

CONF-880903--19

DE88 011860

BEYOND THE NIMBY IMPASSE II: PUBLIC  
PARTICIPATION IN AN AGE OF DISTRUST

Elizabeth Peelle, Energy Division  
Oak Ridge National Laboratory  
P.O. Box 2008  
Oak Ridge, Tennessee 37831-6200  
(615) 574-5948

## I. INTRODUCTION

With the intensification of not-in-my-backyard (NIMBY) responses to both nuclear and chemical waste management and facility siting,<sup>1</sup> we revisit public participation goals, processes, mechanisms and results to evaluate the uses and limits of public participation for achieving legitimate siting decisions. Our theses are that 1) the deepening loss of trust of the American public in most institutions jeopardizes all preemptive nuclear and hazardous waste facility siting decisions, and 2) carefully structured public participation efforts including some form of power sharing offer the best (and in some cases, the only) hope of devising legitimate and durable decisions.

We review the key factors in the general siting milieu as well as the thickets of public participation-public involvement. The latter may leave both participants and onlookers confused and has often deepened the distrust and suspicion now surrounding the siting arena. Outcomes of six public participation (PP) case studies are presented and analyzed for problems as well as common factors contributing to their success or failure. The uses as well as the limits of PP in complex nuclear and hazardous waste management and siting processes are considered.

The analysis is guided by five questions: 1) Whose definition of public participation and "success" is used and how are differences reconciled? 2) What is the relationship of public trust/distrust to PP in siting? 3) What are the common factors in successful PP case studies? 4) What are the limits to PP? 5) What is the role of PP in public acceptance of nuclear-hazardous waste management and siting?

Public participation is broadly defined as any interactive process of citizen involvement in decision making involving a bona fide effort to achieve consensus among stakeholders. "Success" in PP is defined as any outcome which reduces conflict between the stakeholders and the agency/proponents and results in a legitimate and

lasting decision, i.e., one that is generally accepted by risk bearers as well as proponents of the waste management activity. We assume that few siting arrangements will be successful if they do not meet minimum criteria of equity, consent and accountability as judged by the risk bearers.

Using this definition of success introduces public acceptance as a criterion and also implies that no party dominates or overrides concerns of the other(s). It also suggests that negotiation or other techniques are used to enable a final decision that is more nearly a consensus. Developers or agencies have used a PP definition that is much more limited, viewing success as approval of the proposed project. But few nuclear or hazardous waste management (NHWM) proposals have been successful recently by this definition. On the other hand, risk bearers and opponents may prefer a form of PP in which their input determines the entire character of the final siting decision, without the possibility of compromise or consensus. They continue to make effective use of the NIMBY strategy and increasingly reject PP except on their own terms. It is our purpose to examine successful cases of PP (those with accepted and more balanced outcomes) to understand their development and dimensions.

## II. WHAT THE PLAYING FIELD NOW LOOKS LIKE

Limiting and sorting out the critical factors in nuclear and hazardous waste management and siting is difficult. Definition of their importance and interrelationships is incomplete. We review some of the interdependencies among the numerous variables. For instance, the 50 percent decline in levels of public trust over the past 25 years has affected all institutions.<sup>2</sup> Loss of trust in NHWM is due in part to information about the checkered track record of AEC, EPA and DOE in managing nuclear wastes,<sup>3</sup> as well as to state and federal failures in safeguarding public welfare in toxic waste management. Uncertainty about technical effects and future management is due to technical complexity and the long-lived nature of some radionuclides, and underlies the

**MASTER**

*me*

policy instability which has plagued the nuclear waste area. Remote decisionmaking and federal or state preemption of state-local powers relative to siting are two reasons for the uneven distribution of costs and benefits and a cause of opposition and distrust.<sup>4</sup> Fear of nuclear radiation<sup>5</sup> and increased public awareness of these problem areas have paralleled the rise in dominance of the electronic media and led to increasing public demands to be included in decision processes. Such public demands run up against the bureaucratic maze where information is produced slowly, accountability is hard to trace, and technical experts are reluctant to share their decision-making authority. Public fear creates a situation in which compliance with federal and state site selection and operational standards does not necessarily assure community acceptance of siting.<sup>6</sup> The result has been an unparalleled display of local and state NIMBY responses to efforts to site waste management facilities and a growing distrust of the agencies, Congress, and the processes and procedures they invent.

### III. WEIGHING PUBLIC PARTICIPATION FACTORS

After review of the various attempts to bring focus and coherence to the many variables involved<sup>7,8,9,10</sup> (among others), we select trust, consent, uncertainty, accountability and the distribution of costs and benefits as a minimum set of factors bounding the siting arena and significantly related to PP.

Considerable confusion surrounds the many uses and claims for PP. The "theology of public participation" has complicated the development of empirical knowledge and evaluation of PP.<sup>11</sup> It is frequently asserted that public acceptance cannot be achieved without "meaningful" PP. But just what objectives PP should serve is seldom agreed upon by the different parties involved in NHWM and siting.<sup>11</sup>

Two concepts of PP have developed in the past 25 years: citizen involvement and citizen action. The first involves a topdown policy by a government agency or developer that, at its best, permits public input and produces an informed citizenry. At its worst, the topdown approach results in tokenism and manipulation and can lead directly to increased antagonism or adversarial relationships. The second approach involves citizen action - a bottom up approach of grass roots action resulting in protest or autonomous self help.<sup>12</sup> Others frame the debate in terms of democratic theory - representative versus direct or participatory democracy.<sup>13</sup>

Many feel that the success or failure of PP strategies is closely linked to the amount of power which citizens have to affect outcomes. The failure of community action PP programs of the 1960's is linked to lack of power.<sup>14,15</sup> PP strategies have been ranked by the amount of power granted to citizen participants.<sup>16,6</sup> The

current stalemate in NHW siting may be interpreted as blockage of the topdown decision-making mode by citizens unhappy with their exclusion from decision-making that affects them. Neither extreme (all the power to one party at the expense of the other(s)) appears to be acceptable to the others, which suggests that some power sharing arrangement may offer more possibilities for consensus and compromise.

Grid-group theory<sup>17</sup> provides a different way of looking at things. Each of the four ideal-type socioeconomic groupings labeled competitive individualist, bureaucratic hierarchist, egalitarian and alienated individual is shown to respond best to fundamentally different approaches to the questions of trust, liability and consent.<sup>7</sup> Knowledge of these differing approaches is essential for designing workable compensation and participation strategies.

Kasperson<sup>18</sup> and Ellis<sup>19</sup> suggest that PP conflicts arise from lack of early and continuing public involvement. PP successes are linked to 1) development of indigenous technical and analytic resources, 2) institutional means to act on increased technical knowledge, and 3) PP programs tailored to the wide variety of participants.<sup>18</sup>

Because agency personnel and the affected public don't agree on PP goals, many problems have developed in implementation of PP programs. For example, agency decision makers are often slow or reluctant to define their involvement and their acceptance of public input.<sup>20</sup>

The evidence to date suggests that PP inclusion is problematic for resolution of NHWM conflicts. Thus it is important to differentiate those factors which contribute to success or failure in public acceptance.

### IV. WHAT CAN PP CONTRIBUTE TO RESOLVING THE DISTRUST DILEMMA?

Lack of trust of the federal government remains a principal barrier to siting waste facilities, according to the Office of Technology Assessment.<sup>21</sup> In their attempts to structure hazardous waste siting, the states have found that public acceptance does not follow automatically.<sup>6</sup> What is the relationship of PP to trust/distrust? Can PP help create or regain trust where distrust now reigns? Why have so many PP efforts ended in distrust and stalemate?

Trust has been defined as "the willingness of the rank and file to let authorities get on with the job of producing decisions."<sup>22</sup> Luhman sees trust as a social mechanism for reducing complexity and increasing tolerance of uncertainties.<sup>23</sup> Norm-oriented distrust challenges the institutional methods of pursuing society's goals, while value-oriented distrust challenges the validity of the goals themselves.<sup>24</sup> Both types of distrust are major factors in the opposition to siting and waste management. This

suggests that operation of decision systems under high levels of uncertainty as in NHHM requires either more trust or more autonomy (power) for legitimated decisions, or perhaps both.

The multi-dimensional nature of social trust includes judgments by affected citizens that the agency 1) is competent, 2) is without bias and hidden agendas, 3) cares about the people it serves, 4) uses due process in arriving at decisions, and 5) provides opportunities for individuals to make their concerns known.<sup>18</sup> Even one negative judgment will seriously interfere with the ability of an agency to carry out its functions. If part of trusting is believing that those trusted are accountable,<sup>25</sup> then we can expect sharp reversals of attitude when it is discovered that those in whom trust was vested have avoided responsibility or behaved in non-trustworthy fashion.

Unfortunately, PP processes are a double edged sword. In some instances PP has increased reciprocal levels of trust. But if not properly used in good faith, PP can create more distrust. The exchange theory of social relations specifies that involvement entails costs, requiring sacrifices of other activities, time and effort. This theory predicts that distrust will result if participants perceive they are not receiving a fair return on their time and energy, on their investment in the process.<sup>26</sup> This prediction seems to be borne out in the increase of adversarial activities and lawsuits which followed first round NHPA implementation efforts. Fundamental but unacknowledged disagreements over objectives are probably at the root of much of this difficulty.

But if trust cannot be rebuilt, ("Don't underestimate the depths of community disillusionment."),<sup>27</sup> then other approaches will be needed to help develop conditions for siting acceptability. Sandman argues that instead of being asked to trust, communities should be helped to rely on their own resources and directed toward mechanisms that provide this autonomy. For example, local health authorities and citizen activists could monitor effluents, the developer or agency could fund community consultant expertise, duplicate monitoring equipment could be provided in public places, and trust funds could be established so that compensation in the event of accident will be available without relying on the courts.<sup>27</sup> Thus power sharing is another way out of the distrust dilemma.

Moving now to empirical data, we review case studies and other selected data for PP practices and lessons learned.

#### V. CASE STUDIES AND OTHER PP DATA

Six case studies with major public participation components and a variety of settings and outcomes are compared on eighteen factors. Some

cases are locational disputes about future facilities, two are management actions concerning existing facilities, three are state level and three are local level cases. Two sets of paired cases are included. They are the proposed Monitored Retrievable Storage facility as seen by a local task force (MRS TF) and by the state of Tennessee (state MRS evaluation), the Hanford Defense Waste Citizens Forum, the Waste Isolation Pilot Project (WIPP), and two North Carolina Citizen Task Forces on hazardous waste management. Comparisons are made from available data. WIPP is included because it is the only federal nuclear waste storage facility actually under construction, and because the host state was successful in pre-NHPA days in securing modification through litigation of the DOE plan as well as several state level mitigation, compensation and incentives commitments. Though not successful by our definition (stakeholders did not agree and conflict was increased by the process), the state MRS evaluation is included to show both sides of a siting proposal which received conditional local endorsement and unconditional state rejection.

#### A. Clinch River Monitored Retrievable Storage Task Force<sup>28,29,30</sup>

In response to DOE's announcement in 1985 that three potential MRS sites had been chosen in Tennessee, local governments at the preferred site (Roane County portion of Oak Ridge) initiated their own joint citizen review and evaluation task force. A grant of \$100,000 for TF support and expenses was received from the state from its \$1.4 million DOE grant for state and local assessment of the plans and projected impacts. About half of TF members had technical backgrounds. Three areas were investigated: environmental, transportation, and socioeconomic impacts of the proposed facility. Intensive group interaction during their investigations and development of trust within the TF led to consensus decisions on safety and conditional acceptance of the facility. The TF used mitigation, compensation, and incentives (economic and non-economic) to address the problem of distrust of DOE and to change the net local impact balance from negative to positive. DOE accepted most of the TF conditions after informal negotiations, but the project is in limbo following intense state opposition and successful intervention by Tennessee legislators to include an MRS-prohibition-in-Tennessee in the NHPA amendments of 1987.

#### B. State Evaluation of MRS Proposal<sup>28,31</sup>

The state evaluation included inhouse evaluation by the Governor's Safe Growth team and agency heads, numerous outside consultant studies, and various PP activities including hearings across the state, and a telephone hotline for questions and registering of opinion. Questions addressed included safety of the facility and of transportation of the spent fuel rods,

licensing, transportation impacts, environmental impacts, economic and tourism impacts and need for the facility. The state declined to negotiate anything with DOE, to consider conditions which might modify negative impacts or to coordinate its assessment with the local TF in Oak Ridge. Legislative hearings were also held, with near unanimous opposition being declared by both state and national legislators. The Governor vetoed the MRS because of lack of need for the facility and cited its negative economic impacts upon tourism and economic development in the East Tennessee-Oak Ridge Technology Corridor area.

#### C. North Carolina Hazardous Waste Sitings - Greensboro and Durham<sup>32</sup>

One of the few hazardous waste facility sitings in the U.S. in the past decade occurred in Greensboro in 1985 with the blessings of city officials and environmentalists. In Durham, an explosion at an existing waste treatment plant led to formation of neighborhood and city-wide organizations which directed a risk assessment of the facility with state funds and municipal support. Eventually the city, state and the operator negotiated a consent order and the firm moved out of Durham. In both cases, citizens, scientists, industry and local and state officials worked together to negotiate a difficult problem. Both cities had pre-existing volunteer task forces chaired by League of Women Voters members and funded by EPA in 1979 to further public education about hazardous waste. In an open, consultative manner the Greensboro plant manager regularly shared information with the local task force, solicited public input, consulted with local emergency response personnel, answered detailed questions and provided tours of his facility to anyone interested. The TFs also reviewed technical documents and served as catalysts for local government cooperation which facilitated the development of detailed management arrangements such as right-to-know and zoning ordinances, and interagency agreements regarding emergency response capability in their communities. This cooperative approach to assessing impacts and reviewing policy led to siting a new facility and shutdown of an existing facility.

#### D. Hanford Defense Waste Citizens Forum<sup>33</sup>

DOE appointed and funded a two-state citizens group to review its plans and environmental assessment documents about management plans for existing nuclear wastes on the Hanford reservation. Many existing waste disposal areas do not meet current standards and some facts necessary for informed decisions on handling wastes were unknown. After some initial reluctance, DOE adopted a more open stance, declassifying and releasing some 19,000 pages of documents and providing knowledgeable staff to answer questions and give tours of the Hanford Reservation. Relying on its own in-house experts and interaction with Hanford staff, the citizen group

formulated questions and devised detailed recommendations for action and research to complete the evaluation of wastes. DOE adopted these recommendations in its EIS. Members of the TF have subsequently lobbied Congressional representatives in an attempt to secure the large amounts of funding necessary to proceed with the cleanup.

#### E. Waste Isolation Pilot Plant (WIPP)<sup>3</sup>

This first U.S. geological disposal project for military and TRU wastes has undergone several changes in direction since it was first proposed in the early 1970's by the governor of New Mexico. State litigation resulted in a legally binding set of stipulations in 1978 which lay out DOE responsibilities to fund or assist in obtaining funds for various state concerns. The stipulations included guarantees of liability coverage for the state, emergency response funding, transportation and operations environmental monitoring, and highway funding. Also negotiated were state-designed experiments to test the suitability of the site and repository design, state and public review for any further changes in the scope of the project, and a state-federal task force to address state concerns. Probably most important, ERDA-DOE agreed in 1978 to fund an independent state technical review board which is still functioning. The presence of this independent technical review group has added considerable credibility and stability to the project during its planning and construction phases. The state review board has argued successfully for change in project goals from permanent storage of N-waste to temporary storage pending evaluation of technical performance of the salt repository during its first years of operation. Local support for the repository at Carlsbad has remained strong for economic reasons, lack of resource conflicts and positive local leadership.

#### F. Comparison of Case Studies on Selected Characteristics.

Significant differences between the local and state MRS evaluation efforts and objectives show up clearly in their PP profiles (see Table 1) where 1) a local TF would accept the facility providing appropriate conditions and guarantees could be assured, while 2) the state's rejection of the MRS was strongly foreshadowed in its choices for non-interactive PP and rejection of negotiation for conditions. State agencies and officials reviewing the same data as the local task force seemed never to consider "getting on the road to maybe" since this interfered with their strategy for opposing the MRS. The state used other avenues to prevent DOE from implementing its decision to site the facility in Tennessee, chiefly political action and influence in the Congress.

The PP approaches of the two North Carolina hazardous waste TF efforts show great similarities despite the fact that one approved a siting and one negotiated a shutdown. Both are judged

Table 1. Public Participation Profiles of NHW Case Studies

Characteristics	MRS TF	MRS-State	NC-HazW		Hanford DWCF	WIPP
			D	G		
TF initiator	local govt	NA	X	X	DOE	State
Citizen task force	X	O	X	X	X	Expert TF
Membership	apptd-local	NA	?	open	apptd-DOE	apptd-NM
PP goals agreement	X	O	?	X	X	O
Federal funding	X	X	state-local		X	
TF logistical support	X	NA	X	X	X	X
Economic need (jobs and/or money)	X	O	?	?	NA	X
Prior citizen education	O	O	X	X	O	O
Inhouse technical experts	X	?	X	X	X	All expert
Power sharing	X	O	X	X	X	X (after lawsuit)
2-way communication	X	+/-	X	X	X	+/-
Interactive PP	X	O	X	X	X	+/-
Information adequacy	X	O	X	X	X	?
Information timeliness	X	late	X	X	X	?
Confidence in own (TF) understanding	X	?	X	X	X	X
Responsive developer or agency	X	?	?	X	X	+/-
Incentives, conditions negotiated	X	State declined	X	X	?	lawsuit settled
Plan/decision modification	X	+/-	X	X	X	X

Key to symbols: X = yes; ? = unknown; D = Durham; G = Greensboro; O = no; +/- = mixed results (some yes, some no). NA = not applicable.

as successful PP processes because stakeholders came to agreement and conflict was lessened. The longer history and many policy turns in the WIPP saga mean that it is atypical among these case studies, but it is deemed successful because the benefit balance has been improved by lawsuit and WIPP decisions have been altered by input of the expert TF.

The successful PP sites share many PP factors in common: citizen or expert task force, federal or state funding of local or state assessments and PP activities, interactive PP with a responsive developer or agency, adequate and timely information provided, logistical support of the TF, inhouse technical expertise, two-way communication during the process of assessment, TF confidence in its own understanding of the proposal and its impacts, and negotiation of incentives, compensation and mitigation measures.

Task force (citizen) confidence in its own understanding of the issues emerges as a key factor in successful PP. Not only is this variable vital for completion of the interactive PP process, it is also essential to enable starting the process. In Oak Ridge, such confidence

enabled the local government to overcome its distrust of DOE and enter the process. Likewise, the prior experience and technical savvy of pre-existing TFs in North Carolina enabled these communities to overcome the fear and distrust with which most potential host areas respond to the prospect of NHWM and siting. In the WIPP case, the funding of an expert, independent TF to monitor and evaluate DOE's plans appears to have been the primary factor in the survival of the WIPP arrangements through the policy changes of the past decade. In two cases, willingness to enter the process appeared also to be influenced by economic need and benefits (Oak Ridge MRS and WIPP).

The WIPP case also demonstrates the importance of volunteering in public acceptance of HWMS. Volunteer hosts are now being sought by several low level radioactive waste compacts as well as by states in their efforts to site hazardous waste management facilities.

Experience with the policy jury mechanism suggests another mechanism for providing representative citizen input to controversial policy areas.<sup>34</sup>

## VI. LIMITS TO PUBLIC PARTICIPATION

While PP is useful for solving certain types of problems and for developing consensus between proponents and stakeholders, it has definite limitations, particularly in the preemptive siting framework of nuclear and hazardous waste. PP alone cannot

- \* alter structural constraints in the siting process (lack of power)
- \* overcome agency determination to keep proceedings technically focused
- \* overcome timing errors (late involvement of citizens)
- \* force those with power to listen or acknowledge public concerns
- \* compensate for unanswered health and safety concerns
- \* substitute for inadequate compensation for risks borne by others
- \* counteract use of the DAD (decide, announce, defend)<sup>35</sup> strategy by proponents
- \* resolve incompatible views of PP objectives among the participants, or
- \* convince a skeptical public to enter the siting process.

Hence, PP can help create successful siting arrangements which address the problems above, but only in combination with other measures such as power sharing. In fact, PP cannot start until stakeholders have an incentive to begin participating, often the most difficult obstacle for HNWM and siting.

## VI. CONCLUSIONS

In addition to the several limitations listed above, PP in HNWM also suffers from problems in implementation. For instance, PP is not the panacea which some PP practitioners preach. PP has a mixed record, with some successful or partially successful examples, and numerous failures which increased distrust between the parties and resulted in intensified NIMBY efforts by citizens or states. Together the normative approach of PP practitioners and stakeholders plus agency reluctance to engage in PP often obscure the lessons to be learned from experience. Unless differing and incompatible goals for PP are recognized and resolved, it is unlikely that any consensus can be achieved during the siting process or that a lasting decision can be reached.

But the major problem in PP is the lack of power of communities or other stakeholders. Widespread implementation difficulties suggest that the big problem is reluctance of agency/developer staff to define their own involvement in PP or to accept citizen inputs. Those PP cases deemed successful all demonstrate some form of power sharing with the citizens affected by the action. Successful PP is thus about empowerment of the stakeholders to influence, determine and/or alter outcomes. Some form of joint decision making is needed, to the extent that

stakeholders feel that their concerns are being heard and acted upon. Increased control over events helps diminish fear and feelings of helplessness which often accompany siting. Balancing the power held by participants appears to be the key to better decisions.

Distrust means prohibitive transaction costs for economic activities<sup>36</sup> and for siting processes. Part of the complexity of present siting efforts is due to distrust which necessitates more citizen involvement. Therefore, our task is to devise institutional arrangements and processes which enable development of trust. Shared authority means more complexity, but it may be the only way to achieve respected and obeyed decisions.<sup>37</sup> Interactive, responsive PP carried on in good faith efforts that result in consensus decisions can create reciprocal trust among the participants.

But even when distrust is impenetrable, the community can be assisted to develop its own resources to monitor, verify and control the situation to some extent. Limited local control through citizen oversight panels to review safety parameters is one such mechanism which reduces fear and increases public acceptability. Here PP is useful for citizen definition of risks, impacts and compensation.<sup>38</sup> Having reviewed the problems and limitations of PP, we now turn to uses of PP and the conditions in which PP can make a contribution to legitimated decisions.

PP can build consensus in siting only if it is combined with several other factors. The absence of any one can destroy the effort. Those factors appear to include:

- \* some citizen power to influence or design their future
- \* technical expertise under citizen control
- \* benefits which exceed costs, as judged by the risk bearers
- \* minimum levels of trust and incentive to begin the process
- \* provisional arrangements to permit re-opening the decision when new information or circumstances require. Dealing with uncertainty requires flexibility of this sort.
- \* Public participation is useful for citizen definition of risks, impacts, and compensation<sup>38</sup>
- \* two-way communication and education
- \* development of consensus and legitimate decisions
- \* increasing trust among participants, provided the developer is responsive to citizen concerns

With the distrust of DOE and the entire nuclear enterprise having reached new heights and the states encountering much distrust and opposition in their hazardous waste siting efforts, we submit that PP is one of the few possibilities, a necessary though not sufficient

feature for rebuilding trust and regaining the confidence of the public. Only through an open, responsive, interactive PP process can citizens experience directly that due process is used or that their concerns are heard and may be used to affect decisions. Involvement, not education, is one of the few avenues shown to change beliefs.<sup>37</sup> In this fashion the arduous process of rebuilding trust and dispelling skepticism may at least begin.

There is no easy solution, no single right way to carry out public participation efforts in siting. PP that is not carried out in good faith is worse than no PP at all, raising levels of distrust, suspicion, and inevitably, opposition. But, as demonstrated in the case studies, some sharing of authority and responsibility for decisions permits consensus to develop which can meet the needs of stakeholders as well as the promoters of waste facility siting.

#### REFERENCES

1. E. PEELLE and R. ELLIS, "Beyond the NIMBY Impasse," Forum of Applied Research and Public Policy, 2, No. 3, 128-137 (1987).
2. L. HARRIS and Associates, "Erosion of Public Confidence in Business and Other Major Societal Institutions," Public Opinion, 3, 26 (1980).
3. L. CARTER, Nuclear Imperatives and Public Trust, Dealing with Radioactive Waste, Resources for the Future, Washington, D.C., (1981).
4. D. MORELL and C. MAGORIAN, Siting Hazardous Waste Facilities: Local Opposition and the Myth of Preemption, Ballinger Publishing Co., Cambridge, Mass, (1982).
5. S. NEALEY and L. RADFORD, "Public Fear of Nuclear Technology," Waste Management 87, University of Arizona, Tucson, Ariz. (1987).
6. A. D. TARLOCK, "State versus Local Control of Hazardous Waste Facility Siting: Who Decides in Whose Backyard," Resolving Locational Conflict, R. Lake, ed., 137-158 (1987).
7. S. RAYNER and R. CANTOR, "How Fair is Safe Enough? The Cultural Approach to Societal Technology Choice," Risk Analysis 7, No. 1 (1987).
8. H. OTWAY, "Multidimensional Criteria for Technology Acceptability: A Response to B. Cohen," Risk Analysis 5, No. 4, 271-273 (1985).
9. C. WHIPPLE, "Credibility and Nuclear Waste Management," Risk Workshop, Battelle Human Affairs Research Center, Seattle, Washington, (1987).
10. D. MORELL, "Siting and the Politics of Equity," Resolving Locational Conflict, R. Lake, ed., 117-136 Rutgers University Press, New Brunswick, New Jersey (1987).
11. J. CREIGHTON, "An Overview to the Research Conference on Public Involvement and Social Impact Assessment," Public Involvement and Social Impact Assessment, G. Daneke, M. Garcia and J. Delli Priscoli, eds., 1-10, Westview Press, Boulder, Colorado (1983).
12. H. SPIEGEL, "Citizen Participation, Public Planning and Social Impact Assessment," Social Impact Assessment, no. 2-4, (1986).
13. T. O'RIORDAN, "Citizen Participation in Practice: Some Dilemmas and Possible Solutions," Public Participation in Planning, W. R. D. Sewell and J. T. Coppock, eds., 15-26, John Wiley and Sons, (1977).
14. R. KASPERSON, "Participation Through Centrally Planned Social Change: Lessons from the American Experience on the Urban Scene," Public Participation in Planning, W. R. D. Sewell and J. T. Coppock, eds., 173-190, John Wiley and Sons, (1977).
15. M. GITTEL, Limits to Citizen Participation: The Decline of Community Organizations, Sage Publications, Beverly Hills, California (1980).
16. S. ARNSTEIN, "A Ladder of Citizen Participation," J. American Institute of Planners, 35, 212-224 (1969).
17. S. Rayner, "Disagreeing About Risk: The Institutional Cultures of Risk Management and Planning for Future Generations," Risk Analysis, Institutions and Public Policy, S. Hadden, ed., Associated Faculty Press, Port Washington, New York (1984).
18. R. KASPERSON, "Six Propositions on Public Participation and Their Relevance for Risk Communication," Risk Analysis 6, No. 3, 275-282 (1986).
19. R. ELLIS, and J. DISINGER, "Project Outcomes Correlate with Public Participation Variables," J. Water Pollu. Control Fed., 1564-1567 (1981).
20. R. HOWELL, M. OLSEN, and D. OLSEN, Designing a Citizen Involvement Program: A Guidebook for Involving Citizens in the Resolution of Environmental Issues, Oregon State University, Corvallis, Oregon (1987).
21. U.S. Congress, Office of Technology Assessment, "Managing Commercial High Level Radioactive Waste: A Summary," U.S. Government Printing Office, Washington, D.C. (1982).
22. N. DENNIS, "In Dispraise of Political Trust," Public Participation in Planning, W. R. D. Sewell and J. T. Coppock, eds., John Wiley and Sons, New York (1977).
23. N. LUHMAN, Trust and Power, John Wiley and Sons, New York (1980).

24. N. Smelser, Theory of Collective Behavior, Free Press, New York (1963).
25. T. COTTON, Personal communication, May 29, 1987.
26. W. FREUDENBERG and D. OLSEN, "Public Interest and Political Abuse: Public Participation in Social Impact Assessment," J. Community Development Society, 14, No. 2, 67-82 (1983).
27. P. SANDMAN, "Getting to Maybe: Some Communication Aspects of Siting Hazardous Waste Facilities," Seton Hall Legislative Journal 9, 437-465 (1986).
28. E. PEELLE, "The MRS Task Force: Economic and Non-Economic Incentives for Local Public Acceptance of a Proposed Nuclear Waste Packaging and Storage Facility," Waste Management '87, Vol. 2, University of Arizona, Tucson, Arizona (1987).
29. J. KING, "The DOE and the MRS Proposal: Responding to Community Concerns," Nuclear News 29: 59-60 (1986).
30. E. B. SIGMON, "Achieving a Negotiated Compensation Agreement in Siting: The MRS Case," J. Policy Analysis and Management 6, No. 2, 170-179 (1987).
31. A. S. MCCABE, "Open Systems of Environmental Decision Making: the MRS Nuclear Waste Siting Case in Tennessee," Ph.D dissertation, University of Tennessee, Knoxville (1987).
32. F. LYNN, "Citizen Involvement in Hazardous Waste Sites: Two North Carolina Success Stories," Envir. Impact Assessment Review 28, 347-361 (1987).
33. E. PEELLE, unpublished interviews, December (1987).
34. N. CROSBY, "Citizens Panels: A New Approach to Public Participation," Public Administration Review, 170-178 (1986).
35. D. DUCZIK, "Citizen Participation in Power Plant Siting: Aladdin's Lamp or Pandora's Box?" J. Am. Plan. Assoc. 47, No. 2 (1981).
36. R. BARNES, R. CANTOR, et al. "Report on Technology Push Research Opportunities for the Energy Division," Oak Ridge National Laboratory, Oak Ridge, Tennessee (1984).
37. J. SORESENSEN, J. SODERSTROM, E. COPENHAVER, S. CARNES and R. BOLIN, Impacts of Hazardous Technology: The Psycho-Social Effects of Restarting TMI-1, State University of New York Press, Albany, New York (1987).
38. E. ROSA, A. MAZUR, and T. DIETZ, "Social Analysis of Risk Impacts Associated with the Siting of a High Level Nuclear Waste Repository: The Case of Hanford," Risk Workshop, Battelle Human Affairs Research Center, Seattle, Washington, August 6, 1987.

## DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.