

WM2016 Conference Panel Report

PANEL SESSION 093: **Progress Towards the Implementation of Environmental Remediation Projects in Eastern Europe and Central Asia – Lessons Learned, Challenges and Opportunities – Results of the IAEA TC Project RER 9121 – Supporting Environmental Remediation Projects.**

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Panelists:

- **Horst Monken-Fernandes**, *IAEA (Austria)*
- **Larry Boing**, Argonne National Laboratory
- **Christian Kunze**, IAF – Radioökologie GmbH (Germany)
- **Marcelle Phaneuf**, IAEA (Austria)
- **Natalia Latynova**, ROSATOM CICE&T (Russian Federation)
- **Svitlana Kulchytska**, Ministry of Energy and Coal Industry of Ukraine (Ukraine)
- **Ilkhom Mirsaidov**, Nuclear and Radiation Safety Agency (Tajikistan)
- **Alice Mariana Dima**, Nuclear Agency for Radioactive Waste (Romania)

Summary of Presentations

The aim of this Panel was to present relevant achievements from some of the countries participating in the IAEA's Technical Cooperation Project RER 9121 (Supporting Environmental Remediation Projects in Member States). Project RER 9121 provided countries from Eastern Europe and Central Asia with a series of training workshops across the wide range of activities required to achieve a successful environmental remediation project throughout its entire lifecycle.

With respect to environmental remediation, IAEA support to its Member States primarily covers capacity building, training and the provision of technical advice but the available budgets very rarely are sufficient to facilitate actual physical remediation. For large remediation projects to be achieved (especially at legacy sites) there is a requirement for the major international funding organisations to provide financial support and to procure experienced contracting/consulting organisations.

The Panel members discussed their needs and challenges (which might include the establishment of policies and strategies, infra-structure development, technology transfer; regulatory developments, stakeholder engagement strategies in decision making, capacity building, training, etc.). A further aim of the Panel was to determine if there was a potential role and opportunity for contractors and multilateral organisations to provide support towards the implementation of remediation projects in these regions.

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The first presentation was given by **Natalia Latynova** from the Russian Federation who focussed her presentation on capacity building and the formulation of integrated training programs in relation to the remediation of areas contaminated as a consequence of uranium mining and milling activities. These remediation and decommissioning training courses were originally proposed and ultimately supported by the IAEA in conjunction with Rosatom. Participating IAEA Member States included Ukraine, Tajikistan, Uzbekistan, Belarus, Kazakhstan, Kyrgyzstan, and the Russian Federation with the delegate representing managers, engineers and regulators.

The principal objective of the project was to develop the prerequisite competencies for managing remediation programs in order to help resolve uranium mining legacy challenges (primarily) in Central Asian countries. A heavy focus was therefore made on understanding the radiological criteria used in environmental remediation decision making, characterisation of sites as well as a description of strategies and technologies which could be applied during the remediation process. It was felt that the training courses provided a good platform for any future plans the IAEA might have in creating an international school on environmental remediation and decommissioning.

Svitlana Kulchytska from the Ukraine then provided an overview of developing remediation and infrastructure development for the former uranium mining facilities in her country. The authorised country specific body is responsible for providing funding and overseeing such projects. The Pridneprovsky Chemical Plant in Dneprodzerzhinsk is an example of a legacy of uranium production facilities in Ukraine where a remediation program is under development. A State program was initiated in order to provide safe management at this legacy site and to support the various functions of the operator including:

- Site Safety management (radiological and non-radiological)
- Surveillance and monitoring
- Preparedness to further any ongoing remediation activities
- Provision of security and radiation protection at the site
- Coordination and support of the site investigation and actions for remediation strategy planning (national and international)
- Public communication and data management

Special legal and regulatory frameworks will need to be developed in order to assist and stimulate financial and social support of the planned remediation activities. The site has to be remediated in line with regulatory guidance for its next intended industrial use. All waste management activities will be carried out in line with existing international practice and national standards and regulations regarding uranium legacy site management and remediation will be harmonized with IAEA Basic Safety Standards. The overall remediation action plan for long-term site management is currently under development and is expected to be ready for international peer-review in Q-4 2016.

The third presentation was provided by **Ilkhom Mirsaidov** from Tajikistan who provided an overview of the challenges in his country and the lessons learned from project RER 9121. A legacy of radioactive residues have been left following an intensive period of uranium mining and milling in former Soviet times. While small remediation activities have been carried out adjacent to populated areas thus reducing radon exhalation and gamma dose rates, the

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numerous tailings dumps still present an environmental and health risk due to their proximal location to residential housing. In some instances tailings are not covered and both humans and livestock can easily gain access. At Taboshar, untreated overflowing mine waters are often used by the local population as a water source because other sources are not available.

Key challenges in Tajikistan include;

- A need to refine national legislation and produce supporting legislation with respect to many aspects of environmental remediation.
- A lack of qualified regulator and operator personnel who would oversee safe and cost effective environmental remediation programs.
- A lack of a fully operational infrastructure (laboratory equipment and other tools). International support could help adequately equip these laboratories.

IAEA Project RER 9121 has facilitated the training of personnel and familiarisation with international best practice. Based on this new knowledge a number of legislative documents have been developed while others are being amended. A greater understanding of laboratory requirements has allowed a list of equipment to be formulated which will hopefully be procured with the assistance of international organisations.

Alice Mariana Dima from Romania gave the fourth presentation and highlighted the nuclear fuel cycle activities in her country. The major challenges and issues related to environmental remediation included:

- Project management
- Site or facility characterisation
- Remediation technologies
- Regulatory uncertainty
- Regulator expertise
- Public stakeholder concerns
- Funding resources
- Lack of waste disposal facilities
- Access to technical expertise and/or training

Although there is no significant environmental contamination from those facilities in operation or undergoing decommissioning the uranium mining legacy had led to some radiological environmental challenges. Most of these sites have or are undergoing successful remediation. Technical cooperation with the IAEA has provided the country with access to technical expertise, training and best practice guidance.

Horst Monken-Fernandes from the IAEA commenced his presentation by providing a background to the types of environmental challenges faced by IAEA Member States. A key high level objective of the IAEA is that its Member States will eventually have in place a proper infrastructure and technologies for managing their radioactive legacies and resolving all related issues in a timely, safe and cost-effective manner. He provided an overview of their Technical Programs in general and RER 9121 (Supporting Environmental Remediation Programs) in particular. RER 9121 was implemented between 2012 and 2015 and had two project outcomes:

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1. Enhanced preparedness for the implementation of environmental remediation projects in the European Member States
2. Strengthened capacity towards increased effectiveness in remediating contaminated sites and facilities in Europe

And two project outputs:

1. Qualification of individuals or organizations engaged in remediation are increased in Member States
2. Knowledge and experience on remediation (including technology) is disseminated and exchanged in the Member States

The overall project structure was split along managerial and technical activities related to environmental remediation. Activities included planning and management, maintenance and closure, general contents of a remediation plan, groundwater remediation and design of engineered barriers

A general assessment of the participating countries showed that:

- No large funds were accumulated for Environmental Remediation projects - work was generally funded from federal budgets
- There was a high cost associated with the transportation and storage of radioactive waste
- In many cases there are no available facilities for the final disposal of wastes
- Most shutdown facilities store/contain nuclear materials to be removed for centralized storage or reprocessing
- No clear legislation and financial basis exists for large-scale remediation projects

The following key issues need to be addressed in the participating countries:

- Fundamental Requirements:
 - Appropriate legal and institutional framework
 - Adequate funding scheme
 - Access to appropriate technologies and availability of trained personnel
- Significant Constraints:
 - Funding Schemes
 - National policy and institutional infrastructure for liability and project management
 - Waste disposal routes – need for integrated approaches to waste management

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Marcelle Phaneuf from the IAEA focussed on the range of interrelated IAEA Technical Cooperation projects (related to uranium mining) whose aim was to develop Member State capacity so that they could implement risk based remediation approaches consistent with international standards and good practices. The common goals of these projects included:

- Enhanced regulatory framework
- Enhanced monitoring programs
- Enhanced analytical capabilities (including QA/QC)
- Appropriate risk assessment methodology
- Use of institutional controls and appropriate stewardship measures
- Risk communication/ Public Information

The projects included workshops held at arrange of USDOE uranium mining sites where environmental remediation had been or was being successfully undertaken

Larry Boing from the US highlighted the training and capacity building carried out by Argonne National Laboratories for IAEA Member States with respect to environmental remediation and decommissioning. Experience has shown that radioactively contaminated sites present numerous challenges:

- Site characterization
- Risk assessment
- Waste management
- Establishing clean-up criteria
- Cost estimation and work planning and management
- Long-term stewardship/monitoring
- Stakeholder engagement

It is therefore critical to develop an adequate competency and capacity in a diverse set of skills to ensure appropriate risk reduction in the most effective manner possible and to address life-cycle management considerations to prevent future events. For the past six years annually, the IAEA has partnered with Argonne to provide training on facility decommissioning and environmental characterization and remediation. The objective of this training is to provide an overview of management concepts, approaches, methodologies, and tools for ensuring appropriate and cost-effective D&D and remediation action; and share knowledge of past industry experiences. The courses are co-funded by the IAEA (IDN and ENVIRONET) and the U S State Department. Participants to date have come from over 40 countries from 6 continents with attendees representing a diverse cross-section of industries and staff, including operators, regulators, educators, consultants and researchers. Importantly, these delegates demonstrated varying levels of experience including entry level, junior staff, mid-level managers, and more senior individuals that are changing careers or responsibilities.

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Christian Kunze from Germany wrapped up the presentation component of the Panel session through the provision of a contractor's perspective of working in these geographical regions in general and within project RER 9121 in particular. He felt that the training workshop held in Azerbaijan in September 2015 provided a good success story. The workshop was attended by over seventy participants, with those from the host country attending for free thus allowing a mixture of experienced and younger personnel to become involved in the various workshop activities. Questions were put to the delegates after each lecture presentation to test their understanding and a series of interactive exercises allowed everyone to become involved in the workshop.

From his experience in working at uranium mining legacy sites in central Asia he felt that major remediation work was not always justified. It was more important to test pilot schemes in order to ensure sustainable solutions could be applied to the site specific conditions. Key areas to focus on included implicitly understanding the site water balance, resistance of tailings and rock piles to erosion, percolation rates, vegetation types and potential radon exposure. Getting the site operators to understand the after care and long term stewardship challenges was crucial. Because international funding organisations rarely fund stewardship activities the onus lies with the country itself. This presents a different problem because if such activities are not undertaken correctly the initial remediation success might be undone and long term monitoring and verification may not be carried out.

While technical and engineering services are often sourced nationally the primary benefit from the international expertise lies in the areas of delivering an optimised remediation approach. Adopting an appropriate conceptual approach supported by civil engineering and earth moving is often required rather than the application of more advanced technological solutions. Growing in-country practical expertise and experience is a slow and long term process, especially considering the financial constraints. One area of concern is that quite often when expensive radio-analytical equipment has been supplied through international contracts there is rarely any provision for spare parts, sample preparation equipment and continuous calibration.

In the remaining time the Panel co-chair (**Peter Booth**) put a number of interrelated questions to the panel and audience. The Panel was asked from their specific in-country experience what they believed were the main barriers to achieving successful remediation. Svitlana Kulchytska felt that in the Ukraine a lack of Governmental and Local Authority support coupled with insufficient funding were the main barriers. Ilkhom Mirsaidov explained that in Tajikistan the primary challenge was also a lack of sufficient funding. Natalia Latynova believed that in the Russian Federation, environmental remediation was rarely going to be a priority activity.

The Panel and audience were then asked if the creation of partnerships between the host countries and international expert organisations would help resolve some of these legacy issues and if there was an interest in forming such partnerships. Ilkhom Mirsaidov believed that such partnerships would only be successful if the host country also had sufficient technical and managerial expertise. Stewart Walker from USEPA felt that contractors from the US were more likely to focus on internal challenges, especially if funding models for work in other geographical areas of the world were not clearly understood. David Shafer from USDOE suggested that partnerships which provided greater opportunities for interns and staff exchanges in addition to field visits to successfully remediated sites might provide a

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more viable approach. He added that if funding mechanisms were in place international contractors would be more likely to be interested in providing support to IAEA Central Asian and Eastern European Member States.

Conclusions:

The IAEA through projects like RER 9121 have successfully trained individuals and facilitated capacity building in a range of its Member States. It could be seen that Eastern European and Central Asian Member States with legacy sites require both the kind of support provided by the IAEA as well as further financial and technical support if they are to successfully remediate such sites. It was recognised that there was an opportunity for contracting organisations to look to develop partnerships with the host countries and the international funding bodies in order to progress some of the major remediation projects.

The WM Symposia through its PAC and particularly IPAC members are trying to attract and develop a greater international perspective to the conference. It was recognised during this year's IPAC meetings that the IAEA could provide an important role in helping WM Symposia to facilitate the development of synergy and relationship building of the wider international community with the more regular attendees in relation to environmental remediation. Discussions at the IPAC had included a suggestion that the IAEA might (as an international "entity" or "body") one year take the role of the featured country. This subject will undoubtedly be discussed further at the next IPAC meeting which will be held in Madrid in May 2016 during the IAEA's decommissioning and environmental remediation conference.

Horst Monken-Fernandes commented that the IAEA had organised Panel sessions for the last two years on the subjects of capacity building and gaining international cooperation for its Member States. In line with the outcome from these Panels and the IPAC discussions there would need to be further consideration towards how to attract an audience who might be interested in such partnership building.