ENERGY SYSTEMS LABORATORY
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September 29th, 2009

Mr. Felix Lopez, P.E.
Senior Engineer
State Energy Conservation Office
Comptroller of Public Accounts
111 East 17th Street, Room 114
Austin, Texas 78701

Dear Felix:

In accordance with the Health and Safety Code Section 388.003, as amended, the Laboratory reviewed and considered the comments received and performed a technical analysis that compared the stringency of the Texas Building Energy Performance Standards, based on the 2000 International Energy Conservation Code with the 2001 Supplement (2000/2001 IECC), to the 2009 IECC and Chapter 11 of the 2009 IRC.

The Laboratory recommends that Texas, through the State Energy Conservation Office's (SECO) rulemaking process, adopt the 2009 IECC and the Chapter 11 of the 2009 IRC, as statewide energy codes. The state should immediately begin educating, training, and providing technical assistance for building professionals and enforcement officials to enable statewide compliance.

The Laboratory's analysis has determined that:

1. For residential construction with 15% or less window to floor ratio, the residential prescriptive provisions of the 2009 IECC and the Chapter 11 of the 2009 IRC are as stringent as the Texas Building Energy Performance Standards (TBEPS), which is based on the 2000/2001 IECC (see attached tables for details). The Laboratory's analysis of the 2009 IECC and the Chapter 11 of the 2009 IRC indicate a marginal improvement in overall residential energy efficiency of the 2009 IECC over the energy provisions of the 2009 IRC.

2. For all other residential structures, the residential performance provisions of the 2009 IECC are as stringent as the TBEPS based on the 2000/2001 IECC.

3. The commercial provisions of the 2009 IECC are as stringent as the TBEPS based on the 2000/2001 IECC.

The Laboratory recognizes that several major municipalities are in the process of adopting energy codes that are equal to the 2009 IECC and/or the energy provisions of the 2009 IRC Codes. Although builders, suppliers, and manufacturers will be required to meet the newly adopted codes, and will need to retrain their employees and restock their supplies to meet the new requirements of the more stringent code, implementation of improved codes should be effected as soon as possible in order to maximize desired emissions reductions. An increased number of raters, inspectors and code officials will also be required to handle the increased demand. The Laboratory recognizes the challenge of these efforts and is ready to

assist SECO. The Laboratory is also in the process of updating the International Code Compliance Calculator (IC3) to facilitate compliance with the new residential provisions of the 2009 IECC.

Notwithstanding the comparisons in overall energy efficiency, the Laboratory observes the potentially greater reduction in peak demand associated with the 0.30 SHGC limitations found in the 2009 IECC. This, in addition to the corresponding emissions reduction resulting from the peak demand savings, provides enhanced benefits over a higher SHGC in compliance with the goals of the Texas Building Energy Performance Standards in the Health & Safety Code Section 388. 001.

The Laboratory recommends compliance with the 2009 IECC or the Chapter 11 of the 2009 IRC when using the prescriptive path for residential evaluation of residences with 15% or less window to floor ratio, since both are more stringent than the current TBEPS. The Laboratory also recommends using the 2009 IECC when using the performance path for all other residential evaluations.

These new codes will further Texas' Emission Reduction Plan (TERP) goals in improving air quality. Furthermore, adoption of the 2009 IECC is a requirement for securing American Recovery and Reinvestment Act (ARRA) Federal funding for Texas.

Sincerely,

Bahman Yazdani, P.E. Associate Director	Charles Culp, P.E., Ph.D. Associate Director	Jeff Haberl, P.E., Ph.D. Associate Director

cc: David Claridge, P.E., Ph.D., Director – ESL

Table 1: 2000/2001 IECC Performance Path vs. 2009 IECC Performance Path

County	IECC 2009 Weather Zones	Energy Type**	Total Annual Savings of the IECC 2009 Performance Path compared to the IECC 2000/2001 (%)*	
			Gas Heating, DHW	Heat Pump Heating, Electric DHW
Houston (HAR)	2A	Site	10.9 %	10.9 %
		Source	11.9 %	10.9 %
Brownsville (CAM)	2B	Site	16.4 %	13.6 %
		Source	15.1 %	13.6 %
Dallas (TAR)	3A	Site	12.8 %	10.8 %
		Source	12.3 %	10.8 %
El Paso (ELP)	3B	Site	10.2 %	10.0 %
		Source	11.2 %	10.0 %
Amarillo (ARM)	4B	Site	16.0 %	14.6 %
		Source	16.7 %	14.6 %

**Base-case Simulation Assumptions:* Analysis used single-family house, 2,500 ft^2, single story, four bedrooms, slab-on-grade, ducts in the unconditioned, ventilated attic, window-to-floor ratio: 18% for 2000/2001, 15% for 2009, windows equally distributed (N,E,S,W), and no exterior shading. HVAC Distribution efficiency: 0.8 for 2000/2001, 0.88 for 2009. All other roof, wall and window parameters as per 2000/2001 and 2009 IECC for county shown (IC3 ver. 3.03.02).
***Source Energy Consumption*: A factor of 3.16 was used to calculate the source electricity consumption. A factor of 1.1 was used to calculate source gas energy consumption.

Table 2: 2000/2001 IECC Performance Path vs. 2009 IECC Prescriptive Path

County	IECC 2009 Weather Zones	Energy Type**	Total Annual Savings of the IECC 2009 Prescriptive Path compared to the IECC 2000/2001 (%)*	
			Gas Heating, DHW	Heat Pump Heating, Electric DHW
Houston (HAR)	2A	Site	7.8 %	8.7 %
		Source	9.1 %	8.7 %
Brownsville (CAM)	2B	Site	14.3 %	11.6 %
		Source	13.0 %	11.6 %
Dallas (TAR)	3A	Site	9.6 %	8.6 %
		Source	9.6 %	8.6 %
El Paso (ELP)	3B	Site	7.0 %	8.3 %
		Source	8.9 %	8.3 %
Amarillo (ARM)	4B	Site	10.7 %	11.9 %
		Source	13.1 %	11.9 %

**Base-case Simulation Assumptions:* Analysis used single-family house, 2,500 ft^2, single story, four bedrooms, slab-on-grade, ducts in the unconditioned, ventilated attic, window-to-floor ratio: 18% for 2000/2001, 15% for 2009, windows equally distributed (N,E,S,W), and no exterior shading. HVAC Distribution efficiency: 0.8 for 2000/2001; for 2009 IECC, HVAC distribution efficiency simulated using R8 insulation for supply, R6 for return ducts and total duct leakage of 11% to outdoor. All other roof, wall and window parameters as per 2000/2001 and 2009 IECC for county shown (IC3 ver. 3.03.02).
***Source Energy Consumption*: A factor of 3.16 was used to calculate the source electricity consumption. A factor of 1.1 was used to calculate source gas energy consumption.

Table 3: 2000/2001 IECC Performance Path vs. Chapter 11 of the 2009 IRC Prescriptive Path

County	IECC 2009 Weather Zones	Energy Type**	Total Annual Savings of the IRC 2009 compared to the IECC 2000/2001 (%)*	
			Gas Heating, DHW	Heat Pump Heating, Electric DHW
Houston (HAR)	2A	Site	7.7 %	7.7 %
		Source	8.3 %	7.7 %
Brownsville (CAM)	2B	Site	13.7 %	10.4 %
		Source	11.8 %	10.4 %
Dallas (TAR)	3A	Site	9.9 %	7.8 %
		Source	9.0 %	7.8 %
El Paso (ELP)	3B	Site	7.1 %	7.1 %
		Source	7.9 %	7.1 %
Amarillo (ARM)	4B	Site	10.7 %	11.9 %
		Source	13.1 %	11.9 %

**Base-case Simulation Assumptions:* Analysis used single-family house, 2,500 ft^2, single story, four bedrooms, slab-on-grade, ducts in the unconditioned, ventilated attic, window-to-floor ratio: 18% for 2000/2001, 15% for 2009 IRC, windows equally distributed (N,E,S,W), and no exterior shading. HVAC Distribution efficiency: 0.8 for 2000/2001; for 2009 IRC, HVAC distribution efficiency simulated using R8 insulation for supply, R6 for return ducts and total duct leakage of 11% to outdoor. All other roof, wall and window parameters as per 2000/2001 and 2009 IRC for county shown (IC3 ver. 3.03.02).

***Source Energy Consumption*: A factor of 3.16 was used to calculate the source electricity consumption. A factor of 1.1 was used to calculate source gas energy consumption.