

## WM2015 Conference Panel Report

**PANEL SESSION 012:**      **IAEA's Initiative to build up an International Coalition to Advance the Implementation of ER and D&D Programs – Challenges and Opportunities**

**Session Co-Chairs:**      **Horst Monken-Fernandes, IAEA**  
**Tjalle Vandergraaf, Canada**

**Panel Reporter:**          **Horst Monken Fernandes, IAEA**

### Panelists:

- **Horst Monken Fernandes**, *Environmental Remediation Specialist – IAEA*
- **Delcy de Azevedo Py Junior**, *Radiation Protection Officer – INB – Brazil*
- **Viktor Riazantsev**, *Head of Radiation Safety Department, State Nuclear Regulatory Inspectorate – Ukraine*
- **Christian Kunze**, *Associate Director, AMEC*
- **Alexander Pozhidaev** – *Expert, JSC Federal Centre for Nuclear and Radiation Safety – Russian Federation (regret)*

### **Summary of Presentations:**

Much remains to be done in terms of addressing the legacies from the early development of nuclear energy, including the dismantling of redundant research and fuel cycle facilities, research reactors, and power plants, and the remediation of sites affected by past uranium mining and processing operations. Long term solutions still need to be found for management of the resulting waste, including development of disposal facilities that meet public acceptance and safety requirements. Some countries are moving forward with dealing with these legacies and accordingly have built up appropriate technical resources and expertise, but many national programmes still face very significant challenges.

Dealing with the legacies from past nuclear and non-nuclear activities is a global concern. Principles of social justice and intergenerational equity provide fundamental reasons why governments should undertake early dismantling and decommissioning of disused nuclear facilities and remediation of radioactively-contaminated sites

The factors constraining progress in addressing past legacies were considered at side events to the General Conference of the International Atomic Energy Agency (IAEA) in 2010, 2011 and 2012. The discussions at these events pointed to the importance of early implementation of decommissioning and environmental remediation (D&ER) programmes in order to safeguard people and the environment from the undesirable effects of ionizing radiation and other hazards associated with these sites. It was concluded that there is an urgent need to better understand the global status and to analyse and report the barriers impeding the implementation of D&ER programmes, with the aim of outlining actions that may improve the current situation.

As a response to those recommendations, the Constraints to Implementing Decommissioning and Environmental Remediation (CIDER) project was launched with the broad aim of contributing to improve current levels of performance on D&ER programmes by promoting greater cooperation amongst IAEA Member States and relevant international organizations.

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The barriers that need to be overcome concerning the implementation of Environmental Remediation projects have been examined. However, a broader understanding of these constraints were needed and this should also address decommissioning projects due to the fact that in many situations these activities are intrinsically associated.

Progressing with D&ER projects and not delaying their implementation will yield economic benefits as sites and associated infrastructures are returned to useful activity. This will also improve societal confidence in the sustainability of nuclear energy, and comply with the relevant international agreements that relate to these issues.

In the second phase of the project specific actions and innovative approaches will be proposed with the goal of facilitating progress in programme implementation. Therefore, the successful implementation of these actions will only be possible if cooperation mechanisms are put in place at the international level. Discussing potential ways to develop this concept and foster more effective international cooperation to advance remediation and decommissioning projects was the main objective of this panel.

### Synopsis of Panel Discussion

The session began with the presentation of the CIDER project by **Mr. Horst Monken-Fernandes** from the IAEA. It was mentioned that a variety of issues have been identified in the CIDER project that impede the proper implementation of D&ER projects e.g. the absence or weakness of a national policy and regulatory framework, the lack financial resources, the unavailability of adequate technology and infrastructure and the low consideration of stakeholder and political challenges. A number of major strategic steps that will help to overcome those barriers and thereby will facilitate a better implementation of D&ER programmes have been identified; these include:

- Implementation of an appropriate legal and regulatory framework, which includes a clear identification of all roles and responsibilities of those involved;
- Inventorying all legacies to be considered, assess the associated risks and possible remedial strategies and elaborate a prioritization and sequencing scheme of the projects;
- Planning projects over their whole lifecycle, up to achievement of the desired end state;
- Ensuring adequate funding, which can be national or through international funding mechanisms;
- Ensuring access to competencies needed to implement projects and address the need for cultural change of operating organizations now implementing D&ER projects;
- Communication with stakeholders and engagement with political representatives;

The representative from INB-Brazil talked about the major constraints that were faced in the implementation of remediation works at the Pocos de Caldas Uranium Production Site. Operations have taken place for about 15 years and now the site is no longer operational and acid mine drainage treatment is the major activity taking place there.

It was recognized that the definition of the site end-state, ideally after proper discussions with the relevant stakeholders, shall be performed. In relation to future land uses, among the three already evaluated scenarios, only restricted use scenarios would meet the established acceptance criterion.

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The “rural property alternative” would not meet the dose increment criterion, mainly because of the possibility of underground water use. It has also been demonstrated that the issues related to a regulatory framework also constitute important barriers to project implementation. It was emphasized that the lack of regulatory requirements in the licensing of the project dealing with the remediation phase was a crucial factor contributing to the prevailing situation (i.e. stagnant remediation project implementation). That absence, for example, led to the inexistence of appropriate funding mechanism to support the remediation works now needed. It did not stimulate the company to develop the necessary licensing organizational structure. As a final comment the late start of renewing the company staff – that started to occur only five years ago – created a generation gap and lot of the site knowledge was lost.

**Mr. Py Jr.** indicated that enhancing the licensing organizational structure of INB, with the associated increase of the INB staff trained in licensing processes would help in improving the overall situation. Nevertheless, it has been recognized that the assistance to be provided by international companies with experience in uranium mine site closure and remediation will be of key importance.

The presentation of the third speaker, **Mr. Riazantsev**, focused on the remediation of the former Uranium Production facility “Pridneprovskiy Chemical Plant” located in Dneprodzerzhinsk/Ukraine and used to produce uranium concentrate between 1948 and 1991. The milling facilities used ore from different countries, including Central Asia and Eastern Europe. As a result of its activity, 5 tailings dumps and one uranium ore storage facility were created, at the site. It is estimated that about 42 million tonnes of radioactive waste are deposited in the site.

The state-owned enterprise “Barrier” is in charge of site remediation. Contaminated soils around the facilities contain significant activities of  $^{226}\text{Ra}$  and also high concentrations of some toxic elements such as Arsenic, Zinc and Manganese. Ground waters are significantly contaminated by uranium and heavy metals. Despite the above mentioned situation, available risk assessments indicate that the population of the nearby town of Dneprodzerzhinsk is not exposed to relevant radiological risks. Extreme scenarios leading to the dispersion of radioactive material cannot be disregarded. Non-radiological hazards associated with the geotechnical stability of the tailings compounds located at the slope of the Dnieper River terrace, need to be addressed.

Mr. Riazantsev indicated that international assistance is very much needed to help in the implementation of remedial works at the site. He reported that a preliminary concept for a remediation strategy is under development for the site and that it was based on the results achieved from national programs and also from the results of ENSURE project (Ukraine-Sweden collaboration). Currently the European Commission (EC) supports a project aimed at helping Ukraine in the development of the overall remediation strategy to the site. That would include the identification of priority actions and would help to select the appropriate technologies for decontamination of facilities and to create sufficient radiation protection and waste management programs as part of the overall remediation plan for the site. Unfortunately, the remediation state supported program in Ukraine is currently suspended due to the ongoing economic crisis and also as a result of the instability at the south-east region of the country.

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The fourth speaker was **Mr. Kunze**, from AMEC who focused his talk on issues faced in the remediation of uranium mining and processing sites. He defined that three main steps can be seen as critical in the implementation of remediation works in these sites. The first involved the justification of remedial action, end state definition, and choice of the remediation strategy. The second would be the implementation of proper site investigation and historical site assessment. Finally, the third one was characterized as being the one in which aftercare and corrective actions need to be implemented. Regarding the first one Mr. Kunze emphasised that, despite exaggerated stakeholder expectations, most often radiological risks do not alone justify the need for implementation of remedial actions. These were driven by other reasons that include geotechnical aspects, erosion of engineered structures, acid mine drainage, etc. It was noticed that existing legal frameworks are often prescriptive and not ALARA/risk based.

Mr. Kunze advocated that discussion with all stakeholders requires substantial time.

Regarding site characterization it has been indicated that it is not uncommon that useful datasets are not available, or if available, they are of insufficient quality. It was recommended that fifteen months should be allocated for a best practice baseline and site characterisation effort. Finally, it was emphasized that although low-maintenance design is frequently intended, aftercare will almost always be required. In this regard, he stressed that training programs and monitoring are useless if means for corrective action are not made available. Of extreme importance it was noted that most often developing countries are expected to provide for monitoring and maintenance but that turns out to be unrealistic as funds to implement these activities will not be available. Therefore providing funding for the after-care activities will be of utmost importance.

As a conclusion, Mr. Kunze suggested that at least 3 years should be allocated for the delivery of high quality remediation designs that could be understood and accepted by all relevant stakeholders. During the discussions he criticized the ongoing rules used by some of the funding agencies that allocate a short time for the development of remediation plans.

The last speaker **Mr. Pozhidaev** could not attend the Symposium due to VISA related problems. Mr Vandegraaf graciously took his paper and gave the audience an overall idea about the topics that would be covered by the speaker. It was noted that huge quantities of radioactive waste deposited in waste rock and tailing piles have been left behind as a result of large-scale uranium mining and milling in Central Asian countries. It was noted that natural processes, that took place during the decades that passed since the disintegration of the former Soviet Union, have led to the degradation of the engineered barriers of the facilities. Therefore, in order to address the legacy wastes from uranium mining and milling activities the Inter-State Targeted Programme 'Remediation of the Territories of the Eurasian Economic Community (EurAsEC) Member States Affected by Uranium Mining and Milling Facilities' has been developed in the framework of the Eurasian Economic Community.

This Programme has been implemented since 2013. In 2013 and 2014, a number of research activities as well as engineering and environmental surveys were carried out at the Programme sites located in Central Asia (Min-Kush, Kadji-Sai (the Kyrgyz Republic) and Taboshar (the Republic of Tajikistan)). As a conclusion, it was offered that existing data demonstrate significant hazards posed by the uranium mining and milling sites in Central Asia and calling for the need of their urgent remediation.

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Medical and demographic information and data from radioecological surveys however show a very low level of malignant tumour morbidity of the population in areas affected by uranium mining and reference territories. It was finally indicated that the remediation programme makes provisions for developing design and other documentation in 2015, whereas programme “phase two” – to be developed from 2016 to 2018 - will include remediation activities.

### Conclusions

Dealing with the legacies from past nuclear and non-nuclear activities is a global concern. The papers presented in this session were examples coming from IAEA Member States that face significant constraints in making progress with the implementation of remediation programmes. The barriers reported by the speakers’ articulate well with those annotated in CIDER project.

Progressing with D&ER projects and not delaying their implementation will contribute to improve societal confidence in the sustainability of nuclear energy, and comply with the relevant international agreements that relate to these issues.

The organisation of this session at WM2015 was part of a global strategy developed under the IAEA CIDER project aiming at collecting inputs from different audiences on what can be done and how an organisation like the IAEA can best make its resources available to assist countries that are in great need of support to move ahead their environmental remediation and decommissioning projects.

It was envisaged that innovative solutions to the identified problems may be needed and also that functional schemes of assistance can only be achieved if new arrangements involving problem owners, financing organisations, governments, contractors/consulting companies could be put in place. That was the essence of this session and WM2015 was seen as a proper forum for this discussion as many of the actors mentioned above attend the event. Therefore it was also envisaged that strategic partnerships (that some may read as business opportunity) could be formed. Having such kind of session in WM Symposia would also help to give the event an international flavour as many believe that it is mainly focused on US related audience.