

## **STATUS OF RADIOLOGICAL SAFETY IN MADHYA PRADESH**

**Dr. J.P. Sharma, Ph.D., Dip R.P.**  
Director Radiation Safety, Madhya Pradesh  
& Professor Medical Physics,  
Gandhi Medical College, Bhopal (MP) 462 001  
Mobile : 94253-93491, e-mail : [drjpsharma@sify.com](mailto:drjpsharma@sify.com), [radiationsafetymp@gmail.com](mailto:radiationsafetymp@gmail.com)  
Fax/Phone No. Residence : 0755-2556819

Radiation Safety in all over the country including Madhya Pradesh State (in Medical Institutions and District Hospital) were looked after directly by the Division of Radiological Protection, Bhabha Atomic Research Centre Bombay and was continued up to Sixties, Radiological Physics speciality/faculty was not available. The courses for Radiological Physics were organised by BARC in collaboration with W.H.O. A diploma (Dip R.P.) was given in Radiological Physics & Hospital Physics after completion of 1 year successful training and on qualifying examination by Bombay University. These speciality were made available, in the beginning in Radiology departments of Medical Colleges of the State.

### **CREATION POSTS OF MEDICAL PHYSICIST FOR RADIOLOGICAL SAFETY:**

Four posts of Medical Physicists were created in the Medical Colleges of the State. These posts were lying vacant for a long period. Candidates who used to be selected did not remain in job and left. The reason being that their future was dark as they were having no promotion avenues. Secondly low pay scales in M.P. as compare to other States.

### **DUTIES OF MEDICAL PHYSICIST :**

The duties of Medical Physicists were made for Radiation dose calculation, Safety of Radiation sources, calibration of all Radiological Instruments and Radiation measuring instruments. They were also assigned Teaching duties of post-graduate students of Radiology (Diploma & Degree) for teaching Radiological Physics. Posts were still not being filled up. Than Govt. of M.P. made cadres of Radiological Physics. Teachers in the Medical Collage of he State, as suggested by BARC and M.C.I. on these Designations with honourable pay scale appointments at par with other Lecturers of Medical Colleges. The basic requirement was that candidate must have Master's Degree in science and Diploma in Radiological Physics as an essential qualification for the post of Asstt. Professor.

These Professional were well trained by BARC for proper delivery of Radiation doses to the patients undergoing Radio therapy. Radiological Physics for diagnostic Radiology is not taught by these faculties. Basic knowledge of X-Ray and other imaging modalities i.e. X-Ray, CT, MRI & Ultrasound etc. were given with the help of lectures and demonstrations. Use of Ra-226 (Needles & Tubes) replaced by use of Co-60 and Cs -137 Needles. Tubes for Brachy Therapy Treatments. Tele Radio Therapy was also replaced by indulging Co-60 Tele therapy machines replacing deep X-Ray therapy machines.

### **RADIO THERAPY INSTALLATION IN M.P. :**

In early seventies remote controlled Brachy therapy machine "cathetron" was installed in M.Y. Hospital Indore (M.P.). Another similar machine was installed in Manipal State in India up to 1975 only 3.

Tele & Brachy therapy treatments were available in Indore. First Rotational Tele cobalt unit "Theratron780" came at Cancer Hospital, Gwalior in M.P. in 1974. J.S. Saggoo was the first Medical physicist at Cancer Hospital Gwalior, who used to deliver guest lectures on Radiological physics,

Radiation Safety to MD & DMRE students of Radiology subject at G.R.M.C. Gwalior. Medical physicist working in State were engaged in the Radiation Treatments, Radiation protection & Medical Physics teaching programme.

### **UNSAFE PRACTICE IN DIAGNOSTIC RADIOLOGY :**

Exposure of Radiation Protection was not well explained for the persons working in diagnostic Radiology programme as this faculty was not there. There were some deaths of Doctors due to excess radiation exposures. In my notice Dr. Motiramani of Gwalior got radiation exposure in excess. These doctors were not aware about the personal monitoring of Radiation exposures and radiation doses, Limitation for quarterly, yearly and life time radiation doses were not known. They did not contact BARC for Film badge personal monitoring service for personnel radiation doses and radiation safety. Purchase of X-Ray machine by non qualified (Radiologist) seems to be non judicious. X-Ray machines sold by the manufacturing company is easily available having no restriction on them.

Doctors having x-ray machines were doing Fluoroscopy without having knowledge of doses of Radiations. They use to screen under Fluoroscopy every patient daily, for chest and abdomen region. They do not have proper distance from X-ray Tube. Room dimensions were not having as desired for X-ray unit and were install in a very less Limited area of working. No lead Apron, lead goggle, lead gloves were used. They were not having knowledge of radiation hazards. Similarly it is said that two radiographers D.D. Sharma of T.B. Hospital, Bhopal and Shri Ratnakar of District Shivpuri died due to excess dose of radiation exposures. K.C. Jain Radiographer of Kannod (District Dewas) got radiation burn in the finger.

### **ABOUT THE CONFERENCE ON RADIOLOGICAL SAFETY & MEDICAL PHYSICS IN M.P. :-**

- 1) **The first “National Conference on Radiation Protection IARP** was held in Nov./Dec. 1975 at Cancer Hospital Gwalior. This Conference was inaugurated by Hon’ble Chief Minister of M.P. Shri Virendra Kumar Saklecha.
- 2) **The First Radiation Protection Workshop was conducted in 1987** by Dr.J.P. Sharma, Asstt. Prof. Radiological Phys., at G.M.C. Bhopal Director Medical Services of M.P. Dr. A.K. Handa, & Dr. T.P. Sharma DPH whole heartedly supported and took the interest for Radiation safety knowledge through this workshop. This National Conference benefitted the radiologists and Radiographers of the State and also to the Teaching Staff of Radiology of Medical Colleges in the National Workshop Dr. K.P. Mehra Director Medical Education presided over the inaugural function of Workshop of Radiology Protection in 1987 at G.M.C. Bhopal. The Chief Guest ex-Vice Chancellor of Bhopal University, Dr. Ravi Prakash inaugurated the Conference. The Radiology Protection, Quality Assurance of Diagnostic Radiology, Scientific sessions were arranged to benefit the participants. The conference (participating 300 delegates, Radiographers, Radiologists and Radiological) was a great success of the State. B.A.R.C. scientists who were Teachers Members of IARP & AMPI participated on behalf of Govt. of India who brought their display materials along with lectures on Radiation Protection. Dr. O.P. Sharma Dean, G.M.C. Bhopal arranged concluding session An Exhibition “ Displaying Radiation Protection” Inaugurated by Chief Guest Dr. A.K. Handa, Director Medical Services, was addressed to the participants. He also promised to look into the problems being faced by the Radiographers/Radiologists of the State. Radiation safety to the State Govt. Authorities was well understood. To make provisions for all accessories for having radiation safety devices was agreed Radiation Risk allowances to the Radiographers from 1995 was also sanctioned.)
- 3) **“Nuclear energy for better health care and to ensure care hygienic quality of food and food security”** was organised on 7<sup>th</sup> July 1997. Conference was inaugurated by Hon’ble

Minister for Medical Education Shri Narendra Nahata. (organised by G.M.C. Bhopal & Dr. J.P. Sharma, Associate Professor was assigned as Organising Secretary)

Presidential note was given by Shri B.K. Shaha, IAS, Secretary Atomic Energy, Mumbai who was later as Chief Secretary of M.P. . This was a message to the State Business community for taking up projects for use of Radiation in Food Security. M.P. State Science & Technology was also involved in this activity.

- 4) The XIX National Conference of AMPI (Association of All India Medical Physicists of India) was organised at Gandhi Medical College, Bhopal. A good number of participants about 300 delegates made the conference a great success. Radiological Physics in Radio diagnosis Radiotherapy, Nuclear Medicine, subjects and quality assurance in Diagnostic Radiology were covered in the scientific sessions. The conference was inaugurated by Chief Secretary K.S. Sharma, IAS on 9<sup>th</sup> Nov. 1999. Who expressed the need to the participants for having Radiation Safety facilities in the State. Dr. J.P. Sharma was organising Secretary & Dr. P.K. Jain Dean G.M.C. Bhopal was the Chairman Organising Committee.

#### **PROPOSAL FOR SETUP OF NEW CO-60 TELE THERAPY TREATMENT FACILITY:-**

The another responsibility was given to make the proposals for Radiation Treatment Plan of (co-60 Teletherapy Units) for Raipur, Bhopal and Gwalior. Proposal were submitted to Govt. of M.P. for sanction of grant from Govt. of India under N.C.C.P. Gwalior and Bhopal Medical Colleges were sanctioned Rs. 1.5 Crore each for upgradation of their Radiotherapy departments by Govt. of India under N.C.C.P.

#### **SET UP X-RAY SURVEILLANCE CENTRE IN M.P. :-**

The B.A.R.C. in 1989 desired to have "X-Ray surveillance centres" in each State. Govt. of M.P. Public Health & Family Welfare Department vide No. 323/195/17/Med.3/89 Bhopal dated 25 Jan. 1989. (Principal Secretary V.G. Nigam) informed to Head, Division Radiological Protection B.A.R.C. that Govt. of M.P. agrees for proposal for having "X-Ray Surveillance Centre" for M.P. at Gandhi Medical College, Bhopal. Dr. J.P. Sharma Prof. GMC & Radiological Safety Officer was assigned the duties for running the Surveillance Centre. Govt. of M.P. made Technical Advisor for Purchase of future demands of X-Ray machine in the State.

"X-Ray Surveillance Centre of M.P." at Gandhi Medical College, Bhopal was not given any financial grant by Govt. of m.P. and hence the activity could not progressed up to the standard, Secretary AERV vide letter (58)798/2992 dated 28<sup>th</sup> April 1998, AERB/SEC/BDFLOP asking the status of present position for Radiation Safety in X-ray machine, is the proof my statement.

AERB on 23 June, 1998 vide letter No. AERB/Sec/BDTLUP/58/(98) 3448 dated June 23, 1998 on the subject of Enforcement of statutory requirements in the diagnostic X-Ray machine and formation of Radiation Safety Committees were asked from Dr. J.P. Sharma Asstt. Prof. & Radiological Safety Officer. Dean, G.M.C. Bhopal formed the Committees as per advice of Dr. J.P.Sharma, but function of this committee is also not active.

#### **GOVT. OF M.P. USING RADIOLOGICAL PHYSICS TEACHER AS EXPERT FOR RADIATION SAFETY:-**

AERB instructed to Medical College & other Hospital of the State Govt. of M.P. to take technical advice for purchase of X-Ray and Radiotherapy machines from the 'Radiological Safety Officer Dr. J.P. Sharma Prof. Medical Physics G.M.C., Bhopal. Govt. Of M.P. Public Health & Family Planning Deptt. Vide letter No. 841/4743/93/Med.3/17, Bhopal dated 22 Feb. 1994 made clear instructions to all Deans, DME, DMS & DPH. Police, Jail & Directorate of Ayurvedic Meicine etc. for obtaining all

the Technical advice for purchase of X-Ray machines from this centre. Technical advice for purchase of X-Ray machines and advice for radiation safety and quality assurance can be obtained from Dr. Sharma who is assigned with radiation safety responsibilities.

The Govt. of M.P. made Dr. J.P. Sharma, Professor & Radiological Safety Officer as a Technical advisor & Co-ordinator in Technical Committee for purchase of various diagnostic equipments required in 11 districts at Excellent Diagnostic Centres under 11<sup>th</sup> Finance Commission. These excellence diagnostic centres under 11<sup>th</sup> Finance Commission of eleven districts, Buildings map for CT, X-Ray machines, Ultrasound & O.T. etc. were prepared having Radiation Safety with proper construction of these centres.

### **PROPOSED SOLUTION FOR PROBLEMS FOR RADIOLOGICAL SAFETY IN DIAGNOSTIC X-RAY MACHINES BY FORMING DRS:-**

- (1) X-Ray machines being purchased in Private/Semi Govt. & Govt. in the state must be Registered with D.R.S., Madhya Pradesh D.R.S. will give guidance for required Dimension of room, wall thickness etc. as per AERB Code. The necessary accessories for Radiological Safety will be suggested by D.R.S., M.P.

D.R.S. to begin with, will be conducting a survey to find out proper working X-ray units in the state as per AERB Code. Proper fee as prescribed by A.E.R.B., required forms having terms & conditions mentioned is to be filled. X-Ray Machine scientifically qualifying as per the A.E.R.B. code after Quality Assurance Test, will be give a **certificate of Registration of X-ray Machine** by **D.R.S. Madhya Pradesh** for running x-ray unit. Annually renewal of these registration by D.R.S. will be done after inspection.

- (2) The Directorate Radiation Safety (D.R.S.) of State will be empowered by A.E.R.B. for exercising powers given by competent authority Director Radiation Safety of M.P. is having trained and qualified & experienced person as mentioned in AERB Code.
- (3) The Directorate of Radiation Safety M.P. for functioning and to implement laid down procedures mentioned in A.E.R.B. Codes for Diagnostic Radiology, will start to control all diagnostic X-Ray machines to maintain radiation safety in M.P.
- (4) Pecuniary Punishment is also notified to penalize the defaulters.
- (5) The supplier of machine should have necessary pre-requisite approval from DRS of the state for their proposed installation as per A.E.R.B. Code.
- (6) Type of Approval made by AERB Manufacturing X-Ray machine's Firms can market their medical X-Radiation equipments in the State after Registration from Director Radiation Safety (DRS). M.P.
- (7) D.R.S., M.P. will look after and control the activity of radiation safety & safe function of X-Ray machines, in the entire State as per guidance of A.E.R.B.

### **D.R.S., M.P.**

In the Supreme Court Writ Petition 501/2001 an undertaking was filed by the chief Secretaries of all the State assuring Apex Court that they will establish the D.R.S. in their States before 2001.

Action was taken by Govt. of M.P. and D.R.S. in M.P. has been established and will function under direct control of Atomic Energy Regulatory Board, Govt. of India, Mumbai through Commissioner Health Services Madhya Pradesh.

**DIRECTOREATE OF RADIATION SAFETY (D.R.S.)  
AND ITS RESPONSIBILITIES**

**S.P. Agrawal**

Head, Radiological Safety Division,  
Atomic Energy Regulatory Board, Mumbai, India

1. To set up DRS with adequate staff.
2. DRS to be an independent agency under the Health Department of Government of the STATE.
3. To designate Director of DRS.
4. The Director to provide the list of radiation safety inspectors and technical assistants from the DRS involved in the inspection work along with their bio-data and photographs for AERB's evaluation and concurrence.
5. Units of DAE to be excluded from the purview of DRS.
6. Include Director DRS in Tech. Committee for the purchase of X-ray machines for the STATE.

**Structure suggested**

1. Director, DRS	-	1
2. Radiation Safety Inspector	-	4
3. Technical Assistants	-	4
4. Confidential Assistant	-	1
5. Typist	-	1
6. Peon	-	2
7. Driver	-	1

**Responsibility of DRS**

- Agency under the Government of STATE entrusted with the responsibility of implementing Rules 30, and 31 1,2,3 (b) and 32 of the Atomic Energy (Radiation Protection) Rules (AERPR) 2004 and the guidelines promulgated by the AERB from time to time regarding radiation Safety in medical diagnostic X-ray installations in the STATE.
- Send the information collected through the proforma as specified to AERB.
- For each EQUIPMENT inspected a dimensioned sketch of the layout of the room.
- Approach the individual medical X-ray installations for registration initially and for renewal of registration after every two years by inspecting the installation.

**Before registration/renewal of registration**

- a) Review the plan or layout of medical X-ray installations in the light of AERB codes, guides, standards and suggest modifications if any, as appropriate.
- b) Inspect all medical X-ray installations which are to be registered or for which registration is to be renewed.
- c) Verify whether every medical x-ray unit installed in the STATE is of a type, approved by AERB.
- d) Inform AERB in case any new medical x-ray unit installed at any premises is not of a type, approved by AERB.

- e) Inspect the work practices being followed in medical x-ray installations and ensure they are acceptable from the point of view of safety.
- Inspect any permanently installed or movable protective barriers.
  - Carry out such tests and measurements as may be necessary to assess radiation safety and take necessary steps as it may be considered necessary, including examination of relevant records, to determine the adequacy or otherwise of the methods employed as well as the devices used in the medical x-ray installations, to provide adequate protection.
  - Organize training programmes on radiation safety in co-operation with appropriate agencies and under the guidance of AERB.
  - Organize workshops/seminars in co-operation with appropriate agencies to update the knowledge of radiation safety among the technical people involved.
  - Organize suitable public awareness programmes regarding radiation safety.
  - Interact on technical matters pertaining to radiation safety with national and international bodies, with prior concurrence of AERB. No policy-related subjects shall be dealt with in such interactions.
  - Undertake radiation Safety related research work in collaboration with appropriate agencies.
  - Prepare a Manual containing the mode of registration, including a check list of every item to be assessed/noted during the inspection, acceptance tests and quality assurance tests in consultation with AERB.
  - Ensure that the Manual covers all the requirements of radiation safety stipulated by the rules, standards, codes, guides and manuals issued by AERB.
  - Update the Manual referred above regularly and in any case once every three years after appropriate review to incorporate modifications, if any, on the basis of experience gained.

### **Responsibility of AERB**

- To hold one refresher training programme to the staff of the Directorate in Mumbai to prepare them for carrying out the inspection task.
- TA/DA expenses by the sponsoring institution.
- May issue an appropriate authorisation card for each employee of the Directorate entrusted with the inspection work on behalf of AERB. (To be returned after the inspector leaves the job)
- To provide information available with them regarding the list of EQUIPMENT, installations and other relevant data.

### **JOINT REVIEW**

- AERB and Department of Health of the STATE to jointly review the overall progress of work along with the Director, DRS at least once annually.
- The Director, DRS should submit to AERB a detailed status report on the inspection work once in 3 months and hold a review meeting with AERB at Mumbai once in 6 months.
- TA/DA for the review meeting shall be met by DRS.

### **CONFIDENTIALITY**

DRS not to divulge the information collected during the inspection to any outside agency or persons without the prior permission to AERB. No publications shall arise from DRS or any of its laboratories on the inspection work and data without the explicit concurrence of AERB.

## **RELATIONSHIP BETWEEN DRS AND AERB**

- DRS to carry out the functions envisaged under the Rules 30, and 31, 1,2, 3 (b) and 32 of the Atomic Energy (Radiation Protection) Rules (AERPR) 2004
- AERB to have the right to inspect any radiation installation on its own or to re-inspect a representative number of installations already by DRS to verify the correctness of its observations.
- AERB shall have the authority to withdraw the authorisation extended to the Directorate or any of its inspectors after conveying in writing the reasons for the withdrawal.
- If DRS find that any institution has violated the rules and guidelines of radiation safety, it will inform AERB about the violation in detail, along with recommendation on action to be taken.
- Necessary action will be taken by AERB and intimated simultaneously to DRS.

## **LEGAL MATTERS**

- All legal matters, including court cases etc., arising out of the functioning and enforcement of actions of DRS to be handled by appropriate lawyers/legal representatives to be appointed by the State Government.
- AERB also reserves the right to be represented through the same State Government lawyers appointed by the AERB, in case AERB in made a co-respondent in any case. The legal fees etc. for such defending DRS action shall be borne by the DRS, except for the fees of lawyers appointed by AERB.