FIFTH COORDINATION MEETING OF WHO COLLABORATING CENTRES IN RADIATION EMERGENCY MEDICAL PREPAREDNESS AND ASSISTANCE, (REMPAN)

Paris, France , 5-8 December 1994

Programme

Monday, 5 December 1994 Opening of the Meeting

09h00-10h00 Reception of the participants

10h00-11h00 Opening Session

Opening of the meeting by the WHO Representative, W. Kreisel, Executive Director. Greetings of the President of Institute Curie: C. Burg, and of the Medical Director: J.P. Camilleri. Welcome by the Chairman of the ICR: H.P. Jammet

11h30-12h30 General Session

Overview of the REMPAN: G. Souchkevitch. Radiation Accident Programme in European Union: J. Sinnaeve. Assistance: H. Eriskat

12h30-14h00 Lunch

14h00-18h00 Closed Session for the Directors of the Collaborating Centres. Chairman: G. Souchkevitch

Presentation: main activities of WHO Collaborating Centres

Argentina	J. Skvarca
Australia	C. Mason
Brazil	E. Amoral
France	H. Jammet
Germany	T. Fliedner
Japan	Y. Hasegawa
Russian Federation	V. Komar
USA	R. Ricks

Conclusion: G. Souchkevitch
J. Skvarca, Rapporteur

- Main features of the Collaborating Centres
- Complimentaries and deficiencies of the various activities
- Desired cooperation between the Collaborating Centres

18h30 Cocktail party (Institut Curie)

Tuesday, 6 December 1994 **Open Scientific Session for all Participants**

09h00-12h30 General discussion, Chairman: Th. Fliedner

Contributions and Cooperations:

- Scenarios of radiological and nuclear accidents
- Medical preparedness for radiation accidents
- Physical and radioactive dosimetry for radiation exposures
- Diagnosis: Biomarkers
  Biophysics: thermography, MRI
- Treatment: ARS: growth factors, haemopoietic transplantation
  Burns: medical: enzymotherapy
  surgical: various skin grafts
  Radioactive contamination: external
  internal: new drugs

12h30-14h00 Lunch

14h00-16h00 General discussion, Chairman: R. Ricks

Contributions and Cooperations:

- Follow-up of patients
  Late deterministic effects: sequela after radiotherapy
  Connective tissues: fibrosis, thrombosis, necrosis
  Late stochastic effects: epidemiological studies, thyroid, leukaemia
- Education and training
- Medical assistance for: Triage
  Emergencies
  Intervention

16h30-18h00 REMPAN Session, Chairman: G. Souchkevitch
Rapporteur: A. Oliviera

- WHO responsibilities for notification and assistance conventions in case of nuclear accident or radiation emergencies
- Plans for medical preparedness and assistance
- Preparation of the summary reports

Wednesday, 7 December 1994 Open Scientific Session for all Participants

09h00-12h30 Presentation of various data bases and registries: Chairman: E. Amoral

{E. Baranov: Russian Federation and Germany
{Th. Fliedner: International computerized data base for radiation victims. Questionnaire: clinical laboratory, functional follow-up.

V. Bebeshko: Computer data base on clinical observations (after Chernobyl accident

R. Ricks: USA registries: REACTS, NRC
Radiation accidents Worldwide Industrial radiography sources
Radiation accidents in medical uses

12h30-14h00 Lunch

14h00-18h00 Presentation of various data bases and registries, Chairman. E Komarov

Y. Hasegawa: Hiroshima-Nagasaki epidemiological studies
Present activities of RERF

T. Makio: Activities of HICARE

G.Y. Ye: China, Data bank and consulting system for medical management of the acute radiation sickness patients

{A. Laugier
{ : Registry of radiological data for patients after TBI (French Society of Oncologic Radiotherapy)
{J. Reiffers: Registry of clinical data for patients after TBI (French Society of Bone Marrow Transplantation)

{J.M. Cosset
{H. Jammet: Collection of patients in radiopathology (Institut Curie)

Conclusion: Cooperation of coherent and useful information and implementation
Rapporteur: C. Mason, V. Komar

19h30 REMPAN dinner: Hotel Lutetia, Paris

Thursday, 8 December 1994 **Open Scientific Session for all Participants**
Indications and Treatments for Acute Radiation Sickness

09h00-12h30	Hematological Syndrome: Chairman: General therapeutic indications	V. Covelli Th. Fliedner/D. Densow
	Haemopoietic growth factors: Experimental data and clinical indications	G. Wagemaker
	Cytokine therapy in preclinical models of radiation induced bone marrow aplasia: cytokine protocols	T.J. Mac Vitie
	Cell therapy for radiation induced aplasia: Bone marrow and cord blood transplantation	E. Gluckman
	New research in hemopoietic transplant Immunological aspects in skin after BMT Natural killer cells in cord blood and BMT	E. Carosella
12h30-14h00	Lunch	
14h00-16h00	Gastro-Intestinal Syndrome: Chairman: Characteristics of gastro-intestinal syndrome New research strategy for therapy	N. Wald P. Gourmelon
	Pulmonary Syndrome Characteristics of various damages New research strategy for therapy	J.M. Cosset/B. Dubray
	Associated damages Radiation burns Trauma and thermal burns	A Guskova/A Barabanova
	Conclusion Various indications and treatments Rapporteur: E. Carosella	
16h30-18h00	Closure of the meeting:	
	Future programme of the REMPAN: Closing remarks	G. Souchkevitch H. Jammet

ADDENDUM TO THE FIFTH REMPAN MEETING

Satellite Symposium on the Radiopathology of persons victims of non-ionizing radiations: damages of the eyes by lasers; skin effects by UVR

Paris France, 9 December 1994

10h00-12h30 Introduction: Chairman: M. Repacholi
H. Jammet

The non-ionizing radiations cover a broad spectrum of radiations in optics (IR, Visible, UV) and in radiofrequencies (microwaves, radar, ELF) and include also the electric magnetic statics and fields and acoustics (infrasound, ultrasound). The correlated radiopathology is very complex and we selected two examples with lasers and UVR.

Laser Session: Chairman. L. Court

Characteristics of coherent light
Various types of lasers
Deterministic damages on eyes by lasers
Diagnosis of various types of effects
Prognosis and treatment

12h30-14h00 Lunch

14h00-16h00 UVR Session: Chairman: J.P. Cesarini

Characteristics of the ultra-violet radiations
Classifications in UVA, UVB, UVC
Characteristics of the skin: dermatocytes, melanocytes
Deterministic damages of UVR on the skin
Skin cancer by UVR (A, B, C)

16h00-17h00 Conclusions

Annex II

5th Coordination Meeting of WHO Collaborating Centres in Radiation Emergency Medical Preparedness and Assistance (REMPAN)

Paris, France, 5-8 December 1994

List of the Participants

Representatives of WHO Collaborating Centres

Dr H.P. Jammet
Président
Centre International de Radiopathologie
B.P. n° 34, Batiment 01 — Tel: ++33-1-46547266
F-92260 Fontenay aux Roses, FRANCE — Telex: 204841 F
(WHO Collaborating Centre : International Reference Centre for Radioactivity) — Fax: ++33-1-46382445

Dr V.E. Komar
Head
Department for Clinical Radiobiology
Central Research Institute of Roentgenology & Radiology
Pesochnaya-2, ul. Leningradskaya 70/4 — Tel: ++7-812-437 87 81
188646 St. Petersburg, Russian Federation — Fax: ++7-812-437 87 87
(WHO Collaborating Centre on Medical Radiation Pathology)

Dr G.C. Mason
Head of Radiation Health Section
Australian Radiation Laboratory — Tel: ++61-3-433-2211
Lower Plenty Road — Telex: AA 31726
Yallambie, Victoria 3093, AUSTRALIA — Fax: ++61-3-432-1835
(WHO Collaborating Centre for Radiation Protection and Radiation Emergency Medical Assistance)

Dr Y Hasegawa
Permanent Director
Radiation Effects Research Foundation — Tel: ++81-82-261-3131
5-2 Hijiyama Park, Minami-Ku — Fax: ++81-82-263-7279
Hiroshima 732 JAPAN
(WHO Collaborating Centre for Radiation Effects on Humans)

Dr R.C. Ricks
Director REAC/TS and CREA — Tel ++1-615-576-3450
Centre for Radiation Emergency Assistance — Fax: ++1-615-481 1000
Oak Ridge Associated Universities — Fax: ++1-615-576-9522
Oak Ridge, Tn. 37831-0117, U.S.A.
(WHO Collaborating Centre for Radiation Emergency Assistance)

Dr J.J. Skvarca
Chief Director, Department of Health Radiophysics — Tel: ++54-1-381 0971
P.O. Box 3268 C. Central 1000 — Fax: ++54-1-382 5680
Buenos Aires, Argentina — Telex:25064 COOPRE AR
(WHO Collaborating Centre for Radiation Emergency Response and Medical Assistance)

Dr E.C.S. Amoral
Director — Tel: ++55-21-442 1950
Institute for Radioprotection and Dosimetry — Fax: ++55-21-442-1927
Avenida Salvador Allende S/M — Telex: 31624 IRDE
CP 37750, CEP 22600 Rio de Janeiro, BRAZIL
(WHO Collaborating Centre for Radiation Protection and Medical Preparedness for Radiation Accidents)

Dr T.M. Fliedner
Institute for Social and Occupational Medicine
University of Ulm — Tel: ++49-731-502-3400
Albert-Einstein-Allee 11 — Fax: ++49-731-502-3415
7900 Ulm/Do., GERMANY — Telex: 712 567
(WHO Collaborating Centre for Radiation Emergency Medical Assistance)

Dr G. Souchkevitch
Radiation Scientist — Tel: ++41-22-791-37-63
World Health Organization — Telex. 415416 OMS CH
1211 Geneva 27, SWITZERLAND — Fax: ++41-22-791-07-46

Dr A. E. Baranov
Head of Haematology Department — Tel : ++7-095-190 45 91
Institut of Biophysics — Fax : ++7-095-190 3590
Marshal Novikov St. 23 — Tel: ++7-095-193 7578 home
123098 Moscow, RUSSIAN FEDERATION — Telex: 411 407 MOH SU

Dr E. Carosella
Hôpital Saint-Louis
Centre Hayem
1, rue Cl. Vellefaux — Tel.: ++33-1-42 49 96 60
75010 Paris — Fax: ++33-1-48 03 19 60
FRANCE

Dr A. Oliveira
Radiation Medicine Division
Industrias Nucleares Do Brasil S.A. — Tel.: ++55-21-537 5315
Rua Mena Barreto, 161-3 andar — Fax: ++55-21-537 9428
Rio de Janeiro, BRAZIL

Dr T.J. MacVittie
Chairman
Department of Experimental Hematology
Armed Forces Radiobiology Research Institute
8901 Wisconson Avenue
Bethesda, MD 20889-5603
USA
Tel.: ++1-301-2951352
Fax . ++1-301-2956503

Dr G. Wagemaker
Erasmus University Rotterdam
Department of Radiobiology
Burgemeester Oudlaan 50
Rotterdam
NL-3000, DR, THE NETHERLANDS
Tel.: ++31-10-4635 100
Fax : ++31-10 436 2315

Dr N. Wald
Department of Environmental and Occupational Health
Graduate School of Public Health
University of Pittsburgh
Pittsburgh, Pennsylvania 15261
USA
Tel: ++1-412-624-2735
Fax.:++1-412-624.7534
or 3040

Dr X. Pei
Assistant Director
Institute of Radiation Medicine
No. 27 Tai Ping Road
Beijing, Peoples Republic of China
Tel.: ++86-1-821-4653
Fax : ++86-1-821.3044

Dr G.Y. Ye
Professor
Dept. of Clinical Haematology and Radiation Medicine
No. 2 North Tai Ping Road
Beijing, Peoples Republic of China
Tel.: ++86-1-821-4647 or 823 2160
Fax. ++86-1-821- 3044

Dr J. Sinnaeve
Commission of the European Communities
Directorate General
Biology, Radiation Protection
and Medical Research
Rue de la Loi 200
B-1049 Bruxelles, BELGIUM
Tel: ++32-2-2954046
Fax: ++32-2-2966256

Dr D. Densow
System Science Laboratory
Institute for Occupational Health
of the University of Ulm
c/o FAW, Postfach 2060
Ulm
GERMANY
Tel : ++49-731 501 480
Fax: ++49-731 501 999

Dr H. Kindler
Institut für Arbeits- und
Sozialmedizin
Universität Ulm
c/o FAW, Postfach 2060
Ulm
GERMANY

Tel: ++49 731 501 480
Fax: ++49 731 501 999

Dr C.E. de Almeida
University of Rio de Janeiro
Laboratorio de Ciencias Radiologicas
Rua Sao Francisco Xavier 524
Rio de Janeiro
BRAZIL

Tel/Fax. ++ 55 21 248 59 23

Dr J. Aractin
Hôpital Saint-Louis
Centre Hayem
1, rue Cl. Vellefaux
75010 Paris
FRANCE

Tel: ++ 42 49 96 60
Fax: ++48 03 19 60

Dr V. Bebeshko
Doctor of Medical Science
Director, Institute of Clinical Radiology
Scientific Centre for Radiation Medicine
Academy of Medical Sciences
Kiev, UKRAINE

Tel: ++7044 430 0653
7044 430 0662
Fax: ++7044 431 9830
7044 213 7202

Dr Bensoussan
Hôpital Saint-Louis
Centre Hayem
1, rue Cl. Vellefaux
75010 Paris
FRANCE

Tel: ++ 42 49 96 60
Fax: ++48 03 19 60

Dr M.E. Berger
Associate Director REAC/TS
Centre for Radiation Emergency Assistance
Oak Ridge Associated Universities
Oak Ridge, Tn. 37831-0117, U.S.A.

Tel: ++1-615-576-3131
Fax: ++1-615-481 1000
Fax ++1-615-576-9522

Pr. C. Burg
Président de l'Institut Curie
25, rue d'Ulm
75005 Paris
FRANCE

Tel: ++44 32 50 53
Fax: ++43 25 52 71

Pr. J.-P. Camilleri
Directeur de l'Institut Curie
25, rue d'Ulm
75005 Paris
FRANCE
Tel: ++44 32 41 00
Fax: ++44 32 41 19

Dr Cesarini
Fondation Rotschild
25, rue Manin
75019 Paris
FRANCE
Tel: ++48 03 69 49
Fax: ++48 03 65 10
48 03 78 70

Pr J.-M. Cosset
Chef du département de Radiothérapie
Institute Curie
25, rue d'Ulm
75005 Paris
FRANCE
Tel: ++44 32 46 22
Fax: ++44 32 46 16

Dr Covelli
ENEA. Casellia
Casella Postale 2400
00100 Roma A.D.
ITALY
Tel: ++6 304 834 01
Fax: ++6 304 836 44

Dr Doria
University of Rome "Tor Vergata"
Department of Biology
Via della Ricera Scientifica
00133 Roma
ITALY
Tel: ++39 6 3048 3619
Fax: ++39 6 3048 3644

Dr H. Eriskat
Chef de Division Radioprotection
Commission de Communautés Européennes
Direction Générale Environnement
Sécurité Nucléaire et Protection Civile
Centre Wagner, Plateau du Kirchberg
L-2920 LUXEMBOURG
Tel: ++4301 36360
Fax: ++4301 4646
Telex: COMEUR LU 3423

Dr E. Gluckman
Hôpital Saint-Louis
Unité de Greffe de Moëlle
1, rue Claude Vellefaux
75010 Paris
FRANCE
Tel: ++ 42 49 96 35
42 49 96 39
Fax. ++42 49 96 34

Dr Gourmelon
C.E.A
DPHD/SARAM
B.P. 6
92260 Fontenay-aux-Roses
FRANCE

Tel: ++46 54 83 42
Fax: ++46 54 46 10

Dr Guskova A. Konstantinovna
Institute of Biophysics
Ministry of Public Health RF
Associate Member of the Academy
of Medical Sciences RF
Zhivopisnaya 46
Moscow 123182
RUSSIAN FEDERATION

Tel: ++7095 190 6258

Dr G.K. Iyer
In charge
Occupational Health Unit
Medical Division
Bhabha Atomic Research Centre
Bombay 400085
INDIA

Tel: ++9122 551 16 77 (office)
9122 551 23 22 (home)
Fax: ++9122 556 0750
9122 556 0534
Telex: 011 71017
011 72322

Dr E.I. Komarov
Head
International Cooperation Department
Institute of Radiation Hygiene
Mira St. 8
St Petersburg 197101
RUSSIAN FEDERATION

Tel: ++7812 233 48 43 (O)
7812 233 35 76 (H)
Fax: ++7812 232 70 25

Dr W. Kreisel
Executive Director
World Health Organization
1211 Geneva 27
SWITZERLAND

Tel: ++4122 791 3582
Fax: ++4122 791 4849

Dr Laugier
Chef du Département de Radiotherapie
Hôpital Tenon
20, rue de la Chine
75020 Paris
FRANCE

Tel: ++40 30 67 95
40 30 66 18
Fax: ++40 30 64 90

Dr K Lin
Physician in Chief, Associate Professor
Department of Haematology
North Taiping Road Hospital
2 North Taiping Road
Beijing 100039
CHINA

Current address:
The Dept. of Haematology
The Liverpool Univ. Hospital
Duncan Building
Prescot St.
Liverpool L69 3BX
UNITED KINGDOM
Tel: ++44 051 706 4326

Mr T. Makio
General Secretary of H.I.C.A.R.E.
Hiroshima International-Council for Health Care of the Radiation Exposed
Atomic Bomb Victim's Affairs Division
Hiroshima Prefectural Government
10-52 Motomachi Nakaku Hiroshima
JAPAN 730
Tel. ++082 228 9901
Fax: ++082 228 3277

Dr R. Masse
Président/OPRI
B.P. 35
78110 Le Vésinet
FRANCE
Tel· ++30 15 52 00
Fax: ++39 76 08 96

Dr U.C. Mishra
Director Health, Safety and Environment Groups
Bhabha Atomic Research Centre
Bombay 400085
INDIA
Tel ++9122 556 6601
9122 556 3060
9122 556 8382 (home)
Fax. ++9122 556 0750
9122 556 3117
9122 556 0534
Telex: 011 61017 Barc in

Dr V. Pavlov
Head, Dept of Radiation Therapy of Blood Disease
Medical Radiological research Centre
Koroleva St.
Kaluga oblast, Obninsk
RUSSIAN FEDERATION
Tel: ++7095 255 2317
Fax: ++7095 255 2486

Dr Reiffers
U.F.R. Paul Broca
146, rue Leo Saignat
33076 Bordeaux
FRANCE

Tel: ++56 24 20 84
Fax: ++57 57 15 89

Dr Roman
Médecin-Chef
CRESSA
24, Avenue du Maquis de Grési Vaudan
38702 La Tronche Cédex
FRANCE

Tel: ++76 73 69 00
Fax: ++76 63 69 00

Dr I. Turai (IAEA Representative)
Senior Scientist
Deputy head, Dep-Environm-Radiohygiene
"Frederic Joiliot-Curie"
Natl. Res. Inst. for Radiobiol. & Radiohyg.
P.O. Box 101
H-1775 Budapest

Tel: ++361 226 0144

Home address:
Korompai 21-23/B 13
H-1124 Budapest
HUNGARY

Tel: ++361 186 2073

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Contents

1. CRERMA - Collaborating Centre for Radiation Emergency Response and Medical Assistance (Buenos Aires, Argentina, Director - Chief Eng. J. Skvarca)

In March 1990 the Department of Radiation Physics of the Ministry of Health of Argentina was officially designated as the WHO Collaboration Centre for Radiation Emergencies, Medical Preparedness and Assistance (REMPAN).

The point of contact for this Centre is the Department of Radiation Health Physics, Department of Medical and Sanitary Equipment.

The Centre is based on the existing structures of two institutions responsible by law for ionizing radiation in Argentina, and the hospital facilities in Buenos Aires.

a) Ministry of Health which, through its Radiation Health Physics Department on the national level Federal Systems and its similar divisions in the provinces, as responsible for X-ray sources and linear accelerators (protection, training, licensing etc.

This Department functions at a national level by supporting a permanent advisory committee (CTARI) on ionizing radiation.

b) National Atomic Energy Commission (CNEA) which is responsible for nuclear plants and all radioactive materials (protection, training, licensing etc.).

At the end of this year (Oct. 1994) CNEA splits in three new institutions. One of them, the National Regulatory Nuclear Committee - ENREN, ENTE NACIONAL REGULADOR NUCLEAR is today responsible at the national level on regulations, safety, protection and licensing as before CNEA.

These two organizations work very closely together. In 1984 both institutions together with the Municipality of the City of Buenos Aires which coordinates the Civil Defense for the entire country, agreed by a special convention to establish a system called SAMARI (System for Medical Preparedness and Assistance to persons overexposed from ionizing radiation). This agreement covers three important items:

a) Distribution of duties in response to a radiation accident, including assignment for radiological emergency facilities and equipment;

b) Elaboration of emergency plans for a radiation accident, which should describe its typical features and measurements to be taken;

c) Identification of the experts and hospital facilities for preparedness and response.

The National Atomic Energy Commission (now National Regulatory Nuclear Committee) has the capability to provide physical reconstruction of the accident, means of decontamination, instrumentation including whole-body counter units, stationary and mobile laboratories for environmental measurements and biological dosimetry.

The Health Ministry will coordinate the hospital facilities. There are two general hospitals in Buenos Aires having special sterile rooms and other facilities such as a unit for treatment of burns. The Ministry also provides the National Emergency Communication and Transportation Network (DINES) which has representatives in all provinces.

At the international level, particularly for countries in Latin America, we have a strong and fast contact in coordination and cooperation in this field through the Programme of HSD of PAHO from Washington (Regional Adviser in Radiological Health).

The work in recent years has been directed to the following aims:

1) To consolidate activities among the different components of the Collaborating Centre (CNEA, MCBA, Ministerio de Salud).

2) To establish technical and administrative contacts with relevant institutions in Latin America. (IPEN-PERU, CIN-URUGUAY, DPR-PARAGUAY).

3) To support with expertise international training courses in radiation emergency preparedness and management (Toluca, Mexico - January 1990; Buenos Aires, Argentina - August 1991 and 1992, Asuncion, Paraguay 1991).

4) To provide technical assistance to Spanish-speaking countries in Latin America (elaboration and improvement of the national legislation on radiation protection including preparedness for radiation emergencies)

5) To exchange technical documentation with other collaborating centres.

6) To render assistance in radiation accidents such as in San Salvador (San Salvador) and in Santa Cruz (Bolivia).

7) To participate in international coordination meetings of WHO Collaborating Centres on radiation emergency.

8) To carry out a research project on the correlation of physical dosimetry with biological indicators of radiation sickness in primates (rhesus).

The biological indicators considered in the above-mentioned project are cytological indices (peripheral blood and bone marrow), free radical induction in bone and teeth measures by electron spin resonance techniques, biochemical changes (raurine concentration in serum and amilase activity in saliva), immunological tests (T and B lymphocyte count, immunoglobulin and antibody production in vitro). The full description is available in Spanish.

There were two major radiation accidents in Argentina. One occurred in 1968 at a ^{137}Cs industrial source. The other one took place in 1983 at a small nuclear research reactor and the exposed worker died after 48 hours. A minor accident happened over 10 year ago with a ^{60}Co unit when the physician lost some of his fingers.

In improving the medical preparedness for radiation emergencies an important step has been the establishment of a regional network, based usually on Regional Hospitals of different Provinces in Argentina to involve all the country in coordination with the National Collaborating Centre. Special

questionnaires were developed for hospitals to facilitate the triage. At the international level (South America), the Centre is officially in touch with health authorities from Paraguay-Departamento Proteccion Radiologica-DPR, Uruguay-Centro Investigaciones Nucleares-CIN and Peru-Institute Peruano de Energia Nuclear-IPEN in order to establish liaison institutions in REMPAN with these countries in conjunction with PAHO-Washington DC. We have officially requested from Peru and Paraguay.

SAMARI also plans to develop educational and training programmes for our regional centres (Provinces) in 1995, in eluding exercises of emergency preparedness plans.

Particular attention is paid to personal contacts among the responsible persons of the centres belonging to REMPAN. This contributes to the spirit of cooperation which is so important in emergency situations.

The points of contact and correspondence:

Skvarca, J
Director, Department of Health Physics
Department of Medical and Sanitary Equipment
P.O.Box 3268 C. Central 1000
Buenos Aires, Argentina

Tel: 54 (1) 381 0971
Tlx: 25064 COOPRE AR
Fax: 54 (1) 381 0971 or 382 5680

2. CRPREMA - Collaborating Centre for Radiation Protection and Radiation Emergency Medical Assistance (Yallambie, Australia)

2 1 Terms of reference of the Centre:

- help in developing radioactivity environmental monitoring in the Region;
- help in developing radiation protection standards and codes of practice for the safe and effective use of radiation;
- provide technical advice and to organize personnel training in radiation health when needed;
- disseminate on a regional basis information on radiation health;
- participate in the regional dosimetry intercomparison programme;
- help Member states in elaborating their plans for medical preparedness and first aid;
- promote training of personnel in developing countries in medical preparedness and first aid;
- define optimal methods for diagnosis and treatment for overexposure; and
- provide medical assistance to exposed persons, both on site and in specialized clinics (through the Peter MacCallum Cancer Institute) subject to bilateral agreement between Australia and the country(s) involved.

2.2 Work performed in relation to the terms of reference

- ***help in developing radioactivity environmental monitoring in the Region***

ARL continues as the Asia/Pacific Regional Centre for the Global Environmental Radiation Monitoring (GERMON) programme.

Dr M.B. Cooper has continued to wok as a committee member of the South Pacific Environmental Radioactivity Association (SPERA).

ARL is now the designated Pacific Region Reference Laboratory of the International Radon Metrology Programme (IRMP) for the IAEA Coordinated Research Programme for Radon in the Human Environment. It is also the Coordinating Laboratory for the Pacific Region for the same programme.

- ***help in developing radiation protection standards and codes of practice for the safe and effective use of radiation***

ARL has managed the preparation of revised Australian radiation protection standards on behalf of Australia's National Health and Medical Research Council and National Occupational Health and Safety Commission. The new recommendations, which are based on ICRP Publication 60, are expected to be adopted towards the end of 1994, following a period of public comment during which radiation protection experts from several Pacific Region countries were invited to comment on the draft.

Dr G.C. Mason of the Radiation Health Section was co-presented of an IAEA Regional Workshop on the implementation of ICRP Publication 60 held in Kuala Lampur in August 1993 Dr Mason has also represented Australia in the development of the revised Basic Safety Standards published by the IAEA, WHO, ILO, FAO, PAHO and NEA and which are expected to be adopted by the governing bodies during 1994.

Dr K.H. Lokan, Director, has been appointed to Committee 4 of the ICRP and continues to serve as Australia's delegate to UNSCEAR.

- ***provide technical advice and to organize personnel training in radiation health when needed***

A number of IAEA Fellows and other trainees from countries in the Region have made short-term visits to the Laboratory and there have been several longer-term attachments of up to six months, particularly from Chinese radiation protection specialists. The laboratory is receiving an increasing number of application for such placements.

In November 1992, the Laboratory co-hosted an IAEA Regional Training Course on Dosimetric Assessment of Internal Contamination and provided several of the lecturers.

Dr S.B. Solomon of the Airborne Radioactivity Group lectured at an IAEA Regional Workshop on Radon Monitoring held at Hengyang in China in October 1993

Mr N.J. Hargrave of the Ionizing Radiation Standards Group was a WHO consultant for a two-week training programme for staff at the Philippine Radiation Health Service on matters related to the calibration of instruments and the use of absorbed dose protocols.

In December 1992, the Laboratory ran a two-week GERMON course for participants from Mongolia, Thailand and Indonesia. The course was designed to equip the participants with the practical skills required for effective environmental monitoring of radioactivity.

- ***disseminate on a regional basis information on radiation health***

- ***participate in the regional dosimetry intercomparison programme***

The Intercomparison of Personal Radiation Monitoring Services in the Asia/Pacific Region has been published as ARL Technical Report TR110 (Young and Hargrave) and in the journal *Radiation Protection Dosimetry.*

The results of the Asian/Australian Regional Radon Intercomparison have also been published as ARL Technical Report TR104 (SoLomon and Peggie).

- ***help Member states in elaborating their plans for medical preparedness and first aid***

Plans are in hand to host, in conjunction with the Australian Nuclear Science and Technology Organization, an IAEA Regional Workshop on Off-site Planning and Countermeasures for Radiological Emergencies in September 1994.

- ***promote training of personnel in developing countries in medical preparedness and first aid***

- *define optimal methods for diagnosis and treatment for overexposure*

- *provide medical assistance to exposed persons, both on site and in specialized clinics (through the Peter MacCallum Cancer Institute) subject to bilateral agreement between Australia and the country(s) involved.*

2.3 Collaboration with other WHO Collaborating Centres

Provision of quarterly air monitoring data to the WHO Collaborating Centre of SCPRI, le Vésinet has continued, as has participation in the WHO intercomparison programme carried out by the International Reference Centre at Le Vésinet.

The Laboratory has participated in the WHO/UNEP/GERMON environmental radiation network as a Regional Coordinating Laboratory.

2.4 Evaluation

The Laboratory is finding itself more and more involved in Regional collaboration and training, partly through bilateral arrangements such as with China, but importantly also through the Regional Cooperation Agreement of the IAEA. This trend is expected to continue.

For information, the Laboratory reports that is has signed a Memorandum of Understanding with the Laboratory of Industrial Hygiene within the Chinese Ministry of Public Health in Beijing. The Memorandum provides for cooperation between the two agencies, including interchange of information and exchange of staff on temporary attachments

2 5 WHO Collaborating Centre for Radiation Protection and Radiation Emergency Preparedness and Assistance

The Australian Radiation Laboratory (ARL) and the Peter MacCallum Cancer Institute are jointly designated as a REMPAN centre within the Asia-Pacific region. ARL fulfils the programme management function and provides health physics services, the Peter MacCallum Cancer Institute provides specialist medical services for the treatment of irradiated patients.

Since the last REMPAN meeting in Ulm, ARL has continued to develop its capacity to respond to a radiation emergency. It has built up a suite of portable equipment for the purpose:

- 6 'health physics' kits, each packaged in an aluminium suitcase containing:

  - high and low dose rate survey meters;
  - ratemeter/scaler with contamination probe and NaI(TI) gamma-ray probes;
  - personal dosemeters, etc.
    (there are additional cases containing respirators, protective clothing, gloves, etc.)

- 15 'survey' kits, each packed in a small metal toolbox containing:

  - ratemeter/scaler with NaI(TI) probe and 'wand';
  - contamination probe.

- 2 portable germanium gamma-ray spectrometers.

ARL is prpared to respond within hours to most foreseeable radiation emergencies in Australia and plants to be in a similar position, in due course, with regard to other countries in the region. The purpose of the initial response is to determine the scope of the emergency and to identify anu life-threatening or potentially injurious circumstances and then, in conjunction with the local emergency responmse agenices, to take whatever urgent actions are necessary in the first fewa days; specialist medical teams would assist, as necessary. The emergency plans are being integrated with the well-developed emergency response planning of Emergency Management Australia, the national emergency agency, which covers the re-entry to the atmosphere of nuclear-powered satellites, accidents involving visiting nuclear-powered warships, and other, non-radiation accidents. Energency Management Australia has an existing infrastructure for a regional emergency response capability which it is hoped to build upon to cater for radaition emergencies outside Australia.

ARL continues to augment this function through related training and development activities. In September 1994, the Laboratory, in conjunction with the Australian Nuclear Science and Technologu Organization, hosted a 2-week IAEA Regional Workshop on Off-Site Planning and Countermeasures for Radiological Emergencies for senior radiation protectioan specialists from countries in the Asia-Pacific region. There were 25 delegates from 12 countries, in addition to several Australian participants. The Workshop involved lectures, discussion sessions and exercises, and covered basic principles of radiation protection and of intervention in radiation accidents, emergency response planning, environmental modelling of radionuclide transport, fose assessment, handling of contaminated patients, accident recovery and accident plan maintenance. One whole day was devoted to a live exercise built around a containment failure at a research reactor. ARL is planning to develop a training package, in conjunction with medical advisers from the Peter MacCallum Cancer Institute and the Australian Defence Force, which it will then offer in state capital cities around the country. Subsequerntly, it is intended to offer training workshops in other countries in the region.

The points of contact·

Dr Keith Lokan
Director
Australian Radiation laboratory
Lower Plenty Road
Yallambie, Victoria 3085
Australia

Tel: ++61 3 433 2211
Fax: ++61 3 432 1835

Dr G.C Mason
Head, Radiation Health Section
Australian Radiation Laboratory
Lower Plenty Road
Yallambie, Victoria 3085
Australia

Tel: ++ 61 3 433 2211
Fax· ++61 3 432 1835

3. CRPMPRA - Collaborating Centre on Radiation Protection and Medical Preparedness for Radiation Accidents (Rio de Janeiro, Brazil, Coordinator - Dr Eliana Amoral)

3.1 The terms of reference of the Centre are:

to act as a focal point in Brazil for expert advice on radiation protection under normal conditions and on remedial actions in the case of overexposure and radioactive contamination;

- to take part in coordinated WHO programmes on general aspects of radiation protection, radioactivity monitoring and medical preparedness for radiation accidents;
- to promote the operation of laboratories, medical equipment, development of techniques and the training of personnel;
- to participate in the preparation of relevant national and WHO documents and guidelines;
- to exchange information with WHO on developments in radiation protection;
- to assist in the elaboration of radiation emergency plans for Brazilian installations or together with similar Collaborating Centres in neighbouring countries;
- in the case of a radiation accident, to take necessary measures to mitigate the consequences of the accident and to cooperate, if necessary, with other WHO Collaborating Centres

3.2 Organization

The Brazilian WHO Collaborating Centre on Radiation Protection and Medical Preparedness for Radiation Accidents, as shown in Figure 1, is based on the existing structure of the Institute of Radiation Protection and Dosimetry, IRD, from the National Nuclear Energy Commission, CNEN in collaboration with the National Cancer Institute, Furnas Centrais Elétricas (Electric Power Utility), Brazilian Nuclear Industry and the Laboratory of Radiological Sciences including the Pedro Ernesto Hospital.

Under nuclear accident conditions the National Nuclear Energy Commission (CNEN) and the Civil Defense are immediately informed and mobilized. In the case of a possible radiological emergency, the CNEN, the Civil Defense and the local State Regulatory Body are immediately informed The emergency coordination and evaluation team of CNEN is actioned to confirm the emergency and to mobilize the IRD emergency team responsible for the radiation protection and dosimetry response.

To accomplish this task, the IRD has an emergency assistance service, SAER, responsible for the maintenance of the response system through the coordination of different groups with a total of 140 people. Each emergency worker is kept on call 24 hours a day for seven days per month, concurrently with his routine tasks.

WHO COLLABORATING CENTRE ORGANIZATION

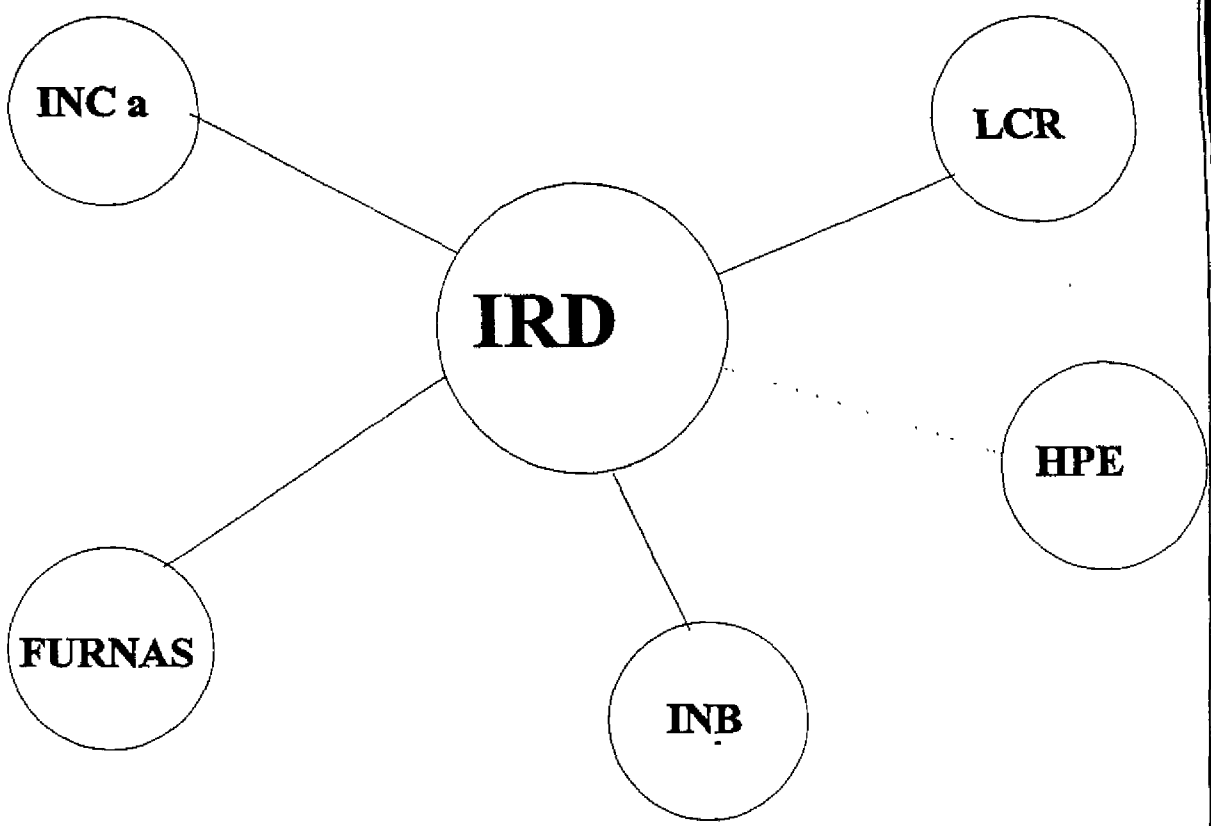

Figure 1

- IRD - Institute of Radiation Protection and Dosimetry
- INCa - National Cancer Institute
- INB - Brazilian Nuclear Industries
- Furnas - Electric Power Utility
- LCR - Laboratory of Radiological Sciences
- HPE - Pedro Ernesto Hospital

The response management of IRD has an operation room, a communication centre, a room for equipment storage and the following mobile units equipped with radiation measurements instruments:

- a mobile radiometry laboratory;
- a terrestrial survey unit;
- area monitoring units;
- occupational control unit; and
- multi means units.

The IRD response team also include a radiological assessment group with metabolic and dynamic environmental models running on computers to provide timely dose assessment information.

In addition the IRD has available the following laboratories:

- National Laboratory for Ionizing Radiation Meteorology;
- Cytogenetics Dosimetry Laboratory;
- Excreta Analysis Laboratory;
- Whole-Body Counter Unit,
- Radiometry and Radiochemistry Laboratory;
- Photographic and Termoluminescent Dosimetry Laboratories.

In case of victims with potential individual exposure and/or contamination, medical doctors specialized in radiation medicine will also be called, starting the medical emergency response

The growing awareness of the State of Rio de Janeiro as to radiation protection and medical preparedness due to the location in this State of the Angra dos Reis Nuclear Power Plant, lead to the foundation of the Laboratory of Radiological Sciences at the State University and the proposal of a model for medical emergency response. Therefore, in accordance to a special agreement with the University of the State of Rio de Janeiro (UERJ) the coordination of the medical response to radiation accidents has been handed over to the Laboratory of Radiological Sciences (LCR), of that University. LCR is a facility whose main goals are to support state programmes on radiation protection and sanitary surveillance, post-graduation training in radiation related sciences and to assist state authorities in responding to radiation accidents.

Within the scope of the LCR, a Reference Centre for the Evaluation and Assistance of Radiation Victims (CRAAR) has been created. Besides training health personnel on the medical assistance of radiation victims, CRAAR has developed a three level response medical plan for radiation accidents that has not only been approved by Rio de Janeiro State authorities but also is under consideration by the Health Ministry for use on a nationwide basis. This plan will constitute the backbone of the National System for Medical Assistance for Radiation Emergencies (SNAER).

3.3 Activities

The main activities of the Collaborating Centre, shown in Figure 2, can be summarized as: emergency preparedness, external and internal individual monitoring, field survey, environmental monitoring, calibration of instruments, medical assistance and training of external support organizations.

In this context the responsibilities of the Institute of Radiation Protection and Dosimetry are:

- to make the preliminary evaluation and analysis of an event in the area of radiation protection;
- to perform radiation monitoring at the emergency site;
- to keep the source under control in the case of a radiological emergency,
- to perform the screening of individuals, foodstuffs, animals and potentially contaminated objects of common use;
- to make the external and internal dosimetry of contaminated and/or exposed people and suggest adequate countermeasures;
- to estimate the individual dose to be received by the public and suggest adequate countermeasures;
- to control doses received by the emergency workers; and
- to follow up the accident response consequences (victims and environment).

The Laboratory of Radiological Sciences, LCR, and the Furnas Centrias Elétricas (Electric Power Utility) also have available facilities which can give support to the IRD in the area of radiation protection.

Regarding the medical assistance, under the coordination of the LCR/CRAAR, the medical response to a radiation accident in Brazil will be provided near of at the scenario by specially trained individuals, such as Civil Defense and occupational health personnel (1st level). If an exposed or contaminated patient needs hospital admission, mainly because of associated conventional injuries, this will take place at a local hospital that represents the 2nd level of assistance. The 3rd level of medical care refers the patient to specialized centres, cap of dealing with the acute radiation syndrome, severe local injuries and massive internal contamination.

The reference centres contracted through the LCR/CRAAR are the National Cancer Institute it Bone Marrow Transplant Centre, and the Pedro Ernesto University Hospital, both in Rio de Janeiro. A specially designed facility near the Angra dos Reis Nuclear Power Plant, operated by Furnas - Centrias Elétricas S/A (Electric Power Utility) in Parati city, State of Rio de Janeiro, is also available to LCR/CRAAR to deal with either externally or internally contaminated persons.

In all instances, LCR/CRAAR together with CNEN and Brazilian Nuclear Industry - INB, will be available to coordinate medical care and to assist on the particular aspects of Radiation medicine, including trained doctors, nurses and physicists for the management of radiation victims, and kits for external and internal decontamination.

3.4 Results

The following activities carried out in 1994 can be highlighted:

- training on radiation protection of personnel directly involved in an accident response. State Regulatory (1 course/25 People), Navy personnel (2 courses/25 participants each), Army personnel (4 courses/30 participants each), policemen/civil defense/firemen/doctors(/volunteers (2 courses/30 participants each);

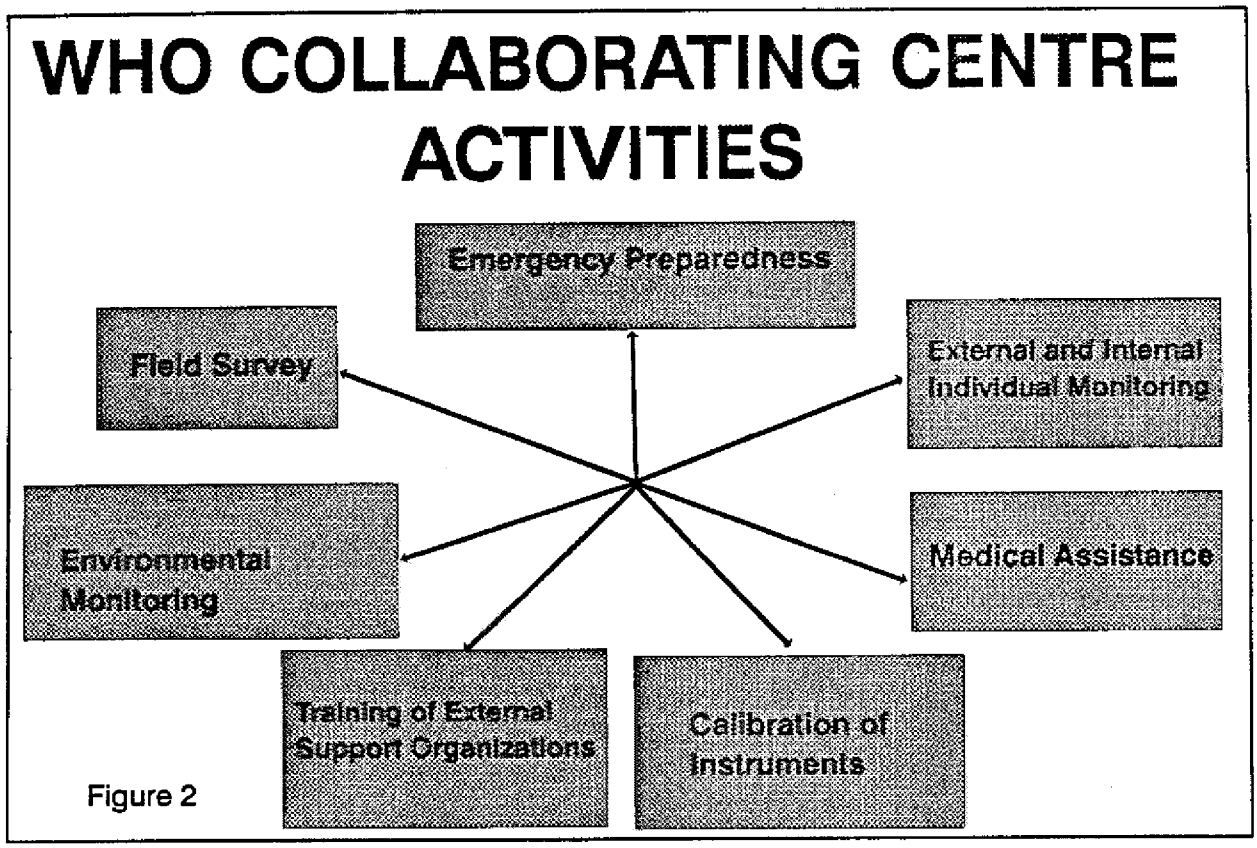

Figure 2

- organization and coordination of the IAEA regional training course on radiation protection and medical physics held at IRD in August for 15 Latin American countries with a total of 30 participants;

- organization of the International Workshop on Scientific Bases for Decision Making after a Radioactive Contamination of an Urban Environment, held in Rio de Janeiro (IRD) and Goiania from August 29 to September 2, with 17 countries and a total of 90 participants;

- the start-up of extending the Global Radiation Monitoring Network (GERMON), to other CNEN institutions and Universities located at other States;

- the start-up of the establishment of the on-line dose rate network;

- the inclusion in the Collaborating Centre of the Reference Centre for Medical Assistance coordinated by LCR and provision of an official agreement with CNEN; and

- the Centre is represented in the technical and scientific advisor group on ionizing radiation of the Health Ministry.

3.5 Working plan for the future

- to improve the infrastructure of the emergency assistance service of the IRD;
- to optimize the technical structure of communication within the Centre for radiological and medical assistance;

- to extend the GERMON network to other states in Brazil;
- to establish the on-line dose rate network at the communities around the Nuclear Power Plant and if possible throughout Brazil (under the IAEA financial support);
- to contribute to WHO training activities in Brazil or elsewhere on radiological and medical response, including advice or assistance to other Member States;
- to contribute to the elaboration of a regional WHO system for radiation emergency preparedness together with the USA and Argentina under the auspices of PAHO;
- to participate in WHO and other meetings on emergency response related aspects.

The main contact for the Centre is the Instituto de Radioproteçao e Dosimetria, IRD:

Dr Eliana Amoral, Director
Av. Salvador Allende s/n
CEP 22600, P.O. Box 37750
Rio de Janeiro, Brazil

Tel: ++55 21 4421927
Fax: ++55 21 4421950

3.6 Main needs/problems

- Better communication and cooperation between WHO Collaborating Centres
- Better participation in WHO programmes
- Few people in Brazil are specialized in the different areas, mainly considering the size of the country,
- Size of the country compared to the not adequate communication means and local capacity at some regions;
- Need of better infrastructure
- **Very important:** This Centre is not well known and recognized by the Brazilian Government. The WHO has an important role on it.

3 7 Main areas to offer training

Mainly regarding the Goiania such as:

- Medical treatment and handle of contaminated
- Internal dosimetry and decontamination
- Cytogenic dosimetry
- Urban assessment and decontamination
- Radiation protection as a whole.