

## OHIO'S STATEWIDE LOW-LEVEL RADIOACTIVE WASTE EDUCATION PROGRAM: A NEW PARTNERSHIP

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### ABSTRACT

Faculty members from the Ohio State University (OSU) Nuclear Engineering Program and OSU Extension have formed a team to conduct a Statewide Low-Level Radioactive Waste Education Program. Nuclear Engineering faculty with expertise in radioactive waste management and Extension faculty with expertise in environmental science, education, and communications work together to develop accurate, research-based, unbiased educational materials on low-level radioactive waste. These materials are then distributed through the well-established OSU Extension network which has offices in each of Ohio's 88 counties. The materials include 27 fact sheets and four exhibits. The goal of the program is to provide Ohio's citizens and their elected officials with information they need to participate in discussions and decisions related to low-level waste. The program is funded by a grant from the Midwest Interstate Low-Level Radioactive Waste Compact Commission.

### INTRODUCTION

In July of 1991, Ohio became the host state for the Midwest Compact's low-level radioactive waste disposal facility. At that time, a team of faculty members at The Ohio State University, recognizing that there would be heated debate over the low-level waste issue in Ohio, began developing plans for an educational program that would provide Ohio's citizens and their elected officials with a source of information to which they could turn for unbiased, research-based answers to their questions on low-level waste.

The faculty team consisted of professors from the Nuclear Engineering Program with expertise in radioactive waste management and professors from Ohio State University (OSU) Extension with expertise in environmental science, education and communication. They were assisted by graduate students in nuclear engineering, environmental communication, law, and biomedical engineering.

This partnership between Nuclear Engineering and OSU Extension is a unique approach to providing information on low-level radioactive waste to a State's citizens. OSU Extension is the outreach arm of The Ohio State University with County Extension Offices in each of Ohio's 88 counties. Extension was created in 1914 primarily to provide the latest news on agricultural research to Ohio's farmers. Over the years, OSU Extension has expanded its mission to include providing unbiased, research-based information on a wide variety of technical issues about which citizens are concerned. Low-level radioactive waste has become one of those issues. Through this new partnership, informational materials on low-level waste are developed by nuclear engineers and extension faculty and then distributed statewide through the OSU Extension network.

### PROGRAM PHILOSOPHY

Early in the discussions that led to a proposed educational program on low-level radioactive waste, the faculty agreed on a basic program philosophy. It is shared with all new members of our Project Team and is reflected in our work. The following paragraph contains a brief statement of that philosophy.

Low-level radioactive waste exists. It must be disposed of properly. Citizens and their elected officials will need to make decisions about low-level waste management. Sound decisions must be based on accurate information. Our purpose is to provide Ohio's citizens and their elected officials with accurate, complete, research-based, unbiased information they need to participate in discussions and decisions related to low-level radioactive waste. The Project Team advocates no particular position or decision. In short, we do not take "sides". Our goal is to help make discussions on low-level waste rational and well-informed.

### PHASE I

The faculty members developed a proposal to conduct a low-level radioactive waste education program and approached potential sponsors. In the Spring of 1992, the Midwest Interstate Low-Level Radioactive Waste Compact Commission agreed to fund Phase I of the program. Phase I was a one-year effort to prepare educational materials for the general public. The primary materials were fact sheets and exhibits which could be used at fairs, mall shows, civic meetings, and other public events.

### Fact Sheets

Project Team members agreed that the fact sheets needed to be 1) technically accurate and as complete as possible, 2) educationally effective, and 3) unbiased. Meeting these goals was a great challenge. The first and second criteria seemed to be nearly mutually exclusive. Technically accurate, complete materials generally contain the correct technical terminology, mathematical expressions of the principles involved, and detailed discussions. On the other hand, educationally effective materials on technical topics written for the general public must be relatively free of technical terminology and mathematical equations and very short. Obviously, compromises had to be made.

Satisfying the third criterion, lack of bias, required special effort as well. People who have studied a particular subject (e.g. nuclear engineering or environmental science) in depth for several years, develop biases that are so ingrained that they become transparent to the person who holds them. Efforts to

eliminate bias in the fact sheets included actively searching for and rooting out bias in our own work, maintaining a balanced team with faculty members and graduate students from many disciplines, and seeking review comments from numerous people with diverse backgrounds and points of view.

Fact sheet development began with an outline of the topics to be addressed. The topics were divided into two main categories: Technical and Historical/Legal. The technical category was split into three subdivisions:

1. Characterization of low-level waste;
2. Radiation science; and
3. Technology.

The characterization of low-level waste included topics such as definition of low-level waste, processes that produce low-level waste, volumes of waste, and categories of generators.

Radiation science included discussions of radioactive decay, background radiation, health effects, and shielding. The technology category included waste treatment and disposal methodologies, transportation, and waste minimization.

Historical and legal fact sheets addressed legislation, regulations, the history of the Midwest Compact, and Ohio's role in that compact. Costs, site selection requirements, and community considerations were also included.

Each fact sheet addressed a single topic and was designed to stand alone although references to other fact sheets containing related material were placed at the end of a fact sheet when appropriate. Twenty-seven fact sheets were written. Each one was restricted to one or two sheets of 8 1/2" x 11" paper.

A process for writing the fact sheets was designed to enable the Project Team to satisfy the three criteria identified at the beginning of this section (technically accurate, educationally effective, unbiased). The steps in the production of each fact sheet were:

1. Technical draft
2. Education draft
3. Project Team review
4. Review by external group with expertise in the topic addressed
5. Revision
6. Review by 5-person Review Panel
7. Revision
8. Review by large group of interested persons
9. Final revision
10. Production.

The technical draft was written by Nuclear Engineering faculty and graduate students, sometimes in cooperation with a law student. That draft was then passed to faculty and graduate students from OSU Extension with expertise in development of educational materials and environmental communication. Often there were several iterations between the technical and education drafts. Then the faculty members of the Project Team reviewed the draft before it went to any outside reviewers.

Faculty members not on the Project Team but having expertise in the topic addressed by a fact sheet and representatives of the Midwest Compact conducted the first external review. Their comments were addressed, and the draft was

revised. The composition of this review team varied, depending on the content of the fact sheet.

The fact sheet then went to a 5-person Review Panel consisting of a science education expert, a representative of a national environmental group, a nuclear safety expert, a physician working in the nuclear medicine department at a large hospital, and a retired judge. This group reviewed every fact sheet. Their comments addressed not only the criteria mentioned earlier but also consistency of style, vocabulary, and level of detail across the entire set of fact sheets. Again the comments were considered, and the fact sheet was revised.

The last review group was quite diverse. All identifiable environmental groups in Ohio as well as all generators of low-level waste were invited to review the draft fact sheets. Several groups accepted the offer. Any person or organization that contacted the Project Team and asked to be in the final review group received drafts for their comments. In addition to representatives of environmental groups and generators, the final review group included professional organizations, reporters, and legislators. Comments from this group ranged from condemnation of OSU's involvement in this project to thoughtful line-by-line suggestions for modifications. The latter proved to be of tremendous value. As a result of those comments, information was added to make the fact sheets more complete, vocabulary was changed to make them easier to understand, and previously unrecognized bias was removed.

### Exhibits

OSU Extension Agents often have opportunities to display informational exhibits at fairs, meetings of civic organizations, and other public events. Over the years they have developed techniques for presenting technical information on display boards, commonly called exhibits. These boards are about four feet high and six to eight feet long. Each board has two or three simple illustrations and only 20 - 40 words, many in very large letters. Exhibits are placed on a standard folding table, with a few fact sheets containing additional information lying in front of them.

The purpose of the exhibits is to draw peoples' attention to the topic being addressed, perhaps convey one fundamental concept, and encourage people to take and read fact sheets containing more detailed information. Exhibits are often unattended so that people will feel comfortable approaching the displays and taking some time to look at them.

Prototypes of four exhibits were produced during Phase I. One was developed for each of the four categories of fact sheets 1) Characteristics of low-level waste, 2) Radiation science, 3) Technology, 4) Historical/Legal. The prototypes were displayed at several meetings, and comments from people with many different backgrounds were received. Final versions of the exhibits are to be produced during Phase II of the Education Program.

### **PHASE II**

In November of 1993 the Midwest Compact Commission approved funding for Phase II of OSU's Low-Level Radioactive Waste Education Program. Phase II is entitled "Outreach". Its goal is to distribute the educational materials developed in Phase I throughout Ohio. The outreach efforts are focused on three target audiences: 1) the general public, 2) state and local officials (including health and environmental officials), and 3) the media. Outreach programs are conducted at two levels: county and state.



### County Outreach Programs

Since the beginning of Phase I, County Extension Faculty have been aware of the Low-Level Radioactive Waste Education Program. Some of them provided comments on the draft fact sheets. In February, members of the Project Team conducted a workshop in each of Ohio's five Extension Regions. At these workshops, County Agents learned to use the educational materials developed in Phase I and discussed the county-level outreach programs with the Project Team.

As part of Phase II, each County Extension Office conducts a variety of programs to provide information on low-level radioactive waste to each of the three target audiences in that County. The types and number of programs offered in any particular county are determined, in part, by the level of public interest in low-level waste in that vicinity.

However, every county conducts some outreach activities. All County Extension Offices maintain a file of the fact sheets on low-level waste and make them available to the public. Each Extension Office has provided sets of fact sheets to the County Commissioners, County Health Department, and other county, city, and township officials as appropriate. Summaries of the fact sheets are being written by the Project Team in a form suitable for use as a newspaper article, and the County Extension Office will provide those summaries to the county's newspapers.

One of the most important activities of County Extension Agents is to serve as a liaison between the people of their counties and the Project Team. They are being asked to listen carefully to questions on low-level waste, document those questions, request answers through a hot line established in Columbus by the Project Team, and convey the responses quickly. County Agents are also asked to clip any articles on low-level waste that appear in their local papers and send them to the Project Team.

In counties where the interest in issues related to low-level radioactive waste is high, County Extension Offices are offering additional services. The Project Team at Ohio State University has developed a set of slides with a script for County Agents to use to make presentations. Four sets of the exhibits described earlier are being made, and will be available for use by Extension Faculty. Within the constraints of project funding, Nuclear Engineering Faculty on the Project Team will visit any county to make presentations and answer questions at meetings arranged and facilitated by the County Extension Agent. The Phase II budget also includes funds for small grants to County Extension Agents to design and conduct their own programs on low-level waste in their counties, using materials provided by the Project Team.

### State-Level Outreach Programs

Outreach programs at the state level focus primarily on providing information on low-level waste to state officials, state-wide organizations, and media with large audiences. In addition, the Project Team at OSU produces new educational materials, as needed, and conducts training sessions on their use. The Project Team at the state level also is responsible for operating two hot lines: one to answer questions from the general public (through Extension Agents) and one for questions from the media.

As part of the state-level outreach program, a complete set of fact sheets was provided to every state legislator, and the fact sheets were discussed at a briefing session for legislators and their staffs. The Ohio Hospital Association requested 250 sets of fact sheets and distributed them to every hospital in the state. Five day-long workshops, one in each of Ohio's five Extension Districts, were prepared and conducted by the Project Team.

Another workshop is being planned for mid-March. This one is for the media, particularly for science and environmental reporters. It is being cohosted by the Project Team and three major science education centers affiliated with The Ohio State University. The day-long workshop will provide factual information related to low-level radioactive waste, a presentation by a nationally recognized expert on communicating scientific information to the public, and details on how reporters can get additional technical information for their stories from OSU.

Project Team members from the Nuclear Engineering faculty also accept invitations to make presentations on low-level waste at regularly scheduled meetings of state-wide organizations.

### **OBSERVATIONS AND CONCLUSIONS**

One of the observations that most surprised the Project Team was the difficulty almost everyone had understanding the project's purpose and goals. The term "education", when it is associated with some specific issue, is almost universally interpreted as "indoctrination" or "propaganda". The faculty members of the Project Team are educators. They strongly believe, and have explained time and time again, that education is not telling people what to think, but rather providing them with the tools they need to think for themselves. The purpose of the Statewide Low-Level Radioactive Waste Education Program is to provide Ohio's citizens and their elected officials with the information they need to participate in discussions and decisions related to low-level waste. The program does not advocate any specific position or action.

A second observation is that most people think an "unbiased" presentation of information on any issue means presenting "both sides" of the argument. The Project Team considered this approach early on and emphatically rejected it. People and organizations on "both sides" will do a quite adequate job of presenting their arguments, occasionally with some exaggerations, omissions, or perhaps even inadvertent errors in fact. The general public recognizes that these arguments are designed to persuade and may contain inaccuracies or perhaps omit relevant information. Ohio's citizens need a place to turn for information they can trust.

A university is one of the few institutions with the expertise and credibility to produce accurate educational materials that people will trust. Unfortunately, materials written by technical experts at a university are often for a very specialized audience and are not of much use to the general public. The partnership between OSU's Nuclear Engineering Program and OSU Extension offers both a team that can write technically accurate materials for the general public and a well-established network for distributing those materials.