

# Status of National Arrangements on Dose Registry

“Regulatory provisions on NDR & its’ implementation”

## **VIET NAM**

1. Mr. Dinh Xuan Hoang, Dalat Nuclear Research Institute.
2. Mr. Tran Vinh Thanh, Licensing division, VARANS.
3. Mr. Pham Trung Quan, Inspectorate division, VARANS.

# Legal Basis- Regulatory provisions

- Requirements and provisions for the NDR:
  - + *Currently, Vietnam has no regulations on the establishment of NDA;*
  - + *Vietnam Agency for radiation and nuclear safety (Varans) is responsible for the management of occupational dose data.*
- Any requirement applicable for authorization of the NDR: None
- Criteria and/or reference standards for authorization and/or approval of dosimetry services:  
*Organizations that want to perform irradiation dosimetry services must submit an application to VARANS for a registration certificate according to the instructions in Decree No. 142/2020/ND-CP*
  - Validity period: *The term of the Registration Certificate is 5 years*
  - Types of dosimetry services available: *Provide personal dosimeters and Measurement of personal exposure*
  - Radiation types for which dosimetry services can be provided: *X, gamma, alpha, beta (except neutron)*
  - Types of personal dosimeters provided: *TLD - Thermoluminescent Dosimeter (core: CaSO<sub>4</sub>; LiF) OSLD - Optically Stimulated Luminescence Dosimeter*

# Operational Technical Service Providers (TSPs) in the country

- For typical list of TSP, please refer GSG-7 Section 8
- List here all TSPs and their scope of service & indicate TSP maintains the NDR

*Currently, in Vietnam, there are 15 units licensed to perform radiation dosimetry services (for example, Institute of Nuclear Science and Technology, Dalat Nuclear Research Institute, Hoang Nguyen Company...). The scope of activities of these units is to provide technical support and provide services on radiation and nuclear safety.*

*The above-mentioned units are responsible for updating personal occupational radiation dose data into the national database on occupational radiation under the guidance of VARANS (according to Article 28 of Circular No. 19/2012/TT-BKHCN of the Ministry of Science and Technology).*

# Dosimetry service characteristics

- Monitoring periods used for external dosimetry: *Frequency of individual dose measurement is at least once every 3 months*
- Calibration procedures for external dosimetry: *Individual dosimeters are recalibrated after each measurement. The usual dosimetry system is re-calibrated after 1 year (including: instrument calibration curve reconstruction; associated devices...).*
- Extremity dosimetry: *Normally measure 3 indicators:  $H_p(10)$ ;  $H_p(3)$ ;  $H_p(0.07)$ .*
- Internal dosimetry: **Currently, Vietnam does not have specific regulations on the management of Internal dosimetry. However, in the routine activities of the DNRI (e.g. radioisotopes production), the internal dose for staffs involved in the production chain is estimated, recorded and reported.**
- Software for internal dosimetry analysis: **MONDAL3, DCAL**

# Dosimetry service characteristics

- Dose assessment methodologies for internal dosimetry:

## IN-VITRO Method

(measuring the radio-activity  
in biological samples)

Urine  
sampling



Chemically  
processing



$\gamma$  emitting  
radionuclide

Gamma  
spectrometry



$\beta$  emitting  
radionuclide

Liquid  
Scintillation  
Counting



Computer code

MONDAL Ver.3.01

File Setup Tools Help

Radionuclide / Intake route and Subject

Radionuclide [ ] Half Life [ ] Radiation Type [ ]

☒ Inhalation by Workers ☐ Inhalation by Members of the Public

☐ Ingestion by Workers ☐ Ingestion by Members of the Public

AMAD or Age / Type or f1 [ ] Mode of Intake

☒ Acute ☐ Chronic ☐ Uneven Chronic

Absorption Type [ ]

AMAD or Age / Type or f1 Value [ ]

Measurement

Measurement [ ] Graph [ ]

Period of intake [ ] days

Measured at [ ] days after last intake

Measured activity [ ] Bq or Bq/d

Working hours [ ] Calculation [ ]

Exit [ ] Print form [ ] Print result [ ] Save to file [ ]

Result

Excretion rate at measurement day [ ] Bq/d/Bq

Activity of intake [ ] Bq

Effective dose [ ] Sv

Tissue equivalent dose [ ]



Individual's  
Internal Dose

# Dosimetry service characteristics

**IN-VIVO Method:** measuring the radiation emitting from the body.

MCNP-based code  
(PIMAL)

Developed phantoms (whole body, thyroid,...)

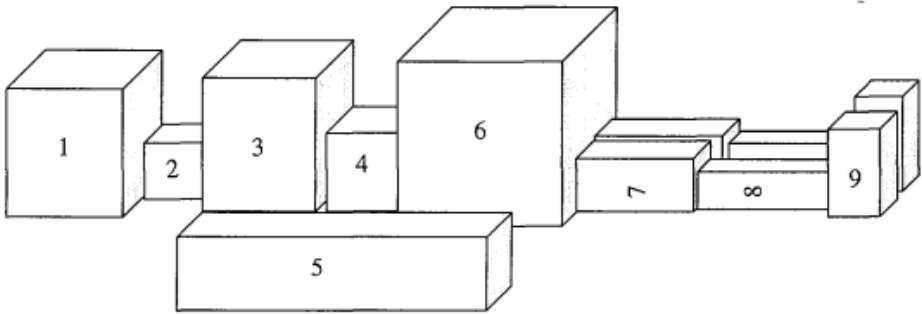
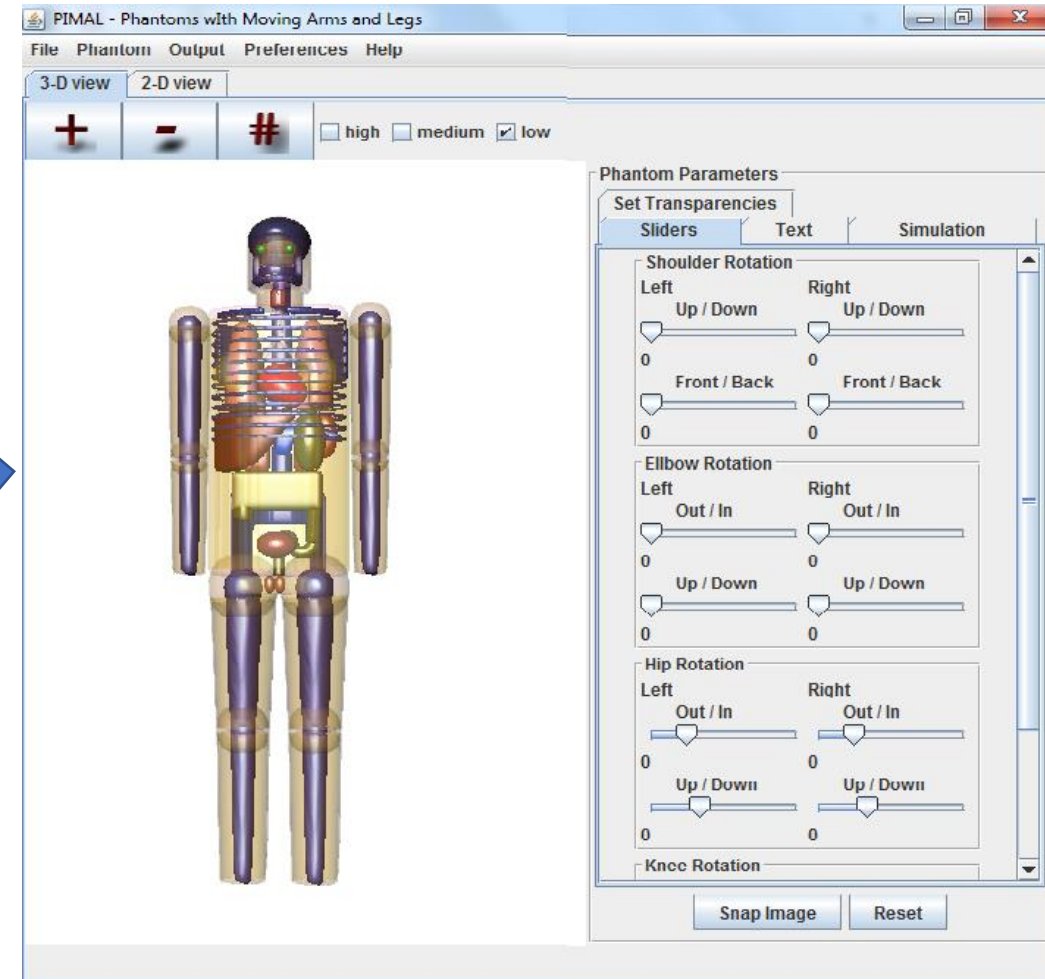


Figure : Brief diagram of a whole-body standard phantom by plastic material

Individual's  
Internal Dose



Mathematical MALE Phantom model



# Dosimetry service characteristics

- Calibration procedures for internal dosimetry:

Instruments used for measuring radioactivity (Gamma spectrometer (HPGe, NaI(Tl) detector) were calibrated annually by using standard check sources.



Phantoms and counters were calibrated by using standard solutions and compared with Monte Carlo calculations.

# Dosimetry service characteristics

- Dose estimation of internal dose using the results of workplace monitoring:

Radiation Protection Dosimetry (2016), pp. 1–7

doi:10.1093/rpd/nw269

Dose estimation was also carried out by measuring the activity of air samples (airborne cartridge). From the concentration of radionuclide and the working time of staffs, we can estimate the internal dose.

## ESTIMATING THE INTERNAL DOSE FOR $^{131}\text{I}$ PRODUCTION WORKERS FROM AIR SAMPLING METHOD

Tran Xuan Hoi<sup>1,2,\*</sup>, Huynh Truc Phuong<sup>2</sup> and Nguyen Van Hung<sup>3</sup>

<sup>1</sup>Faculty of Natural Science, Phu Yen University, 18 Tran Phu Street, Tuy Hoa, Vietnam

<sup>2</sup>Faculty of Physics and Engineering Physics, VNUHCM–University of Science, 227 Nguyen Van Cu, Ho Chi Minh City, Vietnam

<sup>3</sup>Training Center, Nuclear Research Institute

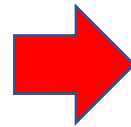
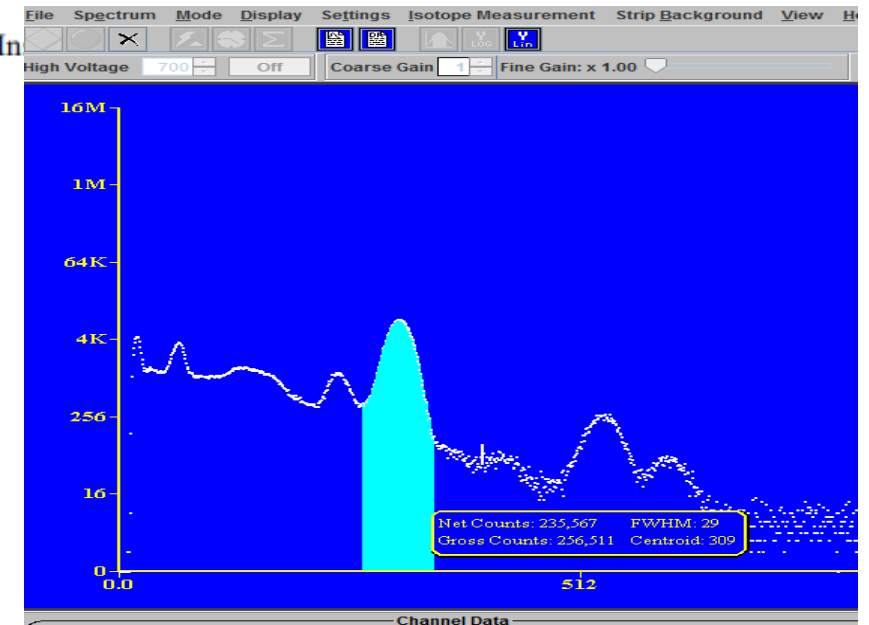
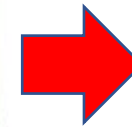


Figure 1. The cartridge holder of the sampling system was settled at the height of 1.5 m from the floor, near the worker's breathing zone.



- Monitoring requirements for emergency exposure situations and recording arrangements:  
Vietnam has regulations on radiation control for incident responders and the public



# Provision for Quality Management System for TSPs

- Provide info on
  - What system?
    - + Every year Varans is responsible for carrying out the quality assessment of TSPs by dosimeter calibration and comparing the measured results of TSPs.
    - + TSPs must develop a quality assurance program according to the provisions of Decree No. 142/2020 and submit it to Varans for appraisal before granting the registration certificate.
  - Certification: Certificate of equipment inspection and calibration.
- Accreditation and scope: Specified by the Registration Certificate of TSPs
- Qualified staff: Persons who have completed the training course and been granted a training certificate in personal irradiation dosimetry must submit a dossier for evaluation by VARANS before granting a practicing certificate.
- Training requirements: Training in personal irradiation dosimetry.

# General characteristics of the NDR

- Establishment date: [None](#)
- Responsible body/organization:
- Role of the NDR:
- Occupational categories included in the NDR:
- Responsible organisation (individual) for submitting the required information to the NDR:

# General characteristics of the NDR

- Information is required by the NDR:
- Types of doses are recorded in the NDR:
- Procedure applicable for overexposure and/or in an emergency situation:
- Time period for submitting data to the NDR:
- Retainment period of the NDR data:
- Number of currently registered occupationally exposed workers: (in your service in the country or from all services)

# General characteristics of the NDR

- Type of database to establish a NDR and maintenance arrangements (e.g., in-house developments, off the shelf, etc.) :
- Difficulties when establishing the NDR:
- Reporting mechanism to occupationally exposed workers or organisations:
- Management system of the NDR (collection of exposure data):

# Introduction of 2022 Annual Report / Newsletter

- Brief information on the content of the report: Currently, Vietnam is synthesizing information and developing a national report in 2022. Usually in the Report there is a section on individual radiation dose control, including: List of TSPs, evaluation of measurement results of TSPs...
- Samples of the analysis on exposure data: Every year, Varans compiles data on occupational doses of radiation and records cases of unusually high doses. Then send a dispatch requesting the facilities with radiation staff receiving high doses to send reports on the investigation of the cause and application of response measures. For complicated cases, Varans set up a working group to conduct inspection and examination.