THE NUCLEAR WASTE POLICY ACT

Unit Purpose:

This unit of study will identify the key elements of our Nation's nuclear waste dilemma and introduce the Nuclear Waste Policy Act and the role of the public in the development of a high-level waste management program.

An introductory study of the Nuclear Waste Policy Act makes use of several media including a videotape, reading lesson and review, analytical essay writing, discussion on participatory democracy, development of a schematic, and the possibility for original document research and role-play.

Through participation in a "hands-on" activity, students will begin to develop insight into the difficult task we face in the development of nuclear waste management technology. This activity will enhance appreciation for the complexity of the task of siting, storing, transporting, and disposing of high-level nuclear waste.

Risks specifically associated with nuclear waste will be explored and students will examine their own risk judgments through use of pencil-paper and computer activities. Additionally, students will look into how scientists and decision-makers who are involved in determining methods of protecting health or improving safety quantify relationships among risks by developing mathematical probabilities. By exploring the issue of nuclear waste in this broader perspective, students will begin to appreciate the complex societal and technical challenges faced by the Nation. This awareness will help students become better informed citizens and future decision-makers. Student apprehensions regarding nuclear waste technology may surface during the discussions on risk and probabilities. It is important to probe for, acknowledge, and address these concerns as they are expressed.

Unit Concepts:

A national challenge exists because there is an accumulation of nuclear waste.

1. Many solutions have been explored over a 30-year period. Today, the majority of informed technical opinion holds that disposal in deep geologic repositories is the preferred method of permanent isolation.
2. The purpose of the Nuclear Waste Policy Act (NWPA) of 1982 and its amendments is to provide for the safe handling, storage, and disposal of our Nation's spent fuel and high-level nuclear waste.
3. The U.S. Congress has established that the management of nuclear waste is the responsibility of the present generation and should not be left for future generations.
4. Those involved with the program are dedicated to making technically sound decisions, working with affected parties to identify potential negative impacts and to avoid, mitigate, or compensate for such impacts.
5. The NWPA provides for independent oversight and review.
6. Many steps must be identified and addressed in planning and completing a complex task.
7. Complex technical and societal challenges must be addressed and solved in making decisions

about the management of nuclear waste.
8. In making decisions about the management of nuclear waste, both technical and societal aspects of the challenge must be addressed.
9. In a democratic society, national challenges are solved through striving for legitimate and acceptable decisions arrived at through open and balanced dialogue.
10. Societal decisions are shaped by human values, perceptions, and analysis of facts.
11. The Nuclear Waste Policy Act of 1982 and amendments established a plan for the safe handling, storage, and disposal of our Nation's spent fuel and high-level radioactive waste.
12. State and public participation in the planning and development of the system is essential in order to promote public confidence in the safety of disposal of high-level nuclear waste and spent fuel.
13. Despite the controversy associated with the managing of our Nation's nuclear waste, it is imperative that this growing national challenge be addressed promptly and responsibly.
14. Risk has many dimensions.
15. Every human activity involves some degree of risk.
16. In making decisions about managing nuclear waste, public risk perception and the distribution of risk must be considered.
17. Both risk management and risk assessment are important aspects of the waste management program.
18. Scientists quantify relationships among risks by developing mathematical probabilities.
19. Judgment is an inevitable element in selecting criteria for quantifying risk.
20. Someone has to make the decision of whether or not a level of risk is acceptable.

Duration of Unit:

Seven 50-minute class periods

Unit Objectives:

As a result of participation in this unit of study, the learner will be able to:
1. name the key provisions of the Nuclear Waste Policy Act;
2. identify the key agencies involved in the high-level radioactive waste management program;
3. discuss whether this generation or future generations should provide for disposal of nuclear waste currently in storage;
4. identify specific attempts to allow for participation of affected parties;
5. identify ways in which independent oversight of DOE is provided for;
6. explain how and why the Nuclear Waste Policy Act provides for public participation;
7. explain the Federal role in the management of nuclear waste;
8. identify major steps involved in completing a complex project;
9. draw a conclusion about the complexity of the task DOE is faced with regarding the nuclear waste management program;
10. identify challenges and solutions associated with nuclear waste;
11. differentiate between technical and societal issues related to disposing of nuclear waste;
12. state ways in which people living in a democratic society make decisions about risks related to technology;
13. explain why he/she ranked the various items on the risk activity as he/she did;

14. discuss risk and what can be done to reduce it in his/her own life;
15. discuss both positive and negative results of risk management limitations;
16. discuss probabilities and risk assessment on an introductory level; and
17. discuss limitations of using probabilities in making societal decisions.

Unit Skills:

Analyzing, comparing and contrasting, concluding, critical thinking, decision-making, describing, designing, discussing, drawing conclusions, evaluating, explaining, graphing, group dynamics, note taking, rank ordering given items, reading, summarizing, synthesizing, viewing

Unit Vocabulary:

Acceptable level of risk, affected parties, Benefits Agreement, certification, democracy, distribution of risk, environmental impact statement, EPA, flow chart, global, judgment, MRS, MRS Review Commission, NIMBY, notice of disapproval, Nuclear Waste Fund, Nuclear Waste Policy Act of 1982, Nuclear Waste Policy Amendments Act of 1987, Nuclear Waste Technical Review Board, OCRWM, probabilities, quantify, risk assessment, risk management, risk perception, site characterization, societal, technical, trade-off, Yucca Mountain

Unit Materials:

Reading lessons

The Nuclear Waste Policy Act: An Overview, p. SR-1
Probability: The Language of Risk Assessment, p. SR-15

Activity sheets

Overview – Nuclear Waste Policy Act, p. 53
Swimming Pool Construction Flow Chart, p. 55
Nuclear Waste Challenges and Solutions (Parts 1 & 2), pp. 57, 59
Risk, p. 61
Risk Perception Computer Activity, p. 63
Probability: The Language of Risk Assessment, pp. 65, 66

Videotapes

Managing the Nation's Nuclear Waste (11 minutes)
Worldwide Waste Management (3 minutes, 25 seconds)
The Monitored Retrievable Storage System (8 minutes, 15 seconds)
(order all tapes free of charge from the OCRWM National Information Center at 1-800-225-6972; within Washington, DC, 488-6720)

Masters for transparencies

Nuclear Waste Challenges and Solutions (Part 1), p. 47
Ordering of Perceived Risk, p. 49
Factors for Locating Hazards, p. 51

Computer diskette (IBM or IBM compatible only in 5.25 and 3.5 inch disks)
Risk Perception and Judgment **(order free of charge from the OCRWM National Information Center at 1-800-225-6972; within Washington, DC, 488-6720)**

Background Notes
Risk Perception and Judgment, p. 25
The Debate About Risk, p. 26

Enrichment:
Probability: The Language of Risk Assessment, pp. 65, 66
Factors Affecting Risk Judgments , p. 67
Location of Hazards, p. 69
Probability Exercises, p. 71
Probability Exercise: Challenge Level, p. 73
Metric and U.S. Unit Conversions, p. 75

"Roles for Citizens," The Nuclear Waste Primer **(order free of charge from the OCRWM National Information Center at 1-800-225-6972; within Washington, DC, 488-6720)**