



## **New lightning phenomena and protection issues**

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Although the subject and study of lightning is now centuries old it is nevertheless still of key importance to those associated with high hazard industries because of the threat to personnel, commercial interests and the environment. Despite this long period of study, the topic is still subject to gaps in our knowledge and to new developments. Both issues impact on our evolving approaches to safety. The present authors are concerned with the protection of high hazard explosive facilities and as such have been involved in developing advanced protection techniques to ensure their safety against the lightning threat as these new issues arise. This paper covers three examples of developments in this general area. The analysis methodology for characterising and assessing the consequence of lightning induced explosions at conducting discontinuities. The electromagnetic response modelling techniques currently being applied to typical facility structures housing hazardous material. Finally, the potentially hazardous and new phenomena associated with induced charge resulting from thunderstorm activity but in the absence of lightning strike itself. The latter appears to represent a new area for study and the authors are currently actively engaged in this together with colleagues at a number of establishments both in the UK and US. This phenomenon appears to be characterised by very large transient currents having occurrence frequencies far exceeding national strike rate data. Currently we have found no evidence to suggest that our measurement techniques are in error. It remains our view that there may still be additional thunderstorm related hazards, which we do not thoroughly understand but which need our attention if we are to ensure the highest standards of safety.