

UNENE and Nuclear Human Resource Development in Canada

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Abstract

There are currently 17 operating nuclear power plants in Canada, which provide 16% of Canada's electricity, and more than 50% of the electricity of the province of Ontario. With the phase-out of coal plants in Ontario, electricity forecasts show a significant supply gap opening up around 2015, and as a result Ontario has decided to include new nuclear power plants in its planning, as well as life-extension of 10 existing nuclear plants. As a result Ontario Power Generation (OPG) expects to hire hundreds of new nuclear engineers; over the next few years 40-50% of their experienced nuclear engineers will retire. Timely supply of the new graduates and their mentors is clearly a significant challenge.

UNENE (University Network of Excellence in Nuclear Engineering) is uniquely placed to contribute to Human Resource Development (HRD) needs. UNENE is an alliance of universities, nuclear power utilities, design and research organizations and regulatory agencies for the support and development of nuclear education and R&D in Canadian universities. The main HRD purpose of UNENE is to assure a sustainable supply of qualified nuclear engineers and scientists to meet the current and future needs of the nuclear industry through university education. It does this through programmes that:

- Upgrade the education of staff working in the nuclear industry
- Develop and supply highly-qualified graduates
- Support nuclear research, and
- Create respected university-based experts for consultation by industry and the public.

In particular UNENE runs a course-based **Master's of Engineering programme** aimed at improving the fundamental knowledge of professionals already working in the nuclear industry. The UNENE M.Eng. is a joint programme offered by member universities, and the courses are graduate-level in content and expectations. Courses are given live, and use synchronous distance education technology for remote students. In addition some of the M.Eng courses have been adapted for high-calibre non-accredited enhanced professional development of utility professionals.

In terms of the impact of the accident at Fukushima, similar to other countries, operating utilities in Canada have performed an initial evaluation of their plants with respect to lessons learned from the accident, and have reported to the Canadian regulator on implementation plans for short-term and long-term measures to address any significant gaps. The recovery from the accident took place while the UNENE Safety Design Course was being delivered, the first time a real accident was evolving simultaneous with the safety course and the first serious accident most students had lived through in their career. Certainly Fukushima will take a prominent place among the case studies which are already part of the Safety Design Course, and will be used as a vehicle for learning about design bases, design features for severe accident prevention and mitigation, severe accident evolution, and severe accident management and recovery. Insofar as students use the knowledge acquired during their UNENE M.Eng. in their daily work, a deep understanding of Fukushima cannot but increase their day-to-day awareness of nuclear plant safety.

In conclusion, to help meet the upcoming surge in human resource demand as the nuclear renaissance begins and as boomers retire, we need to ensure there are no barriers to student mobility, and that learned institutions cooperate to make the best use of scarce teaching resources. Reliable sustained industry support is key. The Canadian model of cooperation among universities, and mutual recognition of courses and degrees, may be also useful internationally. Finally the use of distance education technology opens the door to organizations outside of Canada to develop cooperation with UNENE in terms of course delivery and student exchange.