

**From:** [Aguirre, Mark A.](#)  
**To:** [Loveless, Berkeley;](#)  
**CC:**  
**Subject:** FW: Greenhouse Thermal Curtains and IR Film  
**Date:** Thursday, December 14, 2006 9:24:16 AM  
**Attachments:**

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**From:** Anderson, Richard R.  
**Sent:** Wednesday, December 13, 2006 7:36 AM  
**To:** Aguirre, Mark A.  
**Subject:** FW: Greenhouse Thermal Curtains and IR Film

[Mark, here is the formal approval of the green house heat curtains and IR film from Eric.](#)

Rick Anderson  
Senior Energy Programs Advisor  
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[rranderson@semprautilities.com](mailto:rranderson@semprautilities.com)

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**From:** Kirchhoff, Eric  
**Sent:** Friday, December 08, 2006 4:04 PM  
**To:** Anderson, Richard R.  
**Cc:** Decarlo, Tom  
**Subject:** FW: Greenhouse Thermal Curtains and IR Film

Rick,

[I went through my email too and cannot seem to find even the release of the revised workpaper that is referenced in this email. However, I have posted the revised workpaper on the server, and I would not put it there if I didn't accept it. I](#)

doubled checked and saw the only real significant flaw was corrected (an ambiguous table). I am including the email chain that leads up to the final release for your reference.

So, to complete the regulatory group's requirements:

**I Take No Exception** with the Greenhouse Thermal Curtains and IR Film (Version B) workpaper.

Sincerely,

**Eric Kirchhoff, PE**

*EE Engineering Supervisor*

*Customer Programs*

**Southern California Gas Company**

*a Sempra Energy Utility*

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**From:** Decarlo, Tom

**Sent:** Wednesday, September 20, 2006 12:17 PM

**To:** Kirchhoff, Eric; Rick Tidball

**Cc:** Shearer, Corine

**Subject:** RE: Greenhouse Thermal Curtains and IR Film

You do bring up some interesting points, however, the preponderance of Unit Heaters vs.. Boiler installs would dominate, and since our WPs are based on this, they are probably fairly accurate. If I red0 the WPs for any reason we will run 2 separate scenarios. Seems as though we will proceed with the wp as-is for now and take the exposure on the boiler GHC projects.

Thanks

Tom

-----Original Message-----

**From:** Kirchhoff, Eric

**Sent:** Wednesday, September 20, 2006 9:57 AM

**To:** Rick Tidball; Decarlo, Tom

**Cc:** Shearer, Corine

**Subject:** RE: Greenhouse Thermal Curtains and IR Film

I am okay with leaving the T&Cs as is. I would have liked my comment to have started a conversation whether or not it is a factor that should be considered. As I mentioned in the comments, my instinct tells me that the boiler is more efficient than a furnace unit heater and therefore one would initially think the furnace unit heater is the more conservative approach. Then again, maybe we are only modeling the furnace unit heater in eQUEST because it is well suited for it, and eQUEST's hot-water loop modeling for this application is not very good. To continue with evaluating the hot-water loop heating system, when you draw the system boundary around the target zone (four-feet above the ground around the plants?), it is possible the curtains have less impact on the boiler system. My thought is that when the hot water is circulated within the soil pots, this is very effective (much more than the furnace unit heaters), such that the air around the plants can be allowed to drop to a much lower temperature (such as 48F or maybe lower just so long as the air temperature does not adversely affect the plant). When lowering the temperature, the radiation effect goes down and subsequently the amount of savings associated with the curtains goes down.

Since there are not many of the hot-water loop installations, we could just accept that the furnace unit heater installations will subsidize hot-water loop installations. This is why I believe this is more a programmatic question. Although the technical discussion is interesting, the programmatic exposure is not so great.

Tom--I hope this helps you in making a decision.

Eric

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**From:** Rick Tidball [mailto:rtidball@eea-inc.com]  
**Sent:** Wednesday, September 20, 2006 9:23 AM  
**To:** Kirchhoff, Eric; Decarlo, Tom  
**Cc:** Shearer, Corine  
**Subject:** RE: Greenhouse Thermal Curtains and IR Film

Hi Eric – Thanks for your comments. I will address your comments and then issue a revised WP. I don't anticipate any changes to the numerical conclusions, but your comments will help clarify a few key points in the workpaper.

Hi Tom – I will need your input on one of Eric's comments. In the ES

under Terms and Conditions, Eric asks about excluding greenhouses from the rebate program that do not have unit heaters. The rationale is that the modeling work completed by Green Building Studio assumed that the greenhouse was heated with a unit heater, not a boiler. Do you want to make this exclusion or leave the rebate Terms and Conditions as presently written? My first reaction is to lean towards leaving the Terms and Conditions as is. If a greenhouse is heated with a boiler, then this greenhouse would still be eligible, even though we did not complete a modeling run using a boiler.

Rick

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**From:** Kirchhoff, Eric [mailto:EKirchhoff@semprautilities.com]  
**Sent:** Tuesday, September 19, 2006 4:43 PM  
**To:** Decarlo, Tom; Rick Tidball; Shearer, Corine  
**Subject:** RE: Greenhouse Thermal Curtains and IR Film

Here are my comments. Generally they are minor. I have one programmatic question affecting the Terms and Conditions section, and a more technical verification issue regarding the air gap of the double layer inflated PE roof.

Eric

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**From:** Decarlo, Tom  
**Sent:** Tuesday, August 22, 2006 3:12 PM  
**To:** Rick Tidball; Kirchhoff, Eric; Shearer, Corine  
**Subject:** FW: Greenhouse Thermal Curtains and IR Film

I approve of the attached GHC workpaper and supporting documentation.

Eric: If you have not done so already, please send your approval per the existing procedure. Ideally we get this in the next day or so, so we can post it Friday morning in advance of the webinar training.

Thanks

Tom

Corine: If we do not have the necessary approvals by COB Thursday we will still launch this.

Thanks

Tom

-----Original Message-----

**From:** Rick Tidball [mailto:rtidball@eea-inc.com]

**Sent:** Sunday, July 30, 2006 1:45 PM

**To:** Decarlo, Tom; Kirchhoff, Eric

**Subject:** Greenhouse Thermal Curtains and IR Film

Hi Tom and Eric,

Attached please find a revised Greenhouse Workpaper. In the attached document, I have included an analysis of both thermal curtains and IR film. For both measures, the energy savings are calculated based on hourly load modeling results completed with the eQUEST model. A quick summary of the results is as follows:

Measure	Energy Savings (therms / sq ft / yr)	
	Previous	Attached WP
Thermal Curtain	0.39	0.32
IR Film	0.06	0.17

For IR film, the previous energy savings value shown above (0.06) is the number that is shown in the SCG 2006 Workpapers file (55 page document that I received earlier this year from SCG – includes several energy efficiency programs). The 2004 analysis from Rocky Harmstead (received via Tom and Lisa-Ann on July 13) shows an energy savings that is double this value -- 0.12 therms / sq ft / yr. Regarding IR film, I have used a life of 3 years in the attached WP, compared to a life of 4 years, which is stated in the SCG 2006 WPs file.

For IR film, the calculated energy savings (0.17) seems high to me. However, I reviewed the eQUEST modeling set-up for IR film with Green Building Studio, and I don't see any obvious errors. The calculated savings using eQUEST (0.17) represent a savings of 25%. On a percentage basis, this level is consistent with a couple of other studies that I located that discuss expected savings from IR film.

Please let me know if you have any questions or comments concerning the attached WP. If it looks okay, please send me an e-mail with your approval.

There are 9 attachments that go along with the Greenhouse WP. Due to file size, I will send these attachments in two subsequent e-mails.

Regards,

Rick Tidball  
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