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Carrier
A United Technologies Company

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Mr. Joseph Cassmassi
Planning, Rule Development and Area Sources
SCAQMD
21865 Copley Drive
Diamond Bar, CA 91765
(909) 396-3155

RE: Comments on Draft 2007 Air Quality Management Plan

Dear Mr. Cassmassi:

Carrier Corporation is pleased to submit these comments on the draft 2007 Air Quality Management Plan (AQMP).

Carrier is the world's largest manufacturer of forced-air gas furnaces, with shipments into the State of California under the Carrier, Bryant, Payne, Hell, Tempstar, Comfortmaker, Kenmore and Arcoaire brand names. These brands combined comprise the largest share of the residential furnace market in southern California.

Proposed 14 ng/j Requirement

The proposed reduction of residential gas furnace NOx emissions from the current 40 ng/j to 14 ng/j by the 2010 implementation period requires the unprecedented development of unproven technologies for indoor furnaces in an unreasonable timeframe.

We disagree with the AQMP assumption that the same low NOx burner technology being applied to water heaters and boilers (i.e., premixed combustion) can be as easily applied to a residential forced-air gas furnace. Carrier and our research partner, the United Technologies Research Center, have pursued NOx reduction technologies over the past two decades, resulting in the granting of 15 U.S. patents during that time.

These concepts, of varying complexity, were capable of achieving NOx levels ranging from 35 ng/j to 5 ng/j, and include enhanced flame radiators, catalytic cleanup, premixed combustion, and partial catalytic oxidation of the fuel. Other than enhanced flame radiators, which achieved 35 ng/j, none of the other technologies are suited for high volume production at this time.

The technologies are very complex and inherently unreliable for the residential forced-air space heating market:

- Sulfur contaminants can attack the catalyst and quickly degrade performance.
- Honeycomb shapes holding catalytic materials in the flue gas stream are easily fouled by paint and dust prevalent in new construction installations.
- Powered premixed burners, as would be required for the typical serpentine heat exchanger, are not fail-safe in a forced-air furnace due to positive flue gas pressure. For safety reasons, we always operate the combustion system at a negative pressure to avoid a possible flue gas leak to the circulating air stream in the event of a heat exchanger failure. This is inherently different than a boiler or water heater, where a heat exchanger failure would not leak flue gas into the home, but rather, create a water leak that is immediately apparent to the homeowner.

As a result of these significant problems and our extensive research, we do not believe that any technology capable of achieving <25 ng/j in the laboratory can be fully developed and qualified for high volume production by 2010.

Furnaces Are A Very Minor Source

While we recognize that the District must examine all NOx control measures, we respectfully point out that residential gas furnaces are estimated to represent only 1% of NOx emissions in the South Coast District. The 14 ng/j requirement would yield just over a 0.5% improvement in emissions, yet likely require a complete product redesign and factory re-tooling for the entire furnace industry for technology that is unproven. This emissions improvement, however small, would only be achieved if furnaces are in operation – not an inconsequential point when the intense non-attainment season is during the summer months when furnaces are off.

Electric Heat Pumps

We note with concern that the SCAQMD considers electric heat pumps as a NOx control strategy. While it is true that an electric heat pump will emit less NOx at the site (i.e. residence), it is not true that they emit less NOx when considering the source of the electricity. Our analysis of the source of electric power generation for the South Coast area shows an electric heat pump may actually increase NOx emissions to the atmosphere.

A Path Forward

Notwithstanding the fact that any change to the 40 ng/j requirement will yield only minimal results in overall air quality attainment, Carrier supports the Gas Appliance Manufacturers Association recommendation to conduct a joint feasibility project with the SCAQMD and other interested stakeholders to evaluate the feasibility of achieving anything below 40 ng/j in high volume residential furnace production. We request that this joint feasibility study be included in the 2007 AQMP and that the 14 ng/j requirement be postponed pending the outcome of this study.

Thank you for considering our comments.

Sincerely,

John M. Mandyck
Vice President
Government & International Relations