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GLOBAL ENVIRONMENT MONITORING SYSTEM

**GEMS
REPORT SERIES
NO. 13**

**NAIROBI
JUNE 1992**

UNEP/WHO

GERMON

Global Environmental Radiation Monitoring Network

**Report of the Scientific Advisory Committee Meeting
Montgomery, Alabama, USA, 27-30 April 1992**



**UNITED NATIONS
ENVIRONMENT PROGRAMME**



**WORLD HEALTH
ORGANIZATION**

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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".

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, Russia, between 28-30 May 1990. It finalized the structure of the network and recommended that GERMON be put into operation. A standard form for transmission of data was developed and minimal requirements for equipment were set out. The proceedings of the meeting are contained in the WHO document PEP/90.19.

To date, some 58 countries have indicated their willingness to become part of GERMON. About 40 of these have technical staff and equipment to meet the minimum requirements for joining the network, and about 30 have designated appropriate organizations within their country to serve as national Liaison Institutions for GERMON. Sixteen countries are now providing data on a regular basis to the CCC at SCPRI in Le Vesinet, France. Thirty-two countries responded to the request of WHO for readiness to take part in a IAEA radiation emergency exercise. However, early experience in the operation of GERMON has revealed a need to improve its functioning so that it becomes more efficient and has more countries involved in the transmission of data. It should be noted also that a number of developing countries which are interested in participating, lack the desired minimum capability at this stage and would require assistance to participate actively.

The present meeting has been held in Montgomery, Alabama, USA at the National Air and Radiation Environmental Laboratory between 27 April 1992 and 30 April 1992, with the purpose of reviewing GERMON. One important topic considered was the implementation of GERMON in the Americas. Particular attention was given to the need for better coordination with IAEA in responding to the Convention on Early Notification, to the role of the CCC, to forms of data transmission, etc.

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

2.1 GERMON will regularly provide, from as many countries as possible, information about levels of radioactivity in the environment 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. Such information would improve national authorities understanding of the radiological situation in other countries and hence enable them to take effective remedial action on their own.

2.3 GERMON will help countries who 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 through their environmental radioactivity monitoring programmes.

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 Global Environment Monitoring System (GEMS) co-ordinated by UNEP, the WHO network of 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 and 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 country requesting it.

4.2 Scientific Advisory Committee (SAC)

The main task of the SAC is to advise WHO and 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 and 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 and UNEP for distribution upon request to other international agencies and interested countries.

Under emergency conditions the CCC, in collaboration with other scientific groups which may be formed at the time, will compile and analyze the data coming from GERMON and provide, in a timely way, WHO and UNEP, Liaison Institutions and the IAEA with assessments of the radiation situation.

To ensure uniformity of data coming from the Liaison Institutions, the CCC will implement a quality assurance programme. This will include:

- the distribution of reference standards;
- the definition of measurement protocols;
- periodic external dosimetry intercomparisons, and periodic activity samples for intercomparisons.

4.4 The Regional Coordinating Centres (RCCs)

The RCC's role is to provide technical advice and support to Liaison Institutions within their regions in formation of the Institution and in the interpretation of data.

It will be the responsibility of the RCCs to develop and carry out training programmes to ensure that all LIs in their region have the capability to provide reliable data to GERMON. This will include practical training courses, staff exchanges and the distribution of up-to-date material on measurement methodologies and equipment.

4.5 Liaison Institutions

As a rule, 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 and to WHO. 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 original data from national environmental monitoring stations or laboratories in their countries, process these data and provide processed information to the CCC and to WHO. 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 at any time;
- 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 and to WHO not later than one month after the end of each calendar quarter;
- vi) use SI units for reporting information and indicate clearly in an attachment to the transmission form, the conditions of sampling and measurement so that data from different Liaison Institutions can be compared.

Detailed requirements for reporting are presented in Annex III.

5.1.2 Countries with well-developed environmental monitoring programmes routinely undertake more comprehensive investigations. 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 bulletins which 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 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. During periods of monitoring of abnormal conditions, data will be sent by the Liaison Institutions to the CCC by the normal means, the difference being that data will be sent more frequently and additional items may be included.

5.2.2 For most abnormal situations, GERMON will be activated (see section 5.2.6) under circumstances following notification of a release under the Convention (see section 5.2.8.1). There may be some circumstances, however, when it will be necessary to activate GERMON to investigate a possible release detected by one or more of its LIs. This constitutes an abnormal situation outside the Convention (see section 5.2.8.2).

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 countries 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 such as Non-Governmental Organizations or the media (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 is required 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 country incurring the accident. In addition, the CCC and any Liaison Institution may wish to report upon elevated levels that have been registered in that particular country and which have been regarded by the country 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 of the emergency. WHO may also notify countries in particular Regions through its Regional Offices.

5.2.7 Liaison Institutions should then intensify radiation monitoring in their countries so that their national authorities are 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 The transfer of data:

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 and 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 country with information of value in making decisions regarding the potential public health hazard.
- ii) Response to requests for data: It is expected that IAEA, WHO and UNEP will receive requests for data on environmental radioactivity from many countries; GERMON will respond. Data will be provided as quickly as possible. If the desired data are not immediately available, a clear acknowledgement of receipt of the request will be sent within 12 hours.
- iii) During the period following an accident, CCC will distribute data on a routine basis to all LI's.
- iv) Time frame: The IAEA will provide information about the characteristics and progress of a situation as specified in articles 4 and 5 of the Convention. GERMON will continue to provide information on radioactivity in the environment in the following months and years.
- v) Mode of communication: Each country must develop the most effective means of communication with the CCC.

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 reported under the Early Notification Convention, the Liaison Institution should inform the CCC and/or the RCC of its findings. Advice and relevant information will be provided by the CCC to Liaison Institutions.

5.2.9 Under abnormal conditions:

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

6. FURTHER DEVELOPMENT OF GERMON

6.1 GERMON should expand its data acquisition capacity to include new members. For example, several new monitoring stations throughout the Americas would provide an improved global coverage of radiation monitoring data of air, water and milk.

6.2 Brazil, Mexico, Peru and Venezuela have expressed their willingness to participate in GERMON.

6.3 Several laboratories in the above mentioned countries already have the capability to comply with GERMON requirements regarding minimum laboratory equipment to collect and measure environmental samples and have sufficient technical staff to accomplish routine environmental data measurements. Summary tables are presented in Annex V.

6.4 Brazil

6.4.1 The Liaison Institution for Brazil is the "Instituto de Radioprotecao e Dosimetria" (IRD) in Rio de Janeiro.

6.4.2 In 1991 the IRD established in Rio de Janeiro a sample collecting pilot station following GERMON recommendations. This station will be used as a reference and model for the rest of the country. In the near future an environmental radiation monitoring network will be established consisting of six stations. In 1992 the following institutions will be requested to participate: the Nuclear Power Plant

of ANGRA, Rio de Janeiro"; "Instituto de Pesquisas em Energia Nuclear", Sao Paulo, and "Centro Brasileiro de Tecnologia Nuclear", Belo Horizonte.

6.5 Mexico

6.5.1 It is proposed that the " Dirección General de Salud Ambiental de la Secretaria de Salud", be the Liaison Institution.

6.5.2 Mexico at the present moment has three laboratories that collect environmental radiation monitoring data. They belong to the following entities: the "Comisión Federal de Electricidad", the "Instituto Nacional de Investigación Nuclear" and the "Comisión Nacional de Seguridad Nuclear y Salvaguardias". The sampling stations are near the nuclear power plant Laguna Verde and Mexico City.

6.6 Peru

6.6.1 The proposed Liaison Institution is: the "Instituto Peruano de Energia Nuclear, Dirección General de Seguridad Radiológica, Division de Control Ambiental" (IPEN).

6.6.2 The IPEN has three environmental radiation monitoring stations in: Lima, Arequipa and Huancayo. They perform gross beta counting and gamma spectrometry of airborne radioactivity weekly. In addition the Lima station measures gross beta and gamma spectrometry of soil; drinking, underground and surface water; milk; forage; agricultural products and river sediments. In the near future, the IPEN will implement an environmental airborne monitoring network consisting of a total of seven stations.

6.7 Venezuela

6.7.1 In Venezuela the laboratory interested in the GERMON programme is the: "Universidad Simón Bolívar, Sección de Física Nuclear, Laboratorio de Medición de Bajos Niveles de Radiación"

6.7.2 There are two other institutions in the country that will be asked to participate as well, namely: "Instituto Venezolano de Investigaciones Cientificas (IVIC), Radiofisica Sanitaria" and the "Universidad Central de Venezuela". The laboratories in these three institutions are currently prepared to measure the radiation level in environmental samples (mainly milk, rain water and foodstuff). The sampling stations are near Caracas.

6.8 The capabilities and expertise of these countries would be enhanced by: additional staff training, the implementation of a quality assurance programme to ensure the reliability of the data, the establishment of a computerized data bank to process and store the available information and some additional equipment such as a TLD system. Because the communication system often suffers interruptions, a better communication system should be explored.

6.9 The following specific needs have been identified:

6.9.1 The need for a training course to be organized and held in Spanish in the American region.

6.9.2 A Regional Coordinating Centre for GERMON in the Americas to provide participating countries with technical advice and support. It is suggested that this center be located in Montgomery, Alabama with EPA/NAREL as the lead agency.

6.9.3 Financial support to ensure the continuity of the monitoring programme.

6.10 It is envisaged that the PAHO/WHO offices in these countries will play a major role in the development of GERMON, especially in facilitating the distribution of reference environmental samples and technical information.

7. CONCLUSIONS AND RECOMMENDATIONS

The Scientific Advisory Committee of GERMON recommends that:

- every member of GERMON will have an established Quality Assurance (QA) programme.
- liaison institutions may provide data to GERMON at two levels. As a minimum, summary data for their country should be provided to WHO and to the CCC in the standard format presented in Annex III(a). More detailed information in the format presented in Annex III(b) may be provided to the CCC. This is particularly important for very large countries which will need to provide details from up to ten geographically dispersed measurement locations in order to ensure an adequate global coverage to meet the needs of GEMS.
- data on routine monitoring should be summarized in a bulletin to be issued annually by the CCC.
- all countries should use the most efficient means of communication in the event of an emergency.
- the CCC should provide support to national Liaison Institutions by making available reference sources and intercomparison samples to ensure the uniformity of measurements throughout the system.
- WHO and UNEP, with the assistance of IAEA, should continue to conduct training courses in relevant regions to ensure an appropriate level of technical expertise within GERMON so that reliable measurements and interpretations can be maintained.

- . WHO and UNEP in cooperation with IAEA should provide some financial support in those cases mentioned above for the purchase and maintenance of necessary measurement equipment.
- . Regional Coordinating Centers should provide training, technical advice and support to ensure that equipment continues to function and to assist in the interpretation of the data, when it is requested. Some Liaison Institutions, especially those serving as Regional Collaborating Centres, should continue to provide, with support where appropriate, training courses and fellowships for young scientists from developing countries.
- . while GERMON would directly involve those countries with national institutions that can meet the minimum requirements for participation, any country should have access to information resulting from the GERMON operations.
- . once the major part of GERMON is in operation, readiness for information transfer under abnormal conditions should be tested, as feasible, and within available resources in collaboration with IAEA.
- . at suitable intervals, determined 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.
- . the National Air and Radiation Environmental Laboratory (NAREL), Montgomery, Alabama, U.S.A., and the Australian Radiation Laboratory, Melbourne, Australia, should be formally designated as Regional Collaborating Centres by both UNEP and WHO.
- . the possibility of establishing a Regional Coordinating Centre for Africa based on the Radiation Protection Service of the Public Health Ministry, Rabat, Morocco should be explored.
- . the NAREL, Montgomery, Alabama, U.S.A., should enter into a formal memorandum of conversation with the regional Radiological Health (HSD/RAD) Programme of PAHO/WHO.
- . Mexico, Peru, Russia and Venezuela should be added to the list of national Liaison Institutions.

8. ACKNOWLEDGMENTS

The SAC Group expressed its gratitude to the National Air and Radiation Environmental Laboratory, the United States Environmental Protection Agency and Auburn University at Montgomery for their assistance in hosting and organizing the meeting and for the warm hospitality which they have shown.

AGENDAMonday, 27 April

- 0830 Opening of the meeting (M.D. Gwynne)
 Address on behalf of hosting Institution - S. T. Windham, Director of NAREL, Margo. T. Oge, Director, Office of Radiation Programs, EPA, and Col. Adams, Maxwell Air Force Base
 Objectives of the meeting and the layout of the report to be produced by the participants (I. Riaboukhine)
 Election of Chairman, Vice Chairman and Rapporteur
 Adoption of the agenda
- 0900-0920 Place of GERMON in the Global Environment Monitoring System (M.D. Gwynne)
- 0920-0940 Status of GERMON (I. Riaboukhine)
- 0940-1010 Coffee Break
- 1010-1215 Experience of participation in GERMON and requirement for improvement
 Argentina (J. Skvarca)
 Australia (K. Lokan)
 Ethiopia (H. Wolde)
 Indonesia (S. Soekarno)
 Morocco (Y. Charif)
 Romania (C. Milu)
 USA (J. Broadway)
- 1215-1345 Lunch
- 1345-1400 Briefing on Maxwell Air Force Base (A. Easterling)
- 1400-1530 Development of GERMON in the Americas reports from: Brazil, Canada, Mexico, Peru, Venezuela
 Summary by Dr Cari Borrás
- 1530-1545 Coffee Break
- 1545-1630 General discussion on revisions in GERMON

Tuesday, 28 April

- 0830-0900 Breaking into working subgroups to produce the report of the meeting; nomination of rapporteurs in the subgroups;
GERMON under normal conditions
GERMON in the event of a radiation emergency
Development of GERMON in the Americas (observers from the Americas are also invited to this subgroup)
- 0930-1030 Work on the report in the subgroups
- 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
- 1545-1715 Continuation of work in the subgroups

Wednesday, 29 April

- 0900-0915 Role of the Coordinating Collaborating Centre (P. Pellerin)
- 0915-0930 Discussion on CCC
- 0930-0945 Presentation of the draft report by Rapporteur
- 0945-1030 Supplementary comments by the subgroup rapporteurs
- 1030-1045 Coffee break
- 1045-1230 Final amendments of the draft report
- 1230-1400 Lunch
- 1400-1715 Visit to the National Air and Radiation Environmental Laboratory (NAREL)

Thursday, 30 April

0900-1030 Finalization of the Report

1030-1045 Coffee break

1045-1215 Adoption of the Report

1215-1230 Conclusions on the meeting by Chairman

1230-1400 Lunch

1400-1700 Lectures on radiation emergency facilities at NAREL

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GERMON SUMMARY DATA
(to be provided to WHO and CCC)

Country:

Identification: Name of Liaison Inst.: _____

Tel No _____ Fax No. _____ Telex No. _____

City State/Province Country No. of Stations

Period year From To

RESULTS

1. Ambient Gamma-Radiation (nGy/h)

Median: _____ nGy/h location: _____

Minimum: _____ nGy/h location: _____

Maximum: _____ nGy/h location: _____

Elevated values: (with date and location)

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

Median Beta: _____ Bq/m³ location: _____

Minimum Beta: _____ Bq/m³ location: _____

Maximum Beta: _____ Bq/m³ location: _____

Elevated values for Beta in Bq/m³, (with dates) (specify radionuclides)

Median Alpha: _____ Bq/m³ location: _____

Minimum Alpha: _____ Bq/m³ location: _____

Maximum Alpha: _____ Bq/m³ location: _____

Elevated values for Alpha in Bq/m³, (with 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 deposition): Quarterly Average, Bq/m² _____
(specify radionuclides) _____

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

Median quarterly average: _____ Bq/m² location: _____

Minimum quarterly average: _____ Bq/m² location: _____

Maximum quarterly average: _____ Bq/m² location: _____

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)

Median quarterly average: _____ Bq/l location: _____

Minimum quarterly average: _____ Bq/l location: _____

Maximum quarterly average: _____ Bq/l location: _____

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 _____

GERMON DATA TRANSMISSION FORM
(to be provided to CCC)

Country: _____

Identification: Name of Liaison Institution: _____

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

City State/Province Country No. of Stations

Period year From To

Station Lat. Long.

RESULTS

1. Ambient Gamma-Radiation (nGy/h)

Average over reporting period: _____
Elevated values (with dates)

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

Total Beta: _____ Bq/m³
Total Alpha: _____ Bq/m³

Elevated values for Beta in Bq/m³, (with dates) (specify radionuclides)

Elevated values for Alpha in Bq/m³, (with 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 deposition): 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 _____

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

a) Period: legal quarter of the year (1st January to 31 March, etc.). These forms should be dispatched, preferably by telefax, within 30 days of the end of each quarter.

b) Ambient Gamma Radiation: refers to the absorbed dose rate in air at 1 meter above the soil, measured with an appropriate calibrated dose meter (G.M. counter, ionization chambers, TLD's, etc.). Integrating dosimeters (TLD and films) will be provided, free of charge except for postage, by Le Vesinet.

c) Elevated Values: It is the responsibility of the laboratory to determine the local average background. "Elevated Values" are defined as values exceeding 3 times this average background.

d) Emergency Situation: To be completed only if there is a "yes" answer. In this case, the activity should be specified if possible. The information should be transmitted immediately by any appropriate means to Le Vesinet.

e) Precipitation: the recommended capacity of the measuring beaker is 1 litre.

f) Milk: fluid milk should be collected from mass production facilities in order to provide the best estimates of mean activity.

g) Meteorology: The raw data should be obtained from the local meteorological service and are very important in emergency situations.

h) Average value: A temporal average taken over the reporting period.

i) Median, minimum and maximum values: (Annex III(a)) are appropriate only to Liaison Institutions reporting a summary for a number of stations. The median value is the average value for the median station. The median station is that station for which half of the set of stations have values less than and half have values greater than the values at the median station. The minimum and maximum values are the minimum and maximum average values respectively, for the set of stations.

j) Location: means the name, latitude and longitude for the reporting station.

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

Portable gamma survey meters with a limit of detection of 50 nGy/h. Thermoluminescent dosimeters which integrate three month (quarterly) absorbed dose with a sensitivity of 0.1 mGy per quarter. SCPRI has already agreed to provide TLD's without charge to all LIs in the GERMON programme.

Air Particulate Measurement

Normal conditions: Fixed filter paper using low volume (20-50 l/min) air samples for a typical 24 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 ^{137}Cs (yes or no).

Abnormal conditions: The sampling interval will be reduced according to the emergency situation (10 to 120 minutes) and the counting will be done immediately. For iodine identification an appropriate sampling head containing activated charcoal will be used.

Milk and Precipitation Monitoring

Both of these measurements are accomplished by gamma spectrometry using a NaI crystal detector with a minimum diameter of 2 inches and a Marinelli style beaker of one liter capacity and a lead shield of minimum thickness of two inches. This system should be calibrated using a suitable ^{137}Cs source to be 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 50 nGy/h and a sensitivity to measure changes about 20 - 30 nGy/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 (Li or HPGe) detector replaces the NaI detector given above for Level I. The detection limit shall be a minimum of 10 Bq per litre of sample volume.

SUMMARY INFORMATION ON GERMON IN THE AMERICAS

TABLE 1:
MONITORING CAPABILITIES

| <u>Country</u> <u>Air</u> | <u>Outdoor</u> <u>Air</u> | <u>Indoor</u> | <u>Water</u> | <u>Soil</u> | <u>Milk</u> <u>Food</u> | <u>Other</u> |
|------------------------------|------------------------------|---------------|--------------|-------------|----------------------------|--------------|
| Argentina | Yes | Yes | Yes | Yes | Yes | a-b-g |
| Brazil | No | Yes | No | Yes | Yes | a-b-g |
| Canada | Yes | Yes | Yes | Yes | Yes | Yes |
| Mexico | Yes | Yes | Yes | Yes | Yes | g |
| Peru | b-g | No | Yes | Yes | Yes | b-g |
| Venezuela | Yes | No | Yes | No | Yes | g |
| U.S.A. | Yes | Yes | Yes | Yes | Yes | abg |

* a = alpha, b = beta, g = gamma.

TABLE 2:
INSTRUMENTATION CAPABILITIES FOR GERMON

| <u>Country</u> <u>Chamber</u> | <u>Ion</u> | <u>GM</u> <u>GELI</u> | <u>GE/</u> | <u>NaI</u> | <u>TLD</u> |
|----------------------------------|------------|--------------------------|------------|------------|------------|
| Argentina | Yes | Yes | Yes | Yes | No |
| Brazil | Yes | Yes | Yes | Yes | Yes |
| Canada | No | No | Yes | No | Yes |
| Mexico | ? | ? | ? | ? | ? |
| Peru | No | Yes | Yes | Yes | No |
| Venezuela | No | Yes | Yes | Yes | No |
| U.S.A. | Yes | Yes | Yes | Yes | Yes |

**TABLE 3:
HUMAN RESOURCES FOR GERMON**
(number of individuals)

| <u>Country</u> | <u>Technicians</u> | <u>Physicists/</u> | <u>Chemists/</u> | <u>Physicians*/</u> |
|---------------------|--------------------|--------------------|------------------|---------------------|
| <u>Biologists**</u> | | | <u>Engineers</u> | <u>Radio-</u> |
| | | | | <u>chemists</u> |
| Argentina | 1 | 4 | 1 | |
| Brazil | | 1 | 2 | |
| Canada | 5 | | 1 | |
| Mexico | | | 3 | 1* |
| Peru | 2 | 2 | | 2** |
| Venezuela | 1 | 2 | | |
| U.S.A. | 4 | | 1 | |

**TABLE 4:
COMMUNICATIONS, QUALITY ASSURANCE AND TRAINING**

| <u>Country</u> | <u>Communications</u> | | | | <u>QA Training</u> | |
|----------------|-----------------------|-------------|---------------|--------------|--------------------|-----|
| | <u>Fax</u> | <u>Telx</u> | <u>E-mail</u> | <u>Radio</u> | | |
| Argentina | Yes | Yes | No | Yes | No | No |
| Brazil | Yes | Yes | No | No | Yes | Yes |
| Canada | Yes | No | Yes | No | Yes | Yes |
| Mexico | Yes | No | No | No | No | ? |
| Peru | Yes | No | No | No | No | Yes |
| Venezuela | Yes | Yes | Yes | No | No | Yes |
| U.S.A. | Yes | Yes | Yes | No | Yes | Yes |

**TABLE 5:
ADDITIONAL INFORMATION ON
FUTURE GERMON PARTICIPANTS**

| <u>Country</u> | <u>Labs*</u> | <u>Sampling* Stations</u> | <u>Maintenance</u> | <u>Instr. Needs</u> | <u>Supply Needs</u> |
|----------------|--------------|-------------------------------|--------------------|-------------------------|-------------------------|
| Brazil | 1/5 | 1/6 | Good | No | No |
| Mexico | 3/1 | 2/0 | Good | ? | No |
| Peru | 1/4 | 3/4 | Good | alpha | Yes |
| Venezuela | | 2/2 | 3/3 | Fair | TLD Yes |

* Operating/Additional Available