NUCLEAR WASTE INFORMATION MADE ACCESSIBLE: A CASE STUDY

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ABSTRACT

The Nuclear Industry has made great technical strides toward the safe and efficient management of nuclear waste but public acceptance and cooperation lag far behind. The challenge is to better inform the public of the technical options available to safely manage the various types of nuclear wastes. Westinghouse responded to this challenge by creating the NUCLEAR WASTE MANAGEMENT OUTREACH PROGRAM with the goal to make nuclear waste information accessible as well as available.

The OUTREACH PROGRAM is an objective informational seminar series comprised of modules which may be adapted to various audiences. The seminars deal with radioactive wastes and the legislative and regulatory framework within which the Industry must function. The OUTREACH PROGRAM provides a forum to present relevant information, encourage an interchange of ideas and experiences, elicit feedback, and it provides for field site visits where feasible and appropriate.

The program has been well received by the participants including technologists, government officials, educators, and the general public.

INTRODUCTION

Nuclear Waste exists. It must be managed safely. The nuclear industry has made great technical strides toward the safe and efficient management of nuclear waste but public acceptance and cooperation lag far behind. Intense opposition to disposal projects is causing delays in government programs while the nationwide buildup of nuclear waste increases. If this opposition is to be overcome, the public must be informed. They must be able to deal with the issues intelligently and reasonably rather than emotionally. The challenge we face is to better inform government officials, environmentalists, community leaders, educators, and the general public of the technical options available to safely and efficiently manage the various types of nuclear wastes. This case study provides the details of one industrial company's response to this challenge.

CASE STUDY

Westinghouse created and developed the NUCLEAR WASTE MANAGEMENT OUTREACH PROGRAM with the objective of fostering a well-informed public with the ability to demonstrate a rational rather than emotional response to nuclear waste issues. The goal of the OUTREACH PROGRAM is to meet this objective by making nuclear waste information not only available, but accessible. How? Westinghouse believes the key to accessibility is to provide a forum to present the relevant information, encourage an interchange of ideas and experiences, elicit feedback, and provide for field site visits where feasible and appropriate.

Inception

The OUTREACH PROGRAM is an objective informational seminar series which evolved in response to a growing number and variety of requests for information. Originally planned as a one week seminar, a broad-scoped NUCLEAR WASTE MANAGEMENT OVERVIEW was developed by engineers and scientists from Westinghouse assisted by faculty members from the University of Pittsburgh School of Engineering. The OVERVIEW, which still remains a basic segment of the OUTREACH PROGRAM, was designed to give participants a comprehensive picture of all aspects of nuclear waste management in this country. The pilot program was first presented in November 1984 on the University of Pittsburgh campus. Twenty-two faculty and graduate students from both the University of Pittsburgh and Carnegie Mellon University attended the pilot session. These participants provided Westinghouse with detailed feedback which was used in developing the first public offering of the program in March 1985.

Scope

The OVERVIEW takes a broad look at the basics of radioactive waste and the legislative and regulatory framework within which the Industry must function. The four general waste types--High-Level Waste, Spent Fuel, Transuranic Waste, and Low-Level Waste--are defined and the sources of each studied. It is important to note that the seminar does not merely focus on the ultimate disposal of these wastes. Technologies are presented for the processing, handling, packaging, storing, and transporting, as well as disposing of all types of nuclear wastes. Economic, health, and safety factors are evaluated and geologic repository siting and characterization are discussed.

The OUTREACH PROGRAM also includes more specialized seminars that evolved when it became apparent that not everyone was interested in all phases of waste management. Because the program employs a modular design it is easily adapted to audiences with specific interests. Modules may be used in many different combinations to satisfy special requirements. For example, the module on Transportation Alternatives is included in both the LOW-LEVEL and the TRANSPORTATION seminars, where it is lengthier. However, the module on treatment and packaging of Spent Fuel is included in the TRANSPORTATION seminars, but omitted for LOW-LEVEL ones. Figure 1 illustrates that combinations of modules are employed in different seminars.

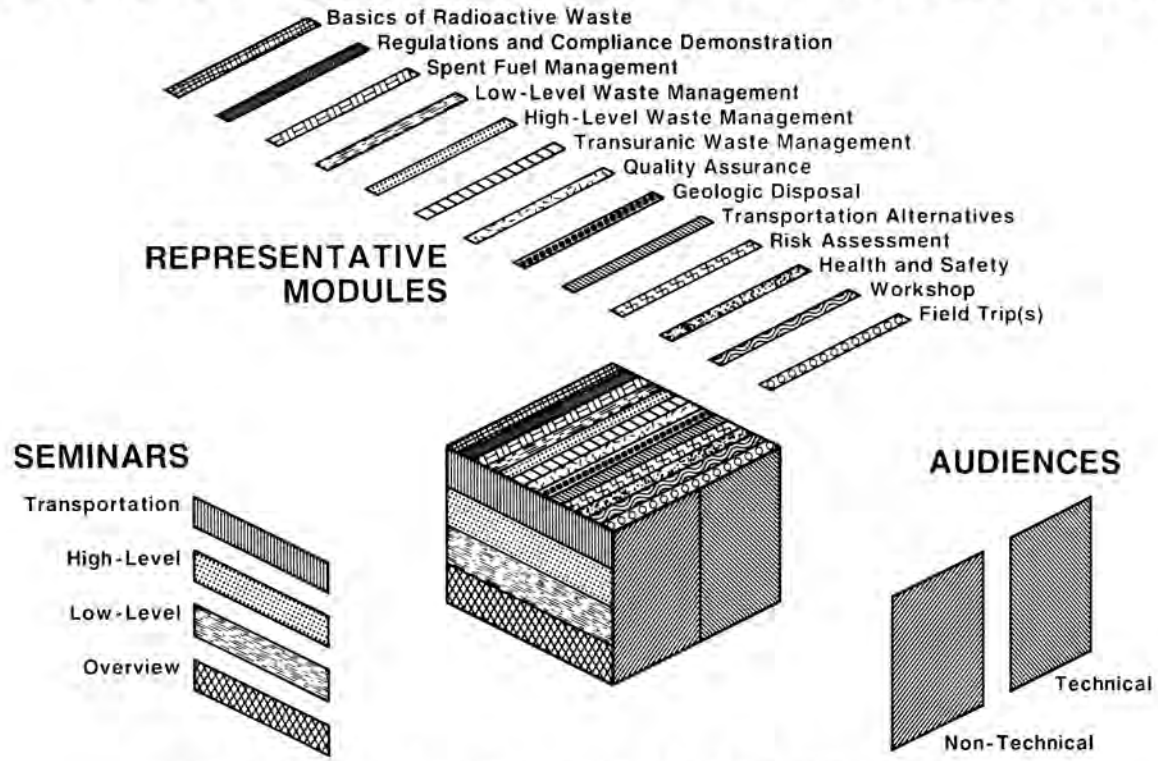

Fig. 1. Nuclear Waste Management Seminars can be Structured to Meet the Needs of Specific Audiences

The evolving OUTREACH PROGRAM grew in three directions to meet the needs of various audiences:

1. Shorter more specialized seminars were developed by sharpening the focus and narrowing the scope of the original OVERVIEW.

2. The OVERVIEW was expanded to two weeks to include field site visits. Where appropriate, field trips are also offered in shorter seminars.

3. A third variation adapting the technical seminars for non-technical audiences was designed in order to meet the growing demand from various segments of the general public for information about nuclear waste technology and related issues.

Implementation

The seminars which form the basis of the NUCLEAR WASTE MANAGEMENT OUTREACH PROGRAM are structured to allow for maximum interaction among the participants and require teamwork in problem solving. Instruction is presented in a classroom setting. The seminars are basically taught by Westinghouse senior technical staff although consultants with expertise in areas of special interest often serve as guest lecturers. University professors are also regularly involved with the program. Professors from the University of Pittsburgh and the University of Missouri-Rolla have taught modules. At the conclusion of the final substantive presentation, a comprehensive interactive workshop led by a senior technical manager is held, where the various teams compare and discuss their conclusions. The format and teaching methods developed for the OVERVIEW have been employed in all seminars. How technical information is made accessible in the OUTREACH PROGRAM is described below:

- MATERIALS - Each participant is provided with a loose-leaf binder containing several hundred pages of the most current information on nuclear waste. Other reading material includes documents for future reference. This is especially valuable to some overseas participants who may have limited library facilities. Audiovisual aids are employed including posters, maps, videotapes, geologic samples and exhibits of scale models of equipment.

- CLASSROOM INSTRUCTION - Classroom lectures are separated into chapters (modules), each addressing a specific topic. Examples of modules are SPENT FUEL MANAGEMENT, LOW-LEVEL WASTE MANAGEMENT, HIGH-LEVEL WASTE MANAGEMENT, TRANSURANIC WASTE MANAGEMENT, and TRANSPORTATION ALTERNATIVES. Key technical and legislative issues, safety, and economic trade-offs are offered for each topic.

- TEAMWORK - Seminar participants are organized into teams immediately after the first module. The teams are carefully formed to achieve a proper balance with respect to expertise. Team members elect their own captain. During the course of the seminar, teams assemble in their free time to work on problems relevant to the open-book assignment.

- INTERACTIVE WORKSHOP - After the completion of the final module, a comprehensive interactive workshop is held during which the teams of participants compare and contrast sources, issues, technology, projects and regulations applicable to each type of waste. The workshop, directed by a senior member of management, provides an opportunity for participant discussion and questioning.

- BANQUET AND KEYNOTE ADDRESS - Each seminar includes a banquet or luncheon held on the final full day of classroom instruction. The keynote address is delivered by a prominent member of the waste management community. Keynote speakers at past seminars have included high level members of the American Nuclear Energy Council, the Department of Energy, and the U.S. Congress.

- OPTIONAL FIELD SITE VISITS - Where appropriate, participants are offered field site visits to major waste-related demonstration projects. Attendees are given a first-hand view and explanation of current work at the facility on a guided tour conducted by project experts. They have the opportunity to observe the attendant safety precautions, approaches to environmental protection, and redundancies built into the program. In addition, they are presented with literature and lectures by project personnel.

Depending upon time constraints and the duration and location of the seminar, various other opportunities for active participation are available. In the past, at the conclusion of the workshop, participants have been invited to attend a discussion featuring a panel of experts associated with current waste-related projects. Each panelist briefed the participants in the area of his/her expertise and was available for questioning. On other occasions, the seminar concluded with a scheduled consultation period during which participants met with an expert engineer or scientist to discuss the topic of their choice.

History

Westinghouse established the Technical Assistance Program for Nuclear Waste Management in September 1984. The program was conceived as an educational outreach and public service program in direct support of Section 223 of the U.S. Nuclear Waste Policy Act of 1982 (NWPA) which requires the United States to cooperate with and provide technical assistance to non-nuclear-weapon states in the field of spent fuel storage and disposal.

Early Seminars

The first public offering of the OVERVIEW occurred in March 1985. Twenty-five people, including nine industry representatives from Japan, attended. In response to participants' comments, especially from overseas students, the course was subsequently expanded to include an optional second week of field site visits and additional lectures. The OVERVIEW was first presented in its two week format in September 1985. The thirty-five attendees represented a cross-section of U.S. industry, government, and academia. Also in attendance were engineers from Belgium, Japan, the Republic of China, and from Euratom in Italy.

Evolution

As described above, the evolving OUTREACH PROGRAM grew in three directions to meet the needs of various audiences, i.e., addition of field site visits, short specialized programs, and seminars for non-technical audiences. The shorter more specialized seminars are available for general audiences and in-house presentations. They are customized for specific audiences and range in length from two to three days. A sampling of seminars that have been presented are:

- LOW-LEVEL NUCLEAR WASTE SEMINAR - A seminar on low-level waste management was presented to two groups of split-shift five day employees of the DOE Feed Materials Production Center (FMPC) at Fernald, Ohio in May 1986, enabling them to continue working half-time. The program received a unanimous positive response and was repeated in December 1986. At the request of FMPC, the latter program included the addition of a section on defense waste, stressing acceptance criteria at the Nevada Site. Guest lecturers from Reynolds Electrical and Engineering Co., Inc. were included to satisfy this requirement. Non-technical employees attended a modified three-day version in December 1986.

- HIGH-LEVEL NUCLEAR WASTE SEMINAR - These seminars were first offered to technical audiences in 1986. Two seminars, two and a half days each, were presented in the Washington, D.C. area to allow for easy access by government and regulatory employees. A one day optional tour to a vitrification facility followed.

- SEMINARS FOR NON-TECHNICAL AUDIENCES - A presentation was made to a non-technical audience at the request of the Confederated Tribes of the Umatilla Indian Reservation in Pendleton, Oregon. A two-day High-Level Nuclear Waste seminar was presented to members and invited guests in June 1986. Designated an "Affected Tribe" because of its close proximity to the proposed site of a high-level nuclear waste repository near Hanford, Washington, this group was interested in learning about nuclear waste so they could deal intelligently with the issues. The seminar was appropriate for the purpose and favorably received by a diverse audience in which many occupations and varying educational backgrounds were represented.

  The same format and teaching methods developed for the technical presentations are employed in presentations to lay audiences in order to provide them the same benefits of teamwork, dialogue and interaction.

Audiences

The OUTREACH PROGRAM seminars are intended for opinion leaders from industry and government as well as private interest and environmental groups. Because nuclear waste management is a global problem and in response to Section 223 of the NWPA, overseas participants were also targeted.

Almost 400 people have taken part in a dozen seminars since the pilot program in September 1984. The dateline for the presentation of these seminars is illustrated graphically in Fig. 2. Many of the attendees are representatives from nine foreign nations. The expanded OVERVIEW is particularly appropriate for foreign audiences. The two week format, including field-site visits, makes traveling to the U.S. for training worthwhile. Foreign participation is mutually beneficial. Attendees from the United States learn about the applications of technology employed by other societies and the

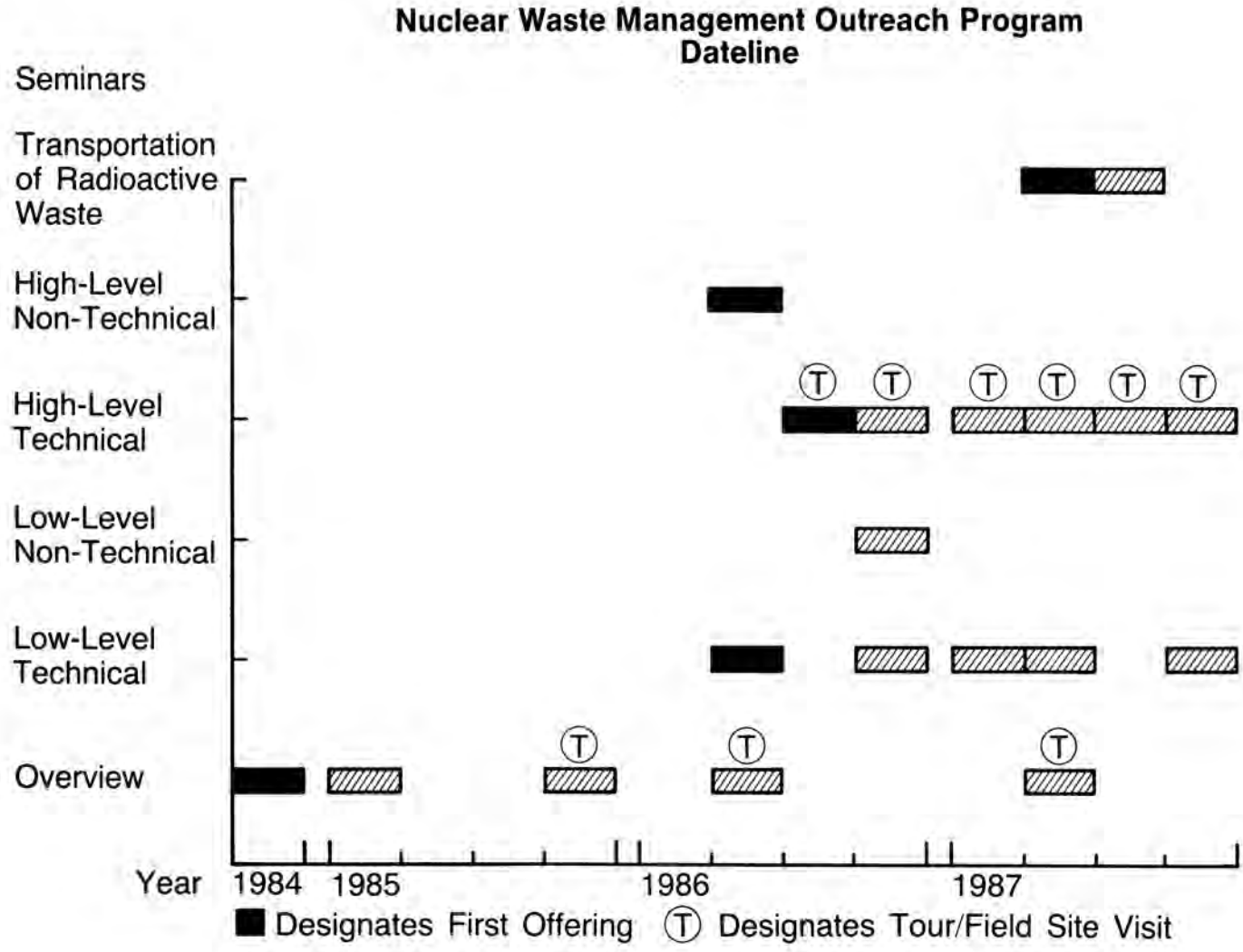

Fig. 2. Nuclear Waste Management Outreach Program Dateline.

different priorities dictated by geographic, cultural, and economic differences. A representative list of participants is shown in Fig. 3.

EVALUATION

The value of any program is judged by how well it meets its objectives and goals. The OUTREACH PROGRAM presentations have been extremely successful in meeting their goal of making information accessible and have had a favorable impact on the objective to foster a well-informed public with the ability to demonstrate a rational rather than emotional response to nuclear waste issues. A vast array of current information from myriad sources is compiled and organized into a coherent useful resource. The program, by providing a conceptual framework, technical foundation and vocabulary to use when discussing nuclear waste topics, serves to create a nucleus of informed citizens who are visibly less mystified, less apprehensive, and often less hostile to the entire nuclear waste situation. These better informed citizens, in turn, are often eager to share what they have learned with their colleagues and their communities.

Government officials who have attended the seminars have been unanimous in praising their value. Congressman Harold Volkmer, in a May 1986 letter to Mr. Ben Rusche, Director of the DOE Office of Civilian Radioactive Waste Management, recommended that more such programs be presented. Various DOE Offices have requested brochures and presentations. The National Conference of State Legislatures have expressed interest. Following the Confederated Tribes seminar, the Richland DOE Representative recommended to headquarters that these programs be presented nationwide.

Universities play a pivotal role in training future urban planners, scientists, engineers and managers. Therefore, university involvement is vital. Educators were quick to recognize the value of the OUTREACH PROGRAM. The University of Pittsburgh has, as a direct result of its earlier collaborative effort with Westinghouse, developed and now offers a three credit graduate course. The University of Missouri-Rolla has also developed a three-credit upper-level course and, in addition, has provided instructors for the OUTREACH PROGRAM. Favorable word-of-mouth has prompted inquiries from other universities, including the Pennsylvania State University and the Virginia Polytechnic Institute.

INDUSTRY

E. I. duPont deNemours & Company, Inc.
EG&G Idaho, Inc.
Electrobel S.A., Belgium
Euratom, Italy
GEC Energy Systems, Ltd., United Kingdom
Impell Corporation
Ishikawajima-Harima Heavy Industries, Japan
Mitsubishi Atomic Power Industries, Japan
Nuklearna Elektrarna, Krsko, Yugoslavia
NUS Corporation
Rockwell International
Rust Engineering

GOVERNMENT

Atomic Energy of Canada Ltd.
Atomic Energy Council, ROC (Taiwan)
City of Las Vegas
Missouri Transportation Division
National Conference of State Legislatures
Tennessee Valley Authority
U. S. Department of Agriculture
U. S. Department of Energy
U. S. General Accounting Office
U. S. Nuclear Regulatory Commission

UTILITIES

General Public Utilities Nuclear
Nebraska Public Power District
Northern States Power Utility
Texas Utilities Generating Company
Philadelphia Electric Company
Southern California Edison
Wisconsin Public Service

OTHER

American Nuclear Insurers
American Nuclear Society
Confederated Tribes of the Umatilla Reservation
League of Women Voters
Louisiana Geological Survey
National Academy of Sciences
Nuclear Waste News
Pennsylvania State University
University of Tennessee
Washington State Institute for Public Policy

Fig. 3. Representative List of Participants.

Response by lay audiences who have attended the non-tecnical presentations has been equally favorable. These participants have expressed appreciation for the factual information presented. Once in possession of the facts, they were in a position to have an informed opinion or, in some cases, to make decisions based upon a more realistic evaluation of the issues. Guests who were invited to the seminar by the Confederated Tribes of the Umatilla Indian Reservation included officials from nearby states, representatives from other affected Indian tribes, emergency response personnel, and various public interest groups. These guests were so favorably impressed with the information provided that they, in turn, have expressed an interest in making similar programs available to their respective constituencies.

Participants in the OUTREACH PROGRAM are asked to evaluate every aspect of the course throughout the seminar. Selected comments from these evaluations are listed in Fig. 4.

FUTURE

Obviously, the need for an informed public still exists. We have barely made a beginning in the quest to reach key decision-makers and opinion leaders who need to know more about the nuclear waste options available to them. It is the authors position that those with current, hands-on experience with actual radwaste projects can best meet this need. A joint effort of the industrial/scientific community, government at all levels, and public interest groups is needed to ensure that the technological advances made thus far are not impeded by poorly informed decision-makers who will ultimately determine future policies and implementation of nuclear waste disposal programs.

TECHNICAL	NON-TECHNICAL
"The overall application of the many diverse factors that influence technical decisions with regard to Nuclear Waste Management will be invaluable in helping me make educated decisions."	"The program was presented to me as a lay person.... The Staff made things clear and understandable.... I am a better informed person."
"This seminar has broadened my background on a very critical public policy issue in Washington State. I now have more technical information (or access to it) to use in working in this issue area."	"A good job covering a lot of difficult material. Good printed material--will be helpful later on."
"Fantastic interaction with other participants, especially hearing technical viewpoint on institutional issues..."	"The seminar was beneficial to me personally because its overall content was understandable as a sort of frame of reference and established a better perspective in my work."
"Attendance at this seminar will better enable me to understand the waste program and where it is going. It gave me a wealth of knowledge to draw upon."	"(I will use what I have learned to) better explain to others the activities proposed by DOE and the scientific community."
"This seminar was definitely worth attending. It was a good all-around educational experience."	"A much-needed course. Thanks!"
"All instructors were impressive."	"The anti-nuclear groups may benefit from this presentation. Perhaps high school teachers would benefit as they in turn could pass knowledge along."
"Material (distributed) was excellent - informative and well organized."	

Fig. 4. Selected Comments from Evaluations.