EUROPEAN ALARA NETWORK

18th EAN Workshop

Conclusions & recommendations

"ALARA for Decommissioning and Site Remediation"

Institut de Chimie Séparative de Marcoule (ICSM), CEA-Marcoule, France, 11-13 March 2019

Fernand Vermeersch, SCK•CEN, EAN Chairperson

Sylvain Andresz, CEPN, EAN Co-ordinator

Julie Gilchrist, Public Health England, EAN Secretary

Objectives

- Re-visiting the topic of the 1st and the 7th EAN workshop
- + including site remediation
- **Objectives:**
  - To present the regulatory background and latest guidance and standards regarding RP
  - To **examine the conceptual and the practical aspects of ALARA** (nuclear + non-nuclear + legacy sites)
  - To discuss and investigate selected key themes **holistic approach** and **waste**

Contributions to the workshop

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Working Group Topics

WG 1 (a+b) – How to apply the ALARA principle for workers during decommissioning and remediation?

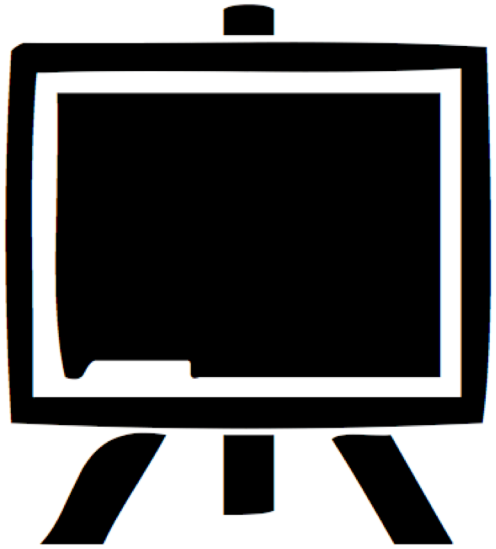
WG 2 – The challenges raised by wastes and how to overcome?

WG 3 – The holistic approach: how to be ALARA in the context of other risks?

Report back

Feedback from the working groups

+ discussions



Summary of presentations

Session 1

- EAN - 1st and 7th Workshops
- ISOE WG-DECOM (2015)
  - Real feedback experience
  - Strategies for decommissioning (immediate, deferred and entombment)
  - Holistic approach
  - Real data on exposure

Session 1

- IAEA: publication of guidances + international cooperation projects

- IAEA guidance topics:
  - Decontamination of facilities (inc. non-nuclear)
  - Application of concept of clearance and exemption (being updated)
  - Remediation process guide
  - Management of residues containing NORM
  - Decommissioning risk management (due to be published)
  - End of decommissioning/end-state

Session 1

- NEA
  - set up a committee on Decommissioning and Legacy Management (2018)
  - organising topical workshop on optimization “rethinking the art of reasonable” (2020)
- Regulatory point of view (BfE):
  - Regulatory framework: specific to decommissioning
  - highlight on Work Permit Procedure

Session 2 Nuclear

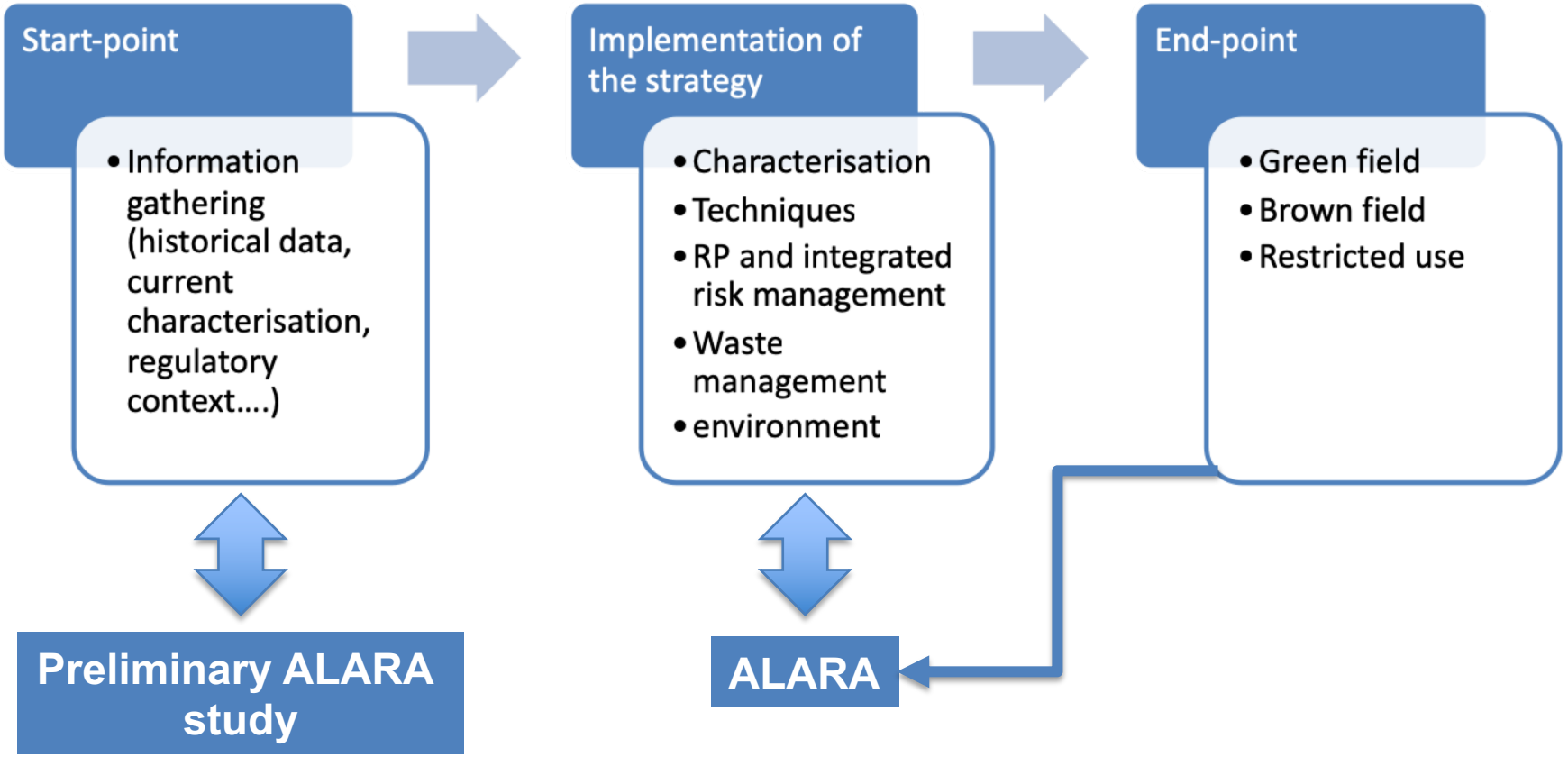
- Practical examples and return of experience
  - Hot cell;
  - Small reactor;
  - Pit7;
  - CIEMAT (portfolio);
  - Full System Decontamination (FSD);
- Site remediation:
  - FBFC
- In planning: Mühlberg NPP

Session 3&4 non-nuclear, other risks

- Radium Action Plan;
- Gas mantle factory;
- Geological materials;
- Uranium mines;
- Scrap metal processing;
- Risk management at legacy sites and facilities
- Mixed risks:
  - Radioactivity and asbestos
  - NORM facilities (phosphorus,…)
  - PAHs

Key themes and topics

Strategies in decommissioning



Optimisation Procedure – Step by Step

Description of work to be performed
Tasks sequence / Work areas / Workplaces
Radiological risks analysis

Review of input data needed for the initial dose assessment
(doserates, working time,…)

Initial Dose Assessment

ALARA Analysis

- Analysis of occupational Doses
  Where? When? Who? How?
- Identification of Protective Actions that can (or cannot) be implemented
- Protective Actions Efficiency
  Impact on doses - Other impacts
- Selection of Protective Actions
  Identification of Decision Criteria
  Hierarchization of actions
- Sensitivity Analysis

ALARA Synthesis
Operational follow-up = > to check if the optimisation procedure is well implemented

Follow-up & Feedback experience
Performance analysis. Comparison with objectives. Gap & Mishaps analyses. Proposals for corrective actions

ALARA principle and workers

- Information and experience may be lacking
  - Decommissioning is often a ‘first-of-its-kind’
  - Technical expertise is rare resource
- Knowledge transfer
  - Return of experience
  - Operational history (if available)
  - Retention of knowledge
- (preliminary) Characterisation adapted to RP purposes
  - Accurate data needed (avoiding conservatism)

ALARA principle and workers

- Radiation protection
  - Differences between operation and decommissioning phases
  - e.g. internal contamination, skills, …
  - Need for specific training
  - Need for specific tools and techniques
  - New techniques can help (?)
- In the end, data shows that the exposures (collective, individual) have been kept limited

Waste strategies

- Strong link between decommissioning strategy and waste strategy
- Mixtures of strategies may assist ALARA
  - i.e. the right approach involves considering a number of methods and the optimum approach may comprise a combination of them
- (preliminary) Characterisation adapted to waste management
- Repository and waste acceptance criteria should be available
  - If not: flexibility should be allowed (e.g. re-packaging)
- Management in practice:
  - Large spectrum of wastes ⇒ large volume/low activity vs. small volume/high activity
  - Mixed-risks wastes
  - Balance between radiological risks and other risks (lowering doses might be detrimental for other risks)

Waste strategies

- The generation of waste has associated environmental, social and economic implications:
  - Benefits and drawbacks
- Balance between RP and other topics (lowering doses might be detrimental elsewhere)
- Impacts should be taken into account at the very beginning and weighted to identify the most at stake
  - Transparency of the decision;
  - The importance of time;
  - Avoiding legacy sites and burden for the next generations
  - ‘Real’ short term doses vs. ‘potential’ long term doses
- The optimum solution may involve to leave materials on-site (ex. geological materials, uranium mines)

How to be ALARA in the context of other risks?

- Decommissioning = multi-risks
  - Conventional, chemical, etc. risks that are now in relation with RP risks
  - Taking "*all*" risks into account is not possible
- '*Go home safely; now and in the future*'
- Proposed methodology:
  - Defining the scope (= putting limits and recognizing them) (regulation provides you the limits)
  - Identify all the risks (HAZID);
  - Evaluating and ranking the risks
  - Management of contradictory risks?
- This should be a dynamic process: adjustment and updates may be needed ("*ALARA, a moving target*")

How to be ALARA in the context of other risks?

- Holistic is a case-by-case approach
  - There is no generic recipe
- This require a flexible attitude
- Evaluating and ranking the different risks (the different worlds?) requires to consider rationale factors but also involve judgment
- Teamwork needed (not only RP), advisory group for management and discussions to reach agreement,

Key elements for a holistic approach

RP + integrated risks management

Defining the scope and the limits

Hazards identification

Risk assessment and ranking the risks

- There are science + judgment
- Not RP alone: teams to advice on the decision
- Several dimensions; workers/public/enviro + time

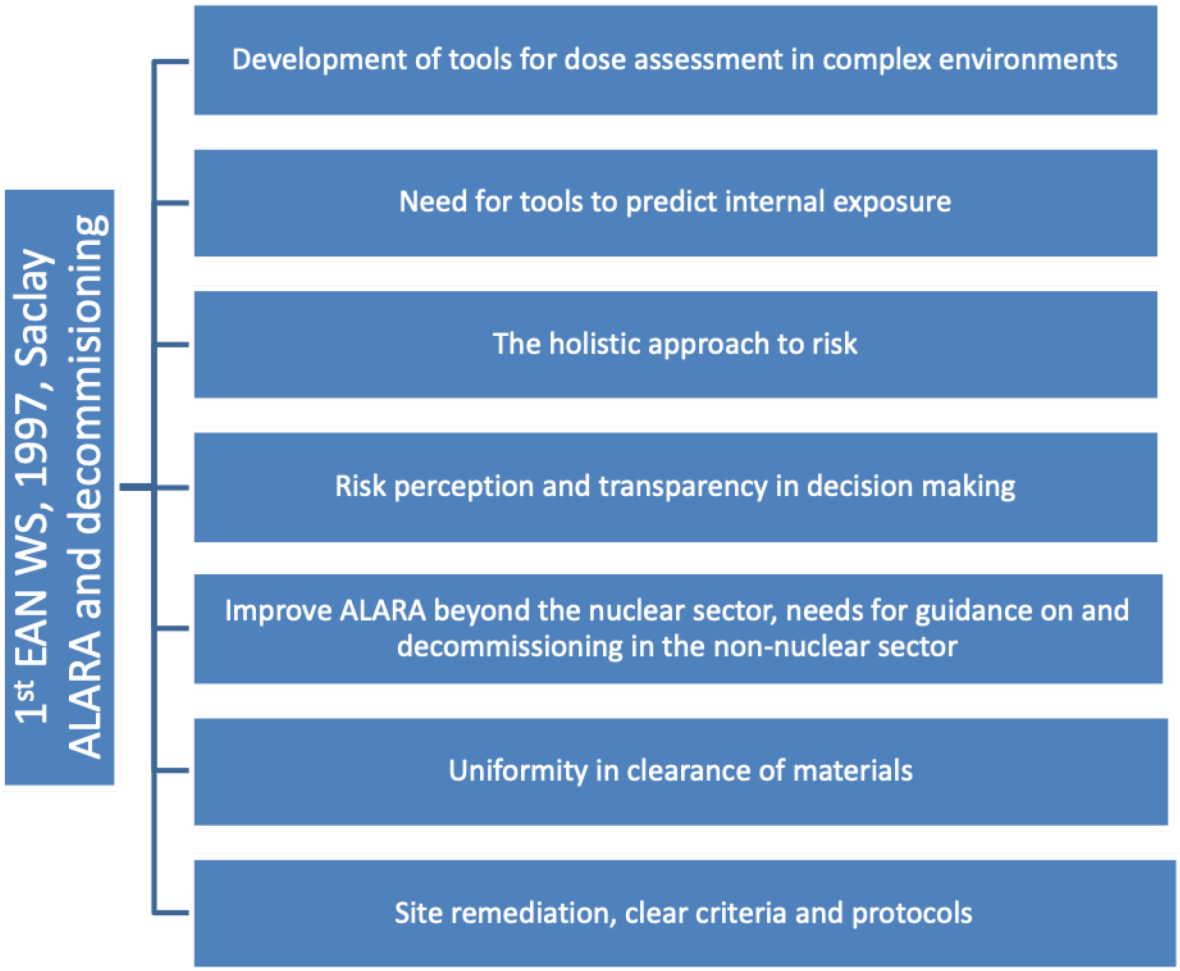
Transparency and documentation of the decision

Conclusions

- Strategy
  - Desired endpoint
  - Material and waste flows
  - Risk management (including RP)
  - Time → long term, short term
  - Environment
  - Economic
- Similar approach nuclear and non-nuclear (criteria ?)
- Material and wastes: what are your end solutions? Treatment strategies, acceptance criteria
- Holistic approach better understanding: importance of scope, method, rationale, practical implementation, transparency

What are the recommendations?

Feedback former workshops, recommendations



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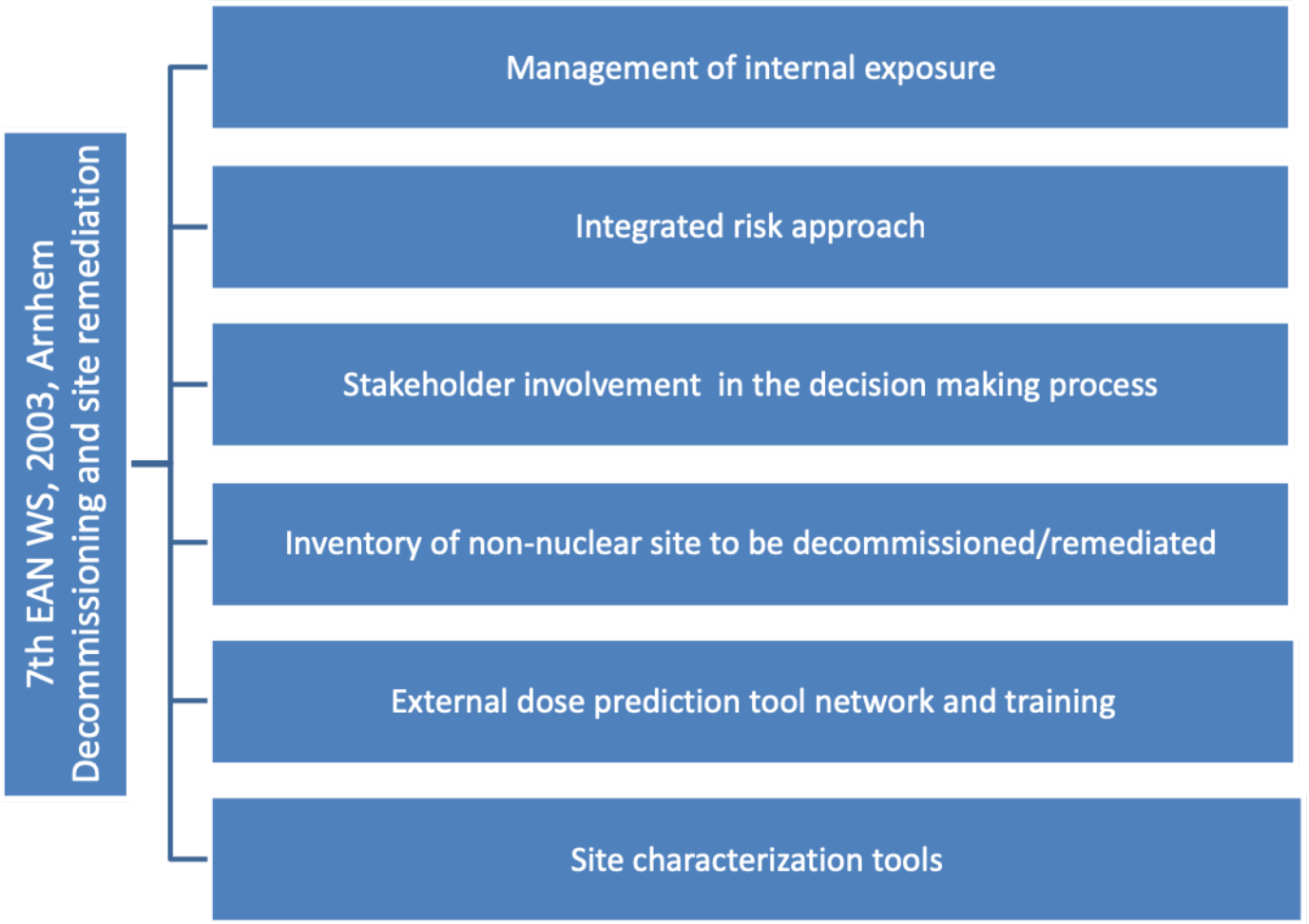

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18th Workshop – initial recommendations

- Need to adopt a total risk approach with various trade-offs such as radiological and conventional risks, public and occupational exposure, imposed and voluntary risks, human health and environmental hazards.
- Need to develop tools to introduce transparency and coherence in the decision making, especially where multiple hazard/risks are considered.

Initial recommendations

- Need for an international database of plants being decommissioned in order to feedback experience and exchange support (role of ISOE?)
- Development of good training standards and resources
- New technologies can be profitable to ALARA (?)
- Waste: cooperation between countries?
- Holistic approach: good dicusssions on a proposed methodology

The way forward

- Conclusions and recommendations will be formulated based on the feedback from the presentations, WG's and discussions and dialogues.
- Published on the EAN website and the newsletter

Thanks to the Programme Committee

Mr. Sylvain Andresz	Nuclear Protection Evaluation Centre (CEPN), France
Mr. Ignacio Calavia Gimenez	Spanish Nuclear Authority (CSN), ISOE WG-DECOM, Spain
Ms. Petra Hansson	Swedish Radiation Safety Authority (SSM), Sweden
Mr. Marc Lahfid	CEA Marcoule, France
Mr. Paul Livolsi	CEA-INSTN, France
Ms. Julie Gilchrist	Public Health England (PHE), EAN Secretary, United Kingdom
Mr. Bernd Rehs,	Federal Office for the Safety of Nuclear Waste Management (BfE), Germany
Mr. John H. Rowat	IAEA, Decommissioning and Remediation Unit, Austria
Ms. Caroline Schieber	Nuclear Protection Evaluation Centre (CEPN), France, Head of ISOE-European Technical Centre
Mr. Nicolas Stritt,	Federal Office of Public Health (FOPH), EAN Treasurer, Switzerland
Mr. Ludovic Vaillant	Nuclear Protection Evaluation Centre (CEPN), France
Mr. Fernand Vermeersch	SCK•CEN, EAN Chairman, Belgium

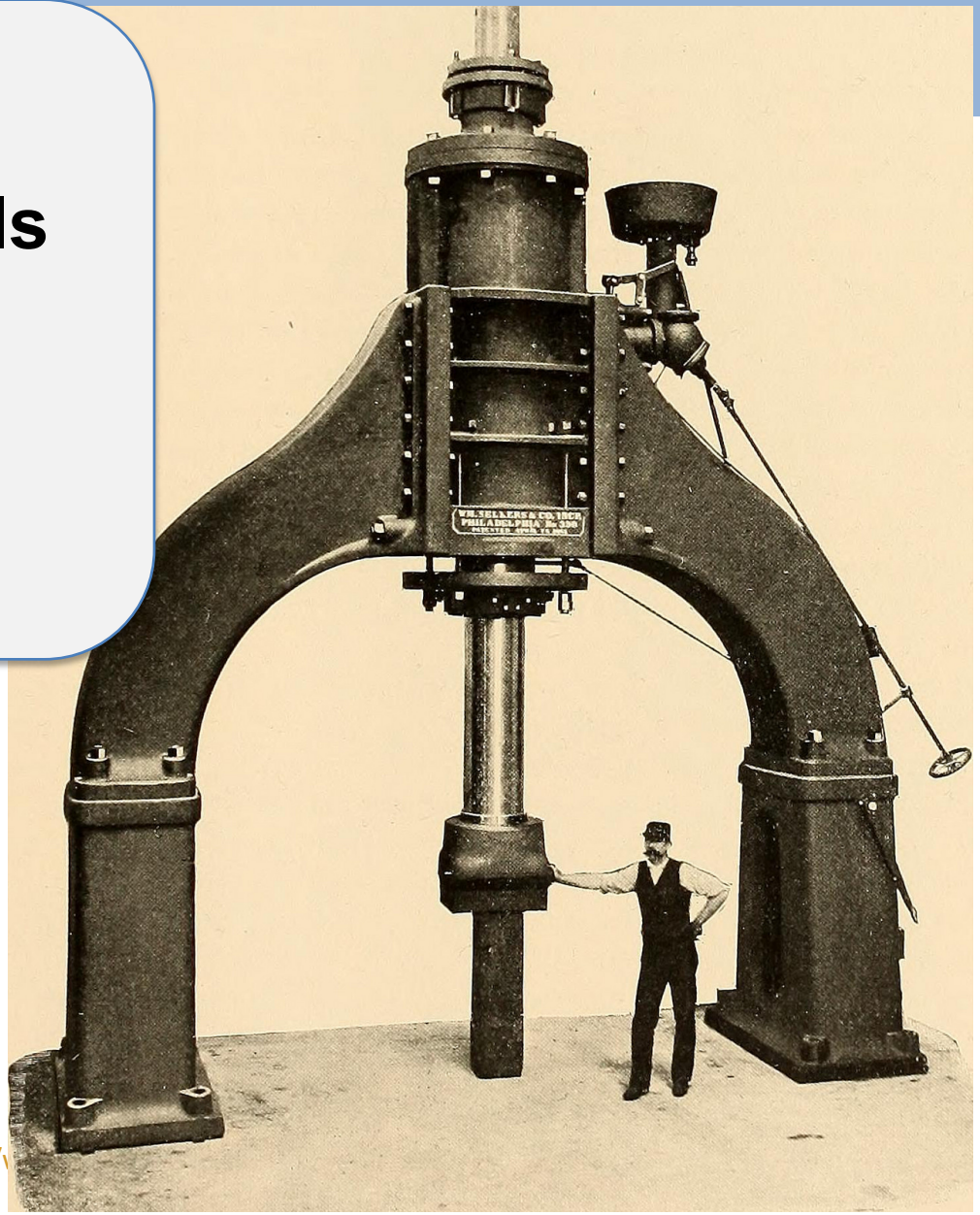
Thank you for your participation

(.ppt will be on-line (*soon*)
eu-alara.net)

EAN 19th workshop
Innovative ALARA Tools

Jointly organized with the PODIUM project (Horizon 2020, PODIUM, CONCERT)

Athens, 26-29 November 2019 (provisional)



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