Summary of the Advisory Board's Evaluation for FY2024

Advisory Board Members:

Prof. Brenda Howard (UK Centre for Ecology & Hydrology)

Prof. Sergey Fesenko (Russian Institute of Radiology and Agroecology)

Prof. Wolfgang Raskob (Karlsruhe Institute of Technology)

Dr. Satoshi Yoshida (Institute for Environmental Sciences)

Evaluation period: April 1, 2024 - March 31, 2025

Annual Symposium: March 10, 11, 2025 at CORASSE Fukushima

Advisory Board meeting: March 12, 2025 (Fri) 9:00 ～ 11:30 at IER 6F Conference Room

- **Prof. Brenda Howard**

IER continues to incorporate both junior and senior scientists from a number of countries. I think this is highly beneficial to both the IER and the individual researchers. A wide variety of topic areas continue to be covered each of which seem to be producing a wide variety of refereed papers.

There was some consideration within the Advisory Board regarding the possible benefits of merging the groups which address aquatic systems. Merging these projects may encourage the IER researchers to better describe radionuclide transfer throughout the entire ecosystem and provide a holistic view of the processes. I can see the potential benefit of this approach in that it may assist analysis of entire catchments. However, it would be important to consult affected staff and to critically evaluate the pros and cons from both scientific and personal perspectives.

There are clear indications of significant outputs from each of the different project groups. Enhanced interactions between experimental and modelling projects seem to be improved which is encouraging.

I note that other Advisory board members emphasized the importance of adapting the approaches used to report ongoing research activities at IER for different audiences. My view is that such interactions were generally quite well adjusted to the types of audience addressed. It is inevitable that some scientists are better speakers for the public than others.

It was also suggested that research objectives and goals be more closely linked to management options for mitigating the consequences of the Fukushima Daiichi accident. Such a suggestion may need to be evaluated to ensure that such efforts are compatible with the perspectives of relevant local and national organisations.

Study of the transfer of 137Cs from contaminated lands to rivers and then marine systems continues to be an important aspect of the research at IER. Participation in interesting marine studies by IER continues to benefit from the proximity of IER to the ocean.

The annual symposium provides an important source of information on the consequences of the accident for local people in Fukushima prefecture as well as for scientists. Presentations and posters provided at the IER annual symposium and other social activity events are usually informative and interesting for both experts and the public. It is inevitable that some scientists are better at talking to the public than others.

- **Prof. Sergey Fesenko**

Despite its relatively small staff, the Institute's research output at the IER is of high quality and value. While the IER's project performance has been significantly successful, there are some opportunities for further development.

Project descriptions are now better structured, and the connections between modeling projects and others are highlighted. It would be beneficial to emphasize key research findings, and the practical importance of the obtained data, both for management in affected areas and for its application in emergency preparedness and response. The practicality of the research and its potential applications should also be more clearly presented. Finally, research objectives and goals could be more closely linked to management options for mitigating the consequences of the Fukushima Daiichi accident.

To increase work efficiency and improve interaction between projects, a general recommendation is to merge three projects – primarily those focused on lakes and rivers, the ocean, and ecosystems – into a single, coordinated project. This is because the lakes and rivers project studies the abiotic components of ecosystems, while the ecosystem project (and others) research biotic components. Merging these projects would allow IER researchers to better describe radionuclide transfer throughout the entire ecosystem and provide a more holistic view of the processes. Another option is to synthesize data from other organizations into short reviews, providing readily accessible information on the environmental behavior of Fukushima radionuclides.

Applying the accumulated experience to study environmental behaviour of other radionuclides, such as elements of the uranium and thorium series, could be a promising direction for further development of the IER activities. The Fukushima area contains natural sources of these radionuclides, which may require monitoring, control and assessment.

As in recent years, the IER successfully continues to share information on the ongoing radiological situation in areas affected by the Fukushima Daiichi accident, organizing seminars for those contributing to the reconstruction of the affected regions.

New opportunities have arisen with research initiatives within the framework of the recently established Fukushima Institute for Research, Education, and Innovation (F-REI). Projects related to this initiative align with the IER's activities and encourage the institute's staff to focus more intently on data analysis related to major nuclear accidents.

Dialog meetings and the annual symposium remain key communication channels with the population of Fukushima Prefecture. Presentations at the IER annual symposium and other social events were informative and interesting for experts. However, these could be better tailored for the audience. Obtaining feedback on audience perception of the presentations would also be valuable.

The reviewer has had the pleasure of following the IER's development from its inception to the present day. Based on this observation, I can confirm its success in various areas. Currently, all aspects of the IER's activities, including research, education (graduate school), information dissemination, public communication, and social impact, are well-balanced. In this respect, the effective management of the institute's administration, which fosters a positive working environment within the institute's diverse and multicultural milieu, should be emphasized.

- **Prof. Wolfgang Raskob**

As the years research activities are structured in six areas namely Rivers and Lakes / Ocean / Ecosystems / Measurement and Analysis / Speciation Radiochemistry / Modeling. The work performed is excellent as one could see in the many peer reviewed publications. A further important aspect of the research work is dissemination to the international community of researchers and to the local population to support their daily life in a contaminated territory. In particular the second aspect was well performed with the dialogue meetings. However, the link to international organizations and platforms can be extended. I highly appreciate the interaction with IAEA and Ukrainian representatives. Expanded could be the interaction with European research organizations and in particular the European Radioecology Alliance platform (http://www.er-alliance.org/). Alliance collects key research organizations interested in radioecology and is therefore an ideal counterpart for the IER. Being part of Alliance, possibly more scientists can be attracted to visit Japan and work in Fukushima.

There is an ongoing debate about the structure of the research groups of the institute. One suggestion is to combine research groups into a wider research structure. For example, Rivers and Lakes + Ocean could be combined to "aquatic environment" and Ecosystems + Speciation Radiochemistry could be combined to "terrestrial environment". As suggested in 2024, Measurement and Analysis and Modeling are transversal activities interaction with the two main pillars of the IER named before. This suggestion might be also useful in restructuring the groups, but mainly should support the message that is transmitted to the outer world. If modelling and measurement and analysis are transversal research activities, interaction between the institute members will be intensified and results might be improved.

Fourteen years of high-level research after the accident has revealed many interesting insights and surely not all research questions are solved. These open questions should be better addressed in the communication to the external world. Also for me as advisor, there is no clear vision what IER wants to achieve in the next 5 years. I therefore suggest to develop a vision for the future of IER and which research questions will be tackled by the institute. It would also help to define one research question/topic where all six research groups can contribute to with some 10-20% of their time.

The aquatic food web – marine and rivers/lake – are still not fully explored. Existing models are quite simple and focus on a standard food chain. In this respect a research focus on the aquatic environment might be one possibility to sharpen the profile of IER.

IER has collected information for many years now. To understand processes, model, either conceptual or detailed, are important. I suggest to use such models for sensitivity and uncertainty analysis to identify those parameters/information that is crucial for the process understanding and modelling and which requires further research activities. So far missing is the development of a new model – or expansion of an existing one – taking into account the many data that has been collected.

Further, the use of Artificial Intelligence might be a new cross cutting topic processing the many data obtained either to develop models or improve datasets.

A final point is the situation with education. The number of students is limited and requires new effort to be increased. Sharpening the research topics and expanding the links with national and international research organizations might be one way to attract more students.

- **Dr. Satoshi Yoshida**

研究は、事故から 14 年が経過した福島のニーズを踏まえた課題に的確にシフトしており、国内外の大学・研究機関と連携し、また、競争的資金も獲得しつつ、着実に学術的な成果を挙げている。福島の住民への成果の還元と人材育成に関する取り組みも積極的に進めている。一方で、研究スタッフの入れ替わりを含めた研究内容の変化により、これまでの研究の枠組みでは分類しきれないような状況も生まれている。６つのプロジェクトの枠組みを超えた横断的な取り組みを強化するためにも、研究の体制を柔軟に見直すことも検討してはいかがか。

The research has appropriately shifted to address issues reflecting the needs of Fukushima 14 years after the accident, collaborating with domestic and international universities and research institutions, while steadily achieving academic outcomes and securing competitive funding. Efforts to provide feedback of research results to the residents of Fukushima and to foster human resources are also being actively pursued. On the other hand, changes in research contents, including staff turnover, have created situations that cannot be fully categorized within the existing research framework. In order to strengthen cross-cutting initiatives that go beyond the framework of the six projects, it may be worth considering a flexible review of the research structure.

外部との連携では、ERAN を軸にした非常に多くの共同研究を実施しており、我が国の環境放射能研究の中核としての役割を十分に果たし、若手研究者の活躍の場としても有効に機能している。また、F-REI において、重要な役割を果たしつつあることは大きく評価できる。福島の復興を担う研究機関の一つとして、今後も積極的な連携を進めていただきたい。

In terms of external collaboration, a large number of joint research projects have been conducted, centered on ERAN, thereby fully fulfilling its role as a core institution in Japan’s environmental radioactivity research and effectively providing opportunities for young researchers to be active. Furthermore, its increasingly important role within F-REI is highly commendable. As one of the research institutions contributing to the reconstruction of Fukushima, I hope that it will continue to actively promote collaboration in the future.

3 月に開催された市民向けのシンポジウムは、現在の福島の環境における重要課題と住民の関心事を的確に捉えており、発表もわかりやすく工夫がされていた。合わせて開催された専門家向けのシンポジウムも質の高い発表がなされ、特に若い研究者や学生が積極的な議論をしている姿が印象的であった。研究活動懇談会も、フグをテーマにして地元関係者と連携して開催するなどの工夫が見られた。

The symposium for general public held in March accurately addressed key issues in the current Fukushima environment and matters of concern to residents, with presentations that were thoughtfully designed to be easy to understand. The accompanying symposium for experts also featured high-quality presentations, with the active engagement of young researchers and students in discussions leaving a particularly strong impression. The dialogue meetings also showed ingenuity, such as by collaborating with local stakeholders to organize the event around the theme of fugu (pufferfish).

博士課程と修士課程の修了者 4 名のうち 3 名が研究機関などで研究に関わるポストについていることは、人材育成に関わる研究所として大きく評価できる。また、2025 年度に新たな学生 6 名を迎えることも特筆すべきである。
The fact that three out of four graduates from the doctoral and master's programs have taken positions in research institutions or similar organizations is highly commendable as an achievement of the institute's role in fostering human resources. It is also noteworthy that six new students will be welcomed in FY2025.

研究所の設立から時間が経過し、施設や設備が老朽化する時期に入りつつある。長期的な視野に立った整備・更新計画の立案を進めていただきたい。
As time has passed since the establishment of the institute, its facilities and equipment are entering a stage of aging. I hope that plans for maintenance and renewal will be developed with a long-term perspective.