APPENDIX 5c

JOINT EXPERT GROUP MEETING ON DYNAMIC MODELLING

Summary report on the sixth meeting prepared by the organisers

I. INTRODUCTION

1. The sixth meeting of the Joint Expert Group on Dynamic Modelling took place on 28 October 2005 in Brighton (United Kingdom). It was organised by the Centre for Ecology and Hydrology (United Kingdom), and by the Swedish programme on International and National Abatement Strategies for Transboundary Air Pollution (ASTA programme).

2. The meeting was attended by experts from the following Parties to the Convention: Canada, United Kingdom, Norway, Denmark, Sweden, Netherlands, Switzerland, United States, Czech Republic, Finland, Germany and Austria. The International Cooperative Programmes (ICPs) on Integrated Monitoring (ICP IM), Modelling and Mapping (ICP M&M), Forests (ICP Forests) and Waters (ICP Waters), as well as the Coordination Center for Effects (CCE at the Netherlands Environmental Assessment Agency, Bilthoven, Netherlands) were represented. The secretariat of the Working Group on Effects was also represented.

3. The meeting was co-chaired by Mr Chris Evans (United Kingdom) and Mr Filip Moldan (Sweden).

II. AIMS AND ORGANIZATION OF THE MEETING

4. The objectives of the Joint Expert Group meeting were to:

   (a) Review the outcome of the 2004 call for dynamic modelling outputs
   (b) Consider the potential for using dynamic model outputs within the forthcoming review of the Gothenburg Protocol
   (c) Assess progress on linking dynamic biogeochemical models with models of biological damage and recovery
   (d) Consider the potential for model applications incorporating both climate change and emissions reduction scenarios
   (e) Review the outcomes of the Nitrogen Workshop
   (f) Discuss the Work Plan for 2006 and 2007.

III. CONCLUSIONS AND RECOMMENDATIONS

5. The Joint Expert Group agreed on 20 conclusions and recommendations:

6. The JEG strongly recommends that dynamic modelling outputs should be employed in the review of the Gothenburg protocol. This should include a) the use of Target Load Functions as a complement to Critical Load Functions for Acidity in Integrated

Assessment Modelling, where dynamic models have been applied, and b) use of dynamic models for scenario assessment.

7. There is a continuing need to communicate the potential application and importance of dynamic models in support of the Review. A joint JEG-CCE summary document which illustrates the effect of using dynamic Target Load Functions in place of Critical Load Functions is in preparation.

8. The outcome of the 2004 call for dynamic modelling outputs represents a major breakthrough in assessing the effects of future air pollution. The JEG congratulated the CCE on its summary of the results of the 2004 call, presented at the meeting. The joint effort of the CCE and NFCs has produced new insights into the predicted time-scales and extent of recovery from acidification. The JEG also applauded the CCE for their report summarising the outcome of the call.

9. The JEG was pleased to note that the call for data issued in 2004 generated a response from 14 countries, providing increased coverage of Europe and therefore increased strength of the results of modelling assessment. The JEG also pointed out that the response and the outcome of the call exceeded hopes expressed at the previous JEG meeting in 2004.

10. As hypothesised, the European map of target loads of acidity differs significantly from the map of critical loads. The target load map suggests that in many regions, deposition reductions considerably below critical loads will be required to achieve ecosystem recovery within the next 25 to 100 years. In some areas, recovery may not be possible on this timescale regardless of non-exceedance of critical loads. The JEG noted these differences and felt that the target loads map provides a more realistic and also a more politically relevant picture of the ecosystem response.

11. The JEG pointed out that once a dynamic model has been calibrated to multiple sites within a country, it is relatively easy to test different deposition scenarios. Fourteen European countries are now in position to perform such scenario analysis beyond the two deposition scenarios defined in the 2004 call.

12. The JEG noted that additional work has been completed in several countries since the CCE data submission deadline in March 2005. Those countries were encouraged to contact CCE to discuss whether there still is a possibility to accommodate these new results.

13. The JEG felt that maps in which Target Loads replaced Critical Loads in 'modelled' squares provided the best current means of representing deposition targets at the European scale. The Target Load Functions associated with these squares could be incorporated in Integrated Assessment Models using identical methodology to that currently used for Critical Load Functions.

14. The JEG concluded that separate presentations of dynamic modelling results for surface waters and for soils provided a more balanced and complete picture of the effects of future air pollution.

15. The JEG noted that progress has been made on developing and testing biological response models for surface waters, and urges that this work continue.

16. The JEG took note of work being conducted on the interactions of global change and deposition of sulphur and nitrogen compounds on ecosystems. Progress in dynamic modelling of these interactions has been made within the EU project Eurolimpacs and other national and international research projects. There is clear potential for global change to affect the recovery of ecosystems to reduced emissions of pollutants, and that TLF could thus be altered.

17. The JEG concludes that the dynamic modelling calibrations produced in response to the 2004 call for data provide a basis for running climate change scenarios in conjunction with emission scenarios, and thereby provide a means to assess the effect of climate change on damage and recovery of ecosystems.

18. The JEG urged all ICPs to continue monitoring aquatic and terrestrial ecosystems to document the response to changing levels of S and N deposition. These data are of crucial importance in the evaluation, testing and development of dynamic models.

19. The JEG noted that much of the dynamic model development and testing is being conducted under the auspices of national and international research projects, and urged the parties to the Convention to continue and expand the support of such research.

20. The JEG endorsed the conclusions of the N workshop, which are reported separately. Although many issues remain to be resolved, the group felt that considerable progress has now been made on the dynamic modelling of N as a nutrient in terrestrial ecosystems.

21. The JEG noted that management has a major influence on the impact of N deposition on terrestrial ecosystems, and must be considered in models of N as a nutrient. However, management is highly heterogeneous across countries and habitats, and the JEG did not consider that a harmonised assessment of different management scenarios between countries was appropriate.

22. The JEG observed that there is now increasing evidence, from North America, the UK and Norway, that N can have a significant eutrophying effect in some oligotrophic surface waters. It is therefore recommended that in future, the impact of N as a nutrient should be considered in dynamic model (and critical load) assessments for surface waters.

23. The JEG noted the request of the WGE that the 2006 workplan should include summary reports in support of effects based approaches, dose-response functions and stock at risk, and links between field observations and critical loads. The JEG considered this to be feasible but stressed that its primary role should be to review and assess the output of the ICPs, rather than to generate new data or reports. The JEG, however, could also provide some additional guidance with regard to effects of nitrogen and acidity based on work undertaken outside the ICPs, particularly relating to the background documents for the nitrogen workshop.

24. Future work requirements identified include:

    a. Expansion and revision of existing dynamic model and target load coverage for acidity in Europe.
    b. Further development and review of progress on dynamic modelling of N as a nutrient, and the development of target loads for nutrient N.
    c. Predictions of biological recovery in surface waters using empirical chemical-biological relationships, initially on a site basis
    d. Further development of dynamic models that take into account the confounding effects of climate change.

25. Members of the JEG felt that a further meeting would be beneficial towards the end of 2006, to review progress on these issues in anticipation of a future call for data.