

**PANEL SESSION 62 - Training and Human Resource Development in  
Radioactive Waste Management**

**Co-Chairs:** James Szenasi, *Consultant (USA)*;  
Paul Degnan, *IAEA (Austria)*

**Reporter:** Paul Degnan, *IAEA (Austria)*

Panelists Included:

- Paul Degnan, *IAEA (Austria)*
- Wang Ju, *Head of HLW Disposal Program, BRIUG (China)*
- Marjatta Palmu, *Senior Advisor, Posiva (Finland)*
- Gary Scott, *Consultant (USA)*
- James Szenasi, *Consultant (USA)*

Worldwide the nuclear industry is suffering from a critical shortage of skilled personnel. This problem is reflected in the radioactive waste management sector by the insufficient availability of scientists and engineers knowledgeable in safety requirements and technological methods relevant for the development and operation of waste disposal facilities and also in associated areas that interface with the disposal of nuclear waste (e.g. decommissioning, storage, conditioning and treatment). The severity of this shortage in individual countries and organizations varies in relation to a number of factors. However, two sub-issues are apparent; (i) the numbers of professionals involved in radioactive waste management needs to be increased and (ii) professionals working in the sector need to be supported throughout their career lifetime in order to improve skills and capabilities and adapt to changing circumstances when necessary, including moving jobs within and between organizations, countries, regions and globally. The problems of skilled staff shortages and the lack of targeted career development often arise due to inadequate long-term planning, low levels of funding and other resources, and an historical lack of infrastructures. These issues are not unique to countries with nascent or developing nuclear infrastructures. This panel session focused on efforts to improve the training and development of human resources for performing activities in Radioactive Waste Management.

Disappointingly, only one person was present in the audience at the start of the session and only twenty or so people were present to hear most of the talks, despite the significant importance that education, training and qualifications has for an organization involved in radioactive waste management.

**James Szenasi** opened the proceedings. After introducing the panelists he outlined the reason for the session and, despite the apparently poor interest from conference delegates, he encouraged the panelists to engage constructively in discussion so that key issues could be aired and options provided for advancing strategic Education and Training (E&T) in radioactive waste management.

**Paul Degnan's** presentation focused on "The Role of the IAEA in the Provision of Education and Training for Radioactive Waste". As well as discussing the mandate of the IAEA and the practical role it provides in disseminating knowledge to Member States, Dr Degnan provided more information on the services the Agency provided, both through face-to-face lecture-based

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and hands-on training and through a new initiative aimed at delivering a wide range of educational materials to a large audience over the internet. He then introduced what he believes are some of the major challenges related to the education and training of staff. He pointed out that governments, the IAEA and individual organisations all have a key role to play, but his major message was that all of these actors need to plan strategically for the long term.

**Wang Ju** gave a talk on “Education and Training in the Geological Disposal of High Level Radioactive Waste in China”. In his presentation, Professor Wang described how the ambitious Chinese program aimed at significantly increase the proportion of nuclear energy used in the country makes efforts to establish a HLW repository a key part of the national program. As context he provided the Chinese policy for HLW disposal and an overview of the site investigation program that he leads. Within this framework China involves several academic and industrial institutes to support its organizations involved in radioactive waste management. He explained how on-the-job training is a major part of the approach taken to advance E&T in China.

**Marjatta Palmu** then gave her first of two presentations entitled “Shifting from R&D to Preparing for the Operation of Disposal Facility, Ensuring Competence and Competence Providing Infrastructures for a Small Waste Management Organization, Case of Posiva Oy”. Posiva is currently an organization moving from an R&D focus to one that will be involved in operational disposal. She explained how learning from projects and international cooperation are still an important means of developing, enhancing and maintaining competence. However, the younger generation of personnel does not necessarily have the luxury of the same time span to develop their competence compared with the expert generation now retiring from the field of geological disposal and competence acquisition requires speeding up. She provided examples of how a strategic and systematic approach to E&T in Posiva is one of the means to address this requirement.

**James Szenasi** - in his presentation, the “Qualification of a Federal Workforce” Dr Szenasi firstly described the history of the development of DOE’s Technical Qualification Programme. He then comprehensively described the mission and guiding principles of the Federal Technical Capabilities Panel, set up to establish and maintain qualification standards in various work areas. In his presentation, Dr Szenasi clearly indicated how the DOE has used a strategic approach to develop a comprehensive framework by which it trains and qualifies its technical workforce.

**Gary Scott** - in his presentation, Training and Qualification of an Operational Nuclear Workforce, Dr. Scott then discussed how this strategic approach was translated in the case of WIPP into a viable and robust program. As such, his presentation concentrated on training and qualification for a working facility and a key message was that the fundamental Scientific and Technical Training provided in a research orientated organization is not enough. Rather, several years of specialized training in operational areas are required and this needs to include training and qualification of the entire workforce, especially concerning safety related areas. Dr. Scott outlined the approach taken by DOE to identify the technical training needs in an organization and then provided a detailed explanation of each step.

**Marjatta Palmu** presented the last talk on the “PETRUS Program; A Coordinated European Initiative to Address Industry Needs for E&T in Deep Geological Disposal. This regional

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initiative is intended to coordinate efforts to ensure the continuation, renewal and improvement of professional skills in the field of radioactive waste disposal and to provide a critical mass of professionals available for providing training opportunities at a reasonable cost (given the small size of the geological disposal community in terms of needs and supply of human resources). She provided information on the detailed objectives and work plan, together with the structure of the Petrus training schemes and the contributing organizations. An important component of the work planning and delivery is to ensure that the views of the end-users are established and accommodated.

### **Public Comment and/or Questions:**

Comment – Why are organizations doing their own training programs if it is being organized and delivered to them by the IAEA, national and regional initiatives?

Response - Industry must clearly address immediate requirements but it also needs to proactively plan for the long-term. This necessarily means that it should provide staff with strategically structured career development opportunities. Organisations cannot necessarily expect external bodies to address all of its E&T needs. In particular, the move from research to operations to closure will mean different demands need to be met and this entails a proactive approach by organisations towards E&T. Furthermore conventional Health & Safety issues arise especially during repository operation. Only an individual organisation can establish its own detailed requirements.

Comment – Who should be responsible for the training of the contractors used in RWM operations?

Response – For long-term involvement in a project it would be reasonable to expect a shared responsibility. Key competencies must be made available to the client, so the contractor clearly needs to train its own staff to be competent in the services it provides. However, for the specifics of the complex and demanding roles that need to be undertaken in RWM, especially in respect of safety-related issues, the organization responsible for operations should acknowledge that additional training may be necessary and hence provide any support necessary.

Comment – Has there been a reduction in the quality of entrants into the RWM field over the past years?

Response – We have not experienced a reduced quality of individual; however difficulties in recruitment into waste management and remote areas can lead to employment of individuals that lack training in a particular discipline (matching the right jobs with the level of training/experience). There is a sense that this may be the case globally, so a structured training program could transform individuals to meet the specific requirements for particular jobs, such as environmental permitting conducted by someone trained in another field, or untrained individuals selected for jobs that require specific knowledge to ensure nuclear safety or licensing violations are considered prior to making operational decisions thus reducing occurrences/violations and fines. Even highly trained individuals such as nuclear engineers can make an operational decision that negatively impacts environmental regulations if not trained on these regulations.