1.0 POLICY:

The policy defines the standardization process for the Radiation Safety Program of our hospital

2.0 PURPOSE

Our hospitals radiation safety program establishes uniform policies and procedures for the safe Useof all sources of ionizing radiation within the Hospital. The program provides for monitoring of personnel and facilities and offers other services to assist users in ensuring that radiation exposure is maintained As Low as Reasonably Achievable (ALARA) within the established dose limits. To assist all staff at the Hospital to understand the importance of radiation safety in their day-to-day operations

3.0 POLICY DETAILS:

- **3.1** Radiation Safety Committee
- **3.2** Monitoring of Radiation Safety
- **3.3** Practical Radiation Protection
- **3.4** Radiation Dose Limit

3.1RADIATION SAFETY COMMITTEE

The Radiation Safety Committee of our Hospital is chaired by the Head of the organization and the Chief Medical Physicist shall be the Convener of the committee. Other members will be Inducted from the Departments using Radiation Sources – For composition of Radiation Safety Committee – Please refer to the Radiation Safety Committee

Our hospital's Radiation Safety Committee has the following responsibilities:

a. To formulate and review policies on radiation safety
b. To monitor radiation safety issues to ensure that they are appropriately addressed by administration

c. To review radiation safety procedures for effectiveness and recommend revisions
d. To ensure that guidelines, advice, assistance and practical services are available to all users of radiation sources in the Hospital.
e. To ensure compliance of laws and regulations relating to the use of ionizing radiation
f. To specify additional conditions of use when required to maintain compliance with Hospital Policies.
g. To conduct investigations into radiation related incidents or accidents
h. To specify the requirement for instruction/training sessions on radiation safety for Hospital staff members at all levels
i. To maintain written records of meetings, actions, incidents or unusual occurrences along with recommendations.
j. To meet and discuss on a monthly basis as defined by the committee calendar
k. The committee may impose requirements, as it seems appropriate or necessary, to protect health or to minimize danger to property

The Radiation Safety Officer our hospital has the followingresponsibilities:

a. To ensure smooth functioning and decentralization of the work - he shall recommend nomination of additional RSO's for approval by the competent Authority, AERB.
b. He shall act as the chief liaison officer between our hospital and outside authorities, such as the AERB (Atomic Energy Regulatory Board) and in all matters relating to radiation safety
c. Monitor compliance of laws and regulations relating to the use of ionizing radiation
d. Establish, implement and maintain a safety control and assessment program in conjunction with the Radiation Safety Committee
e. Systematically and periodically review survey data for radiation and contamination levels in all areas where radioactive materials are used, stored or disposed
f. Implement a personnel-monitoring program to ensure radiation safety of staff members

g. Review occupational radiation exposures and recommend ways of reducing exposures in the interest of the ALARA (As Low AsReasonable Achievable) principle.
h. Conduct and/or supervise decontamination and decommissioning procedures
i. Certify decommissioned facilities as being free of contamination
j. Ensure leak testing of sealed radioactive sources
k. Maintain required AERB/BARC records along with the Radiation Safety Manual/guidelines
l. Propose to the Radiation Safety Committee any amendments to the Radiation Safety Policy Manual
m. The Radiological Safety Officer shall train all radiation workers on relevant safety measures, educate and instruct new entrants, implement all radiation surveillance measures, maintain proper records of personnel doses, conduct periodical radiation protection surveys and take appropriate local measures including clear administrative instructions in writing to deal with radiation emergencies
n. The RSO shall ensure that all radiation measuring and monitoring instruments are properly calibrated and maintained in good working condition.
o. Select and recommend use of appropriate personnel monitoring devices and area survey meters that shall be made available for the radiation protection program.
p. In the event of an accident, the RSO shall take every possible care to save human life, minimize radiation doses to personnel and take such further remedial steps as considered necessary and the competent authority shall be consulted at the earliest to restore normal conditions
q. The Radiation Safety Officer should coordinate and arrange for the annual periodic medical screening of all the Radiation workers at subsequent intervals not exceeding 12 months and any other examinations, which may be specified by the competent authority.

POLICY TO MONITOR TIMELY QUALITY CHECKS OF TLD BADGES & LEAD APRONS

Prepared by:	Verified By	Approved by:
Dr.Gayatri	**Dr. Gowtham Krishna**	**Mrs.G. Lakshmi Lavanya**
Radiologist	Medical director	**Chief executive Officer**

1.0 PURPOSE

The thermo luminescent dosimeter (TLD) is a device used for personal monitoring to measure the dose of radiation received by an individual. It also aids in evaluating the effectiveness of radiation controlled practices in the work place. It detects the changes in radiation levels in the work place and to provide information about accidental exposures too.

When the TLD material is exposed to ionizing radiation at room temperature, part of the energy absorbed is used in changing the energy state of electronics in the material. If the TLD is heated, these energy states revert to their normal level accompanied by the emission of light. Portion of this light emission may be measured and is directly proportional to the amount of radiation energy received by the dosimeter.

Badges must be returned to BARC upon receipt of the new batch promptly. Extend delay decreases the chance of knowing the dose immediately in case of over or accidental exposure. Also, in case of a dose recorded by the badge it is important to evaluate it as soon as possible so action can be taken to prevent exposure in the future. If it is suspected that a person has received a significant radiation dose, the TLD badge should be returned for assessment immediately.

(The Radiation In-charge shall ensure that records are maintained in a form and place where they are available for inspection by the person to whom they relate the reasonable times during normal working hours).

2.0 POLICY

A continuous monitoring and recording of the number of times the badges are not sent within 15 days for quality checks shall be done.

A quality check for the Lead Aprons shall be done once in a year.

2.1 Checking of Lead Aprons

Lead aprons should be checked for hidden damage immediately upon receipt and prior to being put into service and thereafter on a regular basis of thrice in a year (3 times) with Fluoroscopy and Physically. Aprons found to contain damages should be removed from service immediately.

Record should be maintained noting the dates of inspection and the due date for the next inspection.etc….

2.2 Storage

Lead aprons should be stored on a proper Lead apron stand. They should not be folded, thrown on the floor or draped over anything with a sharp edge. eg: door or X-ray table etc…

2.3 Cleaning of Lead aprons

Lead apron should be cleaned as per Hospital Infection Control policy. As per the policy, the lead aprons should be cleaned with soap and water / Bacillocid Sprayonce in a week by the respective users of the department.

3.0 PROCESS

The list of all the badges shall be collected and updated for all the employees in the hospital who shall be exposed to radiations. As the new badges are sent for accredited laboratory by AERB after every three months, the used badges shall be sent within 15 days for evaluation.

The number of times the TLD badges are not sent within 15 days for quality checks shall be recorded and data shall be analyzed. Care shall be taken that such incidents shall be reduced to Zero.

MONITORING

Monitoring is an essential component of any radiation safety program. It involves the regular and routine measurement and/or assessment of factors relevant to radiation safety and takes the following forms:

a) Area monitoring, i.e. measurement of radiation dose rate at various points in an area where a radiation-emitting device is located, or where radioactive sources are stored, handled or used.
b) Personnel monitoring, i.e. measurement of the total dose received by individual radiation workers over a specified period of time
c) Medical surveillance of radiation workers

PRACTICAL RADIATION PROTECTION

Accepted good practice for the use of radioactive material and radiation-producing machines results in personnel radiation exposures being reduced to values. As Low As Reasonably Achievable (ALARA). The international Commission on Radiological Protection (ICRP) publishes guidelines for maintaining radiation doses at ALARA levels.

As any exposure may involve some degree of risk, and thus some detriment, the comprehensive system of dose limitation is aimed at the following principal objectives:

a) To ensure compliance with the dose limits
b) To avoid the use of unnecessary sources of exposure
c) To provide for operational control of specific procedures, both individually and in combination, so that the resulting doses are As Low As Reasonably Achievable, economic and social considerations being taken into account; and

d) To provide a general framework to ensure that these doses are justifiable in terms of benefits that would not otherwise have been received

Record keeping

Authorized users or persons designated by them shall have the responsibility of keeping accurate records of all activities pertinent to radiation protection specifically, these documents shall include

a) Copies of the original license application, renewal and / or amendment applications, and all correspondence submitted in support of the application to the RSO
b) Copies of licenses, permits or work authorization
c) Copies of all correspondence between the user and the RSO
d) Copies of all survey and inspection reports
e) Copies of all reports of personnel monitoring / annual medical results
f) Record of radiation safety training

RADIATION DOSE LIMIT

The purpose of a system of dose limits is to ensure that the radiation dose received by any person (other than an accidental exposure, or a deliberate exposure as in medical diagnosis) is such that:

a) The dose is below the threshold for any biological effect (non-stochastic or deterministic) which requires a minimum dose for expression:
b) The probability of any effect of the all-or-nothing (stochastic) type is small enough to be acceptable to the individual and to society.

c) Any person who is exposed to ionizing radiation as a direct and necessary condition of his occupation, business or employment is said to be "occupationally exposed"

The effective dose limit for radiation workers, as prescribed by the AERB (Atomic Energy Regulartory Board), is 100 mSv (10,000 mrem) for 5 years (with a maximum of 30 mSv in any given year or an average of 20 mSv/yr for 5 years) for whole-body exposure

The ALARA Principle

The effective and equivalent doses received by Radiation Users or other personnel, are dose limits. They are in no sense "dose allotments" which can and shall be used up. On the contrary, the guiding principle of all radiation work is: the dose shall be As Low as Reasonably Achievable; economic and social factors being taken into account. This is called the "ALARA Principle" and is central to all radiation safety.

Any Radiation User who's annual or quarterly dose, as measured by external monitoring or calculated from the results of bioassay procedures, greatly exceeds the normal value either for that individual or for persons carrying out similar work, is subject to investigation by the License Holder, in co-operation with the Radiation Safety Officer.

ACCIDENT AND EMERGENCY PROCEDURE

Management of Radiation Emergency

Radiation Emergency action plan

The purpose of the Radiation emergency action plan shall be to mitigate the consequences and manage any emergency situation. The intervention, if any, shall aim at limiting external exposure.

Foreseeable Radiation Emergency:

Damage/Disable/Loss/Theft of radiation equipment at the installation during use, storage, transport and natural calamities such as fire, flood or earthquake.

Identification and training of emergency handling personnel:

The emergency action plan includes,

a. Identifying personnel for the handling radiation emergencies and make them familiar with the responsibilities and function, line of authority and most direct and alternate lines of communication.

b. Providing training and periodic retraining.

c. Providing training to recognize abnormal exposures and for prompt communication to the RSO.

d. Providing appropriate tools, radiation monitoring instruments and personnel monitoring devices to be kept and maintained in working condition.

Reporting of Radiation Emergency:

RSO shall,

a. Report to the Licensee immediately on any emergency situation, initiate necessary remedial actions and endorse a copy of the report to **Atomic Energy Regulatory Board.**

b. Carry out prompt investigation on causes of emergency, evolve means to prevent recurrence and submit a copy of the report to **Atomic Energy Regulatory Board**.

Licensee shall,

a. Report to the competent authority regarding the incident.

b. Submit a detailed report which includes,

    a. Date and time of occurrence

    b. Brief description of the incident

    c. Action taken

    d. Probable causes of the incident and

    e. Steps taken to prevent recurrence of such incidents in future.

c. Arrange to carry out prompt investigation on any emergency situation including

    a. Any equipment failure, accident, mishap or any other unusual occurrence.

    b. Any therapeutic treatment delivered to either the wrong patient or wrong dose from the value prescribed by the radiation oncologist that may lead to undue acute secondary effects.

Employer shall,

a. Report to the competent authority regarding the incident within 24Hrs of its occurrence and

b. Lodge a written complaint with the police in case of loss or theft of the radioactive source or any radiation generating equipment, if they are not traced within 24Hrs.

Fires or Other Major Emergencies

a) Alert all personnel in immediate danger.
b) Report the fire immediately regardless the size.
c) Try to put out manageable fires. If fire is not manageable, leave the area immediately, close the door and wait for assistance.
d) Notify the Hospital Radiation Safety Office
e) Govern fire fighting or other emergency activities by the restrictions of the Hospital Radiation Safety Officer. The Hospital Radiation Safety staff shall be responsible for the remaining steps.
f) Following the emergency, monitor the area and determine the protective devices necessary for safe decontamination.
g) Permit no person to resume work until conditions allow.
h) Monitor all persons involved in combating the emergency.

SAFETY/ RISK SCREENING

Patients are appropriately screened for safety/ risk prior to undergoing an imaging on a particular modality

HANDLING USAGE AND DISPOSABLE OF RADIO ACTIVE HAZAARDOUS MATERIALS:

Not applicable – Radiation Oncology is out of scope of services

TRAINING:

Imaging and ancillary personnel are trained in imaging safety practices and radiation safety measures

SIGNAGES:

Imaging signage's are prominently displayed in all appropriate locations

Radiation Safety Check list

ITEMDESCRIPTION	Yes	No	NA
GENERALRADIATIONSAFETY IN RADIOLOGY & CATHLAB AREAS:			
1. Appropriateradiationwarningsign(s)postedatentrance?			
2. Radiology &Cathlab, endoscopy & OT areas are secured toprevent unauthorizedaccess?			
3."RadiationSafetyManual"available?			
4. Allpersonnelhavedocumentedtrainingofappropriatetype?			
5. Appropriatepersonnelsuppliedwithdosimeters?			
6. Appropriate Radiation Safety protective equipment are available in the respective areas			
7. Quality control of protective equipment is completed and labeled?			
RADIATIONPRODUCINGDEVICES:			
1. CopyofRegistrationposted?			
2. Operatingandemergencyproceduresposted?			
3. Quarterlysafetydevicetestsareperformedanddocumentedinlog?			

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Dr.Gayatri	**Dr. Gowtham Krishna**	**Mrs.G. Lakshmi Lavanya**
Radiologist	Medical director	**Chief executive Officer**

4. Annualinspectiondoneanddocumented?			
Radiation Safety Officer:	Signature:		Date:
5. Controlpanelmarkedwithappropriatewarnings?			
Chief Biomedical/FMS Engineer:	Signature:		Date:
Hospital Safety Officer:	Signature:		Date:

Any other non-compliance issues observed by the auditors:

Document Revision History

DOCUMENT REVISION HISTORY		
Version	**Date of issue**	**Reason for Revision**
Original version - 1	10/03/2022	Prepared 5th edition
Revised version - 2	05/07/2023	Periodic revision and update
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Revised version - 4		
Revised version - 5		

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