

## AUTHOR'S RESPONSE

I thank Prof. Drysdale for his lucid and interesting comments re my letter to this journal [1] in which I question the use of the term 'spontaneous ignition' in a paper which had appeared in the same journal the previous year. I offer the following thoughts, for the benefit of readers, by way of response.

I am not, at this stage, able to accept that what Prof. Drysdale refers to as 'radiation induced spontaneous ignition of solids' involves the same processes which occur in spontaneous ignition in the conventional sense of such things as coals and cellulose. This is because in ignition of coals and cellulose in bulk the heat production and any consequent thermal imbalance are due solely to reaction between the substance and atmospheric oxygen without there being any heat transfer from the surroundings. There will of course be heat transfer to the surroundings, and the interplay of this with the rate of heat release is what determines the subsequent combustion phenomenology: steady, slow burning or ignition. In 'radiation induced spontaneous ignition of solids' ignition could not occur without supply of heat, as radiation, from the surroundings. In what sense then is such ignition 'spontaneous'? And is there not more similarity between this and piloted ignition than between this and ignition of a bulk solid attributable entirely to its own heat release by chemical reaction? There has been much debate about the extent to which low-temperature volatiles are involved in the spontaneous heating of solids in bulk. However at least for one solid very rich in volatiles – briquetted

peat – it has been shown that combustion of the solid *per se* is what 'drives' the behaviour at incipient ignition [2]. There can be little if any basis for comparison between this and the vapour-phase processes invoked in Prof. Drysdale's description of the behaviour of a surface receiving heat by radiation.

I therefore have reservations about coining the term 'radiation induced spontaneous ignition of solids'. In any case, are not 'induced' and 'spontaneous' conceivably contradictory?

## REFERENCES

1. J.C. Jones, "Commentary on performance criteria for fire safety in enclosures", International Journal on Engineering Performance-Based Fire Codes, Vol. 3, No. 3, pp. 130-131 (2001).
2. J.C. Jones, P.S. Chiz, R. Koh and J. Matthew, "Continuity of kinetics between sub- and supercritical regimes in the oxidation of a high-volatile solid substrate", Fuel, Vol. 75, Issue 15, pp. 1733-1736 (1996).

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