

**Atmospheric Dispersion Modelling
Liaison Committee**

Annual Report 2005/2006

INCLUDING

**Review of atmospheric dispersion in complex
terrain**

PREFACE

In 1977 a meeting of representatives of government departments, utilities and research organisations was held to discuss methods of calculation of atmospheric dispersion for radioactive releases. Those present agreed on the need for a review of recent developments in atmospheric dispersion modelling, and a Working Group was formed. Those present at the meeting formed an informal Steering Committee, that subsequently became the UK Atmospheric Dispersion Modelling Liaison Committee. That Committee operated for a number of years. Members of the Working Group worked voluntarily and produced a series of reports. A workshop on dispersion at low wind speeds was also held, but its proceedings were never published.

The Committee has been reorganised and has adopted terms of reference. The organisations represented on the Committee, and the terms of reference adopted, are given in this report. The organisations represented on the Committee pay a small annual subscription. The money thus raised is used to fund reviews on topics agreed by the Committee, and to support in part its secretariat, provided by Health Protection Agency (HPA). The new arrangements came into place for the start of the 1995/96 financial year. This report describes the eleventh year in which the Committee has operated under the new arrangements, and during which it placed one contract. This covered a review of atmospheric dispersion in complex terrain. The technical specification for the contract is given in this report, and the contract report is attached as an annex to this report. The Committee funded 24 studies in previous years; they are described in its earlier annual reports.

The Committee intends to place further contracts in future years and would like to hear from those interested in tendering for such contracts. They should contact the Secretary:

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1 ORGANISATIONS REPRESENTED ON THE COMMITTEE

The organisations on the committee during the year covered by this report were:

GE Healthcare

Atomic Weapons Establishment, Aldermaston

Defence Science and Technology Laboratory

Department for Environment Food and Rural Affairs (DEFRA)

Environment and Heritage Service, Northern Ireland

Environment Agency

Food Standards Agency

Health and Safety Executive

Methodology and Standards Development Unit, Hazardous Installations Directorate

Nuclear Installations Inspectorate

Health Protection Agency

Home Office

Meteorological Office

National Nuclear Corporation

Nuclear Department, HMS Sultan

Scottish Environment Protection Agency

Shell Global Solutions

Westlakes Research Institute

The Chairman and Secretary are provided by the radiation protection division of the HPA.

2 TERMS OF REFERENCE

The terms of reference of the committee are:

Areas of technical interest

1. ADMLC's main aim is to review current understanding of atmospheric dispersion and related phenomena for application primarily in authorisation or licensing of discharges to atmosphere resulting from industrial, commercial or institutional sites. ADMLC is primarily concerned with dispersion from a particular regulated site or from discrete sources, and will not normally consider work in the following areas: traffic pollution, acid rain and ozone.
2. ADMLC is concerned both with releases under controlled conditions occurring at a constant rate over long periods, and with releases over shorter periods such as accidents or controlled situations where the release rate varies.
3. ADMLC is concerned with modelling dispersion at all scales, including on-site and within buildings.

Organisations and outputs

4. The Committee shall consist of representatives of Government Departments, Government Agencies and organisations with an interest in modelling dispersion of material for the situations identified above. Each organisation represented on the Committee shall pay an annual membership fee.
5. ADMLC believes that it can be most effective by limiting its membership to about 25 organisations. New organisations will only be admitted to membership of ADMLC if the majority of existing members agree to their membership.
6. ADMLC aims to review, collate, interpret and encourage research into applied dispersion modelling problems. It does not endorse particular brands or suppliers of commercial models. However, it is concerned to ensure that users for industrial applications are aware of what is available, how it can be applied to particular problems and of the uncertainties in the results.
7. The Committee will commission work on selected topics. These should be selected following discussion and provisional agreement at meetings of the Committee, followed by confirmation after the meeting. It will produce reports describing current knowledge on the topics. These may be reports from contractors chosen by the committee or may be based on the outcome of conferences or workshops organised on behalf of the committee. The money raised from membership fees will be used to fund contractors, organise workshops and report on their outcome, and any other matters which the Committee may decide.

3 WORK FUNDED DURING THE YEAR

3.1 Review of atmospheric dispersion in complex terrain

The Atmospheric Dispersion Modelling Liaison Committee is interested in reviewing methods of modelling dispersion in the types of complex terrain found in the vicinity of nuclear and other industrial sites in the UK. Although many UK nuclear sites are located in coastal regions this work is concerned primarily with orographic effects rather than coastal effects. However, the case where coastal and orographic effects combine to influence concentrations measured at a receptor is relevant.

The review should give general guidance on the types of terrain for which the standard Gaussian plume model could be applied, and comment on the likely effect of complex terrain on predicted air concentrations.

The review should identify a number of models, and comment on the types of terrain for which each model is appropriate and the extent to which the model is based on experimental data or generally accepted theoretical assumptions. The review should comment briefly on the extent to which predicted annual average and short term peak concentrations would change if calculated using a complex terrain model rather than a standard Gaussian plume model. The review should also comment on ways in which modelling of dispersion in complex terrain could be improved.

The review should comment on the quality of meteorological information needed for such studies, including the calculation of concentration on flat terrain with complex terrain in the vicinity.

The review should comment in particular on the model incorporated in ADMS.

The report on this work is published as [ADMLC/2005/1](#).