Issues linked with potential public exposure from environmental contamination by NORM

What are the needs and the practical questions that authorities, industry, scientists, consultants are having? How can we provide an answer to these needs?

1. **How to integrate the radiological assessment with the overall environmental assessment**
   - Risks should be considered jointly i.e. integrated risk assessment
   - Benchmarking of approaches from Environmental Agencies since they have well developed regulation and we could evaluate how you can fit radiation protection in these approaches
   - Also benchmarking of good practice between Environmental Protection and Radiation Protection Agencies is important
   - Institutional barriers sure exist but it would be good to promote collaboration between institutions; for NORM this seems feasible and seems to work for specific cases
   - **Recommendation to establish guidelines and reference values for the uranium and thorium as chemical components/toxicants; → TASK for ENA? → interaction with EU regulators is needed (comment - look at REACH for U, Bioprota)**
2. **How to come to an integrated site management/remediation approach?**
   - Comes down to the previous point; if environmental and radiological protection systems are integrated it will show which of the two determines most the need for remediation
3. **Risk communication**
   - Clear information should be given to the public
   - Seems to be a case by case problem and it can be advised to engage professional risk communication experts
   - **ENA, as an independent 3rd party, could give scientific advise and generate an expert report on the expected public impact based on available information.**
4. **Need for less conservatism / more realism in radiological impact assessment**
   - Conservatism is justified in a first step (Tier 1) of a graded approach.
   - As scientists, consultants we need to provide realistic impact assessment (in higher tiers of assessment) and give indications (and explanations) about the uncertainties. It is up to the decision makers to consider conservatism. Here, we as scientists/consultants/risk assessors have a responsibility.
5. **Research needs →**

a. **Need for appropriate parameter values: DCC, interception, …**
   - **Critical evaluation of the DCCs for natural radionuclides certainly for the rather refractory materials which are linked with NORM** → should be done by the (ENA?-)NORM community; if there is an issue, ICRP may be asked for a critical re-evaluation.
   - Crops interception factors derived for Cs, Sr → need for better data us relevant in specific cases e.g. Po-Pb interception after stack release

b. **Dispersion models for detailed assessment**
   - More interaction between monitoring people and modellers for site specific assessments

- Models need to be adapted to the case
- There may be specific modelling needs confronted with specific case studies but that has to be evaluated on a case-by-case basis.

6. **How to develop a meaningful and cost-efficient monitoring program for a NORM site? How to deal with the uncertainty linked with monitoring results?**
   - Important as a basis for impact assessment and for compliance
   - Most of this information is available but not always straightforward to find. **ENA could collect this information/these documents and make them available in a structured way**.
   - How to deal with uncertainty will depend on the interpretation of the parties involved. Asking **ENA to develop guidance on how to deal with uncertainty** is considered of value but not considered highest priorities now.
7. **Is there a need for training with respect to exposure and impact studies, regulation, monitoring, …?**
   - Measurements (e.g. lab training of RN measurements in difficult matrices)
   - Monitoring plans
   - Simple impact models - e.g. guidance on how you assess dose in typical NORM contamination situation
   - **Role of ENA is to coordinate the training, to find the lecturers, to identify the laboratory where someone can be trained, make an inventory of the expertise within the ENA association etc., organise refresher courses in relation to workshops and meetings**

People present in discussion: Stéphane Pépin, Rafael Tenoio Garcia, Petr Otahal, Philippe Steinmann, R. Rakhu, Hildegarde Vandenhove