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A Successful Effort to Involve Stakeholders in a Facility Siting Decision

Using LIPS with Stakeholder Involvement

Lee Merkhofer
Applied Decision Analysis, Inc.
2710 Sand Hill Road
Menlo Park, California 94025

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Rarilee Conway
Environmental Restoration
Sandia National Laboratories
Albuquerque, New Mexico 87185-5800

Bob Anderson
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Local public opposition to federal bureaucratic decisions has resulted in public agencies rethinking the role of stakeholders in decision making. Efforts to include stakeholders directly in the decision-making process are on the increase. Unfortunately, many attempts to involve members of the public in decisions involving complex technical issues have failed. A key problem has been defining a meaningful role for the public in the process of arriving at a technical decision.

This paper describes a successful effort by Sandia National Laboratories (SNL) in New Mexico to involve stakeholders in an important technical decision associated with its Environmental Restoration (ER) Project. The decision was where to locate a Corrective Action Management Unit (CAMU), a facility intended to consolidate and store wastes generated from the cleanup of hazardous waste sites. A formal priority setting process known as the Laboratory Integration Prioritization System (LIPS) was adapted to provide an approach for involving the public. Although rarely applied to stakeholder participation, the LIPS process proved surprisingly effective. It produced a consensus over a selected site and enhanced public trust and understanding of Project activities.

Preparation

The effort began with the formation of a CAMU Working Group composed of individuals from a variety of stakeholder organizations, including the Sandia Citizens Advisory Board (CAB), the New Mexico State Environment Department (NMED), the Department of Energy (DOE), the Environmental Protection Agency (EPA), SNL, and the public at large. To provide siting options, EPA and SNL criteria for CAMU siting were used to screen an initial list of 156 potential siting locations down to five feasible sites (Figure 1).

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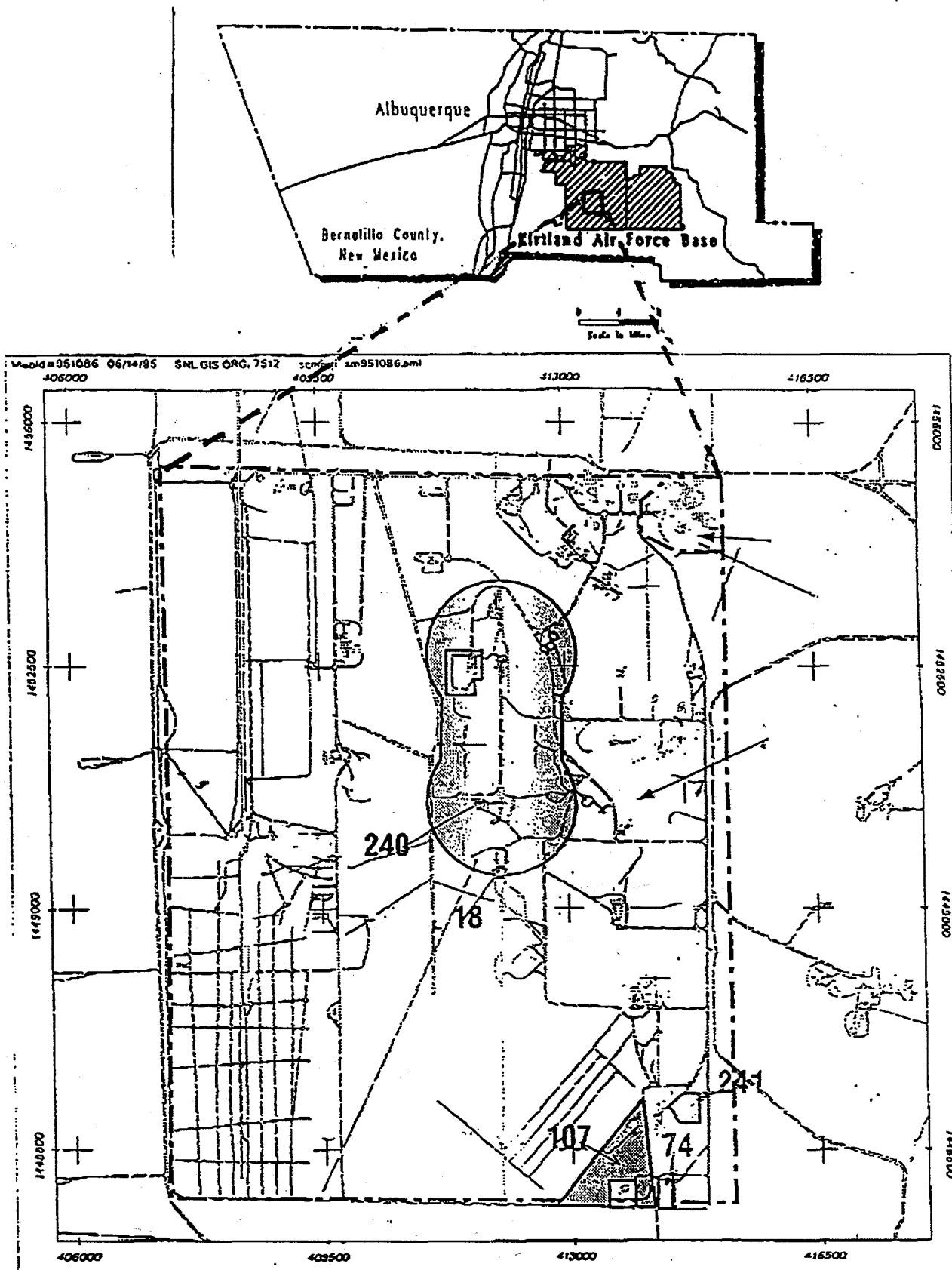


Figure 1. Candidate Sites

Ranking Process

LIPS and, more precisely, the theory called multiattribute utility analysis (MUA) on which LIPS is based, were used to conduct the key step of ranking the five candidate sites. MUA is a formal approach for evaluating options using multiple criteria (Keeney and Raiffa 1976). LIPS is a set of tools, techniques, and software for implementing MUA (Anderson, et.al., 1994).

Numerous technical requirements must be satisfied to properly apply MUA (Keeney 1982). However, in its simplest form, the basic steps are:

1. Identify decision objectives.
2. Establish attributes and rating scales for measuring the degree to which options achieve objectives. Assess weights and other value judgments specifying the relative importance of achieving the objectives.
3. Combine weights and ratings to obtain an overall measure of the desirability of each option.

Although MUA has been applied previously to siting decisions (e.g., Markhofer and Keeney, 1987), it has rarely been used as a means for involving the public and other stakeholders in public-policy decisions. LIPS makes MUA more useful for stakeholder involvement by simplifying MUA and making it more comprehensible to the lay public. The application to selecting a site for the CAMU required two one-day meetings with members of the CAMU Working Group and other stakeholders.

First Meeting with the Working Group

In the first meeting, a LIPS expert led participants through the process of identifying objectives for the site-selection decision. The question was, "What, exactly, does a good CAMU site need to do?" Even the least technical participants found it easy to participate in this step. After some discussion, it was agreed that the selected sites needs to: (1) protect public and worker health and safety, (2) minimize adverse impacts to the natural environment, (3) meet the necessary technical and regulatory requirements to enable it to serve as a CAMU, and (4) promote effective and efficient use of resources, including land, money, and time. Following the standard LIPS process, the objectives were displayed as a hierarchy of site-selection criteria as shown in Figure 2.

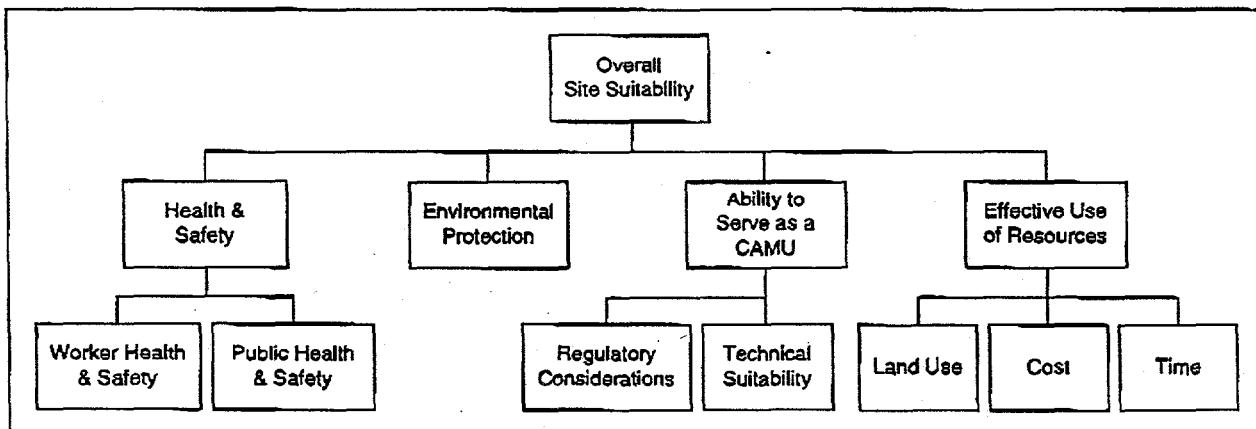


Figure 2. Criteria Hierarchy

Next, site characteristics and other factors were identified that influence how well sites perform against the criteria. Discussion was documented using a computer program for constructing and displaying influence diagrams (Applied Decision Analysis, 1995). Influence diagrams graphically display the influences among factors relevant to a decision, and they are useful for selecting the attributes and rating scales for MUA (Merkhofer, 1990). Participants first agreed on the factors influencing each criterion and then identified the factor or factors judged to be the most useful site discriminators. Although SNL participants took the lead in this step, other participants asked questions and seemed to find the diagrams useful to their understanding.

Figure 3 provides an example of one of the resulting influence diagrams. It shows the consensus influence diagram for the criterion related to public health and safety. The asterisk by the factor labeled "distance to existing communities" indicates that distance (measured in miles) was agreed to be a useful discriminator for the public health criterion. Due the similar geological and hydrological characteristics of the candidate sites, the other factors shown in the diagram were judged not to differ significantly from site to site.

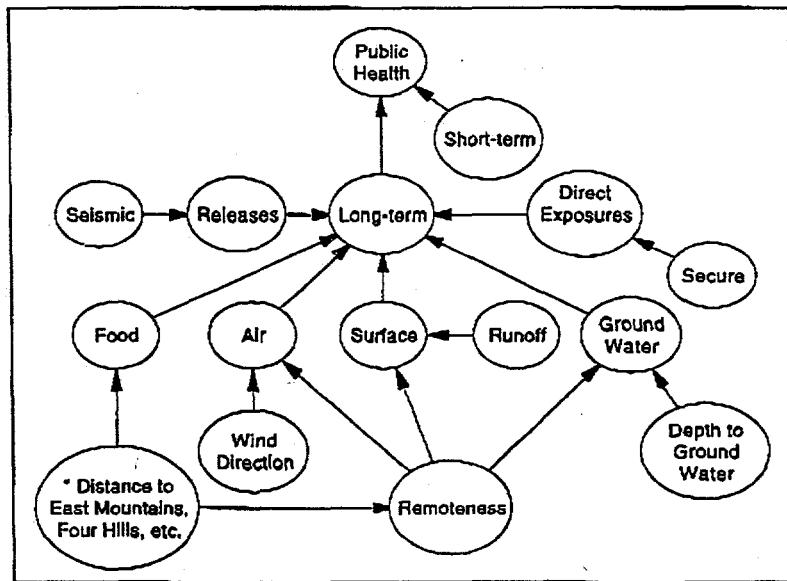


Figure 3. Influence Diagram for Public Health

In the interval between the first and second meetings, rating scales were developed for each of seven factors identified as useful discriminators. The scales, together with scoring instructions, were provided to SNL technical specialists who used the scales to rate each site.

Second Meeting

To begin the second session, participants were provided with a tour of the candidate sites. After returning to the meeting room, the rating scales were described and accepted by the group. SNL technical participants explained the reasoning that each had previously used to score the sites on the rating scales. After a question and answer period, the external stakeholders individually scored the sites, using the same scales but applying their own judgments.

Finally, weights were used to combine the ratings on the various factors into an overall measure of performance. Weights were assessed by the LIPS facilitator using a technique that ensures consistency between the weights and the range of possibilities expressed in the rating scales. Neither weights nor ratings were averaged across individuals, so that differences in opinion over the rankings could be traced to differences in ratings, which reflect technical judgments, or differences in weights, which reflect value judgments. This distinction was regarded by participants as important. Although some stakeholders acknowledged that their ratings might be less valid due to their limited technical expertise, most felt that their value judgments were at least as valid as those provided by technical specialists. At least one stakeholder commented that he anticipated major disagreements between the rankings obtained from the technical specialists and stakeholders, based on differences in weights.

Results

The results of the site prioritizations from various participants were surprisingly similar. As shown in Table 1, regardless of how the various rating scores and weights were combined, the resulting site prioritization remained the same. Site 74 was quite obviously a poor choice, while the other four candidates were closely matched. Participants felt that the results made sense and matched their personal, intuitive site rankings. A consensus was expressed that Site 107 was a preferred choice. Participants then proceeded to praise the process. Comments included, "I really felt as though we did a thorough job," "What we did was just common sense," and "Sandia should use this approach more often."

Table 1. CAMU Site Selection Summary of Overall Performance

Site	Avg. of All Weights and All Scores	Avg. of Technical Weights and All Scores	Avg. of Technical Weights and Technical Scores	Avg. of External Stakeholder Weights and All Scores	Avg. of External Stakeholder Weights and External Stakeholder Scores
28	90	90	89	90	90
74	83	83	82	84	83
107	91	91	89	91	91
240	89	88	87	89	89
241	88	88	88	88	87

Note: Overall performance is measured on a zero-to-100 scale rounded to nearest point. Highest score in each category is boldfaced.

Summary and Conclusions

In order for the public to be able to participate effectively in decision making, participants need to become involved and understand the subject matter. The approach was successful because:

- It was simple and readily understandable to participants. It made sense.
- It focused discussion on the issues that really mattered. Although it identified areas of disagreement, it demonstrated broad agreement over the course of action.
- It provided participants with a meaningful and important role in the decision process.

The LIPS approach using MUA provided a framework for organizing the decision making process—a framework that clearly outlined available decision options, identified relevant technical information, and efficiently communicated these elements to stakeholders. In addition, the LIPS approach allowed stakeholders to provide weights and other value judgments that are essential to the decision making process. By incorporating public and other stakeholders preferences, a sense of ownership and confidence in the process was produced.

The ideal path for public involvement is for environmental professionals to make the public a part of the solution, not view the public as part of the problem. As demonstrated by this application, solution-oriented public participation can work. Admittedly, one success does not prove the usefulness of the approach. Success, in this case, was obviously aided by the fact that rankings were insensitive to weightings. However, the results demonstrate that logic can be a powerful force for consensus. By using a logical, structured framework for analyzing decision options, stakeholder involvement can be an investment with considerable benefits.

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