REGIONAL TRAINING COURSE ON RADIOACTIVE SOURCE SECURITY MANAGEMENT

Office of Atoms for Peace, Bangkok, Thailand

30 October– 2 November 2018

TRAINING REPORT

OBJECTIVES OF THE TRAINING

The purpose of this 4-day training was to contribute to the increase of radioactive source security in the Asia-Pacific region through the development of knowledge, skills and cooperative relationships among regional stakeholders. The training was part of a broader professional development opportunity offered to regional stakeholders, including becoming WINS Academy Certified Nuclear Security Professionals (CNSP).

This course was based on the WINS Academy Module titled Radioactive Source Security Management and used short lectures, case studies, interactive exercises and discussions to further explore areas and issues of direct relevance for the audience. Participants were required to attempt the Radioactive Source Security Management module certification exam on Day 4 of the training course at a Pearson VUE authorised test centre in Bangkok.

By the end of the in-person training course, participants understood:

- The IAEA categories of radioactive sources and the security risks, threats and vulnerabilities they face at different times during their lifecycle.
- What needs to be done to ensure source security, who the stakeholders are (e.g. global, state, regulator, licensee), and what each one is responsible for doing.
- How regulation affects licensees and overall source security.
- Why it is so important to identify how sources will be used, tracked, maintained and disposed of before they are purchased.
- What the various options are to reduce the security risk, including replacing radioactive sources by alternative technologies.
- What a security policy, programme and plan are.
- The principles of physical security (e.g. graded approach, defence in depth, basic security objectives).
- The importance of prior agreement and training with law enforcement and other first responders before an event occurs.
- Some practical ways to increase communications, cooperation and coordination among key stakeholders.

Upon completion of the blended online and in-person training, participants will have improved their competence and will understand how their knowledge, skills and professionalism comprise an important asset that can be harnessed to improve radioactive source security.

INSTRUCTIONAL METHODS

The following instructional methods were used during the course:

- Reference: The WINS Academy Module titled Radioactive Source Security Management
- Short lectures on key learning objectives with Q&A
- Small group discussions on questions for reflection
- Interactive exercises, scenarios, case studies and classroom discussions (whole group, small group, group by stakeholder)
- Visit to the Thai irradiation Centre
- Electronic Voting system to poll participants' opinion and further explore subjects of common interest
- Hand-outs and take-aways

All participants were provided access to the online WINS Academy Certification programme on Radioactive Source Security Management ahead of the course and were given hardcopies of the WINS Academy Radioactive Source Security Management module and Foundation module textbooks. Participants also received a participants' booklet which included information on the purpose of the course, learning objectives, course agenda, key definitions and the training course slides.

The agenda of the training course can be found in annex 1 and the learning objectives in annex 2 of this report.

TRAINING COURSE SUMMARY

The training course was delivered by a WINS representative in conjunction with subject matter experts from Thailand, Vietnam and Canada. The training course was attended by 16 participants from Thailand, Cambodia, Laos and Myanmar. The audience was composed of representatives from regulatory bodies.

DAY 1

INTRODUCTION SESSION

Ms Raquel Delgado (WINS), welcomed participants to the training, thanked OAP for the excellent collaboration and introduced Ms Nguyen Nu Hoai Vi (nuclear security consultant, Vietnam), Mr Craig Thompson (Canadian Nuclear Safety Commission) and Mr Rungdham Takam (Office of Atoms for Peace, Thailand) as instructors for the course sessions.

Ms Vilaivan Tanjoy, OAP's Deputy Secretary General, welcomed participants, stated OAP's expectations towards the regional training course and emphasised OAP's support and commitment to the success of the event.

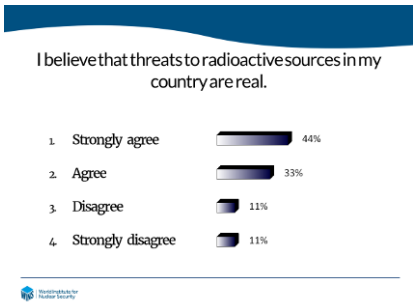
Ms Delgado described the practicalities and didactical materials for the training course and provided participants with an overview of the training purpose, objectives and structure. She then asked participants to introduce themselves and discuss what they would like to get out of the training course.

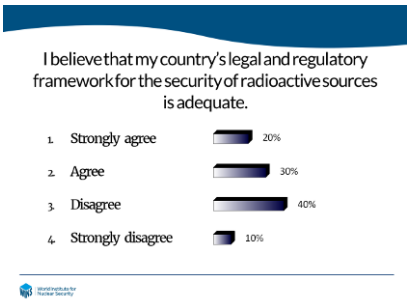
UNIT 1 – UNDERSTANDING THE CHALLENGE

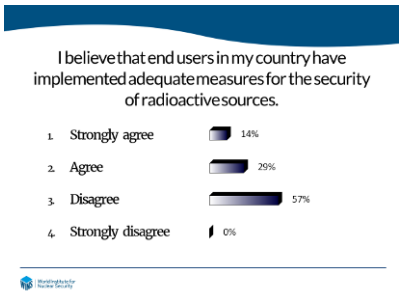
Ms. Nguyen started unit 1 by introducing e-voting questions to review and discuss participants' opinion towards the following topics:

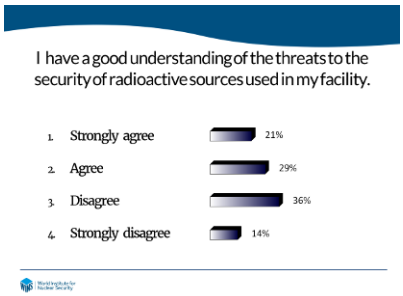
1. I believe that threats to radioactive sources in my country are real.
2. I believe that my country's legal and regulatory framework for the security of radioactive sources is adequate.
3. I believe that end users in my country have implemented adequate measures for the security of radioactive sources.
4. I have a good understanding of the threats to the security of radioactive sources used in my facility.

Results were as follows:









Session 1.1: Categorisation and Risks

Ms Nguyen was the lead instructor for this session. She clarified the basics of radioactivity, the IAEA system for categorising radioactive sources and the benefits and uses of radioactive sources in medicine and industry. This session also included questions for reflection on the IAEA categorisation of radioactive sources.

Session 1.2: Threats, Risks and Consequences

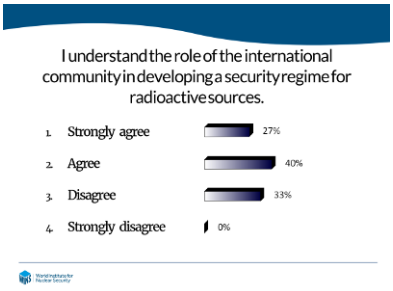
Mr. Thompson was the lead trainer for this session. He explained what is meant by "threat" and "risk" in nuclear security, outlined what threat assessment and the design basis threat are, described risks posed by radioactive sources and highlighted the potential consequences of a malicious use of radioactive sources. This session included several questions for reflection and a case study on the 1987 Goiania (Brazil) accident. At the end of this session, participants were asked to work in groups to identify and develop two scenarios of concern (one for an outsider group and one for an insider) for a facility of their choice.

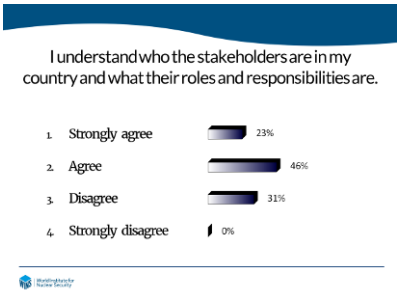
UNIT 2 – STAKEHOLDERS RESPONSIBILITIES

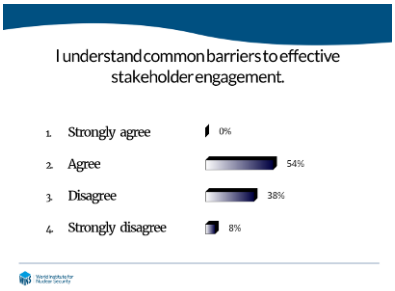
Ms. Nguyen started unit 2 by introducing e-voting questions to review and discuss participants' opinion towards the following topics:

1. I understand the role of the international community in developing a security regime for radioactive sources.
2. I understand who the stakeholders are in my country and what their roles and responsibilities are.
3. I understand common barriers to effective stakeholder engagement.

Results were as follows:







Session 2.1: Global Responsibilities

Ms Nguyen was the lead instructor for this session. She described the stakeholders in the international community and their responsibilities for radioactive source security (United Nations and the IAEA). The session also included questions for reflection regarding IAEA's nuclear Security Series publications.

Session 2.2: State Responsibilities

Mr Takam was the lead instructor for this session. He outlined the State's roles and responsibilities, namely of the regulator, and explained the difference between a prescriptive and a performance based approach. At the end of this session, participants were divided by country and were asked to discuss which organisations are involved in the security of radioactive sources in their country. This exercise included mapping out the organisations involved, describing their responsibilities and their coordination process.

Session 2.3: Licensee Responsibilities

Mr. Thompson was the lead trainer for this session. He focused on the licensees' liabilities for their radioactive sources and outlined the roles and responsibilities of the different (internal) stakeholders in the organisation. At the end of this session participants were divided by groups and were asked to think about a hospital that performs cancer treatments and discuss what kind of staff are involved in this service and what they need to know about security.

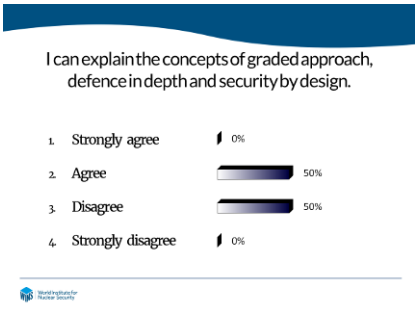
DAY 2

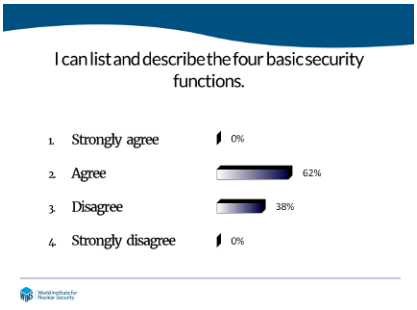
UNIT 3 – ESSENTIAL ELEMENTS OF SECURITY

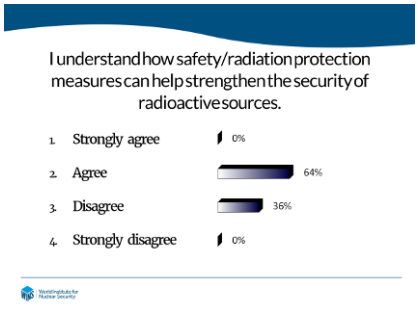
Ms. Nguyen started unit 3 by introducing e-voting questions to review and discuss participants' opinion towards the following topics:

1. I can explain the concepts of graded approach, defence in depth and security by design.
2. I can list and describe the four basic security functions.
3. I understand how safety/radiation protection measures can help strengthen the security of radioactive sources.

Results were as follows:







Session 3.1: Principles of Physical Protection

Ms Nguyen was the lead instructor for this session. She explained the basic physical protection principles used to ensure the security of radioactive sources, including taking a graded approach toward security, implementing defense in depth measures, and implementing the four security functions of deter, detect, delay and respond. At the end of the session participants were asked to work on a hospital scenario and discuss the four security functions.

Session 3.2: Common security systems

In this session Mr Thompson reviewed what common security systems are and how they are implemented. He also provided illustrative examples of adequate and inadequate systems prompting informal discussions around them.

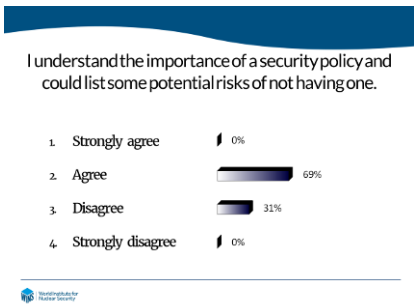
Session 3.3: Transport Security

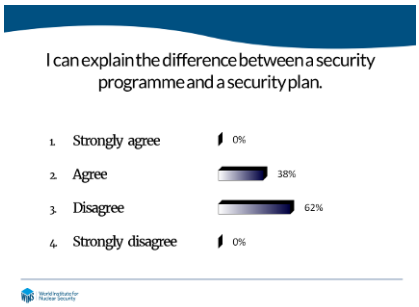
In this session Mr Thompson explained the potential vulnerabilities of radioactive sources during transport and how to mitigate the risks. He also discussed how the IAEA characterises radioactive material for transport, the three basic security levels for radioactive sources, and how to adopt a graded approach to the transport of radioactive sources. This session included a transport case study from a 2013 truck theft in Mexico and questions for reflection.

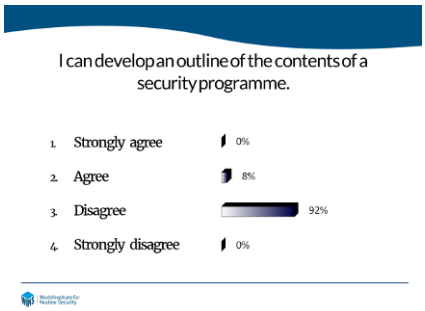
UNIT 4– THE RADIOACTIVE SOURCE SECURITY PROGRAMME

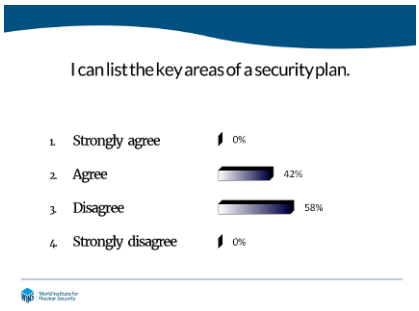
Ms. Nguyen started unit 4 by introducing e-voting questions to review and discuss participants' opinion towards the following topics:

1. I understand the importance of a security policy and could list some potential risks of not having one.
2. I can explain the difference between a security programme and a security plan.
3. I can develop an outline of the contents of a security programme.
4. I can list the key areas of a security plan.









Session 4.1: The Security Policy and Security Programme

Ms. Nguyen was the lead trainer for this session and explained the purpose of a security policy and programme, who is responsible for creating them, and the kinds of information they address. This session included questions for reflection on security system performance testing, on the response programme and on the importance of security culture.

Session 4.2: The Security Plan

Mr. Thompson was the lead trainer for this session and explained the objectives of a Security Plan for radioactive sources, identified the three basic sections of a security plan and their content, and discussed how to describe and characterise radioactive materials and facilities. The session included questions for reflection. At the end of the session participants did a site security plan exercise. They were divided by country and were asked to choose one section of a hypothetical site security plan of a Blood Bank Irradiator at a hospital in their country.

DAY 3

The third day started with a group practical exercise involving the assessment of the physical protection system in a hospital that has two facilities that use category 1 radioactive sources: a gamma knife (Cobalt-60) and a blood irradiator (Cesium-137). Participants had to identify vulnerabilities, propose improvements and plan response actions to deal with the disappearance of radioactive sources.

In the afternoon of day 3 the group visited the Thai irradiation Centre outside Bangkok. The purpose of this visit was to identify the physical protection system components and equipment, assess their location and operation and propose improvements.

DAY 4

The fourth day started with a discussion of the security system elements of the Irradiation facility and improvements were proposed by the participants.

THE WAY FORWARD

This session was led by Ms Nguyen and focused on identifying and discussing the threats related to radioactive sources that could occur in the participants' country, detailing the responsibilities of the organisations they work for, listing short- and medium-term objectives/activities they must carry out in order to improve nuclear security, and listing other national organisations they must coordinate with.

EVALUATION AND CONCLUSION SESSION

An evaluation of the training course was done via a worksheet (average scores below, ranked from 1-5 with 1 being poor and 5 being excellent). Overall, participants were very satisfied and considered this to have been a very good training and a useful learning experience. Many were very satisfied with the opportunity to exchange experiences and knowledge with regional countries.

The overall quality of the training	The degree to which the course met the stated course objective	The overall usefulness of the training to my job or professional development	The quality of facilitation	The quality of Session 1:	The quality of Session 2:	The quality of Session 3:
4.5	4.3	4.4	4.1	4.2	4.2	4.3
The quality of Session 4:	The quality of instruction for the practical exercises was:	The organisation of the training:	The usefulness of the training exercises:	The training aids (slides, videos):	The training venue:	
4.3	4.5	4.4	4.7	4.3	4.1	

In her concluding remarks, Ms. Delgado thanked training participants for their attendance and thanked the instructors and OAP's efficient support in the organisation of this training. Ms. Delgado also thanked the financial contribution of the New Zealand Ministry of Foreign affairs and Trade, which made this course possible, and thanked the presence of Mr. James Andersen, Deputy head of Mission of the New Zealand Embassy in Bangkok.

Mr. Andersen thanked course participants and organisers and highlighted New Zealand's work and contribution in strengthening radioactive source security in the Asia-Pacific region.

Ms. Vilaivan Tanjoy and Ms. Rachada Hemapattawee, Deputy Secretary Generals of OAP, closed the training course by presenting a gift to the New Zealand representative as a token of appreciation for their support.

Course participants took the *Radioactive Source security Management* exam in the afternoon of day 4 at a Pearson VUE test center in Bangkok. WINS encouraged participants to finish

their WINS Academy certification programme and informed that the Foundation module exam needs to be taken within 6-months after the training course date.

ANNEX 1

REGIONAL TRAINING COURSE ON RADIOACTIVE SOURCE SECURITY MANAGEMENT

(30 OCTOBER – 2 NOVEMBER 2018)

Agenda

DAY 1- Tuesday, 30 October 2018	
Time	**Session**
09:00 -09:30	**Opening Session** • Welcome remarks • Training course purpose, objectives and structure • Walk through the agenda
9:30 – 9:45	**Participants' introduction and expectations**
9:45 – 10:00	**Unit 1 – Understanding the challenge** • Learning about the participants (e-voting) • Unit 1 objectives
10:00-10:15	Coffee Break
10:15 -11:15	**Session 1.1: Uses of radioactive sources, categorisation and risks** ▪ Lecture ▪ Questions for reflection
11:15 -13:00	**Session 1.2: Threats, Risks and Consequences** ▪ Lecture ▪ Discussions to share experiences ▪ Questions for reflection

	▪ Break-out groups to develop scenarios
13:00 -14:00	Lunch
14:00 -14:15	**Unit 2 – Stakeholders responsibilities** • Learning about the participants (e-voting) • Unit 2 objectives
14:15 -14:45	**Session 2.1: Global responsibilities** ▪ Lecture ▪ Questions for reflection
14:45 -15:30	**Session 2.2: State responsibilities** ▪ Lecture ▪ Questions for reflection ▪ Exercise
15:30 -15:45	Coffee Break
15:45-17:15	**Session 2.3: Licensee responsibilities** ▪ Lecture ▪ Discussion and role play
17:15-17:30	Review of the day
17:30	End of day 1
18:00	Dinner reception

DAY 2- Wednesday, 31 October 2018	
Time	**Session**
09:15 – 9:30	**Unit 3 – Essential elements of security** ▪ Learning about the participants (e-voting) ▪ Unit 3 objectives
9:30-10:30	**Session 3.1: Principles of physical protection** ▪ Lecture ▪ Break-out groups to develop a scenario
10:30 -10:45	Coffee Break
10:45-11:30	**Session 3.2: Common Security Systems** ▪ Lecture ▪ Discussions
11:30-12:45	**Session 3.3: Transport Security** ▪ Lecture ▪ Case Study
12:45-13:45	Lunch
13:45-14:00	**Unit 4: The Radioactive Source Security Policy, Programme and Plan** ▪ Learning about the participants (e-voting) ▪ Unit 4 objectives
14:00-15:30	**Session 4.1: The Security Policy and Security programme**

	▪ Lecture ▪ Questions for reflection
15:30-15:45	Coffee break
15:45-16:45	**Session 4.2: The Security Plan** ▪ Lecture ▪ Questions for reflection
16:45-17:00	Review of the day
17:00	End of day 2
DAY 3-Thursday, 1 November 2018	
Time	**Session**
09:00-09:30	**Group Exercise: Fictional Medical Facility** ▪ Explanation of the exercise (structure, objectives)
09:30-10:45	**Group Exercise: Fictional Medical Facility** ▪ Group work
10:45-11:00	Coffee break
11:00-12:00	**Group Exercise: Fictional Medical Facility** ▪ Presentation of results by group ▪ Discussion
12:00-12:30	**Explanation of the visit to the Thai Irradiation Center**
12:30-13:30	Lunch
13:30	**Departure from OAP to the Thai Irradiation Center**
15:30	**Visit to the Thai Irradiation Center**

16:30	Departure from the Thai Irradiation Center - End of day 3
DAY 4-Friday, 2 November 2018	
Time	**Session**
09:00-09:30	**Discussion of the visit to the Thai Irradiation Center**
09:30-10:30	**Group Exercise: The Way Forward**
10:30-10:45	Coffee break
10:45-11:45	**Conclusion session:** ▪ Overview of units 1,2,3 and 4 ▪ Q&A Session from participants
11:45-12:00	**Conclusion session (continuation):** ▪ Course and instructor evaluation by the participants ▪ Closing remarks
12:00	**End of the training course**
12:00-12:45	Lunch
12:45	**Departure to Pearson test center**
14:00	**Radioactive Source Security Management exam**

ANNEX 2

Learning objectives

INTRODUCTION SESSION

Session objectives:

Welcome remarks.

Training course purpose, learning objectives and structure.

Walk through the agenda.

Participants' introduction and expectations.

UNIT 1 – UNDERSTANDING THE CHALLENGE

Unit 1 objectives:

Participants will:

Review radiation, sealed radioactive sources and IAEA categorization levels.

Review how radioactive sources are used in medicine and industry.

Understand what is meant by threat, threat assessment and design basis threat.

Understand the risks and consequences of radioactive sources used in medicine and industry.

LESSON	**CONTENT**
Session 1.1: Uses of Radioactive Sources, Categorisation and Risks	
Session objectives: Understand the basics of radioactivity. Discuss the IAEA system for categorising radioactive sources. Discuss the benefits and uses of radioactive sources in medicine and	**Session structure:** Lecture on radioactive sources use and potential consequences. Questions for reflection.

industry.	

Session 1.2: Threats, Risks and Consequences	
Session objectives: Understand what is meant by "threat" in nuclear security. Understand what threat assessment and the design basis threat are. Discuss the risks posed by radioactive sources. Discuss the potential consequences of a malicious use of radioactive sources.	**Session structure:** Lecture on the definition of "Threat", threat Assessment and Design Basis Threat, sources of information on accidents, factors influencing the security risk and consequences of a malicious act. Case study on the risks in Medicine. Questions for reflection. Break-out groups to develop a threat assessment and credible malicious scenarios.

UNIT 2 – STAKEHOLDERS RESPONSIBILITIES

Unit 2 objectives:

Participants will learn about:

The international stakeholders (e.g. IAEA).

The national stakeholders (e.g. state, regulator, licensee) and what each one is responsible for doing.

The individuals accountable for the security of radioactive sources amongst selected stakeholders (e.g. licensees and regulators).

Session 2.2: State and Competent Authorities	
Session objectives: Understand the roles and responsibilities	**Session structure:** Lecture on the role of the State and of the

of the State, including the regulatory authority.	regulator. Exercise on organisations involved in the security of radioactive sources.
Session 2.3: Licensee	
Session objectives: Understand the roles and responsibilities of the licensee.	**Session structure:** Lecture on licensee responsibilities. Discussion and role play to identify internal stakeholders and map out their respective responsibilities.

UNIT 3 – ESSENTIAL ELEMENTS OF SECURITY

Unit 3 objectives:

Participants will learn about:

The basic principles involved in providing security for radioactive sources, including such concepts as taking a graded approach and defence in depth.

Common security systems commonly used at sites with radioactive sources.

The potential vulnerabilities of radioactive sources during transport and how to mitigate the risk.

LESSON	**CONTENT**
Session 3.1: Principles of physical protection	
Session objectives: The terms of Graded Approach and Defence in Depth, and how they apply to security. The four basic security objectives (Deter, Detect, Delay and Respond) and how to	**Session structure:** Lecture on physical security principles and objectives. Break-out groups to develop a scenario.

implement each one.	
Session 3.2: Common security systems	
Session objectives: Review common security systems and how they are implemented.	**Session structure:** Lecture on common security systems and how they are implemented. Questions for reflection.
Session 3.3: Transport Security	
Session objectives: Understand the potential vulnerabilities of radioactive sources during transport and how to mitigate the risks. Discussion on vulnerabilities of radioactive sources during transport.	**Session structure:** Lecture on characterising Radioactive Sources for Transport and examples of a graded approach adoption. Transportation Case study.

UNIT 4 – THE SECURITY PROGRAMME

Unit 4 objectives:

Participants will learn about:

The fundamental role of a security policy.

The purpose of a security programme and what it contains.

The purpose of a security plan and what it contains.

LESSON	CONTENT
Lesson 4.1: The Security Policy and Security Programme	
Session objectives: Understand the purpose of a security policy and programme, who is responsible for creating them, and the kinds of information they address.	**Session structure:** Lecture on the security policy and on the security programme objectives and content. Discussion to listen to participants' experience in designing and implementing a security programme.
Session 4.2: The Security Plan	
Session objectives: Understand what the purpose of a Security Plan for radioactive sources is and the kinds of information that it addresses.	**Session structure:** Lecture on the outline, overview and content of the security plan. Discussion to listen to participants experience in designing and implementing a security plan, and to further explore the arrangements for responding to a security incident.

GROUP EXERCISE: FICTIONAL MEDICAL FACILITY

Session objectives:

Identify vulnerabilities of the facility, propose improvements and plan response actions to deal with the disappearance of radioactive sources.

Assess the security features of radioactive facilities and the implemented administrative measures.

GROUP EXERCISE: THE WAY FORWARD

Session objectives:

Identify and discuss the main challenges faced in participants' countries.

Identify and discuss opportunities for improvement.

Set up medium and long-term objectives for the national regime.

Suggest a list of actions to be conducted for achieving these objectives.

CONCLUSION SESSION

Session objectives:

Overview of units 1,2,3 and 4.

Course and instructor evaluation by the participants.

Key lessons learned and suggestions for improvement.

Closing remarks.