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**EXECUTIVE BODY FOR THE CONVENTION ON
LONG-RANGE TRANSBOUNDARY AIR POLLUTION**

Steering Body to the Cooperative Programme for Monitoring and Evaluation
of the Long-range Transmission of Air Pollutants in Europe (EMEP)
(Twenty-fifth session, Geneva, 3-5 September 2001)

Item 4 of the provisional agenda

DRAFT WORK PLAN FOR 2002 AND PROPOSED PRIORITIES UP TO 2004 ^{*/}

Note by the secretariat

1. This note presents, as a basis for discussion, a proposal for:
 - (a) Longer-term work programme up to the year 2004; and
 - (b) The EMEP work-plan for 2002.

It is based on discussions by the task forces, proposals by the centres and discussion by the EMEP Bureau.

I. PRIORITIES UP TO 2004

2. At its eighteenth session the Executive Body acknowledged the benefits of a more advanced, longer-term planning of the activities of its subsidiary bodies and invited the Steering Body of EMEP and the Working Group on Effects to prepare their medium-term programmes for the period 2001-2004 for review of the protocols and to submit them to it for consideration at its nineteenth session (ECE/EB.AIR.71, para. 80). At its twenty-fourth session the Steering Body

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^{*/} This document has not been formally edited.

adopted a tentative timetable for work necessary for the review of the 1999 Gothenburg Protocol (EB.AIR/GE.1/2000/2, annex). The Executive Body had welcomed this initiative and approved the work programme in principle. In planning work up to the year 2004, this timetable and the Long-term Strategy for EMEP 2000-2009 (ECE/EB.AIR/73) served as a starting point.

3. There are four main general areas of work, as identified in the mandate of the EMEP Steering Body (Executive Body decision 1999/2 (appendix III)): To provide sound scientific support for the Convention, in particular in the areas of:

- Atmospheric monitoring;
- Atmospheric modelling;
- Emission inventories and emission projections; and
- Integrated assessment modelling.

These four areas of work are to cover the following five substantive issues:

- Acidifying and eutrophying compounds;
- Photo-oxidants;
- Heavy metals;
- Persistent organic pollutants (POPs); and
- Particulate matter (PM).

The work programme for 2002-2004 has been developed around these issues and work areas.

4. All EMEP work should target two main objectives:

- (a) To identify the benefits from implementing existing protocols; and
- (b) To develop the basis (tools and scientific knowledge) for new policies, in particular the reviews of the 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, the 1998 Aarhus Protocol on Heavy Metals and the 1998 Aarhus Protocol on POPs.

5. The work of the Task Force on Measurements and Modelling on the assessment report is important for objective (a). With regard to objective (b), for acidification, eutrophication, ground-level ozone and particulate matter, the tools required for policy should support an effects-based approach. This requires the full development, or further refinement, of integrated assessment modelling. Objective (b) for POPs and heavy metals the situation is less clear and, therefore, there is some need for clarification from the Working Group on Effects and the Working Group on Strategies and Review. However, the coverage of modelling work for international air pollution policies has to be increased. This is already clear for POPs and heavy metals, for which hemispheric models are already under development, but evidence for the importance of a larger scale is also emerging for ozone and particulate matter.

6. The EMEP work-plan is limited to the work done by the Parties and the EMEP centres and task forces, but it also relies on input from other bodies under the Convention and work done by other international organizations and programmes, in particular the EEA and the European Commission's CAFE programme. Uncertainty analysis, scientific review and communication with stakeholders are part of the work-plan of each of the centres and task forces.

7. Based on the above considerations the following main priorities have been identified for work up to 2004. An overview of EMEP activities planned for 2003 and 2004 is given in annex I, while a proposal for specific work items to be carried out in 2002 is given in annex II.

A. PRIORITIES FOR WORK ON EMISSIONS

1. Acidifying, eutrophying compounds, photo-oxidants and particulate matter (PM)

8. To refine and complete emission data for sulphur, NO_x, non-methane volatile organic compounds (NMVOCs), NH₃, and CO with specific focus on the spatial resolution. To develop reliable PM emissions inventories and projections. To establish and test methodologies and the necessary data for verifying emission data.

2. Heavy metals and POPs

9. To develop reliable emission inventories and projections for cadmium, mercury and lead, for POPs listed in the 1998 Protocol as well as preliminary data sets for the other five metals and substances that are possible candidates for inclusion into the 1998 Protocols.

B. PRIORITIES FOR MONITORING WORK

1. Acidifying, eutrophying compounds, photo-oxidants and particulate matter (PM)

10. To redefine and implement the monitoring strategy to serve the following needs:

(a) Linking the regional and the hemispheric scales (i.e. the intercontinental transport of pollutants between North America, Europe and Asia), including through establishing closer links with the East Asian Acid Deposition Network (EANET), the WMO Global Atmospheric Watch global and regional stations, links to North Africa and the Middle East;

(b) Linking the regional and local scales for species with a strong local component in terms of policy (PM, NO₂, ammonia);

- (c) Rethinking the choice of measured parameters (e.g. concentration versus effect-oriented uptake or deposition measurements);
- (d) Coordinating the needs and priorities of the Convention work with European Community policy needs;
- (e) Consolidate the EMEP monitoring network to meet the needs of new policies, policy revision and the assessment of the results of implementing existing regulations and protocols;
- (f) Development of a strategy to derive three-dimensional fields of priority substances on the basis of surface observations, satellite observations, remote sensing, balloon-borne or aircraft-borne sensors, integration with meteorological information to generalize measurements into three-dimensional fields. This includes the preparation of a methodology to judge the representativeness of surface sites.

2. Heavy metals and POPs

- 11. To redefine and implement the measurement strategy for POPs and mercury with a view to improve not only the determination of the load to ecosystems, but also the understanding of the cycling of material and its speciation, between atmospheric, terrestrial and aquatic systems.
- 12. Redefine and implement the measurement strategy for heavy metals other than mercury.

C. PRIORITIES FOR ATMOSPHERIC MODELLING

1. Acidifying, eutrophying compounds, photo-oxidants and particulate matter (PM)

- 13. To develop and verify the modelling system for source allocation to respond to the following needs:
 - (a) Link hemispheric and regional air quality models in order to examine the contribution from North American and Asian emission sources to depositions and concentrations in Europe;
 - (b) Link regional and local air quality models in particular for species with relevant local component like ozone, particulate matter, NO₂ and NH₃, through a comprehensive revision of the numerical structure of the EMEP model and of the treatment of boundary conditions;
 - (c) Investigate the chemical and physical interaction between different compounds through an integrated modelling system (the unified Eulerian model);

(d) Develop methods for better understanding the interactions between biosphere and atmosphere and the subsequent evaluation of effects (in particular: ozone modelling to be consistent with the level II critical levels approach; ammonia emissions and deposition to include compensation point approaches);

14. To evaluate the use of new observations tools (see para. 10 (f) above) and observations from other networks and to develop methods for using these observations for model validation.

2. Heavy metals

15. To provide an assessment for Europe of the deposition fluxes, contamination levels and trends for the priority metals listed in the Protocol. To quantify the contribution of transboundary transport of these metals to the depositions to the countries within the EMEP region and to the regional seas. To support the development of an effect-based approach in accordance with article 6 (g) of the Protocol on Heavy Metals.

16. To provide a preliminary assessment of the mercury contamination levels on a hemispherical and global scale.

3. POPs

17. To provide an assessment of deposition fluxes, contamination levels and trends of POPs (listed in the Protocol on POPs, annexes II and III) in various environmental compartments (atmosphere, soil, sea, and biota) in Europe. To evaluate the response of the environment to national abatement strategies in support of the implementation of the Protocol on POPs. To quantify the long-range transboundary transport and the source-exposure relationship for selected POPs. To support the investigations on an effect-based approach (risk assessment) in accordance with article 8 (f) of the Protocol on POPs.

18. To provide a preliminary assessment of contamination levels of POPs with high potential for long-range transport on hemispheric and global scales.

19. To provide information to the ad hoc Expert Group on POPs regarding new substances candidates for addition to the Protocol on POPs.

D. INTEGRATED ASSESSMENT MODELLING

20. To develop integrated assessment modelling so that the tools, covering acidification, eutrophication, ground-level ozone and fine particle pollution, are available to support the review of the 1999 Gothenburg Protocol in 2004. To refine the approach to modelling health and ecosystem effects. Ozone modelling should be consistent with the level II approach under development by the Working Group on Effects. Integrated assessment modelling should take account of the results of

dynamic modelling of acidification and eutrophication effects and incorporate available results on the economic benefits from reducing damage to buildings and materials.

21. To update the abatement costs curves used in modelling to reflect best practice, anticipate new technological developments, reflect structural change and incorporate available results on economic instruments, new costing methods and burden sharing.
22. To extend integrated assessment modelling to provide information on the impact of abatement strategies on those heavy metals and POPs that are emitted through combustion processes.
23. In order to have modelling tools ready to be applied by 2004, the year 2003 will be reserved for testing and sensitivity analysis. The results of specialized studies and new data should therefore be available by 2002.
24. To encourage national modelling activities to make it possible to define abatement strategies at the sub-national level and to foster close links with experts working at the national level.
25. To develop the links to climate change issues to help establish global emission scenarios. To incorporate in the modelling work, in an appropriate manner, the contribution from non-European emission sources to concentrations and depositions in Europe and to show the export of pollution from Europe.

II. DRAFT WORK PLAN FOR 2002

26. The draft work plan for 2002 is attached in the annex II. It follows the structure of previous work plans, with two main exceptions. The issues related to cooperation that appeared, given the priority attached to cooperation, under almost every single work plan item have been collected in an introductory paragraph that applies to all work of EMEP. Previously, all general activities related to atmospheric measurements and modelling were listed under the item for acidifying and eutrophying compounds. A new item has been inserted to better reflect the general nature of this work. As a result, there are now three work plan items covering general cross-cutting issues and reflecting the general work of the three task forces responsible for overlooking these activities. Then follow the five thematic areas, which list specific work of the centres and, in some cases, the task forces.

Annex I**RESULTS OF EMEP WORK IN 2003 AND 2004**

	Acidification/ eutrophication	Photo-oxidants	PM	Heavy metals	POPs
2003					
Monitoring	Data reporting, collection (Parties, CCC)				
	Dry deposition of nitrogen compounds (CCC, Parties)	Evaluate QA/QC (CCC, TFMM)	PM2.5 measurement for shorter periods (CCC)	Revise superstation network (CCC, TFMM)	
	Laboratory comparison of main components (CCC, Parties)		Mass closure studies (CCC)	Revise measurement programme (CCC, TFMM)	
	Updating metadata (CCC)	Link with national networks to improve geographic coverage (CCC, TFMM)			
	Harmonization of methods for sampling and analysis (CCC, TFMM)				
Monitoring and modelling	Finalization and publication of the assessment report (TFMM, Parties and all centres)				
	Comparison of measurements and modelling results, back to 1980 (MSC-W, CCC, TFMM)			Comparison of HM and POPs measurements and modelling results, back to 1950 (MSC-E, CCC, TFMM)	
Atmospheric modelling	Calculation and evaluation of the source-receptor relationships for 2001 and validation of 2000 results (MSC-W)			Country-to-grid matrix for Pb and Cd for 2001 (MSC-E)	Deposition and concentration fields for B[a]P for 2001 (MSC-E)
	Internet-based version of the Lagrangian model available for Parties (MSC-W, TFMM)			Trend analysis for 1990-2000 (MSC-E)	Evaluation of α -HCH, PCDD/Fs and B[b]F levels (MSC-E)
	Estimation of base cation deposition (MSC-W)	Study of source-receptor relationships for ozone, PM in regional versus local scale models (MSC-W, CIAM, JRC, Parties)		Evaluation of Hg regional and hemispheric transport (MSC-E)	Prelim. calculations of α -HCH contamination levels on hemispheric scale (MSC-E)
		Results of inter-comparison of photochemical schemes (MSC-W)	Urban modelling workshop (MSC-W, CIAM, JRC, Parties)	Model intercomparison study (MSC-E, Parties)	
			Results with aerosol dynamic model (MSC-W)	Contribution to effects-based approach (MSC-E, WGE)	
				Estimate HM and POPs deposition to regional seas (MSC-E)	
Emissions and projections	Submission, compilation, checking, storage and presentation of emission data (Parties, MSC-W)				
	Presentation of emission data on the Internet and further development of database (MSC-W)				
	Methodologies for emission validation/verification (TFEIP and all centres)				
	Methodologies for emission projections (TFEIP, TFIAM and all centres)				
	Evaluation of NH3 data (TFEIP, MSC-W)		Analysis of re-suspension of PM (TFEIP, MSC-W; CIAM)		
Integrated assessment modelling	Evaluation of sectoral trends (MSC-W, CIAM, TFIAM)			Analysis of side-effects for Cd, Pb, PAH (B[a]P) (CIAM, MSC-E, TFIAM)	
			Review of PM cost curves (Parties, CIAM)		
		Report on influence of chemical interactions on PM source-receptor relationships (MSC-W, EC)			
	Report on differences between regional and urban scale modelling and consequences for modelling (MSC-W, CIAM, JRC, EC, Parties)				
	Test of scenario analysis, sensitivity and uncertainty management workshop (CIAM, TFIAM)				

	Acidification/ eutrophication	Photo-oxidants	PM	Heavy metals	POPs
2004					
Monitoring	Data reporting, collection (Parties, CCC)				
	Representativeness studies (CCC, MSC-W, Parties)	Evaluate QA/QC (CCC, TFMM)	Workshop to review monitoring strategy (CCC, TFMM)		Intercomparison runs for sampling and analytical methods (CCC, Parties)
	Harmonization of methods for sampling and analysis (CCC, TFMM)		Comprehensive research at supersites (CCC)		
	Laboratory comparison of main components (CCC, Parties)			Comparison of modelled and measured data (MSC-E, CCC)	
Monitoring and modelling	Follow-up of work on the assessment report (TFMM, Parties and all centres)				
	Comparison of measurements and modelling results (MSC-W, CCC, TFMM)			Comparison of HM and POPs measurements and modelling results (MSC-E, CCC, TFMM)	
Atmospheric modelling	Calculation and evaluation of the source-receptor relationships for 2002 and validation of 2002 results with unified Eulerian model (MSC-W)			Transboundary transport of Pb and Cd for 2002 (MSC-E)	Country-to-country matrices for B[a]P and B[b]F for 2002 (MSC-E)
	Results from linking global, regional and urban transport model (MSC-W, Parties)				
	Updated graphical visualisation system available for Parties in the Internet (MSC-W, TFMM)			Trend analysis for Pb and Cd, 1980-90 (MSC-E, TFMM)	Trend analysis 1990-2001 (MSC-E, TFMM)
	Results from fry deposition update to take account of ozone level II approach and NH3 (MSC-W, United Kingdom)			Prelim. multi-compartment modelling of Hg (MSC-E)	Assessment of transport and accumulation levels of PCB, α-HCH, PCDD/Fs to identify zones for risk assessment (MSC-E)
	Results from updated wet scavenging routine (MSC-W)		Updated model estimates for sea salt, mineral dust natural sources of PM (MSC-W)		Prelim. calculations of HCB contamination levels on hemispheric scale (MSC-E)
				Model intercomparison study (MSC-E, Parties) Estimate HM and POPs deposition to regional seas (MSC-E)	
Emissions and projections	Submission, compilation, checking, storage and presentation of emission data (Parties, MSC-W)				
	Presentation of emission data in a dynamic Internet-accessible database (MSC-W)				
	Methodologies to assess accuracy of emission data (TFEIP and all centres)				
				Emission estimation guidelines (CCC, TFEIP)	
Integrated assessment modelling	Apply modelling for WGSR (CIAM, MSC-W, TFIAM)				
	National IAM experience, workshop (Parties, TFIAM)				

Annex II

DRAFT WORK PLAN FOR EMEP FOR 2002

All work items listed below will be undertaken in close cooperation with Parties and national experts, and, where relevant, with other bodies under the Convention. Wherever relevant and possible, the centres will cooperate with the organizations, programmes, projects, including the Arctic Monitoring and Assessment Programme (AMAP), the marine commissions, United Nations Environment Programme (UNEP), the World Meteorological Organization (WMO) and its Global Atmospheric Watch (GAW) programme, the International Geosphere-Biosphere Programme (IGBP) and its International Global Atmospheric Chemistry (IGAC) activity, the project Transport and Chemical Transformation of Environmentally Relevant Trace Constituents in the Troposphere in the over Europe (EUROTRAC-2), the European Commission's Clean Air for Europe (CAFE) programme and the European Environment Agency (including its Topic Centre for Air and Climate Change).

1. EMISSIONS

Description/objectives: Maintain the EMEP emission inventory, using data submitted by Parties, provide reliable information on emissions and emission projections, aid the review of compliance, and provide assistance to Parties to help them fulfil their reporting tasks. The Task Force on Emission Inventories and Projections, led by the United Kingdom, will provide a technical forum and expert network to exchange information, harmonize emission factors, and discuss methodologies and reporting. The secretariat will request the data in line with adopted guidelines. The Meteorological Synthesizing Centre-West (MSC-W) will support the compilation, update and availability of an inventory database including carrying out quality assurance of the data. The Centre for Integrated Assessment Modelling (CIAM) will support work on emission projections. The Meteorological Synthesizing Centre-East (MSC-E) will provide support for heavy metal and persistent organic pollutant (POP) emission activities and the Chemical Coordinating Centre (CCC) will also contribute to this work.

Main activities and time schedule:

(a) The Task Force on Emission Inventories and Projections will finalize the emission reporting guidelines, based on experience gained during the reporting on emission data for the year 2000, for consideration at the twenty-sixth session of the Steering Body, for approval by the Executive Body at its twentieth session, and for comprehensive reporting at the end of 2003. It will prepare a further extension of the Guidebook on heavy metals and particulate matter. It will work with Parties to improve the quality and completeness of emission reporting. The eleventh meeting of the Task Force

and an associated EIONET workshop will take place in Spain on 6-8 May 2002;

(b) By 31 January 2002, as requested by the secretariat and in accordance with emission data guidelines, Parties will submit 2000 emission and data and projections, at the requested sectoral, temporal and spatial distribution, for sulphur, NO_x, non-methane volatile organic compounds (NMVOCs), NH₃, particulate matter (PM), CO, heavy metals (priority metals: cadmium (Cd), mercury (Hg) and lead (Pb)) and selected POPs. Parties will ensure that data previously submitted are updated as necessary and that data are available for the protocol base years;

(c) MSC-W will extend the emission database to support the collection and management of new data provided under the emission reporting guidelines. It will also set up a version of the emission database that is directly accessible via the Internet so that all data will be available as soon as the internal consistency evaluation is completed. MSC-W will present a report on 1980-2000 emissions;

(d) The Task Force on Emission Inventories and Projections will intensify its work on the verification of emission data supported by MSC-W, in cooperation with the other EMEP centres, EEA and the secretariat.

2. ATMOSPHERIC MEASUREMENTS AND MODELLING

Description/objectives: Evaluate the results of implementing the Protocols under the Convention and develop and ensure support for the atmospheric measurement and modelling tools necessary for further international air pollution abatement policies, including the review of protocols. The Task Force on Measurements and Modelling, led by Austria and co-chaired by WMO, with the assistance of the EMEP Centres, supports the EMEP Steering Body and its Bureau by: (i) Reviewing and assessing the scientific and operational activities of EMEP related to monitoring and modelling; (ii) Evaluating their contribution and support to the effective implementation and further development of the Protocols; and (iii) Drawing up specific proposals. It provides for closer collaboration of Parties to the Convention, the EMEP centres, other bodies under the Convention, other international bodies and the scientific community in strengthening scientific communication and cooperation in air pollution monitoring and modelling.

Main activities and time schedule:

(a) The Task Force on Measurements and Modelling will investigate the trends in transboundary fluxes, concentrations and depositions over the lifetime of EMEP in different regions, making use of measurements and modelling results. It will assist Parties in the application of tools to assess their data, contribute to the preparation of an Assessment Report and coordinate the input by

national experts to the preparation of the report. The assessment report is scheduled for 2003, but much of the work will be done in 2002. The Task Force will hold its meeting early in 2002;

(b) CCC, MSC-E and MSC-W will support the work for the assessment report. CCC will evaluate historical data according to quality objectives. In cooperation with MSC-E, it will prepare trends information for selected heavy metals and POPs from 1950 onwards and compare them to modelled and measured concentrations. It will give assistance to Parties to continue or resume reporting and to provide historical data. It will continue publishing monitoring site descriptions and relevant metadata on the Internet. CCC will assist national experts and the Task Force in identifying and quantifying trends observed across national boundaries. It will utilize links with other bodies with monitoring responsibilities to improve the geographical coverage of trend data. MSC-E and MSC-W will make available updated modelled data and will continue the recalculation of meteorological input data from 1990;

(c) The Parties will report monitoring results for 2001 to CCC by 1 September 2002. CCC will continue to collect monitoring data and evaluate and store them in the EMEP database. It will cooperate with EEA on development of the Data Exchange Module (DEM) used for submission of data to the EEA database. DEM will be optional for Parties to report data, as an alternative to the NASA-AMES format. CCC will present to the Task Force on Measurements and Modelling proposals for further harmonizing reporting between EMEP and EEA, with the focus upon promoting the quality and consistency of data and reducing the burden for Parties;

(d) CCC, in consultation with the Task Force on Measurements and Modelling, will continue work towards the improvement of the EMEP Manual for Sampling and chemical analysis. It will update the quality assessment (QA) / quality control (QC) part of the Manual and expand the QA information available through the Internet;

(e) The Task Force on Measurements and Modelling will review the current measurement strategy. CCC, in cooperation with MSC-E and –W, will perform representativeness studies to provide input into this work. At selected sites, it will evaluate the regional representativeness and compare EMEP data with data from other monitoring networks. Parties, supported by CCC in close cooperation with EEA, will continue their efforts to improve the EMEP network in the Mediterranean and in central and eastern Europe;

(f) The centres will publish all monitoring and modelling results and related data on the EMEP web site once the EMEP Steering Body has derestricted them.

3. INTEGRATED ASSESSMENT MODELLING

Description/objectives: Analyse scenarios on cost-effective reduction of acidification, eutrophication,

tropospheric ozone, particulate matter (PM) pollution and related phenomena, including POPs and heavy metals pollution. Modelling will cover: (i) abatement options for reducing sulphur, nitrogen oxides, ammonia, VOCs and primary particulate matter, including structural measures in energy, transport and agriculture, and their costs; (ii) projections of emissions; (iii) assessments of the atmospheric transport of substances (including global transport); and (iv) analyses and quantification of environmental and health effects and benefits of emission reductions. Modelling will draw upon the results from other subsidiary bodies. The Task Force on Integrated Assessment Modelling, led by the Netherlands, will guide the work of CIAM at the International Institute for Applied Systems Analysis (IIASA). All activities will be conducted in close collaboration with related work led by the European Commission.

Main activities and time schedule:

(a) The Task Force on Integrated Assessment Modelling will continue to discuss modelling work by CIAM and other national and international initiatives. It will review progress in the preparation of model inputs covering all model elements and liaise with the responsible bodies under the Convention to this end. It will encourage and support national modelling activities carried out by National Focal Points for Integrated Assessment Modelling and enhance the exchange of data and experience with integrated assessment modelling work outside the EMEP region. It will hold its twenty-seventh meeting in May 2002;

(b) The Task Force will hold a workshop at CIAM at IIASA in Laxenburg, Austria in November 2001 to follow up the discussion on the requirements for urban modelling within the context of integrated assessment modelling;

(c) CIAM, in collaboration with the Coordination Center for Effects, will pursue work on uncertainty analysis using error propagation. In addition, work done in collaboration with MSC-W will focus on uncertainties in atmospheric transport models and related non-linearities from numerical advection and atmospheric chemical processes. The Task Force will hold a workshop, tentatively scheduled for January 2002, on uncertainty management in integrated assessment modelling;

(d) CCC, in cooperation with CIAM, will develop criteria for POPs and heavy metals emission projections for selected scenarios and present results to the Task Force on Integrated Assessment Modelling.

4. ACIDIFYING AND EUTROPHYING COMPOUNDS

Description/objectives: Provide monitoring and modelling data on concentrations, depositions and transboundary fluxes of sulphur and nitrogen compounds over Europe. Analyse past, present and future exceedances of critical loads of acidifying and eutrophying depositions in Europe, in

collaboration with the Coordination Center for Effects (CCE). Support the preparations for the review of the Gothenburg Protocol.

Main activities and time schedule:

- (a) MSC-W will calculate the transport of sulphur and nitrogen compounds with the Eulerian model. It will further work to implement a unified Eulerian model for acidification, eutrophication, ground-level ozone and particulates, based on the evaluation of boundary conditions, the inclusion of base cations in the model and the revision of dry deposition routines;
- (b) CCC will arrange for laboratory comparisons of the main components in air and precipitation. Laboratories participating in other monitoring programmes under the Working Group on Effects will also be invited to participate where appropriate. CCC will start field comparisons for air and precipitation chemistry at two new sites (to be selected) and finalize and evaluate field comparisons for Slovenia, Netherlands and possibly Switzerland;
- (c) The Task Force on Measurement and Modelling will review the monitoring and modelling work of EMEP related to ammonia. CCC and MSC-W will provide a summary report to the Task Force on their work related to ammonia.

5. PHOTO-OXIDANTS

Description/Objectives: Provide monitoring and modelling data on concentrations and transboundary transport of ozone and VOCs. Evaluate short- and long-term exposures to photochemical oxidants. Analyse scenarios of ground-level ozone. Support the preparations for the review of the Gothenburg Protocol.

Main activities and time schedule:

- (a) MSC-W will calculate the short-term exposures of vegetation to photochemical oxidants for the growing periods, as well as the potential exposure of humans. It will apply the revised ozone level II dry deposition sub-routine. MSC-W and CIAM will collaborate with work under the Working Group on Effects to develop methods for damage analysis;
- (b) MSC-W ozone modelling work will focus on the implementation of the unified Eulerian model. It will revise the radiation routines used in the calculation of photo-oxidant concentrations and evaluate the results of the inter-comparison of the photochemical schemes;
- (c) CCC will increase its links with national and other existing monitoring networks to improve the regional coverage of ozone and VOC monitoring data, particularly in southern and eastern

parts of Europe. CCC will also evaluate the selection of individual VOCs reported including their accuracy, precision and representativeness. It will propose to the Task Force on Measurements and Modelling a list of selected VOC species with precision requirements for the future EMEP VOC measurement programme. In collaboration with MSC-W, CCC will evaluate the representativeness of the photo-oxidant monitoring stations using atmospheric transport models, local scale models, monitoring data and available surface data. In cooperation with other ongoing research projects, they will perform trend analyses and comparisons with model results for some selected sites;

(d) CCC, in collaboration with participating laboratories, will prepare a proposal for the Task Force on Measurements and Modelling of a procedure for regular campaigns with parallel sampling and analyses of VOC. Once agreed upon, Parties will implement the programme, at each EMEP site;

(e) CIAM, in cooperation with MSC-W, will continue to evaluate the effects of control measures on photo-oxidants, paying particular attention to effects of scale. A joint project by MSC-W, CIAM and the Environment Institute of the Joint Research Centre will address urban ozone pollution and its linkage to regional background pollution. A comparison of urban and regional dispersion will be conducted to explore the importance of local and regional emissions for urban air quality and assess the response of the various models towards changes in local and regional precursor emissions. A series of model intercomparison workshops will be conducted covering different urban models that apply the same emission data and meteorological assumptions. MSC-W will start the development of numerical methods to nest urban meso-scale models in the regional model.

6. HEAVY METALS

Description/objectives: Provide monitoring and modelling data on concentrations, depositions and transboundary fluxes of cadmium (Cd), lead (Pb) and mercury (Hg). Develop further the Pb, Cd and Hg transport models in parallel with the development of heavy metal critical limits under the Working Group on Effects. Analyse trends in Pb and Cd deposition. Further develop emissions data. Support preparatory work for the review of the Protocol on Heavy Metals.

Main activities and time schedule:

(a) MSC-E will present to the EMEP Steering Body in 2002 information on: deposition and air concentrations fields for 2000 of Pb, Cd and Hg in Europe with a resolution of 50 km x 50 km as well as deposition to the regional seas; country-to-country deposition matrices for Pb and Cd; first results of calculations of Hg atmospheric transport on a hemispheric scale; calculation of heavy metal effect-related deposition maps using land cover data agreed upon under the Working Group on Effects; and results of comparisons between regional and hemispheric models;

(b) MSC-E will further develop its models by: a study of Hg exchange processes between the atmosphere and environmental compartments; improving model parameterisations (Pb, Cd, Hg dry deposition to different underlying surfaces, wet removal processes and mercury atmospheric chemistry); verification of modelling results (concentrations in air and precipitation, deposition fluxes) against monitoring data; and model sensitivity studies with different sets of meteorological parameters;

(c) MSC-E will continue the Hg model intercomparison study. At stage II, concentrations in short-term episodes (1-2 weeks) will be calculated and compared with measurements obtained in a special campaign, at stage III the modelled annual and monthly mean concentrations will be compared with measured values at EMEP stations, and at stage IV export-import matrices for three countries (Italy, Poland, United Kingdom) will be compared;

(d) CCC will publish the guidelines for sampling and analysis of heavy metals and distribute them to the EMEP laboratories and continue collecting measurement data. It will complement EMEP data with data from other international programmes. It will organize an intercomparison for sampling and analytical techniques for Hg and carry out an analytical intercomparison of the other seven heavy metals measured in precipitation;

(e) In cooperation with Parties, CCC will complete setting up the superstation network (about ten monitoring sites in defined areas). Hg, Cd and Pb will be included as first priority elements and second priority elements will be Cu, Zn, As, Cr and Ni. Heavy metals in precipitation will be collected weekly with wet-only samplers. Heavy metals in air will be collected weekly with high volume samplers. Hg in precipitation will be collected monthly using bulk samplers, whilst one 24 h sample of Hg in air will be collected each week with gold traps;

(f) MSC-E, in collaboration with the Task Force on Emission Inventories and Projections, will organize a workshop on heavy metal emission data and factors in Moscow on 21-23 November 2001. MSC-E will also prepare gridded anthropogenic emission data, based on officially submitted data and expert estimates, and collect available data on natural emissions. CCC and MSC-E, in consultation with national experts, will adjust European Hg emission inventories to modelling requirements. CCC will develop profiles of chemical species of heavy metal emissions.

7. PERSISTENT ORGANIC POLLUTANTS (POPs)

Description/objectives: Improve the monitoring and modelling data on concentrations, depositions, and transboundary fluxes of selected POPs. Study further the physico-chemical processes of POPs in different environmental compartments, taking into account their transport within the EMEP region and on the hemispheric/global scale. Further develop heavy metals emission data. Support preparatory work for the review of the Protocol on POPs.

Main activities and time schedule:

(a) MSC-E will report to the EMEP Steering Body in 2002 on: an assessment of transboundary transport of Benzo[a]pyrene (BaP) (deposition and concentration fields and country-to-country matrix) for 2000; an evaluation of transport and accumulation of PCDD/Fs and HCB in various compartments; first results of the calculation of PCB regional and hemispheric transport (including to the Arctic) and estimation of its accumulation in different environmental compartments; an assessment of long-range transport of selected POPs to regional seas. It will support the ad hoc expert group on POPs and its national experts in their work on new substances and contribute to work to develop an effects-based approach under the Working Group on Effects;

(b) MSC-E will further develop its models by: modifying the modelled behaviour in soil; modifying modelled air/sea exchange; refining degradation rates in vegetation and litter in view of vegetation types and climatic conditions; improving the gas/particulate partitioning description and the parameterisation of aerosol deposition; refining the physical-chemical properties of PAHs, γ -HCH, PCDD/Fs and HCB; modifying the hemispheric version of the POP multi-compartment model for PCB and γ -HCH transport. It will initiate preparations for model intercomparisons;

(c) In cooperation with Parties, CCC will complete setting up the superstation network (five sampling sites). As a first step, PAH, PCB, HCB, chlordane, lindane, α -HCH, DDT/DDE should be sampled, but this may require financial support to laboratories or a central laboratory to analyse samples. POPs in precipitation will be collected weekly. CCC will finalize the draft guidelines for sampling and analysis and present them to the Task Force on Measurements and Modelling. In cooperation with MSC-E, it will complement EMEP data with data from other international programmes for comparison with model results;

(d) CCC, MSC-E and the Task Force on Emission Inventories and Projections, in consultation with the Parties, will improve the POPs emission data quality. They will adjust European emission inventories for POPs to the modelling requirements. CCC will develop profiles of chemical species of the selected POPs and collate information on the height of major point sources;

(e) The Task Force on Measurement and Modelling will review the monitoring and modelling work of EMEP on POPs. CCC and MSC-E will provide a summary report to the Task Force on their work related to POPs.

8. FINE PARTICULATES

Description/objectives: Provide a first evaluation of particulate matter emissions, concentrations, transboundary fluxes and cost-effective abatement strategies. Evaluate experience with reporting and review guidance for emission reporting and monitoring of concentrations. Support the investigations

on fine particulates under the review of the Gothenburg Protocol.

Main activities and time schedule:

- (a) MSC-W will develop further the unified Eulerian model to include aerosol dynamics on the basis of the aerosol dynamic module MULTIMONO. It will carry out model inter-comparisons with other European aerosol modelling groups;
- (b) MSC-W and CCC will evaluate the status of monitoring and quality assurance activities, in particular assessing the rural versus urban characteristics of PM in various parts of Europe. CCC will further improve the monitoring data by: supporting Parties to start monitoring or increase their number of sites; extending the database to accommodate the storage of PM data; determining the rural concentrations of elemental and organic carbon (EC and OC) for selected EMEP sites covering different regions of Europe. It will enhance cooperation with other research projects for level 3 monitoring as defined in the PM monitoring programme and continue work on source apportionment and chemical mass closure in cooperation with the other centres and national experts;
- (c) MSC-W will evaluate the emission data reported by Parties and analyse the consequences of the allocation of PM concentrations. CIAM will review the projections reported by Parties. All centres will support work to improve the emissions database and support Parties' efforts using the results of the Coordinated European Emissions Inventory Project for Particles (CEPMEIP);
- (d) CIAM, in collaboration with MSC-W, will further develop the framework for integrated assessment modelling of fine particulates, in particular to incorporate advances in atmospheric transport models. CCC will support CIAM especially by evaluating emissions data. Parties will review their PM abatement cost-curves available on the Internet and present comments to CIAM, which will update its database. The centres will provide the Task Force on the Health Aspects of Air Pollution with data allowing it to draw up recommendations on health indicators/ limit values for subsequent inclusion into integrated assessment modelling;
- (d) An EMEP workshop on fine-particulate modelling and specialised measurements will be organized in collaboration with United States Environment Protection Agency in autumn 2002.