Radioactive waste Management at KFUPM

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The following terms and Phrases, used herein, shall have the assigned meanings unless the context indicates otherwise

Kingdom: King of Saudi Arabia

Licensee: Any person holding a valid license.

RSO: radiation safety officer

NRGC: Nuclear and radiation protection group coordinator

Authorized People: any person has authority approved by the department of physics to access the nuclear and radiation lab and handle radioactive sources and practices.

Temporary permit holder: students working under the supervision of an authorized person and any other person collaborating with the authorized person for a while.

Ionizing Radiation: Radiation can create ion pairs in biological materials.

Radiation Exposure: Any act or condition causing exposure to ionizing radiation.

Radioactive waste: Material left over from the use of radioactive materials

Radioactive source: Any material sealed or unsealed that emits ionizing radiation

Nuclear material: uranium containing an admixture of naturally occurring isotopes and materials that are used in fission and fusion reactions.

Radioactive material: spent fuel, naturally radioactive materials, irradiated material, uranium, thorium, and radium ores.

Typical waste: contaminated protective clothing and gloves, wiping rags, mops, and filters

Solid low radioactive waste: contaminated test tubes, bottles, tubing, and process equipment come into contact with the radioactive material.

Low-level waste: containing some radioactive material that is not particularly hazardous unless inhaled or consumed, and a person can stand near it without shielding.

Radiation Exposure: Any act or condition causing exposure to ionizing radiation.

Lost Source: Any radioactive source not under the control of the Authority, because it has never been under such control, has been abandoned, lost, withdrawn, or stolen, or has been circulated through illicit trafficking.

Incident: Any unplanned event, including operation errors or equipment failure; pre-accident situations; pre-accident warnings; near-miss incidents; harmful or non-harmful unauthorized acts, the actual or potential consequences of which Law of Nuclear and Radiation Control 5 cannot be ignored in terms of protection or safety.

Responsibility

Authorized People and Temporary Permit Holder

They are encouraged to manage their activities to limit the amount of radioactive waste they produce.

Radiation Safety Officer

The Radiation Safety Officer (RSO) reports to the Chairman of the physics department for research through the NRGC, and is responsible for the following:

1- Assuring the safe use of radioactive material and radiation-producing equipment;
2- Approval of all purchases of radioactive material;
3- Managing the radiation safety program and ensuring compliance with license conditions, applicable governmental rules and regulations, and University policies and procedures;
4- keep accounting and operational records of nuclear and radioactive materials and submit periodic reports to the Authority
5- Providing external and internal radiation exposure monitoring;
6- Leak testing of sealed radioactive sources;
7- Analysis and testing for radioactive material;
8- Assisting users in the design and implementation of laboratory experiments,

safety equipment, etc.;

9- Surveys of radiation-producing equipment;
10- Calibration of radiation detection instruments;
11- Responding to radiation emergencies;
12- Providing training to workers;
13- maintain records relating to the transfer, storage, or disposal of all radioactive material in the lab;
14- track the life of the radioactive inventory item, from receipt until it is finally all consumed and transferred to the location waste status;
15- coordinate the collection, storage, and disposal of radioactive waste;
16- reviews and compiles records of disposals, or transfers, performed by the Authorized person and maintains records of all facility releases, disposal, and shipments;

Radioactive Waste room at KFUPM

The room is provided with an interlock alarm system, a controlled monitoring system by RSO, negative pressure ventilation, Fume Hood, and a glove box. A yellow radioactive material warning sign is posted on the door. Access to this room is restricted to authorized people.

However, the radioactive waste room in the nuclear and radiation Lab. at KFUPM does not fully conform to the IAEA requirements for a radioactive waste storage facility are:

1- The storage area should be isolated and away from areas of chemical and flammable sources and persons;
2- It should be away from routes of public access but accessible for transport of wastes;
3- It should have appropriate ventilation and sufficient size to hold the space and volume requirements;
4- It should be provided with a well-established system of segregation of wastes;
5- It should have washing facilities and radiation monitoring equipment;
6- It should be provided with a physical barrier, intruder alarm system, and posting of authorized persons to contact for entry; and
7- It should have floor protection in cases of contamination.

Radioactive waste management

Generally, we apply delay-and- decay principle in radioactive waste management. Radioactive waste is generated and collected in the laboratory, in a radioactive waste container for segregating process.

Segregation Process

The radioactive wastes are segregated as 1- Non-radioactive from radioactive; 2- Solid wastes from liquid wastes; and 3- Sealed from unsealed radioactive sources. Radioactive wastes are properly labeled with the name of the isotope, chemical form, exposure rate, and date. Maintain a separate file in the database of each type of disposal performed at the location.

Typical Waste

Typical wastes are separated from normal trash and collected in a special container. They surveyed using radiation survey meters. They treat as normal trash if the survey results are equal to the background level. Otherwise, they label with a radioactive warning sign and stored in the radioactive waste storage room.

Solid Low Radioactive Wastes

They are stored in metal or plastic containers provided they

1- have an inner plastic bag
2- have a securely fitting cover and
3- are clearly labeled with a sign saying “caution radioactive material” or “caution radioactive waste do not empty”

Liquid radioactive waste

Liquid radioactive waste is stored in containers, provided with a secondary containment system that can collect all of the liquid in case of a spill or breakage. The container is labeled with a warning sign of radioactive material.

Volatile waste material

Volatile materials are stored in a fume hood. They are labeled with a radioactive material warning sign.

The RSO performs a regular survey to make sure there is no leak and the exposure rate is within the normal level. If there is any leak or high exposure rate, the RSO reports that to the chairman of the physics department through the group leader.