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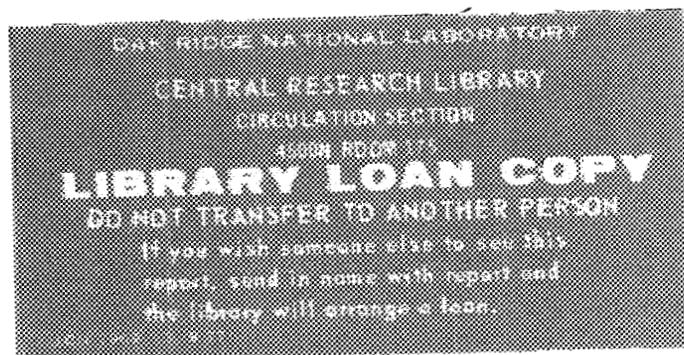


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ORNL/TM-9789

Mock Site Licensing Demonstration Project Final Report

R. D. Roop



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MOCK SITE LICENSING DEMONSTRATION PROJECT
FINAL REPORT

R. D. Roop
ENERGY DIVISION

Date Published - June 1986

Prepared for the
DOE National Low-Level Waste Management Program
Idaho Falls, Idaho

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ABSTRACT

The Mock Site Licensing Demonstration Project developed the Low-Level Radioactive Waste Siting Simulation, a role-playing exercise designed to facilitate the process of siting and licensing disposal facilities for low-level waste (LLW). This report describes the development, content, and usefulness of the siting simulation. The simulation was designed by Harvard University's Program on Negotiation; it can be conducted at a workshop or conference, involves 14 or more participants, and requires about eight hours to complete. The simulation consists of two sessions. In the first, participants negotiate the selection of siting criteria, and in the second, a preferred site for a facility is chosen from three candidate sites. The project sponsored two workshops (in Boston, Massachusetts and Richmond, Virginia) in which the simulation was conducted for persons involved in planning for LLW. It is concluded that the siting simulation can be useful in three ways: (1) as a tool for information dissemination, (2) as a vehicle that can foster communication among parties in conflict, and (3) as a step toward consensus building and conflict resolution. The DOE National Low-Level Waste Management Program is now making the siting simulation available for use by states, regional compacts, and other organizations involved in development of LLW disposal facilities.

EXECUTIVE SUMMARY

No site for disposal of low-level radioactive waste (LLW) has been licensed since 1971, and since that time the regulatory and socioeconomic climate for LLW disposal has changed significantly. Now, under the impetus of the Low-Level Radioactive Waste Policy Act of 1980, several states and regional compacts have started planning to establish LLW management facilities for the wastes they generate. The Mock Site Licensing Demonstration project was undertaken to provide assistance to persons involved in this siting and licensing process, with the overall goals being (1) to identify potential problems in the siting and licensing process and (2) to demonstrate methods to facilitate the process.

The major accomplishment of the project was development of a simulation exercise that can be used as a tool for information dissemination, improved communication, and consensus building on LLW-related issues. The "Low-Level Radioactive Waste Siting Simulation" is a role-playing exercise that allows participants to walk through several early steps in the siting process. The simulation, designed by Harvard University's Program on Negotiation, consists of two sessions that are typically conducted in the morning and afternoon of an all-day workshop. In the first session participants are asked to negotiate the selection of siting criteria; the second session involves selection of a preferred site from three candidate sites.

The siting simulation has been tested in several dry runs and formally conducted in two workshops in Boston, Massachusetts, and Richmond, Virginia. Each of the workshops involved about 35 persons concerned with LLW management. Participants included state and federal agency personnel, industry representatives, citizen activists, environmentalists, and persons from academic institutions.

Response to the simulation has been enthusiastic. Participant evaluations indicated that most participants did not find the exercise difficult, and that the simulation provided them with information regarding the siting process, negotiating techniques, and the processes necessary for reaching consensus among diverse interest groups. A majority of participants felt that the simulation might be useful in their community or local situation.

It is concluded that the simulation is valuable, providing three types of benefits to participants:

1. Familiarization with the siting process. The exercise helps participants become familiar with (1) siting criteria (both those criteria required by regulations and those possibly desired by various interest groups), and (2) how the choice of a preferred site from among candidate sites is affected by technical, economic, environmental, and social concerns.
2. Demonstration of an "enlightened" conflict management process. The simulation exercise presents an overall model of siting as a process which balances many competing interests. Participants learn about the concerns of other interest groups with which they may not be familiar. The simulation suggests to participants that negotiation can serve their interests in the siting and licensing process.
3. Instruction in negotiating skills. The simulation introduces participants to basic skills of conflict resolution. The simulation can make people more aware of (and proficient with) negotiation skills they already have, especially in the context of siting and licensing.

The Low-Level Radioactive Waste Siting Simulation is now available for use by parties involved in siting LLW disposal facilities. Use of the simulation can be coordinated through the DOE Low-Level Radioactive Waste Management Program, and copies of simulation materials can be obtained from the Case Clearinghouse at Harvard University's Program on Negotiation.

1. INTRODUCTION

The Low-Level Radioactive Waste Policy Act of 1980 made each state responsible for the commercial low-level radioactive waste generated within its borders. The law also encourages states to form regional compacts for low-level waste (LLW) disposal. As a result, several states and compacts have started planning to establish LLW disposal facilities for the wastes they generate. The U.S. Department of Energy conducts the National Low-Level Waste Management Program (LLWMP) to assist the states in this effort. As part of its support to states, the LLWMP sponsored the Mock Site Licensing Demonstration Project in an effort to develop information and materials to facilitate the siting and licensing of LLW disposal facilities. The overall goals of the Mock Site Licensing Demonstration Project were to: (1) identify potential problems in the siting and licensing process, and (2) demonstrate methods to facilitate the process.

The major accomplishment of the Mock Site Licensing Demonstration Project was development of a simulation exercise that can be used as a tool for training, communication, and consensus building with persons involved in siting LLW disposal facilities. This report describes the "Low-Level Radioactive Waste Siting Simulation," summarizes its development, and discusses its usefulness. The primary audience for this report is those persons concerned with the siting of disposal facilities, especially persons who might use the siting simulation to facilitate the siting process.

2. THE SITING PROBLEM FOR LLW DISPOSAL FACILITIES

No new sites for disposal of LLW have been developed or licensed since 1971, the year when the disposal facility in Barnwell, South Carolina was opened. Since 1971 the regulatory and socioeconomic climate for LLW disposal has changed markedly. Before the early 1970's siting of LLW disposal facilities received minimal regulatory or public scrutiny. In the past decade, however, the handling and disposal of radioactive waste have generated enormous controversy. Major regulatory changes occurred in 1982, when the Nuclear Regulatory Commission (NRC) issued new rules regarding LLW disposal (10 CFR Part 61). As a result of these changes, the siting and licensing of future LLW disposal facilities will be a complex undertaking that requires fulfilling new technical and regulatory requirements as well as dealing with public opposition. The following sections discuss the siting problem in general (Sect. 2.1) and for LLW disposal facilities specifically (Sect. 2.2).

2.1 THE GENERAL SITING PROBLEM

Siting is a problem common to a wide variety of facilities, such as power plants, refineries, airports, prisons, and waste disposal facilities. All of these facilities are needed by society as a whole, but they typically are considered undesirable by a substantial number of person's who live near any proposed site. This local negative reaction to a proposed siting, known as the "not-in-my-backyard" or NIMBY syndrome, has become the predominant pattern facing proponents of facility development (Peelle and Ellis 1986.) Such opposition is predictable because of the changes in distribution of costs and benefits that inevitably occur with the siting of a major facility. While a new facility provides benefits to society in general (and perhaps profits to the developer), the costs and risks of the facility fall primarily on its immediate neighbors (Peelle and Ellis 1986). Correcting this imbalance in costs and benefits would appear to be important to society, from the standpoint of avoiding both social injustice and the waste of resources on failed siting efforts.

Facility siting is a multifaceted problem, and a variety of factors contribute to current siting problems. One basic problem is that facility developers often perceive the siting and licensing process to be solely either a technical task of choosing the "best" site or a legal and regulatory task of obtaining all necessary licenses and permits. Kasperon (1985) identifies seven factors contributing to siting difficulties: the lack of a systems approach, uncertainty regarding risks, difficulties in communication about risk, inaccurate perception of risks, inequity in costs and benefits, distrust of institutions, and availability of adequate institutional means for resisting unwanted facility siting. O'Hare et al. (1983) contend that the siting problem boils down to two basic propositions:

1. Inadequate mechanisms exist at present for the parties affected by a proposed new facility to share equitably in the benefits of the project, or to negotiate effectively the size of their share.
2. Much of the facility siting debate is based on inadequate information because the social, political, and economic structures by which information is made available obstruct its efficient use or generation.

A central premise of this report is that the siting problem is fundamentally a "people problem," that is, that socioeconomic and political problems outweigh technical problems. Although siting requires substantial technical and regulatory efforts, the basic challenge is to resolve the conflicts that arise between developers and affected parties. Conflict management activities that can contribute to solving the siting problem include programs for public involvement, efforts to enhance communication, and development of incentives and schemes for compensation of affected parties. People who manage siting efforts frequently mention such activities as being desirable, but effective implementation is not common. Instead, facility siting efforts often appear to have been conceived as a program of technical and regulatory tasks to which public participation activities have been added (Wiltshire 1985). Given the premise that siting is largely a people problem, then facility siting programs should pursue conflict management tasks at least as fully as the technical and regulatory aspects.

Finally, this report reflects a limited bias toward facility development; project personnel have tended to view a siting process as successful when it leads to construction and licensing of a facility. This bias stems from the belief that siting efforts can work to locate facilities that are environmentally acceptable and economically viable, and that siting and facility development can be performed in an equitable fashion. Reforms in current siting practices may be needed to accomplish this, but we believe that such an optimistic approach to siting is preferable to the pessimistic position (common to the NIMBY syndrome) that considers project abandonment as the only successful outcome of a siting process.

2.2 SITING OF LLW DISPOSAL FACILITIES

At the outset of the Mock Site Licensing Demonstration project (October 1983) an analysis of procedures for siting and licensing was performed (Roop and Van Dyke 1985). This analysis considered those procedures required by federal and/or state regulations, as well as public participation and conflict management activities.

The major parties involved in siting and licensing are the regulatory agency, the applicant, and the publics (Fig. 1). The term "publics" is used to indicate the multifaceted nature of the various individuals, groups, and organizations sometimes referred to as "the general public." The "applicant" in the siting and licensing process may be a state agency, a commercial or public corporation, or some combination of these. As indicated in Fig. 1, public involvement or conflict management activities require the establishment of some form of liaison between the applicant and the potentially affected publics. Such liaison should foster continued communication during each phase of the siting and licensing process. While the nature of the liaison between the applicant and the publics can take many forms, the importance of this link is indicated by the fact that several states have passed legislation requiring such liaisons and, in some cases, specifying their form.

An analysis of the siting and licensing process (Roop and Van Dyke 1985) suggests several conclusions. First, a facility developer must do a good job in the early phases of site selection if the project is to survive

the public and regulatory scrutiny that will come. The initial steps of siting (Fig. 2) include selection of siting criteria, site screening, and choosing a preferred site. Second, public participation programs during these stages are likely to be beneficial. A variety of mechanisms have been tried or proposed for public participation, including public hearings, advisory committees, dialogue groups, and legislative requirements for negotiations. Finally, there is consensus among a variety of sources that the use of compensation and incentives may play a positive role as part of conflict management activities (O'Hare et al. 1983, APA 1985, Kasperson 1985, Peelle and Ellis 1986).

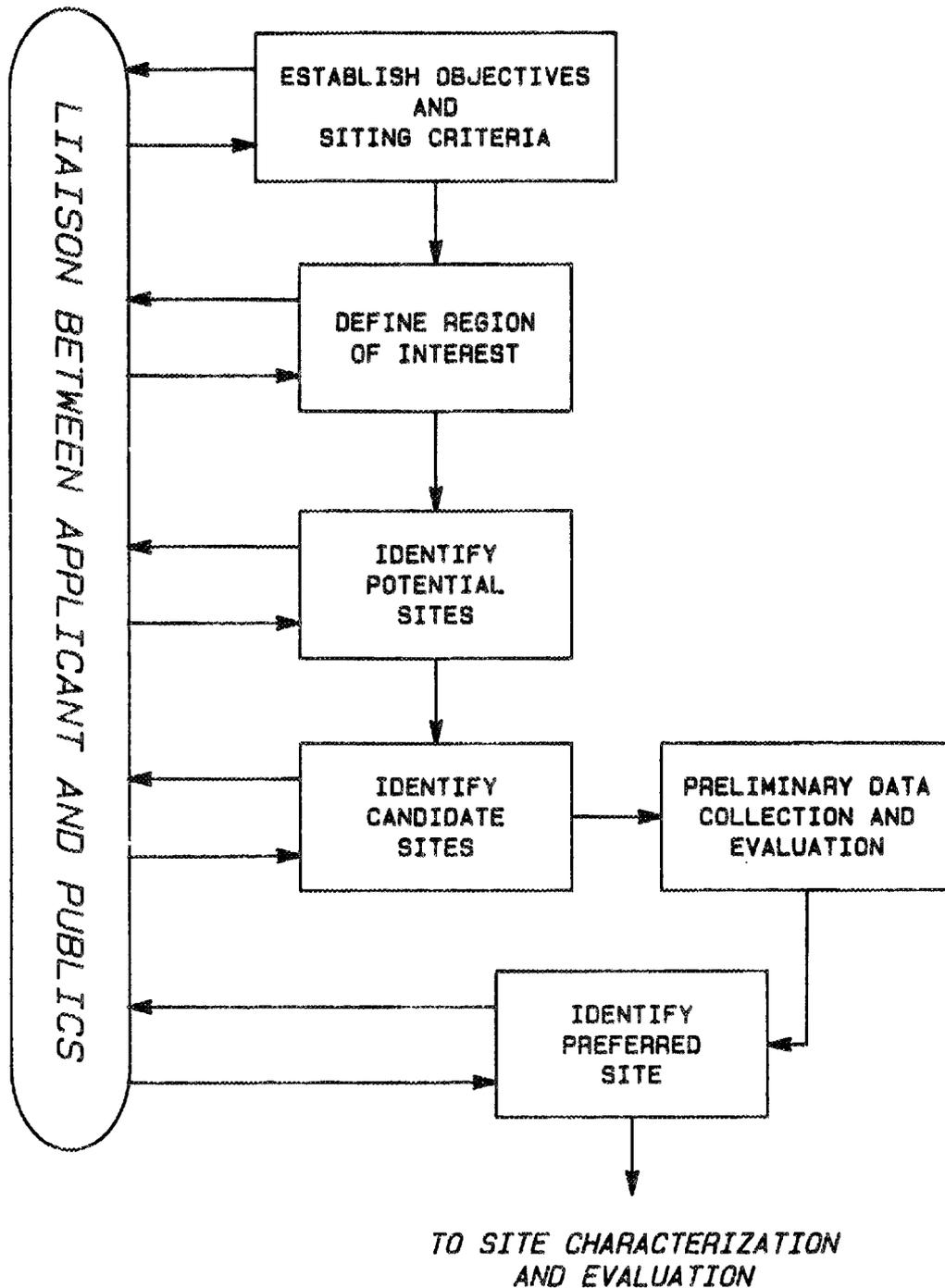


Fig. 2. Steps in site screening and site selection.
 Source: Modified from Plate 2, Roop, R. D. and Van Dyke, J. W.
 1985. Licensing Procedures for Low-Level Waste Disposal Facilities.
 ORNL/TM-9715, Oak Ridge National Laboratory, Oak Ridge, Tenn.

3. THE SITING SIMULATION

The objective in developing the siting simulation was to design an exercise in which participants could "walk through" key steps of the siting and licensing process. In this way participants would become familiar with procedures and issues involved in siting a LLW disposal facility. The siting simulation is a two-part role playing exercise that is conducted in a one-day workshop led by a moderator/facilitator. The simulation focuses on socio-political conflicts that occur in the early phases of site selection. The following sections describe the development and use of the simulation and discuss its evaluation and use.

3.1 DEVELOPMENT

The first step in the development of the siting simulation was to investigate what type of simulation would best meet the needs of the project. The project assembled a six-member review panel to assist in evaluating the options for simulation function and structure. A key decision was whether the simulation would function primarily for training or for research. Other important decisions involved the mechanisms for control of the simulation and for providing feedback to participants.

The project identified two types of simulations that were applicable. Both types focused on negotiations between parties in conflict over proposed siting decisions. The first type of simulation was developed by John McGlennon (ERM-McGlennon Associates, Inc.) for use in training workshops. The simulation confronts participants with a hypothetical siting situation. Participants are given confidential role descriptions and instructed to reach an agreement; the workshop leader periodically provides new information to participants and refocuses their efforts. The structure of the simulation gives freedom to invent and create solutions, and the simulation may reach a variety of endpoints. The second type of simulation, developed by Howard Raiffa and Lawrence Susskind (Program on Negotiation, Harvard Law School) is designated a "scorable game." The scorable simulation is similar in many respects to the exercises developed by McGlennon, but the scoring system imposes greater structure on the

simulation. The simulation is built around a hypothetical but realistic situation that is sufficiently abstract to prevent identification with any actual project or site. Participants are assigned roles, given confidential role descriptions, and instructed to reach a negotiated agreement which will be supported by most of the parties present. During the simulation the participants periodically vote to determine if agreement has been reached. The exercise is a "scorable" simulation because each participant's instructions indicate a score assigned to each issue and the total points required for a "yes" vote. The two types of simulations are compared in Table 1.

The project proceeded with design of a simulation based on the following two decisions. First, rather than being designed specifically for training or research, the simulation would sensitize participants to the issues involved in siting and licensing; the simulation would demonstrate the compromises which are needed to handle conflicts, the types of communication which are effective, and how the siting process could be managed effectively. Second, the project would develop a scorable simulation. The factors which favored this approach included the desire to incorporate rapid feedback into the game structure and have a simulation with a more predictable endpoint.

Design of the simulation began in July 1984 by the Program on Negotiation (an inter-university consortium at the Harvard Law School) under the direction of Dr. Lawrence Susskind. The initial concept of the project was to simulate the entire siting and licensing process. However, because the entire process is too lengthy and complex to be simulated in a single workshop, it was decided that two key steps of the site selection phase would be simulated. The two site selection steps explored in the simulation are the selection of siting criteria and the selection of a preferred site (see Fig. 2). These parts of the siting process were chosen because they occur early in the process and can be enhanced greatly by public participation.

The design activity began with research to identify (1) who are the stakeholders (those parties having significant interest in LLW facilities) and (2) what are the positions and underlying interests of stakeholders. This research was accomplished by conducting interviews of persons involved

Table 1. Comparison of scored and unscored simulations.

| Feature | Type of Simulation | |
|---------------------|---|--|
| | Unscored | Scored |
| Control | Moderator/facilitator has major role; simulation requires skillful moderator | Facilitator's role is slightly less important, since control is built into simulation structure |
| Scenario | Situation can approach "real world" complexity | Simulation structure abstracts from realism, presents issues clearly |
| Feedback | Debriefing discussions; video replay can also be used very effectively | Scoring provides rapid feedback; debriefing can include discussion leader with roving microphone |
| Game Structure | More subjective, less structured, more flexibility on the types of interactions and "lessons" | More objective; because of imposed structure, results are more repeatable, comparable |
| Potential Drawbacks | Single personality may dominate simulation; people may take away the "wrong lessons" | People may pay too much attention to score, get caught up in gamesmanship |

in LLW management. Research on stakeholders was followed by creation of a scenario for the simulation and designation of the issues to be negotiated in the exercise. To create the scenario for the exercise, designers of the simulation used the information on stakeholders to choose a limited number of roles that represent the most important positions. Both parts of the simulation exercise employ the scenario of a negotiation session in which the six or seven various parties must try to resolve the major issues of conflict and reach some sort of agreement. Simulation development was completed by developing the scoring scheme. This involved assigning point values to each of the issues under negotiation for each role, based on the knowledge of stakeholders positions. Scores were then adjusted to produce a workable simulation. This "calibration" of the scoring system was accomplished by conducting a series of test-runs of the simulation.

The simulation consists of two sessions which typically are conducted in the morning and the afternoon of an all-day workshop. (A general description and instructions for the simulation are contained in Appendix A.) The scenario for the first session is a meeting to negotiate the selection of criteria for siting a LLW disposal facility. Minimum criteria on site suitability for a LLW disposal facility are established already by the U.S. Nuclear Regulatory Commission's regulations 10 CFR Part 61 (Roop and Van Dyke 1985). Participants in the simulation exercise would not be negotiating whether to adopt the NRC's required criteria; the criteria discussed and negotiated in the simulation would be adopted as supplements to the 10 CFR 61 requirements. Parties participating in this negotiation are the Public Management Authority, the Federated Indian Tribal Council, the Environmental Coalition, the "Green Wave" Anti-Nuclear Coalition, the Association of Municipal and County Governments, the Association of Radwaste Generators, and the Governor's Blue Ribbon Advisory Panel.

The second session of the siting simulation deals with selection of a preferred site for a facility from among three candidate sites. This step in the siting process was chosen to be part of the simulation because it highlights the phenomenon of local opposition to any proposed site. Issues which are discussed in the negotiation include compensation to the host community and the sharing of control over the facility between the operator and community. The parties represented in this negotiation are the

Governor, the Environmental Coalition, the Association of Radwaste Generators, Town A, Town B, and Town C.

To conduct a simulation, 6-10 participants are grouped together. Each group sits at a separate table and includes at least one person assigned to play each of the 6-7 roles in the negotiation. Participants are given printed confidential role descriptions that indicate their particular goals and instructions. Each role description includes a score sheet which indicates (1) the importance attached to each of the issues under negotiation (indicated by a numerical point value) and (2) the total number of points required for a player to be allowed to register a "yes" vote. At intervals during the session, the negotiators are asked to vote on whether they can support a package of proposals. If five or more parties vote "yes," the negotiated package is adopted. At the conclusion of the session the facilitator conducts a debriefing in which the results from all the groups are compared. The debriefing elicits discussion from participants about the licensing process, the realism of the simulation, and the factors that contributed to successful or unsuccessful negotiations.

The first draft of the simulation was tested in a "dry run" conducted October 31, 1984, in Boston. Over 50% of the participants were persons whose real-world activities were quite similar to the groups incorporated into the simulation. Feedback from the dry run participants was used to evaluate the realism of the exercise and to calibrate the scoring scheme. For example, as a result of comments on the dry run, the role of the "Green Wave" anti-nuclear coalition was added to the first part of the exercise. In addition, the score sheets for a number of role descriptions were modified to identify one or more issues as "non-negotiable;" this was done to focus the discussion on negotiation of issues rather than the trading of points.

A second dry run of the simulation was conducted November 28 in Oak Ridge, Tennessee. This event involved approximately 35 participants including scientists and engineers involved in LLW disposal, local politicians, environmentalists, representatives from states and regional compacts, and newspaper and TV reporters. Once again, the comments and suggestions of participants were used to refine the exercise. Some of the changes made in response to participant feedback included: (1) revising

the proposed site selection criteria to make them more realistic, (2) adjusting the scoring scheme to make the "Green-Wave" anti-nuclear group take a harder bargaining position, and (3) providing more detail regarding the political situation of the Governor in the site selection session.

3.2 EXPERIENCE WITH USE OF THE SIMULATION

On December 14, 1984, the Siting Simulation was conducted in Boston with 34 persons from the northeastern states. This represented the first use with the intended audience, namely persons who are involved actively in siting LLW disposal facilities. Project personnel attempted to identify prospective participants corresponding to each cell of the matrix shown in Figure 3. Prospective participants were contacted by phone and invited to attend, after which a written invitation and background information were mailed to them. Persons from all the New England states and New York attended, but no participants came representing New Jersey, Pennsylvania, Delaware, or Maryland. (The time requirement and the distance of travel obviously were factors which discouraged participation.) Dr. Lawrence Susskind served as the facilitator for the workshop.

The Siting Simulation was conducted in a second workshop in Richmond, Virginia, June 18, 1985. The Virginia Solid Waste Commission co-sponsored the workshop, and about two thirds of the participants were members of the Low-Level Radioactive Waste Dialogue Group organized by the Commission. The remaining participants were other Virginia residents actively involved in LLW issues as well as participants from North Carolina, Ohio, Michigan, Texas, and California. John McGlennon and Peter Schneider (ERM-McGlennon Assoc., Inc.) served as workshop facilitators.

Since its development, the siting simulation also has been used several times in academic training exercises. On April 19, 1985, it was conducted with 16 participants of an "Environmental Law" course at the University of Tennessee Law School. The simulation was also used with 34 people in an MIT summer session short course, "Bargaining and Negotiation," July 17-21, 1985.

ORNL-DWG-85-11482

| | REGULATORS | WASTE GENERATORS AND APPLICANTS | ADMINISTRATORS / LEGISLATORS | ENVIRONMENTALISTS/ CONSUMER GROUP REPS. | MEDIA PEOPLE, EDUCATORS, & GENERAL PUBLIC |
|----------------------------------|------------|------------------------------------|---------------------------------|--|---|
| MASSACHUSETTS | | | | | |
| NEW YORK | | | | | |
| PENNSYLVANIA | | | | | |
| NEW HAMPSHIRE | | | | | |
| CONNECTICUT NEW JERSEY | | | | | |
| VERMONT RHODE ISLAND MAINE | | | | | |
| DELAWARE MARYLAND | | | | | |

Fig. 3. Distribution matrix for Boston workshop participants.

3.3 EVALUATION ACTIVITY

Each time the simulation was conducted in a dry run or formal workshop, project personnel asked participants to fill out questionnaires regarding the exercise. Also, follow-up questionnaires were sent to some participants after periods of two to six months in order to determine participants' thoughts about the simulation after some time had passed. Table 2 summarizes these data collection activities. Appendix B provides the results tabulated on the questionnaires.

The Boston workshop was also the subject of research by an MIT graduate student who had contributed to the design of the simulation (Rundle 1985). This independent evaluation of the simulation is discussed in Sect. 3.3.3.

3.3.1 Evaluation of the Dry Runs

The questionnaire distributed by the Harvard Program on Negotiation at the first dry run of the simulation (Boston) was aimed solely at soliciting suggestions for improving the simulation (see Sect. 3.1). At the Oak Ridge dry run, in addition to asking participants for suggested improvements, participants were asked if their assigned roles matched their "real world" activities and if their role assignments were difficult. Less than 15% of the participants said that their assigned roles were "close" to their everyday activities, and about 60% played roles "not at all" like their current real-world role. Nevertheless, only about one third of the respondents found their roles to be "unfamiliar or difficult to play." This was interpreted to mean that the simulation was not too difficult and that it was feasible to assign participants to roles dissimilar to their real-world roles. Assigning participants to unfamiliar roles was considered somewhat desirable because of the potential for learning that comes with such role-reversal. Participants also were asked to rate how realistic the simulation was. Out of 17 answers to the question, 4 persons considered the simulation "very" realistic and 13 rated it "somewhat" realistic; no respondents considered the simulation "not at all" realistic.

Table 2. Summary of questionnaires.

| Time of Questionnaire | Group Surveyed | Purpose of Questionnaire | Percent Return of Questionnaire |
|---|--------------------------------|--|---------------------------------|
| October 31, 1984 (end of session) | Boston dry run participants | Request suggestions to improve simulation | 80-90% ^a |
| November 28, 1984 (end of session) | Oak Ridge dry run participants | Request suggestions to improve simulation | 60% |
| December 14, 1984 (end of workshop) | Boston workshop participants | Determine lessons learned, request suggestions to improve simulation | 70% |
| January, 1985 (2-3 months after sessions) | All dry-run participants | Determine lessons learned | 60% |
| June 18, 1985 (end of workshop) | Richmond workshop participants | Determine value of simulation to participants | 83% |
| July, 1985 (6 months after workshop) | Boston workshop participants | Determine value of simulation to participants | 24% |

^aEvaluation performed by Harvard Program on Negotiation - actual return rate not recorded.

In January 1985 participants in the dry runs were mailed a follow-up questionnaire to determine what they had learned from the simulation (Appendix B.3). The questionnaire attempted to determine whether participants: (1) thought they had learned about the siting and licensing process, (2) were more inclined to participate in negotiations because of their experiences in the simulation exercise, and (3) felt they had learned techniques of negotiation. Respondents generally reported a positive response to the simulation, as indicated by the following results:

| As a result of participating in the simulation, participants felt that they... | per cent positive response | per cent "strongly agree" |
|--|----------------------------|---------------------------|
| ...had a better understanding of procedures, issues, and problems | 83 | 21 |
| ...were more willing to engage in negotiations regarding a proposed LLW facility | 68 | 43 |
| ...were better negotiators | 66 | 21 |

One reason for undertaking the follow-up evaluation with dry run participants was to test the evaluation questionnaire prior to use with workshop participants. For several reasons, however, this quantitative questionnaire was not used with the workshop participants. First, the questionnaire contained several questions intended to determine the participants' knowledge base regarding LLW; respondents commented that these "quiz" questions were embarrassing and would not necessarily give an accurate indication of the participants' knowledge. Second, it was concluded that, for purposes of evaluation, equally valuable information could be obtained from a questionnaire that solicited written responses. Consequently, subsequent evaluations of the workshop used an "essay question" format.

3.3.2 Evaluation of Workshops

The questionnaires given to participants of the workshops were directed at determining what the participants had learned from the simulation and whether they considered the workshops to be of value. Feedback from both the Boston and Richmond workshops indicated predominantly enthusiastic response to the simulation.

3.3.2.1 Boston workshop

Like the participants at the dry runs, most of the Boston workshop participants had little difficulty with their role assignments (Appendix B.2). Only 13% of the respondents indicated that their roles were unfamiliar, and only 9% indicated that they had difficulty in playing their roles. Many respondents said that more time would have been desirable for reading their instructions and for conducting the simulation. The Boston workshop ran behind schedule, and the attempts by facilitators to keep on schedule caused the simulation to be somewhat rushed. When participants were asked what aspects of the simulation were unrealistic, 65% of the respondents identified the time pressure under which the negotiations took place. Two other structural aspects of the simulation were identified as unrealistic: the constraint on the number of siting criteria which could be selected and the constraints imposed by the scoring system. Participants also criticized the simulation for not addressing the issue of long-term site liability and for exaggerating the influence that money and other forms of compensation might exert on negotiators from candidate sites. However, participants thought that the simulation was realistic in its depiction of interest groups, roles, and issues.

The lessons which participants said they learned from the simulation mostly involved the negotiation process. Three participants (13% of questionnaire respondents) specifically stated that they learned about the process of compromise leading to a consensus. Other lessons mentioned by participants involved methods of communication between diverse interest groups, especially the importance of listening. One participant stated that the simulation helped provide an overall picture of siting procedures.

Numerous participants indicated that they learned about the various other interest groups and their points of view.

In July 1985 participants were sent a follow-up questionnaire to determine if, in retrospect, they thought the simulation had been valuable. Only seven participants returned the questionnaire (24% response rate); five respondents said that attending the workshop had been a worthwhile use of time, one said "somewhat worthwhile," and one said "not worthwhile." Four out of seven persons thought that the simulation would be useful or somewhat useful in their local community or situation. The respondents considered the group discussions and the role-playing aspect of the workshop to be most valuable. When asked what "specific facts, procedures, or techniques" they had learned, respondents cited various negotiating skills. Two persons suggested that the instructions should be sent out in advance.

3.3.2.2 Richmond workshop

The questionnaire distributed at the close of the Richmond workshop resulted in the highest response rate (83%) obtained for any group. In describing the "specific facts, procedures, or techniques" they had learned, most respondents mentioned skills or aspects of negotiation. Six respondents (21%) indicated that they learned about some aspect of siting. Three persons mentioned the influence of political considerations and alliances in the siting process, and three persons indicated that they learned about compensation, its various forms, and the roles it can play in siting LLW facilities. While most participants considered practice with negotiation skills and role playing as the most valuable part of the workshop, several respondents identified as "most valuable" their interactions with other participants and the insights gained into the perspectives of other interest groups. Twelve persons (41%) thought the morning session on selection of siting criteria was more valuable to them, and seven respondents (24%) preferred the afternoon session; seven persons considered them equal in value or expressed no preference.

The participants suggested that the simulation could be improved by allowing more time for players to prepare for the roles, including the possibility that instructions should be sent out in advance. Several

participants suggested modifying the simulation toward a more "free-form" simulation that would allow participants more creativity to invent criteria and generate proposals. Two thirds of the participants felt that the simulation probably or definitely would be useful in their community or local situation, and only three persons (10%) thought the simulation would not be useful.

3.3.3 MIT Research on the Siting Simulation

In April 1985 an investigation of the Boston workshop was undertaken by Ms. Wendy Rundle, an MIT graduate student who had contributed to the design of the simulation. Rundle's research (1985) examined whether the simulation increased the commitment of participants to approach complex dispute situations in a cooperative manner and, if so, what factors contributed to this. Rundle designed a questionnaire (Appendix B.6) and sent it to the 34 participants of the December 14 workshop in Boston. She subsequently conducted phone interviews with participants and noted their answers to questions; using these methods she collected information from 100% of the participants.

The questionnaire solicited the following five types of information: (1) the respondents' approach to negotiation, (2) their impressions of the dynamics between parties, (3) their motivations for participating, (4) their perceptions regarding the effect of the simulation on their behavior, and (5) personal data including their past experience with negotiations and simulations. Rundle hypothesized that "some participants would leave the sessions expecting to behave in a more cooperative manner when negotiating," and that those who did would be those who felt "that their gaming behavior closely resembled the behavior they would exhibit in a real negotiation."

Based on the questionnaire results, Rundle classified 20 respondents (59%) as "learners," those persons who felt they had learned something about cooperation in negotiating situations and who expected that, in future negotiations, they would use some of the techniques that they had used in the game. Rundle also classified respondents as "cooperative negotiators" (32%) and "non-cooperative negotiators" (68%). Although

cooperative negotiators represented only about one-third of the 34 participants, Rundle said it was noteworthy that cooperative negotiators were mostly (73%) learners. Several factors contributed to participants' commitments to approach dispute situations in a cooperative manner; personal goals were the most important. In support of her hypothesis, Rundle found that 60% of the cooperative negotiators tried to play their roles in the simulation as they would behave in a real negotiation.

4. DISCUSSION

4.1 NEGOTIATION AND SITING CONFLICT

The past two decades offer numerous cases in which the proposed siting of facilities has provoked notable conflict. The patterns by which conflict arises are well documented (O'Hare et al. 1983), and there is every reason to believe that development of LLW management facilities, if developed according to past patterns, would encounter similar problems (Roop and Van Dyke 1985). The traditional approach to facility siting frequently results in situations characterized by rigidity, suspicion, hostility, and lack of communication by both proponents and opponents. Frequently the parties in a siting conflict engage in behavior that is uncooperative, uncompromising, and adheres strictly to a particular set of narrowly-framed, preconceived notions about how to accomplish specific goals (Rundle 1985). Parties in siting conflicts typically see their goals as mutually exclusive to their opponent's goals.

It is apparent why parties may behave in a rigid, uncommunicative manner in siting conflicts. Local citizen groups, following the NIMBY pattern, often view a stalled siting effort as a successful outcome, and there is little incentive for these groups to compromise in siting conflicts. As noted by Peelle and Ellis (1986), present siting systems and arrangements do not provide citizens with any stake in positive outcomes. Facility proponents may act rigidly because of institutional or bureaucratic constraints. Uncommunicative behavior may stem from fear that information divulged will be used against them; indeed, citizen groups are increasingly sophisticated in their use of information both for its technical value and "leverage" purposes (Peelle and Ellis 1986). Intense mistrust frequently develops among developers, regulators, citizens, and public officials. The parties in conflict often have little willingness or ability to make tradeoffs.

Several researchers have suggested reforms to improve the siting process for waste disposal facilities. Kasperson (1985) recommends the application of a broad array of policy tools, such as appropriate concentration of authority, use of a systems approach, enforcement of greater

risk reduction and safety assurance, mechanisms for wider risk sharing, and compensation. Peelle and Ellis (1986) suggest the following reforms: increased and improved participation of affected parties, creating opportunities for sharing and testing information, negotiation (and possible mediation among affected parties, and use of incentives. Suskind (1985) has proposed that the siting process should define "joint problems" and move toward their solution. Joint problems are those shared by the parties in conflict; when such problems are solved, all parties benefit. The process of defining joint problems provides an incentive for negotiations.

4.2 USEFULNESS OF THE SIMULATION

The siting simulation exercise originally was conceived as fulfilling two simple functions: providing participants with (1) a greater understanding of the site development and licensing process, and (2) greater sensitivity to the issues and problems involved. Based on the experience to date, however, the simulation has shown itself to be valuable in three ways: (1) as a tool for disseminating information about LLW management, (2) as a vehicle that can foster communication, and (3) as a step toward consensus building and conflict resolution.

4.2.1 Information Dissemination

As an educational training tool, the simulation operates on three levels:

1. Familiarization with the siting process. The exercise helps participants become familiar with (1) siting criteria (both those criteria required by regulations and those possibly desired by various interest groups), and (2) how the choice of a preferred site from among candidate sites is affected by technical, environmental, economic, health, safety, and social concerns.
2. Demonstration of an "enlightened" conflict management process. The simulation exercise presents an overall model of siting as a process which balances many competing interests. Participants learn about the concerns of other interest groups with which they may not be familiar.

The simulation suggests to participants that negotiation can serve their interests in the siting and licensing process.

3. Instruction in negotiating skills. The simulation introduces participants to basic skills of conflict resolution. The simulation also can make people more aware of (and proficient with) negotiation skills they already have, especially in the context of siting and licensing.

Part of the value of the siting simulation as an educational tool comes from the fact that the participants learn by doing. Through their experience in the simulation, participants learn how various issues and interest groups affect siting and licensing. The simulation probably has the greatest educational value to persons who are relatively less knowledgeable about siting and licensing. Many participants, however, are well informed about their area of concern (e.g., regulations) but can benefit by broadening their knowledge of the entire process. While some of the information that participants learn from the simulation is written in the simulation materials, participants also gain from exposure to the opinions and perspectives of other players.

Of the simulation's three educational functions, the second, broadening participants' mental models of the siting process, may be the most valuable. Many people have a rather simplistic conception of the siting and licensing process that includes only two groups, "the developers" (e.g., the state, compact, or development contractor) and the "opponents" (e.g., environmentalists or local landowners). Persons who identify with either stance frequently see the other group as being significantly more powerful. Opponents of a facility may believe that developers can brush aside environmental or local concerns because of the state-wide or regional "need" for a site, or because of the profit motive. On the other hand, developers often believe that opponents can block development of a worthwhile facility through delaying tactics or legal maneuvers. This simplistic model of the licensing process contributes to confrontational behavior. By portraying siting as a process that balances the interests of multiple groups, the simulation may cause participants to adopt more cooperative behavior.

4.2.2 Improved Communication

In the process of attending a siting simulation workshop, participants meet and interact with other people who are concerned with LLW management, thus promoting communication. While any meeting of people concerned with LLW would foster communication, the mechanics and content of the simulation seem likely to enhance the quality and value of interaction for many participants. In a role playing exercise, participants must listen to each other in order to play their roles well. In addition, because participants are playing a role, they can make statements or proposals more freely than they would in a real negotiation or in normal interaction. In other words, a simulation provides a lower-stakes environment for interaction between participants. The patterns of improved communication between persons at a simulation may carry forward into their real-life interaction.

4.2.3 Consensus Building and Conflict Resolution

Based on the evaluations conducted, participants of the siting simulation may take home two key lessons:

1. Siting requires compromise to accommodate the needs of many diverse interest groups, and
2. Shared power and compensation are two of the issues that may need to be negotiated in order for a LLW disposal facility to be acceptable to a community.

In addition, the simulation highlights the conflicts in a siting situation and their sources.

By providing a positive, holistic model of the process of conflict management, the simulation can provide a step toward consensus building and conflict resolution. Contributing to this is the simulation's demonstration of joint gains, the mutual benefits that can accrue to all or most stakeholders from joint problem-solving activity. In a real conflict situation, if most parties (or if an influential minority of the parties) share a positive model of conflict management, the prospects for resolving the conflict are improved.

4.3 FUTURE USE OF THE SIMULATION

The siting simulation is suitable for use by regional compacts, states, and communities that contemplate siting LLW facilities. Between September 1985 and the date of this report, siting simulation workshops were conducted by the Midwest Compact and North Carolina. Other organizations have contacted DOE's Low-Level Radioactive Waste Management Program expressing interest in conducting the simulation, and it appears likely that other compacts or states will conduct the simulation some time in the future.

An obvious way in which the simulation would be useful as a tool for public education and training would be to conduct the exercise in several communities or areas that were being considered as candidate sites for LLW disposal facilities. The simulation also might be conducted for members of state legislative bodies or for the staffs of state regulatory agencies.

Although the simulation can be conducted as it is, several modifications or elaborations might increase the convenience or usefulness of the simulation. For instance, the simulation can be conducted in an abbreviated version by conducting only one of the two sessions, thus allowing a workshop to be conducted in a shorter period of time, such as an evening. Another variation in the use of the workshop, suggested by a participant at the Boston workshop, would be to repeat the simulation several times in one workshop, altering the rules slightly each time. The first iteration would be played as the existing scorable simulation, but the next session would be conducted as an unscored exercise that would allow participants greater latitude to use their creativity and invent options. A final session could be conducted (if time allowed) in which the facilitator and participants would restructure the exercise so that it more closely resembled the "real world" situation at the time and place of the workshop. In such an exercise the participants would approach a negotiating session in which actual issues were under discussion. Used in this manner, the siting simulation could evolve into a mechanism for actual resolution of existing conflicts.

The siting simulation also could be expanded for use in situations where the state or regional compact had progressed beyond the site selection

stage. Additional phases of the simulation could be developed to deal with issues arising during facility design, site characterization, and site licensing. This would require generation of new scenarios for the simulation and could be done generically for the entire country or for a specific public involvement program in a particular state or region.

The Low-Level Radioactive Waste Siting Simulation is now available for use by parties involved in siting LLW disposal facilities. Use of the simulation can be coordinated through the DOE Low-Level Waste Management Program (LLWMP), and copies of simulation materials can be obtained through the LLWMP or from the Case Clearinghouse at Harvard University's Program on Negotiation. Additional materials to assist users in conducting a siting simulation workshop are also available from the DOE LLWMP. The estimated costs of conducting a siting simulation workshop are shown in Table 3.

It is thought that the siting simulation can be used most beneficially in the following circumstances:

1. There is a real possibility that the region, state, or community will host a LLW disposal facility;
2. The LLW planning process has begun but has not passed beyond the site selection phase (and preferably has not completed selection of siting criteria);
3. Parties in conflict have some commitment to dialogue and problem solving; and
4. Resources and interest exist for organizing a moderate-sized workshop.

Table 3. Estimated costs of a one-day siting simulation workshop.

| | Cost range, per person | | Cost range for 50-person workshop | |
|--|------------------------|---------|--------------------------------------|------------|
| | Lower | Upper | Lower | Upper |
| Costs of organizing workshop | | | \$1500 (1) | \$4500 (2) |
| Facilitator's fees | | | \$1000 (3) | \$2400 (4) |
| Assistants | \$10.00 | \$28.00 | \$500 | \$1400 |
| Workshop materials | \$5.00 | \$5.00 | \$250 | \$250 |
| Room rental | | | \$75 | \$150 |
| Coffee, refreshments | \$1.00 | \$2.00 | \$50 | \$100 |
| Lunch | \$5.00 | \$10.00 | \$250 | \$500 |
| TOTAL | | | \$3625 | \$9300 |
| Optional costs: | | | | |
| Travel and lodging expenses 5-10 persons @ \$250 - 500/person | | | \$2500 | \$10000 |
| TOTAL PLUS OPTIONAL EXPENSES | | | \$6125 | \$19300 |

(1) Assumes 0.75 person months staff time @ \$2,000/mo.

(2) Assumes 1.5 person months staff time @ \$3,000/mo.

(3) Assumes 1 facilitator @ \$800/day plus \$200 travel and lodging expense.

(4) Assumes 2 facilitators @ \$800/day plus \$400/person expenses.

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APPENDIX A

GENERAL INFORMATION AND INSTRUCTIONS FOR THE SITING SIMULATION

LOW-LEVEL RADIOACTIVE WASTE SITING SIMULATION I**(General Information for All Interested Parties)**

There are currently three facilities nationwide that accept low-level radioactive wastes (LLW) for disposal. These facilities, located in Washington, Nevada, and South Carolina, must provide LLW disposal capacity for the entire country; all three sites employ shallow land burial techniques.

In 1980, Congress passed the Low-Level Radioactive Waste Policy Act which was designed, in part, to relieve the unfair burden borne by these three states. This Act mandated that each state accept responsibility for the disposal of its own low-level radioactive waste. The Act also stated that LLW can be "most safely and efficiently managed" on a regional basis and

This simulation was prepared for the Public Disputes Program of the Program on Negotiation by Wendy Rundle, Douglas Rae, and Tod Loofbourrow under the direction of Professor Lawrence Susskind and Denise Madigan.

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encouraged states to enter into regional compacts as necessary to provide for the disposal of LLW. The Act enables any congressionally-ratified regional compact, as of January 1, 1986, to refuse to accept LLW from states outside the regional compact. Thus, each state must provide for disposal capacity either within the state, or within a region defined by a compact.* The January 1986 deadline is now approaching, and a number of states are without access to one of the three existing LLW sites. In addition, not one state has been successful in siting a new facility.

Our state has chosen not to participate in a regional compact. It must therefore site a facility in-state within a year. The State Regulatory Agency (SRA)** responsible for siting

 * Several scenarios are possible:

- a) A state may be part of a regional compact, but not designated the host state to provide LLW disposal capacity for the entire region.
- b) A state may be part of a regional compact and may be designated the host state for the entire region.
- c) A state may not be party to a regional compact and may therefore run the risk of being excluded as of January 1986. In this case the state would have to explore several options, one of which would be to provide an in-state LLW disposal site.

** The State Regulatory Agency (SRA) is empowered by the Federal Government, under the Agreement State Program, to promulgate regulations regarding the siting of low-level radioactive waste (LLW) facilities. These state regulations must be consistent with existing Federal regulations. Current regulations, primarily embodied in the Nuclear Regulatory Commission's (NRC) 10 CFR 61, outline performance objectives for all sites as well as technical requirements for achieving those objectives using shallow land burial technology. The SRA may, however, promulgate regulations which are more restrictive or comprehensive than the Federal regulations.

assumes that the actual site will employ technology which meets the performance criteria set forth in the NRC's regulations 10 CFR Part 61 and will be operational for 25 years. But before a site is actually chosen, the SRA must decide which siting criteria it will employ. Originally, the SRA planned to develop a set of 10 siting criteria that would supplement those already embodied in federal regulations, but, given growing public concern and fears that widespread opposition might delay the siting process, the SRA now prefers not to decide these criteria unilaterally.

The siting of a LLW facility typically involves numerous stakeholders. The SRA hopes that the various parties concerned about the siting of a LLW facility in the state will meet and reach agreement on a set of siting criteria, without SRA interference. If the parties can agree to a set of 10 siting criteria (consistent with federal regulations), the SRA will adopt them. If, however, the parties fail to reach agreement, the SRA will move quickly to promulgate its own set of 10 criteria.

THE PARTIES

The State Regulatory Agency is responsible for promulgating site selection criteria and enforcing compliance with state and federal regulations. (N.B. it is not the entity that will manage the actual disposal facility). The SRA is anxious that siting criteria be decided as soon as possible.

Several other parties, however, also have an interest in the siting criteria. Seven of the most powerful are:

Public Management Authority (PMA): The Public Management Authority is the newly created state agency that will manage the disposal site once a facility is constructed. (In some states, management of the facility may be delegated to a private enterprise, but for this game the management responsibility is retained by the public authority.) The primary goal of the Public Management Authority is to be sure that a facility is sited. Yet it recognizes that the long-term viability of a site hinges on the overall level of local public support, the minimization of contamination risks, and the site's financial feasibility.

Federated Indian Tribal Council (The Council): The Federated Indian Tribal Council represents the state's Indian population in today's negotiation. (It should be understood, however, that no change in the status of any reservation can occur without unanimous consent of the whole tribe.) The Indian tribes own extensive tracts of land in remote regions of the state. Historically, the Council has strongly resisted efforts to develop these lands. In the past few years, however, it has become more receptive to development projects which could improve the Indians' standard of living. The Council views the state's need to site a LLW facility as an opportunity to promote economic development on submarginal tribal lands while assuming a relatively small and manageable environmental risk. The Council

expects that a LLW facility, if sited on Indian-owned land, could provide jobs, additional income, and improved community services at a time when they are most needed. To promote this opportunity, siting must not be restricted to lands owned by the Federal or state governments. The Council is also concerned that any development avoid disruption of Native American culture or artifacts.

Environmental Coalition (EC): The Environmental Coalition is an umbrella organization representing more than a dozen environmental groups. Although viewed as moderate by the most ardent environmentalists, the Coalition is generally opposed to any development which threatens scarce natural resources, recreational land, or sensitive habitats. In particular, the Environmental Coalition is worried that the development of a LLW disposal site will cause irreversible environmental damage. In addition, it fears that the radioactive nature of the wastes involved will pose a threat not only to the environment, but to public health and safety.

Green Wave: The Green Wave is an active coalition of grassroots peace and environmental groups that oppose the use of most nuclear technologies. Several years ago Green Wave members, along with some members of the Environmental Coalition, successfully blocked the construction of a nuclear power plant through demonstrations and a series of court actions. Some members of the Green Wave have hinted that similar "direct

action" might accompany any attempt to open a LLW facility in the state. The Green Wave's tenacity and effectiveness is well-documented, and their willingness to participate in these negotiations has surprised some parties.

State Association of Municipal and County Governments: The Association includes representatives from all the state's cities, towns, and counties. The Association is acutely aware that none of its members want a LLW facility sited in their "backyards." However, it also recognizes the inevitability of a site being placed somewhere in the state. If a city, town, or county has to accept a facility, the Association is committed to stringent health and safety standards and substantial compensation for the host community.

Association of Radwaste Generators (ARG): The Association of Radwaste Generators includes radwaste generators from all over the state. It is pleased that the state has begun a process that will ultimately lead to the construction of an in-state LLW disposal facility. Currently, these generators ship their waste to an out-of-state facility which is part of a different regional compact. But they could soon find themselves with no disposal site if that state acts to exclude waste from non-compact states. ARG thus is most concerned about securing access to a site. But it is also interested in keeping siting and operator costs low, since most of these costs will probably be passed along to ARG members in the form of user fees.

The Governor's Blue Ribbon Advisory Committee: This Committee is a blue-ribbon panel of science, health, and economics experts who advise the Governor on science-related public policy questions. The Committee is interested in seeing a low-level disposal facility sited; it realizes the state must develop an in-state disposal capability as soon as possible. The Committee is, however, also interested in seeing the siting process proceed in the most rational, sensible fashion possible. It is therefore sensitive to the need to balance the risks, costs, and benefits involved.

NEGOTIATION PROCESS

The State Regulatory Agency (SRA) has identified 21 possible siting criteria. These criteria have been proposed by some or all of the interested parties over the past several months. The SRA is considering all 21 criteria as possible candidates for inclusion in the state's supplementary list of 10 siting criteria.

In an attempt to maximize public support for the regulations it will ultimately promulgate, the SRA has agreed to host a special meeting for all parties interested in the regulations. The purpose of that meeting, which is about to begin, is to generate a "joint proposal" listing the 10 supplementary criteria

that will be used in evaluating potential LLW sites. Only 10 criteria will be incorporated into the final list of regulations.

The SRA will participate only as the convener of today's meeting. The Commissioner of the SRA has appointed a high-level SRA staff member to monitor the progress of today's meeting. The SRA hopes that the parties will be able to agree to a set of 10 siting criteria on their own. If, however, the parties fail to reach an agreement today, the SRA will take matters into its own hands. The SRA has not indicated which criteria it will promulgate if it is forced to act on its own.

MECHANICS OF THE NEGOTIATION

The seven key parties have agreed to attend the meeting and are represented at the negotiating table. The SRA staff member will open the meeting by explaining the ground rules for the meeting. Each participant has a copy of the list of the 21 proposed criteria.

The discussions may proceed in whatever direction the parties like. A proposal will be accepted only if at least 5 of the 7 parties support it. In other words, no proposal with fewer than 5 parties behind it can be accepted. In addition, all proposals must specify only 10 criteria--no more and no fewer. "Incomplete" packages will not be accepted.

THE SRA STAFF MEMBER WILL CALL FOR A FORMAL VOTE ANY TIME AT LEAST 3 PARTIES ARE READY TO SUBMIT A PROPOSED LIST OF 10 SITING

CRITERIA. OTHERWISE, THE SRA STAFF MEMBER WILL CALL FOR A VOTE EVERY 30 MINUTES using a provisional list of 10 criteria supplied by the SRA committee currently working on this issue.

Voting must be done by simultaneous hand-raising. Votes are binding and, if a proposal passes, parties cannot renege on their promise of support. Parties are free, however, to explore "improvements" to any agreement, but if proposed improvements are not unanimously supported by the parties to the original agreement, the original agreement stands.

Negotiations must stop at the end of the meeting. If a package of 10 criteria has not been approved (i.e. if no proposal receives at least 5 votes), the SRA will promulgate its own siting regulations.

THE CRITERIA TO BE NEGOTIATED

The 21 possible criteria identified by the SRA are listed below. They are organized under 5 headings: Site Suitability; Environmental Impacts; Economic/Financial Impacts; Site Location; and Legal/Political/ Regulatory Context. Each criterion is described briefly below. In some cases, the proposed criteria are more strict than existing Federal criteria (10 CFR 61). In other cases, the proposed criteria address issues that are not addressed at all by existing Federal regulations. Not all these criteria, as defined, are appropriate for all states, but, they are assumed to be

appropriate for this state in this game.*

1. **SITE SUITABILITY**

A. **Proposed site may not be located within 15 miles of an earthquake fault line:**

10 CFR 61 does not specify the distance a site must be from a fault line. Federal regulations state only that "areas must be avoided where tectonic processes such as faulting, folding, seismic activity, or vulcanism may occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives...or may preclude defensible modeling and prediction of long-term impacts."

B. **Proposed site must have a natural slope of less than 5 degrees:**

10 CFR 61 does not specify slope requirements for the proposed site. Regulations state only that "areas must be

* This moderately-sized state has many diverse characteristics. Most of the land within the state is owned by private entities and townships, but substantial acreage is owned by the state and federal governments and by Native American Indian tribes. The state's several densely populated pockets of urban activity and suburban sprawl are complemented by many rural and agriculturally-oriented counties. While the topography of the metropolitan areas is relatively flat, hills and valleys are scattered about the less densely populated rural areas. The moisture content of the land ranges from arid to quite moist. Located within state boundaries are several earthquake fault lines, the majority of which have been inactive for decades. There are, however, a few fault lines that are occasionally active. Also located in the state are two nuclear power plants and numerous public and private hospitals, universities, research organizations, and corporations that produce low-level radioactive wastes.

avoided where surface geologic processes such as mass wasting, erosions, slumping, landsliding, or weathering occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives...or may preclude defensible modeling and prediction of long-term impacts." The proposed criterion would reduce the chances of run-off and erosion.

- C. **Proposed site may only be located where maximum water table lies at least 20 feet below the disposal zone and at least 50 feet below the surface:**

10 CFR 61 does not specify the distance a disposal site must be from the water table. Regulations state only that "the disposal site must provide sufficient depth to the water table that ground water intrusion...into the waste will not occur."

- D. **Proposed site may not be located within 10 miles of a water supply aquifer:**

10 CFR 61 does not specify minimum distance requirements from an aquifer. Regulations only state that "areas must be avoided having known natural resources, which, if exploited, would result in failure to meet the performance objectives..." The NRC considers aquifers to be natural resources.

- E. **Proposed site may not be located on fractured or complex bedrock where such complexity may reduce the ability to characterize, model, and monitor the site.**

10 CFR 61 does not exclude zones of fractured or complex bedrock from consideration. This type of substrata would,

however, significantly complicate the modeling and monitoring processes necessary for the protection of groundwater.

Current regulations state only that "areas must be avoided having known natural resources, which, if exploited, would result in failure to meet the performance objectives..." The NRC considers groundwater to be a natural resource.

2. ENVIRONMENTAL IMPACT

- A. Proposed site must result in no permanent loss of endangered species, natural wildlife, or other habitat:

10 CFR 61 does not address this issue.

- B. Proposed site must result in no permanent loss of unique geologic or archaeologic resources:

10 CFR 61 does not address this issue.

- C. Proposed site may not be located within 1 mile of any public road or property boundary:

10 CFR 61 does not address this issue.

3. ECONOMIC/FINANCIAL IMPACTS

- A. Proposed site may not be located where the construction labor force increases the local population by more than 10%:

10 CFR 61 does not address this issue.

- B. Proposed site must be more valuable as a low level radioactive waste disposal site than for any other use:

10 CFR 61 does not address this issue.

- C. Proposed site must be the most cost-effective (lowest cost) disposal alternative that ensures an acceptably low level of risk to human health and the environment:

10 CFR 61 does not address this issue.

- D. **Compensation to residents near the proposed site must not exceed 20% of total development costs:**

10 CFR 61 does not address this issue.

- E. **Proposed site infrastructure improvements must not exceed 15% of total development costs:**

10 CFR 61 does not address this issue.

4. **SITE LOCATION**

- A. **Proposed site must be at least 30 miles from any urban area and at least 5 miles from any town center:**

10 CFR 61 does not specify minimum distance from population centers. Regulations state only that "...a disposal site should be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet the performance objectives..."

- B. **Proposed site must be readily accessible to major highways:**

10 CFR 61 does not address this issue.

- C. **Proposed site must not be located on or adjacent to recreation land, wildlife refuges, or protected habitats for other species:**

10 CFR 61 does not address this issue.

- D. **Proposed site must not be located with or near solid or hazardous waste facilities:**

10 CFR 61 does not prohibit co-located facilities; however, regulations state that "the disposal site must not be located where nearby facilities or activities could adversely impact the ability of the site to meet the performance objectives...or significantly mask the environmental monitoring program."

5. LEGAL/POLITICAL/REGULATORY CONTEXT

- A. Proposed site must be on land that has been owned by the State or Federal government prior to the siting process:**

Although 10 CFR 61 states that "disposal...may be permitted only on land owned in fee by the Federal or a State government," it is possible for the government to purchase private land or acquire it through eminent domain. The proposed criteria would prohibit this type of acquisition.

- B. Proposed site must not be located in towns that have rejected proposed nuclear power plants or hazardous waste facilities:**

10 CFR 61 does not address this issue.

- C. A geohydrological profile must be available for the proposed site in advance of the Environmental Impact Statement (EIS):**

10 CFR 61 does not state that specific data on a site must exist but does state that "the disposal site shall be capable of being characterized, modeled, analyzed, and monitored."

- D. Proposed site must not require a change in existing local zoning ordinances:**

10 CFR 61 does not address this issue.

(END)

LOW-LEVEL RADIOACTIVE WASTE SITING SIMULATION II

(General Information for All Interested Parties)

In 1980, Congress passed the Low Level Radioactive Waste Policy Act which was designed, in part, to relieve the unfair burden borne by the small number of low-level radioactive waste disposal (LLW) facilities accepting wastes for the entire country. The Act mandated that each state accept responsibility for the LLW generated within its own boundaries and specified a time limit for each state to arrange for disposal of its wastes. In our state the Public Management Authority (PMA) has been created to manage the siting, construction, operation, and decommissioning of an in-state disposal facility.

This simulation was prepared for the Public Disputes Program of the Program on Negotiation by Wendy Rundle, Douglas Rae, and Tod Loofbourrow under the direction of Professor Lawrence Susskind and Denise Madigan.

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The goal of the PMA is to site a low-level waste facility within the time limit specified by law. But it recognizes that the long term viability of a site is dependent upon public support, the minimization of environmental risks, and the economic feasibility of the facility.

After a year of screening activity, the Public Management Authority (PMA) has identified three candidate sites for a disposal facility with an active design life of twenty five years. The three sites differ in several aspects, but all satisfy the state's special site screening criteria. In addition, all three sites would require impermeable liners and other standard engineering safeguards. The Public Management Authority is convinced that the town selected to "host" the LLW facility will realize substantial economic benefits. With total development costs estimated at \$50 million, construction and other development activities would generate at least 100 jobs for several years. Once the site was developed, operation of the facility would require a permanent labor force of 40 to 50 employees. In addition, the PMA believes the establishment of such a facility could stimulate other industrial development in or near the host community.

But despite these potential benefits, selection of the LLW facility site is likely to be one of the state's most politically complex and controversial undertakings in recent years. (The earlier process of choosing site screening criteria proved to be fraught with conflict.) Several key parties have expressed concerns about the candidate sites,

including representatives of the three communities in which the candidate sites are located.

In an attempt to maximize the level of political and public support for site selection, the PMA has agreed to convene a special meeting for the key stakeholding parties. The purpose of the meeting is to select a site jointly for the state's low-level waste disposal facility. The PMA hopes that the parties, without PMA interference, will be able to select a site they can all support.

If the parties reach agreement on one of the candidate sites, the Public Management Authority will approve that site for the State's LLW facility. But if the parties fail to reach agreement, the PMA will quickly select a LLW facility site on its own.

THE STATE

This moderately-sized state has many diverse characteristics. Most of the land within the state is owned by private entities and townships, but substantial acreage is also owned by the state and federal governments and by Native American Indian tribes. The state's several densely populated pockets of urban activity and suburban sprawl are complemented by many rural and agriculturally oriented counties. While the topography of the metropolitan areas is relatively flat, hills and valleys are scattered about the less densely populated rural areas. The moisture content of the land ranges from arid to quite moist. Located within state boundaries are several

earthquake fault lines, the majority of which have been inactive for decades. There are, however, a few fault lines that are occasionally active. Also located in the state are two nuclear power plants and numerous public and private hospitals, universities, research organizations, and corporations that produce low-level radioactive wastes.

THE OTHER PARTIES

The Public Management Authority (PMA) has the power to select a facility site. It is concerned, however, that unilateral action will alienate the various parties and thus increase the likelihood of controversy and delays in the site development process. The PMA is therefore willing to let the other parties select a site through a consensual process.

Other parties concerned about the facility siting process include: the Governor, the Environmental Coalition, the Association of Radwaste Generators, and residents of those towns in which the three candidate sites are located. The interests of each of these other parties are described below.

GOVERNOR: The Governor, a Democrat, grew up near Alford in the western part of the state, and is a graduate of Alford's Clearwater College. Over the years she has developed a strong political base in the western counties. Nevertheless, she represents the residents of the entire state, all of whom benefit from activities which generate low-level radioactive waste and all of whom depend on the state for the protection of public health and safety.

The Governor is anxious to have a site chosen as soon as possible and has empowered the PMA to do so if a consensual site selection process fails. But the Governor is also committed to an environmentally sound and economically viable disposal site, and, naturally, wants to avoid public opposition if possible. (She was not endorsed by either environmental or business groups in the last election, and hopes this negotiation will promote her political standing with both the Environmental Coalition and the Radwaste Generators.) She will participate in the negotiations as long as the other parties remain willing to negotiate in good faith.

ENVIRONMENTAL COALITION (EC): The Environmental Coalition is an umbrella organization representing several environmental groups. Although viewed as moderate by the most ardent environmentalists, the Coalition is generally opposed to any development that threatens the existence of natural resources, recreational land, or sensitive habitats. However, given the necessity of selecting a LLW disposal site in the state, the Environmental Coalition is committed to ensuring that the chosen site is the most environmentally sound. If today's negotiations fail to produce a satisfactory agreement, and if the Public Management Authority fails to select the most environmentally acceptable site, the EC has publicly threatened to challenge the site in court.

ASSOCIATION OF RADWASTE GENERATORS (ARG): The Radwaste Generators include public organizations and private enterprises

from throughout the state. These generators currently ship their waste to an out-of-state facility. The Radwaste Generators are pleased that an in-state site will finally be selected and that construction and operation will begin soon; a new facility should reduce the costs and problems associated with shipping waste out of state. The Radwaste Generators are concerned, however, about the potential development costs associated with the three proposed sites. It fears these development costs will be passed on to its members in the form of user fees. In addition, if the siting process faces substantial opposition and delays, the generators have warned that some of its members may have to reduce or suspend operations or attempt interim on-site storage.

TOWN OF ALFORD (SITE A): The town of Alford (pop. 20,000) is a picturesque community located in the western half of the state. Alford is also home to Clearwater College, a small liberal arts college which numbers among its graduates the incumbent governor. Relations between the college and the town are close, and last year, several anti-nuclear faculty and student groups co-hosted a series of workshops on nuclear issues for the Alford community. Not surprisingly, Alford does not see any reason why it should be forced to bear the LLW burden for the entire state.

Alford officials appear to have frequent contact with the Governor. Town officials have also recently sought state help in controlling pollution from upstream dischargers located in another state.

TOWN OF BELLMAN (SITE B): The town of Bellman (pop. 10,000) is located roughly 65 miles from the nearest urban area. A predominantly rural farming community, Bellman usually votes Republican and voted against the Governor in the last election. Located in Bellman is a major research and teaching hospital associated with the State University. This hospital is a generator of low-level radioactive wastes which are currently disposed of out-of-state.

Residents of the town are extremely worried about the risks of groundwater contamination from the LLW disposal because most of their irrigation water is pumped from wells. Pollution of several wells has already occurred due to seepage from the municipal landfill, and the Environmental Coalition is suing the town to take expensive measures to stop the pollution. Given all their problems, the citizens of Bellman cannot understand why their town should be forced to accept the state's LLW facility.

TOWN OF CRANDON (SITE C): The town of Crandon (pop. 35,000) is an old mill town roughly 30 miles from a major metropolitan area. Strongly Democratic when the mills employed large numbers of blue collar workers, Crandon's political tendencies are now much more difficult to predict. The old mills have long since closed, and Crandon is in the midst of a local recession. It is eager to promote development, but fears the presence of a LLW facility will seriously limit its ability to stimulate "attractive" development in the area.

NEGOTIATION PROCESS

Because it would prefer that the parties reach agreement on a site without its interference, the Public Management Authority will participate only as the convenor of today's meeting. The Director of the PMA has asked a senior staff member to organize and observe today's meeting.

Two sources of information are available to all the parties. The first is an Environmental Impact Statement for all three sites prepared by the State's Department of Environmental Quality. The second, a critique of the State EIS by a prominent academic consultant to the Environmental Coalition (EC), challenges the State's Environmental Impact Statement on several issues. Abstracts of the two reports are attached.

If an agreement cannot be reached today, the Governor has empowered the PMA to select one of the three sites on its own. The PMA has announced that a site will be selected within the next few months so that site development can proceed. No one knows which site the PMA will choose; thus, there is no guarantee that the site will be chosen with complete sensitivity to the various concerns represented here today.

MECHANICS OF THE NEGOTIATION

All six parties have agreed to attend the meeting and are seated at the table. The PMA staff representative has opened the meeting and explained the procedures that the negotiating

session will follow. Each party has an abstract of the State's Environmental Impact Statement and the EC's critique in hand.

The discussions may proceed in any direction proposed by the parties. The only restriction is that, in the interests of promoting consensus, private caucuses or discussion away from the negotiating table cannot take place until 15 minutes into the negotiation. After this time, caucusing will be allowed. The PMA hopes that an agreement can be reached, thus preventing a situation in which it would have to choose a site on its own. But, the PMA will accept an agreement only if at least 5 of the 6 parties will support it and only if the "host" community agrees to accept the site. This LOCAL VETO POWER is granted by state statute, but remains effective only as long as these negotiations continue. The PMA would, of course, prefer an agreement supported by all 6 parties.

The PMA will not participate in today's negotiations. However, the PMA staff representative will appear periodically to see how the negotiations are progressing. He or she will call for a formal vote any time four or more parties are ready to submit a proposal for selection of a particular site (only Sites A, B, and C can be proposed). In the absence of a specific proposal, the PMA representation may periodically ask the parties to comment on each possible site.

Voting is done by simultaneous hand-raising. The votes will be taken on one proposed site at a time. If a proposal passes, the votes are binding; parties cannot renege on their promise of support. The parties are free, however, to explore "improvements" in any agreement which either benefit the

supporting parties or entice a non-supporting party to lend its support. If proposed improvements to an agreement are not unanimously supported by the parties to the original agreement, the original agreement stands.

Negotiations must stop at the end of the meeting. If a disposal site has not been agreed upon (i.e. if no proposal receives at least five votes), the PMA will begin its own decision-making process and select a site soon thereafter. (NOTE: If the negotiations fail, all prior commitments are off and the towns lose their ability to veto a site in their own communities.)

APPENDIX B - TABULATED EVALUATION FORMS

B.1 Oak Ridge Dry Run, November 28, 1984

EVALUATION FORM

NAME _____

GAME 1

YOUR ROLE _____

How could the General Instructions be made clearer?

How could your Confidential Role Instructions be made clearer?

Did your assigned role match your current "real world" role?

4 closely 7 somewhat 9 not at all

GAME 2

YOUR ROLE _____

How could the General Instructions be made clearer?

How could your Confidential Role Instructions be made clearer?

Did your assigned role match your current "real world" role?

1 closely 5 somewhat 13 not at all

OVERALL

Did you find your role assignments unfamiliar or difficult to play?

Unfamiliar? - Yes - 3
No - 6

Difficult? - Yes - 3
No - 8

How would you rate the realism of the simulations?

4 very realistic 13 somewhat realistic 0 not at all realistic

Suggestions for increasing the realism of the simulation:

Other comments and suggestions (use back side if needed):

*** - specific suggestions were provided, some of which were incorporated into the next revision of the simulation (see Sect. 3.1).

B.2 Boston Workshop, December 14, 1984

EVALUATION FORM

NAME _____

GAME 1

YOUR ROLE _____

How could the Instructions or Role Descriptions be made clearer?

Most participants thought the instructions were clear. Specific suggestions were provided.

Did your assigned role match your current "real world" role?

Yes - 4

No - 14

Somewhat - 4

GAME 2

YOUR ROLE _____

How could the Instructions or Role Descriptions be made clearer?

Most participants thought the instructions were clear. Many participants wanted shorter instructions or more time to read them.

Did your assigned role match your current "real world" role?

Yes - 1

No - 22

Somewhat - 0

OVERALL

Did you find your role assignments unfamiliar or difficult to play?

Unfamiliar? - Yes - 3
No - 14

Hard to Play? - Yes - 2
No - 16

What aspects of the simulation did you find most unrealistic?

Time pressure - 15 mentions
Constraint on number of siting criteria - 2 mentions
Constraints of point system
Lack of concern for long-term site liability
Exaggerated influence of money and other forms of compensation

What aspects were most realistic?

Roles and groups represented - 4 mentions
Issues, especially handling of multiple issues - 3 mentions
Change in options mid-stream during negotiations

EVALUATION FORM (continued)

What "lessons" did you learn from participating in the simulation?

Process of compromise leading to a consensus - 3 mentions

Process of communication between diverse interest groups - 2 mentions

Importance of listening - 2 mentions

Overall picture of siting procedures

Other comments and suggestions:

"I thoroughly enjoyed this. I consider the time spent well worth it. I learned a lot."

B.3 Follow-up for Dry Run Participants, February 1985

29 PARTICIPANTS RETURNED FORMS

MEAN

QUESTIONNAIRE ON THE
LLW FACILITY SITING SIMULATION

Please indicate whether you agree or disagree with the following statements by circling the number (1-7) which best describes your position.

2.3

1. Negotiations work better if the parties involved don't feel under pressure to reach a settlement.

| | | | | | | | |
|-------------------|----|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 11 | 10 | 3 | 1 | 1 | 2 | 1 | |

5.4

2. Negotiations over siting conflicts will probably benefit all or most of the parties involved.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| | 1 | 4 | 1 | 7 | 6 | 9 | 1 |

5.9

3. NRC requires that LLW disposal facilities be located so that future population growth and development will be unlikely to result in unacceptable exposure to the general public.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| | 1 | 2 | | 1 | 4 | 7 | 4 |

6.0

4. If I were the governor of a state that was required to host a LLW disposal facility, I would definitely want to have a negotiation process in my state's siting and licensing procedures.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 2 | | 1 | | 4 | 5 | 17 | |

4.9

5. Negotiations work better if all parties discuss their interests and reveal their actual bargaining positions.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 1 | 1 | 5 | 3 | 6 | 7 | 6 | |

4.4

6. One of the siting criteria established by the U.S. Nuclear Regulatory Commission (NRC) is that a LLW disposal facility site must be readily accessible to major highways.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 2 | 1 | 3 | 3 | 3 | 5 | 4 | 7 |

3.9

7. Negotiation sessions may air the issues, but they are unlikely to significantly reduce opposition to a controversial facility.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 2 | 6 | 8 | 1 | 8 | 2 | 2 | |

4.0

8. As a negotiator it's best for me to play my cards "close to my chest" and not tell people what my bottom-line position is.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 3 | 5 | 8 | 1 | 3 | 9 | 1 | |

5.3

9. As a result of participating in the "LLW Facility Siting Simulation", I would be more willing to engage in negotiations regarding a proposed facility.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| | | | 9 | 5 | 2 | 12 | |

3.1

10. In negotiations it's OK (maybe even helpful) to be unpleasant toward people you strongly disagree with, if this reflects your true emotions.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 8 | 4 | 6 | 5 | 6 | | | |

6.1

11. Agreements reached through negotiations or a consensus-building process will have greater credibility with the public than unilateral decisions.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| | 1 | | 1 | 5 | 6 | 16 | |

5.1

12. Having played the "Siting Game", I believe I am a better negotiator.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| | | | 10 | 7 | 6 | 6 | |

2.6

13. The only way to select and license a LLW disposal site is for the state or developer to use a "heavy hand," i.e. use eminent domain power and/or "steamroll" the opposition.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 13 | 4 | 5 | 2 | 2 | | 1 | 2 |

4.7

14. I would accept a commercial LLW disposal facility in my community if it complied with all existing federal, state, and local laws and regulations.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 1 | 4 | 3 | | 3 | 4 | 10 | 4 |

3.6 15. In siting and licensing a LLW disposal facility, you can't please everyone, and you might as well not try.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 9 | 4 | 4 | 1 | 5 | 3 | 3 | |

5.2 16. I have a better understanding of the procedures, issues, and problems associated with siting of a LLW disposal facility now that I have been through the simulation.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| | | 2 | 3 | 10 | 8 | 6 | |

2.0 17. Under no circumstances would I accept a commercial LLW disposal facility in my community.

| | | | | | | | |
|-------------------|---|-------------------|---------|----------------|---|----------------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | ? |
| strongly disagree | | disagree somewhat | neutral | agree somewhat | | strongly agree | don't know |
| 17 | 7 | 2 | | | 1 | 2 | |

18. Technical siting criteria for commercial LLW disposal facilities are specified in: (circle one)

- A) The Low Level Radioactive Waste Policy Act of 1980
- B) 10 CFR 61
- C) both A and B
- D) neither A nor B
- E) don't know

21
2
6

19. Rank the following aspects of a siting package according to their ability to enhance the acceptability of a LLW disposal facility in your community. (Assign rank: 8 - most desirable; 1 - least desirable.)

| MEAN SCORE | RANK | ASPECT |
|------------|------|--|
| 3.9 | 6 | direct economic compensation to the community |
| 3.4 | 4 | a local management panel with authority to monitor the facility |
| 4.9 | 8 | a local management panel with power to monitor and close the facility |
| 3.2 | 3 | a source-reduction program to limit future production of LLW |
| 3.6 | 5 | a requirement that the facility be relicensed every seven years, with an EIS prepared to document the decision each time |
| 4.1 | 7 | establishment of a trust fund to be used for any remedial action needed for the facility |
| 3.2 | 2 | waste acceptance criteria prohibiting disposal of the more contaminated higher-activity LLW |
| 2.0 | 1 | establishment of a crash program of applied research, development, and demonstration aimed toward alternative disposal technology for your region/state. |

Comments on the overall value of the LLW Facility Siting Simulation:

- Exercise was valuable, useful, and worthwhile - 9 mentions
- Exercise had uncertain value - 3 mentions
- Exercise provided better understanding of issues, stimulated dialogue between groups - 5 mentions
- Exercise provided insight regarding techniques of negotiation - 3 mentions
- Problems mentioned: time constraints, playing for score

Did you feel the Siting Criteria game (AM session) or Site Selection game (PM session) was more valuable to you.

- AM - 4
- PM - 10
- No preference - 3
- Not applicable - 12

Other comments or suggestions (including any comments/suggestions on this questionnaire - use additional page if needed):

- Industry viewpoint well represented
- "Grass-roots" environmental viewpoint not well represented - 2 mentions
- Some assumptions of the simulation are arguable.
- Regarding the questionnaire:
- Questions 8 and 19 noted as ambiguous.
- Questions to test knowledge base regarding LLW were embarrassing, would not provide accurate indication.

Please indicate if you want more information on the project:

- 20 Results from analysis of this questionnaire
- 16 An information package describing the simulation
- 24 Project final report

Name _____

Address _____

Return evaluation form to:

Dickinson Ropp
ORNL, Bldg. 2001
P. O. Box X
Oak Ridge, TN 37831

Please return before February 8.

B.4 Richmond Workshop, June 18, 1985

EVALUATION FORM

LOW-LEVEL RADIOACTIVE WASTE SITING SIMULATION

1. Were there specific facts, procedures, or techniques that you learned from the simulation/workshop?

Principles, mechanisms, strategy of negotiation - 9 mentions
 Various forms of compensation - 3 mentions
 Influence of alliances, political considerations - 3 mentions
 Need for compromise - 2 mentions
 Need to involve all interest groups - 2 mentions
 Negotiators need priorities, specific instructions - 2 mentions

"We were forced to use specific siting criteria rather than intellectual analysis."

2. What aspects of the simulation did you find most valuable? Least valuable?

Most Valuable

Practice with negotiation skills - 6 mentions
 Role playing - 3 mentions
 Interaction with other participants - 2 mentions
 Insights into perspectives of other interest groups - 2 mentions
 Lessons in compromising - 2 mentions
 Expanded concept of compensation

Least Valuable

Post-session "process" discussions
 Individuals not addressing role properly
 Negotiation of actual dollar-amounts of compensation bogged down discussion of concept.

3. Did you feel the Siting Criteria session (AM) or the Site Selection session (PM) was more valuable to you?

AM (Siting Criteria) - 12

PM (Site Selection) - 7

No preference - 7

4. Can you suggest ways to improve the simulation or the workshop format?

Allow people more time to prepare for roles - 5 mentions
 Allow participants more creativity to invent criteria, proposals,
 etc. - 2 mentions
 More role reversal - 2 mentions
 Use real role first, then do role reversal
 Send out instructions in advance
 Double-up on persons in role to avoid mis-playing of roles
 Two day workshop
 "Give the group an opportunity to discuss assumptions/more acceptable
 proposals after simulation is finished."

5. Could the Siting Simulation be useful in your community or local situation?

| | | |
|------------|------|--|
| Yes | - 16 | "Need more public education first as it takes well-informed participants to play these roles." |
| No | - 3 | too academic, "war games" |
| Maybe | - 6 | |
| No opinion | - 3 | |

6. Additional comments?

"Enjoyed it" - 2 mentions

"Excellent workshop"

"The time schedule makes you work to get something accomplished."

"I'm discouraged to know my tax dollars are supporting such a program as the development, 'refinement', and showboating of this game."

"Public officials could profit by this experience."

Name _____

Address _____

_____ ZIP

Return Evaluation Form to:

Dickinson Roop
 Oak Ridge National Laboratory
 Building 2001,
 P. O. Box X
 Oak Ridge, TN 37831

B.5 Follow-up Evaluation for Boston Workshop Participants, July 1985

EVALUATION FORM

LOW-LEVEL RADIOACTIVE WASTE SITING SIMULATION

1. What specific facts, procedures, or techniques did you learn from the simulation/workshop?

Need to state your interests/priorities during negotiation

Mediation skills

Negotiation process

Learning how to identify and work toward elements of an agreement

2. What aspects of the simulation did you find most valuable? Least valuable?

Most valuable: role playing - 2 mentions
group discussion

3. Was attending the simulation workshop a worthwhile use of your time?

Yes - 5

No - 1

Somewhat - 1

4. In retrospect, can you suggest ways to improve the simulation or the workshop format?

Send out instructions in advance - 2 mentions

More time to absorb roles and rules

"More public involvement, but I do not know how"

5. Could the Siting Simulation be useful in your community or local situation?

Yes - 2

No - 3

Somewhat/Probably - 2

6. Additional comments?

"Pleased with program"

"Appreciate the opportunity to attend"

"Broad based public education is needed, yet the public will not take sufficient time until they feel the direct impact. Most times it's already too late."

Questionnaire is being sent out too late- 2 mentions

Name _____

Return Evaluation Form to:

Address _____

Dickinson Roop
Oak Ridge National Laboratory
Building 2001, M.S. #2
P. O. Box X
Oak Ridge, TN 37831

ZIP _____

4 Check here if you want to receive a copy of the project final report.
requests

B.6 MIT Research Questionnaire for Boston Participants

LOW-LEVEL RADWASTE SIMULATION GAME

The purpose of this questionnaire is to find out your reactions to the game on low-level radwaste management that you played at MIT in December. The questionnaire is divided into 6 parts. Please be sure to complete all 6 parts. This should take no longer than 15 minutes.

I will call to record your responses to the questions. Your responses will be kept strictly confidential. If you have any concerns, please call me, Wendy Rundle, at 617/926-2736 or leave a message at 617/253-2026. Thank you.

I. NEGOTIATION

The following statements relate to negotiation. Please indicate whether you agree or disagree with each statement by checking the appropriate space.

| | STRONGLY AGREE | SOMEWHAT AGREE | SOMEWHAT DISAGREE | STRONGLY DISAGREE | DN'T KNOW |
|--|-------------------|-------------------|----------------------|----------------------|--------------|
| A. When I enter a negotiation I try to take an opening position that is much greater than what I know I will settle for. | 11 | | 11 | | 1 |
| B. By acknowledging the legitimacy of my adversary's concerns or problems, I can usually help us both do better. | 34 | | 0 | | 0 |
| C. I will agree to discuss any set of alternatives proposed by my adversary even if I am not willing to commit to them. | 31 | | 3 | | 0 |
| D. When I get my way it means that my adversary has lost. | 31 | | 2 | | 1 |
| E. I usually find it advantageous to complete one part of a negotiation before going on to the next. | 12 | | 17 | | 5 |
| F. Once I get what I want, I am not interested in helping my adversary further. | 30 | | 2 | | 2 |
| G. If I am opposed to a proposal suggested by my adversary, I almost always reveal the true reasons for my opposition. | 26 | | 7 | | 1 |

II. RADWASTE SITING GAME

The following statements relate to the Radwaste Siting Game you played at MIT in December. Please indicate whether you agree or disagree with each statement by checking the appropriate space.

| | STRONGLY AGREE | SOMEWHAT AGREE | SOMEWHAT DISAGREE | STRONGLY DISAGREE | DON'T KNOW |
|--|-------------------|-------------------|----------------------|----------------------|---------------|
| A. The most successful players were those who invented options that the other players could accept. | 33 | | 0 | | 1 |
| B. The players that had the greatest impact on the agreement were those who did the best job of explaining their concerns. | 24 | | 9 | | 1 |
| C. The most successful players were those who focused primarily on their interests and not those of other players. | 23 | | 11 | | 0 |
| D. The players most likely to get what they wanted were those who never deviated from the positions they stated initially. | 27 | | 5 | | 2 |
| E. Prior negotiating experience was the most important factor in determining who got what they wanted. | 16 | | 7 | | 11 |
| F. The most successful players were those who consistently tried to accommodate other players. | 20 | | 14 | | 0 |

III. SMALL GROUP INTERACTIONS

The following questions concern the interactions within the small group of which you were part, for Games One and Two. Game One involved criteria for the screening of sites. Game Two involved the selection of an actual community site.

A. Game One

1. Indicate the parties that dominated the negotiation session. Check no more than 3.

| | |
|-----------|---|
| <u>4</u> | Governor's Blue Ribbon Advisory Committee |
| <u>9</u> | Environmental Coalition |
| <u>8</u> | Public Management Authority |
| <u>11</u> | Association of Radwaste Generators |
| <u>15</u> | Green Wave |
| <u>10</u> | State Association of Municipal and County Governments |
| <u>9</u> | Federated Indian Tribal Council |

2. Indicate the parties that had the least impact on the outcome. Check no more than 3.

| | |
|-----------|---|
| <u>10</u> | Governor's Blue Ribbon Advisory Committee |
| <u>3</u> | Environmental Coalition |
| <u>5</u> | Public Management Authority |
| <u>8</u> | Association of Radwaste Generators |
| <u>8</u> | Green Wave |
| <u>2</u> | State Association of Municipal and County Governments |
| <u>13</u> | Federated Indian Tribal Council |

3. Indicate any group player whose behavior was inconsistent with behavior you would expect from a person in that role in real life.

| | |
|-----------|---|
| <u>2</u> | Governor's Blue Ribbon Advisory Committee |
| <u>4</u> | Environmental Coalition |
| <u>3</u> | Public Management Authority |
| <u>10</u> | Association of Radwaste Generators |
| <u>6</u> | Green Wave |
| <u>0</u> | State Association of Municipal and County Governments |
| <u>11</u> | Federated Indian Tribal Council |

For any that you have checked, please explain:

4. Indicate any group player whose behavior was consistent with behavior you would expect from a person in that role in real life.

| | |
|-----------|---|
| <u>12</u> | Governor's Blue Ribbon Advisory Committee |
| <u>14</u> | Environmental Coalition |
| <u>8</u> | Public Management Authority |
| <u>11</u> | Association of Radwaste Generators |
| <u>14</u> | Green Wave |
| <u>8</u> | State Association of Municipal and County Governments |
| <u>7</u> | Federated Indian Tribal Council |

For any that you have checked, please explain:

A. Game One (continued)

5. Rank in order of importance the factors that best explain the outcome of your group's negotiation. Please number the choices 1 through 6.

5 Parties were skillful and experienced negotiators
1 Design and structure of the game controlled the outcome
3 Personalities of the people involved in the game
2 The fact that it was a game and not a real negotiation
4 Ability to talk informally amongst parties
6 Other (please specify): _____

B. Game Two

1. Indicate the parties that dominated the negotiation session. Check no more than 3.

14 Governor
8 Environmental Coalition
10 Association of Radwaste Generators
11 Town of Alford
4 Town of Bellman
5 Town of Crandon

2. Indicate the parties that had the least impact on the outcome. Check no more than 3.

7 Governor
7 Environmental Coalition
7 Association of Radwaste Generators
0 Town of Alford
1 Town of Bellman
6 Town of Crandon

3. Indicate any group player whose behavior was inconsistent with behavior you would expect from a person in that role in real life.

5 Governor
5 Environmental Coalition
6 Association of Radwaste Generators
8 Town of Alford
6 Town of Bellman
6 Town of Crandon

For any that you have checked, please explain:

4. Indicate any group player whose behavior was consistent with behavior you would expect from a person in that role in real life.

8 Governor
6 Environmental Coalition
9 Association of Radwaste Generators
13 Town of Alford
11 Town of Bellman
11 Town of Crandon

For any that you have checked, please explain:

B. Game Two (continued)

5. Rank in order of importance the factors that best explain the outcome of your group's negotiation. Please number the choices 1 through 6.

5 Parties were skillful and experienced negotiators
1 Design and structure of the game controlled the outcome
4 Personalities of the people involved in the game
2 The fact that it was a game and not a real negotiation
3 Ability to talk informally amongst parties
6 Other (please specify): _____

IV. PARTICIPATION

The following questions seek to establish why you participated in the gaming sessions.

- A. Indicate which of the following explains your interests in attending the gaming sessions. Check all that apply.

14 Learn about gaming
22 Learn how negotiation can be used to help solve disputes
12 Make professional contacts and meet others in the field
8 Learn about low-level radwaste issues
17 Learn about the interests and opinions of others in the field
11 Other (please specify): _____

- B. Indicate which of the following reflects what you hoped to accomplish by playing. Check all that apply.

15 Behave like I would in a real negotiation and see the results
15 Understand the interests and opinions of others, hear why they believe as they do
11 Test out different behaviors from those I would typically assume in a negotiation
23 Learn about negotiation
1 Reach an agreement at any cost
11 Reach an agreement that I could support in real life
5 Make a statement about my beliefs on the issues
9 Other (please specify): _____

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