

Australian Government Australian Radiation Protection and Nuclear Safety Agency

## **Issue 2 – July 2015**

## Welcome

Welcome to the 2015 issue of the Australian National Radiation Dose Register (ANRDR) annual newsletter, **ANRDR in Review**.

In line with our objectives, the ANRDR has continued to promote national uniformity for the management of worker radiation dose records across different workplaces, industries and jurisdictions.

In this issue of **ANRDR** in **Review**, our aim is to communicate information to stakeholders about the key ANRDR activities over the past year, including analysis of data, stakeholder engagement and expansion activities.

We hope that you find this newsletter of interest and, as always, we encourage your suggestions and input for future issues of **ANRDR in Review**.

The ANRDR Team Ben Paritsky and Fiona Charalambous

## **Featured Articles**



### **Expansion activities**

Over the past year the ANRDR Team has been working with our key industry partners and State regulators to overcome challenges and expand coverage of the Dose Register to Commonwealth Licence Holders (CLHs), the mineral sands industry and airlines.

### Analysis of ANRDR data

The ANRDR has performed a periodic analysis of the latest uranium industry data to characterise the occupational exposure situation at the national level.

## **Contents**

Significant events 2
Worker outreach program2
New ANRDR portal3
Existing exposure situations3
nalysis of data4
akeholder engagement6
blications of interest
e ANRDR Team 11
ocoming Events 11
Contact ANRDR 11

Pu

## **ANRDR** in Review **Significant events**

#### Summary of significant events since July 2014

2015		
June	The ANRDR team presented at ARPANSA's Licence Holders' Forum in Melbourne	
April	The ANRDR team attended the ICRP Main Commission meeting in Sydney	
2014		
December	Commenced redevelopment of ANRDR system	
October	Third annual ANRDR workshop held in Hobart The ANRDR co-ordinated a national response to an IAEA questionnaire investigating the capability of indi- vidual monitoring and national dose registries in Member States	
August	Uranium exploration data included in the ANRDR The ANRDR team presented at the CSIRO Radiation Safety Officer Training Day	

#### Worker outreach program

The ANRDR team is in the process of revising the worker outreach program which was initially designed for the uranium industry. The poster series (pictured) has been redesigned to be more engaging and to inform workers that their dose histories can be obtained from the ANRDR. The aim of the outreach program is to advise workers on the capabilities and benefits of the ANRDR, and to encourage workers to periodically request their dose histories in order to optimise their radiation protection practices.

The ANRDR is working to enhance radiation safety within your workplace



Find out more about the Australian National Radiation Dose r FREE dose h Register and request yo www.arpansa.gov.au/Services/ANRDR Freecall: 1800 022 333

When was the last time you requested your radiation dose history?

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You can track your radiation dose history throughout your career



Find out more about the Australian National Radiation Do Register and request your FREE dose history: www.arpansa.gov.au/Services/ANRDR Freecall: 1800 022 333

#### **New ANRDR portal**

ARPANSA's Information Management team has been busy redesigning and developing the new ANRDR portal, database and associated systems from the ground up. Due to be released in early 2016, the new portal will boast improved functionality, such as greater automation and increased efficiency for both users and ANRDR administrators. New functions, such as notifications and publications sections will be introduced to facilitate communication between ARPANSA and its stakeholders by allowing the ANRDR to more effectively impart relevant information to applicable stakeholders. The new system will aim to achieve a more streamlined and enjoyable ANRDR user experience.

#### **Existing exposure situations**

Current international radiation protection guidance identifies three types of exposure situations: planned, existing and emergency exposure. Exposure to workers during uranium mining and milling operations is a planned exposure situation and the radiation protection approach uses dose limits and dose constraints. Existing exposure situations include cosmic ray exposure to air crew and radon exposure to cave tour operators.

Radiation protection efforts for workers in existing exposure situations are concerned with controlling the 'work activity', not the 'source' as in planned exposure situations. For example, exposure of air crew to cosmic radiation can be controlled by adjusting flight paths, altitude and flight duration.

Consistent with the General Safety Requirements Part 3 of the IAEA's Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, ARPANSA is responsible for identifying existing exposure situations in Australia in which occupational exposures exist. As part of this process, ARPANSA will assess specific existing exposure situations, such as cave tour operators. If warranted, ARPANSA will undertake the required work through a consultative process to extend the radiation protection framework to cover these workers.



Requirements of the IAEA's General Safety Requirements Part 3

## Analysis of data

#### **Analysis of ARPANSA data**

Average and maximum effective doses for ARPANSA staff (1987 – 2014)



\*Elevated max dose in 2006 was received by an ARPANSA staff member during an overseas visit

A detailed analysis of ARPANSA staff data was included in the first issue of ANRDR in Review. ARPANSA staff data has been included in the Dose Register to test the suitability of the ANRDR for accepting dose data from non-uranium industries, and spans back to 1987 when ARPANSA began keeping records in a digital format. Typically, ARPANSA staff doses are well below 1 mSv and 2014 was no exception, with the maximum effective dose for that year below 0.2 mSv.

#### Analysis of uranium industry data

Last year the ANRDR achieved a milestone – complete coverage of the Australian uranium industry. To demonstrate doses across the industry, an initial periodic analysis of the industry's doses was completed for the first issue of the ANRDR in Review. Following on from the previous year, the ANRDR has provided an up to date analysis, including a complete dataset until the end of 2014. It should be noted that Olympic Dam contributes more than 90% of the total number of uranium industry records registered in the ANRDR. As such, the dose trends presented here are dominated by Olympic Dam data, however similar trends are observed across other operations.

The average and maximum annual effective doses to Australian uranium industry workers continue to exhibit an overall downward trend for the period 1 January 2004 to 31 December 2014. The chart below clearly demonstrates that average doses to workers remain consistently low despite the overall workforce increasing in number during that period.

#### Analysis of uranium industry data (cont.)



Average and maximum effective doses for uranium industry workers (2004 – 2014)

#### Annual dose distribution for all Australian uranium workers (2014)



Effective dose (msv)

An analysis of the dose distribution for 2014 reveals that approximately 95% of workers received a dose less than 3.5 mSv and 73% of workers received a dose below 0.5 mSv. The percentage of doses that fall below 0.5 mSv have increased by 6% on last year's data, indicating that more workers are now receiving lower doses across the industry, despite a notable increase in the workforce.

#### Analysis of uranium industry data (cont.)



The graph above demonstrates the breakdown of annual average effective doses by work categories. During the eleven year reporting period, higher doses were received by mining workers with a mean annual dose of 1.4 mSv compared to a mean annual dose of 0.6 mSv for processing and 0.3 mSv for other workers. The 2014 data is consistent with previous years across the three categories.

#### Stakeholder engagement

#### **CSIRO Radiation Safety Officer Training Day**

In August 2014, ARPANSA was invited to present on the ANRDR and to participate in a Radiation Safety Officer (RSO) training session. In attendance were ARPANSA representatives from the ANRDR team, as well as the Personal Radiation Monitoring Service (PRMS) and the Information Management (IM) team to answer any technical questions regarding CSIRO's participation in the Dose Register. The session was an overall success with interesting discussion points generated by participants regarding the management of occupational exposure dose records.

#### IAEA International Conference on Occupational Radiation Protection, Vienna

An ARPANSA representative attended the International Atomic Energy Agency conference titled 'Occupational Radiation Protection: Enhancing the Protection of Workers – Gaps, Challenges and Developments' at its headquarters in Vienna, Austria in December 2014. The major items discussed at the conference were the protection of medical workers and those exposed to naturally occurring radiation, such as air crew and miners.

The conference was attended by 470 delegates from 79 Member States and offered an opportunity for Member States to share and discuss experiences from the implementation, management and development of occupational radiation protection policies.

The cohort included representatives of regulatory bodies, workers and employers involved in the use of radiation sources and in the operation of installations containing or handling radioactive materials, radiation protection experts, researchers, persons

#### Stakeholder engagement (cont.)

responsible for occupational monitoring services and manufacturers of radiation emitting apparatus and other radiation sources.

The main concluding outcomes of the conference were to:

- implement existing international safety standards to enhance occupational protection of workers in Member States
- develop and implement new international safety guidelines for occupational radiation protection in different exposure situations
- promote exchange of operating experience between Member States
- enhance training and education in occupational radiation protection to equip workers with the necessary knowledge, skills and competencies to implement protection measures for workers,
- improve safety culture among workers who are exposed to ionising radiation, including promotion of safety culture by regulatory authorities through outreach and education,
- develop young professionals in the area of radiation protection, particularly for developing nations,
- apply a graded approach of the IAEA Radiation Protection and the Safety of Radiation Sources: International Basic Safety Standards (BSS) in protecting workers against exposures to elevated levels of naturally occurring radiation or radioactive materials, and



• convene an appropriate international forum to exchange additional information and analysis of worker protection in different exposure situations.

#### ICRP, ARPANSA and Uranium Mining Industry Meeting

The Main Commission of the International Commission on Radiological Protection (ICRP) met in Sydney, Australia in early April 2015. This was the first time the Commission had visited Australia since its establishment in 1928. On the 16th April 2015, ARPANSA and the ICRP jointly hosted a workshop on 'Radiation Protection in Uranium Mining'. The meeting was also attended by the Minerals Council of Australia.

The program included presentations by Claire Cousins (ICRP Chair) who provided an overview of the ICRP, John Harrison (PHE, England) on dose conversion coefficients of radon progeny, Stephen Solomon (ARPANSA) on particle sizing measurements in the Olympic Dam underground mine, as well as Frank Harris and Jim Hondros on the uranium mining industry's views on radiation protection. This was followed by a thought-provoking discussion session on key topics related to radiological protection in the mining environment.



Attendees of the ICRP meeting in Sydney, consisting of the ICRP Main Commission, ARPANSA and uranium industry representatives

#### Stakeholder engagement (cont.)

#### Cybermynd

Over the past twelve months, the ANRDR team has worked closely with Cybermynd, an external company that has developed a personal radiation dose management system. Among its many useful features, the HISTORION software has an integrated ANRDR data submission tool which is able to generate a submission file in the correct format using the data and parameters defined by users within HISTORION. During the development process, the ANRDR provided advice on operational matters and testing of submission files.

#### Iluka Resources – Western Australia



Iluka Resources have agreed to participate in the ANRDR's pilot program for the mineral sands industry by volunteering one of their Western Australian (WA) worksites as a test site for the ANRDR. The aim of the pilot program is to test the ANRDR's capability to accept mineral sands data, and to resolve any technical issues or those related to privacy. The privacy legislation prohibits an employer from providing personal information of workers to a third party, in this case ARPANSA, unless authorised by a relevant authority.

The ANRDR team has engaged with the Radiological Council as the regulator of the mineral sands industry in WA to seek approval for Iluka to

participate in this project. The successful implementation of the ANRDR to the Iluka test site will pave the way for all mineral sands companies in WA and across Australia, as well as other industries in WA to participate in the ANRDR.

#### Department of Natural Resources and Mines, QLD

In anticipation of the ANRDR's expansion into the mineral sands industry, the ANRDR engaged in productive discussions with the Department of Natural Resources and Mines (DNRM), Queensland's mining industry regulator.

#### **Queensland** Government

#### **Department of Natural Resources and Mines**

The DNRM have been developing their own database to record doses received by occupationally exposed workers within their regulatory sphere of influence. As part of this new system, DNRM have developed a capability to automatically generate an ANRDR-compatible submission file for each company registered in their system which is ready for submission to the Dose Register.

#### **ANRDR Workshop**

ILUK



ANRDR workshop in Hobart, Tasmania

In October 2014, the ANRDR hosted its annual workshop on the sidelines of the ARPS Conference in Hobart. Focussing on 'international best practice', the workshop commenced with an update on the ANRDR activities over the previous 12 month period as well as a stimulating presentation by Adjunct Professor Ray Kemp, on the importance of uniformity and transparency for public trust and worker confidence.

This was followed by a discussion session in which our stakeholders raised key issues on data analysis, national uniformity and privacy legislation.

The workshop was an important means for ARPANSA to engage with stakeholders by updating them on the ANRDR's activities, to seek feedback on key issues and to provide an opportunity for networking. The stakeholders in attendance engaged in robust discussions and reaffirmed their support for the Dose Register.

#### Stakeholder engagement (cont.)

#### Commonwealth Licence Holders' Forum



Ben Paritsky delivering a presentation on the ANRDR

ARPANSA is the regulator of Australian Government organisations that use radiation. These include ANSTO, CSIRO, Defence and others.

ARPANSA hosted two forums for Commonwealth Licence Holders (CLHs) in Sydney and Melbourne in June.

This year the Regulatory Branch took a different approach to the Forum by inviting guest speakers who delivered fascinating presentations on the economics of effective and efficient regulation, as well recent international developments in nuclear regulation.

The ANRDR also delivered a presentation to Commonwealth stakeholders during the Melbourne Forum on the current status, challenges and future developments of the Dose Register.

The short discussion session at the end of the presentation generated some thought-provoking feedback on the type of technical and educational resource material our stakeholders would find useful from ARPANSA as well as how historical data can be used to optimise radiation protection for workers. ARPANSA is currently working with CSIRO as our partner organisation in the pilot phase of our expansion before the Dose Register expands coverage to all CLHs. The stakeholders in attendance confirmed their interest in participating in the Dose Register and we look forward to working with all of ARPANSA's Licence Holders in the near future.

#### **Airlines**

ARPANSA has engaged in positive discussions with Qantas to participate in submitting radiation exposure data of aircrew to the ANRDR. The capture of Qantas's aircrew data in the ANRDR will be beneficial for both the airline



industry and workers by enabling the comparison of aircrew data on a national and global level, and encourage optimisation of radiation protection for aircrew.

Successful discussions with Qantas will facilitate further dialogue with other airlines operating within Australia to participate in the ANRDR. This will become increasingly important with ARPANSA's publication of guidelines for existing exposure situations.

#### Minerals Council of Australia Uranium Forum – ARPANSA Dialogue



ARPANSA CEO Carl-Magnus Larsson and MCA Uranium Forum Executive Director Daniel Zavattiero sign the MoU

The Australian Uranium Association (AUA) was an industry body which represented companies involved in uranium exploration, mining and export. In 2013, the AUA's responsibilities were absorbed by the Minerals Council of Australia (MCA), establishing the MCA Uranium Forum.

ARPANSA and MCA recognise the importance of open and transparent exchange of information, views and ideas on radiation safety and radiation protection issues associated with the exploration, extraction, processing and transport of minerals that contain radioactive material.

With due regard to the different roles both organisations play, it has been agreed to form the MCA Uranium Forum – ARPANSA Dialogue.

To honour this commitment, a Memorandum of Understanding (MoU) was signed at ARPANSA's Yallambie site between the two parties on July 2, 2015.

#### **IAEA NDR questionnaire project**

The IAEA has embarked on a project to evaluate the statusof the capability of individual monitoring and National Dose Registries (NDR) in Member States in the form of a questionnaire.

The purpose of the survey, which was submitted by the ANRDR on behalf of Australia, was to provide an overview of the status for activities in planned exposure situations and in emergency situations.

The results of this survey will be made available anonymously on the IAEA's Occupational Radiation website and will allow the IAEA to address recommendations to harmonise and optimise radiation protection of workers in this field.



#### **Publications of interest**

#### Code- Consultation Draft "Radiation Protection in Planned Exposure Situations"

Australian Government Australian Radiation Protection and Nuclear Safety Agency

105

**CODE** – CONSULTATION DRAFT

Radiation Protection in Planned Exposure Situations Radiation Protection Series C-1 A planned exposure situation involves the deliberate introduction and operation of radioactive sources. Planned exposure situations may give rise both to exposures that are anticipated to occur (normal exposures) and to exposures that are not anticipated to occur (potential exposures). The purpose of this document is to establish the requirements in Australia for the protection of occupationally exposed workers, the public and the environment in planned exposure situations.

#### CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2013

Each year, the Canadian Nuclear Safety Commission (CNSC) produces a report on the safety performance of Canada's nuclear power plants.

The CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants for 2013 summarises the assessment of the Canadian nuclear power industry's safety performance during that year and details the progress of regulatory issues and initiatives until May 31, 2014.



#### Protecting the Health of Uranium Mine Workers: The Situation from the 1930s to Present Day



During September 2014, the Canadian Nuclear Safety Commission participated in the Government of Quebec's Bureau d'audiences publiques sur I'environment (BAPE) public hearing phase of a commission inquiry to study issues relating to uranium exploration, mining and processing in Quebec.

CNSC staff participated in the BAPE's public hearing phase by providing objective scientific, technical and regulatory overview presentations and answering inquiries from BAPE members.

A presentation on Protecting the Health of Uranium Mine Workers: The Situation From the 1930s to Present Day discussed the health effects of uranium mine workers in past and present mines.

## **The ANRDR Team**



#### Ben Paritsky, ANRDR Science Officer

Since joining the ANRDR team in 2012, Ben has provided support to the operation, on-going maintenance and development of the ANRDR. Ben is currently leading the ANRDR team and managing activities relating to the expansion of the Dose Register beyond uranium mining, including stakeholder engagement and coordinating the redevelopment of the database and portal.





#### Fiona Charalambous, Science Officer

Fiona is the newest member of the ANRDR team and is contributing to numerous aspects of the ANRDR project, such as stakeholder engagement and coordinating the development of the quality management system. Fiona is also providing valuable support on other projects at ARPANSA.



#### Sarsha Collett, ANRDR Manager

Sarsha joined ARPANSA in 2011 to lead the ANRDR. After accomplishing several key milestones on the ANRDR project, Sarsha has taken a 12 month secondment with the Victorian state government to broaden her experience in various aspects of the public service.



### **Upcoming Events**

- Australian Uranium Conference 15-16 July 2015, Perth, WA
- ARPS Conference
   6-9 October 2015, Canberra, ACT
- Annual ANRDR Workshop Week of 12 October 2015, Adelaide, SA
- <u>3rd International Symposium on the</u> <u>System of Radiological Protection</u> 20-22 October 2015, Seoul, Korea

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