

**YUCCA MOUNTAIN
NUCLEAR WASTE
REPOSITORY PROGRAM**

**PHASE II SOCIOCULTURAL RISK ASSESSMENT
AND MONITORING VARIABLES REPORT**

For the

**Socioeconomic Impact Assessment of the Proposed
High-Level Nuclear Waste Repository at
Yucca Mountain, Nevada**

Prepared for the

**CLARK COUNTY
Department of Comprehensive Planning
Nuclear Waste Division**

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List of Acronyms and Abbreviations

AGC	Assoc General Contractors
ANEC	American Nuclear Energy Council
ANS	American Nuclear Society
COC	Chamber of Commerce
DK	Don't Know
DLP	Desert Livestock Producers
DOE	U.S. Department of Energy
F	variance ratio (F distribution)
IAI	Impact Assessment, Inc.
LCOC	Latin Chamber of Commerce
LVAR	Las Vegas Assoc. of Realtors
LVCVA	LV Convention and Visitors Authority
n	number of cases or sample size
NDA	Nevada Development Authority
NR	No Response
NTS	Nevada Test Site
NWD	Nuclear Waste Division, Clark County Department of Comprehensive Planning
NWPO	Nuclear Waste Projects Office, State of Nevada
NWRP	Nuclear Waste Repository Program, Clark County
p	Significance level of (bivariate) correlations
PIA	Professional Insurance Assoc.
PRC	Peer Review Committee
r	Pearsonian coefficient of correlation
RJ	Las Vegas Review-Journal (newspaper)
RRA	Red Rock Audubon Society
SC	Sierra Club
SD	Standard Deviation
SNHBA	Southern Nevada Home Builders Assoc
SNORE	Southern Nevada Off-Road Enthusiasts
TNC	The Nature Conservancy
YMP	Yucca Mountain Project

Executive Summary

This document, the preliminary draft of the *Phase II Sociocultural Risk Assessment and Monitoring Variables Report*, presents the findings of research carried out during Fiscal Year 1994 (FY94) by Impact Assessment Inc., for the Clark County Department of Comprehensive Planning, Nuclear Waste Division. This ongoing research is directed at understanding the social impacts that may be associated with the site characterization phase and the possible location of a high-level nuclear waste repository at Yucca Mountain, Nevada. The report provides an analysis of the current level of public concern about the Yucca Mountain Project, and identifies variables that are useful for tracking public concern and public response.

To understand and monitor changing public concerns and actions that could result in negative impacts to community well-being, the salience of issues, including risk perceptions regarding the Yucca Mountain Project, must be placed in context. Negative impacts can be exacerbated if citizens lose trust in the ability of local government to protect their health, safety, and quality of life. Thus, to aid local government planners, the Clark County Nuclear Waste Repository Program's research of special repository-related socioeconomic impacts emphasizes evaluating risks in their historical, social, and cultural context of Clark County. This phase of the multi-method research approach includes the following:

- (1) **Ethnographic studies** to collect data about the nature of risk perceptions; key events that affect resident responses to YMP; and the behavioral consequences of events on County residents.
- (2) **A survey** of the general population in Clark County to monitor and analyze YMP in relationship to other risk concerns.
- (3) **Archival review** of newspaper and YMP information sources for the content of information communicated to the public about the YMP.

This report discusses each of these methodologies in turn. Chapter 1 provides an introduction to the report. Chapter 2 presents a literature review of published and unpublished sources that focus on the four study areas: the ethnographic sociocultural risk study, sociocultural/risk communication study, sociocultural/risk perception survey, and behavioral response to sociocultural/risk concerns. Chapter 3 presents the results of the ethnographic research on the potential social impacts associated with the proposed Yucca Mountain high-level nuclear waste repository. This chapter also includes a 'chronicling' section, in which a time-line of events associated with the Yucca Mountain Project are presented. Chapter 4 details the information gathered through a sociocultural risk perception survey of Clark County residents, which investigated, among other issues, the weighting of risk-related concerns and perceived effects of and attitudes towards the proposed repository. Chapter 5 presents the findings of the behavioral

response to sociocultural/risk concerns study, in which the linkages between issues of concern and actions taken by county residents were investigated. Chapter 6 presents the findings from the sociocultural/risk communication study, which examined the communication of risk-related information about the Yucca Mountain Project. Chapter 7 provides a summary of FY 1994 research and a synthesis of findings.

Sociocultural Risk Identification and Literature Review

Chapter 2, originally submitted as the *Sociocultural Risk Identification and Literature Review* (Deliverable 94-2 for the Clark County Department of Comprehensive Planning, Nuclear Waste Division) provides a literature review of published and unpublished sources that focus on the four study areas, the ethnographic sociocultural risk study, risk communication study, survey, and behavioral responses to risk concerns. The purpose of this review is to provide a background which contributes to the formulation of research topics and methodologies, and the analysis of data. The review reflects an emphasis on previous socio-economic reports commissioned by the State of Nevada's Nuclear Waste Project Office, while the broader academic literature on risk and the Yucca Mountain Project is also consulted.

Previous ethnographic research commissioned by the State of Nevada and Clark County has provided critical data about the general social environment in which the Yucca Mountain Project is being carried out. The literature reviewed here focuses more directly on ethnographic approaches to understanding the way people conceive of risk and hazardous facilities. Methodological approaches include survey research on mental imagery, field research on the connection between cultural ideologies and the perception and response to hazards, factor analysis regarding the significant dimensions of risk, and chronologies to reconstruct the connection between events and social impacts. This literature focuses on the patterns of interpretive elements, or 'schemas', that people use to think about, evaluate, and formulate responses to risk. A number of findings are reported. 1) The most common imagery of a nuclear waste repository involves negative consequences (such as 'toxic', 'death', and leakage) and negative concepts (such as 'scary'). There is some difference in imagery depending on where people live, and Nevadans have more negative imagery reflecting practical concerns (the negative consequences category), while residents of Phoenix, Arizona mentioned Nevada more often than other samples. 2) Those whose neighborhoods and homes have been contaminated experience not only practical losses, but also construe these losses in terms of cultural ideologies such as diminished independence and social mobility. 3) Peoples' views about the causes of technological disasters -- the sources of technological risks -- are in part culturally shared. Thus the precise sources of public concern over risks (for example, in waste transportation), can be investigated. 4) The repository is seen as a highly dreaded and unknown risk, and people conceive of it as associated with other nuclear risks such as nuclear war. Some dimensions of repository risk perceptions are shared by other cultures, while others differ. 5) Chronologies trace the genesis and report the consequences of technological disasters, including social, economic, legal, political, and psychological results.

Studies concerning the 'social amplification of risk' are reviewed. These studies investigate the way public concern is increased or diminished through communication, and the social impacts produced beyond those caused by the event itself. The methodologies include case studies, and content analyses of media. A number of findings are noted. 1) The impact of a communication can depend on the number of 'channels' through which it is conveyed (such as the range of media, number of news articles), the drama of the story, and whether the source is trusted. 2) The impact of an event or communication is importantly related to what it is believed to portend about future events or similar facilities and technologies. 3) In the Three Mile Island case, those closer to the facility responded more strongly to the communications about danger. 4) The impact of a communication may be related to a person's receptivity, including their motivation to listen and the 'fit' between what is heard and prior understanding. 5) Perception of incompetence by managers is generalized to other facilities and technologies, and has an impact on public response. 6) The literature debates whether personal communication or media communication has a greater influence on behavior. 7) Studies of news articles on Yucca Mountain reveal an overwhelming emphasis on political processes and political sources. The articles convey a degree of skepticism about the political process related to the facility. Government sources are more commonly cited than other sources, and they consider different risks than do citizen groups. Thus the risks of concern to public action groups are rarely covered. Imagery in the editorials and cartoons portrays villains, i.e. the federal government, and victims, the citizens of Nevada.

The review of surveys points to a number of findings. 1) The great majority of respondents were opposed to the repository in a hypothetical vote. Between 1989 and 1994, there has been fairly stable opposition expressed in State surveys, and also an increase in support among previously undecided respondents. In Clark County, there was stable opposition until 1994, when opposition increased; there was a gradual increase in support until 1994, when this trend reversed. While the majority in the State and Clark County believe the State should not make a deal in exchange for siting the facility, there was also a gradual increase in the numbers willing to have the State take compensation and accept the facility, and a decrease in those who felt the State should continue to fight. 2) Most opponents of the siting are strongly opposed, while the supporters are generally less strongly supportive. 3) Women's opposition has been stable, but levels of support have fluctuated. Men's levels of support have been more stable, while their opposition has fluctuated. Women are more opposed than men. 4) The major concerns among opponents are risk to future generations, transportation of nuclear waste, and water contamination. 5) The repository is rated as highly dreaded and unknown, and is rated higher than other hazardous facilities. 6) Rural residents are more supportive of the facility than urban residents. While both areas express distrust for government, rural residents supportive of the facility more often trust that the facility will be competently managed, and that they will be informed in the event of any problems. 7) Those who know people working in government are more supportive. The risk of a hazardous facility concerns people less if they plan to visit the area for a short time than if they consider remaining for a long time. 8) With respect to 'social amplification', people responded negatively to an advertisement supportive of the facility, while

an earthquake that occurred mid-way through a survey process revealed that the quake acted as a 'risk signal', which heightened concern about the siting. 9) Trust in government is an important factor in risk perceptions.

Approaches to understanding the connection between risk perception and behavior, including State studies about the Yucca Mountain Project, are reviewed. It is observed that behavior cannot be predicted on the basis of risk perception. Methodologies used to study risk perception and behavior have included scenario surveys (where people are asked to report how they would behave in hypothetical circumstances), analogue case studies, and combinations of experimental and case study approaches. 1) Scenario surveys suggest that a repository would have a negative impact on economic behavior and residence choices, specifically tourism, the convention industry, starting a business, and migration decisions by retirees and younger adults. 2) Duration of exposure (length of time a person would be staying) and distance from the facility appear to be taken into account as respondents make these decisions. 3) The difficulty of using hypothetical decisions to predict actual behavior is mentioned. 4) Analogue case studies suggest that economic opportunity is an important element in acceptance of hazardous facility sitings, but that this becomes less important as time progresses, while potential health effects become more important. 5) Consequences of negative events at hazardous facilities include persistent distrust of officials, significant economic impacts, stigma for the community, and community conflict. 6) Despite the interest in economic opportunity from a siting, one study finds an increase in unemployment as well as in employment during site construction. 7) There are problems with using analogue case studies to predict behavior, since contextual variables (the intervening variables between event and impact) are different from one setting to another. 8) A combination of experimental and case study approaches finds a bimodal distribution in the evaluations of risk for low probability, high consequence hazards. It is argued that economic behavior follows upon these risk perceptions. Since economic behavior by those with high risk perceptions can affect those who see little danger, this leads to social conflict among groups who evaluate the threat differently.

Ethnographic Sociocultural/Risk Studies

Chapter 3, originally submitted as the *Ethnographic Sociocultural/Risk Studies Report* (Deliverable 94-8 for the Clark County Department of Comprehensive Planning, Nuclear Waste Division) presents the results of ethnographic and chronicling research and analysis carried out during the Fall of 1994. The study provides information on the social forces surrounding the Yucca Mountain issue, the way people think about the risks, benefits, and consequences of the Project, and the public response to the YMP and to concerns about technological hazards.

The study investigates the social dynamics of the community to see how these dynamics affect public response to the Yucca Mountain issue. Research focused on interest groups including business and growth interests, environmental organizations, labor unions, concerned citizen groups, professional groups, population sub-groups, resource user interests, and nuclear industry

interests.

The study does not draw conclusions about how the social dynamics of the community will affect the Yucca Mountain issue, but suggests some of the major patterns of alliances and divisions within the community. There is stated opposition to the YMP in some organizations interviewed for this study. Opposition comes from the State Medical Association, the Parent Teacher Association, and Citizen Alert. Groups that have expressed support of studies of the proposed repository are the construction labor unions, the Nuclear Waste Study Committee, and the Southern Nevada Homebuilders Association. Organizations not interviewed for this study have also taken public positions on the YMP, and these include groups opposed to the YMP such as the Nevada Resort Association, the Clark County Commission, the Las Vegas City Council, and the Clark County School Board. There are significant divisions in the community over the YMP issue, and groups including the League of Women Voters, Nevada Concerned Citizens, the Clark County Teachers Association, the Nevada Development Authority, and the Latin Chamber of Commerce are internally divided and have taken no positions on the YMP. In some cases this divisive pattern includes continuing discord within groups that have already taken a public stand for or against the YMP. There may be unstated division over the YMP issue between elements of the two major business sectors, the tourism and gaming sector and the construction sector. There is also some disagreement on the YMP issue between those associated with local and state government, and those associated with the federal government and its contractors.

A number of risk concerns were mentioned in interviews, including transportation of waste, waste storage, water contamination, earthquakes, negative economic consequences, and risks to health and to future generations. The most widely mentioned concern, referred to by both YMP supporters and opponents, was the transportation of nuclear waste, but the issue that elicited the greatest intensity of concern (among opponents) was risks to health and safety, and threats to future generations. Different degrees of belief were expressed in the impartiality of the scientific effort and the adequacy of current scientific knowledge to address potential risks.

Many people expressed anger at the political process through which Nevada was selected as the sole site studied. This view was expressed by opponents and some supporters of the YMP. There is a fairly widespread view that the past decisions about Yucca Mountain have been based on political rather than scientific considerations. This has undermined confidence in the legitimacy and influence of the scientific effort, and in the decision that will be made on the siting.

Chronicling research finds a range of public responses to the YMP, including organizations taking public stands on the YMP issue, group formation and division, and changing levels of conflict between organizations.

Analysis of Sociocultural/Risk Perception Survey

Chapter 4, the *Analysis of Sociocultural Risk Perception Survey* (originally Delivery Item 94-9) is a component of the Clark County Nuclear Waste Repository Program's fiscal year 1994 (FY94) research corresponding to the socioeconomic impact assessment of the Yucca Mountain Project. As such, this report summarizes the results and analysis of a population-based telephone survey designed to gather information about the relative weighting of risk-related concerns, actions taken about risk-related concerns, sources of information about the Yucca Mountain project, and perceived effects of and attitudes towards the proposed repository. In addition, information regarding several important demographic characteristics of the survey respondents was also collected. The frequency distributions of selected questions as well as and cross-tabulations of respondents' demographic characteristics and response categories are presented in this report.

Responses to the telephone survey indicated the storage of nuclear waste at Yucca Mountain and the transportation of nuclear waste through the county were among the most serious issues in the community. The actions people had taken about the repository were most often voting, contacting federal officials, and information seeking.

There was statistical significance regarding the importance of the transfer of nuclear wastes through the County as an issue affecting the quality of life in Clark County in association with ratings of the importance of the quality of schools and education, diversification of the county's economy, crime, air pollution, job opportunities, traffic congestion, water shortage, and overpopulation, and the demographic characteristics of age, education, and length of residence in Nevada. The importance of the storage of nuclear wastes at Yucca Mountain as an issue affecting the quality of life in Clark County was significantly associated with ratings of the importance of diversification of the county's economy, crime, air pollution, job opportunities, traffic congestion, water storage, and overpopulation, and the demographic characteristics of age, employment at the Department of Energy or DOE contractor, and length of residence in Nevada.

Individuals' perceptions about nuclear waste transportation and storage were investigated by asking respondents to answer questions specifically regarding the Yucca Mountain Project. The following is a summary of the responses by 295 individuals who agreed to participate in this line of inquiry:

- 83% of the 295 respondents who answered the Yucca Mountain-specific component of the survey agreed that there are dangers of accidents that cannot be avoided when transporting nuclear waste to the proposed repository.
- 79% felt that people living in the county will worry about the proposed repository.
- 71% indicated that it could affect the health of those living nearby.

- 69% agreed that the YMP is a threat to future generations.
- 63% considered it a threat to the overall quality of life in Clark County.
- 60% thought that a repository could negatively affect property values.
- 51% thought it will cause groundwater contamination.
- 48% thought it would create a bad image of Clark County. Given that gaming and tourism are the "backbone" of the Clark County economy, the image of the area with respect to the proposed repository is an important consideration.
- 60% of the respondents felt that the benefits from a repository, if built, will not outweigh the harms it poses to the community. This suggests that in a time where publics are concerned about economic diversification, jobs, and overall growth in the quality of life in Clark County, the proposed repository is not assessed as a benefit among the reasons why people want to make the county their home.

From where and how the public receives information about the proposed repository is also a subject examined in the telephone survey. Responses to an inquiry about Yucca Mountain information sources indicated that local newspapers and local television stations are the most important sources of information to the public about the Yucca Mountain Project. Future monitoring of these major information sources will contribute to an understanding about what messages the public is receiving about the YMP and how these messages are likely to affect perceptions about risk associated with the repository project.

Behavioral Response to Sociocultural/Risk Concerns

Chapter 5, a revision of Deliverable 94-10 entitled *Behavioral Response to Sociocultural/Risk Concerns*, investigates linkages between issues of concern and actions taken by Clark County residents. In this process of investigation, the report provides a description of the types of actions and behaviors individuals and groups have taken in response to their perceptions of risk about issues of concern in Clark County, including the Yucca Mountain Project. By explaining why, when, and how issues reach a threshold which requires action, this research provides a clearer understanding of the overall link between perceived risks and impacts on the community. This information about what actions have been taken or may be taken by groups or individuals in response to crime, water shortages, traffic congestion, the proposed repository, and other issues of concern will aid local government planners in identifying effective policies and plans.

Data pertaining to actions and behavior were collected through ethnographic interviews,

participant observation, and survey methods. In examining the concept of group behavior, four categories of variables are revealed that influence a group's threshold for action, and thus help to describe the linkage between issues of concern and actual behavior.

The first of these categories includes elements that contribute to a group's definition. Key elements described in this category include organizational mandate and mission. Organizational factors comprise the second category of elements which influence a group's threshold for action. Important aspects considered in this category include a group's internal structure and resources available to it, as well as such considerations as group autonomy and solidarity. The third category found to influence group action includes those elements which are external to the group itself. Such elements include the affect that events, potential occurrences, and media communication has on a group's perception of issue salience. The fourth and final category of elements is comprised of the actual behaviors and actions utilized by groups in response to their issues of concern. Organizations are shown to have a pre-determined selection of potential choices for action, or a 'behavioral repertoire,' which influences their threshold for action. As explained in the report, it is the *unique* interaction of a number of elements from each of these four categories, combined with the particular details of an issue at a specific point in time (i.e., under specific circumstances), that determine the way in which an organization will react or behave.

The second part of the report employs a survey of Clark County residents to consider the kinds of actions individuals take, and the actions they have taken (or foresee taking) on a range of issues including the Yucca Mountain Project. Survey respondents indicated a variety of actions in response to different issues. In response to the two nuclear waste questions (transport and storage), the most common actions taken by survey respondents were voting, contacting a federal senator, and seeking and giving information. Thus political behavior and 'risk communication' behaviors are the most common responses (among the options listed) to the Yucca Mountain issue. As noted, the nuclear waste issues rank among the issues with the highest number of actions recorded, preceded only by crime and quality of schools and education. This level of interest and action on the Yucca Mountain issue is markedly different from the findings of research with interest groups (described in Chapter 3, and in this report) which found only some organizations had taken actions on, or expressed an interest in the Yucca Mountain Project. Reasons for these differences are not clear, but they warrant further research.

Sociocultural/Risk Communication Studies

Chapter 6, originally submitted as the *Sociocultural/Risk Communication Studies Preliminary Report*, examines the communication of risk-related information about the Yucca Mountain Project. Presented in this report is information about the perceived risks and benefits of the proposed repository as depicted in media and non-media sources. This effort represents a step in the long-term process of examining the messages communicated about the Yucca

Mountain Project, sources of repository-related information used by different publics, how these sources are evaluated, and what kind of information results in actions. Such information is useful in understanding the dynamic relationship between information sources, information content, and the salience of issues in the community context.

Data from the analysis of media sources indicate that the portrayal of the Yucca Mountain Project is changing over time. While articles reflecting opposition to the repository still outpace articles supportive of the repository by a two-to-one margin, negative articles appear to have declined over time. The particular risks communicated in the media have changed over time. Earthquake and seismic risks dominated risk-related subjects and, with the exception of cask construction and water contamination, coverage of other risk areas has declined.

Although sources opposed to the repository have declined in frequency and miscellaneous sources have increased in frequency, there remains a strong association between the citation of federal versus state and local sources and the intent of the subjects discussed in the articles. Articles supportive of the repository are more likely to cite federal sources while articles opposed to the repository are more likely to cite state and local sources. However, despite the fact that articles expressing opposition to the repository are more common than articles expressing support, the number of articles citing federal sources has grown significantly over the past five years. Although this trend requires further analysis, it suggests a greater interest in publicizing the federal perspective on the Yucca Mountain issue.

Non-media sources analyzed were drawn from a number of different organizations. A predominantly Yucca Mountain-oriented journal from each of federal, state, and county governmental levels was coded, along with a locally available Yucca Mountain-oriented journal from a nuclear industry association and one from a repository opposition group. Non-media sources show a wide range of messages being communicated to at least some segments of the population. 'Risk' and 'Benefit' categories, for example, provide interesting contrasts. Risk, as a percentage of overall topics, was notably high in the federal journal -- exceeded only by the county publication. Under benefits, on the other hand, the industry association journal had the highest percentage of content, followed by the federal journal. The state and opposition group journals tended to be strong in their criticism of officials and their actions relative to the other journals.

Discussion of Findings

As discussed in Chapter 7, this study finds differences between ethnographic data and survey data in the importance attributed to the water issue and the Yucca Mountain issue, and agreement in findings on crime. Demographic and social differences between community leaders and the general population are suggested to explain this discrepancy. The survey and ethnography are similar in revealing a degree of polarization in risk perception, and those opposed to the YMP are often highly opposed. This confirms findings in previous studies. Actions taken in

response to YMP risk concerns in both survey data and ethnographic data include monitoring and information seeking, information dissemination (through publications and symbolic action), and voting or encouraging others to vote on the issue. Thus risk communication and political behaviors are responses found in both studies. While concern about risk perception has remained steady, media coverage of risks has declined, a finding that suggests a need for further study.

1.0 INTRODUCTION

This document, a preliminary draft of the *Phase II Sociocultural Risk Assessment and Monitoring Variables Report*, presents the findings of research carried out during Fiscal Year 1994 (FY94) by Impact Assessment Inc., for the Clark County Department of Comprehensive Planning, Nuclear Waste Division. This research is directed at understanding the social impacts that may be associated with the site characterization phase and the possible siting of a high-level nuclear waste repository at Yucca Mountain, Nevada. The report provides an analysis of the current level of public concern about the Yucca Mountain Project, and identifies variables that are useful for tracking public concern and public response.

To understand and monitor changing public concerns and actions that could result in negative impacts to community well-being, the salience of issues, including risk perceptions regarding the Yucca Mountain Project, must be placed in context. Negative impacts can be exacerbated if citizens lose trust in the ability of local government to protect their health, safety, and quality of life. Thus, to aid local government planners, the Clark County Nuclear Waste Repository Program's research of special repository-related socioeconomic impacts emphasizes evaluating risks in their historical, social, and cultural context of Clark County. This phase of the multi-method research approach includes the following:

- (1) **Ethnographic and chronicling studies** to collect data about the nature of risk perceptions; key events that affect resident responses to the proposed repository; and the behavioral consequences of events on County residents. These studies also include a) 'risk explanations' regarding the Yucca Mountain Project and other Clark County issues; b) investigation of interest groups and their perspectives on local issues; c) chronicling which provides a time-line of Yucca Mountain Project developments, the public's response to developments, and the influence of local and non-local events on public response.
- (2) **A telephone survey** of the general population in Clark County to monitor and analyze the proposed repository in relationship to other risk concerns. This research includes analysis of: a) the weighting of local risk concerns; b) the perceived effects of the Yucca Mountain Project; and c) demographic correlates of risk perception.
- (3) **Archival review** of media and non-media sources of Yucca Mountain-related information for the content of information communicated to the public. These studies directly relate to earlier (FY93) analysis of the frequency, contents and sources of information about risk-issues in major Las Vegas newspapers (the *Las Vegas Review-Journal* and the *Las Vegas Sun*).

The results of each of these research methodologies is discussed, in turn, in this report. A comparison of findings and the implications of FY94 research for monitoring activities is also presented in this document. The report is organized into the following chapters:

- Chapter 2 presents a literature review of published and unpublished sources that focus on the four study areas: the ethnographic sociocultural risk study, sociocultural/risk communication study, sociocultural/risk perception survey, and behavioral response to sociocultural/risk concerns. The purpose of this review is to provide a background which contributes to the formation of research topics and methodologies, and the analysis of data.
- Chapter 3 presents the results of the ethnographic research on the potential social impacts associated with the proposed Yucca Mountain high-level nuclear waste repository. The study provides information on the social forces surrounding the Yucca Mountain issue, the way people think about the risks, benefits, and consequences of the project, and the public response to the proposed repository and to concerns about technological hazards. This chapter also includes a 'chronicling' section, in which a time-line of events associated with the Yucca Mountain Project is presented.
- Chapter 4 summarizes the results and analysis of a population-based telephone survey designed to gather information about the relative weighting of risk-related concerns, actions taken about risk-related concerns, sources of information about the Yucca Mountain Project, and perceived effects of and attitudes towards the proposed repository.
- Chapter 5 presents the findings of the behavioral response to sociocultural/risk concerns study, in which the linkages between issues of concern and actions taken by county residents were investigated. Provided in this chapter is a description of the types of actions and behaviors individuals and groups have taken in response to their perceptions of risk about issues of concern in Clark County, including the Yucca Mountain Project.
- Chapter 6 presents the findings from the sociocultural/risk communication study. Included in this chapter is information about the perceived risks and benefits of the Yucca Mountain Project as depicted in media and non-media sources.
- Chapter 7 provides a summary of FY94 research and a synthesis of findings.

Individual chapters of this report were submitted as preliminary, stand-alone reports (Deliverables 94-2, 94-8, 94-9, 94-10, and 94-11). Revisions were made in the Sociocultural Risk Identification and Literature Review (94-2) and the Sociocultural/Risk Communication Report (94-11) to address comments of the Nuclear Waste Division and the Peer Review Committee. Changes were made in Chapter 3 (Ethnographic Sociocultural Risk Study, originally 94-8), and Chapter 4 (analysis of Sociocultural/Risk Perception Survey, originally 94-9), and most noticeably in chapter 5 (Behavioral Response to Sociocultural/Risk Concerns, originally 94-10) in efforts to address recently-received Nuclear Waste Division comments. It must be emphasized that this document is a preliminary draft that will be reviewed by the National Peer Review Committee and the Clark County Nuclear Waste Division. We expect that further revisions will be made in this draft as a result of this review process.

2.0 SOCIOCULTURAL RISK IDENTIFICATION AND LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this Sociocultural Risk Identification and Literature Review is to provide a literature review of published and unpublished materials that apply to the four study elements (i.e. ethnographic sociocultural risk study, risk communication study, survey, and behavioral responses to risk concerns). In the interest of building on previous research produced for the State of Nevada's Nuclear Waste Project Office, the emphasis in this review is on the socioeconomic reports commissioned by Nevada. However, since these reports are part of a wider academic literature on the social impacts of risks and hazards, this broader literature must also be considered. This review is intended to provide a background which informs both the composition of research topics and the issues that may be considered in data analysis. While it will inform these studies, it is not intended to define them, since to do so would be to limit active and ongoing research to reiteration of previous findings.

This review is organized according to the study elements. First, there is a consideration of the ethnographic and sociocultural literature which focuses on perceptions and explanations of risk. Methodology and findings are noted, along with a brief discussion of the theoretical issues in this research field. Recommendations are made about the areas in which research is needed. Second, risk communication studies, including case studies, Yucca Mountain media analyses, and theoretical and methodological approaches are reviewed, and suggestions for further research are noted. Third, survey findings regarding risk perception, and especially perceptions of risk about the Yucca Mountain project, are reviewed, and suggestions are made about the direction research should take. Finally, studies concerning risk perception and behavior are considered, including a discussion of the approaches that have been employed, study findings, and some general theoretical issues in the relation between risk perception and behavior. Additional approaches are proposed.

2.2 ETHNOGRAPHIC SOCIOCULTURAL/RISK STUDIES

The literature review for the ethnographic sociocultural/risk studies has three parts: a review of the literature related to ethnographic research, a similar review for chronicling research, and a summary of these two literature reviews and their implications to research.

2.2.1 Literature Review: Ethnography

Previous studies have investigated the current social, economic, and cultural environment of Nevada's rural areas (Little and Krannich 1990) and a major urban area, Clark County (Impact Assessment 1994; research for this report was conducted in 1993). This background provides critical data about the setting in which the Yucca Mountain Project is being carried out. The studies reported below focus more directly on how people construct and explain the environment of risk. After briefly introducing a theoretical concept that organizes this area of research, the following pages review research on the topics of imagery, the association between risk perception and cultural ideology, ideas regarding the social construction of risk, existing Yucca Mountain Project ethnography concerning risk, and exploration of cross-cultural similarity and cultural diversity in the structuring of risk.

One important focus of study in the field of risks and hazards has been the way people think about those things they judge to be risky. A central mission in the cognitive sciences has been to investigate the mental processes people use to think about themselves and the world. This research field has used the term 'schema' which, D'Andrade (1992:29) writes, is "a shorthand way of saying that a distinct and strongly interconnected pattern of interpretive elements can be activated by minimal inputs. A schema is an interpretation which is frequent, well organized, memorable, which can be made from minimal cues, contains one or more prototypic instantiations, is resistant to change, etcetera." He further notes that an "important property of schemas is that they have the potential of instigating action . . ." The following discussion reviews some of the methodological approaches and findings of research on the way people think about things nuclear and, specifically, about a nuclear waste repository. While this research generally does not refer to 'schemas' or cognitive science, it provides insights from a range of perspectives on the interpretive processes people employ in thinking about, evaluating, and formulating action regarding risks.

Slovic, Layman, and Flynn (1990a) use a method of continued word associations to explore imagery, beliefs, attitudes, and emotions related to the idea of a nuclear waste repository. Respondents to this telephone survey were drawn from Nevada (including an emphasis on Lincoln, Nye, and Esmeralda Counties), Southern California, Phoenix, Arizona, and a national sample. The method consisted of giving the respondent a word prompt (such as 'underground nuclear waste storage facility' or 'underground nuclear repository') and asking them to produce a word or image that came to mind when they heard the phrase. They were told they would be asked for six images, and each time they were again provided with the word prompt. This continued until they had produced six images or could think of no more. They were then asked to rate each image they had produced on a five point scale from very positive to very negative. They respondents in these regional samples were not asked identical questions, and those in the non-Nevada samples were first asked to provide images, according to this method, of either four cities or four states, while the Nevada sample was first asked questions about community satisfaction and environmental concerns.

Slovic *et al* (1990a) provide a grouping of the terms that were evoked by the nuclear waste word prompt. The two largest categories of response referred to negative consequences (25%) and negative concepts (20.68%). The most mentioned negative consequences included the category 'dangerous/toxic', 'death/sickness', and 'environmental damage', and also grouped less-mentioned images such as leakage, destruction, and pain and suffering. The most common negative concepts included the categories 'bad/negative', and 'scary', along with somewhat less frequent images such as unnecessary/opposed, not near me, war/annihilation, unpopular, crime and corruption, and decay/slime/smell. Other major groupings noted by the researchers included references to location (13.9%), radiation and physical states (4.24%), safety, security (3.31%), and concerns (3.11%), along with others less frequently mentioned. The least mentioned major category was 'positive' (.97%), including positive, unconcerned, effective, improved environment and feasible. The authors note that 'dread' is one of the main dimensions along which risk is perceived, and is a significant constituent in the perception of nuclear waste. While the term 'dread' was not used by respondents, related ideas, such as scary, danger, death, destruction, uninhabitable, and darkness/emptiness, were widely mentioned.

There were some differences between the regional samples in the preponderance of imagery, and Nevadans appeared slightly different than the other samples (Slovic *et al* 1990a). They had the highest percentage of images in the 'negative consequences' category, and the lowest percentage in the 'negative concepts' category, and they had more imagery related to leakage, safety and security, economics, transportation, and degree of distance: It appears, in short, that they had the most imagery related to the practical concerns associated with the repository. Phoenix residents provided more associations to the locations of Las Vegas and Nevada and to nuclear sources (weapons, power, radiation). It would have been interesting to see (using additional methods) whether these associations were related to Arizonans' knowledge of the proposed siting, or their knowledge that they may have been 'downwind' in some early nuclear tests at the Nevada Test Site (NTS). The authors suggest that demographic differences in imagery were slight, but that women rated their images as more negative, while those over 64 and those with conservative political views rated their images as more positive than the norm. This finding raises an interesting question: Do people share largely the same range of imagery, or do they hold disparate sets of images? Does imagery reflect the interests (e.g. political, economic) and concerns (e.g. for family, environment) of subjects? Since imagery is an important factor in risk perception and decision making (Slovic *et al* 1990b, MacInnis and Price 1987), it would be useful to re-explore this issue of imagery, in conjunction with more detailed information about subjects, their views of other Clark County risk concerns, and their explanations of risk.

Fitchen (1989) employed the methodologies of ethnography and interviews to investigate response to toxic water contamination. The interviews generally covered a list of topics, but they were open-ended and tailored to each situation and interviewee. Fitchen (1989:314) notes "The words, phrases, and metaphors people used, the questions they asked, the emotional intensity with which they discussed the problem, and the public actions they took all revealed a great deal about their implicit assumptions and beliefs." The researcher also drew on peoples' narrative accounts of events to explore beliefs. Fitchen observes the threat that these events

caused to home and family, and the way the symbolism of family suffused the public discourse. It is left unclear whether public use of this symbolism was a rhetorical device or an expression of sentiment, or (as Bailey, 1983, argues in an entirely different setting), a bit of both. Fitchen also notes the sense of violation expressed by residents, and observes that 'home' has sacred connotations in American culture, and is an expression of personal identity and status. The decrease in property values and inability to sell property were not only economic burdens in themselves, but also meant a loss of mobility in relation to career locations, and "frozen social mobility." Since contamination had an impact on people without regard to social status, it acted as a social leveler, which called into question existing social patterns. Fitchen makes an interesting observation about the operation of the American ideology of independence and individualism with respect to pollution. Based on research in a number of neighborhoods, she finds that people defend their right to pollute their property (even if it affects others), and feel less harmed than if the pollution is caused by others, polluting *their* own property. What emerges from this research is that risks and hazards threaten not only, or even primarily, physical environments, but also culturally cherished ideological environments -- the realm of the American Dream, home, social mobility, and individualism. These ideologies are part of the way people construe their losses, and are an integral part of the rhetoric used by all sides to defend their positions.

Social processes are evident not only in consequences of technological disasters, but also in the definition of causes. Hilgartner (1992) discusses a idea he terms 'the social construction of risk objects'. The location of causes and the placement of blame for recurrent or singular risks emerges from a social context, and is constructed by social actors. Hilgartner points to the example given by Gusfield (1981) in which the cause (or 'risk object') in car accidents was for many years believed to be bad drivers, while the car itself (for example, its construction and safety features) was exempted from consideration or blame. This definition had consequences in terms of where society sought solutions, and the re-ordering of this social construction of risk objects has proven a wrenching and on-going process. This idea has relevance for Yucca Mountain research. It is known, for example, that some people are concerned about the transportation of nuclear waste. But what is the focus of their concern -- is it the trucks, the drivers, the containers, the roads, other drivers -- and how deeply entrenched are these concerns? Further research is warranted about the way the Clark County context influences public response and the social construction of risk.

Other ethnographic studies (Little and Krannich 1990, Krannich, Little *et al* 1993, Impact Assessment 1994) have investigated the cultural and social setting in parts of Nevada prior to a proposed siting of a high level nuclear waste repository. While these studies only briefly explore attitudes towards the repository, they provide some interesting preliminary insights. Little and Krannich (1990, and Krannich, Little *et al* 1993) suggest that rural residents are more positive towards the siting than are urban Nevadans, and that rural residents see it as a potential economic boon and also support it out of a sense of patriotism. They observe that the repository is almost never discussed by citizens, and suggest that this is because support, in some towns, is unquestioned and unquestionable. A study of Clark County (Impact Assessment

1994; research for this report was conducted in 1993) writes that the repository is generally seen as a political (rather than a technological, environmental, or health) topic, and is described as a "political football". This definition may also act to constrain conversation, since discussion might produce conflict, and because the issue itself is devalued by its definition as merely 'political.'

Research employing factor analysis has been used to investigate the way people think about nuclear risks. The methodology asks respondents to rate risks and hazards on a multiple point scale in terms of various possible dimensions of risk. It provides a way of investigating the major dimensions of risk and how people group those things they consider risky. Studies with U.S. samples (Slovic, Fischhoff and Lichtenstein 1985, Fischhoff, Svenson and Slovic 1987) indicate that the major dimensions of risk perception are 'dread' and 'unknown', and that the idea of a nuclear waste repository scores high with respect to both dimensions. Kleinhesselink *et al* (1991) use this methodology to compare the cognitive representations of risk, with an emphasis on nuclear risk, in a Japanese and an American sample of college students. Their interest is in seeing to what degree the conceptions of nuclear risk are shared by culturally diverse populations. The authors conclude that both populations structure their risk perceptions according to the same major dimensions of 'dread' and 'unknown' (Hinman, Rosa, *et al* 1993 provide similar findings), which is consistent with research in other cultures. Further, both cultures assigned high dread to nuclear issues (which included power production, weapons, transportation, waste disposal, reactor accidents, weapons testing, gas emission) and both samples clustered these nuclear issues close together. The two cultures differed, however, in the assignment of the known-unknown dimension of risk, with Americans rating nuclear issues as more unknown, and as newer than did the Japanese sample (similar findings are noted by Hinman, Rosa *et al* 1993). They also find that Americans rate many chemical and medical perils as more unknown than the Japanese sample, and mention that other researchers have found that Americans rate risks higher on the unknown dimension than do Hungarian and Norwegian samples. The authors suggest that the Japanese may rate nuclear risks as less 'unknown' because of an objective difference in experience with things nuclear, specifically with reference to Hiroshima and Nagasaki. They expand this idea to suggest that cultural differences in ratings of risk may reflect differences in experience. However, some of the 'tests' of this idea with other risks (e.g. Japanese rate AIDS as more known, though it is less common in Japan) do not appear to support their hypothesis.

Another study (Hinman, Rosa, *et al* 1993) makes additional comparisons between the Japanese and American samples. The Japanese sample judges nuclear risks as less voluntary than does the American sample. The authors also note that, in both cultures, radioactive waste disposal, nuclear accidents, and nuclear war are assigned the highest levels of dread of any nuclear issues. While this methodology provides interesting findings about the dimensions of risk concern that are shared across cultures, it also raises questions about the reasons for differences between cultures. To understand both the cross-culturally shared and the culturally unique aspects of risk beliefs, it would be useful to investigate the way people in these cultures explain their judgements about risk. This area of research also raises questions about the degree to which,

and circumstances under which, nuclear facilities derive their meaning from a context (are context dependent), and to what degree they are instead seen as a thing apart which has the power to shape the meaning of any context.

2.2.2 Literature Review: Chronicling

The studies presented here include chronologies and case studies. In general, they trace the genesis and development of a hazardous event, including the scale and nature of the event. There is discussion of the traits (demographic, economic) of affected parties and communities, and a description of how these parties were affected. There is often description of responses to the event, including political, civic, economic, social, and psychological, and the long term results and the degree of community and individual recovery. The following discussion briefly outlines some of the methods that have been used in chronologies of hazardous events.

A number of studies have attempted to reconstruct the history associated with a facility after a serious event has taken place (Pettersen 1988a, 1988b, Peters and Hennen 1988, Hardert 1992, Levine 1992, Kroll-Smith and Couch 1990, 1992, Edelstein 1988, Erikson 1994, C. Flynn 1984). Other studies have looked at agency and public response during the siting process (Fitzgerald and McCabe 1988, Cummings 1988, Carter and Willard 1992). Methodology employed in this research has included fieldwork, interviews, and review of published and unpublished sources (Pettersen 1988a, 1988b, Peters *et al* 1988, Fitzgerald *et al* 1988, Cummings 1988, Hardert 1992, Edelstein 1992, Kroll-Smith and Couch 1992, C. Flynn 1984), content analysis of media (Peters *et al* 1988, Lodwick 1992), surveys and construction of a chronology (C. Flynn 1984) and consideration of public opinion polls and legislative action (Titus 1988, reviewed in Chalmers *et al* 1993, Burns *et al* 1990).

These studies represent syntheses by the authors and, as such, include selections of data according to the theoretical interests of the researcher. For some, the interest is in political processes leading to and resulting from the event, economic consequences (see 'risk perception and behavior' for review of some of the economic results of technological disasters), and in a number of studies the emphasis is on the psycho-social consequences. These consequences include alterations in self concept, a persistent reduction in trust in authorities and civic-governmental agencies, and a rending of the view that the environment is largely benign. They also include hopelessness, depression, health fears for family members, social fragmentation and conflict, and a sense of being stigmatized. There is also, often, a sense of dislocation from home and the meaning of home, and a view that the home has been invaded not only by contaminants, but also by officials and the media reporting the event.

While the research cited above has provided useful insights into the social process and public response to events, it has generally had temporal limitations (with studies beginning after an 'event') or has been narrow in its inclusion of data (it may rely heavily on media sources). Yet it may be harder to construct a balanced chronicle after a serious negative 'event', because there may be fewer disinterested sources. Studies note the tendency for polarization and social

fragmentation following a technological disaster or toxic contamination, and this may contribute to a difficulty in reconstructing the status quo which existed before the event. Detailed chronicling of facilities in the absence of a significant event are rarer, though it might be revealing of the social and cultural processes related to risk.

2.2.3 Ethnographic Sociocultural/Risk Studies

The following discussion briefly summarizes the literature review presented above (sections 2.2.1 and 2.2.2) in terms of the issues to be pursued in further research. The research on imagery, while it provides information about demographic correlates of imagery, does not provide details about the construction of risk perception in the Clark County setting. Further research on this topic would be useful, especially in conjunction with data on peoples' views of other significant Clark County risk concerns, and with information on the reasons (the 'risk explanations') underlying this imagery. This 'risk explanation' approach is further supported by the studies arguing that peoples' views about the causes of technological disasters are in part culturally constructed.

Research on the effects of toxic contamination noted that these events were interpreted and understood in terms of broad cultural ideologies such as independence and social mobility. Ethnographic research in rural areas of Nevada found that attitudes towards the repository are related to perceived economic interests and political views. These findings suggest that it would be useful to investigate risk perceptions and risk explanations in those groups that have announced their ideological perspectives, and have a role in shaping Clark County. The inclusion of individuals associated with interest groups would enable greater understanding of the manner in which social forces will shape the repository issue.

Research comparing risk perceptions in different cultures proposed that a society's historical experience with hazards influences risk perception. While the evidence was not persuasive in this research, other studies have argued that knowledge, or experience with comparable technological risks, sensitizes people to subsequent risks and contributes to higher levels of risk perception. It would be useful to investigate this idea by asking interviewees about prior experiences with risks and hazards.

Chronologies of hazardous events have traced the genesis, public response, and social impacts of disasters. Relatively few studies have constructed chronologies during site characterization. Further, some chronologies rely on limited sources, such as media sources. It would be useful to construct a chronicle of the YMP which enables tracking of attitudes towards the YMP, media coverage, and public response.

2.3 SOCIOCULTURAL/RISK COMMUNICATION STUDIES

This discussion of sociocultural/risk communication studies is presented in two parts. First the literature review is presented. Following the literature review is summary of the review in terms of the issues to be pursued in further research.

2.3.1 Literature Review

Risk communication is a broad field, and includes a number of disparate objectives with related interests. Studies designed to increase public awareness and encourage public action regarding health risks such as cigarette smoking and radon mitigation have investigated the process of effective risk communication between agencies and the public (Covello 1986, Fisher *et al* 1989, *et al* 1991, Rohrmann 1992). Studies of risk communication within organizations have looked into the social processes and organizational culture associated with the withholding of critical information from the public and responsible authorities in, for example, the Challenger disaster, the initial stages of the Three Mile Island accident, and the contamination at a nuclear feed materials production center in Fernald, Ohio (Hardert 1992). The studies of risk communication most relevant for this review are associated with the thesis termed the 'social amplification of risk'. These studies consider the way social processes, especially the public response to communication about certain classes of events, produces secondary and tertiary consequences beyond those caused by the event itself. The example of 'social amplification' most often mentioned is public reaction to the Orson Welles Halloween broadcast of the "War of the Worlds." In this instance, a radio drama about the alien invasion of a fictional town was thought to be genuine information provided by a trusted source; citizens living in a town with a name similar to the fictional location fled. The following discussion outlines research approaches and findings in this area of risk communication studies. Case studies commissioned by the State of Nevada and a report detailing content analysis of newspaper articles about the Yucca Mountain siting are presented here, along with theoretical and methodological issues raised in the literature.

Petterson's research (1988a, 1988b) on the radiological accident in Goiania, Brazil, raises some interesting issues regarding the media's role in contributing to a public perception of risk. The event itself led, in the short term, to four deaths and approximately 129 cases in which people were contaminated. However, the economic, political, social, administrative and health care impacts were dramatic (see 'risk perception and behavior' for an abbreviated discussion of these impacts). These wider impacts can to some degree be attributed to the treatment of the incident by television. Newspaper reporting of the accident was factual, but was followed by "a full-scale sensationalistic television broadcast on the nuclear accident and widespread radiological contamination in the city of Goiania. This broadcast was based upon scant information, was rushed to beat the competition, was presented by a well-respected journalist, and originated from a large city (Sao Paulo) television station"(1988:19). Once this 'story' had been transmitted, other journalists from newspapers, television, and radio went to report the same

story and, the researcher suggests, their coverage of the incident was shaped by a spirit of competition with their colleagues. Subsequent announcements by officials were greeted in an atmosphere of heightened public risk perception and brought renewed panic rather than calm. Covello (1986) argues that when information is provided by multiple communication 'channels', it is considered more credible. While Covello makes this observation while offering suggestions about how to effectively persuade the public to take protective action following disaster warnings, this case suggests that multiple channels also have the power to increase the impact of inaccurate and unintended warnings.

Another report (Peters and Hennen 1988) considers the public response to a conventional mining accident in Gorleben, Germany. Methods included field research, interviews, and content analysis of newspapers. The accident took place at a site that was being considered for the location of a high level nuclear waste repository. While this accident did not involve any radiological material, a portion of the sources quoted in the media suggested that this accident constituted evidence of the inability and untrustworthiness of officials to safely manage nuclear waste disposal, and the unsuitability of the specific location. The mining accident thus acted as a 'risk signal', i.e. as an event that had greater significance because of what it was believed to portend. The mining accident also provided a newsworthy occasion for the issues of suitability and competence to be re-raised. The authors note that the number of newspaper articles about the proposed repository increased fairly dramatically after the accident, along with an additional number of articles on the accident itself. They add that moral aspects (or assertions) about the siting became an important part of the rhetoric. They observe that moral arguments are frequently raised in political controversies, since the object among proponents and opponents is not to convince one another but to win the audience's support.

A study of the accident at Three Mile Island (C. Flynn 1984) provides a particularly interesting case with respect to media treatment of hazardous incidents, and public response. The method of presentation relies heavily on a chronology of events, though the researcher conducted surveys and fieldwork at the site. The study observes that while reports appeared in the media shortly after the event, these described the situation as under control, although it was not. It was fully two days after the worst of the accident that the press began to report the uncertainty of the situation. During that two day period, Flynn writes, the public did not appear highly alarmed. That Friday, two days after the accident began, the governor advised that pregnant women and pre-school children living within five miles of the plant be temporarily evacuated, and that schools within this radius close. A radiation release occurred that morning, and was reported later that day. By that evening the governor had said that people in the area could go outside, but that pregnant women and young children should remain out of the area. The public responded strongly to these announcements, and around a third of the 370,000 people who lived within 15 miles of the plant evacuated. Flynn writes that there were scenes of chaos as entire neighborhoods evacuated. Many remained away for five days. Distance from the facility was related to the rate of public evacuation, and 60% of those living within five miles, and approximately 44% of those in the 5-10 miles around the facility left. There were economic impacts, and a dairy serving Harrisburg experienced an 18% decrease in sales in the first week

and a 15% decrease the second week; there were also losses of around \$2 million in the hotel and convention business. There were decreases in sales of near \$39 million, additional losses in income, and a growth in the anti-nuclear movement in the area. However the author also observes that the area has returned to a more normal state since the accident.

Two researchers suggest that the listener's receptivity to communication is a variable which partly determines the influence of the message. Covello (1986) writes that while strongly held beliefs are difficult to change, weakly held beliefs are more easily manipulated by the manner in which risk information is presented. This argument may be applicable to Nevada State survey findings, noted below, about the opponents of the repository who report themselves 'strongly' opposed, and the lower levels of fluctuation in their response rates. A second observation is made by Coleman, who cites other researchers (Dunwoody and Neuwirth) to argue that communication affects individuals more strongly when related information is being actively sought, and when the information is associated with pressing concerns, and affects them less strongly if they simply come across the risk information by chance. In short, motivation along with, perhaps, the degree to which the new information matches existing patterns of understanding, influences the individual's reception of messages about risk.

Mazur (1984) argues that public opposition to technologies increases with an increase in their coverage in the media, even where the media coverage of the topic is unbiased. He suggests that this is because coverage reveals the differing points of view among technical experts, and thereby contributes to a public perception of danger. He further argues that, historically, media coverage of these technological issues is associated with public interest in the wider political issues with which the technology is believed to be related. Thus, to continue his argument, the fluoridation controversy was associated with national concern over communism, while the nuclear power controversy was linked with issues of nuclear fallout from testing. This argument would suggest that the portion of public risk perception that derives from media 'amplification' is context dependent -- i.e., it is ultimately dependent on the broader political concerns of the time.

Burns *et al* (1993) argue that the media and public response have critical roles in determining social impacts of a hazardous event. They further suggest that an event's ability to inspire dread, the view that the incident was occasioned by incompetence, and that it implies future risks, contribute to its high value as a 'risk signal' (they define risk signal as "the degree to which an event leads the public to believe that a new risk has appeared or that the risk is different and more serious than previously thought"). The high value as a risk signal, which is affected by media coverage, will in turn contribute directly to the degree of public response, and to social impacts. The model was operationalized, and correlations were run between the different elements of the model. The data consisted of a set of negative events that occurred over a ten year period in the U.S. The researchers found that media coverage and public response are critical in determining the impact of hazardous events, and find that public perception of managerial incompetence has a considerable impact on public response. In contrast, a study by Doyle *et al* (1991) found that radon mitigation behavior was not correlated with exposure to

media messages, but was correlated with personal communication, and those who had more conversations with others were more likely to mitigate. It may simply be that the information seeking implied in conversation is a closer measure of active mitigation behavior, while media coverage is likelier to lead to the response by political officials that was part of the measure of 'public response' in the Burns *et al* study.

A study by Kasperson *et al* (1992) provides a content analysis of the *Las Vegas Review Journal* newspaper from 1985 through 1989. It investigates the messages about Yucca Mountain that are communicated to the public through the media. The report finds that political process and political sources served as the major focus for the newspaper. The same finding was recorded in an Impact Assessment (1994) analysis of the *Review Journal* and the *Sun*. The vast majority of the sources cited in the news stories are governmental, with the relative proportion of Federal and State sources varying from year to year. Similarly, political processes constituted the major topic covered in the newspaper with respect to Yucca Mountain, with 43% of Yucca Mountain coverage devoted to politics. The category of political processes included management performance, social protest, abuse of the political system, litigation, and legislation. The next most common categories received considerably less attention, with 13% of the articles on safety, 11% on trust, and 10% on benefits from the siting, and 9% on fairness. Health was mentioned in only 3% of the articles, and environment was the topic in 2%. Socioeconomic impacts were mentioned in 3% of the articles, and mention of future generations and vulnerable groups received 0.7% and 0.3% of the coverage, respectively.

A further breakdown of the subjects suggests that news stories convey a degree of skepticism about the political process associated with Yucca Mountain. Among the citations on political processes, there was a primary focus on legislation (30% of the political process citations), and on issues of competence/good management and incompetence/bad management, with the bulk of these discussing incompetence. And of the citations on trust, over three-quarters (77%) involved distrust in governments, with a smaller number (11%) referring to trust in government, and fewer yet with respect to trust or distrust of other entities.

While the Kasperson *et al* (1992) study counts news sources independently of news topics, an Impact Assessment (1994) content analysis of two newspapers, the *Las Vegas Review Journal* and the *Sun*, permits us to see the degree to which different sources discuss different topics. The results are particularly interesting with respect to the topic of 'risks'. The study finds that Federal sources, State sources and interest group sources discuss different specific risks and a different range of potential risks. Since Federal and State sources are most often cited, the topics referred to by government (Federal and State) sources appear most often in the newspaper, while the topics of concern to interest groups rarely appear. This finding provides evidence for the view that news sources which are available to the media and easily quoted may find attention for their positions. Covello (1991b) proposes guidelines (based on risk communication research), for managers in the nuclear power industry who wish to communicate with the media about nuclear energy. Among his suggestions are that officials develop a list of media contacts, create a media room, hold a media open house, and remain available to journalists. Mazur

(1984) suggested that there is often a symbiotic relationship between anti-technology activists and the media, yet it appears that his point can be generalized to other entities and organizations that wish to communicate a point of view.

The Kasperson *et al* (1992) study also analyzes those aspects of newspaper coverage that go beyond the provision of factual communication in conveying a message about the seriousness or manageability of the Yucca project. They term such messages 'signals'. The researchers find 'signals' in editorials, headlines, and cartoons in the *Review Journal*. These signals refer to unfairness, exploitation, and political expediency, and contain imagery of villains, largely the federal government, Congress, and the Department of Energy, and victims, which is most often Nevada and its citizens. This approach, though more difficult to quantify, may partially answer a critique by Peltu (1985) that most content analysis relies solely on the volume of coverage, and ignores significant features of media such as dramatic content, and the prominence given to a news item.

2.3.2 Sociocultural/Risk Communication Studies

The following discussion briefly summarizes the literature review presented above in terms of the issues to be pursued in further research. With the exception of Kasperson *et al* (1992) and Impact Assessment Inc. (1994; the study was conducted in 1993), there have been few risk communication studies of the Yucca Mountain Project. Thus, the bulk of the studies summarized here are about other locales, and suggest directions that would be important to pursue in Clark County research.

The Goiania case provides evidence that the impact of communication messages can depend on the number of communication 'channels' (such as the number of news articles and the range of sources covering a story) and the trust placed in the news source. This suggests that, in the Clark County case, it would be useful to track the frequency with which Yucca Mountain stories appear, and this can be accomplished with a content analysis of media sources (such as in IAI 1994), and the identification and coding of non-media sources of information.

In the Gorleben case, a somewhat mundane mining accident during site construction for a high level nuclear waste repository acted as a 'risk signal', which placed media attention on (and raised public concerns about) the suitability of the site and the competence of managers. This case and the Goiania case both suggest that it would be very useful to investigate, in Clark County, the public's attention to and evaluation of media communication messages. The utility of this investigation is supported by research arguing that the influence of media messages is partly determined by the individual's interest in the message, and the 'fit' between what is heard and what is already believed. Research on this topic in Clark County can best be accomplished using ethnographic interviews and surveys, and both exposure to information and information seeking should be noted. The Three Mile Island study, in which low public response and then high public response were associated with media coverage, suggests that chronicling provides

another useful approach to investigating the impact of media on public response.

Mazur (1984) proposed that media coverage of technological topics depends on their association with the broader political concerns of the time, and that this coverage (regardless of "slant" for or against the technology) raises public risk perceptions. This argument implies that the portion of risk perception that derives from media 'amplification' is context dependent (i.e. that it is ultimately dependent on broader political issues). It would be useful to pursue this question in Clark County through ethnographic research on the 'explanations of risk' about the YMP and other significant Clark County risk concerns.

Studies noted above (in section 2.3.1) suggest that personal communication about risk, along with media communication, are important in prompting behavior. Therefore, it would be important to include some measure of personal communication in the 1994 research; the survey and the ethnography provide the logical means for obtaining this information.

2.4 SOCIOCULTURAL/RISK PERCEPTION SURVEY

This literature review for the sociocultural/risk perception survey is presented in two parts. First the literature review is presented. Second is a brief section which summarizes the literature review in terms of the issues to be pursued in research.

2.4.1 Literature Review

The State of Nevada has commissioned a number of survey reports regarding the potential social impacts of the proposed high level nuclear waste repository at Yucca Mountain. These surveys have investigated public perceptions of risk by means of various questions and approaches, and have drawn on different population samples, including Nevada residents, a U. S. sample, Southern Californians, Arizona residents, and individuals in specific professions, such as the convention industry. The following discussion reviews some of the findings of this research, along with a few of the published studies which have analyzed the same data, with the goal of clarifying the objectives of future survey research on Yucca Mountain. Section 2.4.2 (see below) summarizes this review and outlines the direction to be taken in further research.

The levels of public support for, and opposition to the siting of the nuclear waste repository have been tracked over time using several different questions. One of these asks respondents how they would vote on a hypothetical referendum on the repository, assuming that the hypothetical referendum would determine the fate of the repository in Nevada. Another question asks respondents to judge whether the harms and risks outweigh the benefits, or the benefits outweigh the harms and risks of a repository. And a third query asks whether the State should seek economic trade-offs from the federal government and cease its opposition to the siting, or should continue to fight and accept no trade-offs. At least one of these questions has been included in

most of the surveys between 1987 and 1994, and this allows us to see how public response has developed.

A 1989 report (Mountain West Research) finds that most Nevada respondents would vote to reject the repository (69%, with 68% of Clark County residents) and a minority would vote for the facility (14%, and 15.8% from Clark County). In a 1994 report on Nevada (Flynn, Slovic, Mertz), 69.4% (73% from Clark County, Mushkatel *et al* 1994) said they would vote against the repository in a hypothetical referendum, and 23.4% (18.8% from Clark County, Mushkatel, *et al* 1994) reported they would vote for it. This reflected a fairly stable level of opposition in the State since 1989, though there was a gradual 9% increase in support (along with decrease in 'undecided'/'no vote') between 1989 and 1994. Clark County results also showed stable opposition, until 1994, when there was a 6% increase in opposition. Support in Clark County peaked in 1993, and while there was a 9% increase in support between 1989 and 1993, there was only a 3% increase in support between 1989 and 1994.

An high proportion of State respondents in 1989 (78%, and 77.7% from Clark County) thought the State should try to stop the facility. A majority in 1989 (73.6%, and 70% in Clark County) thought the State should fight the repository, even if this meant turning down benefits that might be offered in exchange, while only 19.6% (and 23% in Clark County) thought the State government should cease fighting and make a deal. In a 1993 survey of State residents (Flynn, Slovic and Mertz 1994) 63.8% supported the State's continued opposition to the repository, while 28% thought the State should negotiate for compensation from the federal government. The surveys in 1989, 1991, and 1993 reflect a gradual decrease of 9.8% in the number who would oppose making a deal (7.6% for Clark County), and a gradual 8.4% increase (9.2% in Clark County) in the number who believe the State should stop fighting and make a deal.

Respondents in the 1993 State survey (Flynn, Slovic and Mertz 1994) who supported the repository were fairly evenly divided between those who would somewhat support and those who would strongly support a repository in a hypothetical referendum. However, the opponents to such a measure were much more likely to state their strong opposition (from 51% to 55.7% in two 1993 surveys) rather than moderate opposition (14% to 16.8% in two 1993 surveys). While a number of studies have noted that women are more commonly opposed to the repository siting than are men, this report also provides tabular data which suggests that opposition among women is steady, though there are fluctuations in the levels of 'undecided' and 'support' responses, while among men (in contrast) the levels of support have remained at a fairly constant level, while levels of opposition have shown greater fluctuation (Flynn, Slovic and Mertz 1994). This approach raises questions about whether opposition is more firmly entrenched than support, and whether the factors motivating opposition are different in substance and salience than the factors motivating support.

A second topic that features prominently in the survey reports involves the nature of the perceived risk. One study (Center for Risk and Decision Processes and Decision Research 1987) found that respondents view a high level nuclear waste repository as a source of serious

risk, with a high likelihood of accidents, and they express substantial dread of the consequences which might be experienced by those living near the site. The three major concerns (Center for Risk and Decision Processes *et al* 1987) are the risk to future generations, possible transportation accidents, and groundwater contamination. A number of studies (such as Fischhoff, Svenson, and Slovic 1987, Hinman, Rosa *et al* 1993) note that nuclear power and nuclear waste are rated as highly unknown and as evoking substantial dread. A 1990 report (Mushkatel, Pijawka and Dantico) notes that the quality of response to such a facility is substantially different than response to other hazardous facilities. According to Flynn, Slovic *et al* (1990), respondents drawn from Nevada, Southern California and nationally evaluated the risks from a repository as higher than for facilities such as pesticide plants, nuclear power stations, toxic dumps, and garbage dumps.

The imagery associated with the words "underground nuclear waste repository/storage facility" was explored by Slovic, Layman *et al* (1990a). They found that the words evoked by this phrase were overwhelmingly negative, and included danger, toxicity, death, sickness, environmental damage and scary, and that the three most frequent terms were dangerous, danger and death. They also found, contrary to their expectations, that few terms associated such a facility with long term storage or transportation. There were few differences in imagery based on demographic variables, but some differences depending on whether the respondent was in Nevada, Phoenix, Southern California, or was part of a national sample. The authors also draw attention to previous research which suggests that the positive or negative imagery associated with a city is predictive of stated vacation preferences and is associated with past vacation choices.

Demographic and geographic variables associated with risk perception have also been explored. Gender differences are noted in a 1990 report (Mushkatel, Pijawka and Dantico), with higher levels of risk perception among female respondents, along with less confidence among females that the government would accurately report and effectively mitigate negative events. And Flynn, Slovic *et al* (1990) measured responses in Nevada, Southern California and nationally, to questions bearing on the perceptions of safety with respect to waste transportation, and potential earthquakes, water contamination and sabotage. Respondents evaluated potential risks as high, with women viewing such risks as more likely than men. As noted above, opposition by women has remained fairly stable, though there has been greater fluctuation in levels of support by women.

There are also urban-rural differences in risk perception. A Nevada survey (Center for Risk and Decision Processes 1987) found that those living within 75 air miles of the Yucca Mountain, and those in rural communities, perceived less risk and were more were both more willing to have the repository sited in Nevada and more willing to accept compensation than others in the State. Differences between Nevada urban (Las Vegas) and rural (Amargosa Valley, Beatty, Pahrump, Indian Springs, Mesquite and Caliente) are considered in a 1991 report (Krannich, Little *et al*). Questions explored the repository's acceptability, its perceived risks, perceptions regarding the Nevada Test Site, views regarding the trustworthiness of government agencies managing the

repository, and attitudes towards other kinds of potentially hazardous facilities. Amargosa and Beatty were distinguished from urban and other rural residents in having a positive view of both the NTS and the proposed repository. Respondents considered the repository unlikely to have negative health effects or to be subject to transportation or other negative events, and expressed the view that it would have benefits for their communities. Responses among urban residents and those of Indian Springs and Pahrump depicted the repository risks in negative terms, and were similarly opposed to NTS activities.

Two other demographic variables emerge as important, and worthy of further investigation, in this body of research. Kraft *et al* (1993) suggests that those who have worked in government, or know those who have, are less likely to be opposed to the repository siting. A second variable involves the length of time people expect to remain in Nevada. Surveys employing scenarios of tourism decisions and migration decisions found that the longer people expect to stay in Nevada, the more the repository affected their stated intentions: ". . . it was found that the longer people think they would be in an area, the more likely they are to think that the repository would make the area less desirable" (Mountain West Research 1989:2.34), and "knowledge of the repository had stronger effects on the stated willingness of people to move to Nevada than it did on their willingness to visit" (Mountain West Research 1989:2.36). Thus risk perception may be influenced by various factors, including patterns of association and duration of exposure.

Another topic that has occupied survey research is the affect of risk perception on decision making. Respondents in both a national and Nevada sample (Center for Risk and Decision Processes *et al* 1987) expressed a view that a repository would make an area less desirable as a place to live, retire, start a business, or visit. Judgements of the nearest distance to a facility respondents would live before they moved or protested found that the median distance to a nuclear waste repository was twice that of any other facility, at 200 miles, with 100 miles for a pesticide plant or chemical landfill, and 15 miles for a garbage dump (Mountain West Research 1989). In a 1990 report (Mushkatel, Pijawka, and Dantico), a survey employed scenario questions to elicit respondents intentions to remain or move from the area if a repository were sited, and found that approximately 30% would consider leaving within five years if the repository were located at Yucca Mountain. Hypothetical investment decisions were also altered in response to repository scenarios.

The surveys addressed two opportunities to study the process termed 'the social amplification of risk'. One of these involved the public response to advertisements, and the other involved the occurrence, while the survey was being conducted, of an earthquake. The affect of persuasion on the evaluation of the repository was explored in a 1994 report (Flynn, Slovic and Mertz). Public reaction to advertisements by the American Nuclear Energy Council, a nuclear energy industry group, is tracked using 1991 and 1993 survey data (Flynn, Slovic and Mertz, 1994). Respondents report a somewhat paradoxical reaction to the advertising campaign. The majority of respondents thought they had not been much influenced by the campaign, while few reported themselves more supportive as a result of the campaign, and a larger number considered themselves less supportive as a consequence of the advertisements. In Clark County, and the

State generally, the paradoxical effect of the campaign increased between 1991 and 1993, with an increasing number of respondents saying they were less supportive, and fewer saying they were more supportive, as a consequence of the advertisements (Flynn, Slovic and Mertz 1994). Questions were added to a survey (Mushkatel and Pijawka, 1992) and asked of a portion of the sample, following the occurrence of an earthquake of magnitude 5.6, centered 12 miles from Yucca Mountain. The perceived importance of the repository increased among respondents after the earthquake, and while 59% of the pre-quake sample judged the resolution of the repository issue extremely important, 68% of the post-quake sample took this view. There was also a 9% increase, post-quake, in the number of respondents judging that health and safety would be placed at serious risk by the repository. It is possible that the earthquake acted as a 'risk signal' (Kasperson, *et al* 1988), sensitizing people the potential risks of a repository, while the advertising campaign may have either made the repository issue more prominent to them (termed the 'availability heuristic'), or may have been greeted with skepticism as to its motives, and thereby increased public distrust.

One of the topics that has featured most prominently in the body of survey research produced by Nevada is the relation between risk perception and public trust in government. A 1992 report (Mushkatel, Pijawka, Jones *et al*) cites findings from 1988, 1989, and 1990 surveys regarding the low levels of trust in government, especially those federal government agencies associated with the repository siting. It notes the correlation between high perceptions of risk and low trust in government/governmental credibility. Kunreuther, Easterling, *et al* (1990) observe that lack of trust in government, specifically the Department of Energy, to safely manage the repository is one of the main correlates of the perception of risk. A substantial proportion of respondents in one survey (Mushkatel, Pijawka, and Dantico 1990) believe the government cannot prevent a serious accident from occurring at a nuclear waste repository. A 1989 report (Mountain West Research) notes that trust in Nevada's governor was higher (among Las Vegas metropolitan area respondents) than trust in the Nuclear Regulatory Commission, the Department of Energy, or the U.S. Congress.

There is the suggestion in some reports that demographic and geographic variables associated with higher risk perception are, at the same time, associated with trust. Thus women have higher risk perceptions than men, and in some studies (the 1989 and 1991 studies cited by Flynn, Slovic, Mertz 1993:19) they also have less confidence in government to inform the public of problems and to mitigate such problems; this finding did not hold true in the 1993 survey. And rural residents have lower risk perceptions than urban residents, and while rural residents have low general trust in government, they have higher trust (than do urban residents) that government will accurately inform them of risks, and will effectively mitigate problems (Krannich, Little, *et al* 1991).

The report by Mushkatel, Pijawka *et al* (1992) also employs focus groups to clarify the factors contributing to trust in government. Focus group findings suggest that the most important contributors to trust are competence, credibility and consistency, while the least important factors are fairness, personal control and openness. The meaning of these terms, as they are used by

focus group members, is not fully explicated. The authors also cite Kasperson *et al* (1988) to suggest that trust has attributes of competency, predictability, caring and commitment, and also has a temporal dimension, so that it is built over time, can be quickly lost and takes time to rebuild. Further, the authors mention the suggestion by Stoffle that public perception of incompetence and mismanagement at other facilities has contributed to public opposition to subsequent efforts by these agencies to site hazardous facilities, a notion he terms 'risk shadows'.

Studies have noted that a majority of survey respondents -- especially those who have high perceptions of risk -- consider the siting process to have been unfair. While early surveys suggested that the population was fatalistic about their ability to stop the project, and believed that it would proceed despite any eventualities, more recent surveys (Mountain West Research 1989) suggest that the public sees the repository as less inevitable: In 1987, 89% stated that the repository would be built whether it was opposed or not, while in 1988 it was at 77% and 1989, 53% (56% in Clark County) expressed this view.

2.4.2 Sociocultural/Risk Perception Survey

There are many survey studies about the Yucca Mountain Project, and the following discussion briefly summarizes the literature review presented above (section 2.4.1) in terms of the issues to be pursued in further research. State of Nevada studies have monitored the degree of public concern and public attitudes about the Yucca Mountain Project. However, they have not provided concurrent monitoring of other salient concerns. This approach is recommended, since it will provide additional data on the degree to which YMP risk perceptions co-vary with other significant risk perceptions.

State of Nevada research has found that most opponents of the siting are strongly opposed, while supporters are more divided between mild and strong supporters. Other research has noted that a nuclear waste repository is viewed as a highly dreaded and unknown risk, and as higher on these measures than other risks. It would be important to continue to track the public's weighing of YMP risk concerns, and especially the weighing of this concern in comparison to other significant risk concerns in Clark County.

Demographic variables, including gender and urban-rural status, have been found to correlate with risk perceptions. Demography constitutes another area that should be monitored. A useful way to investigate reasons for these demographic differences would be to ask survey respondents about the perceived effect of specific risks on their family and community. Additional data could be gathered in ethnographic interviews about the explanations of risk.

2.5 BEHAVIORAL RESPONSE TO SOCIOCULTURAL/RISK CONCERNS

This discussion is presented in two parts: 1) the literature review is presented and 2) the literature review summarized in terms of the issues to be pursued in research.

2.5.1 Literature Review

Much of the survey research on the Yucca Mountain project has addressed the perceptions of risk surrounding the siting of the high level nuclear waste repository. However, less clearly understood is the degree to which, and manner in which, such perceptions will shape public action. The problem of defining the causal force of perception on behavior is not limited to the field of public response to risks and hazards, but is part of a more general and widely investigated question in the human sciences. The connection between belief and action has been explored with respect to religion and social norms (Kluckhohn 1962, Spiro 1982), the relation between intention and action is a central question in much of decision research and consumer research. Intention and action and has also figured, along with the topic of knowledge and action, in current public health research.

In a 1991 study of radon mitigation, Doyle *et al* found that those segments of the population with the highest risk perceptions about radon (women and those with children in the house) were not the same segment of the population with the highest rates of mitigation behavior. Demographic correlates of risk perception, and of behavior, did not match. Recognizing this problem, studies commissioned by the State of Nevada have explored the connection between risk perception and behavior with respect to the high level nuclear waste repository. The following discussion briefly reviews the approaches and findings of this research, and considers surveys employing scenarios, case studies, and combinations of experimental and case study approaches. A few of the published studies in this field are also noted. Some of the problems with using these methodological approaches to predict actual behavior in a specific setting are discussed and, finally (in section 2.5.2), an alternative strategy is proposed.

Most of the State's scenario surveys focus on those decisions that could have an economic impact on Nevada. An early survey (Center for Risk and Decision Processes, *et al* 1987) included several questions to elicit how people in a national and Nevada sample might behave if a repository were located at 50 miles and 100 miles from a city. They were asked if a repository would make a city less desirable as a place to take a vacation, go to a convention, start a business, or raise a family, and also addressed retirement plans. The great majority in the national (80%) and Nevada (70%) samples indicated that a repository 50 miles away would make an area less desirable to raise a family (73% and 61% if it were 100 miles away), and slightly fewer thought it would make an area less desirable to start a business (72% of the national sample and 63% of the Nevada sample; 68% and 57% if it were 100 miles away). Attitudes towards convention attendance were least affected (48% nationally, and 42% in Nevada; 38% and 42% if it were 100 miles away). We can note here that respondents appear

sensitive to both the proximity of a facility and expected duration of exposure to its environment as they make these hypothetical decisions.

Studies aimed at understanding the potential impact of the repository on the Nevada convention industry have explored the decision processes of convention organizers (Kunreuther, Easterling, *et al* 1988) and attenders (Easterling, Morwitz, *et al* 1990). These studies have also used scenarios to elicit hypothetical decisions. In the 1988 report, convention planners who had scheduled Las Vegas for meetings described the process by which they choose a convention city, and were then asked to reconsider their choice of Las Vegas under the hypothetical conditions described in seven separate scenarios. The seven scenarios included varying degrees of media reporting, and different levels and kinds of problems at the repository (such as a benign history, transportation accident, a minor or moderate repository accident, recurrent events, etc.). Scenarios also included variables such as the amount of time before a scheduled convention that a negative repository event were to occur. The authors suggest that, once the repository begins operation, between 3% and 28% of convention planners who currently choose Las Vegas might choose another city. Under the worst scenario, including a number of radioactive releases, transportation accidents, and media focus, between 39% and 68% of planners might choose another city. At the same time, Easterling, Morwitz *et al* (1990) note that the NTS, located quite near Yucca Mountain, has been the site of many nuclear tests, yet this has had no apparent affect on the convention industry. Case studies of other cities (e.g. Goiania, Brazil, described by Petterson 1988b) show a broader impact of nuclear events on convention attendance.

A 1990 study (Easterling, Morwitz *et al*) of convention attendance included subjects from the membership rolls of organizations that had held recent conventions in Las Vegas. Subjects' image of each city with respect to 'pollution and environmental hazard' was significantly related to their stated likelihood of attending a meeting in the city, and was also related to past meeting attendance in that city. The study thereby drew a connection between stated intentions and past behaviors. Other studies have noted the connection between (self-reported) past behavior and (self-reported) future behavior (Otten and van der Pligt 1992, Bentler and Speckart 1979). A scenario question was employed with the same population sample to learn whether a nuclear waste repository would affect stated intentions to attend a convention, and found that 23% stated that they would not attend a convention if a high level nuclear waste facility were located 100 miles away, which was higher than the response for other such facilities (10% noted they would not attend if a low level nuclear waste facility were 100 miles away, 6% gave this answer regarding a hazardous waste incinerator). This is a lower level of objection to the proposed repository than noted in the 1987 scenario survey, where 38% in a national sample and 42% in a Nevada sample said they would find a city with a high level nuclear waste repository less desirable for convention attendance. This difference in levels of response may reflect differences in wording of the questions, or the fact that one sample was drawn from the general population while the other included only potential convention attenders.

With respect to retirement decisions, in the 1987 report (Center for Risk and Decision Processes *et al*) 66% nationally and 57% of a Nevada sample said that a repository fifty to a hundred miles

away would cause them to change their plans. Most of those whose retirement decisions would be affected indicated they would change their plans even if it cost them another \$5,000 a year in housing costs. However, since they responded in similar numbers whether the cost to them would be \$500, \$1,000, or \$5,000, it is difficult to interpret the results. This result suggests some of the problems with using hypothetical scenarios to investigate behavior, since people may react to them as purely hypothetical, and not bring to bear the judgements they might make and the factors they might consider if the conditions were real. In any case, this approach raises problems of interpretation for the researcher, and an alternative approach is suggested in section 2.5.2.

In other research on migration decisions, employing an experimental approach (Greenwood, *et al* 1994), it was found that older adults, those of pre-retirement age, attend less to information about potential technological risks (and more to other aspects of an environment) in making hypothetical migration decisions than do younger adults. The authors suggest that those who are likely to move in connection with job location choices (younger adults) are much more attentive to technological hazards than those in older age groups, and they conclude that individuals are unlikely to select a city with a nearby repository, even when the repository scenarios they are presented with are benign.

Thus the difficulty with using scenario decisions to predict actual behavior is that this methodology simply cannot replicate the complexity and pressures of real circumstance. Further, it is possible that, in the absence of such pressures and complexities, people may respond to scenarios in a somewhat more ideological fashion than they would to real events. The migration decision study (Greenwood *et al* 1994) provides a valuable technique, as it investigates the processes by which people make decisions, specifically the issues people attend to and their propensity to decide one way or another based on each issue. An alternate approach, which investigates actions taken in the Clark County setting, is suggested in section 2.5.2

A second general methodological approach taken in State of Nevada reports involves using case studies of previous facility sitings and 'events' to extrapolate the potential response to the Yucca Mountain facility. There are three problems with this approach. First, most of these studies consider social impacts after a significant negative 'event' has occurred (Kroll-Smith and Couch 1992, Petterson 1988a and 1988b, Levine 1992, Lodwick 1992, Hardert 1992), and fewer studies look at impacts during the site characterization process (Fitzgerald and McCabe 1988, Carter and Willard 1992), or trace response to major and minor events at a single facility (Peters and Hennen 1988, Lodwick 1992). Second, most of these studies are not as comprehensive, in terms of the kinds of methodologies employed and the description of social impacts (exceptions here include Edelstein 1988, Kroll-Smith and Couch 1992, Petterson 1988a and 1988b) as are Yucca Mountain studies commissioned by the State of Nevada and Clark County, and this makes comparison problematic. Third, as is noted below, the context of each case -- including variables such as general cultural beliefs and values, risk perceptions, trust in officials, media 'amplification', the parts of the social and physical environment that are threatened, etcetera -- vary greatly from one setting to another. Thus, while one can identify potential impacts based

on these cases, it is impossible to make predictions about Yucca Mountain based on their example, since many of the contextual variables -- crucial intervening variables -- are different. Another approach is to consider actions taken in the Clark County setting; this idea is elaborated in section 2.5.2.

Hardert's study (1992) of the Fernald, Ohio nuclear feed materials production center describes the discovery of levels of radioactive environmental pollution. The report suggests that DOE and contractor secrecy contributed to a situation in which land, groundwater, and airborne radioactive pollution could easily take place, and led to serious health problems in the area around the plant. Social impacts, including decreased property values, legal actions by members of the public, and by Ohio State, and Federal government (including interagency lawsuits), and the anguish of those with (or fearful of) health problems, are briefly noted.

Lodwick's (1992) case study of Rocky Flats, Colorado makes several interesting observations based on this example. It notes that while the economic contributions of a facility are very salient during the phase of facility development and early operation, they are later taken for granted. As health problems became apparent and health risks to the population become more widely known, the economic benefits are less valued. This contributes to fragmentation and community conflict, as those concerned with health and environmental risks, and those who are economically dependent on the facility take opposing positions. Lodwick also observes that distrust in the DOE has increased over time, though the DOE has sought to quell distrust through a degree of openness, and by placing blame for the problems on two contractors (DOW and Rockwell) who were fired. This suggests that once public distrust takes hold, it is difficult to alter the balance of judgment.

Petterson (1988a, 1988b) describes a case in Goiania, Brazil in which the fairly small exposure of relatively few people to radioactive material led to significant social impacts. Among these impacts were a 40% drop in the sale price of goods produced in the area, decrease in the rental and sale price of homes and property, a 30% to 40% drop in the hotel occupancy rate, the time taken from other issues by government agencies, extensive health testing of citizens, and the widespread stigmatization of the area and its citizens, leading to a range of further impacts. Petterson notes the importance of social amplification by the media and the fear and widespread stigma associated with the uncertainty about where the material had been passed.

Kroll-Smith and Couch (1992) draw conclusions from three case studies of sites with hazardous waste contamination. They argue that three important characteristics of such contamination are the duration of the threat -- that it continues for a long time and is difficult to eradicate, the invisibility of the threat -- that since the contamination often cannot be perceived it also cannot be intellectually confined to one place, and blame -- the fact that it was caused by others contributes to distrust and social conflict. The authors also note a range of social consequences. These include psychological stress and negatively altered self-conception, uncertainty over the degree and kind of danger posed by the hazard, which then develops into a dichotomous view of the world - as basically safe or as basically unsafe (termed 'threat beliefs') -- among citizens.

Social conflict among those with different 'threat beliefs' often emerges. The authors also note that two other characteristics of these situations are the difficulty of mitigating the pollution, and the widespread disruptions of community functions.

A report on the Waste Isolation Pilot Project, located in New Mexico (Cummings 1988) describes some of the controversy and rhetoric surrounding the siting of the facility. While the majority of New Mexico residents opposed the facility, the author suggests that economic opportunity during a time of economic difficulty was one element in support for the siting among some New Mexicans, especially those closest to the site (this concurs with the suggestion by Lodwick, 1992, that economic opportunity is often the most salient factor in public reaction during development and early operation). However, Cummings also notes that contrary to expectations of these supporters, both employment and unemployment increased in the area. The increase in unemployment was due to in-migration of people seeking jobs and, indeed, those who received jobs and were awarded contracts were often those from other cities and states. While stating that adequate research on the social impacts of the period of site characterization and construction was not done, Cummings observes that there is no evidence that emigration has increased or that Carlsbad, New Mexico is less attractive as a retirement location. However, this was written before the site was scheduled to begin accepting waste.

Another kind of study has considered the perception of risk and economic behavior using both experimental and case study approaches. In a 1990 study (McClelland, Shulze and Hurd), researchers found that people living near a hazardous waste site generally believed the risks posed by the site were either high or were low, and few believed the risks were in between these extremes: There was a bimodal distribution in risk perceptions, with some probably overestimating and others underestimating the levels of risk. Further, actual behavior corresponded with these risk perceptions, and the higher the perceived risk, the less money people were willing to accept for their homes. The authors suggest that the bimodal distribution of risk perceptions is common in low probability, high consequence risks, and that this contrast in perceptions contributes to community conflict. Social conflict has been observed in a number of the case studies. Property values in the area near the facility decreased by an estimated \$40 million (for the 4,100 homes) while the site was accepting waste, and by \$19.7 million after it closed. The authors mention that expert evaluations of the area have thus far detected no increased levels of serious health problems near the site, and that any potential health risks would be the same while the site was accepting waste and after it closed, in contrast to the pattern of property values. Another study (McClelland, Schulze, and Coursey 1993) uses an experimental approach to investigate people's behavior with respect to low probability risks; here, an experimental situation is devised to simulate insurance purchasing behavior. The authors conclude that unlike (simulated) insurance purchasing decisions for high probability and mid probability risks, which have a unimodal distribution, "individuals appear either to dismiss low-probability risks by bidding near zero or to worry about the risk so much that they bid in a mode substantially above expected value." The authors note that a similar bimodal distribution of risk perceptions was found in a national survey about a high level nuclear waste facility (reported by Kunreuther, Desvousges, and Slovic in a 1988 article in the journal *Environment*).

2.5.2 Behavioral Response to Sociocultural/Risk Concerns

The following discussion considers issues raised in this literature. Research on risk perception and behavior by the State of Nevada has employed scenario surveys and case studies to investigate how people might behave if the high-level nuclear waste repository is sited in Nevada. The discussion above suggested some of the problems with these approaches. The problem with using scenarios is that people may respond differently to hypothetical questions than to actual circumstance. With respect to analogue case studies, contextual factors, which are important variables in determining public response, differ from one situation to another, and thus the results of case studies are difficult to generalize. Another approach is suggested. This approach employs ethnography (interviews and participant-observation), chronicling, and surveys to collect data in Clark County about past behavior, current actions, and future intended action.

Reports commissioned by the State of Nevada NWPO have focused primarily on economic behavior, but it would also be useful to see whether other kinds of behavior, including political behavior, information seeking, and personal communication behaviors are associated with risk perceptions. Studies in other locales have found that hazardous events brought significant public response and social conflict. Change in patterns of public action during site characterization can be noted through chronicling.

The finding that bi-modal risk perceptions was associated (in one study) with economic behavior and social conflict, suggests that there is a connection between risk perception and both social relations and actions taken by individuals and groups. This idea should be studied in Clark County, and a combination of methodological approaches would be most productive. These methods include ethnographic data on risk explanations, survey research on levels of risk perception, and ethnographic and chronicling data on actions taken.

2.6 LITERATURE REVIEW SUMMARY OBSERVATIONS

This section provides an abbreviated summary of some of the important issues or "lessons learned" that emerge from the literature review. Further discussion of these topics is contained in the review as a whole, and in sections of this report titled 'Summary' (sections 2.2.3, 2.3.2, 2.4.2, and 2.5.2). As noted in the introduction to this chapter, the purpose of this review is to provide a background for the formulation of research topics and the issues to be considered in analysis. However, it must be emphasized that this review is not intended to define or constrain data collection or analysis, since this would limit active and ongoing research to the reiteration of previous findings.

2.6.1 Ethnographic Sociocultural/Risk Studies

The following issues have appeared in previous research studies:

- 1) The imagery of the repository reported by Nevadans may reflect an emphasis on practical concerns.
- 2) The County context, including the influence of interest groups and the non-repository issues of local concern may affect public response.
- 3) Political attitudes and economic interests may be factors in responses to the siting.
- 4) The definition of the repository as a political issue may act to constrain conversation and public debate.

2.6.2 Sociocultural/Risk Communication Studies

The following issues have emerged in previous studies:

- 1) The impact of a communication message can depend on the number of communication 'channels' (such as the number of news articles and the range of sources covering a story) and the trust placed in news sources.
- 2) The impact of an event or communication is related to what it is believed to portend about future events or similar facilities and technologies.
- 3) Those close to a hazardous facility may respond more strongly to communications about danger.
- 4) The impact of a communication may be related to a person's motivation to listen, and the 'fit' between what is heard and what is already believed.
- 5) Perception of incompetence by managers is generalized to other facilities and has an impact on public response.
- 6) Some research suggests that any media coverage of a technology, whether the coverage is positive or negative, raises public risk perceptions.
- 7) Personal communication about risk is important in prompting behavior.

2.6.3 Sociocultural/Risk Perception Survey

The following findings have appeared in previous survey research:

- 1) Prior research has found demographic differences in response patterns, including male-female differences, and urban-rural differences.
- 2) Events that remind people of the potential dangers of a facility, such as the occurrence of an earthquake, may raise public risk perceptions.
- 3) Factors such as distance from a facility, and the length of time people plan to be in the area, may affect risk perception.
- 4) The factors that motivate opposition to the repository may be different in substance and salience than the factors motivating support. Opposition to the repository may be more firmly entrenched than support. The three major concerns noted by researchers are risk to future generations, possible transportation accidents, and groundwater contamination.

2.6.4 Behavioral Response to Sociocultural/Risk Concerns

The following issues have been noted in previous research:

- 1) Social conflict may emerge between groups with different risk perceptions.
- 2) Change in economic behavior has been suggested in a number of studies about facility siting.
- 3) Consequences of negative events at hazardous facilities include persistent distrust of officials, significant economic impacts, stigma for the community, and community conflict.
- 4) Migration decisions may be affected more among young adults than among retirees.
- 5) Distance from a hazardous facility, and the length of time people intend to remain, may make a difference in the decisions people make.

3.0 ETHNOGRAPHIC SOCIOCULTURAL RISK/STUDIES

This chapter presents the results of research carried out in the Fall of 1994 for the Clark County Comprehensive Planning, Nuclear Waste Division.

3.1 PURPOSE AND ORGANIZATION OF THE REPORT

The purpose of this chapter, originally submitted as the Ethnographic Sociocultural/Risk Studies Preliminary Report (Deliverable 94-8), is to present the results of ethnographic research on the potential social impacts associated with the proposed Yucca Mountain High Level Nuclear Waste Repository.

The focus of this report is on the social context and risk beliefs associated with the Yucca Mountain Project. The study effort is designed to uncover how these variables will affect public response to Yucca Mountain Project events. The document concentrates on outlining the social dynamics of major community groups and the way people think about nuclear issues in general and the Project in particular. The argument made here is that the major interest groups and social forces have the power to define the Yucca Mountain issue and will thus be important participants in determining public response to the Yucca Mountain Project. Further, the manner in which groups interact over the issue of the YMP will be central in deciding the overall social impacts of the Project.

With respect to beliefs about the Yucca Mountain Project ('risk explanations'), it is argued that public response to the Project will be shaped by the way people evaluate its risks. Therefore, the report investigates the interpretive processes people employ to think about, evaluate, and formulate responses to risks and hazardous facilities.

Following a section on methodology, the structure and dynamics of Clark County interest groups is discussed. Next, the concepts surrounding nuclear issues are examined. A 'chronicling' section follows, and presents a timeline of Yucca Mountain Project events and some brief case examples of public response to the Project and to hazardous facilities.

3.2 METHODS, PROCEDURES, AND DATA SOURCES

3.2.1 Procedures for the Investigation of Risk Explanations

This section reviews the methods used to gather and analyze data for this report. As outlined in the Scope of Work, the methodologies employed in this study include interviews with interest groups, chronicling, and participant observation. Brief description of these methodologies is presented below, while detailed discussion is provided in the Research Design.

The organizations included in the study were identified through the "*Attentive Publics Report*" (IAI 1991) and previous ethnographic research in the community. On the basis of this previous work a list of organizations and interest groups was generated, and this list was included in the *Data Requirements Report* (Deliverable 94-4). Leaders and spokesmen for these organizations were contacted for interviews (this process is described below), and during the interviews they often identified other important organizations and interest groups in the community. Many of the organizations identified during interviews were then added to the list and contacted for interviews. Thus the eventual list of organizations taking part in this study is larger than the set originally submitted in the *Data Requirements Report*. There were also a few cases in which an organization identified in the *Data Requirements Report* was unable or reluctant to participate, and in these cases another organization from the same sector of the community was interviewed. The criteria for selecting interest groups and organizations is discussed in section 3.3.1, "The Concept of Interest Groups as Applied to County Social Structure".

There was extensive development and testing of the protocol for the first set of interviews. This process is described in Deliverable 94-6 (the *Sociocultural Field Data Collection Report*). The protocol for the second set of interviews was taken directly from the *Field Data Collection Protocols*, Deliverable 94-5. (The first and second set of interviews are outlined below).

The interviews were open ended: While the protocols submitted to Nuclear Waste Division were used in every interview, the interviewer was free (consistent with ethnographic interview methodology) to pose additional questions, and the interviewee could answer questions in the form they found most useful. Interviews occasionally ranged from the topic, but these additions were often productive in establishing the perspective of the individual and the organization. With the exception of two telephone interviews, all interviews were held in person, generally at the office of the interviewee.

Interviewees were told that quotations would be used in the report, and that the names of those providing the quotes would not be included but might be apparent to those familiar with the organization. Many interviewees asked to see a copy of the eventual report, and were told that the contractor would not be able to provide a copy, but they might contact Comprehensive Planning.

Most interviews were carried out in two stages, in accordance with an agreement between the contractor and the NWD. The first interview with each group took place before the first week in November. This interview inquired about the nature of the organization, the issues the group deals with, the social structure of the community and the allies and opponents on issues of importance, the major events in the community, information published by the organization, and prospects and risks facing Clark County.

The second interview with each group (or a 'combined' interview with those groups not reached for the first set of interviews, see below) was conducted after the first week in November. The

content of the second interview was drawn directly from the *Field Data Collection Protocols* (Deliverable 94-5). It included questions about actions taken by the organization in areas of concern to the group. Also, a sheet of paper was handed to interviewees, with a list of issues (derived from FY93 survey research) and actions, and they were asked their attitudes towards the issues, and if they had taken any of the actions. This part of the interview was designed, in part, to collect data for the behavioral study, chapter five (originally submitted as Deliverable 94-10). Then questions focused more closely on two of the issues on the "issues list," namely water shortage/management and the Yucca Mountain Project.

A 'combined' interview was conducted with organizations that were not contacted until after the first week in November, and those groups unable to schedule an interview until that time. Since the first interview generally took an hour to two hours, and the second interview lasted almost that long, it was necessary to compress the set of questions asked in the combined interview. Therefore the combined interview included questions (from the first protocol) about the nature of the organization and the issues it deals with, and questions (from the second protocol) about actions taken by the organization and attitudes toward water shortage and the Yucca Mountain Project. Additionally, the two organizations included in the *Behavioral Pilot Study* (Deliverable 94-7) were interviewed three times: The first interview employed the same protocol as that used with the other organizations, while the second interview (in this case conducted before the first week in November) asked only about actions taken by the organization, and the third interview (after the first week in November) was limited to questions about water shortage and the YMP. The following table indicates the organizations included in the study (along with those mentioned as target organizations in the *Data Collection Protocols*, Deliverable 94-5), and shows which groups took part in the different interviews.

**Table 3-1
Ethnographic Sociocultural /Risk Studies
Interest Group Interviews**

Target Category	Organizations	Stage I Interviews Completed	Combined I and II Interviews Completed	Stage II Interview Completed
Community Business & Growth Interests	Associated General Contractors*	√		√
	Bank of America	√		√
	Greater Las Vegas Association of Realtors*	√		√***
	Southern Nevada Home Builders		√	
	Professional Insurance Agents Association	√		√
	Las Vegas Chamber of Commerce*	√		Scheduling difficulties
	Las Vegas Convention and Visitor's Bureau	√		√
	Nevada Development Authority	√		√
	Nevada Resort Association*	Declined to be interviewed		
	Mirage Resorts		√	
Community Business & Growth Interests (continued)	Downtown Progress Association (member organization)		√	
	Independent Nevada Casino Operators	√		√
Environmental Interests	Sierra Club*	√		Scheduling difficulties
	The Nature Conservancy*	√		√

	Red Rock Audubon Society	√		√
Professional Group Interests	Clark County Medical Society		√	
	Nevada State Medical Association	√		√
Concerned Citizens Interests	Citizen Alert*	√		√
	Campaign for Nevada's Future (newly-forming organization)		√	
	Citizens Call*	Based in southern Utah		
	Las Vegas League of Women Voters		√	
	National Conference of Christians and Jews	√		√
	Nevada Concerned Citizens		√	
	Nevada Tax Payers Association	√		√
	Soroptomists		√	
Religious Interests	Church of Jesus Christ of the Latter Day Saints		√	
Labor Interests	American Federation of Government Employees*	√		√
	Clark County Teachers Assoc.		√	
	Culinary Workers Union*	√		√
	Laborers (Hodcarriers) Union*	√		√
	Building Trades Council Central Labor Council	√		√
Population Sub-Group Interests	Black Chamber of Commerce*	√		√
	Latin Chamber of Commerce*	√		√
	Parent Teacher Association*	√		√
	Seniors United* (organization			

	substituted for another senior group)	√		√**
Resource User Interests	Desert Livestock Producers	√		scheduling difficulties
	Southern Nevada Offroad Enthusiasts	√		√
	Nevada Farm Bureau	√		√
	Nevada Mining Association		√	
	People for the West	√		√
Nuclear Industry Interest Groups	American Nuclear Society*		scheduling difficulties	
	Nevada Nuclear Waste Study Committee*	√		√
Cultural Interests	Nevada Historical Society	√		√
* Organizations on the original target-interview list. **Interview accomplished in two parts to accommodate Behavioral Pilot Study				

The procedure for approaching the organizations was as follows: Telephone calls were made to the organizations indicated in the Data Requirements Report, requesting the name and title of the head of the organization, or a spokesperson. A later phone call requested an interview with the head of the organization or the spokesperson. Those answering the telephone call were told that the researchers were with Impact Assessment Inc., a contractor for the Clark County Department of Comprehensive Planning, and that the leaders of major organizations and sectors of the community were being interviewed about their perspectives on Clark County and Las Vegas. The Nuclear Waste Division was not identified as the specific entity within the Department of Comprehensive Planning conducting the study, although in at least one case the interviewee was aware of the work being conducted by IAI, and in two instances asked during the course of the second interview (described below), which division of Comprehensive Planning was conducting the study. The Nuclear Waste Division was not specifically named at the outset of the interview so that interviewees would not give YMP issues greater weight (in comparison to other issues) than they would ordinarily have for them. This was more important for the first set of interviews, which did not ask about the Yucca Mountain Project, and which asked the interviewees to define the issues of importance. In two cases, the interviewees requested a copy of the interview protocol prior to the interview, and they were accommodated. For the second interview, the interviewees were told that these interviews were being conducted to follow up on

some of the specific issues raised in the first round of interviews.

The great majority of organizations participating in the first interview followed through with subsequent interviews. Indeed, in most cases it was much easier to arrange the second interview, since the interviewees had been asked at the end of the first interview if they would be willing to take part in the second part of the interview, and all had expressed their willingness (time permitting) to take part. Where organizations found it difficult to schedule a second interview, every effort was made to find a convenient time to meet. With one exception, the interviewer who conducted the first interview also conducted subsequent interviews with that organization, and in most cases the same individual (in each organization) was interviewed each time.

Participant observation was carried out in only a few instances, and consisted of attendance at meetings and nature outings held by organizations, attendance at public hearings, and participation in a Yucca Mountain tour. This method is discussed at greater length in the Research Design.

Chronicling employed more than one methodology. A timeline covering some of the major developments in the Yucca Mountain Project between 1989 and early 1994 was constructed from newspaper articles in the *Las Vegas Review Journal* and the *Las Vegas Sun*. The Department of Energy's *OCRWM Bulletin* provided additional material for the timeline. Given the mass of articles that have appeared between 1989 and 1994, significant selectivity was necessary. (Deliverable 94-11 contains a more extensive catalog of YMP topics appearing in sources available to the public.) Only news items about important events (such as earthquakes) and developments (for example personnel changes, new equipment) in the Yucca Mountain Project were included. The researcher who has compiled and coded newspaper articles for the risk communication reports in FY93 and FY94 (and is therefore most familiar with the data) reviewed all the collected articles for possible inclusion in the timeline, and cross-checked items appearing in the *OCRWM Bulletin* to see if they also appeared in the newspapers. Included in the timeline is a list of some of the local resolutions passed in support or opposition to the Yucca Mountain Project. This list was generated from Impact Assessment files, and through a search for the term 'resolution' in the NWD archive database. Chronicling also includes interviews with interest groups during the fall of 1994.

3.2.2 Data Sources

Data sources for Section 3.3.2, titled "The Structure of Interest Groups" consisted of interviews with leaders of interest groups and influential organizations. Those interviewed provided information about their own organization, and about other groups in the community. In discussing other organizations, the leaders of interest groups provided information on groups that have similar functions, groups they are allied with on issues, those they have worked in opposition to on issues, and some of the major political and social forces in the community.

Data sources for the "Nature of Risk Explanations" (3.3.4) also came from interviews with community leaders. The data for the "Sociocultural Context of Risk Explanations" (Section 3.3.5) was provided by two newspapers, the *Review Journal* and the *Sun*, the periodic Department of Energy publication titled *OCRWM Bulletin*, the NWD archive database and Impact Assessment files (for resolutions on the YMP issue) and from interviews with leaders of interest groups.

3.3 THE SOCIAL STRUCTURE OF INTEREST GROUPS IN CLARK COUNTY

This section first introduces the notion of interest groups, and considers how interest groups fit into an overall construct of social structure in Clark County. The criteria for selection of interest groups and organizations is presented. Secondly, the structure of Clark County interest groups is outlined, along with the alliances and divisions among these groups. This section looks at each interest group and some specific organizations that make up these groups. This enables us to observe divisions within interest groups, along with the patterns of alliance among interest groups. The stances taken by the organizations on the Yucca Mountain Project are also noted.

3.3.1 The Concept of Interest Groups as Applied to County Social Structure

The consideration of interest groups is one element in the Nuclear Waste Division study program's description and analysis of Clark County society. This research is directed at understanding the potential impacts of the Yucca Mountain Project on the community. Its principle purpose is to learn which interest groups are concerned about the YMP. It also looks at how organizations might be affected by the YMP issue, in terms of their investments in the community and their relations with other groups. Additionally, it considers how organizations might respond, alone and with others, to the YMP. Essentially, this section considers the social forces surrounding the YMP issue. This report expands on earlier work, specifically the Attentive Publics Report (IAI 1991), in two ways. This report includes both groups that have a concern about the YMP and those groups that do not. Organizations that have the power to help define the issue are included here, whether or not they have taken a position on the YMP. Further, this study attempts to depict the dynamic relations among and within interest groups, in an effort to see how these dynamics will affect the way the YMP issue evolves. We shall begin with a very brief and broadly drawn sketch of elements of County social structure, and then consider the criteria used in selecting groups for this study.

One enduring feature of Clark County society is the counterpoint between the prominence of a specific religious institution, the Mormon church, and of a specific economic sector, the gaming industry. This does not imply that the two are opposed; obviously, both have an interest in the welfare of the community. Further, traditionally and at present, many in Clark County leadership, and heading organizations, are members of the Latter Day Saints Church. Groups

that may have an interest in the nature of the YMP also include those representing continuity with the area's traditional occupations such as ranching and mining. The federal government is another obvious major influence and employer within the County, a visible presence spanning the County from the Hoover Dam to the vicinity of the Nevada Test Site, and encompassing activities from the Air Force bases to the current YMP. Gaming is the most obvious local private sector economic presence, but it also appears as an overlay (of longstanding) on traditional, and still vital, community structures.

The focus of this section is on interest groups and sectors of the community that will help shape the way the YMP issue evolves. The distinction between interest groups and social structure is an analytic one: That is, we focus on the groups' interests in the community, and especially their interests with respect to impacts of the Yucca Mountain Project, rather than looking simply at their position relative to other groups. We include both those groups that currently take an active interest in the YMP (attentive publics) and sectors that have an investment in the future of the community (such as specific economic organizations).

As a complex, heavily populated area, greater Las Vegas and Clark County features many groups that may be usefully included in a study effort such as this. In order to make the research manageable, earlier research served as a winnowing process, and the *Data Requirements Report* (Deliverable 94-4) specified particular groups for inclusion in this report. The types of interest groups identified for inclusion in this study were community business and growth interests, environmental interests, concerned citizen interests, population sub-group interests, labor interests, and nuclear industry interests. Some modifications to the original list were necessary. One of the organizations in the 'business interest' category, the Nevada Resort Association, appeared reluctant to participate in the study, so other organizations in the gaming industry were substituted for them. One of the 'concerned citizens interests,' Citizens Call, was eliminated as a participant because they are located in Utah, with little if any Clark County representation. In this case, a number of other 'concerned citizens interests' were interviewed instead. Among the 'nuclear industry interests,' the interview with the American Nuclear Society was difficult to arrange. Some additional sectors were identified by the end of study but not interviewed, such as local government, those in federal employment or under federal contract, religious groups (other than the LDS), cultural groups (outside of the Historical Society), professional groups (other than those in medicine) and the major land development companies. Contact with these groups may prove beneficial to future study efforts. And it will be important to include the Native American communities in Clark County in future studies. Environmentalists and resource users were oversampled because of the common assumption (not borne out by this study) that environmental organizations have a high level of interest in the YMP, and because the resource users are part of traditional economy, and they represent a number of the more rural interests in Clark County.

3.3.2 The Structure of Interest Groups

Those interviewed for this study observed that while Las Vegas is growing rapidly, a relatively small number of people take an active role in the community. One person said that these influential people serve on Boards of Directors in many organizations, so that organizations, in effect, 'share' Boards. While Clark County has a population approaching one million, there is a concentration of community involvement and influence. The common use of personal contacts and the accessibility of those with influence (compared to many other large cities), may be one of the defining characteristics of Clark County. As an informant explained:

Nevada is very unique because we have elected officials that are small in numbers but also because of the nature of the state. It still has a little bit of the Old West or the open, or the rebel flavor to it. We have a much better open door policy. It's not a problem, I can go in and pick up a phone and I can make an appointment with all four of our Washington delegation and be able to see them within a week, be able to go in and sit down and talk to them. In a lot of other states that's not possible. There is a good open door and a first-name-type basis with most of our elected people, and that makes life a lot easier. We can be a little bit more effective.

There is a marked consensus among community leaders regarding the major interest groups and stakeholders in the County. The gaming industry is the group most consistently mentioned, and especially those heading the largest resorts, and individuals with long ties to Las Vegas gaming. Other business interests were often mentioned (such as banking and the Chamber of Commerce), while another important interest group identified by community leaders was the major land developers such as the Howard Hughes company. Other significant groups include organized labor, the federal government and its employees, demographically defined groups such as senior citizens and the Hispanic and African American communities, the media, University of Nevada Las Vegas and the extended educational community, the descendants of Las Vegas families with long roots in the community (called 'old timers') and, often associated with the 'old timers,' members of the Latter Day Saints faith. Also occasionally mentioned were groups like taxpayers and families with children. Groups organized around issues, such as environmentalists and resource users, often defined stakeholders as those associated with the issues of concern to them, while those in the business sector often focused on business groups. Since interviews were held in the fall of 1994, the importance attributed to certain groups may have been affected by election issues (for example education bonds, and whether there was a significant division between senior citizens and families with children on this ballot issue), and the organizational effectiveness of certain groups (for example, firefighters) during the primary elections.

One of the most influential and significant aspects of community structure is the central position of a small group of prestigious individuals. This group of individuals commands a great deal of influence in the community because of their political and, often more importantly, social

contacts. Frequently these individuals are members of families which have lived in Las Vegas or Clark County for several generations. As one informant explained, "You will find that the power structure is [made up of] people that have lived here most of their lives. I've lived here 40 years, and its a very closed community in many ways." These individuals' influence within the community is magnified by their involvement with many professional and charity organizations. Frequently sitting on the Board of Directors of several associations, these individuals are able to affect the decisions and actions of many people, as well as the course taken by the organizations. Another informant stated that:

There are a few power brokers in town who set on everything. Ten years ago how big was this city? It was a small little town. It was gaming only. So the government officials and the gaming owners just kind of ran the city. It just hasn't evolved a lot from that standpoint. It's not necessarily a bad thing.

The largest sources of local power are thought to reside with County government and the gaming industry. Contacting someone in County government is often considered the best way to get something accomplished. One interviewee remarked that gaming and labor are the major stakeholders, and when they agree on an issue, that tends to become the community consensus, but if they disagree they can divide the rest of the community.

In the following sections interest groups are discussed by sector. Each section begins with an overview of the groups. This is followed by individual group treatments.

Community Business and Growth Interests

Two of the major business and growth interests are those representing building and construction, and those representing gaming and tourism. The construction sector has been involved in work on federal government projects, while the gaming sector has not. These two business sectors are often tied together, but may be more divided in their perspectives on the Yucca Mountain Project.

Business and growth interests play a significant role in the dynamics of the community. Many of these groups are well organized and experienced in political affairs.

An important aspect of this sector's active involvement in the community is its efforts to lobby the City Council, County Commission, and State legislature. Many of the local associations maintain paid staffs, Executive Directors, and political lobbyists to see that their interests and concerns are closely monitored and effectively represented with government officials.

Sub-sector coordination is an important aspect of business activity in the community. Not only are the individual associations and organizations active, but frequently they coordinate their efforts with other associations related to their field. This cooperation between related

businesses sometimes leads to the formation of coalitions. These coalitions vary in duration and stability from long standing alliances to brief agreements that hold only long enough to solve a specific problem. Likewise, activities and benefits from participation in these coalitions varies widely. In some cases, only information is shared between organizations. In other cases, a group of issues may be divided among the members of a coalition. In this situation each organization would select and pursue a particular issue that all members of the coalition felt was significant. This effort would free the other members of the coalition to pursue additional issues with their full attention and resources. In other situations all groups may focus their effort upon a particular shared concern in order to present a united and powerful front.

An example of these coalitions is found between organizations associated with the construction and sale of property. The Greater Las Vegas Association of Realtors, Southern Nevada Home Builders Association, and Associated General Contractors at times combine to form a powerful coalition to act in defense of their combined interests. As an example of this, according to an informant, the Home Builders and the Association of Realtors joined together to protest implementation of a county rent control program. No informants from these groups expressed immediate concern over the Yucca Mountain Project.

Associated General Contractors

Established in the state over fifty years ago, the Associated General Contractors' strives to be the voice of the commercial construction industry. The Nevada Chapter divided six years ago to become the Las Vegas Chapter and the Northern Nevada Chapter. There are over 100 Associated General Contractor chapters nationwide. The Las Vegas Chapter has over 370 members, all of whom are either commercial construction or construction related firms. Both union and non-union firms are members. The organization provides a number of services for its members, including safety inspections of job sites and representation of its members' interests with both state and local governments. Three lobbyists are employed by the organization in order to achieve this goal.

Greater Las Vegas Association of Realtors

The Greater Las Vegas Association of Realtors is a key group in Las Vegas involved with the buying and selling of residential property. It is made up of approximately 4,000 members, all of whom are involved with the trade of residential property. Their overarching goal is the "protection of private property rights." The Association of Realtors takes an active role in supporting political candidates whose outlook on private property is similar to their own. The informant explained that in his opinion "If real estate is your profession, then politics is your business." Of the 4,000 members in the association, approximately 15% are active in either committee work or the organization's leadership. Because Las Vegas is growing rapidly and many houses are being bought and sold, many new people are leaving old jobs and becoming

realtors. Of the new individuals joining the Association of Realtors, approximately 20-30% have recently moved to Las Vegas.

The Association of Realtors began in 1947 as the Greater Las Vegas Board of Realtors. Four years ago they changed their name because the use of the word "board" implied that they were a part of the government. The association has grown substantially since it was created. The group is a member of a legislature watch coalition comprised of themselves, the Nevada Mortgage Bankers Association, and a third group (called the 'ESCRO Association', though meaning of the acronym is unknown). The general purpose of this coalition is to watch for and prevent new laws that would harm the real estate industry.

Southern Nevada Home Builders Association

The Southern Nevada Home Builders Association is a non-profit, professional trade association for individuals involved with the homebuilding and construction industry. The organization was established in 1953 with 15 members, and has grown to over 800 members currently. The membership of organization is made up of large and small scale builders, as well as individuals and companies that supply support services to the industry. The Home Builder's main goal is to be the voice of the building industry in Southern Nevada. The Home Builders Association is funded through membership dues, and is led by a member elected Board of Directors. The organization also maintains a full-time professional support staff to assist with the affairs of the organization. The group is affiliated with the Nevada Home Builders Association and the National Association of Home Builders.

This organization passed a resolution in October of 1991 supporting the YMP site studies. The organization's president was mentioned in the *Las Vegas Review Journal* as saying that the Board of Directors unanimously adopted the resolution because the repository would help protect the jobs of 50,000 construction industry employees.

Professional Insurance Agents Association

The Professional Insurance Agents Association is a national organization of insurance agents. In general, the goal of the organization is to protect the interests of the insurance industry. There are roughly 1,600 members of the organization in Nevada and California.

According to an informant from the group the majority of the organization's actions are taken on the state level. Very little involvement in county affairs was noted by the informant. Despite the informant's general interest in the Yucca Mountain Project, no official action or stance has been taken.

The Las Vegas Chamber of Commerce

The Chamber of Commerce is a central business organization in the community. The Chamber attempts to represent the interests of business in the community and to enhance the local business environment. Member service is key concern of the Chamber of Commerce. Several business guides and directories are produced by the Chamber in order to aid their members. Established in 1911, the organization has grown to have 3,700 members, and is currently growing at the average rate of 70 new members a month. According to an informant, the Chamber of Commerce has shifted away from an all white-male dominated leadership. Women and minorities have become more active on various committees and in leadership positions. Perhaps reflecting the recency of changes, the newly formed Women's Council within the Chamber is sometimes considered a "rebel faction" by various Chamber members. The organization works with other Chambers of Commerce in the community, such as the Black Chamber of Commerce and the Latin Chamber of Commerce, on issues of common concern. The Las Vegas Convention Authority, and the County Commission are also viewed as allies.

Nevada Development Authority

The Nevada Development Authority is a private, non-profit corporation dedicated to attracting new and diverse businesses to the community. The Development Authority was established in 1956 under the title Southern Nevada Industrial Foundation. Approximately 20 years ago the Association changed its title to the Nevada Development Authority, hired its first paid staff, and truly became the institute that it is today. The Development Authority has approximately 580 members, and currently functions as an umbrella organization for economic and business development interests in the county. A third of the organization's funding comes from State, County, and city governments. The remainder comes from the group's members. The Development Authority employs four professional staff members and four support staff members. In conjunction with the State Commission on Economic Development, the Development Authority does most of the advertising to attract new businesses to the area. The organization is active in marketing, responding to inquires on the community, giving tours to prospective new businesses, sharing expertise and knowledge with prospective new businesses, and helping new companies to assess the suitability of Las Vegas and Clark County for their business' needs.

Las Vegas Convention Center and Visitors Authority

Established by the Nevada State legislature in 1955, the Las Vegas Convention and Visitors Authority is a "quasi-government" organization. The Authority's purpose is to serve the community in two ways. First, it manages the activities at the Las Vegas Convention Center, and the community's sports facility, Cashman Field. Second, the Authority is responsible for advertising the city as a vacation destination. The Authority accomplishes these two goals

through funds generated by the Las Vegas hotel room tax. The Authority has taken the place of a visitors bureau, which in most other cities is a membership organization, and promotes only member businesses. Because of its government origin and tax funding, the Authority is free to market the entire city, and all its resources and attractions, as a single destination. The Authority has a large full-time staff, including a President and three Vice Presidents. Despite its government origin, the Authority does not work directly with the City or County. Instead, the Authority reports to a twelve member Board of Directors, which is responsible for the organization's long term planning and direction. Six of the members of the Board of Directors are government officials appointed to represent the County and the five incorporated communities in Clark County. The remaining six members are individuals from the business community and are appointed by the Las Vegas Chamber of Commerce. The Authority works with a number of different organizations in the community to promote tourism and strengthen the local economy. These organizations include the Chamber of Commerce, Las Vegas Airport, Nevada Resort Association, Hotel Motel Sales Association, Nevada Hotel Motel Management Association, Nevada Development Authority, Nevada Commission of Tourism, and the Nevada Gaming Control Board. The Authority produces a number of annual studies of tourism in the area.

Financial Institution Organizations

No organizations of financial institutions were interviewed. However, one interview was conducted with a representative of Bank of America. Banking, and this bank in particular, was very involved in the coalition to support the school bond issues. The bank's leaders are interested in the issues facing the community, especially topics like crime, education and water.

Gaming Interests

Gaming is the major revenue producer in Clark County, and the largest employer. As the major industry, gaming is also a central to the image of the community. Much of the information about the gaming industry comes from what is reported about it. Because it is so important, it is looked to for direction and its intentions are read by others: Most interviewees addressed the topic of gaming's role in the community at some point during the interview. There has been substantial change in gaming in the last several years, including a shift from family owned operations to corporate ownership, the expansion of Clark County gaming corporations to other locales in the country, the building of large resorts, and the development of family oriented resorts.

A view expressed in gaming (and elsewhere in the community) is that the expansion of gaming to a number of specific locations outside Nevada is not a serious threat in general, but that Native American gaming in California is a greater concern. This concern is two-fold. First, because many Nevada tourists come from California they may chose to not travel for their gaming.

Second, if they do travel, there is the potential for Indian gaming establishments run between Nevada and tourist points of origin to obtain a portion of business that would have otherwise gone to Nevada.

Those in gaming downplay the value (and possibility) of increasing diversity in the County economy, and other community leaders did not give this a high priority (in contrast to the interest in this topic expressed during FY93 research). It may be that concerns about gaming and diversity have diminished because the industry is viewed as having met the challenge of gaming's expansion by building novel, successful resorts in Las Vegas. This suggests that concern about local diversity was exacerbated by the emergence of competition in other cities, a concern diminished by the recent success of Las Vegas resorts. This is relevant to the present topic since FY93 research suggested that need for diversity might make the YMP appear as an economic solution.

The social and political influence of those in the gaming industry varies, from the wide influence and contacts of the Nevada Resort Association and those heading major resorts, to much more modest contacts among the small non-corporate casinos. Someone outside the gaming industry observed that gaming wields major influence in Clark County and Nevada politics, while its clout in national political circles is very limited; this distinction becomes important because many believe that the decision on the Yucca Mountain Project will be made, exclusively, at a national level.

In terms of patterns of alliance within the gaming industry, one person said that small operators only come together when their interests are directly threatened, while the large owners more often work together to promote their mutual interests. However, this was qualified by someone associated with a larger company, who said that it is very difficult to get owners to work together on a project unless they see direct benefit for their establishment. He added that owners tend to be somewhat individualistic and concerned about the share they will contribute.

There are at least three formal coalitions of Clark County gaming companies. The largest and most widely recognized group is the Nevada Resort Association (NRA), which includes the major Las Vegas Strip resorts. This group includes some of the most influential and economically powerful individuals in the County. Recent development and improvement projects to benefit hotels on the Strip have been carried out through specific ad hoc coalitions and organizations rather than through the NRA. The Downtown Progress Association is an organization of casinos located in downtown Las Vegas. It formed about fifteen years ago, when some NRA members left that organization to create a group to address some of the unique problems of downtown hotels. The Downtown Progress Association includes approximately twelve hotels. It currently has a development project underway to revive the downtown casino trade. Some members of the NRA are also members of the Downtown Progress Association, if they own downtown properties. The third, and much smaller, organization is the Independent Nevada Casino Operators. While the NRA businesses cater to tourists, the Independent Casino Operators businesses more often serve local patrons.

The NRA passed a resolution in September of 1991 opposing the YMP. However, there appears to be fairly low awareness of this resolution in the gaming industry. The NRA's resolution was not mentioned in any of the interviews, and interviewees said that, to their knowledge, the gaming industry does not have a stated position on the YMP. Further, when the NRA was contacted to confirm the existence of the resolution, the person answering the telephone did not know of any such resolution, and referred the caller to someone who had worked at the NRA longer. However, those outside the industry had views about the industry's position, and opinions, pro and (more often) con, are commonly attributed to them. The issue is salient, at least for some in the industry: An industry member participating in the first round of interviews (when no questions were asked on the subject) raised the topic independently. One of those interviewed suggested that the impetus for opposition to the YMP ought to come from the public, but that industry members might take a position at a later date, if the transport and storage of nuclear waste becomes imminent. One company took a more public position in the past: A few years ago, Circus Circus made a financial donation to an anti-YMP activist group. The three gaming industry people interviewed expressed their personal opinions on the YMP rather than the positions of their organizations. One expressed strong personal opposition, another expressed milder opposition along with a sense of fatalism ('the federal government will do what it wants'), and the third provided a brief comment on the patriotism of the YMP. It does appear that, at least for the moment, the industry does not want to be seen as taking a leadership role on the issue.

Individual resorts may belong to more than one association. For example, the Mirage Resorts is a member of the Nevada Resort Association. The head of the organization also belongs to the Downtown Progress Association, and is widely acknowledged as perhaps the most influential non-governmental person in the County. This influence is associated with the economic position of the company and with its general activism in the community. The broad role taken by the Mirage includes sponsorship of educational programs and recent participation in a coalition (along with a number of business, educational, labor, and public sector groups) to increase funding for schools. The company has worked with government agencies, for example the Water District, and has an interest in water issues for the future of the area. The company works with charities and senior citizens, and has community relations and public relations departments that are very responsive to the public and the media. The company's role as a benefactor was raised by several organizations during the course of interviews. The gaming industry in general has an influence on the labor unions, both those in construction and in service. The head of this company and other gaming interests are highly involved on all the major economic boards in the city. There is a widespread view that gaming, and this company in particular, has the clout and influence to get things done in the County and the State. The company's activism on a range of issues bespeaks a high degree of investment in the community. The company has not taken a public position on the YMP, but members of other organizations suggest that they are opposed.

Nevada Resort Association

The senior staff of the Nevada Resort Association was not receptive to being interviewed for this research. As noted above, the Resort Association passed a resolution in September of 1991 opposing the Yucca Mountain Project.

Independent Nevada Casino Operators

The Independent Nevada Casino Operators is a small statewide organization with headquarters in Las Vegas. It consists of the smaller, non-publicly traded companies that operate casinos in the State. It has around forty-five members statewide, and over twenty in Clark County, with members on the Strip, downtown, and in suburban areas. It formed in 1987 or 1988, and generally the membership only reacts when faced with a specific threat. The issues that most threaten this group, and others in the gaming industry, are the possibilities of greater taxation or regulation. These issues become especially prominent every two years, when the legislature meets. Since these businesses serve local patrons, they are often places where people meet and share information about the community. While the organization represents businesses with comparatively little economic power in the community, the head of the organization has broad contacts through past work in federal law enforcement and on the State Gaming Control Board.

Downtown Progress Association

The interviewee from the Downtown Progress Association, who is in the management of a downtown hotel, gave little information about the Downtown Progress Association, but did talk about the gaming industry, which he has been involved in since the end of the 1940's. His conversation mainly reflected the change in the industry, the transition from family run casinos to corporations, and the increase in regulation.

Environmental Groups

A number of groups make up a fairly active environmental sector in Clark County. An effort was made to identify the most active and influential of these groups. There is a wide array of environmental groups present in the community, ranging from chapters of large, national organizations with broad areas of interest, to small, local groups that focus on a limited number of specific concerns. The groups identified as most influential tended to be local chapters of national organizations. Based on information from interviews with previously identified groups, it is suggested that in the future, further investigation of smaller local groups would contribute to the understanding of this sectors' significance in the community.

Two key differences noted between the organizations interviewed within this sector were: (1) the scope of concerns the organizations monitor and act upon; and (2) the methodology used by the

organization to accomplish their goals.

Although concerned with overall environmental quality, two of the groups from the environmental sector -- The Nature Conservancy and Red Rock Audubon -- limit their efforts to the protection of endangered species and critical habitat. Other concerns, such as water quality or air pollution were significant only in the sense that they affect species and habitat. The desire by these organizations not to lose their non-profit status reportedly limits their ability to respond to political issues. Only one of the groups interviewed from this sector -- the Sierra Club -- viewed themselves as flexible enough to approach a wide variety of environmental issues. The Sierra Club does not have non-profit status, which perhaps allows them the freedom to respond to any given issue as they see fit.

The general approach of environmental groups interviewed typically followed one of two different routes. The first of these routes is roughly a "traditional" approach taken by environmental groups, and relies upon the media, publicity, public concern, and protective legislation to accomplish its goals. The second of the two routes is a newer approach in which lands that are viewed as containing endangered species or habitats are actually purchased by the environmental group. Other protective methodology utilized by the groups taking this second route include enticing land owners to utilize their land's resources in a more environmentally sensitive manner. A key difference between the two routes is the decision by the environmental groups involved to work with or against established economic systems. The more traditional method of working for environmental protection can be viewed as "anti-establishment." It argues issues in terms of hierarchies of values, of right and wrong. The second, newer approach attempts to work out environmental solutions from within the system. According to this strategy, because much of business and resource management is considered in economic terms, the solutions sought must also be economic.

Cooperation between groups in this sector has typically been minimal. Organizations at times support one another's efforts, but alliances and actual mutual involvement is rare. Recently, an information sharing coalition has been established between some of the groups in this sector to help keep them all informed of important environmental issues. More concrete cooperation between the groups does at least occasionally take place: Informants noted a coordinated effort between groups to support and promote the establishment of the Red Rocks Conservation Area. Part of these efforts included holding a large support rally at the Red Rocks Area to increase public awareness of the area and the issue.

Of additional interest is the fact that many of the groups in this sector noted having a productive relationship with government resource management agencies, such as the Bureau of Land Management and the U.S. Forest Service. Volunteer efforts of the organizations are frequently carried out with the cooperation and guidance of various agencies. Likewise, agencies at times consult with the organizations to assess their views of natural resource management issues.

As noted in the Natural Resource User Group section overview below, organizations in the

Environmental Group sector often find themselves at odds with organizations in that sector. Groups in these two sectors often have an interest in the same sets of resources, and the same specific locales, but hold very different perspectives on desired uses.

While interviewees with a variety of organizations expressed the view that opposition to the Yucca Mountain Project comes from environmentalists, the environmental groups interviewed for this study were not especially interested in the issue. One group, the Red Rock Audubon, has a member monitoring the Yucca Mountain Project (a discussion of this groups activities on the YMP is included in Chapter 5). An interviewee who is an activist opposing the Yucca Mountain Project said that participation among local environmentalists is generally on an individual basis, and the organizations have not become involved.

The Nature Conservancy

The Nature Conservancy is a private, non-profit international organization, which was described by a representative of the group as the "real estate arm of the environmental movement." The goal of the organization is to protect endangered species and preserve unique habitat. The group has worked with mining companies and cattle ranches in Nevada in order to achieve this goal. When presented with the option, the organization may purchase property that contains rare habitat or endangered species. According to the informant interviewed, the Nature Conservancy attempts to take a "mid-line" approach in environmental issues and conservation techniques. Although the Nevada office has been in Las Vegas for four years, only recently has it become autonomous in relation to the regional headquarter located in Salt Lake City, Utah. There are 3,400 members in Nevada, with approximately 2,000 of those members residing in Clark County. Locally the group has approximately 200 active volunteers and nine paid staff members. Occasionally other local environmental groups support the Nature Conservancy's efforts, but actual alliances with other groups are rare.

Sierra Club

Established approximately one hundred years ago, the Sierra Club is one of the nation's oldest environmental protection groups. The Club focuses upon both environmental protection and outdoor recreation. The local group, known simply as the Southern Nevada group, is a sub-unit of the larger Toiyabe Chapter which encompasses all of Nevada and part of California. The two other groups in the Toiyabe Chapter are the Great Basin group, based in Reno, and the Range of Light group in California.

According to a member of the organization, the Toiyabe Chapter has existed for at least forty years. At present, the Toiyabe Chapter has approximately 3,300 members. The Great Basin group was established at the time the Chapter was established, and is reportedly a more

environmentally and politically "radical" group than the local organization. The Southern Nevada group is a newer entity, having been formed around 1970. The Southern Nevada group has experienced significant growth in recent years, growing from roughly 500 members in 1986 to over 1,200 members at present.

The Southern Nevada group has monthly meetings to discuss upcoming events and issues. The officers of the sub-groups within the Toiyabe Chapter have quarterly meetings to maintain communications on statewide and regional issues. Approximately one hundred members in the Southern Nevada group actively participate in either Club meetings or group outings. A member of the Sierra Club explained that within the local group, there are approximately twelve "activists," or individuals who are involved in environmental protection.

Red Rock Audubon

Red Rock Audubon is the local branch of the national Audubon Society. The local group has approximately 950 members; 35 members are active in the organization's leadership and activities. The group has a number of goals they focus upon, the most important and traditional of which is promoting interest in "birding." Secondly they are involved with environmental conservation issues and service projects to aid land management agencies. These projects typically involve plantings that benefit endemic wildlife in the area. The Red Rock Audubon Society has been in the community since 1976. The chapter grew out of a smaller local birding club. Since 1976 it has gained members, and diversified from birding to include service projects and involvement in environmental issues. There exists a division among members of the organization between the "conservatives" (extremists) and the "compromisers."

Large scale environmental concerns -- such as water quality, air pollution, or the Yucca Mountain Project -- are monitored and acted upon only if they are perceived as affecting endangered species and unique habitat. To these ends Red Rock Audubon has designated a member to monitor the Yucca Mountain Project (Chapter 5 contains a more thorough discussion of the organization's interest and activities with respect to the YMP).

Natural Resource User Interest Groups

A number of resource user groups in Clark County were interviewed. An attempt was made to contact and interview those groups that were viewed by other informants as the most influential and outspoken of these groups. Ranching, farming, large and small scale mining, and off-road vehicle user interests were all contacted. This sample was by no means exhaustive; a number of additional groups involved with these issues exist, as well as other groups that represent other types of natural resource utilization. Despite the diversity of the types of groups and the resources they utilize, a number of similarities exist between the groups.

Of central importance in most of the interviews with individuals of this sector was the fact that their economic stability and well-being was directly connected to their access to and utilization of the natural resources at issue. With the exception of the off-road vehicle users, this dependence was significant for all of the groups interviewed.

Off-road vehicle users fall into a particular sub-category composed of non-extractive, recreational resource users who do not otherwise fit the "environmental" or "conservation" group category. Many of those in these other categories make recreational use of the resources, but their uses, such as hiking, photography, etc., are considered non-extractive and non-economic (and of negligible impact to the resources themselves). Off-roader use is considered by many to be of a different nature; it is recreational and non-extractive/non-economic, but is considered "intrusive" and not without its own environmental impacts -- both in the sense of altering the environment (the degree and significance of alteration being a contentious issue) and excluding other uses of the landscape, such as those uses that require relative silence and solitude by their practitioners (e.g., wildlife observation or hiking in what is perceived to be a relatively pristine natural environment).

Many of the individuals interviewed from this sector viewed their use of natural resources, be it ranching, mining, farming, etc., to be an important *tradition* and *way-of-life* for them and their communities. The question of access and right to utilize natural resources was described as having more than simple economic significance. Because of lengthy dependence and involvement in a given occupation, the utilization of the given natural resource has become a part of the group's culture. In one individual informant's case, his family had been involved in ranching in Nevada for five generations. This type of lengthy and traditional involvement was not unusual among some natural resource utilization groups.

A significant aspect the *traditional* nature of these groups is their independent and somewhat 'anti-government' attitudes. The strength and independence of the Western farmer or rancher is a quality that is still idealized and highly valued in many rural communities. Much of the population in rural Nevada, like much of the rural Western United States, is desirous of governing their own affairs free from the influence of "Eastern politicians." However, as is the case throughout much of the West, the Federal government's near omnipresence in Nevada is a reality to be dealt with, and a cause of resentment and unrest in many rural residents.

Cooperation between groups in this sector is highly variable. Although all of the groups have an interest in maintaining access to public lands, there are frequent disagreements between groups over strategy to be used to ensure this goal. Some informants have noted that attempts at cooperation have been rebuffed by different groups within the sector. Cooperation and mutual support has, however, been noted in some cases. Representatives of People for the West and Southern Nevada Off-Road Enthusiasts have both noted the importance of their mutual support.

Each of the groups in this sector primarily focused on a central issue -- for example, grazing

rights, mining permits, or off-road racing -- rather than larger scale, community wide issues such as Yucca Mountain. These groups are typically intensely concerned and involved with the defense of their use of public lands and way of life. Several informants interviewed from this sector supported the Yucca Mountain Project, but active involvement with the issue was never suggested.

As noted in the overview of the Environmental Groups section, conflict between environmental groups and natural resource utilization groups is common in Clark County. Both sectors tend to view the other as an antagonist or opponent. The views of the opposing group or sector are frequently viewed as politically motivated, alarmist, or simply ignorant. At present, apparently little effort is made to communicate between the two sectors. Efforts at cooperation and communication have been made in the past, yet groups in the two sectors remain doubtful of the other's goals and motivation. Trust of the other sector is difficult for both, and this situation is understandable given the depth of convictions held and the estimation of consequences that will result from unwise use by each side. At its most basic, the underlying issue is quality of life. Both groups see their well-being as immediately connected to the environment; conflict arises over the question of the wisest use of natural resources. Environmentalist groups see the benefits (e.g., species diversity, certain types of recreation) from protecting and conserving natural resources. Utilization groups, however, see the benefits to their lives from using natural resources (e.g. income, continuation of traditions, other types of recreation). Until better channels of communication and mutual understanding are established, the two sectors will most likely remain at odds.

A specific ramification of the antagonism between environmental groups and resource utilization interest groups is that both sectors tend to disbelieve and discredit the information and opinions of the other. An example of this attitude comes from a discussion with a member of an off-road vehicle users group as they describe information they receive from a local environmental group:

Most of their arguments are like most of the 'green' arguments; they're panic: 'What if' and 'this has happened,' and it's true it has happened, but it doesn't mean it is going to happen again or it can't be managed or can't be changed or can't be done better.

Another underlying point of debate is varying perspectives on the efficacy of multiple-use natural resource management approaches. Some groups find different uses mutually exclusive, while others would seek to fashion a compromise. Familiarity and involvement with these issues make both sectors particularly aware of the YMP.

Farm Bureau

The Farm Bureau is a national organization of farmers and ranchers. It has a highly developed leadership/organizational structure which includes a national office and President, as well as state and county officers and boards. Each state Farm Bureau has an annual convention to debate current issues and update group policy. According to the informant, the purpose of the Farm Bureau is to represent and protect the interests of the agricultural community with local and federal government. Other services provided for members and their families include a women's group and young farmers group. Within Clark County, the Farm Bureau has 3,800 members, roughly 300 of whom are active in group activities and affairs. The Farm Bureau has existed, to the knowledge of the informant, for over 100 years. Within Clark County, the organization has existed since the 1930s.

Desert Livestock Producers

Desert Livestock Producers is an association of ranchers in Utah, Arizona, and Nevada. There are 35 members, all of whom are ranch owners. The organization has a President and a Secretary, but no other official positions. Desert Livestock Producers was established as a means for ranchers in the region to protect their traditional way of life. In their opinion, ranching is a 'piece of American heritage.' This heritage, according to members, is currently threatened by strong environmental protection legislation, including the Desert Tortoise Protection Bill. Currently the organization and the BLM are at odds over the ranchers right to graze cattle on public lands. Desert Livestock Producers has gone to court once before in defense of this right and was successful in keeping it. The BLM has reportedly renewed its efforts to remove the ranchers from at least some public lands that have traditionally featured ranching among its uses, so Desert Livestock Producers is preparing to take the issue to court again. The organization holds barbecue dinners to raise money to cover legal costs and to inform the public of what they perceive to be a serious threat to their way of life. Members of the organization attend hearings on the desert tortoise and other related land access issues. Desert Livestock Producers itself has existed for approximately two and a half years. Other attempts at similar organizations occurred in the years preceding the formation of Desert Livestock Producers, but this has been the largest and most successful organization of desert land ranchers to date. Desert Livestock Producers has a working relationship with Nevada Cattleman's Association, as well as various off road groups and hunting groups. The only major division within organization is the debate over how to protect their right to ranch. Some of the group's members advocate more extreme measures -- including violence -- but the majority want to handle the issue through the court system.

Southern Nevada Off Road Enthusiasts

Established in 1969, Southern Nevada Off Road Enthusiasts (SNORE) is the oldest off road

vehicle club in Las Vegas. The organization has between 500 and 600 members, with approximately 25 of those members active in leadership. SNORE itself is comprised of individuals interested in racing and otherwise utilizing off road vehicles. Other groups within the county specifically cater to motorcycle, all-terrain vehicle (ATV), "go cart," and other vehicle user interests. Primarily SNORE functions as the organizer for seven local races. Members of the group are also involved in maintaining off road vehicle users' access to public lands.

People for the West

People for the West is a national coalition established to support the multiple use of public lands and natural resources. Nationally its members include, among other groups, ranchers, loggers, miners. Within Clark County the organization is relatively small and disorganized, with approximately 15 members. Despite their small numbers, members of the group have been active and influential in dealing with matters affecting mining and ranching in the county, such as the Desert Tortoise Protection Bill. Locally, the group attempts to coordinate its defense of the multiple use of public lands with off-road vehicle groups and hunting clubs.

Nevada Mining Association

Comprised of mining companies, exploration companies, mining equipment suppliers, and mining consultants, the Nevada Mining Association is the voice of the mining industry in Nevada. The Association has approximately 100 company members, of which 20 to 25 are active in the affairs of the organization. The Nevada Mining Association has established a set of goals it for itself and mining in Nevada. These include: (1) ensuring "reasonable and practical taxation of the mining industry in Nevada;" (2) ensuring "reasonable and practical environmental regulations and laws geared, whenever possible, to specific site and operations conditions. Incorporating simple, yet responsible permitting procedure for new operations, with attainable post-closure requirements for operations ceasing business"; (3) ensuring "access to public lands for exploration, production of minerals, and multiple use. Fostering a favorable general government and regulatory approach to the production of minerals;" (4) promoting "a sensible approach to safety, work rules, and regulations in industry operations;" (5) broadening and enhancing "the education of legislators, regulators, members of our state education system, and the public on the importance of a healthy minerals industry in Nevada;" and (6) "working to maintain a business and operating environment that will encourage the exploration for development and production of minerals in Nevada, now and in the future."

The Association has a paid Executive Director with eight support staff members to manage the daily affairs of the organization. A 14 member Board of Directors establishes the organization's long-term priorities and makes decisions on important issues. The Association also maintains eight committees to aid the Executive Director and the Board of Directors in their decisions.

These committees correspond to the following categories: education; environmental; human resource; mine safety and health; political action; public lands; taxation; and suppliers club (mining supply company relations).

The Nevada Mining Association occasionally works with the Prospectors Association and the Nevada Cattleman's Association on issues of importance. *The Nevada Miner*, the Association's monthly newsletter, is sent to all the organization's members to keep them informed of issues affecting mining and Association activities.

Labor Interests

Nevada is a 'right to work' state, essentially meaning that individuals cannot be obligated to become union members in order to be employed at a worksite that has been organized by a union. While this is generally understood to diminish the power of unions, an interviewee (not associated with labor) commented that Las Vegas is a "union town," and that unions are traditionally important in Las Vegas. According to a labor leader, the building of the Hoover dam provided impetus for the growth of the labor movement in Nevada. Reflecting the area's economy, approximately half the local union members are in the service trades, 20-25% are public employees, another 20-25% are in building trades, and only 5% are in industrial unions. The most powerful labor groups in Clark County may be the Culinary Workers Union, and the coalition representing building and construction unions.

All the unions interviewed were responsible for contract negotiations and grievance and arbitration work on behalf of members. Insurance and a variety of support services for members were also common concerns.

There are a variety of formal and informal coalitions of labor groups in Clark County. The largest formal coalition is the American Federation of Labor-Congress of Industrial Organizations (AFL-CIO). There is a State AFL-CIO convention every year, which passes labor resolutions, some of which become part of the AFL-CIO lobbying effort. One of the larger formal coalitions is the Central Labor Council, which includes approximately forty unions that are affiliated nationally with the AFL-CIO. The Central Labor Council, formed approximately fifty years ago in Clark County, includes unions in the building and construction trades, the service unions, industrial unions, and some of the public employee unions. A number of public employee unions are not part of this coalition. Among the public employees, State employees recently joined the Central Labor Council, while most city employees are not members; however, the police and the firefighters unions are part of the Central Labor Council.

The purpose of the Central Labor Council is to promote issues of common concern to the unions, such as worker's compensation, and the organization lobbies in the State Legislature for union interests. The Council does not become involved in any of the disputes over union jurisdiction (that is, which union can organize a particular business) that may arise between unions. A

union member implied that jurisdictional disputes among unions can become quite heated.

An ideal of mutual aid exists among unions, so that when a service union is on strike, members of a construction union are expected to join the picket line as a sign of support. There is also an explicit understanding that unions should not obstruct the creation of jobs for members of other unions. This principle is particularly relevant to the Yucca Mountain issue, since there is a common view that the service unions should not and will not publicly oppose the Yucca Mountain Project because it would create jobs for the construction unions.

There are a variety of compromises when the interests of different unions diverge. In recent primary elections, the public employee unions worked hard for the defeat of an incumbent whose rhetoric and policies had been especially critical of public employees. Yet this same incumbent had been supportive of a major service union during a strike. Publicly, the service unions remained neutral during this election. However, privately, and on an individual basis, service union members could work to support this candidate. Since the service unions are much larger than the affected public employee unions, it is unclear why the compromise took this particular form, though service unions are more often involved in job actions, and this may have been a form of reciprocity for prior support.

Unions that deal with specific sectors of the economy are often allied. For example, there are coalitions (within the Central Labor Council) of approximately seventeen unions representing the building trades (the Building Trades Council), and this coalition has been in existence in Clark County for around forty years. In the last several years, a coalition of service unions (called the Service Trades Association) has formed. A service union member reported that his union was closest to, and most often worked with, another large service union. Additionally, several of the building trades unions work out of a common building. A union representative observed that there are different concerns associated with service, construction, industrial, and public employee jobs (for example: there is no seniority in construction trades, while service and industrial unions depend on seniority; and, public employees are long-term employees and thus work harder to fight terminations than do construction employees). These distinctions mean that similar unions more often work together.

Another important factor in patterns of labor alliance is the significant ties between unions and the business sectors they most commonly work with or against. Business and labor in any given economic sector often perceive common interests, and may work together to promote those interests. An example comes from a recently approved large scale land development project. There was an suggestion in a couple of interviews that representatives of construction unions had been helpful in getting the project approved, and that there was an understanding between the unions and developers that union employment would be used on the project. In a similar vein, there was an assumption expressed in a number of interviews that those groups highly dependent on tourism, in both the business and the labor sector (especially gaming interests and service unions) are opposed to the Yucca Mountain Project, although neither has publicly stated their opposition. More easy to substantiate is the common support for the Yucca Mountain Project

site studies among nuclear industry interests and the construction unions.

Culinary Workers Union

The Culinary Workers Union (CWU) is one of the largest unions in Clark County, with approximately 35,000 members. Geographically, it includes the greater Las Vegas area and the Nevada Test Site. The union was chartered in Clark County in 1948, and became active in the mid-1950s. The name of the union may be unique to Las Vegas, while the union is affiliated nationally with the Hotel Employees and Restaurant Employees International union. Locally, the CWU is most closely tied to the Stagehands Union (the International Association of Theatrical and Stage Employees), a small (approximately 900 member) but very active and organized union. It is also close to the Musicians Union and the Bartenders Union, and is part of the Central Labor Council, described above. About 10-20% of the CWU membership is active in the union, at rallies, picket lines, and membership meetings. Despite its many members, voter registration and turnout for political elections may be fairly low (someone suggested that approximately a fourth of the membership is registered), and this may be attributable to night work shifts for many members, and other factors such as transient Las Vegas residence. This means that the group does not have electoral impact proportional to its size.

Despite the efforts of the CWU, the last five to ten years has seen growth in the number of non-union hotels, so that today there are nearly an equal number of union and non-union hotels. Further, contract negotiations have become more difficult for this union. In the past, the contracts for several associated unions expired at the same time, which enabled the unions to present a more powerful front in the following round of negotiation. When this changed, with some contracts expiring after three years and others after four, the unions lost a measure of negotiating power. The CWU has also been involved in a jurisdictional dispute with the carpenters and steelworkers in Reno and Laughlin, who are trying to organize unions in hotels.

Decisions within the Culinary Workers Union are made by a group including the Secretary-Treasurer and Chief Executive Officer, the President of the union, five Executive Board members and three Trustees. The Secretary-Treasurer, who heads the union, generally acts as sole spokesman. The CWU and the Bartenders Union each provide three members to the Joint Board of Las Vegas, and this board decides the direction that the chief negotiator will take in negotiations. In terms of organizing action, there are eight hundred members designated as committee people, and each is responsible for getting ten members to take part in union events.

The Culinary Workers Union has taken no position on the YMP. A member of a construction union said that the CWU is strongly opposed to the Project, but not publicly. The interviewee with the CWU emphasized that only the Secretary Treasurer could speak to the union's position on the issue. The interviewee did express his own personal opinion, which does not favor the YMP.

Laborers (Hodcarriers) Union

The Laborers Union, chartered in Southern Nevada in 1913, has been active since the 1950s. It has 2,300 members, and includes both hodcarriers and construction miners. The union has been involved in construction projects in Las Vegas and at the Nevada Test Site. The construction miners also took part on a more regular basis in Test Site work associated with below-ground testing, and union members are currently working on construction and tunneling for the Yucca Mountain site studies.

The Laborer's Union is closely affiliated with other building trades unions (there are approximately 35,000 members in all the building unions in Southern Nevada), and is a member of the Building Trades Council the Central Labor Council, and the AFL-CIO. The Laborer's Union works out of the same building as these organizations.

The union member who was interviewed said the union sees political action, such as lobbying and working towards the election of political candidates, as its main avenue for success, while strikes are considered ineffective. Candidates for political office are interviewed and a decision made about endorsements, with a listing of endorsements sent to members. Endorsements are made for offices ranging from the governor's office to family court judges. There are sometimes divisions between unions over candidates, and in the last election the Laborers, the Carpenters, and the Teamsters construction local disagreed with the AFL-CIO's endorsement for governor in the primary election.

When asked to identify organizations or interest groups at odds with the union, the interviewee mentioned the activist groups opposing the Yucca Mountain Project. The union is very supportive of the Yucca Mountain Project, and has contacts with those in government and industry who support the Project. In late 1991 a union member initiated a letter writing campaign directed at Senator Bryan. The letter argued that the Senator should take part in negotiation for benefits such as the location of a cask building factory in Nevada, and other projects which would create jobs.

American Federation of Government Employees

The Federal Employee Unions are geographically divided between those at the Hoover Dam, those at the Nevada Test Site, and the Forest Service. The Hoover Dam branch was interviewed for this section.

The American Federation of Government Employees is the largest federal union in the country. The Hoover Dam unit of the Federation has approximately 153 members. The Federation is primarily concerned with employee wages and working rules. The Hoover Dam unit of the Federation has received the National Federal Mediation Facilitatory Award for its outstanding

efforts in "partnershiping," or promoting cooperation between labor and management in order to create a more efficient and effective work force.

Clark County Classroom Teachers Association

Unlike the Laborer's Union and the Culinary Workers Union, the Classroom Teachers Association (CTA) is not affiliated with the AFL-CIO, and therefore is not part of the Central Labor Council. The Clark County Teachers Association belongs to the National Education Association rather than to the (AFL-CIO affiliated) American Federation of Teachers; however, these two national teachers unions may merge in the next few years. Of the approximately 8,400 classroom teachers in Clark County, around 7,700 are members of this union. The interviewee observed that teachers constitute the largest group of college graduates in the State.

During the 1994 election the CTA formed a coalition with other public employee unions to support candidates they favored. Unlike the AFL-CIO or the Central Labor Council, this coalition was temporary. The other unions in the coalition included the police, the firefighters, the Educational Support Employees Association, and the Teamsters, who represent workers for the Water District. This coalition was successful in electing candidates to the school board, the sheriff's office, the district attorney, and a number of judges. While most of the union leaders interviewed after the election were disappointed at the election results on the whole, the Classroom Teachers said they had finally had successes after years of losing elections. The CTA also worked with the school district and many of the major business groups to pass the school bond measures, and succeeded at getting one of the two bonds passed. This coalition between the School District and the teachers union again represents the organizational principle mentioned earlier, namely the interests shared by labor and management, and their effort to maximize their common economic goals. A more long-term coalition is between the Classroom Teachers and the Educational Support Employees Association, and these two unions work out of the same building. Opposition to the Teachers Association has come from business groups that believe they will be unfairly taxed to support education.

The Teachers Association has not taken a position on the Yucca Mountain question, and they are divided on the issue. The following interview quotation, a description of a case in which the YMP issue was raised before an organization, suggests some of the dynamics of the issue among teachers and in the community more generally. There appears to be a division between science teacher and humanities teachers. However, the more important factor may be that members of the Association have relatives who work with the YMP, and this is related to support. The quote also suggests that the YMP issue creates divisions between local and national organizations.

. . . took the position to (the) executive board, when Governor Miller took his position. And . . . said to (the) executive board: 'What do you think about us taking a position either pro or con on Yucca Mountain, lets talk about it.' It was

interesting. Two people had relatives working at Yucca Mountain. One was working as a scientist on the project. One was working in security. One of the members of the board at the time was a biology teacher, . . . very pro anything to do with science and believes in science and believes that science will protect us. So there were 3 votes sitting there. Then you had 3 or 4 votes on the opposite side . . . So . . . really did not even have the 4 votes to take a position. And they felt that since we had relatives working there and that our position would again affect the money issue, the relatives, we took no position. It's never been brought up at the state level. That's the group that should take the position.

. . . tried something at the National Education Association this summer. A Clark County teacher introduced a bill on moving hazardous waste through states. And, got up and pleaded to have these 12,000 delegates from around the nation . . . And, I remember his impassioned plea to this group that our children in Nevada, we don't want them playing next to a truck with radioactive waste. It was defeated. It was -- I mean, he had a second to it. And, it was sort of a resolution. It never went anywhere. And, this was -- and, this is where you had teachers, science teachers, getting up and arguing the point of science. They really believe in science. They really -- they believe that everything is white and black, and everything can be solved. And that's how they live. Where you get the other side, the humanity side -- these people have divergent beliefs. . . . But, I remember Nevada -- the Nevada delegation was strongly for that. We had probably, 150 out of the 12,000 votes. And, it was roundly defeated. It was interesting that the other states didn't want to support that . . . Because most of them were saying "we don't want it in New Jersey, we'd rather have it out there in Nevada were nobody lives." That's what they said when they argued against it. But, there hasn't been much discussion of it since.

Nuclear Industry Interests

The data on this sector is confined to two groups: the American Nuclear Society and the Nevada Nuclear Waste Study Committee. Information on the American Nuclear Society that is used in this discussion is drawn from the *Attentive Publics Report* (Impact Assessment, 1991). Attempts to conduct an ethnographic interview with a representative of the American Nuclear Society were made but were unsuccessful due to scheduling difficulties. The two groups in this sector are closely tied to the nuclear industry. The connections are, however, of very different natures. The Study Committee's connection is financial; the group's funding comes exclusively from the industry's trade organization. The American Nuclear Society's connection to the nuclear industry is through its membership. Several members of the local unit's Board of Directors are Department of Energy contractors, and some of the group's officers are Department of Energy employees. Both groups in this sector are actively involved in information dissemination and promoting research related to nuclear issues. A representative of the Nevada

Nuclear Waste Study Committee emphasized the fact that the group is not decidedly pro-repository; instead they support the study of Yucca Mountain's suitability as a nuclear repository.

Nevada Nuclear Waste Study Committee

Established approximately ten years ago in response to the question of nuclear waste storage in Nevada, the Study Committee advocates the scientific evaluation of Yucca Mountain's suitability as a site for a nuclear waste repository. Additionally, the Committee is committed to the State of Nevada negotiating for benefits and compensation from the federal government for the placement of the repository in the state. The Study Committee is funded by the Nuclear Energy Institute, which is the nuclear industry's trade organization and government affairs body. The Study Committee has approximately 14,500 members, to whom it sends newsletters four to six times a year. These newsletters contain information on the Yucca Mountain Project that the Committee feels its members should be aware of. The group serves as an information source on Yucca Mountain to political candidates by providing private briefings, and to the public through press releases, exhibits, public speaking, and official statements made at hearings and meetings. The Study Committee has a Steering Committee that is reportedly semi-inactive because the mission of the group is well defined, obviating the need for a strong steering committee. An additional directional body maintained by the Committee is their Advisory Board, which is made up of influential members of the community who support the study of Yucca Mountain. Efforts of the Study Committee are coordinated by two Co-Chairmen, one for Northern Nevada and one for Southern Nevada. The daily management of the Study Committee's affairs is performed by paid professional staff.

Of the interest groups interviewed, the Nevada Nuclear Waste Study Committee is one of the organizations most likely to view the Yucca Mountain Project as more significant than other issues. The organization's goals and purpose center on ensuring unimpeded studies of Yucca Mountain and investigating the possible benefits associated with a repository's placement in Nevada. Related issues, such as additional uses of the Nevada Test Site, are also monitored and considered, but Yucca Mountain is paramount in the organization's view.

Concerned Citizens Interests

While concerned citizen interests are presented here as a group, in fact they represent a range of divergent perspectives, and they are probably much more similar in function (the kinds of service they provide) than they are united in purpose. The organizations differ in political perspective and the issues on which they focus, while a function they all share is seeking and analyzing information, and then disseminating the information to members, politicians, and the public. In several cases, these groups work with policy makers, and in other cases they attempt to influence policy through lobbying. The groups also differ in the degree to which their agenda is broad or narrow. Of these groups, Citizen Alert is distinct in its intense focus on the YMP and the

inclusion of symbolic action among its tools for communicating with the public and policy makers. It appears to put more effort than other concerned citizen groups into shaping public opinion and forming coalitions with groups across a broad range of economic sectors that might take an interest in the YMP. Citizen Alert is the major concerned citizen group on the Yucca Mountain issue, and is one of the most important voices in the community on the topic.

Citizen Alert

Citizen Alert, which sees itself as a watchdog organization, is currently in the process of internal change. Citizen Alert was formed 20 years ago, and is a state-wide organization with offices in Reno and Las Vegas. It focuses on issues of renewable energy, the NTS, Yucca Mountain, water resources, ranchers' problems with federal land use, and Native American issues; recently, they have placed an emphasis on growth related issues

Two of the major figures in Citizens Alert, the Executive Director and the Southern Nevada Director, recently left the organization. The Executive Director left to found an alliance of environmental groups and Citizen Alert to work for electoral change. The Board recently elected a new Executive Director. The Southern Nevada Director left following differences with the Board of Directors, and may form a new organization (Campaign for Nevada's Future, see below), along with some members of the Board who left after his departure. The past Southern Nevada Director, who had a large part in speaking for the organization on the Yucca Mountain issue, said he believes the organization is likely to be weaker as a result of the internal change.

There are over 13,000 members on the Citizen Alert mailing list, and most of these live in Nevada (no exact number or percent was given). Membership is defined as the payment of membership dues, and there are also volunteers who do much of the work. Decisions about the organization's direction are made by the Board of Directors, and are carried out by the Executive Director. Another change that has developed over the last few months has been the decision to place an emphasis on growth issues in the south of the State. To carry this out, the Board decided that the next Executive Director (who has traditionally been located in Reno), will be placed in the Las Vegas office. This shift in emphasis from north to south brought out some of the tensions and differences in the concerns of these two regions.

In terms of alliances with other organizations, Citizen Alert used to work with American Peace Test, an organization that is now defunct. Citizen Alert Native American Program, a branch of Citizen Alert, deals with Native American issues, and works with tribal councils. The past Southern Nevada Director of Citizen Alert is a participant in the Environmental Network, a coalition of environmental groups. Some of these groups have not taken formal stands on the YMP, but their membership ranks include individuals attuned to and active on the issue. For example, individual members of the Sierra Club and the Audubon Society take an interest in the Yucca Mountain Project, though their organizations are not involved in the YMP issue. Other

groups that oppose the YMP consistent with Citizen Alert's stance do not necessarily coordinate with them. For example, the PTA and State Medical Association have taken positions against the Yucca Mountain Project, but do not work with Citizen Alert. There is also a small organization, (with leadership based in Reno and a representative in Las Vegas), that has an interest in the Yucca Mountain Project called CanWin (Citizens Against Nuclear Waste in Nevada). However, the interviews suggested that, at least in Southern Nevada, Citizen Alert and CanWin do not work together and Citizen Alert knows rather little about the other. Opposition to Citizen Alert comes from the construction unions in particular. Specific manufacturing companies, and a variety of governmental entities also appeared as the objects of Citizen Alert's watchdog activities.

With respect to information sources, Citizen Alert publishes fact sheets on water, nuclear issues, state bills, and national legislation. They also send out surveys and publish a newspaper four times a year. These items are mailed to their members, and they are also sometimes distributed to the general public with the help of volunteers who, for example, set up tables at shopping centers. They get information from newspapers, periodicals, and individuals who call with pertinent information, such as "whistle blowers."

Campaign for Nevada's Future

This is a provisional name, given to an organization that is not yet formed, but may be announced during the winter of 1994-95. The past southern Nevada Director of Citizen Alert, and a few former Citizen Alert Board members would be part of the new group. The purpose of the new group would be to oppose the placement of a Monitored Retrievable Storage Facility in Nevada (in response to the speculation that a MRS might be placed at the Nevada Test Site). While current regulations prohibit the location of an MRS in the same state as a permanent storage facility (such as Yucca Mountain), some people speculate that this law might be changed. The interviewee said that one of the hardest aspects of political organizing with respect to the YMP has been the fact that nuclear waste will be placed there at some distant date in the future; he anticipates that the MRS issue will be more immediate and important for the public, and it will be easier to mobilize public opposition.

League of Women Voters

The League of Women Voters of Nevada is a branch of the national League, and has approximately sixty members in Clark County and forty to fifty members in Carson City, with a few additional "at large" members in other areas in Nevada. The League works towards citizen involvement, informed voting through voter education, and advocacy on certain issues. The League advocates on issues of abortion ("pro-choice"), protection of the environment, health care reform, and the safe disposal of nuclear waste, while it has adopted no position on the siting of a repository in Nevada. The national League has worked with government in the formulation of

policy, and advised on the Nuclear Waste Policy Act of 1982. The Nevada League is part of a coalition of approximately twenty environmental groups, including the Sierra Club and the Audubon Society, called the Environmental Network. The League is also part of another coalition on health care reform with the AFL-CIO, American Association of Retired Persons, and medical associations.

General meetings are held once a month during most of the year, and board meetings (with seven or eight board members) are also held monthly. The League decision-making process involves studying both sides of a question and then reaching a consensus among members. The local League can take a position on a local issue, but if the issue is national, as is the Yucca Mountain question, then the formal position taken locally cannot differ from that adopted by the national League.

The membership of the Nevada League is deeply divided on the Yucca Mountain Project site studies, and the national League has taken no position. Some members of the Carson City League work for the State of Nevada and are strongly opposed to the YMP, while some members of the Las Vegas League are past or current employees at the NTS (or have relatives who work there) and favor continuation of the site studies. Agreement was reached that the Carson City branch would not look at the Yucca Mountain issue, but the Las Vegas branch would consider it. The local League has study groups on the Yucca Mountain Project, health care reform, and water issues, and provides a monthly update to the Board on these topics.

Nevada Taxpayer Association

The Taxpayer Association was established in 1922. Its interest is in fiscal matters, and it provides original research and analysis to government, policy makers, business groups, news media, and the public. The organization is respected for its publications and original analysis, and it is closely allied with business and growth interests in Clark County. The Association is listened to by these groups, and is attentive to their interests as part of a goal of promoting the general fiscal health of the community. Members of influential organizations sit on the Board of Directors of the Association. One of the Association members mentioned Nevada Concerned Citizens among the stakeholders in the County (this group and the Taxpayers Association may share a view of government regulation), and made critical comments about organized labor, as had a member of the Chamber of Commerce. There is a perspective, shared with other business groups in the County, concerning taxation, government regulation, and the appropriate relationship between government and business.

The Taxpayer Association has taken no position on the YMP, and the interviewee noted that the issue had not been discussed by the Association.

Nevada Concerned Citizens

This is a fairly small organization that was formed six years ago as a grassroots group based in Clark County. Its interest, according to the interviewee, is in good government. The number of people represented by the organization is quite variable, and depends on the specific issue the group is speaking to. Good government was described as government that is "constitutional" (for example, gun control is not favored), encourages personal responsibility, and strengthens the family. The organization was formerly called "Nevada Conservative Concerned Citizens," and both the Constitution and Biblical principles provide the group's charter. This is not a single issue organization, and Board members read the range of legislation offered every two years, and provide their analysis and response, lobbying against those bills and proposals they oppose. They also endorse political candidates. Decisions within the organization are made by a Board of Directors that meets in person or speaks by phone weekly. The current Director held local office, and has a range of contacts in the political community.

The Yucca Mountain Project is not a primary interest for the group, and the organization is divided on the issue. Some members strongly oppose the Project, though the Director is a proponent of nuclear power who favors the YMP. Because of a strong division of opinion, the group has not attempted to take a public position on the YMP.

Soroptomists

Soroptomists is a service organization of professional and executive women that is international in scope. The group was founded in 1921 in Oakland, California, and currently has over 100,000 members in 100 countries worldwide.

Soroptomists has established an intricate multi-dimensional set of goals for itself as an organization. These goals are as follows: (1) To maintain high ethical standards in business and professional life. (2) To strive for human rights for all people and, in particular, to advance the status of women. (3) To develop a spirit of friendship and unity among Soroptomists of all countries. (4) To develop interest in community, national, and international affairs. (5) To contribute to international understanding and universal friendship. (6) To develop the highest concept of patriotism. The group has set forth six different areas in which to focus their service efforts. These areas include: (1) economic and social development, (2) education, (3) environment, (4) health, (5) human rights/status of women, (6) international goodwill and understanding.

The international organization is divided into four federations, of which the United States is a member of the Federation of the Americas. The organization is further divided to national, state, and local levels. Within Clark County, there are six clubs, with a total area membership of between 130 and 150 individuals. Each club has a Board of Directors to manage day-to-day business, but important decisions are made by the membership as a whole. The group also

maintains committees to monitor and lead group action on the six service areas indicated above. All Soroptomist clubs produce a periodic newsletter to keep their members informed of club activities and concerns. Newsletters are also produced at the state and federation level to keep members informed of the broader activities of the group. Occasionally, public forums are organized by the Soroptomists to inform the public about an issue they view as important.

Locally, the group has been very involved in environmental issues. Although no official group position on the Yucca Mountain Project was discussed during the interview with a Soroptomist representative, the informant viewed the project as highly negative. Although the issue is not at the forefront of the organization's current agenda, Yucca Mountain could become an issue of interest in the future, given past environmental issue involvement.

Population Sub-Group Interests

Population sub-groups represent diverse interests, but often act in similar ways. They operate as advocates for the interest of the population group, and often function as service organizations that provide information to members. In two of the groups (PTA and Seniors United), their clout derives from the number of votes they represent, and the number of members that can be mobilized to lobby for their position. These two organizations act in a manner similar to the concerned citizens' groups in seeking, analyzing, and publishing information, and in their lobbying efforts.

Seniors United

There are a variety of senior citizen organizations, with some serving senior citizen housing developments, some located in senior centers tied to the State or the city, and some associated directly with advocacy for seniors. Someone who has analyzed the senior population drew a distinction between three sectors of the senior populations: (1) those seniors who are traditional residents of Clark County (i.e., those who have "aged in place"); (2) those who settled in the community in the 1970's and 1980's, many as federal retirees; and, (3) the most recent arrivals whose views on issues are least known but who are somewhat more affluent and often come from areas with more developed state-provided senior services.

Because senior citizens are believed to vote in proportions higher than the general population, and because Clark County has become a favored retirement destination, there is a view that the senior vote is increasingly important in winning elections. During the 1994 election, candidates and incumbents put considerable effort into courting the senior vote: candidates attended senior citizen events, they took positions on the topics of greatest concern to seniors, and placed resources at their disposal.

Seniors United, an organization formed approximately eleven years ago and consisting of around

200 members, was the group interviewed for this study. The interviewees observed that there are a variety of perspectives represented in the senior community, and that there is little interaction among senior groups.

Seniors United has activities that make it unique. While, like other senior organizations, it provides informational services to seniors (for example about health care, insurance, crime prevention and so forth), it also offers an occasion for meetings with candidates, discussion of political topics and endorsement of ballot proposals. Endorsements are voted on by members, and the group remains non-partisan. Through these activities, the members and especially the leadership establish contact with those in government, which acts to the benefit of the members. The YMP issue has come up at meetings and been discussed, but the group has not held an entire session about it, or moved to take a formal position on it.

Seniors United has not taken a position on the YMP. The interviewee reported that the topic has been discussed at meetings, but they have not held a meeting solely to consider the YMP. The interviewee expressed a personal opinion opposing the YMP, both on the grounds of health risks to the community, and the possibility that it might hurt tourism.

Black Chamber of Commerce

According to the interviewee, the most influential organization in the African American community is the Church, and the most influential individuals in the community are church leaders. The Black Chamber of Commerce has approximately 200 members, and there are around 600 small African American owned businesses in Clark County. To some extent, there is a division of purposes in the Chamber. Those who have led the organization for many years consider a range of social concerns in the African American community as the appropriate focus for the group. However, there are also a few people who want to see the Chamber become more business-oriented, and see the hope for the community in the creation of jobs for community members. One outcome of this difference in emphasis was the creation in 1994 of a new organization, called the Black Business Council. This group includes African American business leaders and professionals, and will seek to promote Black businesses in Las Vegas. Because the focus of the Chamber had not been especially business-oriented, at the time of this interview there were not strong ties between the Chamber and other business organizations in the County. The interviewee contrasted his group with the Latin Chamber of Commerce, which does have more ties to the wider business community. The riots following the first verdict in the Rodney King case in Los Angeles had, paradoxically, opened dialogue with the wider business community and provided some opportunity for Black business development, but it was too early to tell whether these contacts would be maintained. The other major contact was with an official elected by the African American community in Las Vegas. Outside of these contacts, this community appeared to be more isolated, or circumscribed in terms of access to influential parties, than many other groups interviewed for this study.

The Black Chamber of Commerce has not taken a position on the YMP. However, the

interviewee expressed personal support for the Project because it creates jobs, along with some concern about the risks associated with the transportation of nuclear waste.

Latin Chamber of Commerce

The Latin Chamber of Commerce is an organization for Hispanic business owners, managers, and professionals in the community. The goal of the organization is to strengthen the local Hispanic business community. According to an informant, with more economic power the group will have a greater "impact on the political and social empowerment of Hispanics" in Southern Nevada. The chapter has about 450 members. The Latin Chamber of Commerce actively seeks to recruit new members by hosting banquets and mixers for members and non-members. These functions also serve to promote "networking" among the organization's members. The Latin Chamber has been in Las Vegas since 1978, and has made an effort to keep all sectors of the Hispanic community involved in the Chamber.

Clark County Parent Teacher Association

The State PTA is under the umbrella of the national PTA, and derives its organizational structure from that body. The smallest local unit is the school. Next are the Councils: there are three councils in Las Vegas, with the number of councils dependant on the size of the city. Beyond the Councils is a regional organization, covering all of Clark County; this body oversees the Councils and the local units. Above the County level is the State organization, and beyond that is the national organization. The organization represents 30,000 statewide, including primarily parents, teachers, and administrators, although others in the community can join. The legislative priorities of the PTA arise at the unit level, and are voted on at convention. Each unit has representatives who may develop possible resolutions; these resolutions are sent to the state level and then distributed to all the state representatives, who in turn survey their members on these topics and then go to the statewide convention to listen to testimony and vote to accept, defeat, or amend the resolution. Each unit is allowed one delegate per 25 unit members at the convention, and on average the units each have four delegates. All the delegates go to lobby the legislature, and during the legislative session they have a legislative team, usually delegates from the Carson area. There are approximately 400 members at each school. The organization publishes information about schools (for example, school crowding) and children (for example, adolescent suicide). The PTA also provides information to the community about issues ranging from school crosswalks and traffic lights to educational resources.

A number of years ago, the PTA passed a resolution opposing the Yucca Mountain Project. The decision process associated with this resolution was the same as for other issues. The resolution states that none of the waste to be stored at Yucca Mountain are produced in Nevada, that such materials could cause "extreme hazards" to citizens, that Nevada had been unfairly singled out in site selection, and that a repository creates "potential danger for our children and

future generations." The resolution has been regularly challenged in subsequent years, (generally on the grounds that new information has come out that should change the evaluation of the YMP), but has thus far the resolution has stood. The interviewee suggested that the percentage of support for the resolution (and opposition to the YMP) in the PTA has declined slightly over the last several years.

Religious Interests

Although religious organizations were not targeted for inclusion in this study in the Data Requirements Report (Deliverable 94-4) several interviewees suggested that they have an important role in the community. According to interviewees, the most influential religious organizations in the community are the Church of Jesus Christ of the Latter Day Saints, the Catholic Church, and Jewish religious organizations. Black churches, such as the African Methodist Episcopal Church, were identified as the most influential organizations in the Black community. The LDS Church and a central Jewish religious organization were contacted for participation in the study, and it was possible to arrange an interview with an LDS representative, but scheduling did not permit an interview with the Jewish religious organization. The importance of these organizations is both through the religious leadership, and through the influence of their members in the community. Many LDS members are part of multi-generational Las Vegas families, and have wide influence and community involvement as leaders in organizations and government. Individual LDS members, interviewed as leaders of other organizations, often mentioned a difference in perspective between themselves and the gaming industry. Based on the information developed to date, it would seem to be useful to include the Black churches, Jewish organizations, and the Catholic Church in later study or monitoring efforts.

National Conference of Christians and Jews

The National Conference was founded in 1927 as an organization to promote understanding between Jews, Catholics, and Protestants. Since its creation, it has enlarged its scope to promote open communication and understanding among all religious groups and ethnicities. The Southern Nevada Region is one of 70 chapters of the National Conference, and has approximately 600 local members. The local chapter was established in 1952; until that point work in the area had been carried out by representatives of the Los Angeles chapter. The Las Vegas chapter of the National Conference maintains an Executive Board to help decide long term goals, and a small paid staff to coordinate the local efforts of the organization. The National Conference works with many different churches and religious groups in the community to accomplish their goal of cross-cultural understanding and peace. Additionally, the group organizes periodic forums and meetings to discuss current problems and challenges between groups in the community. Although a representative of the group expressed an interest in the issue of the Yucca Mountain Project, no indication was given that the organization would take a

formal position on the issue.

Church of Jesus Christ of the Latter Day Saints

The LDS church has had an important role in the development of Las Vegas from the community's earliest days. Las Vegas was originally established as a Mormon settlement and rest station on the route between southern California and LDS settlements in Utah. Currently there are over 60,000 LDS members in the Las Vegas area, and over nine million members worldwide. The LDS church is highly structured and well organized. The smallest unit within the church is a ward, which has anywhere between 400 and 800 members. A stake, comprised of five to 10 wards, is the next level of organization. A combination of four or five stakes makes up a Region, of which there are four in Clark County. Representatives of the Region report periodically to an Area President, of which there are 70 world wide. A President is at the head of the entire church. Decisions within the church are made at the upper levels of the organization and are passed down through the various levels to the members. This structure ensures uniformity in doctrine and teachings. Officially the church is politically neutral, but it encourages its members to be active in local politics and community affairs. Each Region maintains a Community Affairs Committee, made up of representatives from each of the Stakes of which it is comprised. This Committee gives the individual wards guidance for their community service projects.

The LDS Church is active in the community not only in religious matters but also in community service. Towards this goal the LDS Church is involved in a number of services for the poor and underprivileged. Despite this active role in the community, the Church officially avoids involvement in political matters such as the Yucca Mountain Project.

Arts and Cultural Interests

Despite the high profile role that entertainment plays in Las Vegas, arts and cultural groups are not noticeably active in the community. The Historical Society was the only group interviewed that readily fit into this category. Other organizations and associations related to this sector may exist locally, but their presence and influence was not readily apparent in the community.

Historical Society

The Historical Society is a State funded agency. It was established in 1975, and was combined with the Nevada State Museum in 1982. The Society has approximately 300 private members. Primarily the Historical Society functions to develop and maintain exhibits and education on Nevada's history and environment. The Society maintains a small research library, and acts as an information source for businesses, scholars, the media, and the general public. Since it joined with the museum in 1982, the Society has become more oriented towards historical research. It works closely with the Lost City Museum in Overton, which is also a state funded agency.

Professional Group Interests

There are at least three obvious professional sectors that may take an interest in the YMP: doctors, engineers, and lawyers. Two doctors organizations and two lawyers organizations were contacted for this study, and the doctors groups were willing to be interviewed. All three sectors are reportedly very active in the community, especially in political affairs, and engineers have been involved in work at the NTS and on the Yucca Mountain Project. It may well be that the engineering groups take a different position on the Yucca Mountain question than the medical groups, and it would be useful, in further study, to include lawyers and engineers among the interviewees.

Nevada State Medical Association

This is a statewide professional association, and has been in existence for almost ninety years. It has between 1,100 and 1,200 of the 2,000 medical doctors in the state, and it includes most of the active physicians. All members of the State Association are also members of a county affiliate, and there are six county medical societies in Nevada. The Association deals with issues of concern to doctors, such as tort reform, and deals with medical and medical-social issues more generally, such as worker's compensation, health care reform, and AIDS. Each of the county Societies has an independent board, and each Society has delegations representing them at the State Association's House of Delegates. The House of Delegates also includes representatives of medical schools. The Association lobbies on issues before the State Legislature, and has a Political Action Committee. It provides research and analysis on issues facing medicine, and provides this information to members. The group works with the American Medical Association, and brought before the AMA its position on the Yucca Mountain Project. Depending on the issue before it, the State Association has formed ad hoc coalitions with a range of groups. It has worked with labor unions on workers compensation issues, and will probably work against lawyers on tort reform. And it sometimes works with medical associations in other states on common issues. In Las Vegas, the Association works out of the office of the Clark County Medical Society.

Several years ago, the Association took a formal position opposing the Yucca Mountain Project. The resolution states a concern about the viability of the site, the length of storage, transportation concerns and the possibility that the repository would "seriously impact public health and safety over a wide area." An interviewee noted that opposition was also on the grounds that medical expertise and public health considerations were not being included in the evaluation of Yucca Mountain as a site, and that a 'decision' about siting (the limitation of site studies to Nevada) had preceded the scientific investigation. There was some disagreement about this stance within the Association, and it came (according to the interviewee) from those who believed the organization should not speak to the issue, and from a doctor who had suffered from a controversy surrounding the Beatty low level waste site. The interviewee also suggested that there was a degree of controversy among AMA doctors about which doctors should participated in studies about health impacts of the YMP. Here, as in the Teacher Association case, the YMP issue brings a degree of controversy both within the local association and between the local and national associations.

But the heart of the issue for our leadership was that the discussions among the engineers and the policy types, DOE, and the congressional offices seemed insensitive, in fact they actually seemed not to consider the medical health effects that Nevada physicians had to deal back in the '50s and '60s with patients whose health had been severely impacted by the testing program when it was atmospheric testing. And physicians hadn't been consulted before any of that was done. And so, what we had was a mix of physicians in rural Nevada particularly who had had patients who were, whose health and lives had been cut short because of federal policy that hadn't considered the medical aspects of it. It looked like to them that we were about to repeat the same problem. . . . And it didn't look like that was being considered, that medical input was not being solicited, . . . And so we took that to the AMA on those grounds.

. . . And we have some physicians who disagree, mostly from the perspective that they were unconvinced of particular health risks associated with nuclear waste. I think that that was a distinct minority of physicians, but they were vocal and I think were listened to . . . the view of the physician who spoke on that was that that was inappropriate. . . . his own history he had been chairmen of the State Board of Health when the Beatty controversy emerged. And Beatty is where the low level nuclear waste is stored and he was removed from the that position as a result of that controversy. So I think that for him it was an issue of the appropriateness of medicine getting involved in that political issue.

. . . I think that AMA was ambivalent . . . They didn't want to limit it to only Nevada or Utah or California physicians, physicians who would be treating the patients effected . . . So it was a political issue within the house of medicine as well as nationally.

Clark County Medical Society

The Medical Society is an voluntary organization, approximately forty years old, that deals with local issues such as physician referrals, community relations, complaints about physicians, and puts together seminars and workshops for physicians, and does social and charitable work. The state organization, on the other hand, deals with governmental issues, and interacts with the legislature, Congress, and regulatory bodies. Members must be licensed in Nevada, and nearly half of the licensed doctors in Clark County are members of the Society. Doctors can be members of the AMA, independent of their membership in these two organizations. Other medical groups locally include organizations in medical specialties. The Clark County Medical Society does not have a stated policy on the Yucca Mountain Project, while the State Association does have a policy: The interviewee with the County Society said that the two organization in some ways divide their functions, with the State Association having a greater role in policy, and this is the reason the County Society does not, and probably would not, have a stated position. However he expressed strong personal support for the policy of the State Association. The Society works in coalitions with other groups on specific issues, for example with the Heart and Lung Associations on tobacco use.

The following table summarizes the positions taken by organizations included in this report. The table includes organizations supporting, those opposed, and those divided on the YMP issue. The table does not include those organizations with less defined positions on the Yucca Mountain question, or those groups which, though they have a clear perspective for or against the YMP, do not currently want this view stated. There are also additional organizations, not interviewed, that have taken public stands on the YMP, and some of these are noted in the timeline, later in this chapter.

Table 3-2 Organizational Positions on the YMP				
Interest Group	Organization	Support for YMP	Internal Division	Opposition to YMP
Business and Growth	Southern Nevada Homebuilders	√		
	Nevada Development Authority		√	
Professional	Nevada State Medical Assn.			√
Labor Interests	Laborer's Union	√		
	Building Trades/ Central Labor C.	√		
	C.C. Teachers Association		√	
Population Sub-Group	Parent Teacher Association			√
	Latin Chamber of Commerce		√	
Concerned Citizen	Nevada Concerned Citizens		√	
	League of Women Voters		√	
	Citizen Alert			√
Nuclear Industry	Nuclear Waste Study Committee	√		

3.3.3 Section Summary

This section summarizes the positions groups have taken on the Yucca Mountain Project. It notes the groups that mentioned the topic independently in the first round of interviews (when no YMP questions were asked), which groups have a stated position on the Project, and which are divided. Reasons for divisions within interest groups on the YMP issue are also mentioned. It then briefly reviews the concern with the YMP within each of the identified 'interest groups sectors.'

Of the groups that took part in the first round of interviews (interviews which did not include questions about Yucca Mountain), interviewees from six organizations raised the YMP themselves. This provides information about the degree to which the issue is salient for the group. An individual in the gaming industry, a leader in the Medical Association, two people in the construction labor unions, an individual with a government employees union, the nuclear industry interest group, and the anti-YMP concerned citizens group mentioned the YMP during the course of the first interview. The interviewee in the gaming industry expressed a concern that the YMP would present problems for Clark County in the future. The person with the Medical Association suggested that the 1987 Amendment to the Nuclear Waste Policy Act has had a profound affect on the way Nevadans see their relation to the federal government and their position in the nation. He suggested that under certain conditions, the issue could become extremely divisive locally. Those in the construction labor unions said that the Project means jobs for their workers, and that a problem in the YMP debate is the emotionalism encouraged by media and politicians. The anti-YMP concerned citizen group raised the topic of health risks, transportation, and trust in government, and the nuclear industry group argued for the importance of conducting site studies and the possibility of benefits for the community.

Very few organizations have a publicly stated position on the Yucca Mountain Project. These groups include (but are not limited to, see section 3.5.3) the State Medical Association, the Parent Teacher Association, the construction labor unions, the Southern Nevada Homebuilders Association, the nuclear industry group, and Citizen Alert. The position of the Medical Association was that medical and public health expertise was not included in the Site Studies, and that little to no study had been done on the health impacts of high level nuclear waste storage on a population. Further, there was concern that the 1987 Amendment to the Nuclear Waste Policy Act had determined that politics rather than science would decide the siting. The representative of the PTA did not elaborate on the reasons for the organization's policy, but the PTA resolution states a concern for "our children and future generations." A construction labor union representative noted that the Project creates jobs in the community, and that if the State agrees to negotiate with the federal government, there may be substantial benefits granted, including creation of new industries (another construction union representative said that there is now little chance for benefits, because the federal government believes it can put the YMP in Nevada without negotiation). Further, the representative said that there is no risk created by the site studies, and thus no reason to oppose them. The arguments of the nuclear industry interest group include economic benefits, and comments on the accuracy of the media, while Citizen Alert commented on health risks, and the trustworthiness of government and contract scientists.

There are strong divisions over the YMP in some of the organizations studied. As detailed earlier, there are divisions within the League of Women Voters and Nevada Concerned Citizens, and in the Teachers Association. The Nevada Development Authority and the Latin Chamber of Commerce are also divided on the issue. Opinions within the first three groups are affected by the economic ties of individuals and families (association with the NTS on one side or with the State on the other side) and personal ties to the fields of science and engineering or non-science fields. With respect to the greater support among science teachers for the YMP

(mentioned earlier) it must be added that support may derive both from a belief in science and from the substantial support the YMP has given to science teachers in Clark County.

Within the business and growth sector, the greatest concern about the YMP is attributed to the gaming industry, though the extent of industry unity and activism on the issue is unclear. An organization in the construction business sector, in contrast, has stated its support for YMP site studies. Among environmental groups, the organizations interviewed have not taken a formal position, and some individuals in the organizations are interested in the YMP, while others are not. The Red Rock Audubon has a member who monitors the issue for the group. Among concerned citizens organizations, Citizen Alert is the most active, and most readily identified as opposing the YMP. They have also undergone significant organizational change in the last year, and it is unclear at this point whether that will affect the group's actions. The League of Women Voters also has a focus on the YMP, but is divided. Among labor groups, the YMP is an important issue, but it may be that the labor groups have different views on the issue though remaining united publicly. In the population sub-groups, the PTA has taken a position against the YMP, but this is challenged almost every year by members supportive of the YMP, though the margin of YMP opposition remains fairly high. Seniors United has taken no position on the YMP, though its influential leaders are personally opposed to the Project. The Latin Chamber of Commerce is divided on the YMP, and the position in the Black Chamber is less clear. Among resource user groups, individuals expressed support for the YMP, though the organizations have taken no positions. The nuclear industry group the Nevada Nuclear Waste Study Committee is very active in support of the YMP.

As noted at the beginning of this section, some interest groups are more influential than others, and within interest groups, some organizations are more powerful than others. Business interests, especially gaming and construction, labor unions, and local government all exert a significant influence on the community. The patterns of social alliances and divisions within the community can also be outlined, though it would be too early to conclude how these dynamics will affect the YMP issue. In the business sector, close alliances exist in the areas of construction, sales of property, and land development. These groups are also allied with construction labor unions. Members of the gaming business sector, along with the construction business sector, serve on local Boards and economic organizations, but otherwise the ties between these two business sectors do not appear to be close. Most often, they are brought together by specific projects. The gaming business sector also has alliances, with service and construction labor unions, and with government. Specific gaming organizations have also established ties with population based groups such as senior citizen interests and, along with all the business sectors, with family/educational interests.

The environmental interest groups are issues-based organizations rather than (as with the business sector) being united by shared economic interests. In other words, members work together because of the interest they take in issues. Environmental groups rarely work together (there is an exception in an information sharing Network), and individuals chose to be members of these groups based on their interest in the specific issues covered by the organization. There

is a degree of opposition between environmental groups and those in construction-business and construction-labor groups, and there is also some antipathy between environmental groups and the resource user interests. The resource user groups are focused on work that is based in tradition and has a strong cultural component. The environmental and resource user groups are brought together, to a limited degree, by the concerned citizen interest group, Citizen Alert. This organization attempts to meld the concerns of these two antagonistic sectors through their common opposition to federal policies on land use and management.

The largest labor interest groups in the County are in the areas of construction, government projects (this has included all the unions), tourism, and public employees. There are well organized formal coalitions among the various unions, and values about unity. However, as mentioned above, labor unions also have alliances with the business sectors they work with, and these interests are sometimes opposed. This may be the case with the Yucca Mountain Project. The public position of labor is in support of the YMP, and this suits the business interests of the construction unions. However, the service unions may eventually be pulled in two directions over this issue, by the construction unions on the one hand and their interests in the tourism industry on the other. A union that is not allied with the AFL-CIO found it acceptable to raise the issue of the YMP, though they were internally divided.

The nuclear industry interest pairs an interest in a particular issue, the YMP, with an economic interest. They have informal alliances with construction labor unions, and they may work with some of the professional interest groups (engineers). The concerned citizens interests are generally focused around an issue or perspective, and many of them form ad hoc alliances with other groups. One of these organizations, Citizen Alert, is the major non-governmental organization opposing the Yucca Mountain Project. They have worked with other community groups to organize public opposition to the YMP. They have also attempted to forge an alliance between Citizen Alert, environmental interests, and resource user groups over the issue of federal land use.

Population sub-group interests often focus on specific issues facing their membership, and they have alliances with those sympathetic to their interest. The patterns of alliances and divisions depends on the group. Religious groups are quite influential through their members in government and the leadership of organizations. The Church is considered one of the most influential organizations in the Black community. Professional groups are quite active, especially in government, and have alliances throughout the community depending on the issue.

3.4 THE NATURE OF RISK EXPLANATIONS AMONG INTEREST GROUPS

This section investigates the way that a select sample of Clark County residents thinks about the risks, benefits, and consequences of the Yucca Mountain Project. After introducing the concept of 'risk explanation', the relative importance attributed to the Yucca Mountain Project (in relation to other issues of local concern) is briefly presented. Then an analysis of statements made by

interviewees considers the 'risk explanations' associated with the Project.

3.4.1 The Theoretical Concept of Risk Explanations

As discussed at length in the *Data Requirements Report* (Deliverable 94-4) and the Literature Review (Chapter Two, originally submitted as Deliverable 94-2), 'risk explanation' refers to the way people conceive of risks. The interest is not only in the degree of risk attributed to a potential event ('risk perception'), but the way people think about the nature of the risk and its consequences. It is proposed that this interpretive process is an important variable in motivating individual response and, thereby, social impacts.

3.4.2 YMP Risk Explanations in the Context of Other Risks and Concerns

This section briefly refers to some of the other risks perceived by interviewees and County residents more generally. Each of the organizations interviewed had a well defined focus on particular issues, and the interviews reflected these interests. Studies by the State of Nevada, using close-ended questions, have found at least 70% of respondents opposing the YMP. An open-ended survey of Clark County residents conducted in 1993 (see IAI March 1994) identified risks most commonly mentioned by survey respondents, and the proportion of residents who cited 'nuclear waste' among their concerns. As noted in that study (employing open-ended questions), 17.7% of respondents mentioned nuclear waste among their answers, and 5.35% offered 'nuclear waste' in answer to more than one question (questions such as 'what are the top five issues in Southern Nevada today', and 'what could happen to make life in Southern Nevada worse'). However, it was not the most commonly mentioned 'risk' facing County residents, and appeared as the fifth or seventh issue, depending on the question. Not surprisingly, nuclear waste was preceded in number of mentions by currently existing problems such as crime/gangs, overpopulation, traffic/roads, and water problems. For particular questions, taxes, schools/education and environmental quality were also mentioned as more important. However, in the 1994 IAI survey (Chapter 4, originally submitted as Deliverable 94-9) transportation of nuclear waste was rated a 'very serious problems' (a rating of 10 on a 1-10 scale) by 55.5% of the respondents, and storage of waste was rated 'very serious' (10) by 53% of respondents. Only crime was rated 'very serious' (10) more often, by 61% of respondents, while traffic congestion was rated ten by 51% of respondents (other issues rated by respondents were water, economic diversity, overpopulation, schools and education, air pollution, job opportunities, and the expansion of gaming outside Las Vegas).

The following discussion reports responses of interviewees to certain issues. Interviewees were asked to rate their interest, or the concern of their organization, in the following issues (issues were derived from responses to the FY93 open-ended survey, and topics that appeared in the first round of FY94 interviews): Crime, Diversity in the County Economy, Expansion of the

Gaming Industry outside of the Las Vegas Valley, Federal Government Land Use/Management, Hazardous Industries or Materials/PEPCON, Yucca Mountain Project, Traffic Congestion, Quality of Schools and Education, Overall Environmental Quality, Water Shortages, Overpopulation.

Other issues in Clark County were given much higher priority than the YMP, and crime and water were common concerns. Almost without exception, interviewees said that water (shortage and management) is an extremely important problem. There is a widespread willingness among community leaders to work together, along with government, to find solutions to water shortage and management. Many said that they believed they were alone in their deep concern about water, and alone in their view that the deadline for finding solutions was rapidly approaching. One person noted that in pre-election polling, the top three issues in the County were crime, taxes, and education.

While interviewees considered water more important than the YMP, they also (in general) thought it would be easier to find solutions to the water problem than to the YMP. However, this last question sometimes prompted some interesting responses on the YMP, in which interviewees wanted to distinguish between the ease of finding political solutions (it will either be sited or it will not, the public will either fight it or will be convinced to accept it) and the difficulty of finding solutions to the risks.

Another major issue is crime. In some cases this was raised as the most important issue, and one that could threaten the tourist base of the economy. Here again, while this poses a great risk, it is seen as fairly easy to solve, and (for reasons somewhat unclear) as easier to solve than either water problems or the YMP.

An issue that was sometimes associated with the YMP and drew in some interesting response was the topic of federal land use and management. This is an interesting issue because it seems to bring together environmentalists and resource user groups (often opposed), and those who believe the federal government has dealt unfairly with Nevada.

3.4.3 Perceptions of YMP Risks and the Effects on Clark County

The following discussion looks first at comparisons people draw between the Yucca Mountain Project, the Nevada Test Site, and chemical hazards. Since some in the community argue that public response to the YMP will be similar to response to the NTS, it is useful to ask how community leaders think about the two government projects. Second, the risks interviewees associate with the Project are presented, and third, the benefits expected from the Project are noted. Opinions about the possible consequences and impacts of the YMP appear throughout the section.

People offer a variety of analyses of the Yucca Mountain Project, and in many cases these ideas

are complex, and blend prospects of benefits and concerns about risks. The following discussion reviews some the ways interviewees talk about the YMP. This section does not attempt to represent the proportion of interviewees who hold various views, but rather the nature of the ideas and concerns about the Project. Further, this discussion does not systematically represent the kinds of explanations offered by different interest groups. As mentioned above, most organizations have no stated position on the YMP, and many do not have uniform opinions among their members. However, almost all the interviewees had personal opinions on the topic, and many were willing to express their views. Further, the questions asked were designed to get at personal explanations of risk, and several interviewees wanted to be certain that their ideas were not represented as the organization's stance.

Yucca Mountain, the Nevada Test Site, and Chemical Industries

Clark County residents' experience with the Nevada Test Site is sometimes used to anticipate public response to the YMP. Therefore, some interviewees were asked to compare their views of the NTS the YMP. The following quotations from interviewees about the NTS reflect a mixture of familiarity and pride in a unique identity as Nevadans, along with reports of harm done to family or friends, and a degree of distrust in past federal protection of Nevadans. It also appears from these examples that longtime residents do not view NTS as a risk that has been uniform over time, rather, they draw an implicit distinction between the risks of above-ground testing and below-ground testing.

This comment, from a supporter of the YMP, refers to beneficial uses of radiation along with pride in challenging work. Yet it is also reflects risk.

Now I guess you could say very few people, very, very few people are not afraid of radiation. If you take somebody's life that's been saved by radiation through cancer therapy, they're not a damn bit afraid of radiation. I'm not afraid of radiation because I worked in it for ten years, I was on numerous re-entries where we were in high levels of radiation, and I had suits on, and I felt, I felt I was fairly well-protected, and I took urinalysis every day, they took blood samples, I made sure I had plenty of extra clothing on, we had film badges that tested radiation, we had monitors with us at all time. I was a guinea pig, but I knew it, my eyes weren't closed to it. I mean there's stuff I did then that I sure they won't -- there's stuff I did ten years ago, five years ago they won't do anymore -- they won't let people in atmospheres like that anymore [what's reentry] When they had a test at the NTS in a tunnel, and they stemmed it out and plugged everything up, and they had the actual test, when the device went off, I was on the, within 24 hours we had to reenter that tunnel and recover films, and so on, experiments, but we had to be back in there within 24 hours. And I was on numerous reentry teams.

Another interviewee, a member of a family with three generations of residence in Nevada, was asked if the history of the NTS might make Nevadans less concerned about the YMP. The interviewee (who opposes the YMP) disagreed, and replied that exposure to open air testing was probably associated with cancers in her family.

I'm like a third generation native Las Vegan. But they lived here in Las Vegas, they would go out and view the above ground testing. And of them, of the women, my grandmother died of cancer, my mother has colon cancer, my aunt had cancer, my -- I mean the cancer rate in them is extremely high. And so if you talk to them, rightly so, they would feel like we were misled, we were told this is safe. No one would say this caused the cancer, but if you look at the family history ... And pancreas cancer, just a whole bunch (of different kinds). [do they see it that way too?] They feel that that's what caused it, because, their doctor could not explain, in my mother's case, her health, her age, her diet were such that she was not -- she was such a low risk for this type of cancer that was so aggressive, that they were really looking at why this would come about . . . she had none of the -- and so that's why they were really looking at that. [how did..] Well, it was something she brought up, and then when we started realizing well, Grandma died of cancer, and . . . had cancer, and . . . has cancer and . . . has cancer, and . . . has -- you know, we started putting -- all of a sudden it started clicking and we realized how many of them had actually been out to view -- that was the one common thing.

Yet at the same time, this interviewee expressed no concern about below ground testing at the NTS.

I guess I don't see it as much (of a concern) because I've lived here all my life, it used to be when they set off a blast, it was like hold on to your seat, the whole . . . house would start shaking. And it was like yeah, here goes that test . . . I guess having it always been there makes it familiar. Just something that I grew up with.

Another statement of familiarity, along with a slightly eerie tone, comes from another opponent of the YMP.

[do you see it as similar to the test site] I've lived here since 1958, I remember when the tests were above ground, and then they were below ground. And throughout the years I can't say I felt a lot of them. I'd wake up in the morning on some of the unannounced tests in '58, '59, '60, we lived on Sahara Avenue right over here, and opened the door, well tried to open the door, and it's dust, sand. From a windstorm - I don't know? From the A-blast storm - I don't know. I don't know where it came from. I just remember thinking to myself, my God were did all this dirt come from, well it was a windstorm, well, yeah, who knows

why that windstorm was caused?

This longtime resident does not especially favor the YMP, but sees it as inevitable and argues that the state should accept benefits. He proposes that older Nevadans and those who lived through the tests have less concern about the YMP than younger and newer residents of the area. But he also describes the death of a friend associated with above-ground testing, and draws a connection to the uncertainties of the YMP. This risk is seen as less pressing (for him personally and in the public imagination) than more immediate concerns.

I've lived in southern Nevada since 1960. There have been all sorts of atomic tests radiation, leaks and so on up at that test site. Thirty-four years. Now unless they establish that there is something geologically unsound, to me there's no difference in digging a tunnel to store that than it is to digging a tunnel to blow out an H-bomb or an A-bomb test that could leak into the atmosphere through fissures that open up.

[when people are concerned, what is their main concern] Life safety. Radiation contamination. [you mentioned your friend who died of leukemia after exposure] One of ten children -- the only one to die of leukemia in that family -- the only one exposed in an open trench test up at the Test Site, 1955. [here?] Yeah, at the Test Site. There have been a number of stories recently. And those stories about the early history of the Test Site and the radiation exposure and how the army kept it very quiet even though they knew from laboratory engineers and scientists what the potential was, yet they went ahead and did the test. But the younger generation isn't even aware of that. Every now and then there's a story that comes out in the newspaper, in fact there's a class action lawsuit that's been filed, by some military and test site employees, alleging that they were knowingly exposed without their knowledge. Unbeknown to them they were willingly exposed, sacrificed, and some of these exposure areas, and they've contracted terminal disease because of it. [so . . .] I think what it does, all it does is periodically when you read one of those stories, all it does is reminds that we did at one time have a real potential hazard out there because of poor government handling of a situation. And we could have the same thing happen at Yucca Mountain. It's an iffy thing. Then it fades away and it's gone. Next thing you read about's a carjacking or some woman was assaulted at the ATM machine or whatever, so then it goes away. Something more close to home takes on greater importance. [closer to home?] More current, more geographically closer: hey, that's way up there, 75 miles away. I got trouble right here in my own neighborhood, . . .

The interviewee (quoted above) whose family had high cancer rates drew a different conclusion about the YMP:

I just think basically it's just the unknown, the fear of the unknown, and it's too close to home. And that's how they see it. Well, there's no guarantees, what if there's one chance it could -- they don't want to take that risk.

This comment comes from a more recent (five-year) resident of Clark County, an opponent of the YMP, who is in a business associated with tourism.

. . . the Test Site is something that we know of, it exists. I think that the Test Site was just as dangerous and maybe more so. I think that the divergent fact that the Test Site in the '50s when it was actually considered a good thing, here we were doing something for the country, now low these many years later we find out how many of these workers died of cancer from having worked there. So, I think that you are going to end up with a split opinion about that. . . . I think the similarity is strong. They were both very dangerous places. At the time the Test Site was built we were unaware of just how dangerous it was. And we know now, for whatever it is worth we know now.

And a supporter of the YMP who is in the construction field also suggests (as did the YMP opponent, above), that the YMP might be safer than the NTS. He argues that the greater support for the NTS was related to jobs and, for politicians, votes:

[people don't seem to be particularly afraid about the test site. Is that right or wrong?] That's true. And they should be more fearful of that than this project (YMP). [what is that about] I think it goes back to the culture, the area. You know we've had people working out there since the early '50s, and Las Vegas wasn't a very big town. Very few of the people, the older timers in the valley, very few of them -- that own the bars and the businesses and the lands and the so on, they're heavily connected to the Test Site and making fortunes and losing fortunes, and it's been big business for -- the reason people are for the Test Site, politician-wise is, 10,000 votes. When there were 10,000 people working there you were talking 40,000 votes. So it was a political issue.

One question that appears in social research on risk is whether nuclear hazards are seen as different in kind and degree than chemical hazards. In an attempt to investigate this question, some interviewees were asked how they compare these hazards. One interviewee (who opposes the YMP and has broad experience as a political organizer), described a case in which a series of small-scale chemical disasters occurred in Clark County, and said that nuclear hazard are seen as different from chemical hazards. He offered ideas about why.

. . . it's interesting because there's a lot of chemicals that are highly hazardous, but the -- until the PEPCON explosion, I think most people who lived across the highway from BMI in Henderson, and still a lot of them that do, would roundly defend that facility. A lot of them now are a lot more skeptical about it (laugh)

since that time, but not nearly as adamant as -- you've got people who are just dead set against this dump. I mean there are people that are just livid about the whole idea of the dump, and I have yet, in the years of organizing around these issues, found anybody that's that livid about BMI.

. . . people just fear a substance with is lethal, potentially lethal, poisonous, and is invisible in a lot of its forms. I mean you can't see when you're being exposed to radiation, sometimes you're close enough to see the source, but it doesn't glow, I mean they jokingly say it glows, but it doesn't, you can't tell that you're being irradiated, you can't feel it, and yet you could be getting a lethal dose of it.

Another person said:

PEPCON was hazardous but not to the extent that this could be. PEPCON is like a lighted match and Yucca Mountain is like a bomb.

In the last example and the next one, it is clear that one thing that differentiates PEPCON and the YMP is the scale of the project and the scale of the potential event. Therefore, it is not simply the difference between chemical and nuclear hazards that separates these cases. Other interviewees said that they could imagine chemical and biological hazards being more dangerous than nuclear hazards.

You know, if something were to happen that were seriously compromise Yucca Mountain that could seriously compromise a million people. That is a little different, if there is an explosion at PEPCON, a dozen people might get hurt, a few thousand might be affected. But not several hundred thousand, . . . It's just like saying this Tasmanian Devil that could bite your hand off in one bite is very similar to a rabbit. . . . But hazardous material pass through a community, that's what they do, they go in, they come, they leave. This stuff comes and stays.

Risks

As mentioned earlier, this discussion does not attempt to represent the proportion of interviewees who stated these views, but rather the kinds of explanations they offered. A number of interviewees expressed concerns about the risks and impacts of the YMP. Some of these risks are to the present population of Clark County, and some are to future. There are a variety of practical concerns, such as risks to water sources and risks from transportation accidents, storage, earthquakes, and so on. There are also more philosophical concerns, such as insufficient scientific knowledge and the duration of the YMP effects, and these may be more difficult to answer.

The suggestion arose in a couple of interviews that a nuclear incident, for example, one caused

by a transportation accident, could create contamination that would turn an area into a forbidden wasteland. While a few people mentioned the mushroom cloud as the nuclear image most common in the general public, this wasteland reference appeared in comments by interviewees.

I'm really am not an expert on nuclear waste, but if they want to contain it under a mountain, everything we hear about it, it's so dangerous, if we had a spill in the inner city around the turnpikes, what, I just can't even fathom what that would entail, you know what do we do, close off that area to traffic forever? (laugh), because that's basically what it would be. I don't know. That's certainly the waste isn't, I guess, I'm guessing, as hazardous as the, as an atom bomb going off. But it seeps into the water and into the ground, at least that's what I've heard, and that can contaminate the whole valley.

This same interviewee, who has ties to labor and the gaming, expressed mixed ideas about the YMP. He, like many other interviewees (both opponents and supporters of the YMP), had particular concern about the transportation of waste.

I mean if you build a big beltway like they're talking about, and you don't get close to the suburbs of Las Vegas, hopefully, I don't even see that happening, once even the beltway is done, all the transportation of these radioactive materials from other states are going to have to go through populated areas. And unfortunately, we don't have a very good track record of having non accidents with toxic materials. . . . What I'm saying, on the one hand I'm saying, yeah, I think we need to do that for jobs, on the other hand safeguards have to be just like out of this world, to make sure that no accident ever happens. But that's -- my fear is that it will.

There is also a concern about the YMP's impact on tourism, and peoples' decisions to live in Las Vegas. This comment is from someone in a business dependant on tourism.

In one way or the other the community is affected by it as a whole and if it should hurt the tourism industry, that's going to certainly hurt everyone, in fact, there are very few people that aren't going to feel that.

You know, it is a city we need a lot of people to make this place work. And we are still growing, we still have continuing needs. I would be very concerned about it as a community in our ability to draw people who may say hey you know, I don't know Las Vegas, your only 90 miles away from one of the biggest nuclear repositories in the world, I don't think that I want to live there. So, that would concern me.

And another person (unconnected to the tourism industry) stated an argument heard in other interviews, namely that the widespread presence of gaming in Clark County makes other

industries less likely to locate in the area. Therefore, tourism is especially important, and the YMP is particularly risky.

So, I think that Nevada, gaming is the only show in town. And I have heard diversification for 20 years. I have seen CitiBank show up with 3,000 jobs, Montgomery Wards showed up, we have a Levi's Strauss plant, PEPCON left. I don't see that diversity. I don't see people moving from New Jersey here. Utah is attracting national concerns. A furniture business and a hog business going to Beaver, Utah. Why didn't they come to Southern Nevada? It is the quality of life in Utah. It is that family orientated life, low stress, no taxes, just like Nevada has. So, I think that gaming is our mainstay.

One of the major points people make as they express concern about the YMP is a sense of uncertainty, an absence of confidence and of trust. At the same time, other interviewees believe that risks are generally overstated, often by the media, and that the Project can be carried out safely. Uncertainty is associated with practical matters, like earthquakes and the water table, but also with the general view that our state of knowledge is too limited to justify the Project.

[what are there risks and the benefits?] OK, again, I think the risks are, I don't have confidence that they really know what they are doing, I don't know why. . . . And I am thinking, you know, this whole mystique of that Test Site, what is going on in there. How many failures have they had? How many successes have they had? I don't know. My confidence, I really don't have confidence in storing stuff for a long period of time like they are talking about safely that is not going to affect us for some reason. . . . But I still don't have, I don't have confidence in my heart that they really know what they are doing up there, long-term, 50 years and they are talking thousands of years. The reason that I don't have confidence is that earthquake. See, because I know that the plates in the earth are moving. I know that where we live there is a string of volcanoes that go up through this area of the country. Volcanoes are a result of the plates of the earth moving. So, the earthquake deal is a question you know in terms of that being solid. Nothing is solid on the earth. And that is kind of my science side of me telling me that I am still not sure, I still do not have confidence, but again, I don't know enough.

And, from another person:

I mean, I don't believe the government or industry sets out to do anything purposely harmful and I think that if this happens that there will be every safeguard taken at that time, that is known at that time to insure safety to the extent possible at that time. The biggest question is none of us know what the hell we are dealing with how can we know that what we are doing is safe.

Sometimes the time period necessary for storage of the nuclear waste is mentioned as a source of uncertainty and doubt. Along with uncertainty and the duration of risks is the suggestion of vast and irremediable consequences.

But this is something almost on a geologic time scale, it's impact is likely to be felt as many years out ahead as we are from the Egyptians. Would we really have wanted a Pharaoh to make a decision that now we would be reaping the world away from (them). I mean how do you hold a Pharaoh to a bargain? How is somebody going to hold our political leadership accountable if the impact is somewhere between now and 3, 4, 5, 6,000 years from now. But it's massive and overwhelming and unredeemable where you don't get to undo it. If we make the wrong, if we make the wrong decision on this thing we collectively, whatever humans are around right now, if we make the wrong decision, we can be making a fatal decision for generations to come that they won't be able to undo. We better be darn certain before we do it.

And, from a second interviewee:

. . . the problem that always bothers me is how do you sign something that's going to be valid for 10,000 years when we can't read something that goes back for less than 1,000 years.

A third person commented:

[How is it different from NTS or PEPCON] Because it's longer term, and permanency, originally they were going to design a repository for 10,000 years. Well, that just doesn't compute to the average imagination, you can never convince me that you can design for 10,000 years. At science meetings they would talk about getting weather data for 10,000 years, well you can't even tell next week what the weather is going to be (laugh). . . . But I think that's probably the biggest problem people have is because the length of time, 10,000 years, that makes it different than PEPCON. Because also you're not just talking the decisions that you make today, but also talking about our children's children and I think people do get a little emotional about that, they don't want to leave a mess for our kids. . . You can't just sit here and design 20 years out and hope to have something for 10,000 years.

Among both supporters and opponents of the Yucca Mountain Project, a number of interviewees expressed anger with the political process that determined that Nevada be the sole site investigated for the high level waste repository. This process, they suggest, has cast strong doubt on the credibility of the scientific effort, and the likelihood that science will determine the outcome. Many interviewees expressed hope, but not confidence, that the decision on the YMP would be made on scientific rather than political grounds.

I think that Nevada has been grossly wronged in the entire Yucca Mountain process. I don't believe that it went through a fair process in determining that was the site, that is should be the only site, and I am not convinced that the process that they're going to is going to give it an unbiased opinion as to whether or not it is viable.

Another person said:

I don't like the way that that has come about. And there's supposed to be a number of sites studied, and suddenly, overnight, only Yucca Mountain is being studied, and I don't appreciate that. And I find it very hard to believe that if after ten years and billions and billions of dollars, something comes up to suggest this it's not the best site, it does not meet the criteria established, that everybody will pack up and go away. What will happen, is probably, the criteria will just be changed to fit the circumstances. And again, I think Nevada really relies on our gaming and our tourism and so forth, and storage of radioactive materials doesn't necessarily seem to mix with that.

An individual who is very supportive of the YMP suggested that a similar political process might determine that federal law be changed to allow the placement of a monitored retrievable storage facility at the NTS:

I think there's going to be some horrible legislation passed. Above all, I'm a Nevadan, and I don't want to see us get -- I don't like things jammed down my throat, as a Nevadan, as a citizen, as anything. I think we should have a lot of say on it. Of course we don't. California can control us, look at their senators and congressmen, look how many we've got, so . . .

When asked whether there are conditions under which the Project is acceptable, one person gave an answer of some intensity. His views contrast with arguments about 'benefits,' presented below.

. . . It is a political decision. The (YMP) is going to happen or it is not. So screw the conditions. You know, what conditions are going to make it any better. Either it is going to be in Yucca Mountain or it isn't. There aren't any conditions that are going to make it any better. See the citizen side of me says, I don't want to live anywhere near it, don't put it in my state, get ride of it, end of story -- unequivocal. The corporate side of me says, well, what's going to happen are we going to put it here or not. Now, if we are going to put it here, yeah I mean, our conditions, yeah, I guess the conditions is that we have thoroughly evaluated safety and we've seen to it that as regards an avoidable safety concerns we've covered those off.

Benefits

Interviewees were asked to consider the risks and benefits of the Yucca Mountain Project. Jobs were often mentioned as benefits, by both supporters and opponents of the Project. Attitudes were varied on the acceptance of federal funds. Some saw this possibility as positive, while others described it as compensation for a project they would in any case be forced to accept, and others rejected it. The topic of acceptance of federal funds is a sensitive one, and is surrounded by arguments about whether such acceptance would signal assent (both symbolically and legally) to the siting of the Yucca Mountain Project. Again, this discussion does not attempt to represent the number of people who held these views, but instead the kinds of arguments made.

Arguments in favor of the proposed Yucca Mountain repository have been noted in interviews with informants from a variety of organizations. These arguments have included benefits for the community, the State of Nevada and the country.

Frequently informants view the Yucca Mountain Project as a potential economic boon to the community. The jobs that may be created by the project are viewed as a means to mitigate the effects of staff reductions at the Nevada Test Site following the moratorium on nuclear weapons testing. As one informant stated, "It [the YMP] creates jobs . . . it's a big backbone of the economy in Vegas." Another informant further explained the economic benefits to the community from the project.

Well today we're reaping a lot of benefits just from the inherent benefit of a major federal project being conducted here. There's hundreds of millions of dollars being spent every year in Nevada. High paying jobs associated with that. I don't know what the average salary is but it far exceeds the average salary of the typical job in the service industry in Nevada. My guess is its probably twice as high. Those are people paying taxes and contributing to the infrastructure. Those higher paying jobs do that. Burger flippers don't support the infrastructure. They don't pay taxes, but they use all the services. So you have the advantage of that. You have a lot of procurement of goods and services in the community by the Test Site. They need tires and pencils and pens and all those things in large quantities because its a large operation.

In a similar argument, the individuals attracted to Clark County by the Yucca Mountain Project were viewed as a direct benefit to the community. These individuals were not described as an economic strength, but rather as a social force and community resource. As one informant explained:

The people who are involved with the project are all very active in the community. Not all, but many are very active in the community. In the

sciences programs, in helping teach our kids about science and about technology. So its just the advantage of having a lot of really bright people in the community that otherwise wouldn't be in this community. That's of critical importance. You can't put a dollar figure on that, but its extremely important.

An additional argument in favor of the repository is a federal benefits package for the state and the community. A variety of benefits have been noted, including federal funding for education, highways, emergency response facilities, additional site oversight, university research, as well as additional water rights. As one informant stated:

I think the state can get a lot of money from the federal government out of it . . . We can become one of the top . . . We can say to the Federal Government [that] 'if we're going to take all of your nuclear waste, you're going to fund us with billions of dollars into our universities and we're going to have the best universities in the country on nuclear waste' . . . They're going to give us more highway money. We're going to get something out of it in return.

Another informant explained additional federally funded benefits:

You could get additional research money for the universities. You could get more resources for the State to do oversight, if you think that's the right thing . . . You could negotiate for water rights. You could negotiate for anything that we wanted to.

As in the above example, some people see the promise of vast benefits granted in exchange for the YMP. One interviewee referred to yearly funds (Permanent Fund dividends) received by all Alaska residents (derived from the Trans-Alaska Pipeline related oil royalties) as an example, along with the possibility of monies for education and infrastructure. However, two interviewees, one supportive of the YMP, argued that federal benefits will not be forthcoming. The YMP supporter said that the time for negotiation had passed, and the federal government now believes it can place the YMP in Nevada without negotiations. The opponent of the YMP said that the offer of benefits had never been genuine, because no specific offer had ever been made.

The following interviewee comments change the frame of reference from the benefits that might be given to Nevadans to a concern for patriotism, and the benefits the Project would provide to the nation. One person commented that the Yucca Mountain Project, like the Nevada Test Site, was or should be an issue of patriotism.

While most interviewees were interested in the possible advantages of the Project for Nevadans, some focused on the benefits of the Project for the nation. The productive utilization of the Nevada Test Site was also mentioned as a positive effect of the proposed repository. The Test Site was explained to be a unique national resource, with scientific facilities and sufficient area

to undertake large scale experiments. One informant expressed their opinion:

The Nevada Test Site has been very important to our economy in the State of Nevada historically. We see it as a significant national asset. Its a special place, where you can do special things that are not easily done elsewhere in the country. It has been a real national asset. We would like to see it continue to be a national asset to help us solve our problems.

A sense of responsibility to the country and to its needs was also expressed by one informant as a cause to support the repository. The Nevada Test Site and Yucca Mountain were described as unique resources that Nevada possesses could be put to use in the disposal of high level nuclear waste. This informant explained his organization's views.

We think that Nevada might very well have the solution to an important national issue, and if Nevada has the solution to that, we should be cooperative and help solve that problem.

One person disputed this view, saying that while the NTS had contributed to the defense of the nation, Yucca Mountain would benefit an industry. However, while anti-YMP activist groups identified the Project as the project of an industry, it was very unusual for interviewees in general to depict it this way.

The desert environment found at Yucca Mountain has been mentioned by several informants as an ideal setting for the repository. The site's relative isolation, and lack of other productive options have also been noted by informants as reasons that Yucca Mountain is an acceptable location for the repository.

I try to be practical about it. I say, 'Okay, you're going to have atomic waste, it's going to have to be put somewhere.' Well you show me a state that has more desert land. If it can be done safely. That's the practical nature of me. They're certainly not going to put it in New York, in the middle of where there is no waste land, or desert land.

An informant summarized many of these arguments in his discussion of the Nevada Test Site. In the informant's opinion, the Test Site's location, environment, and history of nuclear activity all lend the area to continued use.

We have a very unique asset. We have a very arid environment, we have lots of land that is unpopulated, will remain unpopulated. Not going to put up a hotel at the Nevada Test Site. Its always going to remain in the government domain. They probably will not do a big clean up at the Nevada Test Site. I don't think its really feasible, economically, technically to do a clean up at the Test Site. So what we have is a great asset, the testing ground for our country. They might

want to do things there that are generally unpleasant. A large industrial society is going to do some unpleasant things. It's a lot smarter to do them at one place than all over the place. Especially if you can do it at that one place without affecting the surrounding environment. Outside of that area. Nevada should allow that to happen, in a smart way, protecting the safety of the citizens of Nevada.

3.4.4 Section Summary

As noted at the outset of this section, the focus here is on the ways people think about the Yucca Mountain Project. Only a small portion of the interviewees independently raised the issue of the YMP. Independent mention of an issue is one indication of its salience. Yet when interviewees were asked their opinions of the YMP, a much larger number viewed it as a risk, most often with respect to transportation of waste, but also in terms of health concerns and water contamination. Hazardous incidents were viewed as possible, for some people they were seen as likely, and the consequences serious. Other issues in the County are generally given higher priority in terms of their importance (for example water and crime). However, the YMP is viewed as harder to solve, and the risks rather than the politics of siting are seen as most problematic.

There was a common view that a direct and foreseeable benefit of the YMP would be the creation of jobs. Benefits from federal funds were also mentioned. Some described these funds as purely positive, while in other cases, these were seen as a positive aspect of an otherwise negative program the community would in any case be forced to accept. The amount of these benefits was sometimes described as vast, and as potentially solving many of the community's problems. Yet in several of the same arguments, federal funds were seen as incapable of preventing the risks, especially from transportation. Thus while federal funds (in this view) might remedy more solvable problems, they might not eliminate the hazards of the YMP, even if they were directed towards that purpose.

The Nevada Test Site serves as an example for those on both sides of the debate. Arguments most often heard were that the NTS provides as an example in terms of having no impact on tourism, and that it serves as an example in terms of causing serious health impacts. It does appear that long-term residents (more than recent residents) may distinguish between the dangers of above ground testing and the more benign period of below ground testing. This above/below distinction may re-emerge if there is a decision to temporarily store waste above ground.

There is a division of opinion about whether nuclear hazards are different in kind than chemical hazards. For those who see them as different, the scale and consequences of nuclear incidents are depicted as wider and more devastating. Interviewee comments suggest that this attitude may be partly tied to the original uses of nuclear energy (weaponry), to imagery of mushroom clouds and of contaminated wastelands and because, invisible, it gives no warning of harm.

Wasteland imagery may especially relevant to some economic impacts.

Risks to health and life are widespread concerns, and touch upon issues of family and future generations. While statements about transportation accidents were more often made (by both supporters and opponents of the YMP), the comments about health risks were made with much greater intensity. In some cases these concerns were tied to personal experiences in which a family member or friend had suffered.

A number of the community leaders interviewed were reflective about how the present historical period affects public reception of the YMP issue. People are described as more sensitive to risk concerns of all kinds, the media is seen as having a greater influence, population influx means that many people may not be aware of the YMP or are too consumed with more immediate concerns to care, and risks may be more known than in the past.

The YMP is seen as a divisive and political issue. A number of interviewees appeared relieved when the topic was changed from Yucca Mountain to water shortages. While the community can do something about water (in the view of those interviewed), most believed that the decision about Yucca Mountain would be made elsewhere.

Many people expressed anger at the political process through which Nevada was selected as the sole site studied. There is a fairly widespread view, more directly expressed by some than by others, that the past decisions about Yucca Mountain have been based on political rather than scientific considerations. This has undermined confidence in the legitimacy and influence of the scientific effort, and in the decisions that will be made on siting the YMP.

There are two related arguments made. One is that people are disproportionately concerned with risks, and that this derives from unbalanced media coverage, lack of knowledge, and use of emotion rather than reason. The other argument is that the uncertainty and risks associated with the Project are high, and the level of current scientific knowledge is low, with serious consequences touching lives, families, and the region's well being, and stretching far into the future. These ideas appeal with different force to different people. Yet it is not uncommon to find both arguments made by the same person.

3.5 THE SOCIOCULTURAL CONTEXT OF RISK EXPLANATIONS

This section looks at the relationship between Yucca Mountain Project developments and public response to those events.

3.5.1 The Relevance of Sociocultural Context for Explanations of Risk

'Sociocultural context' includes a region's economy, values, history, and population. The idea

proposed here is that the social setting influences the importance given to issues, and the meanings they are believed to have. Clearly, society is not static but rather changes over time, and the meaning and salience of issues changes as well.

This section briefly refers to findings in this report about the influence of the County setting on the YMP issue. A more thorough review of this topic, bringing in data from other reports, is left for later summary documents. Here, we will look at change and development, in organizations and in risk explanations, by first providing a timeline of YMP developments and, second, through more detailed chronicling of select topics during 1994. The interest here is in citizen response to YMP developments.

3.5.2 The Influence of the County Context on Explanations of YMP Risks and Their Effects

A number of variables appear to influence the way the YMP issue is looked upon in Clark County. Rather than repeating previous discussion, the reader is referred to the two previous sections of this report. This paragraph mentions some of the issues included in previous sections. Arguments made about the YMP include the importance of tourism for Clark County, and whether the YMP will hurt tourism. Some suggest that an interest in economic diversity makes the YMP desirable, while others say that gaming's prevalence makes other businesses less likely to locate in Las Vegas, and thus tourism is the economic mainstay and should not be threatened by the YMP. The influx of new residents may mean that some people do not know about the YMP. Las Vegas' twenty-four hour business day, with multiple work shifts, may also mean that people have other more immediate concerns, and (a point raised by an interviewee and not noted elsewhere) that people are not as commonly exposed to the same news broadcasts as people in other cities, which may affect 'risk communication' on all issues. As a rapidly growing area, Clark County has many pressing infrastructure needs which are readily apparent to citizens (examples include schools and roads, along with the less apparent water shortage issue). These currently observable problems may make the future YMP issue a lesser priority. The influence of the nuclear history of Nevada on the YMP issue is discussed in section 3.4.3.

As noted in the Scope of Work FY94, chronicling has three purposes. These are to provide a chronology of YMP developments, specifically a timeline of key YMP events, to describe public response to YMP developments, and to consider how events, local and otherwise, (along with context) influences public response.

3.5.3 Chronicling

This section contains a timeline of YMP events between 1989 and 1994. Discussion of a few cases indicating public response during 1994 follows.

Timeline of Yucca Mountain Project Events, 1989-1994

Table 3-3 Timeline of Yucca Mountain Project Events, 1989-1994				
Year/Month	YM Events Reported in DOE Progress Reports & OCRWM Bulletins	YM Events Reported in Newspapers		Public Response: Resolutions Pro and Con YMP (See Appendix)
		Las Vegas Review Journal	Las Vegas Sun	
1982	Nuclear Waste Policy Act			
1985				1/85 Clark County Commission passes a resolution against siting nuclear waste repository at Yucca Mountain. Resolution mentions possible transport through L.V. Valley, area with many residents and tourists, and economic and physical risk posed to residents and visitors. And mentions previous contributions of Nevada to U.S. nuclear program.
1987	Amendment to the Nuclear Waste Policy Act			
1988				Nevada State Parent Teacher Association adopts resolution opposing the YMP.

				Resolution mentions extreme hazards to citizens, potential danger for children and future generations, and unfair site selection.
1989 December		<u>12/27</u> - NV files lawsuit against Energy Secretary James Watkins stating it is unconstitutional to consider YM for waste storage because of two resolutions passed into law in 1989 by NV Governor that forbid storage of high-level nuclear waste in the state.		
1990 January	J. W. Bartlett nominated as OCRWM director. DOE files lawsuit against NV, claiming that NV obstructs Studies	<u>01/25</u> - DOE files lawsuit against NV asking that U.S. District Court declare "inoperable" those laws passed by the NV Legislature in 1989 forbidding the storage of high-level	DOE sues Nevada.	

	<p>by refusing to act on permit applications. New YMP information office to be opened Feb. NV filed suit against DOE in Dec '89</p>	<p>nuclear waste in the state. Lawsuit also asks that NV be required to act on the DOE's permit applications w/in 30 days.</p>		
<p>1990 February</p>	<p><u>3/22</u> Nuclear Waste Technical Review Board released first report to Congress and Secretary of Energy. Statement of FY91 OCRWM budget request</p>	<p><u>02/17</u> - DOE opens YM information office in Las Vegas, situated next to the YMCA and across from Meadows Mall.</p> <p><u>02/21</u> - John W. Barlett is appointed to head the DOE's OCRWM. Not confirmed until 04/05/90 due to procedural hold placed on confirmation process by NV Sens. Reid & Bryan.</p>		

1990 April	Bartlett confirmed as Director of OCRWM. YMP update meetings held. 1st in Fallon, with 175 attending, 2nd in Nye Cty with 20 attending, 3rd in L.V. 100 present		04/05 - John Barlett finally confirmed as head of OCRWM after NV Sens. Reid & Bryan lift the hold they placed on the confirmation process.	
1990 May	April/May DOE issues interim report on national energy strategy, includes statement of social/political obstacles, technical obstacles, and options		05/22 - Clark Co. School Board approves a resolution against YMP. Resolution prepared by Citizen's Alert.	.
1990 June	DOE petitions NRC for a rulemaking to establish accident dose			6/12/90 Clark County School District Board of Trustees adopts resolution opposing YMP. States that project may cause extreme hazards, and mentions transportation risk, that none of wastes are

	criteria			from NV, that complex technology is fallible, that local politicians oppose YMP, and that it is a threat to children and future generations.
1990 July	DOE announces proposed reorganization of OCRWM. Change would mean Yucca Mountain Project (YMP) Office Director reports directly to head of OCRWM.	<u>07/11</u> - DOE reorganizes itself so Carl Gertz, YMP Office Director, can report directly to head of OCRWM, thereby giving Gertz greater responsibility.		
1990 September	<u>09/19</u> - Ninth Circuit Court of Appeals rules in favor of DOE in lawsuit brought by Nevada. Court effectively denied that site characterization studies were unconstitutional as Nevada had claimed.			

1990 November	Project update meetings held in Hawthorne, Amargosa Valley, Henderson			
1990 December	Summary of DOE progress report on YM studies NW Tech. Review Board issues 2nd report to Congress and DOE DOE issues progress report to NRC and NV governor and legislators	One-time advisor to NV Governor Miller, Kent Oram agrees to plan and execute advertising campaign for the nuclear industry aimed at persuading Nevadans to keep an open mind about siting a repository at YM.		
1991 February	OCRWM FY92 budget request DOE ready to begin work at YM	<u>02/07</u> - YMP Director, Gertz says project finally ready to proceed after gathering equipment, 800 scientists, and 600 support personnel.		<u>2/19/91</u> Clark County Commission adopts resolution opposing national energy policy that would eliminate State enforcement of environmental laws, and thereby limit NV's oversight of DOE's YM activities.

		Milestone empty however as permits needed by state to actually begin site studies have not been issued.		
1991 April	<p>Status of litigation between DOE and NV</p> <p>Public tours of the YM site held</p> <p>Announcement of financial grants to NV and to Lincoln, Clark County for oversight of YM studies</p>	<p><u>04/18</u> - GAO announces that the DOE had spent \$48 million on questionable research at YM.</p>	<p><u>04/18</u> - GAO tells Senate committee that \$97 million worth of YMP studies may be useless because samples were unlabeled and therefore probably could not be used before the Nuclear Regulatory Commission.</p>	
1991 May	<p><u>05/20</u> - Eureka, Esmeralda, & White Pine Counties, NV, as well as Inyo County, CA are granted AULG</p>	<p><u>05/13</u> - A federal judge in LV sets 7/17 deadline for NV to decide whether to issue two environmental permits needed by</p>	<p><u>5/20</u> - Supreme Court rules against NV by letting stand a rulings by lower courts that NV had no legal right</p>	

	status.	DOE to begin site studies at YM.	to challenge the BLM's decision to allow DOE YM access.	
1991 June	06/12 - Air quality permit needed by DOE to conduct studies is granted by Nevada.	06/11 - Senate panel approves an additional \$5 million for NV to continue its own studies of YM. 06/13 - NV Environmental Protection Division issues air quality permit to DOE.		
1991 July	07/08 - New field activities initiated at YM including trenching and excavating following granting of air quality permit. 07/17 - Underground injection control		07/08 - DOE breaks ground at the YM site for the first time since 1986. Ground breaking made possible by the air quality permit granted by state on June 12.	

	permit issued to DOE by Nevada			
1991 August	<u>08/02</u> - Mineral County granted AULG status.	<p><u>08/21</u> - Las Vegas City Council passes a resolution opposing location a repository at YM for the third time.</p> <p><u>08/28</u> - DOE official announces that budget cuts will force them to scale back plans to study YM and could delay the projected licensing date for the repository. YMP personnel lay offs will probably also occur.</p>		<p>Las Vegas City Council, passes resolution against YMP</p> <p><u>8/28/91</u> Nevada State Medical Association adopts resolution opposing the YMP; resolution taken to the AMA. Mentions unsuitability of site, length of storage, political rather than scientific site selection, health, safety, and environmental impacts, including long term and unforeseeable consequences to the health of Americans.</p>
1991 September	<u>09/12</u> - Churchill County granted AULG status.			<p>Nevada Resort Association passes resolution against YMP.</p> <p><u>9/23/91</u> City of Sparks passes resolution opposing YMP, cites transportation, physical and economic risk for visitors and residents.</p>

<p>1991 October</p>				<p>Southern Nevada Homebuilders Assn. adopts resolution supporting YMP. RJ newspaper notes Assn. interest in construction industry jobs, possible federal help with water shortage in NV.</p> <p><u>10/14/91</u> City of Sparks passes resolution opposing federal policy that would limit state oversight of YMP..</p>
<p>1991 November</p>	<p>4th report by Nuclear Waste Technical Review Board</p> <p>Revision of plan for exploratory studies facility outlined</p>	<p><u>11/14</u> - Nuclear industry's confidential advertising campaign plan outlining the way to convince Nevadans to support the repository is leaked to the press. Document called "The Nevada Initiative".</p> <p><u>11/19</u> - Clark Co.'s Capitol Hill lobbyist, Ed Allison, resigns. Allison helped write Nevada Initiative for ANEC.</p> <p><u>11/28</u> - Senior DOE</p>	<p><u>11/13</u> - Safe Energy Communications Council (SECC) leaks "The Nevada Initiative" to the press. This document outlines a three-year, \$8.7 million public relations campaign prepared by local political consultants to ANEC to persuade Nevadans to accept the YM</p>	<p>Nevada Cattleman's Assn. passes resolution supporting YMP, in exchange for benefits of funds, Colorado River water, and land. Current status of resolution unclear.</p> <p><u>11/24/91</u> Las Vegas Sun announces opposition to YMP.</p>

		geologist, Jerry Szymanski, says he intends to resign from the YMP because of "scientific fraud" occurring in site studies.	repository.	
1992 January		The Nevada chapter of the Associated Builders and Contractors go on record in support of a scientific study at YM.		
1992 February	02/29 - DOE opens new YM information center in Pahrump, NV. Two other YM info. offices are already open in Las Vegas and Beatty, NV			1992 Paradise Democratic Club passes resolution against YMP. Resolution mentions politics rather than science in choice of NV as site, harm to economy, and risk to health and safety of visitors, residents, and children.
1992 March	03/02 - Nevada state engineer grants DOE water permit, the			

	<p>last of three permits the DOE requires for site studies</p> <p>Cooperative agreement signed with League of Women Voters Education Fund for update of Nuclear Waste Primer</p>			
<p>1992 April</p>	<p>National Research Council report disputes view of former DOE senior geologist, Jerry Szymanski, regarding changes in level of water table and potential groundwater contamination.</p>	<p><u>04/22</u> - Earthquake measuring 6.1 on the Richter scale causes fluctuations in ground water levels at YM.</p>	<p><u>04/22</u> - An earthquake measuring 6.1 on the Richter scale occurs near Desert Hot Springs, CA resulting in a 1.6 ft. rise in YM's groundwater.</p> <p><u>04/25</u> - An earthquake measuring 7.1 on the Richter scale occurs in Eureka,</p>	

			CA resulting in a 1.7 ft. rise in the ground water at YM.	
1992 May	Unsaturated zone drilling program commenced.	<u>05/21</u> - The U.S. House of Reps. approves an amendment to the energy bill that would rend Nevada of its authority to issue permits for repository studies at YM.		
1992 June	<u>summer/fall</u> 5.6 magnitude earthquake at Little Skull Mountain, 12.5 mi S.E. of YM. scientists report: - this the largest quake in vicinity in decades - tunnels relatively unaffected - water level fluctuations	<u>06/29</u> - A 5.6 magnitude earthquake occurs 20 miles S.E. of YM. Windows knocked out, walls cracked, etc. Site manager estimates damage in "tens of thousands" of dollars.	<u>06/29</u> - An earthquake measuring 5.6 on the Richter scale occurs in So. CA approx. 20 miles from the YM site. Total damage to four site buildings is estimated at one million dollars.	

	<p>minimal - so far no evidence of surface faulting - the major damage was at Field Operations Center, \$1 million to building</p> <p>Earthquake was well within seismic design parameters of 6.5 magnitude.</p>			
1992 July		<p><u>7/23</u> - Senate Appropriations Committee restores funding to study YM as potential repository site despite Nevada Sen. Reid's efforts to keep funding at reduced level .</p>		
1992 August/	<p>As part of DOE's public outreach program a</p>			<p><u>8/27/92</u> Big Pine Band of Paiute/Shoshone Indians adopts resolution against YMP. Resolution mentions safety,</p>

September	spent-fuel shipping cask was displayed on 22 occasions in the Las Vegas area.			and Shoshone land rights.
1992 October	Funding approved for YM studies			
1992 November	Lake Barrett named temporary Acting Director of the OCRWM. <u>11/30</u> - Site preparation work begins for the pad construction of the Exploratory Studies Facility (ESF).			
1993 January			<u>01/14</u> - It is reported that the head of OCRWM, John W. Bartlett, had resigned and was replaced by	

			Lake Barrett, a long-time DOE employee.	
1993 April	04/02 - Excavation work begins at Exile Hill on a starter tunnel for the planned underground ESF.	04/03 - Energy Secretary Hazel O'Leary announces that an internal review of the YMP has begun.		
1993 May		05/25 - GAO releases a report based on a year-long study of the YMP concluding that the DOE needs to review its YMP funding priorities.		
1993 June		06/16 - Energy Secretary O'Leary agrees to an independent review of the YMP. NV Governor Miller's office will be involved in the process of selecting organization to	06/14 - NV Rep. Vucanovich persuades House appropriations energy and water subcommittee to add an additional \$1.5 million to energy bill to help fund state and	

		conduct review.	local governments oversight studies of the YMP.	
1993 November	11/15 - Robert M. Nelson, Jr. appointed Acting Project Manager for the YM Site Characterization Office.			
1994 March	Tunnel Boring Machine arrives at YM. Will be used to bore a minimum of five miles of tunnels to utilize for underground lab. Water pockets found below YM, above water table.			

Chronicle and Discussion of Select Topics, 1994

Chronicling includes the use of a number of research methods, such as attention to risk communication data, information on risk perception and the escalation or de-escalation of issue salience, a record of relevant events, and consideration of public responses to events. A variety of approaches can be taken to construct a chronicle of YMP events and public response. The means used here is the case study approach, because it allows the complexities of developments to be recorded.

Five brief cases are presented here. One concerns the formation of new organizations, another considers how the recent election may affect conflict between organizations, the third presents a very small-scale example of the impact of risk communication, the fourth looks at the emergence of risk explanations, and the fifth considers a case of group formation in response to a perceived chemical hazard.

Case 1: 1994 has seen the multiplication of new organizations with an interest in YMP issues, and divisions in others. Further, a few national and statewide organizations may increase their focus in Clark County. The organizational context of the County changes with the addition (or loss) of groups. These developments have been prompted by at least four circumstances. (1) A particular historical circumstance: 1995 is the fiftieth anniversary of the nuclear age, and there is some interest in marking this anniversary. Some national and statewide groups may be more active in Clark County. (2) The evolution and division of groups: Divisions within groups, and perception of new issues and methods (for example an interest in focusing on electoral politics), have caused new groups to form. The outcome of this process for the strength of these groups is yet unclear. (3) Technological change: A new technology, the Multi Purpose Canister, has prompted a group to form around an economic interest. The group seeks to have Canister plants located in Clark County. (4) A new regulatory and legislative context: The possibility that Congress might pass legislation allowing placement of an MRS in Nevada has groups ready to respond. Concern among some that this might happen was increased by the 1994 election.

The formation of new organizations points out that the social structure of interest groups is not static, and is a variable that might be tracked. This is especially true since there are significant divisions within many existing organizations over the YMP.

Case 2: A second observation has to do with the impact of the recent election on potential conflict between elements of pro-YMP labor and the anti-YMP organization, Citizen Alert. One irony of the election may be that outright conflict between the two groups may be less likely, and cooperation more likely, because the alliances that could win back political power require that divisions be muted. This possibility was suggested by interviews conducted after the election. One person noted that when he had worked

with a member of the opposing group on a political campaign, the candidate had won. This points out that related and unrelated events can bring about shifts in organizational relationships that can, in turn, affect public response to the Yucca Mountain issue.

Case 3: The emergence of new risk explanations, (or change in their prevalence or salience), appeared in responses to earthquakes in Nevada and California. These explanations addressed the concerns that might arise about the YMP after an earthquake. The OCRWM Bulletin published after the magnitude 5.6 earthquake (centered in Little Skull Mountain) in 1992 noted that repository design would take into account the possibility of earthquakes, and that current design parameters (which could be adjusted if research findings dictated) would support a 6.5 magnitude earthquake on a nearby fault. During one interview, an individual offered the information that people working underground during a quake felt nothing, and did not know an earthquake had occurred. A member of another organization also said that earthquakes would not disqualify the site. Thus the argument, carried out among members of the public as well as scientists, is about defining the levels of existing risk. A State of Nevada survey conducted both before and after the earthquake, noted that public risk perception had increased, and become more salient, after the quake.

Case 4: This very small-scale case briefly describes the way a specific kind of risk communication, namely rumor, can affect individual behavior and response in the economic sphere. Rumor may be an especially powerful kind of risk communication. During one of the interviews used to test the first interview protocol, the interviewee mentioned that she had recently decided not to buy land in an area near the NTS. A friend (a nurse) told her that medical facilities in the area were treating some strange conditions among those living in that area, and she suspected that people might have been exposed to an unidentified toxic substance. The interviewee expressed a suspicion that water contamination might be to blame. She did not trust that if the matter were taken to authorities or the water taken to a local laboratory, it would be genuinely investigated. Another researcher found this same issue, water contamination near NTS, arising in a conversation with another Clark County resident. An ethnographer with long experience on YMP studies observed that this is one of a number of colorful rumors surrounding the NTS and the Air Force bases. Yet such rumors have the power to motivate behavior, including economic behavior. And this rumor suggests that there is some existing sensitivity among members of the public on the issue of toxic exposures and government facilities. When rumors become credible to a broader number of people, they can also have an impact on the community. Tracking of rumors might be one way to identify public concerns.

Case 5: Another case looks at group formation and disintegration around a series of toxic incidents. It suggests possible parallels to public reaction to the YMP issue. This case is described through a long quotation by a single interviewee, though other people mentioned the same incident. (Two lines of this quotation appeared in an earlier

section).

This case reveals a couple of different points. Like an example presented in the earlier discussion of social structure, this case shows how social and economic divisions among Las Vegans, with some tied to the NTS or YMP, affects the outcome of organizational action. Second, the interviewee is making a point about the 'risk explanations' surrounding nuclear issues, namely that nuclear hazards are surrounded by much more fear than chemical hazards. (In contrast, an interviewee who had personally suffered damage to his home from the PEPCON explosion, said it was more serious than the YMP). Additional interviewee comments on this case, from a real estate organization and a senior citizens' group, were analyzed in the Behavioral Pilot Study (Deliverable 94-7). This interviewee discusses how a group of local citizens formed an organization after an explosion at a chemical plant (PEPCON), but when a second incident occurred at another plant, the group was deeply divided about how to respond, and broke apart. When a third potential incident appeared, some of the citizens who had been part of the organization worked together in a temporary group to prevent the use of the plant for an industry they considered dangerous.

... I mean there are people that are just livid about the whole idea of the dump, and I have yet, in the years of organizing around these issues, found anybody that's that livid about BMI. In fact when the group did get started around the whole thing at PEPCON, and then the Pioneer Chlor-Alkali leak happened, that group got completely confused. Because they had people in their group who were essentially promoting diametrically opposed solutions to what had happened. And it tore the group apart. Group called CARE -- Citizens Aware of Respecting the . . . Citizens Active of Respecting the Environment or something. It lasted for about 2-3 years. But it was funny because -- I guess two years basically, I mean it got started because of PEPCON and the explosion and it was mainly more affluent homeowners in the Green Valley part of Henderson, less than the working class folks over in the older section of Henderson, but it had some of both. At any rate, what happened was, the Pioneer Chlor-Alkali they worked real hard on a policy, they got most of it passed in Carson City, they did a good job of lobbying on it [the name..?] Pioneer Chlor Alkali, that's a plant over there, and there was a leak there, there was a chlorine leak, very large chlorine leak about two years ago, you must not have been here, you couldn't have missed it if you were. These were two rather astounding events in Las Vegas Valley history, one was in 1988, and the other was in -- must have been in '92, no maybe in '91. I'm not sure exactly when the chlorine leak was but I remember the explosion real well cause I was working in a place where the windows bowed in and out when it happened, and then there was a cloud of smoke on that side of valley that you could see from anywhere in the valley.

Basically the explosion had been about a one kiloton impact in terms of its explosive force. And that was at a plant that produced rocket fuel. [the PEPCON] The PEPCON explosion. Well a group got started out, and they were fairly successful at getting something passed in the '91, must have been the '91 legislature -- so the Chlor Alkali leak must have happened either in late '91 or early '92. But this was another one you couldn't miss if you were in the valley at the time cause if you were on that side town, where you couldn't really see the green cloud, you could smell it. I was over on the west side of the valley, and I could smell the chlorine that morning. And it did look yellowish off on that end, but once you got to the center, you could see there was a cloud of green over Henderson.

But what happened was this group completely split on it. They had their lead spokesperson came out saying the way to respond to things like this was to provide gas masks (laughs) to all students in the valley. But the majority of people that worked on this bill, and the whole intention behind the bill that they passed in '91 legislature was to provide incentives to move that industry out of the valley and up to Apex. And that hasn't happened yet. They've avoided doing that. [so the plant's still there?] Plant's still there, and [even after..] Yeah, exactly, cause the group just completely tore itself apart -- that's what I mean, the comparison I was trying to draw was that there are people who are lividly opposed to Yucca Mountain, they know exactly where they stand, they're diametrically -- and the people who were opposed to those plants being there were so confused about these things, when they had a leak, which should have been the death knell for that whole thing, should have been the end of it, it tore the group apart instead of ending the plants out there. It was crazy. [how do you account for that] Well part of it was because I think some of the people who were involved in the group really had ulterior motives (laughs), but [like..] Well, some of them were pro-dump businessmen, who had gotten involved cause they lived in Green Valley and there's a fair amount of people who live in Green Valley who work for the Yucca Mountain Project. I mean those homes were built over the years when these people were moving into town. I think some of those people were scared of this group, so they got involved in it thinking that they would moderate it somehow. And I think that what happened, is when they had this sudden emergency, those folks stood up and said -- 'well we can't advocate for the moving just because of this' -- and that was part of driving the whole group apart and driving a big wedge in the group in terms of this. It was very strange. But it was really berserk in the press, I mean they're being quoted as one guy saying they should buy gas masks for all the children and other people saying they should move all the plants

out of the valley. But that group has since disappeared completely. I don't think . . . [have they formed two separate groups or] no, no, [defunct?] yeah I think they're just defunct. So. [and were some of them involved in the Yucca Mountain issue and some of them not, or] Exactly. Some of them are Yucca Mountain employees, yeah. [what about on the other side] they were just local residents. Although some of them, I think, were active last summer - two summers ago, when we defeated a plutonium burning proposal for Lockheed labs in that part of town. We had some people show up who I think had been involved with CARE. It was much more ad hoc group, it was just concerned citizens, it never did develop into any sort of permanent group, but it did a lot of work over course of about 4 and a half to 5 months, canvassing neighborhoods, putting up flyers and leafletting and grocery stores, and ended up defeating this proposed plutonium burner, the lab south of the airport.

[the group had originally formed] after the PEPCON explosion. [I see, so it formed after the PEPCON explosion, and then in response to this new thing] It tore itself apart (laugh). It was very weird. . . . [so in same area had three things - PEPCON, then Chlor Alkali, then the third thing was Lockheed] Yeah, that was further to the west. But I think what happened is, when you got over to some of those neighborhoods, if you look just south of the airport, the lab is just literally south of the airport . . . Lockheed lab is right about there. So when you look at the neighborhoods over to the right of that, those are those same neighborhoods where CARE was based, some of those folks got involved in the plutonium burner stuff.

3.5.4 Section Summary

A number of observations could be made about the chronicle. Much of public response to the YMP during 1994 was not tied to specific developments in the Project. There are occasions when an organization makes a public response to an event, but they sometimes choose the most advantageous occasions to make their response. In an example mentioned in the Chapter 5 (the Behavioral Report, originally submitted as Deliverable 94-10), an organization protested the YMP through symbolic action at a American Nuclear Energy Council convention. In another case, the Medical Association chose a medical convention with national media coverage to address its position on the YMP.

In the cases presented above, a variety of public responses can be seen. These responses include organizational change, such as the formation of new groups, changes in group relations and levels of intergroup conflict, and group fragmentation. They also include the development

of new risk explanations or rhetoric, economic decision making, and risk communication.

In the cases described, public risk perception and public response are affected not only by developments in the Project itself, but also by the wider community issues. These include political elections, economic ties of community members, and issues of existing sensitivities about toxic exposures (both case four and case five). These and other factors are significant in configuring and amplifying public risk perception, and contributing to social impacts.

3.6 SUMMARY AND DISCUSSION

This chapter has covered three general topics. The first is the social structure of Clark County interest groups, and the social forces surrounding the YMP. The second topic is 'risk explanations', that is the way people think about the YMP. The third topic concerns public response to YMP events and technological hazards. This section briefly reviews findings and addresses some questions raised by this material.

In broad outlines, two of the major Clark County business sectors are construction and gaming. The construction sector has ties to the construction unions, and these two interest groups have a history of working together on large federal projects in Nevada, as well as other development projects. The gaming industry is one of the largest employers in Clark County, and has somewhat mixed relations with the large service unions. Both gaming and construction sectors serve together on local economic boards, and their interests sometimes overlap, but otherwise they do not appear to be especially close.

While both the construction and gaming sectors work closely with local government, it is generally believed that gaming is the economic force that fuels the community, and that it has especially close ties with state and local government. In contrast to the construction sector, gaming has little contact with federal projects. The construction unions favor the YMP (a federal project), and some support has been given them by the construction business sector. The gaming industry is believed to have a degree of opposition to the YMP, as are some service unions, and more forceful opposition comes from state and local government.

Another dimension of social contrast on the YMP issue involves the organization's purpose: While support for the YMP in the construction sector is associated with interest in construction jobs, the concern in the gaming and service sectors is said to involve interest in the vitality of the tourism industry. These two sectors have different economic interests with respect to the YMP. Organizations charged with public welfare may also have an interest in the YMP. Organizations such as local government, the school board, the PTA, and the State Medical Association, have stated their opposition to the YMP. It would be useful to investigate this idea further by interviewing other organizations and unions that are explicitly entrusted with public safety.

Perhaps because the Yucca Mountain issue is so highly charged with politics and divisiveness, it is a topic that some organizations avoid, especially if they have a common purpose they wish to pursue. A number of organizations, including concerned citizen interests and economic boards, noted that they are deeply divided over the YMP. Clearly, a deep division is not the same as neutrality, and division indicates that the issue is highly salient to members with opposing views. While division and neutrality may both prevent the organization from taking a public stand or united action, internal division suggests a degree of fragility in the organizational and the social fabric.

One of the unexpected findings is that some local environmental groups (with the notable exception of the concerned citizen/environmental organization Citizen Alert) are not highly involved in the YM issue. This does not mean that the membership is unconcerned, and members may be interested or active in other ways. However, these organizations (and the majority of concerned citizen groups) currently do not provide a forum for (pro or anti) YMP concern. Environmental organizations may avoid the YMP issue because they view it (as do many interviewees) as 'political'; some environmental groups avoid political issues out of concern about loss of non profit status. Further, there may be no clear consensus about how the YMP fits into an overall environmental perspective. That is, while environmental views on endangered species are widely shared, opinions about a high level nuclear waste repository are less defined among environmentalists.

While most organizations have not taken a public stand on the YMP, we can see that there is public concern about the YMP by noting the findings in Chapter 4. These survey findings (based on a random sample of 492 Clark County residents) show that most respondents consider the YMP 'very serious' (76% rate both transportation and storage of nuclear waste 6 or greater on a ten point scale, where 10 is 'very serious'). And when respondents were concerned (the six or greater rating), they were often highly concerned: 53% of the sample rated storage of nuclear waste at the highest rating of '10' ('very serious'), and 55% gave a '10' rating to transportation of waste. In other words, of those who were concerned (rating of 6-10), three quarters of these 375 respondents rated waste transportation and storage at '10'. Other researchers (McClelland, Schulze, and Coursey 1993) have noted a bi-modal distribution in risk perceptions with respect to low probability, high consequence risks. Some people perceive the risks as high, while others see them as low. McClelland, Schulze, and Hurd (1990) suggest that this contrast in risk perceptions, and attendant actions, contributes to community conflict.

Ethnographic interviews indicate that when people have concern about the YMP, it is often accompanied by considerable intensity, including anger, fear, and distrust. Opposition to the YMP in ethnographic interviews is associated with a perceived threat to those things most valued, such as family, community, life, and legacy, and with serious and unpredictable consequences. Support for the YMP in ethnographic interviews is associated with other powerful issues, such as the need for jobs, and patriotism.

Another question arises: If there is a high level of concern about the YMP in the public at large,

why are organizations relatively uninvolved? One reason is that the issue is not central to their mission and that the Yucca Mountain facility does not currently exist. Another reason (proposed above) is the very divisive nature of the issue, and its definition as 'political'. An additional factor may be that those interviewed have considerable access to power. Whether they are for or against the YMP, they have contact with the decision makers, and their voices are heard. This is not the case with the general population. A sense of control, of access to the 'true' facts, may be an element in risk perception. Trust, in the decision process on siting, in science and technology, and in government, are related to risk perception, as exemplified in the interviews and found in previous studies (see Chapter 2).

Chronicling found a range of public responses to the YMP, and to hazardous technologies with parallels to the YMP. These responses include organizational change, such as the formation of groups, change in group relations and conflict within organizations, and group fragmentation. The emergence of new risk explanations, economic decision making, and risk communication were also evident.

The last case presented in the chronicling section (3.5.3) provides an example of public response to an event that encompasses some of the interest groups, and ideas about risk, discussed in this report. While this is an example of a chemical rather than a nuclear hazard (the PEPCON explosion), it may provide parallels to public response to the Yucca Mountain Project. This case involved a number of interest groups, including real estate brokers, senior citizen organizations, insurance interests, local government, ad hoc citizen groups, activist groups, and YMP employees. They all responded to the event, with consequences and impacts for the community.

The Behavioral Pilot Study (94-7) observed that members of a senior citizen group instituted a lawsuit because of damage to their property. The interviewee in this organization commented that PEPCON was worse than YMP because it had actually occurred, and had caused damages to homes. Ethnographic data suggests that issue salience may be affected by personal experience and the experience of those known to the individual, and the 'closeness to home' of the event or facility. The real estate broker noted a depression in home sales in the area, with problems greater nearest the plant. He also suggested that insurance companies were, for a time, reluctant to provide insurance to the area. There may be an association between issue salience, 'risk explanation' (such as 'close to home'), and economic impacts.

The extended quotation in the chronicling section describes how a citizen group formed in the area near the plant in response to the event. It lobbied and had legislative successes. However, a second hazardous event revealed deep division within the group over response to the incident, and caused the group to break apart. The interviewee suggested that the divisions arose between local citizens employed by the Yucca Mountain Project, and those who were not. Similarly, with respect to the Yucca Mountain question, many interest groups and organizations (like the Teacher Association, and the League of Women Voters) are divided between those who have ties to federal employment, (or, perhaps, have ties to State employment) and those who do

not. Thus one of the social structural and contextual elements that clearly affects public response to the YMP, is the fact that so many Clark County residents have worked as federal employees or contractors. This is another way in which personal experience, or contacts, affects risk perception.

The case also suggests that when an issue is highly salient, people may re-mobilize and find ways of responding. This is exemplified by the third incident, the reaction of some citizens to the possible plutonium burning facility.

This chapter suggests that it would be useful to track group formation and division, as one measure of issue salience and public response. Further, the new 'risk explanations' offered about the YMP (for example by environmental groups, media, and activists on both sides of the issue) will be important to track. And it might also be useful to track risk communication, such as rumors, that reflect sensitivity to risk concerns and may appear in advance of public action. Additional development of cases involving Clark County hazardous incidents might provide information about possible public response to the YMP.

4.0 ANALYSIS OF SOCIOCULTURAL/RISK PERCEPTION SURVEY

Survey methods and other methodologies employed in this study are useful in gathering information about specific risk perceptions, actions, and information sources relating to the proposed Yucca Mountain repository and the salience of repository related concerns in Clark County. Surveys are also helpful in providing data which can be used to track the relationship of changes in risk-perception and community development or changes in the repository program. This chapter presents a preliminary analysis of a sociocultural/risk perception telephone survey implemented as part of the Clark County Nuclear Waste Division's FY94 socioeconomic research. The emphasis in this presentation is summarizing survey findings and a preliminary analysis of results by demographic variables.

The primarily close-ended response telephone survey was administered by Professor Dennis Soden, Ph.D., of the Department of Environmental Studies and the Southwestern Social Science Research Center at the University of Nevada, Las Vegas. A randomly-selected, statistically-valid sample of 492 Clark County residents participated in the survey. Respondents supplied data about the relationship of the Yucca Mountain Project (YMP) to other risk concerns by responding to questions regarding: (1) the relative weighting of risk-related concerns; (2) any actions taken about risk-related concerns; (3) sources and evaluation of information about the YMP; (4) attitude towards and perceived effects of the proposed repository; and (5) personal demography, which was used to evaluate correlations between risk concerns and demographic characteristics of survey respondents.

This population-based survey is the second telephone survey implemented for the Clark County Nuclear Waste Division's Socioeconomic Impact Assessment of the Proposed High-Level Nuclear Waste Repository at Yucca Mountain, Nevada. The first telephone survey, also referred to as the stage-one or Phase I survey, gathered information about how residents think about Clark County as a place to live, and what they believe are the major issues and concerns about their environment and quality of life. This contributed to an understanding of what people perceive to be of value in Clark County, and therefore what is at risk, and it provided some insight into how the proposed repository is perceived relative to other possible concerns in the Clark County socioeconomic context. Stage-one information in addition to ethnographic and other research compiled for this study prior to FY94 was the foundation for the stage-two survey's design. Subsequently, the stage-two, or Phase II, survey serves as a major step in the process of establishing a monitoring tool regarding public attitudes about the Yucca Mountain Project and its effects.

4.1 PURPOSE AND ORGANIZATION OF THE SURVEY CHAPTER

The purpose of this chapter is to present a summary and analysis of the Phase II telephone survey. This survey was implemented to collect monitoring data about public attitudes and actions regarding the Yucca Mountain Projects and its effects on Clark County. The chapter includes a description of the methodological background for survey administration, the survey instrument, sampling methods and procedures, and an analysis of the findings, including frequency distributions of all questions and analysis of the relationship of demographic variables to patterns of responses identified within the data.

The "Analysis of Sociocultural/Risk Perception Survey" chapter is presented in four major sections. Following this overview of the chapter's purpose and organization, a description of the methods, procedures and data source is presented (section 4.2). The third section (4.3) exhibits information on survey findings. The findings section is composed of three components: 1) the demography of respondents, 2) survey findings regarding the evaluation of major issues and concerns, and 3) an analysis of responses by demographic categories. The final section (4.4) provides a brief summary and conclusions.

This chapter is a revision of Deliverable 94-9, submitted to the Clark County Nuclear Waste Division (NWD) January 10, 1995. Incorporated into this chapter, where possible, are responses to NWD review comments.

4.2 METHODS, PROCEDURES, AND DATA SOURCE

The survey described herein is the second telephone survey implemented for this study. Stage one was implemented in May 1993. The results of the stage one survey are presented in the report entitled *Site Characterization Sociocultural/Risk Report* (IAI March 1994). Stage two was completed in early December 1994. A description of the methods, procedures, and data source of the stage two telephone survey is presented in the subsections below. In summary, the activities for this area of work included the following:

- (1) A draft of the survey questions and implementation procedures was constructed by Impact Assessment staff. The draft survey instrument (see Delivery Item 94-3) was based on a review of previous work and a review of the relevant scientific literature.
- (2) The survey instrument was reviewed, revised, and finalized. The draft survey was tested and reviewed internally by IAI staff, and then it was submitted to the NWD, PRC, and survey administrator for additional comments and subsequent revisions. A field test to determine suitability of questions, ease of administration, time of administration, and

any other problem areas of the survey content and structure revealed, among other problems, that it was approximately an hour in length. Given that one goal of the survey was that it be implemented in less than 20 minutes, additional revisions were made to this end. An audit of changes that occurred between the first draft and the final survey protocol can be found at the end of this document in the "Survey Appendix."

- (3) Designing and constructing sampling procedures for the random-sample survey was straight-forward. The random sample of Clark County residents came from a database of phone numbers supplied to the survey administrator every three months by the telephone company for the urban and rural areas of the County.
- (4) The telephone survey was then arranged and conducted by Professor Dennis Soden of Southwestern Associates and the University of Nevada, Las Vegas. The survey was conducted from noon to 7:30 pm, November 30th through December 5th, using seven interviewers.
- (5) The survey administrator processed the data and delivered it to Impact Assessment in a systems file amenable for statistical analysis with SPSS® 6.0 for Windows.
- (6) Demographic data and survey responses were then examined by IAI staff. The results of this analysis is reported in this chapter. The use and layout of tables and charts in the sections below is intended to facilitate cross-referencing and ease of comparison of survey information throughout the chapter. Data are typically presented in the order in which they were collected during survey implementation.

The analysis of responses by demographic categories is presented in section 4.3.3. A description of how demographic categories and responses were grouped for analysis is provided in that section. The scientific methods used to examine the survey responses by demographic characteristics are described immediately below.

When more than one question is used to determine an individual's characteristics, beliefs, or behavior, an important question is whether the set of questions reliably measures the characteristic, belief, or behavior under investigation. In other words, how consistently does an individual answer the same question on different occasions or different questions on the same occasion. One way to assess the reliability of such a set of questions is to determine the level of consistency by which an individual responds to the entire set. In other words, how likely is a person who disagrees with the statement that the Yucca Mountain Project will help the economy of Clark County will also disagree with other statements emphasizing the potential positive benefits and agree with statements emphasizing the potential negative benefits). The

probability that an individual will consistently answer each of these questions in the same manner is measured by a particular type of correlation coefficient known as a Cronbach's alpha. A Cronbach's alpha of 1 would mean that each answer given by an individual to a set of questions is related to every answer given to the remaining questions. A Cronbach's alpha of 0 would mean that there is no relationship between the answer given by an individual to one question and the answer given to the remaining questions. In the case of the Global Yucca Mountain Project perception score, a Cronbach's alpha of .86 suggests that people are generally consistent in the way they answered the individual questions relating to their perceptions of the positive and negative effects of the Yucca Mountain Project.

A Pearson product-moment correlation is also used in the analysis of the survey. This correlation, denoted by "r", is a measure of the association between two variables in the following sense:

- The more positive r is, the more positive the association is. This means that when r is close to 1, an individual with a high value for one variable will likely have a high value for the other, and an individual with a low value for one variable will likely have a low value for the other.
- The more negative r is, the more negative the association; that is, an individual with a high value for one variable will likely have a low value for the other when r is close to -1, and conversely.
- If r is close to 0, there is little, if any, linear association between the two variables.

Regression analysis is a statistical tool for evaluating the relationship of one or more independent variables (e.g., demographic characteristics) to a single, continuous dependent variable (e.g., a global measure of people's perceptions of the Yucca Mountain Project). If there is a linear relationship between two variables, a straight line can be used to summarize the data. When a correlation coefficient is +1 or -1, a straight line passes through all the data points on a graph with an x and y axis. When the observations are less correlated, many different lines can be drawn to represent the data. A regression analysis calculates the slope (angle) and intercept (point at which the line passes through the y axis) of the line that best fits the observed data (i.e., passes through the middle of a cluster of observations). It helps one to determine how much of the variation in a dependent variable (e.g., ratings of seriousness of transportation of nuclear wastes through Clark County) can be accounted for by one or more independent variables (e.g., age, sex, length of residence in Nevada).

Multiple regression analysis can be looked upon as an extension of straight-line regression analysis (which involves only one independent variable) to the situation where there is more than one independent variable to be considered. Such an analysis examines the relationship between the dependent variable and each independent variable while controlling for the effects of the other independent variables in the analysis. A beta is a standardized regression coefficient that describes the association between the dependent variable and a specific

independent variable after controlling for all the other independent variables in the analysis.

Factor analysis is an analytic procedure used to understand conceptually what the data are measuring. It is used to understand exactly what is being measured and, at the same time, to reduce the number of original variables to more basic factors for analysis. In this study, a factor analysis was applied to the responses to the questions relating to perceived positive and negative effects of the Yucca Mountain Project. This analysis involves two steps. The first step is the application of a principal components analysis to explain as much of the total variance in the responses to these questions as possible with as few factors (i.e., principal components) as possible. Because components are often difficult to interpret directly, the axes of the coordinates identified by the principal components analysis are then rotated in order to achieve more interpretability. Using this method, we found that there were three factors that were being measured by the 14 questions in the survey that asked about perceived positive and negative effects of the Yucca Mountain Project: 1) absence of negative consequences, 2) negative consequences, and 3) positive benefits. The factor analysis also indicated that the first factor accounted for the largest percentage of the variation in responses to all 14 questions (39.7%), while the third factor accounted for the smallest percentage (7.7%).

Only statistically significant results are reported in the descriptions of survey analyses in this chapter. Other comparisons may suggest the presence of certain trends; however, the determination as to which trends are meaningful from a policy standpoint and which are not is arbitrarily based on whether they are statistically significant (i.e., the probability of less than 1 in 20 that the trend is the result of chance). Variable associations with a significance level of less than 0.05 (denoted as $p < 0.05$) suggests that it is *unlikely* that the variables are related to one another by chance.

4.2.1 Telephone Survey Administration

Impact Assessment, Inc. designed the stage-two telephone survey under the auspices of the NWD and PRC, and then contracted Southwestern Associates to conduct the survey. The stage-two telephone survey was administered as a means of quickly collecting a relatively large amount of data from County residents for a modest cost in comparison to face-to-face interviews or other data collection strategies. A periodic telephone survey can be employed as a means of monitoring changes in residents' perceptions of risk or measuring public opinions or actions regarding the key issues in the community, including the proposed repository. Survey methodology was intended for use in this study for that purpose; that is, to collect monitoring data about public attitudes and actions regarding the YMP and its effects on Clark County. The *Primary Sociocultural Data Collection Requirements Report* (Delivery Item 94-4, IAI August 1994) and the *Site Characterization Sociocultural/Risk Report* (IAI March 1994) both discuss the advantages and common uses of survey research as a methodology. In addition, for the reader's reference, the *Final Research Design* (IAI January 1991) provides additional discussion of available survey research techniques (pages 126A-B) and other methodologies of data

collection.

Seven interviewers, trained by and experienced as employees of Southwestern Associates, made over 750 first-attempt calls between the hours of noon and 7:30 pm, from the 30th of November through the 5th of December 1994. A total of 492 persons were successfully interviewed. The margin of error for this survey is ± 3.5 at a 95% confidence level.

The time needed to implement the survey ranged from five to 40 minutes; however, approximately 85% of the interviews required between 10 and 20 minutes to for completion. Part of this variance in time is attributed to whether or not respondents answered "yes" when asked if they were willing to answer questions specifically about the Yucca Mountain Project. Willingness to respond to these questions not only lengthened the survey, but also contributed new information to the study. It should be noted, however, that declining to answer this group of questions did not result in a survey wholly without examination of Yucca Mountain topics. Part 1 of the survey was dedicated to gathering information about several issues in Clark County, including storage and transportation aspects of the Yucca Mountain Project. Interviewers investigated the relative seriousness of these issues, what types of actions had been taken about these issues, and the need to take future action about these issues. A copy of the final survey protocol is appended to this document in the "Survey Appendix."

Data collection and entry proceeded manually. The reason for this is twofold: 1) the University's Computer Assisted Telephone Interview system was not properly functioning when the survey was being arranged, and 2) sufficient time and effort went into the development of the survey to allow its administrator to easily gather data directly onto the survey protocol without excessively increasing the amount of time in which the survey was to be processed nor the total cost. Interviewers recorded respondents answers on a pre-printed form which also displayed the interviewers script. Open-ended responses were recorded verbatim and later coded by the survey administrator in consultation with Impact Assessment staff. The survey data was transferred from hard to electronic copy by two professional data-entry personnel. After the survey administrator checked for inconsistencies or errors in the data entry and made corrections where necessary, an SPSS[®] 6.0 for Windows[™] database was delivered to Impact Assessment staff for analyses.

4.2.2 Sampling Procedures

The survey used a random sampling design patterned after J. Waksberg's "Sampling Method for Random Digit Dialing" (1978:40-46), and a database of all Clark County residents' telephone numbers. This database is updated quarterly. Under consultation with the NWD, it was decided that the survey would not use stratified sampling techniques to over-sample for populations with specific ethnic, income, locational, or other demographic characteristics, thus easing the implementation of sampling procedures. The demographic characteristics of the survey sample are described in the "Survey Findings" (Section4.3), below.

A total of 492 interviews were completed by Southwestern Associates' seven interviewers. There was a refusal rate of approximately 34.8%. While this rate may sound high, according to the survey administrator, it is over 15% lower than other recent surveys implemented by UNLV and others. In effort to interview all potential respondents when they were not successfully contacted at first attempt, at least two additional attempts or "call-backs" were made to the randomly-selected household. When callback attempts were unsuccessful, a replacement household was randomly selected within the same telephone exchange prefix, using the same numeric interval that selected the original household's number.

It should be noted that while original plans for this survey estimated that over 600 households would be included in the sample, it was later determined that only about 450 respondents were needed to attain this degree of statistical significance for the County. The higher number of households was based on state-wide survey needs. Marginal returns for increasing the size of the Clark County sample were disproportionate to the increases that could be achieved in statistical significance, and the cost of implementation would rise considerably with a larger sample size.

4.3 SURVEY FINDINGS

The survey was designed to collect information regarding each respondent's personal characteristics (independent variables) and perceptions (dependent variables). These two aspects of the survey are described independently. Respondent demographic characteristics are summarized first followed by findings regarding the evaluation of major issues and concerns. Then, in a third subsection below, these two types of variables are compared in an analysis of responses by demographic categories.

4.3.1 Demography

Demographic variables are useful in investigating public perspectives regarding key issues in Clark County, including the proposed repository. While an infinite amount of detail can be gathered, and indeed found interesting, about respondents' demographic characteristics, the purpose of collecting this information during the stage two survey was to facilitate an analysis of the distribution of responses and the effects of these characteristics on any pattern of responses found in the data. For example, gender has often been a variable helpful in measuring differences in association or perception of risk-related topics.¹ Similarly, in this survey, women were significantly more likely than men to believe the YMP represented a threat to future

¹For example, in three surveys reported on by Flynn et al. respondents who were males rated repository risks as less likely than those who were female. (1990:4) Similarly, Mushkatel et al, stated that, "females are consistently more concerned over the repository than males ..." (1990:78).

generations and less likely than men to believe that YMP was not as risky as the Nevada Test Site. Other comparisons of how respondents agreed with statements regarding the Yucca Mountain Project are presented later in this report (see section 4.3.3). The demographic variables obtained in the survey included gender, ethnicity, length and place of residency, employment, education, marital status, family status, and household income. For descriptive purposes, the demographic characteristics of the 492 survey respondents are summarized in this subsection.

In the tables and figures below, several demographic characteristics of the survey respondents are compared to those of the entire County (as reported in the 1990 Census of Population and Housing). A comparison of the survey sample and the County population reveals that there are both existing similarities and differences between the two; however, the sample supplies us with a degree of reliability. That is, the survey sample, with a margin of error of ± 3.5 at a 95% confidence level, is a helpful source in understanding the risk-related perceptions and actions.

Table 4-1 illustrates several demographic characteristics of survey respondents: age, gender, marital status, and family status. As indicated by this table, these characteristics correspond closely, in proportion, to the 1990 Census figures. The largest proportion, about 41%, of survey respondents were between the ages of 25 and 44; 46% of the 1990 County population was in that age range. The male-female ratio in the survey and the census was almost one-to-one. Over half of the census population and the survey sample are married, although the survey sample of married individuals (60%) is a slightly larger percentage than that of the County (52%). Whether they are married or not, 64% of those surveyed do not have children under 18 living in the household.

**Table 4-1
Age, Gender, Marital Status, and Family Status for the County and Survey**

Demographic Variable		County Total (1990)	% of County Total	Survey Total*	% of Survey Total**
Age	18 to 24	75,680	13.5%	49	10.0%
	25 to 34	254,542	45.5%	112	22.8%
	35 to 44			88	17.9%
	45 to 54	84,077	15.0%	74	15.0%
	55 to 64	67,673	12.9%	74	15.0%
	65 and older	77,678	13.9%	94	19.1%
	Refuse	N/A	N/A	1	0.2%
	TOTAL	559,650	100.0%	492	100.0%
Gender	Male	376,108	50.73%	248	50.4%
	Female	365,351	49.27%	244	49.6%
	TOTAL	741,459	100%	492	100%
Marital Status***	Married	306,638	52.3%	294	59.9%
	Single	144,065	24.6%	67	13.6%
	Living Together	N/A	N/A	8	1.6%
	Separated	15,770	2.7%	8	1.6%
	Divorced	86,753	14.8%	69	14.1%
	Widowed	32,837	5.6%	42	8.6%
	Refuse	N/A	N/A	3	0.6%
	TOTAL	586,063	100.0%	491	100.0%
Family Status	Children in Household	N/A	N/A	173	35.2%

No-Child Household	N/A	N/A	316	64.4%
Refuse	N/A	N/A	9	0.4%
TOTAL	N/A	N/A	491	100.0%

*Missing Values are indicated when survey totals do not add to 492.

**Percent of Survey Total is a valid percent and does not include missing values.

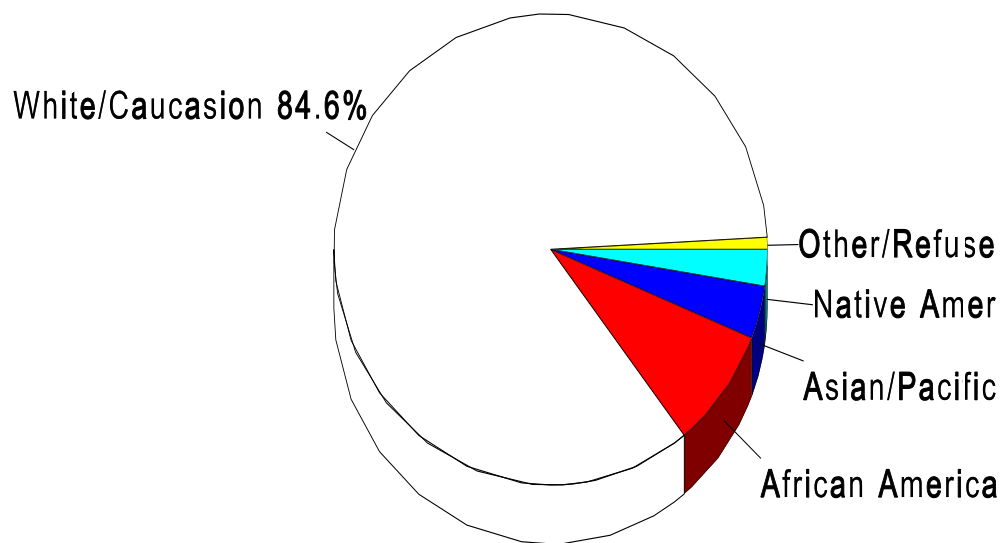
***Married persons for the Census data includes persons 15 and older.

Table 4-2 shows the ethnicity of respondents in the survey sample and the County census. Although the totals presented here are fairly representative of the Clark County's 1990 ethnic populations, the small numbers for minority populations lends difficulty to effective analyses. Caucasian respondents were notably the most numerous in both instances: 81% of the County census population, and 85% of the survey sample. Of the minorities surveyed, African Americans made up the largest proportion, then, in descending order, Asian/Pacific Islanders, Native Americans, and others. While the number of Native Americans surveyed is small (11), it is over double in proportion to the American Indian population listed in the census data. The surveyed Native Americans did not indicate that they were from regional Paiute tribes: three of the eleven American Indians surveyed did not specify their tribal affiliation, five were Cherokee, and one respondent was recorded for the Sioux, Mohawk, and Navajo tribes.

Table 4-2 Ethnicity for the County and Survey				
Ethnicity	County Total (1990)	% County Total	Survey Total	% Survey Total
White/Caucasian	602,658	81.3%	416	84.6%
Asian	26,043	3.5%	18	3.7%
Black/African Am	70,738	9.5%	42	8.5%
Native American	6,416	0.9%	11	2.2%
Other	35,604	4.8%	3	0.6%
Refuse	N/A	N/A	2	0.4%
TOTAL	741,459	100%	492	100%
Hispanic*	82,04	11.2%	48	9.8%

*U.S. Census and the Survey Sample includes all persons who indicated Hispanic origin; this is a component distinct from the categories above and is not included in the TOTAL.

Survey Sample Ethnicity

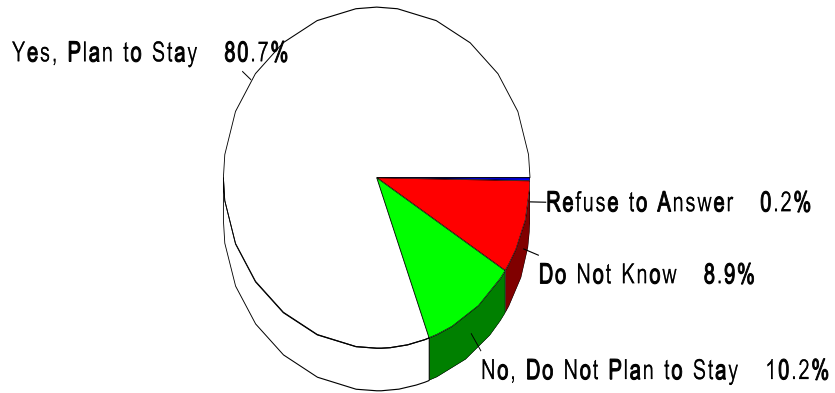


The survey asked questions regarding the respondents length and place of residence. These questions were designed to gather data about respondents' city or town of residence, years of Nevada residency, intention to remain in Nevada, residence zip code, and nearest major intersection. Table 4-3 displays current residency of the survey respondents. The stated location of residency does not correspond well to the census population distribution; however this may be due, in part, to individuals stating that they live in Las Vegas when they are actually residents of the unincorporated county. Investigation of zip code data better reveals where respondents are located and distributed across the Las Vegas Valley. The map entitled "number of respondents by zip code region" does not depict Clark County in its entirety because there were no respondents from areas outside of the Las Vegas Valley.

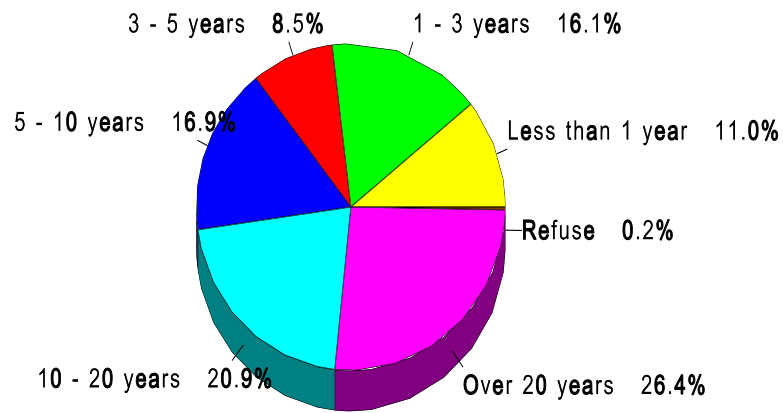
Table 4-3 City or Town of Residence for County and Survey				
City/Town	County Total (1990)	Percent of County Total	Survey Total	Percent of Survey Total
Las Vegas	258,295	34.84%	412	83.7%
North Las Vegas	47,707	6.43%	30	6.1%
Henderson	64,942	8.76%	46	9.3%
Boulder City	12,567	1.69%	4	0.8%
Unincorp. Areas	325,658	43.92%	0	0%
Other	32,290	4.35%	0	0%
Refuse	N/A	N/A	0	0%
TOTAL	741,459	100.00%	492	100%

The pie charts below depict the number of years respondents have lived in Nevada and whether or not respondents plan on remaining in the State. Given the large influx of residents into the Las Vegas Valley in recent years (for a summary of County population growth, please see the *Site Characterization Sociocultural/Risk Report*, dated March 1994) of the Las Vegas region population, it is noteworthy that the survey sample is largely composed of established or long-time residents; that is, residents who have lived here more than five years. The great majority of the respondents also intend to remain living in Nevada.

Respondents' Intention to Stay in NV



Respondents' Number of Years in Nevada



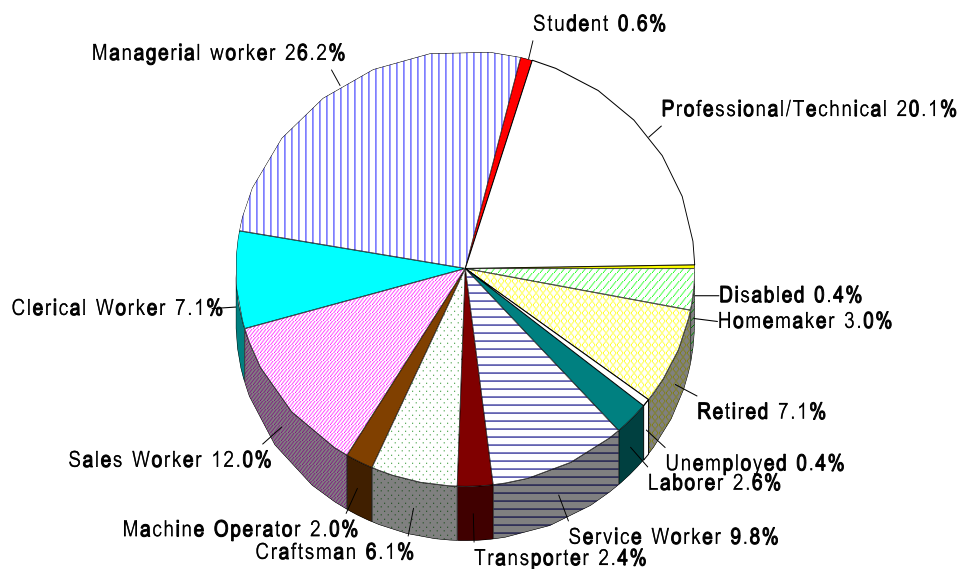
4-4 compares the education level of survey respondents to that of the census population. As shown, the surveyed population varies from the census population at both ends of the educational spectrum. On the whole, survey respondents reported more formal education than the census population. The differences between survey sample and census population education levels are particularly evident in the "less than high school" category, where the percentages are 8.6% and 23.3%, respectively. This difference is compensated for in the categories of "some college" and "associate degree" categories which, together, encompass over 40% of the survey population's educational attainment. High school graduates constitute just less than a third of both the sample and the census population, and individuals with a baccalaureate degree make up 13.3% of the survey sample and 13.7% of the census population. Similarly, the disparity in the upper end of the spectrum, post-graduate area, is not large: a little over one percent.

**Table 4-4
Education Level in County and Survey**

Education	County Total (1990)	Percent of Total	Survey Total	Percent of Total
< high school*	130,529	23.3%	42	8.6%
High school graduate	182,677	32.6%	153	31.2%
Some college	146,972	26.2%	174	35.4%
Associate degree	N/A	N/A	24	4.9%
College degree	76,666	13.7%	66	13.4%
Masters degree			19	3.9%
PhD			6	1.2%
Other post grad. degree	24,011	4.3%	2	0.4%
Refuse	N/A	N/A	5	1.0%
TOTAL	560,855	100%	491**	100%
*For County only, includes categories of less than 9th grade and 9th to 12th grade with no diploma				
** The total reflects one missing value; the percentages are valid for this total.				

The pie chart below depicts the occupations of the survey respondents. The survey sample was diverse in this area. County census data indicates that some of these proportions are not unusual, while other survey categories are almost twice that of the census proportions. Census categories, combined for the purpose of summary, depict 24% of the County population in professional, technical, and managerial work. This same summary category for the survey constitutes almost 46% of the sample. Clerical and sales occupations are 28% of the County census population; 19% for the survey. In services (all services, including gaming) census figures account for only 26% of the population. In the census, 10% of the county population is working in machine trades, and the remaining 12% in other occupations. A pie chart of the industries in which survey respondents are employed is also presented below.

Occupations of Survey Respondents



Industry of Employment for Respondents

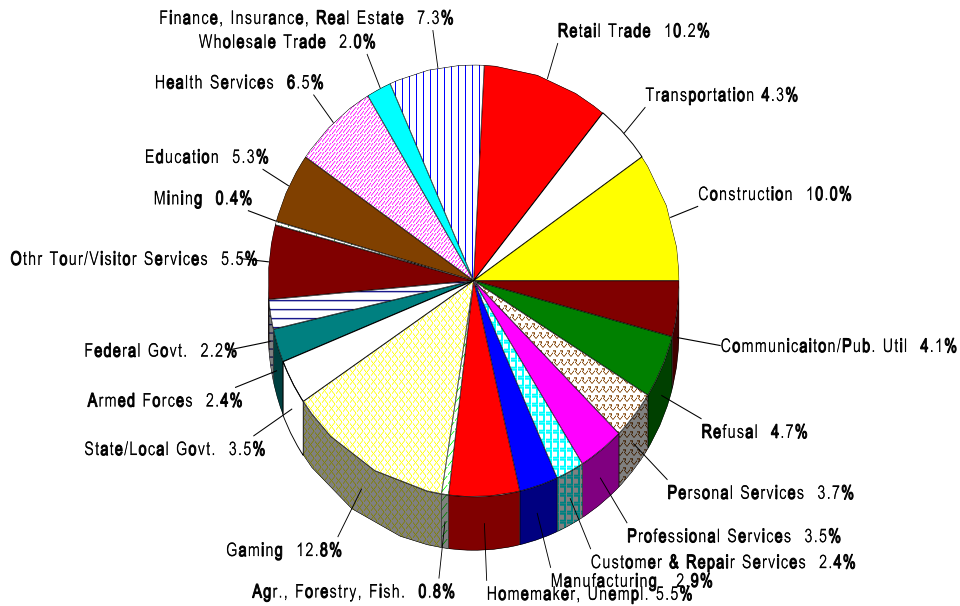
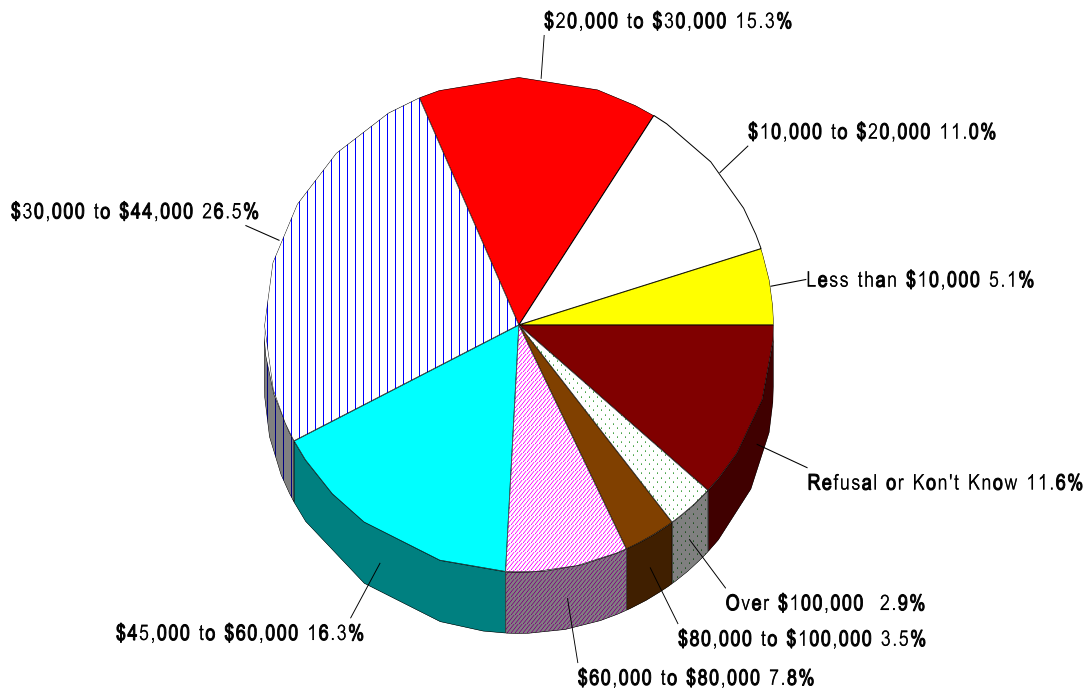


Table 4-5 and the following pie chart presents a breakdown of the level of total family income for survey respondents. Also included in Table 4-5 is the breakdown of County census data by income. The majority -- about 82% -- of persons in the survey sample have family incomes of less than \$60,000, with 16% being less than \$20,000. The greatest single category of family incomes range from \$30,000 to \$44,000 (27%). For the county as a whole, according to the census, the proportion of lower-income families is larger, as is the upper end of the income scale, but the latter is to a lesser degree. For the County, 85% percent of the population indicated incomes of less than \$60,000, and of that, almost 30% made less than \$20,000.

Family Income for Survey Respondents



**Table 4-5
Level of Total Family Income in County and Survey**

Family Income	County Total (1990)	Percent of County Total	Survey Total	Percent of Survey Total
Less than \$10,000	33,802	11.0%	25	5.1%
\$10,000 to \$20,000	51,997	18.1%	54	11.0%
\$20,000 to \$30,000	53,605	18.7%	75	15.3%
\$30,000 to \$44,000	65,918	23.0%	130	26.5%
\$45,000 to \$60,000	38,029	13.3%	80	16.3%
\$60,000 to \$80,000	20,068	7.0%	38	7.8%
\$80,000 to \$100,000	13,500	4.7%	17	3.5%
Over \$100,000	10,765	3.8%	14	2.9%
Refuse/Don't Know	N/A	N/A	57	11.6%
TOTAL	287,025	100%	490*	100%

* The total reflects one missing value; the percentages are valid for this total.

4.3.2 Evaluation of Major Issues and Concerns

Presented in this section is a summary of the findings for each major information category contained in the survey. The frequency of responses by coding categories is presented for each of the data collection topics: issue evaluation, actions and behaviors, and Yucca Mountain information sources and evaluation.

Issue Evaluation

The issues evaluation section of the survey gathered data on the perceived seriousness of major issues and concerns in Clark County, including the YMP. Respondents were asked to scale the following issues by how serious a problem they are (with the scale ranging from one, being not at all serious, to 10, being very serious): quality of schools and education, diversity in the

County economy, transport of nuclear wastes through Clark County, storing high-level radioactive waste at Yucca Mountain, crime, expansion of the gaming industry outside of the Las Vegas Valley, air pollution, job opportunities, traffic congestion, water shortages, and overpopulation. The following eleven charts depict the results of this scaling exercise. Of the issues, crime, the transport of nuclear wastes through the County, and storing radioactive waste at Yucca Mountain were the three most frequent issues ranked as "very serious" by respondents.

Actions and Behaviors

Following the scaling exercise discussed above, respondents were asked about the actions they had taken or their assessment of the need to take action for each issue identified in the "Issue Evaluation" list. The questions regarding actions were directed at those issues which the respondent had considered more serious than not; i.e., those issues scaled in the issues evaluation as a value of six or higher. If no action had been taken by the respondent or a member of his/her household, the question of whether there was a need to take action on the issue in the next five years was asked. To protect against losing important data concerning actions with respect to issues with lower seriousness ratings, a question asking "have you taken any other actions with respect to any of the issues to which you gave a rating of five or less to?" was included at the end of this section. Table 4-6 and the charts which follow it summarize the results of this line of questioning about actions and behaviors.

The survey's inquiry about a respondent's or his/her family's actions upon an issue disclosed data regarding not only the occurrence of an action on an issue, but also what kind of actions had been taken. Table 4-6 displays the frequency and type of actions taken for each issue. This table is not intended to indicate the total number of respondents who took action; rather, because an individual can take more than one action, it indicates the number of actions taken. It is interesting to note that several actions are more common than others. For example, voting in a specific manner, attending meetings, and seeking or supplying information about the issue are generally more common actions than contributing money to an issue. Regarding the two Yucca Mountain issues, the three most frequent actions taken by respondents and their families were reported as voting, contacting federal officials, and information seeking or dissemination.

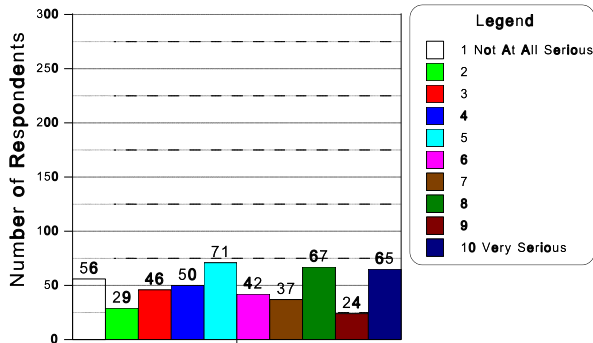
In the pie charts depicting the need to take action on issues, the high number of "don't know/missing" values is associated with the number of respondents who either did not have an opinion on whether action was needed, already had taken an action, or did not consider the issue relatively serious by giving it a scale of 6 or more. These values are listed to give the reader a sense of the proportion of respondents that had an opinion on the need to take action on "serious" issues that had not yet been acted upon.

**Table 4-6
Total Number of Actions Taken by Respondents for Each Issue**

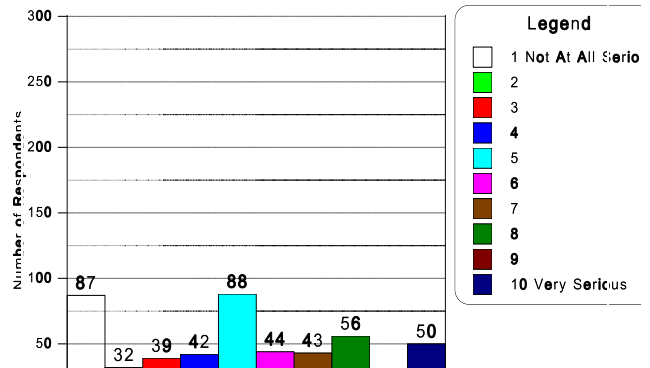
Issue	Behavior												Row Total
	1 Attend meeting	2 Issue has influence vote	3 contacted gvt/don't know who	3.1 contacted public agency	3.2 contacted federal senator	3.3 contacted state rep.	3.4 contacted city/coun ty rep.	4 sought/ given info.	5 contrib/s pent \$ on issue	6 contempl ated moving	7 joined group	8 other actions	
Quality of education	28	70	1	3	7	8	10	13	4	19	7	3	173
Diversity economy	5	15	2	1	1	1	2	3		3	4	3	40
Transport N-wastes	8	31	4	6	16	5	7	12	3	5	3	1	101
Storing nuclear wastes at Yucca Mtn	11	29	4	6	14	7	6	14	2	7	5	3	108
Crime	22	54	7	3	8	4	10	18	5	27	15	5	178
Expansion of gaming	5	5	3	1	1	1	2	5		2	1	2	28
Air pollution	6	14	5	2	5	3	5	8	4	12	4	5	73
Job opportunities	2	8		1	1	1	3	1		6	1	2	26
Traffic congestion	10	16	4	4	3	5	8	7	2	20	3	4	86
Water shortages	7	16	1	6	5	2	4	8	4	5	3	5	66
Overpopulation	5	12	4	1			3	6	2	20	2	2	57
TOTAL	109	270	35	34	61	37	60	95	26	126	48	35	936

Note: some individuals may have indicated more than one action per issue, thus the totals may add to more than the total number of respondents (n = 492).

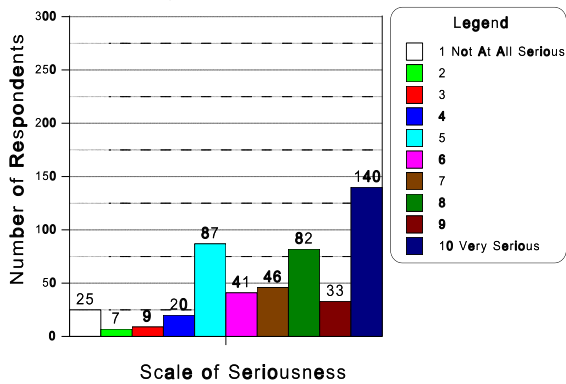
Scale from 1 to 10: How Serious is Job Opportunities



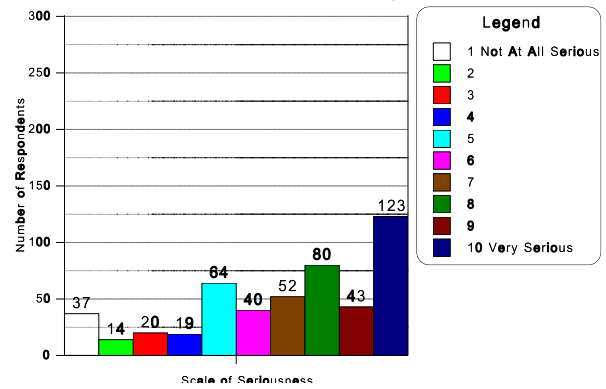
Scale from 1 to 10: How Serious is Expansion of Gaming Outside LV Val



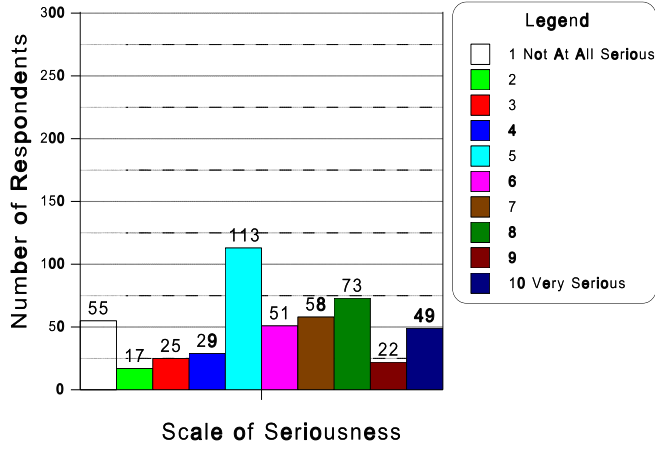
Scale from 1 to 10: How Serious is the Quality of Schools and Education



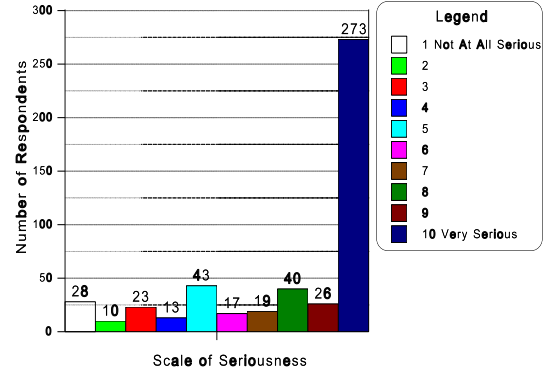
Scale from 1 to 10: How Serious is Water Shortages



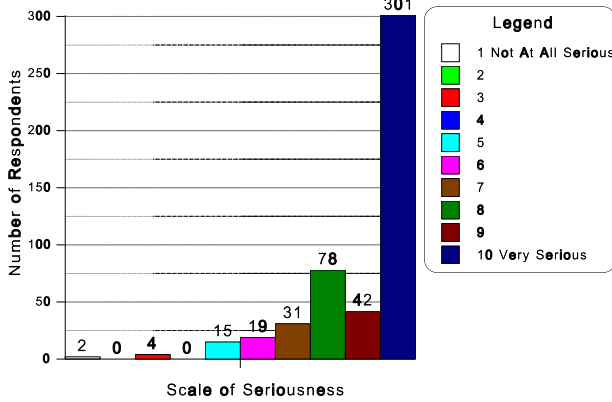
Scale from 1 to 10: How Serious is the Diversity in the County Economy



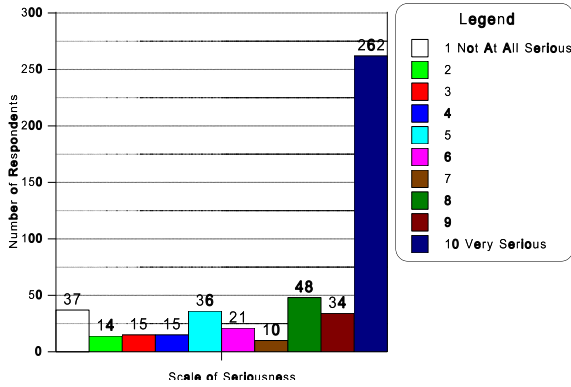
Scale from 1 to 10: How Serious is the Transport of Nuc. Wastes Through County



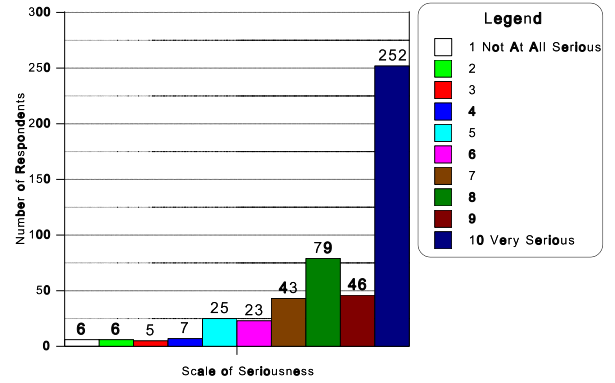
Scale from 1 to 10: How Serious is Crime



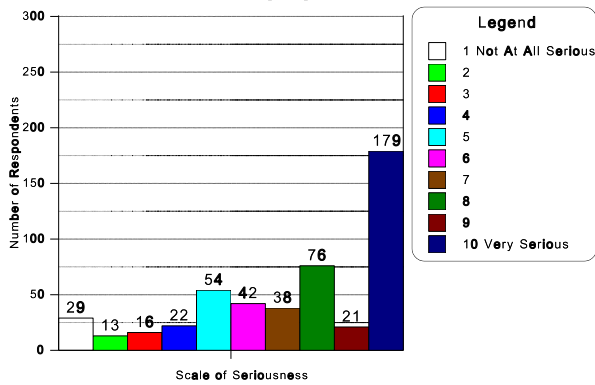
Scale from 1 to 10: How Serious is Storing Radioactive Waste at Yucca Mt.



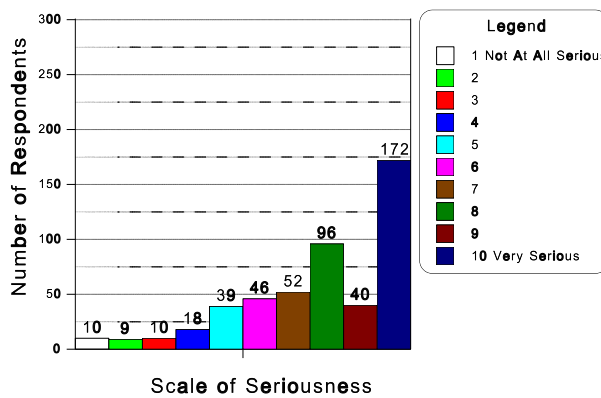
Scale from 1 to 10: How Serious is Traffic Congestion



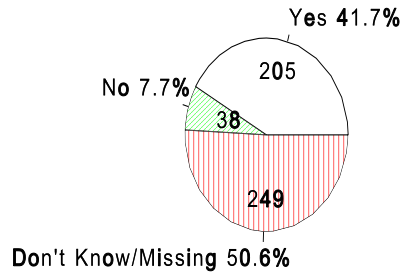
Scale from 1 to 10: How Serious is Overpopulation



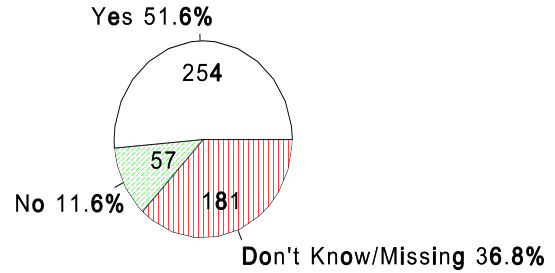
Scale from 1 to 10: How Serious is Air Pollution



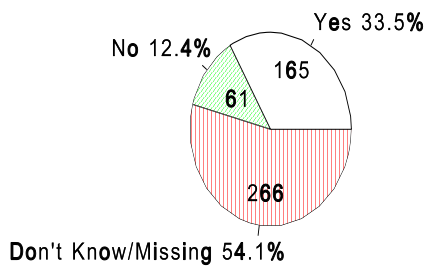
Need to do Something about Quality of Schools and Education in Next 5 Years



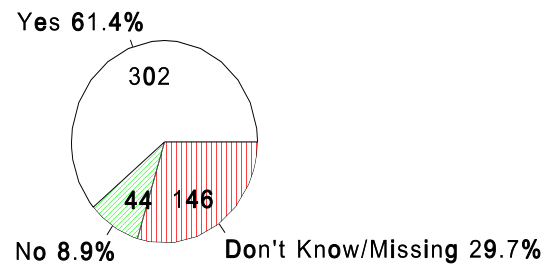
Need to do Something About Overpopulation in the Next 5 Years



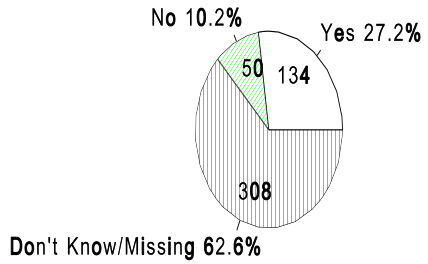
Need to do Something About Diversity In the County Economy in Next 5 Years



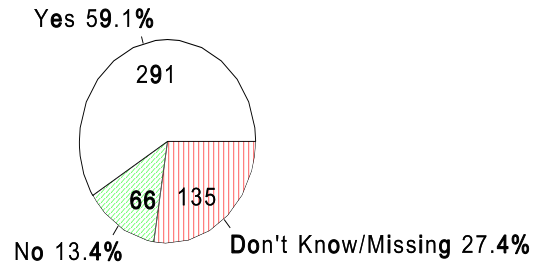
Need to do Something About Crime in the Next 5 Years



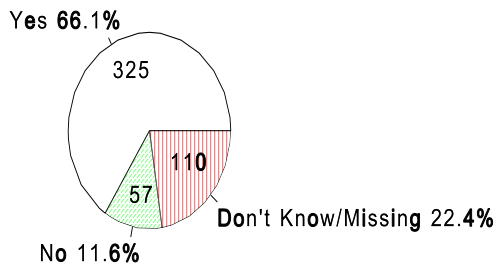
Need to do Something About Expansion of Gaming Outside LV Valley in Next 5 Yrs



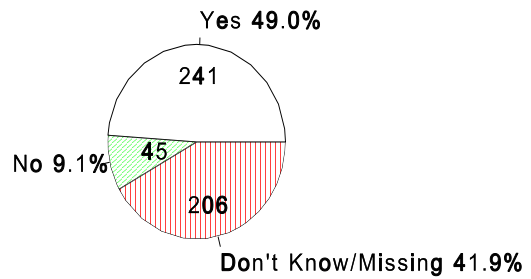
Need to do Something About Air Pollution in the Next 5 Years



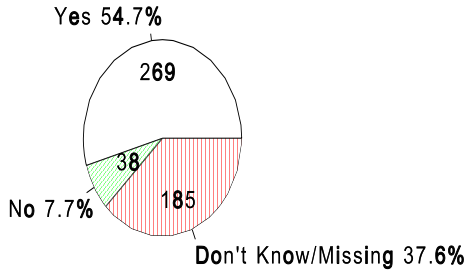
Need to do Something About Traffic Congestion in the Next 5 Years



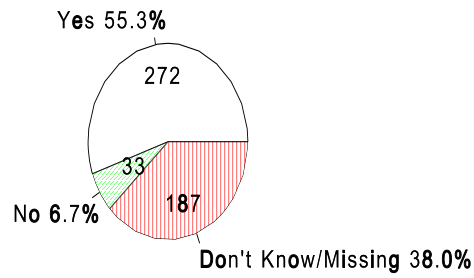
Need to do Something About Water Shortages in the Next 5 Years



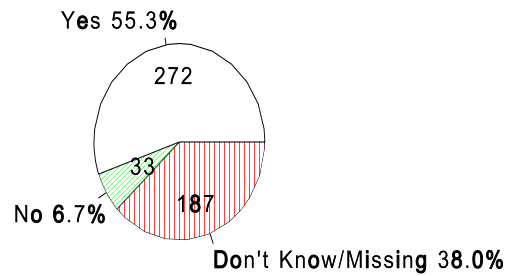
**Need to do Something About Transport
of Rad. Waste through County in Nxt 5 Y**



**Need to do Something About Storage of
Nuc. Waste at Yucca Mt. in Next 5 Years**



**Need to do Something About
Job Opportunities in the Next 5 Years**



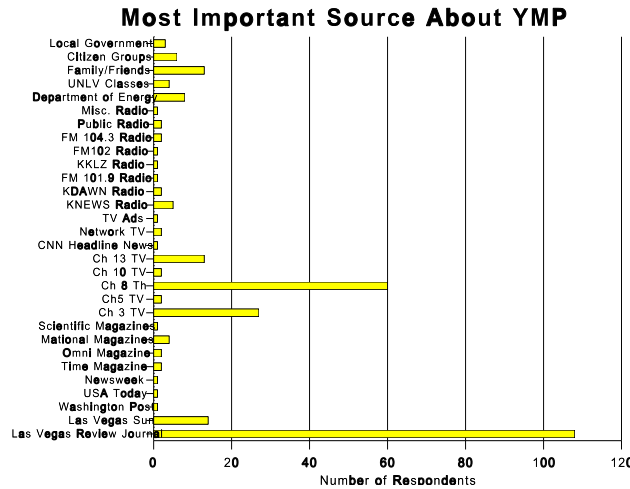
Information Sources

Part two of the survey was directed at gathering information about the Yucca Mountain Project. As part of the Yucca Mountain section, respondents were asked about where they get information about the proposed repository and how they evaluate those sources. In effort to keep the information sources and evaluation questions close-ended and concise, while maintaining usefulness, responses were coded as follows: local newspapers, non-local newspapers, locally-based radio programs, radio programs originating outside of Clark County, television, friends/family/co-workers, magazines, US Department of Energy, Other federal government sources, State government sources, County government sources, city/town government sources, association/concerned citizen groups, church, and other sources. Specifically, for each of these sources, respondents were asked if during the last six months, they had never, seldom, or often received information, and then they were asked about the level of trust held for the information received from the source -- i.e., no trust, some trust, or strong trust. A total of 295 respondents answered these information source questions, along with other Yucca Mountain-related questions described in the next section. The frequency of responses to the information source and evaluation questions are presented in Table 4-7. Television, local newspapers, and friends/family/co-workers were the three most frequently stated sources of information for respondents. These three sources, along with locally-based radio programs were also among the most trusted sources of information according to those respondents who had either "some trust" or "strong trust" in these sources. The "some trust" category received the most frequent responses for each of the source items when a level of trust was indicated. Many respondents declined to respond to the trust question. One interpretation of this finding is that respondents had difficulty in separating their trust in a sources information about a particular topic from their general trust in that source. Such difficulty could have resulted in the many refusals to answer this question. The high "some trust" and "no response" categories together, however, provide some indication that most sources seem to be more-or-less neutral for respondents. Information sources with the highest frequency of "no trust" (representing 11% of the respondents asked this question) was DOE. All other sources listed received a "no trust" response of less than 10% of the respondents to the Yucca Mountain-specific questions.

**Table 4-7
Frequency of Responses to Questions Regarding Information Sources and Evaluation**

SOURCE	In the last 6 months, have you never, seldom or often received information from					Do you have no trust, some trust, or strong trust in the information from this source?				
	never	sel-dom	often	DK	NR	no trust	some trust	strong trust	DK	NR
Local Newspapers	68	133	91	1	2	18	182	26	3	66
Non-Local Newspapers	213	43	3	8	18	7	42	15	7	224
Locally Radio Programs	142	121	23	6	3	17	105	26	11	136
Radio Programs Outside of Clark County	232	28	1	12	22	4	28	4	16	243
Television	32	164	96	2	1	29	197	35	3	31
Friends/Family/Workers	145	94	44	9	3	5	90	49	10	141
Magazines	212	62	10	6	5	7	60	18	10	200
US Department of Energy	200	75	12	4	4	33	57	8	10	187
Other Federal Government Sources	245	33	6	7	4	10	37	9	15	224
State Government	246	28	7	10	4	8	33	5	17	232
County Government	251	27	4	9	4	9	33	3	16	234
City/Town Government	248	27	4	9	7	9	31	3	18	234
Associations/ Concerned Citizen Groups	231	39	13	7	5	8	46	8	15	218
Church	256	18	1	10	10	2	22	9	19	243
Other sources	45	4	4	236	6	5	2	5	236	47
n=295										

Respondents were also asked what was their "most important" source of information about the Yucca Mountain Project. The Las Vegas Review Journal, a local newspaper, captured 37% of the responses and was the most frequently stated "most important" source. Local television stations were the second-most frequently stated source. Together, channels 3,5, 8, 10, and 13 were stated as the most important source for almost 36% of those who responded to this question



(292 valid cases). The chart below depicts the proportion of other responses to this question. *Attitudes and Perceived Effects of Yucca Mountain*

This section examines responses to several questions regarding the proposed repository. This section was introduced by asking respondents if they were willing to answer questions about the Yucca Mountain Project. Approximately 60% of the respondents consented to answer the questions in this section. The interview with respondents who were not willing to answer these questions skipped to the demographic component then concluded. Sixty percent or more of the 295 respondents to this section of the survey were in accord on the following:

- 83% affirmed that accidents when transporting nuclear waste cannot be avoided
- 80% denoted that YMP is a general threat
- 79% indicated that people living in the County will worry about it
- 72% agreed that YMP will create new jobs
- 69% considered YMP a threat to future generations
- 60% thought that YMP will have a negative effect on property values
- 60% did not think that the benefits of a repository would outweigh the harms

Table 4-8 displays the frequency of the 295 interviewee responses to several statements about the Yucca Mountain Project. The analysis of these and other responses by demographic categories is presented in Section 4.3.3.

**Table 4-8
Frequency of Responses to Statements Concerning Attitudes About YMP**

Statement	Disagree	Neither Disagree nor Agree	Agree	Don't Know	No Response
It will help the economy of Clark County.	111 (38%)	44 (15%)	116 (39%)	23 (8%)	1 (.3%)
It is a threat to the quality of life in Clark County.	57 (19%)	35 (12%)	187 (63%)	16 (5%)	0 (0%)
It is a threat to future generations.	45 (15%)	28 (9%)	205 (69%)	17 (6%)	0 (0%)
It is no threat at all.	236 (80%)	23 (8%)	25 (8%)	9 (3%)	2 (.7%)
It will have no effect on the health of people living nearby.	208 (71%)	22 (7%)	48 (16%)	17 (6%)	0 (0%)
It will have a negative effect on property values in the County.	59 (20%)	34 (12%)	178 (60%)	24 (8%)	0 (0%)
It will have no effect on tourism or new-business growth in the County	115 (39%)	42 (14%)	112 (38%)	26 (9%)	0 (0%)
It will not be as risky as the Nevada Test Site.	140 (47%)	46 (16%)	71 (24%)	38 (13%)	0 (0%)
It will create new jobs.	37 (13%)	27 (9%)	213 (72%)	18 (6%)	0 (0%)
It will cause groundwater contamination.	48 (16%)	43 (15%)	150 (51%)	54 (18%)	0 (0%)
It will create a bad image of Clark County.	87 (29%)	39 (13%)	143 (48%)	25 (8%)	1 (0%)
People living in the County will not worry about it at all.	234 (79%)	27 (9%)	21 (7%)	13 (4%)	0 (0%)
There are dangers of transportation accidents that cannot be avoided.	25 (8%)	14 (5%)	246 (83%)	9 (3%)	1 (.3%)

If the repository is eventually built, the overall benefits will outweigh the harms.	176 (60%)	31 (11%)	67 (23%)	21 (7%)	0 (0%)
n = 295 (Note: Percent totals may not add to 100 due to rounding)					

4.3.3 Analysis of Responses by Demographic Categories

Presented in this section is the analysis of responses to the major content questions of the survey (the dependent variables) by demographic variables (independent variable). In describing the results of the analyses conducted with the survey data, only significant results are reported.² While other comparisons may suggest the presence of certain trends (such as the belief that storage of nuclear wastes at Yucca Mountain is a serious issue increases with age), the determination as to which trends are meaningful from a policy standpoint and which are not is arbitrarily based on whether they are statistically significant (i.e., the probability of less than 1 in 20 that the trend is the result of chance). Associations with a significance (p) level of less than 0.05 suggest that it is unlikely they are related to one another by chance.

Extreme caution must be exercised in interpreting these results for two reasons. First, in this analysis, several such comparisons were made and it is also possible that 1 out of every 20 comparisons will be statistically significant on the basis of chance alone when in fact, the two variables are not related to one another. Second, the fact that two variables are associated with one another does not imply that they are causally related. Establishment of causal relationships between people's perception of the Yucca Mountain Project and any one of a number of independent variables (age, gender, length of residence in Nevada, sources of information) requires information not available from the survey itself.

To facilitate analysis, demographic characteristics and responses to questions were categorized. These categories are described below along with the analysis of relationships between independent and dependent variables:

- Respondents were grouped into five categories on the basis of age: 18-24 year olds, 25-34 year olds, 35-44 year olds, 45-64 year olds, and 65 years and older
- Ethnicity was divided into five categories: Non-Hispanic white, black, Native American, Asian American/Pacific Islander, and Hispanic.

²An explanation of methods used to analyze survey responses by demographic categories and determine levels of statistical significance is presented in the methodology component of this chapter (section 4.2).

- Education was grouped into five categories: less than a high school diploma, a high school diploma, some college, a college graduate, and graduate level training.
- Household income was categorized into two groups, those making less than \$45,000 a year and those making \$45,000 or more a year.
- Occupation was grouped into seven categories: professional/technical, managerial, clerical and sales, skilled labor, unskilled labor, retired or on disability, students and homemakers, unemployed, and other (three individuals employed in the gaming industry). However, the latter two categories were excluded from analysis because of the small numbers. Length of residence was grouped into six categories: less than one year, 1-2 years, 3-4 years, 5-9 years, 10-19 years, and 20 years or more.
- Respondents intention to remain in Nevada was grouped into three categories: yes (plan to remain in Nevada), don't know, and no (plan to leave Nevada).
- The evaluation of a list of 11 issues as seriously affecting the quality of life in Clark County was examined in three different ways. Each respondent was asked to rate how serious a problem each issue was on a scale of 1 to 10. The mean scores of respondents for each issue were then compared on the basis of respondents' age, gender, ethnicity, whether they had children under the age of 18, whether they or other household members had ever worked for the Department of Energy or a DOE contractor, income, education, occupation, length of residence in Nevada, and intention to remain in Nevada. The association between these demographic characteristics and the evaluation of the seriousness of each issue was further examined by comparing the percentage of respondents who rated the issue as *most serious* (assigning an issue a score of 9 or 10). Finally, the issues were rank ordered on the basis of 1) their mean scores and 2) in the case of ties, the proportion of respondents who rated the issue as most serious. These rank orders were also compared across the different social/demographic groups.
- Perceptions regarding the Yucca Mountain Project were evaluated in two different ways. First, demographic characteristics were examined for the proportions of respondents who participated in Yucca Mountain-specific component of the survey and for those who agreed with a particular statement regarding the potential effect of the Yucca Mountain Project. Second, a YMP Perception Scale was created to better interpret the overall perception of respondents about the proposed repository. This scale by constructed by recoding the responses to individual statements so that they were comparable on a single scale. Statements in support of the proposed repository³

³Statements in support of perceived YMP effects include: It will help the economy of Clark County; It will create

were coded 1 for disagreement, 2 for neither disagreeing or agreeing or don't know, and -1 for agreement. Statements regarding impending danger⁴ were coded 1 for agreement and 0 for disagreement, neither agreement or disagreement, or don't know. Statements negating potential risks⁵ were coded as 1 for disagreement and 0 for agreement, neither agreement or disagreement, or don't know. This produced a scale with values ranging from -3 to +14. Low scores reflect an overall perception more in favor of the effects of the Yucca Mountain Project, while high scores reflect a perception more in opposition to potential repository effects. The scale was found to have high reliability with an internal consistency (Cronbach's alpha) coefficient of .86.⁶ A principal components factor analysis with varimax rotation revealed the existence of three factors corresponding to the three groups of responses described above, accounting for 7.7% 8.8%, and 39.7% of the variance in global YMP perception scale scores, respectively.

Comparisons of measures of the seriousness of issues, perception of the effects of the Yucca Mountain Project, information sources, and actions taken by the demographic characteristics of the study population were based on one-way analysis of variance for continuous variables and the chi-square test for categorical variables. The Mantel Haenszel chi-square test for trend was used to compare categorical outcomes by age, education, and length of residence in Nevada. However, no adjustment was made for multiple comparisons, and caution should be exercised in interpreting results. Because these statistical tests were not used for the purpose of hypothesis testing, the findings should be interpreted as illustrative of more general trends in the population.

The remainder of this section presents the analysis of responses to survey questions by demographic categories. Throughout this section, missing or unknown values are excluded from cross-tabular analysis, and individual category totals will reflect this adaption.

new jobs; If the repository is eventually built, the overall benefits will outweigh the harms.

⁴Statements regarding potential risk include: It is a threat to the quality of life in Clark County; It is a threat to future generations; It will have a negative effect on property values in the County; It will cause groundwater contamination; It will create a bad image of Clark County; There are dangers of accidents that cannot be avoided when transporting nuclear waste to the proposed repository.

⁵Statements negating potential risk include: It is no threat at all; It will have no effect on the health of people living nearby; It will have no effect on tourism or new-business growth in the County; It will not be as risky as the Nevada Test Site; People living in the County will not worry about it at all.

⁶A Cronbach's alpha of .86 suggests that people are generally consistent in the way they answered the individual questions relating to their perceptions of the positive and negative effects of the Yucca Mountain Project. Cronbach's alpha ratings range between 0 and 1. A 0 would mean that there is no relationship between the answer given by an individual to one question and the answer given to the remaining questions. A Cronbach's alpha of 1 would mean that each answer given by an individual to a set of questions is related to every answer give to the remaining questions.

Analysis of Issues

The mean evaluation of the seriousness of each of the 11 issues addressed in the survey are presented in Tables 4-9a, b, and c. The two Yucca Mountain Project issues were among those with the highest mean evaluation scores, after crime and traffic congestion. Concern about traffic congestion and the transportation of wastes through Clark County were significantly associated with increasing age. In contrast, concern about the quality of schools and education declined significantly with increasing age. Women were more concerned about crime than men and individuals with children under the age of 18 were more concerned about the quality of schools and education than those without young children. Respondents who did not work for the Department of Energy were more concerned about the storage of nuclear wastes at Yucca Mountain than respondents who were or were related to Department of Energy employees.

Concern about the transport of nuclear wastes through Clark County and overpopulation were inversely associated with level of education, while concerns about air pollution and traffic congestion displayed a significant, U-shaped association with the highest levels of concern exhibited by respondents with some college education. Concern about water shortages was significantly associated with income. Respondents employed in the clerical/sales fields exhibited the highest levels of concern about the transport of nuclear wastes through the County and the storage of wastes at Yucca Mountain. However, the level of concern with respect to these two issues did not appear to differ significantly by occupation. The respondent's assessment of their intention to remain in Nevada was unrelated to their evaluation of the seriousness of any of the issues addressed in the survey.

Table 4-9a
Mean Evaluation of Issues by Demographic Characteristics

Issue	All	Age					Gender		Ethnicity					Kids		Work for DOE	
	(492)	18-24 (49)	25-34 (112)	35-44 (88)	45-64 (148)	65+ (94)	Men (248)	Women (244)	White (378)	Black (39)	Native Am.. (10)	Asi a/P. I. (19)	Hispanic (44)	Yes (173)	No (316)	Yes (42)	No (442)
Quality of schools	7.1	7.3	7.6	7.5	6.7	6.9*	7.1		7.0	8.1	7.6	6.7	7.2	7.7	6.7***	7.6	7.1
Diversity in County economy	5.8	5.1	5.9	6.0	5.8	5.6	5.7		5.7	6.3	4.7	6.3	5.7	5.7	5.8	5.9	5.7
Transport of nuclear wastes	7.9	6.8	7.6	8.1	8.1	8.4*	7.7		7.8	8.6	8.2	7.5	8.2	7.6	8.1	7.4	8.0
Storing nuclear wastes at Yucca	7.8	7.2	7.5	8.0	8.1	8.1	7.6		7.8	8.6	6.8	7.7	8.1	7.7	7.9	6.9	7.9*
Crime	9.0	8.8	9.1	8.8	9.1	9.0	8.9		9.0	9.3	9.0	8.7	9.2	8.9	9.0	9.1	9.0
Expansion of gaming industry	5.1	4.8	5.5	4.8	4.7	5.5	4.8		5.0	5.3	3.5	5.2	5.5	4.8	5.2	4.9	5.1
Air pollution	7.8	7.7	7.8	7.8	7.9	7.4	7.7		7.7	8.5	8.3	7.3	7.2	7.7	7.8	8.2	7.7
Job opportunities	5.6	5.8	5.9	5.4	5.6	5.3	5.4		5.4	6.2	5.4	5.9	6.3	5.6	5.6	5.4	5.6
Traffic congestion	8.5	7.7	8.5	8.3	8.8	8.8**	8.6		8.5	9.0	8.4	8.1	8.1	8.3	8.6	9.0	8.5
Water shortages	6.9	6.0	7.1	6.7	7.1	6.9	6.7		7.0	7.2	6.0	5.8	6.0	6.7	7.0	6.9	6.9
Overpopulation	7.3	7.1	6.9	6.9	7.6	7.7	7.0		7.2	7.8	6.7	7.0	7.2	7.0	7.4	8.0	7.2

(n) number of respondents in parentheses
* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-9b
Mean Evaluation of Issues by Demographic Characteristics

Issue	Education					Income		Occupation						
	<HS (42)	HS (153)	Col (198)	BS (66)	Grad (27)	<\$45K (284)	\$45K+ (149)	Prof Tech (99)	Manager (129)	Clerical Sales (94)	Skilled (40)	Unskilled (70)	Retired (37)	Student Hsewif (18)
Quality of schools and education	6.4	7.4	7.2	7.0	6.8	7.3	7.0	7.6	6.3	7.5	7.2	7.1	7.5	8.1
Diversity in County economy	5.6	5.7	5.9	5.3	6.6	5.9	5.8	6.5	5.4	5.8	5.1	5.5	6.5	5.3
Transport of nuclear wastes through County	8.1	8.1	8.2	7.5	6.2**	8.1	7.7	7.6	8.1	8.5	7.7	7.8	8.4	6.6
Storing nuclear wastes at Yucca Mountain	8.3	7.8	8.0	7.6	6.9	8.0	7.8	7.6	8.0	8.0	7.9	8.0	7.7	6.6
Crime	9.0	9.2	9.0	8.8	8.5	9.1	8.8	9.1	8.9	9.2	8.9	9.0	9.0	8.9
Expansion of gaming industry	4.4	5.2	5.2	4.8	4.6	5.1	5.0	5.2	4.9	4.9	4.3	5.4	5.4	5.5
Air pollution	7.3	7.8	8.1	7.3	7.0*	7.8	7.9	7.9	7.5	7.9	7.6	8.5	8.5	6.8
Job opportunities	5.2	5.8	5.8	5.3	4.4	5.8	5.4	6.0	5.0	5.8	5.2	5.9	5.9	5.5
Traffic congestion	8.0	8.8	8.5	8.6	7.4**	8.6	8.5	8.5	8.6	8.7	8.2	8.3	8.8	7.8
Water shortages	6.1	6.7	7.1	7.3	7.0	6.7	7.4*	7.3	6.7	7.1	6.5	6.7	7.0	6.1
Overpopulation	7.2	7.6	7.4	6.7	5.9*	7.3	7.2	7.2	7.5	7.4	6.4	6.8	7.8	8.3

(n) number of respondents in parentheses
* p < 0.05; ** p < 0.01; *** p < 0.001

**Table 4-9.c
Mean Evaluation of Issues by Demographic Characteristics**

Issue	Length of Residence in Nevada						Remain in Nevada		
	< 1 yr (54)	1-2 yrs (79)	3-4 yrs (42)	5-9 yrs (82)	10-19 yrs (103)	20+ yrs (130)	Yes (397)	Don't know (44)	No (50)
Quality of schools and education	7.0	6.9	6.7	7.2	7.3	7.3	7.1	7.5	6.9
Diversity in County economy	5.0	5.6	5.9	5.8	5.8	6.1	5.6	6.2	6.3
Transport of nuclear wastes through County	6.9	7.5	8.5	8.3	8.0	8.2*	8.0	7.8	7.7
Storing nuclear wastes at Yucca Mountain	7.0	7.6	7.8	8.0	7.9	8.2	7.9	7.6	7.6
Crime	8.7	8.9	8.9	9.2	9.1	9.0	9.0	9.2	9.0
Expansion of gaming industry	4.9	4.6	5.6	5.1	4.8	5.4	5.1	4.5	5.2
Air pollution	7.9	7.2	7.3	7.6	7.9	8.1	7.7	7.7	8.5
Job opportunities	5.7	5.3	5.9	5.6	5.9	5.3	5.5	5.7	5.9
Traffic congestion	8.0	8.0	8.1	8.5	8.8	9.0**	8.5	8.4	8.8
Water shortages	6.1	6.7	7.4	7.3	6.9	6.9	6.9	7.2	6.6
Overpopulation	6.9	6.2	7.4	7.4	7.7	7.6**	7.1	7.5	8.1

(n) number of respondents in parentheses
* p < 0.05; ** p < 0.01; *** p < 0.001

The evaluation of the seriousness of these issues was also examined by determining the proportion of respondents who rated the issue as most serious (a score of 9 or 10, in a scale of 1 to 10). The results are presented in Tables 4-10a, b, and c. The proportion of respondents who evaluated the two Yucca Mountain issues as most serious increased significantly with age. Similarly, age was positively associated with the proportion of respondents who rated traffic congestion and overpopulation as most serious, and inversely associated with the proportion of respondents who rated the quality of schools and education as most serious. A higher proportion of respondents with children under the age of 18 rated the quality of schools and education as most serious, while a higher proportion of respondents without younger children rated the storage of wastes at Yucca Mountain as most serious. A higher proportion of respondents who worked for, or were related to someone who worked for the Department of Energy rated traffic congestion as most serious. Level of education was inversely associated with the proportion of respondents who rated the transport of nuclear wastes through Clark County, crime, traffic congestion, and overpopulation as most serious. The proportions of respondents who rated the storage of nuclear waste at Yucca Mountain, traffic congestion, diversification of the County's economy, and overpopulation as most serious were significantly associated with length of residence in Nevada. The proportion of respondents who rated the transport of wastes through Clark County was also significantly associated with length of residence, but exhibited a U-shaped curve. The rating of any issue as most serious was unrelated to gender, ethnicity, income, occupation, and intention to remain in Nevada.

As noted earlier, crime was rated by the respondents as a group as the most serious issue affecting the quality of life in Clark County, followed by traffic congestion. The transportation of nuclear waste through the County and the storage of waste at Yucca Mountain were rated the 3rd and 4th most important issues, respectively. Expansion of the gaming industry outside the Las Vegas Valley, job opportunities, and diversification of the County's economy were rated the least important issues by all respondents. The remaining issues were ranked between these two groups of most important and least important issues. When these rankings were compared by the demographic characteristics of the respondents, these six issues were consistently assigned the same ranks as those found for the study population as a whole, with some exceptions (see Tables 4-11a, b, and c). Respondents living in Nevada for more than 20 years rated traffic congestion as more important than crime. Hispanics and respondents with less than a high school diploma rated the two Yucca Mountain issues as more important than traffic congestion. Unskilled laborers rated air pollution as more important than traffic congestion and the two Yucca Mountain issues. Students and homemakers rated the quality of schools and education and overpopulation as more important than traffic congestion and the two Yucca Mountain issues.

**Table 4-10a
Percent Evaluating Issue as Serious by Demographic Characteristics**

Issue	All	Age					Gender		Ethnicity					Kids		Work for DOE	
	492	18-24	25-34	35-44	45-64	65+	Men	Women	White	Black	Native Ameri	Asian P.I.	Hispanic	Yes	No	Yes	No
Quality of schools and education	35.3	36.7	47.3	36.4	28.6	30.1**	32.9	37.7	32.2	61.5	60.0	21.1	36.4	43.9	30.3*	42.9	34.8
Diversity in County economy	14.4	8.2	15.2	19.3	14.2	12.8	14.1	14.8	14.0	25.6	20.0	15.8	6.8	15.6	13.9	19.0	13.6
Transport of nuclear wastes through County	60.8	38.8	55.4	59.1	66.2	71.3***	57.7	63.9	59.3	66.7	60.0	52.6	70.5	54.3	64.2*	52.4	61.8
Storing nuclear wastes at Yucca Mountain	60.2	40.8	56.3	58.0	67.6	66.0***	56.9	63.5	58.7	69.2	40.0	63.2	68.2	56.6	62.3	52.4	61.1
Crime	69.7	63.3	72.3	60.2	74.3	71.3	67.3	72.1	69.0	76.9	60.0	57.9	75.0	68.2	70.6	66.7	70.6
Expansion of gaming industry	12.4	10.2	12.5	11.4	10.1	18.1	10.1	14.8	11.9	12.8	10.0	15.8	15.9	11.0	13.3	16.7	12.0
Air pollution	43.1	42.9	45.5	46.6	43.9	35.1	41.5	44.7	42.9	61.5	50.0	31.6	31.8	42.8	43.7	54.8	42.3
Job opportunities	18.3	16.7	19.8	17.2	18.4	18.3	17.1	19.4	16.6	33.3	11.1	21.1	20.5	16.3	19.2	26.8	17.6
Traffic congestion	60.6	46.9	59.8	59.1	64.9	63.8*	58.9	62.3	59.3	79.5	70.0	52.6	56.8	59.0	61.4	78.6	59.0*
Water shortages	33.7	20.4	36.6	34.1	35.1	35.1	35.1	32.4	34.9	41.0	20.0	26.3	22.7	33.5	33.9	31.0	33.7
Overpopulation	40.7	32.7	35.7	38.6	41.5	52.1**	37.7	43.9	39.3	51.3	40.0	42.1	43.2	36.4	43.2	50.0	39.9

* p < 0.05; ** p < 0.01; *** p < 0.001

**Table 4-10b
Percent Evaluating Issue as Serious by Demographic Characteristics**

Issue	Education					Income		Occupation						
	<HS	HS	Col	BS	Grad	<\$45K	\$45K+	Prof Tech	Manager	Clerical Sales	Skilled	Unskilled	Retired	Student Hsewif
Quality of schools and education	31.0	41.4	34.0	30.3	29.6	38.5	30.9	40.4	24.4	41.5	32.5	35.7	32.4	61.1
Diversity in County economy	19.0	15.7	12.6	12.1	22.2	16.5	12.1	28.3	12.4	8.5	7.5	11.4	16.2	11.1
Transport of nuclear wastes through County	66.7	62.7	64.6	54.5	33.3**	64.1	57.0	56.6	65.9	70.2	50.0	57.1	67.6	33.3
Storing nuclear wastes at Yucca Mountain	66.7	58.8	62.6	60.6	48.1	63.0	59.7	55.6	67.4	62.8	52.5	57.1	59.5	50.0
Crime	71.4	77.1	70.7	57.6	55.6**	72.5	63.8	74.7	65.1	76.6	60.0	70.0	75.7	55.6
Expansion of gaming industry	14.3	14.4	11.6	7.6	18.5	14.8	9.4	14.1	14.0	8.5	10.0	12.9	13.5	11.1
Air pollution	38.1	48.4	47.0	36.4	18.5*	43.7	43.6	44.4	36.4	48.9	42.5	41.4	54.1	44.4
Job opportunities	16.7	19.2	19.5	18.2	7.4	21.0	15.6	24.5	13.3	14.9	10.3	25.7	27.8	11.1
Traffic congestion	54.8	67.3	61.6	57.6	33.3*	62.7	60.4	60.6	60.5	64.9	55.0	55.7	70.3	50.0
Water shortages	28.6	31.4	35.9	36.4	37.0	32.7	39.6	43.4	30.2	33.0	25.0	30.0	45.9	22.2
Overpopulation	42.9	45.8	42.6	31.8	18.5**	43.1	37.6	46.9	41.1	38.3	25.0	34.3	51.4	55.6

* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-10c
Percent Evaluating Issue as Serious by Demographic Characteristics

Issue	Length of Residence in Nevada						Remain in Nevada		
	< 1 yr	1-2 yrs	3-4 yrs	5-9 yrs	10-19 yrs	20+ yrs	Yes	Don't know	No
Quality of schools and education	31.5	36.7	26.2	35.4	38.8	36.4	35.7	38.6	30.0
Diversity in County economy	1.9	13.9	4.8	22.9	13.6	18.5**	13.9	15.9	18.0
Transport of nuclear wastes through County	42.6	54.4	69.0	66.3	64.1	63.8**	61.2	59.1	60.0
Storing nuclear wastes at Yucca Mountain	51.9	54.4	59.5	62.7	60.2	66.2 [†]	61.5	52.3	58.0
Crime	64.8	65.8	61.9	74.7	74.8	70.0	69.5	70.5	72.0
Expansion of gaming industry	7.4	11.4	19.0	8.4	12.6	15.4	13.6	4.5	10.0
Air pollution	50.0	36.7	33.3	39.8	41.7	50.8	42.1	43.2	52.0
Job opportunities	13.0	17.9	24.4	23.2	19.4	14.8	19.1	13.6	16.3
Traffic congestion	51.9	49.4	54.8	60.2	62.1	72.3***	59.9	59.1	68.0
Water shortages	20.4	32.9	33.3	37.3	38.8	33.8	34.5	31.8	30.0
Overpopulation	29.6	26.9	38.1	44.6	47.6	46.9***	38.9	45.5	52.0

* p < 0.05; ** p < 0.01; *** p < 0.001

**Table 4-11a
Ranking of Issues as Serious by Demographic Characteristics**

Issue	All	Age					Gender		Ethnicity					Kids		Work for DOE	
		18-24	25-34	35-44	45-64	65+	Men	Women	White	Black	Native Ameri	Asian P.I.	Hispanic	Yes	No	Yes	No
Quality of schools and education	7	4	5	6	9	8	6	7	8	6	5	7	6	4	8	5	7
Diversity in County economy	9	10	10	9	8	9	9	9	9	9	10	8	10	9	9	9	9
Transport of nuclear wastes through County	3	7	4	3	4	3	3	3	3	4	4	4	2	6	3	6	3
Storing nuclear wastes at Yucca Mountain	4	5	6	4	3	4	5	4	4	3	6	6	3	3	4	7	4
Crime	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Expansion of gaming industry	11	11	11	11	11	10	11	11	11	11	11	11	11	11	11	11	11
Air pollution	5	3	3	5	5	6	4	5	5	5	3	3	7	5	5	3	5
Job opportunities	10	9	9	10	10	11	10	10	10	10	9	9	8	10	10	10	10
Traffic congestion	2	2	2	2	2	2	2	2	2	2	2	2	4	2	2	2	2
Water shortages	8	8	7	8	7	7	8	8	7	8	8	8	10	8	7	8	8
Overpopulation	6	6	8	7	6	5	7	6	6	7	7	7	6	7	6	4	6

**Table 4-11b
Ranking of Issues as Serious by Demographic Characteristics**

Issue	Education					Income		Occupation						
	<HS	HS	Col	BS	Grad	<\$45K	\$45K+	Prof Tech	Manager	Clerical Sales	Skilled	Unskilled	Retired	Student Hsewif
Quality of schools and education	7	7	7	7	6	7	8	6	8	6	6	6	7	3
Diversity in County economy	9	10	9	9	7	9	9	9	9	10	10	10	9	11
Transport of nuclear wastes through County	3	3	3	4	8	3	5	4	3	3	4	5	4	7
Storing nuclear wastes at Yucca Mountain	2	4	5	3	5	4	4	5	4	4	3	4	6	6
Crime	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Expansion of gaming industry	11	11	11	11	10	11	11	11	11	11	11	11	11	10
Air pollution	5	5	4	5	4	5	3	3	6	5	5	2	3	5
Job opportunities	10	9	10	10	11	10	10	10	10	9	9	9	10	9
Traffic congestion	4	2	2	2	2	2	2	2	2	2	2	3	2	4
Water shortages	8	8	8	6	3	8	6	7	7	8	7	8	8	8
Overpopulation	6	6	6	8	9	6	7	8	5	7	8	7	5	2

Table 4-11c
Ranking of Issues as Serious by Demographic Characteristics

Issue	Length of Residence in Nevada						Remain in Nevada		
	< 1 yr	1-2 yrs	3-4 yrs	5-9 yrs	10-19 yrs	20+ yrs	Yes	Don't know	No
Quality of schools and education	5	6	8	8	7	7	7	7	7
Diversity in County economy	10	9	10	9	10	9	9	9	9
Transport of nuclear wastes through County	6	4	2	3	3	4	3	3	5
Storing nuclear wastes at Yucca Mountain	4	3	4	4	4	3	4	5	6
Crime	1	1	1	1	1	2	1	1	1
Expansion of gaming industry	11	11	11	11	11	10	11	11	11
Air pollution	3	5	7	5	5	5	5	4	3
Job opportunities	9	10	9	10	9	11	10	10	10
Traffic congestion	2	2	3	2	2	1	2	2	2
Water shortages	8	7	6	7	8	8	8	8	8
Overpopulation	7	8	5	6	6	6	6	6	4

Pearson product-moment correlations⁷ were then calculated to identify potential independent variables for multiple regression models predicting the rating of the two Yucca Mountain issues. All the demographic characteristics, with the exception of occupation, and the ratings of the remaining nine issues were examined. Ethnicity was recoded into white and nonwhite. The results are presented in Table 4-12. The importance of the transfer of nuclear wastes through the County as an issue affecting the quality of life in Clark County was significantly associated with ratings of the importance of the quality of schools and education, diversification of the County's economy, crime, air pollution, job opportunities, traffic congestion, water shortage, and overpopulation, and the demographic characteristics of age, education, and length of residence in Nevada. The importance of the storage of nuclear wastes at Yucca Mountain as an issue affecting the quality of life in Clark County was significantly associated with ratings of the importance of the diversification of the County's economy, crime, air pollution, job opportunities, traffic congestion, water shortage, and overpopulation, and the demographic characteristics of age, employment at the Department of Energy or DOE contractor, and length of residence in Nevada.

These variables were then entered into two multiple linear regression models. The variables found to be significantly correlated with the importance of the transportation of nuclear wastes through the County Age accounted for 12.5% of the variance in respondent's rating of this issue (Table 4-13). Education, and the rating of crime as a serious issue were significant independent predictors of the rating of this issue as serious. The variables found to be significantly correlated with the importance of the storage of nuclear wastes at Yucca Mountain accounted for 10% of the variance in respondent's rating of this issue. Length of residence in Nevada, employment in the Department of Energy or DOE contractor, and ratings of crime and water shortages as serious issues were significant independent predictors of the rating of this issue as serious.

⁷ A Pearson product-moment correlation is a measure of the association between two variables. This correlation is noted by "r". The more negative "r" is, the more negative the association is. Similarly, the more positive "r" is, the more positive the association is. The Pearsonian coefficient of correlation is further described in the methodology component of this chapter.

**Table 4-12
Correlations of Demographic Characteristics and Rating of Seriousness
of Issues with the Ratings of Seriousness of Yucca Mountain Issues**

Independent variables	Transportation of wastes through County r	Storage of waste at Yucca Mountain r
Age	.15*	.10*
Gender	.07	.09
Ethnicity (white/nonwhite)	.06	.05
Children < 18 yrs	.08	.04
Work for DOE	.06	.09*
Education	-.12**	-.06
Income	-.06	.03
Length of residence in Nevada	.12**	.11*
Intention to remain in Nevada	-.03	-.04
Quality of schools and education	.14**	.07
Diversity in County economy	.16***	.11*
Crime	.21***	.21***
Expansion of gaming industry	.08	.07
Air pollution	.16***	.12**
Job opportunities	.13**	.12**
Traffic congestion	.12**	.11*
Water shortages	.17***	.20***
Overpopulation	.12**	.11*

The evaluation of the seriousness of these issues was examined by determining the proportion of respondents who rated the issue as most serious (a score of 9 or 10, in a scale of 1 to 10).
r = Pearson product-moment correlation coefficient
* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-13 Regressions of Demographic Characteristics and Rating of Seriousness of Issues on Ratings of Seriousness of Transportation of Nuclear Waste through County and Storage of Waste at Yucca Mountain		
Independent variables	Transportation of wastes through County beta	Storage of waste at Yucca Mountain beta
Age	.13**	.07
Work for DOE	-	.12**
Education	-.12**	-
Length of residence in Nevada	.07	.11*
Quality of schools and education	.07	-
Diversity in County economy	.08	.03
Crime	.13**	.16***
Air pollution	.08	.03
Job opportunities	.05	.05
Traffic congestion	-.01	<.01
Water shortages	.09	.13**
Overpopulation	<.01	<.01
beta = standardized regression coefficient * p < 0.05; ** p < 0.01; *** p < 0.001		

Analysis of Actions Taken

The distribution of actions taken on issues by the selected demographic characteristics is presented in Tables 4-14a, b, and c. One in four respondents reported taking some action in response to the crime issue, and one in five respondents reported taking some action in response to the quality of schools and education. More than 13% of respondents reported taking some action concerning the possible transportation of nuclear waste through Clark County and the storage of waste at Yucca Mountain. Taking action in response to the quality of schools and education, crime, air pollution, and traffic congestion was significantly associated with ethnicity. Respondents with children under 18 years of age and employees of the Department of Energy or DOE contractors were significantly more likely to have taken action to improve the quality of schools and education; the latter group was also significantly more likely to have taken action regarding job opportunities. Taking action to address the issues of air pollution, traffic congestion and water shortages was significantly associated with education. Taking action to address the issue of future water shortages was significantly associated with income. Respondents in professional or technical occupations and in clerical or sales occupations were significantly more likely to act to improve the quality of schools and education than respondents in other occupations. Taking action in response to the issues of the quality of schools and education, traffic congestion, and overpopulation was significantly associated with length of residence in Nevada. Individuals who were uncertain as to whether they would remain in Nevada were significantly more likely to take action to address the quality of schools and education, crime, and traffic congestion than respondents who did not intend to remain, followed by respondents who did intend to remain in Nevada, respectively. Respondents who did not intend to remain were more likely to report having taken some action in response to water shortages and crime than respondents who were uncertain as to whether they would remain, and respondents who intended to remain in Nevada, respectively.

The distribution of respondents who felt a need to take action in the future among those who had not already taken action by the selected demographic characteristics is presented in Tables 4-15a, b, and c. The two Yucca Mountain Project issues had the highest percentage of respondents who felt the need to take some action in the future. This belief was unrelated to the respondent's age, gender, ethnicity, having young children, employment in the Department of Energy or DOE contractors, education, income, and intention to remain in Nevada. Unskilled workers were less likely to see a need to take action regarding the quality of schools and education and the diversification of the County's economy than respondents in other occupations. Perceived need to take action over possible expansion of the gaming industry outside the Las Vegas Valley was inversely associated with length of residence in Nevada.

Analysis of Views and Perceived Effects of Yucca Mountain Project

After addressing a range of issues which affect the quality of life in Clark County, respondents were then asked if they would be willing to answer a series of questions related specifically to the Yucca Mountain Project. Approximately 60% of the 492 respondents agreed to do so. These respondents exhibited some differences from those who declined to participate in the Yucca Mountain component of the survey with respect to gender, ethnicity, employment in the Department of Energy or DOE contractors, education, income, occupation, and length of residence in Nevada. The characteristics of respondents and non-respondent to this part of the survey are displayed in Table 4-16. There were no significant differences in the mean ratings of the two Yucca Mountain issues (transportation of nuclear waste through Clark County and the storage of waste at Yucca Mountain) by the two groups.

Table 4-14a
Percent of Respondents Taking Action Among Those Evaluating Issue as Serious by Demographic Characteristics

Issue	All	Age					Gender		Ethnicity					Kids		Work for DOE	
	(295)	18-24	25-34	35-44	45-64	65+	Men	Women	White	Black	Native Ameri	Asian P.I.	Hispani c	Yes	No	Yes	No
Quality of schools and education	20.3	14.3	23.2	30.7	20.3	10.6	17.7	23.0	17.5	28.2	60.0	10.5	29.5**	30.6	14.6***	35.7	19.0**
Diversity in County economy	5.1	10.2	3.6	6.8	3.4	5.3	5.2	4.9	5.0	5.1	10.0	5.3	4.5	5.8	4.7	4.8	5.0
Transport of nuclear wastes through County	13.8	10.2	8.0	17.0	16.9	13.8	12.5	15.2	13.8	7.7	30.0	10.5	18.2	12.7	14.6	11.9	13.8
Storing nuclear wastes at Yucca Mountain	13.6	10.2	8.0	17.0	16.2	14.9	12.1	15.2	13.8	12.8	10.0	10.5	15.9	13.3	13.9	14.3	13.3
Crime	25.6	24.5	24.1	22.7	31.8	20.2	23.4	27.9	25.1	33.3	60.0	26.3	15.9*	26.0	25.3	38.1	24.7
Expansion of gaming industry	3.9	4.1	2.7	4.5	2.7	6.4	4.0	3.7	3.7	2.6	0.0	5.3	6.8	1.7	5.1	7.1	3.4
Air pollution	10.2	10.2	5.4	9.1	13.5	10.6	10.1	10.2	10.6	5.1	50.0	10.5	2.3***	9.2	10.8	16.7	9.7
Job opportunities	3.9	8.2	4.5	2.3	4.1	2.1	3.2	4.5	3.2	5.1	10.0	10.5	4.5	5.8	2.8	9.5	3.4*
Traffic congestion	12.6	8.2	7.1	14.8	15.5	14.9	11.3	13.9	13.0	2.6	40.0	15.8	11.4*	9.2	14.6	19.0	12.0
Water shortages	9.6	4.1	7.1	10.2	12.8	9.6	7.7	11.5	10.1	5.1	20.0	10.5	6.8	8.7	10.1	14.3	8.8
Overpopulation	9.3	8.2	8.0	10.2	10.8	7.4	9.3	9.0	9.3	7.7	20.0	5.3	6.8	10.4	8.5	16.7	8.1

* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-14b
Percent of Respondents Taking Action Among Those Evaluating Issue as Serious by Demographic Characteristics

Issue	Education					Income		Occupation					Retired	Student Hsewif
	<HS	HS	Col	BS	Grad	<\$45K	\$45K+	Prof Tech	Manager	Clerical Sales	Skilled	Unskilled		
Quality of schools and education	16.7	18.3	20.7	24.2	25.9	19.7	24.8	34.3	11.6	27.7	12.5	21.4	8.1	11.1***
Diversity in County economy	0.0	5.9	4.0	7.6	11.1	5.6	6.0	9.1	4.7	5.3	5.0	2.9	2.7	0.0
Transport of nuclear wastes through County	9.5	11.1	15.7	19.7	11.1	14.8	13.4	15.2	18.6	16.0	7.5	10.0	8.1	5.6
Storing nuclear wastes at Yucca Mountain	7.1	10.5	13.6	22.7	22.2	13.7	16.1	18.2	18.6	14.9	5.0	8.6	5.4	5.6
Crime	19.0	24.8	24.2	37.9	22.2	23.9	30.2	32.3	23.3	33.0	20.0	22.9	16.2	16.7
Expansion of gaming industry	2.4	3.9	3.0	6.1	7.4	3.5	4.7	4.0	5.4	3.2	2.5	4.3	2.7	0.0
Air pollution	2.4	7.2	11.6	16.7	14.8**	9.5	11.4	14.1	10.1	9.6	2.5	7.1	13.5	11.1
Job opportunities	2.4	3.9	3.5	7.6	0.0	3.9	4.7	4.0	3.1	4.3	2.5	4.3	2.7	5.6
Traffic congestion	4.8	10.5	12.6	21.2	18.5**	11.3	16.8	17.2	14.0	11.7	7.5	7.1	13.5	5.6
Water shortages	2.4	5.9	9.1	19.7	22.2***	7.0	16.8**	17.2	10.1	8.5	5.0	4.3	8.1	5.6
Overpopulation	2.4	11.1	8.6	13.6	3.7	8.5	12.1	11.1	11.6	7.4	2.5	10.0	5.4	5.6

* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-14c
Percent of Respondents Taking Action Among Those Evaluating Issue as Serious by
Demographic Characteristics

Issue	Length of Residence in Nevada						Remain in Nevada		
	< 1 yr	1-2 yrs	3-4 yrs	5-9 yrs	10-19 yrs	20+ yrs	Yes	Don't know	No
Quality of schools and education	5.6	22.8	21.4	15.7	19.4	28.5**	18.1	34.1	26.0*
Diversity in County economy	0.0	8.9	2.4	3.6	7.8	4.6	5.5	4.5	2.0
Transport of nuclear wastes through County	3.7	15.2	14.3	21.7	6.8	17.7	12.8	25.0	12.0
Storing nuclear wastes at Yucca Mountain	3.7	19.0	14.3	20.5	6.8	15.4	13.1	20.5	12.0
Crime	13.0	27.8	33.3	20.5	26.2	30.0	21.7	47.7	38.0***
Expansion of gaming industry	1.9	6.3	2.4	1.2	5.8	3.8	4.0	2.3	4.0
Air pollution	5.6	13.9	16.7	4.8	10.7	10.8	9.3	18.2	10.0
Job opportunities	3.7	2.5	2.4	2.4	5.8	4.6	2.8	9.1	8.0*
Traffic congestion	5.6	10.1	11.9	8.4	13.6	19.2**	10.3	25.0	20.0**
Water shortages	1.9	11.4	14.3	6.0	10.7	11.5	8.1	15.9	16.0*
Overpopulation	1.9	7.6	9.5	2.4	7.8	18.5***	7.6	11.4	20.0**

* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-15a
Percent of Respondents Seeing a Need to Take Action Among Those Evaluating Issue as Serious by Demographic Characteristics

Issue	All	Age					Gender		Ethnicity					Kids		Work for DOE	
	(295)	18-24	25-34	35-44	45-64	65+	Men	Women	White	Black	Native Ameri	Asian P.I.	Hispanic	Yes	No	Yes	No
Quality of schools and education	84.4	85.2	85.0	90.2	84.6	78.0	85.2	83.5	84.0	95.2	50.0	80.0	81.3	89.3	82.3	78.9	85.4
Diversity in County economy	73.0	56.3	70.4	80.0	83.3	55.3	73.9	72.1	75.4	75.0	100.0	63.6	52.6	73.1	73.0	68.2	73.4
Transport of nuclear wastes through County	87.6	80.8	85.9	91.2	89.0	87.1	89.4	85.9	87.9	93.5	80.0	72.7	84.6	84.8	89.0	77.3	88.7
Storing nuclear wastes at Yucca Mountain	89.2	80.6	89.7	92.6	91.4	86.4	91.8	86.7	89.1	96.6	85.7	90.9	81.5	88.3	89.6	95.2	89.0
Crime	87.3	91.4	83.8	90.9	89.6	82.6	87.5	87.1	87.2	88.0	75.0	85.7	88.6	90.2	85.6	80.0	88.5
Expansion of gaming industry	72.8	85.7	76.0	79.3	71.2	61.5	74.7	71.4	75.2	58.8	100.0	75.0	64.7	76.8	70.9	76.9	72.6
Air pollution	81.5	83.8	80.4	90.8	76.7	80.0	81.3	81.8	80.1	87.9	75.0	78.6	87.9	83.1	80.4	92.9	81.0
Job opportunities	80.4	78.3	82.7	83.8	77.6	80.0	84.5	76.6	82.5	75.0	66.7	66.7	81.5	78.7	81.9	84.6	80.9
Traffic congestion	85.1	79.4	86.0	93.9	83.6	80.6	86.4	83.7	86.0	86.1	100.0	69.2	78.1	87.0	83.8	90.6	84.8
Water shortages	84.3	77.8	85.1	89.6	83.1	83.6	88.7	80.0*	82.7	96.2	100.0	87.5	81.8	84.3	84.7	87.0	84.6
Overpopulation	81.7	76.7	81.8	88.0	79.8	81.8	84.4	79.3	81.1	84.0	66.7	83.3	85.2	80.0	82.9	88.9	81.4

* p < 0.05; ** p < 0.01; *** p < 0.001

**Table 4-15b
Percent of Respondents Seeing a Need to Take Action Among Those Evaluating Issue as Serious by Demographic Characteristics**

Issue	Education					Income		Occupation					Retired	Student Hsewife
	<HS	HS	Col	BS	Grad	<\$45K	\$45K+	Prof Tech	Manager	Clerical Sales	Skilled	Unskilled		
Quality of schools and education	100.0	81.9	87.5	75.9	77.8	88.1	77.9	93.3	80.4	87.0	91.3	66.7	83.3	100.0*
Diversity in County economy	80.0	70.1	77.8	63.0	61.5	71.7	73.2	87.0	57.1	75.6	92.3	56.7	76.0	85.7**
Transport of nuclear wastes through County	92.9	89.5	88.9	78.1	83.3	90.3	85.6	89.7	86.3	82.8	100.0	82.6	88.9	100.0
Storing nuclear wastes at Yucca Mountain	90.0	86.3	92.9	90.3	83.3	89.9	92.0	94.3	86.3	88.5	93.5	82.0	95.7	100.0
Crime	84.8	83.5	91.5	86.8	90.0	85.4	92.8	92.3	81.1	90.0	93.5	82.7	86.7	100.0
Expansion of gaming industry	46.7	77.4	69.8	85.7	87.5	72.1	75.4	82.2	67.5	78.8	100.0	58.3	57.1	81.8
Air pollution	83.3	86.7	81.2	75.6	68.4	82.8	78.2	81.9	77.3	81.7	93.1	82.7	75.9	90.9
Job opportunities	77.8	83.8	82.2	69.6	75.0	83.5	75.0	91.5	72.1	76.1	86.7	75.0	78.9	90.0
Traffic congestion	76.5	88.6	87.7	76.1	83.3	85.6	86.9	90.4	79.8	87.1	90.3	84.2	80.0	84.6
Water shortages	87.0	80.9	87.6	82.5	90.9	85.1	83.1	91.4	75.7	80.7	96.0	85.0	87.5	88.9
Overpopulation	70.0	83.2	84.2	81.8	81.8	84.0	84.5	94.5	77.1	75.0	91.3	76.9	79.3	88.2

* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-15c
Percent of Respondents Seeing a Need to Take Action Among Those Evaluating Issue as Serious by Demographic Characteristics

Issue	Length of Residence in Nevada						Remain in Nevada		
	< 1 yr	1-2 yrs	3-4 yrs	5-9 yrs	10-19 yrs	20+ yrs	Yes	Don't know	No
Quality of schools and education	84.4	90.6	73.7	93.5	83.6	78.0	84.7	84.2	81.8
Diversity in County economy	76.2	77.4	56.5	69.2	76.1	75.8	71.8	85.7	71.4
Transport of nuclear wastes through County	87.5	90.9	82.8	88.0	88.7	87.5	88.2	86.4	86.2
Storing nuclear wastes at Yucca Mountain	94.1	94.9	80.0	91.7	87.7	88.2	90.0	87.5	86.2
Crime	93.2	88.9	75.0	88.5	89.0	85.9	86.7	90.9	93.1
Expansion of gaming industry	94.7	75.0	70.0	80.6	63.6	66.1*	75.5	55.6	60.0
Air pollution	86.4	81.3	63.0	79.7	88.2	81.4	82.1	80.0	80.5
Job opportunities	76.9	81.3	82.4	88.6	71.7	84.3	79.5	86.7	82.6
Traffic congestion	77.3	86.0	73.3	88.2	88.2	87.6	85.2	85.7	86.1
Water shortages	82.8	79.5	73.1	85.7	84.7	90.3	84.0	95.8	75.0
Overpopulation	88.6	73.7	70.0	82.8	88.9	80.5	80.8	84.0	90.0

* p < 0.05; ** p < 0.01; *** p < 0.001

**Table 4-16
Demographic Characteristics (by Percent) of Respondents and Non-Respondents to
Yucca Mountain Component of the Survey**

Characteristic		Respondent	Non-Respondents
Gender	Male	55.6	42.6
	Female	44.4	57.4**
Age	18-24 yrs	8.8	11.7
	25-34 yrs	22.8	22.8
	35-44 yrs	20.1	14.7
	45-64 yrs	31.6	27.9
	65+ yrs	16.7	22.8
Ethnicity	White	82.7	68.9
	African American	6.8	9.7
	Native American	2.4	1.5
	Asian/Pacific Islander	1.4	7.7
	Hispanic	6.8	12.2***
Kids	Yes	32.8	39.3
	No	67.2	60.7
Work for DOE	Yes	11.7	4.1
	No	88.3	95.9**
Education	Less than high school	5.8	12.9
	High school diploma	27.7	37.1
	Some college	45.5	33.5
	College graduate	15.4	10.8
	Graduate school	5.5	5.7**
Income	< \$45,000	61.2	73.1
	\$45,000 +	38.8	26.9**
Occupation	Professional/technical	23.7	14.7
	Managerial	30.2	20.3
	Clerical/sales	15.9	23.9
	Skilled labor	8.1	8.1
	Unskilled labor	16.6	10.7
	Retired/disabled	4.1	12.7
	Student/housewife	1.0	7.6***
Length of Residence in Nevada	Less than 1 yr	3.7	21.8
	1-2 yrs	15.0	17.8
	3-4 yrs	9.2	7.6
	5-9 yrs	18.4	14.7
	10-19 yrs	23.5	17.3

	20+ yrs	30.3	20.08***
Intend to Remain in Nevada	Yes	83.0	77.7
	Don't know	7.8	10.7
	No	9.2	11.7
For Respondents, n=295; for non-respondents, n=197. Percentages for demographic characteristics may add to more than 100% due to rounding. * p < 0.05; ** p < 0.01; *** p < 0.001			

Comparisons of the percent of respondents agreeing with statements regarding the effects of the Yucca Mountain Project by demographic characteristics are presented in Tables 4-17a, b, and c. Women were significantly more likely than men to believe the Yucca Mountain Project represented a threat to future generations and less likely to believe the YMP was not as risky as the Nevada Test Site. Native Americans and Hispanics were significantly more likely to believe in the inevitability of nuclear-related accidents and less likely to believe the YMP was not as risky as the Nevada Test Site than blacks and Asian Americans/Pacific Islanders. Respondents with children less than 18 years old were significantly more likely to believe that the YMP would have a negative effect on property values and cause groundwater contamination and significantly less likely to believe the YMP would provide more benefits than harms than respondents without young children. DOE workers and contractors were significantly more likely to believe the YMP would generate more benefits than harms than were other respondents. Belief in the aspects supportive of the Yucca Mountain Project (that it would help the economy, create new jobs, have no effect on the health of those living nearby, not pose a threat to the quality of life or to future generations nor have a negative effect of property values) was significantly associated with education. Respondents with higher household incomes were significantly more likely to believe that the project would help the economy than respondents with household incomes less than \$45,000. This belief that the project would help the economy was also significantly associated with length of residence in Nevada. Respondents who did not intend to remain in Nevada were significantly more likely to believe the project would contaminate groundwater than respondents who intended to remain or were uncertain of their intentions.

Global YMP perception scores were significantly associated with gender and employment in the Department of Energy or DOE contractors, and marginally ($p = 0.1$) with education. These three variables were then entered into a multiple regression model with global YMP perception score as the dependent variable. All three demographic characteristics were significant independent predictors of the overall perception of the effects of the Yucca Mountain Project, collectively accounting for 6% of the variance in global YMP perception score ($F=6.3$; $df = 3,279$; $p < 0.001$).

Table 4-17a
Percent Agreeing with Statement Regarding Effects of Yucca Mountain Project by Demographic Characteristics

Issue	All	Age					Gender		Ethnicity					Kids		Work for DOE	
	(295)	18-24 (26)	25-34 (67)	35-44 (59)	45-64 (93)	65+ (49)	Men (164)	Women (131)	White (243)	Black (20)	Native Am (7)	Asian/ PI(4)	Hispanic (20)	Yes (96)	No (197)	Yes (34)	No (256)
Help the economy	39.5	19.2	41.8	45.8	41.9	35.4	43.6	34.4	41.3	25.0	28.6	25.0	40.0	38.5	39.8	38.2	39.2
Threat to quality of life	63.4	69.2	56.7	64.4	67.7	59.2	59.1	68.7	61.7	75.0	42.9	50.0	80.0	65.6	62.4	50.0	65.2
Threat to future generations	69.5	76.9	62.7	74.6	73.1	61.2	64.6	75.6*	66.3	90.0	85.7	50.0	85.0	74.0	67.5	55.9	71.1
No threat at all	8.5	7.7	10.4	5.2	6.5	14.3	11.0	5.4	9.5	5.0	0.0	25.0	0.0	6.3	9.7	12.5	8.2
No effect on health	16.3	7.7	17.9	16.9	16.1	18.4	21.3	9.9	18.9	5.0	0.0	25.0	0.0	16.7	16.2	23.5	15.6
Negative effect on property values	60.3	69.2	65.7	55.9	58.1	57.1	57.9	63.4	59.7	60.0	71.4	25.0	70.0	68.8	55.8*	50.0	61.3
No effect on tourism or new business	38.0	30.8	32.8	39.0	41.9	40.8	39.6	35.9	39.1	30.0	42.9	25.0	30.0	36.5	39.1	52.9	35.9
Not as risky as Nevada Test Site	24.1	23.1	20.9	22.0	22.6	34.7	29.3	17.6*	27.2	10.0	0.0	50.0	5.0*	17.7	27.4	26.5	24.2
Create new jobs	72.2	65.4	68.7	71.2	77.4	71.4	75.0	68.7	72.4	70.0	57.1	50.0	80.0	68.8	74.1	61.8	73.4
Cause groundwater contamination	50.8	42.3	50.7	50.8	49.5	57.1	47.0	55.7	49.4	60.0	57.1	0.0	65.0	59.4	47.2*	47.1	51.2
Create a bad image for County	48.6	38.5	46.3	47.5	51.6	52.1	43.6	55.0	49.2	40.0	42.9	50.0	55.0	51.0	48.0	35.3	50.6
People will not worry about it	7.1	7.7	4.5	3.4	9.7	10.2	7.9	6.1	7.8	5.0	14.3	0.0	0.0	6.3	7.6	11.8	6.6
Dangers of accidents	83.7	73.1	79.1	89.8	87.0	81.6	81.0	87.0	84.3	65.0	100.0	25.0	100***	82.3	84.2	76.5	84.7
Benefits will outweigh harms	22.7	23.1	23.9	18.6	22.6	26.5	26.2	18.3	24.3	15.0	28.6	25.0	10.0	13.5	26.9**	47.1	19.5***
Mean Perception Score	6.6	6.9	6.5	6.7	6.6	6.4	6.0	7.4*	6.4	7.4	8.0	4.5	8.1	7.2	6.4	4.9	6.8*

(n) number of respondents in parentheses

* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-17b
Percent Agreeing with Statement Regarding Effects of Yucca Mountain Project by Demographic Characteristics

Issue	Education					Income		Occupation						
	<HS (17)	HS (81)	Col (133)	BS (45)	Grad (16)	<\$45K (167)	\$45K+ (106)	Prof Tech (70)	Manager (88)	Clerical Sales (47)	Skilled (24)	Unskilled (49)	Retired (12)	Student Hsewif (3)
Help the economy	23.5	30.9	40.2	53.3	56.3**	33.1	50.9**	52.9	40.9	29.8	50.0	22.4	41.7	33.3
Threat to quality of life	76.5	69.1	63.9	55.6	43.8*	66.5	58.5	60.0	64.0	72.3	58.3	65.3	33.3	100.0
Threat to future generations	88.2	72.8	69.9	64.4	50.0*	70.7	68.9	68.6	67.4	74.5	66.7	75.5	41.7	100.0
No threat at all	6.3	7.4	9.1	8.9	12.5	9.0	9.4	5.8	11.2	8.5	4.2	4.1	36.4	0.0
No effect on health	11.8	6.2	21.8	20.0	18.8*	13.8	20.8	17.1	16.9	10.6	29.2	8.2	41.7	0.0
Negative effect on property values	88.2	58.0	60.2	60.0	37.5*	61.1	58.5	57.1	58.4	68.1	54.2	67.3	41.7	100.0
No effect on tourism or new business	35.3	30.9	42.1	37.8	50.0	41.3	33.0	37.1	41.6	38.3	29.2	34.7	50.0	33.3
Not as risky as Nevada Test Site	17.6	18.5	26.3	31.1	25.0	24.0	27.4	21.4	36.0	14.9	29.2	10.2	41.7	0.0
Create new jobs	58.8	70.4	66.9	93.3	81.3**	70.1	76.4	80.0	77.5	55.3	87.5	59.2	75.0	66.7
Cause groundwater contamination	64.7	53.1	50.4	51.1	37.5	55.1	47.2	45.7	57.3	57.4	41.7	51.0	33.3	33.3
Create a bad image for County	47.1	50.6	47.7	55.6	31.3	49.4	50.0	45.7	53.9	55.3	37.5	45.8	33.3	66.7
People will not worry about it	11.8	7.4	7.5	2.2	12.5	6.0	8.5	8.6	7.9	2.1	8.3	6.1	16.7	0.0
Dangers of accidents	82.4	86.4	84.1	77.8	81.3	84.3	84.0	78.6	89.8	85.1	83.3	83.7	66.7	100.0
Benefits will outweigh harms	29.4	22.2	19.5	24.4	37.5	21.0	26.4	22.9	25.8	14.9	33.3	16.3	41.7	0.0
Mean Perception Score	7.9	7.1	6.7	6.0	4.2	6.9	6.2	6.0	6.6	8.0	5.4	7.5	3.6	9.3

(n) number of respondents in parentheses

* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-17c
Percent Agreeing with Statement Regarding Effects of Yucca Mountain Project by
Demographic Characteristics

Issue	Length of Residence in Nevada						Remain in Nevada		
	< 1 yr (11)	1-2 yrs (44)	3-4 yrs (27)	5-9 yrs (54)	10-19 yrs (69)	20+ yrs (89)	Yes (244)	Don't know (23)	No (27)
Help the economy	27.3	27.3	29.6	44.4	39.1	47.7*	41.2	26.1	37.0
Threat to quality of life	72.7	65.9	48.1	68.5	65.2	61.8	63.5	60.9	66.7
Threat to future generations	72.7	68.2	51.9	68.5	73.9	73.0	68.9	65.2	81.5
No threat at all	0.0	11.4	14.8	9.3	2.9	10.2	9.1	0.0	11.5
No effect on health	9.1	15.9	18.5	18.5	14.5	16.9	17.2	8.7	14.8
Negative effect on property values	63.6	72.7	63.0	53.7	55.1	60.7	59.4	56.5	70.4
No effect on tourism or new business	18.2	43.2	25.9	40.7	31.9	44.9	37.7	26.1	51.9
Not as risky as Nevada Test Site	36.4	25.0	22.2	27.8	21.7	22.5	25.8	13.0	18.5
Create new jobs	63.6	72.7	66.7	75.9	71.0	73.0	74.6	52.2	66.7
Cause groundwater contamination	63.6	47.7	40.7	44.4	47.8	60.7	49.6	39.1	74.1*
Create a bad image for County	63.6	43.2	37.0	51.9	44.1	53.9	48.1	47.8	51.9
People will not worry about it	18.2	6.8	3.7	7.4	8.7	5.6	7.8	0.0	7.4
Dangers of accidents	90.0	79.5	85.2	79.6	87.0	84.3	84.4	73.9	84.6
Benefits will outweigh harms	18.2	29.5	25.9	25.9	23.2	16.9	23.4	21.7	18.5
Mean Perception Score	7.3	6.7	6.3	6.3	6.7	6.7	6.5	6.7	7.4

(n) number of respondents in parentheses
* p < 0.05; ** p < 0.01; *** p < 0.001

Analysis of Sources of Information

Television and local newspapers were reported by respondents who answered the Yucca Mountain component of the survey as the major sources of information about the proposed repository. Tables 4-18a, b, and c display these and other sources of information about the Yucca Mountain Project by specific respondent demographic characteristics. Sources with fewer than ten responses were excluded from these analyses because of the small sample size. Information from local newspapers was significantly associated with increasing age, having children less than 18 years old, and education.

The extent of information about the Yucca Mountain Project from all of the listed sources and the extent of trust in each source is presented in Table 4-19. Information was most often received from television and local newspapers and least often received from government sources, church, and non-local newspapers and radio programs. The greatest level of trust was placed in information obtained from family/friends/co-workers and from church. Trust in the information was significantly correlated with extent of information received from local newspaper, television, family/ friends/co-workers, and magazines. However, caution must be exercised in interpreting these results because of the small number of respondents who answered the questions regarding trust in each information source.

Extent of information from each source was also compared with the global YMP perception scale scores to determine if perceptions regarding the potential effects of the Yucca Mountain Project were influenced by reliance upon particular sources of information. Table 4-20 displays the results of this comparison as negative perceptions of YMP by source of information. Individuals who seldom received information from magazines and from the Department of Energy had a significantly lower YMP perception score, reflecting an attitude more in support of the effects of the project than respondents who either never or who often received information from magazines or DOE sources. The YMP perception score was also significantly associated with extent of receiving information from other (non-DOE) federal government sources, indicating that the greater the extent one receives information from these sources, the more favorable the perception of the effects of the project.

Table 4-18a
Source of Information about Yucca Mountain Project by Demographic Characteristics

Issue	All (295)	Age					Gender		Ethnicity					Kids		Work for DOE	
		18-24 (26)	25-34 (67)	35-44 (59)	45-64 (93)	65+ (49)	Men (243)	Women (131)	White (243)	Black (20)	Native Ameri (7)	Asian P.I. (4)	Hispanic (20)	Yes (96)	No (197)	Yes (34)	No (256)
Local newspapers	31.2	15.4	18.5	29.3	44.1	34.7***	59.3	40.7	31.3	20.0	28.6	50.0	40.0	21.3	36.2**	26.5	31.6
Non-local newspapers	4.8	4.0	5.0	3.6	2.4	11.4	7.1	1.8*	4.5	5.6	0.0	25.0	6.7	4.5	5.1	0.0	5.5
Locally-based radio programs	8.0	3.8	6.2	11.9	7.8	6.7	7.0	9.4	7.6	5.3	28.6	0.0	11.8	8.4	7.9	15.6	7.2
Television	32.9	30.8	25.8	36.2	39.1	28.6	29.3	37.5	32.0	35.0	42.9	25.0	42.1	27.7	35.2	44.1	31.2
Friends/family/coworkers	15.5	7.7	12.5	23.2	15.7	14.9	16.4	14.5	16.7	5.3	28.6	0.0	10.5	14.1	16.4	18.2	14.7
Magazines	3.5	7.7	1.6	6.9	1.1	4.3	3.1	4.0	3.4	5.0	0.0	0.0	5.6	5.4	2.6	5.9	3.3
U.S. Dept of Energy	4.2	3.8	0.0	3.4	6.5	6.5	3.1	5.6	3.8	5.0	0.0	25.0	5.3	3.2	4.7	3.0	4.4
Associations/concerned citizens groups	4.6	8.0	3.2	5.1	3.3	6.7	3.2	6.3	5.1	0.0	0.0	0.0	5.9	3.2	5.3	5.9	4.5

(n) number of respondents in parentheses
 * p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-18b
Source of Information about Yucca Mountain Project by Demographic Characteristics

Issue	Education					Income		Occupation						
	<HS (17)	HS (81)	Col (133)	BS (45)	Grad (16)	<\$45K (167)	\$45K+ (106)	Prof Tech (70)	Manager (88)	Clerical Sales (47)	Skilled (24)	Unskilled (49)	Retired (12)	Student Hsewif (3)
Local newspapers	23.5	23.5	31.8	40.9	53.3**	32.7	32.4	30.9	39.8	36.2	33.3	12.2	25.0	33.3
Non-local newspapers	0.0	4.1	5.6	5.0	7.1	5.2	5.3	5.2	7.5	0.0	8.3	2.1	8.3	0.0
Locally-based radio programs	6.7	5.1	9.2	11.1	7.1	6.8	8.8	9.0	6.9	13.0	4.3	2.1	18.2	33.3
Television	23.5	30.0	32.1	40.0	43.8	33.7	32.4	31.9	30.7	40.4	17.4	34.7	41.7	66.7
Family/friends/coworkers	5.9	15.6	12.6	24.4	28.6	16.0	17.0	19.4	16.7	17.4	17.4	8.3	9.1	0.0
Magazines	0.0	1.3	3.1	11.4	0.0	5.0	1.9	3.1	3.5	0.0	8.7	6.1	0.0	0.0
U.S. Dept of Energy	5.9	2.5	3.8	9.1	0.0	3.0	5.9	3.0	4.7	4.3	0.0	4.1	9.1	33.3
Associations/concerned citizens groups	0.0	2.6	4.7	11.1	0.0	5.7	2.9	3.0	4.7	6.5	4.2	4.3	0.0	33.3

(n) number of respondents in parentheses
 * p < 0.05; ** p < 0.01; *** p < 0.001

Table 4-18c
Source of Information about Yucca Mountain Project by Demographic Characteristics

Issue	Length of Residence in Nevada						Remain in Nevada		
	< 1 yr (11)	1-2 yrs (44)	3-4 yrs (27)	5-9 yrs (54)	10-19 yrs (69)	20+ yrs (89)	Yes (244)	Don't know (23)	No (27)
Local newspapers	36.4	35.7	33.3	31.5	26.1	31.8	31.5	34.8	25.9
Non-local newspapers	10.0	2.7	8.0	7.8	3.1	3.7	4.4	5.0	8.3
Locally-based radio programs	0.0	7.0	11.1	13.0	3.0	9.4	8.1	13.6	3.7
Television	27.3	39.5	25.9	34.0	27.5	36.4	32.8	47.8	22.2
Friends/family/coworkers	33.3	11.6	11.1	17.6	8.8	21.4	15.0	13.6	23.1
Magazines	0.0	7.3	3.7	3.9	4.3	1.2	3.0	4.5	7.4
U.S. Dept. of Energy	0.0	2.3	3.7	3.9	2.9	6.8	3.8	4.5	7.4
Associations/concerned citizens groups	0.0	2.3	7.7	6.1	5.9	3.5	3.8	4.8	11.5

(n) number of respondents in parentheses

Table 4-19
Extent of Information and Trust in Information Received by Source

Source	Extent			Trust			Correlation
	n	mean	SD	n	mean	SD	r
Local newspapers	292	1.1	0.7	226	1.0	0.4	.17**
Non-local newspapers	269	0.3	0.5	64	1.1	0.6	-.01
Locally-based radio programs	286	0.6	0.6	148	1.1	0.5	.14
Radio programs originating outside Clark County	261	0.1	0.3	36	1.0	0.5	-.02
Television	292	1.2	0.6	261	1.0	0.5	.19**
Family/friends/coworkers	283	0.6	0.7	144	1.3	0.5	.33***
Magazines	284	0.3	0.5	85	1.1	0.5	.28**
U.S. Dept of Energy	287	0.3	0.6	98	0.7	0.6	-.06
Other federal government sources	284	0.2	0.4	56	1.0	0.6	.25
State government sources	281	0.1	0.4	46	0.9	0.5	.19
County government sources	282	0.1	0.4	45	0.9	0.5	.24
City/town government sources	279	0.1	0.4	43	0.9	0.5	.12
Associations/concerned citizens groups	283	0.2	0.5	62	1.0	0.5	.06
Church	275	<0.1	0.3	33	1.2	0.5	.23

* p < 0.05; ** p < 0.01; *** p < 0.001

**Table 4-20
Negative Perception of Yucca Mountain Project by Source**

Source	Never			Seldom			Often		
	n	mean	SD	n	mean	SD	n	mean	SD
Local newspapers	67	6.7	5.1	131	6.6	4.4	89	6.6	4.5
Non-local newspapers	208	6.8	4.6	43	6.1	4.3	13	6.6	5.4
Locally-based radio programs	139	6.9	4.3	119	6.2	4.8	23	7.6	4.9
Radio programs originating outside Clark County	228	6.6	4.6	28	7.1	4.3	1	0.0	0.0
Television	31	7.1	4.4	162	6.6	4.6	94	6.5	4.8
Family/friends/coworkers	143	7.0	4.2	93	6.5	4.8	42	5.6	5.3
Magazines	207	7.0	4.4	62	5.3	4.8	10	7.8*	5.0
U.S. Dept of Energy	196	7.1	4.4	74	5.3	4.7	12	7.1*	4.4
Other federal government sources	242	7.1	4.5	31	4.1	4.2	6	3.5***	5.3
State government sources	242	6.9	4.5	27	5.1	4.5	7	5.6	5.1
County government sources	247	6.7	4.6	26	6.7	4.0	4	6.8	5.6
City/town government sources	243	6.6	4.6	27	6.6	4.2	4	6.8	5.6
Associations/concerned citizens groups	227	6.8	4.4	38	5.1	4.9	13	7.6	5.1
Church	251	6.7	4.5	18	6.1	4.8	1	12.0	-

* p < 0.05; ** p < 0.01; *** p < 0.001

4.4 SUMMARY AND CONCLUSIONS

Earlier research (see IAI's *Site Characterization Sociocultural/Risk Report*, March 1994) has suggested that the socioeconomic impacts in Clark County from the proposed Yucca Mountain repository program will likely be shaped by two factors: 1) the attributes and associated actions of the repository program itself, and 2) the local context in which those attributes and actions will be played out. A monitoring tool such as the telephone survey reported in this document provides a means 1) to evaluate how county publics perceive the proposed repository and 2) how these perceptions are related to the on-going stream of events within the Clark County socioeconomic context. Stage one of the Clark County Nuclear Waste Repository Program's telephone survey was conducted in FY93. That survey provided useful insight about the types of issues of concern within the socioeconomic context of the county. The stage one survey revealed, for example, that crime/gang issues were the most often named by the survey

respondents (named by almost 42% of the 243 respondents) when asked to list the top five major issues facing Southern Nevada today. Other issues of major concern were overpopulation/increase of people (29%), environmental quality, traffic concerns, and water problems (each approximately 20%), and issues related to nuclear waste were mentioned by almost 12% of the sample. These findings are the basis for this first monitoring survey to assess how repository-related concerns are evaluated relative to these other types of issues that county residents identify as important.

The stage-two, or Phase II, telephone survey used a random sampling design to collect monitoring data about public attitudes, actions, information sources regarding the Yucca Mountain Project and its perceived effects on Clark County. Two types of variables were collected in this survey: 1) demographic characteristics (e.g., age, gender, ethnicity, occupation, education, marital status, family status, length and place of residence, and household income) of the study respondents, and 2) their perceptions about important issues -- including nuclear waste storage and transportation issues -- related actions, and information sources in the County. Unlike the stage one survey which did not explicitly ask questions regarding the proposed Yucca Mountain repository, the stage two survey had a section devoted to this subject. This section was introduced delicately, and respondents had the option of whether or not to answer the Yucca Mountain-specific questions. This approach was taken in an attempt to minimize respondent frustration and successfully complete interviews.

A total of 492 respondents were interviewed, and 295 of those willingly answered questions directly related to the Yucca Mountain Project. From the survey data analyses, there is now a larger understanding about the relative salience of the Yucca Mountain Project and other issues of concern in Clark County, actions and behaviors about those issues, information sources and evaluation the perceived effects of the Yucca Mountain Project, and other views about the proposed repository.

The survey was designed by Impact Assessment, Inc. under consultation with the Clark County Nuclear Waste Division and guidance by the program's Peer Review Committee. Southwestern Associates administered the survey and supplied Impact Assessment with a database for analyses. Several findings from this monitoring survey are noteworthy:

- Gender, ethnicity, education, number of children, and other demographic variables seem to indicate differences in local risk perceptions. For example, in response to questions in this survey directed towards the proposed repository, women were significantly more likely than men to believe the YMP represented a threat to future generations. An implication of this finding is that the more diverse the perceptions about the repository the more potential there is for conflict among elements within the Clark County socioeconomic context.
- Native Americans and Hispanics were significantly more likely than other ethnicities

to have the view that there are dangers of accidents that cannot be avoided when transporting nuclear wastes to the proposed repository. An implication of this finding is that these populations may require more focused work to understand why they perceive special risks associated with the transportation of materials to the proposed repository.

- Respondents with children were significantly more likely than those without to believe that the proposed repository would have a negative effect on property values and cause groundwater contamination. They were also less likely to believe the YMP would provide more benefits than harm. This finding is consistent with findings by the state and with other research about perceived risks (*c.f.*, Flynn *et al.* 1990).
- Concern about the transportation of nuclear wastes through Clark County, as well as general concerns related to traffic congestion, were significantly associated with increasing age. High levels of education, on the other hand, were inversely associated with concern about the transportation of nuclear wastes through Clark County. These findings will require more data to understand the statistical associations presented here.
- Students and homemakers rated the quality of schools and education and overpopulation as more important than the Yucca Mountain issues. These near-term problems are can easily be understood as more salient in the minds of this population group than concerns about a program that has a much longer term horizon. However, to the extent that YMP developments impact schools and other education issues, rising population, or other salient concerns of this sub-group, then the proposed repository is likely to be evaluated according to its impact on these issues.
- In all, the proportions of respondent who rated the storage and transportation nuclear waste, traffic congestion, diversification of the County's economy, and overpopulation as the very serious issues, were significantly associated with length of residence. This finding is important because it suggests that those who are vested in Clark County as a place to live long term are ones who are likely to become involved in responding to issues related to repository developments.
- More than 13% of all the survey respondents reported taking some action concerning nuclear waste issues. Only concerns about education and crime were reported as resulting in actions taken by respondents more frequently than their concerns about YMP issues. An implication of this finding is that although the proposed repository is an important enough concern for county publics that they perceive the need to do something despite the long-term horizon of the actual construction and operation of this facility.

- According to survey responses, local newspapers and local television stations are the most important sources of information about the Yucca Mountain Project. These major information sources will be important for the county to monitor in the future to assess the messages that publics are getting about the YMP and how these messages are likely to affect perceptions about risks associated with the project.
- 60% of the 295 responses to statements concerning attitudes about the proposed repository indicated that if the repository is eventually built the overall benefits will not outweigh the harms. This is a significant finding because it suggests that in a time where publics are concerned about economic diversification, jobs, and overall growth in the quality of life in Clark County, the proposed repository is **not** assessed as a benefit to the reasons why people want to make the county their home.

It should be noted that with the quantity of data and high number of comparisons made, statistical significance is sometimes achieved on the basis of chance alone, and the issues in this should be investigated and monitored in future surveys to better understand and keep track of trends in the general population. With appropriate adjustments made according to time and review, the structure of this survey will lend itself well to future monitoring information about specific risk perceptions, actions, and information sources relating to the proposed Yucca Mountain repository and the salience of repository-related concerns in Clark County.

5.0 BEHAVIORAL RESPONSE TO SOCIOCULTURAL/RISK CONCERNS

This chapter considers the behavioral responses to perceptions of risk in Clark County. The study effort consisted of: (1) an examination of organizational responses to the broad range of risk concerns (e.g., crime, education, water supply) identified in our initial survey; (2) a more narrow examination of the specific concerns and behavioral actions taken by the selected organizations in response nuclear waste transportation and storage issues associated with the Yucca Mountain Project; and (3) an examination of the processes by which these risk perception have led to action and social consequences and the formulation of a preliminary explanatory model.

5.1 PURPOSE AND ORGANIZATION OF THE CHAPTER

This chapter develops a framework for investigating the process of organizational response to perceptions of risk about the Yucca Mountain repository. The effort builds upon Deliverable 94-7, *Behavioral Pilot Study, A Work-in-Progress Report* which focused on the processes through which two Las Vegas-based organizations, Seniors United and The Greater Las Vegas Association of Realtors, have responded to their risk concerns. This chapter expands that focus to include a wider range of groups and organizations and the processes underlying their response to perceptions of risk. A second area of analysis is added by the inclusion of data on individual actions and behaviors derived from the Phase II survey effort that was completed following the submission of the *Behavioral Pilot Study*.

Earlier research conducted under the auspices of the Clark County Nuclear Waste Division (NWD) and others (such as the State of Nevada studies) indicates that the public perceives that a wide range of risks are associated with the proposed high-level nuclear waste repository at Yucca Mountain. While risks have been identified in a number of different areas, comparatively little work has been done to determine whether and/or how the public has responded, or is currently responding to these perceptions. Understanding the processes through which the public reacts to those issues perceived as risky is important to planners seeking to understand the kinds of social impacts that could accompany development of the facility. Further, such information is a key element of the socioeconomic impact analysis enterprise, since the an understanding of the behavioral correlates of 'risk perception' data provide the foundation for quantitative measures of impacts and the cornerstone of projected future impacts. That is, this information will help in developing an understanding of how people's ideas and perceptions relate to how they ultimately act, and the processes by which this occurs.

Regarding the proposed Yucca Mountain repository, area residents hold a variety of perspectives on how the Project may affect their lives. Some residents expect that the project will have

beneficial results while others believe it is largely, if not completely, negative in nature. Still others have mixed ideas on the potentialities of the YMP. These perspectives are discussed in further detail in the ethnographic sociocultural/risk component of this report (Chapter 3). On the group level, data from organizations interviewed also demonstrate a range of perceptions on the subject, with a number of groups showing marked internal divisions.

Understanding the kinds and range of ideas residents have about the Yucca Mountain Project and the manner in which these are distributed among the region's population is important to planning entities and policy makers interested in public opinion about the repository. Of equal importance is the process through which those ideas manifest in behavior. These kinds of questions are obviously critical for local government and others anticipating possible future change, but can only be addressed by gauging how residents have, are, or will respond to the associated perceived risks, and by assessing the nature of that reactive process. This concern is emphasized in the *Scope of Work for Fiscal Year 1994*:

The Clark County Peer Review Committee has argued that the study program, in order to address the legitimate needs of local government (which may increase dramatically if recent efforts to designate a federal interim storage site at Yucca Mountain are successful), must be increasingly concerned with *behavior*. What do people actually *do* in response to perceived risks -- particularly those posed by the proposed repository -- and how are those behaviors likely to affect public policy? Inevitably, regardless of how well public risk perceptions, beliefs, attitudes, stigma effects, image effects, etc., are documented, legislators, utility representatives, and the public will be asking what it all means in terms of actual behavior.

To investigate possible links between risk explanations and behaviors, data were collected to describe the actions that have been taken and are being taken (and might be taken); the outcome of known behaviors; and the rationales motivating action.

As part of the process of identifying the behavioral correlates of risk perceptions among organizations, we have also sought to identify the point at which groups have decided to take an action. The process of developing a "threshold model" is discussed at length in the Behavioral Pilot Study Addendum. Our research methodology is designed to assist in understanding *how, when, and why a group reaches a threshold and takes an action*. The research in the case analyses has been directed toward: (1) establishing organizational thresholds in relation to particular issues; (2) examining the organizational factors that influence how the issue is treated; (3) identifying the dynamic variables that can influence the organization's responses to issues, including external events and information; and (4) identifying the behavioral repertoire and sequence in which different actions are considered and taken by the group.

This chapter is comprised of four sections. This introduction is followed by Section 5.2, Methods, Procedures, and Data Sources, which reviews the research methods utilized to gather

the data and conduct the analysis. Section 5.3, Findings, provides the preliminary results of the work and analysis of the findings. This section is divided into two major subsections, covering group and individual analyses. Section 5.4 provides a summary and conclusion.

5.2 METHODS, PROCEDURES, AND DATA SOURCES

This section describes the methods, procedures, data sources, and sampling techniques used in the current behavioral research. Two principal methodological strategies were used to gather data for analysis of the links between perception and behavioral outcomes: face-to-face interviewing and a county-wide telephone survey. The methods of data collection, the topical content of the data collection queries and the sampling strategy are summarized in this section.

5.2.1 Interviewing and Survey Research

In-depth, face-to-face interviews were conducted with key members of organizations identified as attentive to a wide range of social issues in the Southern Nevada region. The interviews were used to gather in-depth information about the way organization leadership and members have responded and are currently responding to risk perceptions, and to determine their ideas about possible future action. These types of interviews were designed to elicit: (a) information about the basic mandate of the group, and perceptions about issues that are seen to require group attention; (b) information about the organizational structure of the group, particularly as regards decision-making and the process through which the groups reach a point at which they will take action on a given issue; (c) information about how the groups and members have responded in the past to the kinds of issues outlined in the Phase I-Stage I Survey (i.e., crime, population growth, water, pollution, and the repository, among others); and, (d) data about anticipated future responses to specific areas of concern.

The Phase II survey research was conducted with a sample of 492 telephone interviews. The survey was designed, in part, to provide specific data on actions and behaviors and to allow analysis of the correlation between a large number of perception and respondent attributes and behavioral issues.

For detailed information on ethnographic interview content, the reader is referred to the methodology section of the ethnographic sociocultural/risk studies in Chapter 3 of this report. For an extended discussion of the survey component of the research the reader is referred to Chapter 4 of this report.

5.2.2 Sampling

As noted in the *Scope of Work* (IAI May 1994:6), the behavioral study is intended to include a

variety of interest groups and other organizations active in the region. Each of the groups selected for study are known as influential in the community, with the assumed ability to amplify or dampen public response, and to galvanize sentiment and organize action. These characteristics were part of the rationale for including the groups in the sampling frame. Thus, group selection does not represent a random sample, but is purposive, and based on prior research conducted for the NWRP "*Attentive Publics Report*" (IAI 1991), subsequent fieldwork, and ongoing research about the social dynamics of the County.

It should be noted that this effort to examine organizational behavioral responses to perceived risk has proceeded through a number of steps. The initial step involved a preliminary examination of selected organizations, believed to be representative of those organization that were relatively quiescent in terms of behavioral actions, and therefore a valid test of whether or not behavioral correlates of perceptions could be identified. This initial investigation, while it did reveal some actions, did not yield sufficient confidence to proceed with the larger study effort -- a sufficient basis for generalizing the conclusions to other organizations in Clark County was not apparent. Additional effort was therefore committed to the development of a model that might enable the NWD to identify thresholds at which actions could be predicted or anticipated. This addendum, by providing a more concrete and defensible approach to interpreting or understanding the association between risk perceptions and behaviors proved sufficient to allow the larger study effort, including use of the full interview protocol and inclusion of the entire list of key organizations.

The investigation ultimately yielded anticipated results in some areas and surprises in others. The original thrust of the organizational behavioral study effort was to amass the broadest possible array of behaviors taken or available to organizations, identify actions taken in response to specific risk perception stimuli. This effort revealed the expected results. Clark County organizations did have extensive histories of responding to risk issues considered pertinent to their particular concerns, and sometimes to issues (if sufficiently pervasive or intense) seemingly outside their basic mandates. Organizational response to Yucca Mountain specific concerns, in the areas of transportation and storage of nuclear waste, revealed rather limited results. These results, however, are consistent with the threshold model in the sense that few organizations in Clark County have been organized with such issues as elements of their mandates or articles of incorporation. Nevertheless, in several cases, existing mandates have been interpreted (perhaps stretched) to encompass Yucca Mountain-related issues and actions, in response to specific risk perceptions, have been taken by specific organizations. These organizations can be considered more likely to act in similar ways in the future. Another cluster of organizations, however, acknowledge having rarely taken action on any of the issues they have identified as significant, and do not expect to do so in the future. The structural characteristics -- history, mandates, resources, hierarchy, etc. -- of these organizations provides a strong basis for predicting the nature of their future response to risk perceptions and a picture of the thresholds that must be exceeded before such actions are taken.

Sampling for the survey component was designed to provide statistically valid results for a random survey of county residents. Sampling issues for the survey data are discussed in detail in Chapter 4.

5.2.3 Analytical Framework

As noted, this study builds upon a *Behavioral Pilot Study* (Deliverable 94-7) submitted earlier. The rationale and research design for the current work is similar to the earlier research, but expands the scope to include a broader treatment of area organizations and encompasses action and behavior data from the survey effort. That is, this report covers a wider range of groups and organizations, seeking to continue to develop a typology of groups in terms of mandate, decision-making structure, collective perceptions about important issues, and kinds of actions or behavioral response available. Each of the groups has different constituencies, tends to see specific issues in the county as important and evaluate the same event in different ways, and often choose different behavioral responses. Thus, examining a wide range of groups provides a more complete picture of behavioral response to risk perception of the Yucca Mountain Project and other regional issues.

While all informants were questioned about the reactions of their groups to perceptions of risk, the data obtained was not consistent across the sample. Some organizations are more active than others, and this study focuses on the more active organizations, and those groups from which the most complete information was available.

The quantity and quality of information recovered *per issue* also varies across the sample. Some organizations deal with certain issues more than do others, and are more likely to have significant perspectives and behavioral responses to them. For instance, labor organizations are more likely to deal with the issue of the potential employment opportunities available through the Yucca Mountain Project than are environmental interest groups, which tend to focus on the potential impacts of the project. We have thus chosen to examine the issues that the volume and quality of data indicate are most important for each organization.

Our analysis is conducted in a step-wise fashion. We first provide a simple taxonomy of groups and organizations. That is, we categorize each group in terms of the kind of mandate that drives its activities, i.e., whether it is economically-oriented, whether it is environmentally-oriented, and so forth. Categorization simplifies comparison within and across groups and allow patterns in the data to be more easily recognized and described.

To assist in analyzing results, we have developed a threshold model for charting group actions. Because public perception of the YMP is a dynamic process, as is the project itself, the model must accommodate the entry of new groups into the picture. As new repository-related issues surface, it is possible that new groups will form or that existing ones will alter their mission in

response, and modeling action thresholds and behavioral outcomes must accommodate these possibilities. This modeling and monitoring process is discussed in the final section of this chapter.

5.3 FINDINGS

In this section, findings regarding organizational and individual behaviors are presented in separate subsections. Information on organizational behaviors derive from face-to-face interviews, whereas data on individual behaviors derive from survey efforts.

5.3.1 Organizational Perceptions and Behaviors

This section is divided into three subsections. In the first subsection, group behavioral descriptions are provided. In the second subsection, a summary of group behavioral descriptions is provided, primarily in matrix form. In the final subsection, a threshold identification model is presented for the analysis of group behaviors.

Group Behavioral Descriptions

This section describes pertinent aspects of selected organizations included in the study. The basic purpose and decision making traits of the groups are displayed in Table 5-1. This is followed by descriptions of the behavioral repertoire used by a selection of groups in response to their issues of key concern.

Each of the organizations included in the study is different in terms of membership, organizational structure, and function. Only by looking at a range of groups can we investigate the variety of decision-making structures, perspectives, and behavioral responses, and provide a general analysis of the relation between risk perception and behavior.

The following table, Table 5-1, presents a taxonomy of the organizations included within the study frame. The groups are presented in terms of sector and subsector (or constituent) category.

**Table 5-1
Taxonomy of Clark County Organizations**

Sectors	Sub-Sectors	Organizations	Mandate/ Mission	Decision Making Traits
Community Business and Growth	Multi-Sector	Las Vegas Convention and Visitors Authority	Manage activities at Convention center; promote Las Vegas as a tourist destination	-Quasi-government -No members; -Funded by hotel room tax; -Paid staff
		Nevada Development Authority	Attract new business to community; diversify local economy	-Large membership; -Paid staff; -Member and government funded
		Las Vegas Chamber of Commerce	Represent interests of business in the community; enhance local business environment	-Large membership; -Highly structured; -Paid staff
		Downtown Progress Association	Represent interests of downtown casinos	-Not interviewed; only management in member company
	Single Sector	Independent Nevada Casino Operators	Represent interests of independent casino companies	- Loose organization - Reactive - Statewide - Legislative and regulation focus
Community Business and Growth	Single Sector (continued)	Professional Insurance Agents Association	Represent interests of the insurance industry	- Low local autonomy; - State level action

(continued)		Associated General Contractors	Represent commercial construction industry	<ul style="list-style-type: none"> - Highly structured; - Paid staff; - Coalition member - Member funded; - National and state affiliations
		Greater Las Vegas Association of Realtors	Protect rights of private property owners	<ul style="list-style-type: none"> - Highly structured; - Paid Staff; - Coalition member - Member funded - National and state affiliations
		Southern Nevada Home Builders Association	Represent interests of builders in Southern Nevada	<ul style="list-style-type: none"> - Highly structured; - Paid staff; - Coalition member - Member funded - National and state affiliations
	Private Businesses	Bank of America	N.A.	<ul style="list-style-type: none"> - Nat'l corporation - Local political decision making by leadership
		Mirage Resorts	N.A.	<ul style="list-style-type: none"> - Size - Wealth - National interests
	Professional Interests	Clark County Medical Society	Medical service organization	<ul style="list-style-type: none"> - Local membership - Paid staff - State affiliation - Member funded
		Nevada State Medical Association	Represent interests of physicians in Nevada	<ul style="list-style-type: none"> - - Political/legislative - Separate PAC - Statewide membership - Membership funded - Small paid staff

				- Formal board and house of delegates from County Societies
Concerned Citizens	Single Sector	Nevada Tax Payers Association	Monitor fiscal aspects of state legislation	- Statewide organization - Small active staff
		The National Conference of Christians and Jews	Promote human rights and open communication	- National affiliation; - Paid staff
		Campaign for Nevada's Future	Opposition to a monitored retrievable storage facility in Nevada	- Group in planning stage, does not yet exist
		Nevada Concerned Citizens	Promotion of constitutional and moral government	- Local to C.C. may expand to Nevada - Small decision making body - Volunteer staff - Variable membership by issue - Autonomy
	Multi-Sector	Soroptimists	Women's service organization focusing on education, environment, economic and social development, health, human rights, and international goodwill	- Highly structured; - Extremely democratic - Volunteer leadership; - High Autonomy; - High mobilization
		Citizen Alert	Protection of human rights and the environment	- Medium-large membership - Formal decision structure around State - Small paid staff;

				<ul style="list-style-type: none"> mostly volunteer - Statewide, with strong Clark Co. organization
		League of Women Voters	Promotion of citizen involvement and informed voting	<ul style="list-style-type: none"> - Nat'l affiliation - Statewide organization - Small membership - Consensus decision making - Active membership
Population Sub-Groups	Ethnic/ Business	Latin Chamber of Commerce	Representation of economic, social, and political interests of Latino community	<ul style="list-style-type: none"> - Highly structured; - Paid staff; - Highly autonomous
		Black Chamber of Commerce	Represent interests of African American community	<ul style="list-style-type: none"> - Local to Clark Co. - Board with broad social concerns
	Religious	Church of Jesus Christ of Latter Day Saints	Religious and humanitarian services	<ul style="list-style-type: none"> - Highly structured; - Highly centralized - Low unit autonomy; - Non-political
	Age Cohort	Parent Teacher Association	Represent interests of education in community and state legislature	<ul style="list-style-type: none"> - Highly structured - Nat'l affiliation - Local decision making - Large membership - Democratic decision making
		Seniors United	Represent interests of senior citizens in community and	<ul style="list-style-type: none"> - Small organization - Influential

			political issues	leadership - Volunteer leadership - Membership votes on endorsements
Labor	Government Related	American Federation of Government Employees-- Hoover Dam Chapter	Represent interests of Federal government employees	
		Clark County Teacher's Union	Represent interests of teachers	- Paid staff - Nat'l and State affiliation - Formal and democratic decision structure
	Business Related (all part of well-organized semi-hierarchical coalition)	Culinary Workers Union	Represent interests of culinary workers	- Large membership - Paid staff - Local members - Centralized leadership
		Laborers (Hodcarriers) Union	Represent interests of Hodcarriers and construction miners	- Nat'l affiliation - Local membership - Leaders with strong advisory role - Paid staff
		Building Trades Council/Central Labor Council	Represent interests of labor unions in community and state legislature	- BTC: Formal structure for political decision making - CTC: Wide scope given to leaders for political decisions

Resource User Interests	Multi Mission	People For the West	Support multiple use of public lands	- Coalition structure; - Small local membership; - Locally disorganized
		Nevada Mining Association	Represent interests of mining industry in Nevada	- Highly structured; - Paid staff - Member funded
		Farm Bureau	Represent interests of agriculture with local and federal agencies and legislature	- Large membership; - Highly structured; - Paid staff - Highly democratic
	Single-Mission	Southern Nevada Off Road Enthusiasts	Protection of off road vehicle access to public lands	- Local focus - Loosely organized; - Highly autonomous
		Desert Livestock Producers	Protection local ranchers' interests	- Local focus - Loosely organized; - Highly autonomous
Environmental Interests	Non-Profit	The Nature Conservancy	Protection of endangered species and unique habitats	- National affiliation; - Autonomous; - Highly structured; - Paid staff
		Red Rock Audubon	Promotion of birding and protection of bird habitat	- National affiliation; - Autonomous; - Volunteer staff
	General	Sierra Club	Environmental	- National

			protection and promotion of outdoor activities	Affiliation; - Highly Structured; - Reactionary
Nuclear Interests	Pro-Study	Nevada Nuclear Waste Study Committee	Assuring the scientific study of Yucca Mountain and benefits for Nevada	- Large membership - Funded by nuclear industry organization - Paid staff
Arts and Culture	Specific Interest	Historical Society	Supporting education on Nevada's history and environment	- Government agency; - Few members

Groups with different organizational structures and functions perceive issues differently, and evaluate their behavioral options in different ways. They may initiate a range of actions based upon their structure and perceptions, among other factors. We begin by describing the individual groups. This is followed by a summary of behavioral responses. Finally, a behavioral analysis framework is discussed and an analysis presented. Through these means, as developed in the *Scope of Work* and other research design elements, it is intended that the perceptions and actions of a range of groups can be monitored as a proxy for more extensive or intensive types of research on the changing nature of the County's social context.

Specific Group Descriptions

This section provides descriptive information on the behaviors discussed by representatives of subsample of the organizations contacted. While Chapter 3 considered group alliances, this chapter looks instead at action. These groups provide a cross-section of the total sample of groups interviewed. For the interested reader, other group descriptions may be found in the ethnographic sociocultural/risk studies section of this report (Chapter 3) and the previously submitted *Behavioral Pilot Study* and *Behavioral Pilot Study Addendum* (IAI Deliverable 94-7, November 1994). As an exploratory initial effort, our objective was intended to be representative, not comprehensive (the selection of organizations was derived from the *Attentive Publics Report* [IAI, 1991]).

Following are group behavior descriptions for eight organizations, spanning a variety of group types. The groups included here are The Greater Las Vegas Association of Realtors, Nevada

Taxpayers Association, Soroptomists, Seniors United, Nevada Mining Association, Desert Livestock Producers, Red Rock Audubon, The Nature Conservancy, Nevada Nuclear Waste Study Committee, and Citizen Alert.

The Greater Las Vegas Association of Realtors

The Association of Realtors' political action takes several different forms. On the local level, once a position is taken by the Board of Directors the most common method of taking political action is to activate the association's "legislative tree." This "tree" is a network of contact between the Association of Realtors and government officials. Primarily the legislative tree originates with the Political Affairs Committee and spreads to include other realtor members. Through this system the organization's concerns and opinions are quickly communicated to policy makers. As the interviewee explained:

Most of the time somebody in our organization is friends with each of the council members that are involved. So we're able to call those people . . . Say it was me. Say [the issue involved] the county commissioner for the district I live in . . . I'd call them. Then I'd also call five of six other realtors that live in the district and have them call that commissioner also.

Political actions the association utilizes on the state level are more varied. The group may activate a similar legislative tree to the one used on the local level. The informant stated that when there is an issue before the legislature that they disagree with, he and other members of the Association would "talk to the people we know, the legislators we've been in harmony with over these last months and years." Additionally, State legislators are frequently written, telephoned, telegraphed, or faxed by Association members when important legislation on real estate, taxes, or other issues central to the mandates of the organization is up for vote.

Lobbyists are also an important part of the Association of Realtors political action strategy. They are reportedly very effective in presenting the Association's opinions and concerns to State Legislators. The Association employs a full time executive officer that organizes the lobbyists and their efforts in the legislature.

Supporting political candidates that best represent the interests of real estate and the private property owner, as well as opposing those which do not, is an important activity for the Association.

We have to be united. We have to be prepared to fight. We do fight . . . We don't just fight back with money. We fight back with bodies and with telephones. If we see a candidate that comes along that is against us, we'll go to whatever means it takes to try to defeat that candidate. And we have made the

difference in some elections. We plan to continue that . . . You can't just sit by.

The Association of Realtors is also a member of a local coalition of construction, banking, title, and business associations. The coalition works together not only to monitor the government and legislation that is perceived to be potentially harmful to real estate and business communities, but also to fight that legislation as a united front. Many of the other members of the coalition also employ lobbyists as well as executive officers whom they send to the State Legislature sessions. These lobbyists frequently work together to influence the legislator's opinions of proposed bills and regulations. The informant explained that:

Our state executive officer roams the halls of legislature during the general session and she knows them all. She and the executive officer from the Homebuilders, whenever they roam the halls together, they are very good at cornering legislators and being able to talk to them. Then there's the lobbyist that would join them from, say, the Chamber of Commerce . . . If it was an issue that affected some of those other coalition members they would probably, at least for that time, hire a lobbyist to represent their views. [If] four or five lobbyists gang up on several legislators over a time span of hours you can help defeat bad legislation that way.

Public protests are an additional method the coalition has utilized to fight harmful local regulations. The informant provided an example of this that pertained to rent control, an issue which locally has been a point of heated debate.

We had a rent control measure that came before the County Commission about two years ago . . . I'd say there were 3,000 people on the streets, the street corners, and areas surrounding the County Commission Chambers. There were realtors, homebuilders, some of the other groups we mentioned [title companies, lenders, mortgage bankers, etc.], and it was defeated. That's a pretty strong lobby. If you were a Commissioner, you don't know how many of those people live in your district . . . Its a strong voice.

The Association participates in several community service projects that can best be described as "group activist" types of activity. The Association maintains a Community Affairs Committee that once a year identifies a needy family living in poor housing. The Association coordinates donations of time and materials to improve the family's home. Some of this work is accomplished with the help of other members of the coalition mentioned above, such as title companies, lenders, and contractors. Additionally, the Association makes donations of food and money to needy families during the holidays.

Information seeking and dissemination is also an important activity for the Association. The Association utilized several different techniques for collecting information. Lobbyists at both

state and federal legislature levels monitor the creation of new laws and alert the Association of possibly negative bills. The agendas for City Council and Clark County Board of Commissioners meetings are monitored by the Association for actions that could affect real estate and private property owners. Additionally, contact with someone on staff with City Council and the County Commission enables the Association of Realtors to learn of potentially significant issues before the agendas are mailed to the public.

The Association is also involved in a number of different efforts to communicate information to its members as well as local and state government. The Association publishes a monthly newsletter for its members to keep them aware of legislation and events that affect their businesses. Association members are also informed by the Political Affairs Committee of important political concerns such as Bond issues and political candidate endorsements through additional mailings. Additionally, the organization holds annual seminars for Association members to provide them with information that is helpful in dealing with legal and political aspects of local real estate sales. Information is disseminated to Council members, Commissioners, and Legislators directly through the "legislative tree" discussed above, as well as through informal telephone calls, letters, and telegrams or faxes.

The Nevada Taxpayers Association

The Nevada Taxpayers Association is a local grass-roots organization that is primarily concerned with the fiscal aspects of state issues. The group takes a number of actions in response to this concern.

Information dissemination is the Association's typical means of taking action. The group produces two different types of document, a newsletter and a special report format. The group attempts to address "general issues", and to correct or counter "mis-information" in their periodic newsletter. The special report series the group produces, titled *Nevada Issues*, is designed to present and explain the details of complex fiscal issues in terms the public may readily understand.

These two publications are distributed to the group's members, public libraries and to media sources statewide. Their strategy is to provide information to the individuals and institutions through which it will be further disseminated. As an Association representative explained:

We will try writing up something, because it goes out not only to our membership, but to all the press and all the libraries in the state. We have a circulation -- not huge when you consider the state -- but we do hit people that then in turn can continue to disseminate the information. Particularly through the media. In the rural counties, they are always looking for things. So, we're quoted. Almost everything that we put out will be quoted in a couple of the rural county papers.

The Nevada Taxpayers Association also directs information and recommendations to the state legislature. In the past the group has advised the Nevada legislature on fiscal aspects of such issues as transportation and financing infrastructure development. Currently the Association is developing material on the fiscal aspect of the state's welfare system.

Soroptomists

Soroptomists are one of the more dynamic organizations within the community. They have a broad mandate and mission, as well as an extensive behavioral repertoire with which to work. As detailed in Chapter 3, new group formation is an important monitoring element to changes in organizational context over time, and one of the activities in which Soroptomists engage is facilitating interest group formation, as detailed below. This suggests that Soroptomists may be a key node to monitor for changes in the organizational structure of the county.

As indicated by the group's numerous mission areas, Soroptomist have a wide array of concerns and interests within the community. The local club has reportedly done much work with public land issues, and issues related to the community's infrastructure (such as water, air, and traffic).

In response to their array of concerns, the Soroptomists take a variety of actions. The majority of their actions are of a political nature. A member of the organization explained that the group frequently works with federal, state, and local governments and management agencies to help resolve community problems. As an example of this, members of the group have coordinated efforts with the water district, and served as members congressional task force committees. Additionally, members of the group frequently make direct contact with legislators and other representatives. As the informant explained:

We send people to Washington, as well as the things here locally. We feel we've made a real difference in a lot of things in the State. Nevada is very unique because we have elected officials that are small in numbers but also because of the nature of the state. It still has a little bit of the old west or the open, or the rebel flavor to it. We have a much better open door policy. It's not a problem, I can go in and pick up a phone and I can make an appointment with all four of our Washington delegation and be able to see them within a week, be able to go in and sit down and talk to them. In a lot of other states that's not possible. There is a good open door and a first-name-type basis with most of our elected people, and that makes life a lot easier. We can be a little bit more effective.

The organization also emphasizes communication as a means of problem solving. Presentations designed to educate and inform the public have been carried out by the group on various issues. Communication with groups opposing the Soroptomists' position was noted as

an important element of their problem solving methodology. Additionally, Soroptomist attempts to act as a conduit of information between various government agencies. According of the informant, frequently the government has the knowledge and the means to solve a problem, but the individual agencies that could contribute to the solution are unaware of the other agency's resources. By networking with all of these entities, the group is able to facilitate communications and develop a solution. This situation was described by the informant:

I have found that a lot of bureaucrats . . . have to operate in a vacuum. They are not privy to the thinking of their counterparts in one of the other entities: one of the other cities, or counties, or the other agencies. So by being able to provide a forum where people come together and discuss things they start to see a little broader picture than their particular area of responsibility . . .

Soroptomists vary their methods or actions to meet the needs of the situation. The group has the experience, organizational structure, and the skills to respond to many different kinds of issues with a refined response. As an example of this refinement, the group is able to adjust the magnitude and style of their response to meet each particular issue. When asked if and when Soroptomist respond to concerns en masse, the informant explained how the group determines the style of their reaction.

It would depend on the issue. If we're looking at an issue where numbers count, then we would certainly involve everybody in doing that type of thing. If we're looking at the level [situation] where an issue needs to be addressed by presenting more than one side [or viewpoint], then we feel that [sending] a small contingent of people that have a little bit of expertise in the area [is a more appropriate response]. You're not going into a combative situation, but going in and showing a side of an issue that somebody is not aware of. And try to bring your facts and your figures in that way. If we're talking about a thing where numbers are very important, then of course everybody will participate.

Additionally, the Soroptomist utilize a unique method of addressing important issues within the community. The group has reportedly been successful in helping to establish new organizations which address specific concerns. Soroptomist passes on its own experience and knowledge of group functions -- such as leadership, organization, and funding -- to developing activist groups. According to the informant the formation of new groups benefit the community by increasing the number and variety of concerned citizens organizations that are directly involved in local problems. The informant explained the process and the rationale behind Soroptomist's development of new groups:

Our goal normally within our particular club is to identify a need, to help bring it together, and to get it on its feet, because one of the [areas of] expertise Soroptomist has is in leadership. They have the ability to bring groups together,

to help get funding, to set up boards, to do that type of thing. Get them on their feet and then we try to pull back and let them function. . . . I think that one of the things that they have found is that women, when they reach a certain level, have an ability to empower others to get to that point. I know that I personally have found that a lot of people want to do a lot of things, but they're a little bit intimidated and they're not sure where to start. It's "I really care about this but I don't know what to do." Well, okay. We'll help you get to those points. Take you along under our arm, and pretty soon you've got another organization. I think that's one of the roles of a lot of the women organizations, or female organizations, to do that type of thing. Whether it be through education or through issues in the community. I think that's one of our responsibilities . . . There's so many neat things out there that need help. The more outside people that you can bring in and try to involve in the process, the better it is for the community and better it reflects the feelings of the community.

Soroptomists mandate is broad enough to react to the issue of the Yucca Mountain Project. The group member interviewed was highly critical of the Project, the process by which Nevada was selected, and the government's management of nuclear waste. Currently it is unclear what type of actions the Soroptomists may take in response to the issue.

Seniors United

Seniors United and its leaders are involved in a range of activities. Seniors United sees its primary purpose as, and directs its principal actions toward, the provision of information to its members about political candidates and issues, and services available to seniors. The group holds monthly sessions in which members meet with political candidates, public officials, health care organizations, corporations, and so forth. Aside from these meetings, the group disseminates information by producing a periodic newsletter that covers developments within their areas of concern. This newsletter is sent to Seniors United members and to political and social leaders, to banks and libraries, and to those with whom Seniors United seeks visibility.

The group also takes a number of political actions. Seniors United makes official endorsements of candidates, and promotes these candidates in their newsletter. The organization also petitions County Commissioners on behalf of seniors. As an example, Senior United's leaders once contacted a County Commissioner to request easier street access to a major boulevard for a neighborhood in which many of the group's members reside. The interviewees commented that County Commissioners are very important people in the County, and that they can do a lot for their constituents.

Seniors United has also taken legal action in defense of group member's interests. Approximately four years ago, a flood damaged homes in the area where the group draws a significant membership base. As leaders of a homeowners' association in the area, Senior United's leaders organized a meeting of affected parties. At this meeting, a neighbor suggested that they might have a viable lawsuit. The interviewees approached a lawyer who instituted a class action lawsuit against the housing authority for not providing proper sewage in the area.

Along with their primary political function, the leaders of Senior United have periodically organized and taken part in a number of non-political actions on behalf of seniors. They pursue these actions as community services, while these services also contribute to the group's legitimacy, visibility, and contacts with seniors and government. Seniors United also takes an interest in civic action intended to help other sectors of the community, and other groups nationally in times of natural disasters. As an example, the organization participated in relief efforts following the recent California earthquake and Hawaii hurricane.

Nevada Mining Association

The Nevada Mining Association is extremely concerned over laws, regulations, and rules affecting mining, and therefore attempt to make their opinions known. Lobbying Congress or the state legislature is the Association's primary method for affecting the outcome of mining related issues. The organization's paid staff is responsible for this task.

Interaction between the Mining Association and regulatory agencies is carried out by the chairmen of the group's mission area committees. According to a representative of the group, these chairmen are frequently "on a first name basis" with the directors of the state's agencies, and are able to clearly express the organization's concerns to them.

In order to maintain credibility, the Mining Association attempts to work only with issues of which they are knowledgeable. A group member explained, "we pick and choose our topics and our subjects, we do not just go out and comment on everything. We 'zero in' on the ones that are important to us."

Education is also an area in which the Mining Association takes an active role. As an example of this, the association runs teacher conferences and an accredited teacher education course. In this course teachers learn about natural resources-- including aspects of their development, exploration, and production-- and the environmental regulations the mining industry works under. The Mining Association has also worked with the Western Governors Association and the Governors Council in educating them to the concerns of the mining industry.

Additional actions noted by the informant included making financial contributions and supplying information to individuals involved in issues of importance to the group, as well as attending

meetings and public hearings.

Although the informant personally supported the Yucca Mountain Project, they felt that the Nevada Mining Association would not take an active position on the issue. The informant explained elsewhere in the interview, the group carefully selects the issues it chooses to act upon. This is done to concentrate their efforts and maintain credibility.

Desert Livestock Producers

Desert Livestock Producers' range of actions has been fairly limited in the past. The group has held barbecue dinners in order to raise funds and spread information on the threat to local ranching. Members of the group have attended public hearings on Desert Tortoise protection. The organization has taken the BLM to court in defense of ranchers' right to graze cattle on the public lands they have traditionally used. The group's first lawsuit was successful, but the BLM reportedly has renewed efforts to restrict the ranchers access to public lands. According to a member of the organization, they are again preparing to take the agency to court.

Red Rock Audubon

Red Rock Audubon's non-profit status, according to a group member, restricts them from becoming involved with any issue that may be viewed as political. As a result, the majority of the group's actions take the form of service projects. As an example, a service action that is frequently taken by Red Rock Audubon is revegetating damaged bird and small animal habitat. This activity has become the specialty of the group, and to a degree the group searches out situations in which such habitat rehabilitation is a productive endeavor.

Red Rock Audubon also participates in a multi-group effort to preserve a local park that contains some of Las Vegas' original springs and a rich bird habitat. As a part of these efforts at protection, the group has written letters to city councilmen and made statements at city council meetings. Additionally, the group has offered to revegetate the area to improve the bird habitat.

An additional way that the group has had success in protecting bird habitat is by contacting various government agencies -- such as the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the Bureau of Land Management -- and informing them of the group's concerns. According to the informant, these agencies may want to take action on issues, but are unable to do so without a certain amount of support from the public.

Due to the group's non-profit status, the Yucca Mountain Project may be beyond both the

organization's mandate and its mission. Red Rock Audubon Society does not have an official position on the Yucca Mountain Project. Although the group maintains a committee to keep them informed of Yucca Mountain Project developments, the group has no plans to take any actions in relation to this issue. Investigation of the details of Red Rock Audubon's monitoring actions revealed that the group places relatively little concern on the proposed repository as compared with other environmental concerns. Likewise, the group's efforts at monitoring the YMP were explained to be limited:

Well, we do have a nuclear waste committee person. *We lost the person that we had and she wasn't very active and so we haven't really done a lot about the nuclear issue. I'm not sure that we will.* That stuff seems to be pretty well confined to the test site and so on. It's not like it's affecting Lake Mead per se. So I think our number one issue overall is environmental quality. [Note: A replacement has since been identified but has yet to begin her committee duties.]

Red Rock Audubon's status as a non-profit organization also limits the group's ability to react to the proposed repository (the informant notes that the Sierra Club, a national environmental organization, lost its non-profit status as a result of political action).

They [the Sierra Club] are very politically motivated. They are no longer a non-profit organization. You can lose your non-profit status if you're not careful. We don't wish to do that. I think that we are already most effective in what we're doing. I don't think coming out and saying that you're for one political issue or another is particularly a good idea if you want to appeal to everyone. Politics is not the thrust of this organization. Conservation is.

A representative and key decision maker within the Society explained the issue's salience and its threat to the environment as follows:

I really don't have an earth shattering opinion about that [the YMP]. Personally I feel that I would rather see nuclear waste deposited in one area instead of having patches of it all over and contaminating a lot of places. I'd rather see it stored in a dry environment instead of in situations like Hanford, Washington, where it can go right straight into the ocean down the Columbia River.

Thus, Yucca Mountain Project is, at present, perceived to be beyond both the organization's mandate and its mission. While monitoring the issue for the sole purpose of informing members, the Yucca Mountain Project is not a key issue for the group. The group does, however, plan to maintain a committee to keep them informed of Yucca Mountain Project developments.

The Nature Conservancy

The Nature Conservancy is unique among environmental groups in that it goes beyond traditional environmental protection techniques. The group is well known for purchasing property that contains threatened or endangered species and unique habitat. These purchases are carried out with funds collected from its membership.

Additional actions the group has taken include working with property owners -- such as ranchers or mining companies -- to help them use their properties in a more environmentally sensitive manner. The local Nature Conservancy office was reportedly influential in working a solution to the conflict between local land developers and the government over the Desert Tortoise Protection Bill. As the informant explained, with the implementation of the Tortoise Protection Bill, local building was essentially halted because it would affect tortoise habitat. A lengthy and expensive legal battle between the government and developers was begun, the end of which seemed quite distant. At this point the Nature Conservancy volunteered to help broker a solution to the conflict. The organization approached the issue using the experience it has gained from studying and working with similar situations in other states. The Conservancy enlisted the aid of scientists and experts, and helped the government and developers to devise a tortoise relocation plan that was acceptable to all parties involved. This is an example of the type of solutions and actions the Conservancy is interested in taking.

The Yucca Mountain Project, in its current state, is somewhat beyond the scope of the organization. The Nature Conservancy remains interested in protecting endangered species and unique habitat, and only if either of these two concerns were impacted by the Yucca Mountain Project would the Conservancy consider taking direct action in response to the proposed repository.

Nevada Nuclear Waste Study Committee

The Nevada Nuclear Waste Study Committee's primary means of taking action on issues involving the Yucca Mountain Project is disseminating information. The group attempts to communicate with elected officials, political candidates, community leaders, and the general public. Most communication between the Study Committee and community or political leaders is accomplished through private meetings and briefing sessions. According to a group representative, the Study Committee provided information on the Yucca Mountain Project to many of the candidates in Nevada during the recent election campaign.

The Study Committee provides information to the public through press releases and exhibits. Members of the group have made statements at Yucca Mountain Project hearings to express their views publicly. The Study Committee targets some communication toward particular demographically defined constituencies, including senior citizens and African-Americans, on

issues related to the Yucca Mountain Project. The group also publishes a pro-study newsletter, *The Nevada Monitor: Assuring Scientific Study of Yucca Mountain and Benefits for Nevada*. This publication is received by the group's 14,000 members.

In an explicit attempt to offer a counterpoint to information critical of the Department of Energy and the Yucca Mountain Project, the Study Committee has arranged tours of the current work at Yucca Mountain and at DOE sites across the country. As the informant explained:

We set up our own tours of Yucca Mountain, get people to go out there so they see what's going on. So they're comfortable that there is good science going on at Yucca Mountain, that everything that they read in the newspaper isn't true. That there are some of the best scientists in the world working on this project. We, on occasion, take people to other facilities around the nation so that they can see that there are -- that the DOE isn't just a bunch of bungling government bureaucrats like the State of Nevada tries to portray them. That there are good, well-run operations that DOE is involved with.

The Nevada Nuclear Waste Study Committee is a highly organized, well-funded organization with a focussed interest on the Yucca Mountain Project. As a group with industry ties and a behavioral repertoire that encompasses a range of communication efforts with local publics, it is an organization that provides insight into the dynamics of information dissemination to the public at the county level.

Citizen Alert

Based on data from numerous interviews with individuals and organizations around the county, Citizen Alert is the most readily identified group opposing the Yucca Mountain Project. The group has been noted to take a number of actions in response to a wide range of issues with which they are concerned, including the proposed repository.

Citizen Alert works to form coalitions with those who have common opponents and those interested in common issues. For example, it has worked with ranching interests in opposition to federal land policies in Nevada. Additionally, the organization works with Native American groups to oppose military overflights of tribal lands. There are ties between Citizen Alert and other organizations attempting to prevent siting of the proposed repository in Nevada. Citizen Alert has also sought to mobilize opposition to the Yucca Mountain Project in the community by helping organizations formulate public stances against the proposed repository, and by using the media to communicate their message.

Citizen Alert carries out a number of information dissemination actions. Organization members often testify at public hearings. Organization members write letters to the editors of

local papers expressing group opinions and concerns. The group publishes a quarterly newspaper with a distribution of approximately 10,000 to inform its members and the public of events and developments that the group views as important. Additionally, Citizen Alert publishes fact sheets on water, nuclear issues, State bills and national legislation. Leaflets and tee-shirts are also printed in order to raise public awareness of an issue.

Citizen Alert employs symbolic action as one method of communicating its message. For example, in one instance they collected large amounts of styrofoam and sent it to Louisiana's Senator Johnson, as a comment on his view that Nevada would be a good place for the repository (in their words, 'dump'). They designed an aluminum can, with an anti-YMP message, that could be mailed to state and federal legislators. Again, the message was anti-waste. They held a 'party' near the American Nuclear Energy Council (ANEC) convention in Las Vegas, and wore ties in with one end extended upward as if it were the end of a noose (this was called "A-NEC tie party"). One informant discussed another example of action designed for symbolism to carry a message:

. . . everything from the simple things like putting signs outside of public hearings, to much more dramatic things, sort of staged theater type things. We did something a number of years ago with a full bed and couple of manikins outside of a reception that the university was hosting for the nuclear industry, at the chemistry department, and we had little baseball caps, one labeled DOE and the other one was labeled UNLV and we pulled back the bedspread, they were covered in money, underneath the covers, so. So that worked pretty well, everybody got the message (laughs). Got a lot of press coverage, and we heard that at the big industry conference that was happening, which was the occasion for this whole thing, that was the talk of the conference the next morning.

It is clear from this example (and others) that Citizen Alert is interested in directing public attention towards their issues of interest, and that they are also interested in evaluating the effectiveness of their actions. As a group they have consciously sought to enlarge their behavioral repertoire to include types of actions that will draw attention in and of themselves.

Citizen Alert takes direct political action in a number of forms. The group communicates its concerns to Congressmen and state legislators through letters and phone calls. The group also conducts mass actions through such techniques as telephone campaigns and "post card drives," in which many cards expressing concerns are mailed to state legislators or Congressmen.

The group sometimes provides organizational support to people in the community. Citizen Alert learned from a citizen about the possibility that a hazardous facility might be placed in a community, and provided organizational direction to community members to oppose the company.

Group Behavioral Summary and Classification Framework

As noted in the previous section, the groups included in this study have spanned a wide range of organizational types, and they go about their business in a variety of ways. Groups vary in their organizational attributes, such as type of staffing (paid or volunteer), funding and resource types, issue- versus constituent-orientation, degree of relationship to regional or national organizations, membership definition and types of membership involvement, types of communication within and outside of the organization, and so on; for a broader descriptive range the interested reader is referred to Chapter 3. Here the focus is on behavioral repertoire, and the relation of perception/group orientation and behavioral outcomes. In the two summary tables included in this section behavioral types are classified on varying dimensions. The first table (Table 5-2) classifies actions taken in response to specific perceived risks, and the second table (Table 5-3) notes actions taken by the organizations interviewed. These summaries provide a framework for looking at the types of behaviors noted in the group descriptions provided above, and the threshold model used for analysis.

This study investigates the processes by which risk perception leads to action and thereby contributes to social impacts. To investigate this process we have considered a wide range of groups, risk concerns, and actions taken. *However, this discussion is not meant to imply that there is an equal weight given to all risk concerns, or that all actions have equal consequence, or that all groups have equal influence.* The widest range (of behaviors, actions, and groups) is set out here in order to develop a framework for the analysis and monitoring of YMP developments. Survey research (presented in Chapter 4 of this report) indicates the issues considered of greatest concern to Clark County residents (and the transportation and storage of nuclear waste rate high among these risks), and those issues members had taken, or would take, action on. The literature review (Chapter 2) describes past studies which found that some risks are given greater weight in terms of their evaluation as dreaded and unknown (high among these is nuclear waste). And the analysis of interest groups in Chapter 3 is directed at understanding the groups that have the greatest influence, and those whose actions have the most sway. Therefore, while this document considers a broad range of risk concerns and group interests, an array of groups and a variety of actions, it is recognized that some risks will prompt greater concern, and lead to more serious action and social impacts.

Table 5-2, "Risk Categories by Behavior/Action," provides a matrix that utilizes the previously established behavior/action categories along its x-axis. These are: "Political," "Group Activist," "Individual Activist," "Economic," and "Information Seeking and Dissemination." The specific behaviors discussed by interviewees, and included in these behavioral categories, may be briefly described as follows:

Political. The behaviors included here range from voting to contacting representatives, and otherwise engaging in the formal political process of the community in response to some issue or concern. The range of behaviors discussed with informants is quite lengthy and

diverse. Actions include those carried out by individuals and by organizations, such as attending hearings and meetings, and writing or calling one's State Legislators and Congressional representative. Another level of involvement is the formation of an activist group or coalition to better represent and investigate concern on a given issue. This can give groups and group members more power and influence in political circles because they represent more votes and have more contacts and resources than do the individual members alone. Groups often establish a consensus on official policies and view points in order to guide their actions on specific issues, and they generally have a decision making process. Political behavior is diverse, and includes active measures such as hiring lobbyists, holding rallies, making financial contributions, and publicly supporting or opposing political candidates, legislation, and ballot propositions. This persuasion of other individuals or groups can be carried out privately, through the media, or in political campaigns. Groups have worked with the government on controversial issues, and acted as mediators between rival interest groups in legal or political matters.

Group Activist. These behaviors are related to participation in local "concerned citizen" or activist groups. These groups are formed in response to specific issues (e.g., environmental or YMP specific) of concern to citizens within the community. Their structure and organization ranges from loose local associations with volunteer leadership, to highly structured national organizations with paid officials. Group behavior covers a wide spectrum of involvement and actions. Formation of the group itself represents a type of behavior. Involvement in non-controversial charity or volunteer work is a type of action frequently taken by non-profit groups. Group contact with Legislators or government officials about issues of importance can come through letters, telegrams, telephone calls, and personal meetings. Activist groups frequently hire lobbyists to represent their interests at State and Federal Legislature sessions. Representatives of activist groups attend official hearings that relate to the group's concerns. Attempts by activist groups to inform and involve the public in their cause include among other things rallies and alerting the media to current issues of concern. Further efforts of activist groups include the formation of coalitions. These coalitions cooperate to varying degrees, ranging from an information sharing network, to a large united activist front. Lawsuits are an additional tool utilized by activist groups with issues of extreme importance.

Individual Activist. Persons who engage in personal acts of protest, advocacy or other actions that attempt to oppose or change the outcome of an event are placed in this category. Actions mentioned by informants include attending meetings, monitoring the media for information, and calling or writing letters to political or other individuals regarding specific risk issues or other community concerns. Individuals who act as mediators between interest groups or points of contact and alliance between interest groups are also included. Such individuals can be especially influential because of their multiple contacts. Additionally, individuals assist the government and other institutions by

donating their time or resources to help with personal issues of concern.

Economic. Interviewees mentioned investing, buying, selling, and otherwise engaging in the expenditure of monies regarding an issue or risk perception. Economic behavior noted by informants was highly variable. Actions include giving donations to an individual, charity organization, or activist group. The hiring of lawyers or political lobbyists represents a common expenditure of money by various groups. Involvement in BLM land exchanges, and the purchasing of land, were also mentioned by environmental activist groups as reactions to issues of concern.

Information Seeking and Dissemination. Interviewees discussed actions regarding the collection and distribution of information about risk concerns. Seeking information is a behavior noted among both individuals and groups alike, while information dissemination was more often carried out by organizations. A variety of methods have been mentioned by informants for collecting information. Monitoring the media, reading City Council and County Commission meeting agendas, and attending hearings all seem to be common forms of gathering information. Various groups collect information on political candidates through pre-election interviews with the candidates. Independent scientific research, either conducted by the activist group or contracted out to research firms, has been noted as a key source of information for some organizations. An additional method of collecting information about the government frequently mentioned by activist groups is the hiring of lobbyists to monitor issues before the State and Federal Legislature. Joining information sharing coalitions, which expand the number and variety of contacts individual activist groups have, is also a frequently utilized strategy for obtaining information. It is very common for interviewees to mention getting information from informed and well placed sources. A number of methods are used to disseminate information to group members, the public, and the government. Information is shared within organizations at group meetings and through group publications. Almost all organizations contacted produced a periodic newsletter or magazine informing group members of important events, issues, and legislation related to the group's focal concerns. Several informants also noted that information was disseminated to Legislators and government officials through the group's lobbyists. Information is shared with other activist groups through the coalitions mentioned above. Attempts by activist groups to inform the public of important issues include a wide variety of behaviors. Alerting the media to the an issue, and providing interviews, is a quick method of attracting the public's attention and support. Holding rallies and public meetings, and conducting strikes are highly visible methods of information dissemination. Additional methods of informing the public include distributing fliers, and implementing fax and telephone network, or organized "phone tree" campaigns, in which an individual contacts several other people, and they in turn contact others, and so forth. This provides a rapid means of mobilization.

Along the y-axis of Table 5-2 are risk categories that are derived from an initial content analysis of ethnographic interview data from all of the interviews, spanning all of the groups contacted. These categories were developed through a grouping of similar types of answers provided by interviewees.

**Table 5-2
Risk Categories by Behavior/Action**

Risk Category	Behaviors/Actions				
	Political	Group Activist	Individual Activist	Economic	Information Search/Dissemination
Political					
Empowerment	√	√	√	√	√
Representation	√	√	√		
Legislation	√	√	√		√
Legal					
Lawsuits	√	√		√	√
Economic					
Taxes	√	√			√
Personal Income	√	√		√	√
Economic Empowerment	√	√			√
Regulation	√	√			√
Protecting Market Share	√	√	√		√
Social					
Poverty	√	√		√	√
Education	√	√			√

Children's Welfare	√	√			√
Growth	√	√			√
Crime	√	√			√
Medical Services	√	√			√
Infrastructure	√	√	√		√
Conservation					
Pollution	√	√			√
Water	√	√			√
Habitat	√	√		√	√
Species Diversity	√	√		√	√
Recreation Areas	√	√		√	√
Land Use					
Restricted Access	√	√	√		√
Restricted Ranching	√	√		√	√
Restricted Building/ Development	√	√			√
Yucca Mountain	√	√	√	√	√

The next table, Table 5-3, presents information on types of organizational responses, by individual organization. The x-axis of this summary matrix uses the same behavior/actions categories seen in Table 5-2 and discussed above, and presents the individual groups along the y-axis. These groups are derived from the Scope of Work and subsequently developed field plan documents, with limited additions made based upon field data collection results (such as the need to substitute groups where interviews could not be conducted with the originally planned

group).

Table 5-3 Organizational Responses: Behavior Types					
Organizations	Political	Group Activist	Individual Activist	Economic	Information Search/ Dissemination
Las Vegas Convention and Visitors Authority	√			√	√
Nevada Development Authority		√		√	√
Las Vegas Chamber of Commerce	√	√			√
Downtown Progress Association*					
Independent Nevada Casino Operators	√	√	√		√
Professional Insurance Agents Association	√	√			√
Associated General Contractors	√	√		√	√
Greater Las Vegas Association of Realtors	√	√	√	√	√
Southern Nevada Home Builders Association	√	√		√	√
Bank of America		√			

Mirage Resorts	√	√		√	√
Clark County Medical Society		√			√
Nevada State Medical Association	√	√		√	√
Nevada Tax Payers Association	√	√			√
The National Conference of Christians and Jews		√			√
Nevada Concerned Citizens	√	√			√
Soroptimists	√	√	√		√
League of Women Voters	√	√			√
Latin Chamber of Commerce	√	√		√	√
Black Chamber of Commerce	√	√		√	√
Church of Jesus Christ of Latter Day Saints		√	√	√	
Parent Teacher Association	√	√			√
Seniors United	√	√	√		√
American Federation of Government Employees		√		√	
Clark County Teacher's Union	√	√			√
Culinary Workers	√	√		√	√

Union					
Laborers (Hodcarriers) Union	✓	✓			✓
Building Trades Council/Central Labor Council	✓	✓	✓		✓
People For the West	✓	✓	✓	✓	
Nevada Mining Association	✓	✓		✓	✓
Farm Bureau	✓	✓		✓	✓
Southern Nevada Off Road Enthusiasts	✓	✓			✓
Desert Livestock Producers	✓	✓	✓	✓	✓
The Nature Conservancy	✓	✓		✓	✓
Red Rock Audubon		✓	✓		✓
Sierra Club	✓	✓			✓
Nevada Nuclear Waste Study Committee	✓	✓		✓	✓
Citizen Alert	✓	✓			✓
Campaign for Nevada's Future**					
Historical Society				✓	✓
<p>Notes: * No behavioral data were obtained from this organization. ** Organization in the planning stage; no behavioral data to date.</p>					

Group Behavioral Analysis: The Threshold Identification Model

This section builds upon the threshold identification model first presented in the *Behavioral Pilot Study Addendum* to (IAI November 1994). As described in the Addendum, this model contains four broad categories of elements which affect the ways groups react to issues. These categories include group definition, organizational structure, external factors, and behavioral responses. All elements described here do not, however, influence all groups at all times. It is the *particular* interaction of a number of elements from each of these following four categories, combined with the unique characteristics of an issue at a specific point in time (i.e., under specific circumstances), that determine the types of action an organization will take. The intent of our analysis is to provide an understanding of the underlying structural (historical, organizational, resource base, decision making structure, etc.) characteristics of organizations which lower or raise the threshold for action in response to risk perceptions, in particular, those associated with nuclear waste transportation and storage issues.

Group Definition

This category of elements addresses the question of how a given organization defines its mission. A group's definition contributes to other elements of its behavior. Distinct groups, each with their own sense of purpose, view issues and events differently because their understanding of the event or issue, and their relation to it, is unique. Organizations, by the nature of the consensus on common issues or interests required for their formation, have particular points of view and sets of concerns which relate to their explanation of who they are as a group. This viewpoint may predispose a group to particular sensitivities and perceptions of risks, which in turn directly affects the group's threshold for action. As an example, health care is an important issue for Seniors United; hence they easily and commonly respond to this issue (i.e., they have a low threshold for action on health care). Health care is not, however, as important to the Association of Realtors, and it would be unusual for the group to respond to the issue (i.e., they have a high threshold for action on health care).

An array of factors contributes to the establishment of a group's definition, and the organization's threshold on any given issue. Of key importance is the group's mandate. Organizational mandates (which may be as formal as written by-laws or as informal as shared understandings between a core of active members) establish the basic focus of a group. Such guidelines delineate the purpose and operating protocol used by each organization. As an example, mandates may reveal a group's general orientation, such as: service, activity or hobby, or action. Additionally, groups' geographic dimensions may be defined within the mandate. A group that focuses upon local or regional events may react differently to an issue than an organization that is national (or even international) in orientation. As an example of how these two aspects of group mandate may combine to influence the behavior of different groups we may compare two different organizations active in local issues. Concerned with defending rancher access to

public lands in southern Nevada, Desert Livestock Producers is essentially a local issue, action-oriented group. This local group was established to respond to a specific threat. Their mandate is relatively focused. In contrast, Soroptomist are service oriented and international in scope. These two groups therefore have decidedly different group definitions and points of view. This difference may therefore lead the two groups to view the same issue in an extremely different light. One may feel that an issue demands to be addressed, where as the other may view it as insignificant.

An important additional factor influencing a group's behavior is the degree to which a given issue falls within the group's mission. When an issue clearly lies within the organization's formal mission, the threshold at which action is taken is lower, and action is more probable. Under such circumstances, the probability of action is also increased because the group is likely to have previous experience with similar issues. In this case, the organization has had opportunities to refine its methods of reaction and find those actions that are most effective with the given type of issue.

A group's ability or likelihood to react to an issue outside of its official mission is also paramount in understanding the threshold at which action is taken. Although many elements contribute to understanding this question, many of them as of yet undefined, a possible explanation is presented here. As issues arise and gain prominence in the community, it appears that their significance to organizations grows. Supporting or opposing a given issue may provide a group with benefits that are not immediately obvious. As an example, during recent (November, 1994) elections, the issue of school bonds was prominent within the community. Many organizations not directly connected with schools, the education system, or children's interests became supportive of the proposed bonds. Several business and trade organizations, such as the Southern Nevada Home Builders and the Greater Las Vegas Association of Realtors, reportedly urged their members to vote in favor of the issue, and provided financial donations in its support. At one level, the rhetoric surrounding the issue was couched in altruistic terms regarding the positive aspects of general support for education. At another level, additional factors were clearly behind these actions. Although not expressly stated by the group members interviewed, particular local business sectors would certainly stand to benefit directly and indirectly from an improved school system for a variety of reasons, including at the highest level attracting new families -- and more business -- to the area. Therefore the groups may eventually reap direct benefits from supporting an issue not clearly within their mission. Likewise, groups such as these may react to the issue of the Yucca Mountain Project if they come to perceive that possible secondary gains are to be derived from support or opposition. More analysis of the variables affecting group mission flexibility would greatly improve the understanding of this complex element of group action thresholds.

Additionally, the number of mission areas a group has affects the probability of the group taking action. A group with a number of mission areas will be much more likely to react to a variety of issues than a group that has only one mission. These multi-mission groups may therefore be

forced to carefully select the specific issues they respond to. As a representative of the Nevada Mining Association, a group with a wide variety of mining related missions, explained:

We try and act on issues only that we know about. What we want to do is have credibility, so when we speak, people are going to listen. So we pick and choose our topics and our subjects, we do not just go out and comment on everything. We 'zero in' on the ones that are important to us.

Similarly, groups with a sole mission may have more freedom to take action on any issue that presents itself within that mission area. The Nature Conservancy is an example of a group that functions with one mission: the protection of threatened and endangered species and unique habitats. Rather than diversify and become involved in a wide array of environmental concerns, the group has been able to focus on a specific type of issue. As a result, the organization has developed and refined a specific set of methods for reacting to this variety of issues. The organization is essentially an expert within their chosen mission area.

Factors that influence a group towards or away from a threshold for action that may change over time require special consideration. A group's interpretation of an issue may change rapidly as the situation develops. The reinterpretation of an issue may change the way in which it is viewed by a group, and alter the definition of whether it is central or peripheral to the mission. The imagery may be viewed along the dimension of strong and weak. As a group's perception of an issue shifts towards 'strong,' the group becomes more likely to act.

An additional important factor is the group's trust in others (along a continuum of high/low), specifically governmental bodies and regulatory mechanisms, to deal effectively with issues. Shifts along this dimension (towards distrust), may also contribute to action. Some group's self definition include elements of either trust or distrust in government officials, agencies, or other organizations within the community. As an example of how distrust in a government body may affect group mission and definition, a representative of the Nevada Nuclear Waste Study Committee explained the group's disapproval of the state's approach to the Yucca Mountain Project.

The State of Nevada provides so much, an incredible amount of misinformation. When people hear that bad information, over and over again, it becomes the truth in their minds. So we [the Study Committee] need to do something to combat that.

An organization's perception of an issue, and how well the given issue fits their group mission or mandate, may also be influenced by the degree to which the membership of the organization is personally affected by an issue. Factors included here are the number of members affected, whether the leadership is affected, and whether impacts are direct or indirect. As an issue comes to affect higher numbers of the group's members, and as the impact becomes more apparent, the group will be more likely to act.

Additional dimensions within this factor are the intensity of the event (strong or mild), the proximity of the event or issue (is it geographically near or far, does it affect individuals known to members, or parts of town valued by members), the recency of the event (is it current or in the past or future), and its prominence (is it something seen or heard frequently or is it invisible).

Organizational Factors

The second category of elements in the model include organizational factors that influence the way judgements and decisions are made within a given group. Organizational factors can influence many aspects of risk perception and behavioral response. These factors may include such aspects of group structure and organization as autonomy, solidarity, leadership structure, internal hierarchy, funding or resources, the proportion of active members, and internal division of labor. These and other influential organizational factors are discussed below.

An organizational factor of central importance when examining a group's threshold for action is the group's internal structure. Frequently groups establish internal bodies or sub-units within their organization. These sub-units exist to perform specific activities for the group. Sub-units may take such forms as elected officers, committees, boards, and paid staffs. Whereas the specific duties of these bodies vary from group to group, some similarities of purpose have been noted in many of the groups studied. Elected officers are typically involved with managing the daily affairs of the group, leading the group's interactions with other organizations, and providing guidance to the group as it interprets and acts upon their concerns or missions. Committees also have been noted to serve a number of functions within organizations. Key tasks of these bodies include: monitoring specific issues of concern; informing the organization of developments within the community; acting as liaisons between their organization and outside groups; and planning and/or executing group actions. Boards of Directors are almost universally responsible for making key policy and action decisions and providing the groups with long-term objectives. Paid staffs of some groups function to manage the group's day to day affairs; plan group actions; advise boards and elected officials; collect information; and carry out the actions of the group. Paid staffs are particularly influential in establishing a group's threshold for action. The individuals in these roles are frequently professionals well versed in affecting change in communities and politics. Because staffs are employed by the organization, they are free to invest a high amount of time and effort into the group's areas of concern. Organizations with fully volunteer staffs are typically more constrained in their actions by the amount of time group members are able to donate to their cause.

When two or more of these bodies exist within an organization, the interactions between them frequently has strong affects on the behavior of the overall organization. The likelihood that a given group may have a number of these sub-units increases as the size and mission scope of the

organization grows. As an example, Desert Livestock Producers -- a small, focused-issue organization -- maintains a leadership structure of only a two elected officers. In contrast, The Greater Las Vegas Association of Realtors -- a relatively large, multi-dimensional group -- maintains all of the types of sub-units described above. These bodies provide the Association of Realtors, as they would most groups, with a means of addressing their particular needs and areas of concern.

Funding or resources available to an organization is an important factor in determining the kinds of actions a given group can take. Groups having a relatively high amount of resources may have broader or more numerous mission areas, or lower group action thresholds. Resources are less of a limiting factor on behavior in such circumstances. In contrast, groups with little funding or resources are forced to be more selective of the issues upon which they choose to take action. As an example of this, one interviewee noted that anti-nuclear organizations have had considerable trouble raising money since the nuclear test-ban treaty, and that this has severely limited their activities and effectively ended some organizations.

The degree to which a group is democratic also plays a significant role in the establishment of a group's threshold for action on a given issue. Organizations in which the entire membership takes part in the decision making process frequently behave differently from groups in which a small sub-unit is responsible for this process. While presenting an issue to a group's full membership may produce a decision that most accurately represents a complete organizational viewpoint, this process may significantly increase the amount of time necessary to react to an issue. Similarly, the degree to which group members are able to affect changes in their leadership may influence the threshold for action. Elected leaders of organizations are more responsible to the interests and concerns of their group's members than are those officials who are appointed. In some organizations interviewed in this study, the only recourse a member has if they do not approve of the group's actions or its leaders is to leave. An organization's threshold for action is beyond group member's control in these circumstances.

Group autonomy is also a significant factor in understanding group behavior. The degree to which an organization is connected to other groups, or a national organization, is an important factor influencing the group action threshold. Within organizations in which decisions are made on a national level, a local event outside the group's usual focus is unlikely to prompt response. In contrast, a group with local decision-making and purely local interests might be more responsive. An example of an organization in which most important decisions are made by the national organization is the Church of Latter Day Saints. Local units of the LDS church are directly integrated with the national leadership through a well maintained and complex leadership structure. All major decisions within the organization are passed down directly from the national leadership to the members through this structure. In contrast, Southern Nevada Off Road Enthusiasts is a purely local and highly autonomous organization. All decision making processes that determine group actions take place within the local group. This organization is therefore completely free to take any action its local members deem appropriate.

Group solidarity is an additional factor influencing group behavior. The unity of the members, and the degree to which they share an ideology, may facilitate decision making and action, while divisions on an issue may make action less likely. Such divisions are particularly important when they occur within an organization's decision making body. As an example of how division may affect group behavior, an informant explained how his group had come to decide what action to take on the issue of the Yucca Mountain Project.

The Board has taken a stand that the are not going to take a stand . . . Because it would divide the organization, it would not be good for our organization. There are enough other kinds of issues that we can work on that -- We can focus on other things and keep plenty busy. We don't need to bring something divisive into our meetings.

As division within an organization over a given issue gains strength, the likelihood that a subgroup may take action increases. Evidence of this outcome has been collected during initial discussions with representatives of activist groups.

Additional elements of organizational structure, such as group mobilization and the frequency of group decision making sessions, may influence groups' ability to respond to rapidly evolving issues. As an example of this, organizations that establish a rigid group mission and operating protocols that narrowly constrain the group's actions may be unable to react to an issue that was unforeseen at the time of policy formation. The Farm Bureau, for example, has an annual state policy conference to establish the group's official position on issues affecting the group. A member of the Farm Bureau explained that these policies are typically broad enough to cover all issues encountered within the following year. The possibility exists, however, that an issue may arise which could affect the organization between conferences. Similarly, an organization's ability to mobilize and react quickly to an issue may affect the threshold at which action is taken. Well organized and prepared groups may be more likely to react to sudden events because their reaction and preparation time is minimal. As an example of a case in which this ability was influential, the PTA once reportedly mobilized quickly, using a large phone tree, to inform the Governor's office that they disapproved of a legislative proposal.

Interorganizational relations play a role in establishing the threshold for action among groups in the community. Cooperation, as well as conflict between organizations affects their perception of issues' salience. Organizations with similar outlooks or perceptions of an issue's salience may choose to coordinate their responses to the issue. This coordination may lead to the formation of formal coalitions. These coalitions vary in duration and stability from long standing alliances to brief agreements that last only long enough to solve a specific problem. The activities and benefits involved with participation in these coalitions varies widely. In some cases only information is shared between organizations. In other cases, a group of issues may be divided among the members of a coalition. In this situation each organization would

select and pursue a particular issue that all members of the coalition felt was significant. This effort would free the other members of the coalition to pursue additional issues with their full attention and resources. In other situations all groups may focus their effort upon a particular shared concern in order to present a united and powerful front.

External Factors

The third category of elements in the model include the external factors that can influence a group's interpretation of the events it encounters. These external factors include events, media communication about actual and potential events, non-media information, and relationships with other organizations. These elements combine to affect organizations' views on the salience of issues.

Actual events affect the salience of issues and hence group thresholds for action in a number of ways. An unforeseen event with which a group has immediate contact may expose previously unseen situations or issues in the community. The reaction of the exposed group may depend upon the magnitude of the affects [impact] of such first contact on the group or its members. An issue may proceed from well outside, to clearly within a group's mission or area of concern with the occurrence of a single event. Seniors United's reaction to the PEPCON explosion is an example of how such a case can develop. The PEPCON explosion directly affected members of the group by damaging their homes. This made the organization aware of a new type of issue confronting its members. As a result, the organization became involved and helped its members to file a law suit against PEPCON and to thus be compensated for the damage. Although this case is extreme, this type of event can raise groups' perceptions of the salience of issues, and consequentially broaden a group's mission or make them aware of existing circumstances' potential to fall within their mission.

In addition to direct contact with issues or events, the media also affects organizations' perceptions of issues by providing reminders of risks. Included are issues and events that are viewed as risky (both actual current events, and potential events), reminders of such events, and occurrences that are seen to prefigure future risks. With respect to risk communication, the number and strength of reminders, and the group's evaluation of these, along with the messages' appeal and power to define the issue may influence group response.

Organization's relationships with other groups may also affect their perception of an issue's salience. Both organizations that are sympathetic and opposed to a group's mission may influence their perception. Organizations that share similar viewpoints or missions may influence one another's behavior by making a case for action in relation to an issue or by enlisting one another's aid.

Similarly, interorganizational conflict may influence the threshold at which groups take action on

an issue. Groups may perceive their interests as being directly opposed to those of another organization. In such a situation, an escalation of attention to, or action on, an issue by one group or one type of group can prompt countermeasures in opposing organizations (e.g., environmentalists vs. developers).

In contrast to this, distrust of a given group and their opinions may also contribute to the reduction of an issue's salience among members of opposing organizations. In this case, an issue that may have otherwise been examined more closely for risks could be discounted by an opposing organization. An example of this type of reaction was exhibited by a respondent in reference to an environmentalist group's position on the Yucca Mountain Project:

Most of their arguments are like most of the 'green' arguments; they're panic: 'What if' and 'this has happened,' and it's true it has happened, but it doesn't mean it is going to happen again or it can't be managed or can't be changed or can't be done better. You know, they keep going back to Three Mile Island. Well, what actually happened at Three Mile Island? How many people were injured? Of course, I know none. It was a problem and a very expensive one, but it was managed and handled, and pretty well worked.

Behavioral Responses

The fourth category of elements which is influential in determining organizational thresholds for action includes the behavioral responses themselves. Each organization has a repertoire of actions that it characteristically takes, and those it generally avoids. Organizations may choose to use similar actions in different situations. Some groups have an extensive behavioral repertoire, while other groups depend upon a few trusted actions. It is likely that, in each organization, some actions may be taken for a range of concerns, both serious and mild, while other actions are only considered if the risk perception is high.

In unique circumstances, behavioral responses themselves may actually influence the type of issues that an organization reacts to. In one example, an organization reportedly has mastered a type of action, and currently searches out issues or problems with which their action is effective: the Red Rock Audubon Society is particularly skilled and experienced with the rehabilitation of bird habitat, and this the group now seeks out problem areas in which this specialty is effective.

Threshold Model in Action: Interactions of Elements

The Threshold Identification Model is a tool that assists in explaining how, when, and why issues gain salience in group perspective and come to require action. Elements that influence group behavior have been divided into four categories -- group definition, organizational

structure (including resource availability), external factors, and behavioral responses -- and presented in the section above. It is important to note that each of these elements do not exist in a vacuum; they are not the sole elements affecting a group's threshold for action. One must consider the degree to which an individual element's affect on group behavior is modified by the presence (or absence) and action (or inaction) of additional elements. As noted earlier, it is the *particular* interaction of a variable number of elements from each of the four categories under specific circumstances that channel organizational behaviors.

Due to the extremely complex and highly variable nature of this system, understanding group threshold for action is an approximate science. Such thresholds are constantly evolving, and are in a sense, "moving targets." In spite of this, some elements of the model have been noted to be more influential in determining group threshold for action than others.

First among these influential elements is a group's mandate. As explained above, a group's mandate (e.g., articles of incorporation, statement of purpose) forms the basis of its definition of self. The organization's purpose, its most basic reason for existing, is frequently spelled out in its mandate. This mandate determines the general focus or orientation a group has, and establishes its base position relative to the community, other groups, and issues.

Second in this discussion of key elements is a group's mission or set of missions. This element identifies the general area of issues in which a group has interest. Mission parameters (i.e., its scope, components, specificity) varies from group to group. Some organizations investigated in this study focus upon a single mission, others have as many as six or eight central mission areas. Issues that lie clearly outside of a group's mission are unlikely to attract attention or action, unless or until they become so encompassing that members push the organization to action.

Resources available to a group are the third important element in determining their threshold for action. Resources may determine what actions a group is capable of undertaking. Resources available to groups include, among other things, funding, volunteers, paid staff, personal contacts, and political clout. In a situation in which an organization has the desire but not the necessary resources to affect the outcome of an issue, the threshold for action may be set out of reach and essentially become a moot point within the group.

Last among these influential elements in determining a threshold for action is an issue's perceived salience among the group. Issue salience is the most flexible of the elements discussed here. As discussed above, an organization's perception of an issue's salience may increase or decrease with the occurrence of events, media coverage, or actions taken by an opposing group. The salience of an issue is significant in determining an organization's threshold for action in that it influences an organization's perception of the issue's seriousness as a threat and the degree to which it demands action.

The interaction of these four elements influences a group's threshold for action on any given

issue. Frequently, when an issue is applicable to all four of these elements-- e.g., the issue falls within the group's mandate, a mission is applied to it, there are sufficient resources available to act upon it, and it is salient to the group -- the threshold for action is attained. The absence of one or more elements in this interactive process may hinder or postpone the group's achieving their threshold for action.

These elements may be viewed in the form of a decision tree as illustrated in the following figure. This diagram depicts the steps a group may take in considering taking action on an issue. This particular example is relatively limited in the number of steps and variety of elements it includes. Actual decision processes used by organizations in establishing a threshold for action can include many more elements and steps.

In order to better understand the interactions of the elements involved in the Threshold Identification Model, examples noted among organizations interviewed are presented here. The following cases depict some of the processes indicated in the model. The cases describe interaction between organizations, changes in issue salience, change in levels of social activism, and processes involved in organizational decisions to take stances on the Yucca Mountain Project.

The interactions of two interest groups with different positions on the Yucca Mountain Project are presented in this first example, which is taken from an interview with a member of a labor union. In this quotation, the informant describes the behavior of members of a local concerned citizen organization, and how his group was prompted to take action in response to their behavior.

Interesting, when I first went to work here, I went to a (DOE update) meeting and they basically controlled the meeting. I mean they did some horrendous things that were really insulting to me in the meeting. So since that meeting, we pretty much control the meetings. [what did they do] They would sneeze and when they would sneeze they would go (loud noise) when people were up speaking on the podium. This one lady, several ladies had kids there, and whenever someone from the DOE was speaking this kid just screamed. I know she was pinching this -- she had -- because the minute they'd come off the podium, the kid would just go silent. And if it didn't she'd go outside with it. But the minute -- it was awful . . . [how did you change the meetings] Membership involvement, from different locals in the building and construction trades say 'look, here's what's going on in these meetings. If you guys want these views expressed in the community, and if you ever want to work out there on this exploratory facility, you're going to have to start coming to these meetings and participating, and express your views that this is how you feel about it. So generally by masses. [how many members attend these meetings] It's not that many. I mean [2, 5?] Uh, probably, total, from all the building and construction trades, we probably end up with anywhere from 50 to 150 depending on the time of the year, weather, whether or not you have some other function to go on.

In the case above, the informant's organization became more active in respect to the proposed repository in response to the behavior of a group opposed to the Yucca Mountain Project. This quote illustrates how factors external to an organization, in this case the behavior of an opposing group, may influence them to take action on an issue. In this case, the labor union members may not have attended the Department of Energy hearings in such numbers had they not perceived the behaviors of the concerned citizen group as a threat.

Such conflictual interactions frequently result in action on both sides. Resentment on the part of a particular group may be mirrored in an opposing organization. As an example of this, a leader in the 'concerned citizen organization' mentioned above gave a different picture of the tensions at Department of Energy update meetings. This interviewee asserted that incidents of tire slashing (of cars with anti-YMP bumper stickers), had occurred at hearings approximately two and a half years ago. The interviewee did not identify specific individuals or organizations as having taken these actions. The 'concerned citizen organization' had then publicly announced that they would no longer participate in update meetings because the Department of Energy, though not involved in the tire slashings, had done nothing to prevent them. The interviewee also said that the DOE had encouraged union members to attend en masse.

The following case describes how a change in organization leadership may influence a group's position in regard to a specific issue. This case is drawn from a quotation of a person outside the organization in question (the Chamber of Commerce). The quotation implies a shift away from YMP support in this leading business organization in Clark County. This example

suggests that a change in the position taken by an organization may not reflect a shift in issue salience among the organization's members, but instead a change in leadership personnel. It also suggests that while an organization's leader can have an important influence on the position taken by the organization, this influence may not last beyond his/her tenure. As discussed in Chapter 3 regarding ethnographic studies, this case also indicates a division of interests in the organization and in the community.

I think to some extent the new leadership at the Chamber of Commerce got if off that, but when . . . was the head over at the Chamber of Commerce, they were doing a lot of pro-dump stuff, but (he) was (leader) about six year ago or so. But this -- I'm not really clear whether people at the Chamber -- in fact I'm sure there are a significant number of businesses that belong to the Chamber that are anti-dump, and that may have had something to do with (it), once (he) himself was no longer president of the Chamber, they basically just dropped it completely, because they had members who didn't agree with that perspective... I think (the Chamber) dropped all that after he left, it became pretty obvious it was just his little crusade, but at the time I recall a discussion of the possibility that there were people who thought they would profit from the dump, and those were the people who were pro-dump, and there were other people who realized that their businesses based on being service-oriented or tourism-oriented were going to suffer because of the dump, and they were anti-dump. So there's that.

The quote above suggests the significance of a number of different organization structure elements in determining a group's stance on a given issue. The influence of the organization's leader described above suggests that the group may not have a very democratic leadership structure. Had the group been more democratic, the personal views of the group's leader may have been less likely to make the organization support the YMP. The quote also indicates that without the past leader, the group's pro-repository position gave way due to the underlying division over the issue.

An additional example comes from the Parent Teacher Association's development of an anti-Yucca Mountain Project resolution. In the late 1980s, the PTA adopted a resolution in opposition to the proposed repository. In the years since that decision against the Yucca Mountain Project, the resolution has been repeatedly challenged by members within the group. As illustrated in the following quote, elements of the threshold identification model, including group mandate, social context/momentum, may combine to influence group behavior with respect to a given issue. This quotation suggests that organizations may take stances as part of a general social momentum surrounding the issue, while being prevented from additional action by remaining organizational division.

The community as a whole tends to sort of respond to the polls that are out there, and there was a series of resolutions that were passed by groups like the PTA,

years ago, early on in the struggle, in the mid '80s, and late '80s, . . . and mainly what they do is just try to prevent pro-dump people within their organization from trying to rescind those resolutions every year. [really] Because the DOE employs enough people, that some of them are active in the PTA, and they take a shot, once a year, at trying to rescind the PTA's opposition to the dump and so on. A lot of these groups did those anti-dump resolutions, seven, eight, nine years ago . . . and there's not much else they do about it, other than just be on record against the dump.

While social momentum on an issue (an 'external factor' in the model) may be one element impelling a group to act, the group's mandate (or 'definition') is another important variable. Thus the YMP issue may have been considered an appropriate one for the PTA because their mission includes a broadly defined interest in the health and welfare of children. The fifth clause of the PTA resolution reads: "WHEREAS, a high level nuclear waste repository creates a potential danger for our children and future generations, therefore be it RESOLVED" This might imply that organizations with a charge or mission of public welfare may consider the YMP an appropriate issue for debate.

5.3.2 Individual Perceptions and Behaviors

One goal of the sociocultural/risk perception survey was to collect data regarding the behaviors and actions of residents in response to important issues in the community, including the proposed repository. While these data are presented in more detail in an actions and behaviors section of Chapter 4, "Analysis of Sociocultural/Risk Perception Survey," it is summarized here for the readers convenience in this stand-alone chapter format. This summary is intended to emphasize the significance and benefits of a multi-method approach to this research.

Behavioral Survey Data

Survey methodology provides statistically significant information which is characteristic of a community at large. The ability of survey methods to quickly and inexpensively provide information about a community is advantageous. Such studies provide researchers and policy makers with knowledge of trends and community-wide generalizations, or the "big picture." Ethnographic research, while sometimes more time consuming, is effective in lending a deeper understanding of elements within a community. The combination of these two methodologies is particularly effective in studying community issues. Ethnographic research complements survey data by providing "the story behind the numbers." Likewise, surveys provide information on an entire community which may serve as a helpful cross-check for ethnographic data.

Within the context of risk perceptions and behavior, surveys can provide statistically-significant data regarding which people take action, how they act, what actions are taken, and what actions a population believes should be taken. Surveys do not delve into the complexities of issues within a historic, sociocultural, and economic context. Facilitating the understanding of how and why actions are taken is the strength of ethnography. Thus while surveys cannot identify thresholds for behavior, they can facilitate a discussion about a larger sample size and can compare the behaviors of one group or one issue to others in relative terms. The use, therefore, of survey methodology in combination with other research methodologies is useful in gaining a broad-based understanding of how an issue is perceived by a population (or subpopulation) and how that perception may lead to action or non-action.

Behavioral Survey Findings: Individual Actions and the YMP

When considering issues relating to the proposed repository, it is interesting to make comparisons with other issues of importance in the county. Table 5-4, below, compares and contrasts the array and frequency of actions taken in reaction to several issues of importance in Clark County. This survey is based on the responses of a statistically valid sample of Clark County residents. The frequencies in this table represent the total number of actions taken by respondents on a given issue. It is interesting to note that the two nuclear waste issues rank among the issues with the highest number of actions recorded -- only crime and quality of schools and education rank higher. Similarly, in evaluating the seriousness of issues, the two issues pertaining to the Yucca Mountain Project were among those with the highest mean evaluation scores, after crime and traffic congestion. It is also worth noting in Table 5-4 the types of actions taken for one issue in relation to other issues. Nuclear waste issues, for example, both exhibit the greatest number of actions corresponding to contacting a U.S. Senator. While other issues rank higher in frequency, issues concerning nuclear waste appeared to influence voting practices of respondents.

The information in Table 5-5 indicates that a set of issues including crime, air pollution, overpopulation, traffic congestion, job opportunities, storage of nuclear waste at Yucca Mountain, and transportation of nuclear waste through the community are perceived by more than half of the individuals interviewed as requiring action within the next five years. In contrast, issues such as diversity in the county economy and expansion of gaming outside of the Las Vegas Valley were viewed as demanding action by fewer individuals. It appears that the majority of residents are confident that gaming and the local economy will not fluctuate enough to drive individuals over the threshold to take action. In comparison, the first group of issues addressed in this discussion appear to be perceived of as having a higher probability of demanding action in the next five years, if no action has yet been taken. Respondents view these issues as being relatively serious (i.e., rated a 6 or more on a scale of 1 to 10; where 10 is very serious).

Surveys can be a good indicator of who is acting on, or who is concerned about, given issues. The level of concern with respect to these two issues did not appear to differ significantly by occupation. In all, more than 13% of the 492 survey respondents reported taking some action concerning the possible transportation of nuclear waste through Clark County and the storage of waste at Yucca Mountain. In comparison, 25% of the respondents reported taking some action in response to the crime issue, and one in five respondents reported taking some action in response to the quality of schools and education. The distribution of actions taken on issues by the selected demographic characteristics is presented in Tables 5-6a, b, and c. It should be noted that the two Yucca Mountain Project issues had a very high percentage of respondents who felt the need to take some action in the future, and this perception did not appear to be related to age, gender, ethnicity, having young children, employment in the Department of Energy or DOE contractors, education, income, nor intention to remain in Nevada. This result is considerably higher than might have been predicted on the basis of the Phase I open-ended survey questions concerning the relative significance of "concerns" facing Clark County (i.e., a very small number of respondents identified the repository issue as among the most significant). The conclusion to be drawn from this contrast is that while Clark County residents do not spontaneously identify repository issues among the most salient *in the context of current concerns* they do consistently identify such issues among *the most important future issues in need of resolution*.

This disparity, between immediate risk concerns and temporally distant risks, should not be seen a trivial finding in light of the fact that most Phase I survey respondents, to the extent they were at all knowledgeable about the repository process, would have understood that the planned repository was at least 10-15 years from actual operation -- whereas Congressional efforts currently underway would have an "interim storage" facility located at NTS within the next three years (i.e., 1998). The implication is that, as the public increasingly recognizes the possibility that nuclear waste could actually be shipped through Clark County (i.e., the Las Vegas valley) within the next three years, public opinion may undergo a dramatic shift in opposition to the repository

**Table 5-4
Frequency of Actions Taken by Respondents for Issues of Concern In Clark County**

Issue	Behavior												Row Total
	1 Attended meeting	2 Issue has influenced vote	3 contacted gvt/don't know who	3.1 contacted public agency	3.2 contacted federal senator	3.3 contacted state rep.	3.4 contacted city/country rep.	4 sought/given info.	5 contrib/spent \$ on issue	6 contemplated moving	7 joined group	8 other actions	
Quality of schools and education	28	70	1	3	7	8	10	13	4	19	7	3	173
Diversity in County economy	5	15	2	1	1	1	2	3		3	4	3	40
Transport of nuclear wastes through County	8	31	4	6	16	5	7	12	3	5	3	1	101
Storing nuclear wastes at Yucca Mountain	11	29	4	6	14	7	6	14	2	7	5	3	108
Crime	22	54	7	3	8	4	10	18	5	27	15	5	178
Expansion of gaming industry	5	5	3	1	1	1	2	5		2	1	2	28
Air pollution	6	14	5	2	5	3	5	8	4	12	4	5	73
Job opportunities	2	8		1	1	1	3	1		6	1	2	26
Traffic congestion	10	16	4	4	3	5	8	7	2	20	3	4	86
Water shortages	7	16	1	6	5	2	4	8	4	5	3	5	66
Overpopulation	5	12	4	1			3	6	2	20	2	2	57
TOTAL	109	270	35	34	61	37	60	95	26	126	48	35	936

Note: some individuals may have indicated more than one action per issue, thus the totals may add to more than the total number of respondents (n = 492).

**Table 5-5
Frequency and Percentage of Respondents Indicating a Need to Do Something About Serious Issues In the Next 5 Years**

Issue	YES		NO		DON'T KNOW/MISS		ROW TOTAL	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Quality of education	205	41.7%	38	7.7%	249	50.6%	492	100%
Diversity in economy	165	33.5%	61	12.4%	266	54.1%	492	100%
Transport of nuclear wastes	269	54.7%	38	7.7%	185	37.6%	492	100%
Storing nuclear wastes	272	55.3%	33	6.7%	187	38.0%	492	100%
Crime	302	61.4%	44	8.9%	146	29.7%	492	100%
Expansion of gaming	134	27.2%	50	10.2%	308	62.6%	492	100%
Air pollution	291	59.1%	66	13.4%	135	27.4%	492	100%
Job opportunities	272	55.3%	33	6.7%	187	38.0%	492	100%
Traffic congestion	325	66.1%	57	11.6%	110	22.4%	492	100%
Water shortages	241	49.0%	45	9.1%	206	41.9%	492	100%
Overpopulation	254	51.6%	57	11.6%	181	36.8%	492	100%

Note: This question was asked when an issue was ranked by respondents as fairly serious; that is, when the issue was given a 6 or higher on a scale of 10 (1 being not at all serious, and 10 being very serious), and an action had not yet been taken. Thus, included in the "Don't Know /Missing" values, is the number of respondents who have already acted upon the issue, hence may act again.

**Table 5-6a
Percent of Respondents Taking Action Among Those Evaluating Issue as Serious by Demographic Characteristics**

Issue	All	Age					Gender		Ethnicity					Kids		Work for DOE	
	(295)	18-24	25-34	35-44	45-64	65+	Men	Women	White	Black	Native American	Asian P.I.	Hispanic	Yes	No	Yes	No
Quality of schools and education	20.3	14.3	23.2	30.7	20.3	10.6	17.7	23.0	17.5	28.2	60.0	10.5	29.5**	30.6	14.6***	35.7	19.0**
Diversity in County economy	5.1	10.2	3.6	6.8	3.4	5.3	5.2	4.9	5.0	5.1	10.0	5.3	4.5	5.8	4.7	4.8	5.0
Transport of nuclear wastes through County	13.8	10.2	8.0	17.0	16.9	13.8	12.5	15.2	13.8	7.7	30.0	10.5	18.2	12.7	14.6	11.9	13.8
Storing nuclear wastes at Yucca Mountain	13.6	10.2	8.0	17.0	16.2	14.9	12.1	15.2	13.8	12.8	10.0	10.5	15.9	13.3	13.9	14.3	13.3
Crime	25.6	24.5	24.1	22.7	31.8	20.2	23.4	27.9	25.1	33.3	60.0	26.3	15.9*	26.0	25.3	38.1	24.7
Expansion of gaming industry	3.9	4.1	2.7	4.5	2.7	6.4	4.0	3.7	3.7	2.6	0.0	5.3	6.8	1.7	5.1	7.1	3.4
Air pollution	10.2	10.2	5.4	9.1	13.5	10.6	10.1	10.2	10.6	5.1	50.0	10.5	2.3***	9.2	10.8	16.7	9.7
Job opportunities	3.9	8.2	4.5	2.3	4.1	2.1	3.2	4.5	3.2	5.1	10.0	10.5	4.5	5.8	2.8	9.5	3.4*
Traffic congestion	12.6	8.2	7.1	14.8	15.5	14.9	11.3	13.9	13.0	2.6	40.0	15.8	11.4*	9.2	14.6	19.0	12.0
Water shortages	9.6	4.1	7.1	10.2	12.8	9.6	7.7	11.5	10.1	5.1	20.0	10.5	6.8	8.7	10.1	14.3	8.8
Overpopulation	9.3	8.2	8.0	10.2	10.8	7.4	9.3	9.0	9.3	7.7	20.0	5.3	6.8	10.4	8.5	16.7	8.1

* p < 0.05; ** p < 0.01; *** p < 0.001

**Table 5-6b
Percent of Respondents Taking Action Among Those Evaluating Issue as Serious by Demographic Characteristics**

Issue	Education					Income		Occupation					Retired	Student Hsewif
	<HS	HS	Col	BS	Grad	<\$45K	\$45K+	Prof Tech	Manager	Clerical Sales	Skilled	Unskilled		
Quality of schools and education	16.7	18.3	20.7	24.2	25.9	19.7	24.8	34.3	11.6	27.7	12.5	21.4	8.1	11.1***
Diversity in County economy	0.0	5.9	4.0	7.6	11.1	5.6	6.0	9.1	4.7	5.3	5.0	2.9	2.7	0.0
Transport of nuclear wastes through County	9.5	11.1	15.7	19.7	11.1	14.8	13.4	15.2	18.6	16.0	7.5	10.0	8.1	5.6
Storing nuclear wastes at Yucca Mountain	7.1	10.5	13.6	22.7	22.2	13.7	16.1	18.2	18.6	14.9	5.0	8.6	5.4	5.6
Crime	19.0	24.8	24.2	37.9	22.2	23.9	30.2	32.3	23.3	33.0	20.0	22.9	16.2	16.7
Expansion of gaming industry	2.4	3.9	3.0	6.1	7.4	3.5	4.7	4.0	5.4	3.2	2.5	4.3	2.7	0.0
Air pollution	2.4	7.2	11.6	16.7	14.8**	9.5	11.4	14.1	10.1	9.6	2.5	7.1	13.5	11.1
Job opportunities	2.4	3.9	3.5	7.6	0.0	3.9	4.7	4.0	3.1	4.3	2.5	4.3	2.7	5.6
Traffic congestion	4.8	10.5	12.6	21.2	18.5**	11.3	16.8	17.2	14.0	11.7	7.5	7.1	13.5	5.6
Water shortages	2.4	5.9	9.1	19.7	22.2***	7.0	16.8**	17.2	10.1	8.5	5.0	4.3	8.1	5.6
Overpopulation	2.4	11.1	8.6	13.6	3.7	8.5	12.1	11.1	11.6	7.4	2.5	10.0	5.4	5.6

* p < 0.05; ** p < 0.01; *** p < 0.001

Table 5-6c
Percent of Respondents Taking Action Among Those Evaluating Issue as Serious by
Demographic Characteristics

Issue	Length of Residence in Nevada						Remain in Nevada		
	< 1 yr	1-2 yrs	3-4 yrs	5-9 yrs	10-19 yrs	20+ yrs	Yes	Don't know	No
Quality of schools and education	5.6	22.8	21.4	15.7	19.4	28.5**	18.1	34.1	26.0*
Diversity in County economy	0.0	8.9	2.4	3.6	7.8	4.6	5.5	4.5	2.0
Transport of nuclear wastes through County	3.7	15.2	14.3	21.7	6.8	17.7	12.8	25.0	12.0
Storing nuclear wastes at Yucca Mountain	3.7	19.0	14.3	20.5	6.8	15.4	13.1	20.5	12.0
Crime	13.0	27.8	33.3	20.5	26.2	30.0	21.7	47.7	38.0***
Expansion of gaming industry	1.9	6.3	2.4	1.2	5.8	3.8	4.0	2.3	4.0
Air pollution	5.6	13.9	16.7	4.8	10.7	10.8	9.3	18.2	10.0
Job opportunities	3.7	2.5	2.4	2.4	5.8	4.6	2.8	9.1	8.0*
Traffic congestion	5.6	10.1	11.9	8.4	13.6	19.2**	10.3	25.0	20.0**
Water shortages	1.9	11.4	14.3	6.0	10.7	11.5	8.1	15.9	16.0*
Overpopulation	1.9	7.6	9.5	2.4	7.8	18.5***	7.6	11.4	20.0**

* p < 0.05; ** p < 0.01; *** p < 0.001

5.4 SUMMARY AND CONCLUSIONS

This section provides a brief summary of the current research on behavioral outcomes. In a second subsection, future study and monitoring implications of the present work are discussed.

5.4.1 Summary: Current Research

This report considers the factors that prompt behavior by looking at organizational action and individual action. These are based on ethnographic research and survey research respectively. The focus is on understanding the variables, such as changes in issue salience, that lead people to take action on issues of concern to them. Surveys provide population based data about the frequency with which people act, and consider acting, on issues including the Yucca Mountain Project.

For the first part of the report, the unit of study is the organization, including the factors that

predispose a group to act or not to act, and the way it reaches decisions. The pattern of analysis moves from organizational structure to action. A taxonomy of organizations suggests the range of organizations and organizational types included in the study. Some specific organizations are then taken from this taxonomy for extended description and analysis. For comparative purposes, several matrices present the range of behaviors taken by a larger number of organizations. The descriptive framework is then further elaborated into a threshold identification model which suggests the way groups move towards the 'threshold' at which they decide to take action. Examples are drawn from cases to exemplify elements of the model. These elements include the group definition, organizational structure, external factors, and behavioral response. The variable relationship among these model elements is noted, as is the importance of additional elements, such as the resources available to the group to take actions.

The second part of the report employs a survey of Clark County residents to consider the kinds of actions individuals take, and the actions they have taken (or foresee taking) on a range of issues including the Yucca Mountain Project. Perhaps obvious but worth mentioning is that survey respondents take different actions in response to different issues. In response to crime, respondents reported that the issue had influenced their vote, that they had contemplated moving, they had attended a meeting, sought or given information, joined a group, or contacted a city or County representative. The issues that most influenced votes were the quality of schools and education, crime, transport of nuclear waste and storage of nuclear waste. The behavior with the largest economic impact of those mentioned in the survey, namely contemplated moving, was prompted by crime, traffic congestion, overpopulation, and quality of schools and education. Respondents most often sought and gave information in response to issues of crime, storing nuclear waste, quality of schools and education, and transport of nuclear waste.

The behaviors with the highest overall frequency were: (1) influenced vote; (2) contemplated moving; (3) attended a meeting; and (4) sought or given information. To some degree this is similar to the findings of the group behavior section, in which most of the groups listed had taken political action, group action, and were involved in information search and dissemination. Somewhat rarer among survey respondents was joining a group. Not surprisingly, the issues that were of importance to organizations (such as crime and schools and education), were also concerns to survey respondents. An exception, as mentioned above, is the greater importance placed on the YMP by survey respondents. Caution is required in the interpretation of some of survey results as some of the findings do not reach levels of statistical significance (as discussed in more detail in Chapter 4 for reasons of differing sample size for portions of the survey). Of interest is that when respondents reported having contacted someone in government, it was most often a federal senator or someone in city or County government.

In response to the two nuclear waste questions (transport and storage), the most common behaviors were: (1) influencing their vote; (2) contacting a federal senator; and (2) seeking and giving information. Thus political behavior and 'risk communication' behaviors are the most common responses (among the available options) to the Yucca Mountain issue.

Nuclear waste issues rank among the issues with the highest number of actions recorded, preceded only by crime and quality of schools and education. This level of interest and action on the Yucca Mountain issue is markedly different from the findings of research with interest groups (described in Chapter 3, and in this report) which found only some organizations had taken actions on, or expressed an interest in, the Yucca Mountain Project. It may be noted that one of the reasons for investigating organizations was our belief that they would serve as surrogates for public response or as "advance indicators" of imminent social change. While this still may prove to be the case, it is now evident that organizations have many more constraints on their actions than was originally envisioned. Mandates not only promote certain actions, they also operate as powerful constraints on organizational response and behavior. Resource constraints, in terms of financial, staffing, membership, training, and political capital, also operate to constrain response. Thus, while we continue to view the actions of certain organizations as likely barometers or predictors of future change in the wider social context, it seems unlikely that organizations without mandates associated with the particular issue will take actions until and unless the broader social context is poised to accept or require such action. By that time, any advance warning signs will have already been broadcast.

In contrast, we have been struck by the range, frequency, and apparent seriousness of individual behavioral response to nuclear waste concerns and issues. The array of actions was considerably broader than expected, more frequently employed, by a larger number of actors than originally envisioned. The number of informants who claimed to have been in contact with their U.S. Senator or state legislative representative was surprising. It is apparent that the actions of individuals in response to risk concerns are not constrained by their membership in groups, political concerns, or economic constraints. This finding, in turn, underlines the importance of understanding the salience of these issues from the perspective of individual actors.

5.4.2 Conclusions: Future Study and Potential Monitoring Implications

The information presented in this preliminary study, which has built upon an earlier pilot study, suggests that behavioral correlates of risk perceptions will continue to be a fruitful area for research. While past or current behavior (or ideas about future behavior) are not to be taken as a chart for definitive future behavior, understanding the relationship between past events and corresponding behavioral response must be considered among the best foundations for anticipating future behavior. Additional discussion of this process may be found in the chronicling portion of the ethnographic sociocultural/risk studies report (Chapter 3). Such information has direct and immediate utility for decision makers. For example, voting, relocating, protesting, promoting, or other actions may affect individuals, communities, and ultimately policy decisions. The knowledge of how public perceptions about key issues are eventually channeled into actions is of service when planning and implementing effective public policy. It is suggested that this knowledge can be best obtained through a multi-method research approach combining survey efforts and in-depth interviewing/chronicling activities.

This report has provided information on a number of organizations in summary and tabular form. This information has shown a range of behavioral responses to a wide array of issues perceived to be important to the various groups. In extending the earlier Behavioral Pilot Study work, questions regarding Yucca Mountain have been asked, and groups whose primary focus involves Yucca Mountain or other nuclear related issues have been interviewed. Although this is a preliminary report, the results indicate that there is a significant amount of information to be gained by monitoring groups over time. Issues have changed in their salience over time and, as noted especially in the companion Chapter 3, groups are continuing to evolve. Some new groups have come into being over specific issues related to Yucca Mountain; in other cases, while groups have remained intact, Yucca Mountain issues have proven to be internally divisive. In yet other instances, the social context has altered through groups having formed alliances in response to increases in salience of particular issues upon which they share common interests, while remaining divided on other issues. In this shifting context, continued monitoring and chronicling oriented toward behavioral outcomes offers the promise of documenting a set of dynamic processes which should lead to more effective local response and longer-term projections.

Ethnographic interviews, described in Chapter 3, have contributed to this expanded behavioral study. A different set of data has derived from the Phase II survey effort, as detailed in Chapter 4 regarding the analysis of the sociocultural/risk perception survey. Given that these chapters are included in this document as revisions of earlier stand-alone drafts (i.e., Deliverables 94-8, 94-9, and 94-10), there is minor redundancy between them; hopefully this will facilitate the review process without unnecessary overlap.

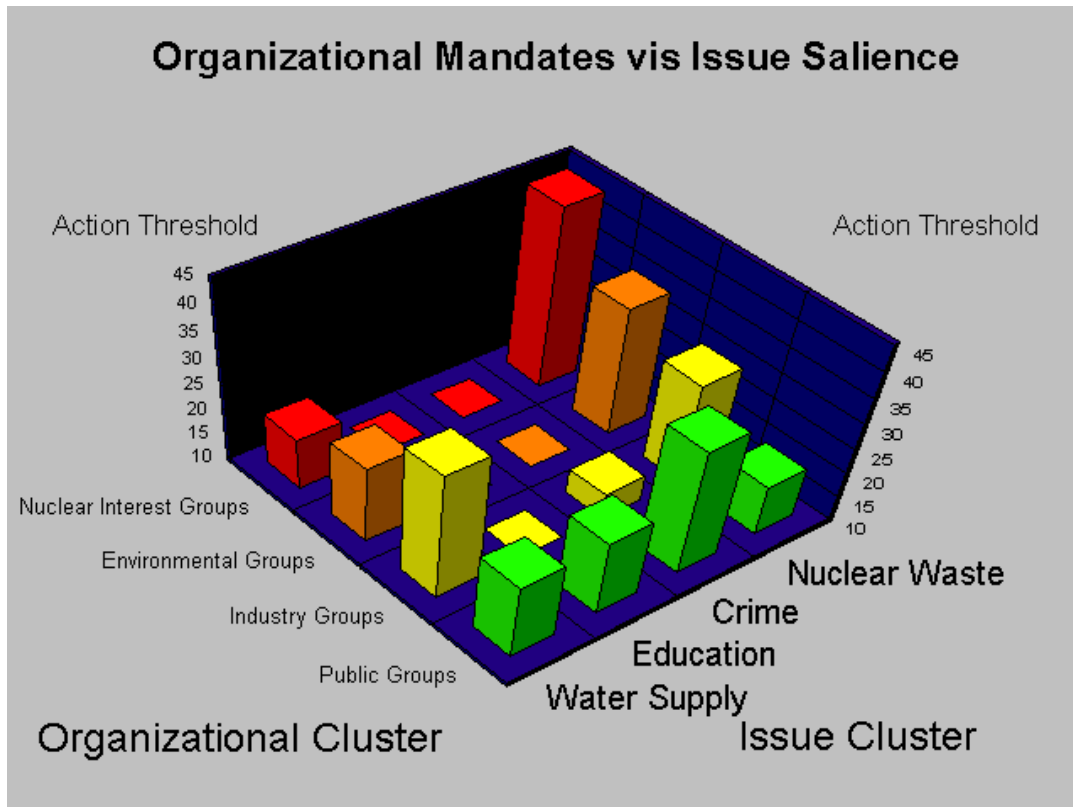
The objective of this behavior-oriented effort is to provide another building block in the bridge between the responses of the general population, derived from statistically valid random surveys

of perceptions and informed by non-random ethnographic interviews, and actual measurable behavioral responses to the dominant concerns and issues affecting the residents of Clark County. Perceptions, in and of themselves, may or may not lead to measurable behavioral consequences. For individuals, whether or not perceptions yield action depends on many factors, including the strength of the stimulus, personal and cultural predispositions, vested interests, and many other factors. At one end of the continuum of research into public response are the range of public perceptions, and weights attached, to the dominant issues affecting Clark County. For organizations, behavioral response (action) will be promoted or inhibited depending on the nature of the event, the organization's mandates, resources, organizational structure, and social context within which it occurs. We now know, however, that the task of understanding these variables is less complex than at first envisioned and that the identification of organizational action thresholds may be both possible and useful for Clark County.

In our effort to build a bridge from perception to behavior, it was deemed unrealistic to attempt to conduct sufficient random individual interviews to establish this relationship. In its stead, this behavioral study, like its pilot predecessor, was conceived to examine *organizationally-derived response* to the set of concerns identified by Clark County residents in the Stage I survey effort (1993). That is, we sought to elucidate the relationship between perceptions of organizational members (to the list of Clark County concerns) and potential behaviors available to its members. Our objective was to document the range of behavioral responses available and historically utilized by the membership in relation to prior or current concerns. In effect, the selected organizations were utilized as surrogates for particular sets of stakeholders.

As social mechanisms for the achievement of defined goals, we know that these organizations can, and should be expected, to respond to issues of relevance to their original charge. Our objective, however, was not merely to demonstrate that organizations take actions, or take actions in response to issues for which the organization was conceived, but that the actions of these organizations and their membership can be used as surrogates, or gauges, to measure, evaluate, or predict the behavioral responses of segments of the community to a much wider range of issues and concerns including the proposed nuclear waste repository. With the caveats noted earlier, expansion of this effort from the earlier pilot work would seem to confirm that, when combined with survey and ethnographic efforts, a behaviorally oriented approach can be integrated into an efficient socioeconomic monitoring program.

Finally, it is our belief that further investigation would enable the development of a more quantitatively based framework for understanding current or predicting future organizational response. The following graphic represents a conceptual mock-up of the above framework relating the organizational mandates of four organizational groupings to four issue categories.



The graphic portrays, in approximate and *conceptual* form, where different groups of organizations -- in this example, nuclear interest groups, industry groups, environmental groups, and public action groups (such as PTA, Women's League of Voters, etc.) -- *might stand* on a quantitative threshold scale relative to the four example issues (i.e., nuclear waste, crime, education, and water supply). If, for purposes of this exercise, we assumed a uniform action threshold of 25 on this scale, action in response to a particular stimulus (or event) might be predicted once sufficient understanding of the mandates, missions, resources, and organizational structure of the particular organization is understood. Clearly, our intent is not to try to precisely fix such thresholds but to underline the reasons we believe NWD should consider collection of additional data on organizations that have yet to be included, and further refinement of the internal or external factors that might precipitate action in response to nuclear waste transportation and storage issues -- issues that may arise much sooner than expected.

6.0 SOCIOCULTURAL/RISK COMMUNICATION STUDIES

Sociocultural/Risk Communication Studies represent FY94's third major area of work (broad-based ethnographic and survey research being the two other major components). This archival research examined the communication of risk-related information about the YMP and identified the content of information about the risks or opportunities of the YMP. Data collected through other methodologies described in this report comprise the "information receiver" portion of the study; whereas the portion described in this chapter addresses the content of information messages as communicated by important media and non-media information sources about community issues, including the Yucca Mountain Project (YMP).

This chapter is a revision of Deliverable 94-11, submitted to the Clark County Nuclear Waste Division (NWD) December 2, 1994. Incorporated into this chapter, where possible, are responses to NWD and PRC review comments. The information presented here is founded on archival methods directly tied to previous sociocultural risk communication research, the results of which was reported in the *Site Characterization Sociocultural Risk Report* (IAI March 18, 1994). Discussion of archival research techniques is also available in the *Final Research Design* (IAI August 1991).

6.1 PURPOSE AND ORGANIZATION OF THE CHAPTER

The purpose of this chapter is to examine the communication of risk-related information about the Yucca Mountain Project (YMP). The Sociocultural/Risk Communication Studies reported herein identify the content of information about the risks posed or the opportunities presented by the YMP as seen in both media and non-media sources. This effort represents an initial step in a longer term process of examining the messages communicated about the proposed repository, the sources of Yucca Mountain Project-related information (formal and informal) used by different publics, how these sources are evaluated, and what kind of information results in actions.

This chapter is organized into four sections. Following this introduction, Section 2 contains a discussion of methods, procedures, and data sources used to produce this document. Section 3 presents information on findings and is subdivided between discussions on media and non-media sources, with a comparative discussion closing the section. Section 4 provides a general summary and conclusions.

6.2 METHODS, PROCEDURES, AND DATA SOURCES

The methods, procedures and data sources to be employed and used in this area of work were largely defined in previous research in this area. In overview, the activities for this area of work may be summarized⁸ as follows:

- (1) *Las Vegas Review-Journal* and *Las Vegas Sun* newspaper accounts published between January 1 through October 31, 1994, were coded. The coding categories, including references to perceived and possible YMP impacts, were developed during FY93 work, and the new 1994 data were added to those earlier compiled for 1990-1993.
- (2) Non-media sources of Yucca Mountain Project information were identified and coded. Data gathered through the methods described in this report contributed the identification of non-media sources of YMP information. Practical factors including information provided through ethnographic interviewing, timing, and division of labor contributed to the definition of actual non-media sources analyzed. Given a broad range of potential sources to be researched, discussions with informants and interest groups suggested that the sources analyzed are among the most common and relied upon. A change in interview process, namely dividing the interview into two components whereby questions relating to YMP information sources were not asked until later in the research effort, contributed to this conclusion. In addition, the division of labor that had been established between Impact Assessment and the Nuclear Waste Division was revised; thus, the available resources to schedule and conduct interviews as well as collect and code data were limited. Never-the-less, the multi-method research included in this study indicates that the non-media sources, while being used less extensively in the analysis than originally anticipated, is sufficient to provide a qualitative sample of available sources, present some balance in reviewing the media and non-media accounts, and stay within the framework of the original scope of work. The change in focus from a large number of non-media sources to the smaller list analyzed in this document, also affected the amount of available "linking information" regarding information sources, the content of risk concerns, and impact types. Taking into account these changes, the non-media material has been treated more qualitatively than has the media materials.
- (3) Media and non-media information sources were independently analyzed. Analysis has identified risk perceptions and the frequencies of topics. Explanation of this analysis is augmented by the use of data tables throughout this chapter. The layout and consistent ordering of topics in these tables is intended to facilitate cross-referencing and ease of comparison throughout the chapter. Information sources were linked to risk perceptions and other topics where possible, but as noted earlier, this analysis is more quantitatively

⁸ The interested reader is referred to the FY94 *Scope of Work* (IAI May 1994) for additional explanation of work activities and the relationship of these to other FY94 study components.

oriented for media sources and qualitatively oriented for non-media sources.

- (4) This work was coordinated with the Clark County Nuclear Waste Division, and the September 1994 newspaper accounts were coded by NWD staff. Quality control measures were taken to ensure that coding procedures corresponded to those carried out by IAI staff.

6.2.1 Methods and Procedures for Coding Media and Non-Media Information Sources

In order to facilitate analysis of changes in media coverage over time, the methodology and coding system employed for this effort is the same one used in previous (FY93) reports.⁹ It was decided to employ the same coding system with both media and non-media sources, since one objective of this report is to compare the information presented in media and non-media information sources. The experience gained in applying of the codes to the non-media sources, however, has shown that it would be desirable to update the content codes for future work. The codes, originally designed for media analysis, would be more useful for more-inclusive applications through both an expansion of coding categories to cover additional types of information, and a greater degree of internal differentiation within some existing categories. The utility of existing information would not be lost with the careful implementation of a new coding scheme.

Following earlier-established and accepted methods, two individuals coded the media sources, one of whom was an experienced coder who had done similar work on FY93 research. Non-media sources were coded by three individuals, with one coding the governmental sources, and all three providing coding on the two non-governmental sources. Two researchers cross-checked the coding on every article. A subject code was assigned if the topic was mentioned in an article; the code was, however, assigned only once to the article, regardless of how many times the subject itself was mentioned.

Summary coding tables were then developed for media and non-media sources. Given the established and limited universe of media data, the coding data from media sources was processed using the SPSS[®] program similar to earlier FY93 work. Post-coding data processing has been less extensive for non-media sources, due to the qualitative focus, and tests for statistical significance have not been applied as this was felt to be of limited utility at this time.

⁹The specific codes used for information sources (source codes) and the content of information in the materials reviewed (content codes) appear as an appendix to this report. These code definitions are consistent with earlier applications.

6.2.2 Identification of Media and Non-Media Information Sources

This chapter analyzes the same media sources as the FY93 research, the *Las Vegas Review-Journal* and the *Las Vegas Sun*. With current (November, 1994) weekday daily circulation figures of approximately 145,000 and 38,000 respectively, these are the dominant newspapers in the area.¹⁰

Initially, non-media information sources were to be identified primarily through the interview process as a means of establishing how individuals and groups obtained information rather than cataloging all potential sources of information without regard to its availability or actual readership. Given the change to a two-part interview approach, the non-media information sources were initially identified by a researcher with extensive experience on the Yucca Mountain issue, and were confirmed as viable sources through a limited number of interviews and review of earlier research (i.e., FY93 efforts) related to this study. When the interviews, both Stage I and Stage II, were completed, no new local YMP information sources had been identified by informants.

Additional media information sources, such as local television and radio, were not analyzed for this chapter, and priority was given to the identification and analysis of non-mass media sources, as indicated below. Ethnographic and survey research (Deliverables 94-8 and 94-9) suggest that television and radio are major sources of information in the community, and therefore the analysis of these media as sources of YMP information would be potentially useful.

Preliminary inquiry on the feasibility of such a study found that the three local network affiliates do not store or archive their newscasts for long: The ABC affiliate, KNTV, keeps news tapes for one week, the NBC affiliate, KVBC saves their news broadcasts for 45 days, and the CBS affiliate, KLAS, maintains tapes for a week. KLAS added that they save tape that is especially newsworthy, but will sell only those portions of the tape that have been broadcast. However, the NWD has for the last year subscribed to a media monitoring service, Shoshona Media South. This service sends the NWD a facsimile every 24 hours, summarizing the contents of the three news broadcasts. The monitoring service preserves tapes for only a week, but the summary enables NWD to order those tapes it wants. The company will also monitor (on request) radio stations. There is a single local radio station, KNEWS, that produces its own news shows, and the monitoring service was not asked if they could also provide monitoring of local 'talk radio.' Since the NWD is currently monitoring television and (somewhat less) radio, analysis of this archived information could be integrated into a comprehensive monitoring program, but was beyond the scope of the present research.

Five non-media sources are analyzed in this chapter. The first of these is the *OCRWM Bulletin*,

¹⁰These papers produce joint weekend editions, with a circulation of approximately 182,200. In the joint editions, the *Sun* appears as a section within the *Review-Journal*. Total Sunday distribution, including newsstands, is approximately 215,000.

and (included in the same publication) *Of Mountains and Science: Yucca Mountain Project*. This journal is published by the Department of Energy, and has a Nevada distribution of 6,000. The second source is a Nevada State publication, titled *Nevada Nuclear Waste News*. This bulletin has a total distribution of 16,000. Clark County's publication, titled *Clark County Nuclear Waste Repository Program Update*, has a distribution of approximately 500. The *Nevada Monitor: Assuring the Scientific Study of Yucca Mountain and Benefits for Nevadans*, is published by the Nuclear Waste Study Committee and distributed to 14,000 members. *Citizen Alert: An Independent Information Source for Nevadans*, published by the organization Citizen Alert, has a Nevada distribution of 10,000. Summary information on the distribution of these various bulletins is presented in the table below. This information was gathered through telephone calls to or personal contact with the organizations that publish them; publishers were asked for available information and were not asked to make detailed studies of the subject. The publishers did not have readily accessible information about the distribution of these bulletins within Clark County, and did not have at hand information about how many went to government offices and libraries, or how many are sent to private citizens. Clark County's Nuclear Waste Division provided the most information on distribution, and reported that approximately half of the copies published go to local governmental entities and advisory boards.

Table 6-1
Overview of Non-Media Sources Analyzed
(as of January 1994)

Publication	Publisher	Distribution Size	Distribution Selection	Frequency of Publication	Source of Information
<i>Nevada Nuclear Waste News</i>	Nevada Nuclear Waste Project Office	16,000 total	individuals/ organizations request to be on mailing list	Every 1 to 3 months	Editor of publication
<i>OCRWM Bulletin</i>	Department of Energy's Office of Civilian Radioactive Waste Management	6,000 in NV 10,000 mailed 20,000 printed also on INFOLINK	individuals/orgs. request to be on mailing list; add'l copies available at public meetings/places	Quarterly	<i>OCRWM Bulletin</i> Staff Writer

<i>Clark County Nuclear Waste Repository Program Update</i>	Clark County Nuclear Waste Repository Program	350 mailed 500 printed	mailed to other public offices/agencies/advisory boards and individuals as public service and others who request to be on mailing list; available at NWD office and speaking engagements	Approx. Quarterly	Editor of publication
<i>Citizen Alert</i>	Citizen Alert	10,000 NV	primarily organization members	Quarterly	Member of Citizen Alert's Board
<i>Nevada Monitor</i>	Nevada Nuclear Waste Study Committee	14,000	organization members and by request	Monthly to Quarterly	Study Committee Staff Advisor

Copies of the bulletins were obtained from the Nuclear Waste Division library. As a member of the mailing lists for all these publications except Citizen Alert which is donated by an individual, the NWD library is a recipient of the aforementioned publications and an abundance of other written work. Those 1994 issues available in mid-November 1994 at the NWD library were analyzed:

- Two issues of the *Clark County Nuclear Waste Repository Program Update* are included (Spring and Summer), and each has eight or nine articles and announcements, along with photographs and graphics.
- Two issues of the DOE publication (Winter and Spring) are included. This publication has approximately thirty pages of articles and announcements, and makes extensive use of photographs and graphics.
- Four issues of the *Monitor* (May, July, September and November) were analyzed, and these are approximately six pages of articles, and a few photographs.
- Two issues of *Citizen Alert* (Spring and Fall) include a sixteen page journal and an additional eight page *Native American News*, published by Citizen Alert Native American Program. The *Citizen Alert* portion contains between twenty and fifty articles, along with a few photographs, illustrations, and advertisements, and a number of cartoons. *Citizen Alert* is the only one of these five publications to include by-lines with the majority of articles. In contrast to the other

publications, many of the *Citizen Alert* articles are not about the Yucca Mountain Project, but cover other topics. Many of these articles are about military bases, federal government land ownership, environmental issues, and topics of nuclear waste elsewhere in the United States. This will be reviewed further in the discussion of findings.

6.3 FINDINGS

This section is divided into three subsections. Individual discussions on media and non-media sources and content are presented, followed by a summary discussion comparing media and non-media analysis.

6.3.1 Media Sources and Content

Media sources analyzed consisted of the *Las Vegas Review-Journal* and the *Las Vegas Sun*. This section focusses on analysis of subject and source categories, and the relations between them. Also included are discussions on coverage variation between the two papers. Risk subcategories, scientific data of risks, and risk probabilities are each discussed by source and by newspaper. A summary is presented at the end of this section. Building upon FY93 work, which covered the time period 1990-1993, trend discussions comparing the 1994 data to earlier data are included where appropriate. The sample size for each of these years is presented in the following table.

Year	Number of Articles in Sample
1990	126
1991	176
1992	165
1993	141
1994	120
TOTAL	728

Note: The total number of articles collected for 1990-1993 was 823; a sample of 608 of these articles was selected for detailed analysis. The entire set of collected articles was used as a sample for analysis in 1994.

While the number of articles written about a topic in a given newspaper or source provides one useful measure of the importance given the topic by media sources, it should be noted that there are other ways of assessing the prominence of news articles. One such method is the length or number of typed lines given to the subject; another is the location of the articles (front page versus back page) in the journal. The placement of articles within a newspaper has not, to present, been systematically recorded in the media archive system for this project, thus a thorough analysis of the prominence of articles based on location cannot be undertaken. To the degree known, the prominence given to YMP stories by location is displayed in Table 6-3. The present collection and archiving system does facilitate an examination of the prominence of articles according to length. Table 6-4 presents the number of lines of type given to YMP articles by the two newspapers investigated in this task. Both journals have approximately the same number of characters per line of type. Based on 1994 data, the *Review Journal*, the larger of the two papers, generally devotes more lines of type to each YMP article than does the *Sun*.

In following FY93 research techniques, media coverage in each of the newspapers coded for FY94 research is based strictly on news articles; editorials, columns, and letters to the editor were not included in this study. Analyzing these latter types of correspondence proves to be complex, requiring subjectivity and wide coding categories to account for expressions of sarcasm and other difficult-to-code characteristics. These types of presentations in media sources are collected by the NWD Library and can be included as another line of inquiry in future work. Similarly, non-YMP topics were beyond the scope of this media analysis, thus it is not possible to draw conclusions about the length or other measures of relative importance given to the YMP in comparison to other subjects. To provide additional data about the changing salience of the YMP in the printed media, factors associated with other sources and characteristics such as length and location of YMP articles could be tracked in future research efforts.

Table 6-3
YMP Articles by Location
Las Vegas Review-Journal and Las Vegas Sun, 1994

Paper	Total Number of Articles	No. of Articles on Page A-1*	No. of Articles on other Section "A" Pages	No. of Articles on Page B-1*	No. of Articles on other Section "B" Pages	No. of Articles in sections other than "A" and "B"	Section unknown
R-J	63	6	1	20	13	2	21
Sun	57	2	17	0	1	1	36
Total	120	8	18	20	14	3	57

*Note: In the *Review-Journal*, Section "A" primarily contains national news, and Section "B" is titled "Nevada." In the *Sun*, Section A focusses on local news, while Section "B" is called "World and Nation." In the combined Sunday edition, the *Sun* is typically Section D of the joint paper.

Table 6-4
YMP Articles by Length
Las Vegas Review-Journal and Las Vegas Sun, 1994

Paper	Up to 30 Lines	31 to 70 Lines	71 to 100 Lines	101 Lines and Over	Row Total
Review Journal	5	15	25	18	63
Sun	6	21	20	10	57
Total	11	36	45	28	120

Subject Categories

For the 120 articles reviewed, a total of 158 subjects were extracted. Table 6-5 displays the total number of subjects presented in repository-related news articles over the past five years. These yearly totals illustrate the fluctuations between subject categories throughout the entire study period, providing an view of what topics were presented as the most and least newsworthy from 1990 to 1994. The coverage of certain topics presented in the news articles varies during the time periods examined. In articles published in 1994, current events comprised the most frequent subject category, accounting for 20.3% of the total, followed by risks which accounted for 17.1%. The frequency of subjects dealing with current events represents a significant increase from 1990-93 ($p=0.026$). On the other hand, lawsuits and legislation, which accounted for 16.8% of the total subjects in 1990-93, accounted for less than 9% in 1994, a significant decrease ($p=0.017$). Criticism of public officials and their actions declined from 15.4% in 1990-93 to 10.1% in 1994, but the decline was not statistically significant. In each instance, the 1994 figures represent a continuation of trends that appear over time. When examined by individual subject, earthquakes, seismic activity, and fault lines were the most frequently addressed topic in these articles, accounting for 10.8% of all subjects discussed.

Table 6-5
Frequency and Percentage of Subjects Presented in YMP-Related News Articles by
Year
1990-1994

Subject Category	1990		1991		1992		1993		1994	
	#	%	#	%	#	%	#	%	#	%
Lawsuits & Legislation	28	14.5%	52	22.0%	41	19.9%	17	9.0%	14	8.9%
Risks	27	14.0%	18	7.6%	38	18.5%	19	10.1%	27	17.1%
Benefits	5	2.6%	10	4.2%	1	.5%	10	5.3%	4	2.5%
Public Communication	6	3.1%	33	14.0%	17	8.3%	9	4.8%	12	7.6%
Funding	15	7.8%	23	9.8%	18	8.7%	11	5.9%	16	10.1%
Criticism of Officials and Their Actions	36	18.7%	31	13.1%	30	14.6%	30	16.0%	16	10.1%
Support of Officials and Their Actions	11	5.7%	4	1.7%	4	1.9%	6	3.2%	4	2.5%
Current Events and Activities	16	8.3%	20	8.5%	26	12.6%	46	24.5%	32	20.3%
Opposition to Studies/Repos.*	23	11.9%	25	10.6%	14	6.8%	18	9.6%	19	12.0%
Approval of Studies/Repos.	17	8.8%	16	6.8%	15	7.3%	18	9.6%	12	7.6%

Unfairness and Distrust	5	2.6%	0	0.0%	1	.5%	2	1.1%	1	0.6%
Impacts	4	2.1%	4	1.7%	1	.5%	2	1.1%	0	0.0%
Other									1	0.6%
TOTAL	193	100%	236	100%	206	100%	188	100%	158	100%

*Note: The coding category "opposition to studies/repository" is used when opposition to any aspect of the YMP is presented in an article. This includes actions such as protests and speeches made in opposition to continued work at the site. The category is also used when the site is considered unsuitable by a source or when alternatives to the repository are proposed as a means of avoiding a repository at Yucca Mountain.

Source Categories

Federal officials comprised the largest percentage of sources for articles in 1994, accounting for 43% of the total (see Table 6-6). This was followed by State of Nevada and Clark County officials, who accounted for 28.5% of all sources. This represents a switch from 1990-93 when Nevada and Clark County officials accounted for 37.7% and Federal officials accounted for 32.1% of all sources. However, when the percentage of sources is examined by year, this switch reflects a trend found throughout the 1990-94 period. Citizens groups, "pro-studies" and "anti-studies" by independent groups and businesses all declined as sources of articles; significantly smaller proportions of sources in the first two of these three categories were found in 1994 when compared with the previous four-year period ($p=0.017$ and $p=0.018$, respectively). In contrast, the proportion of miscellaneous sources increased significantly from 6.1% in 1990-93 to 12.7% in 1994 ($p=0.006$). Independent geologists and scientists were responsible for nine of the 20 (45%) miscellaneous sources cited in these articles. The proportion of articles in which no source was mentioned also increased significantly in 1994 from the previous four-year period ($p=0.01$).

**Table 6-6
Source Categories Cited in Newspaper Articles, 1994**

Source Category	Referred	Quoted	Source Total	Percent of TOTAL
State and County	9	36	45	28.5%
Federal	12	56	68	43.0%
Citizens Groups	0	1	1	0.6%
Schools and Universities	0	1	1	0.6%
Pro-Studies Independent Groups and Businesses	0	2	2	1.3%
Anti-Studies Independent Groups and Businesses	0	1	1	0.6%
Miscellaneous	3	17	20	12.7%
No Source Mentioned	-	-	20	12.7%
TOTAL	24	114	158	100%

Sources and Subjects

The following table presents the total of referred to and quoted sources from 1990 to 1994. These totals reflect variations in information sources during this period, which are further discussed in the following subsections.

**Table 6-7
Frequency and Percentage of Sources Cited in Newspaper Articles by Year, 1990-1994**

Sources	1990		1991		1992		1993		1994	
	#	%	#	%	#	%	#	%	#	%
State and County	67	34.7%	102	43.2%	80	38.8%	61	32.5%	45	28.5%
Federal	63	32.6%	65	27.5%	71	34.5%	65	34.7%	68	43.0%
Citizen Groups	11	5.7%	9	3.8%	9	4.4%	15	8.0%	1	0.6%
Schools & Universities	11	5.7%	4	1.7%	9	4.4%	7	3.7%	1	0.6%
Pro-Studies Independent Groups and Businesses	5	2.6%	21	8.9%	11	5.3%	15	8.0%	2	1.3%
Anti-Studies Independent Groups and Businesses	5	2.6%	11	4.7%	2	1.0%	1	0.5%	1	0.6%
Miscellaneous	19	9.8%	10	4.2%	12	5.8%	9	4.8%	20	12.7%
No Source Mentioned	12	6.2%	14	5.9%	12	5.8%	15	8.0%	20	12.7%
TOTAL	193	100%	236	100%	206	100%	188	100%	158	100%

Sources by Subject Categories

A presentation of the frequencies and percentages of sources cited in each subject category is provided in Table 6-8. This information was produced by a cross-tabulation of the two category types: sources and subjects. The table reveals that State and county officials accounted for 75.0% of the sources of article subjects dealing with support of public officials and their actions, 42.9% of the sources of subjects dealing with lawsuits and legislation, and 43.8% of sources of subjects dealing with criticism of officials and their actions. More than one-third of sources of

subjects dealing with opposition to the studies and the repository were state or local in nature. Federal officials accounted for 41.7% of sources of subjects dealing with public communication, and 68.8% of sources of subjects dealing with funding. Although federal officials were the sole source of subjects dealing with approval of studies and the repository, they were also cited in 51.9% of the subjects dealing with repository-related risks. Nevertheless, article subjects critical of the repository were more likely to cite state and local sources, while subjects in support of the repository were more likely to cite federal sources.

Miscellaneous sources were cited in more than one-third (36.8%) of subjects relating to opposition to studies and the repository. These sources were also cited in one-half of the subjects describing the benefits of the repository. However, the number of articles dealing with this subject (n=4) is too small to draw any meaningful conclusions from this observation.

Table 6-8 Percentage and Frequency of Sources Cited by Subject Category										
Sources	Source Category								No Source Mentioned	Row Total
	State/County	Federal	Citizens Groups	Schools/Universities	Pro-Study Grps	Anti-Study Groups	Misc.	No Source Mentioned		
by percent (totals may not add to 100 due to rounding)										
Lawsuits/Legis.	42.9	28.6	0	0	0	0	14.3	14.3	100	
Risks	25.9	51.9	0	3.7	0	0	14.8	3.7	100	
Benefits	25.0	0	0	0	25.0	0	50.0	0	100	
Public Comm.	33.3	41.7	0	0	0	0	0	25.0	100	
Funding	12.5	68.8	0	0	6.3	0	0	12.5	100	
Criticism of Officials and their Actions	43.8	31.3	0	0	0	6.3	18.8	0	100	
Support of Officials and their Actions	75.0	25.0	0	0	0	0	0	0	100	
Current Events	21.9	43.8	0	0	0	0	3.1	31.3	100	
Opposed to Studies/Repository	36.8	10.5	5.3	0	0	0	36.8	10.5	99.9	
Approval of Studies/Repository	0	100.0	0	0	0	0	0	0	100	

ory									
Distrust/Unfair	0	0	0	0	0	0	100.0	0	100
Unknown	100.0	0	0	0	0	0	0	0	100
by frequency									
Lawsuits/Legis	6	4	0	0	0	0	2	2	14
Risks	7	14	0	1	0	0	4	1	27
Benefits	1	0	0	0	1	0	2	0	4
Public Comm.	4	5	0	0	0	0	0	3	12
Funding	2	11	0	0	1	0	0	2	16
Criticism of Officials & their Actions	7	5	0	0	0	1	3	0	16
Support of Officials & their Actions	3	1	0	0	0	0	0	0	4
Current Events	7	14	0	0	0	0	1	10	32
Opposed to Studies/Repository	7	2	1	0	0	0	7	2	19
Approval of Studies/Repository	0	12	0	0	0	0	0	0	12
Distrust/Unfair n.	0	0	0	0	0	0	1	0	1
Unknown	1	0	0	0	0	0	0	0	1
Total Quantity	45	68	1	1	2	1	20	20	158

Subjects by Source Categories

The data categories depicted in the table above were examined to identify the number of subjects which were cited for each source category. This differs from the crosstabular analysis above, and the results are presented in Table 6-9. Almost one-third of the state and county source citations related to subjects criticizing public officials and their actions and subjects reflecting opposition to studies and the repository. In contrast, none of the subjects citing state and county

sources reflected approval of the studies or repository. On the other hand, 17.6% of the federal source citations were related to approval of the studies and repository. Half of the citations involving miscellaneous sources were related to the two categories of opposition to the studies and repository and criticism of public officials and their action.

**Table 6-9
Percentage of Subjects Presented by Source Categories**

Subject Categories	Source Categories							
	State/County	Federal	Citizens Groups	Schools/Universities	Pro-Study Groups	Anti-Study Groups	Miscellaneous	No Source Mentioned
Lawsuits/ Legislation	13.3	5.9	0	0	0	0	10.0	10.0
Risks	15.6	20.6	0	100.0	0	0	20.0	5.0
Benefits	2.2	0	0	0	50.0	0	10.0	0
Public Comm	8.9	7.4	0	0	0	0	0	15.0
Funding	4.4	16.2	0	0	50.0	0	0	10.0
Criticism of Official action	15.6	7.4	0	0	0	100.0	15.0	0
Support of Official action	6.7	1.5	0	0	0	0	0	0
CurrentEvents	15.6	20.6	0	0	0	0	5.0	50.0
Opposed to Repository	15.6	2.9	100.0	0	0	0	35.0	10.0
Approval of Repository	0	17.6	0	0	0	0	0	0
Distrust/ Unfairness	0	0	0	0	0	0	5.0	0
Unknown	2.2	0	0	0	0	0	0	0
Total Percent	100%	100%	100%	100%	100%	100%	100%	100%
Total Quantity	45	68	1	1	2	1	20	20

Coverage Variation by Newspaper

Of the 120 articles coded for FY94 research, 63 (52.5%) came from the *Review-Journal* and 57 (47.5%) came from the *Sun*. Based solely on daily circulation figures, the *Sun* to *Review-Journal* viewing ratio (how many people view each paper) is 1:3.8.

The distribution of subject categories in each newspaper during 1994 is contained in Table 6-10 below. In general, the two newspapers provided similar coverage of the different subject categories. Although subjects relating to risks, lawsuits and legislation, and opposition to the repository appeared more frequently in the *Sun*, while subjects relating to approval of the repository appeared more frequently in the *Review-Journal*, in no instance were these differences statistically significant. Nevertheless, as shown in Table 6-11, the *Review-Journal* cited federal officials as sources at almost twice the rate as the *Sun* ($p=0.005$). In turn, the *Sun*'s articles were more than twice as likely to mention no source than the articles in the *Review-Journal*; however, this difference was not statistically significant.

Subject Categories	Review-Journal	Percent of RJ Total	Sun	Percent of Sun Total
Lawsuits and Legislation	6	6.8	8	11.4
Risks	13	14.8	14	20.0
Benefits	1	1.1	3	4.3
Public Communication	7	8.0	5	7.1
Funding	12	13.6	4	5.7
Criticism of Official Actions	10	11.4	6	8.6
Support of Officials/Actions	2	2.3	2	2.9
Current Events/Activities	18	20.5	14	20.0
Opposition to Repository	10	11.4	9	12.9
Approval of Studies/Repository	9	10.2	3	4.3
Unfairness and Distrust	-	-	1	1.4
Unknown	-	-	1	1.4
TOTAL	88	100%	70	100%

Table 6-11 Frequency and Percentage of Source Categories by Newspaper, 1994				
Sources	Review-Journal	Percent of RJ Total	Sun	Percent of Sun Total
State and County	23	26.1	22	31.4
Federal	47	53.4	21	30.0
Citizens Groups	0	0.0	1	1.4
Schools and Universities	1	1.1	0	0.0
Pro-Studies Independent Groups and Businesses	0	0.0	2	2.9
Anti-Studies Independent Groups and Businesses	0	0.0	1	1.4
Miscellaneous	10	11.4	10	14.3
No Source Mentioned	7	8.0	13	18.6
TOTAL	88	100%	70	100%

Risk Subcategories

Table 6-12 lists the frequencies and percentages of individual risks mentioned in 1990-1994 coded news articles. This table provides an overview of the most frequently cited risks associated with the placement of a high-level nuclear waste facility at Yucca Mountain, and how the mentioning of risks in news accounts has changed over time. In 1994, risks accounted for 27 or 17.1% of the total subjects in the newspaper articles. Earthquakes and seismic activity are the most frequently mentioned risks in 1994, comprising 17 of the 27 (63.0%) subjects. This focus on articles is not surprising given that there was, in fact, notable seismic activity felt in the region during that year; the frequency of articles does, however, represents a significant increase in the proportion of risk subcategories accounted for by earthquakes and seismic activity in 1990-93 (29.4%, $p = 0.003$). Other risks referred to in the 1994 articles included contaminated or fluctuating water (18.5%) and cask construction (11.1%). Risks relating to human intrusion and radiation are each mentioned only once in the 120 articles.

When compared with newspaper accounts in earlier years, the frequency of articles describing risks associated with cask construction, contaminated water and earthquakes and seismic activity increased markedly over similar citations in 1993. In the first two categories, this represents a reversal of a downward trend during 1990-94, while in the last category, it reflects a continuation of a fluctuating trend over time. Also indicated by the increased number of articles regarding cask construction is changes in DOE's program which is now putting additional emphasis on the potential use of multiple-purpose canisters to store, transport, and eventually dispose of high-level nuclear waste. Other risk subcategories which have declined in frequency over time include transportation risks, (from 15.8% in 1993 to 0% in 1994), and safety standards (from 15.8% in 1993 to 0% in 1994).

**Table 6-12
Frequency and Percentage of Risk Subcategories for Newspaper Articles, 1990-1994**

Risks	1990		1991		1992		1993		1994	
	#	%	#	%	#	%	#	%	#	%
Cask Design	2	7.4%	1	5.6%	1	2.6%	0	0.0%	3	11.1%
Water	6	22.2%	5	27.8%	7	18.4%	2	10.5%	5	18.5%
Seismic Activity	5	18.5%	2	11.1%	18	47.4%	5	26.3%	17	63.0%
Health/safety	2	7.4%	2	11.1%	2	5.3%	2	10.5%	0	0.0%
Intrusion	0	0.0%	0	0.0%	2	5.3%	1	5.3%	1	3.7%
Radioactive	0	0.0%	1	5.6%	1	2.6%	2	10.5%	1	3.7%
Safety Standards	2	7.4%	1	5.6%	5	13.2%	3	15.8%	0	0.0%
Thermal Test	0	0.0%	0	0.0%	0	0.0%	1	5.3%	0	0.0%
Transport	6	22.2%	4	22.2%	0	0.0%	3	15.8%	0	0.0%
Volcanic	4	14.8%	2	11.1%	2	5.3%	0	0.0%	0	0.0%

Activity										
TOTAL	27	100%	18	100%	3 8	100%	1 9	100%	2 7	100%

Risk Subcategories by Source

The sources of subjects dealing with risks are listed in Table 6-13 below. Federal sources were cited in more than one-half (51.9%) of the most recent year's risk subcategories, followed by state and county sources (18.5%) and miscellaneous sources (14.8%). Of all the risk subcategories involving federal citations, 57.1% related to earthquakes and seismic activity. Of all the risk subcategories involving state and local citations, 71.4% related to this subject. However, the numbers are too small to draw any statistically significant conclusions. For the reader's reference, combined frequencies for 1990-1993 risk categories by sources are also included in the following table. In both the recent and earlier year's data, the federal government represents the greatest source of risk-related articles. State/County sources are the second-most-frequently cited for risk information in all five years.

Table 6-13
Frequencies of Risk Subcategories by Sources Cited in Newspapers:
A Comparison of 1994 to the Previous Four Years

Risks	Source Categories								Row Total
	State/ County	Federal	Citizens Groups	Schools/ Univer-sities	Pro-Stud y Groups	Anti-Stud y Groups	Miscellan -eous	No Source Mentioned	
Accounts from 1994 Articles									
Cask Construction/ Design	0	3	0	0	0	0	0	0	3
Contaminated/ Fluctuating Water	1	3	0	0	0	0	1	0	5
Earthquakes/ Seismic Activity	5	8	0	0	0	0	3	1	17
Human Intrusion	0	0	0	1	0	0	0	0	1
Radioactive Releases/ Radiation	1	0	0	0	0	0	0	0	1
1994 Total	7	14	0	1	0	0	4	1	27
Accounts from 1990-1993 Articles									
Cask Construction/ Design	1	1	1	0	0	0	1	na	4
Contaminated/ Fluctuating Water	1	17	0	2	0	0	0	na	20
Earthquakes/ Seismic Activity	5	20	0	3	1	0	1	na	30
Health and Safety Issues	2	2	1	0	0	3	0	na	8
Human Intrusion	0	2	0	0	0	0	1	na	3
Radioactive Releases/ Radiation	1	0	2	0	0	0	1	na	4
Safety Standards	4	7	0	0	0	0	0	na	11
Thermal Testing	0	0	0	0	0	0	1	na	1
Transportation of Waste	4	4	4	0	0	0	1	na	13
Volcanoes/Volcanic Activities	0	7	0	0	0	0	1	na	8
1990-93 Total	18	60	8	5	1	3	7	na	102

Risk Subcategories by Newspaper

As indicated in the results presented in Table 14, both papers included subjects relating to earthquakes and seismic activity more frequently than other risk-related subjects. A comparison of risk subcategories by newspaper suggests that articles in the *Review-Journal* were more likely to address issues relating to contaminated water, while articles appearing in the *Sun* were more likely to address issues relating to earthquakes and seismic activity. However, none of these differences were statistically significant, suggesting that any differences in subject categories between the two newspapers are no greater than chance. This lack of statistical significance may be attributed to the small number of risk subcategories cited in each newspaper.

Risk Subcategories	Review- Journal	Percent of RJ Total	Sun	Percent of Sun Total
Cask Construction/Design	1	7.7	2	14.3
Contaminated/Fluctuating Water	4	30.8	1	7.1
Earthquakes/Seismic Activity	7	53.8	10	71.4
Human Intrusion	1	7.7	0	0.0
Radioactive Releases/Radiation	0	0.0	1	7.1
TOTAL	13	100%	14	100%

Scientific Data Identified With Risks

Risk-related articles were further analyzed in the media review to discover whether or not risk citations were accompanied by scientific data. Table 6-15 lists the coding categories that were determined for each risk appearing in the 1994 news accounts. More than three-fourths (74.1%) of all risk citations in the news articles were accompanied by current scientific studies or reports. Three (11.1%) of the risk citations were accompanied by mention of former accidents or occurrences (i.e., earthquakes). Only 7.4% of the risks cited in the review articles were not accompanied by any scientific data or past accidents. When compared with the scientific data

accompanying risk citations in newspaper articles published in 1990-93, a significant increase was found in the frequency of citations accompanied by current scientific data or reports ($\chi^2 = 6.91, p < 0.009$).

Type of Accompanying Data	Number of Risk Citations Accompanied by Scientific Data		Percent of Risk Citations Accompanied by Scientific Data	
	combined 1990-1993	1994	combined 1990-1993	1994
Current Scientific Studies/ Reports	39	20	42.9%	74.1%
Previous Scientific Studies/ Reports	7	1	7.7%	3.7%
Citing of Accidents/ Occurrences	23	3	25.3%	11.1%
Missing/Unknown	0	1	0.0%	3.7%
No Accompanying Data	22	2	24.2%	7.4%
TOTAL	91	27	100%	100%

Scientific Data by Sources

Table 6-16 lists the number of times scientific data was presented by each source category. This analysis provides a better understanding of which information sources cite scientific data to support risk-related claims. Risk citations by state and county, federal, and miscellaneous sources are accompanied by current scientific studies or reports 71.4%, 85.7%, and 75% of the time, respectively. This represents a marked but statistically nonsignificant increase in risk citations accompanied by current scientific studies or reports for all three source categories. In contrast, state and local citations of risk accompanied by references to accidents or other occurrences declined from 35.7% in 1990-93 to 14.3% in 1994. During the same period, federal citations of risk accompanied by references to accidents or other occurrences declined from 28.3% in 1990-93 to 7.1% in 1994. However, the numbers are too small to allow for any

meaningful quantitative analyses of these trends.

**Table 6-16
Frequency of Risk-Related Scientific Data by Source Categories, 1994**

Data Type	Source Categories								Total Quantity
	State/County	Federal	Citizens Groups	Schools/Universities	Pro-Study Groups	Anti-Study Groups	Miscellaneous	No Source Mentioned	
Current Scientific Studies/Reports	5	12	0	0	0	0	3	0	20
Previous Scientific Studies/Reports	0	0	0	1	0	0	0	0	1
Citing of Accidents/Occurrences	1	1	0	0	0	0	0	1	3
No Accompanying Data	1	1	0	0	0	0	1	0	3
TOTAL	7	14	0	1	0	0	4	1	27

Scientific Data of Risks by Newspaper

A comparison of articles citing scientific studies in the two newspapers is provided in Table 6-17 below. A larger percentage of risk citations in the *Review-Journal* were accompanied by current scientific studies or reports than in the *Sun*. In contrast, larger percentages of risk citations in the *Sun* were accompanied by references to accidents and other occurrences or no accompanying data than in the *Review-Journal*. When viewed collectively (and excluding the category of missing and unknown data), there is a marginally significant difference in the distribution of scientific data accompanying risk citations in the two newspapers ($\chi^2=6.08$, d.f.=3, $p=0.11$).

Table 6-17
Frequency and Percentage of Scientific Data Cited by Each Newspaper, 1994

Data Type	Review-Journal	Percent of RJ Total	Sun	Percent of Sun Total
Current Scientific Studies/ Reports	11	84.6%	9	64.3%
Previous Scientific Studies/ Reports	1	7.7%	0	0.0%
Citing of Accidents/Occurrences	0	0.0%	3	21.4%
Missing/Unknown	1	7.7%	0	0.0%
No Accompanying Data	0	0.0%	2	14.3%
TOTAL	13	100%	14	100%

Risk Probability

The degree of risk citations, as perceived by information sources in the news articles, was also examined in the review of news articles published in 1994. Table 6-18 lists the coding categories used to define risk probabilities and corresponding frequencies. Of the total risk citations in the news accounts, only 7.4% are defined as definite risks or risks that will occur if a repository is built at Yucca Mountain. Approximately 30% of all risk citations are classified as potential risks, or risks that may occur if a repository is built. Almost half of the risk citations in 1994 indicate that the risks are unknown or that further study is required. This represents a marginally significant increase from 23% of the risk citations that appeared in newspaper articles in 1990-93 ($\chi^2=3.72$, $p=0.054$). When 1994 data are examined by individual risk category, two of the 17 (11.8%) citations referring to earthquakes or seismic activity suggest a definite risk probability; three (17.6%) suggest a potential risk; two (11.8%) suggest no risk; and eight (47.1%) suggest that the risks are unknown or require further study.

Table 6-18 Frequency and Percentage of Risk Probability Noted in News Articles, 1994				
Probability	Number of Risk Citations		Percent of Total	
	combined 1990-1993	1994	combined 1990-1993	1994
Definite Risks	7	2	7.7%	7.4%
Potential Risks	27	8	29.7%	29.6%
Minor Risks	12	2	13.2%	7.4%
No Risks	14	2	15.4%	7.4%
Needs More Study/Risks Unknown	21	12	23.1%	44.4%
Does Not Apply	10	1	11.0%	3.7%
TOTAL	91	27	100%	100%

Risk Probability by Source

Table 6-19 lists the frequencies of risk probability by information source. Risk citations are defined as unknown and requiring further study by state/counties and federal sources more often than any other source (57.1% and 50%, respectively for 1994). Although the percentages of risk citations by federal and miscellaneous sources defined as potential risks increased from 17% and 43% in 1990-93 to 21.4% and 75% in 1994, respectively, these differences do not reach statistical significance (due to the small number of cases). This is, however, suggestive and would appear worth monitoring.

**Table 6-19
Frequency of Risk Probability by Sources**

Risk Probability	Source Categories								Row Total
	State/ County	Federal	Citizens Groups	Schools/ Univer-siti es	Pro-Stud y Groups	Anti-Stu dy Groups	Miscel-lan eous	No Source Mentioned	
Definite Risks	2	0	0	0	0	0	0	0	2
Potential Risks	1	3	0	1	0	0	3	0	8
Minor Risks	0	2	0	0	0	0	0	0	2
No Risks	0	2	0	0	0	0	0	0	2
Needs More Study/ Risks Unknown	4	7	0	0	0	0	1	0	12
Does Not Apply	0	0	0	0	0	0	0	1	1
TOTAL	7	14	0	1	0	0	4	1	27

Scientific Data of Risks by Newspaper

Finally, the risk citations in articles published by the two newspapers were compared to determine if either paper displayed a particular trend or bias in the presentation of probability estimates for cited risks. The results are displayed in Table 6-20. Both papers published almost identical proportions of risk probabilities for risk citations in 1994 articles, suggesting that neither paper was more inclined to represent a particular view of the risks associated with the Yucca Mountain repository.

Table 6-20 Frequency and Percentage of Risk Probability by Each Newspaper, 1994				
Risk Subcategories	Review-Journal	Percent of RJ Total	Sun	Percent of Sun Total
Definite Risks	1	7.7%	1	7.1%
Potential Risks	4	30.8%	4	28.6%
Minor Risks	1	7.7%	1	7.1%
No Risks	1	7.7%	1	7.1%
Needs More Study/Risks Unknown	6	46.2%	6	42.9%
Does Not Apply	0	0.0%	1	7.1%
TOTAL	13	100%	14	100%

Summary

Despite a sample size that is small for meaningful quantitative analysis, a few general conclusions can be drawn from the media data. First, there appears to have been a decline, over time, in articles in opposition to the proposed Yucca Mountain repository. Adversarial subjects and articles citing special interest groups opposed to the repository have declined in quantity over the past five years. Nevertheless, articles reflecting opposition to the repository continue to dominate articles supportive of the repository by a two-to-one margin.

Concomitant with the decline in articles reflecting an opinion in opposition to the Yucca Mountain Project, there has been a decline in the number of citations of non-government sources expressing a particular point of view. Collectively, they accounted for 2.5% of sources cited in 1994. In 1993, these groups accounted for 16% of the sources cited in newspaper articles. In turn, there is a noticeable increase in the use of miscellaneous sources, particularly independent geologists and scientists, with no explicit bias in opinion. This suggests an attempt by the news media to rely less on traditional sources of information characterized as biased and to seek out new and potentially more objective sources of information.

Although sources opposed to the repository have declined in frequency and miscellaneous

sources have increased in frequency, there remains a strong association between the citation of federal versus state and local sources and the intent of the subjects discussed in the articles. Articles supportive of the repository are more likely to cite federal sources while articles opposed to the repository are more likely to cite state and local sources. However, despite the fact that articles expressing opposition to the repository are more common than articles expressing support, the number of articles citing federal sources has grown significantly over the past five years. Although this trend requires further analysis, it suggests a greater interest in publicizing the federal perspective on the Yucca Mountain issue.

A comparison of the subjects and sources of the two major daily newspapers suggested that for the most part, they are very similar in the proportion of articles devoted to particular subjects and the citation of particular sources. The exception to this conclusion is the fact that the *Review-Journal* is almost twice as likely to cite federal officials and more likely to cite current scientific studies or reports as the *Sun*. Again, until further study is conducted, it is difficult to know exactly how these differences should be interpreted. In other instances, the data would suggest that the *Review-Journal* is more supportive of the repository than the *Sun*, although based on the number of articles, most of these differences were not statistically significant. Adding weight to the *Review-Journal* articles because of their higher volume of readership, however, may serve to magnify this difference in terms of potential public impact.

Earthquakes and seismic activity dominated the risk-related subjects addressed in the 1994 newspaper articles. With the exception of this subject, cask construction, and water contamination, other risk-related subjects appear to have declined in prominence over the past five years. Again, there are several possible alternative explanations that individually or in concert could account for these trends. One would be the concerns regarding the newly discovered Sundance Fault at Yucca Mountain. Another would be heightened perception of the potential consequences of seismic activity resulting from the recent earthquakes in nearby California. These two represent particular and recent events that may have produced marked results in and of themselves and may have less influence as time goes on and the events fade as current issues. A more generic possible explanation is that the risks associated with a potential earthquake or seismic activity are easier to communicate to and to understand by the general public than other topics such as safety, health and safety, radiation release, thermal testing, and transportation of waste. Emphasis on these risk-related topics appears to have declined over time, either because they are not easy to understand in their details, or because they have not thus far attracted the interest of the reading public.

Another possibility for this trend is that repository-related studies have been more successful in addressing these issues than they have been in settling concerns related to earthquakes and seismic activity. However, this explanation is not supported by an analysis of the risk probability associated with each citation. Of the 17 citations referring to seismic activity, 47% suggested that the risks are unknown and needed further study. This compares with the 40% of the 10 remaining citations referring to other risks which suggested that the risks are unknown

and needed further study.

The fact that almost half of the references to risks associated with the repository suggest that the risks are unknown and need further study also would appear to support a hypothesis that the news media is making a greater attempt to provide more "objective" or balanced coverage of the Yucca Mountain issue. Risk citations have increasingly been referred to as unknown and needing further study. This tendency has also occurred in conjunction with an increased citation of current scientific studies and reports and a decreased citation of accidents and other occurrences, especially by state and local sources. One could conclude from these trends that the media has begun to move away from focussing on particular risk concerns and toward a seemingly more balanced portrayal of the issue.

6.3.2 Non-Media Sources and Content

Unlike media sources, non-media sources were not analyzed in previous research. In this section, information on the first round of non-media analysis is presented. Sources, subjects, and risks are discussed, and a discussion of the utility of the expansion of subject categories for future research is presented.

Sources

For the most part, the five non-media publications reviewed here do not state the original source of the information they provide, and information is presented in a summary form. The DOE's *OCRWM Bulletin/Of Mountains and Science* generally refers to its own studies and the work of its scientists. It also occasionally mentions the work of international researchers, but does not mention State or County studies. The State's *Nevada Nuclear Waste Update* more often mentions a source for its scientific reports, and mentions research both by its own and by DOE scientists. *Citizen Alert* includes articles from all over the United States on issues of nuclear waste. As mentioned earlier, these articles generally include a by-line, and are written in a variety of styles in contrast to the uniform writing in the other non-media publications. The coding for sources on the Study Committee's *Monitor*, and *Citizen Alert's Citizen Alert* found that source information was usually unstated or was the journal itself. In all likelihood this simply reflects the different expectations for bulletins and journals as opposed to newspapers, and means that a tabular analysis of these publications would not be especially productive; if additional non-media publications encountered in the future cite more varied sources, these data will be analyzed in the next report.

Subjects

Differences in the content of the five non-media publications can be seen in Table 6-21. The DOE publication most often mentions topics in the coding category of 'currents,' followed by 'risks,' 'benefits,' 'public,' 'funding,' and 'legislation/litigation.' For the State publication,

criticism of officials and their actions is the most common topic, followed by 'risks' and 'public,' 'currents,' and then 'unfairness and distrust.' In the Clark County publication, 'risks' and 'currents' appear most often, followed by 'funding.'

There is a wide difference between the subjects covered in the *Monitor* (published by a nuclear industry association) and the anti-repository *Citizen Alert*. The most common topic in the *Monitor* is benefits from the repository and site studies, followed by 'currents,' and then by 'support for studies.' In *Citizen Alert*, 'public' is a common content classification (this most often includes the specific coding of 'education/information to the public'), followed by criticism of officials and their actions, 'risks,' and legislation and lawsuits.

Another way of looking at this table is to notice which publication has the highest percentage of citations in each subject category. This approach does not take into account which publication has the higher *number* of citations in each category: *Citizen Alert*, with the highest number of overall subject citations, also has the highest number of citations in most subject categories. *Citizen Alert* has a higher percentage of its citations in legislation and lawsuits, 'public,' and 'support of officials and their actions' than do other publications. The *Monitor* has a higher percentage of its subject citations in 'benefits,' and 'support of studies' than the other publications. The County has a higher proportion of its subject citations in 'funding,' 'risks,' and 'opposition to studies' than do the other publications, although three of the four other publications surpass it in the number of risk citations. Further, the high percentage of 'risk' and 'opposition' subjects partly reflects the small number of overall subjects mentioned in the County journal, and a specific article that introduced the purposes of the County program. A larger number of issues would be required to see if this pattern of subject citations holds constant. The State has a higher proportion of its citations in the 'criticism of officials and their actions,' 'unfairness and distrust,' and 'impacts' than do the other four publications, and the DOE has a higher proportion of citations in the 'currents' category than do the other journals, though it is almost matched by the County journal.

**Table 6-21
Frequency and Percentage of Non-Media Sources by Subject Categories, 1994**

Subject Categories	Federal: OCRWM Bulletin and Of Mountains and Science		State: Nevada Nuclear Waste News		County: Clark County Nuclear Waste Repository Program Update		Nuclear Waste Study Committee: Nevada Monitor		Citizen Alert: Citizen Alert	
	#	%	#	%	#	%	#	%	#	%
Litigation & Legislation	1	2.2	1	2.2	1	4.0	10	6.8	22	9.8
Risks	12	26.1	8	17.4	8	32.0	12	8.2	30	13.3
Benefits	9	19.6	1	2.2	-	-	38	25.9	5	2.2
Public	6	13.0	8	17.4	-	-	14	9.5	54	24.0
Funding	3	6.5	1	2.2	3	12.0	13	8.8	13	5.8
Criticism of Officials or their Actions	-	-	11	23.9	2	8.0	14	9.5	44	19.6
Support of Officials or their Actions	-	-	-	-	-	-	-	-	5	2.2
Currents	15	32.6	6	13	8	32.0	22	15.0	18	8.0
Opposition to Studies	-	-	2	4.3	2	8.0	2	1.4	16	7.1
Support of Studies	-	-	-	-	-	-	15	10.2	1	0.4
Unfairness and Distrust	-	-	5	10.9	-	-	6*	4.1	16	7.1
Impacts	-	-	3	6.5	1	4.0	1	0.7	1	0.4
Totals	46	100 %	46	100 %	25	100 %	147	100 %	225	100 %

*Of these 6, one was a rarely used code 'State treated fairly,' and two were comments by political candidates being interviewed by the Monitor.

Risks

Differences in the risk subjects cited by the five journals can be seen. However, the small number of overall risk citations makes interpretation difficult, and comparison less valid. To some extent, coverage of risk topics is affected by the news of the time (tests currently being conducted, geologic features discovered), while in some cases the journal makes explicit statement of its predominant risk concerns.

The DOE publication most often mentions water, followed by cask construction and transport and radiation. To some degree these last three topics were related, and coverage focused on the possibility of a multi-purpose canister that would ease transportation and radiation concerns. The State journal focused most often on earthquakes and thermal testing, followed by water and health and safety, radiation and volcanos. The County publication most often covered transport, and also mentioned health and safety. One County journal fairly explicitly stated that these risks, along with socioeconomic impacts, are its principle concern with respect to the Yucca Mountain Project. The *Monitor* mentioned health and safety, followed by cask construction (the multi-purpose canister), and transportation, while *Citizen Alert* noted the broadest range of risks (perhaps reflecting their larger number of articles), and gave major focus to health and safety, transport, and cask construction.

The *Monitor* and the County publication had a higher proportion of their citations about cask construction than did the other journals, while DOE gave water and radiation a higher proportion of citations than others. The State gave most attention to earthquakes, thermal testing and volcanos, the *Monitor* to health and safety, and the County to transport.

**Table 6-22
Frequency and Percentage of Non-Media Sources by Risk Categories, 1994**

Risks	D.O.E.: OCRWM Bulletin and Of Mountains and Science		State: Nevada Nuclear Waste News		County: Clark County Nuclear Waste Repository Program Update		Nuclear Waste Study Committee: Nevada Monitor		Citizen Alert: Citizen Alert	
	#	%	#	%	#	%	#	%	#	%
Cask Construction/ Design	2	16.6	0	0.0	2	25.0	4	33.3	5	16.7
Contaminated Water/Fluctuating Water Levels	4	33.3	1	12.5	0	0.0	0	0.0	2	6.7
Earthquakes/ Seismic Activity/Fault Lines	1	8.3	2	25.0	0	0.0	0	0.0	2	6.7
Health and Safety Issues	0	0.0	1	12.5	3	37.5	5	41.7	8	26.7
Human Intrusion	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Radioactive Releases/Radiation	2	16.6	1	12.5	0	0.0	1	8.3	1	3.3
Safety Standards	0	0.0	0	0.0	0	0.0	0	0.0	2	6.7
Thermal Testing	1	8.3	2	25.0	0	0.0	0	0.0	2	6.7
Transportation of Waste	2	16.6	0	0.0	3	37.5	2	16.7	7	23.3
Volcanos/Volcanic Activity	0	0.0	1	12.5	0	0.0	0	0.0	1	3.3
Totals	12	100%	8	100%	8	100%	12	100%	30	100%

As seen in Table 6-23, there is a large difference between *Citizen Alert* and the *Nevada Monitor* in their communication of the probability that risks exist. This again reflects their very different

perspectives on the Yucca Mountain Project.

Table 6-23 Comparison of Risk Probability Conveyed by Two Non-Media Sources, 1994				
Risk Probability	Nevada Monitor		Citizen Alert	
	number	percent	number	percent
definite risks	-	-	5	16.7
potential risks	-	-	16	53.3
minor risks	1	8.3	-	-
no risks	-	-	-	-
needs more study/ risks unknown	8	66.7	2	6.7
N/A (does not apply)	3	25.0	7	23.3
Total	12	100%	30	100%

Additional Subject Categories

These tabular listings do not provide a full description of the content of these journals, and the pictures they present of the risks and opportunities of the Yucca Mountain Project. Some topics covered in these publications are not included in the coding categories, but these non-Yucca Mountain subjects are often supportive of the arguments and perspectives being provided to the public about the Yucca Mountain Project. Discussion of these topics is necessarily interpretive, and this discussion is not meant to imply that the meanings outlined here are necessarily the ones intended by the writers. Further, this discussion is not meant to question the legitimacy or value of this form of debate.

One non-coded subject is construction, and the equipment being used on the Yucca Mountain Project in particular. The DOE Bulletin makes a number of mentions of ongoing construction and equipment (including the tunnel boring machine), and has photographs and graphics showing construction sites, machines, and men working. While this is undoubtedly a subject of

interest in any government project of this size, and especially a project of such novelty, this topic may also specifically appeal to the construction unions that support the Yucca Mountain Project.

The State publication, (and the DOE publication slightly less, if we discount the coverage of risks by these journals) mentions general topics of scientific debate. Included here are the possibility of a phased Yucca Mountain Project to provide a small scale test of the repository, international research and development, the idea that a 10,000 year time period may introduce a high level of statistical uncertainty in safety estimates, the appropriate sequence for conducting site tests, and so forth. The State publication also provided a federal government "800" (toll free) telephone number for anyone who had been subjected to human experimentation with nuclear materials. This announcement can be seen as a public service, but it also may introduce an element of distrust about federal handling of nuclear issues. Other topics may be introduced through non-textual means: while there were no citations on transportation risk, the masthead on the State publication has a cartoon of a rickety waste-carrying truck heading for Nevada.

The DOE publication's discussion of risk places an emphasis on science per se rather than potential impacts. For example, findings in the field of geology are a common topic. This interest in the broader findings (the basic science) is associated with the Bulletin's emphasis on education, and the contributions the Yucca Mountain Project is making to the community and to science.

The County publication and the DOE publication make mention of the growing national problem of nuclear waste storage, which the repository is designed to address. The County journal also observes that monitored retrievable storage facilities are being sought by some Native American groups. *Citizen Alert* includes stories from around the country on the problems associated with nuclear materials and waste. This journal also makes references to issues of government secrecy, and the possibility that laws might be changed to allow a monitored retrievable storage facility at the Nevada Test Site. *Citizen Alert* also makes extensive use of pointed cartoons directed at the DOE and the nuclear industry.

Linking Perceptions and Non-Media Information Sources

Recently initiated Stage II ethnographic interviews include specific questions about the Yucca Mountain Project. While a limited number of these interviews have been conducted to date, they have produced some information regarding Yucca Mountain and non-media information sources. The soon-to-be-initiated survey also asks questions specifically directed toward where individuals obtain information on Yucca Mountain, and the results of this effort will inform more extensive analysis on this topic. The following section briefly describes non-media information sources, risk perceptions, and linkages between information sources and perceptions mentioned in interviews completed to date.

Sources Mentioned in Interviews

A number of non-media information sources including, but not limited to, conversations with friends and co-workers, privately-published literature, personal experiences, and DOE information have been named by informants to date. Levels of trust and confidence by informants vary widely from source to source, but is fairly consistent from informant to informant, at least within general categories of informants.

The catalog of non-media sources of information about various general issues of concern in Clark County is large, and the range of sources for the Yucca Mountain Project, while somewhat limited in comparison, is still quite large. For example, conversations and general word-of-mouth information transmission is noted by a number of informants as an informal means of learning about the Yucca Mountain Project. This method of communication of information is, of course, a common means for other issues of concern (e.g., crime, growth, etc.) as well. Interestingly, according to informants, such communication regarding the Yucca Mountain Project is typically not as trusted as other, particularly written, sources. The level of trust and reliability in non-written/verbally-communicated information is considered higher by informants when it comes from family members or friends who work or have worked at the Yucca Mountain site or the Nevada Test Site.

Newsletters and information published by attentive public organizations have been mentioned in interviews as a means for monitoring the project as well as "environmentalist" attitudes. *Citizen Alert* has been cited as an example of this type of information. This source is also considered by some interviewees as highly biased and only moderately useful. The following statement by one individual expresses the lack of confidence in this particular source:

I get *Citizen's Alert* . . . They're an anti-nuclear group; that's their biggest push, eliminating Yucca Mountain. They're based in Reno and have a moderately strong contingent here [in the Las Vegas area]. They're basically an environmental group, and Yucca Mountain is their biggest single issue . . . [Their arguments] haven't convinced me. Most of their arguments are like most of the 'green' arguments, they're panic: 'What if . . . ' and 'This has happened,' and it's true it has happened, but it doesn't mean it is going to happen again or it can't be managed or can't be changed or can't be done better. You know, they keep going back to Three Mile Island. Well, what actually happened at Three Mile Island? How many people were injured? Of course, I know, none. It was a problem and a very expensive one, but it was managed and handled, and pretty well worked.

Several informants cited the Department of Energy as a key source of information about the Yucca Mountain Project, particularly their informational mailings and Yucca Mountain site tours. Tours of the site are frequently regarded as a very informative and reliable means of

understanding the Yucca Mountain Project. Informants' experiences and their relationship to risk perceptions are included in the discussion below.

Perceptions Mentioned in Interviews

Given the nature of the ethnographic interview protocol, concerns regarding Yucca Mountain are gleaned from a contextual discussion of issues in the community as well as specifically from questions about Yucca Mountain. As in other phases of this research (e.g., FY93 fieldwork), these Stage II interviews elicit from informants a broad range of issues and concerns about the Yucca Mountain Project. Some of the perception-related informant statements about the Yucca Mountain Project are outlined in this section.

A concern expressed by informants related to the potential for nuclear waste to contaminate groundwater below Yucca Mountain and subsequently affect the Las Vegas Valley water supply. The following statement by an informant typifies this concern:

The danger would be if they don't know what they're doing and somehow or another it affected the water, and that -- I just am not a scientist, so I don't know. I don't know if my water comes from 150 miles away, underground.

Another issue of concern is the transport of nuclear waste through the county. Of particular concern is the movement of radioactive material through the Las Vegas metropolitan area; however, passage across the Hoover Dam has also been mentioned by informants as potentially hazardous.¹¹ In addition to transportation issues, the geographic proximity of Yucca Mountain to Las Vegas is also cause for informant concern. This type of concern is exemplified in the following statement by an informant:

The only thing that does worry me is that Vegas is getting so big now that it's actually pretty close [to Yucca Mountain]. If some disaster was to happen, something that could affect Vegas. I worry about that.

A "cost vs. benefits" argument is often raised by informants. For example, some informants view the Yucca Mountain Project as a potential economic boon to the community. The jobs that may be created by the project are viewed as a means to mitigate the effects of the reduction in staff at the Nevada Test Site following the moratorium on nuclear weapons testing. As one informant stated, "It [the Yucca Mountain Project] creates jobs . . . it's a big backbone of

¹¹ Although the present regulatory context (DOT regulations) would appear to discourage the future movement of nuclear waste across Hoover Dam, it remains a possibility. Nuclear waste could be transported across the dam (the roadway atop the dam is a segment of U.S. Highway 93) if it were designated as an alternative transportation route. In any event, the public perception that it is a possibility to be taken seriously is indicative of the concern associated with transportation issues.

the economy in Vegas." The actual magnitude of the impact of the jobs lost with the decline of the Nevada Test Site, or those created by the Yucca Mountain Project, has been questioned by members of the public. As an example, one informant stated:

I know that [decline of the Nevada Test Site] hurt individual families, my family. It's not hurt my immediate family, my husband and I, but my father was laid off after 15 years of working out there. It hurt him . . . I don't think that those 300 or 400 or 500 people that were laid off really had any great impact on the 850,000 people who live here, okay? And so, the Yucca Mountain Project, let's say they hire five or 600 people to run that, it's the same thing: it's not going to have that much impact.

Some informants look forward to the potential for additional state and community benefits. As a topic debated in the State Legislature, the concept of a potential benefits was one reported on by television and newspaper press. This type of "benefits package" includes federal assistance in return for locating the repository in Nevada. The following is an example, stated by an informant, of conceivable benefits and the possibility thereof:

I think the state can get a lot of money from the federal government out of it . . . We can become one of the top . . . We can say to the Federal Government [that] if we're going to take all of your nuclear waste, you're going to fund us with billions of dollars into our universities and we're going to have the best universities in the country on nuclear waste . . . They're going to give us more highway money. We're going to get something out of it in return.

The political nature of the Yucca Mountain Project was central to several informants' perception of the issue. To many informants, the risks associated with the repository have been exaggerated and capitalized upon in Nevada politics to aid candidates in their campaigns for office. The sentiment expressed in the following informant statement was not uncommon:

I think it's a big political hot potato. Anybody in politics had better say they don't want Yucca Mountain or they're not going anywhere.

The perception that there is little difference between the Nevada Test Site and the proposed Yucca Mountain repository exists as well. In the opinions of multiple informants, the area has already been contaminated by the testing of nuclear weapons, and in following this train of thought, informants indicated that locating the repository at Yucca Mountain could do no new harm to the area. For example:

They've certainly tested a lot of radioactive material in the bombing exercises out there, which are underneath the ground, and what really is the difference between blowing up bombs underground and having a storage facility that is designed?

Similarly, the desert environment found at Yucca Mountain has been mentioned by several informants as an ideal setting for the repository. As presented in this view, the site's relative isolation, and lack of other productive and cost effective options also make Yucca Mountain an acceptable location for the repository.

I try to be practical about it. I say, 'Okay, you're going to have atomic waste, it's going to have to be put somewhere.' Well you show me a state that has more desert land. If it can be done safely. That's the practical nature of me. They're certainly not going to put it in New York, in the middle of where there is no waste land, or desert land.

Other informants expressed support for the studies being done to assess Yucca Mountain's suitability as a site for a nuclear waste repository. These studies are frequently mentioned as necessary aspects of accepting the repository. One informant, for example, stated that a repository at Yucca Mountain was personally acceptable "as long as they do the appropriate studies, and we show that its safe."

Linkages Between Non-Media Information Sources and Risk Perceptions

While the informants interviewed to date do not represent the gamut of perceptions of Clark County residents -- and it is important to emphasize this point -- in the work done to date it appears that a connection exists between information received directly from DOE and trust in the safety of the Yucca Mountain Project. Many informants who received information directly from DOE felt that the repository was being handled safely. Similarly, the informants who had taken a tour of Yucca Mountain and/or Nevada Test Site region were favorably impressed. One informant reported her experience:

We went down into the Climax experience -- or experiment -- which was the early testing for that [geologic disposal]. It seemed like a rational and reasonable place . . . I went down there and looked at what they were doing as far as the kind of rock and the testing that they had put their equipment, their storage canisters, through. We saw the film on that. I should say, the storage canister film was pretty interesting. What they did is they took these storage canisters that they designed to hold the nuclear waste . . . and they put them on semis -- one was on a semi and I think one was on a train -- and they were going about 80 miles an hour, I believe, and they slammed them into a wall, and then they caught fire. I think it was the semi that caught fire, and then they examined the canisters, the canisters were intact, except for being dented.

It is important to note that not all tour participants are impressed with the site or the presentation.

Some individuals who have taken the tour remain generally skeptical of the government and of the validity of the research. As more Stage II interviews are completed, and the telephone survey is conducted, it is anticipated that more complete analysis of the link between non-media sources and perception can be performed.

6.3.3 Comparison of Media and Non-Media Sources and Content

As mentioned above, there is little value in comparing the sources cited by media and non-media publications, since non-media publications employ very few sources. Further, since the non-media publications represent very different points of view, it would not be useful to compare them, as a group, to the media publications. On the other hand, some interesting information can be gleaned from comparing subject information. Table 6-24 compares the percent of subject citations by each source. It appears that the newspapers have a higher proportion of citations only on the subjects of 'opposition to studies' and 'support of officials,' while they have a lower proportion of citations regarding 'impacts' than most of the non-media sources. Not surprisingly, there is greater variation among non-media sources than between media and non-media sources.

Table 6-24 Percentage of Subjects by Media and Non-Media Sources, 1994						
Subjects	Media	Non-Media				
	Newspapers	Federal	State	Clark County	Monitor	Citizen Alert
Litigation and Legislation	8.9	2.1	2.1	4.0	6.8	9.8
Risks	17.1	26.0	17.4	32.0	8.1	13.3
Benefits	2.5	19.5	2.1	-	25.8	2.2
Public Communication	7.6	13.0	17.4	-	9.5	24.0
Funding	10.1	6.5	2.1	12.0	8.8	5.8
Criticism of Official Actions	10.1	-	24.0	8.0	9.5	19.5
Support of	2.5	-	-	-	-	2.2

Official Actions						
Current Events	20.0	32.6	13.0	32.0	14.9	8.0
Opposition to Studies	12.0	-	4.3	8.0	1.36	7.1
Support of Studies	7.6	-	-	-	10.2	0.4
Unfairness and Distrust	0.6	-	10.8	-	4.0	7.1
Impacts	-	-	6.5	4.0	0.7	0.4
Total	100%	100%	100%	100%	100%	100%

Risk citations by media sources focus on relatively few issues compared to the non-media sources. This is especially true when we notice that they have a substantial number of risk citations (n=27), which is comparable to the total number of risk citations by Citizen Alert (n=30). The media sources have placed much more emphasis on earthquakes and seismic activity than have the non-media sources, and mentioned 'human intrusion,' which does not appear in any of the non-media sources. The transportation of waste is mentioned by most of the non-media sources, as is health and safety, but these categories are not included among the media risk subjects.

**Table 6-25
Percentage of Risks by Media and Non-Media Sources, 1994**

Risks	Media	Non-Media				
	Newspaper	Federal	State	Clark County	Monitor	Citizen Alert
Cask Construction/ Design	11.1	16.7	-	25.0	33.3	16.7
Contaminated Water/ Fluctuating Water Levels	18.5	33.3	12.5	-	-	6.7
Earthquakes/ Seismic Activity/ Fault Lines	6.3	8.3	25.0	-	-	6.7
Health and Safety	-	-	12.5	37.5	41.7	26.7
Human Intrusion	3.7	-	-	-	-	-
Radioactive Release/ Radiation	3.7	16.7	12.5	-	8.3	3.3
Safety Standards	0.0	-	-	-	-	6.7
Thermal Testing	0.0	8.3	25.0	-	-	6.7
Transportation of Waste	0.0	16.7	-	37.5	16.7	23.3
Volcanos/ Volcanic Activity	0.0	-	12.5	-	-	3.3
Total Percent	100%	100%	100%	100%	100%	100%
Total Quantity	27	12	8	8	12	30

6.3.4 Correlation of People's Concerns to Content of Information

An additional consideration in this study is the correlation of concerns stated during interviews (both ethnographic and survey interviews) to the content of information being provided in the media sources in Clark County. The multi-method approach to this study has resulted in information about what are the major issues of concern in Clark County and how Yucca Mountain issues are perceived among those concerns. These methods are also helpful in understanding how the content of information available to the public addresses those concerns.

In overview, ethnographic interviews provided general information on how individuals and organizations receive and evaluate local media information sources. Informants were often critical of information presented in both major local newspapers and by local television stations. For example, regarding a broad range of community issues, both the *Review Journal* and the *Las Vegas Sun* were described as "biased" or "politically biased" by many informants. Despite this perception, informants stated that newspapers are a valuable source of information on YMP and other issues because of the breadth of material provided. In contrast, a common complaint by informants is the brief amount of time and minimal details television sources provide to the viewer. Informants noted slightly less concern, however, over bias in television news sources. For issues of concern within Clark County and, more specifically, issues of concern to specific organizations, informants mentioned other key sources of information; e.g., public meetings, lobbyists, direct contact with political or governmental agencies, community business leaders, independent study, and published scientific research. Organizations, themselves, did not frequently rely on television and newspapers as their primary information source according to informants. This indicates a degree of dissatisfaction with the media's coverage of issues of importance, including the YMP.

Survey research, described in Chapter 4 of this report, also revealed data regarding YMP information sources. For the 295 respondents to the YMP information inquiry, the four most-frequently-stated sources of repository-related information were, in descending order, television, local newspapers, friends/family/co-workers, and locally-based radio programs. When asked what is the most important source of YMP information for respondents, local newspapers topped the list with 37% of the responses; local television stations comprised nearly as many responses (36%). The remainder of important information sources cited were distributed among magazines, friends and family, DOE, citizen groups, local government, and other sources.

Responses to the telephone survey indicated the storage of nuclear waste at Yucca Mountain and the transportation of nuclear waste through the county were among the most serious issues in the community (i.e., on a scale of 1-to-10, these issues were among those most frequently given a serious rating of 9 or 10 by respondents). When the details of individuals' perceptions of

nuclear waste storage were investigated,¹² 83% of the 295 respondents who answered the Yucca Mountain-specific component of the survey agreed that there are dangers of accidents that cannot be avoided when transporting nuclear waste to the proposed repository, 79% felt that people living in the county will worry about the proposed repository, 71% indicated that it could affect the health of those living nearby, 69% agreed that the YMP is a threat to future generations, 63% considered it a threat to the overall quality of life in Clark County, 60% thought that a repository could negatively affect property values, 51% thought it will cause groundwater contamination, and 48% thought it would create a bad image of Clark County. Only 23% of the respondents felt that the benefits from the proposed repository would outweigh the harms it poses to the community.

¹²For a complete listing of results see Table 4-8, in Chapter 4.

The combined coverage of the two major media sources studied in this report (the *Las Vegas Review Journal* and the *Las Vegas Sun*) noted five primary types of Yucca Mountain Project risk-related issues in 1994. Of these risk categories, earthquakes and seismic activity received the most attention (63%); contamination/fluctuation of ground water was the second-most cited risk category, accounting for 18.5% of the risk-coded articles; an additional 11.1% of the risk-coded articles contained a reference to the design or construction of storage casks; and human intrusion and radioactive releases each accounted for 3.7% of risk-related subjects. A comparison of this coverage of risk-related YMP issues to respondents attitudes towards the proposed repository indicates that several of the specific concerns stated in the survey, such as the repository's potential threat to health, future generations, and property values, have not been addressed in recent (1994) newspaper articles. Water contamination was the only subject category addressed in the survey that was directly addressed in the newspaper articles coded. Risk associated with transporting high-level radioactive waste, a serious concern expressed in the survey, is somewhat related to cask design and construction, a risk category noted in newspaper articles; however, transportation was not specifically addressed in the coded articles.

6.4 SUMMARY AND CONCLUSIONS

Data collected from the *Las Vegas Review-Journal* and *Las Vegas Sun* newspapers, two important sources of information in Clark County, indicate that the portrayal of the Yucca Mountain Project is changing over time. While news articles reflecting opposition to the proposed repository still outpace articles supportive of the Yucca Mountain Project by a two-to-one margin, the number of adversarial articles and subjects have declined over time. Articles citing special interest groups opposed to the repository are on the decline, and there is a notable increase in the use of miscellaneous-source citations. Among governmental sources, federal entities continue to be cited most frequently in those articles highlighting support for the repository, while articles with themes in opposition to the repository project are more likely to cite state and local governmental sources. There is some differentiation in coverage between the two newspapers coded. Of particular note is a higher rate of citation of federal officials in the *Review-Journal*, a newspaper with almost four-times the daily circulation of the *Sun*.

Analysis of media information also indicates that the existence, type, and emphasis of risks communicated in the media have changed over time. Historical and ethnographic information also support this finding.¹³ While national and local media reports in the 1950s and early 1960s emphasized a beneficial and patriotically-founded nuclear program in Nevada, the potential risks associated with nuclear issues in Nevada are frequently cited today. In newspapers analyzed

¹³ The reader is referred to the *Site Characterization Sociocultural Risk Report* (IAI March 1994) for additional historical and ethnographic information. Chapter 3 of that report, for example, presents a discussion the history of nuclear issues in Nevada. It appears that over the last half-century, the history of nuclear issues, in the nation and in Nevada, shows a shift from enthusiasm and support to distrust to skepticism regarding nuclear issues.

during FY94 research activities, threats or potential hazards associated with earthquakes and seismic activity dominated the risk-related YMP subjects. Over the last five years, coverage of risk issues associated with cask construction and water contamination has increased while that of other risk areas has declined.

Non-media sources analyzed were drawn from a number of different organizations. A predominantly Yucca Mountain-oriented journal from each of federal, state, and county governmental levels was coded, along with a locally available Yucca Mountain-oriented journal from a nuclear industry association and one from a repository opposition group. Not surprisingly, the message content varied widely from journal to journal. 'Risk' and 'Benefit' categories, for example, provide interesting contrasts. Risk, as a percentage of overall topics, was notably high in the federal journal -- exceeded only by the county publication. Under benefits, on the other hand, the industry association journal had the highest percentage of content, followed by the federal journal. The state and opposition group journals tended to be strong in their criticism of officials and their actions relative to the other journals.

The percentage of coverage of risk subject categories also varied widely by journal. Water issues tended to dominate the federal journal, with cask, radioactivity, and transportation issues ranking as second order themes. Seismic issues and thermal testing were the predominant issues in the state journal, but overall issue numbers were small. Health and safety and transportation were issues of the first order in the county journal. Health and safety issues were the primary focus of concern for the industry group, while the opposition group focused most closely on health and safety and transportation issues.

This archival research has shown that a wide range of messages are being communicated about the proposed repository and that those messages have changed over time. This work is augmented by the use of other methodology which is helpful in understanding the various risk-related messages sent to the public and the perception and impact of those messages. Ethnographic and survey methodologies described in this report contribute to this task and indicate that the content of major information sources may fall short of addressing public concerns of YMP risk. Additional monitoring of this subject will contribute to a better understanding of the relationship between the content of various messages and structure of opinions held by local organizations and Clark County residents.

7.0 DISCUSSION OF FINDINGS

7.1 INTRODUCTION

This chapter discusses the findings of FY94 research contained in the four data chapters, the Ethnographic Sociocultural/Risk Studies, the Analysis of Sociocultural/Risk Survey (Phase II), the Behavioral Response to Sociocultural Risk Concerns, and the Sociocultural/Risk Communication Studies. The findings are first briefly summarized (this section essentially reiterates the material in each chapter), and then relations among the findings are discussed.

7.2 RELATIONS AMONG FINDINGS

7.2.1 Summary of Findings

Chapter 3, *Ethnography*: The following goals were set out for ethnographic and chronicling research: 1) 'risk explanations' regarding the YMP and other Clark County issues; 2) inclusion of interest groups and their perspectives on local issues; 3) chronicling to provide a chronology of YMP developments, the public's response to developments, and the influence of local and non-local events on public response.

Research included interest groups in the areas of business and growth, environment, labor unions, concerned citizens, professional organizations, population sub-groups, resource user groups, and nuclear industry groups.

1. The research on risk explanation found that some people see nuclear hazards as more serious in scale and consequence than chemical hazard, while for others they are viewed as similar. The verbal imagery associated with nuclear hazards includes references to contaminated and impassable wasteland. The comparison between the Yucca Mountain Project (YMP) and the Nevada Test Site (NTS) is made by those on both sides of the debate, with some suggesting that the YMP will have little impact on tourism, and others mentioning the serious health effects associated with nuclear testing. A distinction between above ground and below ground testing is more often made by long term residents of Clark County, with the period of above ground testing seen as far more dangerous. This distinction between 'above' and 'below' may re-emerge if there is a decision to temporarily site nuclear waste at the NTS. While concern about transportation accidents appeared in interviews with both supporters and opponents of the YMP, risks to life and health were more often mentioned by opponents. The comments about health

were made with much more vehemence, and contain reference to those things most valued, such as family and threats to future generations. Many interviewees, both supporters and opponents of the YMP, expressed anger at the political process through which Nevada was selected as the sole location considered for siting. A number of interviewees suggested that the decision on siting would be made on political rather than scientific grounds. While some argue that people are too concerned with risks, and that this anxiety is created by unbalanced media coverage and lack of knowledge, others argue that the uncertainty and risks of the Project are high, current scientific knowledge is inadequate to the size and time scale of the Project, and the potential consequences are serious and far-reaching.

There is a fairly widespread view that jobs would be a likely benefit of the Project. The granting of federal funds and other assistance (for example more Colorado river water) were evaluated in different ways by interviewees: Some saw these as possible and positive, others described them as compensation for a Project the community would be forced to accept, and others viewed benefits as in all cases inadequate and unlikely to be granted. Specific risks mentioned were earthquakes, water contamination, negative economic consequences, transportation of waste, waste storage, health risks, seepage of radioactivity into the air, and volcanos.

Both crime and water (shortages and management) are described as extremely serious issues, and as problems the community must take action on. While these are seen as issues the community can affect, most believe that the decision on the Yucca Mountain siting will be made at the national level. Crime is considered a current priority, and water is described as an issue that must be rapidly addressed to prevent serious consequences for the community. There is a high degree of interest among community leaders in working with government to solve the water problem. The organizations and sectors interested in this problem include environmental groups, gaming organizations, construction fields, banking, concerned citizen groups, professional organizations, labor unions, and others.

2. The research finds that there is some division, more or less muted, between two major business sectors, construction and gaming. The construction and service unions may also be divided, though the service unions do not publicly object to the pro-YMP stance taken by construction unions and the union coalitions. There is also some division between federal employees and contractors, and those associated with state and local government. The historical tie between the construction businesses, construction unions, and federal projects is noted.

Publicly stated opposition to the Yucca Mountain Project comes from several organizations included in this study. These groups are the State Medical Association, the Parent Teacher Association, and Citizen Alert. Organizations supporting the YMP are the construction labor unions, the Nuclear Waste Study Committee, and the Southern Nevada Homebuilders Association. Other organizations not interviewed have taken a position on the YMP, and these

include groups opposed the Project such as the Nevada Resort Association, the Clark County Commission, the Las Vegas City Council, and the Clark County School Board. Significant divisions within organizations, with some members strongly supporting and others strongly opposed, have also appeared among those groups interviewed. These organizations include the League of Women Voters, Nevada Concerned Citizens, the Clark County Teachers Association, the Nevada Development Authority, and the Latin Chamber of Commerce.

3. Chronicling finds that some of the public response during 1994 was not tied to specific Project developments, and that organizations sometimes waited for the most advantageous occasion to make their response. A variety of public responses were noted to the YMP and other technological hazards. These include organizational change, such as group fragmentation and group formation, and changes in group relations and intergroup conflict. Analysis of cases indicates that wider community issues also affects public response and risk perception. These community issues include political elections, the economic ties of community members, and rumors about toxic sites.

Chapter 4, Survey: The following goals were set for survey research: 1) the monitoring and weighing of local risk concerns; 2) demographic correlates of risk perception; 3) survey data on actions taken in response to risk concern.

Research was based on a random sample of 492 Clark County residents. There was also a sub-sample of 294 respondents to specific questions about the YMP.

1. Eleven issues that appeared important in 1993 research were rated for 'seriousness' by respondents. These issues were crime, diversity in the County economy, storage of nuclear waste, transport of nuclear waste, water shortages, expansion of gaming outside the Las Vegas Valley, quality of schools and education, overpopulation, traffic congestion, job opportunities, and air pollution. Crime, traffic congestion, and transportation and storage of nuclear waste had the highest mean evaluation scores. The percentage of respondents who rated an issue at 'very serious' ('10' on a scale from 1-10) was highest for crime, followed by transport of nuclear waste, storage of nuclear waste, and traffic congestion. Expansion of the gaming industry outside the Las Vegas Valley, job opportunities, and diversification of the County's economy were rated the least important issues by respondents.

2. Concern about traffic congestion and the transportation of nuclear waste through Clark County were significantly associated with increasing age. In contrast, concern about the quality of schools and education declined significantly with increasing age. Women were more concerned about crime than men, and those with children under age 18 were more concerned about the quality of schools and education than those without children. Concern about water shortage was significantly related with income. Those who did not work for the Department of Energy were more concerned about the storage of nuclear waste than respondents who were, or were related to, DOE employees. Levels of concern about the transport and storage of waste did

not differ significantly by occupation. Length of residence in Nevada, employment with the DOE or DOE contractor, and ratings of crime and water shortages as serious issues were significant independent predictors of the rating of nuclear waste storage as serious: These variables accounted for 10% of the variance in the respondents' rating of this issue. Level of education, and the rating of crime as serious were significant independent predictors of the rating of transportation of waste as serious, and accounted for 12.5% of the variance on this issue.

3. One in four respondents reported taking some action in response to the crime issue, and one in five reported taking some action in response to the quality of schools and education. Over 13% reported taking some action concerning the transportation and storage of nuclear waste. Of those who had not taken action, the highest percentage reported the need to take action in the future with respect to storing waste (89.2%), transport of waste (87.6%), crime (87.3%), and traffic congestion (85.1%), followed by quality of schools and education, and water shortages.

Chapter 5, Behavior: The goals set for behavior research were: 1) the types of actions taken by interest groups; 2) the relation of behavior to risk perception and risk explanation; and 3) the consequences of actions taken.

1. A range of actions were taken by interest groups, and these were presented in five broad categories. These categories are political action, group activist, individual activist, economic, and information seeking and dissemination. Political actions commonly taken by interest groups include attending meetings and hearings, contacting representatives, and forming coalitions. Examples of actions taken by interest groups are presented.

2. A model is developed to suggest how risk perception leads to action in organizations. Some of the constraints on action, such as financial resources and organizational divisions, are described. Factors which affect the organization's ability to have an impact through its actions, such as the number of members, financial resources, and coalitions with other organizations, are also mentioned. Some of the external factors which can increase issue salience, such as hazardous events, and broad social attention on an issue, are also described in specific case examples.

3. Consequences of group actions have included economic impacts, the effecting of political change, the promulgation of new ideas and new rhetoric, increases in intergroup conflict, the definition of an organization's opponent in unfavorable terms, and increased access to media coverage for the organization's position.

4. Survey research on individual action found that the two nuclear waste issues are associated with a high number of reported actions, and only crime and the quality of schools and education were designated as issues more often acted on. Further, the nuclear waste issues have the highest percentage of respondents reporting that they would need to take action in the future. While analysis for statistical significance has not been made, it appears that respondents take

different actions in response to different issues. For example response to the crime issue included 'influenced their vote', 'contemplated moving', and 'attended a meeting'. The behavior with the largest economic impact, 'considered moving', was associated with the issues of crime, traffic congestion, and overpopulation. The most common behaviors associated with the nuclear waste questions were 'influenced vote', 'contacted a Senator', and 'seeking and giving information', in other words, political and risk communication behaviors.

Chapter 6, Risk Communication: The following objectives were established for risk communication research: 1) a media archival analysis of the frequency, contents and sources of information about risk issues; 2) an analysis of non-media sources of information about the YMP.

1. The archival review finds that articles citing opposition the YMP have declined over the last five years, though these articles still outnumber articles with positive citations by two to one. There has also been a decline in the citations of non-government sources, and an increase in the citation of federal rather than state or local government sources. And articles suggesting opposition to the repository more often mention state and local sources, while those suggesting support more often employ federal sources. The risks most often mentioned were seismic activity and earthquakes. With the exception of earthquakes, cask construction and water contamination, mention of risk subjects has decreased over the last five years.

2. The non mass media sources analyzed were publications from two activist groups, one favoring and the other opposing the Yucca Mountain Project, and publications from the DOE, the State of Nevada, and Clark County. While there are too few articles from each journal to provide a basis for meaningful comparison, some initial trends can be observed. A frequency and content analysis indicated, as expected, wide differences between the content of the two activist group publications. The pro-YMP publication most often mentioned benefits from the siting, while the anti-YMP publication mentioned public information, criticism of officials, risks, and legislation/lawsuits. The Clark County publication had the highest percentage of its citations in the area of 'risks', while the State publication emphasized criticism of officials and their actions, and the DOE publication mentioned project developments and personnel.

7.2.2 Relations Among Findings

The following abbreviated discussion compares findings on the Yucca Mountain issue in the four studies. Before doing this, a couple of brief observations will be made about other Clark County topics.

Community leaders and survey respondents had different views of the importance of water shortage, and of the relative importance of water issues and the YMP. Most interviewees rated water as very important, and as more important than the YMP, while more survey respondents

rated the YMP as a 'very serious' issue ('10' on a 1-10 scale). To some extent, this can be explained by the demographic correlates of concern about water, (income level), which more closely match community leaders than the population average. In contrast, both community leaders and survey respondents saw crime as very serious, and either had acted or anticipated a need to take action in the future. Behavioral interviews revealed a broader set of actions taken in response to crime than those indicated by the survey.

While survey results and ethnographic interviews differ in the proportion of people concerned about the YMP, the degree and quality of concern evidenced in the survey and the ethnographic interviews is similar: Over 50% of survey respondents rate their concern 'very serious' ('10' on a 1-10 scale), and interviews revealed both great depth of feeling and substantial doubts about the feasibility and wisdom of the Project. Reasons given for these expressions were outlined in the Chapter 3 summary above. Another element in both survey and ethnographic findings is a degree of polarization on the issue: Some organizations are deeply divided, and the survey reflects that there are few people in the middle on the issue.

The research on behavior found that aside from the government entities, few organizations were taking action on the YMP. Such action most often consisted of monitoring, and it was suggested that some of the organizations more strongly for or against the YMP encouraged their members or workers to vote for candidates based on their positions on the issue. Voting and information seeking and dissemination were also the most common behavioral responses to the YMP noted in the survey. The two activist groups have taken wider action. They mainly seek to define the meaning of the issue, and the nature of their opponents, to the public. This is done through information dissemination (broadly, risk communication), but can take some novel forms, such as symbolic action. The pro-study group emphasizes the possible benefits of the Project, and avoids discussion of risks. The anti YMP group defines the pro study activists as an economic interest group, which is nationally rather than locally based and funded.

The media analysis shows a decline in newspaper articles mentioning opposition to studies, a decline in coverage of most risk issues, and a decline in non-governmental and non-federal sources. Yet public risk perception may have remained fairly stable (see studies in Chapter 2), though there are variations associated with events such as earthquakes. It would be useful to do a closer examination of connections between risk perception and media coverage.

Ethnographic interviews found that there are very few non media sources of information on the YMP used by the public. A number of interviewees stated that there is an absence of objective information either from the media or other sources.

7.3 DISCUSSION

Based on an initial review of the data for this Preliminary Report, it is suggested that it might be useful to include additional organizations and sectors of the community in future research. Given the high number of reported actions and intended future actions on the YMP, it would also be important to continue to track behavioral response. Further development of cases involving Clark County hazardous incidents might provide information about possible public response to the YMP. Since television and radio are considered (by interviewees) somewhat more objective sources of information, and since they have a wide audience, it would be useful to include these media in risk communication research. Additionally, it might also be useful to track risk communication, such as rumors, that reflect sensitivity to risk concerns and may appear in advance of public action. Survey research provides another important monitoring tool.

Bibliography

- Bachrach, Kenneth M. and Alex J. Zautra
1985 Coping with a Community Stressor: The Threat of a Hazardous Waste Facility. *Journal of Health and Social Behavior*, v.26:127-141.
- Bailey, F. G.
1983 *The Tactical Uses of Passion: An Essay on Power, Reason, and Reality*. Ithaca, Cornell University Press.
- Baum, Andrew, India Fleming, Ann Israel and Mary K. O'Keeffe
1992 Symptoms of Chronic Stress Following a Natural Disaster and Discovery of a Human-Made Hazard. *Environment and Behavior* 1992 May v.24 n.3:347-365.
- Bentler, P. M. and George Speckart
1979 Models of Attitude-Behavior Relations. *Psychological Review* v.86, n.5:452-464.
- Bord, Richard J. and Robert E. O'Connor
1990 Risk Communication, Knowledge, and Attitudes: Explaining Reactions to a Technology Perceived as Risky. *Risk Analysis*, V.10, n.4:499-505.
- Boyle, M. Ross
1989 Assessment of the Impact of a Nuclear Waste Repository at Yucca Mountain on the Economic Development Potential of Las Vegas, Clark County, and the Surrounding Area. State of Nevada, Nuclear Waste Project Office.
- Brody, Julia G.
1988 Responses to Collective Risk: Appraisal and Coping among Workers Exposed to Occupational Health Hazards. *American Journal of Community Psychology* v.16, n.5:645-663.
- Burns, William, Paul Slovic, R. Kasperson, J. Kasperson, O. Renn and S. Emani
1990 Social Amplification of Risk An Empirical Study. State of Nevada, Nuclear Waste Project Office.
- 1993 Incorporating Structural Models into Research on the Social Amplification of Risk: Implications for Theory Construction and Decision Making. *Risk Analysis*, v.13, n.6: 611-623.
- Carter, Lewis F. and William Willard
1992 Scope, Stakeholder Groups, and Impact Issues Raised by the Proposed Hanford, Washington High-Level Nuclear Waste Repository Site. State of Nevada, Nuclear

Waste Project Office.

Center for Risk and Decision Processes, and Decision Research

1987 Yucca Mountain Socioeconomic Project Report on the 1987 Risk Perception Telephone Surveys. State of Nevada, Nuclear Waste Project Office.

Chalmers, James, D. Easterling, J. Flynn, C. Fowler, J. Gervers, et al

1993 State of Nevada Socioeconomic Studies of Yucca Mountain 1986-1992, An Annotated Guide and Research Summary. State of Nevada, Nuclear Waste Project Office.

Colemen, Cynthia-Lou

1993 The Influence of Mass Media and Interpersonal Communication on Societal and Personal Risk Judgements. *Communication Research*, v.20, n.4:611-628.

Covello, Vincent T.

1991a Informing People About Radiation Risks: A Review of Obstacles to Public Understanding and Effective Risk Communications. in OECD publishers, *Nuclear Energy: Communicating with the Public*.

1991b Communicating with the Public about Nuclear Power: Lessons Learnt. in OECD publishers, *Nuclear Energy: Communicating with the Public*.

Covello, Vincent T., Detlof von Winterfeldt, and Paul Slovic

1986 Risk Communication: A Review of the Literature. *Risk Abstracts*, n.3:171-182.

Cummings, Ronald G.

1988 New Mexico Waste Isolation Pilot Project (WIPP): An Historical Overview. State of Nevada, Nuclear Waste Project Office.

D'Andrade, Roy G.

1992 Schemas and Motivation. in D'Andrade and Strauss, editors, *Human Motives and Cultural Models*. Cambridge, Cambridge University Press.

Douglas, Mary

1985 *Risk Acceptability According to the Social Sciences*. New York, Russell Sage Foundation.

Doyle, James K., Gary H. McClelland, W. D. Schulze, S. R. Elliot, and G. W. Russell

1991 Protective Responses to Household Risk: A Case Study of Radon Mitigation. *Risk Analysis*, v.11, n.1:121-133.

Dunlap, Riley E., Michael E. Kraft and Eugene A. Rosa, editors

- 1993 Public Reactions to Nuclear Waste: Citizens' Views of Repository Siting. Durham, Duke University Press.
- Dunlap, Riley E., Eugene A. Rosa, Rodney K. Baxter and Robert Cameron Mitchell
 1993 Local Attitudes Towards Siting a High-Level Nuclear Waste Repository at Hanford, Washington. in Dunlap, et al editors, Public Reactions to Nuclear Waste.
- Easterling, Douglas and Howard Kunreuther
 1993 The Vulnerability of the Convention Industry to the Siting of a High-Level Nuclear Waste Repository. in Dunlap et al editors, Public Reactions to Nuclear Waste.
- Easterling, Douglas, Vicki Morwitz, and Howard Kunreuther
 1990 Estimating the Economic Impact of a Repository from Scenario-Based Surveys: Models of the Relation of Stated Intent to Actual Behavior. State of Nevada, Nuclear Waste Project Office.
- Edelstein, Michael R.
 1988 Contaminated Communities: The Social and Psychological Impacts of Residential Toxic Exposure. Boulder, Westview Press.
- 1992 Mitigating Environmental Stigma and Loss of Trust in the Siting of Hazardous Facilities. State of Nevada, Nuclear Waste Project Office.
- Erikson, Kai
 1994 A New Species of Trouble: Explorations in Disaster, Trauma, and Community. New York, W. W. Norton.
- Fischhoff, Baruch, Sarah Lichtenstein, Paul Slovic, Stephen L. Derby and Ralph L. Keeney
 1981 Acceptable Risk. Cambridge, Cambridge University Press.
- Fischhoff, Baruch, Ola Svenson, and Paul Slovic
 1987 Active Responses to Environmental Hazards: Perceptions and Decision Making. in D. Stokols and I. Altman, editors, Handbook of Environmental Psychology: 5 : 181-195.
- Fisher, Amy, Gary H. McClelland, and William D. Schulze
 1989 Communicating Risk Under Title III of SARA: Strategies for Explaining Very Small Risks in a Community Context. JAPCA v.39, n.3:271-276.
- Fisher, Amy, Gary H. McClelland, William D. Schulze, and James K. Doyle
 1991 Communicating the Risk from Radon. Journal of the Air and Waste Management Association, v.41, n.11:1440-1445.

Fitchen, Janet M.

1987 Cultural Aspects of Environmental Problems: Individualism and Chemical Contamination of Groundwater. *Science, Technology, and Human Values*, v.12, n.2:1-12.

1989 When Toxic Chemicals Pollute Residential Environments: The Cultural Meanings of Home and Homeownership. *Human Organization*, v.48, n.4:313-324.

Fitzgerald, Michael R. and Amy Snyder McCabe

1988 The U.S. Department of Energy's Attempt to Site the Monitored Retrievable Storage Facility (MRS) in Tennessee, 1985-1987. State of Nevada, Nuclear Waste Project Office.

Flynn, Cynthia

1984 The Local Impacts of the Accident at Three Mile Island. in Freudenburg, W. editor, *Public Reactions to Nuclear Power*.

Flynn, James H., C. K. Mertz, and Paul Slovic

1991 Yucca Mountain Socioeconomic Project, The 1991 Nevada State Telephone Survey: Key Findings. State of Nevada, Nuclear Waste Project Office.

Flynn, James, C. K. Mertz, Paul Slovic and William Burns

1991 A Structural Model Analysis of Public Opposition to a High-Level Radioactive Waste Facility. State of Nevada, Nuclear Waste Project Office.

Flynn, James H., Paul Slovic, and C. K. Mertz

1993 Yucca Mountain Socioeconomic Project, The Spring, 1993 Nevada State Telephone Survey: Key Findings. State of Nevada, Nuclear Waste Project Office.

1994 Yucca Mountain Socioeconomic Project, The Autumn, 1993 Nevada State Telephone Survey: Key Findings. State of Nevada, Nuclear Waste Project Office.

Flynn, James H., Paul Slovic, C.K. Mertz, and James Toma

1990 Evaluations of Yucca Mountain Survey Findings About the Attitudes, Opinions, and Evaluations of Nuclear Waste Disposal and Yucca Mountain, Nevada. State of Nevada, Nuclear Waste Project Office.

Freudenburg, William R.

1991 Human and Social Factors in the Transportation of Nuclear Wastes. State of Nevada, Nuclear Waste Project Office.

Freudenburg, William R., L. F. Carter, W. Willard, D. G. Lodwick, R. A. Hardert et al

1992 Social Impacts of Hazardous and Nuclear Facilities and Events: Implications for Nevada and the Yucca Mountain High-Level Nuclear Waste Repository. State of Nevada, Nuclear Waste Project Office.

Freudenburg, William R. and Eugene A. Rosa, editors

1984 Public Reactions to Nuclear Power: Are There Critical Masses? American Association for the Advancement of Science Selected Symposium 93. Boulder, Westview Press.

Gardner, Gerald T., A. Tiemann, L. Gould, D. DeLuca, L. Doob, and J. Stolwijk

1982 Risk and Benefit Perceptions, Acceptability Judgements, and Self-Reported Actions Toward Nuclear Power. The Journal of Social Psychology, v.116:179-197.

Garling, Tommy and Gary W. Evans

1991 Environment, Cognition, and Action: An Integrated Approach. New York, Oxford University Press.

Garling, Tommy and Reginald G. Golledge, editors

1993 Behavior and Environment: Psychological and Geographical Approaches. Advances in Psychology Series, 96. Amsterdam, North-Holland.

Greenwood, M. J., G. H. McClelland, W. D. Schulze

1994 [revision of 1988 paper for State of Nevada, Nuclear Waste Project Office] The Effects of Perceptions of Hazardous Waste on Migration: A Laboratory Experimental Approach. manuscript.

Gusfield, Joseph R.

1981 The Culture of Public Problems: Drinking-Driving and the Symbolic Order. Chicago, University of Chicago Press.

Hardert, Ronald A.

1992 Feed Materials Production Center Fernald, Ohio: A Case Study. State of Nevada, Nuclear Waste Project Office.

Hendrickx, Laurie, Charles Vlek and Harmen Oppewal

1989 Relative Importance of Scenario Information and Frequency Information in the Judgement of Risk. Acta Psychologica, v.72:41-63.

Hilgartner, Stephan

1992 The Social Construction of Risk Objects: Or, How to Pry Open Networks of Risk. in Short and Clarke editors, Organizations, Uncertainties, and Risk.

Hinman, George W., Eugene A. Rosa, Randall R. Kleinhesselink and Thomas C. Lowinger

1993 Perceptions of Nuclear and Other Risks in Japan and the United States. Risk Analysis,

v.13, n.4: 449-455.

Impact Assessment, Inc.

- 1994 Sociocultural/Risk Analysis Source Identification and Literature Review Report. Delivery Item 94-2 prepared for Clark County Nuclear Waste Repository Program. August. Las Vegas, Nevada.
- 1994 Outline of Preliminary Sociocultural Reports. Delivery Item 94-3 prepared for Clark County Nuclear Waste Repository Program. August. Las Vegas, Nevada.
- 1994 Preliminary Sociocultural Data Requirements Report. Delivery Item 94-4 prepared for Clark County Nuclear Waste Repository Program. August. Las Vegas, Nevada.
- 1994 Sociocultural Field Data Collection Protocols. Delivery Item 94-5 prepared for Clark County Nuclear Waste Repository Program. August. Las Vegas, Nevada.
- 1994 Sociocultural Field Data Collection Report. Delivery Item 94-6 prepared for Clark County Nuclear Waste Repository Program. September. Las Vegas, Nevada.
- 1994 Behavioral Pilot Study. A Work in Progress Report, Delivery Item 94-7 prepared for Clark County Nuclear Waste Repository Program. November. Las Vegas, Nevada.
- 1994 Behavioral Response to Sociocultural/Risk Concerns. Delivery Item 94-10 prepared for Clark County Nuclear Waste Repository Program. January. Las Vegas, Nevada.
- 1994 Sociocultural/Risk Communications Study. Deliverable 94-11 prepared for Clark County Nuclear Waste Repository Program. December. Las Vegas, Nevada.
- 1994 Scope of Work, Fiscal Year 1994. Version 21 prepared for Clark County Nuclear Waste Repository Program. May. Las Vegas, Nevada.
- 1994 Site Characterization Sociocultural/Risk Report. Draft-final report prepared for Clark County Nuclear Waste Repository Program. March. Las Vegas, Nevada.
- 1992 Draft Base Case for Social and Risk Related Studies. Clark County, Department of Comprehensive Planning, Nuclear Waste Division.
- 1991 Final Research Design. Updated January 9, 1992. Prepared for Clark County Nuclear Waste Repository Program's Socioeconomic Impact Assessment of the Proposed High-Level Nuclear Waste Repository at Yucca Mountain, Nevada. Las Vegas, Nevada.

- Johnson, Eric J. and Amos Tversky
1984 Representations of Perceptions of Risk. *Journal of Experimental Psychology: General*, v.113, n.1:55-70.
- Kahneman, Daniel, Paul Slovic, and Amos Tversky, editors
1982 *Judgement Under Uncertainty: Heuristics and Biases*. Cambridge, Cambridge University Press
- Kasperson, J. X., R. E. Kasperson, B. J. Perkins, O. Renn, A. L. White
1992 Information Content, Signals, and Sources Concerning the Proposed Repository at Yucca Mountain: An Analysis of Newspaper Coverage and Social-Group Activities in Lincoln County, Nevada. Worcester, Center for Technology, Environment, and Development, Clark University.
- Kasperson, R.E., O. Renn, P. Slovic, H. S. Brown, J. Emel, R. Gobel, J.X. Kasperson et al
1988 The Social Amplification of Risk: A Conceptual Framework. *Risk Analysis*, 8:177-187.
- Kim, Min-Sun and John E. Hunter
1993 Attitude-Behavior Relations: A Meta-Analysis of Attitudinal Relevance and Topic. *Journal of Communication*, v.43, n.1:101-142.
- Kleinhesselink, Randall R., Eugene A. Rosa
1991 Cognitive Representation of Risk Perceptions: A Comparison of Japan and the United States. *Journal of Cross-Cultural Psychology*, v.22, n.1:11-28.
- Kluckhohn, C.
1962 *Culture and Behavior: Collected Essays*. Glencoe, Free Press.
- Kraft, Michael E., Eugene A. Rosa and Riley E. Dunlap
1993 Public Opinion and Nuclear Waste Policymaking. in Dunlap et al editors, *Public Reactions to Nuclear Waste*.
- Krannich, Richard S., Ronald L. Little and Lori A. Cramer
1993 Rural Community Residents' Views of Nuclear Waste Repository Siting in Nevada. in Dunlap et al editors, *Public Reactions to Nuclear Waste*.
- Krannich, Richard S., R. L. Little, A. Mushkatel, K. D. Pijawka, and P. Jones
1991 Southern Nevada Residents' Views About the Yucca Mountain High-Level Nuclear Waste Repository and Related Issues: A Comparative Analysis of Urban and Rural Survey Data. State of Nevada, Nuclear Waste Project Office.

Kroll-Smith, Steve and Stephen R. Couch

1990 The Real Disaster is Above Ground: A Mine Fire and Social Conflict. Lexington, The University Press of Kentucky.

1992 Social Impacts of Toxic Contamination of Hazardous Wastes. State of Nevada, Nuclear Waste Project Office.

Kunreuther, Howard, Doug Easterling and Paul Kleindorfer

1988 The Convention Planning Process: Potential Impact of a High-Level Nuclear Waste Repository in Nevada. State of Nevada, Nuclear Waste Project Office.

Kunreuther, Howard, Doug Easterling, William Desvousges and Paul Slovic

1990 Public Attitudes Toward Siting a High-Level Nuclear Waste Repository in Nevada. Risk Analysis, v.10, n.4: 469-484.

Levine, Adeline Gordon

1992 Love Canal 1978-1991, A Study of the Social Impact of Hazardous Wastes. State of Nevada, Nuclear Waste Project Office.

Little, Ronald L., and Richard S. Krannich

1990 Major Sociocultural Impacts of the Yucca Mountain High-Level Nuclear Waste Repository on Nearby Rural Communities. State of Nevada, Nuclear Waste Project Office.

Lodwick, Dora G.

1992 Rocky Flats, Colorado, A Case Study. State of Nevada, Nuclear Waste Project Office.

MacInnis, Deborah J. and Linda L. Price

1987 The Role of Imagery in Information Processing: Review and Extensions. Journal of Consumer Research, v.13, March:473-491.

Mazur, Allan

1984 Media Influences on Public Attitudes. in Freudenburg and Rosa editors, Public Reaction to Nuclear Power.

McClelland, Gary H., William D. Schulze and Don L. Coursey

1993 Insurance for Low-Probability Hazards: A Bimodal Response to Unlikely Events. Journal of Risk and Uncertainty, v.7:95-116.

McClelland, Gary H., William D. Schulze and Brian Hurd

1990 The Effect of Risk Beliefs on Property Values: A Case Study of a Hazardous Waste Site. Risk Analysis, V.10, N.4:485-497.

Mountain West Research

1989 Yucca Mountain Socioeconomic Project Preliminary Findings: 1989 Nevada State Telephone Survey. State of Nevada, Nuclear Waste Project Office.

Mushkatel, Alvin H. and K. David Pijawka

1992 Institutional Trust, Information, and Risk Perceptions: Report of Findings of the Las Vegas Metropolitan Area Survey June 29-July 1, 1992. State of Nevada, Nuclear Waste Project Office.

1994 The 1994 Clark County, Nevada Survey: Key Findings. State of Nevada, Nuclear Waste Project Office draft manuscript.

Mushkatel, Alvin H., K. David Pijawka, and Marilyn Dantico

1990 Risk-Induced Social Impacts: The Effects of the Proposed Nuclear Waste Repository on Residents of the Las Vegas Metropolitan Area. State of Nevada, Nuclear Waste Project Office.

Mushkatel, Alvin H., K. D. Pijawka, P. Jones, N. Ibatayo

1992 Governmental Trust and Risk Perceptions Related to the High-Level Nuclear Waste Repository, Analyses of Survey Results and Focus Groups. State of Nevada, Nuclear Waste Project Office.

OECD

1991 Nuclear Energy: Communicating with the Public. Paris, Nuclear Energy Agency, Organization for Economic Co-operation and Development.

Otten, W. and J. van der Pligt

1992 Risk and Behavior: The Mediating Role of Risk Appraisal. *Acta Psychologica* 80 (1992): 325-346.

Peltu, Malcolm

1985 The Role of Communications Media. in H. Otway and M. Peltu, editors *Regulating Industrial Risks: Science, Hazards and Public Protection*. London, Butterworths.

Peters, Hans Peter, and Leo Hennen

1988 The Accident at Gorleben: A Case Study of Risk Communication and Risk Amplification in the Federal Republic of Germany. State of Nevada, Nuclear Waste Project Office.

Petterson, John S.

1988a Enduring Social and Economic Impacts: A Report on the Follow-up Study of the Radiological Accident in Goiania, Brazil. August, 1988.

1988b Perception vs. Reality of Radiological Impact: The Goiania model. Nuclear News, November 1988:84-90.

Rohrmann, Bernd

1992 The Evaluation of Risk Communication Effectiveness. Acta Psychologica, v.81:169-192.

Rosa, Eugene A. and William R. Freudenburg

1993 The Historical Development of Public Reactions to Nuclear Power: Implications for Nuclear Waste Policy. in Dunlap et al editors, Public Reactions to Nuclear Waste.

Savage, Ian

1993 Demographic Influences on Risk Perceptions. Risk Analysis, V.13, n.4: 413-420.

Short, James F. Jr.

1992 Defining, Explaining and Managing Risk. in Short and Clarke editors, Organizations, Uncertainties, and Risk.

Short, James F. Jr. and Lee Clarke, editors

1992a Organizations, Uncertainties, and Risk. Boulder, Westview Press.

1992b Social Organization and Risk. in Short and Clarke editors, Organizations, Uncertainties, and Risk.

Singleton, W.T. and Jan Hovden, editors

1987 Risk and Decisions. Chichester, John Wiley and Sons.

Sjoberg, Lennart, editor

1987 Risk And Society: Studies of Risk Generation and Reactions to Risk. London, Allen and Unwin.

Sjoberg, Lennart and Britt-Marie Drottz-Sjoberg

1991 Knowledge and Risk Perception among Nuclear Power Plant Employees. Risk Analysis v.11, n.4: 607-618.

Slovic, Paul, Baruch Fischhoff, and Sarah Lichtenstein

1985 Characterizing Perceived Risk. in Robert W. Kates, Christopher Hohenemser, and Jeanne X. Kasperson, editors, Perilous Progress: Managing the Hazards of Technology. Boulder, Westview Press.

Slovic, Paul, Mark Layman and James H. Flynn

- 1990a What Comes to Mind When You Hear the Words "Nuclear Waste Repository?" A Study of 10,000 Images. State of Nevada, Nuclear Waste Project Office.
- 1990b Images of Place and Vacation Preferences: Implications of the 1989 Surveys for Assessing the Economic Impacts of a Nuclear Waste Repository in Nevada. State of Nevada, Nuclear Waste Project Office.
- 1993 Perceived Risk, Trust, and Nuclear Waste: Lessons from Yucca Mountain. in Dunlap et al editors, Public Reactions to Nuclear Waste.
- Slovic, Paul, Mark Layman, Nancy N. Kraus, James Chalmers, G. Gesell and J. Flynn
1989 Perceived Risk, Stigma, and Potential Economic Impacts of a High-Level Nuclear Waste Repository in Nevada. State of Nevada, Nuclear Waste Project Office.
- Spiro, Melford E.
1982 [1970] Buddhism and Society: A Great Tradition and its Burmese Vicissitudes. Berkeley, University of California Press.
- U.S. Bureau of the Census
1990 Census of Population and Housing. U.S. Department of Commerce. Summary Tape File 1 and Summary Tape File 3A.
- Vari, Anna, Ray Kemp and Jeryl L. Mumpower
1991 Public Concerns about LLRW Facility Siting: A Comparative Study. Journal of Cross-Cultural Psychology, v.22, n.1:83-102.
- Vaughan, Elaine
1993 Chronic Exposure to an Environmental Hazard: Risk Perceptions and Self-Protective Behavior. Health Psychology, v.12, n.1:74-85.
- Vaughan, Elaine, Brenda Nordenstam
1991 The Perception of Environmental Risks Among Ethnically Diverse Groups. Journal of Cross-Cultural Psychology, v.22, n.1:29-60.
- Viscusi, W. Kip
1991 Communication of Ambiguous Risk Information. Theory and Decision, v.31:159-173.
- Waksberg, J.
1978 "Sampling Methods for random digit dialing." Journal of the American Statistical Association 73:40-46
- Yates, J. Frank, editor

1992 Risk-Taking Behavior. Chichester, John Wiley and Sons.