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California Energy Commission
Dockets Office
1516 Ninth Street
Sacramento, CA 95814-5512

Re: **Docket No. 10-BSTD-01**

To Whom It May Concern:

Thank you for the opportunity to reiterate and to expand upon the comments I made verbally during the June 10 CEC Staff Workshop on Draft Revisions for Residential and Nonresidential Buildings for Possible Inclusion in the 2013 Building Energy Efficiency Standards.

At the outset, I must express this Association's disappointment in the way that the standards development process has been conducted to date. For more than a year, in Stakeholder Meetings sponsored by the California Investor Owned Utilities that I attended and in periodic conversations and e-mail communications that I had with CEC staff members, I was repeatedly told that no significant changes to the "cool roofing" requirements for low-sloped roofing were planned. At the April 12, 2011 Stakeholder Meeting, for example, I was advised by a CEC staff member that the only change under consideration was the possible elimination of *Exception 1 to Section 149(b)1B*, a minor provision of the Energy Code which pertains to the replacement of low-sloped roofs with a rock or gravel surface.

Then quite suddenly and without any warning whatsoever, a host of changes to the "cool roofing" requirements for low-sloped roofing were unveiled during the June 1, 2011 Stakeholder Webinar, including increasing the minimum aged reflectance for low-sloped roofing products from 0.55 to 0.70 and establishing a mandatory minimum aged reflectance of 0.55 for such products. These proposals were accompanied by a considerable amount of supporting "data" and "findings", none of which was developed in cooperation with or even shared with representatives of the roofing industry prior to June 1st. To add insult to this injury, the CEC Staff Workshop at which these proposals would be subject to public comment was scheduled for June 10th, giving the industry less than a week-and-a-half to analyze and respond to proposals that had been developed in secret over the course of many months.

Obviously, this regrettable turn of events has put the roofing industry at a very unfair disadvantage that the granting of an extra few weeks of time to submit comments has hardly ameliorated. It is my understanding that the consultants who developed the proposals in question

have yet to provide the roofing industry with all of the information and data that has been requested. Until complete information is available, a comprehensive industry analysis and response is simply not possible.

Regarding the substance of the proposals that were unveiled at the June 1 Stakeholder Webinar and discussed at the June 10 CEC Staff Workshop, the primary concern of the union roofing contractors that this Association exclusively represents is that if these proposals are adopted, consumer choices will be so severely narrowed as to encourage non-compliance.

There are 494 low-sloped roofing products with aged reflectance values of 0.55 or more currently listed in the Cool Roofing Rating Council's *Rated Products Directory*. Only 216 of these products -- just 43.7% -- have aged reflectance values of 0.70 and above. The vast majority of these highly reflective roofing materials are coatings (151 products, 73.6%), metal (24 products, 11.1%) and thermoplastic single plies (9 products, 4.2%). Many of the most popular and "tried and true" low-sloped materials, such as built-up roofing, modified bitumen and thermoset single ply membranes will be swept aside because they do not meet the enhanced 0.70 aged reflectance standard.

More troubling than arbitrarily increasing the prescriptive requirement for aged reflectance is the draconian proposal to set a mandatory minimum aged reflectance of 0.55 for all low-sloped roofing products. This proposal would effectively ban the use of 968 of the 1,462 low-sloped roofing products currently listed in the Cool Roofing Rating Council's *Rated Products Directory*. During the June 1 Stakeholder Webinar, I asked the following question of the consultants who developed this proposal:

> *Q: How does setting a mandatory minimum save energy over allowing trade-offs? It seems to me that all it does is ban the use of nearly 2/3s of all rated materials.*
>
> *A: The mandatory minimums saves [sic] energy because* ***it is our impression*** *that some efficiency features that are projected to make up the energy use through the trade-off approach may never be actually installed.* (emphasis added)
>
> (source: Architectural Energy Corporation, June 2, 2011 Memorandum by Dan Suyeyasu to Nonresidential Cool Roof and Mandatory Minimum Envelope Measure Stakeholders regarding Notes from June 1, 2011 Webinar on Proposed Title 24 Envelope Measures, p.5; http://www.h-m-g.com/T24/Meeting%20notes%20-%20Cool%20Roof%20and%20Mandatory%20Minimums%20060111.PDF - **copy attached**)

A vague "impression" is hardly a sound logical basis for recommending such a sweeping change to the Energy Code. It is certainly not a legally acceptable basis for rulemaking either, as it fails quite miserably to satisfy the "necessity" standard of the Administrative Procedures Act.

Establishing a mandatory minimum aged reflectance value for low-sloped roofing products does nothing in and of itself to save energy. Indeed, we respectfully submit that adopting such a regulation will actually lead to the opposite result. Under the current Energy Code, consumers who want to install a noncompliant roofing product are afforded the opportunity to do so. All they have to do is save an equivalent amount of energy by installing additional insulation. Compliance with the existing Energy Code is relatively painless -- and

therefore widespread -- because consumers have choices as to how they go about increasing the energy efficiency of their roofing systems.

Establishing a mandatory minimum aged reflectance requirement will make compliance far more painful for consumers. Many of the most popular roofing materials will be banned. Consumers will not be allowed to legally choose them, regardless of how much additional insulation they may be willing to install to save equivalent energy. Many consumers, we fear, will elect to ignore the Energy Code and have the roof of their choice installed anyway, most likely without installing any additional insulation.

There is no shortage of unscrupulous roofing contractors (both licensed and unlicensed) who are ready, willing and able to perform work without permits and on weekends to avoid complying with the current Energy Code. Establishing mandatory minimums in the next iteration of the Code will simply ensure that they have an even greater competitive advantage over legitimate, professional roofing contractors who understand and comply with the California Energy Code. And that will lead to even greater levels of noncompliance and wasted energy.

While I have never heard of a roofing contractor who failed to install the insulation necessary to effectuate a trade-off under the current Code, I have received dozens of phone calls from and about local building departments that suggest that they do not fully understand and enforce the roofing related provisions of the current California Energy Code. We respectfully submit that far more energy can be saved by better educating building officials and promoting compliance than by robbing building owners and contractors of roofing system choices. If the goal of the California Energy Code is to save energy, why limit the ways and means that goal can be accomplished?

For the above reasons, we urge you to reject all of the proposed changes to the low-sloped roofing provisions of the California Energy Code. Thank you for your attention and consideration.

Respectfully submitted,

William D. Callahan, Ph.D.
Executive Director

enclosure

ARCHITECTURAL ENERGY CORPORATION

MEMORANDUM

TO: Nonresidential Cool Roof and Mandatory Minimum Envelope Measure Stakeholders

FROM: Dan Suyeyasu

DATE: June 2, 2011

SUBJECT: Notes from June 1, 2011 Webinar on Proposed Title 24 Envelope Measures

The core elements of the presentation are embedded in the related Powerpoint presentations that describe our analysis and proposed code changes. The following questions and answers comprised the balance of the content for the online presentation:

Q: Given the aged equation does this essentially outlaw products that have not been tested for 3 years? [Jon McHugh]
A: It looks like an $R_{initial}$ of 0.92 would be required to achieve an R_{aged} of 0.70.

Q: What life expectancy are you assuming for field-applied coatings? [Reed Hitchcock] A: We understand that many of these roofing products have a warranty of 10-15 years. Energy savings are projected over 15 years.

Q: Has there been an analysis of how much energy will be saved by going from 0.70 initial to 0.70 aged? [Scott Kriner]
A: No, we only looked at "aged" to "aged" comparisons.

Q: What is included in the "Material Cost" axis? [Charles Ludwig]
A: Only the actual membrane or liquid, adjusted for suggested rate of coverage.

Q: Will there be an equation to estimate the aged R from the initial R before the three year data is available? [Dwayne Wacenske]
A: There is such an equation in the Standards already, and a new equation is currently under evaluation by LBNL.

Q: Have you looked at how many modified bitumen products are eliminated by this proposal? [Reed Hitchcock]
A: We know that most of the modified bitumen products would not be able to meet this standard without using the performance approach. In terms of product availability, we focused on the dominant cool roof products, single-ply thermoplastics and field-applied coatings.

Q: The bigger issue is limiting innovation in the market. Updating the equation is likely a fix and initial reflectance is only allowed if product enters the data base and is committed to completing the 3 year test. [Jon McHugh]
A: You are correct that the initial to aged conversion equation is useful for new products

entering the market.

Q: Were factory applied coatings on metal roofing listed on the CRRC directory used for this analysis? [Scott Kriner]
A: No, we did not look at factory applied coatings since most metal roofing is used in the steep slope context.

Q: There seems to be limited availability of Thermoplastics materials, 5 currently meet .70 and 10 are less than .70. Is that of concern? [Gary Whittemore]

Q: will your slides be available to download, and can we have access to the data/survey responses that form the basis of these conclusions? [James Mattesich]
A: We will distribute the slides soon, and some of the data will be made available, although it will need some editing before doing so.

Q: The current code offers a number of trade-offs for insulation and other factors. Will those be included in the 2013 proposal? [Reed Hitchcock]
A: The exceptions to Section 143(a)1 will not be changed.

Q: have you looked at the product cost or the actual cost to install the products when comparing pre-coated modified bitumen products vs. field applied products listed in CRRC? [Heidi Wollert]
A: We looked at product costs from a dealer to a contractor, but did not look at that comparison in particular.

Q: You've stated several times that .70 is "cost effective"... what do you mean by "cost effective"... to whom? [Helene Pierce]
A: To the building owner, but with some consideration of what it costs on a statewide basis to provide the required electricity. Cost savings are adjusted for average retail rates.

Q: Of the 22 single-ply membranes, there are only 7 individual products. There are many that are private labeled by one company to many others, and there are three that are discontinued.[Dwayne Wacenske]

Q: Please forgive me if I am jumping the gun. Could you explain how you arrived at the .70 number. It seems like increasing the .15 is a dramatic change. Is there a possibility to stair step and start with .60 and then slowly increase to allow the market adjust while ultimately ending up at .70 in the near distant future. [Allen Sopko]
A: 0.70 is cost effective and readily available. We see no reason to use a lower standard in 2014 moving forward.

Q: Eliminating 50% of the available products in the California marketplace, as well as some entire categories, will certainly have an effect on jobs - in the coating or membrane manufacturing facility as well as in the field. Is that part of the consideration when evaluating these proposals?[Reed Hitchcock]

A: The impact on jobs was not considered, but California will have the same amount of roofs and the same need for waterproofing, so it seems that there is unlikely to be a net impact on roofing jobs, even if the jobs move from one type of roofing product to another.

Q: Shouldn't "aging" be conducted only in California, particularly since no Hot/Humid areas (like Florida) exist?[Richard Snyder]
A: We see no need to conduct testing specifically in California. We will continue to use the CRRC certification process.

Q: follow up. What energy database / model did you use in your energy calculations that show the cost savings. [Allen Sopko]
A: We used a 40m by 40m office building modeled in EnergyPlus

Q: Just looked at the Valspar factory applied coatings for steel roofs most reflectances of whites are just at 0.7 . Off-white is 0.55 and 0.65
http://www.paintandcolor.com/pdf/ValsparCRRCProductListing.pdf [Jon McHugh]

Q: what was the R-value used in the Energy Plus analysis for your 40m x 40m building[Helene Pierce] [
A: We used the code minimum R-value for each climate zone based on building type (nonres or high-rise res).

Q: How many of the field applied products that satisfy the aged reflectance of 0.70 also satisfy the other requirements of Title 24? [Dominic Cremona]
A: They all meet the emittance requirement. We did not look at other requirements.

Q: what are the units for the energy savings $/ft2 ?[Scott Kriner]
A: Yes

Q: What discount rate was used for the present value calculation?[Gerry Greaves]
A: 3%. This is the standard discount rate used by the California Energy Commission

Q: Titanium dioxide is a common raw material to increase reflectivity in single plies and coatings. Titanium dioxide is in short supply and prices have increased. This suggests that material prices will increase in the future. Has this been considered?[Gary Whittemore]
A: The prices we are quoting were collected quite recently and include some recent makups due to increases in raw material costs. It is also quite possible that those costs will go down before the standard takes effect from 2014 to 2017

Q: There is so much on the table here - all stakeholders must get a copy of the presentation and raw data/assumptions to give this the thought it deserves. Can you send that information directly to the call participants today? This is critical, and the need for transparency here is huge.[Reed Hitchcock]
A: We will send the presentation and some of the survey materials

Q: Should cool roof requirements apply to all conditioned spaces or only to spaces that have air conditioning? This is an issue for warehouses and factory occupancies especially on the coast. I believe requirement still applies to all conditioned occupancies.[Jon McHugh]
A: The standard will apply to all conditioned spaces, since energy modeling under the code always assumes air conditioning.

Q: please explain whether and how this applies to retrofits? [Cathy Chappell]
A: The new standard will apply to retrofits in the same manner as the old standard.

Q: Your 0.70 proposal is for California, but the CRRC data you analyzed is from multiple geographies. Did you account for that in your analysis, or did you just use a "national average?"[George Daisey]
A: The costs are from California, and the modeling was done for California. We will continue to use CRRC's ratings for reflectance and emittance.

Q: Has there been any consideration to move the standard in .05 increments (i.e .55 to .60 to .65 to .70) so provide non-compliant manufacturers more time to meet the standard?[Gary Whittemore]
A: No, 0.70 is proving to be highly cost effective, so we are proposing to move straight to that standard.

Q: CRRC tests in three climate locations.[Jamy Bacchus]

Q: Jamy Bacchus @ NRDC: is the high thermal mass intended to include extensive green roofs and thick concrete slab roofs irrespective of the insulation location? Would a light roof still be valid in reducing urban heat island even if the building has a large thermal mass?[Jamy Bacchus (the real one)]
A: We did not analyze reductions in the heat island effect.

Q: There would be no savings in heat only buildings, so an exemption for buildings without air conditioning makes sense.[Dan Walker]
A: Buildings are analyzed as if they have air conditioners since they may be installed someday to deal with uncomfortable inside temperatures.

Q: Comment: I would encourage involving industry in this process. We all want to "raise the bar" but reflectivity can be affected by many factors and legitimate products could be eliminated based on the CRRC data. We would like an opportunity to work together with you to "raise the bar" without eliminating viable products.[George Daisey]
A: We will be in touch. Although market segments may shift as the standards shift, it is our understanding that there will be a sufficient number of viable products available in 2014 to meet the standard.

Q: Did you run an energy model with leaving the reflectivity at the current state and in turn simply adding additional insulation (R-value) requirements as the trade off. Would adding insulation be more cost effective, and show higher energy savings, than changing membrane

color requirements?[Allen Sopko]
A: We did not look at this comparison. We only looked at whether the 0.70 reflectance standard would be cost effective and feasible.

Q: (First presentation) Can you say what experts in roofing were involved in the development process? Many of the issues covered here are highly technical and there seem to be big gaps in the program around the technology - buildings designed for specific roof types, cleaning and recoating costs, AC loading, other building envelope factors, affect on the workforce, durability, life cycle, and so on. Involvement of roofing experts from all disciplines could add tremendous value and save both the commission and the stakeholders a lot of wasted time and energy.[Reed Hitchcock]
A: We are looking to get that input from the industry through this process.

Q: Does that mean these are preliminary proposals or will they be rolled out at the public workshop?[Reed Hitchcock]
A: These are just proposals at this point, but they are likely to be rolled out at the public workshop unless we find evidence suggesting that the current proposal would not be appropriate to add to the Title 24 Standards.

Q: How does setting a mandatory minimum save energy over allowing trade-offs? It seems to me that all it does is ban the use of nearly 2/3s of all rated materials.[William Callahan]
A: The mandatory minimums saves energy because it is our impression that some efficiency features that are projected to make up the energy use through the trade-off approach may never actually be installed. The mandatory minimums should help building inspectors insure that key energy saving features are installed in a uniform way across all nonresidential buildings.

Q: can you say how these values compare to ASHRAE 2007 or 2010? [jared blum]
A: We have not made that comparison.