



CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION
International Co-operative Programme
on
Effects on Materials, including Historic and Cultural Monuments

MINUTES OF THE NINETEENTH MEETING OF THE PROGRAMME TASK FORCE
May 8-10, 2003, Munich, Germany

Prepared by the Main Research Centre,
Swedish Corrosion Institute, Sweden

- 1 The nineteenth meeting of the Programme Task Force of the International Co-operative Programme on the Effects on Materials including Historic and Cultural Monuments was held in Munich, Germany from May 8 to 10, 2003. The meeting was held in the premises of the Bavarian State Department of Historical Monuments, who hosted the meeting.
- 2 The meeting was attended by representatives from the following Parties to the Convention on Long-Range Transboundary Air Pollution: Austria, Canada, Czech Republic, Estonia, Finland, France, Germany, Italy, Norway, Poland, Spain, Sweden, Switzerland and the United Kingdom.
- 3 The meeting was introduced by Mr Greipl and Mr Rolf Snethlage on behalf of the Bavarian State Department of Historical Monuments. Mr V. Kucera chaired the meeting.
- 4 The main items discussed at the meeting were:
 - a) Presentation and discussion on draft reports giving results from the multipollutant exposure programme
 - b) Report on one-year extension of the multipollutant exposure programme (broad field exposure of EU 5FP MULTI-ASSESS)
 - c) Creation of a new sub-centre for stock-at-risk and cultural heritage in Italy – presentation of work plan and discussion on involvement of other members of ICP Materials
 - d) Discussion on the future development of the programme
 - e) Substantive report (2004) on the assessment of present air pollution effects and their recorded trends.
 - f) Workshop on Heavy Metals (May 10-12 2003, Munich) and discussion of need of further activities in this field

5 Presentation and discussion on draft reports giving results from the multipollutant exposure programme

Below is given a discussion of individual reports that were approved by the meeting. For each of these reports 30 copies should be sent to the secretariat in Geneva, to arrive at the latest on August 15, at the following address

Mr Keith Bull
UN Economic Commission for Europe
Environment and Human Settlements Div.
Palais des Nation
CH-1211 Geneva 10, Switzerland

a) Report No 41. Final Environmental data report for the multipollutant programme: November 1997 to October 2001.

The environmental data for the multipollutant exposure programme was discussed. The database will be completed during the summer and dedicated request for data has been sent from the Environmental sub-centre to be reported on the latest of June 30 2003. Final yearly means will be calculated by the environmental sub-centre and all sub-centres in their statistical evaluation should use these values. Furthermore, it is recommended that the reports given below are complemented with tables of the latest available environmental data.

The distributions of pollutant concentrations among the sites are typically in the range 0-20 $\mu\text{g m}^{-3}$ (SO_2), 0-50 $\mu\text{g m}^{-3}$ (NO_2) and 0-60 $\mu\text{g m}^{-3}$ (O_3) with extreme values in Katowice (SO_2 35 $\mu\text{g m}^{-3}$), Milan (NO_2 70 $\mu\text{g m}^{-3}$) and Toledo (O_3 90 $\mu\text{g m}^{-3}$). There are still decreasing trends for SO_2 and NO_2 at many sites while there is no significant changes in the O_3 concentration.

b) Presentation and discussion of results of corrosion attack for the multipollutant programme including trend exposures.

Each sub-centre gave during the meeting a short oral presentation of the contents of the reports:

Report No 42. Results from the multipollutant programme: Corrosion attack on carbon steel after 1, 2 and 4 years of exposure (1997-2001).

Signs of erosion by sand on the samples exposed at the Tel Aviv site were reported and the possibility of deleting this site from the statistical treatment was discussed.

Report No 43. Results from the multipollutant programme: Corrosion attack on zinc after 1, 2 and 4 years of exposure (1997-2001).

The site Los Angeles test site was discussed and in particular the missing box for sheltered exposure.

Report No 44. Results from the multipollutant programme: Corrosion attack on copper and bronze after 1, 2 and 4 years of exposure (1997-2001).

The report was already presented at the 18th meeting of the programme Task Force and will be completed by incorporating tables of the final environmental data.

Data from the multi-pollutant exposure has been incorporated in the computer based tool "Compare - The Virtual Specimen Viewer" presented originally at the Task Force meeting in May 20-22, 1997, Rome, Italy. The program enables comparison of copper and bronze data in an excellent way and includes photos, profiles, colour measurements, weight changes, mass losses and environmental data. The possibility of including this information on the home page of ICP Materials or MULTI-ASSESS was discussed.

Report No 45. Results from the multipollutant programme: Corrosion attack on limestone after 1, 2 and 4 years of exposure (1997-2001).

A few additions have been made compared to the version presented at the 18th meeting of the programme Task Force. The dose-response functions developed using data from the original exposure programme have been tested on data from the multi-pollutant programme. The predictive abilities of the stone functions are relatively low and this can be attributed to the new multi-pollutant situation and decreasing SO₂ concentrations.

Report No 46. Results from the multipollutant programme: Corrosion attack on painted steel after 1, 2 and 4 years of exposure (1997-2001).

For the painted steel no new dose-response functions will be developed since 4 years of exposure is too short for this purpose. In the multi-pollutant exposure a few qualitative differences are observed compared to the original programme. This includes the occurrence of filiform corrosion mainly on new sites and generally more cracking. Fungus is often the factor that gives the impression of a dirty surface.

Report No 47. Trends of corrosivity based on corrosion rates and pollution data. Part 3.

A report will be finalised during the summer with the latest trend exposures.

Report No 48. Results from the multipollutant programme: Evaluation of the decay to glass samples of medieval composition after 3, 4, 5 and 6 years of exposure. Part A: Results of the sheltered exposure.

A detailed analysis of corrosion products developed under sheltered conditions was presented, including a statistical evaluation. Analysis of the leached layer on samples exposed in unsheltered position is on-going and results will be presented later.

6 Report on one-year extension of the multipollutant exposure programme (broad field exposure of EU 5FP MULTI-ASSESS)

The one-year exposure was started between the middle of November to middle of December 2002 for most sites. An exception was the sites in Italy due to late delivery of passive samplers. Out of 30 planned sites exposures have started on 29 sites, the site in Tel Aviv being the exception.

On several sites there has been problems with the aluminium arm supporting the two discs for sheltering the particulate passive samplers. It was either broken or bent. All National contact persons are encouraged to inspect the status of the aluminium arm and to make

sure that it is secured. If necessary, Martin Ferm at IVL can provide material and advice on how to secure or replace the arm.

Results of passive sampling of HNO₃ reveal low concentrations, between 0.2 µg m⁻³ (Svanvik) to 1.2 µg m⁻³ (Katowice). These are winter concentrations and it is expected that summer concentrations will be higher.

The measurements of the particulate sampler (Middlesex) were discussed. It was decided make scans of the flattened filter in order to have information of the directional dependence. The pictures could then be treated systematically in photoshop. After the scanning the samples will be cut in half and one part used for reflectance measurements and one part for SEM measurements.

The need of compiling an updated version of the report 'description of test sites' was discussed.

7 Creation of a new sub-centre for stock-at-risk and cultural heritage in Italy – presentation of work plan and discussion on involvement of other members of ICP Materials

The background information regarding the creation of a new sub-centre for stock at risk in Italy was presented at the 18th meeting of the programme Task Force, May 13-14, 2002, Kjeller, Norway.

During the meeting of the UN ECE Working Group on Effects in Geneva in August 2001 special efforts were requested in the field of cost calculations the assessment of the stock at risk from ICP Materials. In the subsequent discussion it was proposed to create a new research sub-centre for assessment of stock at risk and damage on cultural heritage in Italy. The Italian Ministry for the Environment and Territory kindly expressed its willingness to accept to organise the activity with the technical support of ENEA and the national contact person Dr. Stephan Doytchinov.

The sub-centre started officially after the formal approval of the Working Group on Effects at its meeting in August 2002. One of the tasks of the new sub-centre is to promote international activities in this field including financing. To this end a research proposal, "Assessment of Air Pollution Effects on Cultural Heritage – Management Strategies" (CULT-STRAT), was submitted to EU 6FP. The call was within Priority 8.1, Policy-oriented research (SSP), Integrating and Strengthening the European Research Area. The proposal was favourably evaluated and negotiations are currently taking place.

A summary of the activities of the sub-centre has been prepared and is available as part of the 2003 technical report of ICP Materials to the Working Group on Effects (EB.AIR/WG.1/2003/7):

<http://www.unece.org/env/documents/2003/eb/wg1/eb.air.wg1.2003.7%20.pdf>

8 Discussion on the future development of the programme.

The withdrawals of samples exposed for the one-year extension of the multipollutant exposure programme to be performed end 2003 to beginning 2004 officially marks the end of the exposure phase of the multi-pollutant exposure programme. The results will need a deep evaluation resulting in updated dose-response functions for the multi-pollutant situation. After this, no new large exposure programs with the aim of developing dose-response functions are planned. This aim has been one of the two 'old' main aims of ICP Materials together with the trend exposures. The new aim of ICP Materials is the use of results for mapping and calculations of costs and this also includes the new sub-centre for cultural heritage in Italy described above.

The future of the trend exposures was discussed. It was concluded that it would be of great value to continue the trend exposures since these give valuable information and can serve as a warning clock, for example if new pollutants are introduced to the environment that can have an effect on materials. Several countries expressed willingness to provide test sites. Even if the possibility of creating new sites was discussed, taking into account the aim of recording trends, the existing list of sites should be used as a basis for selecting the trend sites. When making the final choice of network of sites for trend exposures the following criteria should be used:

- The possibility of running the site for an extended period in the future. Using a site where measurements are already performed could ensure this.
- Good records of corrosion trend data.
- Good records of reporting of environmental data.
- Uniqueness of the test site.

It was decided that the Main Research Centre will prepare a draft of the future trend exposure programme including available test sites and materials exposed and distribute it to all members for discussion and decision at the next Task Force meeting in 2004.

9 Substantive report (2004) on the assessment of present air pollution effects and their recorded trends.

In connection with the review of the 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, and as a supporting document, a substantive report on the assessment of present air pollution effects and their recorded trends will be produced and all ICPs will be asked to prepare a contribution. This is an important report that will summarise the present state of the knowledge and results from the programme.

ICP Materials has provided a contribution to report and all contributions are currently reviewed and compiled by Mr Guy Fenech. When we receive his first draft it will be circulated to all members of the Task Force for comments.

10 Workshop on Heavy Metals (2003) and discussion of need of further activities in this field.

The workshop on the release of heavy metals due to corrosion of materials took place in Munich, Germany, from 12 to 14 May 2003. The workshop was organized by the Bavarian State Department of Historical Monuments, the Federal Environmental Agency (UBA) and the Swedish Corrosion Institute, with support from the German Federal Ministry for Environment, Nature Protection and Nuclear Safety, the Swedish Environmental Protection Agency and the Nordic Council of Ministers.

A workshop report has been prepared and is available as part of the 2003 technical report of ICP Materials to the Working Group on Effects (EB.AIR/WG.1/2003/7):

<http://www.unece.org/env/documents/2003/eb/wg1/eb.air.wg1.2003.7%20.pdf>

The workshop was organized in a series of plenary sessions to which 22 background papers were presented and one of these papers was based on results from ICP Materials. All papers presented at the workshop including the workshop report will be published in a proceedings volume.

11 Reporting from ICP Materials to the Working Group on Effects

Advanced copies of documents for the twenty-second session of the Working Group on Effects to be held at the Palais des Nations, Geneva, starting at 10 a.m. Wednesday, 3 September 2003 can be downloaded at the following address:

<http://www.unece.org/env/wge/22meeting.htm>

These includes contributions from ICP Materials (technical report and joint report).

12 Next meeting

The twentieth meeting of the Programme Task Force will be held in United Kingdom June 9-11, 2004 (subject to confirmation).

13 Extension of time schedule (active partners underlined)

August 15, 2003

Sub-centres: 30 Reports to be sent to Mr Keith Bull, UN Economic Commission for Europe
Environment and Human Settlements Div., Palais des Nation, CH-1211 Geneva 10, Switzerland.

November 2003 – January 2004

National contact persons: Withdrawal of specimens in the one-year extension of the multi-pollutant exposure programme

February 2004

IVL: Completion of analysis of HNO₃ and particulate matter including soiling

March 2004

Sub-centres: Completion of analysis of materials samples exposed in the one-year extension of the multi-pollutant exposure programme

March 2004

National contact persons: Data on the environmental parameters T, Rh, mm and Sun to be sent to the environmental sub-centre.

April 2004

National contact persons: Data on the gaseous environmental parameters to be sent to the environmental sub-centre.

May 2004

National contact persons: Data on the environmental parameters of precipitation (ion analysis) to be sent to the environmental sub-centre.

June 9-11, 2004

All: Twentieth meeting of the Programme Task Force, Watford, UK (subject to confirmation).

14 Address list

The updated address list is shown in Annex 1

Annex 1 - Updated address list, Thursday May 8, 2003.

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