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Name

Gulzar Azam

ID

14661

Program

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viva

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Q1: Describe the role of Radiation protection officer in radiology department?

Ans
The Radiation protection officer or Radiation Safety officer has an important role in the radiology department which is given below.

The radiation protection officer is a specialist in the radiation safety and Compliance matters.

The role of "RPO" is to support the department work with ionising radiation by ensuring arrangements in place to manage radiation risks, so that work is carried out safely and in compliance with regulation.

"RPO" Role of Radiation protection officer:→
↳ Acting as the point of contact within the

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department relevant for regulators
to ionising

radiation Compliance -

↳ Acting as the point
of contact within the
department for the external
radiation protection adviser.

↳ Arranging for disposal
of radioactive waste
to authorised Contractor.

↳ Managing an inventory
of equipment capable
of emitting x-rays.

↳ Advising on training in
radiation safety.

↳ Implement and oversee the
operational aspect of
the RPP.

↳ Review and approve the
Radiation protection principles "RPP"
Change before implementation -

↳ Ensure that radiation
safety activities are
being performed in
accordance with licensee -
approved procedures.

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↳ Help, identify and investigate the radiation safety problems.

↳ Initiate, recommend or provide corrective action for identified safety problems.

↳ verify the implementation of corrective action.

↳ Stop operations identified as unsafe.

↳ Serve as a member of the RSC and attend the meetings.

↳ provide the contact between the licensee and the regulatory agencies.

↳ Be available for contact by facility staff per regulation.

All the above mentioned are the role of the radiation protection officer in the radiology department.

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Q2:- Elaborate the radiation protection measures in a safe radiology department?

Ans: Measures for Radiation protection:->

By using the some protection measures one can minimize the radiation dose both for the patient and technologist.

The radiation protection is important for the reduction of dose.

Some of the radiation protection measures are given below.

↳ Shielding:- The radiation can be minimize by using shielding, which is a protective material and absorbs the radiation energy.

Lead lined wall and lead glass windows are done for Room shielding.

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There are certain shielding equipments used in the department as a protective measure, such as gloves, apron, or lead lined plaster board etc.

↳ Time: → As much as possible the time for the procedure is minimize to reduce the dose.

By minimizing we can reduce the radiation dose for both patient and also

for technologist.

↳ Distance: → The radiation dose is also reduces by the distance, by doubling the distance from the source to the patient, you will reduces the intensity 25% it is known by inverse square law.

The greater the distance the lesser will be the radiation dose -

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↳ Scattered radiation can be attenuated by protective clothing worn by personnel, such as aprons, spectacles and thyroid shield.

↳ Ceiling-suspended protective screens can provide significant protection, but their effectiveness depends on them being positioned correctly, it provides protection only to the upper body, head & eyes.

List of protective measures:

- ① Time: → Minimum time.
- ② Distance: → Maximize the distance.
- ③ Shielding: → Lead or lead equivalent shielding.
 - Lead apron
 - Mobile lead shields
 - Lead glasses
 - Lead barriers
 - Gonadal shields
 - protective apparel
- ④ Filtration:
- ⑤ Collimation:

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Q3:→ What are the radiation hazards that one should be aware of?

Ans There are several radiation hazards and everyone need to be aware of these hazards and are given below.

- ↳ Genetic Hazards:→ reflected in the offsprings.
- ↳ Radiation Injury:→ Cause change in the living tissues causing radiation sickness.
- ↳ Somatic effects:→ harmful to the person.
- ↳ Radiation decomposition Hazards:→ The splitting of water into H^+ and OH^- and also splitting of other body solvents.
- ↳ The Radiation heat up the molecules of living tissues.
- ↳ Another process is ionization where the radiation interact with matter to form ions.

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- ↳ Damage to the cell occurs.
- ↳ The early effect of the radiation is a result of injury to the tissue.
- ↳ Simultaneous and considerable destruction to the radiosensitive cell lead to radiation sickness.
- ↳ Another hazards of radiation is the shortening of life span, leukemia, malignant tumors and cataract.
- ↳ The early hazards of the radiation includes nausea, vomiting, malaise, diarrhea, fever, loss of appetite, fall of hairs and death etc are the dangerous hazards of radiation.
- ↳ The normal cell division is also disturbed it is a radiation hazard and this lead to cancer.
- ↳ The radiation hazard include the thyroid cancer as well.

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↳ The radiation hazards is fetal (death occurs). High dose of radiation can cause massive damage to organs of the body and kill the person, the exposed person loses white blood cells and the ability to fight infections.

At extremely high doses of radiation the person may lose consciousness and die within hours.

↳ All the above mentioned are the radiation hazards one should beware off these.

Q4: How a radiation technologist can protect himself/herself from radiation, what is the annual occupational dose?

Ans There are some natural ways through which the radiation emits and also some man made way of a radiation, and it is a part of our life.

The ways through which the technologist can protect from radiation is given below.

↳ Distance: The more the distance the lower radiation dose exposure to technologist, it is just like of the fire when you are more away from the fire the heat will reduce in this way the radiation dose also reduces if the

distance is maximize mean
 far from the radiation source.
 ↳ Time: → The technologist can
 also protect themselves
 from the radiation if
 the time as keep
 • minimum as possible for
 the procedure.

Minimize time will result
 in the minimum dose
 exposure, also less scattering
 of radiation will occur.

↳ Shielding: → The technologist can
 also protect himself/herself
 from radiation if he
 use protective shielding,
 and protective shielded room.

↳ The technologist can protective
 himself/herself, if he/she
 never stand in the
 primary beam.

↳ By mean of wearing the
 protective apparel should be
 protected from radiation.

↳ Always stands behind the
 protective barriers.

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- ↳ The technologist can protect himself/herself if he/she not holds the patient during radiographic examination.
- ↳ By using gonadal shields the technologist protects themselves.
- ↳ using lead apron, gloves, lead spectacles, and thyroid shield can also help the technologist to protect himself/herself from the radiation.

All the above mentioned are ways through which a technologist can protect themselves from radiation.

"Part B"

Annual occupational Dose:→
The annual occupational dose is a limit, may vary and depend upon the affected part of the body.

It is a standard dose limit for the protection against radiation.

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Annual Exposure →

①	Activity Radioactive material use in UM Lab	Dose < 10 millirem/year
②	Smoking	280 millirem/year
③	Dental x-ray	10 millirem per x-ray
④	Chest x-ray	8 millirem per x-ray
⑤	Cross country round trip by air.	5 millirem per trip
⑥	Coal Burning power plant.	0.165 millirem/year
⑦	Drinking water	5 millirem/year.