INTERNATIONAL LABOUR ORGANISATION

MEETING OF EXPERTS ON THE CONTROL OF ATMOSPHERIC POLLUTION IN THE WORKING ENVIRONMENT

(Geneva, 19-28 November 1973)

REPORT

1. In accordance with the decisions taken by the Governing Body of the International Labour Office at its 189th Session (Geneva, February–March 1973), a meeting of experts was convened in Geneva from 19 to 28 November 1973 to consider the control of atmospheric pollution in the working environment. Experts invited to attend the meeting included four appointed after consultation with governments, four appointed after consultation with the Employers' group and four appointed after consultation with the Workers' group of the Governing Body. The following experts took part in the meeting:

Mr. G. ARMSTRONG SMITH (Zambia),
Anglo-American Corporation (Central Africa),
c/o The Zambia Federation of Employers,
LUSAKA

Mr. A. N. BUCH (India),
Secretary,
Textile Labour Association,
AHMEDABAD

Mr. W. OSWALD DUMMER (Chile),
Asociación Chilena de Seguridad,
SANTIAGO DE CHILE

M. R. FARHI (France),
Chef du Service études et applications techniques,
Institut national de recherche et de sécurité,
PARIS

Prof. G. GERHARDSSON (Sweden),
Technical Adviser,
Swedish Employers' Confederation,
STOCKHOLM

Dr. N. MITCHELL (Australia),
Assistant Director-General,
Occupational Health Branch,
Department of Health,
CANBERRA

Dr. R. MURRAY (United Kingdom),
Medical Adviser,
Trades Union Congress,
Congress House,
LONDON

Prof. K. NOMIYAMA (Japan),
Department of Hygiene,
Gunma University,
School of Medicine,
GUNMA-KEN
2. The following representatives or observers of international organisations also took part:

   World Health Organisation:
   Dr. G. LAMBERT
   Dr. C.J. CLEARY

   United Nations Environment Programme:
   Mrs. S. SCHNEIDER

   Economic Commission for Europe:
   Mr. R. AUROLA

   Commission of European Communities:
   Mr. P. LEMOINE

   World Confederation of Labour:
   Mr. J. VITTORI

3. The agenda of the meeting, as approved by the Governing Body, was as follows:

1. The definition of and procedures for assessing an occupational exposure to airborne impurities.

2. The determination of those industries or groups of industries as well as internal processes and other activities in which an occupational exposure to airborne impurities may present a safety or health hazard.

3. Basic principles for the prevention or minimisation of occupational exposures to airborne impurities.

4. The need for the adoption of maximum acceptable levels in this field and suggestions for a common approach.

4. In his opening address, Mr. Pavel E. Astapenko, Assistant Director-General of the ILO, invited the experts to provide, during the course of their deliberation, guidelines which the Office might then use as a basis for developing the outline of an international instrument on the control of atmospheric pollution in the working environment which could be examined at a future session of the International Labour Conference.

5. Dr. N. Mitchell was unanimously elected Chairman, and Mr. R. Farhi, Rapporteur.

6. The experts had before them several working documents prepared by the Secretariat. These included a document listing points for discussion which, after agreement by the meeting, was taken as the basis for its deliberations.

General

7. The experts unanimously agreed that atmospheric pollution in the working environment constituted a problem which gave rise to serious socio-economic implications. The introduction into various sectors of economic activity of a multitude of dangerous, irritant and offensive products, sometimes in considerable quantities, urgently calls for the implementation of a system of statutory, administrative and technical measures aimed at controlling this source of pollution.

8. Several countries, it was noted, had already adopted legislation or taken other measures to this effect. Nevertheless, the experts agreed that it would be highly desirable to intensify at the international level action aimed at harmonising and promoting the efforts already made in this field at the national level.
International Instrument

9. The experts were of the opinion that the ILO should adopt, as soon as possible, an international instrument on the control of atmospheric pollution in the working environment. It was considered that the principles contained in the instrument should be mandatory but the means by which they were applied should be flexible. The experts were of the opinion that the instrument could appropriately take the form of a Convention supplemented by a Recommendation.

General Provisions

10. The meeting noted that there are important differences in methods used in the various countries for the control of atmospheric pollution in the working environment. These varied including the use of statutory measures, codes of practice and the adoption of private initiatives.

11. The experts agreed that the instrument should apply to all activities involving the exposure of workers to airborne pollutants in the working environment, although they recognised that available scientific data on the toxicity of a large number of products were inadequate. The experts considered that the instrument should also apply to self-employed workers and out-workers.

Permissible Levels

12. The experts discussed at length the question of permissible levels for atmospheric contaminants in the working environment. They noted that two approaches to permissible levels used by the United States and the USSR have resulted in different lists being adopted by those countries. The basis for this difference was noted to be in the dose-response criteria used. At present, values have been set or proposed for approximately 700 substances. The experts pointed out that the question of threshold limit values is extremely complex and for a certain number of substances, because of the insufficiency of scientific data, the development of internationally recommended values could not be made. The specification of values is made difficult by many factors, including the means of entry into the organism of the substance, its metabolic, synergistic, cumulative, irritant and sensitising properties to cite only some factors which vary among individuals.

13. The experts were of the opinion that the instrument should not try to define the concepts on which permissible levels are based, it simply being understood that they should satisfy the basic requirement that enables work to be performed without risk to the workers' health irrespective of the duration of this work and the nature of the pollutant.

14. It was agreed that the competent authority in individual member States should be requested to set, on a priority basis, permissible levels for all airborne substances that present a hazard to human health. In the surveillance of the working environment such levels should be considered as guides to required technical preventive measures.

15. The experts also considered that the competent authority should periodically review permissible levels in the light of practical and scientific data available from both international and national sources.

16. It was also agreed that the instrument should prescribe that the competent authority take measures to ensure that all substances that might be airborne in the working environment are evaluated toxicologically according to agreed procedures. To this end, the competent authority should also establish the criteria for the toxicological evaluation of substances in question.

17. The experts noted that in addition to the joint ILO/WHO effort on occupational environmental factors, the World Health Organisation had given a high priority to a programme for the establishment of environmental health criteria and standards to protect human health from adverse factors in the total environment, including physical, chemical and biological factors. The criteria will be prepared by groups of scientists, assisted by the resources of the international organisations concerned. The criteria, which will be revised as new information becomes available, will serve governments and international organisations with basic information on which they can set their own environmental health standards.
Monitoring

18. The experts considered that the instrument should necessarily contain some general provisions on the monitoring of atmospheric pollution in the working environment.

19. Generally, they were of the view that biological monitoring should not be a substitute for environmental monitoring and other forms of surveillance of the working environment. Biological monitoring should be carried out when necessary and should be used as a preventive measure that is both complementary to or parallel with other measures for monitoring the working environment.

Preventive and Protective Measures

20. In considering provisions on preventive and protective measures that might be included in the instrument, the experts recommended a certain number of technical and administrative measures presented in an order of decreasing importance.

21. The first of these measures is directed towards the design of new installations and modification of existing plants. Such designs, it was agreed, should include provision for the industrial hygiene requirements of maintenance systems.

22. The second item raised concerns the replacement of dangerous substances by others that are less harmful or harmless. This measure also requires the setting of precise specifications for substances used. In the third item the experts recommended the replacement of dangerous work processes by others that are safer.

23. Other points concern the enclosure and isolation of installations, the mechanisation and remote control of the work process, the utilisation of wet methods in operations that otherwise would emit dusts and the use of local exhaust and dilution ventilation systems.

24. The final measure is concerned with the use of emergency procedures in the case of a mass escape of atmospheric pollutants.

25. The experts agreed that the instrument should specify that all appropriate measures be taken by the employer to regularly inspect a plant to ensure that production equipment as well as apparatus and devices used to control atmospheric pollution are properly maintained and in good working order. Inspection should also be carried out before equipment is put into initial service and again after any alteration which is likely to affect its effectiveness.

26. The experts agreed that defective apparatus or devices should be corrected immediately and where necessary be taken out of operation until they were fully repaired.

27. In the case where the technical and administrative measures did not permit a reduction in the exposure of atmospheric pollutants in the working environment to levels specified by the competent authority, the meeting agreed that the instrument should specify that a programme for the protection of the health of workers, as approved by the competent authority, be introduced within the enterprise. The programme should include measures such as the regular monitoring of atmospheric contaminants, the supply, use and maintenance of approved personal protective equipment and the instruction of workers regarding the use of this equipment.

Personal Protective Equipment

28. Although the experts acknowledged the importance of personal protective equipment, particularly for workers doing maintenance and repair work, they were of the opinion that preference should, in all circumstances, be given to collective protection.

29. They insisted on the necessity of having the type of personal protective equipment used adapted to the nature of the hazard. Moreover, the experts were agreed that the competent authority should establish procedures for the official
approval of various types of equipment and that the ILO should encourage their standardisation at the international level.

30. It was also recommended that the personal protective equipment should be supplied and maintained by the employer or management of the undertaking.

Competent Person

31. The opinion of the majority of experts maintained that the instrument should oblige the employer to obtain, as required by the competent authority, the services of a person competent in the field of the control of atmospheric pollution in the working environment. Preferably, the employer should establish occupational safety and health services to deal with these questions. In this matter, guidance could be obtained from the principles governing the organisation of occupational health services as set out under the provisions of Recommendation No. 112.

32. The experts recognised that there exists in the various countries, including some industrialised ones, a severe shortage of occupational hygienists. This shortage is felt not only in industry, but also in government services. Similarly, there are insufficient numbers of appropriately trained technicians and foremen with adequate knowledge and training in the subject. The experts agreed that countries should institute appropriate programmes of education and training for the above-mentioned categories of personnel.

Medical Supervision

33. The experts pointed out that airborne pollutants may have progressively adverse effects on human health. Consequently, the early pathological changes whose detection is essential for health often go undetected. As a result, medical supervision is of major importance in all programmes for the control of atmospheric pollution in the working environment. The experts further agreed that consideration be given to the worker with problems of special susceptibility.

34. The experts considered that the instrument could not set out precise requirements regarding medical examinations. However, it should, in their view, prescribe for three types of examination: pre-assignment examinations, periodic screening specific to the type of exposure and, because of the latency of some occupational diseases, post-employment examinations. The experts felt that, with some updating, the provisions of Recommendation No. 112 are applicable. The experts were of the opinion that the workers should not be responsible for the costs of medical supervision.

35. The experts considered at length the question of biological monitoring and its use as an indicator of the status of the working environment. The experts were of the opinion that these examinations, although very useful on an individual basis, could only supplement other measures used to assess the working environment. Some were of the opinion that group biological monitoring enabled the early detection of changes among groups of workers especially those due to synergistic effects.

36. The experts agreed that periodic examinations should not in any way affect the worker's security of employment or lead to a reduction of salary that may result from his suspension or transfer to another job.

Notification

37. The experts subscribed to the general principle that the use of products and equipment that might pollute the working environment should be subject to an agreed procedure of notification to and authorisation by the competent authority. However, in recognition of the considerable administrative difficulties that could be posed by the general adoption of such a system, the experts agreed that only products and equipment specified by the competent authority should be subject to this procedure.
Industry

The experts considered that the instrument should retain the principle of the inspection of establishments to ensure that the provisions of the instrument are being implemented. It was observed that inspection could take different forms, viz. that carried out by the establishment itself or that performed by government or recognised agencies.

Education, Training and Information

39. The experts recognised that education and training on matters relating to the control of atmospheric pollutants in the working environment is a fundamental component for a successful programme in this field. They advocated that educational opportunities for future physicians, engineers and managers in occupational safety and health should be increased. These measures should have the advantage of remedying, on the one hand, the shortage of specialised personnel and, on the other, improving the knowledge of in-plant personnel. The experts also recognised the need for employers to be better informed on measures for the prevention and control of atmospheric pollutants in the working environment and the diseases which may follow exposure to these pollutants.

40. The experts agreed that workers should, when taking up new employment, be fully and specifically informed on the potential hazards to which they are exposed and instructed on the measures taken to prevent these hazards. It was further agreed that under certain circumstances and in particular when workers are being transferred to other jobs they should be given preliminary training in the safe procedures of their duties. This training should be repeated at appropriate intervals in order to preserve and update the knowledge acquired.

41. In addition, the experts urged that the competent authorities, in collaboration with interested national and international organisations, including employers' and workers' organisations, should promote research and assist in the collection and dissemination of information on the hazards of atmospheric pollutants in the working environment. The subject of the control of atmospheric pollution in the working environment should be part of workers' training programmes in occupational safety and health.

42. The experts also agreed that workers should be informed of the results of monitoring surveys on atmospheric pollutants in their working environment. They should, furthermore, be kept informed of the results of biological group monitoring. Individual findings should be available to the worker on his request.

Consultation between Employers and Workers

43. The experts affirmed that, within the establishment, effective consultation between employers and workers was an essential component in any programme of occupational safety and health and the instrument should therefore make adequate provision for consultation on the prevention and control of atmospheric contaminants in the working environment.

Duties of Employers and Workers

44. The experts considered the fundamental duties of employers and workers regarding the prevention and control of atmospheric pollution in the working environment. It was pointed out that under the terms of national legislation the over-all responsibility for safety and health in the establishments rests with the employer.

45. The experts, after prolonged consideration on the responsibilities of workers, resolved that the instrument should provide that workers likely to be exposed to environmental contaminants accept responsibility in conforming to safety procedures as agreed between employers and workers.

Responsibilities of Manufacturers

46. The experts recognised that manufacturers of equipment which might pollute the atmosphere of the workplace have an important role in the prevention of atmospheric pollution in the working environment. After reference to the provisions
of the Guarding of Machinery Convention, 1963 (No. 119), particularly on the
prohibition of the sale, hire and transfer in any other manner of machinery without
appropriate guards, the experts agreed that the proposed instrument should provide
for effective consultations to take place between the manufacturers and users of
equipment that might cause atmospheric pollution of the working environment. The
objective of this provision would be to develop precise specifications for
equipment, such as emission standards, thus enabling the users of the equipment to
take the appropriate measures for the prevention of atmospheric pollution in the
working environment.

General Environment

47. Subject to the requirement of the appropriate competent authority, the
experts agreed that measures taken to control atmospheric pollution in the working
environment should not be detrimental to the general environment. The experts
further agreed that the responsibility for this provision rests with the employer.

Other Provisions

48. The experts observed the development of international initiatives
towards the resolution of problems related to the identification, transport and use
of dangerous substances. It was noted with satisfaction that several international
organisations had recommended a system of classification and labelling of these
substances for application in their transportation.

49. With this in mind, the experts agreed that the instrument should provide
that industrial substances classified as toxic and which might become airborne in
the working environment should be labelled giving warning of their hazard and
measures to be adopted for their safe use.

50. After emphasising that priority should be given to the use of engineering
measures, the experts then went on to examine in detail the administrative measures that could be taken for the protection of workers who are potentially over exposed to atmospheric pollution in the working environment. They
were agreed that the instrument could, in this regard, refer to measures such as the
reduction of the hours of work, the limitation of overtime, the transfer of the
exposed worker to alternative work or alternating work schedules, special leave,
early retirement, etc. One expert opposed the inclusion of special leave among
these measures.

51. The experts agreed that member States should make provision to ensure
that there is adequate environmental monitoring and medical supervision of workers
in small establishments who are exposed to atmospheric pollution in the working
environment.

52. The experts considered that the implementation of the provisions of the
instrument should not affect the rights of workers under national social security
legislation or social insurance schemes.

53. Having examined the question above, the experts decided to summarise, in
an appendix to the present report, the various points that could be included in an
international instrument.

Other Possible Activities for the ILO

54. The experts recognised the need to increase the effectiveness of the
exchange of information on the results of research conducted in various countries on
industrial toxicology in addition to new data on "maximum allowable concentrations"
and "threshold limit values". They recommended that the ILO should act as a centre
for the collection and dissemination of information and in particular mentioned the
possibility that the activities of the International Occupational Safety and Health
Information Centre (CIS) be reinforced in this respect.

55. Among the problems raised in the control of atmospheric contaminants in
the working environment, those related to the reproducibility and comparability of
results as well as the reliability of apparatus used in determining the concentrations of pollutants are of primary importance. The experts recognised the difficulties caused by limitation of the choice and the operation of methods and unanimously agreed on the need to set up reference laboratories. These reference laboratories could: develop sampling and analytical techniques; prepare standardised samples to enable the checking and calibration of apparatus used in other laboratories; establish relationships between different sampling and analysis methods to enable the comparison of results; and facilitate the exchange of information between national laboratories in order to check and, if possible, harmonise the equipment and methods used.

56. Experts drew attention to the problem, which is being increasingly encountered, of hypersensitivity in workers exposed to certain pollutants of the working environment. It was considered that hypersensitivity was an important factor in setting permissible levels. As the problem is not well understood, it was recommended that the ILO, in collaboration with WHO, convene a meeting of experts in order to examine this matter and provide advice to member States.

57. On several occasions, the experts illustrated the difficulty in relying on precise criteria for setting maximum allowable concentrations. It was emphasised that these criteria often differ from one country to another. Reference was made to the work already done in this field by the ILO and the WHO, as well as that work carried out by the Joint ILO/WHO Committee on Occupational Health. The experts recommended that the Committee should, in the near future, again examine these matters with a view to advancing the harmonisation of recommended values. It was suggested that this could be achieved by improved knowledge of the definition and criteria to be used in these determinations.

58. Experts posed the question of the utilisation of threshold values in countries with special problems of climate (e.g. tropical climate) and altitude. They recommended that the ILO/WHO Joint Committee on Occupational Health might also be asked to examine this matter with a view to providing the countries concerned with information and guidance.

Geneva, 27 November 1973

(signed) N. Mitchell.

Chairman,

(signed) E. Farhi.

Rapporteur,
APPENDIX

Summary of Items for Possible Inclusion in an International Instrument

Scope

1. The proposed international instrument should be applicable to all activities involving exposure of workers to pollutants in the working environment, including self-employed workers.

Permissible Levels

2. The exposure of workers to atmospheric pollutants in the working environment should be reduced to the lowest possible levels by feasible engineering measures and/or feasible administrative measures.

3. Permissible levels for atmospheric pollutants in the working environment for all airborne substances with adverse effects on health should be adopted on a priority basis by the competent authorities.

4. The competent authority should take steps to ensure that, before a new substance which may become airborne in the working environment is used, an effective evaluation of its potentially adverse properties has been made in accordance with agreed procedures.

5. In setting permissible levels for atmospheric pollutants in the working environment, the competent authority should establish the criteria for determining the degree of exposure of workers to these pollutants. The permissible levels should be regarded as indicators in the supervision of the working environment and the technical prevention and control measures required.

6. The competent authority should review at regular intervals permissible levels taking into account scientifically validated data available from both national and international sources.

Preventive and Protective Measures

7. Feasible engineering measures for the reduction of atmospheric contaminants in the working environment may include:

   (a) approval systems for the design of new plant and modifications to existing plant including reference to emission standards and requirements for maintenance;

   (b) substitution of harmful substances by less harmful or harmless substances;

   (c) the use of raw materials which satisfy agreed standards or specifications;

   (d) adoption of an alternative work process;

   (e) enclosure and isolation of the work process;

   (f) mechanisation and remote control of the work process;

   (g) use of wet methods in dust processes or operations;

   (h) local exhaust ventilation systems;

   (i) dilution ventilation systems; and

   (j) emergency procedures in the event of mass escape of atmospheric pollutants.

8. Where feasible engineering measures are inadequate to deal effectively with exposure to atmospheric pollutants in the working environment, consideration could be given to administrative measures including:
reduction of working hours;
limitation of overtime;
reassignment to alternative employment;
alternating work schedules;
special leave;
lowering of retirement age.

9. When feasible engineering and/or feasible administrative measures fail to reduce exposure to atmospheric contaminants in the working environment to that required by the competent authority, a programme for the protection of the health of workers as approved by the competent authority should be introduced. The programme may include: regular monitoring programmes; medical supervision; the issue, use and maintenance of approved personal protective devices and clothing; and programmes for the adequate instruction of the workers in the use of these devices and clothing.

10. Where methods of collective protection are inadequate to reduce effectively exposure of workers to atmospheric pollutants in the working environment, particularly during maintenance procedures, special attention should be given to the need for personal protection. The type of personal protection should be related to the nature of exposure. The competent authority should establish procedures for the approval of personal protective equipment.

Monitoring

11. The experts agreed that member States should ensure that monitoring and supervision of atmospheric pollutants in the working environment is undertaken on a regular basis.

Medical Supervision

12. Where there exists a potential exposure of the worker to atmospheric contaminants in the working environment that may have adverse effects on his health, arrangements should be made for medical supervision in accordance with procedures laid down by the competent authority. Medical supervision should include:

(a) full pre-assignment medical examination;
(b) periodic screening specific to the type of exposure;
(c) post-employment medical examinations.

In medical supervision, special consideration should be given to the worker with problems of special susceptibility.

13. Any measures taken as a result of medical supervision including transfer of the worker to another form of employment should not result in any financial disadvantage to the worker or affect his security of employment.

Competent Person

14. Employers should appoint competent persons on matters relating to the prevention and control of atmospheric pollutants in the working environment.

15. Member States should take steps to provide training programmes in occupational hygiene which will ensure that persons qualified at both professional and technical levels are available to implement fully the provisions of this instrument.
Notification

16. In order that the competent authorities may grant authorisation and prescribe measures to be adopted in work processes involving the exposure of workers to specified pollutants, member States should take steps to ensure that employers notify their intended use of such processes.

17. All new substances which may become airborne in the working environment should be toxicologically evaluated and notification made to the competent authority in accordance with procedures set down.

Labelling

18. Member States should take steps to ensure that toxic substances that may be present as atmospheric pollutants in the working environment are classified as poisons and, where appropriate, labelled with a warning of their health hazard and precautions for their safe use.

Inspection

19. Member States should take steps by means of appropriate inspection services to ensure that the provisions of the instrument are implemented.

Education, Training and Information

20. (a) The workers, when taking up new employment, should be fully informed on the potential hazards to which they are exposed and be instructed on the measures taken to prevent these hazards.

(b) All persons concerned, at every level of management and on the shop floor, should be fully informed of the nature of the hazard of the atmospheric pollutants and the reasons for the precautions necessary for their control.

(c) Appropriate training should be provided for physicians, engineers, representatives of employers and workers, and civil servants responsible for the administration of technical provisions.

(d) The competent authority, with the assistance of national and international organisations including organisations of employers and workers, should promote studies and collect and disseminate information relevant to the hazards of atmospheric pollutants in the working environment.

Consultation Between Employers and Workers

21. Without reducing in any way the responsibility of the employer for the prevention and control of atmospheric pollutants in the working environment, effective joint consultative arrangements should be made between employers and workers to establish procedures for ensuring the application of measures for the protection of workers against atmospheric pollutants in the working environment.

Duties of Workers

22. Workers in occupational situations where the risk of exposure to environmental contaminants may occur should accept responsibility to conform to safety procedures as agreed between employers and workers.

Design of Equipment

23. Taking into consideration the provisions of the Guarding of Machinery Convention (No. 119), there should be effective consultation between the manufacturer and the users of equipment to ensure that equipment meets performance specifications, including emission standards.
24. Subject to conditions laid down by the competent authority, the employer should be responsible for ensuring that atmospheric pollutants in the working environment do not adversely affect the general environment.