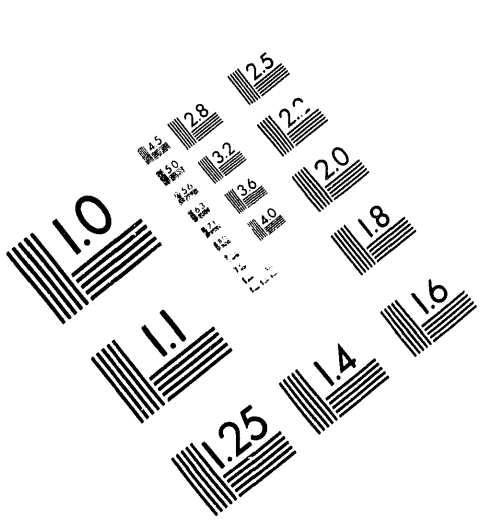

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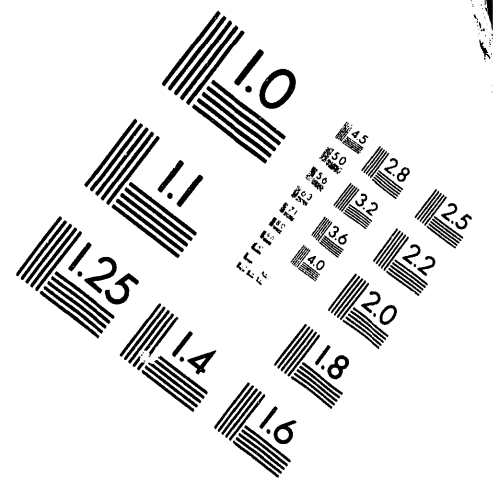

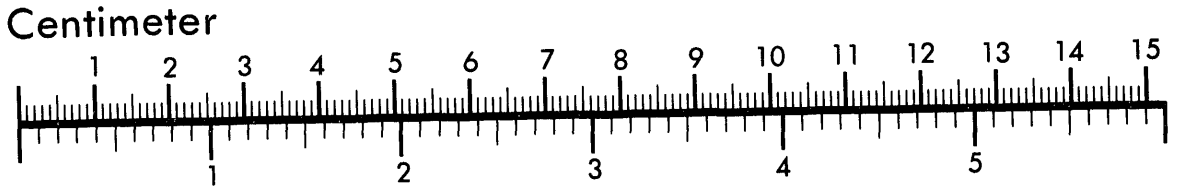

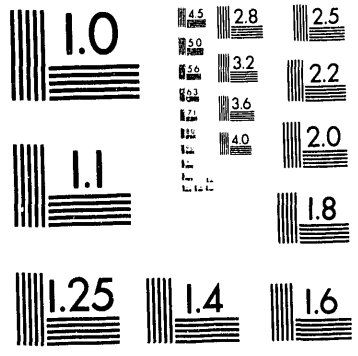

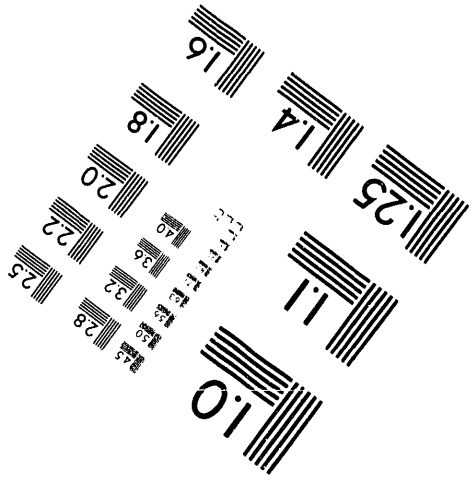

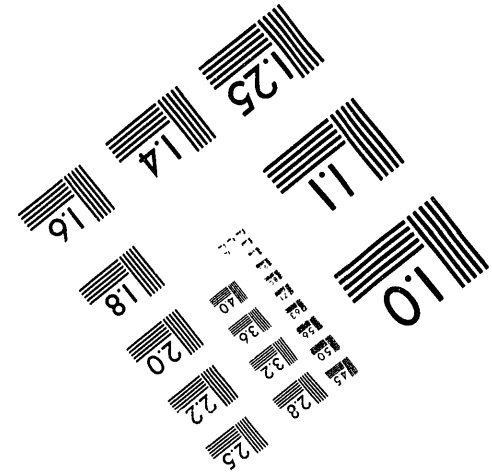

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NUCLEAR WASTE PROJECT OFFICE

NWPO-SE-055-92

Institutional Trust, Information, and Risk Perceptions Report of Findings of the Las Vegas Metropolitan Area Survey June 29-July 1, 1992

by

Alvin H. Mushkatel and K. David Pijawka
Arizona State University

September 1992

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The Nevada Agency for Nuclear Projects/Nuclear Waste Project Office was created by the Nevada Legislature to oversee federal high-level nuclear waste activities in the State. Since 1985, the Agency has monitored the U.S. Department of Energy's proposal to site a high-level nuclear waste repository at Yucca Mountain in southern Nevada. As part of its oversight role, the agency has contracted for studies of various technical and socioeconomic issues associated with the Yucca Mountain Project.

This study was funded by DOE Grant Number DE-FG08-85-NV10461.

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1.0 INTRODUCTION

1.1 Background

This study reports on the preliminary results of a survey of attitudes and perceptions of Las Vegas area residents regarding the proposed high-level nuclear waste repository. The survey's focus was to examine the various dimensions of trust and confidence in government's efforts to develop the country's nuclear waste repository in Yucca Mountain, Nevada.

Trust in government's ability to build and manage a repository in a safe manner has been found to be a fundamental factor associated with risk perceptions and opposition (Mushkatel et al. 1990). The survey provided an opportunity to examine levels of public trust and such trust dimensions as belief in the source of risk information, fairness of the site selection process, agency honesty, accuracy of risk estimations, public access, and control. The survey also provided crosswalks to the previous *1988 Urban Survey* of Las Vegas area residents so that key findings between the two data sets could be compared in terms of consistency of responses and perceptions.

Specific questions on repository risk perceptions, fatalism, and concerns were adopted from the 1988 survey and several questions regarding respondents' knowledge of nuclear waste, attitudinal shifts related to new information, and political efficacy, were taken from several recently completed surveys on public response to nuclear waste repositories. Some of the key trust questions were developed following two focus group sessions held in Las Vegas. Details of the focus groups and the analysis can be found in the Nuclear Waste Project Office's (NWPO) report, *Governmental Trust and Risk Perceptions Related to the High-Level Nuclear Waste Repository: Analysis of Survey Results and Focus Groups* (Mushkatel and Pijawka 1992).

As the survey was being implemented, news of an earthquake 12 miles from Yucca Mountain (June 29, 1992) provided a unique opportunity to expand the scope of the survey from a sample size (N) of 500 respondents to 700 and include an additional five questions pertaining specifically to the event, its impacts, and public policy preferences regarding the repository program. This report presents only the marginal statistics (frequency and percentages) of most of the questions in the survey. Multivariate analysis of findings is ongoing and will be included in a forthcoming final report on trust factors and risk perceptions.

Results in this report correspond to survey questions and represent percentages of sample responses as indicated. The number of valid sample cases (N) may vary per table according to the characteristics of the subgroup being analyzed and the number of valid responses received for the variables included. Percentages may not add up to 100% in some tables due to rounding. Some results are broken into two groups. The total sample consists of 701 respondents, but one group consists of 273 cases of survey respondents who were contacted prior to the earthquake event. The second group consists of 428 respondents who were contacted after the earthquake and subsequently were asked an additional set of relevant questions. Where significant differences were observed, pre- and post-earthquake comparisons were included in the results.

1.2 Methods and Procedures

A sample of 701 residents of the urbanized Clark County area, including cities of Las Vegas, North Las Vegas, Henderson, Green Valley, Boulder City, and unincorporated Clark County, was interviewed by telephone during the period of June 26 to July 1, 1992. Respondents needed to be residents of the calling area and be at least 18 years of age to be qualified for the interview. Random digit dialing was utilized to select respondent households

with information provided by the Centel Telephone Company. A proportionate, stratified random sample based on the geographic location of exchanges and on the proportion of residential listings in the exchange area was drawn. (For example, exchange 452 contains 7,305 residential listings or 2% of the total listings. Thus, for a sample of 700, fourteen completed interviews would be needed from the 452 exchange area.) Exchange digits were matched with randomly generated four-digit numbers to produce a seven-digit number that was eventually called. This procedure makes it possible to include unlisted numbers and any newly listed numbers that have not been included in the most recently published telephone directory. The final number of completed interviews results in a sampling error rate of approximately 3.8% at 95% confidence limits, assuming a random selection, successful replacement, and production of an equal distribution (e.g., 50-50) of responses to questions.

The interview questionnaire of 40 questions sought information on 60 variables and was administered by 14 experienced telephone interviewers from the Center for Survey Research at the University of Nevada, Las Vegas. An additional five relevant questions were added for the portion of the survey which took place after an earthquake event (June 29-July 1) and the entire sample was divided accordingly for purposes of comparative analysis. Appropriate screenings for respondents within the household was utilized.

The average length of an interview call was 20 minutes with some taking 30 minutes or longer to complete. This was due to the length of the questionnaire as well as the interest in the subject matter displayed by many respondents. The response rate was average (62.4%) for this type of telephone interviewing in the Las Vegas area.

2.0 SALIENCY OF ENVIRONMENTAL ISSUES

Research on public perceptions of the proposed high-level nuclear waste repository has focused on measuring levels of concern and perceived risk to health, safety, and economic well-being. There has been some discussion recently that while these measurements are important, they do not characterize the political saliency of the repository. How does the repository compare to other environmental issues as a matter for governmental action and priority?

To provide information on the relative political saliency of the repository two questions were asked of the respondents. The first asked respondents to rate their level of concern with the quality of the environment in the Las Vegas metropolitan area. Approximately 44% of the public indicated that they were *very concerned* with environmental quality. Another 46% stated that they were *somewhat concerned*. The results show that environmental quality is important to residents of the urban area. These findings are highly consistent with the results of the *1988 Urban Survey* which showed that environmental quality concerns were important policy issues.

Respondents were also given a list of environmental issues or problems in Nevada and asked to rate the importance to them that these issues be solved. The issues were identified through content analysis of local media reports. Table 1 shows the percentage distribution of responses on the 1 to 10 saliency scale, where 1 means the issue is *not important* to them, and 10, the issue is *extremely important*.

The percentage distribution of responses is skewed toward the high saliency category for five environmental problems — air quality, water quality, adequacy of water supply, hazardous waste disposal, and the nuclear waste repository. On the 1 to 10 scale, the means for these

TABLE 1. PERCENTAGE DISTRIBUTION OF RESPONSES REGARDING POLITICAL SALIENCY

	Not important								Very important	Mean
Air quality	0.4	0.3	0.6	0.3	4.6	1.8	7.6	16.5	8.1	59.9	8.94
Water quality	0.7	0.4	1.0	1.0	4.9	2.0	4.9	14.7	10.2	60.2	8.91
Water supply adequacy	0.4	0.9	0.9	0.4	5.2	2.0	3.9	13.0	10.1	63.3	8.99
Hazardous waste disposal	0.7	0.7	1.9	1.2	6.9	1.4	4.9	9.1	5.9	67.4	8.89
Nevada Test Site condition	3.5	2.7	4.2	2.4	11.2	3.0	5.4	12.8	6.4	49.2	7.86
High-level nuclear waste repository	3.9	2.1	2.1	1.0	6.6	1.9	4.6	7.4	6.2	64.5	8.53

concerns were all just under 9.0 revealing high levels of political saliency. The public has indicated that it is *very important* to them for government to act to solve the nuclear waste repository issue in Nevada. They want the government to act to resolve the repository problem as much as the other serious environmental issues which confront the residents and are of utmost concern to them.

It is interesting to note that the political saliency of the Nevada Test Site (NTS) is relatively lower than other environmental areas (mean of 7.86). However, the fact that almost 50% of the respondents rated the NTS in the category of *extreme importance* attests to the importance of the NTS factor in the risk perceptions of the repository. Findings from the *1988 Urban Survey* show a *very strong* statistical association between risk perceptions of the NTS and those of the repository (Mushkatel et al. 1990). Furthermore, the Mushkatel et al. (1990) study also found that a substantial number of residents perceived moderate-to-high health risks associated with past and present activities at the NTS.

Lastly, the data indicate a moderate shift towards placing greater importance in the repository following the seismic event. The percentage of responses in the *extremely important* category increased from 59.2% to 67.8% (Table 2). The seismic event had the affect of amplifying the saliency of the repository in terms of its importance for governmental action. However, we cannot be sure of the permanence of the saliency amplification due to the earthquake.

TABLE 2. IMPORTANCE OF RESOLVING THE REPOSITORY ISSUE: PRE- AND POST-SEISMIC EVENT

		Percentage Distribution	
Importance Ratings		Pre-quake	Post-quake
Not Important	1	4.6	3.4
	2	2.7	1.7
	3	2.7	1.7
	4	1.5	0.7
	5	8.0	5.8
	6	2.7	1.2
	7	5.7	3.8
	8	8.0	7.0
	9	5.0	7.0
Extremely important	10	59.2	67.8
TOTAL		100.0	100.0

3.0 REPOSITORY RISK PERCEPTIONS

The Trust Survey provided an opportunity to gauge current risk perceptions and compare these to the findings from the earlier urban survey completed in 1988. For comparative purposes the same risk perception questions were asked in the two surveys. Table 3 shows the distribution of responses to the question regarding the level of risk the repository would pose to the health and safety of residents in the Las Vegas area. If response percentages in the high risk categories (8, 9, and 10) are added, the data show that 54.2% of the respondents perceive serious risks to health and safety from the repository.

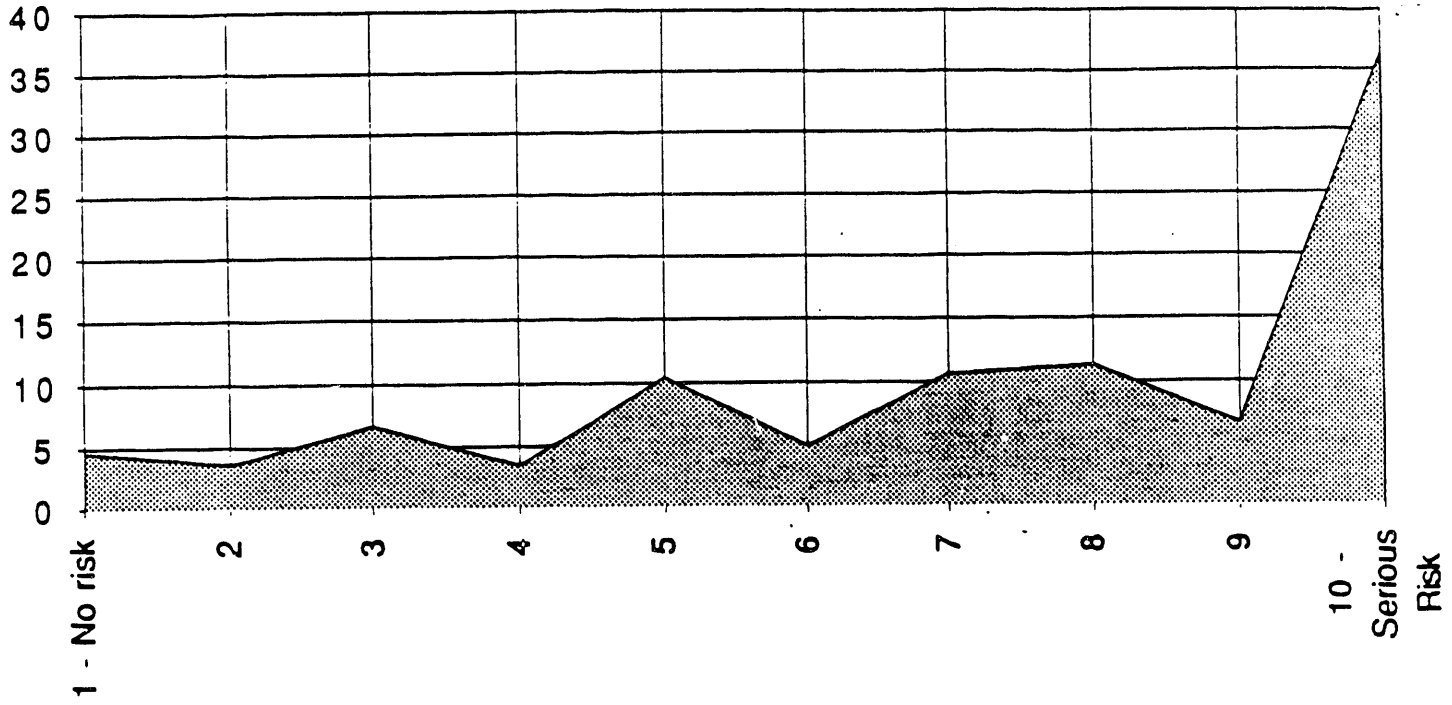
TABLE 3. HEALTH AND SAFETY RISK PERCEPTIONS
TRUST SURVEY 1992

Risk Categories		Frequency	Percent
No risk	1	32	4.6
	2	25	3.6
	3	47	6.7
	4	24	3.4
	5	73	10.4
	6	34	4.9
	7	74	10.6
	8	79	11.3
	9	47	6.7
Serious risk	10	254	36.2
Do not know		12	1.7
TOTAL		701	100.0

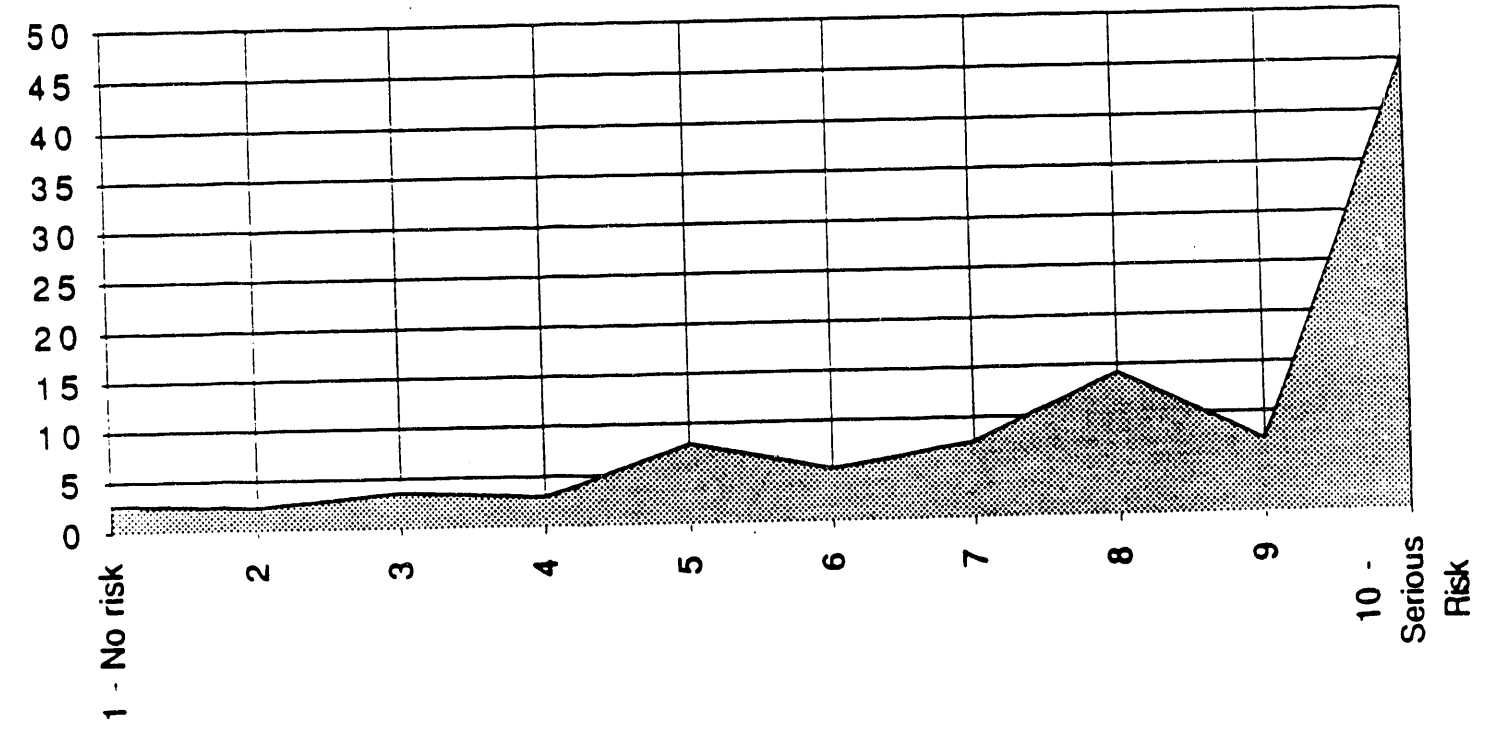
When compared to the results from the same question asked in the *1988 Urban Survey*, the data show strong consistency in the distribution of responses between the data sets. The data also show that the seismic intervention may have had some impact on the public's risk perceptions of the repository. When response percentages are compared between pre- and post-earthquake data, we find an increase of approximately 9% in the *serious risk* category (Category 10) from the pre-intervention responses.

Several studies have now demonstrated that risk perceptions of transporting nuclear materials are likely to be higher than those associated with a nuclear waste disposal facility (Mushkatel et al. forthcoming 1992b). The data in this survey support this finding. The response distribution shows that 69% of the public placed transportation risks in the high risk category (8, 9, and 10 groupings). This percentage can be compared to the 54% response discussed earlier for the repository risk perceptions. The findings regarding transportation risk perceptions are consistent with those from the *1988 Urban Survey* and a moderate increase in the percentage of persons in the high-risk category was observed in the post-earthquake sample.

HEALTH AND SAFETY RISK PERCEPTIONS



TRANSPORTATION RISK PERCEPTIONS



N = 699

4.0 OPPOSITION, FATALISM, AND FAIRNESS

Reports from earlier Nevada surveys found that opposition to the construction and development of the repository fluctuated around 70 to 75% of the population. Interestingly, while opposition to the repository remains fairly substantial, the sense of inevitability (or fatalism) that the repository will be built also continues to be a strongly held public attitude, at least for the Las Vegas area residents.

Table 4 shows that 46.1% of the urban population *strongly opposes* the repository and 28% *opposes* the facility, for a total of 74% opposed. In contrast, approximately 16% *favors* or *strongly favors* the repository. The extent of opposition of urban residents has remained fairly constant over the last four years. Responses to the question regarding the inevitability of the repository resulted in approximately 71% *agreeing* or *strongly agreeing* to the question: The repository at Yucca Mountain is inevitable; it will be built whether the state of Nevada opposes it or not (Table 5).

TABLE 4. EXTENT OF OPPOSITION TO THE REPOSITORY

	Frequency	Percent
Strongly oppose	323	46.1
Oppose	196	28.0
Favor	87	12.4
Strongly favor	27	3.9
No answer	68	9.7
TOTAL	701	100.0

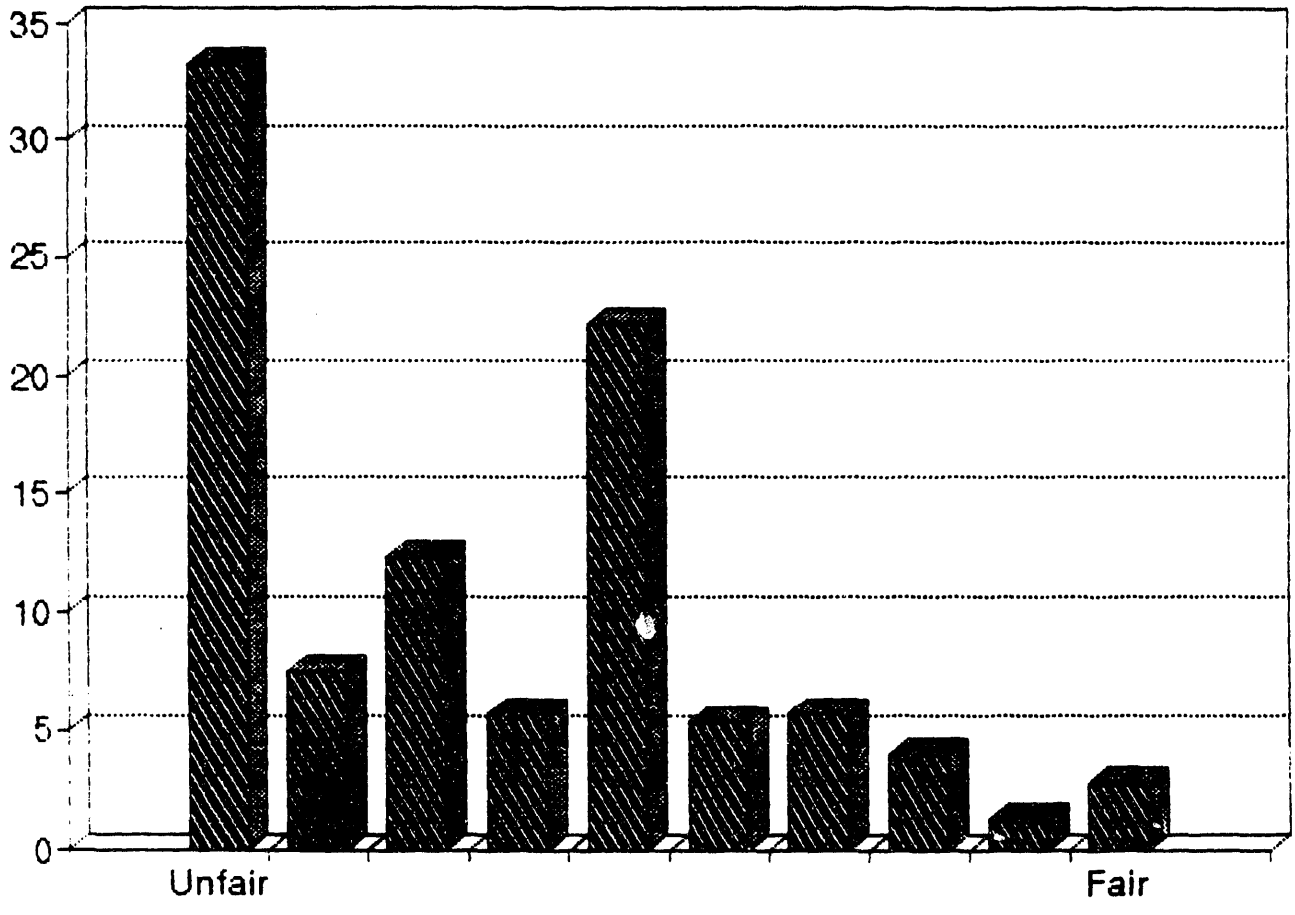
TABLE 5. ATTITUDE REGARDING THE INEVITABILITY OF THE REPOSITORY

Agreement with statement that the repository is inevitable	Frequency	Percent
Strongly agree	252	35.9
Agree	248	35.4
Disagree	123	17.5
Strongly disagree	48	6.8
No answer	30	4.3
TOTAL	701	100.0

Opposition to the repository has been attributed to concerns over risk, distrust of government to develop a safe system, and lack of fairness in the process the government has used to select Yucca Mountain as the site for the repository (Mushkatel et al. 1990). Using the same question as the *1988 Urban Survey*, respondents were asked how fair they felt the siting process has been in selecting Yucca Mountain.

On a scale of 1 to 10, where 1 is *completely unfair*, and 10 is *completely fair*, 31.8% of the population indicated that the process was *completely unfair* (Category 1 on the 1 to 10 scale). Approximately 56% of the population indicated that the selection process was *unfair* (Categories 1 through 4; see figure on next page).

Fair Process in Selecting Yucca Mtn



5.0 RESPONSES TO THE SEISMIC EVENT:

AMPLIFICATION OF RISK PERCEPTIONS

Residents of the urbanized Clark County area were interviewed by telephone during the period of June 26 to July 1, 1992. On June 29 an earthquake, with a magnitude of 5.6 occurred approximately 12 miles from Yucca Mountain. As a result of the seismic event five questions pertaining directly to seismic risk and policy options were added to the questionnaire. The pre-quake sample size was 273 and the number of post-quake households interviewed was 428.

In response to the first question, which asked *if* earthquake activity was discovered at the proposed site for the repository should this be a basis for dropping the site from *characterization*, the majority of Las Vegas area residents *agree strongly* (78.2%) or agree (12%). Seismic activity is considered by the urban population as a serious obstacle in siting a geological repository for nuclear waste. Nearly all of the respondents had heard about the earthquake (96.5%) which occurred about 12 miles from Yucca Mountain.

The survey was designed to ascertain public preferences for various options available to the U.S. Department of Energy (DOE) as a result of the recent earthquake. In choosing from the scenarios listed, many believe that the U.S. DOE should permanently drop the site from consideration (43.2%) or stop characterization of the site to re-evaluate seismic conditions (31.7%). Others felt that the DOE should continue characterization of the site, but study seismics in greater detail (22.5%), while only a few indicated that characterization should continue without worrying about seismic conditions (1.9%). Table 6 shows the distribution of preferences for DOE policy options given to the respondents.

Moreover, when asked the question, In light of the earthquake do you believe the DOE should re-open all other potential sites nationally for reconsideration?, the majority of respondents answered *yes* (84.7%).

TABLE 6. PREFERENCES FOR DOE POLICY OPTIONS RESULTING FROM THE JUNE 29 EARTHQUAKE

Policy option	Frequency	Percent
Drop site from consideration	184	43.3
Stop characterization and re-evaluate seismic condition	135	31.8
Study seismics in greater detail	96	22.6
Continue site characterization	8	1.9
Other	2	0.5
TOTAL	425	100.0

Earlier, data was presented to show that there were heightened risk perceptions among the post-event sample. The percentage of households in the highest risk category (10 on the 1 to 10 scale) increased by about 5% compared to the pre-earthquake sample. When this comparison was made no reference was given with respect to the earthquake. However, when the earthquake is specifically mentioned, risk perceptions become much more amplified. The percentage of persons that feel the repository poses a *serious threat* (10 on the 1 to 10 scale) to health and safety increases substantially. In the pre-event sample, 33% of the population falls into Category *10* which represents *serious risk*. This percentage increases to 38.5% for the post-

event sample. When the earthquake is specifically mentioned, the percentage in the *extreme threat* group (Category 10) increases to *50.9%*.

Kasperson and others (1990) have argued that certain risk or mismanagement events may occur that can trigger social and political amplification of the repository issue. These events can symbolize or portend future failures at the repository. The earthquake occurring so close as it did to the repository site has resulted in shifts toward higher levels of perceived risk. These shifts are characterized by heightened perceptions at the extreme levels of risk. The fact that over 50% of the urban population falls into the highest risk category attests to the important role of the seismic event in heightening perceived risk. The large percentage of residents now perceiving risks at the extreme will not likely result in rapid decline: the political saliency value of the repository combined with *extreme* risk perceptions held by a majority of residents infers greater permanence rather than diminution of concern.

6.0 TRUST IN THE INFORMATION ON REPOSITORY RISKS

The focus group analysis suggested that *trust in the information* about the risks of the repository was a critical factor in their perceptions and views of the repository program. Trust and confidence in the information regarding risk may be strongly associated with the source of the information and its credibility. This relationship will be further tested in later analyses. The survey instrument was designed to address several elements of trust of information.

6.1 Trust in Institutions with Respect to Information

The first area examined involved the trustworthiness of various institutions with respect to the information given on the high-level nuclear waste repository and the repository program. Eleven institutions were listed that have had at least some involvement with the repository

program. Respondents were asked to rate their level of trust in these institutions with respect to their information. On a 1 to 10 scale, 1 was *no trust at all* and 10 *complete trust*.

Table 7 shows there is wide variation in levels of trust given to various institutions when it comes to the information on the repository program. The measure is similar to belief in the source of the information. The range of mean scores is 3.91 for trust in the federal government's information to 6.44 for trust in university scientists.

TABLE 7. LEVEL OF TRUST IN INFORMATION ON THE REPOSITORY

	No trust								Complete trust		Mean
Federal government	23.9	12.3	13.5	9.9	20.2	7.4	5.9	4.9	1.0	2.2	3.91
National environmental groups	9.9	4.3	7.2	9.6	24.3	10.5	12.7	14.2	3.6	4.7	5.41
Scientists (utility industry)	11.7	9.0	11.7	11.1	25.3	9.5	99.5	7.7	2.3	3.3	4.72
U.S. DOE	19.9	10.9	10.3	9.4	24.0	9.0	9.7	8.9	0.9	2.4	4.72
U.S. EPA	12.4	7.2	10.3	9.7	22.4	9.0	12.7	10.6	3.2	4.6	5.0
News media	15.4	8.9	11.5	9.9	28.2	5.9	8.8	8.5	3.0	4.9	4.7
Local government	10.0	6.2	9.9	9.6	27.2	12.2	12.5	9.4	1.5	2.6	4.99
Governor's office	11.2	4.9	9.4	9.2	25.0	10.9	13.9	9.6	2.9	4.2	5.13
Scientists (university)	5.3	2.6	2.9	5.1	19.2	10.4	16.0	21.6	9.9	9.1	6.44
State environmental nuclear agencies	12.3	4.[illegible]	9.9	7.2	30.1	12.0	10.6	9.3	1.9	3.3	4.93
State government	10.3	5.7	10.0	11.0	27.9	10.7	12.5	6.5	2.2	3.4	4.92

Respondents tend to trust the federal government very little with regard to the information they are given on this subject and 23.9% have no trust at all. Twenty percent have a moderate amount of trust, while only 2.2% expressed complete trust of the government in this matter. The average score on the 1 to 10 scale of responses was 3.91, the median score was 4.0, and the modal score (most often occurring) was 1.0. The federal government had the lowest mean score for trust in information on the repository.

There is evidence of a greater degree of trust for national environmental groups as 4.7% indicated complete trust, approximately 40% some degree of trust, and only 9.9% have no trust at all for information they receive from these groups. A mean value of 5.41 was observed and a mode of 5.0.

Residents of the Las Vegas metropolitan area do not trust the U.S. Department of Energy with regard to information on the repository program as almost 20% expressed *no trust at all* and only 2.4% had complete trust. Trust for the U.S. Environmental Protection Agency is slightly greater than that of the Department of Energy; however, distrust is still relatively high.

The news media is not very well trusted by many in the urban area regarding information on the repository as 15.4% expressed *no trust*. State and local governments and the state nuclear agencies have a moderate degree of trust. Las Vegas residents trust scientists at universities the most with regard to the information on the repository and the scientists are given the highest percentage of complete trust and the least amount of total distrust (5.3%).

6.2 Likelihood of Changing Risk Perceptions Through Information

There has been a substantial amount of speculation and some discussion that risk perceptions and attitudes may change given additional information on repository risks. The

survey instrument in this study was designed to measure the likelihood of attitudinal changes and the direction of these changes based on new risk information.

Respondents were asked three questions concerning the *likelihood of change* of their point of view on risks associated with the repository. If they were to receive information from a *neutral* source about the risks of the repository indicating that the risks are greater than they currently believe, many felt that it was *very likely* they would change their point of view (25.4%), while others felt the opposite (30.6%). However, if the neutral source were to indicate that risks are *less* than they currently believe, respondents were less likely to say that they would change their point of view on this issue.

The third question regarding the likelihood of change in risk perceptions related to information from the Department of Energy. It seems unlikely (65.4%) that the urban residents would change their view based on new risk information from the Department of Energy.

TABLE 8. LIKELIHOOD OF CHANGE IN RISK PERCEPTIONS BASED ON NEW INFORMATION

	New information		
Likelihood values	Percent greater risk (neutral source)	Percent less risk (neutral source)	Percent Department of Energy Information
Very likely	25.4	14.7	6.7
Somewhat likely	30.5	31.1	26.5
Somewhat unlikely	12.4	21.7	24.0
Very unlikely	30.6	31.4	41.4
Do not know	1.1	1.1	1.4
TOTAL	100.0	100.0	100.0
N	700	701	701

6.3 Perceived Accuracy of Department of Energy Information

Since 65% of the public indicates that they would be unlikely to change their risk perceptions on the basis of information from the Department of Energy, the survey asked a question related directly to the perception of the *accuracy* of repository information disseminated by the Department of Energy. When asked whether the Department of Energy overestimates the risks, underestimates, or is accurate about risks, almost 78% of the Las Vegas area residents indicated that the Department of Energy underestimates the risks. Another 13% indicated that the risks reported by the Department of Energy are accurate (Table 9).

TABLE 9. PERCEIVED ACCURACY OF DEPARTMENT OF ENERGY INFORMATION ON THE REPOSITORY

Accuracy values	Frequency	Percent
Overestimates risks	45	6.4
Underestimates risks	544	77.6
Accurate about risks	91	13.0
Do not know	21	3.0
TOTAL	699	100.0

6.4 Trust, Confidence, and Information: Perceptions of the American Nuclear Energy Council (ANEC) Campaign

The impacts of the advertisements produced by ANEC in support of the nuclear waste repository has been the focus of at least one survey in Nevada. The survey instrument was designed to measure: the level of awareness of the ANEC advertisements, the level of

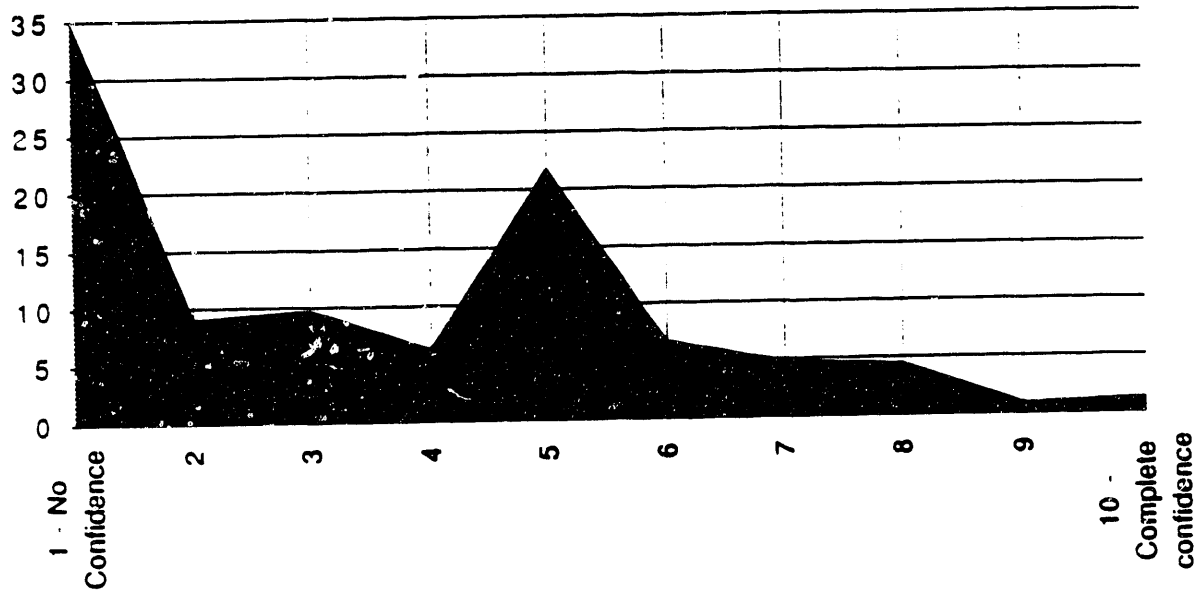
confidence in the *truthfulness* of the ads, and the results in terms of changing the level of public trust in plans to build the repository.

Sixty-five percent of the sample population had seen or heard these ads. The results also show that the *lack of confidence* that the information in these advertisements was truthful is high. Low levels of confidence were expressed by approximately 60% of the population and 35% indicated they had *no confidence* at all (Table 10) in the truthfulness of the ads. Have the ads resulted in *more trust, less trust*, or not changed people's trust in government to build a repository. Only 3.3% of the population reported an increased level of trust. Almost 41% were *less* trusting after the ads compared to their earlier levels of trust, and 60% maintained their prior level of trust. The ad campaign generally failed in its objective to increase the credibility of the Department of Energy program and to increase trust.

TABLE 10. CONFIDENCE IN THE TRUTHFULNESS OF ANEC ADVERTISEMENTS

Level of confidence	Frequency	Percent
1 No confidence	159	35.0
2	41	9.0
3	44	9.7
4	28	6.2
5	99	21.8
6	30	6.6
7	22	4.8
8	20	4.4
9	4	0.9
10 Complete confidence	6	1.3
Do not know	1	0.2
TOTAL	454	100.0

CONFIDENCE IN TRUTHFULNESS OF ADS



N = 454

7.0 GOVERNMENTAL TRUST AND THE REPOSITORY PROGRAM

Recently there has been a plethora of articles and reports dealing with the lack of confidence in governmental institutions to govern, manage programs, and permit citizens a meaningful role in participation. In this context of national distrust, the lack of confidence in governmental institutions to effectively develop and manage a nuclear waste repository has also been observed. The Mushkatel et al. (1990) and Flynn et al. (1992) surveys have shown that lack of trust is associated with higher risk perceptions of the repository and increased levels of opposition.

Mushkatel et al. (1990) found generally high levels of political alienation from the federal government and low levels of individual efficacy — that is, the feeling that an individual's efforts can change things in government. Moreover, trust in governmental institutions to manage safety programs was found to be universally low among the institutions examined, and federal government agencies empowered to manage the environment and nuclear technology — U.S. DOE, EPA, and NRC, were given low grades with respect to trust. This survey was designed to facilitate crosswalks between the earlier surveys on matters of trust perceptions.

7.1 Trust in the Federal Government and Perceived Competency of Government

Two questions were asked as measures of trust in the federal government and individual efficacy in governmental decisions. When respondents were asked how much attention they feel the federal government pays to what they think, the most often indicated responses were *a little* (49.1%) to *no attention* (35.1%) (Table 11). Moreover, most urban residents feel they can trust the federal government to do what is right only *some of the time* (56.1%) and many feel they can almost never trust the government to do what is right (34.4%). These two measurements

support the findings of the *1988 Urban Survey* in terms of the substantial percentage of residents who feel alienated from the political processes in the federal government. There are seriously low levels of trust in the government to do what is right and this context is critically important in understanding repository perceptions. If government in general cannot be trusted, then the level of trust required of governmental agencies to develop, build, and manage a one-of-a-kind facility with high levels of risk and uncertainty would have to be significant.

TABLE 11. ATTENTION OF FEDERAL GOVERNMENT TO RESPONDENTS' CONCERNS

Perceived levels of attention	Frequency	Percent
A great deal of attention	7	1.0
Some attention	103	14.7
Little attention	344	49.1
No attention at all	246	35.1
No answer	1	0.1
TOTAL	701	100.0

7.2 Trust in Federal Government to Manage the Repository

Respondents were asked how much trust they have that the federal government can manage the repository competently and in a safe manner. On a 10-point scale of trust, where 1 represents no trust and 10 complete trust, urban residents indicated a substantial lack of trust, 32% indicating *no trust* (rating of 1 on the 1 to 10 scale) and 54.1% either *no* or *little trust* (Table 12). A mean of 3.67 was observed, a median of 3.0 and mode of 1.0.

TABLE 12. TRUST IN FEDERAL GOVERNMENT TO DO WHAT IS RIGHT

	Frequency	Percent
Just about always trust	2	0.3
Most of the time	62	8.8
Some of the time	393	56.1
Almost never trust	241	34.4
Do not know	3	0.4
TOTAL	701	100.0

Earlier, the data indicated that the information from the federal government and Department of Energy related to repository risks was found not to be credible by a substantial proportion of the residents. Respondents also observed that risk estimates of the Department of Energy were underestimated. One of the key trust dimensions identified in the focus groups was *honesty*. Respondents were asked whether they believed the Department of Energy has been honest in its repository program when dealing with the people of the state of Nevada. On a 1 to 10 scale of honesty where 1 meant *completely dishonest* and 10 *completely honest*, over 50% indicated low or completely dishonest ratings (1, 2, and 3 combined categories).

TABLE 13. PERCEPTIONS OF HONEST OF THE DEPARTMENT OF ENERGY IN ITS REPOSITORY PROGRAM

Honesty ratings	Frequency	Percent
1 Completely dishonest	190	27.1
2	70	10.0
3	97	13.8
4	53	7.6
5	151	21.5
6	30	4.3
7	32	4.6
8	32	4.6
9	8	1.1
10 Completely honest	17	2.4
Do not know	21	3.0
TOTAL	701	100.0

8.0 INSTITUTIONAL CHANGE AND PUBLIC CONFIDENCE

Based on substantial levels of distrust in governmental institutions to build and manage the repository in a safe and acceptable way, questions have been raised as to what changes have to occur in order to increase governmental credibility and trust (if it is indeed possible in the short term). Respondents were asked to consider three major institutional structural changes and the likelihood that these changes could increase trust.

The first question asked whether the public's confidence and trust in the federal government to safely build the repository would increase if the repository program were transferred from the Department of Energy to another existing or new agency. The data show

that most urban residents would continue to have little or no confidence in the federal government if the program were transferred (Table 14). This preliminary finding suggests that while a substantial proportion of the public may express a lack of confidence in Department of Energy it also does not hold sufficiently high levels of trust in government in general or other agencies to manage the program. It may be that the public will require major structural changes in these institutions empowered to make decisions about the repository before it can place its trust in them. We also have to be cautious in making the statement that transference of the program would not likely result in increased levels of confidence by most residents. In addition, maintenance of the program in the Department of Energy combined with more equitable siting procedures and greater public access and control may result in some restoration of public trust.

In this light, respondents were asked to identify possible changes in the Department of Energy that would lead to greater levels of trust. Table 15 shows the responses to this open-ended question. Approximately 25% of the responses indicated the impossibility of restoring any trust in the agency: there was nothing the agency could do to restore trust. In contrast, 75% of the responses suggested changes in policy and in the institution that would restore some trust. However, the *level* of trust that can be restored by any individual action or combination was not ascertained.

"Honesty about the risks" would increase trust in the Department of Energy's program was mentioned almost 20% of the time. Almost 17% of the responses suggested that the Department of Energy must be more open and accessible to regain public confidence. Together, these two changes — honesty about the repository risks and greater public accessibility accounted

TABLE 14. CONFIDENCE IN FEDERAL GOVERNMENT WITH REPOSITORY PROGRAM TRANSFER

Level of confidence	Frequency	Percent
1 No confidence	205	29.3
2	48	6.9
3	71	10.1
4	45	6.4
5	150	21.4
6	43	6.1
7	41	5.8
8	37	5.3
9	10	1.4
10 Complete confidence	18	2.6
Do not know	33	4.7
TOTAL	701	100.0

for almost 35% of the responses. Other proposals included the development of risk mitigation programs, the utilization neutral scientists and peer review, and meaningful public involvement. These proposals for change imply major structural and process change in the institution involving greater public participation, depoliticization of risk assessments, greater accessibility to information, scientific peer review, and greater roles by local and state governments in the siting process. There seems to be a *strong convergence* between options addressed by the academic community for increasing trust and the public's view of the changes to regain some trust. *Transference of the repository program to another or new agency without major institutional*

changes to structure and procedure will not likely increase confidence in the government's ability to develop and manage a repository program.

Although the data suggest that major changes in institutional structure and process is fundamental to increasing public trust, we know very little about this relationship. How significant do these changes have to be before confidence is restored? For what length of time does a new institutional structure have to be in place and operating before confidence has been regained? What *combination* of institutional changes over what period of time would produce real confidence in a context of continued high risk perceptions by the public and uncertainties in the technology? To what degree is the public willing to take a risk on government if structural changes are implemented?

To test the effect of institutional change on trust two measures of change were given to the respondents. These were (1) the provision of greater public access to the Department of Energy's scientific information and decision-making and (2) the Department of Energy would provide the public or the state of Nevada with greater influence and control over the repository program. The respondents were asked the degree to which their trust in the Department of Energy would improve under these two scenarios.

Under both scenarios many respondents indicated that their degree of confidence or trust in the agency's management of the repository program would improve. With greater access, 28% indicated that these levels of trust would *improve substantially* and 36% indicated *some improvement* in their trust. Thirty-four percent indicated that increased access would not really improve their level of trust.

TABLE 15. CHANGES IN THE DEPARTMENT OF ENERGY RESULTING IN GREATER LEVELS OF TRUST

Response category	Frequency	Percent
1. There is nothing the agency can do to restore trust	165	25.6
2. DOE must be honest about the risks	123	19.1
3. DOE must be more open and accessible with respect to information	107	16.6
4. DOE must show strong evidence of workable risk reduction/mitigation programs	47	7.3
5. Do not know what agency can do	35	5.4
6. Utilization of neutral scientists and state scientists/peer review	31	4.8
7. Meaningful public involvement in risk mitigation/siting process	28	4.4
8. More research on the site is needed	23	3.6
9. Requires a pilot project with a good safety record as prerequisite	21	3.3
10. Let private sector manage program	16	2.5
11. Already trust DOE	15	2.3
12. Transfer program to another agency	11	1.7
13. Reorganize DOE	8	1.2
14. Local/state government to have control of site	6	0.9
15. Combination of another agency, neutral scientists, and the public handle project	4	0.6
16. Granting of more incentives/compensation	2	0.3
17. Other technology	1	0.2
TOTAL	643	100.0

With greater state influence and control around 21% of the population's trust in the agency would *improve substantially* and improve only some for other 42%. The data suggest that institutional changes involving greater access and control over decisions and the site would increase trust perceptions. The data are preliminary and cannot be utilized to provide more accurate measures of change in trust perceptions and public confidence.

TABLE 16. IMPROVEMENT IN TRUST WITH GREATER ACCESS AND STATE CONTROL

Degree of improvement	Greater access		Greater control	
	Frequency	Percent	Frequency	Percent
Improve substantially	195	27.8	147	21.0
Improve some	255	36.4	292	41.7
Improve only a little	136	19.4	130	18.5
No improvement at all	101	14.4	115	16.4
Do not know	14	2.0	17	2.4
N	701	100.0	171	100.0

REFERENCES

Flynn, J., W. Burns, C. K. Nertz, and P. Slovic. 1992. Trust as a Determinant of Opposition to a High Level Radioactive Waste Repository: Analysis of a Structural Model. *Risk Analysis* Vol. 12, No. 3, p. 417-429.

Kasperson, R., O. Renn, P. Slovic, H. Brown, J. Emel, R. Goble, J. Kasperson, and S. Ralick. 1988. The Social Amplification of Risk: A Conceptual Framework. *Risk Analysis* Vol. 8, No. 2, p. 177-187.

Mushkatel, A. H., and K. D. Pijawka. 1992. *Governmental Trust and Risk Perceptions Related to the High-Level Nuclear Waste Repository: Analysis of Survey Results and Focus Groups*. NWPO, Agency for Nuclear Projects, Nevada.

Mushkatel, A. H., K. D. Pijawka, and M. Dantico. 1990. *Risk-Induced Social Impacts*. Final Report, NWPO, Agency for Nuclear Projects, Nevada.

Mushkatel, A. H., K. D. Pijawka, and T. Glickman. 1992b. Risk Perceptions of Transporting Nuclear Materials. Proceedings of the International Consensus Conference on Transportation Risk Assessment. Institute for Risk Research, University of Waterloo, Waterloo, Canada (forthcoming).

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