EUROPEAN ALARA NETWORK

NEWSLETTER

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EDITORIAL

Dear Readers,

On 26 January 2024, a news article posted on the IAEA information channel outlined an INES rating 2 incident involving radon exposure in a private boarding school:

< https://www-news.iaea.org/ErfView.aspx?mId=3d552858-060e-4d97-a6e8-eed798c58d10 >

Elevated levels of radon were originally detected in the school in 2007 with some remediation performed. Importantly, no follow-up radon monitoring was carried out in the intervening years to confirm the adequacy of the remediation work which led to several pupils, employees and their children being exposed to high radon gas levels over a period of ten years. Annual doses of two employees were estimated to be 15 mSv as they also resided at the school increasing the duration of exposure to radon gas. The school trustees were subsequently fined for breaching UK Health and Safety law. This incident highlights the importance of workplaces having arrangements in place for the ongoing assessment and management of radon control measures.

With the implementation of the Euratom 2013/59 Directive, the regulatory framework for the management of radon at the workplace have changed in many European countries. The EAN created a working group to investigate the practical application of the optimization principle for radon at work (*Psst, the results of the work has been published in the Journal of Radiological Protection,* https://doi.org/10.1088/1361-6498/ac9b46) and it was very noticeable that only a few countries reported having requirements/guidance for the ongoing maintenance of radon mitigation solutions (Slovenia (checks every 7 years) and in Norway (“regular assessments”).

So, the reported INES 2 incident is a reminder that the application of the optimization principle for radiation protection is not a “once and done” process. The controls, systems and processes used to manage exposures must be re-examined at suitable intervals to ensure ALARA continues to be achieved.

Speaking of long-term, the EAN Newsletter has now passed its 50th issue. In this 51th issue you will first find an article on the application of ALARA at the design stage of a new installation that will be used for the recovery of uranium from irradiated Molybden-99 targets (the RECUMO facility is planned to start operating in 2027). The technical article details how the source-term is defined and how the dose(s) per task are calculated (**p. 3**–**7**).

The Swiss radium action plan is the topic of the second article (**p. 8**–**10**) where the graded approach for the management of over 1,000 radium-contaminated legacy sites is presented with a focus on waste management.

The new radon risk map for Ireland was presented at the EAN 1st webinar in December 2022 (N.B. a synthesis of the webinar was included in *EAN Newsletter* **49**, March 2023) and you will now find a written explanation on how this map was updated by integrating 30,000 radon indoor measurements with geological data (**p. 11**–**13**).

Then a group of Swiss inspectors present the features and capacities of the Radiation Portal in Switzerland (**p. 14**) and explain how digitalization can be fruitful to ALARA.

We are also happy to give a place to the African ALARA network (AFAN) to present its activities (**p. 15**). The AFAN is about to publish a newsletter of its own (check their website: < https://african-alara.net>) and we wish them to go beyond 50 issues!

We started this Editorial with an incident, and we will conclude it with another: a generic incident report about the loss of I-125 seeds for brachytherapy is the subject of the last article (**p. 17**). This is a translation of the last incident reported in French on the RELIR/OTHEA database, which everyone can access to consult/share incident dealing with radiation protection.

We wish you a pleasant reading.
The Editorial Team. —

RECUMO – ALARA in design of a new installation, current status

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Introduction

The RECUMO installation, currently under construction at the SCK CEN site in Mol, Belgium, will, when commissioned in 2027, recover uranium from irradiated Mo-99 production targets. The recovery, based on a chemical process, is performed in a suite of hot cells and glove boxes. The waste stream generated during the recovery consists of radioactive contaminants (fission products, activation products) that will be removed according to regulatory waste standards.

As part of the nuclear license an ALARA study is required by the authorities before commissioning in order to show that the maximum individual dose is as low as reasonably achievable and to assert that the worker dose is well within the dose constraint of 10 mSv per 12 consecutive months applied at the SCK CEN nuclear installations.

In this contribution we give an overview of the current status of the project and how the ALARA study is performed focusing on the interaction with the different stakeholders.

ALARA approach

The approach used in the study follows the steps of the ALARA process as described in [1] enabling a structured and deliberative process to be followed (Figure 1). The process involves gathering relevant contributions from different stakeholders with specific knowledge relevant to the planned activity (Figure 2). This interactive process involves subsequent iteration steps in order to decide on the protection measures to be implemented.

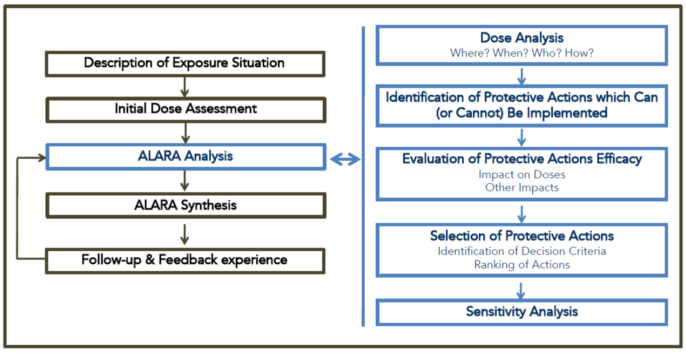

Figure 1 – Schematic representation of the ALARA process [1].

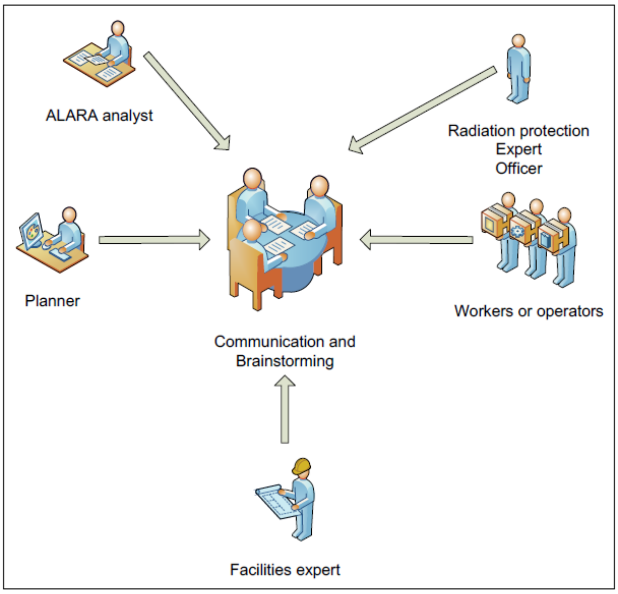

Figure 2 – Stakeholders in the ALARA process [1].

Applying ALARA to the RECUMO planned activity

The different steps shown in Figure 1 are discussed below to illustrate the practical implementation of the optimization process for the RECUMO project.

Description of the exposure situation

The RECUMO installation consists of a suite of hot cells, and gloveboxes along with other infrastructures like transport containers, storage vessels, …. In order to structure the study we split the planned activity into 5 sub processes that are delineated by specific installations:

- Storage & Feed Process (SFP) – mainly performed in hot cells;
- Head-End Extraction Process (HEEP) – mainly performed in hot cells;
- Back-End Process (BEP) – mainly performed in gloveboxes;
- Waste and Treatment Process (WTP) – mainly performed in hot cells;
- Supporting processes – different type of infrastructures like containers.

Initial Dose Assessment

The uranium recovery process is performed in batches (not a continuous process) resulting in radiation fields that vary in the installation according to the steps of the batch process. For calculation purposes we assume that the operator follows the batch leading to a conservative evaluation of the worker dose.

The first step is to perform an initial dose assessment. In order to do so, a good description of the different steps of the planned activity is needed. This description is provided by a nominated process owner (PO) (facility expert) responsible for the design of the specific sub process or step. This also includes information on the source term and distribution of the source at the workstation. The process owner (PO) also acts as the “operator” in the ALARA analysis since the PO will describe the different steps in detail that have to be performed at the workstations. The involvement of the PO is paramount since the PO is knowledgeable in the activities that must be performed at the workstation and can immediately see where some technical or organizational changes can be done to further optimize the dose. Based on the dose evaluation, modifications in the workstation design can then be performed in agreement with health physics.

The basic shielding design of the workstations refers to the general requirement that the dose rate at the worker position must be less than 20 µSv/h (general design rule at SCK CEN) [2]. The evolution of the source term and source term geometric distribution during the different stages of the process is taken into account in the calculations resulting in shielding designs for the different workstations. The different types of shielding applied in the installation consists of steel for the hot cells, lead glass for the glove boxes with calculated shielding thicknesses resulting in dose rates at the worker position below 20 µSv/h.

Solely by applying the shielding design dose constraint, dose rates will already be below the supplementary regulatory warning signalization of “ionizing radiation”.

Further examination of the dose associated with the planned activity is performed and the possibilities of further optimization evaluated. The detailed ALARA calculations take into account work duration at the worker position and the evolution of the source term and source term geometric distribution during the different stages of the process (figure 3).

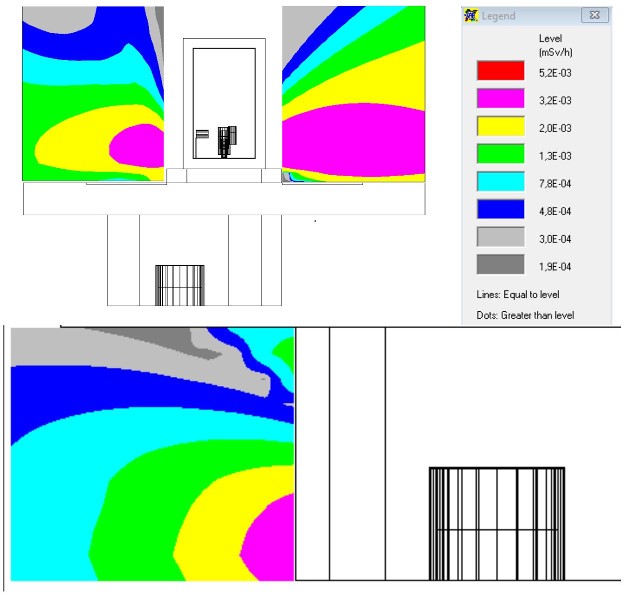

Figure 3 – Examples of dose rate calculation at HEEP and at WTP.

The radioactive material to be treated will enter the installation and will be distributed over different recipients. This means that the source term will be distributed over the different locations in the installations (geometric source distribution) (figure. 4).

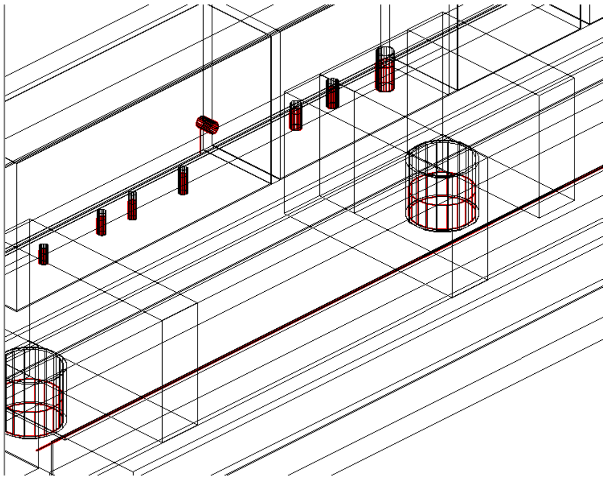

Figure 4 – Different location where radioactivity is present in the HEEP installation (sources are red).

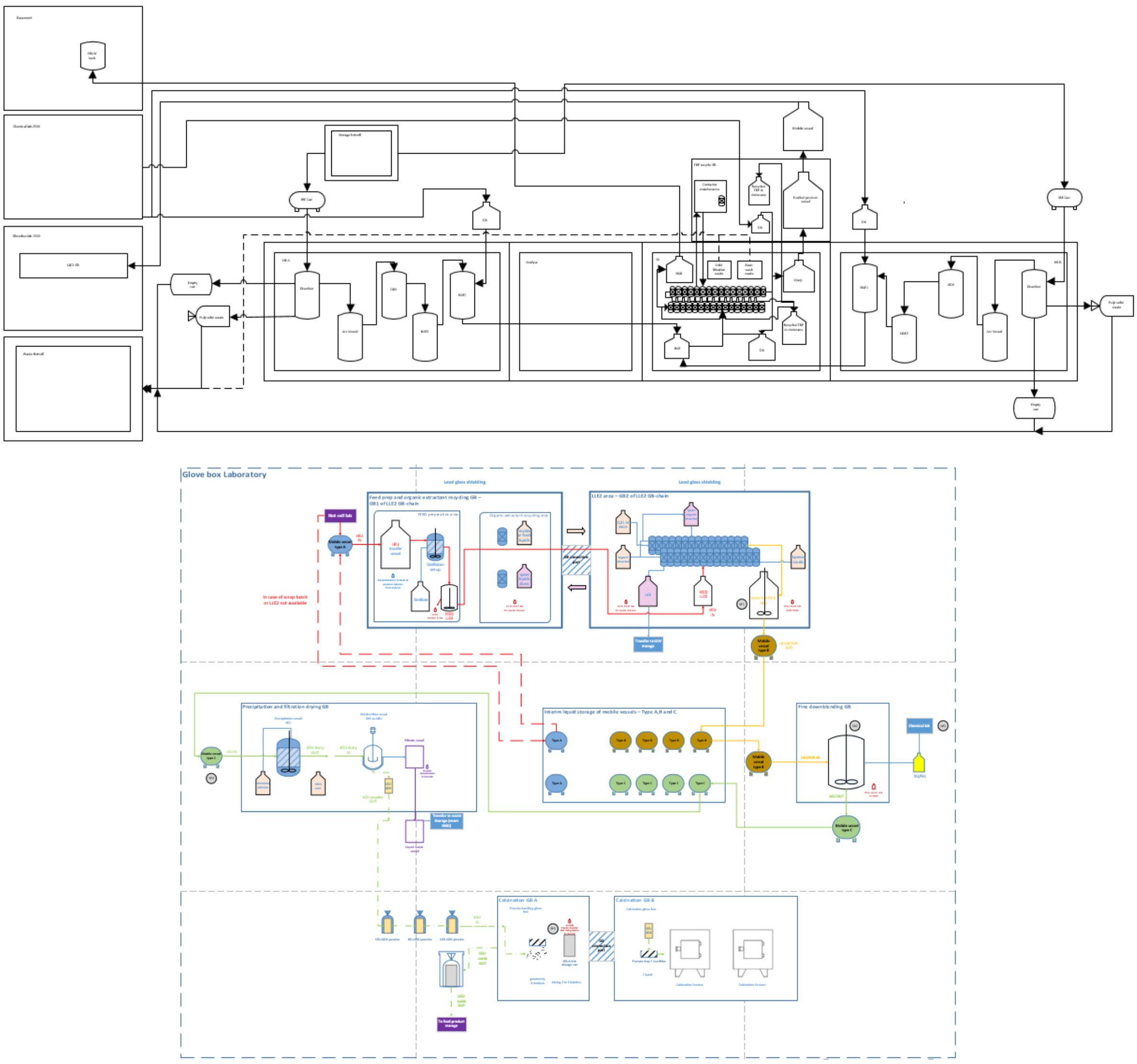

Figure 5 – Process schemes of two different processes. From these schemes the source in the end will be divided into several sub sources. Taking all these different sub sources into account with the calculations, results in a more realistic dose assessment.

The basic shielding design calculations mentioned previously are based on a non-distributed source (conservative approach) at the work stations. The calculations for the radiation exposure in the ALARA evaluation take into account the distributed source (realistic approach).
The source term will also vary along the different steps in the separation process both in magnitude and radio isotopic composition. Dividing the process in different sub processes (steps) enables to use the appropriate source terms for every work station and leads to realistic dose assessments.
A schematic view showing the complexity of the flow is given in figure 5.

The removal of the fission and/or activation products will reduce the source term in the recovery process but will increase the source term in the WTP process and needs to be properly accounted for. In order to do so information is needed on the efficiencies of the process steps. These efficiencies will not only determine the source terms for the different steps in the recovery process but will also establish the waste source term to be used in the WTP processes.
Per task a dose evaluation is done in order to check the importance of each task on the overall dose impact. Tasks identified with a high dose impact lead to further investigation into dose reduction measures by the PO in collaboration with health physics.

Input for detailed analysis

For the detailed analysis the PO performs a breakdown of the process steps into small tasks to be performed by the operator. Each step is described by the following information:

- General task
- Description – to get a clear definition of the task
- Sub tasks
- Estimated duration
- Number of people performing the task
- Involvement of radiation protection officer – this person is only calculated for half the time since he is not always in the near vicinity when performing the task
- More detailed source term (realistic or conservative)
- Basic shielding used for this specific source
- Position of the operator, distance to the source(s)
- Additional shielding present?
- Location
- Hot cell
- Glovebox
- Transport container
- Other sources in the vicinity?
- Personnel:
- Qualification of personnel (junior/senior)

All this information is collected in an Excel sheet per sub installation and is used as input for the dose calculations (figure 6).
Based on this information about HEEP, BEP, SFP, WTP and auxiliary systems dose calculations are performed, for the different scenarios defined by the PO's (figure 7).

ALARA synthesis & follow-up

Based on the performed calculations we obtain a good overview of the radiation exposure during the different main sub processes. The tasks with a higher dose impact are further examined to evaluate possible dose reducing measures.
A sensitivity analysis is also performed based on variations in separation efficiencies in the process and uncertainties of work duration.
The focus in the presented current work was on the major sub processes and associated installations (SFP, HEEP, BEP and WTP). Further dose evaluation work is foreseen on internal transport and maintenance in order to assess the complete dose impact of the planned activities in the installation.
Once this is done, the study will be presented at the ALARA committee of SCK CEN [2] to be reviewed by representatives of health physics and operators of other SCK CEN installations (some similar). The review and feedback from the ALARA committee is then used to further refine the RECUMO ALARA study.

Step N°	Critical path	Installation	Description	time (min)	freq./batch	Dose time 30 cm/batch (min)	Dose time in contact/batch (min)	Total time/batch (min)		n° RECUMO personnel	Rad. Of.	Personnel experience
1*	N	CHEM-LAB	Preparation DU solution stock uranyl nitrate	45	0,33			14,85		1		
1	N	CHEM-LAB		120	0,33			39,6		1	1	
2	N	CHEM-LAB	Analysis of DU solution	15	0,33			4,95		1		
3	Y	CHEM-LAB	Rebatching DU stock solution (NMA)	30	1			30		1		
4	Y	CHEM-LAB	Transfer DU solution from CHEM-LAB to GB-LAB (NMA)	30	1			30		1		
5	Y	CHEM-LAB/FD-GB	Transport DU solution from CHEM-LAB to GB-LAB	10	1			10		1		
6	N	FD-GB	Preparation GB for receipt new batch (chemicals, ...)	20	1			20		1		
7	Y	FD-GB	Transfer purified HEU solution from LIQ-ST to GB-LAB (NMA)	30	1			30		1		

Figure 6 – Data collection.

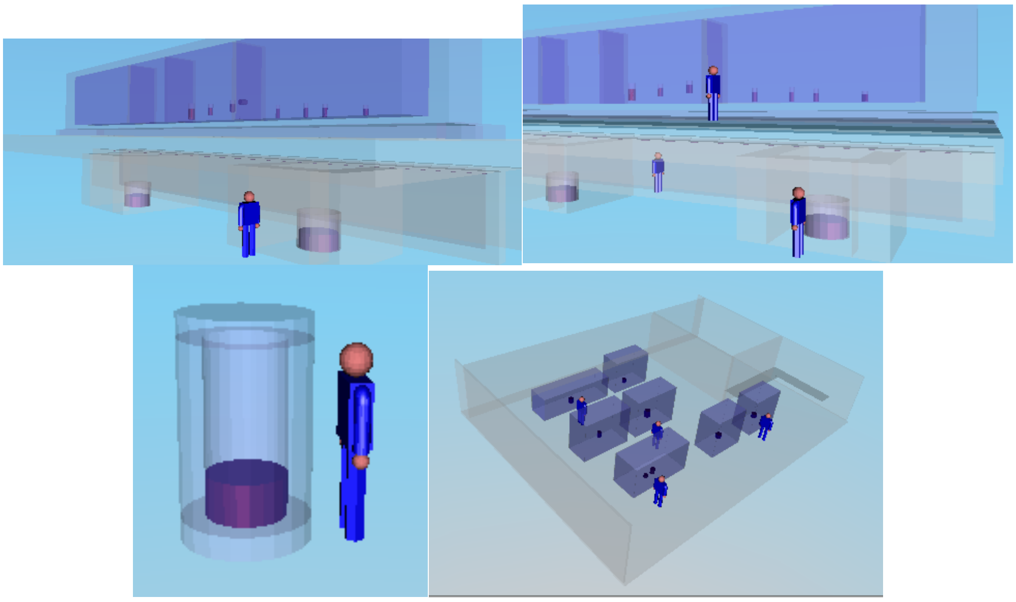

Figure 7 – Based on the information given by the PO, different work scenarios are defined, taking task duration, number of operators, ... into account. Some geometric models used in the calculation are presented here.

Conclusion

RECUMO is a new facility that is being built at the SCK CEN site. In a first step, general calculations are performed in order to design the shielding necessary to comply with the general SCK CEN rule of max. 20 µSv/h at the worker position. In a second step a more detailed analysis is performed to assess the dose impact of the planned activities. This is done based on a breakup of the work into sub processes in its associated installations taking into account the evolution of the source term, location, work duration and operator position in the installation. The study has to be further completed to include the evaluation of the dose uptake from internal transport and maintenance.
dose prognoses and measured dose will be stepwise compared to verify the optimization study.

Each of these steps is performed as a team effort involving the process owners, ALARA analyst and health physics. The results of the analysis are reviewed by, and provided with feedback from the ALARA committee to further refine the study. During the gradual commissioning of the installation dose prognoses and measured dose will be stepwise compared to verify the optimization study

REFERENCES

[1] EAN, Optimization of Radiation Protection - ALARA: A Practical Guidebook, 2019.
[2] P. Antoine, ALARA process SCK CEN; BPR-NRS-194.

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Radium Action Plan in Switzerland

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Introduction

The Radium Action Plan 2015-2023 aimed to address the radiological legacy associated with the application of radium luminescent paint in the Swiss watchmaking industry until the 1960s.

The year 2023 was marked by the completion of all diagnostics and remediation work in former small watchmaking companies using radium, providing an opportunity to draw up a final balance sheet of this work. In addition, the Swiss Federal office of Public Health (FOPH) as regulatory body in radiation protection, in collaboration with the Swiss National Accident Insurance Fund (Suva) as supervisory authority, the Federal Office for the Environment (FOEN) and the cantons concerned, has drawn up a guideline specifying the radiation protection measures to be implemented in the event of the opening of a former landfill likely to contain radium waste.

Former small watchmaking companies using radium

The aim of the action plan was to identify properties/factories where radium paint was handled, and to remediate them if the reference level of 1 millisievert (mSv) per year for occupants is exceeded, in accordance with art. 148 of the Swiss Radiation Protection Ordinance (RPO). For gardens, remediation was required if the concentration of radium in the soil exceeded the threshold of 1,000 becquerels per kilogram (Bq/kg) set in the action plan.

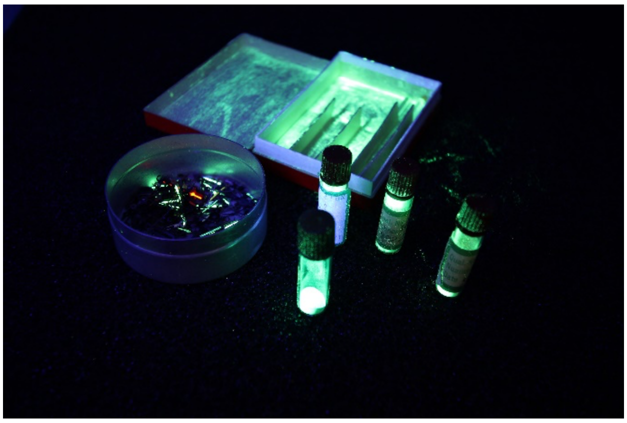

Figure 1. – Radium material used by the former watchmaking companies.

Historical research has enabled the regulatory body to draw up an inventory of around 1,100 properties or small factories, mainly in the Jura Arc region, where former radium watchmaking companies were located. The inventory was made up of 60% small businesses and home ateliers and 40% watchmaking companies. Almost 80% of these sites are currently used for residential purposes. A total of 1,093 sites have been diagnosed for radium, including more than 50 in 2023. In this way, the FOPH had examined almost all the sites in the inventory. Only the owners of seven properties refused the diagnosis or never responded to the FOPH's letters. The diagnoses revealed a need for remediation in 163 of the 1,093 properties examined (93 indoor premises and 109 gardens), bringing the proportion of sites in need of remediation to 15%.

In these 93 premises, the effective doses calculated for the occupants were between 1 and 20 mSv/year, depending on the case. The maximum radium concentrations measured in soil samples taken from the 109 gardens to be remediated averaged 26,500 Bq/kg. In one case, they were close to 670,000 Bq/kg. All contaminated properties have been remediated, with two exceptions: one remediation was refused by an owner, and the other was the remediation of an industrial site heavily contaminated with radium and chemicals, the complexity of which required a dedicated project outside the action plan. The decontamination work was carried out by specialist companies on behalf of the FOPH. Mixed contamination (chemical and radiological) was found in almost 20% of the gardens to be remediated. The FOPH coordinated the remediation of these sites on a case-by-case basis with the cantons concerned (and with the FOEN and Suva in complex cases). In addition, the FOPH has set up collaborations with the Spiez Laboratory and a specialized company (Econetta) for the analysis of chemical pollutants in radium-contaminated samples.

Figure 2 – Remediation work and typical contaminated waste.

Approximately 4,400 m^3 of inert waste from remediation was disposed of in landfill in accordance with art. 114 of the RPO, the specific activity criterion of 10,000 Bq/kg for radium-226 being met. In addition, over 250 m^3 of combustible waste were disposed of in incineration plants in accordance with art. 116 of the RPO, which sets a maximum weekly activity of 2 MBq for radium-226. Finally, almost 7 m^3 of waste with an activity exceeding the above-mentioned values was conditioned as radioactive waste and sent to the Federal Interim Storage Facility under FOPH supervision. A campaign to decontaminate the special waste collected during the action plan, mainly metal waste, was also launched in autumn 2023 in collaboration with a specialized company. The special waste is mechanically decontaminated in a sandblasting cabin, then checked by the FOPH in a measuring chamber prior to disposal.

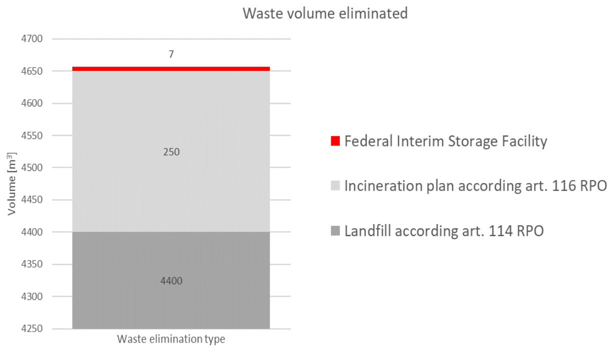

Figure 3 – Waste volume eliminated during the action plan.

Dose estimation for workers and members of public

The action plan was also aimed to identify former landfills likely to contain radium-contaminated waste, and to define appropriate radiation protection measures, particularly for workers and the environment. In this context, the FOPH has developed a method for identifying the former landfill sites concerned, and defining the actions required according to three levels of risk. The results of this work, carried out in collaboration with the FOEN, Suva and the cantons, are detailed in a technical report, available under Radium legacy in landfills. The cantons primarily concerned (Bern, Geneva, Jura, Neuchâtel and Solothurn) have classified their former landfills according to a well-defined process described by the regulatory body. Over 250 former landfill sites were identified as requiring radiation protection measures for workers and the environment during future excavation work. The FOPH has drawn up a directive to specify the radiation protection measures and the specific measurements that have to be implemented in the event of the opening of a landfill likely to contain radium waste. Suva, the FOEN and the cantons concerned were consulted in 2023 to give their opinions on the directive. The directive will be published until the end of 2024. The FOPH will monitor and coordinate this work with former landfill over the long term.

Figure 4 – Former landfills potentially contaminated with radium.

Conclusions

Results of this project will support stakeholders – In summer 2023, the FOPH commissioned an external company to carry out an evaluation of the action plan. The study includes interviews with key players in the action plan and an online survey of people directly affected by remediation projects, as well as cantonal and municipal officials. In addition, the FOPH has asked the "Nuclear Protection Evaluation Centre (CEPN, France)" to draw up an expert opinion on radiation protection aspects. On the basis of these results, the FOPH, in collaboration with the FOEN, will draw up a final report for the Federal Council by the end of 2024.

More information in French, German and Italian can be found on the website of the Swiss Federal Office of Public Health[1].

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[1] https://www.bag.admin.ch/bag/de/home/strategie-und-politik/politische-auftraege-und-aktionsplaene/radium-altlasten.html

Updated Radon Risk Maps for Ireland

ALISON DOWDALL

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Introduction

In 2022, delivery of updated radon risk maps for Ireland were a key achievement for Ireland's National Radon Control Strategy. Incorporating a combination of indoor radon measurements and geological data, the updated maps re-assessed the radon risk for the country and predicted that approximately 170,000 homes nationally are at risk from high levels of radon

Background

The EPA radon risk map is a guide to householders and employers as to whether high concentrations of indoor radon are likely to be found in their building. By law[2], all workplaces in high radon areas as set out on the map are required to be tested for radon and remediated where necessary. The map is also referenced in Irish Building Regulations, which set out the radon preventive measures required in new buildings in Ireland. The radon map has also served as a guide for radon awareness campaigns to ensure that these focus on those areas most at risk.

The first radon map of Ireland was published in 2002 using approximately 11,000 indoor radon measurements from a national radon survey. In 2014, the Government's National Radon Control Strategy (NRCS[3]) identified the need for an improved radon map that better targets local variations in radon levels.

Development of the updated maps

The development of the updated map began in 2012 and involved the collaboration of many different stakeholders including the Health Services Executive, the Geological Survey of Ireland, researchers from Trinity College Dublin and behavioural scientists from the Economic and Social Research Institute of Ireland.

The first step was the geocoding and mapping of approximately 30,000 EPA indoor radon measurements. Following the development of a model for a new map using airborne uranium data, groundwater recharge data and karst terms in specific areas at a 1 km gid resolution, the Geological Survey of Ireland refined their model to produce a national model incorporating mean radon per bedrock unit, aquifer type, groundwater recharge and karst terms. In 2017, researchers from Trinity College Dublin and the GSI further refined this map using the EPA's geocoded indoor radon measurements, bedrock geology, quaternary geology, soil permeability and aquifer type.

Figure 1 summarises the steps in this process from 2012 to 2018.

[2] S.I. No. 30/2019 - Radiological Protection Act 1991 (Ionising Radiation) Regulations 2019 (irishstatutebook.ie)

[3] National Radon Control Strategy 2014 - 2019

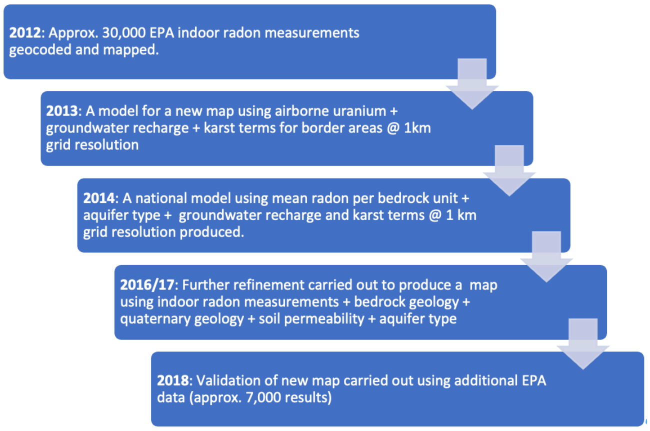


Figure 1 – Process for updating the radon maps.

The map published by TCD with the GSI[4] and validated in 2018 was proposed by the EPA as the national radon risk map as it provided significantly higher resolution than the 2002 map. Before adopting this revised map, the EPA assessed the analytical methodologies and data used to ensure that the most accurate map was published.

On completion of the validation process, online user testing of 17 different versions of the map was carried out by behavioural scientists from the Economic and Social Research Institute of Ireland who tested the performance of different communication features on the map[5]. The best performing map increased householders willingness to test for radon by 72% relative to the 2002 map and used three categories of risk with a yellow to red colour scheme, communicated risk using frequency statements such as “1 in 5 homes in this area is likely to have high radon levels”, and allowed for granular searching. These features were incorporated into the design of the updated Radon Risk Map of Ireland (Figure 2).

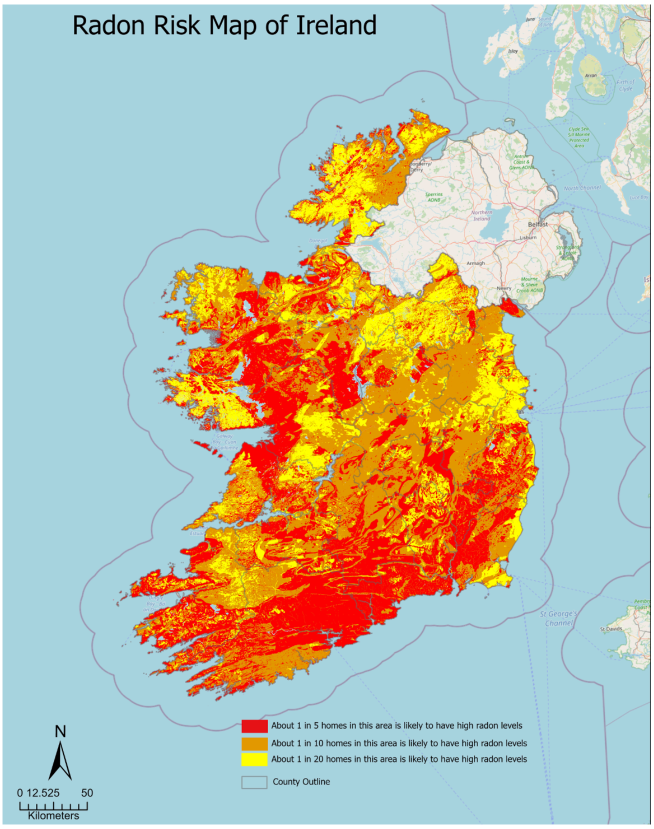
Recognising that different maps are required to meet different stakeholder needs, two binary maps were also published with specific calls to action in high radon areas compared with other areas. The radon in workplaces map is aimed at employers who have a legal obligation to take action related to radon in their workplaces located in high radon areas (Figure 3). In terms of radon preventive measures in new buildings, a map displaying high radon areas has been produced for use in connection with Technical Guidance Document - C (TGD-C) which sets out the radon preventive measures for new buildings in Ireland (Figure 4). Where a building is being constructed in a high radon area, the Technical Guidance Document provides that a radon resisting membrane is installed in the floor build-up. A standby sump is required in all areas.

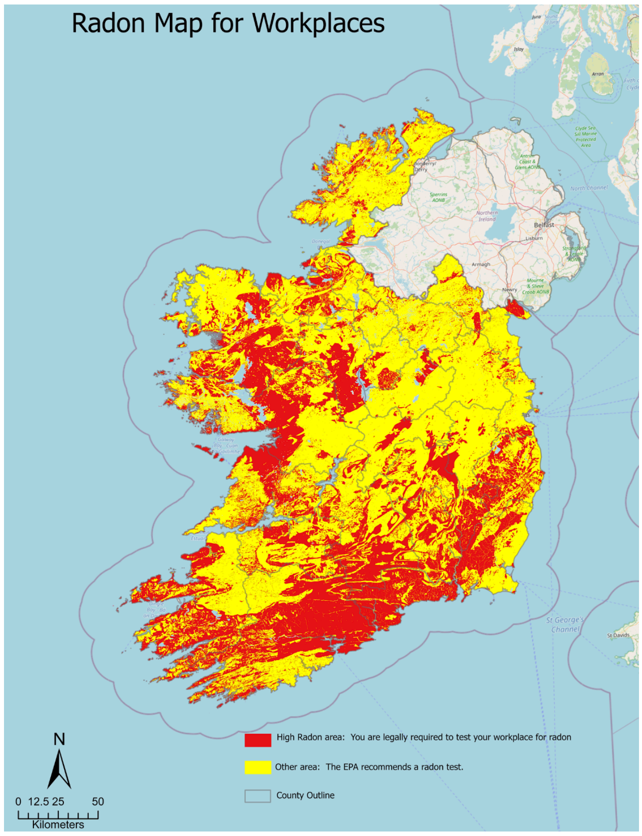
Launch of the updated maps and next steps

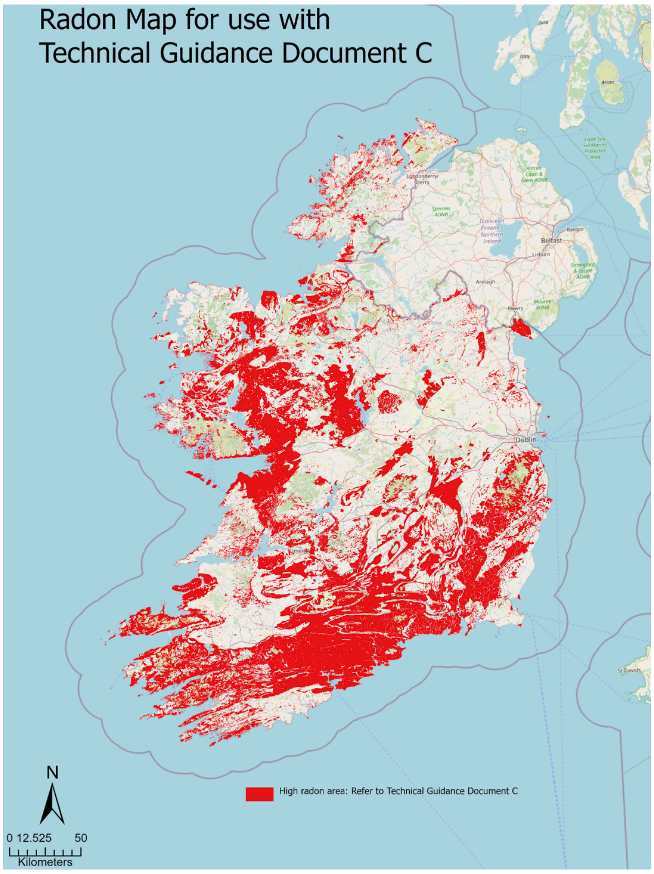
The launch of the updated maps in May 2022 resulted in extensive media coverage both nationally and locally. Significant public engagement was seen with some 80,000 website hits to the EPA’s website www.radon.ie on the day of the launch. Prior to the launch, there were typically 50-100 hits per day on the radon map. Recognising the importance of communicating the updated radon maps, the EPA undertook a comprehensive communication plan involving a wide range of radon stakeholders including the construction industry, employers and householders. This ongoing communication plan aims to promote awareness of the updated radon risk maps with particular focus on areas where the radon risk has been re-categorized. Views of the radon map page on the EPA’s website have remained high since the launch with an approximate 70% increase in page views observed to date.

[4] Logistic regression model for detecting radon prone areas in Ireland, https://doi.org/10.1016/j.scitotenv.2017.05.071

[5] Using information provision and interactive risk maps to motivate testing for radon, https://doi.org/10.1016/j.jenvp.2023.102057







- **Figure 2 – Radon Risk Map in Ireland; Figure 3 – Radon Map for workplace.**
- **Figure 4 –** Radon Map for use with Technical Guidance Document C.

A new digital portal in radiation protection is setting new standards

THOMAS FLURY, PETER GEHRIG, SAMUEL VON GUNTEN, PATRICK VONLANTHEN, AND NICOLAS STRITT

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The Radiation Portal Switzerland (RPS), introduced in March 2023 by the regulatory body, marks a milestone in the digitization of radiation protection and has attracted international attention. The portal allows around 11,000 license holders from medicine, research, and industry to view their licensing data, submit applications and fulfill their duties for declaration such as the quality assurance on medical x-ray equipment or the quantities of unsealed radioactive sources used and discharged. Additionally, approximately 25,000 radiation protection experts who accomplished a legally recognized training are listed in a database.

The data is now always up-to-date, has a better quality thanks to validation mechanisms and since it is online can be viewed and adjusted also directly during on-site supervision activities of the authorities. With numerous data export options, as for example all sealed radioactive sources, types of radiation emitting devices etc., supervision according to the graded approach can be planned relatively easily and efficiently.

Increased efficiency through digitization allows radiation protection regulatory bodies to spend more time in the field instead of transferring data from forms to database or sending out reminders in the case of missing information. RPS has been praised by the Swiss Federal Office of Public Health (FOPH) for its versatile applications, especially as a management tool for companies. RPS is proficient in the digital processing of all administrative tasks related to radiation protection and plays a primary role in companies' maintenance efforts of their inventory of used radioactive sources

The introduction in 2023 of the portal has been well received, with a customer satisfaction rate of over 80 percent and an average rating of 4.23 out of 5 stars in customer reviews, underscoring the success of the implementation.

Contact for more information: rps@bag.admin.ch

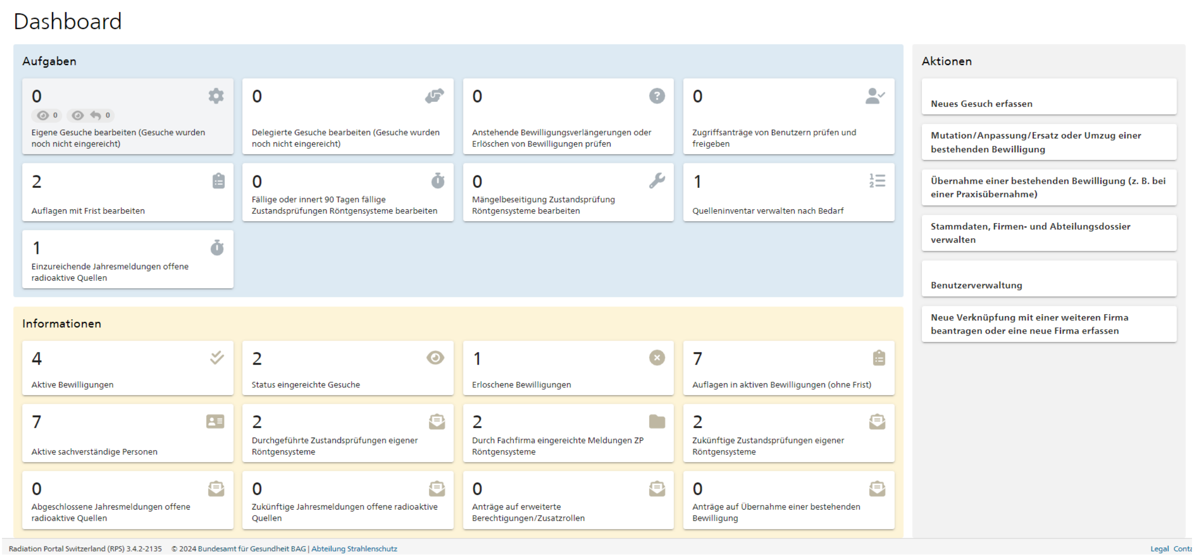

Figure 1 View on the dashboard of a license holder. In the blue part, there are user tasks which necessitate an action; in the yellow part different pieces of information and on the right, there are actions possible on licenses. RPS can be used in three national languages German, French and Italian

Overview of AFAN activities for 2023-2024

WITH THE KIND CONTRIBUTION FROM AFRICAN ALARA NETWORK REPRESENTATIVES

The Steering Group

Election of new members to the Steering Committee was held on 3rd of May 2023. At the end of the electoral process the New Steering Committee consists of the following;

Chair :	Burkina Faso
1ST Vice Chair:	Botswana
2ND Vice Chair:	Morocco
Secretary – Treasurer:	Ghana
IAEA Representative:	Mr Jizeng Ma
Former Chair:	Tanzania

A virtual Steering Committee meeting was held on 12 October 2023. The meeting discussed AFAN activities for the 4th quarter of 2023 and proposed activities for 2024. The meeting agreed on a webinar to be held on 14th November 2023 on the topic of Radon monitoring with a resource person from Ghana.

Newsletter

Publication of a newsletter with articles on the following topics amongst others was agreed upon during the meeting. The topics include:

- Report on International Conference on Occupational Radiation Protection conference – Strengthening Radiation Protection of Workers- Twenty Years of Progress and Way Forward held in Geneva, Switzerland from 5 – 9 September 2022. The article should highlight contribution/presentation by members at the Conference.
- Report on the 6th African Regional Congress (AFRIRPA06) of The International Radiation Protection Association (IRPA) held in Accra, Ghana from 10 – 13 October 2022
- Report on Regional Training Course on The Establishment and Implementation of a Quality Management System Accra, Ghana, 16 to 20 October 2023
- ISO 17025 Accreditation of a Dosimetry laboratory -the Botswana experience
- Regional Coordination (RAF 9068) meeting to be held in Arusha.
- Occupational Radiation Protection Appraisal Service (ORPAS) mission held in Botswana.

Webinar activity

A webinar on 'Radon Monitoring- Ghana's experience' was held on Thursday November 14, 2023. Dr Francis Otoo a Principal Research Scientist with the Radiation Protection Institute (RPI) of the Ghana Atomic Energy Commission (GAEC) made the presentation. His presentation gave an overview of Radon gas monitoring studies being carried out in Ghana by the RPI, Radiation Protection Instrument in Ghana and also highlighted the methodology employed in radon gas monitoring in underground mines in Ghana. He concluded his presentation with some challenges and recommendations.

Presentation at the Regional Coordination Meeting

The Chair of the AFAN Steering Committee, Mr Alphonse YAKORO, gave a presentation on the Overview of the African ALARA Network at the Regional Coordination (RAF 9068) meeting held in Arusha from 11-15 December 2023. His presentation discussed the objectives and organizational structure of AFAN, activities carried out from 2017- 2023. He also discussed the proposed activities for 2024 and ended with some remarks which included low participation in AFAN activities by members and the call for all African IAEA Members States to join the network.

Proposed activities for the year 2024

The underlisted were topics proposed for the webinar series to be held in 2024.

1. Quality Management System Tool kit and Measurement Uncertainties - Q 1;
2. Interpretations of Inter Laboratory Comparison Results and the required corrective actions – Q2;
3. The Online version of the National Dose Registry (NDR) - Q3;
4. Accreditation process for Technical Services – Q4;
5. Authorization of medical facilities - Q4.

The following meetings were proposed to be held in the first quarter of 2024

- Steering Committee Meeting
- AFAN Board Meeting

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Generic incident report about the loss of iodine seeds for brachytherapy

N.B. This article is a translation of an incident report dealing with the loss of iodine (in a generic manner) seed posted on the OTHERA-RELIR website in October 2023.

https://relir.cepn.asso.fr/fiches/medical-et-veterinaire/fiches-curietherapie/321-fiche-generique-sur-la-perte-de-grains-d-iode-radioactif-en-curietherapie.html

Context

Iodine-125 is used for the treatment of prostatic cancers using brachytherapy ("*curiethérapie*" in French). The treatment consists of the insertion of seeds of iodine directly in the prostate using needle and a specific device (Figure 1) and a cartridge (Figure 2) loaded with 60–100 iodine seeds, representing an activity between 10–25 MBq. The physical state of the iodine is a porous ceramic, encapsulated in a titanium case (Figure 3).

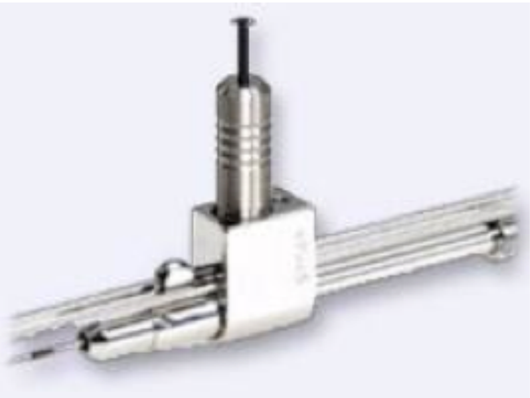

Figure 1 – Device for implanting the seeds.

Figure 2 – Cartridge.

Figure 3 – Five iodine seeds.

Circumstances

A number of circumstances can lead to the loss of iodine-125 seeds. These losses may or may not be detected immediately as illustrated in the following examples:

- In the case that not all the seeds ordered for a surgical operation are implanted, the remaining seeds shall be send back to the manufacturers and any loss can be identified.
- The un-used seeds are placed in storage and then cannot be located when it is time to send them back;
- Lost seeds can be detected by the radiation monitoring portal of a landfill site following inadvertent disposal with normal refuse;
- If seeds are broken and subsequently discovered during routine contamination checks;
- If the device for implanting the seeds failed.

Actions undertaken

Retrieved lost Iodine-125 seeds shall be placed in a lead container and stored securely for further decay (up to 3 years for decay to background levels). Where possible, the seeds would be returned to the manufacturer. In case of contamination of areas/personnel, a decontamination shall be performed.

Radiological consequences

In normal conditions of use, iodine seeds do not present any risk for humans nearby. Manipulating the seeds with hands should be avoided, including any attempts to extract iodine from the titanium case. If the encapsulation of the source is broken (by a damage or fatigue), radioactive material might escape and the risk of internal and external exposure possible.

Lessons learned

Seven lessons can be drawn:

1. The radiation protection/safety training of the personnel working in brachytherapy settings shall be adequate;
2. Specific information shall be provided to affected personnel; for example, a check-list and radiological 'stopping point' can be used to ensure all seeds are collected;
3. In the case of a lost seed or contamination from a seed, a radiation measuring device capable of detecting the emissions from Iodine-125 (low dose rate) shall be used;
4. Appropriate procedures shall be in place should any incident arise involving the seeds during surgery and personnel suitably prepared in advance;
5. Suitable PPE (gloves etc) to be worn in case of incidents involving damaged seeds, due to the risk of the spread of radioactive contamination and potential for intakes. Steps shall be taken to limit the extent of any spread of the contamination;
6. In instances where the patient is deceased less than 3 years after the surgery, the family shall be informed and cremation avoided;
7. The patient shall be informed of what to do in case the seeds are discharged through natural channels after the procedure.

Do you wish to consult the lessons learned from recent accident?
Do you wish to report a radiological incident so the lessons-learned can benefit to others
Use the OTHERA/RELIR database.

Lorem Ipsum

Trenz Pruca

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Life of EAN and ALARA events

14 May 2024 - Administrative Board and Steering Group meetings of the EAN. The meetings are planned to take place at the ISS facility in Rome, Italy, in conjunction with the European NORM Association Conference (see below).

ENA European NORM Association

15-17 May 2024 - Third workshop of the European NORM Association (ENA). The workshop will be hosted by the Italian National Institute of Health (ISS) with the support of the Italian Radiation Protection Association, at Rome, Italy.

The EAN has been invited by ENA to plan a specific session on the application of the ALARA principle to NORM activities. **This will constitute the next EAN (mini)workshop.**

Other events in sight

- **Interdisciplinary Radiation Research on Radon – InterRad**, open to students, PhD and researchers, 15-26 April 2024, BfS, Germany. Contact is Dr. Maria Gomolka <mgomolka@bfs.de>

- **ISOE European Symposium**, organized by the European Technical Centre of the in collaboration with EPZ and ANVS. 4–6 June 2024, Rotterdam, The Netherlands, https://www.isoe-network.net

- **The ALARA Days,** organized by the French Society for Radiation Protection, (SFRP) 18–19 June 2024, Saint Malo, France (in French) < https://sfrp.asso.fr/blog/les-manifestations/8emes-journees-sur-loptimisation-de-la-radioprotection-dans-les-domaines-nucleaire-industriel-et-medical/

- **Training course in internal monitoring and emergency response,** a PIANOFORTE funded training course, hosted by BfS, Germany, https://www.bfs.de/EN/topics/ion/service/incorporation/training-course/training-course_node.html

- **16th International Congress of the IRPA: Radiation Harmonization: Standing United for Protection**, 7–12 July 2024, Orlando, Florida http://irpa2024.com

- **7th European Congress of the IRPA:** 1–5 June 2026, Liverpool, United Kingdom

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