



Status of National Arrangements on Dose Registry

“Regulatory Provisions on NDR & its’ Implementation”

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Regulatory Provisions

- **The licensee shall submit periodic reports to the Authority on occupational exposure** *(PNRA Regulations PAK/904, Regulations 29(1-f))*
- **The licensee shall submit exposure records of workers to the Authority as and when required** *(PNRA Regulations PAK/904, Regulations 31(2-b))*
- **If the licensee intends to cease the activities in which workers are subject to occupational exposure, prior to termination of authorization, he shall submit workers' exposure records to the Authority** *(PNRA Regulations PAK/904, Regulations 29(4))*



Regulatory Provisions (Cont'd)

Reference standards for authorization of dosimetry services:

1. The licensee shall ensure that dosimetry services are availed from an authorized dosimetry service provider (PNRA Regulations PAK/904, Regulations 29(1-b))
2. “Regulations for Authorization of Service Providers to Nuclear Installations and Radiation Facilities - (PAK/906)” *(at the stage of finalization)*

Validity period:

- Five (05) years

Types of dosimetry services available:

- External & Internal Dosimetry

Radiation types for which dosimetry services can be provided:

- X-rays, Gamma Rays & Beta Rays

Types of personal dosimeters provided:

- Film badge Dosimeters, TLD Dosimeters, OSL Dosimeters



Operational Technical Service Providers (TSPs) in the Country

Technical Service Provides (TSPs) in Pakistan include:

- ❖ Radiation Dosimetry Group (RDG), PINSTECH Islamabad
- ❖ Environmental Monitoring and Dosimetry Laboratory (EM&D Labs), Islamabad
- ❖ Karachi Institute of Radiotherapy and Nuclear Medicine, (KIRAN), Karachi
- ❖ The Aga Khan University Hospital (AKUH), Karachi



Dosimetry Service Characteristics

Monitoring periods used for external dosimetry:

- Film badge dosimetry: 1-3 months
- TLD dosimetry: 1-3 months
- OSL Dosimeters: 1-3 months

Calibration procedures for external dosimetry:

- Calibration of external dosimetry system (TLD Reader system) is performed by exposing TLDs in reference gamma field of a Traceable Source of TSDL or SSDL. The exposed TLDs are read on TLD reader system to compute reader calibration factor which is subsequently used in estimating external doses of workers

Extremity dosimetry:

- Ring type dosimeters



Dosimetry Service Characteristics (Cont'd)

Internal dosimetry

- WBC, Bioassay (Urine Analysis)

Software for internal dosimetry analysis

- Mondal based ICRP 78
- Manual Calculation using ICRP 137

Calibration procedures for internal dosimetry:

- For internal dosimetry, whole body counters are routinely used which are calibrated with phantoms. Phantoms are for simulating whole body of reference man, and are having traceable reference sources of mixed gamma radionuclides

Monitoring requirements for emergency exposure situations and recording arrangements:

- The licensee shall ensure that arrangements are in place for the protection of emergency workers... . These arrangements, as a minimum, shall include managing, controlling and recording the doses received. (PAK/914, Regulations 16(5-c))



Provision for Quality Management System for TSPs

Certification:

- Certification of Quality Management System : ISO 9001-2015

Accreditation and scope:

- ISO 17025 and TSPs are committed to provide health physics related services to end user through professional skills contemporary regulatory standards and state of the art techniques by taking care of clients and employees as per their satisfaction keeping in mind continual improvement I provision of service

Qualified staff:

- Fourteen (14)

Training requirements:

- In house/on job training of the workers



General Characteristics of the NDR

Establishment date:

- 2007

Responsible body/organization:

- Pakistan Nuclear Regulatory Body (PNRA)

Role of the NDR:

- Trend analysis of occupational exposure
- Identification/Investigation of overexposure

Types of Facilities:

- Nuclear Installations
- Radiation Facilities

Responsible organisation (individual) for submitting the required information to the NDR:

- Licensee
- Service Providers

Occupational Exposure Database



Radiation Facilities (RF)

New RF



Update RF



Radiation Workers

New Worker



Update Worker



Dose Records

New Dose Record



Update Dose Record



Search In Database



RF by Name



RF by License No



RF by Activity Type



Worker by Name



Worker by CNIC



Worker by Dosi. #



Worker Complete Dose Record



Worker of Specific Facility



Reports

All RF



RF of Activity Type



Regional RF



Regional RF with Type



Regional RF in Specific Division



Regional RF With X-ray/Material



All RF with Workers



Reg. RF with Workers



Reg. RF with Dosimetry Status



Reg. Selected RF with workers



Reg. RF (Without Dosimetry) _Workers



RF in a Specific Division



Dose Record of RF (Specific Year)



RW Dose Record History



RF Collective Dose Record





General Characteristics of the NDR (Cont'd)

Information is required by the NDR:

- i. Radiation Facility Details (Name, License Number, Activity type)
- ii. Radiation Worker Details (Name, CNIC Number, Dosimeter Number)
- iii. Occupational record of workers (Dose report along with name of service provider)

Types of doses are recorded in the NDR:

- i. Whole body dose
- ii. Extremities dose

Procedure applicable for overexposure and/or in an emergency situation:

Investigation procedure for reported case of over exposure of radiation workers

Time period for submitting data to the NDR:

On Annual Basis



General Characteristics of the NDR (Cont'd)

Retention period of the NDR data:

- The licensee shall maintain the record of occupational exposure until the former worker attains or would have attained the age of seventy five (75) years, and not less than thirty (30) years after cessation of the work (*PNRA Regulations PAK/904, Regulations 31(3)*)

Number of currently registered occupationally exposed workers:

- More than 14000 radiation worker

Type of database to establish a NDR and maintenance arrangements:

- Database in MS(Access) is developed inhouse by PNRA IT department

Difficulties when establishing the NDR:

- Dose history of workers during transfer of worker from one radiation facility to the other
- Linkage of dosimeter number with their Computerized National Identity Card (CNIC) number



General Characteristics of the NDR (Cont'd)

Reporting mechanism to occupationally exposed workers or organisations:

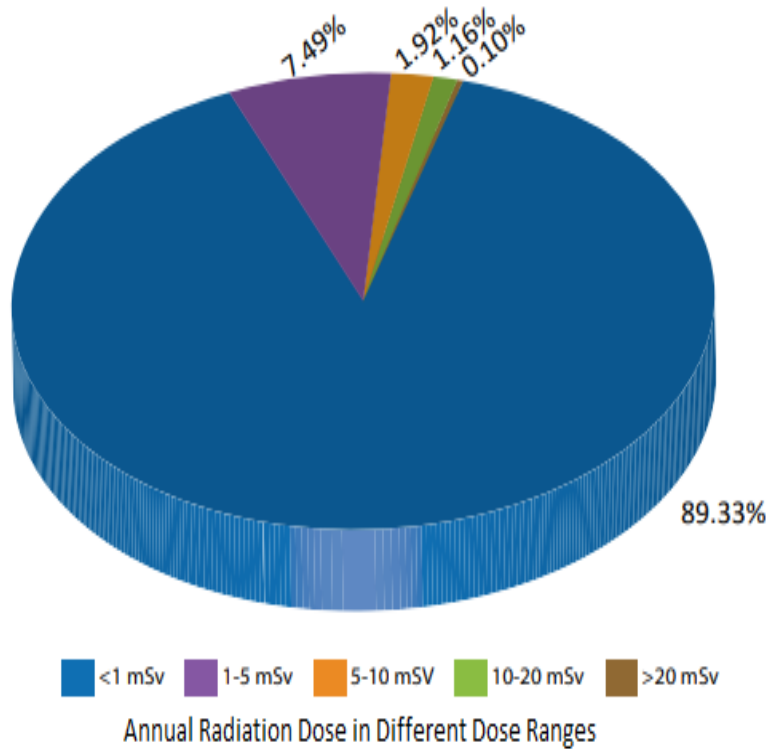
- Licensee is responsible to inform their radiation workers accordingly; (*PAK/904, Regulations 31(2-a)*)
- In case of overexposure, PNRA also required licensee to investigate the matter

Management system of the NDR:

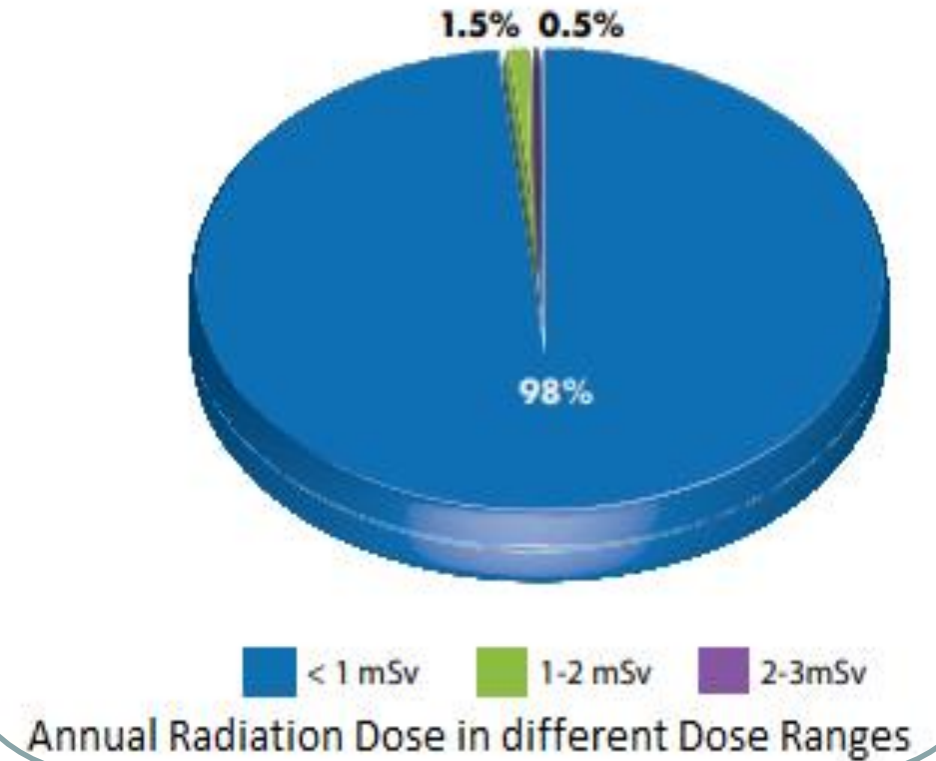
- Management system address the Maintenance of occupational exposure database and evaluation of records
- Procedure for record keeping, maintenance & evaluation of occupational dose records in database
- Procedure for occupational exposure records of radiation facilities



Occupational Exposure Record-2021



Radiation Facilities



Nuclear Installations



Thank You