UNIT-II

NUCLEAR RADIATION AND ITS EFFECTS ON THE BODY

2.5 PERMISSIBLE EXPOSURES

Permissible exposures" typically refer to the maximum amount of a hazardous substance or environmental factor (like noise, radiation, or chemicals) that a person can be exposed to without experiencing harmful effects. These limits are often set by regulatory bodies to protect workers and the general public from health risks.

Some common contexts include:

- **Occupational Safety**:
  - **Permissible Exposure Limits (PELs)**: Established by OSHA (Occupational Safety and Health Administration) in the U.S., PELs specify the legal limit of exposure to substances like asbestos, lead, or formaldehyde in the workplace.
  - **Threshold Limit Values (TLVs)**: Suggested by the American Conference of Governmental Industrial Hygienists (ACGIH), these are guidelines for exposure limits but aren't legally enforceable.

- **Radiation Exposure**:
  - **Annual Dose Limits**: Set by organizations like the Nuclear Regulatory Commission (NRC), defining how much ionizing radiation workers and the public can safely be exposed to over time.
- **Noise Exposure**:
  - OSHA regulates permissible noise levels in the workplace, often measured in decibels over a certain period, to prevent hearing loss.
- **Environmental Exposure**:
  - Environmental agencies like the EPA (Environmental Protection Agency) set permissible exposure limits for pollutants in air, water, and soil.

Maximum permissible occupational doses

Maximum permissible occupational doses refer to the highest levels of radiation or hazardous exposure that workers can safely be exposed to over a specific period, as established by regulatory bodies to protect health and safety. These limits vary depending on the type of hazard (e.g., ionizing radiation, chemicals) and are typically based on guidelines from organizations like the **International Commission on Radiological Protection (ICRP)**, the **Occupational Safety and Health Administration (OSHA)**, and the **National Council on Radiation Protection and Measurements (NCRP)**.

For Ionizing Radiation (according to ICRP and NCRP):

1. **Whole Body (Effective Dose Limit):**
   - **50 mSv (5 rem)** per year
   - **100 mSv (10 rem)** over 5 years (average of 20 mSv/year)

2. **Lens of the Eye:**
    - **150 mSv (15 rem)** per year
3. **Skin, Hands, and Feet (Shallow Dose):**
    - **500 mSv (50 rem)** per year

For Non-Ionizing Radiation (e.g., Electromagnetic Fields):

Regulations depend on frequency and type of exposure. The **American Conference of Governmental Industrial Hygienists (ACGIH)** and **OSHA** provide specific exposure limits.

For Chemical Exposure:

OSHA sets **Permissible Exposure Limits (PELs)**, while **NIOSH** provides **Recommended Exposure Limits (RELs)**.

- **Time-Weighted Average (TWA):** Average exposure over an 8-hour shift.
- **Short-Term Exposure Limit (STEL):** Max exposure for a 15-minute period.
- **Ceiling Limit:** Should never be exceeded.