# Atmospheric Dispersion Modelling

# Liaison Committee Report: ADMLC-R9

## June 2016

**INCLUDING**

## Presenting Uncertain Information in Radiological Emergencies

© Chairman of ADMLC
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# 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 an 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 Public Health England (PHE). The new arrangements came into place for the start of the 1995/96 financial year. This report describes the most recent activities of the Committee. These included a review of techniques for presenting uncertain information in radiological emergencies. The technical specification for the contract is given in this report, and a link to the contract report can be found on the ADMLC website. Previous studies funded by the Committee are described in its earlier 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 secretariat:

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# 1 ORGANISATIONS REPRESENTED ON THE COMMITTEE

The organisations on the committee at the time of publication of this report are:

Atomic Weapons Establishment, Aldermaston

Defence Science and Technology Laboratory (Dstl)

Department for Environment Food and Rural Affairs (DEFRA)

Department of Energy and Climate Change (DECC)

Environment Agency for England (EA)

Environmental Protection Agency for Ireland (EPA)

Food Standards Agency (FSA)

Health and Safety Executive (HSE)

Health and Safety Laboratory (HSL)

Home Office

MetOffice

Public Health England (PHE)

Scottish Environment Protection Agency (SEPA)

The present Chairman is Dr Matthew Hort of the MetOffice and the Secretariat is provided by PHE.

# 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 Presenting Uncertain Information in Radiological Emergencies

ADMLC wish to commission research to clarify and develop principles in presenting uncertain information to decision makers in an emergency context. The main focus of this work is radiological emergencies.

The unplanned radiological releases from the Fukushima nuclear power plant, in the aftermath of the Japanese earthquake and tsunami of 11 March 2011, led in the UK to the further development of tools for predicting dispersion and deposition of radionuclides, and projected doses resulting from the environmental contamination; the development of a dose assessment tool-kit for generic UK nuclear emergency response is continuing. The output from such a tool-kit is used to present information to technical experts and also to those with less scientific background but who have roles in decision-making for health protection. The presentation of the uncertainty associated with such information is key to its use as a basis for appropriate decisions.

Public Health England (PHE), which is represented on ADMLC, has a strong interest in such research, having already published on the presentation of uncertainty in radiological emergency response, and PHE would wish to work in collaboration with the accepted research programme. The details of this collaboration would be discussed with short-listed proposers; collaborative proposals from more than one researching group are welcome.

Both the start date and the duration of the proposed work are flexible and will be discussed with short-listed proposers. It is possible that the research could form part of a higher degree programme.

Summary of required research and outputs

- A summarised review of published literature on techniques for presenting uncertain information to decision makers in emergency response situations. ADMLC are aware that work on the presentation of uncertainties has been undertaken in contexts other than in radiation emergencies, and a summary of this is part of the required work, together with a summary of how key industries represent the uncertainty associated with assessment predictions in the presentation of information to decision makers. A review of how Meteorological Offices internationally use different presentational techniques to present uncertainty in weather predictions would be an additional useful source of information for review.

- Consideration of the sources of uncertainty in emergency response assessments of releases to atmosphere, and the influence of these on the information presented to decision makers. ADMLC have a specific interest in weather related aspects of uncertainty, but other contributors to uncertainty (for example release height and particle size) are also relevant. The scope includes both intermediate model results (for example, the predicted location of the atmospheric plume, the expected levels of concentrations in air and ground deposition) and the results relating to health protection decisions (such as radiation doses to humans, predicted extents of countermeasure areas). PHE is willing to work with the successful contractor on this aspect, bringing in elements of work already undertaken and published.

- How the needs of decision makers would be best met by alternative methods of data presentation. It is envisaged that this would be best done through the development of a particular scenario(s), using assessment tools for predicting the consequences of a radiological release. Again, PHE would be willing to work with the successful contractor in formulating the scenario and in developing consequence estimates. The proposal should give some indication of how the planned work would consider these alternative methods.

- As a result of the above steps, a summary of the key principles and best practice of such communication, with the emphasis on the presentation of scientific material to non-specialist audiences including decision makers with a need to make urgent decisions. The work should be presented to ADMLC in the form of a contract report and presentation. However, joint publication post-contract of a peer-reviewed paper with PHE would also be encouraged.