CONF-960648--1

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Presented at

National Association of Environmental Professionals
21st Annual Conference

Houston, Texas

June 2-6, 1996

Prepared by the
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Oak Ridge, Tennessee 37831
Managed by
LOCKHEED MARTIN ENERGY RESEARCH CORP.
for the
U.S. DEPARTMENT OF ENERGY
under Contract Number DE-AC05-96OR22464

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ABSTRACT

For the last several years, the U.S. Department of Energy's (DOE) Office of Environmental Restoration and Waste Management (EM) has actively pursued a policy of involving local stakeholders in the planning and implementation of environmental management activities at contaminated sites throughout the DOE complex. The environmental management activities have ranged from small and short-term (such as cleaning up a specific building or storage area) to large and long-term (like the shut-down and restoration of an entire DOE facility). Public participation mechanisms that have been used include large public meetings, smaller workshops, local advisory boards, and one-on-one contacts between DOE personnel and community members. Active participants have included a variety of stakeholders, both internal (e.g., DOE and contractor management, public involvement professionals, technical staff and other plant employees) and external (e.g., state and federal regulators, local government officials, environmental groups, nearby residents). An ongoing Oak Ridge National Laboratory (ORNL) study is focusing on how to measure the success of the many and varied public participation efforts extant in the DOE complex.

Under EM sponsorship, ORNL researchers are conducting in-depth interviews with internal and external stakeholders at approximately 10 DOE sites. The purpose of this study is to identify definitions and measurable indicators of success to use in possible future evaluations of DOE's public participation efforts. The widely varying nature of DOE's environmental management programs and public participation efforts and the fact that different stakeholder groups are likely to hold disparate objectives leads us to favor the use of multiple definitions of success that can be applicable to a wide variety of projects and provide a number of different perspectives on what was accomplished. For instance, a successful public participation effort can be defined as one in which the decision-making process is accepted as legitimate by key stakeholders. Alternatively, a public participation program can be said to be successful when DOE's site-specific mission has been accomplished. These and 15 other definitions of success are discussed in this paper. Of course, we recognize that our 17 definitions must be pared down considerably to be useful in an actual evaluation.

The extent to which a given public participation effort has been successful according to a particular definition of success can be

measured by objective indicators created for each definition and tailored to a specific site. For example, the number of acres reclaimed and the completion of milestones relative to the established schedule can serve as measurable indicators of the extent to which DOE's site-specific mission was accomplished. Performance indicators also can measure the success of a public participation effort according to a given definition of success by gauging participants' subjective perceptions, such as the perceived extent to which the goals of non-DOE stakeholders were met.

RESEARCH METHODS

The DOE sites that we selected for this study were chosen to provide substantial variety in terms of geographic location, types of environmental management activities undertaken, the current life-cycle stage of those EM efforts, and the public participation mechanisms utilized. Background information on potential study sites—upon which the selection process was based—came from published reports (U.S. DOE 1995a, U.S. DOE 1995b) and discussions with knowledgeable professionals familiar with DOE's EM activities.

Five DOE facilities were selected for intensive site visits: the Fernald Plant in Ohio; the Savannah River Site in South Carolina; the Oak Ridge Reservation in Tennessee; the Sandia National Laboratories in New Mexico; and the Ambrosia Lake Uranium Mill Tailings Remedial Action (UMTRA) project, also in New Mexico. In addition, telephone interviews are being conducted with key stakeholders at four or five additional sites: the Weldon Springs facility in Missouri; a Formerly Utilized Sites Remedial Action Program (FUSRAP) site in New Jersey; the Stanford Linear Accelerator Center in California; the West Valley Demonstration Project in New York; and, possibly, the Grand Junction Projects Office in Colorado or the Idaho National Energy Laboratory.

At each site, our research efforts focus on the entire range of public participation efforts associated with a specific EM activity or logically connected set of activities. For example, at the Savannah River site, we examined the public participation efforts that addressed the remediation of groundwater contamination at the F- and H-area seepage basins; in Oak Ridge, we focused on the off-site mercury contamination of the Lower East Fork Poplar Creek; and at Sandia National Laboratories, we investigated stakeholder involvement associated with the consolidated treatment, storage, and disposal of hazardous wastes in the Corrective Action Management Unit (CAMU) project. In contrast, our work at the Ambrosia Lake UMTRA site and the Fernald Plant—where the facilities' single current mission is decommissioning—focused on the overall clean-up effort.

We conducted a review of the relevant literature to see how the success of public participation efforts had been measured in

previous evaluations and to help identify the key stakeholder groups to interview. Sources included DOE reports (e.g., U.S. DOE 1994a; U.S. DOE 1994b; U.S. DOE 1994c) and a variety of other professional and academic publications (e.g., Beck, Kelly, and Forbes 1995; Lach, Hixson, and Ramonas 1995; Maguire 1995; Rosener 1978; Syme and Sadler 1994; Young, Williams, and Goldberg 1993).

The key stakeholder groups that we chose to interview at all the study sites include the following:

- DOE community relations staff and project managers;
- Community relations staff and project managers for the Management and Operations contractor managing the case study facility for DOE (e.g., Lockheed Martin Energy Systems at Oak Ridge);
- State and federal environmental regulators (e.g., the U.S. Environmental Protection Agency and state departments of health or environmental control);
- Local government officials (e.g., elected office-holders, paid staff, and appointed board members);
- Non-government groups concerned with environmental protection, public safety, and health issues;
- Business organizations (e.g., local chambers of commerce);
- Civic clubs and organizations (e.g., the League of Women Voters);
- Labor unions;
- Owners of property near the facility with a direct financial stake in the outcome of the EM activity; and
- Other interested parties.

To date, we have found that approximately 12 to 15 interviews are necessary to cover each site adequately.

Based on the literature review and our own professional experience, we designed an open-ended oral data collection protocol to use during the first two site visits: Fernald and Savannah River. Using the information gathered at these sites in late October and early November of 1995, we refined the open-ended oral protocol, designed a supplemental written survey, and used these new instruments to collect data from stakeholders at all subsequent sites. We also sent the written survey to all respondents at Fernald and Savannah River so that we would have comparable data for all sites. The written survey was designed to elicit respondent preferences to specific definitions of success and to extract information regarding the appropriate performance indicators to use in measuring the extent to which public participation efforts had been successful according to those definitions.

We used the data provided by our stakeholder interviews as well as the literature review findings to identify the broad range of possible definitions of success presented in this paper. These sources also have provided valuable information on potential

indicators of success to use with each broad definition. As of this writing, we have briefly examined the preferences and perspectives of different stakeholder groups, but this analysis is still in the preliminary stages because we have not yet collected data from all case study sites. Following the completion of that effort, we will refine our list of success definitions and measurable performance indicators based on the full set of stakeholder responses and a thorough analysis of the preferences expressed by different stakeholder groups and by respondents engaged in different types of EM activities.

DEFINITIONS OF SUCCESS

Based on our data collection and preliminary analysis, we developed 17 definitions of success for public participation programs. Success in terms of any of these definitions is not an "all or nothing" proposition; rather, it is proper to talk of the extent to which a public participation effort is successful according to each individual definition. As shown in Table 1, our success definitions can be grouped into five broad categories, depending on the topic addressed: the decision-making process; effects of public participation on stakeholder understanding and attitudes; effects of public participation on environmental management decisions; effects of environmental management decisions on site conditions; and effects of environmental management decisions on stakeholders' objectives. Together, the 17 definitions provide a fairly comprehensive listing of the attributes of successful DOE public participation efforts. All of these definitions are broad enough to be useful in evaluating a wide range of public participation efforts focusing on a variety of environmental management programs. In addition, the range of definitions that we have identified allows success to be measured from a number of different perspectives. This ability is important in order to represent the divergent viewpoints of the many stakeholder groups that are involved in public participation efforts as well as to represent the multiple interests that are often found within a single group. The remainder of this section briefly discusses each of the definitions of success that we have identified, grouped by subject area.

Definitions of Success that Focus on the Decision-making Process

DOE is presented with comprehensive and thoughtful input by the public. This definition focuses on how successful federal decision-makers are in eliciting important information from all other stakeholders. It is important to note, however, that this definition does not address the issue of how seriously public input is treated nor its effect on subsequent decisions.

The decision-making process allows full and active stakeholder representation. This definition addresses the opportunity that various interested parties have to present their views to DOE.

This is an important component of what is sometimes referred to as "procedural justice," because it deals with how open the process is to the full range of participants. However, as with the previous definition, this measure does not indicate how seriously DOE decision-makers treat the input they receive from various stakeholders nor how much effect this input has on the decisions that are ultimately reached.

The decision-making process is accepted as legitimate by stakeholders. This describes the judgment of the various interested parties as to the fairness of the procedures by which key decisions are made. This goes beyond the involvement of the various stakeholder groups to examine the acceptability of the decision-making process.

Definitions of Success that Focus on Effects of Public Participation on Stakeholder Understanding and Attitudes

The public understands DOE's environmental management problems and associated actions. This is a definition of success that is likely to be most appealing to DOE and its contractors, because it refers to the success of those parties in imparting information about DOE's needs and responses to the other stakeholders. By itself, this definition addresses the educational rather than the interactive success of public participation efforts.

The public understands the connection between clean-up costs and environmental benefits. This is very similar to the preceding definition of success, except that it captures how well the public is educated about the trade-offs that frequently must be made between clean-up costs and environmental quality, rather than about the overall EM program.

DOE understands public concerns. This is the counterpart to those definitions of success that focus on how well the public understands DOE issues and concerns. It also is very similar to the first definition in the preceding category, except that it goes beyond the mere receipt of stakeholder input to address the comprehension of that information.

Existing conflicts are resolved. This addresses the ability of the public participation effort to solve problems that predated its inception. This definition is likely to appeal to DOE, and especially to those staff members involved with community relations.

The public has trust and confidence in DOE and the DOE facility. This is a definition of success that is likely to be extremely important to DOE. The more confidence the public has in this federal agency and the correctness of its actions, the less resistance DOE is likely to encounter in performing those tasks that are vital to its mission.

Definitions of Success that Focus on Effects of Public Participation on Environmental Management Decisions

Key decisions are accepted as legitimate by stakeholders. This is very similar to the last definition in the first general category, except that this one focuses on the substantive decisions themselves rather than on the process by which they are reached. Theoretically, it is possible for a stakeholder to be pleased with the ultimate decision while not approving of the decision-making process, or vice versa, but it is likely that the response by any given group to one of these measures will be similar to its response to the other.

Key decisions are influenced by the public. The focus of this definition is on the effect of public input on DOE's decisions and associated actions. For stakeholders who are more interested in outcomes than in equitable procedures, this is likely to be a popular way to define success.

Key decisions are improved by public participation. This takes the previous definition and adds a value component. Now, it is no longer enough for the public to influence a decision, but that decision has to be influenced in a positive manner. The difficulty with this definition is that the concept of improvement is a subjective one, depending on the needs and interests of the party making that value judgment.

Definitions of Success that Focus on Effects of Environmental Management Decisions on Site Conditions

Environmental management costs are minimized. This definition focuses on the costs of environmental clean-up, without examining how effective DOE's actions are or how appropriate the public considers them to be. While this definition by itself gives a markedly incomplete view of what was accomplished, it does constitute an important component of success because it directly addresses the concerns of cost-conscious DOE project managers.

Adverse environmental impacts are minimized. This is the mirror image of the definition discussed above, in that it focuses on environmental quality without focusing on the associated costs.

Adverse impacts are distributed equitably among the public. This definition frames success in terms of how the negative effects associated with environmental management efforts are spread throughout the local area. This issue often is considered under the rubric of "environmental justice" and reflects a concern that adverse impacts not be disproportionately placed upon minority or low-income communities.

Definitions of Success that Focus on Effects of Environmental Management Decisions on Stakeholders' Objectives

Stakeholder objectives for a particular public participation

effort are met. This focuses on what DOE and all other stakeholders hope to accomplish through their public participation, and sees success in terms of how well these objectives are satisfied.

DOE's site-specific mission is accomplished. This definition describes success in terms of the accomplishment of DOE's goals. While the previous definition examines how well the goals for a specific public participation effort are met, this definition of success focuses on DOE's overall mission for the site in question (e.g., the safe disposal of all on-site wastes) and how well that mission is served by the public participation efforts under study.

The overall objectives of non-DOE stakeholders are met. This is an analogue to the definition discussed immediately above. In this case, however, the overall mission of the external stakeholders is being addressed rather than DOE's mission.

POSSIBLE PERFORMANCE INDICATORS

Performance indicators are measurable factors that can be used to gauge the extent to which a public participation program has been successful according to a particular definition of success. Performance indicators can be either objective or subjective. Objective indicators, created for an individual definition of success and tailored to a specific site, use data about events or actions to show what was accomplished by a particular public participation effort. Subjective indicators, on the other hand, use participants' perceptions to determine the extent to which an effort was successful—again, according to a specific definition of success. Most of the 17 definitions of success discussed above can be measured reasonably well by both objective and subjective performance indicators but, in a few cases, only objective or subjective indicators are likely to be appropriate. Examples of both types of indicators are presented below.

Objective Indicators

Two particular definitions of success seem to be much better suited to objective than to subjective indicators. These definitions are: (1) environmental management costs are minimized; and (2) adverse environmental impacts are minimized. While it is true that interested parties could offer their opinions on how clean-up costs and environmental impacts were affected by the public participation effort, objective indicators to address these topics are likely to provide a more definitive account than would subjective impressions. Unfortunately, the data necessary to measure this are likely to be readily available only upon completion of the environmental clean-up effort. For the minimization of costs, one indicator of success would be the comparison of actual costs incurred with cost estimates based on one or more alternative remediation schemes that were modified

due to public participation efforts. Clean-up costs at the site in question could also be compared to costs at similar sites (if such exist) that were faced with similar problems but arrived at different solutions through the use of dissimilar public participation mechanisms. As for the minimization of adverse environmental impacts, site-specific indicators--such as the presence of particular groundwater contaminants--could be identified and the extent of their remediation could be compared to the predicted effects of alternative clean-up schemes previously proposed for the site or used at other locations. In addition, by identifying the exact location of the environmental impacts in question, one could measure the extent to which adverse effects are distributed equitably among the public.

The accomplishment of DOE's site-specific mission also is well-suited to measurement by objective indicators, as is the satisfaction of the overall objectives held by non-DOE stakeholders. In both cases, site-specific indicators would have to be developed based on the mission/goals of the parties in question. Possible indicators include the number of acres treated and released for unrestricted use, the cost-effectiveness of DOE expenditures, the completion of milestones relative to the established schedule, changes in the number of site accidents and releases, and changes in local property values. As we'll soon show, however, subjective indicators also could be used for the same broad definitions of success.

A final example of objective performance indicators is the set of measures that can be used to show the extent to which the decision-making process allows full and active stakeholder representation. These indicators could include: the times, days, and locations of meetings and workshops and the methods used to advertise them; the number of people attending those events; the race, age, gender, national origin, income, and organizational affiliation of the participants; the number of other mechanisms used to elicit public involvement; and the number of written comments received from diverse stakeholders.

Subjective Indicators

The extent to which public participation efforts have been successful is best measured by subjective indicators for the following four definitions of success: (1) the decision-making process is accepted as legitimate by stakeholders; (2) key decisions are accepted as legitimate by stakeholders; (3) the public has trust and confidence in DOE; and (4) key decisions are improved by public participation. For the first three of these, we can imagine the use of certain objective indicators (such as negative media reports and lawsuits) to measure the degree to which the public accepts and trusts DOE and its actions, but it seems that we can get more meaningful and accurate results by directly asking participants for their responses. For the last definition, it would be possible to objectively measure whether decisions had been <u>changed</u> as a result of public participation,

but the concept of improvement is inherently subjective and suggests the need to ask participants for their judgment on whether (and how much) public participation has led to better decisions.

As mentioned previously, the extent to which public participation efforts have been successful can be measured by subjective as well as objective performance indicators for most of the definitions of success presented in this paper. Two of those success definitions, for which objective indicators have already been described, are: (1) DOE's site-specific mission is accomplished; and (2) the overall objectives of non-DOE stakeholders are met. In contrast to the objective indicators that were suggested, a simple subjective indicator is available that could be used without modification from one site to another: namely, the perceived extent to which participants' overall goals and objectives (whatever they might be) have been met.

The accomplishments of public participation efforts in terms of other definitions of success also can be ascertained using simple subjective measures. For example, the extent to which the decision-making process allows full and active stakeholder representation could be determined by asking participants to describe how well the public participation effort in question did on this score. Similarly, participants could be asked their perceptions of how well existing conflicts have been resolved and the extent to which key decisions have been influenced by the public.

SUMMARY AND CONCLUSIONS

There are many different ways in which the success of public participation efforts can be conceptualized and described, as illustrated by the 17 definitions of success presented in this paper. We believe that useful and accurate evaluations can be conducted using a substantially reduced subset of these definitions and that, in fact, paring down the number of definitions of success is essential for conducting a manageable evaluation yielding results that are focused enough to be of use to decision-makers and public participation practitioners. Such a reduction in the number of recommended success definitions will come at the end of the current study but, for now, we consider it instructional to present the full range of possibilities.

While our eventual goal is to recommend a reduced set of success definitions that would be most useful to those sponsoring and engaging in public participation efforts, we expect to end up with no fewer than four or five separate and distinct definitions. In part, that is because multiple definitions are sure to be needed to fit the different kinds of environmental management activities and public participation efforts that are found across the DOE complex. But an even more critical reason for avoiding oversimplification is the fact that we need a number

of different perspectives on what is accomplished in order to accommodate the tremendous diversity among stakeholder groups as well as the variety of interests that we frequently find within a single stakeholder group.

While we have not completed our analysis as of this writing, our preliminary examination of the interview data indicates that different stakeholder groups are likely to favor different definitions of success, based on their underlying interests and objectives. For example, our early results indicate that DOE and its contractors, more than any of the other participating organizations, favor the following two definitions of success: (1) the decision-making process allows full and active stakeholder representation; and (2) the decision-making process is accepted as legitimate by stakeholders. Not surprisingly, internal stakeholders also favor defining success in terms of public trust and confidence in DOE. Local government officials, on the other hand, seem to attach greater importance to DOE's understanding of public concerns and the improvement of key decisions by public participation.

Our preliminary data also support the notion that single stakeholders are likely to have multiple interests where public participation and environmental management activities are concerned. One DOE official, for example, attaches great importance to both the acceptance of the decision-making process as legitimate and the satisfaction of the overall objectives of non-DOE stakeholders. A local owner of contaminated property is very interested in both the reduction of adverse environmental impacts and the accomplishment of DOE's site-specific mission. And a state environmental regulator reports a powerful concern with the meeting of all stakeholder objectives for the public participation effort and with public trust and confidence in DOE. It is actually quite common for such widely varying definitions of success to be considered important by a single stakeholder, reflecting the fact that the people involved in public participation efforts are often concerned with overall community well-being and its many facets, regardless of their primary organizational affiliation.

When deciding which definitions of success to use, it is important to note that the appropriateness of some definitions will be determined by the stage of the decision-making process (i.e., how far along public participation and environmental management efforts are at the time the evaluation is conducted) as well as by the availability of data. To illustrate the first point, we suggest that measuring the extent to which adverse environmental impacts or environmental management costs have been minimized would be relatively easy to accomplish at the end of an EM effort but would involve considerably more speculation at the beginning or in the middle of clean-up activities. As for our second point, it is likely that the difficulty of measuring how key decisions are <u>improved</u> by public participation could lead an evaluator to measure instead the extent to which key decisions

are influenced by the public.

Once an appropriate set of definitions of success is identified, we believe that each individual definition should be considered separately, rather than weighting each of them to come up with a single tally of success. Not only is it extremely difficult to come up with a widely acceptable weighting system that is meaningful for all interested parties, but focusing on a single "success score" rather than on multiple definitions of success obscures the rich descriptiveness of what was accomplished according to various perspectives.

To measure how well a public participation program has performed according to a particular definition of success, different types of performance indicators can be used. Objective indicators use data about key events or actions to show what was accomplished by a particular public participation effort; these indicators are created for an individual definition of success and tailored to a specific site. In contrast, subjective indicators use participants' perceptions to determine the degree to which an effort was successful in terms of a particular success definition, and each indicator can appropriately be used at many different sites.

There are a few instances where only objective or subjective indicators are likely to be appropriate, but performance can be readily measured by both types of indicators for about two-thirds of our definitions of success. In those cases where both types of indicators are appropriate, an evaluator can decide which kind to use by weighing the relative advantages and disadvantages of each. In general, subjective indicators will be faster and easier to develop and use, but the findings may be more subject to alternative interpretations. Objective indicators, on the other hand, will typically be more difficult to develop and will require more time for data collection, but the findings may have greater accuracy and credibility. Of course, an evaluator could choose to use more than one performance indicator with a single definition of success and, in such a case, both objective and subjective indicators could be employed.

Our research suggests the wide variety of ways in which the success of public participation programs can be defined and measured. Through this paper we have attempted to present what we have learned to date from our work in progress, and we hope that our findings will prove useful to the many interested parties involved in public participation efforts.

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DISCLAIMER

Table 1. Definitions of Success, Grouped by Broad Category

I.	**The Decision-Making Process**
•	DOE is presented with comprehensive and thoughtful input by the public
•	The decision-making process allows full and active stakeholder representation
•	The decision-making process is accepted as legitimate by stakeholders
II.	**Effects of Public Participation on Stakeholder Understanding and Attitudes**
•	The public understands DOE's environmental management problems and associated actions
•	The public understands the connection between clean-up costs and environmental benefits
•	DOE understands public concerns
•	Existing conflicts are resolved
•	The public has trust and confidence in DOE and the DOE facility
III.	**Effects of Public Participation on Environmental Management Decisions**
•	Key decisions are accepted as legitimate by stakeholders
•	Key decisions are influenced by the public
•	Key decisions are improved by public participation
IV.	**Effects of Environmental Management Decisions on Site Conditions**
•	Environmental management costs are minimized
•	Adverse environmental impacts are minimized
•	Adverse impacts are distributed equitably among the public
V.	**Effects of Environmental Management Decisions on Stakeholders' Objectives**
•	Stakeholder (DOE and non-DOE) objectives for a particular public participation effort are met
•	DOE's site-specific mission is accomplished
•	The overall objectives of non-DOE stakeholders are met