

## FOREWORD

The Symposium on the Heavy Gas Dispersion Trials at Thorney Island represented the coming to fruition of a major research project that is not only of great technical importance but also a pioneering one in the way it was funded. The origins of the work lie in the disastrous explosion at the chemical works at Flixborough on 1 June 1974 in which a large cloud of flammable gas was released from a ruptured vessel. The explosion precipitated public concern that installations with the potential to present major risks to public safety and health should be identified, the extent of the hazard assessed and appropriate controls applied.

In the case of substantial releases of toxic and flammable gases, the assessment of the hazard must be based on a knowledge of the behaviour of the gas clouds released, and it was quickly realised that there was a lack of basic data on the dispersion of large gas clouds. The Health and Safety Commission's Advisory Committee on Major Hazards (ACMH) therefore asked the Health and Safety Executive to set up experiments to remedy this lack of knowledge. In making its recommendation for research in this area, the ACMH appreciated that the research would be expensive and difficult to conduct.

Loss of containment accidents can take many forms, and consequently, no single programme of research could hope to simulate all the variables that might influence the consequences of such accidents. HSE identified the experiments that were most urgently needed and were considered feasible, and the proposal for heavy gas dispersion trials at Thorney Island was the eventual result of these considerations. But first it was necessary to conduct small-scale experiments in order to establish the experimental design on a sound footing. These experiments were carried out in the field by the Chemical Defence Establishment and in the laboratory by the Warren Spring Laboratory. They were financed from the Executive's own resources. A different approach to the funding of the large-scale trials was necessary. Firstly, the estimated cost was higher than could be undertaken by the Executive on its own. Secondly, having shown that the experimental design was feasible, it was judged that the large-scale programme would commend itself to other organisations with a like interest in the acquisition of sound data. The considerable support given to the Thorney Island trials has not only vindicated this judgement but given considerable encouragement and impetus to the conduct of the programme. It has fostered a spirit of cooperation amongst organisations across 10 countries working in the field of gas dispersion. This spirit will outlive the project itself and HSE is proud to have been its progenitor. The 38 organisations who joined in the project with HSE were as follows:

American Petroleum Institute  
Amoco

Arabian American Oil Co, Saudi Arabia  
 Atkins Research and Development  
 Atmospheric Environment Service, Canada  
 Battelle Institute, Federal Republic of Germany  
 British Gas Corporation  
 British Nuclear Fuels Ltd.  
 British Petroleum  
 Britoil plc  
 Central Electricity Generating Board  
 Comitato Nazionale per l'Energie Nucleare, Italy  
 Commissariat à l'Energie Atomique, France  
 Commission of the European Communities  
 Department of Energy, U.K.  
 Department of Trade, U.K.  
 Det norske Veritas  
 DSM, The Netherlands  
 E.I. Dupont de Nemours and Co, U.S.A.  
 Electricité de France  
 Esso, U.K.  
 Gas Research Institute, U.S.A.  
 Gaz de France  
 Government of Sweden (Principal Dept's National Defence Research Institute, Fire Research Board, Civil Defence Administration)  
 ICI plc  
 Institute for Air Research, Norway  
 Insurance Technical Bureau  
 Ministry of Public Health and Environmental Hygiene, The Netherlands  
 Mobil  
 National Maritime Institute (now NMI Ltd.)  
 Safety and Reliability Directorate, UKAEA  
 Shell U.K.  
 Texaco  
 TNO, The Netherlands  
 Total, Cie Française des Pétroles  
 TransCanada Pipelines  
 Union des Industries Chimiques, France  
 US Coast Guard

The programme would not have been possible without the cooperation of these organisations in providing both finance and a considerable technical input during the planning of the trials. The project was successfully executed by the staffs of NMI Ltd. and the Safety Engineering Laboratory of HSE's Research and Laboratory Services Division.

In organising this Symposium to present publicly for the first time the result of the endeavour, it is hoped to generate interest from those who were not directly involved in the funding or the conduct of the trials and to build

upon the cooperative spirit. This will continue to be a necessary and valuable stimulus in the considerable task of data analysis which will be necessary if the full benefits are to be achieved.

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