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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-fourth session, Geneva, 4-6 September 2000)
(Item 12 of the provisional agenda)

FINANCIAL AND BUDGETARY MATTERS OF EMEP

Addendum

**WORK-PLAN OF THE COOPERATIVE PROGRAMME FOR MONITORING AND AND
EVALUATION OF THE LONG-RANGE TRANSMISSION OF AIR POLLUTANTS IN EUROPE
(EMEP)**

Note prepared by the secretariat in collaboration with the EMEP Centres

1. The overall objectives of the EMEP work are defined in the mandate of the Steering Body (ECE/EB.AIR/68, annex III, appendix III) and in the long-term strategy for EMEP (EB.AIR/GE.1/2000/5). EMEP provides sound scientific support for the Convention, in particular in the areas of atmospheric monitoring and modelling, emission inventories and emission projections, and

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integrated assessment. The draft EMEP budget for 2001 is detailed in document EB.AIR/GE.1/2000/10. As indicated in the budget, the implementation of the work programme at the Meteorological Synthesizing Centre-West requires extrabudgetary resources. Extrabudgetary support is also expected for work on the fine particle emission inventory.

2. The EMEP work programme is carried out by the Parties together with the Chemical Coordinating Centre (CCC), the two Meteorological Synthesizing Centres -East and -West (MSC-E and MSC-W) and the Centre for Integrated Assessment Modelling (CIAM) in cooperation with the World Meteorological Organization (WMO). At its twenty-third session, the Steering Body agreed to increase scientific contributions from Parties to EMEP and to intensify cooperation between EMEP and all other relevant international organizations and programmes. Therefore, the Parties are further invited to make proposals by 31 March 2001 for national research work that would support EMEP and could be included as voluntary contributions in the EMEP work-plan for 2002 or later. Based on the proposals, the Steering Body's Bureau will in May 2001 prepare the issue for further discussion at the twenty-fifth session of the Steering Body.

3. In 1999, a new Task Force was set up to offer a forum to the Parties, the EMEP centres and other international organizations for scientific discussions on air quality measurements, modelling and assessment, together with further development of methods and tools for measurements and modelling, including quality assurance. The Task Force will be led by Austria and co-chaired by WMO. The first meeting of the Task Force will take place in October 2000. The Task Force is expected to make preparations for an assessment of the 1980-2000 EMEP work and submit to the Steering Body proposals on the main issues that it will consider over the next five years. These issues should be included under the relevant thematic areas in future work-plans.

I. EMISSIONS

Description/objectives: EMEP emission inventory activities aim to help Parties fulfil their reporting tasks, store the reported emission data and control their quality; report on the available data; evaluate emission inventory requirements under the Convention to ensure an adequate flow of reliable information on emissions and emission projections; provide information to monitor compliance with international emission control agreements, and, as far as possible, cooperate and harmonize emission information with other relevant international work.

The Task Force on Emission Inventories and Projections provides a technical forum and expert network to discuss, exchange information and harmonize emission factors, methodologies, projection models and reporting.

Main activities and time schedule:

(a) Recent developments, such as the inclusion of the Centre for Integrated Assessment modelling (CIAM) in EMEP and the changes in the technical activity of the European Topic Centre on Air Emissions (ETC/AE) supported by the European Environment Agency (EEA) (CORINAIR), have made a revision of the emission reporting requirements from the Convention necessary. A special workshop on emission reporting will be convened at the end of 2000/beginning of 2001, as recommended by the Task Force on Emission Inventories and Projections. The workshop will address the reporting of emissions to international bodies in order to: (i) improve the process and quality of reporting; (ii) guarantee the consistency and comparability with emission projections; and (iii) minimize the workload at a national level. The workshop should be planned and managed in close cooperation with other groups concerned with the collection of environmental emission information, such as United Nations Framework Convention on Climate Change, the Statistical Office of the European Communities (EUROSTAT) and the Organisation for Economic Co-operation and Development (OECD);

(b) Recommendations from the workshop will provide input for the finalization of the emission reporting guidelines for the Convention by MSC-W and the secretariat, in cooperation with the Chairman of the Task Force on Emission Inventories and Projections. The guidelines should be available for the comprehensive reporting round at the end of 2001, when data for 2000, including gridded data, will be requested. Therefore, a proposal for the emission reporting guidelines will be submitted for consideration at the twenty-fifth session of the Steering Body and for approval by the Executive Body at its nineteenth session;

(c) All Parties will submit their 2000 emission data from the territories covered by EMEP for SO_x, NO_x, non-methane volatile organic compounds (NMVOCs), NH₃, CO, heavy metals (HMs) (priority metals: cadmium (Cd), mercury (Hg) and lead (Pb)) and selected persistent organic pollutants (POPs) and possible updates of previous figures to the secretariat by 31 December 2001, in accordance with the newly revised guidelines and making use of the latest edition of the Atmospheric Emission Inventory Guidebook. National totals, sectoral and gridded data, and other information should be submitted as requested. For CO₂ and CH₄, the same data as reported under the United Nations Framework Convention on Climate Change should be submitted;

(d) For the first time in 2001, Parties are asked to report emissions of fine particulate matter as PM₁₀ and PM_{2.5}. Guidance for reporting emissions of fine particulates will be provided throughout 2001, in cooperation with the EU and EEA. Parties will be asked to review an interim emission inventory developed by the Netherlands Organization for Applied Scientific Research (TNO) for 1995 as a basis for the 2000 update. Experts at TNO and EMEP will be available for consultations throughout 2001. In addition, the Task Force on Emission Inventories and

Projections is to provide the appropriate forum for discussion and clarification of the emission requirements;

(e) CCC will adjust its European emission inventories for POPs and mercury, developed within the EU projects, to requirements of EMEP and provide these data to MSC-E. These inventories are regarded as the state-of-the-art emission inventories for Hg in Europe;

(f) MSC-W, in collaboration with the secretariat, will report on 1980-1999 emissions and the status of verification to the Steering Body at its twenty-fifth session. The report will also be available for the meeting of the Implementation Committee in September 2001. The data will be made available to the Executive Body at its nineteenth session for consideration in the context of the strategies and policies. CCC plans to develop profiles of chemical species of the HMs and POPs considered within the Protocols on HMs and POPs. This task will be based on experience gained within the recent EU projects POPCYCLING-Baltid, MAMCS, MOE and GLOBAL-SOCs;

(g) MSC-W, in cooperation with CIAM, ETC/AE, the secretariat, the other EMEP centres and the experts of the Task Force on Emission Inventories and Projections, will develop further methods and a scientific basis for compliance monitoring, verifying emission data and controlling their quality;

(h) The Task Force on Emission Inventories and Projections will increase its work on the verification of emission data and on emission projections. It will prepare the further extension of the Guidebook to give more detailed information on VOC species and to cover particulate matter (e.g. particle size distribution, chemical composition, link to HM emission inventories), including emissions of high-molecular weight VOCs, precursors of secondary organic particulate matter. The Task Force will continue work with Parties to improve the quality and completeness of emission reporting, to develop the Guidebook to fill remaining gaps and incorporate new guidance material as required. It will strengthen the use of the designated emission expert network and work with other groups to ensure the effective use of resources, prevent duplication of effort and ensure comparability of reported data. The further integration of the Task Force and experts of the European Environmental Information and Observation Network (EIONET) is feasible by clarifying the goals of the Task Force meetings to serve the Convention and the European Union (EU). The tenth meeting of the Task Force will take place in May 2001.

II. DEPOSITION OF 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 the past,

present and future situation in Europe with regard to the exceedance of critical loads of acidifying and eutrophying depositions, in collaboration with the Coordination Centre for Effects (CCE). Analyse scenarios on cost-effective reduction of acidification, eutrophication, tropospheric ozone and related phenomena. Provide information to monitor compliance with international emission control agreements.

Main activities and time schedule:

(a) The Parties will report their monitoring results to CCC twice a year: January-June data by 1 December and July-December data by 1 June. CCC will assist countries to monitor nitrogen compounds and carry out quality assurance, in cooperation with the national quality assurance managers, and store data in the monitoring database. The exchange of monitoring information and experiences with the WMO/Global Atmospheric Watch Programme, North American experts and other European research groups will be continued and increased. A stronger emphasis on persuading Parties to adopt uniform methodologies, and on conducting quality control and quality management of the network, is planned. The capability of the current network to provide consistent high-quality Europe-wide background surveillance, and its future potential in this matter, will thus be reinforced. This capability will properly serve the ability of EMEP to observe the atmospheric 'state of the environment' across Europe. It will underline the network's value to Parties in observing change over periods of major economic and social change, and by securing quality will provide an effective counterbalance to any tendency to decrease the number of monitoring points with decreasing acidification - quality as a counterpoint to quantity;

(b) CCC and MSC-W will together coordinate the study of the EMEP monitoring strategy for acidifying and eutrophying compounds and also for atmospheric particulates taking into account the evolving needs of the Convention. In collaboration with national experts, CCC will consider solutions to harmonize national monitoring requirements with those of EMEP and the EU. Efforts will be made to encourage monitoring contributions from peripheral regions, such as the southern Mediterranean and Western Asia. CCC will follow up recommendations for harmonization and measurement programme changes individually with all countries;

(c) MSC-W will calculate the annual transboundary transport of sulphur and nitrogen compounds with the Eulerian model. In cooperation with CIAM, it will continue to develop methods and visualization tools to help national experts in the analysis of cost-effective emission reduction strategies. In particular, it will continue to improve the user-interface to run the Lagrangian EMEP models via the Internet;

(d) CCC and MSC-W will continue to evaluate trends in concentrations and depositions of acidifying pollutants, as can be derived from the present EMEP data, and jointly report on their analysis; MSC-W and CCC will explore new methods for evaluating and

validating EMEP results. MSC-W aims at increasing the accuracy of the EMEP model results to 30% agreement with measurements and will review, as necessary, the current parametrization of dry and wet depositions in the EMEP acid deposition model;

(e) MSC-W will focus on the implementation of a unified Eulerian model code for acidification, eutrophication, ground-level ozone and particulates. Model development involves the revision of dry and wet deposition parametrization, in collaboration with experts from the United Kingdom;

(f) MSC-W will initiate the recalculation of meteorological input data back to 1990 in order to facilitate the analysis of trends and the evaluation of Protocol achievements. It will also continue with the revision and verification of meteorological input fields relevant to air pollution modelling, e.g. radiation calculations and surface exchange parameters;

(g) All results will be put on the EMEP Web site once the Steering Body has derestricted them. The contributions to the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the Baltic Marine Environment Protection Commission (HELCOM) will seek to provide a near-regional evaluation of Protocol achievements through interpretation of observed data from EMEP, the OSPAR Comprehensive Atmospheric Monitoring Programme (CAMP) and HELCOM networks. Parties to the marine conventions will be encouraged to develop their networks and to introduce greater quality management;

(h) The EMEP centres, in cooperation with WMO, will organize a third workshop on data analysis and interpretation in Slovenia in 2001;

(i) The first meeting of the Task Force on Measurements and Modelling will be held in October 2000 to consider the harmonization of EMEP sampling and analysis for acidifying and eutrophying pollutants and photo-oxidants and to prepare recommendations on any changes needed in the measurement programme of these pollutants. The Task Force will also prepare for an assessment of the EMEP work 1980-2000 and make proposals on the main issues that it will consider during the next five years. The work of the Task Force will provide the basis for encouraging Parties to cooperate in reviewing their national monitoring network data. This will be of mutual benefit to Parties and to the whole of EMEP by establishing common standards.

III. PHOTO-OXIDANTS

Objectives/Description: Provide monitoring results on ozone and VOCs. Develop and verify the EMEP Eulerian photo-oxidant model aiming at a common oxidant/acidification model.

Evaluate short- and long-term exposures to photochemical oxidants and develop new methods for the analysis of damage in collaboration with the Working Group on Effects. Analyse different scenarios on cost-effective reduction of ground-level ozone in cooperation with CIAM.

Main activities and time schedule:

(a) The Parties will report their ozone and VOC monitoring results to CCC as described above for acidifying pollutants. CCC will carry out quality assurance, data storage, and make the data available on the Internet. It will continue the measurement and collection of ozone and VOC data. It will improve the collection of ozone measurement results from existing national and other international ozone networks to increase their spatial coverage;

(b) MSC-W and CCC will continue the evaluation of the status of monitoring and quality assurance activities for photo-oxidants under EMEP;

(c) MSC-W will calculate the short-term exposures to photochemical oxidants for vegetation periods, and the potential exposure of humans. Progress in the development of the unified Eulerian acid rain-photochemical-particulate matter (PM) model will be achieved by implementing the revision of the ozone level II dry deposition sub-routine and by harmonizing the treatment of emissions in the EMEP models;

(d) MSC-W and CCC will together review the possibility of evaluating ozone trends over Europe and review the present status of the monitoring and quality assurance activities for photo-oxidants under EMEP. For a number of selected monitoring sites, ozone trend calculations will be attempted for certain groups of data, e.g. grouped according to transport patterns (geographical sectors), emission load (trajectory integrated emissions), meteorological situations or simply by month and season. The trends calculated from the monitoring data should as far as possible be compared with trends calculated by models. There is a need to carry out model calculations for several years to support trend studies;

(e) MSC-W will evaluate the effects of specific control measures on photo-oxidants in cooperation with CIAM; particular attention will be given to the study of the effects of control measures at different scales, mainly comparing and nesting effects at local and regional scales.

IV. HEAVY METALS

Description/objectives: Provide more monitoring and modelling data on concentrations, depositions and transboundary fluxes of Cd, Pb and Hg over Europe. Develop further the Pb, Cd and Hg transport models in parallel with the further development of HM critical limits under the Working Group on Effects. Analyse trends of lead and cadmium deposition.

Main activities and time schedule:

(a) During 2001, the Parties, in cooperation with CCC, will continue to establish an EMEP network for trace metals, with first priority elements Hg, Cd and Pb and second priority elements copper (Cu), zinc (Zn), arsenic (As), chromium (Cr) and nickel (Ni). The draft of the HM sampling and analysis manual will be further tested and considered by experts. CCC will also continue the work on the HM standard operating procedures and quality control routines. CCC will collect all new measurement data and it will also continue to collect HM measurement results from existing national and other international networks;

(b) MSC-E will make model calculations of concentrations, depositions and country-to-country matrices for Pb and Cd, as well as their trend analysis. It will cooperate with CCC, MCS-W and the experts of the Task Force on Emission Inventories and Projections in the verification of HM emission data quality. In close cooperation with CCC, the modelling results will be checked against measurements. MSC-E will continue further refinement of model parametrization and uncertainty analysis;

(c) MSC-E will continue to develop the multi-compartment Hg model, paying special attention to the investigation of exchange processes of Hg compounds between atmosphere-soil and atmosphere-seawater. The intercomparison of Hg models (II stage) will be continued. The development of a hemispherical model for Hg will be started;

(d) CCC together with MSC-E will prepare an estimate of trends in emissions, concentrations and depositions of HMs in Europe;

(e) CCC and MSC-E will together report on HM measurements and modelling results. Specific attention will be given to the reporting to HELCOM and OSPARCOM, as agreed. Both centres will put their detailed data on the EMEP Web site. MSC-E will also continue its cooperation with WMO, EU, the United Nations Environment Programme (UNEP), the European Experiment on the Transport and Transformation of Environmentally Relevant Trace Constituents over Europe (EUROTRAC), the Arctic Monitoring and Assessment Programme (AMAP), the Working Group on Effects, the Coordination Center for Effects (CCE), and the Task Force on the Health Aspects of Air Pollution.

V. PERSISTENT ORGANIC POLLUTANTS (POPs)

Description/objectives: Increase the provision of monitoring and modelling data on transboundary fluxes, concentrations and depositions of selected POPs over Europe. Study further the physico-chemical processes of POPs in different environmental compartments,

taking also into account their transport within the EMEP region and on the hemispheric/global scale.

Main activities and time schedule:

(a) In 2001, the Parties, in cooperation with CCC, will continue setting up an EMEP network for POP measurements. CCC will continue to collect the monitoring data on POPs available from other international programmes. The laboratory comparison initiated by CCC will continue. CCC will also continue the work on the POP standard operating procedures and quality control routines for the manual for sampling and chemical analysis;

(b) MSC-E will study the physico-chemical properties of selected POPs (HCH, HCB, selected PCBs, PAHs and PCDD/PCDFs). It will analyse and summarize scientific results obtained under EUROTRAC/MEPOP and other international programmes, such as in the hemispheric modelling under AMAP, and under national programmes. MSC-E will study the model sensitivity, assess the seasonal and annual variations and check the calculated results against measurements, including comparison of concentrations in different environmental compartments, in close cooperation with CCC. The results will be presented on the EMEP Internet site and the MSC-E home page, and will be reported to relevant international bodies. Together with CCC, the POPCYCLING-Baltic model is being used to assess the pathways, deposition and fate of selected POPs in the Baltic Sea region;

(c) MSC-E will implement modified procedures for processing meteorological input data for regional and hemispheric modelling. It will also begin preparatory work on the intercomparison of POP models. Hemispheric model development will continue. MSC-E will develop and validate multi-compartment transport models for selected POPs. The parametrization of atmosphere/sea, atmosphere/soil and atmosphere/vegetation exchange processes will be further improved. MSC-E will investigate the processes of sedimentation in the sea, accumulation and degradation in vegetation and litterfall, and will examine size distribution influences on the long-range transport of benzo(a)pyrene (B(a)P);

(d) MSC-E will cooperate with CCC, MSC-W and the experts of the Task Force on Emission Inventories and Projections in the verification of POP emission data quality.

VI. FINE PARTICULATES

Description/objectives: Develop transport and integrated assessment models to provide the Steering Body, the Task Force on the Health Aspects of Air Pollution and the Executive Body with further information on the transboundary transport of fine particulates. Draw up

recommendations for emission reporting and monitoring of air concentrations of atmospheric particles relevant to the Convention.

Main activities and time schedule:

a) A basic limitation to the development of meaningful emission reduction strategies for atmospheric particles in Europe is the uncertainty of the elements responsible for adverse health effects. On the basis of the information compiled by the EMEP centres during 2000, and information from other relevant sources, the Task Force on the Health Aspects of Air Pollution should be requested to review its material and provide recommendations on plausible indicators/limit values. Such indicators will to a large extent determine the EMEP monitoring and modelling strategy for particulate matter;

b) EMEP will devote the necessary attention to PM₁₀ measurements and develop a monitoring strategy to satisfy the needs of the Convention, harmonized as far as possible with EU directives. CCC will provide recommendations for PM_{2.5} measurements, data on chemical speciation/size distribution and procedures with respect to quality assurance. CCC will initiate actions for obtaining quality-assured PM data from Parties;

c) MSC-W will develop further the unified Eulerian model to include primary and secondary aerosols. In parallel to this activity, a box model, which allows for aerosol dynamics such as nucleation, condensation and coagulation processes, will continue to be tested. The box model is developed as a result of a project of the Nordic Council of Ministers to support EMEP. First results of the introduction of an aerosol dynamic module developed at MSC-W, in cooperation with Nordic experts, will be analysed;

d) A workshop on the implementation of aerosol dynamic modules in Eulerian models will be organized during 2001 to present the results from the Nordic cooperation project and gather comments from national and international experts;

e) The model development work at MSC-W will take account of developments within the coordinated European programme on particulate matter emission inventories. The model development at MSC-W will also contribute to the development of an integrated assessment model for particles by CIAM.

VII. INTEGRATED ASSESSMENT MODELLING

Description/objectives: Analysis of scenarios on cost-effective reduction of acidification, eutrophication, tropospheric ozone and related phenomena, especially particulate matter pollution. Modelling will cover: (i) abatement options for reducing sulphur, nitrogen oxides,

ammonia, volatile organic pollutants and primary particulate matter, including structural measures in energy, transport and agriculture, and their costs; (ii) projections of emissions, including the consequences of implementing current legislation; (iii) in close collaboration with MSC-W, assessments of the atmospheric transport of substances; and (iv) analyses and quantification of the environmental and health effects and the benefits of emission reductions. Where available, modelling will be based on the results of work done by other subsidiary bodies and direct contacts will be established. The Task Force on Integrated Assessment Modelling, led by the Netherlands, will guide the work. CIAM has been set up using as a basis the work carried out at the International Institute for Applied Systems Analysis (IIASA). Specialized workshops will be organized to develop model elements that are not sufficiently covered by other bodies under the Convention. All activities will be conducted in close collaboration with related work led by the European Commission.

Main activities and time schedule:

(a) Of particular importance in the coming year will be the improvement of the components of the framework for an integrated assessment model for particulates, which has already been developed in outline. This will involve close liaison with MSC-W, which is developing an improved atmospheric model for particles in Europe, and with the Coordinated European Emissions Inventory Project for Particles. It will require the development of abatement cost curves for particles;

(b) Further work on non-particle integrated assessment models will involve the analysis of uncertainties, particularly those arising from the use of atmospheric transport models and related non-linearities from numerical advection and atmospheric chemical processes. In collaboration with MSC-W, CIAM will consider necessary revisions and updates in integrated assessment models to incorporate recent advances in atmospheric transport models, such as the increase of spatial resolution and the introduction of aerosol dynamics.