42nd Meeting of the Radiation Safety Standards Committee

Topical Session: Trends and Challenges in Occupational Radiation Protection

14 June 2017

Agenda Item: R7

Occupational Radiation Protection Appraisal Service (ORPAS)

H. Burçin Okyar
Radiation Safety Specialist
Radiation Safety & Monitoring Section, NSRW
Objectives of this talk...

• IAEA Occupational Radiation Protection Program & Strategic Planning
• Introduction of ORPAS with it’s unique characteristics & process in general
• Statistics – concluded missions
• ORPAS web-site
• An example- recently conducted Malaysia mission
• ORPNET (network)
**Objective:** To ensure an appropriate control of occupational exposure due to external and internal irradiation from both artificial sources and natural sources of radiation.

- This is achieved through provision of operational services for radiation monitoring and protection to the Agency’s own operations; and through assistance to Member States in establishing, maintaining and, where necessary, improving programs for the radiation protection of workers.
- Activities are targeting workers, employers, regulatory authority staff and radiation protection professionals.
Strategic planning on ORP

- Occupational radiation protection is one of the important milestones for radiation safety.

- Rapid development in the application of nuclear and radiation technology in the Member States led to the strong needs on occupational radiation protection in terms of guidance, training and different kinds of services.

- Based on GSR-Part 3, the Safety Guide on Occupational Radiation Protection (DS453) has been developed and to be published soon.
Occupational Exposure

- All exposure of workers incurred in the course of their work, with the exception of excluded exposures and exposures from exempt practices or exempt sources (Glossary & GSR Part 3)
- Workers are exposed to ionizing radiation in a wide range of occupational settings
- Area with multiple actors (global / national level)
- Requirements for protection of workers (IAEA - ILO)
- Guidance to national level implementation (support to Member States)
- **Safety Standards** - To protect occupationally exposed workers against the risks associated with ionizing radiations - Overall objective
- ORP, which is getting more industry characteristics, is resolving itself in favour of personalized, highly efficient and reliable methods and approaches.
ORP in Member States

Regulator → Protection of workers → End-Users

Technical Services (Support Organisations)
Implementation / application of Standards

- Essential for ensuring a high level of safety
- The Agency has to appraise the compliance of these Standards in MSs to ensure they are being applied.
- These appraisals are carried out whenever there is a request from the Member State.

  - System of regulation and monitoring of ORP – MS responsibility
  - The Agency provides an independent appraisal service for some or all aspects of occupational radiation protection.

- ORPAS is a family member of the Services, such as IRRS, OSART, INSARR, EPREV, EDUTA, etc.
Review base

MUST have their basis in IAEA Safety Standards

Hierarchy of the safety standards

IAEA Safety Standards

Safety Fundamentals (Principles)

Safety Requirements – GSR and SSR

Safety Guides – GSG and SSG

Safety Reports

TECDOCs

Supporting publications
ORPAS - Independent appraisal

• ORPAS provides a cross-cutting review, against the relevant IAEA safety standards, of the regulatory framework for ORP and the application of the requirements at all facilities and activities utilising radiation technologies in the host State.

• Provides an opportunity for a MS to have its ORP program
  – Independently assessed and evaluated
  – Useful to maintain or enhance the effectiveness of the programme
  – Identify in an objective and unbiased manner the areas where improvements may be required
  – Allows information on best practices from the host country to be made available to other MSs
Team work- Leader & members

• ORPAS: an assessment conducted by international experts selected
  – Experience in such reviews,
  – Knowledge of international guidance and best practices,
  – Ability to recognise and understand the strengths of different national systems and arrangements.
Process in general

• Appraisal is based on international guidelines and best practices.
• However, it is not prescriptive nor is it rigid.
• It takes into account the practical context in the host country and emphasises the positive features of “how things are done” in that country.

MENTORING IN THE GLORY
ORPAS – *questioning attitude*

- The necessary **legislative and regulatory infrastructure for ORP** is in place and functioning;

- **End-users** are aware of their responsibilities and have effective occupational radiation protection programmes in place and functioning, with the aim of ensuring optimized radiation protection;

- **TSO** are available and able to provide radiation protection services, in compliance with the BSS, in respect of:
  - Assessment of occupational exposure from external sources of radiation,
  - Assessment of occupational exposure due to intakes of radionuclides,
  - Workplace monitoring,
  - Recording of occupational exposure, and
  - Advisory services.

- All involved organizations have **quality systems** in place and functioning to ensure ongoing adherence to the standards with potential accreditation or certification.

- Promotion of the **safety culture** at facilities and activities.
ORPAS Guidelines

• Very first version, prepared in 2002
• Revised according to the Agenda methodology (not published yet)

• **Structure**

  1. INTRODUCTION
  2. ORPAS BACKGROUND
  3. OBJECTIVES AND BENEFITS OF THE ORPAS
  4. STRUCTURE OF THE ORPAS
  5. OVERVIEW OF THE ORPAS PROCESS AND INITIAL STEPS
  6. PREPARATION AND INITIATION
  7. APPRAISAL MISSION
  8. REPORTING THE OUTCOME OF THE APPRAISAL
  9. ORPAS FOLLOW-UP MISSIONS
  10. ORPAS MISSION AND FOLLOW UP MISSION PROCESS REVIEW
Process, at a glance

- Step-wise process
- Similarity with IRRS
- More focus on side visits (especially for TSOs and end-users) to observe the normal operations
- Total # of participating organisations is the key to set the duration of ORPAS
- Appraisal report is the final product of the Agency
- Action Plan is the outcome (by the host country)
**ORPAS Pre-mission / Objectives**

- To liaise with the host country regulator and agree a program of visits to End Users and Technical Services Organisations (TSO) that will participate in the appraisal process;
- To hold meetings with the identified End Users and TSOs to present the appraisal process, and the self-assessment questionnaires;
- To visit the facilities of the identified End Users and TSO to form an understanding of these facilities; and
- To agree the program of the full ORPAS appraisal mission.
Self-assessment (two options)

- Tailored **ORPAS questionnaires** (in line with GSR Part 3) sets for the Regulator, the End-users (Practices) and the TSO
  - Provide an effective and efficient information gathering technique;
  - Provide a complete information database upon which to base recommendations;
  - Assist in achieving consistency across different missions;
  - Provide a standard recording format for incorporation into the country profile.

Regulators
- Legal Regulatory framework
- Responsibilities- Registrants, Licensees, Employers, workers
- Authorization process for TSOs
- Monitoring program - TSOs
- Radiation Protection Programme

End-users
- Radiation Protection Programme
- Management structure
- Quality Assurance
- Staff selection, information, training
- Individual monitoring
- Workplace monitoring
- Co-operation
- Health Surveillance
- Control of radiation sources
- Transport arrangements
- Emergency preparedness and response (focus on worker protection)

TSOs
- External dosimetry
- Internal dosimetry
- Workplace monitoring
- Dosimetric specifications
- Quantities, Calibration
- Record keeping
- Direct measurement
- Performance testing
- Type testing
- Quality Management
- Reporting mechanisms
- Accreditation
Self-assessment (SARIS)

- Self-Assessment of Regulatory Infrastructure for Safety
- Suitable for ORPAS peer review

“Self-assessment - a routine and continuing process conducted by senior management and management at other levels to evaluate the effectiveness of performance in all areas of their responsibility”

SARIS Collaboration Platform
http://gnssn.iaea.org/CSN/SA.
Site Visits during pre-mission and mission

- Interviews and direct observations to be carried out at sites
- A site visit commences with an opening statement, including a summary of the scope of the ORPAS, the purpose of the visit and matters to be addressed.
- ORPAS Team members must be accompanied by a host country counterpart.
- Main goal is to have direct and face to face interactions.
- Following a site visit, members discuss their findings with the others at the daily team meeting.
Preliminary report – initial version of the Appraisal report

- No specific format but should follow the structure and tone of previous ORPAS mission reports
- **Strengths** (+ good practices)
- **Weaknesses**
- **Recommendations**
  - **Essential**: a delay in implementation could result in a substantial and immediate hazard to health, and/or addresses a serious deficiency in the occupational radiation protection programme..
  - **Important**: until the situation is corrected, occupational radiation protection effectiveness in a certain area is significantly compromised.
  - **Advised**: the recommendation identifies a relatively minor deficiency.

**Implementation**
- **Essential: Immediate?**
  - certainly without undue delay
- **Important:**
  - As soon as can be reasonably achieved
- **Advised:**
  - Will enhance effectiveness
  - but may be delayed
**ORPAS - Statistics**

**MSs that requested and received ORPAS**

- Slovenia
- Turkey*
- Ecuador
- Chile
- Morocco*
- Uruguay
- Tanzania
- Costa Rica
- Peru
- Venezuela
- Paraguay *(May 2017)*
- Ghana
- United Arab Emirates
- China
- Tanzania
- Malaysia *(May 2017)*

**In progress**

- Panama (pre-mission in July 2017)
- Nicaragua (pre-mission in August 2017)
- Morocco (main mission in November 2017)
- Chile (2017)
ORPAS Web-site

https://gnssn.iaea.org/main/ORPAS/SitePages/Home.aspx
Case study- Malaysia

- Official request from the Member State (February 2016)
- National counterpart- Nuclear Malaysia
- Assignment of IAEA Coordinator
- Identification of the Team Leader
- Pre-ORPAS mission (31 Oct –2 Nov 2016)
- Finalization of official participants
- Selection of Team members
- Full mission (14-23 May 2017)
International ORPAS Team

**ORPAS**: an assessment conducted by international experts selected

- Experience in such reviews,
- Knowledge of international guidance and best practices,
- Ability to recognise and understand the strengths of different national systems and arrangements.

**ORPAS Team to Malaysia**

- Team Leader: Australia
- Team members: United Arab Emirates, Indonesia, Japan, Thailand, Slovenia, Syrian Arab Republic, and Pakistan
Official participants

REGULATORS
• Atomic Energy Licensing Board (AELB)
• Medical Radiation Surveillance Division, Ministry of Health (MOH)

TECHNICAL SUPPORT ORGANISATIONS
• Nuclear Malaysia – SSDL
• APM Nuclear Technology Sdn. Bhd. (+ end-user capacity)
• Asia Lab (Malaysia) Sdn. Bhd. (+ end-user capacity)
• Whole Body Counting Laboratory (WBC) - Nuclear Malaysia

END-USERS
• National Cancer Institute
• UKM Medical Center (National University of Malaysia)
• Prince Court Medical Centre
• Care Ion Technologist Sdn. Bhd.
• Radioisotope Production Laboratory
• PUSPATI TRIGA Mark II Research Reactor (RTP)
• Petronas Carigali Sdn.Bhd.
• Huntsman Tioxide Sdn.Bhd.

TRAINING CENTRE
• Nuclear Malaysia Training Centre
Preliminary Report

• 102 pages
• 18 appendices (1 for each participant)
• 4 annexes
• References, programs and participants
• 83 recommendations
• 6 general recommendations
• 10 Good Practices
• 2 general good practices
General Observations

• ORP system in Malaysia is robust
  • Generally complies with GSR-3
• Currently based on BSS-115
• Technically competent personnel
• TSOs are world-class
• Highly competent personnel
• Well equipped laboratories

<table>
<thead>
<tr>
<th>Action</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editing by team leader</td>
<td>9 June</td>
</tr>
<tr>
<td>Editing by IAEA Coordinator</td>
<td>16 June</td>
</tr>
<tr>
<td>Review by team leader</td>
<td>21 June</td>
</tr>
<tr>
<td>Transmission to National Counterpart</td>
<td>21 June</td>
</tr>
<tr>
<td>Review by National Counterpart</td>
<td>21 June</td>
</tr>
<tr>
<td>Final Report Issued</td>
<td>30 June</td>
</tr>
</tbody>
</table>
Evolution of Occupational Exposures

• **International Conference on ORP (2014)**
  – In general doses within limits
  – NPP doses reducing driven by lower limits and optimisation
  – Individual doses in other areas not changed much.....collective dose increase due to increase in application

• **Controlling & Monitoring**
  • Lack of Finance and Resources
  • Lack of ORP Infrastructure
  • Insufficient Coverage
  • Lack of competent staff (RPO)
  • Lack of internal dose assessment
  • Lack of extremity assessment
  • Regulator as a TSO
  • Nuclear Plants: itinerant workers
  • Mines: ventilation issues / uncertainties in internal dose assessment
  • Medical: RP awareness is low
International Conference on ORP

- Nine focus areas

Selected areas

- More emphasis should be placed on the understanding and implementation of the ORP standards rather than their constant refinement

- Although there is a delay between the update of international standards and their incorporation into legislation, in many countries the major issues and challenges relate to the practical implementation of the radiation protection requirements.
Insights- Performance Audit

• For the Sub programme 3.3.1 (Radiation Safety & Monitoring)
• With regard to ORPAS
  – Promotion of the service
  – Alternate funding
  – Alternate means to collect information to monitor the implementation of ORPAS recommendations
  – Better assessment of the effectiveness

• Close co-operation with other safety services (in terms of organisation), such as IRRS
Final remarks

• ORPAS is peer review service provided by the Agency upon the request from the Member States.
• ORPAS was initiated fifteen years ago, due to the shortage of fund and a few of requests from the Member States, limited number of services has been provided.
• ORPAS missions are supported by the Technical Cooperation Department through national or regional cooperation projects.
• There is an increase for the services in recent years due to the support of Japanese EB project and US EB project.
• The guideline and questionnaire have been updated with the support of EB projects.
• The external audit conducted in 2016 also indicated the importance of ORPAS and the service should be strengthened.

**RASSC** members are requested

• To **take** note of the ORPAS progress,
• To **provide** feedback on how to proceed.
Statement of IAEA Director General Yukiya Amano at the 14th Congress of the IRPA (9 May 2016, Cape Town/South Africa)

“I am sure that many of you are familiar with our Occupational Radiation Protection Appraisal Service (ORPAS), which helps countries to develop an effective safety infrastructure to protect people who work with radiation. During one recent ORPAS mission, our multinational expert team visited a country’s national regulator, hospitals that offer radiotherapy, nuclear medicine and radiology, dosimetry service providers, industrial radiography companies and the civil aviation authority. Our services are comprehensive and I encourage all countries to make full use of them.”
Thank you!

H. Burçin Okyar
Radiation Safety Specialist
Radiation Safety & Monitoring Section, NSRW
Email: H.B.Okyar@iaea.org
ORPNET – Occupational Radiation Protection Networks

First link, if you google “IAEA ORPNET”

goto.iaea.org/orpnet/
ORPNET

- Web-based network with an ultimate goal to promote optimization of the occupational radiation protection.
- It acts as a focal point for the occupational radiation protection providing:
  - Worldwide comprehensive knowledge / information exchange,
  - Global, regional and national networks (targeted to systems for radiation protection of workers).
- The user can find also information about
  - the upcoming occupational radiation protection related meetings,
  - latest publications,
  - joint projects,
  - posters, and news.
- ORPNET spreads good practices, facilitates ALARA implementation, supports experience exchange, and aims to prevent any overlap of activities at the national and international level.
World-wide networks

• International System on Occupational Exposures (ISOE)
• International System on Occupational Exposure in Medicine, Industry and Research (ISEMIR)
• Information System on Uranium Mining Exposures (UMEX)

Regional networks

• RECAN (The Regional European and Central Asian ALARA Network)
• ARAN (Asian ALARA Network)
• REPROLAM (Red de Optimización de Protección Radiológica Ocupacional en Latino América)
• EAN (European ALARA Network)
• EAN NORM (The European ALARA Network for Naturally Occurring Radioactive Materials)
• EMAN (European Medical ALARA Network)
• French regional Radiation Protection Officer’s networks (CoRPAR)
• ESOREX (European Study on Occupational Radiation Exposure)