Options for Developing Public and Stakeholder Engagement for the Storage and Management of Spent Nuclear Fuel (SNF) and High Level Waste (HLW) in the United States

A Technical report prepared for the Blue Ribbon Commission on America's Nuclear Future

6 June, 2011

Thomas Webler, Ph. D.
Research Fellow
Social and Environmental Research Institute, Greenfield, MA 01301
Email: TWebler@seri-us.org

Seth P. Tuler, Ph.D.
Research Fellow
Social and Environmental Research Institute, Greenfield, MA 01301
Email: SPTuler@seri-us.org

Eugene (Gene) A. Rosa, Ph.D.
Edward R. Meyer Professor of Natural Resource and Environmental Policy
Thomas S. Foley Institute for Public Policy and Public Service
Professor of Sociology
Washington State University
Email: rosa@wsu.edu

Abstract

This report puts forth a number of options and recommendations for how to engage stakeholders and other members of the public in the storage and management of spent nuclear fuel and high level waste in the United States. The options are generated from a scientific review of existing publications proposing criteria for assessing past efforts to engage publics and stakeholders in decision-making about risky technologies. A set of nine principles are derived for evaluating cases of public and stakeholder engagement with the intention of deriving lessons for spent nuclear fuel and high level waste management in the United States. We evaluate nine cases, including siting processes for nuclear repositories in Europe and Canada and interim storage in Utah. We also examined case studies in the United States about the siting of a carbon capture and storage facility, siting highly contested marine protected areas in California, cleanup of a former nuclear weapons facility, and developing consensual regional forest policy in New England. One of the most important take home lessons is that it is important to view the SNF management and disposal problem as a system with many interconnected elements. Moving forward on one element while ignoring others is likely to lead to unsuccessful outcomes. A second important lesson is the need for a diagnostic and adaptive framework for designing and implementing public and stakeholder engagement.

Introduction

Scope and vocabulary

The Blue Ribbon Commission on America's Nuclear Future has commissioned this paper to present options that the Commission may consider in examining the challenge of how to integrate **public and stakeholder engagement** (PSE) into Spent Nuclear Fuel (SNF) and High Level Waste (HLW) management.

We have understood "**spent nuclear fuel and high level waste management**" to mean a wide range of activities on the back end of the fuel cycle, including the full range of planning, assessment, decision-making, implementation, operational, and regulatory activities associated with interim storage, permanent storage, transportation, and research and development facilities. Because much of the literature on – and concern with -- public and stakeholder involvement associated with siting facilities, in this report we give special attention to this issue.

In what follows, we use a standard set of principles that are associated with **appropriate and effective public participation** to examine case studies and to derive options for consideration by the Blue Ribbon Commission.

The generic label "appropriate and effective" stands in for a number of adjectives that refer to any of the many different dimensions upon which PSE should perform well. It is a quick way of referring to a process that performs well on multiple important dimensions, including being: successful, empowering, fair, technically competent, effective, rewarding, meaningful, efficient, legitimate, and so on.

Public and stakeholder engagement (PSE) is the phrase we have adopted to refer to participatory decision-making processes that may involve many different kinds of potential participants. The word "public" refers to residents and citizens who may be local, regional, national, or even, in some cases, international. The term "stakeholder" we interpret very broadly to mean organizations or groups, including nuclear utilities, transportation businesses, environmentalists, labor unions, and so on.

We also use the phrase "**interested and affected parties**" interchangeably with "public and stakeholders." It is a phrase popularized in a US National Academy of Sciences Panel that issued a report about the state of the science on public participation (NRC 1996).

By PSE we refer to an intentional process designed for the general purpose of eliciting informed input through engaging interested and affected parties in collaborative assessment, planning, and decision-making. There are many models or mechanisms for carrying out these types of activities.

Finally, we make several references in this paper to the organization that will be responsible for carrying out public and stakeholder engagement in a storage and waste management system. Currently, the main organization with this responsibility is the Department of Energy. However, the DOE may not ultimately be charged with this responsibility as planning moves forward. Thus, we will refer to this organization as "the waste management authority." It could be a public authority, a private entity, or a public-private partnership.

Strategy and organization of this paper

The purpose of this paper is to suggest options that the Blue Ribbon Commission can consider when making recommendations about how to conduct PSE in the management of SNF and HLW. In the next section we focus on how the framing of this management problem will have critical implications for public and stakeholder engagement – including fundamental understandings about its need.

Following that we summarize a set of robust principles that define appropriate and effective public and stakeholder engagement. The nine principles are based on scholarly research and practitioner experience. A full report explaining the derivation of these principles is made available in a technical appendix.

Next, we use these principles to evaluate nine past and on-going processes of PSE. Summary case level reports on the PSE in each of the nine cases are included in a second technical appendix. We selected case studies on the following basis:

- relevance to SNF and HLW management,
- potential to illustrate important lessons for the design and implementation of public and stakeholder involvement efforts, and
- availability of published reports and scholarly analyses (we did not conduct any primary research to support this report).

Four of the case studies involve international efforts to find acceptable host communities for interim or permanent storage of SNF or HLW. These include:

- Canada
- Finland
- Sweden
- United Kingdom

Although siting a facility is of key importance in these cases, they address siting within a systems context, making connections with institutional design for regulation and management, distributional equity, transportation infrastructure, etc. A number of other countries also provide examples of SNF management, and in some cases we draw on them for brief examples. These countries include Belgium, France, Germany, Japan, and Switzerland. We did not choose to evaluate these cases in more depth for multiple reasons including paucity of published reports on the process (e.g., Belgium, Germany), similarity to other processes, lack of recent activity or limited progress (e.g., Germany, Spain), or extensive political, economic, and institutional differences that limit lessons relating to public and stakeholder involvement (e.g., Japan).

A fifth case involves a private effort to site an interim storage facility for spent nuclear fuel in the United States, the Private Fuel Storage facility in Utah.

Four additional cases studies involve decisions that were not related to SNF or HLW management. There were:

- Siting an integrated coal-fired power plant with carbon capture and storage (FutureGen 1), sponsored by the Department of Energy;
- Siting of a marine protected areas off the coast of California (The Marine Life Protection Act Initiative (MLPAI));
- A process to develop recommendations for regional forest management policy in northern New England (Northern Forest Lands Council);
- Clean-up at the Fernald Environmental Management Project, including citizen engagement in selection of remedies to address radioactive contamination at Fernald, Ohio.

We selected these cases because they can provide important lessons relating to PSE. Two of the cases involved the Department of Energy. The FutureGen process was about a new technology, for which public (and stakeholder) knowledge was limited and questions of risk were central. It was also based on a competitive voluntary site selection process. It has generally been described as a successful process – until the DOE abruptly restructured the program, which also offer a cautionary lesson. The Fernald cleanup effort was conducted in a context of deep distrust, and also with a community that had significant concerns about risks but limited technical expertise at the beginning of the process. It has often been cited as a success story in DOE's Environmental Management Program. The Northern Forest Lands Council and MPLAI processes have involved multiple communities on issues generating significant controversy amidst uncertainties about impacts of decisions. The NFLC process also represented a "mid-stream" effort to build consensus on next steps and support for recommendations that must be implemented by federal, state, and local governments.

Finally, we consulted information about other cases about which we are familiar, including the U.S. Army's disassembly of chemical weapons, watershed management (several locations), and conflict over tritium release at Brookhaven National Lab.

From each of these case studies we identify lessons learned about appropriate and effective PSE. We use our evaluations of the case studies to generate options for the Blue Ribbon Commission to consider. These options are presented as ways to achieve the principles for appropriate and effective PSE. These lessons and options are relevant to different subsystems, phases, or components of a waste management planning and implementation process (e.g., development of standards, site assessment, site selection). Admittedly, our evaluations are limited, as they rest on a review of published literature. We would expect that full-scale case study evaluations would identify additional nuances and lessons. At the same time, reviews of published materials provide general insights and a rich set of lessons. Our interpretation of the robustness of these insights and lessons is reinforced by the degree to which they are consistent with a large literature on public participation in environmental and risk assessment and decision – a literature we have both contributed to (Short and Rosa 2004, Tuler and Webler 2006, Tuler and Webler 2010, Webler 1995,

Webler and Tuler 2000, Webler and Tuler 2008, Whitfield et al. 2009) and reviewed in previous work (for example, see Technical Appendix).[1]

In the final section of the paper we re-cap the options proposed to achieve each process design principle and offer over-arching recommendations to support effective public and stakeholder engagement in a SNF and HLW management system in the United States.

Framing the problem has implications for design of the process

SNF and HLW management faces many challenges. The way that the problem is defined will have implications for public and stakeholder involvement – both in what is conceived as appropriate and in how activities are evaluated. Two critical dimensions to the framing of the problem are discussed here.

The Importance of a System's Level Perspective

Management of spent nuclear fuel (SNF) and high level waste (HLW) requires a systems perspective. When discussions are reduced to a focus only on locating a facility or negotiating host community acceptance, important elements are ignored and this can cause subsequent problems. If the SNF and HLW problem is framed in too narrow a way, opposition can emerge and possibly discredit the entire effort. This is why decision-makers need to be aware of all of the multiple dimensions, or subsystems of the problem and deal with the problem at a systems level. A fully implemented waste management system may include interim storage facilities, one or more long-term disposal sites, transportation infrastructure, source communities, waste generators, and research and development facilities. Each subsystem engages government institutions on multiple levels and private enterprises. Each of these subsystems can impact the public and myriad stakeholders in a variety of ways. While some may be interested and affected by all subsystems (e.g., nuclear utilities), others may be associated with activities within a single subsystem (e.g., local businesses in a community traversed by a transportation corridor).

Each of the sub-systems will require a carefully planned and structured decision-making process that includes significant opportunities for stakeholder and public input. These processes must, in turn, be coordinated. Some processes may be conducted in parallel, while others will be accomplished in a series of sequential steps. The order in which decisions are made clearly matters. For example, the process to select suitable host communities for interim storage or a geologic repository needs to be independent of the

[1] In addition, Webler was a consultant to the NRC Committee on Understanding Risk (NRC 1996) and Tuler was a consultant to the NRC Panel on Public Participation in Environmental Assessment and Decision-making (NRC 2008).

process to establish safety criteria, otherwise it may appear that safety compromises are being made in order to secure a politically acceptable site.

PSE has become a well-established – and expected – part of planning and decision-making at all levels of government in the United States. In the context of a waste management system for SNF and HLW, PSE can play an important role in a variety of activities, including:

- Discerning the role of nuclear power in national energy policy;
- Establishing site selection and design criteria for interim storage and long-term disposal facilities,
- Negotiations about joint hazard management and benefits packages for host communities;
- Establishing safety criteria for interim storage and long-term disposal facilities;
- Designing procedures for acceptance and staging of SNF and HLW at source communities;
- Agreeing upon transportation policies and infrastructure for SNF and HLW; and
- Designing the institutional frameworks for the waste management system.

While decisions about where to locate waste management facilities are important and receive a great deal of attention, such "siting decisions" are only one of many types of decisions around which PSE needs to occur. We intend this report to give options for PSE to support *any* decision that must be made to manage SNF and HLW, such as those listed above. It is not limited to siting decisions. Experience and scholarly research strongly suggest that to achieve success such decisions must be made *with* interested and affected parties and that PSE activities in multiple, interacting subsystems must be coordinated.

Technical vs. Voluntary Siting Approaches

While SNF and HLW management can benefit from a systems perspective, planners must attend to a variety of decisions requiring more discrete activities. One of those decisions involves locating, or "siting," waste management facilities in specific communities. Siting decisions are controversial because they inevitably involve inequitable distributions of risks and benefits. Nuclear waste generators and the nation as a whole benefits from waste management facilities, but often the host and neighboring communities bear the additional health risks and other unwanted consequences and risks (such as stigma, declining property values, loss of tourism, change in culture, migration of population, etc.).

Decisions like siting, but also extending to, for example, the determination of regulatory standards, establishing adequate emergency response capabilities along transportation corridors, can be addressed with two distinct problem framings. The first views a problem as something that should primarily be addressed by identifying the best technical solution using the best technical input. The second views a problem as requiring substantial attention to the social context in which an activity takes places and meaningfully incorporate social preferences.

By way of illustrating the implications of these two distinct approaches for public and stakeholder engagement we consider them in the context of hazardous facility siting.

The technical approach characterizes the problem as one of finding the "technically best site." Usually, what is meant by "best site" has everything to do with safety and the expected performance of the facility. In a technical siting approach, scientists and engineers design evaluative criteria and set thresholds of acceptance, perhaps with limited public input. While the degree to which interested and affected parties are informed, consulted, or involved in technical siting processes can vary, the distinguishing feature of technical siting processes is that the technical criteria drive the decision of where to locate the facility.

The Swiss attempted a technical approach to develop a Low Level Waste (LLW) facility in Nidwalden, however popular opposition ended that attempt in 1994. As of 2008, the Swiss have adopted a new technical approach to nominate two potential sites for LLW and two potential sites for HLW with the end goal of constructing one facility for each type of waste. The Swiss's new approach gives final decision-making authority to the Federal Council, which has the option of calling for a national referendum. There is no veto for local communities or cantons. While there is no veto, the Swiss process does include several opportunities for involvement by: local communities, neighboring communities, local and neighboring cantons, and even neighboring countries. However, "involvement" does not mean having any formal influence over the decision (Swiss Federal Office of Energy 2008).

Several other countries originally attempted to site radioactive waste repositories (LLW or SNF) by a technical process that did not significantly involve interested and affected people in decision-making. In the United States, Canada, Germany, and the United Kingdom during the 1980's and 1990's technical processes identified suitable sites, but ultimately failed because of lack of broad public support. Top-down approaches to siting nuclear facilities in the US generally led to failure (Freudenberg 2004, Rosa and Clark 1999). These failures have created a legacy of anger and animosity that can hinder future siting attempts (Tuler and Kasperson 2011). Similarly, in 1982 the British attempted to site three facilities for High-Level (HLW), Intermediate-Level (ILW), and Low-Level (LLW) wastes using a technical approach. They began with 537 possible sites and winnowed down the list by applying different layers of technological criteria. Eleven sites were finally shortlisted, but only two were made public. Protests at the two publicized sites led to the refusal of permits to begin test drilling and, eventually, the abandonment of the two sites when it became apparent that there was not adequate public support to move ahead with the site research or development. Twenty years later, Britain announced it was abandoning technical siting approaches for radioactive waste in favor of a voluntary approach.

The second kind of siting approach is the voluntary approach. A voluntary approach characterizes the problem as one of finding a technically-qualified community that freely elects to be considered to host the facility and then also must certify its approval to become the host. This approach is attractive in democratic societies because it does not impose risks upon others without their consent. It is challenging, however, because it requires that the community be fully informed about the risks and benefits associated with accepting the facility and there must exist a legitimate means for a community to express its collective opinion.

The voluntary approach was first used successfully to site a controversial hazardous waste incinerator in 1987 in Alberta, Canada at Swan Hills, and it has been elaborated by the Facility Siting Credo in both nuclear and non-nuclear contexts (Bunn et al, 2001, Kunruether et al. 1993). In Canada the voluntary siting approach began with a project initiator that announced its intent to construct a facility and requested that communities express an interest in *potentially* hosting a facility. Technical criteria were used to determine the eligibility of communities that expressed an initial interest. A voluntary process is usually conducted in a phased manner, with community commitment being required before each new phase is begun. Communities are inspired to consider hosting a facility because of the prospect of jobs, fees, payments, and tax revenue (Kunruether and Easterling 1996). Compensation agreements are a key ingredient of successful voluntary approaches. Japan, in particular, has been very generous about handing out compensatory funds and other kinds of benefits to communities that host nuclear facilities. The initial design of the FutureGen process in the United States also provided a well-developed voluntary approach.

Today, most developed countries that are actively seeking a solution to the nuclear waste disposal problem have indicated preference for using a voluntary-siting approach, with the notable exception of the United States (U.S. Nuclear Waste Technical Review Board 2011). In controversial political environments where the central government does not have the will or the ability to push an unwanted facility onto a community, a voluntary approach is the preferred approach.

A voluntary process is attractive because, if a technologically suitable host community can be found, the likelihood of successfully siting and constructing a facility is considerably improved. It is widely presumed that a voluntary approach will also promote the building of trust and confidence in management systems (Tuler and Kasperson 2011). However, the approach also faces a number of challenges (Murphy and Kuhn 2009). First, there is the challenge of how to define the boundaries of "the host community." Often, political boundaries are used, but this can be inequitable to neighbors. In Switzerland, a perimeter is defined around the facility and all municipalities inside that perimeter are considered "hosts." A second challenge is to determine how consent is issued. In Finland and Sweden a vote of the municipal council was all that was needed, although public opinion polls were made before the councils voted. Communities in the United Kingdom have held formal referendums to decide whether or not to continue to be considered a possible host community. In the United States evidence from other quarters suggests that local officials may not always represent the diverse views within a community about hosting a controversial facility. A third challenge is how to handle the ethical argument that disadvantaged or underdeveloped communities will be driven to volunteer out of a sense of desperation. This is particularly problematic when these are aboriginal or minority communities, who have complained for decades that they have been systematically denied the benefits of modern development. Imposing upon these communities the burdens of SNF and HLW may be unjust, particularly if they have been denied the benefits associated with nuclear power. But to deny these communities the right of self-determination also seems unjust. Is it unjust to prevent such communities from competing to host a site for a waste disposal facility or is it unjust to include them? Is engaging them a form of economic blackmail? These ethical questions require serious consideration. A fourth challenge concerns safety. In a voluntary process, the site will almost certainly not be the technologically best site. If there are not many communities willing to volunteer, the

pressure to come to agreement with a willing community will be extremely high. And since the site is unlikely to be technologically ideal, it can mean that more engineering and design work is needed to bring the site up to safety standards. This raises the question: How much will safety be compromised if it needs to be over-engineered due to less-than ideal physical conditions? Finally, a challenge to implementing this approach arises from a kind of "chicken and egg" problem. Communities may be expected to express interest in hosting a facility before they have the technical and social science expertise to fully evaluate the risks and consequences. However, convening authorities may not want to support (or have resources to support) communities with initial interest in developing such capacities. The procedures and support offered by Nuclear Waste Negotiator Office in the early 1990s was an attempt in the US to address this challenge.

Both technical and voluntary siting processes face challenges. In some political and cultural environments a technical approach can be successful, while in others it is almost certain to fail. In our view, the potential lessons for the United States from countries that have adopted either technical or voluntary approaches deserve careful and close scrutiny. Specifically, despite the pivotal usefulness of the experience of other nuclear countries like Finland, Sweden, the United Kingdom, France, and Switzerland, there is also the necessity of exercising caution in interpreting the transferability of any one country's experience to the United States. Key demographic, geographic, and political characteristics reveal differences among countries need to be taken into account before transferring their experience to the United States. Among these factors, three in particular, stand out: size of the country, national population, and type of polity. Three of the four comparison cases—Sweden, Finland, and the United Kingdom—have considerably smaller land areas than the U.S. This factor influences, among other things, transportation routes and transport risks to local communities. The population of the United States, currently at 310 million, far exceeds the population of any of the comparison counties (Canada 34 million, Sweden nine million, Finland five million, United Kingdom 60 million). Finally, and perhaps most importantly, is the type of polity in each country. The United States and Canada are federalist democracies, meaning there is a large, powerful middle layer of government between the federal government and local communities such as potential sites for SNF. This middle level of government can, and have, derail policies promulgated at the national level and acceptable to local communities. In contrast, Finland, Sweden, and the United Kingdom are unitary democracies. This governance difference is relevant to controversial siting decisions, like nuclear waste. National governments need only national support and especially local support, but are not challenged by any middle government entity in between.

Our professional judgment is that there is virtual consensus among scholars who study SNF and HLW siting challenges that the most credible approach forward for the United States is a voluntary step-wise process. A systems-oriented, voluntary-based siting approach offers the greatest potential to achieve outcomes that are effective, fair, successful, technically competent, publicly acceptable, and legitimate. It is particularly important when devising a strategy to move forward in a context of significant social distrust (Tuler and Kasperson 2011). This conclusion has previously been reached by both the US National Academy of Sciences and the European Forum for Stakeholder Confidence at the Nuclear Energy Agency of the OECD, both of which recommend a step-wise process to ensure that decision-making for SNF and HLW management moves forward while also remaining voluntary, learning-based, and adaptive (NRC 2003 Pescatore and Vari 2006).

Principles for Good Process

To organize and justify the options we are presenting of how to go about involving stakeholders and the public in siting a repository for SNF, we have developed a set of principles for an effective process (see Box 1). Details on the origins, justifications, and reasoning behind these principles are in the Technical Appendix: *Principles for Appropriate and Effective Public and Stakeholder Engagement*.

To arrive at these principles, we first developed a logical sequence model that identified key activities in a decision-making process. We then reviewed the academic and practitioner literatures on public and stakeholder participation processes and mined these for principles of effective processes. Finally, we organized this extensive set of principles according to the different activities in our model. The result is a list of nine principles for how to carry out public and stakeholder involvement in the context of SNF and HLW management. These principles reflect the findings and conclusions of many other scholars of public participation (see Technical Appendix for more details). The principles can be broadly applied to any public involvement process, including locating of a facility, designing a transportation system, and developing design and evaluation criteria. *How* the principles are applied in such different contexts should be expected to vary, however. For example, simply defining who is an interested and affected party will differ depending on whether a process is aimed at negotiating a compensation package with a potential host community, establishing national standards and procedures for selecting among a set of potential sites, or working with communities along potential transportation corridors.

In the next part of this report, we discuss how each of the principles, listed in Box 1, can be realized in the context of SNF and HLW management in the United States.

We urge readers of this report to recognize that what is commonly called "the public involvement process" or "stakeholder involvement process" is not a singular process. The engagement of so many different kinds of stakeholders, groups, institutions, and individuals will require a diverse mosaic of involvement opportunities. In a report such as this, we deal with this complex phenomenon in a very general way. Actually implementing such a process will undoubtedly use a number of different participatory techniques in a coordinated and strategic manner. That level of planning is beyond the scope of this report.

Box 1. Core Principles of Successful Processes

- The process should be appropriately inclusive.
- Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner.
- Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome.
- The right information and expertise should be made appropriately available to the interested and affected parties.
- The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process.
- Legitimate means to reach closure should be used.
- The process should be effective at influencing the decision.
- The convening organization should evaluate, monitor, learn, and adapt the process as needed.
- In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants.

Performance of case studies on the principles for good process

In this section we generate options for the Blue Ribbon Commission to consider about how to conduct public and stakeholder engagement within a SNF and HLW waste management system. The bases for these options are the nine case studies (summary reports are provided in the Technical Appendix on Case Studies). In each of these reports, we evaluated each case on the nine principles.

In the remaining parts of this section we organize the material according to the same principles that we used to evaluate each case study.

The process should be appropriately inclusive

Inclusivity refers to the manner in which stakeholders (i.e., non-governmental groups, governmental institutions, municipalities, businesses) and private individuals (i.e., the general public) take part in planning and decision processes. In some cases, different types of participants are accorded specific rights to participate in different ways. For instance, Sweden defined the rights of "full participants" and granted them to citizens in the competing host communities, but refused to grant these rights to national NGOs.

In the Marine Life Protection Act Initiative (MPLAI) in California (a process to site marine protected areas), the Regional Stakeholder Group (RSG) was the body that crafted the decision alternatives. Members of the stakeholder group were determined by MLPAI leadership through a process that involved interviews and evaluation of candidates'

cooperativeness and representativeness. Not everyone who wanted to was allowed to be on the RSG. Members of the RSG could speak as much as they wanted, but public citizens were limited to two minutes at the end of the meeting, and they needed to register before hand to acquire those two minutes.

On the whole, Canada has implemented one of the most inclusive processes. There were many different types of participatory activities, including citizen panels, public meetings, and internet dialogues. While a few of these, such as citizen panels, were highly selective, most were open to all that wished to participate.

The determination of what is appropriately inclusive depends on the purpose and intent of a process. It is necessary to match the purpose of a process with the approach used to select participants. For example, there are many policy decisions that need to be made about the design of storage or disposal facilities. To a large extent these should be made in cooperation with the host community and possibly its neighbors. But there are other policy issues that should be made with the involvement of the general public and stakeholders at the national level, such as policies about waste retrievability, the number of centralized interim storage facilities, or the number of repositories.

If the purpose is to broadly inform the public, then an open process is one alternative. If the purpose is to make a collaborative decision (e.g., to negotiate a benefits package), then having a means of formal selection or appointment makes more sense. For example, participants from different stakeholder communities can be chosen by their membership and members at large can be elected.

We are not simply saying that restricting participation damages the process or opening the doors wide is always effective. The challenge is to be *appropriately* inclusive. Sometimes elected officials are the best representatives of a community, in other instances it is much better to work with a cross section of community and interest group representatives. Dangers to losing trust and credibility come from adopting what people see as inappropriate constraints on who can participate and in what way. In general, most people accept the fact that it is necessary to set limits on how long each person is allowed to speak at a public meeting, however, the amount of time they think is reasonable depends on their perception of the seriousness of the issue. Those responsible for carrying out the process need to understand the prevailing beliefs and opinions of the interested and affected parties. In the next sub-section we elaborate more on the way to

Options to being appropriately inclusive

- Clearly define who can participate and in what manner.
- Match the purpose of a process with the approach used to choose participants, e.g. a process with local consequences should privilege local involvement.
- Create diverse ways for people to participate.
- Establish an advisory board and have its members help define what is appropriately inclusive.
- Let public opinion, not budgets or timetables, determine how much participation is allowed.
- Arrange participation for special groups (such as existing nuclear communities), but be careful not to send other people the wrong message.
- Let members of stakeholder groups choose who represents them in the process.
- Select stakeholder representatives on the basis of their representativeness.

involve the public in the design of the participatory process, and we discuss using advisory committees to help discern what is the appropriate process. One of the decisions such an advisory committee could make would be to recommend a policy for establishing inclusivity.

Creating a diversity of participation opportunities is one way to appropriately include people in a manner that is fair and logistically feasible. Venues such as public hearings will have to limit the amount of time people are allowed to speak, but other venues such as citizen panels can offer participants much richer opportunities to deliberate (and learn about) the issue. This is one of the important lessons emerging from the Fernald and NFLC cases, for example. There are many different needs and objectives in a controversial and complex siting process like that for SNF and HLW, and the process organizers should plan to implement a wide variety of participatory opportunities. The United Kingdom's Committee on Radioactive Waste Management (CoRWM) process organized a wide range of PSE procedures.

One of the challenges that voluntary siting processes face is how to appropriately involve communities neighboring the would-be host community. The case of the Private Fuel Storage (PFS) facility in Utah was plagued by complaints by state and county governments that they were not adequately involved in the siting process. Since this operation was run by private industry, which made a legal contract with a tribal government, there was no legal obligation to involve state or county governments. However, the facility did require permits from these governmental entities. An alternative to the approach taken in the PFS case is to develop specific opportunities for state, county, and local governments, as well as other municipal entities such as River Basin Commissions, to participate in the site selection process in an appropriate way. The United Kingdom's Committee on Radioactive Waste Management (CoRWM) organized a National Stakeholder Forum, which brought together representatives from all levels of government and focused upon their mutual concerns in the waste management process.

Another challenge is to define the appropriate roles for communities that already host nuclear facilities. One argument is that nuclear communities ought to receive special treatment because they are more likely to volunteer to host the repository. Eurajoki in Finland, which is the site where an underground repository is being constructed, and Östhammar in Sweden, which has been selected as the site for the repository, are both existing sites of nuclear facilities. The United Kingdom's Nuclear Decommissioning Authority (NDA) places significant emphasis on its relations with nuclear communities. They established special "Site Stakeholder Group" (SSG) committees in each nuclear community and have had extensive engagements with them. One of the side effects of focusing too much on existing nuclear communities could be that it discourages non-nuclear communities from volunteering, since the impression is given that the authority has already made a policy decision to put the waste in an existing nuclear community. Furthermore, it presumes what is essentially an untested hypothesis: that people in such communities will be more amenable to additional nuclear sites. While some empirical evidence is suggestive of such a trend, it is by no means an established fact that there will be consensus in support of a proposed facility or very small minorities standing in opposition to additional facilities (Greenberg 2009, Pidgeon et al. 2008).

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

Deliberation and analysis are recognized in several National Academy of Sciences reports as preferred ways to conceptualize what happens in participatory decision-making processes about controversial topics (NRC 1996). Deliberation refers to communicative exchanges where people make claims, challenge claims, learn from one another, and strive to reach understanding and agreement. Analysis refers to the examination of empirical data or experiences with the purpose of identifying fundamental patterns that yield relevant meaning.

The National Academy of Sciences (NRC 2003) and the OECD (Pescatore and Vari 2006) have also recommended public participation follow a step-wise process that begins with the important activities of collective problem formulation and process design. These are important steps because they establish fundamental constraints and opportunities for undertaking data gathering, synthesis, and decision-making. Process design and problem formulation need to precede other steps in the process. The case study of FutureGen, a process to site a coal-fired generation station with state of the art CO_2 capture and storage, is a good example where the decision-making process was defined early and clearly. The Northern Forest Lands Council offers a second example where this occurred.

Problem formulation

One of the very first steps a waste management authority must undertake is to define the problem that it intends to solve. For instance, the problem could be defined as one of searching for one or more geological repositories. Or it might be defined as one of locating one or more interim storage facilities with the intent of putting off the repository decision for 100 years. There are many possible ways to formulate problems associated with managing the back end of the fuel cycle, and as we discussed earlier two aspects of problem formulation involve the degree to which a systems perspective is taken and the degree to which technical or socio-economic considerations will play a role. At issue is the acceptance of the problem formulation by interested and affected parties.

Analysis and deliberation can both play important roles in this activity. Analysis documents the volume and types of wastes, evaluates different management technologies, and gauges public opinion. Deliberation offers an opportunity for decision-makers and affected parties to consider the pros and cons of different decisions and to reach understandings

Options for coordinating analysis and deliberation

- Propose a process design and set up a way for interested and affected parties to deliberate about it.
- Use formative evaluation to design and adapt the process.
- Have knowledgeable stakeholders help design the analytical studies.
- Systematically identify the questions that the public and stakeholder want answered.
- Anticipate the knowledge needs of each deliberative event and have a strategy to bring in the relevant analytical studies.
- Apply decision analysis techniques to help move deliberation to closure.
- Establish advisory committees to take on the responsibility of ensuring that analysis and deliberation are coordinated as best as possible.

and, possibly, agreement about what to do.

Process design

Similarly, analysis and deliberation need to inform the design of the process that will determine the repository site. Deliberation about process design should include opportunities for interested and affected parties to have a say in what process activities happen and in which order. As the National Research Council argues "one of the most important goals of process design is to devise procedures that are acceptable to the interested and affected parties. Obtaining agreement on a decision process can significantly affect acceptability of the outcome" (NRC 1996: 122). For instance, the NWMO in Canada proposed a template for a process design and then organized deliberative setting where members of the public and stakeholder groups could evaluate the proposal and make recommendations.

One of the analytic activities that should help design or adapt the process is systematic evaluation of on-going processes. For instance, the MLPAI in California hired independent outside contractors to conduct surveys of stakeholder participants to assess how well the process was working and to elicit input about how it should change. The FutureGen process kept close tabs on public option and media stories. The Fernald Site-Specific Advisory Board was one of several DOE Environmental Management advisory boards evaluated multiple times (Bradbury et al. 1999, 2003).

Analysis and deliberation on the main issue

To illustrate how analysis and deliberation can contribute to solving the problem, consider the process Sweden used to site an interim SNF storage facility. Analytic studies characterized the existing SNF types and volumes, specified the requirements for a safe facility, and measured the opinions of the community. Deliberative activities included discussions with the community residents and leadership about how an interim storage facility could be integrated into the landscape and into the economy of the community. They also discussed equity and a compensation package. While it may appear obvious to conclude that there need to be analytic studies and deliberation with the community, there is value in conceptualizing these as activities that need to be designed, structured, and coordinated.

In each and every step of the process, analysis and deliberation should be coordinated. Deliberation can help frame analytic studies and the results of those studies can inform further deliberation. For instance, when the Northern Forestlands Council was trying to understand the extent of second home development in the region, they brought together interested members of the public, social scientists, local planning board members, and real estate brokers to design an analytical study. The Council contended that a study designed in a collaborative manner was more likely to be useful than a study designed by a researcher completely removed from the context of the decision-making process.

But the results of analytical studies can only help inform deliberation if the organizers or the participants know about the studies and have the means to bring those studies into the process. One option is for planners to anticipate the knowledge needed in deliberative events and to have a strategy to gather and bring in the results of the applicable analytical studies.

Deliberation need not always include the general public. In some settings it might be sufficient to bring together a select group. For instance, emergency services personnel might review a safety plan or a group of experts might discuss how to interpret the results of multiple case studies. In other instances, such as when establishing public policy, it might be more appropriate to include all interested and affected parties in the deliberations. When deliberation and analysis are coordinated properly, the results of the analytical work are more likely to be useful and relevant and the results of the deliberation are seen as more legitimate.

One of the major challenges of any public decision-making process is how to give everyone's opinion equal standing, particularly when there are multiple decisions to be made. Analysis can help address this problem. Decision analytic techniques such as deliberative mapping, which was used by CoRWM in the United Kingdom, can help move a deliberative process to closure. Deliberative mapping is a decision analysis activity that creates ordered preferences and evaluates decision options in a consistent and transparent manner where everyone's input is weighted equally.

While analysis can be fruitfully framed via a deliberative process, deliberation is enriched when it is informed with high quality analytic studies. Since safety is such an important consideration with managing SNF and HLW, people will want to make certain that they are working with sound understandings of the physical system. Geological reports, results of experiments of the containment technology, economic studies and much more will be valuable information to inform discussions. In general, a good practice is to establish a deliberative process to identify questions that should be answered and the analytic methods to provide those answers. This can happen at multiple levels. For example, Canada organized public deliberation to come to a shared understanding of the SNF and nuclear waste problem. This was informed by analytical studies that characterized the type, location, and disposal requirements of the wastes. In Sweden, questions asked at public meetings were given to experts to answer later. For example, during one public meeting, a citizen asked what would be the impact of an ice age upon the repository. SKB hired geologists to prepare a short report and the answer was fed back into the public dialogue.

Designing and coordinating appropriate analytic and deliberative activities at each step in the process would benefit from the input of one or more advisory boards. Further below, we identify three types of advisory boards that would be useful to consider.

Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

This principle is intended to ensure that the process is not an empty or superficial attempt to gather meaningful input from interested and affected parties. It signifies that informing the public, while essential, is not enough; that the foundation to an authentic participatory process has to be cooperative decision-making (Susskind, no date). It does not mean that elected and appointed public officials turn over decision-making authority to an *ad hoc* group of stakeholders and citizens. On the other hand, it may mean that decision-making authority should not rest completely with elected and appointed public officials (Richards and Brod 2004, Spies et al. 1998).

Genuine influence is necessary in the definition of what problem the process seeks to address, the strategy or design of the process itself, and the actual decision outcome of the process. Part of genuine influence includes having enough options to choose from. For instance, in the MLPAI process in California the Scientific Advisory Team established scientific criteria that any proposed set of Marine Protected Areas had to meet in order to qualify for consideration. In some cases these criteria could not be met without sacrificing strongly held interests (such as prohibiting abalone collection in the prime abalone fishing grounds). This left some stakeholders feeling that their choices were too constrained by the scientific criteria.

In the Private Fuel Storage process in Utah, many of the interested and affected parties had no influence over the decision. In fact, a point that that State of Utah made quite strongly was that it ought to have had a say in the agreement made between the Skull Valley Goshute Tribal government and the PFS consortium. Within the Tribe there were also voices that did not have influence over the decision of the Tribal Government. While it is perhaps understandable that the consortium did not want to have to negotiate with more parties than necessary, one option would have been for different types of negotiations with different partners to ensure a coordinated effort.

Options for ensuring genuine opportunity

- Give municipalities a right to withdraw their community from further consideration for hosting a facility.
- Require a community referendum to establish acceptance of a facility.
- Establish consensual decision-making between the Community Advisory Board and the Authority over some design issues with the facility.
- Allow communities to establish their own procedures for how they will be involved.
- The legal decision-maker can collect input and recommendations, document what they heard and explain how this input influenced their decision.

Furthermore, as we argued above, a waste management system can be too narrowly conceived as a problem of siting (or locating) one or more facilities in a specific municipality. Such a problem formulation neglects to put the question of location into a broader systems context that includes components such as transportation infrastructure. In fact, this became one of the obstacles in efforts to license the Private Fuel Storage facility in Utah. While support was gained from the Goshute Tribal government, the county and state were not fully involved in development of the plan.

There are several options for how genuine influence in the problem formulation and process design could come about but they are all based on two prerequisites. First, the decision-making authority must have some latitude in what decisions are made and the decisions cannot be made ahead of time. Second, there must be some means where the authority explains *how* it considered the input it received in making its decision. (This is an element of transparency, which we discuss under the transparency principle, below).

Some of the most important decisions made on the back end of the fuel cycle will relate to the siting (or locating) of waste management facilities and the establishment of transportation corridors. One option to fulfill this principle in the specific context of facility siting is to give the municipality what is essentially a veto, or a right to withdraw. Specifying that a majority or a super-majority of a public referendum is needed to allow a community to progress to the next stage of consideration would give interested and

affected parties a genuine opportunity to influence the outcome. Such a mechanism is in place in the process design at use in Canada and in the United Kingdom.

Another option is to give communities influence over certain elements of the design of a facility. In this case a public referendum is not necessary. But a community advisory board could be established and this board might be asked to make decisions about the facility design in collaboration with the waste management authority. Decisions concerning the design and location of above-ground components could feasibly be of interest to community stakeholders. Consensual decision-making between the Authority and the Advisory Board would accord those board members genuine influence. This has been the approach used by the US Army in it's efforts to build disassembly facilities at Army bases that store chemical weapons. Community Advisory Boards are consulted in the layout of some components of the facility. This appraoch was successfully used in the Fernald clean-up when criteria were established for on-site disposal cells.

In the context of decisions about the process design, it is also possible to give interested and affected parties genuine influence over the process design. For example, the NDA in United Kingdom established Site Stakeholder Groups (SSG) at each existing nuclear community. However, the design and operation of the SSGs is left completely up to the local community. Each community can decide for itself how people are appointed to the group and how the group operates. While there are potential disadvantages to having too much local determination (for instance, what will guarantee that minority viewpoints are respected?), these do accord genuine influence to communities.

In many instances, it will be more appropriate for decisions to remain the responsibility of legal public authorities. In these cases, a good practice is for the authority to announce its intention to make a decision and then to seek out input and recommendations from interested and affected parties. This can take many forms. For instance, in the MLPAI process in California a panel of selected stakeholders issued a formal recommendation to a Blue Ribbon Commission, which then reviewed the recommendation, altered it (or not), and then forwarded that to the legal decision-makers who promised to seriously consider the proposal before acting. This is one of the more elaborate process designs, but in general, the authorized decision-maker requests input and shows that it considers the input carefully. To demonstrate that it was influenced by what it heard, the authority prepares documentation to summarize what they heard and how this influenced their decision. Such documentation demonstrates how interested and affected parties influenced the decision. The FutureGen process provides a model for how the rationale for decisions can be clearly documented. Evidence suggests that the sharing of decision justifications was important to interested communities that were not selected for the demonstration facility.

The right information and expertise should be made appropriately available to the interested and affected parties

There is consensus among practitioners and theorists that participants in the process need to have access to information and expertise. But this is not necessarily completely straightforward. A "data dump" of every single bit of information that is unorganized and unsearchable does not meet the intent of this principle.

One option is to make all data open to everyone by posting them to a web site. This is the approach taken by Sweden, Canada and the UK. However, the effectiveness of their work varies wildly. Canada has done by far the best job. It places all documentation on one website, in one searchable library. Reports are numbered to avoid the problem of repeated titles, which plagues the British system.

Accessibility has also to do with the language in which the report is written. After being criticized for not making documents available in aboriginal languages, Canada's NWMO made the policy of providing all key documents in every relevant language and to translating any publicly available document, when requested. Sweden, on the other hand, makes everything available in Swedish, and some documents are available in English. Translating every document into every language spoken in a country is not always feasible, but an American waste authority might consider Spanish and also provide translation of documents into other languages upon request.

Paper copies might seem to be an antiquated system in our internet day and age. However, due to the digital divide access to broadband is not the case for many people in rural America (consider, for example, that one author of this report only has access at his home to the internet via a dial-up or satellite connection). For this reason, instituting the practice of distributing hardcopies or CD based electronic copies in community libraries or with municipal government is still a reasonable option.

Options to make information and expertise available

- Organize and format materials well to ensure easy access and avoid creating a "data dump."
- Create a single web site that hosts a searchable library.
- Store hardcopies of key documents in community libraries or local government.
- Use a document numbering system and avoid identical titles and easy reference.
- Employ a reference librarian who can do electronic searches for those without internet access.
- Manage decisions about access to proprietary and sensitive data with an advisory board.
- Have a program to supply technical assistance grants to groups.
- Commission "state of the knowledge" papers to keep abreast of new knowledge.
- Establish and fund a program of expert liaisons that are widely viewed as balanced and/or independent on key topics of interest.

Most waste management authorities in other countries use electronic means of collecting public input or questions and distributing the answers. Making these information exchanges public and searchable would help reduce repeated workload. However, for this to work, the questions and their responses must be well organized in a managed and searchable database. To ensure that people without internet access are served, local libraries could maintain a staff whose job is to answer requests given by writing or telephone; this would be especially important in potential host communities for facilities. There is also a need for a clear and consistently applied process for determining whether data are proprietary or sensitive, so that access is restricted.

Access to expertise is another component of this principle. It is not sufficient to share information if the intended user cannot understand its significance. For this reason, many

participatory approaches offer groups or communities funding to hire independent expertise. To avoid these costs from getting out of control and to ensure that resources are used efficiently, one option is to require groups of people to apply for a technical assistance grant. The grant would specify the purpose and the period of assistance. Advisory boards can be helpful in designing the finer points of this program. The Fernald clean-up ensured that community members had access to all the technical experts they wanted, so that decisions would be made with a full understanding.

To make certain that the process is informed with the most accurate information and understandings, the waste management authority could consider requesting periodic synthesis "state of knowledge" review papers from appropriate expert communities.

The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process

Scientific evidence shows that processes are more successful when the decision-making authority commits fully to seeing the process through to some end state, when there is continuity of staff during the process, and when it acts in a collaborative manner (NRC 2008). Seeing the process through to the end requires defining the end at the start of the process. Leaving this open and vague is a formula for confusion and dissatisfaction. Premature closure of the process without the consent of the participants leads to a loss of trust. Sunset dates are an option to consider. In the forest policy making case that we studied, the governors of the northern New England states specified a sunset date for the Council. While a sunset date is not always a good idea, it worked well in this case because it was set far enough into the future (4 years) to sufficiently allow the Council to deal with all of the issues it encountered. It also worked because the process was aimed at providing recommendations to public authorities, but not to implement any of the recommendations itself.

Commitment to a process can also be applied to individuals. Maintaining the same faces at the table, particularly on the part of government, is associated with higher satisfaction and effectiveness. There is a significant advantage to promoting personal connections between participants, particularly in collaborative decision-making venues. The development of strong

Options for how the waste management authority should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent

- Establish and publish a clear timetable with milestones (e.g., interim reports, opportunities for public comment).
- Commit political and budgetary resources to the end of the process.
- Consider using a sunset date for some activities.
- Publish reports that explicitly show how input and feedback was used (or not).
- Maintain a continuity of participating staff for as long as possible.
- When there is a transition of staff, create explicit opportunities for introductions and transfer of institutional memory and commitments.
- Establish an independent waste management authority to conduct the process.
- Be transparent about the process design.
- Publicly update where the process is in the timeline.

personal relationships during the Fernald cleanup process was an essential ingredient leading to the completion of that effort. But even processes meant to simply inform the public can suffer if the government sends new people each time while the community participants remain the same. Nevertheless, people also understand that governmental employees are professionals and may seek promotion.

Processes are also viewed as more successful when participants feel that the authorities are sincerely acting in a collaborative manner. This means that authorities are sincerely interested in discussing, learning, and changing their beliefs. People will search for clues to discern whether each authority is sincere and open about their intentions, abilities, and claims.

Many other countries have concluded that the best way to manage the process is to pass legislation that sets up an independent public authority. Certainly, the DOE has provided examples of its inability to maintain consistency and commitment to a process. The FutureGen program is a prime example. In the United States some have suggested public-private partnerships for SNF and HLW management may be a better option than making another federal authority. The case of the PFS in Utah is an example of a private effort at SNF management. In Canada it is the Nuclear Waste Management Organization (NWMO) and in Sweden it the Swedish Nuclear Fuel and Waste Management Company (SKB), each bodies independent of the nuclear regulation arm of government whose charge is to responsibility to manage wastes. The UK established the Nuclear Decommissioning Authority (NDA) and gave it legal ownership over the nuclear fuel waste in the country. And Switzerland made the National Cooperative for the Disposal of Radioactive Waste (NAGRA), which is a public-private partnership. One option is to consider establishing a new independent authority in the United States.

Transparency is much more than sharing information and reports. There also needs to be transparency about the process design, the progress made to date, and the actions and intentions of the authority and other governmental bodies. While a timeline necessarily becomes more uncertain the longer out that it projects, clarity about where the process is on the timeline is important. The step-wise process design, as recommended by the National Academies of Science, can convey a sense of progress and establish a means to orient people about what is coming next. Having a timeline is important, but it is also important to openly recognize that with the adaptive management mode recommended here it can change. Hence, there ought to be a clear procedure for altering the timeline.

The Northern Forest Lands Council did an extraordinary job of being transparent. At the onset they adopted policies and procedures for being transparent, including publishing public comments on draft reports. In addition, all technical reports and results of information gathering activities were made publically available. Interested and affected parties had access to these experts, as well as members of the NFLC. The FutureGen case is another example of how to conduct a participatory process in a transparent manner. For example, after completing a process with public and stakeholder engagement to define host community evaluation criteria, the implementing authority published a report about qualifying communities, including detailed description of the evaluation process, rationales for selection, and summary scores for the eight qualifying proposals.

Legitimate means to reach closure should be used

One of the most important aspects of a process is to decide how to make decisions to wrap up analysis and deliberation on one topic and move along. Processes can be iterative, that is, they can return to earlier steps and revisit them, however, there also needs to be an element of incremental progression. There are many different ways of reaching closure, and different ways will be more or less appropriate in different situations. In some settings majority vote is appropriate, while in others it may be acceptable for the facilitator to simply make an authoritarian decision. Sometimes consensus is best. Rather than take a stand for one type of closure mechanism over all others, or to specify the conditions under which each approach works best, scholars argue for using consensus to decide on the closure mechanisms that will be used at the different steps along the way. If decisions about how closure will be reached are made up front, as part of the process design, then there will be less strategic maneuvering.

Options to reach closure

- Decide how decisions will be made at the start of the process, well before any decisions are made.
- Conduct surveys of public attitudes.
- Run dialogue groups with community members and neighbors to discuss and inform the decision-making.
- Hold referendums on whether or not to volunteer for consideration.
- Allow municipal government to express the community's opinion.
- Create a community advisory board that negotiate and accept agreements.
- Allow communities to decide for themselves how they will decide.

In a step-wise process, a would-be host community may need to re-express its intent to continue with the process several times. There are several options for making these decisions. In Eurajoki, Finland (the established site for a repository) and in Östhammer, Sweden, (the potential site for a repository) the decision was made by vote of the municipal council and informed by a survey of the local population. In Britain, during NIREX's process in the 1980's, communities held referendums to decide whether or not to move ahead.

Canada, on the other hand, has refused to establish a policy about how community consent should be expressed. The NWMO argues that the way a community expresses consent is something that needs to remain adaptable to the times and under the domain of the local community. While this respects the right of local people to govern themselves, it does leave the process vulnerable to criticism if members of the community claim that the process was not suitably fair.

Allowing local government to express community opinion about a decision with such lasting importance is potentially controversial (Richards and Brod 2004, Spies et al. 1998). A waste management authority should consider relying on more than elected local officials or Tribal officials as source of information about local acceptance. For instance, with the Private Fuel Storage process in Utah, the leader of the tribe made executive decisions that had consequences for the tribe and surrounding communities. Although it was legally confirmed, the decision did attract a good deal of criticism and significant opposition within the small Tribe emerged. Another option is to reach out and acquire broader public input, for example, by creating a dialogue with the host community and its neighbors.

While such a dialogue need not result in consensus, it will help people make more informed decisions.

There are many other decisions that need to be made in waste management besides the decision of whether a community should volunteer to host a facility. For instance, decision criteria and standards for site characterization, facility safety, and acceptance must be determined in advance. Transparent assessments using those criteria can be made, and the selection of the host community for the FutureGen facility in Illinois is a positive example of how to do this effectively. Participants in an evaluation workshop and the convening authority considered hundreds of criteria and evaluated all options on each criterion using a transparent and open process. The result was that people accepted the decision because it was competent, fair, and rational.

Another important decision concerns community acceptance of a negotiation agreement. A negotiated agreement of benefits and assurances will certainly be part of any process that involves community consent, whether it is a source community, a transit community, neighboring communities, counties, states, or a host community. While a legally binding agreement will need to be executed with the responsible government authorities, there are different ways that community opinion about the proposed benefits package can be expressed. For instance, the UK's NDA says:

> "Government does not believe it sensible to specify at this stage what specific mechanisms could be used, or to define the level or nature of benefits. Government remains open-minded, believing that any Benefits Package should be developed between communities, the Government and the Nuclear Decommissioning Authority (NDA) as discussions progress, taking into account local needs, affordability and value for money considerations. (http://mrws.decc.gov.uk/en/mrws/cms/Home/How_can_local_/How_can_local_.aspx) Downloaded 9 May 2011

Another option is to establish a community advisory board to assess public opinion and to deliberate about the pros and cons of the agreement before issuing a recommendation to the municipal government.

The process should be effective at influencing decisions

Meaningful public and stakeholder engagement can be measured in large part by the way people feel that their involvement was effective. Effectiveness means that outcomes of a process should be implementable. Effectiveness also means that a process should have some influence upon a decision, including decisions related to process design and policy outcomes. Timing is extremely important. A process should begin when the problem is defined and the scope of the process set. Certainly, a process must end and issue its outcome well before official decisions are made.

Ensuring a tight connection between a process, recommendations emerging from the process, and implementation of the recommendations can be established when a convening authority is responsible for running the process and implementing recommendations. Such is the case in Canada. Because the NWMO is a body whose official charge is to produce recommendations on disposal methods and manage the process for site selection and implementation, it is very likely that the outcome of the process will be a decision that is implementable. In addition, the NWMO is charged with implementing the decisions. While the Northern Forest Lands Council had no authority to implement its recommendations, the process and final recommendations influenced subsequent action by the federal government, the states, and other parties (e.g., environmental groups). The power of the NFLC recommendations came from the hard-fought effort to develop recommendations with broad acceptance and a substantial rationale based in analytic studies. However, not all its recommendations have been acted on.

Options to ensure the process is effective at influencing decisions

- Establish clear decision points in a long-term process.
- Publish documents that clearly apply decision criteria and offer supporting evidence for all recommendations.
- Publish documents that clearly show the ways that public comments, analytic studies, etc. influence decisions. Similarly, explain why some input not used.
- Make the same authority responsible for running the process and implementing recommendations.
- Define the legislative mandates, implementing authorities, and resources required for all recommendations.
- Generate deep and wide-spread support for recommendations that can be used to advocate for implementation by responsible authorities.

At the same time, potential for "theater" need to be avoided. Environmental impact assessment processes are often criticized for having little impact on outcomes, although they are promoted as effective ways for the public and stakeholders to influence decisions. For example, the general conclusion of those who have most thoroughly reviewed the Finnish case is that the EIA process did little to influence the final decision-in-principle that was subject to parliamentary vote.

One option for ensuring that it is clear how the process influenced decisions is to publish documents that provide the evidence and rationale for decisions. In the FutureGen process evidence from technical assessments, project proposals (including responses to Best Value Criteria), and other information were applied in public documents to justify decisions. This was also done in the Northern Forest Lands Council. Final reports of the NFLC made specific reference to examples of public input and technical reports that influenced recommendations. On the other hand, the Blue Ribbon Commission in the California Marine Life Protection Area process tampered with the product of the advisory group, leading to significant frustration among the members, their constituencies, and the affected public.

The convening organization should evaluate, monitor, learn, and adapt the process as needed

When multiple, inter-connected processes are required learning helps ensure that lessons from one experience can be applied in others (Bradbury et al. 2003, NRC 2008, Tuler and

Kasperson 2011). Learning is also a key component of an adaptable process. An adaptable process monitors how the process has been working, evaluates performance, generates alternative plans, and implements revisions to the plan (Tuler and Webler 2010). Adaptive learning is easier to do when the process is designed as *incremental* or staged with discrete points for review and revision where organizers can gauge performance and make changes. However, support for an adaptive, step-wise process must be built. Everyone wants to learn from mistakes, failures, and surprises, but these may simultaneously undermine confidence and trust.

A SNF and HLW management system that adopts a step-wise approach offers many opportunities for evaluation and learning. There will be multiple opportunities over time. In addition there will be opportunities for learning lessons from processes in one subsystem that can be applied to others. Implementation of the Marine Life Protection Act in California offers an example. Since the process took an iterative approach, addressing parts of the State separately, rather than trying to run one state-wide process, the implementing authority had opportunities to pause, review, and learn from its activities before moving on to the new area. Reports produced by outside contractors confirmed that the MLPAI was in fact learning from its prior experiences.

Options for implementing a learning-based, adaptable process

- Design in regular, independent evaluations.
- Adopt a step-wise process that provides opportunities for applying lessons.
- Clarify how evaluation results are to be used to improve the process.
- Show in published documents how evaluations influence process design.
- Rely on multiple evaluators.
- Include the public and stakeholders in evaluation processes.
- Establish institutional structures and cultures that award problem identification rather than assigning blame.

Independent and repeated evaluations can also be the key to ensuring that mistakes, failures, and surprises do not undermine trust and confidence in the process. When failures or surprises are systematically sought, people can have more confidence they will be identified and addressed. A rich literature on "high reliability organizations" also suggests how institutional structures and cultures can be established that award identification of problems, rather than assigning blame (LaPorte 2004, LaPorte and Keller 1996, NRC 2000).

One option is to set up independent evaluations. For instance, Canada has hired evaluators to assess the operation of its different participatory venues. The DOE EM program hired outside consultants to complete a series of evaluations of its site-specific advisory boards (Bradbury et al. 1999, 2003). The FutureGen case involved a great deal of formative evaluation as well.

For the sake of transparency, there should be a clear outline for how the evaluations will happen, and how the results will be used. It is also a good idea not to rely only on one evaluator. It is also important that evaluations be treated as an analytic activity. They should use reliable and systematic social science research methods, and particular attention should be paid to developing methods and reporting results that are appropriate for small samples when necessary.

In the United Kingdom periodic evaluations were also completed. However, the CoRWM's evaluations illustrate the need to ensure that evaluations are *used*. In this case some results were used when planning subsequent activities, but given the tight timetable that CoRWM was on the process could not be fully adapted in ways that were responsive to the evaluations. Some have also criticized the Swedish process for failing to learn and adapt. Evaluators concluded that the Swedish process had not applied lessons learned in a manner that improved upon the process, although others argue that the initiation of its Transparency Program was a result of the SKB learning from feedback.

In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants

Any public effort should strive to use the minimal resources necessary to achieve the stated tasks. In a time of strong concerns about budgets and deficits public and stakeholder engagements activities will be closely watched. At the same time, a longer perspective can be helpful. A Panel of the US National Research Council (2008) reviewed the evidence and concluded that well run public participation processes tend to save government money by reducing public opposition and protracted legal challenges. Well-run processes may cost more in the short term, but save in the long term. The amount of money to be spent will likely depend on how conflict is managed.

Options to ensure the process is appropriately efficient

- Use internet dialogues to reduce the burden of time associated with driving to meetings.
- Provide financial support for participation by community groups, environmental justice communities, and members of the public.
- Provide multiple opportunities for participation, at different times and locations as necessary.
- Establish mechanisms that ensure information provided is information that people want and need to engage in the process.
- Support decision/process relevant activities that also build community capacities in a more general way.
- Create community advisory boards for more extensive input and discussion than can be afforded by short public comments at public hearings.

Another dimension of "cost" involves the time investment and resources required of the participants. Other sacrifices may also need to be made, such as the neglect of other important activities in the lives of the participants. In general, financial costs to participants should be minimal or they should be subsidized by the convening organization. For instance, Canada's NWMO hired university experts on internet dialogues to conduct four different dialogues with national audiences. The MLPAI in California established satellite sites complete with video and audio life 2-way feeds so that people could "attend" the meeting without driving four or five hours up or down the coast. In countries as large as Canada and the United States, where driving distances to meetings can be prohibitive, these offer an opportunity for people to participate with a minimal investment of time.

Another option that can help ensure that participants feel their time is well spent is to create opportunities that provide additional capacities, both at the individual and community level. The FutureGEN process illustrates how partaking in the site selection

process – even among host communities that eventually were not selected – was a positive experience, in large part because capacities for engaging in future processes were increased. They felt that even though they lost in the first round, they were well positioned for possible future carbon capture and storage siting and energy facilities.

A similar outcome arose in the Northern Forest Lands Council Process. In addition to making progress on substantive forest policy and management issues, the NFLC played another critical role in the region: it helped to foster a new spirit of dialogue and cooperation among groups with longstanding conflict. Participants felt that the NFLC process would have important implications for what types of policy planning and decision-making activities could follow, which speaks to their feelings that the NFLC process was worthwhile and not a waste of time.

Advisory boards were particularly useful for helping participants feel that their efforts were not a waste of time, but rather productive, meaningful, and contributing to more knowledge, skills of engagement. Thus, the use of advisory boards is an option that should be considered in SNF and HLW management. In Fernald social interaction in the deliberative settings created by the advisory board was a critical mode of learning and important in the formation of risk perceptions. Learning was not just based on individual efforts or information per se. Relationships were critical. Personal relationships affected learning within and between networks about both technical information and the values of others.

Discussion and Recommendations

Sound planning and wise guidance will be important to successful and "good" processes for PSE in SNF and HLW management in the United States – those that achieve features such as effectiveness, fairness, clear outcomes, technical competence, public acceptance of outcomes, and legitimacy. However, an under-developed science of PSE, the systems character of SNF and HLW management, and the long time horizons over which a fully functioning system will emerge pose particularly difficult challenges.

Empirical research and experience suggest that the design of effective PSE should adhere to a set of principles for effective process. However, in spite of the large and ongoing efforts to investigate PSE, there is limited guidance about what do to in specific contexts and how choices should be influenced by context specific characteristics. In any given context it is unlikely that there will be consensus about what is the best process or the best ways to fulfill the principles. People will likely also disagree about the nature of the context. For example, all participants may want a decision to be informed by good scientific analysis and sound data, but they can disagree about what this means in practice. In short, the problem for conveners of PSE is in the details. What is understood to be the best practice in a particular situation will depend on what those organizing and participating in the process think about the context, the objectives, their roles, the scientific understanding of the issues, and many other factors. General expert guidance can only take a convener so far. PSE can be viewed as a kind of social experiment, although informed by experience (Gross and Krohn 2005).

Consequently, convening authorities that wish to involve interested and affected parties in assessment and decision-making processes are often told that they must match the process

with the context by taking a *diagnostic approach* to PSE (NRC 1996, NRC 2008, Renn 2008, Tuler and Webler 2011). A recognition that a waste management system will take decades to fully plan and implement and that much knowledge will be gained over-time, also argues for an *adaptive* approach to process design. And, an understanding of the multiple components and linkages in a fully functioning waste management system argues for a *systems* approach to process design. Consider, for example, an appropriate and effective process implemented to define national standards and policies for interim storage facilities. A well-run process can enhance trust and confidence within potential host communities and might have positive effects on a process to locate a geologic repository in another community or on a process to establish safety guidelines along transportation corridors.

To coordinate PSE across these system components well, decisions need to be made about the roles that different regulatory bodies will play in the waste management process and how their responsibilities and activities will be coordinated. The Private Fuel Storage case in Utah demonstrated the importance of this when confusion arose as to whether or not DOE was obliged to accept at Yucca Mountain the SNF stored in Utah. A coordinated governance system that involves all relevant federal, tribal, and state regulatory bodies will need to be negotiated so that confusion such as this does not arise.

Because of the importance of having PSE supported by sound guidance based in practical experience and systematic analysis and the need for a high level of coordination and integration, **we recommend the creation of advisory boards that will ensure high quality PSE.** This can be accomplished by establishing advisory boards that provide advice and evaluation on issues related to institutional design and performance, collaborative decision-making and public involvement, procedures for voluntary consent and reversibility, public outreach and communication, etc. We recommend the establishment of:

1. *A National Social Science Nuclear Waste Review Board*. This board would provide a social science complement to the existing *Nuclear Waste Technical Review Board*. The social science board would make recommendations for analytical social science research, establish a peer review system to ensure the competence of studies, and organize independent and competent external assessments of the engagement process on regular basis. Finally, the board would supply oversight to make certain that principles and procedures are applied consistently. This advisory board should be comprised of social scientists, public participation practitioners, and experienced governmental officials who are knowledgeable about participatory decision-making processes. The group would give input about the process design to engage interested and affected parties and would focus on integrating analytical and deliberative activities.
2. *A National PSE Advisory Board* comprised of local stakeholders, community leaders, and non-governmental organizations. This board would provide additional guidance about the design and evaluation of public and stakeholder engagement activities. Their main purpose would be to ensure that principles and procedures are applied in ways that make sense for the regional or local context. This advisory board can also provide coordination of activities at multiple (potential) host communities and among both

parallel and sequential processes for which a web of advisory boards may be established (e.g., for local facility siting and assessment and for transportation planning).

In addition, **we recommend that an *"ombudsman" or inspector general* within or alongside the responsible authority to monitor PSE processes**. This position would organize, coordinate, and oversee independent assessments of PSE. It would ensure that sufficient resources are made available for independent assessments, that communities have adequate resources to participate effectively, and that the results of PSE evaluations are used by the convener to improve PSE processes.

The national level advisory boards and the ombudsman can support the design and implementation of PSE that is sensitive to local conditions, contexts of varying levels of trust and confidence, and decision problems. In addition, careful consideration should be given to the transferability of lessons from one context to another, including international experience in different political-economic environments. The advisory boards can provide advice to the implementing authority for SNF and HLW management about how to build processes by applying appropriate options that support the attainment of each process-related principle. Table 1 summarizes the options presented in the previous section. The options clearly convey the message that there is no single "correct" way to design and carry out PSE. **We want to strongly emphasize that PSE cannot be guided by a checklist approach.** Agencies or authorities that adopt a checklist approach to PSE often find that they fail to create a process that interested and affected parties find to be legitimate or acceptable. Instead, public and stakeholder engagement should be guided by clear principles, but implementing these principles in a specific setting will require adjusting the process.

Table 1. Summary of options for appropriate and effective PSE
The process should be appropriately inclusive
• Clearly define who can participate and in what manner. • Match the purpose of a process with the approach used to choose participants, e.g. a process with local consequences should privilege local involvement. • Create diverse ways for people to participate. • Establish an advisory board and have its members help define what is appropriately inclusive. • Let public opinion, not budgets or timetables, determine how much participation is allowed. • Arrange participation for special groups (such as existing nuclear communities), but be careful not to send other people the wrong message. • Let members of stakeholder groups choose who represents them in the process. • Select stakeholder representatives on the basis of their representativeness.
Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner.
• Propose a process design and set up a way for interested and affected parties to deliberate about it. • Use formative evaluation to design and adapt the process. • Have knowledgeable stakeholders help design the analytical studies. • Systematically identify the questions that the public and stakeholder want answered. • Anticipate the knowledge needs of each deliberative event and have a strategy to bring in the relevant analytical studies. • Apply decision analysis techniques to help move deliberation to closure. • Establish advisory committees to take on the responsibility of ensuring that analysis and deliberation are coordinated as best as possible.
Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome.
• Give municipalities a right to withdraw their community from further consideration for hosting a facility. • Require a community referendum to establish acceptance of a facility. • Establish consensual decision-making between the Community Advisory Board and the Authority over some design issues with the facility. • Allow communities to establish their own procedures for how they will be involved. • The legal decision-maker can collect input and recommendations, document what they heard and explain how this input influenced their decision.

The right information and expertise should be made appropriately available to the interested and affected parties.
• Organize and format materials well to ensure easy access and avoid creating a "data dump." • Create a single web site that hosts a searchable library. • Store hardcopies of key documents in community libraries or local government. • Use a document numbering system and avoid identical titles and easy reference. • Employ a reference librarian who can do electronic searches for those without internet access. • Manage decisions about access to proprietary and sensitive data with an advisory board. • Have a program to supply technical assistance grants to groups. • Commission "state of the knowledge" papers to keep abreast of new knowledge. • Establish and fund a program of expert liaisons that are widely viewed as balanced and/or independent on key topics of interest.
The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process.
• Establish and publish a clear timetable with milestones (e.g., interim reports, opportunities for public comment). • Commit political and budgetary resources to the end of the process. • Consider using a sunset date for some activities. • Publish reports that explicitly show how input and feedback was used (or not). • Maintain a continuity of participating staff for as long as possible. • When there is a transition of staff, create explicit opportunities for introductions and transfer of institutional memory and commitments. • Establish an independent waste management authority to conduct the process. • Be transparent about the process design. • Publicly update where the process is in the timeline.
Legitimate means to reach closure should be used.
• Decide how decisions will be made at the start of the process, well before any decisions are made. • Conduct surveys of public attitudes. • Run dialogue groups with community members and neighbors to discuss and inform the decision-making. • Hold referendums on whether or not to volunteer for consideration. • Allow municipal government to express the community's opinion. • Create a community advisory board that negotiate and accept agreements. • Allow communities to decide for themselves how they will decide.

The process should be effective at influencing decisions.
• Establish clear decision points in a long-term process. • Publish documents that clearly apply decision criteria and offer supporting evidence for all recommendations. • Publish documents that clearly show the ways that public comments, analytic studies, etc. influence decisions. Similarly, explain why some input not used. • Make the same authority responsible for running the process and implementing recommendations. • Define the legislative mandates, implementing authorities, and resources required for all recommendations. • Generate deep and wide spread support for recommendations that can be used to advocate for implementation by responsible authorities.
The convening organization should evaluate, monitor, learn, and adapt the process as needed.
• Design in regular, independent evaluations. • Adopt a step-wise process that provides opportunities for applying lessons. • Clarify how evaluation results are to be used to improve the process. • Show in published documents how evaluations influence process design. • Rely on multiple evaluators. • Include the public and stakeholders in evaluation processes. • Establish institutional structures and cultures that award problem identification rather than assigning blame.
In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants.
• Use internet dialogues to reduce the burden of time associated with driving to meetings. • Provide financial support for participation by community groups, environmental justice communities, and members of the public. • Provide multiple opportunities for participation, at different times and locations as necessary. • Establish mechanisms that ensure information provided is information that people want and need to engage in the process. • Support decision/process relevant activities that also build community capacities in a more general way. • Create community advisory boards for more extensive input and discussion than can be afforded by short public comments at public hearings.

Bibliography

Bradbury, J. and Branch, K. 1999. *An evaluation of the effectiveness of local site-specific advisory boards for U.S. Department of Energy Environmental Restoration Programs*. Report PNNL-12139. Washington, DC: Pacific Northwest National Laboratory.

Bradbury, J., Branch, K., and Malone, E. 2003. *An evaluation of DOE-EM public participation programs. Report prepared for the DOE Environmental Management Program*. Report PNNL-14200. Washington, DC: Pacific Northwest National Laboratory.

Bunn, M., Holdren, J., MacFarlane, A., Pickett, S., Suzuki, A., Suzuki, T., and Weeks, J. 2001. *Interim storage of spent nuclear fuel*. A joint report of the Harvard University Project on Managing the Atom and the University of Tokyo Project on Sociotechnics of Nuclear Energy. Cambridge, MA: Managing the Atom Project, Harvard University.

Freudenburg, W. 2004. Can we learn from failure? Examining U.S. experiences with nuclear repository siting, *Journal of Risk Research* 7(2): 153-169.

Greenberg, M.R. 2009. NIMBY, CLAMP and the location of new nuclear-related facilities: US-National and 11 site-specific surveys, *Risk Analysis* 29(9):1242-1254.

Gross, M. and Krohn, W. 2005. Society as experiment: Sociological foundations for a self-experimental society, *History of the Human Sciences* 18(2):63-86.

Jenkins-Smith, H.C. 2011. *Public beliefs, concerns and preferences regarding the management of used nuclear fuel and high level radioactive waste*. White paper for the Blue Ribbon Commission for America's Nuclear Future. Washington.

Jenkins-Smith, Hank C.; Strandberg, Urban; and Trousset, Sarah R. 2010. New Perspectives on Nuclear Waste Management. *Risk, Hazards and Crisis in Public Policy* 1(4), Article 1. DOI: 10.2202/1944-4079.1064

Kunreuther, H., K. Fitzgerald and T. Aarts 1993. Siting noxious facilities: A test of the facility siting credo, *Risk Analysis* 13**:**301-318.

Kunruether, H. and D. Easterling 1996. The role of compensation in siting hazardous facilities. *Journal of Policy Analysis and Management* 15**:**601-622.

La Porte, T. R. 2004. "Elements for Long Term Institutional Stewardship in a Hazardous Age: (Views from a 'Stewardee')," session on Institutional Challenges for Long-Term Stewardship of Contaminated Sites, Association for the Advancement of Science, Seattle, WA, Feb 16, 2004. Available on web at: www.polisci.berkeley.edu/faculty/bio/emeriti/LaPorte,T/publications.asp

LaPorte, T.R., and A. Keller. 1996. Assuring Institutional Constancy: Requisite for Managing Long-Lived Hazards, *Public Administration Review* 56(6):535-544.

Murphy, B. and Kuhn, R. 2009. Situating Canada's approaches to siting a nuclear fuel waste management facility, in: David Durant and Genevieve Fuji Johnson (editors), *Nuclear waste management in Canada: Critical issues, critical perspectives*. University of British Columbia Press, Vancouver, pp. 150-167.

National Research Council 1996. *Understanding risk: Informing decisions in a democratic society*. Washington, DC: National Academies Press.

National Research Council 2000. *Long-term institutional management of US Department of Energy legacy waste sites*. Washington, DC: National Academy Press.

National Research Council 2003. *One Step at a Time: The Staged Development of Geologic Repositories for High-Level Radioactive Waste*. Washington, DC: National Academies Press.

National Research Council 2008. *Public participation in environmental assessment and decision-making*. Washington, DC: National Academies Press.

Nuclear Waste Management Organization (NWMO) 2010. *Status of National Used Fuel/ High-Level Radioactive Waste Management Programs*. Toronto, NWMO.

Pescatore, C. and Vari, A. 2006. Step-wise approach to the long-term management of radioactive waste, *Journal of Risk Research* 9(1): 13-40.

Pidgeon, N. F., Henwood, K. L., Parkhill, K. A., Venables, D. and Simmons, P.
2008. *Living with Nuclear Power in Britain: A Mixed Methods Study*. School of
Psychology, Cardiff University. Copies of the report can be downloaded from the SCARR website: www.kent.ac.uk/scarr

Renn, O. 2008. Risk governance: Coping with uncertainty in a complex world. London: Earthscan.

Richards, R. and Brod, R. 2004. Community support for a gold cyanide process mine: resident and leader differences in rural Montana, *Rural Sociology* 69(4):552-573.

Rosa, E. A. and Clark, D. L. Jr. 1999. Historical Routes to Technological Gridlock: Nuclear Technology as Prototypical Vehicle, *Research in Social Problems and Public Policy* 7:21-57.

Short, James F., Jr. and Eugene A. Rosa 2004. Some Principles for Siting Controversy Decisions: Lessons from the U.S. Experience with High Level Nuclear Waste, *Journal of Risk Research* 7:115-135.

Spies, S., Murdock, S., White, S., Krannich, R., Wulfhorst, J., Wrigley, K., Leistritz, F. L., Sell, R., and Thompson, J. 1998. Support for waste facility siting: Differences between community leaders and residents, *Rural Sociology* 63(1):65-93.

Susskind, L. no date. The IAP2 spectrum: Larry Susskind in conversation with IAP2 members.

Swiss Federal Office of Energy (SFOE) April 2008. *Sectorial plan for deep geological repositories: Conceptual part.* Bern: SFOE.

Tuler, S. and Kasperson, R. 2011. *Social distrust: implications and recommendation for spent nuclear fuel and high level radioactive waste management*. A Technical report prepared for the Blue Ribbon Commission on America's Nuclear Future. Washington, DC: Blue Ribbon Commission on America's Nuclear Future. Available online at: www.brc.gov/commissioned_papers.html

Tuler, S. and Webler T. 2010. How preferences for public participation are linked to perceptions of the context, preferences for outcomes, and individual characteristics, *Environmental Management* 46(2):254-267.

Tuler, S. and Webler, T. 2006. Competing perspectives on a process for making remediation and stewardship decisions at the Rocky Flats Environmental Technology Site, *Research in Social Problems and Public Policy* 13: 49-77.

U.S. Nuclear Waste Technical Review Board 2011. Experience Gained From Programs to Manage High-Level Radioactive Waste and Spent Nuclear Fuel in the United States and Other Countries. Arlington VA, USNWTRB.
http://www.nwtrb.gov/reports/intl%20rpt_prepub.pdf

Webler, T. 1995. 'Right' discourse in citizen participation: An evaluative yardstick. In: O. Renn, T. Webler, and P. Wiedemann (eds.), *Fairness and competence in citizen participation: Evaluating models for environmental discourse*, 35-86. Boston: Kluwer.

Webler, T. and Tuler, S. 2000. Fairness and Competence in Citizen Participation: Reflections from a Case Study. *Administration and Society* 32(5):566-595.

Webler, T. and Tuler, S. 2008.Organizing a deliberative planning process: What does the science say?. In S. Odugbemi and T. Jacobson (eds.), *Governance reform under real-*

world conditions: Citizens, stakeholders, and voice. Pp. 125-160. Washington, DC: World Bank.
Whitfield, S., Rosa, E., Dan, A., and Dietz, T. 2009. The future of nuclear power: Value orientations and risk perception, *Risk Analysis* 29(3):425:437.

Technical Appendix: Case Studies of Public and Stakeholder Engagement

A Technical report prepared for the Blue Ribbon Commission on America's Nuclear Future

6 June, 2011

Thomas Webler, Ph. D.
Research Fellow
Social and Environmental Research Institute, Greenfield, MA 01301
Email: TWebler@seri-us.org

Seth P. Tuler, Ph.D.
Research Fellow
Social and Environmental Research Institute, Greenfield, MA 01301
Email: SPTuler@seri-us.org

Eugene (Gene) A. Rosa, Ph.D.
Edward R. Meyer Professor of Natural Resource and Environmental Policy
Thomas S. Foley Institute for Public Policy and Public Service
Professor of Sociology
Washington State University
Email: rosa@wsu.edu

Table of Contents

The Evaluation Principles

Box 1 lists the principles used for evaluation of the case studies. Details on the origins, justifications, and reasoning behind these principles are in the supplement report: *Principles for Appropriate and Effective Public and Stakeholder Engagement.* All case studies are based on published documents. No primary research (e.g., interviews) was conducted as part of the case studies presented in this Technical Appendix.

Box 1. Core Principles of Successful Processes

- The process should be appropriately inclusive.
- Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner.
- Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome.
- The right information and expertise should be made appropriately available to the interested and affected parties.
- The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process.
- Legitimate means to reach closure should be used.
- The process should be effective at influencing decisions.
- The convening organization should evaluate, monitor, learn, and adapt the process as needed.
- In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants.

Canada

Summary description of the process[1]

The Seaborn Panel

The Seaborn Panel was convened from 1989-1998 to review a concept for deep geological disposal of nuclear waste in Canada that was proposed by Atomic Energy of Canada Limited (AECL). AECL is a crown corporation whose purpose is to promote safe nuclear technology. Officially named *The Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel*, it was renamed after the Seaborn Panel after its chairman. The Seaborn Panel launched extensive public information and participation programs and ultimately concluded in a 1998 report that, while deep geological disposal was a technologically proven approach, it lacked the broad public support required to be an acceptable option (Steed, 2007). The Seaborn Panel therefore recommended the creation of a waste management agency to study long-term nuclear waste management options.

Partly in response to The Seaborn Panel report, the Canadian government passed the Nuclear Fuel Waste Act in 2002, which mandated the creation of the Nuclear Waste Management Organization (NWMO), which was formed and financed by nuclear utility companies and the AECL. The newly formed NWMO was to assess three approaches to long-term nuclear waste management including i) deep geological disposal in the geological formation called "Canadian Shield," ii) storage at nuclear reactor sites, and iii) centralized storage either above or below ground.

Early NWMO Activities

Between 2002 and 2007, the NWMO ran a variety of public dialogues and engagement processes to determine what method of management could attain broad public support, as this was a key criterion for the adoption of any plan. In November and December 2002, the NWMO began their public opinion research through 14 discussion groups hosted across different regions of Canada. These groups were designed to explore different opinions Canadians had about nuclear waste and to "gauge their awareness, understanding, interest and desired participation" in the NWMO process (NWMO Annual Report, 2002).

In 2003, the NWMO held over 250 face-to-face conversations with individuals and representatives of various organizations at local, provincial, national and international levels. It also commissioned a nation-wide survey of 1,900 Canadians' attitudes toward nuclear fuel waste management (NWMO Annual Report, 2003). It also developed a discussion document that raised ten key questions to spark dialogue in focus groups they were conducting to gauge public opinion about the management options that the NWMO was reviewing.

In 2004, NWMO collaborated with the Canadian Policy Research Networks to create a large-scale dialogue with the national public. It involved 462 randomly selected citizens who participated in 12

[1] We relied on the chapter by Durant and Stanley (2009) in addition to the cited publications when writing this section.

locations across the country to talk about the long-term management of used nuclear fuel and derive a set of Canadian values that would inform any decision-making process. In addition, Professor Ann Dale of Royal Roads University ran the first of four internet dialogues on nuclear waste risk. Ann Dale is a sustainability researcher knowledgeable in organizing e-Dialogues about controversial policy issues.

In April of 2005, Ann Dale held a second internet dialogue. NWMO also published the final report of their three-year study to decide which management plan to recommend to the government. Their outreach efforts up until this point were numerous and involved working with public opinion research groups, aboriginal groups, scientists and technicians to develop a plan they believed captured the values of Canadian citizens. A more complete listing of their public engagement process can be found in their 2005 Final Study report.

2006 was spent summarizing the results of these dialogues and preparing a draft of the Adaptive Phased Management concept as core concept of the plan to move forward.

2007 NWMO proposes Adaptive Phased Management plan and Government of Canada formally accepts it.

From 2007-2008 NWMO began work to design a siting process. They hired consultant firms to organize five panels of 18 participants each, drawn from the four nuclear provinces (Ontario, New Brunswick, Saskatchewan, Quebec). They met four times to provide input on early plans for siting process design. Ann Dale ran the third internet dialogue, this one on a proposed implementation plan. In addition, sixteen information sessions were held in each of the nuclear provinces 700 visitors attended these sessions (NWMO May 2010). Regional dialogues were also developed with aboriginal organizations to coordinate information sessions. Funding was provided along with communications materials about adaptive phase management. About 800 participants attended these. A survey was conducted and people were able to express opinions on a website.

In August 2008, the NWMO released a discussion document called, "Moving forward together: Designing the process for selecting a site." It proposes ten guiding principles for site selection process (which were derived from the public dialogues that had been held):

1. Focus on safety,
2. informed and willing "host community,
3. Focus on nuclear provinces,
4. Right to withdraw,
5. Aboriginal rights,
6. Shared decision making,
7. Inclusiveness,
8. Informing the process,
9. Community well-being,
10. Regulatory review.

It also outlined a 9 step proposed process for selecting an informed and willing host community:

1. Awareness-building activities,
2. Communities identify interest in learning more, initial screening conducted.

3. Preliminary assessment of suitability,
4. NWMO selects one of more suitable sites from communities formally interested conducts detailed site evaluations,
5. Communities with confirmed sites accept the project and propose terms,
6. Community and NWMO enter into formal agreement,
7. Regulatory review and approval,
8. Construction and operation of demo facility,
9. Construction and operation of facility.

The NWMO's dialogues in this proposed process design were based on the following premises:

- citizens have the right to know about and participate in discussions and decisions that affect their quality of life,
- citizens bring special insight and expertise and these result in better decisions, and
- decisions about safety and risk are properly societal decisions and for this reason the priorities and concerns of a broad diversity of citizens, particularly those most affected, need to be taken into account throughout the process.

The NWMO asserted that inclusive and collaborative dialogue was a critical component of adaptive phased management and this needed to be maintained throughout all phases of implementation.

After that document was made public in 2008, NWMO held two Citizen's Panels, in Toronto and Ottawa and facilitated by third party contractor Ascentum. The purpose of the citizens panels was to build a microcosm of society and provide accurate feedback on the ten proposed guiding principles and process design (both of which are outlined above). The meeting in Ottawa was held in French, but attracted only six participants. 63 people attended the English speaking panel. Both panels comprised randomly selected citizens, which were intended to filter out "community-engaged opinion leaders on community, environment, and public/social issues." The panels included learning sessions and small group dialogues on the proposed site selection process.

Five "public discussion groups" (which were essentially miniature citizen panels) of randomly recruited citizens were also held in Saskatoon, Sault Ste., Marie, Toronto, Scarborough/Pickering, and Saint John (facilitated by Navigator). The purpose of those meetings were to:

- Solicit citizen perspectives on proposed process for selecting a site,
- Identify ways of strengthening plan with focus on ensuring fairness and appropriateness
- Identify any challenging or problematic implications of selection process and advise on ways to address challenges.

One of the criticisms of the 2002-2005 process was that informational materials were not available to First Nations people in their native languages. For the 2009 dialogues, the NWMO made all information documents used to inform discussion available in eight aboriginal languages

Then in January 2010, a final report on these dialogues was published identifying seven conclusions that arose from the dialogues. These conclusions were:

1. Guiding principles are on track,

2. Proposed site selection process meets fairness and safety,
3. Robust public participation is essential (including host community, surrounding areas, others potentially affected; a role for the public was sought even after the site is operational),
4. The community must benefit and risks must be mitigated,
5. Need for transparency and neutral third parties (trust issues),
6. A "social contract" with future generations (serious attention to long-term stewardship),
7. Research on reducing the volume and toxicity of nuclear waste (support green initiative, though outside scope of dialogue).

During the remainder of 2010 the site selection process was initiated. The "Learn more" program was developed to inform and start discussion in interested communities. It created visioning documents to help communities discuss and envision their future possibilities.

As of Dec 2010, five communities had expressed interested in learning more: Ignace, Ear Falls, Schreiber, (Ontario), Pinehouse, English River First Nation (Saskatchewan).

Evaluation of the Process

The remainder of this chapter is a summary evaluation of how well the Canadian process performed on the criteria, which are listed in Box 1 above. As was explained above, this process has changed over the years. For the purpose of this evaluation we are studying the process that has taken place since the birth of the NWMO in 2002 up until the last available report in December 2010.

The process should be appropriately inclusive

The process has reached out to the Canadian public and stakeholder groups in numerous ways and to an extent that is truly exemplary. This included:

- Face-to-face conversations with citizens, interest group leaders and members of government,
- Hundreds of randomly selected citizens who were chosen because they did *not* represent an interest group or other constituency were involved in citizen panels,
- First Nations were given support to organize discussion panels in their native languages and in the format that is culturally familiar to them,
- Internet dialogues were held with people who might not otherwise have been able to get to an informational meeting or a citizen panel, and
- A survey of the national population was taken to gather input that would express the opinions of the population as a whole.

These diverse formats are constructive toward achieving this principle. Also positive was the use of multiple means of selecting people. Self-selection was used for information sessions and internet dialogues. Random selection was used for citizen panels. And intentional selection was used to ensure that governmental officials and key stakeholder groups were involved appropriately.

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

The NWMO has committed incredible amounts of resources toward the design of a site selection process. From 2002-2005 they collected input from a wide range of people and groups about what core values should drive the process. They identified and clearly described these values and used them to formulate their list of ten guiding principles for the process.

According to its documents, the NWMO recognizes that citizens bring insights and expertise, not simply opinions, to the process. They hired professional facilitators to manage deliberation at meetings and, in several instances, used strategic deliberative structures (such as citizen panels) as a way to organize deliberation. We focus on how the citizen panels worked because a special report was published on this topic (NMWO January 2010). At the Citizen Panels and the associated five smaller discussion groups, participants had opportunities to ask experts questions or to request that they comment on something. And even although it is less clear what types of analysis were used as part of the panels, the report emphasizes that citizens strongly argued for the siting approach to be adaptive and learning-based, that it should constantly take advantage of new science. Another clear strength of these citizen panels was that they permitted citizens to review and comment upon the *process* used to site the repository.

Canada is one of the few countries that has taken a phased approach to siting that includes public participation at each phase. Citizens were consulted first about what disposal options they would support, then again about what kind of process they would like to see for choosing a site. In this way the process of selection itself was built collaboratively both with sustained meaningful public dialogues with long-term participants and groups and with opportunities for new interested parties to involve themselves at any juncture.

Finally, it should be noted that some have critiqued the NWMO for not having involved native communities as their equals (Johnson 2009). While this can be understood as an issue of claims of insufficient influence, we discuss it here as a matter of deliberative and analytical importance in that a number of national siting processes we have reviewed have run into difficulty determining precisely *what role indigenous groups ought have in a given process.* On the one hand indigenous groups are often granted legal legitimacy as sovereign nations wherein critiques that treating such a nation as "just another stakeholder" is inappropriate given the groups sovereign status. However, there are clearly issues with granting such equality given that the consequences of the final decision will ultimately rest on the shoulders of the national government that sponsors the process. Canada did not accord its First Nations status on par with negotiating as sovereign equals. It is unclear to what degree this is or will become an obstacle, if at all.

Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

It is clear through the publication of numerous "what we heard" documents (See footnote 1, above) that the citizen dialogues were influencing the direction the NWMO took in producing its problem definition and process design (NWMO May 2010). The publication of these documents made the NWMO accountable to what citizens had said and created a dialogic exchange rather than the less

preferred but more often used approach that provides citizens the opportunity to voice their opinion with no sense of what impact their participation had made. Without this key ingredient it is easy for participants to become cynical and disinterested as the role and effect of their participation is not made clear.

In addition, according to the documents outlining the design of the siting process (NWMO August 2008), local government at potential host sites will have significant opportunity to influence decisions along the path of investigating and siting the repository. First, in order to be considered for siting at all, municipalities have to volunteer for consideration. Rather than define a set of potential locations from technical feasibility studies, the NWMO's commitment to volunteer partnerships allows potential host communities to take the first step in determining the outcome, actively submitting their site for consideration rather than be selected by a process out of their control. Host communities further maintain this self-determination capacity through much of the remainder of the review of their site given the "right to withdraw" their site from consideration without penalty any time prior to the signing of agreements that begins construction. While the exact process by which communities express their consent is not determined a priori, and this does leave room for speculation, the NWMO has repeatedly voiced intent to let the communities decide how to decide.

One critique of the early process to produce a recommendation about a disposal method was that the process did not allow for a wider conversation about the place of nuclear fuel in Canadian society and whether disposal options that were being considered would promote the future use of nuclear fuel. This then points to the difficulty of negotiating the degree to which the definition of the problem is restricted by the remit of the agency, in this case the NWMO, who was not charged with running a dialogue about the nuclear future of nuclear energy in Canada, but rather determining what disposal option would have most public support. We do not judge this a shortcoming of the process, but recognize it as a fundamental challenge of any complex decision.

The right information and expertise should be made appropriately available to the interested and affected parties

Information and expertise appears to be widely available to anyone interested in the project. None of the reviews we read complained about the availability of information, except to note that, in the earlier years not all documents were translated into all aboriginal languages. The NWMO changed its policy on this and now does provide documents in many languages.

The NWMO website is one of the best we've seen. It's clearly organized, with documents sorted into appropriate sensible categories and available without having to dig some indeterminate number of links down. This easy organization and presentation of information allows for a broader range of informed public participation.

Key documents on the website are translated into a variety of native languages and a native working group was developed along, with tribal partnerships, to provide these key documents and other necessary information to native communities so they could run their own consultation processes and report back in ways that were commensurate with their cultural practice.

The NWMO further commissioned organizations to run more than a hundred information sessions across Canada that were advertised in print and radio. This information campaign was supplemented by

electronic technologies as NWMO contracted Ann Dale, of Royal Roads University to run four internet dialogues.

The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process

The NWMO reported that transparency was of utmost importance to participants, but it is more difficult to ascertain how transparent the NWMO has been in the 2002-2010 period. Worthy of note is their disclosure of the funding and affiliations of the organization and its members and its citation of outside contractors employed and in what capacities throughout the process. Less transparent are the methods with which the NWMO culled its massive corpus of public engagement dialogues for what is ultimately included in their "what we heard reports" and the dissenting voices that may have been left out of such formulations.

Similarly related is their recurring call for a neutral third party to ensure fairness and transparency, and help instill public confidence and trust in the process. Participants suggest engaging third-party organizations to serve as experts in disseminating information, as reviewers, auditors, monitors and regulators. A related suggestion is to create an ombudsman for the nuclear waste storage site and site selection process.

Legitimate means to reach closure should be used

Canada's "process" can be understood as multiple processes first leading to an implemented disposal concept based upon public consultation on disposal options and ultimately moving to public consultation on a process for site selection. What constitutes "closure" at each step in these processes will vary. During the period up until 2010, there do not appear to be any formal closure mechanisms used, probably because the NWMO was seeking input on disposal options and the choice of the final option was Parliament's decision.

What is clear is that this is a voluntary siting process, which implies that the host community must issue voluntary consent. The particulars of how consent will be deemed are yet unclear in the process for site selection. Generally, there will be a number of decision points leading ultimately to the construction of the site where the host community must indicate willingness to proceed. And at some point, the host community issues it's final consent to proceed, after which the decision is closed. Whether a community expresses consent through a vote of a local council, another body, a public referendum, and who will be included in these final decisions is intentionally left open by the NWMO. They argue that there is no single appropriate means by which communities might want to express their collective opinion and this should be left to local determination.

The process should be effective at influencing decisions

Because the NWMO is a body whose official charge is to produce recommendations on disposal methods and manage the process for site selection and implementation, it is very likely that the outcome of the process will be a decision that is implementable. Of course, any final decisions need to be ratified by Parliament, but the NWMO is charged with implementing the decisions. Consequently, there is

significant promise that the participants in their process will have direct and substantial bearing on both policy and material outcomes.

The convening organization should evaluate, monitor, learn, and adapt the process as needed

The NWMO's process is built to explicitly review and adapt at each of its identified stages. The NWMO's continual process of consultation, reflection, and adaptation provide it the flexibility required to adjust its process as the need arises while maintaining an overarching set of "principles" that guide decision making. The proposed management plan that the NWMO submitted to the government was entitled the Adaptive Phased Management Plan, and speaks to the degree to which adaptability and opportunity for review during and after each phase was considered in the planning of the process and overall approach to disposal. The creation and distribution of the aforementioned, "what we learned" documents are also one mechanism that demonstrates the NWMO's attention to the issues captured in this criterion.

In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants

The NWMO is a conglomerate of owners of nuclear waste and Canadian law dictates that these organizations bear the financial obligation for its disposal. Obviously, they acquire funds for this process from fees on electricity. It appears that the costs of the siting program will be paid by these sources. In surveys conducted of participants who were involved in various phases of public participation, there are no reports of participants feeling their time was poorly managed or wasted. Early on in the process to determine the best disposal option for Canada, some critiqued the NWMO for not providing enough funds for the participation of indigenous groups who would have apparently suffered greater financial consequences as a result of the participation. Since then, the NWMO appears to have remedied this and has funds available to alleviate the strain of participation for indigenous communities. In generally, the abundance of information outlets and multiple forums for participation make it difficult to say that an interested party would not have been able to find a way to participate meaningfully.

Bibliography

Durant, Darrin, and Stanley, Anna. 2009. An official narrative: Telling the history of Canada's nuclear waste management policy making. In: Darrin Durant & Genevieve Fuji Johnson (Editors.) *Nuclear waste management in Canada: Critical issues, critical perspectives.* University of Vancouver Press, Vancouver, pp. 31-51.

Johnson, Genevieve Fuji. 2009. The darker side of deliberative democracy: The Canadian nuclear waste management organization's national consultation process. In: Darrin Durant & Genevieve Fuji Johnson (Editors.) *Nuclear waste management in Canada: Critical issues, critical perspectives.* University of Vancouver Press, Vancouver, pp. 90-105.

NWMO. January 2010. *Final report from the citizens' panel dialogues and the public discussion groups.* Report NWMO SR-2010-01. NWMO, Toronto. http://www.nwmo.ca/uploads_managed/MediaFiles/1390_sr-2010-01_finalreport_citizen.pdf

NWMO. May 2010. What we heard: Collaborative development of the siting process. http://www.nwmo.ca/uploads_managed/MediaFiles/1528_whatweheard.pdf

NWMO. August 2008. Moving forward together: Designing a process for selecting a site. NWMO, Toronto. http://www.nwmo.ca/uploads_managed/MediaFiles/1042_movingforwardtogether-designin.pdf

Steed, Roger G. (2007) *Nuclear Power in Canada and Beyond.* General Store Publishing House. Ontario, CA.

World Nuclear News. 4 June 2010. Search for Canadian nuclear waste site. http://www.world-nuclear-news.org/WR_Search_for_Canadian_nuclear_waste_site_0406101.html

Primary Web Sites

http://www.nwmo.ca Organization responsible for designing and implementing the process to site locations for long term nuclear storage

http://nuclearsafety.gc.ca Canadian nuclear safety commission, regulates the use of nuclear energy and materials, established in 2000 under Nuclear Safety and Control Act, replaces Atomic Energy Control Board. Issues licenses for power plants. Doesn't seem to have any role in siting disposal, rather engages in public processes over licensure issues for siting plants.

http://www.ceaa-acee.gc.ca/ Canadian Environmental Assessment Agency

Fernald: Cleanup and Future Use

Summary description of the process

The Fernald Environmental Management Project (FEMP) was a former nuclear production facility located in a rural, residential area 18 miles northwest of Cincinnati, Ohio. Remediation work has been completed, and the site is now part of the DOE's Legacy Management Program. As part of the cleanup effort and decision-making about future use an extensive public involvement process was implemented.

The site operated from 1951 to until production was suspended in 1988. The main activity of the facility was to produce highly purified uranium metal products ("feed materials") for US defense programs. In December 1989 the site was added to the U.S. EPA National Priorities List. In 1991 DOE officially ended production and the site was renamed the Fernald Environmental Management Project, or FEMP.

Soils, debris, ground water, and surface water in the Fernald vicinity were contaminated with uranium, radon and other radioactive materials. In 1984 the site contractor announced that an accident released uranium dust. At first they denied that any contamination occurred off-site. Subsequent investigations showed that was untrue. This was the first time that the community received such news and the response was anger, disbelief, and a sense of betrayal. Trust and credibility of DOE, Ohio state agencies, and site management was severely eroded. These feelings were exacerbated when news was released that the wells of several abutters were contaminated – and that the site had been testing the wells secretly for several years prior to the residents' being informed. The response was a lawsuit brought by local residents against Fernald and the DOE (settled in 1989).

Local government in Ohio is rooted in the Townships; the governing bodies are the Ross Township Trustees, Crosby Township Trustees, and Morgan Township Trustees. These Townships are located in Hamilton and Butler Counties. Within the Townships are local towns or villages. The primary towns around FMPC are Harrison and Ross. Some, but not all, workers live in these communities. The properties abutting the Fernald site are mainly farmlands. People residing on these farms, as well as many in Ross and Harrison, have long roots in the community, with the most disruption arising when the federal government took lands under eminent domain for the site itself. Many of the farms have been in the same families for generations. The 1990 census reported that 922 people in 333 housing units resided within 1 mile of the site boundary (ATSDR 2000).

The perceptions of government agencies and institutions within the Fernald context are complex, and characterized by evolving feelings of trust, betrayal, and distrust. Individuals' feelings about the trustworthiness, honesty, and accountability of the federal government, Department of Energy, and Fernald contractors have evolved over time. Feelings toward other regulators, such as the Ohio Environmental Protection Agency have also evolved.

Extensive risk communication took place about public and worker health risks from production operations and cleanup activities. There were also extensive opportunities for public involvement. The main avenue for public involvement relating to cleanup and future use decision making was the Fernald

Citizens Advisory Board (FCAB) (one of many DOE Site-Specific Advisory Boards). The DOE established the FCAB to obtain advice about cleanup and environmental restoration activities. The DOE Environmental Management Program points to the Fernald SSAB as one of its key successes in its set of site-specific advisory boards. Community members have praised the contractor's efforts to be more open and inclusive in its planning. The Fernald Citizens Advisory Board played a key role in defining the strategies for disposing of radiological and mixed wastes. One key recommendation made in 1994 concerned the long-term disposal of certain wastes on-site rather than requiring the removal of all contamination off-site and disposal in other locations. Later the board took a lead role in obtaining input from the community and developing recommendations about the future use of the site with the understanding that some contaminated materials will remain on-site in disposal cells.

Cleanup of the site was completed in 2008. The site contains on-site disposal cells, as well as a visitor's center.

Evaluation of the Process

The remainder of this chapter is a summary evaluation of how well the DOE's cleanup process performed on the criteria, which are listed in Box 1 above.

The process should be appropriately inclusive

The DOE Fernald cleanup process evolved into a very inclusive effort. Local officials and residents from the three affected communities were invited to participate in deliberations about cleanup plans and future use.

The Department of Energy Environmental Management Program, US EPA, and Ohio EPA established the *Fernald Citizens Task Force* (FTF) in 1993, and it was later renamed the FCAB in 1995. Regular monthly meetings of the FTF began in August 1993, in addition to periodic special public meetings and workshops. The FTF was originally chartered, under FACA, to advise the DOE about four specific issues:

- What should be the future use of the Fernald site?
- What residual risk and remediation levels should remain following remediation?
- Where should the waste be disposed?
- What should be the priorities among remedial actions?

As a FACA committee, members were selected to represent diverse stakeholder groups in the Fernald community, including Township Trustees, local residents, workers, scientific researchers, and business. Ex-Officio members were from the federal agencies DOE, ATSDR, and EPA. An ex-officio member also represented the Ohio EPA. Members were selected by a well-respected professor from University of Cincinnati, Eula Bingham. She talked with many of the key stakeholders in the community and with agency staff to determine a broadly representative and respected group of individuals to serve as members. She also tapped John Applegate to be the first chair of the committee. According to a staff

person for the Task Force, one of her goals was to establish a committee of "individuals participating as individuals, not just with institutional perspectives."

When the FTF was renamed the *Fernald Citizens Advisory Board* in 1995 it was given a new charter to advise the DOE EM program about cleanup implementation priorities; the Task Force had been established prior to the Site-Specific Advisory Board process of the EM Program. It continued to meet once a month until the cleanup was finished and the site transferred to the Legacy Management Program.

As representatives of the broader community, some FCAB members, as well as the chair and consultant, were sensitive to the way that the committee could become isolated from the community: "After learning a lot, they could have become removed from the community." They might be viewed as being co-opted. In an effort to minimize the perception – or reality – that FCAB members would become "co-opted," a series of community workshops were held. A set of workshops was held during the 18 months leading up to the first set of Task Force recommendations in 1995. Later, whenever a "big" issue was before the committee, additional community meetings were held. One example of such meetings was the series of workshops on future use of the site, as described below (also see Table 3 above). All of these meetings provided opportunities for FCAB members to learn from people outside of the committee. In some cases, however, tensions were revealed between the perceptions of those who were members of the committee and those who were not. While FCAB members may not have been "co-opted," they did begin to form collective views about risks and appropriate future uses.

A second effort to promote inclusivity was established by the site contractor. By the early 1990's the contractor, Ohio EPA, and federal agencies began to establish more open, interactive ways of communicating with the public about risks. They sought to reduce the anger and sense of betrayal. Flour Daniels became the contractor in 1992 and made a strong effort to learn from prior mistakes of National Lead of Ohio and Westinghouse. For example, the *Fernald Envoy Program* was established in 1994 by Flour-Daniel. Its purpose is to promote "one-on-one communication between team members and representatives of the local community" and facilitate two-way communication. In the Envoy Program, Fernald employees act as formally designated liaisons with stakeholder groups, including Township Trustees. Trustees received information from the liaison and they were able to share opinions and information with the liaison to take back to the site contractor. A Trustee stated:

> We have an envoy that comes from [FEMP]. We meet twice a month. And I know he comes once a month, and he's also on the school board, so it's difficult for him to come twice a month, so he's done a real good job supplying information. And ever since they started that program, I think we've gotten a lot more information, and I think he's taken a lot of our concerns back that weren't getting back to them before, so it's worked well, a lot better.

The Envoy Program was successful in part because it relied on trusted members of the community to act as sources of information about the site. Trust between the Envoy Program liaison and the Township Trustees played a key role in how risk information was understood – how well learning took place. For example, without trust, the Trustees were unwilling to believe what the site was saying about risks. By using a trusted person as a liaison, the site was able to break through the resistance to listening.

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

The activities of the FCAB included both deliberative and analytic activities to define the problem, design the process, and make progress on site cleanup plans and decisions about future use.

Once the DOE and contractors admitted that extensive contamination existed both on and off-site, there was general agreement about the problem: health risks to the public and workers from the contamination. The challenge became developing agreement on the best way to address the contamination and ensure that the site was not a cause of stigma or blight on the community.

The FCAB (and other activities) ensured that deliberative activities influenced the design of the public involvement process. In fact, the FCAB established many of its own operating procedures, although it was required to work within the context determined by its being organized under FACA (FCAB 1995). Members sought more activities for sharing information, learning, and providing input. They were very concerned about the processes by which risks were studied, the transparency of decision-making processes, accountability of agencies, and access to information.

The FCAB served an important role in facilitating integration between deliberative and analytic activities in order to make progress on cleanup. The Board chair and staff used a variety of methods to provide useful information to the members and to help them think about different options. For example,

- they created a "tool box" consisting of factsheets, technical summaries, and other information. They updated the information periodically.
- The designed an exercise, "Cleanopoly," to help people understand the DOE budget process. They designed a game simulation "Futuresite" to help members (and non-members) learn complex information about environmental contamination, health hazards, and potential future uses and to promote dialogue about options and their trade-offs (see Applegate and Sarno 1997 for more detailed discussion of its use). As part of the simulation, participants were required to use chose between on-site and off-site uranium waste disposal options while considering residual risk, budget constraints, environmental damage from soil removal, and public opposition to on-site disposal.

The Futuresite simulation was of particular importance for FCAB members and non-members (e.g., DOE HQ, contractors, regulators). The simulation was "run" in multiple meetings, including one that combined stakeholders, DOE HQ, DOE site, regulators, and contractors in organization specific and mixed groups. According to the FCAB consultant, the exercise led to "epiphanies for some members. They realized that ideological viewpoints did not make sense." People who had different opinions had to engage each other, and encounter different perspectives. For example, the FCAB consultant observed that "stakeholders cleaned the site from the outside in, and technical people cleaned the site from the inside out." They also encountered the difficulties of making choices.

In addition, the FCAB generated information that played a role in how risk perceptions have been formed within the FCAB itself. The committee was sensitive to moving beyond the larger community by virtue of their learning and group identity. For example, during the last few years the FCAB has endeavored to develop recommendations about the future use of the site. As part of this process the

FCAB held a series of public workshops. One FCAB member estimated that 75-100 people came to each workshop. According to the FCAB webpage:

> To ensure that the surrounding community plays a significant role in determining the future use of the Fernald site, the Fernald Citizens Advisory Board developed a process that allows the community to provide direct and detailed recommendations to the DOE regarding issues of future use…The Future of Fernald Workshops were designed to provide citizens a direct voice in determining what kind of public facilities should be developed, as well as the types of activities that will be permitted on the Fernald site following the remediation.

The idea for the workshops emerged because some people in the community asked DOE to consider how a "positive legacy" could be left in the community. FCAB members wanted to learn what was the diversity and depth of opinions within the community, and thus they embarked on a process to collect information.

Three workshops were held (April 20, 1999, May 24, 2000, September 26, 2000). During the first workshop participants discussed the potential future activities at Fernald, including:

Native American history and remains;

- public use of the land;
- environmental education; and
- local and Cold War history

The second workshop (which was also broadcast on the internet to allow participation of people that could not physically attend) asked the 100+ participants to consider potential future uses in terms of:

- What are the things you would most like to see as possible community assets at the site?
- What are the things you would definitely not want to see at the site?
- How would you like to see these assets managed within the community? Where should long-term support come from and who should be involved?

The third workshop was held to give the community a chance to discuss and reach consensus on a vision statement that was developed by the FCAB Stewardship Committee.

Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

The FCAB provided a genuine opportunity for local residents and officials to influence the problem formulation, process design and the outcome. Multiple opportunities were implemented to gather input that was relevant to decisions. To ensure that input was informed, effort was put into educating people. Aside from the periodic community workshops, the FCAB used a variety of other mechanisms to provide information to the general public:

- a webpage was created, providing minutes of meetings, etc.;
- newsletter and press releases;
- non-members were invited to participate in some activities, such as the Futuresite simulation.

- FCAB meetings were open to the public.

The right information and expertise should be made appropriately available to the interested and affected parties

The FCAB played a critical role in developing and disseminating technical information to the community. It requested that information be developed by DOE and its contractors. It sought independent experts to provide information. One example is the "tool box" of information provided to members (and made available more widely). Another example is that the FCAB generated its own information for informing discussions of the future use of the site by a feasibility study of the design and construction of an education facility (sponsored by the FCAB under a grant from the DOE; it is open to Ohio colleges and universities).

In some cases, people found themselves overwhelmed by information. Sometimes it was the complexity of information that was overwhelming. In other cases it was the sheer volume. FCAB and other organizations (e.g., FRESH) adapted to this situation by distributing labor and resources within the network. FCAB created subcommittees and working groups. It also relied on a facilitator that received high marks for his abilities as a "science translator."

Legitimate means to reach closure should be used

The FCAB worked by consensus. However, as noted the FCAB made an effort to ensure that its members not become isolated from the community that they were meant to represent. In this case, legitimate means for reaching closure also included getting 'buy-in' from the community at-large for cleanup and future use decisions.

A critical component of how decisions were viewed was related to personal relationships. Personal relationships facilitated dialogue and reaching agreements. The FCAB chair and facilitator worked hard to establish respectful relationships that supported listening and constructive dialogue among members of this network. The quality of these relationships supported members' ability to discuss controversial subjects and to reach agreements (and make recommendations) about controversial issues. This paid off, later. For example, strong positive personal relationships allowed more peripherally involved people to accept decisions. A Township Trustee expressed in an interview that he accepted, grudgingly, long-term onsite disposal of wastes at Fernald because he deferred to FRESH's stance on this issue. FRESH's stance, in turn, was a direct result of participating in the FCAB and having access to relevant information.

The process should be effective at influencing decisions

The process was effective at influencing decisions. The ways they influenced them is illustrated by the many recommendations that DOE implemented. Particularly strong examples are reflected in the design and implementation of the on-site disposal cells and the visitors center (e.g., (Fernald Citizens Task Force 1995). For example, the recommendations of the Task Force were to:

- protect the Great Miami Aquifer and to provide consistent protection across all land uses and environmental media;

- ship highly contaminated wastes off-site;
- dispose of wastes meeting criteria of low level contamination in an on-site disposal facility;
- accelerate remediation in response to reduced annual budgets and priorities for rapid protection of health and the environment, and;
- define future use of the site at a later time, but that decisions should avoid agricultural and residential uses and that a buffer zone be established around the on-site disposal cells.

From these, the only recommendation for which unanimity was not achieved concerned waste disposition; this is the recommendation that concerned the on-site disposal facility for wastes that were to meet specific acceptance criteria. A local resident from Morgan Township opposed the recommendation because he preferred that "all contaminated material be removed from Fernald and disposed off-site" (Fernald Citizens Task Force 1995, pg. 36). According to our interviews, Ross Township was unable to muster additional opposition to the decision, in part based on the lack of scientific controversy about the recommendation and in part based on the broad based support the recommendation had from other representatives in the community.

The convening organization should evaluate, monitor, learn, and adapt the process as needed

Both the FCAB and DOE (as the convener of the advisory board and the cleanup) evaluated and monitored the process. For example, the FCAB was evaluated as part of a larger study of DOE Site-Specific Advisory Boards completed over multiple years (Bradbury & Branch, 1999; Bradbury et al., 2003). Anecdotal evidence points to the DOE (and FCAB) adapting their process in response to input and learning.

In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants

The FCAB chair and consultant felt that major challenges were to maintain members' interest during the education process and to avoid overwhelming the members with technical information. A study of the process suggests that participants felt their time was usefully spent.

An indication that DOE (and the Ohio EPA and other government agencies) felt that the process was a good use of public resources is the extent to which they point to the Fernald cleanup as one of the great successes of the Environmental Management Program.

Conclusion

The cleanup process implemented by the DOE at Fernald exemplifies best practices in many respects. While this was not a siting process, it suggests features that can be important in developing community acceptance of decisions that impact risk and community features in the context of nuclear wastes.

Critical to the building of broad agreement about how to cleanup the site and for what purposes it might be brought back into functional use was the Fernald Citizens Advisory Board. The chair of the board and its staff embarked on a process of inclusion, transparency, and learning.

Risk perceptions evolved, and were shaped by a variety of factors. They included the availability and use of technical reports and presentations, quality of experiences with agency and contractor management, trust in the DOE, CDC, ATSDR, and FEMP contractors, perceptions about the degree to which agency staff cared about the community and its needs, perceived access to information and independent technical experts, perceived quality of the decision making processes, participation in group activities (e.g., FUTURESITE simulation), and personal experiences and observations.

The technical competence gained through participation on the FCAB and in other activities was important to the formation of risk perceptions among interested and affected parties. Township Trustees, FRESH, and FCAB members were for the most part in strong support of a complete cleanup of the site after closure. As they learned more –together -- about the technical feasibility of such a goal, the economic costs, ecological impacts, and consequences to other communities that would receive removed wastes, they began to consider the option of onsite disposal of some wastes. They grappled with the question: what was an acceptable future risk to the community from waste cells onsite? And, most members of these networks agreed to their use, although this was not their initial position. However, there was rarely complete agreement about these controversial decisions. For example, some members of the FCAB and Township Trustees felt that the onsite waste disposal cells were not a good solution to the management of contaminated wastes from the site. Yet, the community was able to move ahead on these controversial decisions by gaining the acceptance of diverse and respected members of the community (and not just elected officials).

The FCAB also generated its own information. It gathered, through a series of public meetings it sponsored, data about the diversity and strength of views in the community for the future use of the Fernald site. This information helped to shape the perceptions of FCAB members. This does not mean that FCAB members necessarily agreed with what they heard. Rather, in some cases it reinforced their opinions that more education with the general public was needed as to why residual contamination should preclude certain uses (e.g., bike riding). As in the case of FRESH, the FCABs efforts to gather input from non-members may have played an important role in how it was perceived within the community.

Tuler (2002) found the development of positive personal relationships was a critical underlying factor in the sharing of risk-related information and formation of risk perceptions.

- First, personal relationships provided access to information about risk-related issues.
- Second, relationships were important to the perceived trust of others. A factor that played a role in the development of personal trust among these networks was long-term stability of key individuals. At the same time, personal relationships were not always enough to overcome institutional distrust and barriers to the sharing of risk information. For example, FRESH members and Township Trustees could expressed trust in individual managers with the site contractor or staff with the DOE, but they held continued, deep distrust of DOE as an organization because of the legacy of lies that were revealed since the 1980's.
- This dynamic highlights a third role for relationships in the sharing of risk-related information and the formation of risk perceptions. Social interaction in deliberative settings was a critical mode of learning and important in the formation of risk perceptions. Learning was not just based on individual efforts or information per se. Relationships were critical. Personal relationships affected learning within and between networks about both technical information

and the values of others. In particular, the FCAB, created important venues for the development of new relationships and learning. In addition, personal relationships between an Envoy Program Liaison and the Township Trustees played a key role in how risk information was understood – how well learning took place.

Fourth, personal relationships facilitated dialogue and reaching agreements. The ability of engaged community members to debate and reach agreement on controversial issues, such as onsite disposal of wastes, depended in large extent on the quality of their relationships. Similarly, the FCAB chair and facilitator worked hard to establish respectful relationships that supported listening and constructive dialogue among members of this network. The quality of these relationships, we learned, supported members' ability to discuss controversial subjects and to reach agreements (and make recommendations) about controversial issues.

Bibliography

Applegate, J. and Sarno, D. 1997. FUTURESITE: An environmental remediation game. Simulation and Gaming 28(1): 13-27.

ATSDR 1999. Demographic analysis for populations residing within 1 mile, 5 kilometers, and 10 kilometers of the Fernald site. Atlanta, GA: Division of Health Assessment and Consultation, ATSDR.

Bradbury, J. and Branch, K. 1999. An evaluation of the effectiveness of local site-specific advisory boards for U.S. Department of Energy Environmental Restoration Programs. Report PNNL-12139. Washington, DC: Pacific Northwest National Laboratory.

Bradbury, J., Branch, K., and Malone, E. 2003. An evaluation of DOE-EM public participation programs. Report prepared for the DOE Environmental Management Program. Report PNNL-14200. Washington, DC: Pacific Northwest National Laboratory.

Depoe, S. 1997. Public involvement, civic discovery, and the formation of environmental policy: A comparative analysis of the Fernald Citizens Task Force and the Fernald Health Effects Subcommittee. In S. L. Seneca (ed.) Proceedings of the 4th Biennial Conference on Communication and Environment, pg. 244-253. Syracuse, NY: SUNY College of Environmental Science and Forestry.

FEMP 2001. Factsheet on on-site disposal facility (OSDF). Available at: www.fernald.gov

Fernald Citizens Task Force 1995. Recommendations on remediation levels, waste disposition, priorities, and future use. Ross, OH: The Fernald Citizens Task Force.

Hamilton, J. D. 2004. Competing and converging values of public participation: A case study of participant views in Department of Energy nuclear weapons cleanup. In. S. Depoe, J. Delicath, and M. F. A. Elsenveer (eds.), Communication and public participation in environmental decision making. Albany: State University of New York Press.

Lee, W. 2002. Determining our Environments: The Role of Department of Energy Citizen Advisory Boards. Boulder, CO: Westview Press.

Ohio EPA 2000. Fernald Chronology. Columbus, OH: Office of Federal Facilities Oversight, Ohio, EPA. www.offo2.epa.state.oh.us/fernald/finfo/chronology.htm

Powell, J., Sizemore, M., and Cornils, K. 2009. Sustainable Design and Construction of the Fernald Preserve Visitors Center. Paper presented at the Waste Management Conference, March 1-5, 2009, Phoenix, AZ. Retrieved from the web: www.wmsym.org/archives/2009/pdfs/9433.pdf

Tuler, S. 2002. Radiation Risk Perception and Communication: A Case Study of the Fernald Environmental Management Project. SERI Report 5. Greenfield, MA: Social and Environmental Research Institute. Retrieved from the web: www.seri-us.org/content/fernald-case-study-report-0

Finland

Summary description of the process

History of the Finnish case

In 1983 a screening study of the entirety of Finland was conducted to determine which sites might be feasible for the location of a nuclear waste facility. This study was concluded in 1985 and preliminary site investigations began in 1986. In 1987 the Nuclear Energy Act was passed that required a "favorable statement" by local council before the process could start. The preliminary site investigations were concluded in 1992 and detailed site investigations began including an environmental impact assessment (EIA) procedure for four of the indentified sites including Romuvaara in Kuhmo, Kivetty in Aanekoski, Olkiluoto in Eurajoki, and Hastholmen in Loviisa. These investigations concluded that, while all sites were scientifically feasible, the Olkiluoto plant on Olkiluoto Island in the municipality of Eurajoki was considered best because it had experience with nuclear technology, had one of the highest percentages of local consent, a larger area could be reserved for the site and a large portion of spent nuclear fuel was already located there. The EIA is the heart of the Finnish siting procedure and will be discussed more thoroughly below.

In 1995, Finland's nuclear power generators, Teollisuuden Voima Oyi (TVO) and Fortum Power & Heat Oy, established Posiva Oy to handle "research and practical matters" associated with the final disposal of spent nuclear fuel and the associated waste. Posiva is the party most responsible for the local negotiations that determined the site through the EIA and as a result will be the focus of most discussion.

After having been identified as a potential site for further investigation, the local council of Eurokjaki voted in December of 1994 to remove a ban on nuclear waste disposal there so that talks could take place. In the following year the municipality of Eurajoki signed a Cooperation Agreement that would lead to further review of Olkiluoto, an area within its borders, for consideration as a host community. The change in the community's perspective on accepting waste was, in part, due to new national legislation that forbade the import of nuclear waste (Kojo 2008).

In 1998, Posiva, knowing it would be required to file an application for decision-in-principle to build at the Olkiluoto site, oriented itself to the important task of securing municipal support for its application. Posiva paid greater attention to public input and pursued public consent, even though the citizens' role in the EIA was not seen as central or even necessary (Kojo, 2006). It was at this point that Posive hired a consulting company, Diskurssi Oy, to communicate with the public about the siting process (Kojo, 2006).

In the following year, Posiva submitted an application for a decision-in-principle to build a repository in Olkiluoto, using the KBS3 method of disposal, which is the same method Canada has adopted. In evaluating the decision-in-principle, the government requested statements from the municipality of Eurajoki and from the Radiation and Nuclear Safety Authority. The municipality could exercise a right of veto, but instead the municipal council approved the site, and the government proceeded with a

positive decision-in-principle in December of 2000. The decision was ratified in parliament in May 2001.

The remainder of this document addresses the limited community involvement that was undertaken in the time leading up to the approval of the site in 2001 by Parliament in a vote of 159 to 3. It should be noted that the Finnish case stands alone as a successful example of a siting process that began unproblematically with the production and investigation of a list of potential sites, identified solely on their scientific feasibility and whittled down to one final, locally supported selection without significant public involvement to remediate potential outcry. There are likely significant cultural differences in the public's conception of the role of government, science, and the level of trust in government that allowed for the success of this approach in Finland.

Evaluation of the Process

The remainder of this chapter is a summary evaluation of how well the Finish repository siting process performed on the criteria, which are listed in Box 1 above.

The process should be appropriately inclusive

Most public involvement came during the EIA program, beginning in 1997 reaching its peak in 1998 and 1999, and involved a variety of methods for engaging the public. Posiva identifies that following public outreach measures taken (Posiva, EIA Report).

- People were informed of opportunities to join in the debate
- Information was given on the planning of the project, the EIA procedure and progress and the completed reports
- An ongoing dialogue was launched between the residents of each candidate municipality
- Open discussion on the project and its impacts took place
- Views on the adequacy of the reports about the project and on the acceptability of the methods used were gathered.

These outreach measures were accomplished by distributing EIA newsletters and making such materials available in public locations; hosting public events and small group meetings; follow-up groups established for municipal officials, exhibitions presenting the project; and discussion in meetings for regional officials and in newspapers.

Despite these efforts, it is difficult to say that the process was appropriately inclusive. While information was clearly disseminated far and wide there appears to be no evidence of a decision-making process in which the public clearly contributed to shaping any outcomes of the siting process. The Finnish outreach strategies should then be understood primarily as information dissemination activities and the creation of opportunities for citizens to express their opinion but with no formal influence that might be used to measure the effectiveness of the scope of citizen participation. Posiva was criticized for not taking enough steps to enable participation by groups with special needs (Lehtonen, 2010).

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

Since Posiva and its contractors primarily engaged the public in a series of well-publicized information campaigns, the deliberative or analytic activities of the public in these contexts is difficult to identify. Posiva notes numerous "discussions" that occurred in each municipality, but what was done with the wealth of opinions and ideas generated from these discussions is unclear. It appears that Posiva conceived of its public participation efforts more as opportunities to inform and provide space for citizens to express their opinions, but whether this expression of opinions generated any outcomes through genuine deliberation or whether these were simply documented, collected and stored are unknown. Posiva did not elaborate any strategies for incorporating the comments they received.

No efforts appear to have been made to define or design the process in conjunction with the public. The initial site selection proceeded primarily from a set of scientific feasibility studies, and only involved the public when the decision-in-principle that Posiva wished to file required public support. It is perhaps not surprising that the design of the process and definition of the problem was also undertaken in autocratic style.

Progress on the main issue appears to have taken place rapidly, apparently due to the efforts of Posiva's negotiations with local municipal councils. The municipal council was ultimately responsible for deciding if Posiva's application would be supported by the municipality.

Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

As noted above, the general public had little opportunity to influence problem formation, process design, or outcome. They were given ample opportunities to learn about Posiva's plans, ask questions, and offer comments, but no formal mechanisms for assuring that these comments had some effect on the process are identifiable.

The process design was largely responsive to legislative requirements that potential host communities submit statements of support for public involvement (Kojo, 2006; Lehtonen, 2010). It is useful to identify three separate participants in this process: the general public in Finnish society, local citizens residing within a potential host community, and members of the municipal council. We this distinction we have grounds for differentiating levels of influence on the outcome. Members of the general public were generally limited to the means of participation identified above. Residents in host communities may have had more influence on the outcome of the process as the majority of the details regarding the outcomes of siting were negotiated with local municipal councils. The councils had a significant impact on the outcome through the right of veto. Nevertheless, how local residents in a potential host community influenced the local municipal council is unclear.

We might further inquire about the influence of potential host communities since their participation in the process was not determined through voluntarism, as it is in the other countries we have reviewed. Rather these communities were selected through an initial expert review of viable locations. This means that a community's influence on the process did not start with their voluntary selection to participate, but instead was limited exclusively to their ability to "opt out."

The right information and expertise should be made appropriately available to the interested and affected parties

Information abounded in Posiva's outreach efforts during the EIA. Posiva held numerous information sessions, created exhibitions to demonstrate their plans, sent out newsletters, took out ads in local media, and papered neighborhoods with brochures and notices about upcoming meetings. However, the process has been criticized for its top-down approach to knowledge-generation and dissemination. Kojo (2006) notes that in many of their communications with citizens, particularly through newsletters, dissenting opinion was silenced while supporters were given much space and a competitive atmosphere between potential hosting communities was encouraged.

This monopoly or knowledge production, as Lehtonen (2010) describes it, makes it difficult to assess the information that was circulating throughout the process and the resulting impact on any deliberation or analysis that might have made use of this information. One key lesson from the Finnish process, then, is the importance of encouraging the use of the best available information from a variety of sources, both to enrich the quality of participation that relies on such information, but also to guard against public perceptions of bias or manipulation on the part of the convening agency.

The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process

The Finnish process appears to have been well funded by the Nuclear Industry, and a shortage of funds or commitment to seeing the process through does not appear to be a problem. Indeed, it was quite the opposite. However, the process has been criticized for not allowing enough space for the deliberation of alternatives, railing ahead with long-term geological disposal options that had been declared the best and only option prior to any public involvement (Lehtonen 2010). In fact, the resources TVO was able to commit likely played a key role in the creation of a compensation agreement that Kojo (2008) argues was critical to the ultimate success of the municipal council vote in Eurajoki that favored hosting the facility.

The process appears to have been quite transparent, in part because the majority of the activities that took place during the EIA were mandated legislatively, and since little effort was exerted to go beyond the requirements of the letter of the law, the activities that were undertaken were well known. Posiva has been criticized, however, for failing to inform citizens about ways they might have influenced the process more directly, such as by lobbying local council members. While this may not be a clear failure of transparency, it certainly functions to obfuscate the range of participatory activities citizens might have otherwise taken up.

Legitimate means to reach closure should be used

Procedures for closure in the Finnish process were determined through a series of legislative acts, which determined the measure by which a site would ultimately be selected. This included the generation of a decision-in-principle, which would require supporting documents to be submitted both from the municipality under consideration and from the Nuclear Authority. Once these documents were submitted the decision would be approved or not. If it was approved, it would later be considered by the Parliament. How local municipalities reached closure on decisions to support the development of the waste facility or exercise their veto right is unclear. The lack of clarity on the particular processes local

municipal councils used to come to their decisions, and the degree to which the public was involved by the municipal councils when such decisions were made, make it difficult to evaluate the legitimacy of the closure means employed. That no significant protests following such decisions are reported suggests that either the public perceived themselves to have been satisfactorily consulted, or that public trust in municipal decision-making bodies is sufficiently high to bypass public consultation on such matters. It is also possible that what the municipalities had negotiated in terms of compensation in exchange for hosting the facility was deemed sufficiently generous to generate little outcry.

With another interpretation of "closure" we might examine the degree to which the Finnish case expanded dialogue and explored alternatives and other opinions. Lehtnonen (2010), has argued that the EIA process did little to expand dialogue or explore alternatives and that "the hegemonic position of the discourse around the developer's concept of long-term geological systematically prevented the opening up of perspectives." This, coupled with reports that the literature disseminated by Posiva in the form of brochures and newsletters ignored critical perspectives and silenced opposition, suggests that the EIA process not only failed to open dialogue, but potentially worked to close down deliberation that was unfavorable to its position (Kojo, 2006).

The process should be effective at influencing decisions

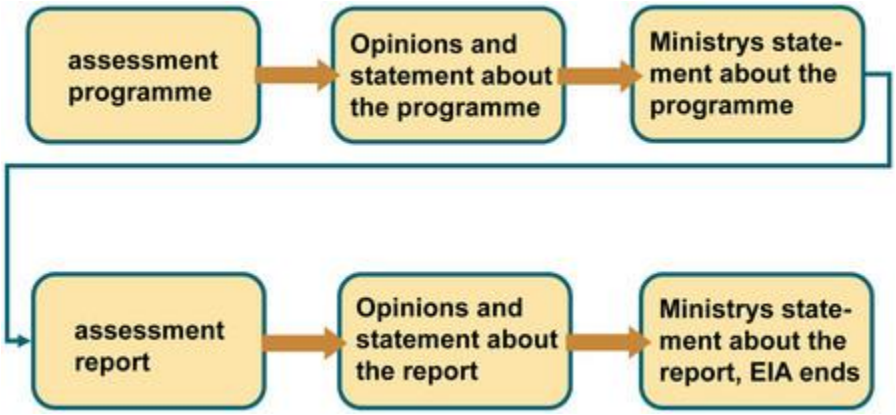
The general conclusion of those who have most thoroughly reviewed the Finnish case is that the EIA process did little to influence the final decision-in-principle that was subject to parliamentary vote. Nor were the many critical opinions expressed in Eurajoki over the course of the EIA included in the application for the decision-in-principal. This suggests that the EIA deliberations with citizens had little impact on the decision-in-principle application, which, in turn, had little impact on Parliament's evaluation of the decision (Lehtonen, 2010). One anti-nuclear activist even described the EIA as "frustrating theatre," with each actor playing to her pre-defined script, fully aware that the EIA would have no impact on decision-making (Rosenberg 2007).

The EIA process was further criticized because it involved citizens, but only through mechanisms of opinion collection. The EIA did not inform citizens about their options for directly effecting the decisions of the process such as the option of exerting influence on local council members directly or through liaison groups (Kojo, 2006). Nevertheless the legal mechanisms that were ultimately in place to govern the siting process did succeed in establishing a site that did not produce disruptive protests. As a result, Finland did not experience the disruptive of rejection actions of other countries reviewed.

The convening organization should evaluate, monitor, learn, and adapt the process as needed

By most accounts, Posiva did little to evaluate or adapt the process. On the one hand, Posiva did show some adaptability, for instance, in their recognition that, in order to successfully gain local support for their decision-in-principle, they would have to seriously expand their outreach efforts. But the goals of their adaptability appear to have served the ends of gaining acceptance for solutions they had already determined rather than adapting toward the goal of following better and more effective forms of collaborative participation and deliberation. Because Posiva effectively followed the letter of the law in its implementation of the EIA, its inflexibility was tied to the rigidity of the legal requirements for its execution.

The EIA was designed as a staged model where public comments were taken at the end of each stage. But, as noted earlier, it is unclear to what extent these comments influenced the process. Indeed, there is some evidence that the comments had little or no impact. For example, critical comments were never incorporated into the decision-in-principle application, which the EIA was meant to inform. The stages of the EIA are displayed in the following graph, reproduced from the Posiva.fi website.



In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants

It does not seem that the process was wasteful of resources or time, although some have characterized the Finnish process as "long" (Lehtonen, 2010). It was not criticized for excessive, or unnecessary spending. Inasmuch as there was no long-term deliberative process, the time citizens were involved was as limited or expansive as they desired, but *how* they were involved was highly constrained. Given numerous information outlets, one could become reasonably well informed about Posiva's plans without having to travel unreasonable distance or having to exert of unreasonable effort. However, some might characterize the time spent by those who did participate as "wasted" given the limited impact of their participation. The role of citizen discourse appears to have largely been conceived of as an outlet for citizen concern or frustration, or for confirmation of a pre-determined solution. To the extent it was a relief valve for frustration, the major benefit of participation may have been the social-psychological benefits, rather than the benefits of civil discourse toward developing an effective solution for Posiva.

Conclusion

The general consensus of those who have written about the Finnish process routinely involves critiques of the rigidity of the EIA process, at least as Posiva implemented it. Particularly troublesome was Posiva's narrow scope for deliberation and its unwillingness to explore alternatives to geological disposal or respond to remarks made by its critics. The Finnish process is an example of the rare siting process that manages to site a facility without a significant, serious, and sustained attempt to engage the public in deliberation about the design of the facility, the siting process, or explanation about how public participation would inform the problem definition or the process design. Since Posiva ultimately required the support of the local municipal council for its application for decision-in-principle, it was able to reduce its focus on engaging the general public in a collaborative process, focusing instead on negotiating with local governmental bodies and on "consultation" with citizens, which may amount to

little more than the collection and storage of public sentiment. Whether a U.S. process that focuses its efforts on negotiations with local government, rather than on analytic and deliberative activities that engage the general public, can assume the same degree of success the Finnish process has enjoyed is unclear. There may be a variety of cultural factors involved in the success of the Finnish process that may make models of its success of little utility in U.S. contexts where trust in government and local decision making bodies is much lower and where there is a greater diversity of opinions about the costs and benefits of accepting a geological repository.

Bibliography

Kojo, M. 2006. Carl country report Finland. Whitepaper: University of Tampere Finland.

Kojo, M. 2008. Compensation as means for local acceptance: The case of the final disposal of spent nuclear fuel in Eurajoki, Finland. Paper presented at the WM2008 Conference, February 24–28, 2008, Phoenix, AZ.

Kojo, M. 2010. Local perception of SNF repository in Eurajoki, Finland. Presentation to BRC subcommittee open meeting, Helsinki, Finland.

Lehtonen, M. 2010 Deliberative decision-making on radioactive waste management in Finland,

France and the UK: influence of mixed forms of deliberation in the macro discursive context. *Journal of Integrative Environmental Sciences*, 7(3), 175-196.

Posiva Oy. *The final disposal facility for spent nuclear fuel: Environmental impact assessment report.*

Rosenberg, T. 2007. Presentation on plans for new reactors in Finland. European Nuclear Critical Conference, Helsinki.

Ruskeeniemi, T. & Paulamaki, S. 2010. Geological site selection process for the high-level nuclear waste repository in Finland. Presentation to BRC, Helsinki, Finland.

"Clean Coal" and Carbon Capture and Storage

FutureGen 1 (2005 – 2008)

Summary description of the process

In February 2003 President Bush announced a major initiative for a federal government and private industry partnership to build a coal-based, zero-emissions electricity and hydrogen producing power plant. The facility was to combine integrated gasification combined cycle technologies (IGCC) with carbon capture and storage (CCS). It would be built at a commercial scale of 275 megawatts, reduce emissions of CO_2 and other pollutants by at least 90%, sequester one million metric tons of CO_2 per year, and produce both electricity and hydrogen as energy sources.

Two other goals were also stated. The first had to do with technology development. This was to develop and test advanced technologies, with the results being widely shared both domestically and internationally, among governments, industry, and the public. The second had to do with public acceptance. A primary goal of FutureGen is to build industrial and public acceptance for future near-zero emission, coal-fuelled power plants of similar design characteristics" (FutureGen Alliance 2006). "International participation was a core component of the project as acceptance of the project's results were deemed necessary by the Administration for building an international consensus on the role of coal and carbon sequestration in addressing global climate change and energy security" (Committee on Science and Technology 2009), and in particular to show the promise of technology as a way of addressing global climate change (Stephens 2010, Markussen et al. 2011).

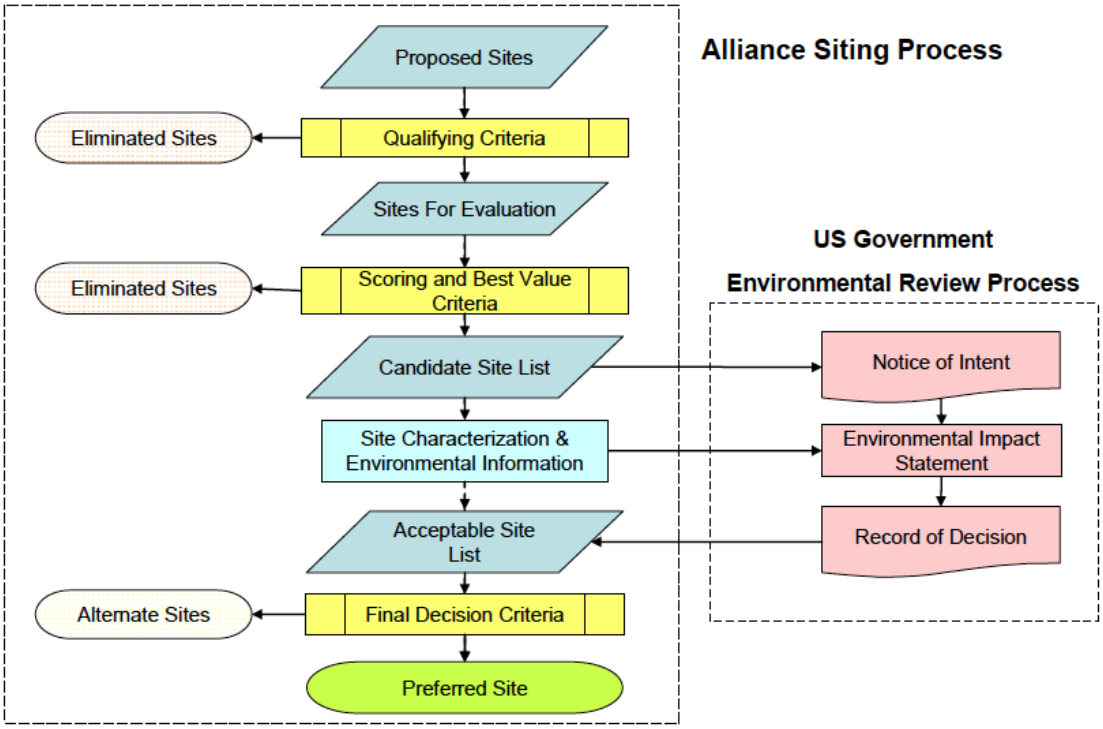
To carry out the siting, design, construction, and operation of the facility the FutureGen Alliance was created in 2005 between the Department of Energy and 13 private members (Hund and Greenberg 2010, pg. 10; see also Committee on Science and Technology 2009). The Partnership involved cost sharing and other features that would make participation appealing to private industry in a context of uncertainties about cost, liability, and performance of advanced technologies.

The Alliance developed an elaborate process with multiple stages to select a host community. It combined aspects of a competitive voluntary siting process with requirements under NEPA. A schematic of the process is shown in Figure 1. Stakeholder involvement at all stages, with strong commitment to openness and fairness, was evident.

A key part of the process was the use of over 100 criteria for evaluating potential sites. These were established prior to seeking applications from interested communities. "The criteria focused on the goals and objectives for FutureGen, including the need to expeditiously demonstrate a viable technology for CO2 capture and storage in order to address an issue of national and international importance. The criteria were established to identify and avoid potential technical, engineering, and environmental challenges that could adversely affect the success of or schedule for the project" (FutureGen Alliance 2006, pg. 2). The Alliance sought input on the criteria from industry, academic researchers, environmental groups, regulatory agencies, and the public. The criteria broadly addressed both the surface requirements of the power plant and the subsurface requirements for CCS. There were three types of criteria (FutureGen Alliance 2006; the full set of criteria and their rationales are in Attachment 1 of FutureGen Alliance 2006):

- *Qualifying criteria*: criteria that each site would have to meet,
- *Scoring criteria*: criteria for ranking sites on various desirable features, and
- *Best value criteria*: "criteria that were not capable of being quantitatively scored but that represented factors the Alliance needs to consider to secure a site that can fulfill the project's mission."

Figure 1. Alliance Siting Process, with DOE's NEPA Compliance Process



[Figure 1 from FutureGen Alliance 2006]

Three important aspects of these criteria are worth noting. First, a number of criteria related to social impacts, including potential impacts to cultural resources, sensitive areas, and public land (e.g., state parks, wildlife refuges); impacts to potential groundwater drinking water sources; and compatibility with existing land uses (e.g., housing developments). Second, public acceptability was considered, including willingness of landowners to allow access for monitoring. Third, the Alliance avoided sites that were deemed higher risk, and which might lead to delays or additional costs, including land and water rights and liability: the Alliance choose technically qualified sites with the best chance of avoiding " potential design, construction, regulatory, or permitting impediments that could result in schedule delay and mission failure" (FutureGen 2006, pg. 14).

Thus, the search was not just for a site that met technical requirements: "as noted in the RFP, the siting criteria for the FutureGen plant were far more stringent than criteria that would be used to site future, commercial, near-zero emission coal-fueled power plants. Offered sites that are not appropriate for the proposed FutureGen facility may be excellent sites for future near-zero emission, coal-fueled power plants." (FutureGen Alliance 2006).

With the site selection criteria in hand, the FutureGen Alliance published a *draft* Request for Proposals in February 2006. Public comments were sought about the draft, and the comments posted to the Alliance's website. The final RFP – that included revisions that reflected comments – was issued in March 2006. At this stage, clarifying questions were addressed, and these too were posted to the website.

Twelve proposals were received by the deadline:

1. Illinois - Effingham-North 45
2. Illinois - Marshall-Forsythe
3. Illinois - Mattoon-Dole
4. Illinois - Tuscola-Pflum
5. Kentucky - Henderson County
6. North Dakota - Team ND FutureGen
7. Ohio - Meigs County
8. Ohio - Tuscarawas County
9. Texas - Heart of Brazos
10. Texas - Odessa
11. West Virginia - Lakin Property
12. Wyoming - Wyoming FutureGen Host Site

After receipt of the proposals, two teams of evaluators were set-up. One was to focus on the criteria relating to the power plant and the second was to focus on the criteria relating to geologic carbon storage. In addition, additional information was requested from some of the proposers.

The evaluation teams then applied the Qualifying criteria. They determined that four sites did not meet all qualifying criteria, and were eliminated from the process:

1. North Dakota - Team ND FutureGen
2. Ohio - Meigs County
3. West Virginia - Lakin Property
4. Wyoming - Wyoming FutureGen Host Site

The reasons for their disqualification were detailed in a public report (FutureGen Alliance 2006). Before they were disqualified the evaluation teams asked for additional, clarifying information. While rationales were provided in many cases for the proposers' failures to fully meet the qualifying criteria, the Alliance refused to "tweak" them. One of the reasons given was "fairness to other site offerors and potential site offerors" – it was viewed as important to apply the criteria consistently and in keeping with prior commitments.

Site visits and scoring criteria evaluations were then completed. Site visits consisted of three people teams, who verified information in the proposals and met with local stakeholders (mainly state and local officials, economic development agents, and utility representatives). Evaluations using the scoring criteria were completed at a workshop that included evaluators from both teams as well as "outside" technical experts. Sites were evaluated using the scoring criteria by each individual, and then combined to give an overall score.

Using the information from the evaluation workshop, the site visits, and narrative discussions of the best value criteria provided in each proposal the FutureGen Alliance Board of Directors selected four sites for further consideration: the Candidate Site List. The process up to this point – including detailed description of the evaluation process, rationales for selection, and summary scores for the eight qualifying proposals – was described in a public document (FutureGen Alliance 2006). The four candidate sites were:

1. Illinois – Mattoon
2. Illinois – Tuscola
3. Texas – Heart of Brazos
4. Texas – Odessa

At this point the process shifted toward more detailed analysis of the four candidate sites. This included development of site specific environmental information about the surface and subsurface areas involved. This information was used as part of an environmental impact statement process lead by the Department of Energy under NEPA (DOE 2007). A number of public meetings were held in each community (e.g., public scoping meetings). The Final EIS was published in November 2007.

During this time the FutureGen Alliance gave considerable attention to public opinion and developing trust in potential host communities. The Alliance commissioned media analyses during 2006 – 2008 (see Hund and Greenberg 2010 for a short review). As has been pointed out by others, there is generally little public understanding of carbon capture and storage technologies and risks (Bradbury et al. 2010, Parfomak 2008, Malone et al. 2010). The Alliance took the need for public education seriously, and attempted to do so in a way that engaged independent experts, addressed the questions and concerns of critics, and built trust.

At this point, during the end of 2007, the process begins to break down:

> The Alliance's time line established the end of 2007 for the announcement of the final site decision. As DOE had completed the final EIS, the Alliance scheduled the announcement for December 18. The winner was the State of Illinois with a site near the city of Mattoon. But within hours, DOE, in a statement made by James Slutz, said that "the public interest mandates that FutureGen deliver the greatest possible technological benefits in the most cost-efficient manner. This will require restructuring FutureGen to maximize the role of private sector innovation, facilitate the most productive public-private partnership, and prevent further cost escalation." DOE also stated that it would not sign the Record of Decision on the EIS which was required before any federal project construction funds could be expended. (Committee on Science and Technology, 2009, pg. 29).

The DOE had begun to re-evaluate its commitment to the established goals and partnership arrangements. Specifically, the DOE, under the leadership of Secretary Bodman, voiced concerns about the rising costs of the project. Concerns were made known to the Alliance, and there were some attempts to renegotiate the cost sharing arrangements and program goals. However, an analysis of how the program was restructured concluded that, "the Alliance did not know the details of Plan B [the proposed restructured program] during the negotiations" (Committee on Science and Technology, 2009, pg. 27). There are many questions about the validity of these concerns and the ways in which they were addressed (Committee on Science and Technology, 2009). Without going into great detail about the elements of "Plan B" or trying to understand the underlying politics, several observations are important (and detailed in Committee on Science and Technology, 2009):

- the DOE backed out of a widely agreed-upon arrangement
- this occurred at the tail-end of an elaborate, transparent process that strongly emphasized the building of institutional trust among the FutureGen Alliance and potential host communities
- the DOE developed a new program, FutureGen 2, for developing and testing carbon storage technologies linked to coal power plants, and
- industry, states, local communities, and the public were surprised and reacted negatively to the restructured program.

During January 2008 the DOE issued a Request for Information to gather input about the restructured program and upcoming competitive Funding Opportunity Announcement. Responses were largely negative:

> The response was quick and skeptical with most of the media viewing FutureGen as dead…The responses received in March from industry to the Request for Information were more damning. There were 49 responses, almost all of which took major "exceptions to the RFI specifications and near zero emissions objectives," a DOE summary document reported. Industry wanted the solicitation expanded to non-IGCC technology; a "substantial relaxation" of the 90 percent carbon capture requirement; government liability protection of the CCS aspects of the projects; elimination of the mandate to sequester 1 million tons of CO2 in a saline aquifer and permission to sell CO2 for enhanced oil recovery; guaranteed funding up front; an expedited NEPA process; a sharing of the additional operating and parasitic energy costs; and reductions in the performance targets of sulfur, nitrogen oxide, particulate matter and mercury. The comments also suggested that the schedule was unrealistic. (Committee on Science and Technology 2009, pg. 36).

In stark contrast to the FutureGen Alliance commitment to openness the Department of Energy "hid the supposedly "public" comments from the public and the press by refusing all requests to release them" (Committee on Science and Technology 2009, pg. 37) and "Despite requests under the Freedom of Information Act, DOE refused to release these comments or those submitted on the draft Funding Opportunity Announcement until this Committee requested them. It provided no legitimate reason for withholding the comments beyond a claim that there was proprietary information in some of the responses" (Committee on Science and Technology 2009, pg. 37, footnote 175). Senator Durbin of Illinois was quoted as saying: "Who can take the Secretary [of DOE] seriously at this point? What community, what state, would make an application for a new plant after what we have just been through in Illinois?" (Wald 2008).

Evaluation of the Process

The remainder of this chapter is a summary evaluation of how well the FutureGen process performed on the criteria, which are listed in Box 1 above. The focus is on the initial process (FutureGen 1), and not on what has happened since 2008 with the restructured program. A published evaluation of the process for the Mattoon, Illinois site provides much of the evidence for the evaluation made here. This means that our summary evaluation is in large part about one of the 4 Candidate Sites that emerged during the process. In the description that follows we make clear where statements are about the FutureGen process in general or about the Mattoon case specifically.

The process should be appropriately inclusive

The FutureGen site selection process was very inclusive. The FutureGen Alliance made efforts to gather input from diverse stakeholders and to develop relationships with diverse stakeholders in the four Candidate Sites. In a review of the process focused on the Mattoon, Illinois site – the one that was ultimately chosen by the Alliance in 2007 – Hund and Greenberg (2010, pg. 11) write:

> "Outreach and engagement efforts on the FutureGen process began very early and were conducted on multiple levels by multiple parties. Levels of stakeholder engagement included national, regional, and local. The parties involved in stakeholder engagement and outreach ranged across semi-fi nalist sites, occurring from the FutureGen Alliance project development team, regional and local economic development organisations, and third-party scientific experts and many others."

In addition, observers reported that, at least in some cases, the site-specific proposal development efforts were inclusive. For example, Hund and Greenberg concluded that,

> "The Illinois FutureGen Team initiated ongoing public engagement during the site proposal preparation process. As early as August 2006, the Illinois Department of Commerce and Economic Opportunity (DCEO) and ISGS held public meetings to explain the FutureGen concept and answer questions about the IGCC plant and CCS. Meetings with separate stakeholder groups were held throughout this period, including meetings with farm bureaus, neighbors, teachers and the general public." (Hund and Greenberg 2010, pg. 12).

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

Integrated deliberative and analytic activities occurred throughout the original FutureGen process from 2006 through the end of 2007 when Mattoon, Illinois was announced as the preferred site. An example, of how they are integrated is shown in Figure 2, which illustrates the process in Illinois.

The Alliance solicited comments on the form of the initial request for proposals and the site selection criteria. These criteria were applied by technical evaluation teams. Further analytic studies characterized features of the candidate sites prior to and during the Environmental Impact Statement process.

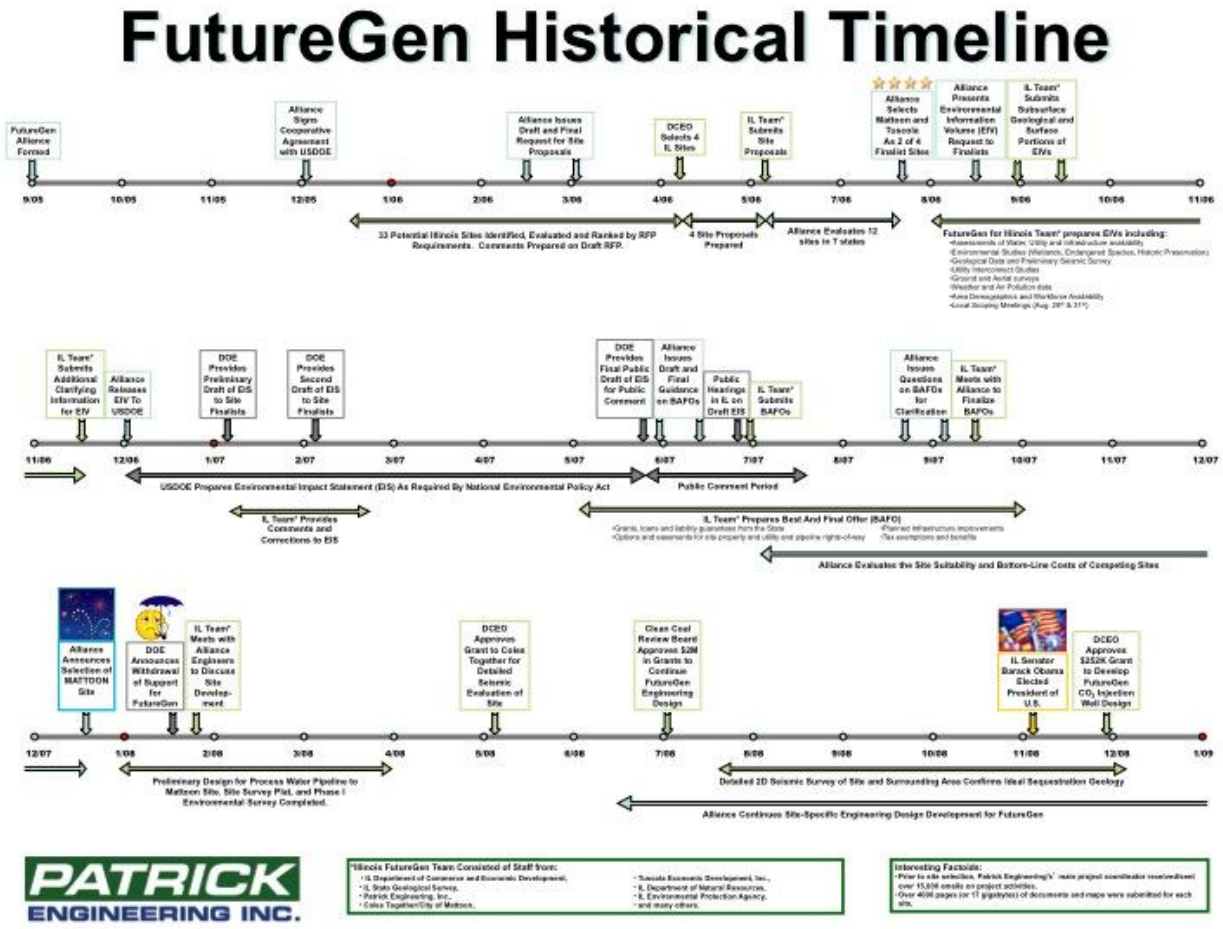
Throughout the Alliance and host site proposers conducted outreach and public education activities to address concerns and answer questions from local stakeholders. In an evaluation of the process in Illinois Hund and Greenberg (2010, pg. 19) write that,

> "Engagement happened in many forums and different sized groups. Public meetings were held throughout the FutureGen process. Some were hosted by the local economic development team in partnership with the Illinois FutureGen Team with participation by the Alliance. These were information sharing meetings that aimed to describe the project and discuss questions from members of the community about the project. Official public meetings were also held later in the process as part of federal regulatory requirements under NEPA. These meetings were hosted by the DOE to describe the project and enable members of the community to comment." Further, "The Illinois economic development office, DCEO, was seen by most respondents as the coordinator of community engagement from the state level. The engagement process was described as very sophisticated and well managed" (pg. 19).

Opportunities for engagement happened at multiple points in the process,

"Most respondents reported that the neighbors felt it was extremely important to have repeat opportunities to get information from multiple sources. Some neighbors were ambivalent when asked if there were enough opportunities in the process. They also pointed out there is a likely saturation point for information" (Hund and Greenberg 2010, pg. 20).

Figure 2. [From www.**futuregen**for**illinois**.com/.../**FutureGen**%20Historical%20**Timeline**.ppt]



Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

Participants in the process had genuine opportunities to influence the problem formulation, the process design, and the outcome (as defined as the selection of a preferred site by the FutureGen Alliance). An example of the multiple opportunities for public comment is illustrated in Figure 2, above.

Participants had an opportunity to influence the problem formulation by being involved in defining the site selection criteria. These criteria essentially defined the kinds of issues that would need to be addressed by a successful proposal. The draft RFP was also made available for public comment, and comments did influence the final RFP.

Regarding opportunity to influence the process, as noted previously, the FutureGen Alliance made community involvement a priority. Input from diverse stakeholders was sought at all stages of the process, including problem formulation and process design. For example, "the FutureGen Alliance invested in a stakeholder engagement team that conducted over 200 interviews and group meetings with local communities to listen to concerns, to address questions and to explain the project" (Quote from Markussen et al. 2011, with reference to Hund and Judd 2009).

In a study of the Illinois process "respondents reported on being engaged in different ways and/or being responsible for driving some of the engagement approaches. From the interviews it was clear that some people chose to participate in the FutureGen process, others chose to observe, and still others waited and/or wanted to be engaged or brought in by the project developers" (Hund and Greenberg 2010, pg. 18).

The ability to influence the outcome (site selection) was apparent in the ways that the Alliance and state/local proponents sought out questions from stakeholders, and then tried to address them with additional information. The local community had influence (at least in Illinois) over the specifics of the proposed Illinois sites by virtue of having their concerns addressed in the proposals. Similarly, this was the experience in Texas, according to the FutureGen Texas: "Texas designed and executed a statewide competition to identify the best possible locations for the FutureGen facility. This open and fair regional competition utilized local expertise, resources and enthusiasm to select the optimal FutureGen host sites in the State of Texas" (FutureGen Texas 2011).

Participants also have opportunity to influence the EIS. For example, stated in the EIS,

> "This document has been revised in response to comments received during the Department of Energy's review, from the public hearings on the Draft Environmental Impact Statement, and from other comments received on the Final Risk Assessment dated April 2007. Small changes were made to the Risk Assessment in response to suggestions made in the comments" (DOE 2007).

The right information and expertise should be made appropriately available to the interested and affected parties

Technical experts were available during public meetings and informational workshops. People interviewed as part of the Hund and Greenberg evaluation noted that technical experts from state agencies were viewed as independent and trustworthy sources of information. When people in the community had questions, project proponents and the Alliance got them answers.

The FutureGen Alliance and state proponents organized meetings with specific stakeholder groups, as well, including academia, industry, and the farming community. Part of the reason was to have small group meetings, with people from a single "community" with the intent of creating more open dialogue (Hund and Greenberg 2010). "Meetings were initiated with specific neighbors so that they could voice their grievances" (pg. 24).

The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process

The process receives mixed reviews on this principle. *During* the process the DOE and the FutureGen Alliance were reported to be committed to the schedule and procedures that were established. Similarly, reports suggest they were transparent and they provided adequate resources and staffing. However, as the initial FutureGen process started to draw to a close, with selection of a single host community, the DOE stopped being committed to seeing the process through (Committee on Science and Technology 2009). The decision about reframing the program was not conducted in a transparent manner.

Legitimate means to reach closure should be used

The FutureGen Alliance rigorously developed and applied site selection criteria. The criteria were developed with input from technical experts as well as broad stakeholder input. The selections of the four Candidate sites and the final, preferred site were described in public documents. These documents provided clear rationale for decisions.

A testament to the perceived legitimacy of the process is found in the post-decision "epilogue" from Ohio (Ohio FutureGen Task Force Final Report No Date). This document examines the reasons for the Ohio sites being rejected in the initial qualifying review. While issue is taken with some of the reasons given for the FutureGen Alliance rejecting the Ohio proposals, the document also states that "Although the final outcome for Ohio was disappointing, the state is fully supportive of the FutureGen process as it moves into its next stage. We wish our colleagues in Texas and Illinois the best in the months ahead. Ohio will continue to be a vital player in the nation's quest to expand clean-coal technology research, development, and deployment" (pg. 6).

When the DOE restructured the program in 2008 many viewed the process and decision as illegitimate. Markussen et al (2011) report that "Responding to this announced change and to the associated reduced significance and reduced international and national prestige of the project, the community of Mattoon withdrew its involvement in FutureGen. Mattoon expressed disappointment and an unwillingness to participate if the community would only be providing the geological storage location forthecapturedCO2."

The process should be effective at influencing decisions

By all accounts the process was effective at influencing decisions. This is reflected in the way that evidence from technical assessments, project proposals (including responses to Best Value Criteria), and other information were applied in public documents to justify decisions.

The convening organization should evaluate, monitor, learn, and adapt the process as needed

As the convening organization, the FutureGen Alliance, made efforts to monitor and learn. For example, the Alliance hired a firm to conduct media analyses throughout the duration of the process (see Hurd and Greenberg 2010). The extent to which elements of the process were modified based on learning during the process is not clear from the documents reviewed here.

In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants

The process waste not a waste of resources or time. Overall, reports of the process up through December 2007 are quite positive (the point at which the DOE restructured the program). Interestingly, even among the states that lost the competition there was a feeling that the process was worthwhile. In Texas it was reported that "Three years of vying for the location of the FutureGen energy development project may not have been in vain as a private company is now looking for a place in Texas to develop a similar energy plant" (Thurber 2008). In Ohio a post-mortem of the process concluded that:

- "The work of the Ohio FutureGen Task Force is viewed by participants and stakeholders as a model that can be replicated in future state efforts that require broad partnerships among government agencies, industry, statewide organizations, higher education, and individual communities.
- Ohio now has a seasoned team of experts who can lead future state efforts in the energy and environmental fields.
- Numerous sites in Ohio have now been identified, as a result of the FutureGen site selection process, as highly desirable for the siting of future power plants or other industrial uses.
- Even if the first FutureGen plant is built in another state, Ohio has fortified its position to be a host state for the next-generation FutureGen power plants envisioned by the United States Department of Energy and FutureGen Industrial Alliance" (pg. 3).

Conclusion

Based on the documents reviewed as part of this study, the initial FutureGen process, implemented by the FutureGen Alliance between 2005 – 2007, was exemplary. By way of concluding we quote extensively from some of the lessons learned as part of a detailed evaluation of the process in Illinios by Hurd and Greenberg (2010);

- Competition was a critical motivating component of the Illinois FutureGen process… Lesson learned: site selection processes involving competition and community self-selection can bring enthusiastic communities together with project developers. Project proponents may consider having public acceptance as an explicit criterion in evaluating sites.
- Community pride and the awareness that hosting FutureGen would bring recognition to the community of Mattoon were important…Lesson learned: cultivating community pride through competition, self-selection, education, and engagement can be beneficial throughout the early planning, site selection and site operation phases of a project.
- The State of Illinois moved quickly to compete in FutureGen. A coordinated State team was augmented by the local team of economic development leaders from both communities (Mattoon and Tuscola). The State and competing communities worked arm in arm with the stated goal of winning FutureGen for the state, recognising that benefits for one would benefit the other… Lesson learned: creating a collaborative, unified work team that is seamless across geographies (state, regional, local) and political boundaries is critical. Having strong leaders responsible for coordinating the players at the outset and throughout the process is also important.
- Stakeholders come to an engagement from different backgrounds and with different knowledge and perspectives… Lesson learned: understanding specific and varied audiences is critical to stakeholder engagement. Background, generational influences and social characteristics of the community may provide increased stakeholder understanding. Seeking input from audiences about what information will be of interest to them and providing that information in a timely manner can be beneficial to engagement. Allowing time for audiences to absorb information and keeping the lines of communication open to answer additional questions as they arise is essential.
- It is critically important to know from where people gather information about a project… Lesson learned: understanding where people get their information and being prepared to

provide it early and often is an important strategy. Messages from multiple sources with potentially varying perspectives may carry more weight.

- Provide accurate and consistent information. Early in the FutureGen process a very optimistic estimate of jobs created from the project was published in Illinois. The estimate included spin-off jobs as well as full-time, operational jobs. The Alliance conducted an estimate that yielded substantially lower jobs. The differences between the sets of numbers and the perception that the jobnumbers were changing left some stakeholders feeling that they were misinformed. Part of the difference was between construction jobs during the building of the plant and full-time jobs once the plant was up and running.
- Stakeholders were pleased, however, with the estimate of the ripple effect in how the full-time positions will create jobs and fiscal activity in the community…Lesson learned: release accurate and consistent information to avoid false expectations.
- The Illinois FutureGen Team held meetings across the state, often including a member of the ISGS. Stakeholders appreciated having these trusted experts available to answer questions…. Lesson learned: ensuring that stakeholders have access to technical experts, not just project proponents, to answer questions is important for building trust. Informal sessions provide stakeholders with the opportunity to become more familiar with the technical issues around a project at their leisure.
- Meeting with stakeholders early in the process was critical…Meetings with groups of similar types of stakeholders provided an opportunity for stakeholders to engage with their peers and speak freely… Lesson learned: Meetings with people with a similar background allows a free exchange of ideas and can result in a shared understanding of the project.
- A range of forums will enable a mix of stakeholders to be reached… Lesson learned: use a range of forums to maximise the opportunity to reach a diverse set of stakeholders.
- Visually oriented stakeholders benefited from a physical geosequestration model designed and presented by the ISGS, an objective entity. By engaging with scientists and asking questions about CCS while viewing the model, stakeholders were able to envision what would happen to the stored CO2…Lesson learned: having third-party scientists (not the project proponent) describing how CCS works provides clarity, credibility, particularly if that organisation is regional and scientists are knowledgeable about it and live in the region.
- Throughout the project, the development team was commended for having an open process where information was shared broadly, often through the Alliance website. The FutureGen site selection process was made explicit and public from the beginning…The media coverage of these announcements gave the Alliance much credit for "having science drive the decision" not politics. The Alliance outreach team answered questions to the best of their ability during site visits and followed up with answers that they could not immediately answer via the local economic development leads. Answers to frequently asked questions were posted on the website based on feedback received from stakeholders…Lesson learned: transparency may build trust, encourage input and engage stakeholders by providing information in a timely and open manner.
- Demonstrate community presence. The Alliance presence in the community – from having a local office to hosting board meetings in town – was noted by stakeholders as making a positive impression and reducing the idea that the Alliance represented outsiders…Lesson learned: acceptance may be facilitated if project developers spend time in and getting to know the community.

Bibliography

Ashworth, P., Bradbury, J., Feenstra, Y., Greenberg, S., Hund, G., Mikunda T., and Wade, S. 2010. *Communication, project planning and management for carbon capture and storage projects: An international comparison.* CSIRO. http://new.globalccsinstitute.com/community/groups/ccs-social-research

DOE 2007. *Final Risk Assessment Report for the FutureGen Project Environmental Impact Statement.* Washington, DC: Department of Energy. www.netl.doe.gov/technologies/coalpower/futuregen/EIS/FG%20Risk%20Assessment%20110807.pdf

FutureGen Texas 2011. Update: March, 2007 Texas Speeds Along Track to Win $1 Billion FutureGen Project. www.beg.utexas.edu/futuregentexas/pdf/FGTUpdate030707.pdf

Hund, G. and Greenberg, S. 2010. FutureGen case study. Appendix 3. In: Ashworth, P., Bradbury, J., Feenstra, Y., Greenberg, S., Hund, G., Mikunda T., and Wade, S., (editors). *Communication, project planning and management for carbon capture and storage projects: An international comparison.* CSIRO. http://new.globalccsinstitute.com/community/groups/ccs-social-research

Hund, G., Judd, K., 2009. Stakeholder acceptance issues concerning advanced coal power plants with carbon capture and storage: lessons learned from FutureGen. In: *Energy Procedia* 1(1): Proceedings of the 9th International Conference on Greenhouse Gas Control Technologies (GHGT-9), November 16–20, 2008, Washington DC, USA.

Markusson, N., Ishii, A., Stephens, J. 2011. The social and political complexities of learning in CCS demonstration projects. *Global Environmental Change.* 21: 293-302.

Ohio FutureGen Task Force 2006. Competing for futuregen: A win-win for ohio. Retrieved from: www.ohioairquality.org/ocdo/other_pdf/InterimReport_on_letterhead-071006FINAL1.pdf

Ohio FutureGen Task Force. No Date. *Ohio FutureGen Task Force Final Report.* Retrieved from web May 2011: www.ohioairquality.org/ocdo/other_pdf/FGFinalReportFinalwithlogo.pdf

Parfomak, P. W. 2008. *Community acceptance of carbon capture and sequestration infrastructure: siting challenges.* Congressional Research Service, Library of Congress.

Price, P. N. and Oldenburg, C. M. 2009. The consequences of failure should be considered in siting geologic carbon sequestration projects. *International Journal of Greenhouse Gas Control,* 3(5), 658-663.

Stephens, J. 2010. Technology leader, policy laggard: CCS development for climate mitigation in the US political context. In J. Meadowcroft and O. Langhelle (eds.) *Catching the carbon: The politics and policy of carbon capture and storage.* Chapter 2. Northampton, MA: Edward Elgar.

Thurber, K. 2008. Officials say they hope FutureGen efforts not wasted, Working for bid from energy company for similar plant, *Midland Reporter-Telegram.* Wednesday, April 16, 2008. Retrieved from: www.mywesttexas.com/news/top_stories/article_b76deeae-78a8-5152-92cc-0e8b9c63e702.html

Marine Life Protection Act Initiative, California

Summary description of the process

History of the MLPA process

The Marine Life Protection Act (MLPA) was passed by the California Legislature in 1999 under Governor Gray Davis and was inherited by Governor Arnold Schwarzenegger when he took office in 2003. The Act mandated the development of a network of marine protected areas (MPAs) along the Californian coast. Research had suggested that a coordinated network of MPAs would be more effective at sustaining and conserving marine life than the existing ad-hoc arrangement of the 80 or so MPAs that existed prior to the Act.

The Act had six explicit, but ambitious goals: 1) To protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems, 2) To help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted, 3) To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity, 4) To protect marine natural heritage, including protection of representative and unique marine life habitats in California waters for their intrinsic value, 5) To ensure that California's MPAs have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines, 6) To ensure that the MPAs are designed and managed, to the extent possible, as a component of a statewide network.

Although it was generally unclear how these goals were to be accomplished, two attempts were made to implement the law in 2000-2001 and 2002-2003. Both attempts failed for a variety of reasons including a general lack of stakeholder involvement, unclear goals and objectives for the MPAs, misunderstandings about the mandate, and not enough time for public input (Gleason et al. 2010). Additionally, a paucity of resources including staff, funding, and technical tools contributed to the slow pace of progress before the process finally came to a full stop due to a state budget crisis in 2003.

In 2004, the mandate was revived through a public-private partnership established in an MOU between the Resources Legacy Fund Foundation (RLFF) and the California state government. The RLFF is a consortium of environmental benefactors, but is led chiefly by the Packard Foundation. With RLFF funding, California created the MLPA Initiative (MLPAI) under the authority of the California Fish and Game Commission (whose members are appointed by the Governor). The MLPAI was led by a Blue Ribbon Task Force (BRTF) of "distinguished citizens" to guide the design process. They were supported by a Science Advisory Team (SAT) whose job was to develop guidelines and evaluate alternative packages, groups, or "arrays" of MPA's. Interested and affected parties were represented in the process by a stakeholder group. This structure was reproduced in each of five coastal regions. In addition there was a statewide advisory council, which helped ensure that each regional effort performed to the same standards. The expectation was that, in each region, the regional stakeholders would come to agreement and recommend one or more arrays of MPA's to the Blue Ribbon Task Force (BRTF). The BRTF would review the recommendations, possibly change them, and then would pass three recommendations to the Commission, which would choose one to implement.

As of this writing, four of the five regions have submitted proposals to the Fish and Game Commission for review and adoption. Each proposal details the recommended arrays for the new networked marine protected areas in their region. The most recent region to have submitted such a proposal was the North Coast study region. This is the focus for our evaluation in the following pages.

Evaluation of the Process

The remainder of this chapter is a summary evaluation of how well the MLPIA process performed on the criteria, which are listed in Box 1 above.

The process should be appropriately inclusive

The primary means of participation was a group entitled the Regional Stakeholder Group (RSG). These stakeholders were meant to act as representatives of particular interest groups and included members who represented a particular city's interests, Native American groups, Anglers, Kayakers, Sport fisherman, Divers, conservation groups, and industrial manufacturers, among others. MLPAI leadership selected the RSG members after an extensive process of nominations and interviews. In part, members were selected because they were perceived to be capable of listening and cooperating with others.

People who were not included in the 33 member RSG could still participate by attending one of the RSG's meetings in person, attending a meeting via internet at a satellite site, or viewing the meeting on a live stream on the internet or on local cable television. They could also speak during a 2-minute comment period. Interested parties could also attend some (but not all) meetings of the Science Advisory Team (SAT), which was made up of experts contracted by the MLPAI to inform the deliberations of the RSG. The SAT held some meetings that the general public could attend, which became a point of contention. The MLPAI also paid "outreach" personnel to provide information on the process to interested parties in their community and to stimulate participation.

Inclusivity was a problem in the MLPA process in a number of additional ways. First, because the Act proposed to regulate the marine uses of Native communities along the North Coast, some tribes resisted invitations to participate on the grounds that it would grant the proceedings legitimate decision making authority over tribal communities, which the tribes denied. Second, tribal requests to retain a member on the Science Advisory Team were denied creating some consternation among Native communities about a lack of respect for traditional knowledge. Third, citizens expressed frustration that their opportunity to participate was limited to either speaking in their two minute allotment at one of the meetings, which sometimes required people to take off work or drive significant distances, or by submitting their comments to the MLPAI online.

The MLPAI did manage to secure the involvement of several Native American tribes on the RSG. It also worked to ensure that the selected RSG stakeholders represented the key interests in the North Coast Region. However, the venues for direct interaction with the general public were much more limited than people would have liked.

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

The MLPAI defined the problem as regulating the use of marine resources for *all* inhabitants of the North Coast. This was objectionable to many Native Americans, who have sovereign rights granted in formal treaties with the United State's government and did not want to be treated as "just another stakeholder group." Several individuals from the key tribes did reluctantly agreed to sit on the RSG. They used that venue to repeatedly state that they disagreed fundamentally with the problem formulation and they refused to collaborate unless it was changed. This demonstrates the necessity of defining the problem in conjunction with the interested and affected parties.

The MLPAI did not engage stakeholders or the public at large in the definition or design of the process, although ground rules were adopted by the RSG. The process was highly structured and run according to a very strict timetable, due to the need to run the process in five different coastal regions and with a very limited budget. The process was also up against a sunset date. Governor Schwartzenegger's term of office expired in 2011 and it was unclear whether or not the subsequent office-holder would continue to support the Initiative.

The MLPAI did engage in a variety of deliberative and analytic activities while designing MPA's. The RSG did engage in deliberation to identify and adopt a set of regional goals and objectives for the group based on the MLPA's statewide goals, which initially informed the deliberations. Members of the RSG also engaged in deliberation to develop proposals for the MPA's, specifying their locations, boundaries, and activity restrictions. The design of the process called for three proposals to be developed by the RSG, but in the case of the North Coast, the RSG was able to forward a consensus proposal.

One innovative analytic tool that supported the deliberation about MPA siting was *MarineMap*, web-based software that allowed individuals to experiment with alternative siting arrays. This helped the public and members of the RSG visualize and track the sites they were proposing and work collaboratively inside and outside of the formal process to explore possibilities for agreement. *MarineMap* was made explicitly for this process.

Another analytic activity the MLPA engaged in early on was the drafting of clear selection criteria to determine who would be included in the RSG, including a set of priorities that would guide selection and an in-depth interview process for potential candidates. While this selection process was informed by analysis of particular features of an appropriately representative process, and was developed in conjunction with a "facilitation team," the actual deliberative activities that were used to develop these criteria is unclear.

Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

Participants in the MLPA process had little opportunity to influence the *problem formulation* or the process design. The Act essentially specified the problem formation by laying out six explicit goals. Each region was able to set rules for discourse and goals for the RSG, but the ultimate problem to be addressed was one that the government had identified and outlined prior to the formation of public deliberation. The *process design* was also identified prior to the formation of the RSG and there were no

opportunities to change it. As a result, interested and affected parties who wanted to participate walked into a process whose scope and structure were already set.

The outcome of the process, in this case, a proposal for an array of MPA's, was susceptible to influence by interested and affected parties, but only up to a degree. The SAT established scientific criteria that every array had to meet. Arrays that did not meet these criteria were, supposedly, subject to revision by the BRTF and there was a great deal of pressure on the RSG to come up with alternative arrays that met the criteria. These scientific criteria severely limited the nature of arrays that the RSG could devise.

Deciding which arrays to recommend to the BRTF was the most important, but by no means the only decision made in the process. Other important decisions included the SAT's determination of scientific criteria, the BRTF's decision of what to recommend to the Fish & Game Commission, or the final decision of the Fish & Game Commission. In reviewing this principle, we consider the decisions of the RSG to forward an array to the BRTF. Whether the public process had effective influence on the outcome of final regulation is discussed in later criteria.

Clearly, members of the RSG had significant opportunity to influence the outcome of its process, although their choices were constrained by the scientific criteria. Those criteria had been set by the SAT without significant input, but the RSG had abundant opportunity to analyze and debate within these boundaries and to produce a proposal that all could support. In the end, most of the RSG seemed satisfied with the consensus proposal they had developed and their concerns were more fully formed around whether the proposal they had developed would be accepted without vigorous modification. Other interested and affected parties who were not selected to be on the RSG had very little influence over the RSG's decision, although they could lobby RSG members and they could use *MarineMap* to craft a specific array.

The right information and expertise should be made appropriately available to the interested and affected parties

The MLPA process demonstrated an awareness of the significance of having quality information available to its participants in the creation of its Science Advisory Team (SAT). While some tribes were dissatisfied with the refusal to allow tribal scientists on the SAT, RSG members seemed happy with the quality of information provided by the SAT (Baal, 2008). Some RSG members complained that local knowledge was not made use of, particularly when scientific data on a particular local phenomenon were not available. Rather than guessing or making estimates based on other data that may have had little bearing on the issue at hand, several RSG members preferred that the SAT would have made use of the observational data that local fisherman, divers, and recreational harvesters were able to provide. This demonstrates the importance of taking into account local ways of knowing, particularly in contexts where competing forms of cultural knowledge may produce conflicts, as was the case in some SAT dealings with tribal communities.

The information that the SAT produced was primarily science guidelines meant to inform RSG deliberation. This was made available to the public. Members of the public or RSG members could also ask the SAT to clarify particular areas of science being used to inform the process or encourage the SAT to review alternative perspectives.

The decision support tool entitled *MarineMap* that was mentioned above help make information available to the public and stakeholder groups.

A variety of additional information on the science backing the MLPA, the MLPA approach to public participation in decision making, and various documents that detail the workings of the MLPA were all made available online.

The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process

As noted in the history section, the MLPA had a rocky start with two attempts to implement the act failing largely due to funding shortages, political will, and public support (Weibel, 2008; Gleason, 2010). Having clearly learned from those lessons, the MLPA was ultimately reinvigorated through a private-public partnership that provided much needed financial resources without which the Act would likely have floundered for some time. The commitment of these financial resources allowed for the expansion of key staff and technologies, and was coupled by a firm commitment at the political level to seeing the process through. It has been noted however, that the Department of Fish and Game (DFG) need to be clear and authoritative in its support of the Act and the process in order for it produce a successful outcome (Raab, 2008).

In regards to the transparency of the process, while much of the process was quite transparent in the collection and dissemination of information and documentation about how the process was to run, there was some persistent public outcry over the particular funding arrangement between the Resource Legacy Fund Foundation who was partnering with the state to finance the process. The RLFF does not, for instance, make clear how its funds are allocated across the process or how much is being spent where or of greater concern to many citizens, to whom. Concerns over whether particular participants were being paid at all, or paid more than others, were frequently voiced, as well as concerns about what other kinds of things the RLFF was also funding. Whether the RLFF is using its financial position to exert influence over the process is less the issue than the opportunity such a lack of transparency allows in the production of a suspicious and distrusting public. Had the RLFF made its financial arrangements more public and easily accessible, and had the MLPAI disclose more information about the allocation of such resources, much of the speculation around these issues would likely be defused.

Legitimate means to reach closure should be used

Criteria for closure of this process shifted as there were multiple decision points that could signal the end of one aspect of the process. These multiple decision points made closure on the process unclear and sometimes frustrating, as some participants conveyed to us. For example, as noted above, the RSG was to produce three proposals that would be submitted to the Blue Ribbon Task Force, who would then forward these proposals, potentially with some modification to the Fish and Game Commission for review and adoption. For the RSG, the end of their part in the process was clear and was signaled by the submission of their three proposals to the BRTF. However, there were additional issues, such as the discussion of special closures and other provisions, including language that detailed Native American uses of these new sites that were actually negotiated by a much smaller group after the final vote cast by the full RSG to submit a consensus proposal was made. This lingering of work beyond the closure point

of the RSG left some feeling that important things which ought to have been dealt with by the larger group were snuck in after the consensus proposal was voted upon.

Recently, there has been additional confusion about exactly when these new laws take effect, with some saying the decisions of the MLPA should be treated as law immediately, while others cite conflicting dates for their official legal adoption (redgreenandblue.org). This lack of clarity about when the process actually ends and when outcomes of the process can be expected to be adopted allows minimally for confusion and risks the loss of public trust.

The process should be effective at influencing decisions

There was significant apprehension among many members of the RSG about exactly what effect the consensus proposal they forwarded to the BRTF would have. Since the RSG proposal was not guaranteed to be adopted as submitted, many members reported some concern about what would be done with the fruits of their tremendous effort. These concerns were born out when discussion among the BRTF members was made public that called into question whether the RSG proposal fit closely enough with the science guidelines developed by the SAT. The BRTF considered modifying the RSG proposal accordingly. The tampering with the product of the RSG's many months of hard work led to significant frustration among the RSG members, their constituencies, and the affected public.

Recent news reports that the BRTF's recommendations will be further modified by the Fish and Game Commission. The Commission is considering changing boundaries for the sites that the RSG had carefully analyzed and discussed under the rationale that it would make the boundaries more closely tied to easily identifiable geographic landmarks, which was an issue that much attention was devoted to during RSG meetings (triplicate.com). The logic of creating an RSG was to take advantage of their local knowledge and experience. Any significant tampering with their recommendation runs the risk of signaling a lack of faith in the process. In cases of nuclear siting, where host communities, local and national government, and private management corporations will all have to maintain positive trusting working relationships for decades, this kind of frustration could be counterproductive.

The convening organization should evaluate, monitor, learn, and adapt the process as needed

The MLPA did an admirable job in its monitoring and adaptation efforts. Since, the MLPA process operated along the entirety of coastal California, it encountered many different cultural environments ranging from urban Los Angeles to the significantly more isolated Northern Coast with dense populations of Native American tribal communities. To operate successfully, the MLPAI needed to learn from lessons past. The MLPAI accomplished this through the production of "lessons learned" documents written by outside consultants who made recommendations about the organization of the MLPA components (RSG, BRTF, SAT) and the way those components might better work with each other and the public. Since the process took an iterative approach, addressing parts of the State separately, rather than trying to run one state-wide process (a lesson learned from prior failed attempts to do so, Weible, 2008), it had opportunities to pause, review, and learn from its activities before moving on to the new area. Reports produced by outside contractors confirmed that the MLPAI was in fact learning from its prior experiences (Raab, 2006, 2008).

The MLPA also took a phased approach within each region, which allowed for public comment and review after each round. The review process is detailed in the image below and is reproduced here from Gleason, 2010.

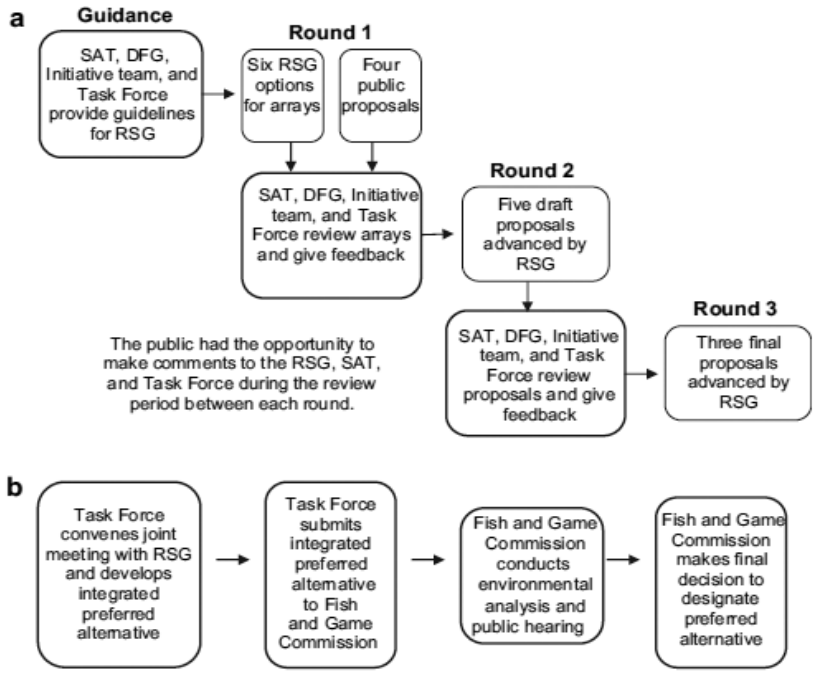


Fig. 3. a) Iterative process of MPA proposal design, evaluation, and refinement and b) development of final Integrated Preferred Alternative and Commission process to designate MPAs.

As noted in the historical section on the MLPA process, early attempts at implementing the Act failed a number of times. That the MLPAI has managed to transform itself so effectively into a process that, while far from perfect, is accomplishing its ultimate objective, is a testament to the benefits of adaptability and monitoring for long-term success and the effectiveness of the phased and iterative process of review that the MLPA has employed.

In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants

Wasting public resources has not been an issue for the MLPA as, after repeated attempts to implement the Act with insufficient resources, the government entered into a public-private partnership to fund the process. However, financial resources are not the only consideration. The process also takes the time and energy and of agency personnel. More prominent issues in the case of the MLPAI involve the potential waste of the time of participants, or undue sacrifices citizens make in order to participate.

Wasting the time of participants is certainly connected to the perceived value of participation. As noted above, some RSG members questioned the value of their participation because of uncertainty over how much influence their efforts would have. At the meeting level, time seemed well used as each meeting was facilitated by a professional facilitator using a clear agenda. The resources required to accomplish these items were present and accessible in the form of representatives from the SAT, BRTF members,

who were available for consultation during deliberations, and the information necessary to inform decisions in a timely fashion.

Nonetheless the process did require significant commitments from all participants and some sacrifices were required. The MLPAI did rotate the location of the meetings to ease citizen participation, though members of the public did complain that coming to deliver a 2 minute comment to a meeting that might require them to take time off work or drive significant distances was unreasonable. And while comments could be made online, this was perceived as a less effective form of participation than an in person comment.

RSG members were often required to drive significant distances and take time off from their jobs to participate in meetings and some commented that the amount of time the process ultimately required was significantly more than they anticipated. Additional concerns were raised by some about inequality in compensation for participation and claimed that certain Native American groups were paid to participate, and other individuals were contracted as consultants for their local community. As a result, some people were paid to participate while most were not. We were able to confirm that the MLPAI did pay certain participants as local outreach consultants, but we were unable to confirm whether some Native groups were paid to participate. The degree to which participants are required to sacrifice, sometimes unequally, in order to participate can then be a point of contention and source of frustration for some participants, the consequences of which should be carefully considered in advance.

Conclusion

Overall, the MLPA performed reasonably well on the criteria as a public participation attempt to site the location of various marine reserves. The case speaks to the necessity of clear closure definitions, effective influence of the process on outcomes, and sensitivity to issues of fairness in the costs and benefits of participation. The main take-home lessons are as follow:

- The MLPAI used satellite venues with live two-way audio-visual feeds to ease the investment costs to participate in a region that is geographically large.
- Tribes and tribal communities are sovereign people who should not be treated as "just another stakeholder." Unresolved political conflicts between tribes and states or the national government may complicate the way that the problem is formulated.
- Transparency of the scientific advisory team meetings was problematic and points to the need to be consistent about openness.
- Transparency of the funding sources and the allocation of those funds is essential to prevent accusations of undue influence or conflicts of interest, which may lead to a loss of public trust.
- *MarineMap* was an intriguing analytical tool that helped facilitate deliberation in a constructive way.

Bibliography

Gaffny, K. (2007). California's Marine Life Protection Act success: First phase comprehensive network of marine protected areas adopted. *Ocean Conservancy*. 1-4.

Gleason, M. (2010). Science-based and stakeholder-driven marine protected area network planning. A successful case study from north central California. *Ocean & Coastal Management, 53*, 52-68.
Marine Life Protection Act Initiative. (2007). California Marine Life Protection Act initiative strategy for stakeholder and interested public participation.
Raab, J. D. (2008). Report on lessons learned from the Marine Life Protection Act Initiative: North central coast study region.
http://redgreenandblue.org/2011/05/16/has-southern-california-restricted-fishing-it-depends-on-who-you-ask/
Raab, J.D. (2006). California Marine Life Protection Act: Evaluation of the central coast regional stakeholder group process.
http://www.triplicate.com/20110510112045/News/Local-News/MPA-decision-expected-soon
Weible, C. M. (2008). Caught in a maelstrom: implementing California marine protected areas. *Coastal Management, 36*, 350–73.

The Northern Forest Lands Council

Summary description of the process

[Summary excerpted from Tuler and Webler 1999]

During 1988, the sale of almost one million acres of forest land in northern New England sparked intense concern over the future of the forest land ownership patterns and uses in the region (McGrory-Klyza and Trombulak 1994, Northern Forest Lands Council 1994a). Concern had been brewing since the mid-1980s as a result of (perceived) forest land fragmentation, development pressure, and changing forest economies. Led by Senators Patrick Leahy (VT) and Warren Rudman (NH), the US Congress initiated the USDA Forest Service Northern Forest Lands Study to focus attention on 26 million acres of northern Maine, New Hampshire, Vermont, and the Adirondack region of New York (USDA Forest Service 1990). In parallel, a four-state Governors' Task Force on Northern Forest Lands wrote its own report detailing state perspectives. A principal recommendation was the establishment of the Northern Forest Lands Council (NFLC). Consequently, in 1990 Congress established the advisory Northern Forest Lands Council for a term of four years. Four members from each state were appointed, with each state member representing a different sector or constituency (e.g., state government, forest products industry, small landowners and businesses, and environmentalists). The Commissioners were individuals well-respected within the states and with long experience on forest policy issues. Policy recommendations were submitted formally to the US Congress and state governors of Maine, New Hampshire, New York, and Vermont in September 1994 (NFLC 1994a). At the same time, the Council members "saw themselves as providing a forum for dialogue, rather than, "we are the experts, we are going to tell you guys what to do" (NFLC staff quoted in Tuler and Webler 1999).

The Council's recommendations were based on its mission

> ...to reinforce the traditional patterns of land ownership and uses of large forest areas in the Northern Forests of Maine, New Hampshire, New York, and Vermont, which have characterized these lands for decades. This mission is to be achieved by:
>
> - enhancing the quality of life for local residents through the promotion of economic stability for the people and communities of the area and through the maintenance of large forest areas;
>
> - encouraging the production of a sustainable yield of forest products; and
>
> - protecting recreational, wildlife, scenic, and wildland resources.
>
> (Northern Forest Lands Council 1994a, inside cover)

Primary areas of study (represented by Council subcommittees) were: property taxes, conservation strategies, recreation/tourism, local forest-based economy, state and federal taxes, land conversion, and biological resources (Northern Forest Lands Council 1994a, b). Many believed that the NFLC's recommendations would have potentially far-reaching consequences for residents, industry, and visitors to the region and both the NFLC's process and outcomes were closely followed by those who wondered whether it would provide a model for other natural resource and land-use policy disputes across the country.

Early in its work, the Council committed itself to listening to the diverse concerns, interests, and values held by residents of the study region. Thus, during the initial stages of their work, Council members and staff emphasized development of a Public Involvement Plan. According to its Operating Principles, "The Council [would] seek input at all stages of its process." (Northern Forest Lands Council 1994a). Further,

> the Council has believed that it was representative of many constituencies in all four states. It saw its role as consulting with the broadest range of citizens on their hopes and fears about the future of forest land and their relationships to it. (ibid.: 11)

A hope was that a public involvement process would lead to informed and collaborative dialogue among stakeholders holding diverse interests and values about the Northern Forest region's economy, local communities, resources, and natural environment. In addition, the Council took the position that public involvement was an important tool for developing ownership, partnerships, understanding, and commitment--which would be necessary to carry out the Council's final recommendations. It was not immediately apparent these goals would be achieved. Tensions were high, with widespread fears that the NFLC would recommend the establishment of a national park or other federal ownership of forestlands or that the Council would cave in to the forest products industry and property rights advocates by allowing any sort of land use without restriction. At some of the initial public meetings Council members reported having their car tires slashed.

The result of their efforts was an extensive and innovative public involvement process. The planned structure and schedule of the process was provided to the public early in the process. What emerged was a creative combination of open public meetings and forums, outreach efforts, and two levels of advisory committees. Diverse interests and stakeholders were encouraged to participate and the Council held meetings with any groups who requested them (e.g., paper industry management, "wise use" property rights advocates, environmentalists, educators, etc.).

The public involvement was integrated with a separate program of technical analysis and information gathering, including the creation of the Northern Forest Resource Inventory (natural and economic resource data) and expert working groups to serve as advisors to the Council's seven subcommittees (about 20 individuals in each working group). Eighteen contractors were hired to gather data and write reports that supplemented NFLC deliberations.

One of the most important features of the process was the state based citizen advisory committees (CACs). CACs were composed of people representing landowners, property rights interests, environmental interests, timber industry, academia, recreation and tourism businesses, communities, and others. The size of the CAC varied from state to state, but approximately involved 20-30 people.

Opportunities for broad public involvement were focused at two preliminary stages leading up to the Council's final report. Comments on the intermediary (and lengthy) Findings and Options Report surpassed 1,000 pages of written response from people inside and outside the study region (Northern Forest Lands Council 1993a, b). These comments were integrated into draft recommendations, for which a second comment period was implemented. At this juncture the Council employed the novel approach of "Listening Sessions" -- public forums designed to avoid the confrontational atmosphere of public hearings and instead "to promote an unhurried, unpressured, and unconfrontational atmosphere" in which "interests feel comfortable and secure in sharing their thoughts" (Northern Forest Lands Council 1993c).

Over 800 people attended 20 Listening Sessions and Open Houses held during April-May 1994 in Connecticut, Maine, Massachusetts, New Hampshire, New York, and Vermont. Eight hundred additional individuals submitted written comments. On controversial topics the Council recognized the importance and legitimacy of the different interests and focused on ways to move the process forward "to find common ground." An important part of this endeavor was the Council members' effort to build credibility and be viewed as fair and good listeners.

The final report Finding Common Ground: Conserving the Northern Forest contained 37 recommendations. The final report made clear what was changed as a result of the comments (NFLC 1994a). In 2001 a report was completed to assess the implementation of the NFLC's recommendations (Malmsheimer et al. 2000). They found substantial progress on many of the recommendations that could be addressed by the states, but fewer that relied on federal government action. In 2004, during the 10th anniversary of the NFLC, The North East State Foresters Association (NEFA) organized a forum with participation from the four states to review the NFLC recommendations and consider additional actions for the region's forests (www.nefainfo.org/nflc10conference.htm).

Evaluation of the Process

The remainder of this chapter is a summary evaluation of how well the Northern Forest Lands Council process performed on the criteria, which are listed in Box 1 above.

The process should be appropriately inclusive

The NFLC process was very inclusive. The Council itself was made up of individuals who broadly represented sectors and constituencies in the region. Some property rights advocates and environmentalists felt their views were not strongly represented on the Council.

In addition, numerous public meetings, advisory committees, and other opportunities provided interested and affected parties to voice their concerns and interests. The four state-based Citizen Advisory Councils included diverse individuals as well. The Council made an effort to reach out to groups and to meet with anyone who expressed an interest.

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

Early in the process the NFLC called on experts in public participation to provide advice about how to structure the process (Bleiker and Bleiker 1995, Institute for Participatory Management and Planning 1995). This lead to a clearly defined and scheduled set of activities. Input from local and regional stakeholders about needs for creating a legitimate process was sought and used. The process involved a series of steps, leading up to the publication of final recommendations. These steps included the publication of technical reports, gathering public input, publication of a Findings and Options report, seeking comment on the Findings and Options report, workshop reports, and publication of draft recommendations. Opportunities for people to comment both in writing and verbally on draft reports were clearly defined and extensive, and summaries of public comments were published (NFLC 1993). The ways that received input received influenced final recommendations was highlighted.

To make progress on the substantive issues the NFLC process involved a coordinated set of deliberative and analytic activities. Technical studies by experts were targeted to address knowledge gaps and controversial issues (e.g., implications of tax structures on landownership, biological diversity, impacts of logging practices on ecology). Studies were done on biological/ecological, economic, and other social dimensions of forest management and landuse in the four state region. Working groups and workshops were held on a number of issues that supported the work of seven subcommittees (e.g., NFLC 19921, 1992b). The selection of the subcommittees was driven in part by public and expert input.

Some participants did not feel that enough technical analysis was done. For example, "If you have a hypothesis and that hypothesis is that the Northern Forest is being fragmented and that fragmentation will somehow impair its function. Then you need to go back and say, "Well, is that really happening?" They never really did that. The closest they came was the Sewell Report, which did try and quantify what happened on land sales over 500 acres. It didn't bother trying to quantify land sales under 500 acres" (NY CAC member quoted in Tuler and Webler 1999).

Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

Participants were empowered to influence problem formulation, process design, and the outcomes. Input from a broad array of interested and affected parties was sought at all stages.

The NFLC responded to concerns about the purpose of its work by carefully crafting a mission statement and plan that reflected a widely accepted definition of the problems facing the northern forests from multiple angles. For example, a staff person from Vermont stated: "There is a public out there that wants us to talk about [biological resources and biodiversity] and we got to address it. And we got to be upfront, and the same with property rights" (quoted in Tuler and Webler 1999).

The process design was influenced as the NFLC responded to requests for additional meetings, etc. As one participant stated: "It was established as a participatory process with citizens who had an opportunity to comment on and be involved in the overall generation of ideas, and review the proceedings and review the mission and right on through until the end" (quoted in Tuler and Webler 1999).

The outcomes were influenced by participants through the extensive effort of gathering comments at all stages of the work, by involving interested and affected parties in technical workshops, and other activities. The ways that participants influenced the outcomes can be found in draft recommendations that used ideas from public comments and in the final report, which identified how draft recommendations were changed as a result of comments. A NY CAC member stated (quote from Tuler and Webler 1999): "I think one thing I found refreshing about the process is that there was a demand for accountability. If you could make a compelling case for something it was appreciated and generally changed the course of the discussions or the outcome."

The right information and expertise should be made appropriately available to the interested and affected parties

All technical reports and results of information gathering activities were made publically available. A large number of experts were engaged as part of working group and advisory group membership and participation in forums addressing key topics. Interested and affected parties had access to these experts, as well as members of the NFLC.

To ensure transparency the NFLC published public comments on draft reports (Findings and Options and the Final Report).

Legitimate means to reach closure should be used

The NFLC sought to be open and show respect throughout the process. It made clear the evidence/informational base upon which recommendations would be crafted. After each recommendation in the Final Report there is a list of references and findings (from subcommittee reports and the Findings and Options report) that inform the recommendation. The intent was for interested and affected parties to understand the basis and logic of each recommendation.

The process should be effective at influencing decisions

The process was effective at influencing final recommendations. Furthermore, the process and final recommendations influenced subsequent action by the federal government, the states, and other parties (e.g., environmental groups). For example, Malmsheimer et al. (2000) write:

> Overall, states made substantial progress on implementing, or partially implementing, nearly the same number of recommendations. States made substantial implementation progress on recommendations: 10 (Educate forest users and the public about sound forest management), 13 (Fund public land management agencies), 15 (Refine state land acquisition planning programs), 17 (Fund state land acquisition programs), 18 (Employ a variety of conservation tools), 26 (Promote public policy to provide forest-based recreation), and 27 (Improve workplace safety). No state implemented recommendations: 8 (Allow inflation adjustment on the original cost of timber), 19 (Exclude from income tax a portion of the gain from conservation sales), 32 (Establish consistent truck-weight regulations), or 33 (Support cooperative efforts among four state universities).
>
> The federal government made substantial implementation progress on only three of the NFLC's recommendations: 22 (Increase funding for Rural Community Assistance programs), 25 (Authorize and fund Community Development Financial Institutions), and 26 (Promote public policy to provide forest-based recreation). The federal government failed to implement recommendations: 3 (Fund the Stewardship Incentive Program), 8 (Allow inflation adjustment on the original cost of timber), 9 (Eliminate the 100 hours per year rule), 13 (Fund public land management agencies), 14 (Institute a national excise tax on recreation equipment), 16 (Fund the Land and Water Conservation program), 19 (Exclude from income tax a portion of the gain from conservation sales), and 33 (Support cooperative efforts among four state universities).
>
> Three recommendations were implemented, but not as the NFLC envisioned. These were recommendations: 4 (Encourage green certification programs), 12 (Achieve principles of sustainability), and 20 (Assess water quality trends).

The convening organization should evaluate, monitor, learn, and adapt the process as needed

There is no clear evidence that the NFLC formally evaluated or monitored the process as it unfolded. However, the NFLC did pay close attention to how people felt about the process. They heard about people's views in a variety of contexts, including Citizen Advisory Councils, public meetings, listening sessions, and written comments.

In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants

The NFLC process was widely viewed as being productive and worthwhile. It made substantive recommendations on a number of pressing and controversial issues. While some groups felt that the Council was ineffective, they were in the minority.

In addition to making progress on substantive forest policy and management issues, the NFLC played another critical role in the region: it helped to foster a new spirit of dialogue and cooperation among groups with longstanding conflict. Tuler and Webler (1999) found in their study that participants felt that the NFLC process would have important implications for what types of policy planning and decision-making activities could follow. If the process fueled conflict, for example, further participatory forest-related policy making in the region would be unlikely. They found that the principles related to the re-creation of the conditions necessary for future policy efforts had to do with:

- resolving conflict and not heightening it. By successfully managing conflict, a process can ensure that future efforts are viewed as reasonable and legitimate. The constructive management of conflict is often viewed as a way to ensure that something useful is done rather than being in a situation where all options are blocked by angry and uncompromising interests:
- building better relationships among the interest groups in the region. The improvement of working relationships among disputants can lay the groundwork for continued constructive deliberations about policy:
- promoting a sense of place. A sense of place or community can give people a stake in outcomes and a desire to be engaged in the formulation of policy:
- being sensitive to issues of cost and effort. Processes viewed as not being cost-effective may reduce support for and legitimacy of proposals for continued dialogue and broad-based policy-making.

As a result of the NFLC process, numerous individuals and organizations became involved in deliberations and policy planning activities in the region that were semi-independent of the formal NFLC process. Some of these individuals established new process oriented groups to provide forums for dialogue among individuals with differing perspectives and concerns, such as the Maine Biodiversity Project, Northern Forest Dialogue Project, and Vermont Citizens Network (Tuler 1996). These groups were formed not to promote any particular viewpoint about the substantive issues facing stakeholders, but rather to promote dialogue and interaction among the variety of stakeholders that were active in the NFLC process. These activities illustrate how participants were able to exert some control over the process and leverage it for on-going activities to address forest management in the region. These activities speak to participants' feelings that the NFLC process was worthwhile and not a waste of time.

Conclusion

The NFLC process provides an example of PSE with a clear purpose and schedule. It strove to overcome a high degree of distrust and controversy within the region and toward itself. The result was a feeling among participants that the process left a positive environment in which future policy making could occur. It certainly did not make things worse. It accomplished this feat with a focus on transparency and multiple opportunities for public engagement that would meet the needs of different parties.

Bibliography

Bleiker, Annemarie and Hans Bleiker. 1995. Public Participation Handbook for Officials and Other Professionals Serving the Public. Ninth Edition. Monterey, CA: Institute for Participatory Management and Planning.

Institute for Participatory Management and Planning. 1995. Citizen participation handbook. Monterey, CA: Institute for Participatory Management and Planning.

Malmsheimer, R. W., Bentley, W. R., and Floyd, D. W. 2000. The Implementation of the Northern Forest Lands Council's Recommendations: An Analysis Six Years Later. A Report by

McGrory-Klyza, C. and Trombulak, S. eds. 1994. The future of the northern forests. Middlebury, VT: Middlebury College Press.

Northern Forest Lands Council 1991. Public participation subcommittee recommendations, 10 December, 1991. Concord, NH: Northern Forest Lands Council.

Northern Forest Lands Council 1992a. Summary of proceedings: Biological resources diversity forum. Concord, NH: Northern Forest Lands Council.

Northern Forest Lands Council 1992b. Summary of proceedings: Forum on building local economies with wood products and forest-based recreation and tourism. Concord, NH: Northern Forest Lands Council.

Northern Forest Lands Council. 1993a. Findings and options. Concord, NH: Northern Forest Lands Council.

Northern Forest Lands Council. 1993b. Listening log of public comments on the findings and options. Concord, NH: Northern Forest Lands Council.

Northern Forest Lands Council. 1993c. Draft public involvement plan (October 1993). Concord, NH: Northern Forest Lands Council.

Northern Forest Lands Council. 1994a. Finding common ground: Conserving the Northern Forest. Concord, NH: Northern Forest Lands Council.

Northern Forest Lands Council. 1994b. Technical appendix. Concord, NH: Northern Forest Lands Council.

The State University of New York College of Environmental Science and Forestry Syracuse, New York. Prepared for the North East State Foresters Association Concord, New Hampshire.

Tuler, S. and Webler, T. 1998. Voices from the forest: What participants expect of a public participation process. Society and Natural Resources 12:437-453.

Private Fuel Storage, Utah

Summary description of the process

Private Fuel Storage (PFS) is a proposed facility for temporary, above ground, dry storage of commercial spent nuclear fuel. It was proposed by a consortium of utilities spread around the US. The location of the proposed PFS facility is the reservation of the Skull Valley Goshute Band, an 18,000-acre Indian reservation in Tooele County, Utah. It is about 50 miles to the west of downtown Salt Lake City.

The story of the Private Fuel Storage (PFS) facility on the Skull Valley Goshute Reservation in Utah began in the early 1990s with Nuclear Waste Policy Act Amendments. In those amendments the Office of the Nuclear Waste Negotiator was formally established. Its purpose was to identify a host community for a monitored retrievable storage site for commercial spent nuclear fuel, with the understanding that the fuel would eventually be transferred to a geologic repository at Yucca Mountain (Erickson et al. 1994). The approach used to identify a host community was a voluntary, negotiated process that was very similar to the facility siting credo developed by Howard Kunreuther and others for noxious facilities in the 1980s (Kunreuther et al. 1993, Erickson et al. 1994). As part of this siting process, the DOE awarded grants to interested communities for feasibility studies. Tribes were invited to apply. As Sovereign entities, they are generally understood to be capable of entering into agreements for waste facilities without permission of the States in which they are located. This is reinforced by a clause in the Nuclear Waste Policy Act (see Erickson et al. pg. 86). Additional benefits could be negotiated with the DOE after feasibility studies were completed.

According to Erickson et al. (1994), pg. 80), the DOE grants were intended to support the community making a credible decision without having to rely on the federal government for information. There were several phases of grants. Phase 1 grants were $100,000, Phase 2A grants were $200,000 (for continued community education and feasibility studies), and Phase 2B offered up to $2.8 million for continued feasibility studies, continued community education and outreach, formal negotiations, potential site identification, and environmental assessments. Erickson et al. claim that the grant amounts were "substantial by tribal standards," which suggests that the grants lured Tribes into considering hosting a waste facility. The Skull Valley Goshute were one of two Tribes to apply for funds under Phase 2B.

The facility siting process is supposedly based on the principle of voluntary informed consent, which means that those affected are able to fully understand the risks and benefits involved and are free of any form of coercion. It is not certain whether these conditions truly exist for Tribes. First, tribes that have few or no economic alternatives may find that the economic benefits are too attractive to say "no" to. Tribes also lack expertise to characterize the risks and benefits and they lack the legal and regulatory infrastructure for facility permitting and environmental oversight. Of course, the purpose of the grants is to help tribes develop this capacity, but grants do not develop capacity, they develop dependency on outside consultants whose interest is purely economic. Furthermore, while the Bureau of Indian Affairs ultimately must issue permits for waste facilities on Tribal lands, it too, has little expertise in making the kind of risk benefit assessments necessary for sound decision making.

The process established by the Office of the Nuclear Waste Negotiator was originally to be terminated in 1993, but President Bush extended authorization until January 1995. This gave the Goshute sufficient time to complete their planning process, with funding from Phases 1, 2a, and 2b. Even after the process was officially ended, there was enough inertia to carry the proposal forward into a formal licensing process.

The PFS in its current configuration as a privately funded facility for a consortium of nuclear utilities emerged after this initial government-initiated process was terminated in early 1995. A consortium of eleven utilities entered into direct negotiations with the Tribal government of the Skull Valley Goshute. This "closed door" negotiation was finalized during 1997, and that same year PFS submitted an application to the Nuclear Regulatory Commission's Atomic Safety Licensing Board (ASLB) for a permit (Keller 2001). The agreement was reached with the Tribal Chairman, Leon Bear, without any participation of the roughly 125 Skull Valley Goshute Band members (about 25 live on the reservation).

The basic outline of the agreement was that up to 44,000 MTU of spent nuclear fuel could be stored for 20 years, with an option for an additional 20 years. Dry casks would be stored on a concrete pad. Payments would be made to the Tribe and its members, but the exact details have not been disclosed.

Eventually, Tooele County also negotiated a set of economic benefits for agreeing to the PFS, including payments in lieu of taxes, payments for each cask brought to the site, and aide for education. However, it is important to note that the County did not have any authority that would allow them to prevent the PFS from being built.

An overview of the application and assessment process for the proposed facility is shown in Table 1. The process was very structured, and followed well-defined legal and technical steps. There were minimal opportunities for public involvement, and these were mainly in the form of opportunities for making comments at public hearings. The state was an intervener in the process. At the same time, the process became highly politicized, and eventually involved the Senators and several Representatives from Utah. The Utah governor at the time stated that that the repository would only be built "over my dead body" (see also later statements in the Salt Lake Tribune, September 27, 2010).

In fact, the state, county, nearby communities and residents, members of the Goshute Tribe, other Native American communities, and other interested and affected parties felt blind-sided and the project became very controversial. The sovereignty of the Goshute was particularly threatening to the state of Utah, as this quote illustrates:

> "In particular, assertions of Goshute sovereignty have irked Utah politicians. According to Utah Representative Merrill Cook, whose congressional district borders Skull Valley, 'Something is dead wrong when a small group of people can ignore the will of 90 percent of our state[,] I don't think this is what the Founding Fathers had in mind. It's just not right, this use of sovereignty. The implications are frightening for us as a nation.'" (Keller 2001).

Ishiyama and Tallbear (2001) noted that tensions ran high between the State and the Tribe,

> "In keeping with the prevalent political tradition, the Goshute leaders did not consult with any neighboring communities in the process of developing a plan to host radioactive waste. The tribe's negligence of outside communities offended the state of Utah tremendously,.. the State and the general public of Utah were absolutely stunned when they found out that they would have no control over the Goshute Indians' decision to make their backyard a nuclear waste dump. … Since Indian tribes have sovereignty over their own land, the state regulation does not cover the jurisdiction of the Skull Valley Goshute Reservation. Goshute leaders have consistently emphasized the tribal sovereignty that enables

> them to make their environmental decisions…. The Utah legislature eventually approved the governor's proposal to seize the Tooele County road to the reservation so that trucks loaded with radioactive waste would not be able to reach the potential dumping site."

The Goshute Tribe leadership noted that extensive development of hazardous industries in the area around the reservation, encouraged by the state and county, was done without consultation with the Tribe and charges of racism flew in both directions.

To further inflame the controversy, DOE officials stated that any waste sent to PFS would not be accepted for disposal at Yucca Mountain unless it was repackaged. PFS was not prepared to repackage nuclear fuel waste (Salt Lake Tribune 10/15/2004). This called into question PFS promises of *temporary* storage. This is relevant to the problem formulation because planning did not frame the facility within a systems context. In addition, the Tribe is clearly not unanimous in its support:

> "In 1997, Bear claimed that 95 percent of the tribe supported the plan, but in early 1999, more than half of the Goshutes living on the reservation joined a lawsuit against the Department of Interior's Bureau of Indian Affairs to overturn the lease agreement, claiming that the federal government failed to look after the well-being of the tribe" (Keller 2001; see also Peeples et al. 2008, pg. 46).

Eventually, the NRC completed the Environmental Impact Assessment and issued a license for PFS in early 2006. That did not end the process, however. The Department of Interior – and more specifically the Bureau of Indian Affairs – as trustee of reservation lands stepped in. The BIA has authority over leases and approval of waste sites on reservations. The Bureau of Land Management also had jurisdiction because a right-of-way for a train-to-truck transfer station was needed, and the location would be on BLM lands. Construction could not begin until approval was granted by the BIA and BLM.

In 2006, both BIA and BLM declined to provide approval. They were taken to court by the Skull Valley Goshute. In 2010 The US District Court in Denver ruled against the Department of Interior (BLM and BIA), calling their decisions "arbitrary and capricious." At this point, the Department of Interior had decided not to appeal. The Utah Congressional delegation is vowing to continue fighting the PFS. Some utilities have dropped out of the consortium.

Table 1. Steps in the PFS licensing process. (Adapted from www.privatefuelstorage.com/project/licensing.html)

Licensing Step		Status
Application to the NRC	1997	PFS filed its application
NRC Staff review		NRC Staff began review of safety and environmental aspects of application. The technical evaluation by the NRC Staff involved requests to PFS for additional data, such as seismic analysis.
Notice in the Federal Register		NRC placed a notice inviting individuals or groups affected by the project to request standing to intervene.
Atomic Safety and Licensing Board (ASLB)		NRC named judges to the Atomic Safety and Licensing Board (ASLB) that will decide the PFS case.
Pre-hearing conference where interveners support their request for standing and present the issues they wish to argue at a later hearing	1998	Pre-hearing conference held. About 90 issues (contentions) were presented by the State of Utah, Confederated Tribes of Goshute Indians, OGD, and Castle Rock Land and Livestock. Scientists for Secure Waste Storage and Skull Valley Band of Goshute Indians petitioned to support the PFS application.
ASLB order on standing of interveners and the issues to be heard		Decision announced: Only 25 contentions were admitted. All interveners except the Scientists were granted standing.
Pre-hearing activities		Lawyers for PFS and the interveners begin informal and formal discovery, filed

		motions to dismiss some issues, and resolved other issues. The number of issues to be heard in formal hearings was reduced to about 14.
Scoping Meetings	1998 - 1999	Scoping meeting heard public comment on the scope of the environmental impact statement. Another scoping meeting related to the PFS proposal for a rail line through Skull Valley to the site was held.
Safety Evaluation Report	1999 - 2000	NRC issued a preliminary report (12/99) evaluating PFS compliance with most of the safety-related regulations, and a final report (9/00) evaluating the remaining safety requirements.
Draft Environmental Impact Statement	2000	The NRC staff released a draft EIS for public comment. This report evaluated PFS's compliance with all environmental laws and regulations.
Evidentiary Hearings		The ASLB held the first of two sets of hearings at which PFS and the interveners presented evidence supporting their positions on the issues. The second set of hearings was held in summer 2002.
Public Comment		The ASLB invited the public to make "limited appearance statements" at meetings held in Salt Lake City and Tooele.
Final Environmental Impact Statement	2002	The NRC issued a final EIS that also addressed issues raised by the interveners and the public.
ASLB Decisions and Evidentiary Hearings	2003	The ASLB began ruling on issues considered at hearings, starting in March 2003.
Late-filed Contention	2004	The state of Utah filed a late contention asking the ASLB to consider whether spent fuel stored at the PFS site would be accepted at the proposed federal repository at Yucca Mountain.
NRC Review	2005	The NRC Commissioners review the ALSB rulings.
NRC Decision	2006	The NRC Commissioners approve license for PFS.
Other licensing	2006	BIA and BLM refuse to grant licenses
Federal Court Review	2010	Federal judge rules BIA and BLM were "arbitrary and capricious" in their decisions to not issue licenses
Response of licensing agencies to court		Department of Interior (BIA and BLM) decline to appeal Federal ruling.

Evaluation of the Process

The remainder of this chapter is a summary evaluation of how well the process for approving the Private Fuel Storage site on the Skull Valley Goshute reservation performed on the criteria, which are listed in Box 1 above. The evaluation is based on reports, journal articles, websites, and newspaper articles. None of these fully describe the process.

The process should be appropriately inclusive

The process was not appropriately inclusive of all interested and affected parties. The Goshute Tribal government was fully involved. Tribal members not part of the Goshute Tribal government were also able to participate in public meetings, by submitting written comments, etc. However, according to multiple published documents they were not involved in direct, formal negotiations between the Tribe and PFS consortium.

According to its own rules, the NRC is not obliged to hold public meetings in the vicinity of a proposed facility (NRC 2011a). An eligible individual or entity can also request a hearing or an opportunity to make oral arguments to NRC, but it is up to the NRC to determine eligibility and to determine whether it wishes to listen to the arguments.

Regional environmental advocacy groups, non-Tribal local governments, Utah state government, and other private institutions were able to participate in the process, but only to a limited extent. The state was formally an intervener in the licensing process. Environmental advocacy groups could submit comments, both in writing and verbally at public hearings. These avenues for participate cannot be considered "appropriate" because they did not permit the parties access to all key aspects of the decision making process.

Deliberative and analytic activities to define the process, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

The process required an applicant to submit a license application to NRC for review and approval (NRC 2011a). The licensing process for the PFS facility included multiple deliberative and analytic activities. These included technical hearings and meetings and an environmental impact assessment. Hearings and meetings were held to discuss assessments that address critical technical issues relating to safety. As such, the process relied heavily upon analysis deliberation among technical staff. There was little attempt to integrate these activities with public deliberation.

The Tribal government received federal funds provided by the Nuclear Waste Negotiator (established as part of NWPA Amendments) to conduct independent technical studies and feasibility studies. According to Erickson et al. (1994) "the express purpose of the grants was to provide financial resources to make a credible decision without having to rely on the federal government for information" (pg. 80). The Skull Valley Goshutes received grants for this purpose in 1992 and 1993 and they certainly did empower the Tribe to analyze the issue.

Environmental Impact Statements were conducted according to federal guidelines for implementing NEPA. Opportunities for public involvement as part of Environmental Impact Statements included scoping hearings, public meetings, opportunities to comment, etc.

Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

Opportunities for stakeholders other than the PFS and the Goshute leadership to influence the process were very limited. Interested and affected parties had little opportunity to influence the problem formulation. In this case, "the problem" is whether an above ground dry cask storage facility for commercial spent nuclear fuel on the Goshute reservation meets criteria for approval by the federal government. Efforts to shift the problem to be about the need for such a facility, where in the country it makes most sense to locate such a facility (or set of facilities), how it fits into a broader waste management system, whether it is appropriate for such a facility to be located on sovereign Tribal lands, or whether such a facility should be operated by a consortium of private companies (rather than a federal agency) were not accommodated as part of the licensing process.

Of course, the Tribal government was able to influence the outcome through its negotiations with the PFS consortium, including details about economic compensation, facility design, etc. However, Goshute tribal members, residents of nearby communities, local officials of nearby communities, and the state of Utah had opportunities to influence outcomes through EIS scoping hearing, public hearings, etc. They also were able to influence the outcomes by lobbying elected federal officials (e.g., Senators and Representatives).

Opportunities for non-government participants were limited, however. For example, Skull Valley Goshute tribal members opposed to the facility had little ability to influence Tribal government decisions. Opportunities for the general public to influence outcomes were also limited. As part of evidentiary hearings before the ASLB, the public was invited to take up to three minutes to make statements to the members of the US Atomic Safety and Licensing Board (Peeples et al. 2008, pg. 42).

Similarly, opportunities for the State of Utah or its county and town governments to influence the outcome were limited, interestingly, by Tribal sovereignty rights. Briefly, the state, county, or towns have no ability to control land use decisions on Tribal lands. On the topic of State veto, the Chief of Staff of the Office of the Nuclear Waste Negotiator was quoted as saying,

> "The Indian tribes in the statute are treated as sovereign entities. Let me put this to rest: There simply is no veto [available to the states]" (as quoted in Erickson et al. pg. 82; see also Peeples et al. 2008, Keller 2001).

Ishiyama and Tallbear (2001) explain further:

> "In keeping with the prevalent political tradition, the Goshute leaders did not consult with any neighboring communities in the process of developing a plan to host radioactive waste. The tribe's negligence of outside communities offended the state of Utah tremendously,.. the State and the general public of Utah were absolutely stunned when they found out that they would have no control over the Goshute Indians' decision to make their backyard a nuclear waste dump. … Since Indian tribes have sovereignty over their own land, the state regulation does not cover the jurisdiction of the Skull Valley Goshute Reservation. Goshute leaders have consistently emphasized the tribal sovereignty that enables them to make their environmental decisions…. The Utah legislature eventually approved the governor's proposal to seize the Tooele County road to the reservation so that trucks loaded with radioactive waste would not be able to reach the potential dumping site."

Finally, the siting of the PFS (and other proposed monitored retrievable storage facilities, as defined by the NWPA Amendments) was intended to be "voluntary." That is, the Tribe freely and voluntarily entered into a negotiation with the PFS and made a decision to accept the facility. The degree to which the PFS was truly voluntary has been the subject of some discussion. According to the initial effort sponsored by the Office of the Nuclear Waste Negotiator the Tribe could drop out of the assessment process at any time prior to Congress approving an agreement and the NRC authorizing construction. However, it is unclear how fully voluntary process could be when the Tribe is so desperately poor.

On the decision to set the scope of the environmental impact assessment, NRC policy suggests that scoping meetings are meant to have influence on scoping decisions,

> "scoping meetings are held in the vicinity of the affected community to provide a forum for members of the public to express their opinion and provide information for the environmental review. These meetings are often held to help the NRC identify issues to be addressed in an Environmental Impact Statement and typically involve state and local agencies, Indian Tribes, or other interested people who request participation" (NRC 2011).

While the policy is promising, it is difficult to discern how much influence people had over the scope.

The right information and expertise should be made appropriately available to the interested and affected parties

The Tribal government received grants to conduct independent assessments of the proposed facility. It is unclear from published documents what they actually did with these funds, beyond touring other SNF storage facilities in the US and other countries (Canada, France, Britain, Sweden, and Japan). It is also not clear whether these funds were used to distribute information or expertise to other interested and affected parties. However, technical reports, public hearing transcripts, and decision documents completed by the NRC and other agencies (e.g., Bureau of Indian Affairs, Bureau of Land Management) were made available to the public and other entities.

Key information relating to the negotiated agreement between the Tribe and PFS consortium were never made available to all interested and affected parties. In particular, the economic benefits package to the Tribe is still not known. Information about economic payments to Tooele County was made available to interested and affected parties.

With regard to the process itself, PFS (and at times the Skull Valley Goshute Tribe) did maintain a website with information about the proposed facility and the status of the licensing effort.

The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process

The process to negotiate the proposal was run jointly by PFS and the Goshute Tribe. The NRC ran the process to conduct the environmental impact assessment. While there was no "convening agency" in this case, the project participants (PFS and the Goshute) were committed to seeing the process through and did have access to adequate staffing and resources. Transparency is much more difficult to determine.

Legitimate means to reach closure should be used

Legitimacy of the Tribal government decision has been questioned on the grounds of opposition within this small tribe – and lack of an open and fair process for determining the level of support among tribe members. Of the 25 tribal members living on the reservation, over half joined the lawsuit against the license. This strongly suggests that the means used to reach closure was not legitimate.

The decision is ultimately relying on court decisions, which may suggest that closure will not be viewed as legitimate among many interested and affected parties. Statements by Utah Senators and Congressional representatives raise questions about legitimacy. HEAL Utah, the regional environmental advocacy group, had questioned the legitimacy of the process and decision.

The process should be effective at influencing decisions

The process clearly influenced the decision, as described elsewhere in this chapter.

The convening organization should evaluate, monitor, learn, and adapt the process as needed

Based on available reports there is no evidence that the collaboration between PFS and the Goshute evaluated or attempted to adapt the process as it unfolded. The same can be said for the NRC and their environmental impact assessment process.

In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants

Substantial social conflict has arisen within the Skull Valley Goshute Band as a result of this process. The ability of tribal members to oppose the Tribal leaders comes with a cost. Other details relating to this principle are not documented in the reviewed literature.

Conclusion

The nature of this process was strongly shaped by the fact that it was initiated and carried out by a sovereign Indian tribe and a private corporation. Government played a variety of roles in the process as well, but did not convene, organize, run, or oversee the process. At this point in time it looks very likely that the agreement will move forward, as the Department of Interior has decided not to appeal the latest verdict from the court. However, it also appears that there will be many displeased parties if the project does indeed go forward.

This process was designed to focus narrowly on a site license for a waste facility. It did not attempt to configure the facility siting decision in a larger picture. For instance, it did not adequately consider the transportation of nuclear fuel wastes from source communities to the site. It also did not adequately consider the needs of requirements that DOE would set for accepting the fuel waste at Yucca Mountain. It did not attempt to incorporate concerns of all members of the Skull Valley Goshute Band, other Indian Tribes, relevant federal authorizes, source communities, or nearby municipalities, counties, or states. As such, the Tribal government and the PFS were strongly empowered to shape an agreement that suited their interests and needs, while most of the other interested and affected parties were given only minor influence, if any.

The sovereign rights of the Skull Valley Goshute Band clearly complicated this process. First, it permitted the tribe to operate according to its own principles, which did not accord all tribal members equal say or influence over the decision. Instead, a small number of tribal leaders wielded an inordinate amount of power. It is unclear whether this distribution of power is consistent with the values of the tribe or tribal community. Second, it constrained the participation and influence of other people and governments living nearby or along transportation corridors.

In summary, this case provides interesting lessons in how influence and power play important roles in shaping the acceptance of decisions made through collaborative processes.

Bibliography

Baker, M. 2011. What does it mean to comply with NEPA?: an investigation into whether NEPA should have procedural or substantive force, *Utah Environmental Law Review* 31(1):241-262.

Erickson, J. D. Chapman, D., and Johnny, R. E. 1994. Monitored Retrievable Storage Of Spent Nuclear Fuel In Indian Country: Liability, Sovereignty, And Socioeconomics, *American Indian Law Review* 19:73-103

Ishiyama, N. and TallBear, K. 2001. Changing notions of environmental justice in the decision to host a nuclear fuel storage facility on the Skull Valley Goshute reservation. Paper presented at the Waste Management 2001 Symposia.

Jefferies, S. 2007. Environmental justice and the Skull Valley Goshute Indians' proposal to store nuclear waste, *Journal of Land, Resources, and Environmental Law* 27(2):409-429.

Keller 2001. Un-American or Very-American?: The Goshute Nuclear Waste Repository. Unpublished manuscript. Utah Valley State College. Downloaded from the web at: http://davidkeller.us/publications/TeachingEthics1_2001_79-87.pdf

Kunreuther, H., K. Fitzgerald and T. Aarts 1993. Siting noxious facilities: A test of the facility siting credo, *Risk Analysis* 13:301-318.

NRC 2011. Licensing Process for Independent Spent Fuel Storage Installations. Available at: www.nrc.gov/waste/spent-fuel-storage/sf-storage-licensing/lic-process-independent.html

Jennifer A. Peeples, J. A., Krannich, R. S., and Weiss, J. 2008. Arguments For What No One Wants: The Narratives of Waste Storage Proponents, *Environmental Communication* 2(1):40-58.

PFS 2011. Project Status. Available at: www.privatefuelstorage.com/whatsnew/status.html

Salt Lake Tribune, September 27, 2010).

Sweden

Summary description of the process

History of Swedish spent nuclear fuel management

The Swedish Nuclear Fuel and Waste Management Company (SKB) is responsible for siting and building a geological repository for the spent nuclear fuel (SNF). In the early 1990's, SKB abandoned a siting approach that had been driven to find the "geologically best" site and instead adopted a voluntary siting process. They called this a switch from "physical geology to political geology." Initial results of the voluntary siting process were discouraging. Few communities elected to enter into the process and those that did proved to be geologically unsuitable. In several communities, political leadership was interested, but the community was opposed. Two communities in the far North (Storuman and Malå) decided to move ahead with feasibility studies. A few years later, both held referenda that defeated further participation.

After the experiment with volunteerism failed, SKB decided to focus on existing nuclear communities. Since 1985 Oskarshamn has been the site of a centralized interim storage facility for SNF. The Forsmark NPP is in Östhammar, as is a repository for short-lived nuclear waste. Both communities decided to move ahead. Another six nuclear communities also joined them and SKB began feasibility studies at the eight sites. In 2000, SKB selected Östhammar and Oskarshamn for the next phase. The government approved this selection in 2001. Both communities took referendums that signaled approval for further site investigation work. The site investigations started in 2002 and ended in 2009 when SKB selected Östhammar as the preferred site (near the Forsmark nuclear power station) for the respository. Oskarshamn was selected to host an interim storage facility.

From 2003 until today, SKB has been running a process in both Östhammar and Oskarshamn. Details are discussed below, but it mainly involves consultation meetings with stakeholders, government, and local residents as laid out by the Environmental Code.

In 1999 Sweden passed "the Environmental Code." It establishes principles and guidelines for public decision making about environmental policy. The key component of the Code as relates to nuclear waste disposal is the Environmental Impact Assessment (EIA) process. The Code gives general guidance for how consultations with the affected and the general public should take place, but details are scant and developers have a great deal of flexibility in how they choose to implement the process (Elan et al. 2010). For many years, the two main regulators involved in the process were the Swedish Nuclear Power Inspectorate (SKI) and the Swedish Radiation Protection Authority (SSI). However, on 1 July 2008 these two authorities were merged into a new authority, the Swedish Radiation Safety Authority (SSM).

Evaluation of the Process

The remainder of this chapter is a summary evaluation of how well the process in Sweden performed on the criteria, which are listed in Box 1 above.

The process should be appropriately inclusive

According to the guidance given in the Environmental Code, SKB organized meetings with municipalities, counties, national authorities, and even with neighboring nations who are concerned they may be affected by trans-boundary pollution (the Espoo Convention). SKB states plainly in the documentation their policy toward inclusivity:

> SKB's goal for the consultations is that everyone who wants to get involved should be given an opportunity to do so. This applies to both private citizens and organizations as well as local and national authorities (SKB 2008: 9).

Public meetings (or "consultations," as the Swedes call them) were held in communities and advertised in local media. Between 8 and 13 consultations have been held each year from 2003-2008. Residents and some stakeholder groups and all the municipalities received written invitations to attend. In both Östhammer and Oskarshamn, environmental impact assessment groups were also set up and SKB held consultations with these groups as well. Local residents and nearby landowners also received special invitations to attend various types of events where they could learn about the project. At the same time, other groups or organizations were denied access to participate. During 2005-2006 environmental groups were denied the right of full participants by the SKB (Elam et al. 2010).

Attendance at the consultations has not been large. In fact, attendance by public citizens in the 2003 consultations was slight or nil. Overall, it appears that limited efforts have been taken to reach out to interested and affected parties and to engage them in the process. Some groups have been disallowed full participation and the locations of meetings may have been an issue in discouraging the national audience from participating.

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

Since 1992, Sweden has been committed to siting a repository in deep crystalline rock. Therefore, unlike Canada or the UK, there have not been significant public consultations over the choice of a disposal method. Instead, similar to the U.S., there appears to be national consensus that the problem is to find a site in the proper type of geological configuration.

The process used by SKB was to prioritize areas of the country according to their physical geology and then to begin to look at the "political geology." This was an analytic activity that was disconnected from public deliberation. The communities most receptive were those already involved in nuclear energy and SKB focused on two in particular. The process SKB used was loosely defined by the Environmental Code and SKB had much leeway in how it decided to carry out the process. We could find no evidence that SKB structured analytic and deliberative activities toward the goal of designing an appropriate process.

The dialogue at the meetings has been criticized as being too constrained (Elam et al. 2010) and there have been problems with members of the public not feeling that they have adequate opportunities to participate in discussions (SKB 2008: 14). According to SKB, this is because meetings have been dominated by environmental stakeholder groups. To help remedy this, SKB instituted a formal process by which people could submit written comments after the meeting, receive responses, and have the exchanges included in the meeting minutes.

As for the substance of the siting decision itself, there does not appear to be sufficient efforts made to link analysis with deliberation. While many technical studies are being done, Swedish institutions that reviewed the science research program suggested that interested and affected parties have been inappropriately excluded from the design or in carrying out of these studies (SKI 2007). This is notable given that SKB claimed that it wanted public input to shape technical studies (SKB 2004).

The quality of deliberation at the public consultations has also been criticized for underperformance. SKB spends a good deal of the agenda time making formal powerpoint presentations and is then forced to squeeze public questions and comments into too short a time period (Elam et a. 2010). However, Elam et al. also point out that SKB responded to complaints by changing the structure of the meetings to allow for more discussion, reversing the order of things and pushing the powerpoints to a time after the public question and comment period. In a study by Soneryd summarized by Elam et al., an analysis of discourse showed that public participation was limited to asking questions that SKB or experts then answered. In other words, despite the reorganization of the deliberations, the public is not seen as a valid source of knowledge and a distinction between audience as listener and SKB as performer is maintained. Anderrson further related that other Swedish researchers noted that the adversarial history of nuclear politics seems to occlude "real deliberation" from taking place, where "real deliberation" means a conversation where people are open to being convinced that their beliefs or attitudes have been seriously heard, but are wrong (Andersson no date).

In sum, the deliberation-analytic process appears to be weak in the sense that people apparently do not have much say in the analyses and it is not a form of conversation where people are open to learning and being convinced to change their viewpoints or beliefs because of arguments raised by others. And, while much analysis is being done, there appear to be no attempts to link analysis with deliberation.

Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

SKB has been extremely thorough about summarizing the content of each public consultation, which sends the signal that they heard what people said. Once a year, they publish a report of the consultations completed that year, and this includes details of every question asked and every answer is given. What remains unclear is whether what they heard made any difference in terms of the problem definition, the process design, or the siting or design of the repository itself. SKB does not explain what difference the comments or questions made in their decision-making.

The first step in the EIA process is to define the scope of the EIA and it is here that the public has an opportunity to shape the EIA study, at least in theory. SKB has stated that it intends for public input during the scoping phase to shape the scope of the EIA (SKB 2004). However, as noted above, SKB seems to maintain a degree of separation between itself as the expert and final decision maker and "the public," who needs to be informed, listened to, and replied to. No evidence is presented by SKB that

public input has affected their decisions. The evidence suggests there is no genuine interest within SKB in having public input substantively affect the siting process or facility design. Overall the SKB appears to be quite isolated from public or stakeholder influence.

The right information and expertise should be made appropriately available to the interested and affected parties

Early on in the EIA process, Oskarshamn formed a project office called LKO (Local Competence Building) and staffed it with a full time project manager. The purpose of the office was to provide documentation to help support local decision-making. In addition, the Nuclear Waste Fund provides funding to environmental organizations to enable them to participate knowledgeably (SKB 2008). SKB has also offered any resident of the two competing host communities to attend study trips to SKB sites in other parts of Sweden, as these are excellent means to familiarize people with the technologies (SKB 2004). All of these efforts, along with policy statements about SKB's commitment to openly sharing information suggest that SKB is taking efforts to make information and expertise available to interested and affected parties.

The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process

SKB has demonstrated commitment to seeing the process through. As noted above, the Environmental Code gives SKB a good degree of flexibility in how it choses to run the siting process. In 2010 SKB declared that public consultations were concluded. There is evidence that Sweden, compared to Canada, allocated significant funds to its siting process, at least up until 2005, the year a key, relevant study was completed (Camacho 2005). Furthermore, case study documents have not revealed significant complaints about the staffing or resources allocated to the process.

Transparency is a topic that is more controversial. In 2006, the SKB initiated a Transparency Program. This came about because key stakeholders complained that more transparency was needed. In addition to the new policy, SKB implemented yearly review meetings with key stakeholders to collect feedback on SKB's efforts to be more transparent. According to one experienced scientist asked to review the policy for the IAEA, the Transparency Program has been very successful at invigorating dialogue in the process (Andersson no date), although Elam et al. are less confident about being able to draw conclusions about the effectiveness of the Transparency Program. Hence, it is reasonable to conclude that SKB was aware of the need for transparency, but may not have been fully committed to it.

Legitimate means to reach closure should be used

Closure is reached in this project in multiple ways. Community veto is one form of closure, which was exercised effectively by communities in the 1990's. However, neither Östhammer nor Oskarhamn have attempted to veto their participation thus far.

The majority of decisions are the responsibility of SKB whose decision-making is defined by law. While there is a great deal of leeway in how they choose to act, their decision-making has not been criticized as being illegitimate.

The process should be effective at influencing decisions

While the consultations with publics and groups were thematically focused, facilitators did not guide people away from digressing to other themes (SBK 2008: 10). The decision about the agenda content is an important decision that is often not discussed in the documentation of a process. The SKB policy, at least, avoided shutting down discussions that were considered off-theme. The fact that people could influence the agenda, even if to tangential themes, is positive, according to this evaluative framework.

The Swedish Environmental Code grants municipalities powers of veto over the siting of new projects that they consider environmentally unacceptable. However local vetoes over facilities for the interim and final storage of nuclear substances and waste can be overridden by the national government. In an interesting twist, the legislation specifies that the national government cannot override a local veto if another community is "potentially" more willing than the vetoing community to accept the faculty or if it can be persuasively shown that a more appropriate site than the one proposed for the facility in question might possibly exist elsewhere in the country. To further complicate matters, local vetoes can only be overridden by the national government if the SKB asks the government to do so. And the SKB has stated that it would not do this. Indeed, SKB did not ask the national government to override the vetoes exercised by Malå or Storuman, noted above, back in the 1990's. All of this leaves a certain amount of confusion as to whether or not indeed local communities have real veto power over the facility.

Still, at least in the process designing, the staged decision-making approach gives communities several occasions to express their willingness to participate in the site selection process or withdraw from it:

- Prior to the feasibility studies being undertaken;
- Prior to detailed site investigations being initiated;
- Before construction of the deep repository.

The municipalities also retain opportunities through the EIA process to have influence, at least on paper. Empirically, we could find no evidence that elaborated on any meaningful changes that were brought about because of public input.

The convening organization should evaluate, monitor, learn, and adapt the process as needed

SKB has been conscientious about collecting feedback from universities, experts, municipalities and other governmental authorities about the quality of its scientific analysis. We reviewed the evaluations of the social science research used in the project (SKi 2008). Input was not uncritical. For instance, one agency remarked that there needed to be a closer relationship between the research that is done and the content of the documentation issued by SKB.

One interesting social science research effort undertaken was called the "Public, Experts, and Deliberation Project." This looked into the ways that information is brought into the deliberative process. This project was criticized for omitting important topics of study, including emotional responses to risk. The municipality of Östhammer remarked, that for communities to find the results of research useful, the community members needed to play a larger role in the design of the research studies, to have the opportunity to be involved in *doing* the research, and for the researchers to present results to community audiences (SKi 2008: 201).

Another social science project: "The Resource or Waste?" sought to learn from other countries' experiences in siting a repository for SNF. Evaluators concluded that the Swedish project had not applied any lessons learned in a manner that improved upon the process. Yet, an important example of SKB listening to complaints and then adapting the process concerns the initiation of the Transparency Program, which was described above under the criterion of transparency (Anderrson no date).

In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants

We did not come across any evidence about people complaining about that the process wasted public resources or the time of participants.

Conclusion

While the Swedish process to locate a site for a SNF repository has resulted in a site that seems acceptable to localities and the nation, the process does not rank highly in terms of our evaluative criteria. There are good reasons to suspect that what worked in Sweden would not work in other places like the United States. Lessons to take from the Swedish case are as follows:

- The entire Swedish process involved a great deal of flexibility and control on the part of the SKB. We could find no documents (in English) that laid out the process SKB intended to use for public engagement. This lack of clarity about the process design would be highly problematic in countries with lower levels of trust in government.
- The quality of deliberation in the process appears to be low, as the communication that SKB promoted was not one of mutual learning and conversation. If the public expects the project proponent to have superior knowledge, then conceding decision-making authority would make sense. However, many American participants are unlikely to adopt this viewpoint because the agencies responsible for nuclear waste in the U.S. are not highly trusted.
- The process did not attempt to integrate analytic activities with deliberative ones. The disconnect between analysis and deliberation would further jeopardize a process where the decision making authority is not trusted or recognized for its expertise.
- SKB did adapt the process in response to feedback it acquired from participants. Adding a Transparency Program may have substantively altered the form of dialogue.

Bibliography

Anderrson, Kjell. No Date. The transparency programme for the Swedish National Council for Nuclear Waste: A status report. http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/41/021/41021979.pdf

Elam, Mark, Soneryd, Linda, Sundqvist, Göran. 2010. Demonstrating safety—Validating new build: The enduring template of Swedish nuclear waste management. *Journal of Integrated Environmental Sciences*. 7(3): 197-210.

Camacho, Rosanne. 2005. *Public participation in nuclear waste management: A comparative analysis of the Swedish and Canadian processes.* Masters Thesis. Ryerson University (Canada).

SKB. 2008. Consultations according to the Environmental Code: Compilation 2008. http://www.skb.se/upload/publications/pdf/MKB.2008_Eng_30.6E.webb.pdf

SKB. 2007. Consultations according to the Environmental Code: Compilation 2007. http://www.skb.se/upload/publications/pdf/MKB.2007_Engelsk_webb.pdf

SKB. 2003. Extended consultations according to the Environmental Code: Compilation 2003. http://www.skb.se/upload/publications/pdf/MKBwebb.Eng.pdf

SKB. 2004. Extended consultations according to the Environmental Code: Compilation 2004. http://www.skb.se/upload/publications/pdf/MKB.Eng30.6.pdf

SKi. (Swedish Nuclear Power Inspectorate) June 2008. Review Statement and Evaluation of the Swedish Nuclear Fuel and Waste Management Co's (SKB) RD&D Programme 2007. http://www.stralsakerhetsmyndigheten.se/Global/Publikationer/Rapport/Avfall-transport-fysiskt-skydd/2008/SKI-Rapport-2008-48E.pdf

United Kingdom

Summary description of the process

History of UK nuclear management

The first attempt at managing nuclear waste in the UK was undertaken in the 1970s by the UK Atomic Energy Authority. In 1976 reports began to appear that indicated the UK Atomic Energy Authority was recommending the Highland Islands and Scottish Uplands as suitable granite formations for HLW repositories. These initial recommendations were generated from desk studies that had whittled down a list of potential sites from 127 to 24, of which eight were shortlisted after field visits and other practical considerations.

During 1978-1979 the UK Atomic Energy Authority submitted several applications to District Councils for permits to conduct preliminary drilling at shortlisted sites. The Department of Environment carried out test drilling in 1979 at Altnabreac in Caithness County (in the far north of the Scottish highlands). All other applications to test drill attracted public outcry and were denied. In 1980, an application to Carrick and Kyle District Council was rejected. The decision was appealed. This sparked the formation of protest groups firmly opposed to nuclear disposal. In 1981 after many failed attempts, the government abandoned test drilling, saying it had decided that the HLW should be stored at least 50 years until heat had been reduced.

The second attempt to manage nuclear waste in the UK was undertaken by NIREX (Nuclear Industry Radioactive Waste Executive). It was formed in 1982 and given the responsibility of disposing Low Level Waste (LLW) and Intermediary Level Waste (ILW). LLW and IIW were disposed at sea until the Government declared a moratorium on sea disposal in 1983. From 1982-1986, NIREX pursued underground low and intermediate level waste disposal at several sites. Intense protests took place in 1986 at these sites, when drilling was to begin. In 1987 the government abandoned these efforts, deciding instead to develop deep-disposal options for ILW and manage LLW in the same facility.

In 1987, NIREX held a 6-month public education and consultation process in which the public was invited to comment on the "best option" for dealing with LLW and ILW, however the only options presented were deep geological disposal (Kemp 1992, Greenpeace no date). After this consultation, NIREX published a document called *The Way Forward*. It described a technical siting process that started with 537 sites and narrowed this down to twelve. The twelve sites were kept secret until 1989 when NIREX announced it wished to move forward with investigations at a site in Caithness and another at Sellafield. The remaining ten sites were kept secret until 2005, when NIREX published a document to explain its historical decision making. In 1991 NIREX announced its preferred site as Sellafield. Ultimately in 1997 NIREX's proposal to develop a "rock characterization facility" was denied by the Secretary of State for Environment. This led to a policy decision to not engage in siting activities until at least 2007/2008 (NIREX 2005).

The 1997 permit rejection marked a shift away from a technocratic siting approach and a recognition that greater public engagement would be needed. For instance, in 1999 a House of Lords review suggested that stakeholder engagement was the key to moving forward. Then in 2001, DEFRA

(Department of Environment, Food, and Rural Affairs) produced a document called "managing radioactive waste safely.[2]" This was the result of a public consultation process to gauge public attitudes about nuclear wastes and to see what methods of disposal people would support. The report recommended extensive public debate over the issue on a timetable that was not rushed. Three main recommendations emerged shortly after this report and likely owe their origination to it. These were: (i) the Committee on Radioactive Waste Management (CoRWM), (ii) the Energy Act (2004), and (iii) the genesis of the Nuclear Decommissioning Authority (NDA).

The purpose of CoRWM was to further determine what options might be viable. CoRWM was formed in 2003 as an appointed committee of experts. It did significant public and expert consultation and outreach, hosting a variety of engagement methods. Despite some complaints about its operation (Ball 2006), CoRWM's recommendations seem to have carried significant weight and influence. CoRWM's main task was to gauge public and stakeholder support for various disposal options. In 2006 it produced a report recommending deep geological disposal as the best waste disposal option. It also made specific proposals for the process by which a site should be selected (CoRWM 2006).

While CoRWM was actively eliciting public input into disposal options, the Parliament passed the Energy Act (2004), which created a new body called the Nuclear Decommissioning Authority (NDA). The NDA was to oversee the management of nuclear facilities across the UK. A component of the NDA called the Radioactive Waste Management Directorate (RWMD) was given responsibility to site, build, and operate a geological disposal facility. (While the RWMD is formally in charge of the siting process, most of the texts simply refer to the NDA as responsible for siting and we shall use that convention in this report.)

NDA adopted many of CoRWM's recommendations when it published its framework for public and stakeholder engagement in 2008, and in subsequent documents in 2010 (NDA August 2010, March 2010). These laid out a voluntary site-selection process with the following qualities:

1. Invitation issued and expressions of interest from communities
2. Consistently applied sub-surface unsuitability test
    a. If unsuitable, advise community not suitable
    b. If suitable go to 3.
3. Community consideration leading to Decision to Participate
4. Lab-based studies in participating areas
5. Surface investigations on remaining candidates
6. Underground operations commence, last chance for community veto

Communities maintain a right of withdrawal until construction begins. The timeline is quite generous and not at all dissimilar to Canada's. Preparatory studies are allocated 5 years, surface based investigation 10 years, construction and underground investigation 15 years, with the facility beginning to receive wastes around 2045.

NDA also uses special forms of public engagement at existing nuclear communities. Presumably this is because these communities are likely host communities for a repository or an interim storage facility.

[2] Note: there are many documents over the years with similar titles, which makes for much confusion. The subtitle is necessary to distinguish reports, but often reports refer to other reports only using the first half of the title: "Managing radioactive waste safely."

"Site stakeholder groups" (SSG) are standing forums for communications between site operators and the community.[3] Their overarching aim is to ensure that decisions taken by the NDA are informed by the local community's views. SSGs have their own constitutions, which define rules for membership and rules for operation in locally specified ways. Suggested members include elected officials, local community groups, and other business interests. Citizens can come and ask questions and participate in discussion at the discretion of the chair. While these institutions have a great deal of local determination, they may not manifest the fundamental principles for engagement that the NDA as laid out in their documentation about public engagement (NDA July 2009a).

Evaluation of the Process

The remainder of this chapter is a summary evaluation of how well the process in the United Kingdom performed on the criteria, which are listed in Box 1 above. As was explained above, this process has changed over the years. For the purpose of this evaluation we are studying both the CoRWM process and the NDA process. The CoRWM process took place from 2003 up until the last available report in 2010. The Nuclear Decommissioning Authority (NDA) employed its own public engagement efforts from 2004-2010, and recently commissioned a report on the effectiveness of its efforts in 2010 (TEC 2010).

Appropriately inclusive

CoRWM's main objective was to hear what citizens and other commercial stakeholders thought about a variety of disposal concepts and to recommend a disposal option that would be publicly supported and set about a broad public engagement plan. Their outreach efforts targeted local and national audiences and included discussion groups, citizen panels, a "schools project", nuclear site stakeholder round tables, open meetings, and bilateral meetings, along with the production of a variety of consultation documents and web-based consultation papers etc. (see Table 1 below) (CoRWM 2006). Overall, involvement appears to have been appropriately inclusive. Some complain the process was not participatory enough, while others claim it was too participatory. CoRWM itself complained that time and resources did not allow for all stakeholders in nuclear communities to participate as fully as they had hoped and they necessarily limited involvement to only eight communities (out of some 17). On the other hand, two CoRWM members resigned in complaint that the process was too participatory and not expert-driven enough (Ball 2006). Overall, the wide variety of methods used, the success these methods had in engaging people, and the purposive design of the involvement activities all speak to the process being appropriately inclusive.

NDA engaged stakeholders, communities, and the general public in face-to-face meetings at national and local levels. National level events did not engage "the general public." For example, the NDA

[3] http://www.sitestakeholdergroups.org.uk/

engaged with the National Stakeholder Group, which is made up of industry executives, regulators, NDA staff, and members of their Site Stakeholder Groups (SSG). The SSGs, which NDA references as their main channel of communication with nuclear site communities, is made up of a diverse collection of "chapters" whose membership is determined by the particular charter. Each chapter organizes its process as they desire, therefore the processes vary widely. Other national level meetings were held with Governmental agencies, Parent Body Organizations (PBOs), policy makers, Strategy Development & Delivery Group (SDDG), supply chain forums, Trade Union Forums, and briefings of MPs. It does not appear that the NDA has reached out in any significant way to the general public outside of the existing nuclear communities.

The external review by The Environment Council found that NDA needed to reach out to more NGOs, a wider group of stakeholders, or the media. In particular, the review noted that NDA was not doing enough to reach out to Greenpeace, Friends of the Earth, and anti-nuclear groups (TEC 2010: 33). The TEC report also noted that the web site needed to be improved upon so that, "people can engage directly on a specific topic or question" (TEC 2006: 39). Although the reviewers strongly recommended that internet communication not be seen as a replacement for face-to-face dialogue.

Overall, the NDA process was much poorer than the CoRWM process in terms of appropriately including participants. The CoRWM process had a number of strengths in that it reached out in different ways to different targeted types of people all across the country. While the NDA process has much room for improvement, the CoRWM process does too and they also identified several ways it could be more appropriately inclusive.

Table 1. CoRWM engagement activities (reproduced from CoRWM 2006)

Activity	Participants	Main Aims
Discussion Groups	Eight groups of 8 recruited citizens at different locations across the UK.	To elicit basic views and concerns about radioactive waste management (PSE1).
Citizens' Panels	Four panels of 12-16 citizens met three times. The panels covered Scotland, Wales, North and South England. Citizens were recruited to ensure a mix of gender, age and social class, but to avoid people who work for the nuclear industry or belong to an anti-nuclear group.	To participate in shortlisting, options assessment and review of draft recommendations (PSE2, 3 and 4).
Discussion Guide	568 self-selecting groups from across the UK, including community groups, environmental groups, older people and schools	To discuss issues relevant to the assessment of shortlisted options and provide feedback (PSE3).
Schools Project	1305 students (aged 11-18) from 15 schools in Bedfordshire.	To identify and discuss the issues considered important to the assessment of options and provide feedback (PSE3).
National Stakeholder Forum	20-25 participants from national bodies, including Government Departments, Non-Departmental Public Bodies, the nuclear industry, the regulators, local government and campaigning groups. The NSF met four times.	To participate in shortlisting, options assessment and review of draft recommendations (PSE1, 2, 3 and 4).
Nuclear Site Stakeholder Round T ables	Meetings in eight locations for stakeholders from local organisations	To participate in shortlisting, options assessment and review of draft

	around a total of 14 nuclear sites (covering civil and military, public and private sector and different types of facilities). The RTs met three times, with a fourth round of events for nominees from each area.	recommendations (PSE1, 2, 3 and 4).
Open Meetings	Two rounds of open meetings were held in eight areas close to nuclear sites.	To identify views and concerns about radioactive waste management, including shortlisting (PSE1 and 2).
'Bilateral' Meetings	A series of meetings between CoRWM members and representatives from stakeholder organisations.	To obtain information and discuss issues as appropriate to the aims of each period of PSE.
Consultation Documents	Various stakeholders and members of the public	To seek views on a formal consultation document over a three month period (PSE1 and 2).
Web-based	Various stakeholders and members of the public.	To provide opportunity for comment on consultation papers, specialist judgements of option performance, and draft recommendations (PSE1, 2, 3 and 4).

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

CoRWM employed different forms of deliberative and analytical techniques to engage the participants there were able to engage in defining the problem.[4] For instance, they experimented with a tool called "deliberative mapping," which is a type of decision analysis technique. This was used to help participants evaluate the acceptance of different disposal alternatives. As input to the criteria used in deliberative mapping, they used value tree analysis to characterize and structure the values of the different stakeholders.

There is less evidence that CoRWM engaged participants in deliberation or analysis about the process to be used to site a repository. CoRWM did give recommendations to the government about a rough design of such a process, but it apparently was not a topic that CoRWM engaged the public or stakeholders in determining.

The method of cooperative discourse employed by CoRWM to structure the process of gathering informed input about disposal outcomes, is a respectable and proven approach to integrate analysis and deliberation (CoRWM 2006: 87, Renn et al. 1993, US NRC 1996). CoRWM explicitly mentions the value of a deliberative process. And it did link decision analysis to deliberation, however that is about the extent of the connection between analysis and deliberation.

NDA did not attempt to coordinate analytical activities with deliberations for any purpose, at least we could find no evidence in the literature demonstrating that. Nor did we find evidence that the NDA perceives this to be important. NDA documentation discusses neither deliberation nor analysis, nor does it cite literature on that topic. They published a document with very specific advice for Site Stakeholder Groups, but it does not deal at all with the question of how information, analysis, or expert

[4] They eventually defined the problem as siting a deep geological disposal facility.

knowledge will be brought into deliberative venues. It does not give any advice for how deliberation can inform analysis (NDA March 2009). Instead, invoke an ambiguous commitment about "consulting" the public (NDA March 2010). The NDA seems to place no effort on understanding deliberation as a form of reasoning, or linking it to analytical activities in any way.

Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome

CoRWM did give participants genuine opportunities to deliberate about the problem formulation. For instance, the small groups that did the deliberative mapping could arrive at their own recommendations, however it is not clear to what extent their input actually shaped CoRWM's final recommendations. Even less evidence is available about the influence participants had on the process design.

NDA did invite comments from stakeholders and the public on the general principles and approaches it intends to use for the siting process. This was done using a web page. A document summarizing what was learned was published (NDA July 2009a), but this only repeats exactly what each party submitted, it does not respond or indicate how the results were used, if at all. A subsequent document (NDA July 2009b) did loosely explain how comments influenced the process design. In addition, we note that the review done by The Environment Council recommended that NDA explicitly explain how it used the input it acquired.

The NDA plan is for interested host communities to assemble a Community Siting Partnership. As with the Site Stakeholder Groups, the NDA is leaving the specifics of the design and operation of those groups to the local community (NDA July 2009b:10). This indeterminacy makes it very difficult to assess the expected performance of the process. Certainly, it does little to guarantee that fundamental principles for good process will be achieved and it leaves open the possibility for abuse and poor performance.

The right information and expertise should be made appropriately available to the interested and affected parties

CoRWM, early on, established an Information Working Group, whose goal was to assess information needs and determine the quality of the information available (CoRWM 2006: 57). They organized and made available factual data on the inventory of nuclear wastes. Overall, the CoRWM process made appropriate efforts to identify the areas of science needed to support good decision making and to distribute this knowledge broadly (*ibid*, 56-63).[5] However, in their final report CoRWM acknowledged that participants sought out more information than CoRWM was able to supply (*ibid*, 47).

The NDA has a simple half-page Transparency Policy, which states that information will be openly shared and made accessible to all, unless there is good reason for it to be withheld. Applicable reasons include: security, legal constraints, rights of third parties to whom information belongs.

There is little evidence as to whether or not the NDA has made information and expertise appropriately available to interested and affected parties. The document that spells out the engagement strategy notes that information should be made widely available, but it gives scant details about how this will

[5] They specified the following fields: technical, ethical, legal, economic, and social.

achieved. The document also acknowledges that different communities will have differing levels of access to expertise, and it notes that, "an approach to correcting this imbalance will be needed," but it says no more than that (NRC July 2009b: 10).

We found navigating the websites of all major agencies and organizations involved including CoRWM, NDA, and the Department of Energy, to be quite difficult. Not only is the relationship between these organizations generally unclear without some significant effort toward teasing them apart, but information that an interested party might be looking for is generally buried in a myriad of menus or dumped into a file collection of some sort. There are several dead links that frustrate an individual seeking a specific document. We believe the organization of these websites, their apparent lack of cooperation or cohesion in the public presentation of the their documents and activities is a barrier to adequate access to information and expertise.

The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process

CoRWM had a short-term purpose, but it did meet its commitments. As noted above, there were points where more staffing and resources were needed to fulfill principles for good process. CoRWM adopted a transparency policy, which committed the organization to being as clear as possible about how they arrived at their recommendations.[6] There apparently was a "transparency review panel," because the final report listed the name of an individual who headed it, but we could find no information about the panel's purpose or function. CoRWM's finest demonstration of transparency is Chapter 12, titled, "How CoRWM reached its recommendations" (CoRWM 2006). This details the positions, learning, dialogue, and negotiation that went on among the committee members in a manner that is clearly transparent. CoRWM gets very high marks for this.

The NDA produced a document on public engagement totaling 109 pages that mentions transparency only five times. One is the reference to the information sharing policy of the NDA. Three refer vaguely to NDA being transparent in stakeholder engagement. And one time it mentions that, "Everything must be done in as open and transparent a way as possible to avoid any potential misinterpretation," (NDA July 2009b: 11). While these statements indicate a commitment to transparency, the lack of detail raises questions about the commitment and leaves open possibilities for transparency to be problematic.

The sincere commitment of the NDA may be a problem. The Environment Council found that some NDA staff see engagement as a chore and noted that they can be patronizing to the public. In interviews with The Environment Council evaluators, some NDA staff also voiced the perception that non-engaged stakeholders lack expertise to contribute to the issue. These attitudes within the organization charged with siting and constructing a suitable HLW repository make the organization vulnerable to making damaging mistakes in their efforts to engage the public.

The Environment Council evaluation also suggested NDA was not allocating adequate resources to the process when they made the following recommendation: "Looking forward, there is an opportunity for the NDA to use web-based, more innovative and interactive engagement as described in section 5.3.2. This would require considerable and dedicated resource from NDA and would require considered use, to

[6] Unfortunately, the transparency policy is not very transparent. The link to that document is one of the many broken links on the CoRWM website.

ensure that it is accessible and fit for purpose." It is unclear whether the NDA has sufficient commitment to make these resources available.

Legitimate means to reach closure should be used

The CoRWM commissioners reached closure on the decision to dispose of the UK's HLW in a deep geological repository via a process of dialogue and learning. Their final decision was reached consensually, after many rounds of working through disagreements. That public comment after closure was reached confirmed that the process did reach closure in a legitimate way.

The NDA process has not made a significant decision that would suffice for us to evaluate the legitimacy of its closure mechanism. No information is given in the strategic plan about how closure will or should be reached.

The process should be effective at influencing decisions

CoRWM's process was clearly influenced by stakeholder and public engagement. In chapter 12 of the final report, where they explain how the final decision was reached, there is a discussion about how a difference among the commissioners about interim storage was resolved with further public and stakeholder engagement. There are other examples also given in the chapter about how the commission relied on public input to help resolve differences among commissioners.

NDA: The Environment Council evaluation noted that NDA listened and provided clear feedback that they heard what people said. However, there are no clear feedback loop about what changes were made by NDA following stakeholders' comments (TEC 2006:35). In their report, TEC emphasized the importance of substantive participation, that is, actually having the participation influence decisions or policies. They put considerable importance on this point when it recommended: "There needs to be an improved understanding of how both NDA staff and stakeholders understand and use the information they gain through engagement" (TEC 2006: 20).

The convening organization should evaluate, monitor, learn, and adapt the process as needed

CoRWM's work was evaluated periodically by independent evaluators and the results were used when planning subsequent activities (CoRWM 2006: 31). However, given the tight timetable that CoRWM was on, there was little it could do to adapt the process.

NDA does recognize that the engagement and communication program will need to change over time,[7] however, there are few specifics given on how it will accomplish this. The Environment Council recognized that the NDA needed to do more to demonstrate how what they heard during their engagement activities actually informed decision making. The report emphasized the importance of evaluation saying, "Evaluation can ensure that these practices or mechanisms are working and can collect valuable data to address these questions," (TEC 2006: 20). Toward this end, NDA staff also

[7] http://nda.gov.uk/consultations/yourviews/gdf-pse/flexible-strategy.cfm

needs to be supported in their activities to evaluate their engagement efforts and ensure that the results of the evaluation are used to revise or adapt the process design.

In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants.

CoRWM's experiment with deliberative mapping was strongly criticized by Baverstock and Ball (two CoRWM members who resigned out of protest) for consuming too much time and resources of the committee (2008). Even CoRWM's independent evaluator noted how expensive the process was (Faulkland Associates July 2004). The process was expensive in staff time, but also required considerable of effort by the participants. However, this was only a trial of deliberative mapping, and the approach was never employed at a large scale.

NDA has a much more difficult agenda than CoRWM did. The potential to waste public resources, or to waste the time of participants is very high. A good way to guard against this possibility would be for NDA to document a participatory process in a manner that reflects knowledge of what could go wrong and to institute safeguards and mitigative actions to be taken in the event that things get off-track. Since the NDA documentation does not come close to doing this, there is a reasonably high chance of failure.

Conclusion

For most of the criteria, the CoRWM process performed reasonably well. It excelled in its inclusivity and in consciously attempting to integrate analysis and deliberation in different ways. CoRWM also did a strong job of making information widely available, although the web site today has problems with many bad links that make accessing reports difficult or impossible. Looking at the CoRWM process in total, it did a large number of diverse activities with a finite budget and very limited timetable. CoRWM had a limited lifetime and purpose. That tight timetable made building a learning and adaptive process difficult, but also limited the waste or inefficiencies.

The NDA process is much more difficult to evaluate. The documentation on the NDA activities pales in comparison with those from CoRWM. Much of the text is vague and only suggestive of broad principles. The one external review that was done by The Environment Council delivers scant evidence of performance, but many suggestions of performance can be induced from the content of the recommendations given. Overall, the NDA process appears to lack the scholarship and expertise that is evident in CoRWM's process. Given that the NDA has a much more difficult task than CoRWM, and that it will need to be functioning successfully for decades, the poor evaluation we give to NDA is highly troublesome.

Bibliography

Ball, D. 2006. Deliberating over Britian's nuclear waste. *Journal of risk research.* 9(1): 1-11.

Baverstock, K. & Ball, D. 2008. Editorial. *Energy & Environment.* 19(3&4):379-390.

CoRWM. July 2006. *Managing our radioactive waste safely: Recommendations to government.* CoRWM Doc. 700.

DEFRA. Sept 2001. *Managing radioactive waste safely: Proposals for developing a policy for managing radioactive waste safely.* http://www.ntec.ac.uk/nuclear_intro/Documents/MRWS_Proposals_September_2001.pdf

Faulkland Associates. July 2004. *Evaluation of the deliberative mapping pilot.* http://corwm.decc.gov.uk/assets/corwm/pre-nov%202007%20doc%20archive/doc%20archive/tier%202%20(1)%20-%20planning/tier%203%20-%20pse/586%20-%20evaluation%20of%20the%20dm%20pilot%20project%20(falkland)%20.pdf

Greenpeace no date. How did the secret Nirex list of potential nuclear waste dump sites come about? http://www.greenpeace.org.uk/MultimediaFiles/Live/FullReport/7219.pdf

Kemp, Ray. 1992. *The politics of radioactive waste disposal.* Manchester: Manchester University Press.

Morton, Alec, Mara Airoldi, and Lawrence D. Phillips. 2009. Nuclear Risk Management on Stage: A Decision Analysis Perspective on the UK's Committee on Radioactive Waste Management. *Risk Analysis* 29:764-779.

NIREX. June 2005. Technical note. Review of 1987-1991 Site Selection for an ILW/LLW Repository (Number: 477002). Didcot, Oxfordshire: Nirex. http://www.nda.gov.uk/documents/old-sites/upload/site_selection.pdf

NDA. August 2010. Public and stakeholder engagement and communications. Statement of principles. NDA: Oxon.

NDA. March 2010. *Geological disposal: Steps toward implementation. Executive Summary.* NDA: Oxon.

NDA. March 2010. Geological disposal. Steps toward implementation. NDA: Oxon.

NDA. July 2009a. *Geological Disposal: Responses received to a consultation on a Framework for Public and Stakeholder Engagement and Communications.* NDA: Oxon. http://nda.gov.uk/documents/upload/TN-17520-GD-Responses-received-to-a-consultation-on-a-framework-for-PSE-and-Comms.pdf

NDA. July 2009b. *Geological disposal: A public and stakeholder engagement and communications strategy.* (Report NDA/RWMD 015) NDA: Oxon. http://nda.gov.uk/documents/upload/Geological-Disposal-A-Public-and-Stakeholder-Engagement-and-Communications-Strategy-July-2009.pdf

NDA. March 2009. NDA guidance for site stakeholder groups. (Ref. LAR 3.0). NDA: Oxon.

NDA. August 2008. *NDA Consultation on a Public and Stakeholder Engagement and Communications Framework for Geological Disposal.* NDA: Oxon.

Renn, O, T. Webler, H. Rakel, B. Johnson, & P. Dienel. 1993. A Three Step Procedure for Public Participation in Decision Making, *Policy Sciences* 26: 189-214.

The Environment Council (TEC). August 2010. *National engagement review: Summary report.* TEC: London.

U.S. National Research Council. 1996. *Understanding risk: Informing decisions in a democratic society.* National Academy of Sciences: Washington DC.

Technical Appendix:
Principles for Appropriate and Effective Public and Stakeholder Engagement

Prepared for the Blue Ribbon Commission on America's Nuclear Future

6 June, 2011

Thomas Webler, Ph. D.
Research Fellow
Social and Environmental Research Institute, Greenfield, MA 01301
Email: TWebler@seri-us.org

Seth P. Tuler, Ph.D.
Research Fellow
Social and Environmental Research Institute, Greenfield, MA 01301
Email: SPTuler@seri-us.org

Eugene (Gene) A. Rosa, Ph.D.
Edward R. Meyer Professor of Natural Resource and Environmental Policy
Thomas S. Foley Institute for Public Policy and Public Service
Professor of Sociology
Washington State University
Email: rosa@wsu.edu

Introduction

To design a successful public and stakeholder engagement process, one needs to begin by identifying the qualities of a good process. In academic-speak, these are the *normative dimensions of a good process* (see Box 1) that are used to judge the performance of the process. Next, these need to be distilled as principles, so that best practices can be identified as strategies to realize effective participation.

One of the main challenges of evaluating public and stakeholder engagement is to evaluate without taking sides. There can be disagreement about whether or not a process was "good," because not everyone wants the exact same thing from a process. For example, process organizers might assign considerable importance to the inclusion of a large number of people, while an interest group might assign more importance to having influence over the decision. How should we evaluate a process that did one of those things well and the other poorly without taking sides? Fortunately, the evidence shows that, while parties differ on how much importance they assign to different principles, there is broad agreement on the principles that are important for a "good" process. There is agreement across researchers, across different kinds of participants, even across different cultures. For example, it is widely held that processes ought to involve many people *and* ought to give people influence in the decision. Of course it is popularly believed that the devil is always in the details and evaluation always involves making some judgments. However, scholars and public participation practitioners have done significant work in this area and we report here on the principles that are widely accepted.

Box 1. A word on language

Normative dimensions of a good process – This phrase acknowledges that any participatory decision making process involves prescriptive elements that stem from ideals or values that are typically expressed in the words "should" or "ought." More specifically, there are different aspects, qualities, or "dimensions" of public participation that reflect these elements. Examples are: (1) who participates, (2) how science is used, (3) what influence the participants have, (4) how efficient is the process, and so on. The word "normative" acknowledges that people have opinions about how well the process performs on each of these dimensions.

"Good" participation – This is a quick way of referring to process that performs well on all of the normative dimensions. "Good" is a catch-all word that includes many normative words such as fairness, competence, success, meaningful, efficient, effective, and so on.

Our approach is to evaluate participatory decision making processes on each of the different normative dimensions and to refrain from drawing summary conclusions about the process as a whole. To reach a summary judgment of a process would require making judgments about the degree of importance of each principle, something that is difficult to discern without being intimately familiar with the context. In other words, we do not impose our judgment on how much importance to assign to each normative dimension, we merely argue that each principle is important.

Before moving ahead to discuss the different principles, however, we detour briefly to clarify *how* principles have been identified. We identify three different paths: the pragmatic, the inductive, and the theoretical.

Pragmatic approaches to determining features of good public and stakeholder engagement

Pragmatists make judgments about the appropriateness of a process based on how well it performs in practice. The adage, *"the proof is in the pudding,"* sums up this approach. The professionals who plan, organize, and carry out public participation are often staff members of governmental agencies or private consultants. In their careers, they accrue a wealth of knowledge based on experience. Certain

individuals in this group are particularly astute at reflecting on years of experience and discerning key trends, patterns, or conclusions. The evidence behind these conclusions is often not visible, in as much as it lies in the subjective experience of the practitioner. Despite the frequent inability to validate the conclusions by independent observations, their judgments often prove to be extremely insightful.

Inductive approaches to determining features of good public and stakeholder engagement

Inductive reasoning begins with individual empirical observations and seeks to generate conclusions that apply to a specific domain, such as to the siting of an energy production facility. The practitioners mentioned above also employ inductive reasoning, but in a much less formal way than meant here. Here, we refer to formal or systematic methods of inductive learning. Scientists in many fields enact strictly defined strategies to standardize the process of studying empirical reality and drawing conclusions (i.e. social facts). These procedures involve selecting samples to study, standardizing data gathering, and using proven techniques to reveal patterns in the data. This can be done qualitatively or quantitatively.

One inductive approach to generate qualities of successful public participation has been to go out and find citizens who participated in a process and simply ask them what about the process made it successful or unsuccessful. By speaking with many different citizens, scientists are able to generate taxonomies of features that are relevant. The importance of each feature can also be assessed by, for instance, asking citizens to rank the importance of each item in a survey.

Theoretical approaches to determining features of good public and stakeholder engagement

Theorists work in the exact opposite direction as those who follow an inductive procedure. Theorists start with fundamental premises (often on the basis of cumulative empirical evidence), which are accepted on a *prima facie* basis. They then use deductive logic to draw conclusions. Scientists often use theory in combination with empirical data collection and analysis, to test hypotheses and to validate each step in the theoretical deduction.

Theoretical approaches to public participation have come from theories of democracy, from theories of communication, theories in the social sciences or a combination of them. Some democratic theorists argue that public participation should enhance the public legitimacy of government or its decisions. Others argue that is should enhance citizenship skills or social capital. Still others argue that it ought to reduce conflict and promote consensus. Deliberative democratic theorists see a connection between effective or good governance and effective or good communication. Communication theorists argue that participation ought to realize respectful dialogue that seeks to produce validated knowledge. And social theorists suggest incentives for overcoming cognitive limits in decisions making.

Summary of Principles in Scholarship and Practice

We do not perform an exhaustive academic review of all the scholarship on this topic here, but have instead strategically selected the works that are broadly recognized as significant works in the field. Based on these, and also drawing from our wide familiarity with the experience, evidence, and argumentation in the field, we have identified key principles for good public participation.

Principles are inherently normative. They tend to address either *process characteristics* (every group should be represented at the table) or *outcome characteristics* (the process should result in a decision that is implementable). Obviously, both are important, but they can be used for different purposes. We focus here on design principles for a good process. These principles are selected because experience shows that, when processes realize these principles, they produce outcomes that are intended and they satisfy participants.

* * *

Much of the scholarship on evaluating public participation processes cites an article by Daniel Fiorino, then with EPA's Office of Policy Analysis (1990). The work was novel because he derived criteria based

on democratic theory and then applied it to evaluate generic types of public participation processes. Scholarship before this point largely took the form of case studies of individual processes. Fiorino built an argument that good public participation processes should do four things:

1. The process should attract laypersons (e.g. impacted citizens not just interest group professionals) to participate in decision making.
2. Citizens should exercise decision authority to codetermine priorities and policies with governmental officials.
3. There should be face-to-face dialogue (relying on persuasive talk) over a period of time in order to transform conflict into constructive agreement.
4. Citizens should participate as equals with scientists and governmental decision makers, meaning that they can help define the problem, identify needed evidence, dispute evidence, and set the agenda.

* * *

Another approach to generating principles for good public participation from a theoretical approach was undertaken by Webler (1995). He approached public participation as a communicative act and used a theory of communication and society to derive principles for good process. Drawing on a theory of society developed by the German philosopher Jürgen Habermas (1984), Webler proposed two major principles: fairness and competence. He further broke these down into the following:

1. Fairness: All interested and affected parties should have adequate opportunities to:
    1. attend meetings,
    2. assert and challenge others's claims, and
    3. influence early and interim decisions (e.g. when to move to next agenda item)
2. Competence: The way that understandings are reached in discourse should be competent:
    1. People should have access to all information.
    2. Participants should use best available processes to resolve knowledge claim disputes.

For each item in the list above, more detailed sets of sub-principles were developed. These were later used by other scholars to evaluate different genres of public participation (1995) and to evaluate case studies of public participation (Kinny 2002 et al., Bardati 2009).

* * *

The set of principles developed by Webler has been adapted by the team of sociologists working at the former Institute for Technology Assessment in Baden-Württemberg Germany and at the University of Stuttgart, in Germany, under the direction of Ortwin Renn (Renn 2004, Goldschmidt & Renn, 2006). The Renn team now uses the following four principles:

1. Fairness: all relevant and affected groups should have an equal opportunity to participate in the process.
2. Competence: communication should rise to a sufficient level of proficiency so that participants can communicate about facts, preferences, norms, and emotions.
3. Transparency: all methods, procedures, and rules should be openly communicated to all persons involved.
4. Efficiency: resource use (time, money) should be commensurate with performance.

* * *

In a parallel development, Webler and Tuler (2000) took an inductive approach to devising principles. In a study of public participation over forest management, they asked participants what they wanted from the process and found the following normative dimensions:

1. There should be broad access to the process.
2. Participants should have power to influence process and outcomes.
3. The process should facilitate constructive personal behaviors.
4. The process should have structural qualities that facilitate constructive interactions.
5. Everyone should have access to information.
6. There should be adequate analysis of the problem.
7. The process should enable the social conditions necessary for future processes.

Most of these are self-explanatory, but for the last item. This item, about future processes, recognized that any one process is simply a single event in a larger context of politics and decision making. For any process to contribute positively to that context, it must be conducted in a responsible manner, meaning that it is not wasteful or overly demanding of one's time (a.k.a. efficient), but it should also produce outcomes that strengthen civil society (improve trust, reduce conflict, build familiarity among groups...).

* * *

Also in the year 2000, two scientists at the Institute for Food Research at the UK Department of Public Health, published a framework for evaluating public participation methods (Rowe & Frewer 2000). They argued that principles developed by political scientist and public administrator Daniel Fiorino focused on public acceptance of the procedure and that it was also necessary to have principles about the implementation of the procedure. They argued that a process must not only be acceptable to participants, but its implementation must also be acceptable. Hence, they differentiated between acceptance principles and implementation principles:

1. Acceptance principles
    1. Participants should be broadly representative of the larger public.
    2. The process should be conducted in an independent and unbiased way.
    3. The public should be involved as early as possible.
    4. The procedure should have a genuine impact on policy.
    5. The process should be transparent so the public can see how decisions are being made.
2. Implementation principles
    1. Participants should have access to appropriate resources.
    2. The nature and scope of the task should be clearly defined.
    3. The process should use appropriate methods for structuring the decision making.
    4. The procedure should, in some sense, be cost effective.

* * *

Two years later, in 2002 Tom Beierli and Jerry Cayford with Resources for the Future (RFF) published a small book called, *Democracy in practice: Public participation in environmental decisions.* This summarized an innovative research project in which they sought to find out what factors lead to more successful public participation. To answer this question, they scoured 239 case studies of public participation,

reviewed the printed material on each case, and measured how well each case performed on the following five principles (or "social goals" as they called them):

1. Public values should be incorporated into the final decisions.
2. The quality of decisions should be substantively improved upon.
3. Conflict between competing interests should be lessened.
4. Trust should be built in institutions.
5. The public should be better informed and educated.

Although these are all principles for *outcomes* and not process nor implementation, we discuss this approach due to the widespread familiarity of this report in the literature and because it underscores the evolutionary steps toward a complete process: (1) participation principles; (2) implementation principles; and (3) outcome criteria.

* * *

Carnes et al. examined public involvement run by the DOE's Office of Environmental Management (EM) in the 1990s. They proposed sixteen criteria for an acceptable public participation process and asked participants at the EM sites to rate the importance of each. Three criteria stood out as extremely important:

1. The process should be accepted as legitimate.
2. The DOE should understand public concerns.
3. The process should allow full representation.

Carnes et al. also asked stakeholders what indicators of performance would they look for to evaluate the process on these criteria. Stakeholders reportedly advocated the following three principles and also suggested useful ways to measure performance (the bulleted items).

The process should be seen as legitimate

1. amount of opposition to outcome decisions in letters to local media,
2. level of public support by participating groups in the decision,
3. documented responsiveness of DOE to comments and suggestions,
4. level of stakeholder participation in the decision making,
5. survey of stakeholder's beliefs about legitimacy of the process.

DOE should demonstrate they understand people's concerns

1. DOE reports on what they learned from listening to concerns
2. regularity of DOE updates to the public

There should be full representation of stakeholders and public at meetings

1. retention of stakeholder and public interest and participation over the length of the process,
2. the percentage of local groups represented in the process,
3. availability of diverse methods for participation,
4. survey of stakeholder satisfaction with process.

* * *

Two important pieces of scholarship on public participation came from the U.S. National Research Council. In 1996, a committee studying public participation in risk decision making proposed the "analytic-deliberative model." This was a new way of thinking about what happened in participatory decision making. Analysis and deliberation were defined as two ways people make sense of the world. This committee suggested that public participation be thought of as a sequence of analytic and deliberative activities in which scientists, stakeholders, lay publics, and governmental officials all interact. The committee also made the important point that the first two steps of any process were *problem formulation* and *process design* and they recognized that these had to be done together. Achieving the proper integration of analysis and deliberation at each step in the decision making process is the challenge. To achieve this, they recommended five basic principles:

1. Get the science right
2. Get the right science

3. Get the participation right

4. Get the right participation

5. Develop accurate, balanced, and informative synthesis

* * *

The second important piece of scholarship on public participation from the U.S. National Research Council is a report entitled: *Public participation in environmental assessment and decision making* (2008). In three chapters on best practices for carrying out public involvement, the study committee recommends the following principles:

1. *Clear Purpose:* The convening organization and the participants should agree on the goals and objectives, the scope of legally possible actions, and the constraints on the process.

2. *Agency Commitment:* The agency responsible for the relevant decision should be committed to the process and take seriously the results.

3. *Adequate Capacity and Resources:* The process should be scaled to the level of resources available, but also, the convening organization should make sure the resources are sufficient to run an acceptable process. Resources include more than just money, having continuity of staff is also known to be important.

4. *Timeliness in Relation to Decisions:* The process should be designed so that it can come to closure in time for the results to have an influence on the decision making.

5. *Focus on Implementation:* Processes should be designed to relate in clear ways to the decision. Agencies need to be clear about what they can and cannot do.

6. *Commitment to Learning:* The process should be adaptable and should use mid-course formative evaluation to enable the convening organization to learn how to run a better process.

7. *Inclusiveness:* Better processes involve the full spectrum of interested and affected parties.

8. *Collaborative Problem Formation and Process Design:* People should be meaningfully involved early on to substantively shape the focus and structure of the process.

9. *Intense deliberation:* Processes are more successful when people spend more time in face-to-face interaction.

10. *Transparency:* It is better for processes to have clear objectives and purposes and for the conveners to give clear information about the way the process will unfold, opportunities to participate, and information and other inputs that are available.

11. *Have a competent discussion:* This requires having transparent decision-relevant information and analysis, explicit attention to facts and values, being explicit about assumptions, acknowledging uncertainties, having independent reviews, and iterating between technical analysis and stakeholder deliberation.

* * *

More recently, the Center for Natural Resources and Environmental Policy reviewed collaborative efforts that involved Federal and State governments along with stakeholders and the public for the purpose of restoring environments or managing natural resources (CNREP 2009). Their cases studied included: Puget Sound, Missouri River Basin, Chesapeake Bay, and the Everglades. They found that accepted and effective collaboration was achieved in each case and was associated with the following principles:

1. There is a shared and clear definition of the problem.

2. There are clear goals for what the collaboration should do.

3. All the right parties are involved (especially those with the ability to stop a project).
4. There is meaningful interaction among the participants.
5. Participants are committed to seeing the process through.
6. There is adequate financial support for the process.
7. Mutual learning through an adaptive management approach is employed.

* * *

Approach to developing an integrated set of principles for public participation

Based upon the principles found in the academic and practitioner literatures as briefly summarized above, we have constructed an integrated set of principles. Our set is inclusive of the principles identified in the cumulative scholarship on public participation. We note that all processes to involve the public in decision making have to address a series of basic questions about how to bring people together in a way that builds understanding and makes recommendations. Furthermore, the process needs to be strategically organized to ensure that the output of the process influences a decision. We identify principles of good practice relevant to each of these questions. We also note that there are two meta-principles that apply to every aspect of a participatory decision making process. These are: adaptability and efficiency.

To build a successful process, the conveners must make the following decisions:

1. Who should participate?
2. How should the process proceed?
3. What are the needs for information and expertise?
4. What logistical resources are needed?
5. How will closure be determined?
6. How can the process be effective at influencing decisions?

Figure 1 shows these six elements and highlights some of the complexities in the second item called, "What happens." This is, obviously, the core of the process. To describe what should happen in the process, we draw on the US National Research Council's analytic-deliberative approach (1996).

Deciding who to involve and in what manner is one of the first decisions that needs to be made. There are different ways to make this decision including:

1. Allow anyone who wants to participate.

2. Use random sampling to make a statistically appropriate group of the general public.
3. Invite stakeholders who are known to be collaborative and respected to participate.
4. Allow the population to elect the people who will participate.

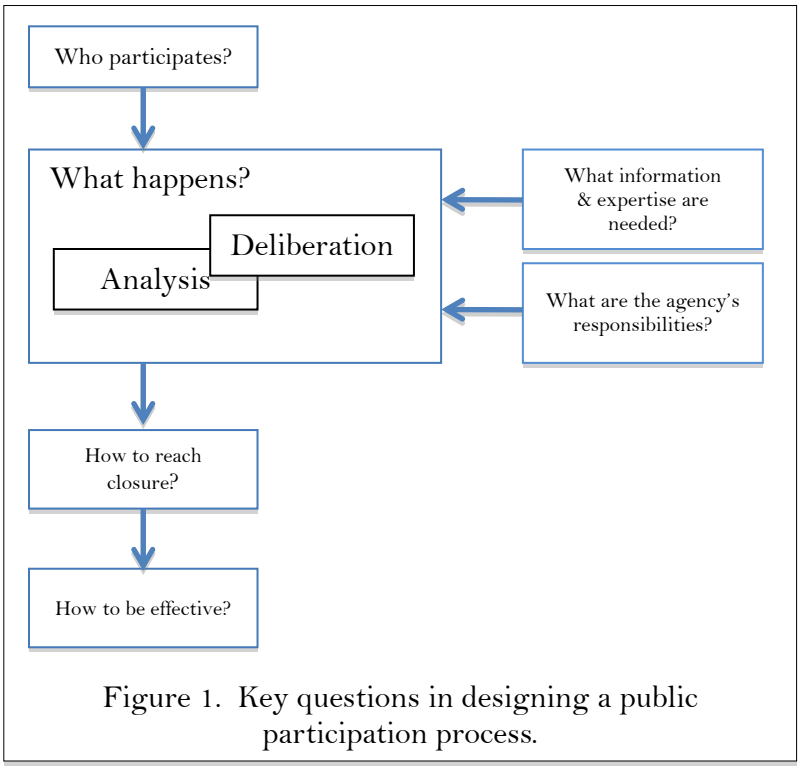


Figure 1. Key questions in designing a public participation process.

Which of these strategies is most appropriate depends on the specific situation. Meeting time, location, and format can encourage or discourage participation. For instance, internet meetings are widely accessible, but they sacrifice quality of communication. A good solution is to hold meetings at diverse places and times so that more people can attend a meeting.

A good way to think about how to design a process is use the ideas of analysis and deliberation. Analysis and deliberation are two fundamental ways that people make sense of the world. Analysis is the examination of experience, evidence, argument, or facts to arrive at conclusions. Deliberation is talk oriented toward building understanding and agreement in order to shape a decision. Several writers have mistakenly concluded that analysis is science and deliberation is politics. This is incorrect. Analysis does include science, but it also includes the setting of priorities for scientific investigation, as well as non-scientific strategies to find patterns and draw conclusions, such as anecdotal observation and reflection used by practitioners who reflect on their many experiences. Local or cultural knowledge is another form of analytical knowing. In addition, analysis can be used to study more than facts. For example, ethical analysis is the use of reasoning to examine the consistency and validity of ethical arguments against standards.

Likewise, deliberation is not just politics. People certainly do deliberate over what is morally right or socially appropriate, but they also discuss facts, different impressions or perceptions, and they discuss their feelings, intentions, and emotions. Deliberation refers to many forms of talk. For example, talk among scientists who are trying to reach shared understandings or conclusions is also a form of deliberation.

In summary, participants use analysis and deliberation to come to understandings that will inform the definition of the problem, the design of the process, and the actual efforts on the policy issue or decision. This obviously makes up the bulk of a public participation process, however the other three questions are important as well.

Processes need to be informed with the right knowledge and information. An important step in the design of a process is to anticipate what information and expertise is needed. To ensure that the biases of experts are clear to all, there needs to be a way that the process makes transparent the affiliations and opinions of experts. Likewise, information documents should be reviewed for accuracy and correctness.

The convening agency has special obligations to the process that can be summarized as being about commitment and transparency. Commitment has to do with adequately supporting the logistical needs of the process. Transparency has to do with being explicit about biases, assumptions, and judgments so that participants can make their own judgments about the fairness of the process.

Closure is another important and complicated idea in this framework. This refers to the means that are used to resolve controversies and make decisions. A public participation process happens in a series of steps. Formulating the problem and designing the process are the first steps. Each step is completed by bringing about closure, but there is no single ideal way for this to happen. One option is to decide everything by consensus, but there are shortcomings to this and majority vote is often more pragmatic. Nor are these the only choices.

Theorists and practitioners have argued that there is not one "best way" to achieve closure in all situations. Instead, the method used must be appropriate to the context. One solution that theorists have come up with is to assert that consensus must be used to choose the method that will be used in a specific context. Whatever method is used it is important that the choice be made long before the process begins, so that the decision is independent of the context.

The final question concerns the way in which the public participation activities are situated in the landscape of power and decision making. A public participation process should be effective at influencing a decision. Several things help to ensure this. First, the framing of the problem must be consistent with the decision making organization's mandate and objectives. If the participants insist on formulating the problem in a manner that is inappropriate to the decision makers, then there will be a disconnect between the two and the process will likely have little influence on the decision. Agencies have specific mandates that they need to fulfill, but sometimes citizens refuse to cooperate if they feel that the agency needs first to remedy a larger policy issue. For instance, in Canada, some groups wanted a national discourse on electricity generation policy before they would agree to participate in siting a nuclear waste repository. The management organization felt that such a national discourse was outside of their mandate. This resulted in a stalemate. Ideally, the participants and the convening agency should come to consensus on the scope of the problem being addressed. The second part of this is that the agency should clearly identify what decision should be taken and by whom. That recommendation should be legal and should relate accurately to the capabilities of the agency. Third, for the process to have influence, it must be well-timed to the decision. One common principle for good participation is that people ought to be involved early and often in the process. This implies that the best time to involve people is from the earliest start of the process.

We can evaluate any process based on how well it addresses each of these six questions (or how well we think the process designed will address each successfully). And we can come up with general rules of thumb, or principles, on what are the best practices for accomplishing each task. In Box 2 we list the tasks and examples of relevant principles, keeping in mind that which principles are best depends on the specifics of the application.

Two overarching principles

In addition to the specific principles outlined above, there are two general qualities that the process should manifest. These are features of "good" process that should be realized in every aspect of the process.

Adaptable. Public participation processes ought to monitor their performance, learn, and adapt to changing conditions. Adaptable processes are flexible about the timeline. They allow participants the opportunity to go back and revisit past activities, as needed. Adaptable processes also build in mid-course evaluation (a.k.a. *formative evaluation*) and use the results of those evaluations as steering advice. Of course, there is a danger in being too adaptable. Some participants could use this to stall the process, by continually returning to past activities and to recurrently revisit resolved issues. To deal with this the process design should identify specific steps or milestones and include a target time plan for meeting

them. Deviations from that plan should be made using a procedure that is established in the process design step. It should be transparent to all exactly what conditions need to be met before the process is changed.

Efficiency. In general, a process should not waste resources or drag out for longer than necessary. This point is elaborated below.

Summary of Principles for Successful Public and Stakeholder Engagement

Box 2. Tasks and principles.

Task	Principles
Who should participate?	The process should be appropriately inclusive.
What to do and how to proceed?	There should be iterative analysis and deliberation to define the problem and to design the process and address the issue itself.
	People should have genuine influence over the definition of the problem, design of the process, and the outcome of the process.
What are the needs for information and expertise?	The right information and expertise should be made available to everyone
What are the agency's obligations?	The convening agency should commit to seeing the process through to the end.
	The convening agency should be transparent in all aspects having to do with the process.
How to achieve closure?	A legitimate means to reach closure should be used at each step of the process.
How can the outcome of the process be effective?	The process should be effective at influencing the decision.

We suggest that the items listed above in Box 2, along with the two overarching principles of adaptability and efficiency incorporate all of the different sets of principles for "good" public and stakeholder engagement that have been identified in the literature by scholars and practitioners. We have listed these principles in Box 3.

In what follows, we elaborate briefly on each of these principles. As a caveat, we note that principles are general guidelines and invoking a particular principle in any specific context will depend on that context. How those contextual factors come into play is something about which the science is very young. We do not attempt to review that science here.

Box 3. Core Principles of Successful Processes

1. The process should be appropriately inclusive.
2. Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner.
3. Participants should have genuine opportunity to influence the problem formulation, the process design, and the outcome.
4. The right information and expertise should be made appropriately available to the interested and affected parties.
5. The convening agency should commit to seeing the process through to the end, provide adequate staffing and resources, and be transparent in all aspects having to do with the process.
6. Legitimate means to reach closure should be used.
7. The process should be effective at influencing the decision.
8. The convening organization should evaluate, monitor, learn, and adapt the process as needed.
9. In general, the process should not waste public resources, waste the time of the participants, or require sacrifices on the part of participants.

The process should be appropriately Inclusive

Processes need to pay careful attention to who is involved. The U.S. National Research Council advocates for the involvement of all *interested and affected parties* (IAPs) (NRC 1996). The label "IAP" signifies that participants need not prove that they would be harmed by the decision, but it is enough to be interested in order to participate. Citizens who assert they have deep interests in the issue also are "affected" to a degree, even if their health or welfare is not in jeopardy. While having the process be wide open to anyone who wants to participate may seem to be logistically impossible, it is often not. Experience shows that, while many people may show initial interest in the process and come to an informational meeting, many fewer will be willing to make the commitment necessary to fully participate in the process. Despite this, it is certainly true that any process has logistic limitations and there is a danger of demand exceeding the ability of the process to serve all who are interested.

A process that relies on self-selection and free and open access also runs the risk of not including participants who do not fully represent all affected parties. Process organizers often have to work hard to get the right parties involved and committed to the process. Toward this end, convening organizations sometimes use analytical techniques to select participants and then explicitly invite specific groups or individuals to participate.

One strategy to answering the question of who should participate is to select citizens and groups who are broadly representative of the population that is affected by the decision. This approach is based on the principle that all categories of people should be equally allowed to participate. There are several ways to go about building a representative group and the context will determine which approach is best. Three options are: random selection, stratified random selection, appointment, and election.

Deliberative and analytic activities to define the problem, design the process, and make progress on the main issue should be undertaken, and in a coordinated manner

Involving citizens in the problem definition and process design are key early steps. Both of these early decisions need to be jointly agreed upon by all participants so that the nature and scope of the process is clear and uncontested.

In both of these activities, and when working on the main substance of the process as well, people will rely on analysis and deliberation. Analysis and deliberation reinforce and inform each other. A successful process finds ways to use deliberation (informed with knowledge learned through analysis) to frame the problem, to design the process, and to make progress on solving the issue at hand.

Analysis and deliberation are both used to understand facts and values. There is a large segment of the literature on public participation that focuses on the way people communicate about facts and values. This scholarship leads to a set of sub-principles that define conditions for communication (Webler & Tuler 2008, Goldschmidt, Renn, & Köppel 2008).

Participants should have genuine opportunity to influence the problem formulation, the process design and the outcome

While the previous principle addressed the way that people ought to be involved in discussing, studying, and coming to an understanding of the problem, how the process might be designed, and the substance of the actual policy issue, this principle acknowledges the importance of having power to actually influence the outcomes of these processes.

The definition of the problem frames the issue and establishes the boundary conditions for what is acceptable and unacceptable talk or evidence. It is not necessary to have consensus on the problem formulation, although it is best when there is. It is, however, necessary for the participants to accept the problem definition. Experience shows that people are willing to accept decisions they don't agree with *if* they feel that they had a fair say and an appropriate opportunity to influence the decision (Grimes 2005). This principle is rooted in democratic theory, which emphasizes that processes for making public choices need to be fair. Theory also suggests that if people are consensual about HOW to make a decision they will accept the outcome (Webler 1995). "Genuine opportunity" then, refers to opportunity to influence the decision of *how to decide*. (Also see section on "legitimate means to achieve closure," below.)

One of the most well-established principles of a good process is to involve the interested and affected parties early and often. Meetings should also be held at multiple locations or over the internet to facilitate attendance. The purpose of early involvement is to ensure that the early judgments, which frame the problem and the process design do not end up unfairly affecting any interested or affected party. This principle also allows the maximum possibility for citizens to influence priorities and the ultimate decision.

Effective processes often conclude with a recommendation to a public agency about how to act. While public decisions should not be made by ad hoc groups of individuals who simply show up at meetings, decision makers ought to, at a minimum, make an explicit promise to seriously consider the recommendation as input when making their formal decision *and* they ought to explain how they made their decisions, particularly when they do not follow the recommendations issued by the process.

The right information and expertise should be made appropriately available to the interested and affected parties

This principle notes the importance of having the right knowledge and expertise available to be used during analysis and deliberation. Information is needed to resolve knowledge claim disputes and to reduce uncertainties. Information and expertise cost money and take time. In the end, every process

will have to deal with some degree of uncertainty in exchange for using a reasonable amount of public resources (i.e. being efficient, see below).

Many processes include means for the participants to be educated or to educate themselves about the issue. The convening organization can facilitate this happening by bringing in expertise, organizing field trips, holding webinars, providing relevant literature, and so on. The best education methods work from the knowledge and needs of the individual learner and serves a variety of learning styles.

When bringing in experts to testify or answer questions it is important that the biases and affiliations of the experts be made transparent to all. Likewise, technical reports and background information should be proofread and reviewed by people from diverse perspectives to assure its biases, accuracy, and factual correctness

The convening agency should commit to seeing the process through to the end, provide adequate staffing and support, and be transparent about all aspects having to do with the process

The convening agency has obligations to the process that are unique. First, scholars and practitioners have commented that processes are more successful when the agency commits fully to see the process through, when it retains specific individuals in roles, and when it can assure the participants that it is listening and hearing what comes out of the process (USNRC 2008). Agencies show commitment by allocating adequate budgets, by keeping personnel consistent so that new people are not constantly having to be brought up to speed by the other participants, and by sending signals from top management that the process is important to the agency. Second, processes are viewed more successful when participants feel that the organizers are sincerely interested in receiving public input and have been sincere and open about their intentions, abilities, and claims. Sincerity is validated by transparency, in all activities, the convening organization should be explicit and clear about its intentions and the information and resources is has available. While other people's principles speak to the process not being biased, really what is important is that there is transparency about actions and intentions. Of course, the convening organization should strive to not be biased, but being completely bias-free is impossible. Transparency, therefore, allows groups and individuals to decide for themselves about what bias may exist and determine how much trust they want to place in the decision makers or the convening organization. Third processes also require certain material resources to function. These are budgeted items and include: renting space for meetings, paying for travel expenses, hiring translators or facilitators, managing a web site, photocopying, field trips, etc. A properly funded process supplies logistic resources (including for affected citizens and other key stakeholders) that are commensurate with the process.

Legitimate means to reach closure should be used

One of the most important aspects of the process is to decide how to make decisions to wrap up analysis and deliberation on one topic and move along. Processes can be iterative, that is, they can return to earlier steps and revisit them, however, there also needs to be an element of incremental progression. Usually processes are defined as consisting of multiple steps, starting with the problem definition and ending with a decision. However, at each step along the way a decision needs to be made to wrap up and move along. How these decisions are made is extremely important.

Closure refers to a host of decisions made during the process to resolve a topic and move to the next. There are many different ways of reaching closure, and different ways will be more or less appropriate in different situations. There is no singularly right way to reach closure in all contexts. In some settings majority vote is appropriate, while in others it may be acceptable for the facilitator to simply make an authoritarian decision. Sometimes consensus is best.

Rather than take a stand for one type of closure mechanism over all others, or to specify the conditions under which each approach works best, theoreticians argue for using consensus to decide on the closure mechanisms that will be used at the different steps along the way. Consensus is advocated because it is

the most protective of individual interests. If the closure decisions are made up front, as part of the process design, then they should be well removed from the strategic actions of individual participants.

The process should be effective

There are many purposes for conducting a public participation process, but in some sense the process should be effective at achieving those purposes.

First, the outcome of the process should be implementable. It should clearly identify what decision should be taken and by whom. That recommendation should be legal and should relate accurately to the capabilities of the agency. On this point the formulation of the problem is the key activity. The convening agency also needs to have a plan in place that is communicated to all parties on how the output of the process will be brought into the decision making process.

Second, the process should have some influence upon a decision. Money spent on a process that educates participants, has them engage each other in structured ways, and works out closure on a final recommendation is money poorly spent if the results never see the light of day. Timing is extremely important. Ideally, the process should start at the earliest stages of a decision making process, because this is when the problem is defined and the scope of the process set. Certainly, the process must end and issue its outcome well before the official decision is to be made.

The convening organization should evaluate, monitor, learn, and adapt the process

The problem formulation and the process design may need to change over the course of the process. This can happen because facts or knowledge that the participants learn during the process or because of external events. In either case, there are advantages to the process being *flexible and adaptable* to changing conditions.

An adaptable process monitors how the process has been working, evaluating that performance, generating alternative plans, and implementing a plan. Monitoring and evaluation require making observations or collecting data about performance. For instance, evaluators may survey the participants or interview the convening organization or the decision makers about how well the process is working to date. This information needs to be interpreted and evaluated, which means it is compared against some expectation or standard of performance. Both process and outcome criteria are helpful at this step. For example, if one of the process principles is to have wide spread participation, then collecting data on what types of people are participating could provide useful information for process organizers. In response, they may decide to hold more meetings in different locations or to offer some internet meetings. Outcome criteria are also useful to mid-stream evaluations. If one goal of the process is to reduce conflict between the agency and stakeholders, then a mid-stream evaluation could provide some steering feedback.

Adaptive learning is made easier to do when the process is designed as *incremental* or staged meaning that it moves through a series of stages. At each stage, organizers can use evaluation tools to determine how well the process has performed. If the process is also *iterative*, it means that earlier steps can be revisited if performance was not up to expectations.

In general, the process should not waste public resources, waste the time of the participants, or require undue sacrifices on the part of participants

Any public effort should strive to use the minimal resources necessary to achieve the stated tasks. Wasting public resources deprives society of other benefits. While monetary cost is surely one important criterion, we note it is very difficult to compare the value added by a given expenditure, since there is nothing to compare it against. Cost efficiencies can only be assessed in a very general way. Some argue that public participation is not worth the money spent, while others argue that a good process can save an agency millions of dollars in court and other costs or implementation failures. The

US National Research Council reviewed the evidence and concluded that well run public participation processes tend to save government money, by reducing public opposition (2008), as have other scholars (Carnes et al. 1998).

Another dimension of "cost" is the time investment required by the participants. Citizens or members of smaller interest groups have limited time available to devote to public participation processes. Their investment in one process is a significant choice. If the process can be designed to use participants' time very judiciously, it is better.

Some individuals or groups may incur costs of participating, for instance, people may have to pay their own travel costs, pay for babysitting, or take a day off of work to attend a meeting. Other sacrifices may also need to be made. In general, these costs should be minimal or they should be subsidized by the convening organization.

Conclusion

We have reviewed key literature on procedural principles for good public and stakeholder engagement process and have developed a framework to organize these principles in a manner that should be clear to organizers and designers of these processes. The framework generated nine principles of good process and we have elaborated on their meaning. While there is demonstrated widespread support for these principles in literature of practitioners and theorists, it is known that different people will assign more importance to some principles over others. Therefore, it is expected that different people could evaluate the same process differently. From our perspective as independent researchers, we want to avoid imposing judgments about the relative importance of each principle in a given case. That judgment is best determined by the nature and context of the decision and by the preferences of all participants. Our approach is to evaluate a process on each principle independently of the other principles. We also recognize that the way each principle is best realized in any specific case is context-dependent. Consequently, evaluations should take into consideration the relevant contextual qualities.

Bibliography

Bardati, D. 2009. Participation, information and forest conflict in the Slocan Valley, British Columbia (Chapter 7, pp. 103-122) in *Environmental Conflicts and Democracy in Canada*, ed. L. E. Adkin. Vancouver, BC, UBC Press.

Beierle, T. and Cayford, J. 2002. *Democracy in practice: Public participation in environmental decisions.* Washington, DC: Resources for the Future.

Branch, K. and Bradbury, J. 2006. Comparison of DOE and Army advisory boards: Application of a conceptual framework for evaluating public participation in environmental risk decision making, Policy Studies Journal 34 (4):723-753.

Carnes, S. A., Schweitzer, M., Peelle, E. B., Wolfe, A. K., Munro, J. F. 1998. Measuring the success of public participation on environmental restoration and waste management activities in the US Department of Energy, *Technology in Society*, 20(4): 385-406.

Center for Natural Resources and Environmental Policy. 2009. *Federal-State collaboration initiatives for resource management and restoration.* Bozeman MT: University of Montana. http://cnrep.org/documents/montana_policy_reports/Federal-State-Collaborative-Initiatives-12-2-09.pdf

Goldschmidt, R. & Renn, O. 2006. *Meeting of minds – European citizens' deliberation on brain sciences.* Institute for Social Sciences: University of Stuttgart.

Habermas, J. 1984. *Theory of Communicative Action. Vol. 1: Reason and the Rationalization of Society.* Boston, Beacon Press.

Kinney, A. G., & Leschine, T. M. 2002. A Procedural Evaluation of an Analytic-Deliberative Process: The Columbia River Comprehensive Impact Assessment. *Risk Analysis 22*(1): 83-100.

Renn, O. 2004. The challenge of integrating deliberation and expertise: Participation and discourse in risk management. In: Tim McDaniels and Michael S. Small (Eds). *Risk analysis and society: An interdisciplinary characterization of the field.* Cambridge MA, Cambridge University Press, pp. 289-366.

Rowe, G. and Frewer, L. J. 2000. Public participation methods: A framework for evaluation, *Science, Technology, and Human Values* 25(1): 3-29.

Webler, T. & Tuler, S. 2008. Organizing a deliberative participatory process. What does the science say? In: Sina Odugbemi and Thomas Jacobson (Eds). *Governance Reform Under Real-World Conditions: Citizens, Stakeholders, and Voice.* Washington DC: World Bank, pp. 125-160.

Webler, T., Tuler, S. & Krueger, R. 2001. What is a Good Public Participation Process? Five Perspectives from the Public. *Environmental Management*, 27(3): 435-450.

Webler, T. & Tuler, S. 2000. Fairness and Competence in Citizen Participation: Theoretical Reflections from a Case Study. *Administration & Society* 32(5): 566-595.

Webler, T. 1995. 'Right' Discourse in Citizen Participation: An Evaluative Yardstick. In: O. Renn, T. Webler, and P. Wiedemann (Eds.), *Fairness and Competence in Citizen Participation: Evaluating Models for Environmental Discourse.* Dordrecht, Kluwer Academic Press, pp. 35-86.