

Recommendations from IUR to the ALLIANCE with respect to integration of radioecology in Europe and beyond

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Radioecology needs to be tackled at worldwide scale irrespective of the local situations prevailing in terms of political trends, funding, and scientific development. IUR, as an independent, non-profit and non-governmental association is committed to this spirit of development since the very beginning, with all suitable actions susceptible to assemble the largest community acting in the field.

- 1- Radioecological expertise is mandatory everywhere around the world given the current and foreseen development of nuclear activities worldwide. Its need is not restricted to nuclearized countries, because the human and environmental consequences from potential accidents with releases of radioactivity are not bound to physical and administrative frontiers.
- 2- The radioecology scientific community is small and fragile. It will benefit, both in political recognition and ability to promote significant scientific progresses (in support of ensuring a safe use of nuclear energy), from gathering the community in as large a manner as possible on as wide consensus findings as possible.
- 3- For the above reasons, IUR believes it important to ensure the largest assembly of participating players, big and small, ranging from industrial operators to TSOs, regulation authorities, research institutions, knowing societies, professional associations and universities, irrespective of the local political situation with respect to nuclear energy. This is the leading principle which has dominated all IUR actions since its foundation almost 40 years ago, and this is still the same spirit that drove the recent efforts committed to construct the worldwide "IUR FORUM", assigned to networking the various existing radioecology networks.

- **Role of the ALLIANCE in the future of radioecology in Europe.**

Two successive EC funded projects, STAR and COMET, have been committed to the construction process of the ALLIANCE, the European network in Radioecology. A key goal was "integration", in order to maintain high level expertise throughout Europe, to establish joint research programs and to share infrastructure for better efficiency. Driven by its main founders, largely representing nuclearized countries, the current ALLIANCE's membership is essentially restricted to integrating the big players of radioecology.

This restriction prevents fulfilling the first principle of maintaining competence throughout Europe, and a first role of the ALLIANCE should be to identify and implement viable solutions to achieve better integration of nuclearized and non-nuclearized countries

which may all be submitted to the impact of a potential accident happening in Europe or nearby.

The SRA which has been formulated provides a very good scientific basis for integrating research with an appropriate justification and positioning of radioecology with respect to radiation protection of man and ecosystems. It therefore should be used as a tool for integration. One second role of the ALLIANCE would be to make sure that integration of (existing) R&D programs is also achieving the scientific dimensions of integration as expressed in the SRA. Pure anthropocentrism has always been, and still is, a strong driver which may lead to restricting radioecology to only play a subsidiary role to human radiation protection (the environment being considered only as a pathway of radionuclides transfer to man).

Finally, following a similar strategy as developed by IUR, the ALLIANCE should seek overall integration also together with non-radiation scientific fields such as ecology, ecotoxicology and biogeochemistry, all similarly committed to environmental/ecological risk assessment of other types of hazards (e.g. SETAC, ...).

- **How could the ALLIANCE be connected to the work done by your organization, or assist this work?**

The ALLIANCE has accepted the IUR invitation to join the IUR FORUM launched in 2014 and committed to develop worldwide harmonization of existing networks in radioecology. Currently and non-exhaustively, the FORUM network members have agreed to work collectively along the following objectives:

- global integration and construction of consensus,
- communication,
- maintenance of expertise.

IUR wishes to benefit from the further participation of the ALLIANCE in this long term effort, hoping that this European example could stimulate similar undertakings elsewhere in view of reinforcing both, actions and recognition of radioecology on a worldwide scale. Also, IUR intends to facilitate appropriate linkage between the ALLIANCE and suitable other network members that could be profitable for Europe.

- **What could be expected in the future of the ALLIANCE? Or in broader context, What could be expected of the recent integration trend in radiation protection (through the EJP-CONCERT of Horizon 2020)?**

Ability to promote joint programming in Europe in self-funded conditions without the further financial support of the EC is the real challenge for the foreseeable future. If successful, this would perhaps form the strongest added value of the ALLIANCE within the radiation protection perspective of integration in Europe.

This is not an easy task given the political situation in Europe with respect to nuclear energy which is strategically quite unclear also leading to loosening consensus. However, one should put forward the justification that would an accident be occurring in Europe, proper global management of the crisis and post-accidental phases would be best served from a wide prior established consensus on how dealing with the consequences on man and the environment, another potential added value of the ALLIANCE as integrated in the overall radiation protection framework of Horizon 2020.

- **Which do you think is the next step regarding radioecology and its integration in the radiation protection arena? How to proceed worldwide?**

The challenge for radioecology is to promote scientific innovation such as to prepare the scientific grounds for moving forward the radiation protection paradigms, and especially the move from a pure anthropocentric view over human risk assessment (past) to a more ecocentric view addressing also ecological risk assessment (future).

Expressed in scientific terms this challenge refers to 1) clarifying the effects of low doses of radiation in chronic exposure, and 2) the resulting possible ecological consequences (not only biological) that can be anticipated. The first is fully common between human and environment radiation protection research and can therefore easily be integrated together. The second, more recently identified, is more specific to radioecology and needs to be strengthened as it will allow considering a better conceptualization of how integration of human and ecological risk assessment should be envisaged.

Civil society fears and criticisms with respect to nuclear industry and techniques proliferate from the lack of scientific consensus with respect to proper understanding of the environmental impacts from past contaminating accidents (Chernobyl and Fukushima). Building scientific consensus is precisely one important objective identified by the IUR FORUM where the continued support from the ALLIANCE would be much expected.

Meanwhile, the Fukushima accident also challenges radioecology on additional specific issues such as the impact of contamination on the marine ecosystem and the development of practical and useful decontamination/remediation techniques and processes to allow for a re-appropriation of the contaminated lands.

- **Any other view/comment regarding the long-term sustainability and integration of radioecology.**

Radioecology is an issue cross-cutting radiation protection and ecological risk. It is therefore connected to unravelling the biological effects of radiation (especially on non-human biota) as well as the ecological impacts from environmental stressors (of which radiation is but one of a large series of potential stressors).

Sustainability and integration of radioecology therefore largely depend on the ability to proper balance effort on both sides, understanding biological effects and clarifying long-term ecological impacts.