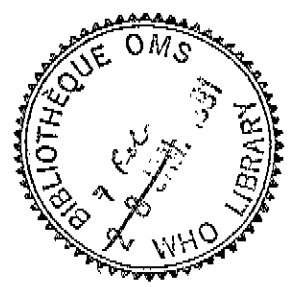


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GEMS: Global Environment Monitoring System

THE WHO/UNEP GLOBAL ENVIRONMENTAL RADIATION NETWORK (GERMON)



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UNITED NATIONS ENVIRONMENT PROGRAMME
PROGRAMME DES NATIONS UNIES POUR L'ENVIRONNEMENT

UNEP/WHO GLOBAL ENVIRONMENTAL RADIATION
MONITORING NETWORK
SCIENTIFIC ADVISORY COMMITTEE MEETING

Suzdal, USSR, 28-30 May 1990

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1. INTRODUCTION

Between 15-18 December 1987, a meeting of experts of WHO/UNEP met at Le Vesinet, France to develop the basic principles of a global environmental radiation monitoring network (GERMON) which would have the function of reporting on a regular basis environmental radiation levels, and be positioned to provide rapid and reliable radiation measurements in the event of a major radiation release. This is described in detail in the 1988 WHO Document PEP/88.8 "Basic Principles of the WHO/UNEP Global Environmental Radiation Network".

Since the above meeting the WHO Secretariat has contacted Members States to determine their interest for participating in such a program. To date, some 58 countries have indicated their willingness to become part of GERMON. Most of these are already sufficiently equipped with technical staff and resources to meet the minimum requirements for joining the network, and have designated appropriate organizations within their country to serve as national Liaison Institutions. A number of developing countries, who are interested in participating have advised, however, that they lack as yet the desired minimum capability and would require assistance to participate actively.

A follow-up meeting of the GERMON Scientific Advisory Committee composed of representatives from five WHO Regions, the Coordinating Collaborating Centre (CCC), and the WHO Secretariat, met in Suzdal, USSR between 28-30 May 1990, to finalize the structure of the network, and to outline a plan for putting GERMON into operation as soon as possible. (See Annexes 1 & 2 for the agenda and list of participants). Dr. K. Lokan of Australia chaired the meeting, Dr. P. Pellerin of the SCPRI (CCC) served as Vice Chairman and Dr. J. Broadway of the USA served as Rapporteur.

The Committee examined in detail the responses from countries who replied to the WHO invitation. Of the 58 countries who responded, it appears that about 40 will be able to contribute actively to GERMON, and that these are distributed reasonably throughout the world. This number is more than adequate to establish GERMON without delay. The members of the Committee outlined their own programs as examples of typical national participation in GERMON, and each offered their support by serving as Regional Coordinating Centres to provide additional regional coordination and support technical assistance to Member States which indicate such a need. The individual reports of the SAC members are available from WHO upon request.

Since 1969, the WHO Collaborating Centre/International Reference Centre for Radioactivity at Le Vesinet (SCPRI) has coordinated a limited network of reporting institutions, who have monitored residual radioactivity from earlier nuclear weapons tests. The Committee recommended that the Le Vesinet Centre become the coordinating Collaborating Centre for GERMON, to carry out the collation and reporting functions outlined in PEP88/8. It was recognized that the National Air and Radiation Environmental Lab, Montgomery, Alabama which is part of the Environmental Protection Agency in the USA could make a special contribution in the area of data collation and communication protocols.

2. OBJECTIVES OF THE GLOBAL ENVIRONMENTAL RADIATION MONITORING NETWORK (GERMON)

2.1 GERMON will regularly provide selected information on levels of radioactivity in the environment, from as many countries as possible, which is needed by governments and the scientific community for the assessment of the impact of radioactive contamination on public health and on the environment.

2.2 GERMON will provide, with minimum delay, information on environmental radiation resulting from a major release of radioactive material. The information would improve national authorities knowledge of the radiological situation in other countries and hence enable them to take effective remedial action.

2.3 GERMON will help countries that do not currently monitor environmental radiation to do so. This would enable governments to assess the situation in the event of a major radioactivity release affecting their territory.

2.4 GERMON will improve the quality and compatibility of data generated by countries by their monitoring programmes on environmental radioactivity.

3. CONCEPT AND DESIGN OF GERMON

GERMON is based largely on existing national programmes for monitoring environmental radiation and for dealing with major releases of radioactivity. In order to meet the objectives 2.1 to 2.4 above, GERMON has four main features:

- i) The ability to collect, compile and disseminate information on environmental radiation;
- ii) The ability to provide an international alert in cases of unusual increases in environmental radiation;
- iii) The ability to collect, compile, and exchange relevant information rapidly during radiation emergencies on a harmonized basis; and
- iv) the ability to improve the quality of measurements, and the harmonization of sampling and reporting, in all participating countries.

GERMON is "low-cost"; it depends mainly on existing mechanisms such as the the Global Environmental Monitoring System (GEMS) of UNEP, the WHO Environmental Radioactivity Monitoring Network, the system of WHO Regional Offices, the WHO Collaborating Centres and the available communication links.

4. STRUCTURE OF GERMON

GERMON is part of GEMS and contains the following elements:

- i) WHO Headquarters and Regional Offices, and UNEP Headquarters;
- ii) a Scientific Advisory Committee (SAC)
- iii) a Coordinating Collaborating Centre (CCC)
- iv) Regional Coordinating Centres (RCC)
- v) national Liaison Institutions (LI)

The responsibilities of each of these elements are summarized below.

4.1 WHO and UNEP

Collectively, these bodies:

coordinate the overall development and operation of GERMON; provide for liaison with IAEA, UNSCEAR, WMO and other relevant international organizations; collect and store summarized information, including the CCC bulletins, on the results of routine monitoring and disseminate it on request;

incorporate the Network into GEMS;

provide advice to Member States under both normal and emergency conditions;

support programmes of technical cooperation to strengthen the ability of developing countries to monitor environmental radiation.

In the event of a major radioactivity release to the environment, WHO/UNEP will:

receive and transfer urgent information, as far as practicable in conformity with the Convention on Early Notification of a Nuclear Accident;

activate the emergency response of GERMON;

promote the exchange of information between the elements of GERMON;

provide advice to any Member State requesting it.

4.2 Scientific Advisory Committee (SAC)

The main task of the SAC is to advise WHO/UNEP on GERMON and its developments. The Committee reviews the GERMON programme every two years. It contains one expert from each of the six WHO regions (Africa, America, Eastern Mediterranean, Europe, South East Asia, and Western Pacific). In addition there are representatives from WHO, UNEP and the CCC. The experts are appointed by WHO/UNEP in consultation with national authorities.

4.3 Coordinating Collaborating Centre (CCC)

For routine monitoring, the CCC collates the processed information from the network and issues regular bulletins on the environmental radiation situation. Processed information is provided by the national Liaison Institutions to the CCC directly. The bulletins and other summarized information are provided by the CCC directly to national Liaison Institutions, and to WHO/UNEP for distribution to other international agencies and interested Member States, if requested.

Under emergency conditions the CCC, in collaboration with other scientific groups which may be formed at the time, will compile and analyse the data coming from GERMON and provide WHO/UNEP with assessments of the radiation situation.

4.4 The Regional Coordinating Centres (RCCs)

The RCCs role is to provide technical advice and support to Liaison Institutions within their regions in starting up and interpretation of data.

4.5 Liaison Institutions

For each country only one Liaison institution is designated by the competent national authority and included in GERMON. In each case the national Liaison Institution coordinates work on environmental radiation monitoring in its own country and provides monitoring data to the CCC. The national Liaison Institution might be a medical research institute, a radiation protection service, a nuclear medicine laboratory or any other appropriate organization.

The national Liaison Institutions will gather raw data from national environmental monitoring stations or laboratories in their countries, process these data and provide processed information to the CCC. These monitoring stations and laboratories will not communicate directly with other elements of GERMON.

In the event of an emergency, the Liaison Institutions will continue to communicate directly with the CCC and provide copies to WHO.

5. OPERATIONAL FEATURES OF GERMON

5.1 Normal Conditions

5.1.1 The minimum requirements for participation in GERMON should be the ability to:

- i) measure external dose rate continuously;
- ii) provide at least weekly average values on airborne radioactivity;
- iii) provide at least quarterly average values on radioactivity in precipitation (rain, snow, dry deposition);
- iv) provide at least quarterly average values on radioactivity in milk;
- v) process the raw information at the Liaison Institution and report the processed information in standard form, once a quarter, to the CCC not later than one month after the end of each calendar quarter;
- vi) use SI units for reporting information to the CCC and indicate clearly the conditions of sampling and measurement so that data from different Liaison Institutions can be compared.

Detailed requirement for reporting are presented in Annex III.

5.1.2 Countries with developed environmental monitoring programmes undertake more comprehensive investigations routinely. They should be encouraged to supplement the basic measurements of 5.1.1 with their more detailed analyses. The choice of radionuclides and material for analysis depends upon the resources available and the contaminants present in the environment.

5.1.3 The reports from national Liaison Institutions will be summarized at the CCC for inclusion in the bulletins.

5.1.4 The bulletin will be produced annually by CCC and be distributed to all Liaison Institutions, WHO, UNEP and other relevant international organizations.

5.2 Abnormal conditions

5.2.1 A distinction should be made between the operation of GERMON during normal conditions and during those that are deemed to be abnormal. The differences only concern the functioning of GERMON and the flow of data to and from it as compared with the flow of data under the provisions of the IAEA Convention on Early Notification.

5.2.2 For most abnormal situations, GERMON will function under circumstances following notification of a release under the Convention. There may be some circumstances, however, when it will be necessary to actuate GERMON to investigate a possible release detected by one or more of its LIs. This constitutes an abnormal situation outside the Convention.

5.2.3 In an emergency, the Convention on Early Notification takes priority over any procedure described in this Report and GERMON will support the Convention by providing data on environmental radioactivity as they become available.

5.2.4 In the event of a major radioactivity release the main functions of GERMON should be to generate, and to accelerate circulation of, reliable and relevant information on the radiation situation needed for decision-making by health, environmental, or other authorities in the Member States concerned.

5.2.5 Information about an accident and/or a major radioactivity release might come to WHO/UNEP in different ways:

- i) from IAEA in accordance with the Convention on Early Notification in the Case of a Nuclear Accident;
- ii) from a Liaison Institution or from the CCC;
- iii) from a competent national authority;
- iv) from other sources (in which case the information should be verified before acceptance).

Under the Convention, in addition to informing those States that may be physically affected, IAEA has to inform relevant international organizations, including WHO and UNEP, of any accident notified to it and, on request, provide any supporting information made available by the State incurring the accident.

In addition, the CCC and any Liaison Institution may wish to report about elevated levels that have been registered in that particular country and have been regarded by the respective Member State as being of international significance. In such a case, WHO/UNEP will inform IAEA.

If an internationally significant release of radioactivity, which has not been reported according to the Early Notification Convention, is confirmed by IAEA, then the actions of WHO and UNEP that follow should be similar to those in the case of notification under the Convention and WHO will activate GERMON.

5.2.6 To activate GERMON in the case of an emergency WHO will notify the CCC and the national Liaison Institutions about the emergency. WHO may also notify through its Regional Offices Member States in their Regions.

5.2.7 Liaison Institutions should then intensify radiation monitoring in their countries so that their national authorities would be better briefed to implement emergency plans. Intensification of monitoring operations should be guided largely by the nature and extent of the radioactive contamination in the country at the time.

5.2.8 Transfer of data depends on whether the abnormal situation is covered by the Convention or not.

5.2.8.1 Accidents covered by the Convention on Early Notification.

Under the Convention, the country incurring an accident is responsible for notifying, either directly or through the IAEA, those States that may be physically affected, as well as notifying the IAEA. In these cases, the IAEA has primary responsibility for notifying the relevant international organizations, including WHO/UNEP, and providing them, on request, with information made available by the State incurring the accident, in support of its initial notification. Several features can be distinguished in the arrangements:

- i) Geographical area of coverage: the IAEA is more likely to receive information for a relatively small geographical area around the accident site: whereas GERMON, which is global in scope, provides any Member State with information of value in making decisions regarding the existing public health hazard.
- ii) Response to requests for data: based on previous experience in such accidents, many requests for data on environmental radioactivity can be expected from countries near and far from the site of the accident. Such requests for information will be met by GERMON.
- iii) Time frame of data availability: the IAEA would be expected to provide information it received from the State incurring the accident, on the conditions at, and near, the accident site for a period of time according to the provisions of the Convention. In contrast, GERMON will continue to provide information to any WHO/UNEP Member State regarding changes in ambient radioactivity for a longer time in order to answer questions relating to hazards to health.
- iv) The GTS (Global Telecommunication System) of WMO can be used for the transmission of data in GERMON, provided the appropriate data protocols are followed.

5.2.8.2 Abnormal occurrences not covered by the IAEA Convention on Early Notification.

If a Liaison Institution detects a significant change in radiation level but no accident has been notified under the Early Notification Convention, the Liaison Institution may wish to keep informed of its findings. Advice and relevant information may be provided by WHO and CCC to Liaison Institutions.

5.2.9 Under abnormal conditions:

- i) all urgent information received by WHO/UNEP, if not marked "confidential", should be passed to their Regional Offices, IAEA, FAO, the CCC and Liaison Institutions; and
- ii) Liaison Institutions are under no binding obligation to provide emergency information to WHO/UNEP, CCC or any other Liaison Institution.

6. CONCLUSIONS AND RECOMMENDATIONS FOR PUTTING GERMON INTO OPERATION

The Scientific Advisory Committee of GERMON recommends:

- . That GERMON be established as soon as possible, based on existing Liaison Institutions with recognized competence in environmental radiation monitoring.
- . That the Le Vesinet SCPRI become the CCC for GERMON.
- . That the activity presently carried out within the existing network of environmental monitoring coordinated by SCPRI in Le Vesinet be continued.
- . That the GERMON network be exercised from the beginning by providing routine quarterly radiation reports to the CCC.
- . That the proposed target date for the first collation of routine reports is January 1991 covering the final quarter of 1990.
- . That data be provided to CCC in standard form, as indicated in Annex III.
- . That telefax is the preferred means of communication between LI's and CCC.

That the secretariat be asked to investigate the mechanism for use of the GTS system of WMO for data transmission between LI's and the CCC.

That there is regular two way communication of data between the LI's and the CCC.

That WHO write to all countries who have indicated an interest, inviting them to start participation in GERMON.

That the CCC provide reference Cs-137 filters to all national Liaison Institutions to provide an intercalibration of measurements.

That for abnormal situations, GERMON should switch from its routine quarterly reporting mode to an enhanced frequency of reporting to be determined by each Liaison Institution in consultation with the CCC, on its own region.

That the minimum requirements for an effective Liaison Institution outlined in Annex IV would exceed the present capabilities of some developing countries, whose participation was desirable in the network to provide adequate geographic coverage. WHO/UNEP with the assistance of IAEA should conduct training courses in relevant regions to ensure an appropriate level of technical expertise so that reliable measurements and interpretations can be maintained.

That WHO/UNEP in cooperation with IAEA provide some financial support in those cases mentioned above for the purchase and maintenance of necessary measurement equipment.

That Regional Coordinating Centers, generally in more developed countries, have an important role to provide technical advice and support to ensure that equipment continues to function and to assist in the interpretation of the data, when it is requested.

The provisions of the Early Notification Convention impose specific requirements to which all participants in GERMON must give priority attention, especially in the period immediately following the release.

That while GERMON would directly involve those countries with national institutions that can meet the minimum requirements for participation, any WHO/UNEP Member State would be able to receive information resulting from the operations. Some Liaison Institutions, especially those serving as Collaborating Centres, should continue to provide with support where appropriate training courses and fellowships for young scientists from developing countries.

That collated data from abnormal occurrences should be summarized annually and published as a supplement to the bulletin.

That once the major part of GERMON is in operation, preparedness for information transfer under abnormal conditions should be tested, as feasible, and within available resources.

That at suitable intervals, as decided by the Scientific Advisory Committee, the data from GERMON should be reviewed on a global basis to characterize the radiation environment at that scale and to reveal changes and developments. This task should be undertaken by the CCC in collaboration with other bodies, as appropriate.

7. ACKNOWLEDGMENT

The SAC Group expressed its gratitude to the centre for International Projects of the USSR State Committee on Environmental Protection for assistance in organizing the meeting and for its hospitality.

UNEP/WHO Global Environmental Radiation
Monitoring Network (GERMON)

ANNEX I

Scientific Advisory Committee Meeting

Suzdal, 28-30 May 1990

Agenda

Monday, 28 May

- 1015 Opening of the meeting (I.S. Riaboukhine)
 Address on behalf of CIP (V. Rezepov)
 Objectives of the meeting and the layout of its report to be produced by
 the participants (I.S. Raboukhine)
 Election of Chairman, Vice Chairman and Rapporteur
 Adoption of the agenda
- 1045-1100 Response of countries to the invitation for joining GERMON
 (I.S. Riaboukhine)
- 1100-1230 Examples of planned participation in GERMON:
- | | | |
|-------|----------------------------|---|
| WPRO | (W.Pacific) | Australia (K. Lokan) |
| SEARO | (S.E.Asia) | India (S. Soman) |
| AFRO | (Africa) | Kenya (S. Oyoo) |
| EMRO | (Eastern
Mediterranean) | Tunisia (H. Gharbi)
submitted in writing |
| AMRO | (Americas) | USA (J. Broadway) |
| EURO | (Europe) | USSR (V. Lystov) |
- 1330-1500 Lunch
- 1500-1630 Tour of Suzdal
- 1630-1700 Possible role of the Coordinating Collaborating Centre in GERMON
 (P. Pellerin)
- 1700-1800 Discussion of the structure and function of GERMON
- 1800-1900 Discussion on the plan for putting GERMON into operation

Tuesday, 29 May

0900-0930 Breaking into two working subgroups to produce the report of the meeting;
 nomination of rapporteurs

0930-1030 Work on the report in the subgroups:

 1) GERMON: Structure and Function
 2) Plan for putting GERMON into operation

1030-1045 Coffee break

1045-1230 Continuation of work in the subgroups

1230-1400 Lunch

1400-1530 Continuation of work in the subgroups

1530-1545 Coffee break

1545-1700 Reports of rapporteurs on the progress in their subgroups

Wednesday, 30 May

0900-1000 Discussion of the draft report of the meeting

1030-1015 Coffee break

1045-1230 Finalization of the draft including summary report and annexes

1230-1430 Lunch

1400-1530 Adoption of the final draft report

1530-1545 Coffee break

1545-1645 Outcome of the meeting:

 - Summary (Chairman)

 - Speakers from experts

 - Speakers from observers

1645-1700 Closing ceremony

UNEP/WHO Global Environmental Radiation
Monitoring Network (GERMON)

Scientific Advisory Committee Meeting

Suzdal, 28-30 May 1990

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UNEP/WHO Global Environmental Radiation
Monitoring Network (GERMON)

Annex III

Scientific Advisory Committee Meeting

Suzdal, 28-30 May 1990

GERMON DATA TRANSMISSION FORM

Identification: Name of Laboratory: _____

Tel No. _____ Fax No. _____ Telex No. _____

City _____ State or Province _____ Country _____

Period year _____ From _____ To _____

RESULTS

1. Ambient Gamma-Radiation

Background - Average: _____ nGy/h _____
Elevated values in nGy/h and dates _____

2. Air Activity - Weekly Average, Bq/m³ (specify kind of radioactivity)

Total Beta Background _____ Bq/m³
Total Alpha Background _____ Bq/m³

Elevated values in Bq/m³ and dates (specify radionuclides)

EMERGENCY ONLY: Presence of Radioiodine: Yes ___ No ___ Value if possible _____
Presence of Radiocaesium: Yes ___ No ___ Value if possible _____

3. Precipitation (rain, snow, dry precipitation): Quarterly Average, Bq/m²
(specify radionuclides)

1st Mo. _____ 2nd Mo. _____ 3rd Mo. _____ Bq/m² (if data available)

EMERGENCY ONLY: Presence of Radioiodine: Yes ___ No ___ Value if possible _____
Presence of Radiocaesium: Yes ___ No ___ Value if possible _____

4. Milk: Quarterly Average, Bq/l (specify radionuclides)

1st Mo. _____ 2nd Mo. _____ 3rd Mo. _____ Bq/l (if data available)

EMERGENCY ONLY: Presence of Radioiodine: Yes ___ No ___ Value if possible _____
Presence of Radiocaesium: Yes ___ No ___ Value if possible _____
Presence of other nuclides: Yes ___ No ___ Value if possible _____

5. Quarterly Dosimeter: transmitted by post to Le Vesinet on _____ date

6. Meteorological Data: Dominant direction wind is directed from _____
average temperature (quarterly) _____ presence of snow: Y-N

NOTES:

- a) Period: legal quarter of the year (1st January to 31 March, etc.). This form must be sent to Le Vesinet preferably by Telefax to reach Le Vesinet not later than 30 days after the end of each quarter.
- b) Background and Elevated Values Definitions: The background is defined under responsibility of the laboratory. It can be a projection which is confirmed by local dosimetry. "Elevated Values" are 3 times higher than the average value.
- c) Emergency Situation: To fill only if there is a "yes" answer. If "yes", the activity should be specified if possible. The immediate information by any appropriate means to Le Vesinet is needed to inform WHO.
- d) Precipitation: the standard volume of the beaker is 1 l.
- e) Milk: fluid milk must be collected in a mass production facility which gives the best representation of consumption.
- f) Dosimeter: integrating dosimeters (TLD and films) will be provided, free of charge except for postage, by Le Vesinet.
- g) Meteorology: These raw data are to be provided by local meteorological service.

UNEP/WHO Global Environmental Radiation
Monitoring Network (GERMON)

ANNEX IV

Scientific Advisory Committee Meeting

Suzdal, 28-30 May 1990

EQUIPMENT REQUIREMENTS FOR PARTICIPATION IN GERMON

INTRODUCTION

The purpose of this annex is to describe the equipment that participating countries must utilize to meet the monitoring requirements for GERMON. Minimal equipment is given below as Level I and a more desirable type of equipment is designated Level II. In either case, care must be taken to insure that equipment operators are fully trained in the usage of all equipment.

LEVEL I - EQUIPMENT DESCRIPTION

Gamma Ray Dose Measurement

Thermoluminescent dosimeters which integrate three month (quarterly) absorbed dose (tissue equivalent) with a sensitivity of 0.1 mGy per quarter. SCPRI has already agreed to provide this service without charge to all LIs in the GERMON program.

Air Particulate Measurement

Fixed filter paper using low volume (20-50 l/min) air samples for a typical 18 hour sampling interval. It is counted after 2 days delay with a system background not greater than 10 cpm for gross beta and 1 cpm for gross alpha. Filter disks shall be stored for 15 days and counted on a NaI system to determine the presence or absence of ^{131}I or ^{137}Cs (yes or no).

Milk and Precipitation Monitoring

Both of these measurements are accomplished by gamma spectrometry using a minimum 2 inch diameter NaI crystal detector with a Marinelli style beaker of one liter capacity and with a minimum two inch lead shield. This system must be calibrated using a reference ^{137}Cs source supplied by SCPRI at no cost.

LEVEL II - MOST DESIRABLE EQUIPMENT DESCRIPTION

GAMMA RAY DOSE MEASUREMENT

Continuous measurement of gamma background using a pressurized ionization chamber, scintillation counter, or GM style counter having a detection limit of about 0.06 $\mu\text{Gy/h}$ and a sensitivity to measure changes about 0.02-0.03 $\mu\text{G/h}$.

Air Particulate Measurement

Same as for Level I above. Some LIs may be better equipped to monitor gross alpha radioactivity on filter paper and in those cases individual institutions may wish to consider measurement of gross alpha. However, because of the problem of obtaining reliable values of gross alpha from filter paper, such measurements are not recommended as a normal component of the data submission.

Milk and Precipitation Monitoring

A Ge detector replaces the NaI detector given above for Level I. The detection capacity shall be a minimum of 10 Bq per litre of sample volume.