1F04: IMPROVED UNDERSTANDING OF THERMAL AGENT FIRE SUPPRESSION MECHANISMS FROM DETAILED KINETIC MODELING WITH IDEALIZED SURROGATE AGENTS.

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Focusing and isolating the dilution and thermal effects with regards to flame extinction is clearly meaningful, and consistent with our previous studies [1.2] dealing with the extinction of partially premixed flames using CO_2 dilution in the air and fuel streams. As discussed in our studies, the relative effectiveness of air stream dilution and fuel stream dilution can be explained by considering the dilution and thermal effects. It will be useful to discuss your results or conclusions in the context of these studies.

References:

[1] A.J. Lock, A.M. Briones, S.K. Aggarwal, I.K. Puri, U. Hegde, *Combust Flame* 149 (2007) 340–352.
[2] A.J. Lock, S.K. Aggarwal, I.K. Puri, U. Hegde, *Fire Safety Journal* 43 (2008) 24–35.

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The two references cited describe extensive experimental and computational studies of partially-premixed and non premixed methane flames inhibited by carbon dioxide added to either the air or fuel sides. The findings provide an improved understanding of inhibition of these types of flames and complement and extend an extensive literature dealing with the effects of thermal agents on diffusion and premixed flames. The present investigation also builds on these earlier studies and is intended to provide an enhanced understanding of the effects of thermal agents on diffusion flames. Unfortunately, due to space limitations, it has only been possible to cite and discuss in detail the most relevant archival studies. As a result, only a small fraction of the large number of studies dealing with flame inhibition and extinguishment of diffusion flames by thermal agents are referenced. Many more of these earlier investigations are discussed in the NIST internal report ([2] in the paper) from which the current work was extracted. This report was completed prior to the publication of the two papers cited by Professor Aggarwal.