

## INTERNATIONAL EDUCATION ALLIANCE: MOVING TOWARD GLOBAL UNDERSTANDING OF RADIOACTIVE WASTE MANAGEMENT ISSUES AND SOLUTIONS

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### ABSTRACT

After many years of public information programs intended to raise the broad knowledge of the public regarding the objectives and methods of radioactive waste management, countries with radioactive waste management programs concluded that information programs for the general public fell short of reaching that goal. Instead, these countries independently began turning to formal education programs to provide background science, technology, and society facts upon which to define and address waste management issues and to begin building science literacy among their respective populace and future decisionmakers. To enhance and assist in a global framework in which it exists, in 1992 an informal international working group formally established the International Alliance for Education in Radioactive Waste Management. This paper discusses the events which led to establishment of the Alliance, its mission and goals, and projects of the Alliance aimed at moving toward global understanding of radioactive waste management issues and solutions.

### INTRODUCTION

The United States and other major nuclear electricity-generating countries have plans for the long-term, permanent disposal of spent nuclear fuel and/or high-level radioactive waste in deep, geologic repositories. International scientific consensus has determined that this is a safe means of protecting the public and the environment. Developing the waste disposal systems involves the solution of complex technical and societal issues and is a national responsibility within each country. At the same time, nuclear waste management and protection of the environment are global issues with global implications. What one country does or plans to do in the area of waste management impacts on the others. What one country learns can help the others.

International cooperation in research and development programs and in sharing information are cost-effective in maximizing limited resources, building consensus on common issues, and broadening national knowledge bases. The U.S. Department of Energy's (DOE) Office of Civilian Radioactive Waste Management (OCRWM) and its predecessor organizations have participated in international activities since 1976 and this participation continues to broaden OCRWM's technical and institutional knowledge. Likewise, sharing of informational and educational resources regarding radioactive waste management is an important element toward building global understanding and developing national solutions. To this end, information and education managers and specialists from 13 countries have established the International Alliance for Education in Radioactive Waste Management. Its mission is to foster science literacy in radioactive waste management through international collaboration in education.

### BACKGROUND

OCRWM is a member of a number of international organizations interested in radioactive waste management. One of these is the Organization for Economic Cooperation and

Development/Nuclear Energy Agency (OECD/NEA). The OECD/NEA was established in 1972 and includes all the European member countries of OECD and Australia, Canada, Japan, and the United States. The primary objective of NEA is to promote cooperation among its member governments on the safety and regulatory aspects of nuclear development and on assessing the role of nuclear energy as a contributor to economic progress.

The work of the NEA in the field of radioactive waste management addresses most of the fundamental aspects of waste management operations and disposal systems. The NEA also advises its member countries on radioactive waste management policies and strategies, and carries out topical activities in support of national programs. Within OECD/NEA is the Radioactive Waste Management Committee (RWMC), in which OCRWM participates actively. The purpose of the RWMC is to formulate and coordinate activities associated with national and international issues pertinent to radioactive waste management. RWMC supports national radioactive waste management and demonstration programs through generic studies of selected technical areas, and through the development of international consensus statements, recommendations, and guidance on criteria, methods, and procedures, and improving the data base available to member countries. It also supports the improvement of national programs through the enhancement of international coordination and promotion of public understanding of radioactive waste storage and disposal issues.

In 1987, OECD/NEA established the Radioactive Waste Public Information Informal Working Group. Participants included representatives from Belgium, Canada, France, Finland, Germany, Japan, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom, and the United States. The objectives of the Working Group are:

- To exchange information on effective public information programs;

- To recognize public concerns and exchange lessons learned;
- To provide support and resources among member countries; and
- To enter into joint projects for these purposes.

Several joint projects were undertaken by the Working Group. The first project was the development and production of a set of 12 brochures describing the radioactive waste management programs of each of the 12 countries. These products, when completed, were then distributed among the 12 countries and have become very popular information resources to schools, professional organizations, and the general public. Each of the countries plans to update its brochure as needed.

The second project resulted in the production by OCRWM of a videotape entitled, "Worldwide Waste Management." It was based on the information contained in each brochure discussed above and reviewed by each country prior to final production. This video will also be updated when necessary.

The Working Group continues to meet annually to exchange information, discuss public concerns, and provide updates on program activities, progress, and problems. In addition, OECD/NEA sponsors various international seminars on public information topics in which Working Group members participate.

#### FROM PUBLIC INFORMATION PROGRAMS TO EDUCATION PROGRAMS

At the 1989 annual meeting of the OECD/NEA Radioactive Waste Public Information Informal Working Group co-hosted by Sweden and Finland in Scandinavia, it became evident from the interests and initiatives discussed by each country represented that general public information programs were evolving into focused education programs. In addition, public inquiries received by the public information offices of the respective countries were coming increasingly from educators and students. As a result, the next annual meeting of the Working Group, hosted by the United States and held in Las Vegas, Nevada, in April 1990, focused on the role of education in radioactive waste.

To help the Working Group assess the role of education in the field of radioactive waste management, the University of Nevada, Las Vegas and Reno, were invited to participate in the Working Group meeting. It was concluded at that meeting that information programs for the general public generally fell short of reaching their goal, which was to raise the broad knowledge of the public regarding the objectives and methods of radioactive waste management. A primary reason cited is that in most cases little or no resource material exists in the school systems for teachers and students to use to learn the facts and issues of the basic science and social science necessary to understand technical issues and the associated societal issues related to radioactive waste and its management.

It was also determined at the Working Group meeting that (1) education does have a role in radioactive waste management, and (2) educators must be involved in helping to define that role. To do that, a unanimous decision was made by the Working Group to sponsor an international education workshop that subsequently resulted in the establishment of

the International Education Alliance for Education in Radioactive Waste Management.

#### INTERNATIONAL EDUCATION WORKSHOP

In June 1991, the first International Workshop on Education in the Field of Radioactive Waste Management was held in Engelberg, Switzerland. The workshop was jointly organized by OECD/NEA and OCRWM, in cooperation with the Swiss Cooperative for the Storage of Radioactive Waste (CEDRA/NAGRA). The focus of the workshop was to see how radioactive waste management is at the crossroads of energy, science, and environment; to discuss how to build an information base for education systems on global aspects of radioactive waste management; and to achieve initial international consensus on the basic tools and methods to develop this information base.

More than 80 education program developers, teachers, professors, information specialists, scientists, and radioactive waste management program managers from 13 countries participated in the workshop in Switzerland. Educational materials from several countries were presented and critiqued. Discussions were extensive about what educational material is needed; who should produce it; what role government or industry radioactive waste management organizations should have in its development; and what impact, if any, educational initiatives might have on radioactive waste management programs. The following conclusions were reached at the Switzerland workshop:

- Educational initiatives are key to developing and implementing radioactive waste management solutions;
- Education in the field of radioactive waste management must be addressed in the context of energy and the environment;
- Participating countries do not have well-defined educational strategies for building knowledge relative to radioactive waste management;
- There are no international educational materials in or related to this field; and
- Much work is desirable and needs to be done in developing educational strategies, educational resource materials, and educational approaches globally toward national use.

OCRWM was given the lead to establish an approach to international education in the field of radioactive waste management.

#### INTERNATIONAL EDUCATION ALLIANCE

Within several months following the Switzerland workshop, and as a result of recommendations at the workshop, a small task group consisting of representatives from Canada, Sweden, the United Kingdom, and the United States met to consider approaches to international education. To assist in the "brainstorming," educators from Oak Ridge Associated University in Oak Ridge, Tennessee, and from the Colleges of Education from the University of Nevada, Las Vegas and Reno, Nevada, participated in the meeting. The meeting resulted in the development of a concept paper with several approaches including the establishment of a formal international education working group to plan, organize, and

implement mutually beneficial international education efforts in the field of radioactive waste management.

Representatives from the 13 countries that attended the Switzerland workshop were presented with the concept paper, and a meeting was held in April 1992 to discuss the approaches. Some approaches were discarded; some were expanded upon. Present at that meeting were representatives from Austria, Canada, France, Spain, Sweden, Switzerland, the United Kingdom, the United States, and the OECD/NEA. As a first step for development and implementation of cooperative international education initiatives, the International Alliance for Education in Radioactive Waste Management was established by acclamation of those present. Subsequently, Belgium, Finland, Germany, Japan, and the Netherlands confirmed their interest in membership in the Alliance. In addition, inquiries have now been received from other countries interested in joining the Alliance, and participation may be expanded.

It was agreed that the United States shall serve as the Secretariat, the chairmanship of the Alliance shall rotate, and the first chairman shall be Ginger P. King, Director of Education and Information, Office of Civilian Radioactive Waste Management, U.S. Department of Energy. The Secretariat responsibilities are carried out by the Civilian Radioactive Waste Management Information Center, managed by Timothy L. Hill, Senior Program Manager, Science Applications International Corporation.

#### MISSION AND GOALS OF THE ALLIANCE

The mission of the Alliance is "to foster science literacy in radioactive waste management through international collaboration in education." The goals established by the Alliance are set in a global framework with the focus on respective national needs. The goals are to:

- Encourage national commitment and participation for international collaboration efforts in education;
- Establish an international framework and strategies to support national education resources;
- Enhance national radioactive waste management through consideration of science, technology, and society issues;
- Establish and maintain national and international clearinghouses for educational materials;
- Exchange ideas, experiences, materials, and information on education strategies; and

- Support and develop programs to enable individuals to make informed decisions.

#### ALLIANCE PROJECTS

Alliance members have determined that an international curriculum is not practical. While there is clearly international consensus for permanent disposal of spent nuclear fuel and high-level radioactive waste, national strategies and political and/or organizational structures vary and so do educational systems of the member countries. A first project, therefore, is a modest one: the development of an International Catalogue of Selected Educational Resource Materials Related to Radioactive Waste Management.

The International Catalogue will be provided to educators and teachers in participating countries and will describe materials available to them from Alliance member countries. The Catalogue will contain: (1) teacher-tested educational materials designed specifically for school use; and (2) informational materials designed for general use and available as an additional resource.

The first edition of the International Catalogue is expected in summer 1993. It will be of a modest and manageable size, and distribution within each country will be the responsibility of each Alliance member. As part of this project, a process will be developed to: (1) provide regular updates or additions, and (2) evaluate its use and effectiveness.

Another project that will be undertaken is one mentioned earlier in this paper -- the updating of the country brochures originally developed under the direction of OECD/NEA. They will be produced in two versions -- as single country brochures for use within the respective countries and as a multi-country booklet for multinational use. A classroom activity sheet or lesson plan may be added for educational use and suggested student research or study projects and other teacher aids may also be included.

#### SUMMARY

In summary, the International Alliance for Education in Radioactive Waste Management can contribute greatly to building the knowledge necessary for responsible national decisionmaking and problem-solving by putting radioactive waste management into a global context; by providing educational resources to teachers for thoughtful classroom investigation and learning; and by helping to identify tools and methods for learning where learning is the number one objective -- in the classroom.