Criteria for Radiological Safety Officer of Nuclear Medicine Facility to function as Radiological Safety Officer for Medical Cyclotron facility

A Nuclear Medicine Technologist, who is eligible to become Radiological Safety Officer for a Nuclear Medicine department, will be eligible to be nominated by the employer as Radiological Safety Officer (RSO) for Medical Cyclotron Facility provided he/she satisfies the following:

a) Minimum three weeks training programme (as per the enclosed syllabus) in an institution having a Medical Cyclotron in operation with due License from AERB, under the supervision of AERB approved RSO of the institution and having at least 5 years of experience as a n RSO for MCF and
b) A certificate (as per the enclosed format) of successful completion issued by the institution conducting the above training programme.

Any Medical Cyclotron facility fulfilling the below mentioned criteria can impart training in Radiation Safety Aspects of Medical Cyclotron:

(i) Should have a Medical Cyclotron in operation with due License from AERB
(ii) RSO having at least 5 years of experience as an RSO for MCF should be available in that institution for providing training to the candidates.

The Candidate after completion of training should successfully undergo the assessment conducted by RP&AD, BARC to be eligible to work as RSO for MCF.

Syllabus for Medical Cyclotron RSO Training

3 weeks duration

1. **Basic Nuclear Physics - (3 lectures)**

   Radioactive decay processes and emission of different types of Radiations (α, β, positron, γ, n) and their characteristics (Range, penetration power etc.). Interactions of radiations with matter. Radiation detectors suitable for use in a medical cyclotron facility.

2. **Physics of Cyclotron, its components, operations, facility design and associated radiation safety procedure - (4 lectures)**

   Principle of Cyclotron and charged particle accelerators, Cyclotrons for medical applications; Self-shielded and unshielded (in-bunker) Cyclotrons; solid, liquid and gas targets, auxiliary equipment: vacuum pumps, RF-power, magnet power supply, radiation detectors and monitors, dose calibrators in the facility, emergency power supply for the facilty. Control software and programs used for medical cyclotron operation.

   Medical Cyclotron Facility Design: Self-shielded vs. bunker-design; Safety interlocks for gamma and neutron radiations; Steps to minimize activation of various components. Production of short-lived radioisotopes and delivery of radioactivity to radio-chemistry lab for conversion to PET- radiopharmaceuticals, Storage of radioactive material.

   Staff requirement for Medical Cyclotron facility and their qualifications, Responsibilities of employer, licensee, RSO, Technologist, workers; Training needs of RSO, Technologists and workers.

   AERB guidelines, requirement and procedures for setting up medical Cyclotron, Protective and Emergency equipment requirements in medical cyclotron facility

3. **Radiopharmaceutical production, packaging, transport and associated radiation safety procedure - (3 lectures)**

Targets used in medical cyclotrons, radioisotope produced and their characteristics, synthesis of some commonly used F-18, C-11, N-13 and O-15 radiopharmaceuticals, use of Reference Standards, dose calibrators, Industry Standards for quality assurance, Maintenance.

Radiation safety considerations during radiochemistry synthesis, dispensing and QC. Radiation safety considerations during packaging and transport (single dose and multiple doses).

Regulatory requirements of AERB for procuring and using the radiopharmaceutical from a medical cyclotron facility.

4. **Responsibilities and duties of RSO : (5- lectures)**

Regulations, Familiarization, demonstration and quality control/calibration of radiation protection instrumentation, calibration of waste gas and effluent exhaust system

Dose apportionment and dose budgeting

Work Place Monitoring

- Radiation Field Survey & Contamination Checks
- Air-borne Contamination
- Permissible Levels of Radiation Field/Contamination
- Management of Minor & Major Spills/Contamination

Radioactive Waste Management

- Solid, Liquid & Gaseous (waste gas system)
- Good Practices of Waste Minimization, Segregation, Collection, Storage & Disposal
- Monitoring & Measurement Procedures

5. **Record Keeping**

Log of all operations, source inventory as at specified time, accounting for source with due correction for decay, names of all workers engaged in operations, names and particulars of patients, QA records, particulars of sources dispatched, transport documents, authorization data, waste arising and particulars of disposal, area monitoring and personnel monitoring details, calibration of area monitors.

Submission of quarterly and annual reports to AERB

Radiation emergencies, preparedness, response actions to be implemented and unusual event reporting.

Practical/Apprenticeship: One week (5 days- 3 hr each) in MCF operation, one week (5 days- 3 hr each) in Radiation survey and monitoring.

DETAILS OF TRAINING IN MCF FOR EVALUATION OF CANDIDATE TO QUALIFY FOR APPROVAL AS RSO FOR MEDICAL CYCLOTRON FACILITY

[To be submitted in the letter head of the Institution conducting field training]

A. Name and Address of the candidate :

B. Present employment :

C. Qualification :

D. Year of qualifying RSO (NM) exam :

E. Name and address of the training Institution :

F. Period of training : from _ _ _ _ _ to _ _ _ _ _ _

G. Details of RSO under whom training is received :

   a) Name :

   b) Qualification:

   c) Working Experience as RSO (in Years):

   d) Contact Number:

   e) Radiation Professional Identification No. (RP ID):

H. Details of the MCF:

   a) Model, Make & Sr. No.:

   b) Type of Cyclotron: (Shielded/ Undshielded)

   c) Radioisotopes produced:

   d) AERB License Details: License No –
   Expiry Date –

Certification

I certify that Mr./Ms.---------- has undergone the above training (including Theory & Practicals) from …… to ……. on all of the topics as per the syllabus prescribed by AERB for eligibility to work as RSO in Medical Cyclotron facilities.

He has been duly trained in the following areas of operation of Medical Cyclotron facilities:

- Operational Safety
- Radiation Protection Program
- Packaging & Transport
- Emergency Preparedness aspects
- Regulatory requirements
- Responsibilities & Duties of RSO

Certified by

Name of RSO:

Signature

Date and Place:

Approved by:

Name of Facility In-Charge (Licensee):

Signature:

Institution Name with Seal

Name of the Head of the Institution:

Signature:

Institution name with seal:

Date:

Place: