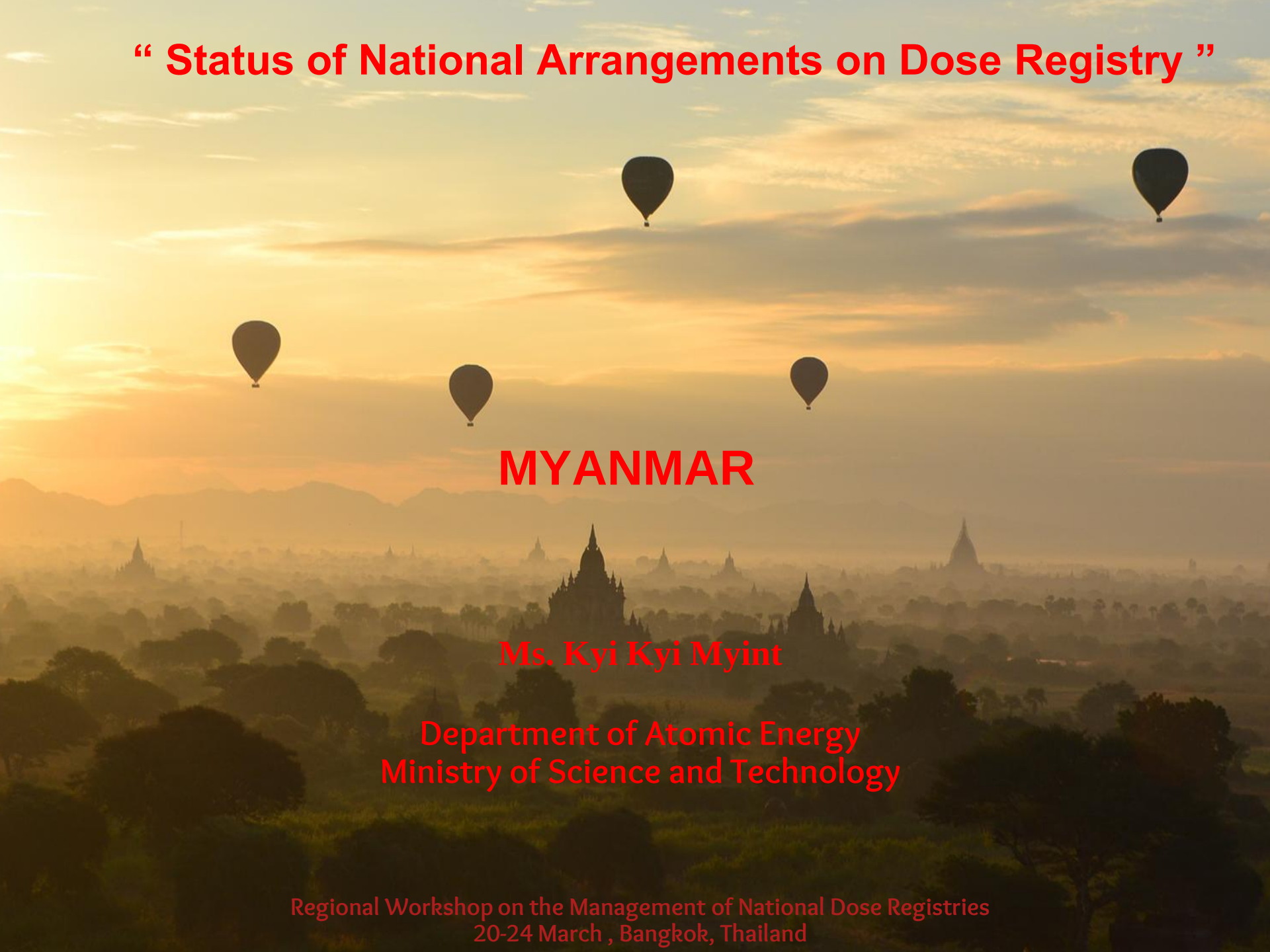
“ Status of National Arrangements on Dose Registry ”



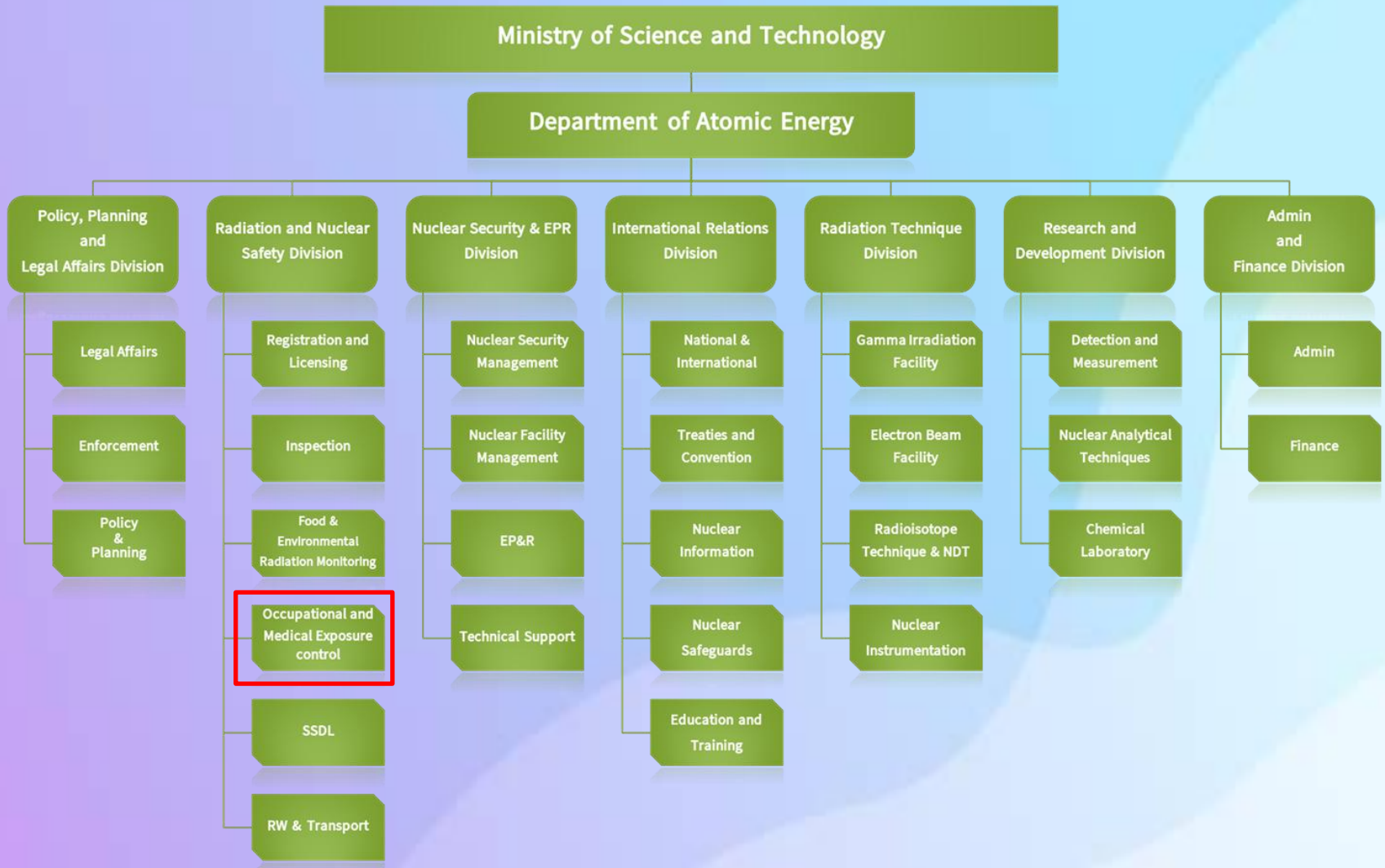
MYANMAR

Ms. Kyi Kyi Myint

Department of Atomic Energy
Ministry of Science and Technology

Regional Workshop on the Management of National Dose Registries
20-24 March , Bangkok, Thailand

Organization Chart of Department of Atomic Energy



Legal Basis- Regulatory Provision

- The Atomic Energy Law was enacted on 8th June 1998 to carry out research and development works relating in the field of atomic energy and to ensure the safety of radiation sources and protection from radiation hazards.
- Regarding the occupational radiation protection,Radiation and Nuclear Safety Division is set up under the Department of Atomic Energy in compliance with the Atomic Energy Law:
  - To ensure the safety usage of radioactive materials.
  - To prescribe acceptable limits of occupational radiation exposure to individual workers.

Legal Basis (Regulatory Provisions)

- Type of dosimetry services available: XA-Dosimeter
- Radiation types for which dosimetry services can be provides
  X-Ray, Beta and Gamma
- Types of personal dosimeters provided: Optically Stimulated Luminesce Dosimeter (OSLD)
- Regarding Extremity dosimetry and Internal dosimetry, Myanmar has not established yet.

General Characteristics of the NDR

- Information required: Request Letter,
  Application Form and
  Details information of radiation workers

- Types of Dose are recorded in the NDR: Personal exposure radiation doses

- Time period for submitting data to the NDR: ~ 1 month
- Retainment period of the NDR data: ~ 15 years
- Currently registered radiation workers ~ 1,950 workers for whole country

- If the worker gets over dose, the Occupational and Medical Exposure Control Unit will send the report to the Licensee and radiation workers for taking necessary action quickly.

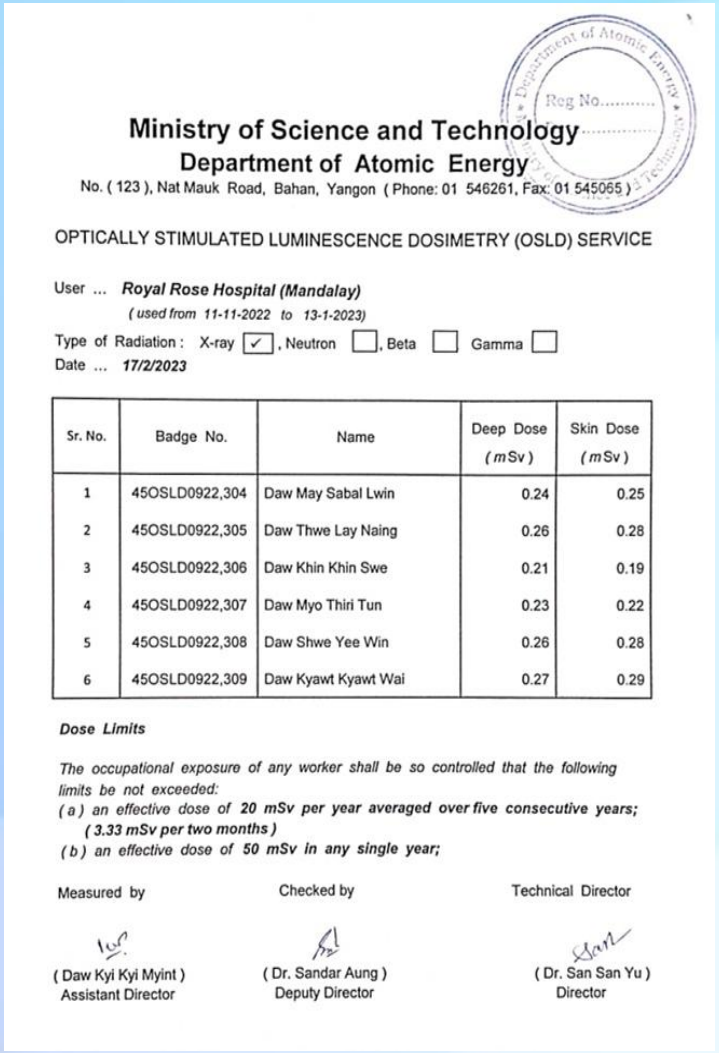
Responsibilities of the NDR

Customer

- After issuing the new License of radioactive source or radiation apparatus, request permission for use of OSLD Badge from Department of Atomic Energy
- Rent OSLD Badge from OSLD unit
- Return back used OSLD Badge and receive new OSLD badges with results of previous period.

OSLD Unit

- Providing new OSLD Badges to the customers for their work and collecting the rental badges
- Do measurement, Documentation process and give results to the customers



Reg No.....

Ministry of Science and Technology
Department of Atomic Energy
No. (123), Nat Mauk Road, Bahan, Yangon (Phone: 01 546261, Fax: 01 545065)

OPTICALLY STIMULATED LUMINESCENCE DOSIMETRY (OSLD) SERVICE

User ... ***Royal Rose Hospital (Mandalay)***
(used from 11-11-2022 to 13-1-2023)
Type of Radiation : X-ray [✓], Neutron [ ], Beta [ ] Gamma [ ]
Date ... ***17/2/2023***

Sr. No.	Badge No.	Name	Deep Dose (mSv)	Skin Dose (mSv)
1	45OSLD0922,304	Daw May Sabal Lwin	0.24	0.25
2	45OSLD0922,305	Daw Thwe Lay Naing	0.26	0.28
3	45OSLD0922,306	Daw Khin Khin Swe	0.21	0.19
4	45OSLD0922,307	Daw Myo Thiri Tun	0.23	0.22
5	45OSLD0922,308	Daw Shwe Yee Win	0.26	0.28
6	45OSLD0922,309	Daw Kyawt Kyawt Wai	0.27	0.29

Dose Limits

The occupational exposure of any worker shall be so controlled that the following limits be not exceeded:
*(a) an effective dose of **20 mSv per year averaged over five consecutive years;***
(3.33 mSv per two months)
*(b) an effective dose of **50 mSv in any single year;***

Measured by (Daw Kyi Kyi Myint) Assistant Director
Checked by (Dr. Sandar Aung) Deputy Director
Technical Director (Dr. San San Yu) Director

Responsibilities of the regulatory body

- DAE was established in 1997 under the Ministry of Science and Technology.
- Responsible for all aspects of control, security and safe management of radiation apparatus and radioactive materials used in Myanmar.
- Acts as a regulatory body concerning all aspects of atomic energy and nuclear technology related activities.
- Exposure records of radiation workers are maintained systematically by Radiation Protection Section under Department of Atomic Energy.

Dosimetry service characteristics

- In Medical and Exposure Control Section, Radiation and Nuclear Safety Division, *Optically Stimulated Luminescence Dosimeter* (OSLD) is being used for the personal radiation monitoring.
  - The monitoring period shall be **two months**
  - The report is submitted to the DAE
  - The service covers for the radiation workers in Myanmar who are working in medical, industrial and research fields.
  - Calibration procedures for external dosimetry:

    Intercomparison Method with support of ASEANTOM Program in Thailand in 2016 to 2019.

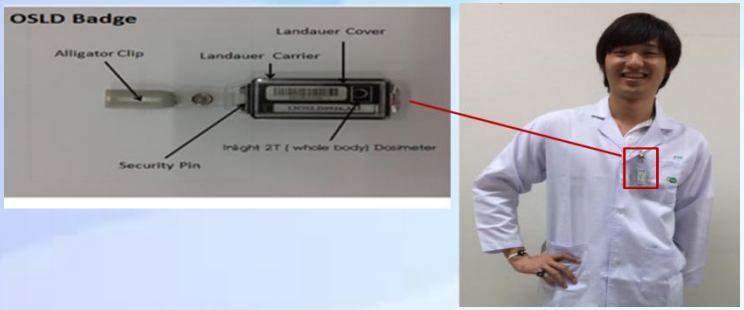
Inlight Automatic Reader 200 Unit and OSLD Badge

InLight Automatic 200 Reader unit

Annealer 50 unit

OSL Badge

Worker wear OSLD Badge while working with radiation



OSLD System Maintenance and Training

Participating OSL data Intercomparison program

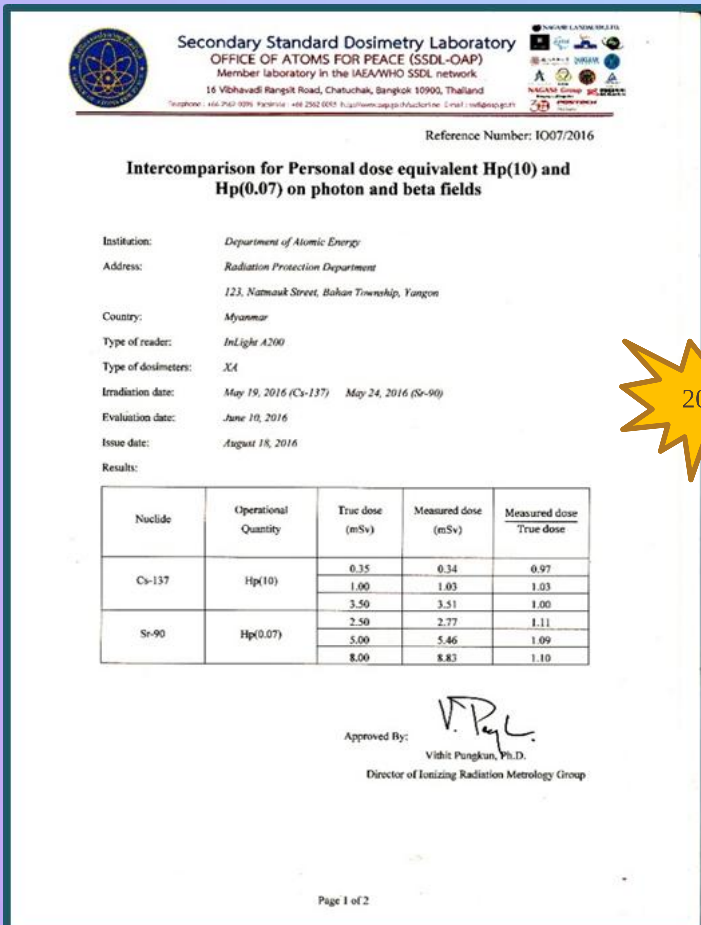
- DAE participated in the intercomparison of Hp(10) and Hp(0.07) for OSL dosimeters which was organized by OAP to improve OSL system for Individual Monitoring Services (IMS) laboratory in order to comply with ISO 17025.

- Measurement of Hp(10) and Hp(0.07) and beta fields

- *As a result*, Hp(10), uncertainty is 2.7 with 95% confidential Level

  Hp(0.07), uncertainty is 2.1 with 95% confidential Level

OSL data Intercomparison program Calibration Certificate (2016)



Secondary Standard Dosimetry Laboratory
OFFICE OF ATOMS FOR PEACE (SSDL-OAP)
Member laboratory in the IAEA/WHO SSDL network
16 Vibhavadi Rangsit Road, Chatuchak, Bangkok 10900, Thailand

Reference Number: IO07/2016

Intercomparison for Personal dose equivalent Hp(10) and Hp(0.07) on photon and beta fields

Institution: *Department of Atomic Energy*

Address: *Radiation Protection Department*
123, Natmauk Street, Bahan Township, Yangon

Country: *Myanmar*

Type of reader: *InLight A200*

Type of dosimeters: *XA*

Irradiation date: *May 19, 2016 (Cs-137)* *May 24, 2016 (Sr-90)*

Evaluation date: *June 10, 2016*

Issue date: *August 18, 2016*

Results:

Nuclide	Operational Quantity	True dose (mSv)	Measured dose (mSv)	Measured dose / True dose
Cs-137	Hp(10)	0.35	0.34	0.97
		1.00	1.03	1.03
		3.50	3.51	1.00
Sr-90	Hp(0.07)	2.50	2.77	1.11
		5.00	5.46	1.09
		8.00	8.83	1.10

Approved By:
Vithit Pungkun, Ph.D.
Director of Ionizing Radiation Metrology Group

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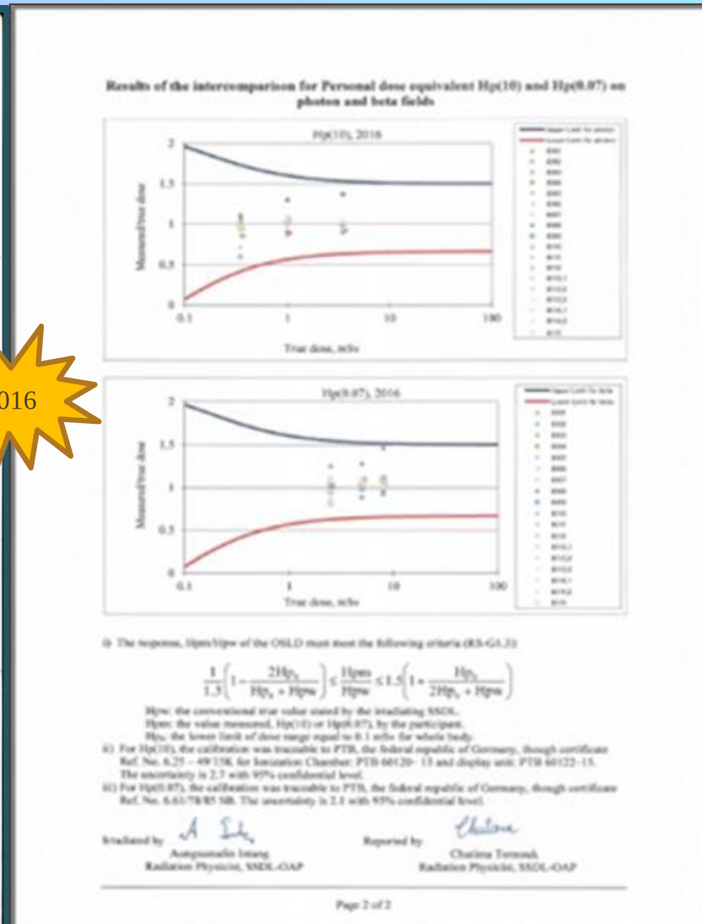
2016



Results of the intercomparison for Personal dose equivalent Hp(10) and Hp(0.07) on photon and beta fields

$$\frac{1}{1.5}\left(1-\frac{2Hp_0}{Hp_0+Hpw}\right)\leq\frac{Hpm}{Hpw}\leq1.5\left(1+\frac{Hp_0}{2Hp_0+Hpw}\right)$$

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OSL data Intercomparison program Calibration Certificate (2019)

NAGASE

Certificate of Participation

Certificate No. IC005 /2019

Intercomparison of Personal Dose Equivalent (Hp(10)) for Photon fileds for Individual Monitoring Service Laboratory in Southeast and East Asia Region

Issued in Bangkok, on 15 March 2019, to

Division of Atomic Energy, Ministry of Education

Each participant was required to provide 27 dosemeters:

- Three dosemeters (set A) were used to measure irradiation during storage and transport (control dosemeters)
- Three dosemeters (set B) were exposed to a ^{137}Cs beam high dose at an incident angle of 0°. The personal dose equivalent delivered was 3.00 mSv.
- Three dosemeters (set C) were exposed to a ^{137}Cs beam low dose at an incident angle of 0°. The personal dose equivalent delivered was 0.40 mSv.
- Three dosemeters (set D) were exposed to a X-ray beam code N-series high dose in the range 120 kV at an incident angle of 0°. The personal dose equivalent delivered was 2.00 mSv.
- Three dosemeters (set E) were exposed to a X-ray beam code N-series low dose in the range 120 kV at an incident angle of 0°. The personal dose equivalent delivered was 0.40 mSv.
- Three dosemeters (set F) were exposed to a X-ray beam code N-series high dose in the range 80 kV at an incident angle of 0°. The personal dose equivalent delivered was 4.00 mSv.
- Three dosemeters (set G) were exposed to a X-ray beam code N-series low dose in the range 80 kV at an incident angle of 0°. The personal dose equivalent delivered was 0.40 mSv.
- Three dosemeters (set H) were exposed to a X-ray beam code N-series high dose in the range 60 kV at an incident angle of 0°. The personal dose equivalent delivered was 2.00 mSv.
- Three dosemeters (set I) were exposed to a X-ray beam code N-series low dose in the range 60 kV at an incident angle of 0°. The personal dose equivalent delivered was 0.40 mSv.

The results measured by the participant were considered to be acceptable if

$$\frac{H_1}{1.5}\cdot\left(1-\frac{2-H_0}{H_0+H_1}\right) \le H_M \le 1.5\cdot H_1\cdot\left(1+\frac{H_0}{2\cdot H_0+H_1}\right) \qquad \text{for } H_1 \ge H_0$$

Here H_0 is the lowest dose that needs to be measured, H_1 is the dose to which the dosemeter was exposed and H_M is the dose measured by the participant. For the purposes of this exercise, H_0 was set at 0.08 mSv

Verified by
Leeda Motrayon
Radiation Physicist-OAP

Approved by
Vithit Pungkun Ph.D.
Head of Ionizing Radiation Metrology-OAP

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2019

Inter-comparison report

Organization : Division of Atomic Energy, Ministry of Education

Reading Date :

set	ID	Reading dose (mSv)	Hp(10) (mSv)	Uncer (mSv)	TRUE	upper	lower
Control	XA018402162P	0.14	0.00				
	XA0002716JU	0.13	0.00				
	XA010967071	0.16	0.00				
Cs-137 High	XA029291088	3.02	3.00	0.43	3.00	4.613924051	1.896103896
	XA018403094	3.33	3.31	0.43	3.00	4.613924051	1.896103896
	XA018398450	3.31	3.29	0.43	3.00	4.613924051	1.896103896
Cs-137 Low	XA018402598C	0.43	0.41	0.05	0.40	0.685714286	0.177777778
	[illegible]94458	0.47	0.45	0.05	0.40	0.685714286	0.177777778
	[illegible]71158	0.45	0.43	0.05	0.40	0.685714286	0.177777778
N-120 High	XA018401857	1.91	1.89	0.26	2.00	3.111111111	1.230769231
	XA016368546	2.00	1.98	0.26	2.00	3.111111111	1.230769231
	XA018740873	2.12	2.10	0.26	2.00	3.111111111	1.230769231
N-120 Low	XA0876509X	0.52	0.50	0.12	0.40	0.685714286	0.177777778
	XA018399829	0.48	0.46	0.12	0.40	0.685714286	0.177777778
	XA018402218F	0.58	0.56	0.12	0.40	0.685714286	0.177777778
N-80 High	XA018401069N	4.61	4.59	0.44	4.00	6.115384615	2.562091503
	XA018393585	4.95	4.93	0.44	4.00	6.115384615	2.562091503
	XA018765047	4.69	4.67	0.44	4.00	6.115384615	2.562091503
N-80 Low	XA018398535	0.60	0.58	0.11	0.40	0.685714286	0.177777778
	XA018400966	0.57	0.55	0.11	0.40	0.685714286	0.177777778
	XA018395290	0.51	0.49	0.11	0.40	0.685714286	0.177777778
N-60 High	XA019975858	1.96	1.94	0.26	2.00	3.111111111	1.230769231
	XA018399752	1.78	1.76	0.26	2.00	3.111111111	1.230769231
	XA018765L1C	1.78	1.76	0.26	2.00	3.111111111	1.230769231
N-60 Low	XA018400047	0.41	0.39	0.07	0.40	0.685714286	0.177777778
	XA018402229	0.47	0.45	0.07	0.40	0.685714286	0.177777778
	XA018760948	0.44	0.42	0.07	0.40	0.685714286	0.177777778

Personal Dosimetry Service Processing and Evaluation

OSLD Unit processes

Measuring OSLD badge

Input data RAIS 3.3 Program

Dose evaluation

Provision for Quality Management System for TSPs

- Successfully done RAIS Server installation cooperation with our local officers in 27 April 2015.

- The software used
  - RAIS (Regulatory Authority Information System) version 3.3 which is a tool being developed by IAEA for Regulatory Authorities

- Collect the list of radiation workers from the private clinics, hospitals and industries with the help of their relevant Ministries.

RAIS 3.3 Web (established in 27th April 2022)

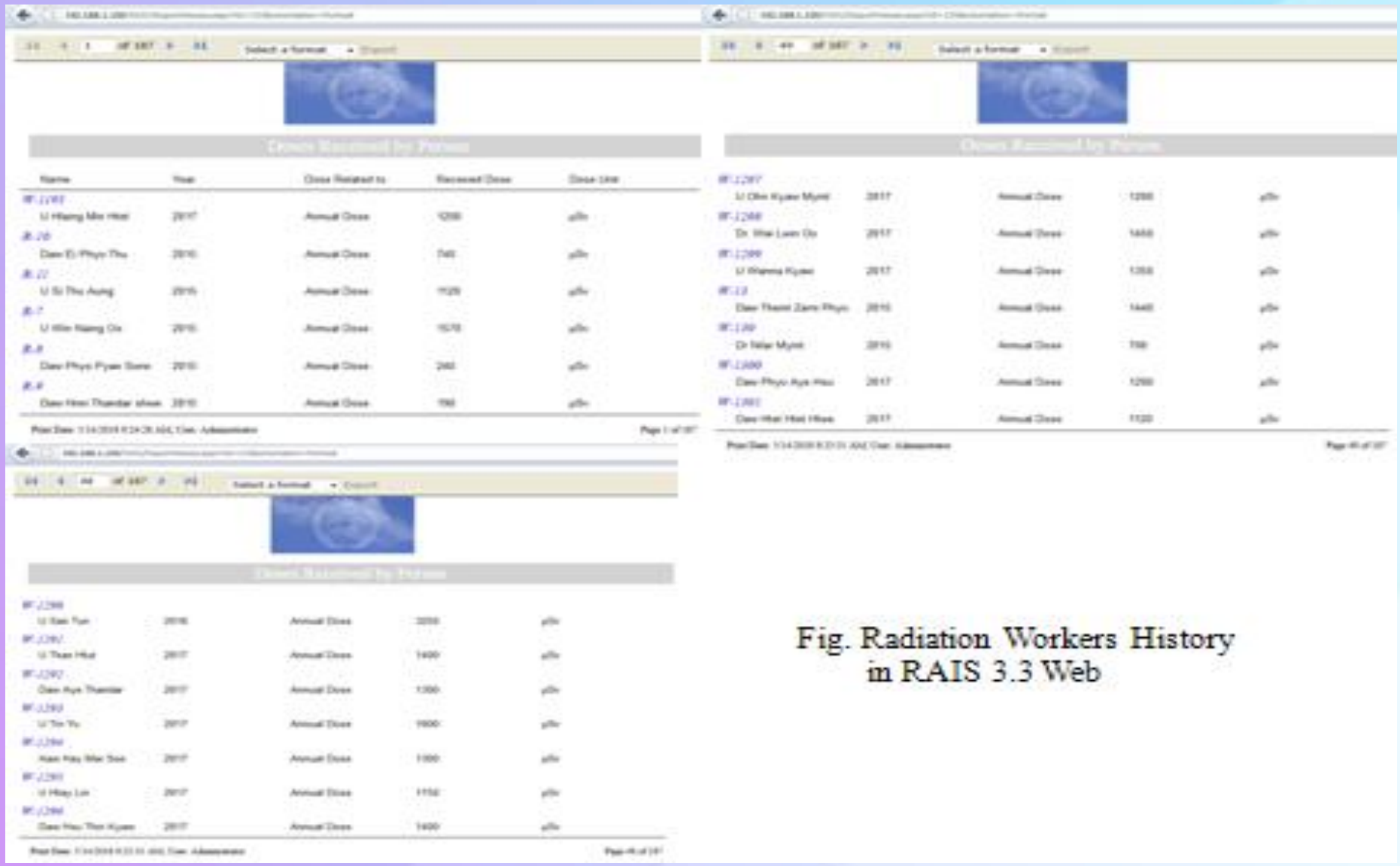
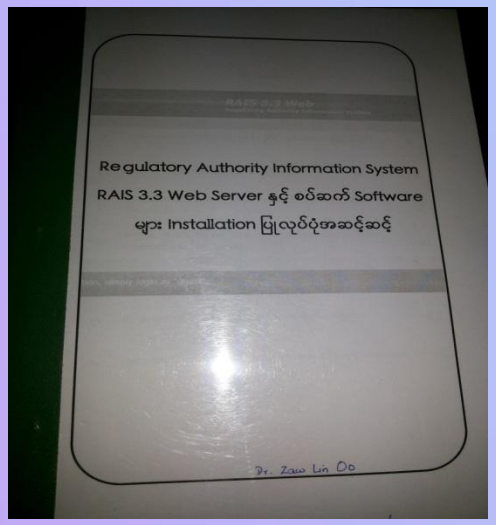


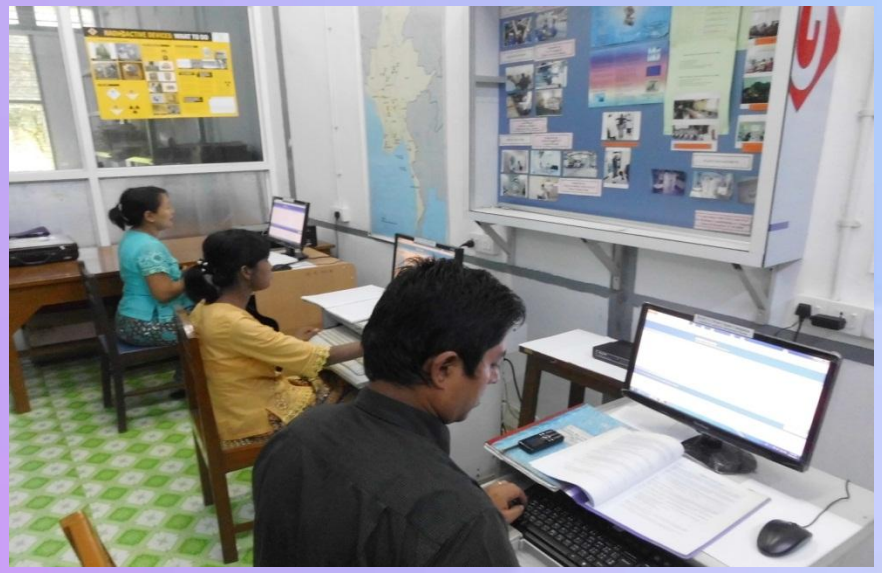
Fig. Radiation Workers History in RAIS 3.3 Web

Documentation of the System



Dose record keeping

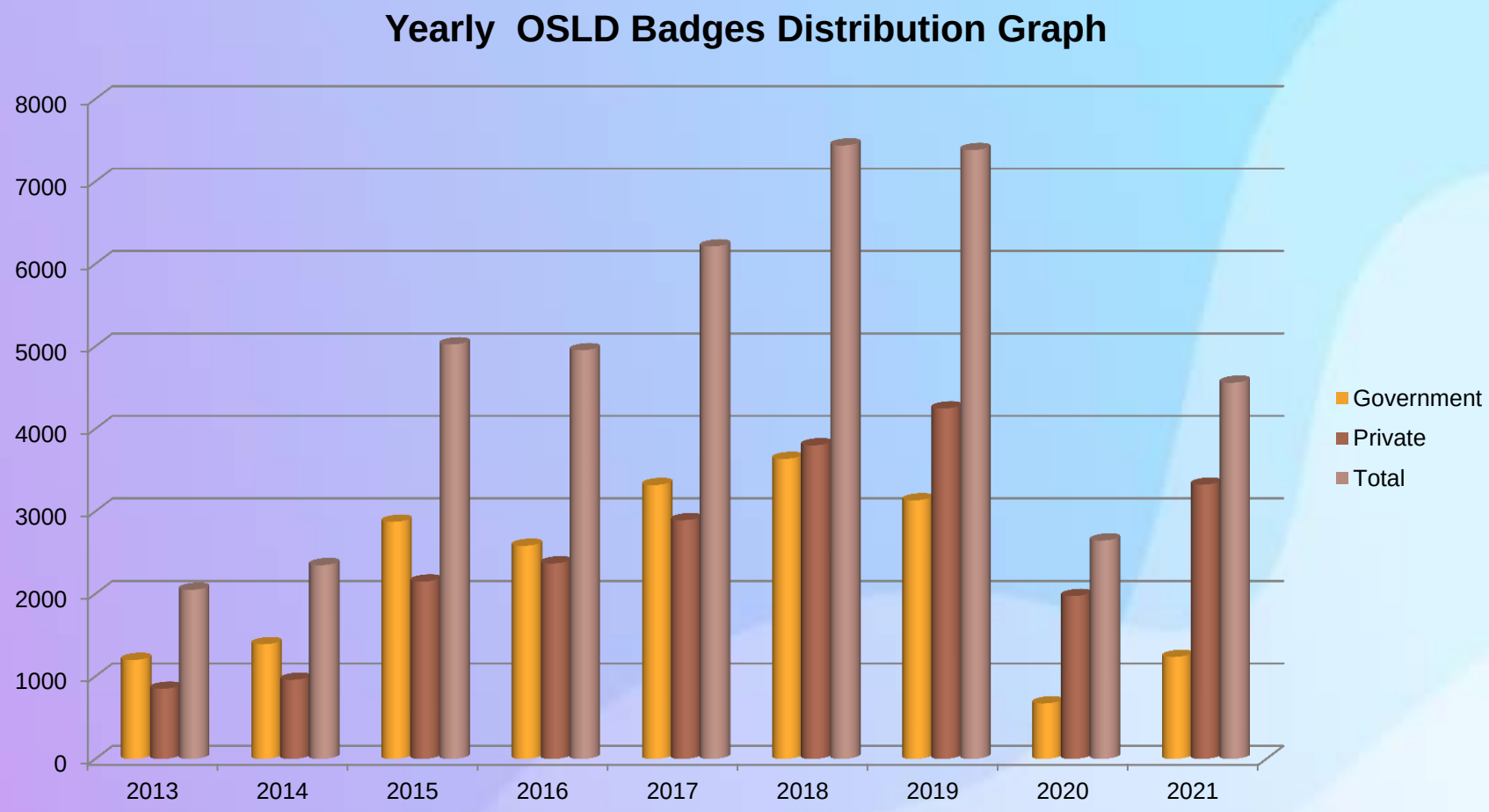
- **providing personnel dosimetry services to the radiation workers on national level.**
- **RAIS 3.3 Web for record keeping.**



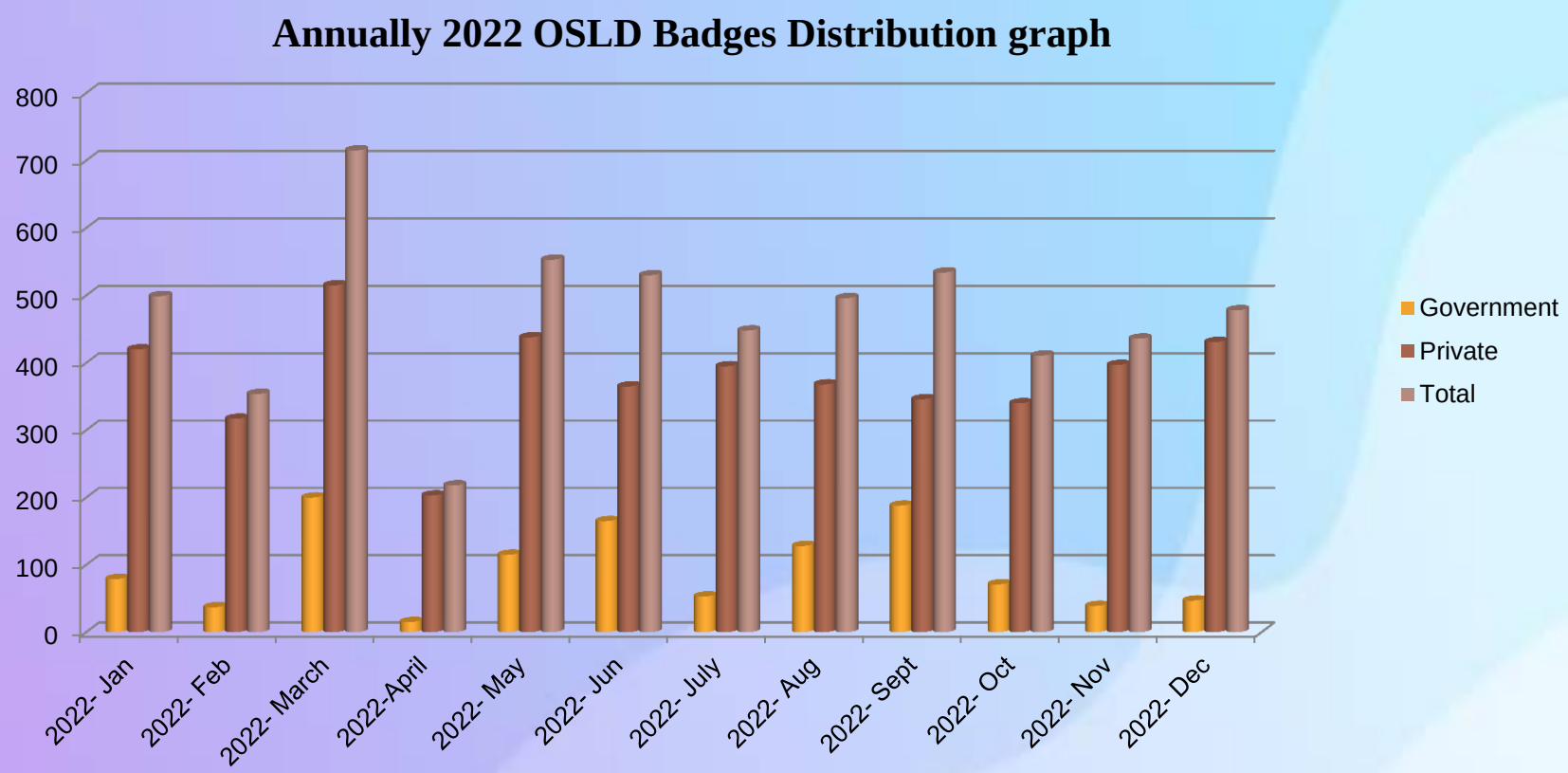
Difficulties when establishing the NDR

- There are many difficulties for Myanmar when establishing the NDR;
  - Upgrading Occupational Radiation Protection Programme. Myanmar need to develop the Regulations for Radiation protection.
  - Improving the Human Resource capabilities. Myanmar is lack of National expertise to enforce the legislation.

Yearly Personnel Radiation Monitoring Services



Annually 2022 OSLD Badge Distribution



Conclusion

- As the applications of nuclear technology expand in Myanmar, radiation safety, security and radiation protection become important for all users and activities involving ionizing radiation.

- DAE will participate the OSL data intercomparison program of IMS Laboratories network in Asia regularly.

- Experiences and knowledge gain from this workshop will be useful in the implementation and management of national dose registries for occupational exposures in Myanmar.


Thank
you