International Conference on Advancing the Global Implementation of Decommissioning and Environmental Remediation Programmes CN-238

Contribution ID: **142** Type: **Oral Poster**

INTEGRATED 3D SUPPORT SYSTEM FOR IMPROVING SAFETY AND COST-EFFICIENCY OF NUCLEAR DECOMMISSIONING PROJECTS

Wednesday, 25 May 2016 15:10 (5 minutes)

Abstract:

A significant number of nuclear power plants will have to be decommissioned over the next few years as a result of earlier and planned shut downs initiated by plant aging, political decisions and unfortunate events. The decommissioning process is challenging for all stakeholders due to uncertainties and risk associated with decisions on applied technologies, organisational changes, and management of human factors.
In this study we investigated how concepts, enabled by advanced information technologies, can be applied for providing continuity between different phases of the decommissioning work process and life cycle of the installation, as well as stakeholders involved in on-going and future decommissioning projects.

1. INTRODUCTION

With the emergence and exploitation of alternative energy sources, and unfortunate events impacting public confidence in safety, justifying the use of nuclear energy for electricity production is increasingly important. Due to the efforts involved to ensure that the work is done safely and the possibility of long term waste storage or site control commitments, decommissioning entails high costs influencing investment per unit energy required from the energy producers. For nuclear energy production to remain sustainable, technologies enabling more efficient methods for developing optimal work strategies and prepare personnel and the organisation for efficient implementation of the decommissioning plans are essential.

1. METHDOS

The scope of this activity is to investigate how new methods enabled by emerging information technologies like 3D real-time radiological and work simulation (Figure 1), advanced user interfaces, and mobile computing, can be utilised for optimising safety and costs in the decommissioning of nuclear installations.

1. RESULTS

Research results and lessons learned from industrial applications shows that new concepts enabled by emerging 3D computing technologies have great potential for improving nuclear decommissioning strategies. Such techniques offer very effective new opportunities for improving early characterisation and strategical decision making, knowledge management, on-site management of radiological waste, briefing and training of field workers, and regulatory compliance.
Figure 1:

Figure 1. User interface of the VRdose system, an interactive work planning tool with real-time 3D radiological modelling and visualisation capabilities.

1. CONCLUSIONS

3D modelling has become an essential tool in the design and licencing of new nuclear installations. In addition, our earlier research results demonstrate that 3D simulation can be efficiently utilised for improving safety and efficiency of maintenance jobs. An increasing number of organisations are adopting 3D simulation technology to support the decommissioning of aged nuclear installations. However full scale international investment and application of new methods enabled by such technology requires research results describing good practices, as well as proving safety and cost benefits.

REFERENCES

[1] SZŐKE, I., et al., "New software tools for dynamic radiological characterisation and monitoring in nuclear sites"in: Proceedings of Workshop on Radiological Characterisation for Decommissioning, Nyköping –Sweden, April 17-19 (2012) http://www.oecd-nea.org/rwm/wpdd/rcd-workshop/
[2] SZŐKE I., JOHNSEN T., "Human-centred radiological software techniques supporting improved nuclear safety"Nuclear Safety and Simulation, 4(2013) 219-25. http://www.ijnsweb.com/?type=subscriber&action=articleinfo&id=176

[3] SZŐKE I., et al., "Real-time 3D radiation risk assessment supporting simulation of work in nuclear environments"Journal of Radiological Protection; 34(2014) 389–416. http://iopscience.iop.org/0952-4746/34/2/389/
[4] SZŐKE I., et al. "Comprehensive support for nuclear decommissioning based on 3D simulation and advanced user interface technologies"Journal of Nuclear Science and Technology, 52(3), 371-82, 2014. http://www.tandfonline.com/doi/full/1
[5] CHIZHOV K., SNEVE M., SZŐKE I., et al. "3D simulation as a tool for improving safety culture during the remediation work in the Andreeva Bay"Journal of Radiological Protection.; 34(2014) 755-73,. http://iopscience.iop.org/0952-4746/34/4/755/ (Bernard Wheatley Award for 2014)

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Session Classification: Session 4A - 3

Track Classification: Technical and Technological Aspects of Implementing Decommissioning Programmes