

RADIATION SOURCES-
RADIATING HEALTH AND PROGRESS....
..... BUT NEED REGULATION NEVERTHELESS!!!

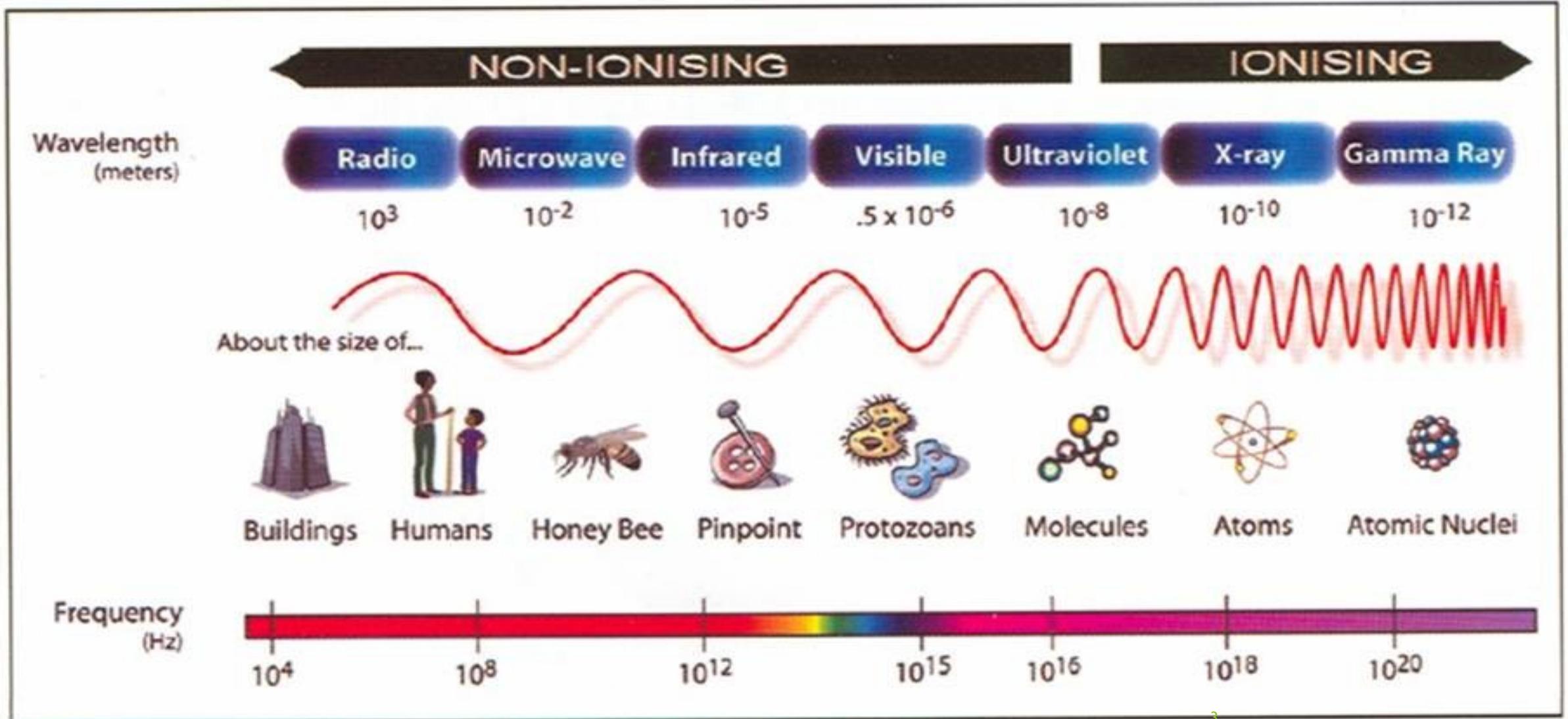
Anuradha V

ATOMIC ENERGY REGULATORY BOARD

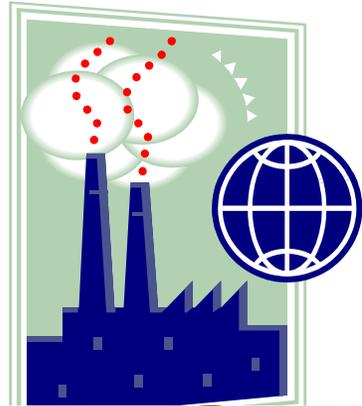
Contents- The four W's

- ▶ What are radiation sources?
- ▶ Where are they used?
- ▶ Why do we need them?
- ▶ When is their use dangerous and how to overcome this?

The Electromagnetic Spectrum



Applications of Radiation- All areas of life



Medical- Diagnosis and treatment

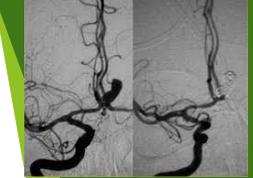
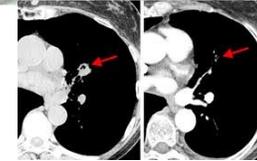
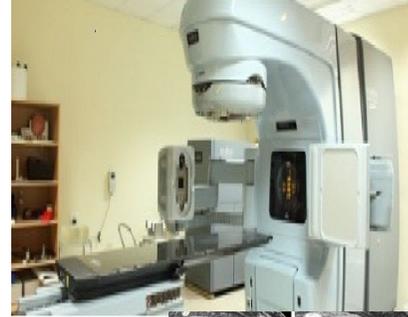
Industrial- Food processing, Radiography,
Gauges and measurement

Research - Irradiation of samples,
Calibration sources, tracers

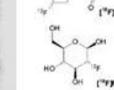
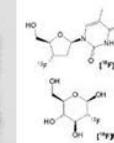
Agriculture- Tracer studies

MEDICAL USES

- ▶ RADIOTHERAPY
- ▶ INTERVENTIONAL RADIOLOGY
- ▶ RADIO-PHARMACEUTICALS
- ▶ COMPUTED TOMOGRAPHY
- ▶ BLOOD/TISSUE IRRADIATOR



FDG FLT

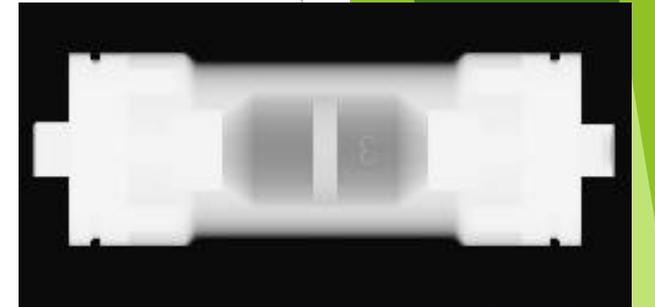


INDUSTRIAL USES

FOOD IRRADIATION



INDUSTRIAL RADIOGRAPHY



NUCLEONIC GAUGES



RESEARCH

- ▶ TRACER STUDY
- ▶ IRRADIATION OF SAMPLES





Atomic bomb survivors



Alexander L.- Polonium poisoning of Russian spy

“RADIATION IS INDEED DISASTROUS”

Image courtesy: socialistworld.net



THE QUESTION TO ASK IS NOT "IS THERE ANY RADIOACTIVITY PRESENT?" BUT RATHER, "HOW MUCH, AND IS IT ENOUGH TO BE HARMFUL?"

Atomic Energy Regulatory Board, Anushakti nagar Mumbai

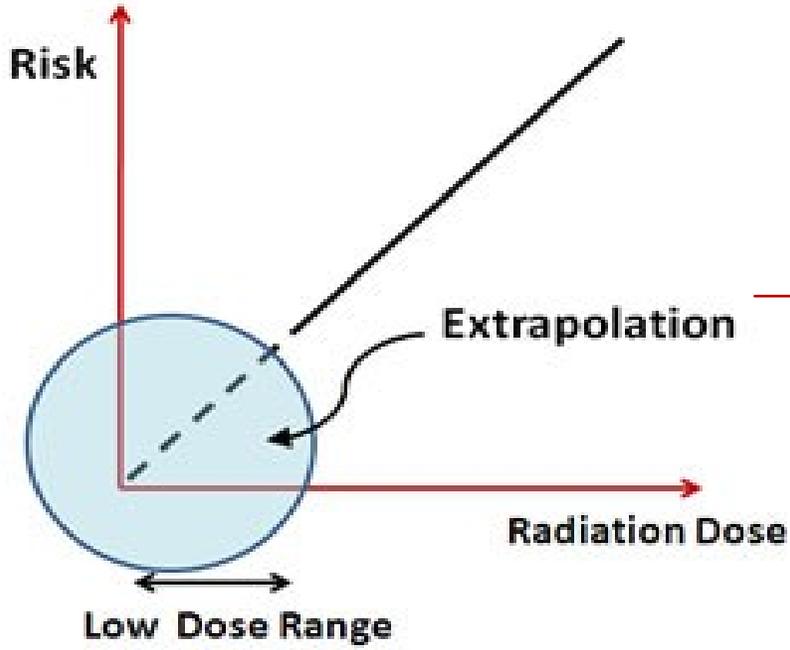


Safety Research Institute at Kalpakkam

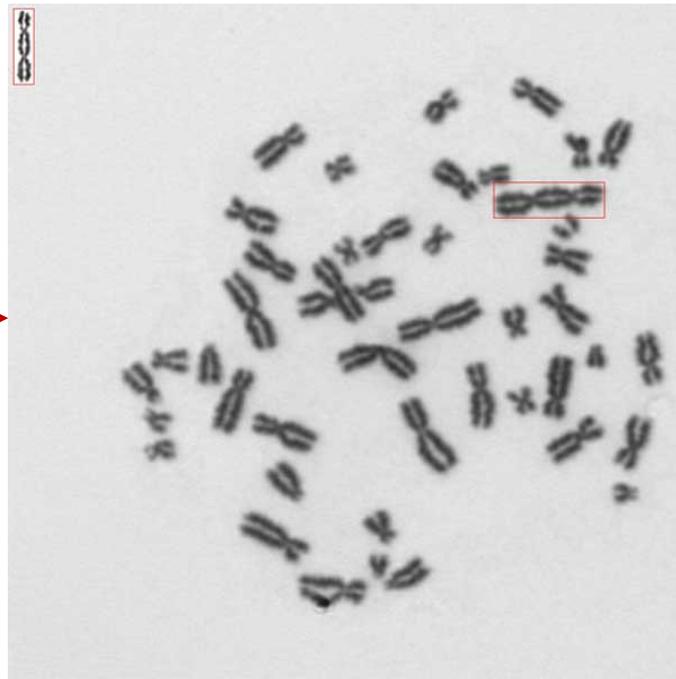
Regional Centers at Chennai, New Delhi and Kolkata



Linear- Non Threshold model for Radiation safety



DNA damage



Effects

AERB mandates in this area for reduction

CANCER RISK

Epilation

Erythema

GI/ CNS

Symptoms

Death

AERB mandates in this area for Prevention

These effects are more profound in the foetus and children

“Licence in accordance with Atomic Energy (Radiation Protection) Rules, 2004 from AERB is mandatory requirement for the procurement and use of radiation sources in India”.



Safety Research funding

- ▶ Safety in application of nuclear and radiation facilities
- ▶ Environmental Impact Assessment
- ▶ Transport of Radioactive material
- ▶ Radioactive Waste Management
- ▶ Civil and Structural Engineering
- ▶ Spent Fuel Storage
- ▶ Reactor Physics
- ▶ Thermal Hydraulics/Fluid Structure Interactions in Reactors under Accident Conditions .
- ▶ Medical/ Industrial Applications of Radiation
- ▶ Fire and Industrial Safety
- ▶ Use of Radiation Sources for Research Purposes
- ▶ Radiobiology/Radiation Dosimetry/Radiation Protection
- ▶ Applied Chemistry in Nuclear Industry
- ▶ Safety Evaluation Methodology
- ▶ Front and Backend Fuel Cycle Facilities
- ▶ Occupational Health and Environmental Safety

Take-away quiz

- 1) The type and quantity of radionuclide determines its hazard True or false
- 2) Radiation sources are if used properly do not pose any danger. True or False
- 3) Pregnant women should not undergo X-ray examination True or False
- 4) Whole body CT-scans can detect cancer in the body True or False
- 5) We are surrounded by Natural/ Cosmic radiation True or False
- 6) It is better to keep away from a radiation source when not required True or False
- 7) MRI is an ionizing radiation source. True or False
- 8) A person is radioactive after he undergoes an X-ray True or False
- 9) A person is radioactive after he has a Nuclear Medicine procedure True or False
- 10) No radioactive source should be touched True or False

RADIATION SYMBOLS...TO BE AWARE OF..



Fig. 2.
Radiation Symbol and Warning Sign for Radiation Generating Equipments



Thank you...