

## **Local Impacts of U.S. Nuclear Weapons Facilities:**

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### **A Survey of Planners**

Karen Lowrie<sup>1</sup> and Michael Greenberg<sup>2</sup>

<sup>1</sup>Karen Lowrie, Ph.D., is a Post-doctoral Associate in the Department of Urban Studies and Community Health at the Edward J. Bloustein School of Planning and Public Policy at Rutgers University, 33 Livingston Ave., Suite 100, New Brunswick, NJ 08901-1958. She conducts research in environmental planning and land use.

<sup>2</sup>Michael Greenberg, Ph.D. is a Professor in the Department of Urban Studies and Community Health at the Bloustein School of Planning and Public Policy at Rutgers University and is Director of the Graduate Program in Public Health at the University of Medicine and Dentistry of New Jersey and Rutgers University.

## **Summary**

This research examines the perceptions of planners in communities around the largest U.S. Department of Energy (DOE) nuclear weapons sites. Surveys and interviews revealed that planners are often unclear about DOE intentions, concerned about jobs and environmental contamination, and desire more involvement with future site use decisions. Planners' ratings of residents' trust of the DOE were also low, and low trust was most strongly associated with places where local officials have not been invited to future use meetings. Recommendations include improving coordination of on-site planning with local land use plans and increasing trust with a Federal-local government partnership that recognizes local concerns about the clean-up, closure and disposition of the sites.

## **Introduction**

Owned and managed by the U.S. Department of Energy (DOE), the nuclear weapons complex consists of some 140 sites located in 38 U.S. states and territories, encompassing 2.3 million acres of land and containing tens of thousands of individual buildings and structures. The complex makes DOE the nation's third largest landowner and the agency and its contractors are one of the largest employers in at least four states (ICMA 1996b). Over 100,000 workers are employed in various activities, ranging from continuing research and production at some locations to cleanup of contaminated water, soil and buildings at other locations.

Every laboratory or facility in the complex is contaminated to some extent with either radioactive or other hazardous materials. However, 80 percent or more of the land on the massive Savannah River Site (SRS) (310 sq. mi.), Hanford (560 sq. mi.) and Idaho National Environmental Engineering Lab (INEEL) (890 sq. mi.) and smaller Oak Ridge and Rocky Flats sites is not significantly contaminated and could be returned to some level of other public or private use (U.S. DOE, 1996b). Many of the DOE's small sites are being remediated with the intent of returning them to industrial or commercial uses.

One would expect that concerns about environmental contamination from the sites would be paramount in adjacent communities. However, environmental aspects are placed against the powerful economic influence of the sites on the growth and development of their regions. These communities are like "company towns" in their heavy reliance on jobs at the facility to maintain their economies. Previous research has shown that the economic health of these regions has changed directly in response to changes at the sites (Greenberg, et al. 1997). Further, the population in some of these regions is relatively poorer and less educated than their respective states (Greenberg and Simon 1995). Local communities may be less able to survive cutbacks because of the high wages paid by the DOE or because the stigma effects of a nuclear site may

have stunted other industrial growth (Mayer and Greenberg 1996; Brauer 1995; Brody and Fleishman 1993; Slovic, et al. 1991).

Integrating the future use of these sites into local land use and economic development planning is a recognized DOE obligation. Since many towns near the sites have been dependent on jobs from the sites for decades, they are anxious for opportunities to maintain or recoup some economic or social value from the site. From a national budgetary perspective, future use is the single largest determinant of the eventual costs of cleaning up the sites, which range from \$150 billion for the least expensive (“iron fence”) to \$284 billion for the most expensive scenario  
highest cost sites over the next 75 years (DOE 1996b).

A culture of secrecy has served as a backdrop and excuse for limited outside involvement in site activities for decades. Not only was there little to no contact with outside planners, but one could not even get a site map or photo of existing land uses until recent years. During the past two to three years, the DOE has begun to solicit input from citizens of surrounding areas into future use planning at the sites (DOE, 1996a; DOE, 1995). This research targets a key stakeholder group, municipal and county planners, to find out their concerns about the DOE sites and their perceptions about involvement in site planning and trust of the DOE.

Our intent was to understand planners’ perceptions of the impacts of the sites on their communities, their preferences for future uses of the sites, their participation in the planning process, and the relationship between the extent of contact with the DOE and trust of the Department’s efforts.

### ***Research Questions***

1. What are the concerns of local planners regarding the past impacts and future use of DOE sites in their areas?
2. To what degree have local planners participated in DOE future land use planning activities?

3. How do planners' perceptions of the public's trust of DOE relate to planners' concerns and involvement with site planning?

## **Previous Research**

### ***Local Involvement in Defense Facility Planning***

DOE's recent future site use report states that the agency "recognizes that the question of future land use can only be answered responsibly with local input," and that the DOE is "committed to undertaking long-term site comprehensive planning, with the significant involvement from affected governments and the public" (DOE 1996a). Previous research by the authors on land use planning issues in the area around DOE's Savannah River Site (SRS) in South Carolina showed that while many local officials were concerned about the impacts of the site's shifting mission on their communities, site officials had not actively reached out to involve local planners in future use decisions (Lowrie and Greenberg 1997). Preliminary findings from interviews with planners around the Hanford Reservation near Richland, Washington, corroborate the SRS study, with planners expressing the perception that the DOE is not incorporating local planning goals (Mercer 1997).

The DOE launched two separate initiatives in recent years as formal mechanisms to integrate off-site concerns into site activities. Site Specific Advisory Boards (SSAB's), formed in response to the 1988 Federal Advisory Committee Act (FACA), are made up of citizens representing diverse interests, who meet regularly to advise DOE on site activities. Community Reuse Organizations (CRO's) are DOE-funded groups formed to help impacted regions deal with the economic transition caused by plant downsizing. These efforts are a step in the direction toward greater integration of on-site and off-site planning, but there is no requirement that local officials take part in either of these groups. The result is varying degrees of local government involvement from facility to facility. Also, there is little evidence that either of these programs has

tackled crucial local community needs like infrastructure development or improvement of public education. Indeed, Congress has not permitted the DOE to fund public improvement programs the way it has at DOD sites.

DOD military bases represent the closest equivalents to the DOE sites in terms of the types of issues arising when a federal facility changes its mission. Since the Base Realignment and Closure Program (BRAC) began in 1989, many have been closed and returned to private uses. At many military facilities, the U.S. Department of Defense (DOD) has taken an active role in local planning processes. For instance, some operating military airports have developed Comprehensive Land Use Plans (CLUP). This is a joint effort to develop plans with local and/or regional governments to promote compatible neighboring land uses for existing facilities. A naval air station near San Diego (CA) established a Community Planning Liaison Office, staffed with professional planners, whose job it is to coordinate on and off-site land use decisions (Pierson 1996).

Congressional legislation related to base closure activities mandates that a community-based reuse planning process begin upon the final selection of the base for closure or realignment. A Local Reuse Organization, or LRA, identifies local needs, solicits public comment, and conceives a redevelopment plan for the DOD to consider in reuse decisions. The LRA has two years to prepare the plan, incorporating environmental considerations, natural resource concerns and cultural and historical requirements (DOD 1995). Thus, most if not all of the facilities identified for downsizing or closure under BRAC have solicited input from local planning officials and the general public early in the transition planning process. Goals are developed for base reuse that support local goals for economic and community development.

***Public Trust of the DOE***

DOE weapons sites enjoyed comfortable relationships with nearby towns in the past because, in many cases, they have been a steady source of high-paying jobs and because the locals had become familiar with the facilities over time (Metz 1996; McCabe and Fitzgerald 1988). However, Nealy and Hebert (1983) predicted over a decade ago that support could be undermined if an accident were to occur, or if resolution of important issues were constantly delayed. During the 1980's, disclosures about mishandling of hazardous materials and possible public health threats at major sites like Hanford and Rocky Flats threatened to destroy the prior "halo effect" across the nuclear weapons complex. In the early 1990's, as some sites began to lay off workers and move toward closure, nearby towns found even more reason to question the DOE's credibility, fueled by their frustration over lack of control over the "boom/bust" impacts of federal decisions (ICMA 1996a).

Public distrust of DOE has been documented by various studies. For example, Kraft and Clary (1993) found from their analysis of comments from public hearings on siting nuclear waste repositories that lack of confidence in the DOE significantly influenced other attitudes and affected the level of opposition to DOE plans. Public officials said DOE "paid little attention" to socioeconomic impacts. The DOE also failed to address local values adequately according to a study of farmers near a proposed waste repository site in the Texas Panhandle (Brody and Fleishman 1993). Binney et al. (1996) found that distrust of DOE characterized attitudes about the transport of nuclear waste. Notably, attitudes were improved for those issues, primarily technical, for which DOE had worked with state and local groups in planning. They conclude that nothing short of a full partnership between the agency and local citizens is required for restoring lost public trust on transport issues. Recent research involving case studies of communities hosting nuclear facilities related adverse perceptions about DOE to two perceptions: a potential for

significant environmental impacts and concealed information or improper monitoring of impacts (ICMA 1996b).

La Porte and Metlay (1996) also identified withholding of information and having operations with high and long-lasting hazards as factors that lead citizens to withdraw their trust in an organization. Krannich and colleagues (1993) point out, though, that unique cultures of individual communities (such as the extent to which the area is economically depressed, the geographical mobility of the local population, or an underlying community ethos) will influence local attitudes and perceptions about nearby nuclear sites. Understanding the local community and its concerns is therefore a needed element in any meaningful DOE-local dialogue.

### **Study Methods**

Our methods consisted of a mailed questionnaire and qualitative data from written comments and selected follow-up interviews with planners.

#### ***The Questionnaire***

A questionnaire was mailed to 166 planners in the fall of 1996. The target population included all planners from the 65 counties within ten miles of the boundary of the DOE's 18 largest sites (see Figure 1). These are the sites where weapons research was conducted, bombs were manufactured and tested, and where radioactive waste remains. We also identified all of the minor civil divisions (MCD's) in the counties with populations above 15,000. If a county or MCD did not have a planning department or anyone else responsible for planning, they were dropped from the list. The final population to receive the survey consisted of planners from 52 counties and 114 MCD's.<sup>1</sup>

[Figure 1 - Map of sites about here]

The four-page survey instrument contained mostly close-ended questions, with space for comments on the last page.<sup>2</sup> Respondents were asked to rate the degree of impact the DOE site



has on their communities in several different areas (economy, social structure, demographics, land use and environment) from 1 (little) to 5 (great), and to rate the overall impact of the site from 1 (very negative) to 5 (very positive). Next, they were asked to evaluate community concern for DOE jobs, environmental contamination, property values, recreation and DOE land ownership from 1 (little concern) to 5 (great concern). A set of two questions asked them to indicate the uses they expected for the site and then to rank their preferences for future use of the site (1 = least preferred, 5 = most preferred) from the same list.

Respondents were then asked to respond with their level of agreement (1 = strongly disagree, 5 = strongly agree) to a series of twelve statements about their involvement with planning at the DOE site, their capability to deal with site changes and local residents' trust of the DOE. Finally, planners rated the importance of various factors in limiting economic growth in their regions from 1 (not important) to 5 (very important). These factors included some typical determinants of economic growth like highway access, taxes and public school quality and also two that referred specifically to the DOE site; high wages paid at the site and stigma effects.

### ***Qualitative Data***

To complement the quantitative findings from survey answers we identified four planners who had responded to the survey for follow-up telephone interviews. We selected planners who had written significant comments and who had indicated that they were willing to discuss the issues further with us. Significantly, they were planners from host counties of four of the five largest sites in the complex in budget terms (SRS, Hanford, Rocky Flats and Oak Ridge). These planners answered open-ended questions about their perceptions of off-site impacts and participation in planning decisions regarding the site. We include excerpts from some of these conversations and from comments written on surveys in the following section.

## **Results and Discussion**

### ***Response Rate***

Of the 166 surveys sent, a total of 66 were completed and returned, for a response rate of 40 percent. These 66 included respondents from around 16 of the sites. The rate was higher for county planners (51 percent) than for municipal planners (34 percent). Since it is important to know who is interested in the sites and who might want to participate in planning processes, we compared characteristics of respondent and non-respondent places. We make the assumption that if someone were more interested in the site, he or she would be more likely to have opinions about the site's impacts and want to participate in the study by filling out and returning the questionnaire. Yet, some may have chosen not to respond because the study was funded by the DOE, or because of a lack of time or personal distaste for surveys.

The analysis showed that planners were more likely to respond if their town or county was closer to the DOE site and if the nearby DOE site was larger geographically and employed more people ( $p < .05$ ). The population and per capita income of the planners' jurisdictions did not differ significantly between respondents and non-respondents.

### ***Question 1: Important Planning Concerns***

To address the first research question, planners were asked their concerns about the site in several different ways. First, they rated their perception of the overall effect of the site on their area's development. Table 1 below shows that almost 40 percent said the DOE site had large economic effects (rated 4 or 5 out of 5). In comparison, other impacts were rated less important, notably including environmental impacts.

[Table 1 about here]

Another question asked for the degree of community concern about DOE jobs, environmental contamination, property values, returning of DOE lands and recreational opportunities at the site (see Table 2). More planners rated DOE jobs as an important concern (4

or 5 out of 5) than any other (47 percent), followed by environmental contamination (38 percent). Fewer than 20 percent of planners thought their residents were concerned about property values, returning DOE land to original owners or recreation at the site.

[Table 2 about here]

Respondents who reported strong economic impacts were twice as likely to rate the overall impact of the site to be positive than those who reported significant environmental impacts. An explanation is that if contamination is perceived to deter new industry or other land uses, economic gains brought by jobs at the site may be more than offset by losses in other areas of the economy. For instance, a planner near the Nevada Test Site said his area might be negatively impacted because “nuclear waste is bad for tourism” (see also Metz 1996 and Slovic, et al. 1991). Or, if the town or county owns land near the site, pollutants migrating from the site may render the land worthless or severely constrain its use. The city of Broomfield (CO), for instance, owns 600 acres adjacent to the Rocky Flats site.

Regarding future site uses, planners rated each of nine choices from 1 (least preferred) to 5 (most preferred). Table 3 lists the nine future use categories in order from most preferred to least preferred. Industrial use was preferred by more planners than any other use (over 60 percent rating it with a 4 or 5), followed closely by cleaning up the site. Ecological and commercial uses ranked next with around 40 percent of planners rating them highly. Only about a quarter said they preferred nuclear uses and over 50 percent said this use was definitely not preferred (rated 1 or 2). This suggests that many of these communities are ready to move away from the past and move on to reclaiming other benefits from these sites.

[Table 3 about here]

When asked what uses they expected for the site, the largest mismatches between preferred and expected uses were for nuclear and ecological uses. For nuclear use, 50 percent

thought it a likely use, but only 27 percent of respondents preferred it. For ecological use, it was the reverse condition. That is, although only 29 percent expected this use, over 40 percent said they preferred it.

### ***Planners' Involvement with DOE Site Planning: Question 2***

A series of twelve statements on the questionnaire dealt with the degree to which the planners felt included or involved in the DOE site planning process. Agreement with the statements was rated from 1 (strongly disagree) to 5 (strongly agree). The strongest agreement was with the statement "We would like to involved more in planning efforts related to the DOE site," with 50 percent answering with either a "4" or a "5." Although 50 percent said they wanted more involvement with DOE site planning, only 25 percent said the DOE facility informs them adequately and only 15 percent said the DOE asks for their input into decisions that affect their areas. Almost 38 percent reported that site officials have asked them to attend meetings, but only 9 percent said they provided any significant input to planning efforts at the site.

In addition to relatively few planners reporting any involvement in site planning, over a third (38 percent) said they do not have adequate planning tools to handle future DOE site downsizing and almost 30 percent said the community did not have adequate infrastructure, meaning roadways, water and sewer.

To summarize, for the planners we surveyed, reported involvement with DOE site planning was relatively weak, with few reporting any significant input. The DOE has not reached out to specifically solicit the input of planners in the vast majority of cases. Direct invitations to planners in affected communities would represent a minimum level of effort to include off-site land use considerations in the planning process, but we found that, in a majority of cases, even this effort was not made. For instance, a respondent from near the Rocky Flats facility reported that no county or city planners were invited to participate in the Future Site Use Working Group.

The tendency to neglect local planning offices could be reflective of the old pattern of secret decision-making at the sites. A planner from near the Hanford Reservation said, when asked to comment about plans at the site, said that he had not seen any plans so he could not provide any comment. He went on to say about the agency, “How does one become involved with a monolith?” Similarly, a planner near Savannah River Site (SRS) said that although he is interested in the impact of site plans on his community, it is “beyond our control” to influence it, and that most efforts to solicit local input are only “lip service.”

It is also difficult to establish a sound process for including off-site impacts when on-site planning goals are not yet clear. A planner from near the Oak Ridge Reservation said she is not sure what the future holds for the facilities, and that the “DOE appears to be as confused as we are.” As a planner near Rocky Flats noted, it is “hard to be read DOE’s intentions still aren’t clear.” On the other hand, a planner near the Portsmouth (OH) plant where planning involvement has been “extensive,” said that when it works well, a joint effort to work cooperatively for economic development and land use growth issues.”

In order to look at interactions of more than two variables at a time in describing concerns and involvement of planners, we employed factor analysis, which constructs new multivariate variables from the original variables that may help to uncover underlying patterns of association. We discuss the first three factors extracted in the analysis because they accounted for the most covariation among the original variables. Table 4 below shows the correlations between the original variables and the factors. Only those variables with correlations  $> |.40|$  with the factors are presented.

[Table 4 about here]

The analysis suggests that, based on the variables we measured, there are at least three general types of regional planning relationships that can be found in the communities that surround the DOE sites: “antagonistic,” “economically dependent,” and “good neighbors” (see Figure 2). These labels summarize the relationship between community officials and the site. Some regions are more homogenous and can be aptly characterized by one of these categories. In other cases, a single site may have nearby communities that fall into more than one of the categories, giving rise to different appraisals within the same region.

[Figure 2 about here]

The first factor describes a situation where planners report that their communities have major concerns about the DOE site. They perceive that the site has a negative overall impact, and their primary concerns are with environmental contamination and land use impacts caused by the site. They say that the nuclear stigma of the site deters growth and limits land use options around the site. These planners expect waste management and ecological use of the site and rate nuclear uses as least preferred. Both public trust and goal agreement with the DOE are low for the planners associated with this factor. Relating the respondents with the new factors, some of the sites with planners who associate positively with this factor are Fernald (OH), Hanford (WA), Nevada Test Site (NV), Rocky Flats (CO) and SRS (SC).

We label the second factor “economically dependent.” It is associated with planners from places close to the larger sites with more employees. The site is viewed as a positive overall influence on the area, and has strong economic social effects on the area. Primary concern is with the maintenance of jobs at the site. Nuclear uses are both expected and preferred, and the respondents do not want to see the site closed. This factor is identified with planners from Hanford (WA), INEEL (ID), Nevada Test Site (NV) Sandia Labs (NM), and SRS (SC) areas.

The third factor, “good neighbor” describes places where planners are well-informed and highly involved in DOE site planning activities. They report good regional cooperation in future use planning and agreement between local and DOE goals. They also rated public trust of DOE highly. The sites that characterize this factor are INEEL (ID), Pantex (TX), Portsmouth (OH), Sandia (NM) and Waste Isolation Pilot Plant (WIPP) (NM).

The three classifications are not mutually exclusive, so we can develop further classifications based on sites that appear strongly positive and/or strongly negative on more than one of the classifications. For instance, the two sites that have probably been the most politically contentious in the past decade in terms of public protest are Rocky Flats (CO) and Fernald (OH). These two sites are both found in the antagonistic and opposite of economically dependent groups. It makes sense that places where planners perceive negative land use and environmental impacts and report low levels of trust, and where the community is not as dependent on jobs would have the most outspoken criticisms of the site.

On the other hand, a group of sites consisting of Hanford, SRS and Nevada Test Site show up in all three categories - the antagonistic, not good neighbor, and economically dependent categories. Some of the places around these sites, then, have some major concerns about the site and also do not report very good planning cooperation. However, because they receive economic benefits from the site, fear of job losses and of the negative economic impacts of plant downsizing has perhaps resulted in less outward contention at these sites.

The most positive indicators of planning cooperation belong to those sites that score low on antagonism and high on good neighbor. This includes INEEL, Sandia, Pantex and WIPP, with the former two also scoring highly on the supportive-dependent classification. Planners responding from around these sites did not have significant concerns about contamination, generally support continued operation of the plant and feel adequately informed about site issues.

### *Trust of DOE: Question 3*

Public trust of the DOE is critical to establishing an effective and credible land use planning process near the sites. We define trust as the “belief that those with whom you interact will take your interests into account (La Porte, 1996).” Hence, the survey included one question that asked for a rating of agreement with the statement “Local residents trust DOE representatives and the information they provide.” About 40 percent of respondents indicated a low level of agreement with the statement (1 or 2), and less than 14 percent reported positive agreement (4 or 5).

To examine the relationships between other variables and public trust, we employed discriminant analysis. Discriminant analysis is a technique that chooses linear combinations of variables that result in the best separation among groups. In this case, we used three groups: those who indicated agreement with the trust statement (n = 9); those who indicated disagreement (n = 26), and those who were neutral (n = 31).

Because the analysis is exploratory, we report all variables that have r-values  $\geq |0.20|$  with the discriminant function. A strong statistical finding for a variable does not necessarily imply a causal relationship between that variable and level of trust. It does, however, allow us to identify characteristics that tend to be associated with more reported trust of DOE. We describe the strongest function, that had a eigen value of 1.7 and accounted for 74 percent of the variance. The second function will not be presented here, because it had an eigenvalue of less than 1, and so is no more powerful than the original variables in explaining variance.

[Table 5 about here]

The function describing variables associated with greater trust was robust, with a canonical correlation of .798 and a correct classification of 83 percent of respondents (Table 5). Notably, the most powerful discriminating variable was being asked to attend future use planning



meetings. This supports the statement of a Rocky Flats area planner who commented that local representation on Site Specific Advisory Boards or Community Reuse Organizations does not replace the need to have a direct government-to-government relationship between the site and local communities (ICMA, 1996a). Another planner we interviewed called for a “public-public” partnership between Federal and local officials.

Those who reported greater public trust also had fewer environmental concerns about the site, rated the overall impact of the site positively and expected nuclear activities at the site in the future. Greater trust was associated with agreement between DOE and local plans. It follows that if these communities have been contacted directly to respond to issues affecting their area, their trust in the process may actually lead to the development of mutually satisfying outcomes.

The analysis suggests that it may be easier to form a trusting relationship in areas that want continued nuclear use of the site and have no interest in returning the land to residential use. If there is no demand for housing and no serious problem with contamination, public controversy is likely to be low. Indeed, the seven sites that score highly positive on the trust factor are places with little controversy and little demand for uses other than continued nuclear. The research labs at Idaho, Los Alamos, Oak Ridge and Sandia (NM) identify positively with the trust function, along with the relatively small sites that have continuing missions, like Pantex, Portsmouth and WIPP.

The converse and equally important interpretation of this result is that public trust of DOE is lower in places where planners rate the overall impact of the site as negative. These planners expect residential uses for the site and not nuclear uses, and report that residents are concerned about contamination. Also, DOE and local planning goals are not in agreement and local planners have not been asked to attend meetings.

The respondents that associated negatively with the public trust function were Fernald and Rocky Flats, two places where off-site contamination has been a concern, site officials have been perceived to withhold information from interested parties, and segments of the public have played activist roles in demanding attention to these concerns and lobbying for clean-up and closure. For example, the Rocky Flats site has some of the most dangerous buildings in the nation and plutonium migrating off-site has prompted concerns about drinking water safety in neighboring communities. Further, disclosures about environmental contamination came after an FBI raid on the facility in 1989 that resulted in the ceasing of all production in 1992 (Martin, 1992).

Other sites with areas that rate public trust low include the highly contaminated Hanford site, the large Nevada Test Site that has been perceived as a tourism deterrent, and sites near larger metropolitan areas, like the Kansas City Plant, the Lawrence Livermore Lab, near San Francisco (CA) and the Weldon Spring site, near St. Louis (MO).

This interpretation indicates that the DOE should see a red flag in areas where residents fear off-site contamination and do not want nuclear uses to continue. If these ingredients for distrust are present, along with a perception that the site has been negative for the area and site officials do not ask for local input into planning, it is a recipe for disaster for trust-building. In these places, the DOE should be especially sensitive to the need to be forthright and involve the community in planning initiatives.

### **Conclusion**

A planner at a DOD military base noted that common pitfalls of the land use planning process are ignorance (not knowing what neighboring communities are planning), apathy (putting off involvement with local governments) and arrogance (assuming that the importance of the mission prevails over local interests) (Pierson 1996). We have seen all three of these pitfalls in DOE's planning process.

We suggest that the DOE act quickly to begin to better integrate on and off-site planning issues. This involves a new thrust in the transition program involving planning for **place** (geographic regions) in addition to planning for **people** (laid off workers). This means making a real effort to understand the important concerns of communities in all directions from the site boundaries and allowing active involvement of local planners and other officials.

Site management needs to show a willingness and good faith effort to discuss and, if feasible, conform future site planning with the needs and wants of adjacent communities. One idea is that the sites may want to mirror land use categories already used in local master plans in adjacent municipalities. This kind of integrative future use planning will give neighboring communities a more sound basis for their own land use and development planning.

Over 20 years ago, Rosenbaum (1976) suggested a permanent and/or mobile planning information center staffed by planners and public relations specialists as a technique for increasing citizen involvement in land use planning. A prerequisite for this approach is that the sites employ trained planners who speak the planners' language, understand the local planning context, and have the expertise to develop sound future plans for the site.

Another idea is to create a board with membership from all hosting and adjacent counties and municipalities and empowering it to make meaningful future use recommendations on parts of sites not needed for future nuclear and/or waste management decisions. A model process took place at DOD's Fort Ord on Monterey Bay in California. After it was identified for downsizing, the Fort Ord Reuse Authority incorporated to prepare and implement a reuse plan. Importantly, the Authority included local officials from the host county and ten surrounding municipalities. A consultant said that this "was a necessity to give a regional focus to the reuse plan, and to get all the involved entities on the same page" ("Fort Ord..." 1997).

Future research will continue to inform the process of conversion from Cold War production to post-Cold War downsizing at the DOE sites. Ongoing and future research by the DOE-funded Consortium for Risk Evaluation with Stakeholder Participation (CRESP), of which this research is a part, will study social, economic and planning aspects from both a macro-scale and micro-scale perspective. Specifically, we will complement this study by evaluating the fiscal and economic health of the communities and regions near all the major weapons facilities with a survey of local government financial officers. We will also evaluate economic impacts of DOE spending allocations with an inter-regional econometric model. At the smaller scale, we plan to study land use and planning issues around the Rocky Flats Site and evaluate economic development efforts at SRS, INEEL and Hanford. We are also conducting a study of the smaller facilities in the DOE complex that are in the Formerly Utilized Sites Remedial Action Program (FUSRAP) to see how the process of public participation has worked to help move these sites toward completion and into private ownership.

The nuclear weapons facilities have left legacies of environmental waste and economic vulnerability in the regions that surround them. The legacy of public distrust in the DOE may be the hardest to overcome. Now that national defense goals no longer drive the activities at the site, but instead the need to clean up, close down and reuse them, local plans and goals need to replace the national agenda. A commitment to a new way of doing business that includes a “partnership in planning” between sites and regions is critical to removing the legacies of the past and reaching some common ground on which to build a future.

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### **References**

- Binney, Stephen E., R. Mason, S. W. Martsolf and J. H. Detweiler. 1996. Credibility, Public Trust and the Transport of Radioactive Waste through Local Communities. *Environment and Behavior* 28, 3: 283-301.
- Brauer, Jurgen. 1995. U.S. Military Nuclear Materials Production Sites: Do They Attract or Repel Jobs? (Some Suggestive Evidence). *Medicine and Global Survival* 2, 1: 35-44.
- Brody, J. G. and J. K. Fleishman. 1993. Sources of Public Concern About Nuclear Waste Disposal in Texas Agricultural Communities, in Dunlap, R. E., M. E. Kraft and E. A. Ross, eds., *Public Reactions to Nuclear Waste*. Durham, NC: Duke University Press.
- Buck, J. V. and B. S. Stone. 1981. Citizen Involvement in Federal Planning: Myth and Reality. *The Journal of Applied Behavioral Science* 17, 4: 550-565.
- Fort Ord Reuse Plan and Environmental Report. 1997. *Planning* 63, 4:10-11.
- Frisch, M., L. Solitare, M. Greenberg and K. Lowrie. 1997. Regional Economic Benefits of Environmental Management at the U.S. Department of Energy's Major Nuclear Weapons Sites, Report 12 to CRESP, New Brunswick, NJ.
- Greenberg, M. and D. Simon. 1995. Economic Characteristics of Counties Adjacent to the Savannah River, Hanford and Other Major U.S. Department of Energy Sites, Report 2 to CRESP, New Brunswick, NJ.
- Greenberg, M. 1993. Local Health Officers' Views on Hazardous Waste Remediation. *American Journal Of Public Health* 83, 5: 752-754.

- Greenberg, M., A. Isserman, D. Krueckeberg, K. Lowrie, H. Mayer, D. Simon, D. Sorenson. 1997. Socioeconomic Impacts of Nuclear Weapons Facilities: The Critical Importance of Scale in Interpreting History and in Developing Policy, Report 4 to CRESF, New Brunswick, NJ.
- International City/County Management Association. 1996a. *Cleaning Up After the Cold War*. Washington, DC: ICMA.
- International City/County Management Association. 1996b. *Base Reuse Consortium Bulletin*, December issue.
- Kaiser, Edward J., D.R. Godschalk and F.S. Chapin, Jr. 1995. *Urban Land Use Planning*, Urbana, IL: University of Illinois Press.
- Kasperson, R. E., D. Golding and S. Tuler. 1992. Social distrust as a factor in siting hazardous facilities and communicating risk. *Journal of Social Issues* 48:161-187.
- Kraft, Michael E. and Bruce Clary. 1993. Public Testimony in Nuclear Waste Repository Hearings: A Content Analysis, in Dunlap, R. E., M. E. Kraft and E. A. Ross, eds., *Public Reactions to Nuclear Waste*. Durham, NC: Duke University Press.
- Krannich, R. S., R. L. Little, and L. A. Cramer. 1993. Rural Community Residents' Views of Nuclear Waste Repository Siting in Nevada, in Dunlap, R. E., M. E. Kraft and E. A. Ross, eds., *Public Reactions to Nuclear Waste*. Durham, NC: Duke University Press.
- La Porte, T. and D. Metlay. 1996. Hazards and institutional Trustworthiness: Facing a Deficit of Trust, *Public Administration Review* 56(4):341-347.
- Lowrie, K. and M. Greenberg. 1997. Placing Future Land Use Planning in a Regional Context: The Savannah River Site. *Federal Facilities Environmental Journal* 8, 1: 51-65.
- Martin, C. 1992. Two decades at the gates of Rocky Flats, *Denver Post*, March 15, p.13.

- Mayer, H. and M. Greenberg. 1996. *Industrial Location and Nuclear Weapons Facilities: The Case of the DOE Facilities at Savannah River*, Report 7 to CRESP, New Brunswick, NJ.
- McCabe, A.S. and M. R. Fitzgerald. 1988. *Open Decision-Making and Citizen Participation in Environmental Policy: The DOE Attempt to Site a Nuclear Waste Facility in Tennessee*. Presented at the Southern Political Science Association Annual Conference, Charlotte, NC.
- Mercer, D. 1997. University of Washington, Personal Communication, June 23, 1997.
- Metz, W. C. 1996. Historical Application of a Social Amplification of Risk Model: Economic Impacts of Risk Events at Nuclear Weapons Facilities. *Risk Analysis* 16, 2: 185-193.
- National Research Council. 1984. *Social and Economic Aspects of Radioactive Waste Disposal*. Washington, DC: National Academy Press.
- Nealey, S. M. and J. A. Hebert. 1983. Public Attitudes Toward Radioactive Wastes, in Walker, S. A., L. C. Gould and E. J. Woodhouse, eds., *Too Hot to Handle?: Social and Policy Issues in the Management of Radioactive Wastes*. New Haven, CT: Yale University Press.
- Noah, J. Christopher. 1996. *A Policy Analysis Regarding Expanded Environmental Uses of the Department of Energy's Savannah River Site*. A Report of a Doctoral Dissertation (for availability, contact author at 803-725-5997).
- Pierson, Fred. 1996. Implementing Compatible Land Use Near Naval Air Station Miramar. Paper presented at Federal Planners' Conference, Orlando, Florida.
- Rosenbaum, Nelson M. 1976. *Citizen Involvement in Land Use Governance: Issues and Methods*. Washington, DC: The Urban Institute.
- Secretary of Energy Advisory Board (SEAB). 1993. *Task Force on Radioactive Waste Management, Earning Public Trust and Confidence: Requisites for Managing Radioactive Waste*, Washington, DC: U.S. Government Printing Office.

- Slovic, P., M. Layman, N. Kraus, J. Flynn, J. Chalmers and G. Gesell. 1991. Perceived Risk, Stigma, and Potential Economic Impacts of a High-Level Nuclear Waste Repository in Nevada. *Risk Analysis* 11, 4: 683-695.
- U.S. Department of Defense. 1995. Office of Economic Adjustment, Community Guide to Base Reuse. Arlington, VA.
- U.S. Department of Energy. 1995. Office of Environmental Management, *Closing the Circle on the Splitting of the Atom*.
- U.S. Department of Energy. 1996a. Office of Environmental Management, *Charting the Course: The Future Use Report*.
- U.S. Department of Energy. 1996b. Office of Environmental Management, *The 1996 Baseline Environmental Management Report*.



**Table 1**

**Planners' Ratings of DOE Facility Effects on Area (Percent of Respondents)**

(n=66)

	<i>Little Effect</i> <i>(1 or 2)*</i>	<i>Great Effect</i> <i>(4 or 5)*</i>
Economy	41	39
Demographics	47	26
Environment	49	24
Social	61	21
Land Use	67	14

\*1 = Little Effect, 5 = Great Effect

**Table 2**

**Planners' Ratings of Residents' Concerns (Percent of Respondents)**

	<i>Not a Concern (1 or 2)*</i>	<i>Very Concerned (4 or 5)*</i>
DOE Jobs	30	47
Environmental Contamination	36	38
Property Values	71	15
Recreation at Site	76	11
Returning DOE Land	88	5

\*1 = Not a Concern, 5 = Great Concern

**Table 3**

**Preferred and Expected Future Uses (Percent of Respondents)**

<i>Future Use of Site</i>	<i>Least Preferred (1 or 2)*</i>	<i>Most Preferred (4 or 5)*</i>	<i>Expected</i>
Industrial	20	61	50
Clean-up	27	56	56
Ecological	36	42	29
Commercial	36	40	33
Nuclear	53	27	50
Recreation	53	26	21
Close Site	62	21	14
Agriculture	61	11	12
Residential	77	9	9

\*1 = Least Preferred, 5 - Most Preferred



**Table 4**  
**Factor Matrix**

Variable	Antagonistic	Economically Dependent	Good Neighbors
Site Employment		.667	
Site Size		.701	
Economy Effects		.786	
Social Effects		.608	.421
Land Use Effects	.618		
Environmental Effects	.614		
Overall Impact	-.499	.486	
Concern: DOE Jobs		.738	
Concern: Contamination.	.680		
Concern: Property Value	.607		
Nuclear Use Expected		.733	
Ecological Use Expected	.482		
Waste Mgt. Expected	.478		
Nuclear Preference	-.468	.456	
Close Site Preference		-.542	
Well-informed			.817
DOE Asks for Input			.789
Provide Input			.759
Asked to Attend Meet.			.685
Belong to a Group			.636
Have Planning Tools			.431
Good Regional Coop.			.534
Trust DOE	-.590		.468
Goals Agree	-.559		.453
Stigma Deters Growth	.550		
Site Deters Land Uses	.620		
<b>% of Variance</b>	<b>16</b>	<b>15</b>	<b>16</b>
<b>Eigenvalue</b>	<b>4.5</b>	<b>4.3</b>	<b>4.4</b>



**Table 5**

**Discriminant Analysis: Variables Associated with Trust**

(Correct Classification = 83%)

<i>Variable</i>	<i>Greater Trust*</i>
Asked to Attend Meetings	.790
Overall Impact of Site	.580
Environmental Concerns	-.529
Expected Residential Uses	-.436
Expected Nuclear Use	.382
DOE/Local Goal Agreement	.333

\* Canonical Correlation = .798

**Figure 2**

**DOE-Local Planning Relationship: Characteristics, Sites and Opposite**

**Sites**

<b><u>1. Antagonistic</u></b>	
<ul style="list-style-type: none"><li>• land use and environmental effects</li><li>• contamination concerns</li><li>• prefer clean-up and ecological use of site</li><li>• low trust and low goal agreement</li></ul>	<ul style="list-style-type: none"><li>• negative overall impact</li><li>• don't want nuclear uses</li><li>• stigma and deterrent effects</li></ul>
<i>Sites: Fernald, Hanford, Nevada Test Site, Rocky Flats, SRS</i>	
<i>Opposites: INEEL, Mound, Oak Ridge, Pantex, Sandia, Waste Isolation (WIPP)</i>	
<b><u>2. Supportive-dependent</u></b>	
<ul style="list-style-type: none"><li>• large sites</li><li>• significant economic impacts</li><li>• don't want site closed</li></ul>	<ul style="list-style-type: none"><li>• large employment at site</li><li>• concerns about jobs</li><li>• want and expect nuclear uses</li></ul>
<i>Sites: Hanford, INEEL, Nevada Test Site, Sandia, SRS</i>	
<i>Opposites: Fernald, Kansas City, Mound, Rocky Flats, Weldon Spring</i>	
<b><u>3. Good neighbors</u></b>	
<ul style="list-style-type: none"><li>• significant planning-related contact</li><li>• well-prepared for changes</li><li>• good goal agreement</li></ul>	<ul style="list-style-type: none"><li>• provide input to DOE</li><li>• high trust</li></ul>
<i>Sites: INEEL, Pantex, Portsmouth, Sandia, WIPP</i>	
<i>Opposites: Hanford, Lawrence Livermore, Nevada Test Site, SRS, Weldon Spring</i>	



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<sup>1</sup> If the planning departments had telefax numbers, surveys were faxed directly to the planner. It was our contention that surveys sent by telefax would have a greater chance of coming to the direct attention of the planner and that planners would be more likely to return them by fax than by mail because of the immediacy and convenience. Approximately 10 surveys were mailed because the jurisdiction had no telefax machine. In an effort to increase response rate, we contacted all planners who did not respond to the first faxing or mailing with at least one follow-up telephone call and, if requested, we sent a second copy of the survey.

<sup>2</sup> All surveys included a cover letter explaining the purposes of the research and assuring confidentiality of answers. The letter described that the research was funded by the DOE through a research consortium. The letter and instrument were reviewed by planners from New Brunswick (NJ) for content, wording and format.