Canadian Nuclear Society Course on the Science of Nuclear Energy and Radiation[1]

by

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SUMMARY

One of the objectives of the Canadian Nuclear Society (CNS) is "to encourage education in, and knowledge about, nuclear science and technology". In this regard, the CNS feels that it is particularly important to reach young people, who will make decisions affecting society in the future. Science and technology have played a major role in reshaping our world, and we believe this role can only continue and expand. It is crucial that we provide the next generation with the education and basic scientific knowledge to enable it to make informed choices.

Schools afford the most effective venue to reach a large number of our youth. Teachers have a strong influence on the way young people learn to view, and think about, important issues in society. However, many teachers, even high-school teachers in developed countries, lack the training or indeed the knowledge to teach about nuclear science and technology. To familiarize teachers with the subject and enable them to present it coherently to their students, the CNS has launched a course on the "Science of Nuclear Energy and Radiation". The pilot project took place at McMaster University in Hamilton, Ontario, Canada, 1998 June 22-25. The cost to attendees was nominal ($Cd 200).

The principal aim of the course was to teach good science in plain language, to help teachers address the lack of understanding of an advanced technology. Most of all, we wanted to explain clearly how nuclear energy really works, and the facts about radiation.

The course was modelled on the one developed by Professor Albert Reynolds at the University of Virginia. While the content was somewhat loosely based on his 1996 book, "Bluebells and Nuclear Energy", there was a great deal of customization to present information on our indigenous CANDU reactors, and on the contribution of nuclear technology to Canadian society in particular.

Lectures were presented on a variety of topics, such as:

- Introduction to Radiation
- Health Physics Orientation

[1] Presented by B. Rouben at the 1998 American Nuclear Society Winter Meeting, Washington, D.C., published in the Proceedings, TANSAO vol. 79, pg 39, 1998 November.

- Biological Effects of Radiation
- Nuclear Energy and Reactor Concepts
- Safety
- Nuclear Fuel Cycle
- Waste Disposal
- Nuclear Medicine

Teachers toured the 5-MW pool-type McMaster Nuclear Reactor, and witnessed labs in detection and activation analysis. The last day of the course, they toured the Engineering Laboratory of Atomic Energy of Canada, Ltd., and the Pickering Nuclear Generating Station on the outskirts of Toronto, Ontario.

The pilot course attracted 13 high-school teachers. They came mostly from Ontario, but one came from New Brunswick and one from Manitoba. We were originally targeting for a larger enrolment, but found that the smaller group allowed for a very effective level of communication between the attendees and the presenters, and the logistics were facilitated.

From the outset, we found the teachers very eager. Teachers make good students: questions and comments flowed continually. On registration, the teachers had been mailed a copy of “Bluebells and Nuclear Energy”. We pleasantly discovered that they had actually done their homework, and had come to the course prepared to learn more.

The presentations, made by a mixture of university and industry people, seemed to fit well the capabilities of the teachers, judging from the large number and nature of comments and questions. The speakers were obviously keen to communicate, as all the presentations ran over their allotted time, but the teachers did not seem to mind. They were also captivated by the hands-on workshop organized by Ross Getsinger, a teacher from Trafalgar High School in Oakville, Ontario, who presented balloons that soaked radiation from brick walls and easy-to-use software for the classroom. The speakers made repeated points about the presence of radiation and radioactivity in nature, which was very important in increasing everyone's awareness that this technology is quite natural.

Feedback from the attendees was very positive. On consensus, they found the event “very stimulating, valuable, and motivating”. They were happy that the CNS recognized “the great value of partnership with the Education sector”. Many commented they will return to their classroom next year to relate how they watched the blue glow of radiation as the McMaster Nuclear Reactor started up before their very eyes. Teachers typically interact with more than 100 students each year (some said about 200!). Giving teachers a basis for communicating enthusiasm, and enabling them to provide factual information (and explain how to use facts) to their students, excellent leverage in communication is achieved. An extra benefit is that the attendees now have contacts at the CNS and in industry to get answers to questions and to guide interested students towards careers in science and engineering.

[Note that a version of the course could perhaps be organized for journalists; this could be helpful in destroying their perception that people in nuclear technology are insular and can only speak in technical jargon.]

A post-mortem evaluation did identify a few things to be changed next time. For instance, in view of the fact that the material was read ahead of time, the level of some presentations was perhaps slightly too elementary. Also, there were a few cases of overlap between presentations. An important finding was that it would be very beneficial to allow more time for these gregarious "students" to vocalize.

The happy conclusion was, however, that this course was a definite success, and should definitely be repeated. We count on the first attendees to provide positive publicity about the course by means of articles in teachers' newsletters and by "word-of-mouth".