THE EUROPEAN ALARA NETWORK

European ALARA Network

Review of the Implementation and Dissemination of Recommendation and Conclusion of EAN Workshops

18th July 2022

Introduction

Foreword

Feedback experience shows that there is in Europe a need for Workshops which are neither a big congress nor a collection of working groups with lots of different meetings, but which over a few days provide a forum for a few dozen experts to exchange feedback experience and to identify problems that need further research or development. Therefore the Network has organised and will continue to organise such type of Workshop once a year.

The subject is selected in order to cover domains where the Network Steering Committee Group estimates that many improvements in terms of ALARA implementation may be found.

Already 19 workshops are organised. To identify the need in specific fields for future workshops, the impact of these workshops, as shown in the following list, shall be evaluated.

1. "ALARA and Decommissioning", Saclay, France, December 1997
2. "Good Radiation Practices in Industry and Research", Chilton, UK, November 1998
3. "Managing Internal Exposure", Neuherberg, Germany, November 1999
4. "Management of Occupational Radiological and Non-radiological Risks: Lessons to be Learned", Antwerp, Belgium, November 2000
5. "Industrial Radiography: Improvements in Radiation Protection", Rome, Italy, October 2001
6. "Occupational Exposure Optimisation in the Medical and the Radiopharmaceutical Sectors", Madrid, Spain, October 2002
7. "Decommissiong of Installations and Site Remediation", Arnhem, The Netherlands, October 2003
8. "Occupational Radiological Protection Control through Inspection and Self-assessment", Uppsala, Sweden, September 2004
9. "Occupational Exposure to Natural Radiation", Augsburg, Germany, October 2005
10. "Experience and new Developments in Implementing ALARA in Occupational, Patient and Public Exposures", Prague, Czech Republic, 12-15 September 2006
11. "ALARA in Radioactive Waste Management", Athens, Greece, 9-11 April 2008
12. "ALARA issues arising for Safety and Security of Radiation Sources and Security Screening Devices", Vienna, Austria, 21-23 October 2009
13. "ALARA and the Medical Sector", Oscarborg Fortress, Norway, 7-10 June 2011
14. "ALARA in existing exposure situations", Dublin Castle, Ireland, 4-6 September 2012
15. "Improving ALARA Culture through Education and Training", Rovinj, Croatia, 7-9 May 2014
16. "ALARA in Industrial Radiography", Bern, Switzerland, 14-16 March 2016
17. "ALARA in Emergency Exposure Situations", Lisbon, Portugal, 15-17 May 2017
18. "ALARA for Decommissioning and Site Remediation", Marcoule, France, 11-13 March 2019
19. "Innovative ALARA Tools", Athens, Greece, 27-29 November 2019

Document overview

First the visibility of EAN is analysed, including a list of organisations which cooperate with EAN.
The impact of the workshops is evaluated with sheets, where different questions are asked. These evaluation sheets are distributed among the members of EAN and participants of the workshops. For every workshop the answered sheets are analysed and the results shown in an own chapter.
Finally in the conclusion the findings are summarized.

Chapter 1 – Visibility analysis

Searching EAN on researchgate

- Project "EUROPEAN ALARA NETWORK"
  - 2 Followers, 4 Reads
- Book "OPTIMIZATION OF RADIATION PROTECTION (ALARA): A Practical Guidebook"
  - "This item's Research Interest is higher than 44% of research items on ResearchGate."
  - 34 reads
- Article "Synthesis of the European ALARA Network 18th Workshop"
  - 7 reads
- Article "17th European ALARA Network Workshop on ALARA in Emergency Exposure Situations Scene"
  - 8 reads
- Article "Conclusions and recommendations from the 17th Workshop of the European ALARA Network 'ALARA in emergency exposure situations'"
  - 17 reads
  - 3 citations
- Article "ALARA in radioactive waste management" Summary and recommendations of the 11th European ALARA Network Workshop"
  - 50 reads
- Article "LARA in Existing Exposure Situations: 14th European ALARA Network Workshop, 4–6 September 2012, Dublin"
  - 12 reads
  - 6 citations
- Article "Meeting report: ALARA and the medical sector - 13th European ALARA Network Workshop Norway, 7–10 June 2011"
  - 1 read
- Article "Experience and new developments in implementing ALARA in occupational, public and patient exposures" Summary and recommendations of the 10th european ALARA network workshop"
  - 24 reads
  - 1 citation
- Article "ALARA issues arising for safety and security of radiation sources and security screening devices" – Summary and recommendations of the 12th European ALARA network workshop
  - 20 reads

Links of other Organisations to EAN

- Orpnet
  - Link at "EAN at Regional networks" section
  - https://nucleus.iaea.org/sites/orpnet/regional/ean/SitePages/Home.aspx
  - Link to EAN Newsletter at "news" section
  - https://nucleus.iaea.org/sites/orpnet/home/SitePages/Home.aspx
- ENA – Network
  - Link at "useful-links" sections
  - https://ena-norm.eu/useful-links/
- Euterp
  - Link at "Related organizations and networks"
  - http://euterp.eu/staticPage.asp?pageID=42&subpageID=164
- CSN – Spanish Nuclear Safety Council
  - Link at "Radioation Protection of workers"
  - https://www.csn.es/en/proteccion-radiologica/trabajadores/red-alara
- SURO - Czech Republic National Radiation Protection Institute
  - Home / Internet links / ALARA
  - https://www.suro.cz/en/odkazy/alara
- CEPN
  - Publications, Articles
  - https://cepn.asso.fr/publications/articles/221-conclusions-and-recommendations-from-the-17th-workshop-of-the-european-alara-network-alara-in-emergency-exposure-situations.html

Organisations or projects networking with EAN

- FAN - African ALARA network
- ARAN - ALARA network in the ASIA Pacific region
- EFOMP - European Federation of Organisations for Medical Physics
- EFNDT - European Federation of Non-Destructive Testing
- EFRS - European Federation of Radiographer Societies
- EMAN - European Medical ALARA Network
- ESR - European Society of Radiology
- EURADOS - European Radiation Dosimetry Group
- EUTERP - European Network on Education and Training in Radiological Protection
- IAEA - International Atomic Energy Agency
- ICRP - International Commission on Radiological Protection
- IRPA - International Radiation Protection Association
- ISEMIR - Information System on Occupational Exposure in Medicine, Industry and Research
- ISOE - Information System on Occupational Exposure
- NERIS - European Nuclear and radiological Emergency management and Rehabilitation strategies

- ORAMED - Optimization of Radiation protection for Medical staff
- RECAN - ALARA Network in the Central and East Europe

Chapter 2 – Workshop Evaluation

To evaluate the impact and the actuality of the topics concerning future workshops, an evaluation sheet was distributed. In the following table the amount of feedback of the different workshops is shown. On the following pages, the feedback of a workshop is summarised. The comments are collected and where indicators on a scale were asked, the amount of the answers is given.

Nr.	Title	year	replies	inquiries
1	ALARA and Decommissioning	1997		6
2	Good Radiation Practices in Industry and Research	1998	1	7
3	Managing Internal Exposure	1999		3
4	Management of Occupational Radiological and Non-radiological Risks: Lessons to be Learned	2000		2
5	Industrial Radiography: Improvements in Radiation Protection	2001	2	12
6	Occupational Exposure Optimisation in the Medical and the Radiopharmaceutical Sectors	2002		3
7	Decommissiong of Installations and Site Remediation	2003	1	7
8	Occupational Radiological Protection Control through Inspection and Self-assessment	2004		9
9	Occupational Exposure to Natural Radiation	2005	2	10
10	Experience and new Developments in Implementing ALARA in Occupational, Patient and Public Exposures	2006	2	14
11	ALARA in Radioactive Waste Management	2008	2	11
12	ALARA issues arising for Safety and Security of Radiation Sources and Security Screening Devices	2009	1	4
13	ALARA and the Medical Sector	2011		1
14	ALARA in existing exposure situations	2012	2	15
15	Improving ALARA Culture through Education and Training	2014		8
16	ALARA in Industrial Radiography	2016	2	16
17	ALARA in Emergency Exposure Situations	2017	4	18
18	ALARA for Decommissioning and Site Remediation	2019	4	18
19	Innovative ALARA Tools	2019	1	2
	EAN Workshops in general		1	

2 - Good Radiation Practices in Industry and Research - 1998

Who are the stakeholders/ is the target audience:

Regulators and qualified experts from industry, research, and teaching.

Had the workshop a specific impact:

Yes, prompting advancements in the acquisition and use of OPEX (operation experience and lessons learned) and communicating radiological risk.

Has much changed since the workshop:

NO	0	0	0	1	0	Yes

Have there been specific incidents, which change the baseline:

Is the topic actually relevant:

NO	0	0	0	0	1	Yes

It was a general topic on ALARA and there are always lessons to learn, as well as practical and communication improvements that can be made.

Would you say the topic delivers enough content for a following workshop:

NO	0	0	0	1	0	Yes

5 - - Industrial Radiography: Improvements in Radiation Protection - 2001

Who are the stakeholders/ is the target audience:

Experts, industrial radiography companies, regulators
Experts, Clients, NDT company, dosimetry

Had the workshop a specific impact:

Difficult to say – gamma radiography equipment in use now differs from the equipment in 2001 but IAEA still report accidents involving radiography sources hence further improvements still desirable.

Yes, it did. After that, the equipment was renewed so that they currently comply with ISO-3999. New requirments were also included for the NDT facilities in relation to the tasks planning, considering radiological protection aspects, training and on-site supervisión of the operator work carried out by an adviser.

Has much changed since the workshop:

NO 0 0 2 0 0 Yes

Have there been specific incidents, which change the baseline:

Not really – only a continued reporting of overexposure events involving site radiography sources. In addition, poor use of enclosure facilities leading to overexposures, eg overriding of door interlocks to use wind out gamma equipment in X-ray enclosures and similar.

In my country there had several incidents that don´t change the baseline, but they have meant tackling new strategies to try avoid those situations. In my country the Regulatory body tries to promote radiography in bunker with safety systems vs radiography on site. New requieremts are also incorporates to imporve these safety systems Another relevant aspects is training, wich also includes knowledge of the equipment that is used Verification of equipment and auxiliary elements previous to work.

Is the topic actually relevant:

NO 0 0 0 0 2 Yes

Worth a follow up but this may have been covered in a recent EAN workshop which I did not attend

Industrial radiography with gamma sources is the practice with the most incidents reported and with the greatest impact in terrms of overexposures

Would you say the topic delivers enough content for a following workshop:

NO 0 0 0 0 2 Yes

Suggestions for new topics:

- Developments in NDT equipment and techniques
- Examination of why SCAR techniques appear not to be popular
- Review of any new techniques replacing IR sources
- Review of recent accident events – lessons learnt

- Industrial radiography in bunker vs industrial radiography on site

- Harmonised standards of training for industrial radiographers and the supervisory staff. Periodic refresh training
- Development of an active detection system integral to gamma radiography source containers to positively confirm (in a fail-safe manner) when the source is not fully retracted. These systems must be really useful and be visible or audible in operation. They aren´t really seen on equipment currently until you get very close to the equipment.
- Verification of equipment and auxiliary elements previous to work and technical assistance
- Organization and management of radiation protection in NDT companies
- How to involve the clients to raise the awareness and also remind them of their responsabilities for safety when industrial radiography take places on their premises
- Supervision on site works. Communication of the work to the Regulatory body
- Dosimetry and environmental radiation measurement in on-site work
- Accidents & Feedback

7 - Decommissioning of Installations and Site Remediation - 2003

Who are the stakeholders/ is the target audience:

I would have thought most organisations would find at least some of the discussions useful, but regulators and industrial practitioners would benefit the most

Had the workshop a specific impact:

The topic of optimisation has been discussed for many years (there have been several IAEA and NEA workshops this year on the general theme of ALARA and decommissioning) so change, if any has been made, comes very slowly. What needs to come out of such discussions are more practical ways of doing what everyone agrees is a good idea rather than people showing what they managed to do in specific situations. Whilst I am sure some good ideas did come out of the discussions at this workshop, I think all of them have been said previously and most have been said many times since, so it is hard to say how much specific impact this workshop had except perhaps raising the same points to a slightly different audience.

Has much changed since the workshop:

NO 0 0 1 0 0 Yes

Have there been specific incidents, which change the baseline:

Workshops like the one in 2003 were useful in highlighting that problems exist with regards to what ALARA may mean and how to implement it in practice but as a lot of the same discussions are still being had (see above about IAEA / NEA workshops in 2020!) it is hard to say what has changed in relation to that specific workshop. In general I think people are more aware of ALARA than 20 years ago but there is still a lot of confusion about what it is and especially how it can be implemented in regulations / by regulators.

Is the topic actually relevant:

NO 0 0 0 0 1 Yes

Discussions on ALARA and the practical way of applying it in different situations are always useful but at some point more practical, generally applicable steps need to taken. Sharing experiences is also useful but this needs to be done on a larger scale than individual workshops as often the same points are raised just in different industries (NORM, nuclear, hospitals, laboratory etc).

Would you say the topic delivers enough content for a following workshop:

NO 0 0 1 0 0 Yes

It depends. Having the same or similar discussions every few years does not feel like progress has been made. Sharing experiences is always useful though.

Suggestions for new topics:

Regulator thoughts on what ALARA actually means and how they would like to see it done in the real world;

How to demonstrate ALARA where activity concentrations are below measurable levels (is there a case for a De minimus level or an alternative way to view what clean may mean ie clean to when you can't measure activity regardless of dose?)

9 – Occupational exposure to natural radiation - 2005

Who are the stakeholders/ is the target audience:

Regulators and qualified experts from NORM industries.
NORM Industries, regulators, research institutes

Had the workshop a specific impact:

Yes, significant prompting advancements in knowledge and communicating radiological NORM risks.

RECOMMENDATION 1: National Action Plans for Radon

- Has been implemented in international requirements and regulations (IAEA, EC).

RECOMMENDATION 2: Communicating the occupational radon risk

- This is a quite obvious recommendation, which should be implemented in the radiation protection programme of each NORM industry. I do not know if national authorities, or the EC, have addressed this in practice.

RECOMMENDATION 3. Communication/compliance strategies

- To my knowledge, this recommendation has been implemented in general on an international level and in national radiation protection programmes.

RECOMMENDATION 4. Targeting radon action

- To my knowledge, this recommendation has been implemented in general on an international level and in national radiation protection programmes.

RECOMMENDATION 5. Radon in new workplaces

- I do not know if this recommendation has been implemented in all EU countries, specifically for new workplaces. The EU BSS contains requirements on the radioactivity concentration in building materials, but these are not specific for new workplaces. The BSS should have been implemented in the EU countries' regulations.

RECOMMENDATION 6. The regulation of NORM

- This recommendation has been implemented in the EU BSS and national regulations.

RECOMMENDATION 7. The SMOPIE recommendations

- ICRP has reviewed the dose coefficients for natural radionuclides in NORM.
- I do noy know if the recommendation to air sample manufacturers and users has been implemented.

RECOMMENDATION 8. Further guidance for NORM users

- This recommendation has been implemented in the guidance documents of the IAEA end the EC. I do not know if this recommendation has been implemented in all EU countries.

Has much changed since the workshop:

NO	0	0	0	1	1	Yes

Have there been specific incidents, which change the baseline:

Is the topic actually relevant:

NO	0	0	1	1	0	Yes

I believe most of the regulatory topics addressed during this workshop have been implemented. However, I do not know if the recommendations have been implemented in practical situations.

Would you say the topic delivers enough content for a following workshop:

NO 0 1 0 0 0 Yes

NORM is being addressed in regular NORM symposia and IAEA projects. Also the European NORM Association is addressing the issues, specifically for practical situations.

10 – Experience and new developments in implementing ALARA in occupational, public and patient exposures - 2006

Who are the stakeholders/ is the target audience:

Regulators and qualified experts from all radiological sectors.
Medical, NORM, decomission, public, dosimetry, experts, stakeholders such as trade unions and employers.

Had the workshop a specific impact:

Yes, helped attendees consolidate up to date understanding of developments and make suggestions for (mostly) generic future improvements in RP.
Reenforcement the ALARA principle and promotion of safety culture.

Has much changed since the workshop:

NO	0	0	0	2	0	Yes

Have there been specific incidents, which change the baseline:

Changes that have ensued I believe were to the common understanding and establishing the common ground that result from a large group of experts from across Europe discussing and agreeing concepts, risks, and opportunities for future improvements. These developed understandings, beliefs and values continue to contribute to societal RP through those that were present.

Is the topic actually relevant:

NO	0	0	0	1	1	Yes

Would you say the topic delivers enough content for a following workshop:

NO	0	0	1	0	1	Yes

There is scope for a following workshop, but I would say after ICRP have developed and presented their thoughts on the future RP system in the coming couple of years.

Suggestions for new topics:

Occupational radiation protection in nuclear power plants and nuclear fuel cycle facilities

11 - ALARA in Radioactive Waste Management - 2008

Who are the stakeholders/ is the target audience:

NORM, decomission, experts

Mainly RP authorities and experts in RP. In addition, a set of stakeholders could be interested in the topics due to the current discussion in Europe on Radiative waste management.

Had the workshop a specific impact:

There were many general and specific recommendations. Many of them are still valid. Only a few are no longer necessary, as problem is solved (e.g. harmonization of clearance levels is done by EC)

At that time (2008), international reflections and preparation of recommendations were under process. It was on opportunity to focus on ALARA issues.

Has much changed since the workshop:

NO	0	0	2	0	0	Yes

Have there been specific incidents, which change the baseline:

In Germany the Asse mine is a mighty obstacle, but other countries have similar challenges. The new EC BSS and the EC Directive for Disposal of radioactive waste are presenting some more guidance and some more restrictions. Especially, small inventory member states without NPPs need some more guidance for their waste management

New international recommendations and works have been published and are still going on. Implementation of ALARA is still at stake with an open discussion on the environmental issues.

Is the topic actually relevant:

NO	0	0	0	0	2	Yes

As more and more NPPs are shut down, waste management is getting more and more important. Lacks of capacity are getting obvious. The principles of ALARA and waste minimization are still sometimes contrary.

Notably the issue of waste issued from dismantling of nuclear installation and the management of disposal would be of interest.

Would you say the topic delivers enough content for a following workshop:

NO	0	0	0	1	0	Yes

Why not a workshop about the management of historical waste and the conflict of real dose for workers for the retrieval and treatment of waste and the potential dose for the public, if the waste is not be retrieved?

Suggestions for new topics:

See the current international publications and possible development on application of ALARA with the promotion of a graded approach and considering environmental issues.

12 - ALARA issues arising for safety and security of radiation sources and security screening devices - 2009

Who are the stakeholders/ is the target audience:
Security sector, dosimetry, experts

Had the workshop a specific impact:
It appears that the findings were eventually crystallised in ICRP publication 125

Has much changed since the workshop:
NO 0 0 0 0 1 Yes

Have there been specific incidents, which change the baseline:
Increase in the use of non medical imaging at penal establishments and introduction of the new generation of X-ray baggage security equipment which incorporate CT sources

Is the topic actually relevant:
NO 0 0 0 0 1 Yes
Yes and could do with an update

Would you say the topic delivers enough content for a following workshop:
NO 0 0 0 0 1 Yes
I believe that the interest in source security has increased since the initial workshop and use of X-ray equipment for security purposes continues to evolve. Interesting to note the replacement of some ionizing sources with non-ionising equipment, eg new generation of body scanners at airports and use of explosive trace detection equipment which now don't incorporate a nickel-63 source

Suggestions for new topics:
Challenges in X-ray security equipment design to restrict exposure – considers new generation of CT X-ray units – with or without curtains
Update – vehicle/ ISO screening equipment
Updates – X-ray body scanners (non medical imaging)

14 - ALARA in existing exposure situations - 2012

Who are the stakeholders/ is the target audience:

NORM, Public and Experts
NORM, Rn, dosimetry and environmental contamination experts

Had the workshop a specific impact:

The Recommendations and the information from the discussions were considered during the transposition of the EU BSS to the national legislation.
The workshop took place before the EU BSS 2013/59/Euratom was issued. As far as I can remember, with the old Directive still in force and with some news about the new one under elaboration, the debate was focused on the best choice to get an effective ALARA approach. I'm not sure if the workshop had a specific impact.

Has much changed since the workshop:

NO	0	0	0	1	1	Yes

Have there been specific incidents, which change the baseline:

Requirements for existing exposure situations are addressed in detail in the new national legislative framework.
the new EU BSS has strongly changed the general approach to the radiation protection in the EES and the role of the ALARA Principle

Is the topic actually relevant:

NO	0	0	0	0	2	Yes

The EES management is still a big issue, particularly concerning the ALARA Principle application.

Would you say the topic delivers enough content for a following workshop:

NO	0	0	1	0	1	Yes

Suggestions for new topics:

Theranostics
Remediation and/or management of Legacy sites

16 - ALARA in Industrial Radiography - 2016

Who are the stakeholders/ is the target audience:

Radiation protection authorities in the domain, companies.
Radiography industry, security authorities, radiation protection expert

Had the workshop a specific impact:

Solutions to solve incidents with radioactive sources which cannot be retracted into the container have been discussed. Source recovery containers presented by the Swiss company Qualitech AG have been sold to authorities in different countries.
Networking for my company, discovery on ISEMIR, knowledge of other European practices

Has much changed since the workshop:

NO 0 1 0 1 0 Yes

Have there been specific incidents, which change the baseline:

In Switzerland, incidents in industrial radiography are rare. Therefore, the education and legislation in that domain has not much changed. The security of highly active sealed sources has received more attention, but not as a result of the workshop.
Practices have evolved, particularly in crisis management, which is much better approached. It would be interesting to be able to publish experience feedback on incidents and accidents at European level, for example via the RELIR/OTHEA site.

Is the topic actually relevant:

NO 0 0 0 1 1 Yes
It is still considered as one of the applications of ionizing radiation in industry with the highest risks.
Yes, of course it is relevant, industrial radiology remains a risky activity

Would you say the topic delivers enough content for a following workshop:

NO 0 0 0 1 1 Yes
The security issue in the daily business of industrial radiography might be added. However, information in that domain is often classified und thus not easy to discuss in full detail.

Suggestions for new topics:

Make comparisons between different countries on the radiation protection approach of industrial radiation and the management of this risk

17 - ALARA in Emergency Exposure Situations - 2017

Who are the stakeholders/ is the target audience:

Experts, i.e. those planning for and responding to emergencies and those setting criteria/frame-works for planning response and developing tools and guidance.

Experts, authorities, radiation protection institute and research, utilities (NPP, other installation) This was organized in collaboration with NERIS.

Mainly experts, public, dosimetry and medical

Mainly experts in the field of Emergency preparedness and response. The workshop was organized jointly with the European research platform NERIS and was an opportunity to address the link with ICRP work on optimization for emergency exposure situations.

Had the workshop a specific impact:

None that I can identify. However, workshops have value mostly for those who attend in broadening perspectives and challenging silo thinking. They play an important role when real events are few and exercises can become ritualised and non-challenging.

- publication in the EAN Newsletter
- Journal of Radiological Protection. 38 (2018) 434–439
- Maybe NERIS has advertise the results of the workshop? or integrated the results in its work?

Is always useful for planning purposes and sharing of experiences

The workshop allows to focus on optimization in this field of emergency. It also allows to share experience from different European and other countries on the procedures adopted to define optimized options in emergency. The impact was mainly on a better understanding and share experience on the implementation of ALARA.

Has much changed since the workshop:

NO 1 0 2 0 1 Yes

Have there been specific incidents, which change the baseline:

COVID pandemic

In terms of planning/responding to emergency exposure situations not much has changed. However, the COVID pandemic is a huge dataset of how populations respond to emergency communication and imposition of controls etc which will take years to unravel and there will be lessons learnt for emergency exposure situations particularly long lasting situations and the recovery phase, e.g. non-radiological detriments (like mental health) when a population is subject to controls for a long period.

No

No real modification. Except the Publication of ICRP and other international activities and publications. In addition, the 10th anniversary of the Fukushima accident provided inputs on the lessons learned.

Is the topic actually relevant:

NO 0 0 0 1 2 Yes

Notably the current development on managing incident or managing malicious acts could be of interest.

Would you say the topic delivers enough content for a following workshop:

NO 0 1 2 1 0 Yes

Yes, particularly in the light of COVID, but also because also for the benefit of new practitioners coming into the field.

the workshop was very comprehensive and informative. It brought a large variety of views: utilities, authorities, Fukushima and Chernobyl experience.

Unsure but always useful material. In the UK (so perhaps other countries too) since the workshop there have been new responsibilities placed on local government organisations so future workshops could look at sharing of experiences from these stakeholders

Suggestions for new topics:

It was difficult to delineate clearly between "emergency" and "post-accident" condition, but I am not sure this is ground for a EAN workshop. In addition, the variety of participants and speakers at the workshop was elevated: making the presentation sometimes to diverse and covering too much aspects. As feedback, I recommend to define clearly what is expected at workshop.

- Emergency relies heavily on modelization: ALARA in modelization and how to avoid conservatism?
- Emergency is also about the difficulties to take a decision: ALARA in decision-making?

Management of malicious acts or management of incidents could be of interest for the future.

18 - ALARA in Decommissioning and Site Remediation - 2019

Who are the stakeholders/ is the target audience:

Decommission, authorities, nuclear utilities (NPP …) NORM utilities, Organized in collaboration with the ISOE network and CEA-Marcoule

People involved in decom. activities with an interest in RP and waste management.

Decommissioning, experts

All concerned with Decommissioning and Site Remediation

Had the workshop a specific impact:

- publication in the EAN newsletter and Journal of Radiological Protection 40(4), 2019 (DOI: 10.1088/1361-6498/ab9508)
- An electronic survey was send to the participants. The data indicators + individuals answers are available here https://www.surveymonkey.com/results/SM-X5VVCLHK9//

The impact is essentially at an individual level and for participants only: networking, exchanges with peers, etc. Group discussions cannot provide valuable lessons learnt for expert of the field and remain pretty much general, but are interesting for beginners. Conclusions of the 18th EAN workshop are similar to those from previous workshops on decom. The most valuable inputs are case studies and associated discussions.

Yes, it was stimulating to discuss decommissioning with radiation protection experts instead of nuclear safety experts and project managers.

I have referenced material from several of the presentations at NEA Expert Groups and other Forums. There is some interest there concerning taking a holistic view of the risks and with that, a proportionate approach to regulatory of radiation protection alongside other hazards. But what does this mean in practice? One of the forums is the Expert Group on developing a Holistic Process for Decision Making on Decommissioning and Management of Complex Sites (HDCS). Getting people to read stuff is like getting blood from a stone.

A wider perspective with regard to other risks.

Has much changed since the workshop:

NO 2 1 1 0 0 Yes

Have there been specific incidents, which change the baseline:

NPP:s are being decommissioned and new experience is gained all the time!

Arguably, some parts of ICRP and IAEA are a little more open to the idea that the world does not rotate around radiation protection. The results of on-gong EC projects on progress with: harmonization of radiation protection standards, waste minimization and waste classification would provide interesting input, if the material is published and widely disseminated. DSA/NEA/IAEA/ICRP

Legislation on specific clearance levels for NORM is now in progress in the Netherlands.

Is the topic actually relevant:

NO 0 0 1 0 3 Yes

Decommissioning is a very long-term process. This is the 3rd EAN workshop on this theme since the foundation of EAN. So there will be maybe the opportunity to continue this list in several years

If you are talking about decom., it is highly relevant, keeping in mind it may also feed other topical discussions.
NPP:s are being decommissioned and new issues will appear, especially when the end state will be defined, achieved and approved.
It was well attended so I think that speaks for itself. DSA/NEA/IAEA/ICRP held a jpint workshop in Nov 2019 that was very well attended and fully documented in DSA-rapport 5:2020 Regulatory Framework of Decommissioning, Legacy Sites and Wastes from Recognition to Resolution, available at: https://dsa.no/en/publications?S=3
Decommissioning of coal energy plants.

Would you say the topic delivers enough content for a following workshop:

NO 0 0 1 0 3 Yes
Participants praised the level of information. Lots of experience and views were collected, especially practical feedbacks. The quality of these materials was high. Meaningful conclusions were written and published.
The 'setting the scene' session provided recommendations from institutions, description of reports, working group achievements etc. are also relevant but far more difficult to present and to grasp. Maybe the public at EAN workshop is not the prime target audience?
Yes, it was just very preliminary discussion.
NPP:s are being decommissioned and new issues will appear, especially when the end state will be defined, achieved and approved.
A lot of questions and problems were raised, but no answers offered, e.g. where to dispose of radioactive asbestos?
Clearance criteria for soil and ALARA.

Suggestions for new topics:

- The JoRP article reminded the former 1st and 7th workshops recommendations and pointed out that some were still true. This is maybe worthwhile to follow these items (in particular)
- The holistic approach (multi-risks, environment) was often mentioned and a draft was initiated but not continued. It can be relevant to dig more concretely on what an holitic approach is.
- The issue of wastes: management, option etc. will become critical in the next years; for example, with the decommissioning of NPP
- contact with IAEA was promising. IAEA can be a driving force in disseminating the results of next workshops.

Contaminated site remediation, medical sector, radioactive waste management, etc.

1. "Optimization of radioactive waste management – what does it mean?"
2. "Radiological characterization – all you need to know about Bq for safe decommissioning and waste management"

"Justification and application of reference levels used in existing exposure situations arising from past practices and events at nuclear and other sites."

- What existing exposure situations do you have?
- Are they regulated as existing exposure situations (e.g. in line with IBSS)?
- What reference levels have been set and to whom do they apply?
- How were they decided? What factors were taken into account in reaching the decision?

19 - Innovative ALARA Tools - 2019

Who are the stakeholders/ is the target audience:

Medical, decomission, dosimetry, experts
Workshop organized in collaboration with PODIUM

Had the workshop a specific impact:

- The attendance of the workshop was limited compared to other workshops. In the end, the working groups were merged in 1 working group
- No conclusion and recommendation were drafted
- Nonetheless, participants made some advertisement because I was contacted twice (direct email) by people willing to know more about the innovative techniques. This is un-official impact which is difficult to measure.
- Maybe PODIUM project has published or advertise the results of the workshop?
- An electronic survey was sent to the participants. The results indicators + individuals answers are available here https://www.surveymonkey.com/results/SM-7N7LDLHK9/

Has much changed since the workshop:

NO 0 0 0 1 0 Yes

Have there been specific incidents, which change the baseline:

No ; this workshop was organized because PODIUM project was looking for a network to disseminate its results. The organisation of this workshop is a matter of opportunity.

Is the topic actually relevant:

NO 0 0 0 1 0 Yes
Maybe in a few years, to give time to new innovative techniques to emerge and the other to have some feedback.

Would you say the topic delivers enough content for a following workshop:

NO 0 0 1 0 0 Yes
It is very difficult to define "innovation". Innovation can apply in many sectors with various modalities. The topics is sooo large, people might feel frustrated. In addition, it is sometimes difficult to follow experts because their presentation can turn to be very technical (more 'innovation' than 'radiation protection')

Suggestions for new topics:

maybe focus on some selected promising innovative technique, where the need to apply ALARA will become even more important in practice such as artificial intelligence?

EAN Workshops in general

Who are the stakeholders/ is the target audience:

Target audience are primarily practical radiation protectors who act "at the front end" of occupational radiation exposure is the work sectors Medicine, Nuclear power, Industry, NORM.

- Experts in practical dosimetry, in particular where new dose monitoring requirement (e. g. eye lens) and new technical developments are involved.
- Regulators and central dose registers

Had the workshop a specific impact:

When I look back at the numerous ALARA Workshops I attended, I can say that there were countless experiences and lesions learned that had influenced my daily work as Head of the German Radiation Protection Register. E.g. the Forbach accident, incidents in industrial radiography, psychological perception and impacts of incorporation, competence quarrels between regulators and radiation protectors concerning optimization, etc...

At least as much important were the personal international contacts and the exchange of experience between the workshop participants. It helped to build and participate in international occupational networks. And a net works only, when its knots remain in mutual contacts, thus EAN workshop are a necessary and fruitful opportunity.

Has much changed since the workshop:

Looking back to all ALARA Workshops a lot has changed. Concerning harmonization and optimization the COUNCIL DIRECTIVE 2013/59/EURATOM was substantially influenced also by participants of the ALARA workshops.

Have there been specific incidents, which change the baseline:

It was less a specific incidence but more the sum of countless little incidences and experiences that influenced my professional experience.

Suggestions for new topics:

The baseline of the ALARA Workshops as a forum for practical occupational radiation protection will remain relevant. Particular focus should be on

- the rapid development in the medical sector (protection and dosimetry of the eye lens, RP requirement in new imaging techniques, RP during handling and application of radionuclides in nuclear medicine,
- practical experiences with the implementation of COUNCIL DIRECTIVE 2013/59/EURATOM concerning
  - graded approach in optimization and
  - indoor exposure to radon and thoron in workplaces
- OPR challenges in the nuclear sector concerning not only decommission but also new built and small nuclear power reactors as considered in France (Nuclear energy will be considered as sustainable by the EU in spite of the positions from Germany and Austria).

The current form of oral presentations, posters, and workshops with lessons learned is fruitful and should no be change. Number of participant of around 70 is ideal.

Useful would be in each workshop a short presentation of representatives from other institutions relevant to ORP (ISOE, EURADOS, HERCA, ESOREX) reporting of recent developments.

Useful would also be a contact and information exchange with other ALARA Networks induced by IAEA (RECAN, ARAN).

Chapter 3 – Conclusion

Has much changed since the workshop

Nr.	Title	rating	votes
12	ALARA issues arising for Safety and Security of Radiation Sources and Security Screening Devices	5	1
9	Occupational Exposure to Natural Radiation	4,5	2
14	ALARA in existing exposure situations	4,5	2
10	Experience and new Developments in Implementing ALARA in Occupational, Patient and Public Exposures	4	2
2	Good Radiation Practices in Industry and Research	4	1
19	Innovative ALARA Tools	4	1
5	Industrial Radiography: Improvements in Radiation Protection	3	2
11	ALARA in Radioactive Waste Management	3	2
16	ALARA in Industrial Radiography	3	2
7	Decommissiong of Installations and Site Remediation	3	1
17	ALARA in Emergency Exposure Situations	2,75	4
18	ALARA for Decommissioning and Site Remediation	1,25	4

Is the topic actually relevant

Nr.	Title	rating	votes
5	Industrial Radiography: Improvements in Radiation Protection	5	2
11	ALARA in Radioactive Waste Management	5	2
14	ALARA in existing exposure situations	5	2
2	Good Radiation Practices in Industry and Research	5	1
7	Decommissiong of Installations and Site Remediation	5	1
12	ALARA issues arising for Safety and Security of Radiation Sources and Security Screening Devices	5	1
17	ALARA in Emergency Exposure Situations	4,7	3
18	ALARA for Decommissioning and Site Remediation	4,5	4
10	Experience and new Developments in Implementing ALARA in Occupational, Patient and Public Exposures	4,5	2
16	ALARA in Industrial Radiography	4,5	2
19	Innovative ALARA Tools	4	1
9	Occupational Exposure to Natural Radiation	3,5	2

Would you say the topic delivers enough content for a following workshop

Nr.	Title	rating	votes
5	Industrial Radiography: Improvements in Radiation Protection	5	2
12	ALARA issues arising for Safety and Security of Radiation Sources and Security Screening Devices	5	1
18	ALARA for Decommissioning and Site Remediation	4,5	4
16	ALARA in Industrial Radiography	4,5	2
10	Experience and new Developments in Implementing ALARA in Occupational, Patient and Public Exposures	4	2
14	ALARA in existing exposure situations	4	2
2	Good Radiation Practices in Industry and Research	4	1
11	ALARA in Radioactive Waste Management	4	1
17	ALARA in Emergency Exposure Situations	3	4
7	Decommissiong of Installations and Site Remediation	3	1
19	Innovative ALARA Tools	3	1
9	Occupational Exposure to Natural Radiation	2	1

http://www.eu-alara.net