Off Whites/Pastels (Light)	
Average of % of Gallon Volume of Colorant	0.093	0.032	0.050	0.028	0.026
Average of White - Average	0.427	0.550	0.646	0.571	0.678

Proposed CRRC Color Family (4-10-2020) | Volume of Colorant (Contains Black) | LRV

- Addition of carbon black can cause drastic decrease in solar reflectance



PROPOSED PROCESS: EXAMPLE

- Manufacturer A has three brands:
  - Economy, Basic, Pro
- Manufacturer A wishes to rate products in the Muted Yellow & Green Color Family for the Basic brand.
- Manufacturer A selects the color “Dusty Yellow” that:
  1. Meets the LRV and CIELAB* values dictated by the Color Family table **and**
  2. Has the highest pigment loading and lowest LRV

COLOR FAMILY SUBMITTAL EXAMPLE

1. Manufacturer A sends “Dusty Yellow” to AITL for initial testing
2. Manufacturer A submits supporting documentation to CRRC (see next slide)
3. AITL confirms that the product meets Color Family CIELAB* requirements, conducts SR and TE testing, reports to CRRC
4. Once reviewed & approved by CRRC, “Dusty Yellow” test results are established as the Representative Element for Manufacturer A’s Basic brand Muted Yellow & Green Color Family and are displayed on Rated Products Directory

SUPPORTING DOCUMENTATION

- With product rating, Manufacturer A must provide a list of the other colors available in that Color Family to the CRRC
  - All other colors in the specified color family must be verified by the manufacturer to have SR values greater than the Representative Element (e.g., “Dusty Yellow”)
- Manufacturer must provide a written statement asserting that:
  - All colors are equal or greater in SR to the tested color (e.g., “Dusty Yellow”)
  - The tested color has the lowest LRV
  - The test color has the highest level of colorants and black (or other low SR) pigment used in that color formulation

RATED PRODUCTS DIRECTORY

- Manufacturer will publish the full list of colors that qualify within each Color Family
  - CRRC will maintain a copy of the list but will not display on the Rated Products Directory
- Eliminating the need to test every color
  - Reduces burden of submittal process
  - Reduces costs to manufacturers
  - Keeps the CRRC Rated Products Directory manageable for users

ADDITIONAL SUBMITTALS

- If Manufacturer A wishes to rate products in the Muted Yellow Color Family for their Pro brand, they must complete the rating process on another Representative Element
  - Differs from roof program: Color Families no longer have one static assigned SR and TE value spanning across manufacturers/brands

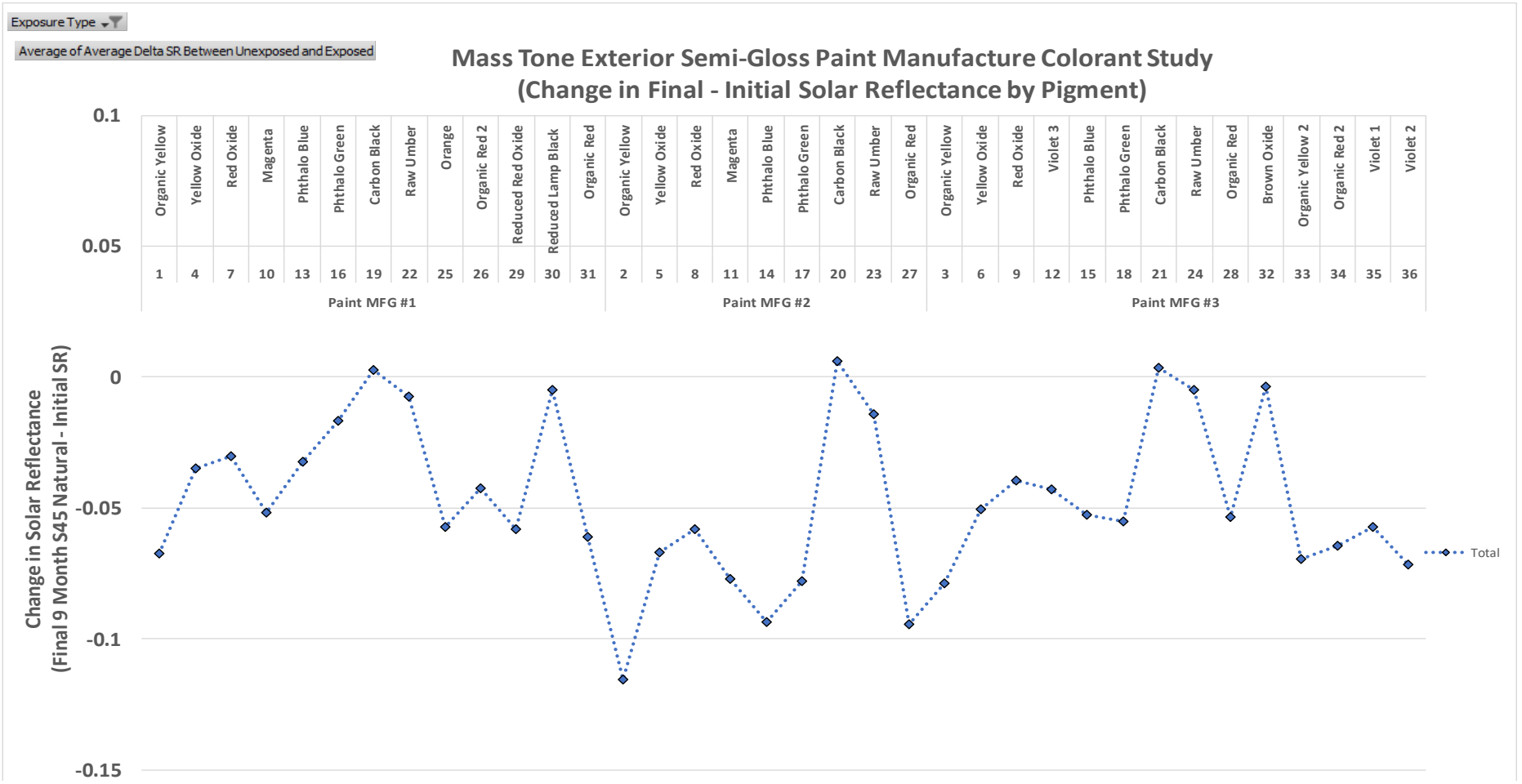
QUALITY ASSURANCE

- CRRC will periodically select a color from Manufacturer A's list of rated products and Color Families to audit for compliance
- Selected products and color families will be sent to an AITL for color, SR, and TE testing
- If the randomly-selected product has a SR or TE lower than the originally approved values, the manufacturer will be notified of intent of CRRC to delist from approved products page, until the matter can be resolved

NEXT STEPS

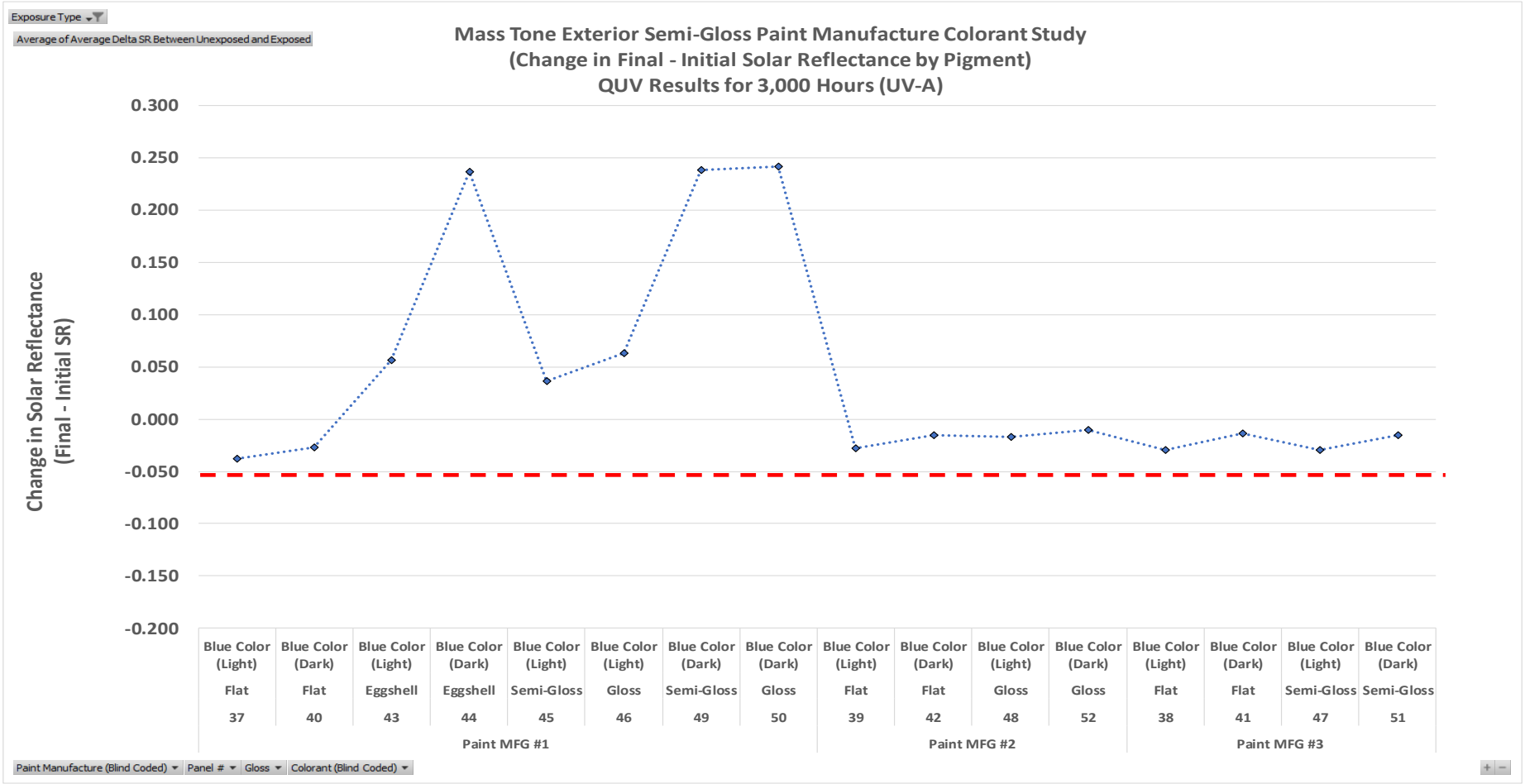
SR Delta -- Natural Exposure South 45 (Los Angeles, CA) -- Individual Colorant– 3 Paint MFG Colorant Lines (9 Months)

- Key takeaway: Early 9 Month Natural Exposure Data shows some drop in SR, but believe this is primarily due to early dirt pick-up, etc. and will increase as products age (see next slide). *Note these are South 45 and not vertical exposures.



3 Paint MFG – QUV Exposure Impact on Solar Reflectance (Light Blue and Dark Blue Color)

- Key takeaway: QUV Exposure Data shows insignificant drop in SR and some noticeable increase in SR as the paints age. *Note these are 3,000 hours QUV (using UVA Bulbs).



TIMELINE

- June 18, 2020: Board meeting to vote on proposal
- Future calls:
  - Further discussion of Color Family program
  - Discussion regarding substrate texture

QUESTIONS?