Attachment 10

UER, "Yucca Mountain Impact Assessment Report, Clark County, Nevada"
(Feb 2002)

Table of Contents

Table of Figures

Executive Summary

Clark County's opposition to the Yucca Mountain Project has been steadfast for nearly 20 years. Clark County, along with other Affected Units of Local Government (AULG), has spent more than a decade evaluating the potential impacts of the proposed high-level nuclear waste repository at Yucca Mountain in Nye County, Nevada.

Clark County has relied on appropriate procedural, legal, and technical bases in the operation of its Nuclear Waste Program. Since 1987, staff has provided program oversight for site characterization activities, including the review of and comment on various U.S. Department of Energy (DOE) documents; conducted and analyzed impact studies; and, conducted public outreach activities for the benefit of Clark County residents.

Clark County's Impact Assessment Report is also included as part of the State of Nevada's impact report. The report provides Clark County's analysis of the potential impacts resulting from the construction, operation and closure of the proposed repository.

The main purpose of the report is to fill the sizeable gap left in the DOE's analysis and assertions regarding impacts to Clark County. For the most part, the DOE has either underestimated or has completely mischaracterized the likely impacts resulting from the proposed repository. Admittedly, it has been difficult to characterize and assess the full range of impacts in the absence of a Final Environmental Impact Statement (FEIS) by the DOE and a final design for the repository. Further, the DOE has not updated much of the data used in its Draft Environmental Impact Statement (DEIS) (e.g. 1990 population data), which contributes to the inaccuracy of its assessment of the impacts.

It must be made clear that this report is not intended to be a request for impact assistance or to imply consent to the proposed repository. Rather, it is a comprehensive analysis of potential impacts anticipated by Clark County in the event that a positive site recommendation by the Secretary of Energy is accepted by the President of the United States and the United States Congress.

This report contains seven chapters and nine appendices. The report describes the context for Clark County's impact assessment by providing some general information about Clark County and it affirms ample basis for Clark County's opposition to the proposed repository. Three

chapters are devoted to articulating the extent of anticipated impacts. A key aspect of these impacts is that they occur immediately, beginning with the negative effect a site recommendation will have on Clark County's economy. For example, over the duration of shipment campaign, the cost to Clark County for additional personnel, planning, training, and public outreach resulting from the DOE's actions is estimated at over $2.672 billion. Additional capital facilities and equipment costs to Clark County through 2010 have been estimated at $280 million. These costs do not include any upgrades to the existing transportation system that may be needed. In addition, facilities and equipment will also need to be replaced at various points throughout the shipment campaign, although replacement costs have yet to be calculated.

In Chapter 3, the reader is able to quickly reference each of the following impacts covered in Chapters 4 and 5: gaming, property values, transportation, and impacts due to Yucca Mountain operations including environmental impacts, public safety, non-public safety, and Native American concerns.

As additional support for its position, Clark County has included in Chapter 6 a summary of public outreach efforts, including public opinion surveys, public information strategies, and other methods designed to inform Clark County residents about the County's position on the issue. It is important to note that the majority of public responses received indicate opposition to the Yucca Mountain Project. It is also important to note that the issues of highest significance and concern to the majority of residents correlate to those studied by Clark County for over fifteen years.

The public health and safety of Clark County residents are our primary concern, particularly in the area of transportation of nuclear waste. This report provides ample evidence that Clark County's constant opposition over nearly twenty years has not been misplaced.

1.0 Background

Clark County, with a land area of over 7,900 square miles, has been the fastest growing county in the United States for many years. Over 5,000 new residents per month have been arriving here to live, work, and play since the early 1990's, due to the surge in the casino industry beginning with the construction of The Mirage Resort Hotel in 1989. At the time of the decision to narrow the DOE's search for a suitable site to store high level radioactive nuclear waste, Clark County's population was half what it is today, over 1.5 million. Over the next twenty years, the area's population is expected to reach 2.8 million.

Clark County is home to the "Las Vegas Strip" which, along with our world-famous downtown Las Vegas, allows the Southern Nevada area to enjoy a reputation as "The Entertainment Capital of the World." With more than 35 million visitors annually, the primary engine that drives our economic growth is the gaming industry. Also key to Clark County's economic growth are service- and construction-oriented businesses. According to the website for the City of Las Vegas, Lesa Coder, Director of the Office of Business Development for the City of Las Vegas, stated:

> *"We're the premier business center in the Western United States, now and well into the twenty-first century. One major advantage is our location, which gives investors access to over 52 million people within a 1,000-mile radius…"*

While the focus here has historically been on gaming and tourism, in recent years the pro-business climate and diversity of lifestyle choices has produced a shift in public perception. Since the construction boom and influx of new residents in the early 1990's, the image of Southern Nevada has shifted from an entertainment mecca for only the rich and famous to one which strives for a sense of community and high quality of life for all residents. For example, a 1999 Federal Reserve Bank of St. Louis study ranked Las Vegas as "The Most Livable Big City in America." In that study, economist Howard J. Wall ranked 59 metropolitan areas of similar size based on strict criteria which reflects why people relocate to, and stay, in a particular community.

In a region where the concept of "perception is reality" is particularly marked, the stigma and perception of any danger associated with high level radioactive nuclear waste presents a very real and significant threat to Clark County residents, businesses, and visitors.

Clark County's opposition to the Yucca Mountain Project has been steadfast. Over the years, Clark County has been joined by other local governments, agencies and groups in opposition to the DOE'S efforts. (See Appendix A for resolutions in opposition to the proposed repository.)

2.0 Purpose and Basis

Purpose

The purpose of this Impact Assessment Report is to set forth, from Clark County's perspective, the full range of potential impacts anticipated should the proposed high level radioactive waste repository at Yucca Mountain be approved and constructed. The proposed repository site is in Nye County, Nevada, just a few miles from the Clark County border. Clark County is the economic and population base for the State of Nevada. Therefore, it is important to articulate as complete a picture of the impacts as is possible, in light of the limited information and analysis provided by the DOE to date with respect to any such impacts.

The impacts identified as important to Clark County must be seriously considered by the Secretary of Energy, the President and Congress during the federal approval process, as required under the Nuclear Waste Policy Act as amended in 1987 (NWPAA) Section 114(a)(1)(D).

Clark County's large land area encompasses a unique mix of incorporated cities, urban and rural towns, and tribal entities. This Impact Assessment Report is intended to address the interests of not only unincorporated Clark County, but also, wherever possible and appropriate, the interests of the cities of Las Vegas, North Las Vegas, Henderson, Boulder City, and Mesquite, as well as the Las Vegas Band of Paiutes and the Moapa Band of Paiutes. Clark County has entered into interlocal agreements with these entities, affording the opportunity for significant impact assessment of critical areas. The results of those studies are reflected in this Impact Assessment Report.

Basis

Since 1983 Clark County has been recognized as an active participant in monitoring the DOE Yucca Mountain nuclear waste program efforts. In 1988, DOE officially designated Clark County as an "Affected Unit of Local Government (AULG)" under provisions of the NWPAA, when the search for a geologic repository study site was reduced to only one alternative: *Yucca Mountain*. The AULG designation was an acknowledgement by the federal government that activities associated with the Yucca Mountain Project could result in considerable impacts to our residents and community. In fact, the provisions under the Act enable Clark County to determine "any potential economic, social, public health and safety, and environmental impacts of a repository," 42 U.S.C. Section 10135(c)(1)(B)(i).

In addition to the NWPAA, applicable case law supports Clark County's efforts to fully identify potential impacts. In *County of Esmeralda v. Department of Energy*, 925 F.2d 1216 (9th Cir. 1991), the court stated: "Affected unit status is also meant to ensure that all potential harms from repository operation – whatever the current estimate of their probability—are sufficiently studied **before** Yucca Mountain is approved as a repository." (emphasis added)

Further, under the National Environmental Policy Act (NEPA), the DOE is required to follow specific processes for identifying and assessing environmental impacts that may result from the operation of a nuclear waste repository at Yucca Mountain. Clark County officials have always maintained that absent the ability to review the DOE's FEIS, it is not certain whether the full range of impacts has been identified. What is certain is that the DOE's DEIS is woefully inadequate in the area of impact identification and assessment.

In addition to relying on applicable policies, regulations, and procedures, Clark County can support its position by looking to lessons learned from other jurisdictions facing similar challenges. Examples exist from the experiences of other communities as the U.S. Department of Energy attempts to address the problem of nuclear waste disposal. This is especially true in New Mexico where the Waste Isolation Pilot Plant (WIPP), a repository for transuranic waste, has begun operations. These lessons have to do with the way that DOE interacts with local governments with regard to plans, agreements and mandates. These lessons have been instrumental to Clark County in developing and/or modifying county policies and actions regarding Yucca Mountain as the program moves into the federal approval phase in 2001 and the licensing phase thereafter.

For these reasons, the Clark County Board of Commissioners created a framework for constant opposition to the Yucca Mountain Project by unanimously passing resolutions in opposition to the Yucca Mountain Project (Appendix B). This Impact Assessment Report, along with previously submitted comments to the DEIS, Supplemental DEIS (SDEIS), and Preliminary Site Suitability Evaluation (PSSE), provide the substance, detail, and justification for Clark County's long-established opposition. (See Clark County Comments to DEIS, SDEIS and PSSE, Appendix C.) In April 2001, the Board of County Commissioners adopted Strategic Priorities that further solidified its opposition to the Yucca Mountain Project.

In addition to submitting the above-mentioned procedural (response) documentation, Clark County has engaged in site characterization oversight, impact assessment, and public outreach

activities (within the parameters of the NWPAA and DOE appropriations requirements) in order to fully understand and compile a comprehensive, realistic analysis and report of the impacts.

Finally, it must be made very clear that Clark County is merely attempting to comprehensively articulate and to quantify potential impacts. This report should in no way be interpreted as a request for impact assistance, nor should it be construed as implied consent to the siting of the proposed repository at Yucca Mountain.

3.0 Overview of Impacts

This overview chapter provides brief summaries of the impacts more fully described in Chapters 4 and 5 of this Impact Assessment Report. The summaries are intended to provide the reader with a reference point from which to quickly gather the key concerns and findings for each of these impact areas. Likewise Appendices A through I are intended to provide additional background, support and context for the impacts described in the report. The discussion of these impacts is based on the three transportation scenarios listed in Figure 1 (page 15). Scenarios 1 and 2 were derived directly from the Department of Energy's DEIS, and Scenario 3 was developed by a consultant for the State of Nevada and a Clark County transportation planner. These scenarios have been applied uniformly and consistently by both the State of Nevada and Clark County throughout our impact assessment studies for many years.

It should be noted that most of the impact analyses contained in this report are based upon the dates used in the DEIS regarding the anticipated time frame (2007) for shipping high level radioactive waste. Further, several of Clark County's impact studies were completed prior to the release of the SDEIS, where the DOE adjusted the time frame to 2010 for the proposed shipping campaign. Absent a final repository design and transportation plan, it is difficult to predict the start and duration of the shipping campaign. According to the recently released General Accounting Office report, shipment of high level radioactive waste would not begin before 2016**.** Clark County's impact studies have not been updated to reflect this timeframe estimate.

Gaming Impacts

Clark County has identified both the nature and the range of concerns of key tourism leaders as to the potential effects on the tourism industry of the DOE's proposal to ship high-level waste through Clark County to a repository at Yucca Mountain. Focused, confidential interviews were conducted with key tourism industry representatives. According to virtually every gaming industry representative interviewed, the most serious risk is from the stigma that will result if there is any accident of any kind involving the shipment of high level radioactive waste.

A survey of Clark County visitors in the weeks following the September 11, 2001 terrorism attacks indicates that even among those willing to travel, the possibility of a nuclear waste shipment campaign that proceeds even without incident will adversely affect their decision to visit

Las Vegas in the future. The survey also indicates that any type of nuclear waste shipment incident would significantly decrease the number of those willing to visit.

Based upon a recently released report conducted for the State of Nevada, even a small drop in visitation could result in gaming revenues falling by one-half billion dollars. In the event of a high-level waste shipping accident that resulted in a downturn of 10.0% - 15.0%, gaming revenue would drop by $1.1 billion to $1.7 billion. These losses could skyrocket to $2.8 billion to $3.7 billion in the event of a severe, prolonged downturn resulting from a serious high level radioactive waste accident.

Property Value Impacts

Stable property values are a necessary component for the stability of Clark County's tax structure. Any threat to a government entity's ability to rely on property taxes as a stable source of income impacts not only that entity's ability to operate, but has a "domino" effect on all aspects of what people expect and deserve in terms of community livability.

This subchapter includes a comprehensive analysis from a practical and quantifiable point of view. Also included in the discussion is an extensive discussion on stigma and perception.

Depending on the transportation scenario applied, property value decreases directly resulting from transportation of nuclear waste through Clark County range from 2% to 30%, resulting in property value losses up to $8.753 billion. Clark County took the initial property value analysis one step further by requesting a population-based economic analysis by University of Nevada, Las Vegas (UNLV). This analysis estimates potential economic impacts over the course of the DOE's shipping campaign (2010 to 2035) to be in the billions of dollars.

UNLV's Center for Business and Economic Research (CBER) analyzed additional economic impacts property value diminution will have on Clark County. The property value diminution report was prepared by Urban Environmental Research, LLC (UER). Job losses estimated in this analysis range from 11,294 – 90,718. Billions of dollars in revenue and income losses were also estimated in the CBER study.

Transportation Impacts

The impacts addressed in this subchapter include impacts such as routine radiation exposure, accident costs, incident delay, transportation planning impacts, land use impacts, and monitoring impacts.

This subchapter also provides an interim assessment of the transportation system impacts attributable to the Yucca Mountain Project. Transportation system impacts are defined as changes

to the operation, condition, and performance of the County's transportation network. This subchapter addresses direct, indirect, and cumulative impacts of transporting waste through Clark County to Yucca Mountain.

In 1997, the Federal Highway Administration Cost Allocation Study developed a detailed model for calculating accident costs for combination trucks on urban highways. Combination trucks include all multiple axle tractor semi-trailer trucks, truck-trailers, trailer-semi trailer, and triple-trailer trucks as defined by the Federal Highway Administration (FHWA). The trucks proposed for use by DOE for the shipment of high level radioactive nuclear waste fall into the category of combination trucks.

When this model is adjusted to year 2000 dollars, and applied to the rail and heavy haul routes through Clark County, the forecasted accident costs range between $70.7 million - $170.4 million. Since on average, approximately 30% of these costs are not reimbursed to the affected party, Clark County can expect to absorb between $21.2 million to $51.1 million if an accident were to occur along one of these routes.

Impacts Due to Yucca Mountain Operations

This subchapter outlines Clark County's concerns related to the construction, operation and closure of the proposed repository. Absent a final repository design and the issuance of a FEIS, it is impossible to identify the full range of impacts.

However, given the long history of quality assurance problems in the Yucca Mountain program, it can be expected that a future inability to follow quality control procedures during the loading and sealing of casks with high level radioactive nuclear waste could result in the immediate loss of life, exposure to elevated levels of radiation, and premature failure of the disposal casks. Any of these events would result in a severe negative impact to Clark County. In addition, upwards of 1,800 Clark County residents are likely to work at Yucca Mountain under conditions that increase their risk of having negative health effects related to the handling of high level radioactive nuclear waste. Operations at Yucca Mountain could also jeopardize Clark County's compliance with the Endangered Species Act and its Federal Section 10A permit. Finally, as a non-attainment area under the Clean Air Act, Clark County's future economic growth may be restricted because of air pollution resulting from the Yucca Mountain Project.

Public Safety Impacts

This subchapter summarizes the integrated findings of an assessment conducted by UER of Southern Nevada's public safety agencies. This study covered incremental or additional costs to

governmental entities that would be directly attributable to the proposed repository. Combined costs under Scenario 3 would likely approach $360 million. The majority of these costs is attributable to Clark County, with the largest portions designated for facilities, equipment, personnel, and training. Clark County's costs alone would be over $274 million in unfounded government mandates.

Non-Public Safety Impacts

County departments and related agencies were studied to determine impacts that were not specifically related to public safety issues. In order to prepare for the commencement of shipments of high-level waste, Clark County non-public safety agencies identified approximately $40 million in additional costs to Clark County departments and agencies. Over the 24-year shipping campaign described in the DEIS, the projected preparedness costs just for personnel, planning, training and public outreach are expected to reach over $350 million. These costs represent an unfunded federal mandate to Clark County and the other affected entities addressed in this subchapter.

Native American Concerns

A separate chapter is devoted to Native American concerns. While many of the concerns of Native Americans are similar to others potentially affected by the Yucca Mountain Project, it is important to recognize that Native American concerns must be considered in ways that identify and reflect the range of impacts from a tribal perspective. Subchapters 4.2 and 4.5 also address specific potential impacts to the Moapa Band of Paiutes.

The Impact Assessment Report includes Chapter 6.0 that summarizes Public Involvement and Outreach, and Chapter 7.0 that offers a Summary and Recommendations. These chapters provide additional context for Clark County's position with respect to the proposed repository at Yucca Mountain.

Figure 1 Summary of Scenarios

Scenarios	Description
1*	No accident of any kind has occurred. However, anti-nuclear environmental groups and property owners along the route (who claim that their property values will decrease) have generated considerable publicity.
2*	Shipments of nuclear waste to the Yucca Mountain repository site have progressed for several years without incident. Three days after New Year's Day 2010, the driver of a truck transporting nuclear waste loses control of the vehicle and runs into the median of Interstate 15. The cask containing the nuclear waste breaks away from the trailer and skids 50 yards along the median of I-15 in North Las Vegas. The cask remains intact and no radiation is released, but the national media covers the event heavily.
3**	An accident involving a truck carrying spent nuclear fuel and a gasoline tanker on I-15 near the Las Vegas Strip. The accident triggers a chain reaction collision. Twenty-seven civilians, four sheriff's deputies, and seven firefighters are hospitalized after exposure to radiation at the site of accident. Another 1,000 or more persons are exposed to radiation from the fire's radioactive plume. Experts indicate that 5 to 200 latent cancer fatalities may result from the accident. The affected highway and several access ramps are closed for four days. The two drivers of the spent fuel hauler and the gasoline tanker, and one driver-escort, died from head injuries and burns. Six months later, the cleanup effort is still under way, and thousands of lawsuits have been filed. Preliminary reports estimate cleanup costs and economic losses in excess of $1 billion.

*Source: U.S. Department Of Energy, Office of Radioactive Waste Management (July 1999) Draft Environmental Impact Statement (DEIS) for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada.

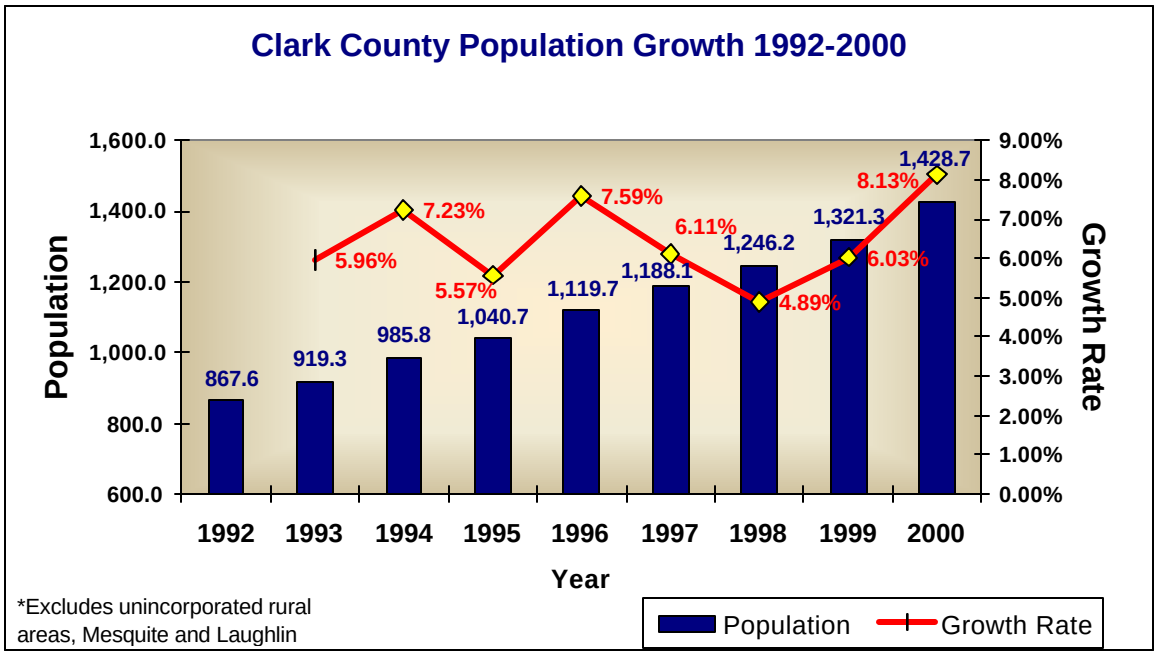
**Source: Robert Halstead, Transportation Advisor, State of Nevada, Nuclear Waste Project Office, and Fred Dilger, Transportation Planner, Clark County, Nevada, Department of Comprehensive Planning, Nuclear Waste Division

4.0 Impact Analyses

4.1 Gaming and Tourism Impacts

Clark County has experienced burgeoning population growth over the last decade from a population of 867.6 thousand in 1992 to over 1.4 million in 2000 (Figure 2). Today, Clark County ranks as the fastest growing county of its size in the nation.

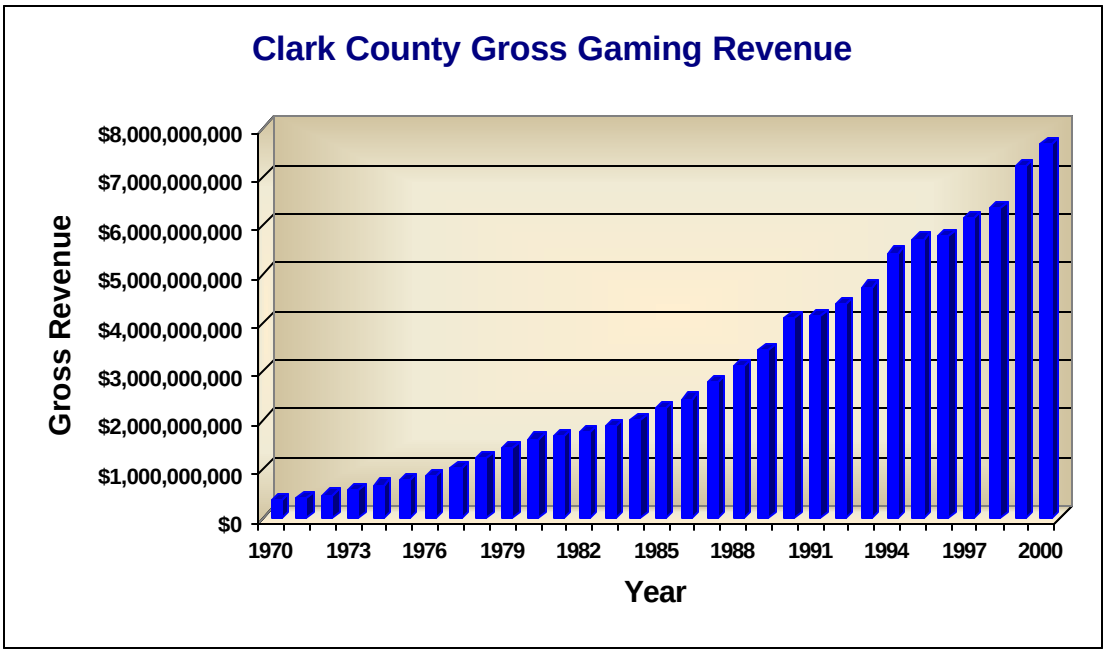
Figure 2 Clark County Population Growth 1992 - 2000



Source: Center for Business and Economic Research, UNLV, 2001

According to the Las Vegas Convention and Visitors Authority, the number of visitors coming to Las Vegas by auto and air exceeded 35.8 million in 2000. The percent of those visiting Las Vegas by air was 46%, while the percentage of those driving in was 54%. Air traffic into Las Vegas has grown at a compounded annual growth rate (CAGR) of 7.35%, while vehicle traffic grew at a 4.15% CAGR between 1970 and 2000. Over the last three decades, gaming revenues have increased from $369 million to $7.67 billion (Figure 3). The overall economic impact from these visitations now exceeds $31.46 billion making it the primary engine of the area's economy.

Figure 3 Clark County Gross Gaming Revenue 1970-2000



Source: Center for Business and Economic Research, UNLV, 2001

In order to identify both the nature and the range of concerns of key tourism leaders as to the potential effects on the tourism industry of the DOE's proposal to ship high level radioactive waste through Clark County, focused, confidential interviews were conducted with gaming executives and a representative of one of their trade associations. The 14 gaming executives represented 10 casinos that generate 95.5% of the *Earnings Before Interest, Taxes, Depreciation, and Amortization* on the "Strip." The gaming executives interviewed included both the largest gaming corporations and representatives of the smaller operations. Gaming executives for the Las Vegas Strip, as well as the downtown casinos were interviewed.

Interviewees were asked what areas, if any, of the visitor economy might be vulnerable to the proposed high level radioactive nuclear waste shipments. Inquiries of respondents were made regarding their organizations and any specific concerns for their own businesses as a result of the DOE's proposal. They were also asked whether the "transportation of nuclear waste near areas of economic activities may create stigma effects resulting in people not wanting to visit such places or buy homes nearby." Gaming executives also were asked to rank the impact of the proposed high level radioactive nuclear waste shipment campaigns on tourism volume, their corporation's credit rating and appraised value.

Another series of questions were asked of the gaming industry executives about the types of activities that the industry and/or their individual organization had undertaken to plan and prepare for the DOE's proposed activities. Specifically, they were asked to discuss "what risk management tools or measures" they might deploy to offset any declines in visitation and to address whether they felt "that any downturn from stigma effects can be overcome by effective marketing." Gaming executives were asked whether they were aware of any coordinated planning activities for evacuating the "Las Vegas Strip" in case of an incident. Finally, responses were obtained to questions about their own organization's evacuation planning activities and whether their insurance covered nuclear related events.

Gaming executives emphasized two other key sub markets that contributed to the growth in revenues that their operations have experienced. Since 1990, the number of convention visitors has grown dramatically as has their economic contribution to Clark County. Since 1990, the number of conventioneers has grown from 1.74 million to 3.86 million in 2000. The economic impact from this component of the market also has experienced phenomenal growth contributing $4.4 billion to the Las Vegas valley's economy in 2000. One gaming executive from a larger destination resort stated that the convention trade is responsible for approximately one-third of its hotel room occupancy.

The current downturn in the U.S. economy was identified as a significant challenge that will likely contribute to slowing growth among this sector in the near term.

In particular, increasing energy costs were identified as a challenge in both minimizing operating expenses, as well as the potentially adverse effect it may have on visitor airline fares. One executive noted that energy costs for his operation had gone up $10,000,000 this past year and that it was now costing about 1½ cents per share of their stock price.

In addition to energy costs, road congestion and air pollution were identified as significant issues that could endanger the longer-term economic health of the gaming industry. In fact, in a filing with the Securities and Exchange Commission, one of the largest companies stated that congestion along the I-15 corridor from California was a potential problem and that "capacity constraints of that highway or any other traffic disruptions may affect the number of customers who visit our facilities." Other challenges faced by these industry representatives include improving Clark County's education system and according to some, ensuring that in-migration continues so that there is a sufficient labor pool. One executive noted that despite all of the

population growth that Clark County had experienced, maintaining an adequate educated labor force remained a significant challenge in the face of a tight labor supply.

Overall, most of the executives believe that despite short-term cyclical responses to national and worldwide economic conditions, the overall trend for the gaming industry in the absence of high level radioactive nuclear waste shipments is positive.

Further, all of the gaming executives interviewed expressed concern that an accident, even a minor one along a route anywhere in Clark County, could have a devastating impact on their business. While some representatives were unsure of the scientific viability of the Yucca Mountain repository, all indicated that under no circumstance should trucks carrying high level radioactive nuclear waste come through Clark County. Several noted that just the transportation of high level radioactive nuclear waste coming from California through Clark County en route to Yucca Mountain, could significantly affect their business in an adverse manner. These industry representatives noted that congestion, particularly on weekends along the California/Nevada transportation corridor, has already proved problematic. They believe the addition of slow moving trucks containing such dangerous wastes will increase the likelihood and severity of an accident, discouraging some Californians from driving to Las Vegas. These representatives stated that Californians make up 30% of the visitors to Clark County. The increase in congestion along the California/Nevada corridor, combined with rising energy costs, is seen as a significant risk to gaming in Southern Nevada, especially for the Las Vegas downtown casinos.

According to virtually every gaming industry representative interviewed, the most serious risk is from the stigma that will result if there is any accident of any kind involving the shipment of high level radioactive nuclear waste. These representatives referenced the media coverage that is likely to accompany any incident involving a vehicle transporting high level radioactive nuclear waste. Several stated that an accident anywhere in Clark County would be reported worldwide and would be linked to Las Vegas because it is the nearest media outlet.

Many of the gaming executives discussed the various ways that stigma could affect their businesses. For example, earlier studies conducted for the State of Nevada indicated that convention planners would be less likely to hold a convention in Las Vegas if there were a nuclear transportation incident. Since 1990, the contribution of convention visitors to the local economy has grown exponentially. Several gaming representatives stated that given the growth in this sector, it is important to investigate what the fiscal implications could be to this subset of the market if the DOE proceeds with its program.

Another concern related to stigma that was frequently cited was the potential loss of attractiveness of Clark County as a place for families to live, especially if an incident were to occur. Some of the casino executives interviewed repeatedly mentioned that the tourism economy is driven by growth and that "population growth begets growth." For these representatives, anything that makes Clark County a less attractive environment for in-migration will have some degree of adverse affect on their businesses. Some noted that this could result in fewer retirees moving into the area. Others felt that younger workers might leave resulting in an aging population that over time would require more services and would contribute fewer resources to the area economy eventually cascading into "urban decay."

Some gaming industry executives were concerned of the possibility that investors might find Clark County a less attractive area for investment because of increased uncertainty related to the effects of the shipment campaign on the visitor economy. These gaming executives linked the high fixed costs associated with the gaming industry, as well as the need to continuously attract investment funds so that the new products can be developed to stimulate the market place. The potential negative impacts resulting from the high level radioactive nuclear waste shipment campaign might make the industry less attractive for investors.

Further, several gaming executives noted that their insurance would not cover the costs associated with a disruption of this type. Many also noted that while each casino has emergency response plans for their own facility(s) that a coordinated "Strip"-wide emergency response plan requiring in-place evacuation did not exist.

Finally, most of the representatives emphasized that the gaming industry is particularly sensitive to downturns in revenues because of the high level of fixed costs associated with this type of business. Thus, for every dollar of gross revenue that is reduced, the impact on the bottom line net income is even greater.

This unique sensitivity and vulnerability to high-profile events was made very clear after the September 11, 2001 terrorism attacks. The combined effects of economic downturn, airline and airport difficulties and the stigma and fear associated with travel safety are still being calculated. In the weeks after the attacks, the Las Vegas area gaming and tourism industries experienced unprecedented revenue and job losses. National media coverage of an in-depth investigation into possible terrorist planning activities in the Las Vegas area has served to heighten and prolong the negative effects of these events.

In order to understand how the Yucca Mountain Project might influence visitation subsequent to the September 11, 2001 terrorism attacks, a survey of 1,013 visitors was conducted in early December 2001, approximately twelve weeks after the attacks. These results reflect the opinions of the least risk adverse visitors to Clark County, that is those who were willing to visit at a time period when the effects of September 11, 2001 were still negatively impacting the area's economy. Among those surveyed, 25% indicated that just the shipment of high level radioactive nuclear waste through Clark County would affect their decision to visit Las Vegas in the future, even if there were no incidents of any type. Among the 25% who indicated that the shipments of high level radioactive nuclear waste would affect their decision to visit, 77% stated that they would reduce their visits and 12% stated that they would never visit Las Vegas again.

If a truck transporting high level radioactive nuclear waste was involved in an accident without a release of radiation, similar to the Scenario 2 event described on page 15, 37% of the visitors surveyed indicated that it would affect their decision to visit Las Vegas. Among these visitors, 49% stated that they would never visit Las Vegas again and 47% said that the frequency of their visits would decrease. If a serious accident resulting in a release of radiation were to occur, those surveyed indicated that the results would be devastating. Almost 80% noted that it would affect their decision and of those who stated that it would affect their decision, 62% stated that they would never visit Las Vegas again and 35% indicated that they would reduce the frequency of their visits.

As September 11, 2001 has already demonstrated, stigma can and has adversely affected Clark County's economy. While the full extent of this impact is still being measured, it is obvious that stigma related impacts have demonstrable adverse impacts on Clark County's sensitive tourism sector. The Las Vegas Sun reported on January 16, 2002, that according to the Las Vegas Convention and Visitors Authority, about 2.65 million people visited Las Vegas in November 2001, a decline of nearly 9% from November 2000. Passenger traffic at McCarran International Airport was down 18% to 2.55 million for the month, and reported vehicle traffic between Los Angeles and Las Vegas on I-15 declined 9% to 479,000. As a result, Las Vegas' average occupancy rate for the month was 76.4%, a 10% decline over November 2000.

This survey indicates that even among those who were willing to visit Las Vegas in the weeks following September 11, 2001, the shipment of high level radioactive nuclear waste will affect their willingness to continue to visit. These survey results highlight the vulnerability of

Clark County's economy to a stigma-related economic downturn as a result of the DOE's proposed shipments of high level radioactive nuclear waste.

The issue of stigma and perception with respect to Yucca Mountain, while minimized by the DOE, arguably poses the most significant threat to the economic well being of Clark County and its incorporated cities.

In a study prepared for the State of Nevada, a scenario-based study of analogous cases examined the potential impact to the gaming industry in Clark County of the of high level radioactive nuclear waste shipment campaign. This study indicates that if only 4.5% - 5.7% of current visitors decide to no longer visit Las Vegas because of these shipments, losses in gaming revenues would fall by more than one-half billion dollars. If 10.0% - 15.0% of the current volume of visitors decided to vacation elsewhere because of the shipment campaign, gaming revenue losses would likely grow to between $1.1 billion to $1.7 billion. Such losses might have been considered unprecedented prior to September 11, 2001. However, the terrorist attacks that occurred over two thousand miles away from Clark County resulted in dramatic drops in revenues for the gaming industry and in gaming tax revenues for state and local governments. If losses of this level were to be sustained for a prolonged period, the effects on the bottom line would be grave for a number of facilities. In the event of a severe, prolonged downturn such as could result from a high level radioactive nuclear waste shipment accident, the gaming revenue losses could reach $2.8 billion to $3.7 billion over one year.

4.2 Property Value Impacts

Two key components of the local government tax structure in Nevada are sales taxes and property values. State and local governments rely heavily on these two sources of income. Obviously, steady increases in property value are desirable for property owners as well as government entities. Any threat to a government entity's ability to rely on property taxes as a stable source of income impacts not only that entity's ability to operate, but has a "domino" affect on all aspects of what people expect and deserve in terms of community livability.

Clark County's research has approached the issue of property values in a comprehensive fashion, analyzing it from a practical and quantifiable point of view, using expert advice and verifiable data through proven methodologies. Public opinion surveys have been conducted which corroborate the findings of technical experts in this area.

Another area that has been studied by both Clark County and the State of Nevada is the issue of stigma. As noted previously, the doctrine of "perception is reality" applies to Las Vegas like no other region in the world. Stigma resulting from an amplified perception of risk has been associated with all aspects of nuclear power plant siting and operations, and stigma has been associated with a decline in property values. Clark County investigated the likelihood and extent of property value diminution that may occur in Clark County, Nevada that is directly attributable to the Yucca Mountain Project. The findings, fully described in the report entitled *Clark County Property Value Report on the Effects of DOE's Proposal to Ship High Level Radioactive Waste to a Repository at Yucca Mountain* (UER, June 2001) are indeed significant.

The research indicates that Clark County would likely experience a loss in fair market property value ranging from $214.7 million to $1.6 billion for three types of properties – residential, commercial, and industrial. Within this range, the projection depends on the route selected and whether the shipment campaign proceeds without incident, or whether an incident occurs but does not result in any release of radioactive material. Further, this projection is based only on the diminution of a limited number of land uses, and thus actual losses are likely to be much higher.

Stigma resulting from amplified perception of risk has been associated with all aspects of nuclear energy including property value diminution (Jenkins-Smith, 1999). Given the amplification of risk that has been associated with all things nuclear and the probability of an incident (even an incident with no release of radioactive material), there is a potential that Clark County may experience significant property value diminution over an extended period resulting from the DOE's proposal to ship and store high level radioactive nuclear waste at Yucca Mountain.

If the proposed Yucca Mountain repository is constructed and primarily truck transport is used to move the waste, the majority of all of the waste will travel through Clark County. In this region of the country, no practical alternatives to I-15 and U.S. 93/95 are available for transit from Los Angeles, California, Salt Lake City, Utah, Phoenix, Arizona, or Reno, Nevada. Thus, while the DOE has not selected the transportation routes it will use, the DEIS for Yucca Mountain does identify these routes among the options under consideration. If the DOE's proposed "mostly highway" scenario is selected, as described in the DEIS, almost 93,000 shipments will traverse through Clark County over 24 years. It must be noted that the exact number and duration of shipments is not known, as the FEIS and the final repository design have not yet been completed.

The property value diminution reported on in this subchapter is not based upon a formal appraisal of specific properties. Instead, it is based on the opinions, perceptions, and beliefs of Clark County residents, lenders, and appraisers as to the effects of the shipment campaign on property values along two routes under consideration.

Over the last 15 years, a number of public opinion surveys addressing the intensity of concerns and public perceptions of the risks of transporting of high level radioactive nuclear waste on nearby routes offer consistent results. These surveys have typically targeted areas or regions containing proposed nuclear waste transportation routes, and the objectives of the surveys were to discern residents' concerns and, in some cases, what their likely behavior might be if these routes were selected.

Property value is directly influenced by the attitudes and behaviors of market participants including real estate appraisers, lenders, and owners. Clark County appraisers and lenders were interviewed to assess their beliefs and perceptions about the extent of property value diminution that could occur under three different transportation scenarios for three different property types, and at distances varying from one mile to three miles along the proposed transportation routes.

Related literature indicates that a wide variety of environmental disamenities from high-voltage transmission lines, Superfund sites, hazardous waste landfills and incinerators can result in stigma-induced property value diminution (Colewell, 1990; McClelland et al., 1990; Greenberg and Hughes, 1991; Kiel and McClain, 1995; Smolen et al., 1992). In a 1978 study, Lindell et al. found that only 29% of the public would be willing to live within 10 miles of a nuclear waste facility and 32% percent stated that they were unwilling to live within 100 miles of a nuclear waste facility. Further, this study found that a nuclear waste repository was the least tolerable of eight industrial facility types including a nuclear power plant (Lindell et al., 1978). A 1997 national survey by Flynn, et al. indicated that 63.6% of the sample agreed or strongly agreed that property values along the transportation corridor for high level radioactive nuclear waste would decline. Similarly, 70% of the respondents to a survey in Santa Fe, New Mexico indicated that property values would fall along a proposed bypass that was proposed for the transportation of radioactive waste to the WIPP near Carlsbad, New Mexico (ZIA Research Associates, 1991). Sixty percent of those respondents also indicated that under *no conditions* would they purchase homes in proximity to the proposed bypass.

The literature also demonstrates that the courts recognize stigma-induced property value diminution as a viable claim. This court recognition is discussed in detail in *Clark County*

Property Value Report on the Effects of DOE's Proposal to Ship High Level Waste to a Repository at Yucca Mountain (UER, 2001).

Formal protocols to measure stigma effects in property values have been developed by experts, such as appraisers. Lenders have developed formal policies for dealing with stigma. The acknowledgement of the effects of stigma on property values by the courts and other experts suggest that it is both reasonable and prudent to consider the potential effects of the proposed Yucca Mountain Project on Clark County's property values.

A survey of 512 Clark County residents was conducted by the Canon Center at UNLV in August 2000. The full findings of the survey are described in detail in the report, *Clark County Residents and Key Informant Surveys: Beliefs, Opinions, and Perceptions about Property Value Impacts from the Shipment of High-Level Nuclear Waste through Clark County, Nevada* (UER, 2001). The results were applied to the fair market valuation data for three groups of land uses within Clark County (residential, commercial, industrial).

The purpose of the survey mentioned above was to identify the attitudes, opinions, and perceptions of Clark County, Nevada residents regarding property values in Clark County, and to characterize their beliefs about the potential impacts of the proposed shipments on property values along the transportation corridor.

Several important findings resulted from this survey:

- Over one-half of the residents of Clark County consider the risk of an accident from the transportation of radioactive wastes to be serious or very serious.
- Clark County residents indicated that having a public school and a shopping center nearby has a positive impact on property values, by 61%, and 52.2%, respectively.
- Respondents stated that a polluting manufacturing plant, a landfill, and a highway or freeway used to ship nuclear waste would have the most negative affect on property values. The findings correlate with a similar survey of Santa Fe, New Mexico residents conducted in 1990.
- Approximately 80% of the respondents indicated that they were familiar with the proposed Yucca Mountain Project, while 75% said that they knew about the DOE's plans to ship high level radioactive nuclear waste through Clark County.
- Respondents were also asked whether a property's location near a high level radioactive waste transportation route would – increase a lot, increase somewhat, neither increase nor decrease, decrease somewhat, or decrease a lot – the likelihood of purchasing property.

- Altogether almost 82% of the respondents stated that a nearby high level radioactive nuclear waste route would either "decrease a lot" or "decrease somewhat" their likelihood of purchasing a residential property.
- Seventy-eight percent of the respondents utilized negative terms to describe the effects of the proposed high level radioactive nuclear waste shipment campaign through Clark County (Figure 4). Among the other terms used to describe the effects of the shipment campaign on property values were a "negative effect," "pretty bad," "upset people," "people would move far away," and "no one will buy houses." In response to a similar closed-ended question, 71% of the Santa Fe, New Mexico residents surveyed indicated that property values would decline from the shipment of radioactive waste.

Figure 4 Perception of Residential Property Value Impacts Located Near Specific Routes in Clark County, Nevada (NV) versus Santa Fe, New Mexico (NM)

Response Category	Nevada	New Mexico*
	Percent (N)	Percent
Danger**	2.4% (12)	NA
Decrease in value	66.1% (327)	71.0%
No effect	12.7% (63)	16.0%
Do not know	3.4% (17)	5.0%
Pretty bad**	2.4% (12)	NA
Negative effect**	5.3% (26)	NA
Upset people**	1.8% (7)	NA
People move**	1.7% (8)	NA
Increase in value	0.6% (3)	5.0%
No one will buy houses**	0.6% (3)	NA
Other	3.0% (15)	3.0%
TOTAL	100% (495)	100% (489)

* All percents are rounded to the nearest whole number and only the total number of respondents (N) was available for comparison.
** NA - Categories not used in the Santa Fe, New Mexico survey

Both the Clark County and New Mexico surveys also questioned respondents about their views concerning potential nuclear waste transportation impacts on nearby commercial or business property (Figure 5). In this case, 40.7% of the Clark County respondents indicated that commercial property would decrease with another 5.8% indicating generally "negative effects" on properties. Interestingly, 6.2% responding to this open-ended question suggested adverse effects on business operations located near these routes. In contrast to the general question on property values, 33.9% of responses to the question on commercial properties indicated that there would be "no effect" on these values. The respondents to a similar closed-ended question in the Santa Fe,

New Mexico survey indicated that 37% of the respondents believed that commercial and business property values would decline along the shipment corridor to WIPP, while 38% stated that the shipment campaign would have "no effect."

Clark County residents were asked under what conditions they would consider purchasing residential properties near high level radioactive nuclear waste transportation routes. Almost three-fourths of the respondents declared that they would not consider purchasing property along the transportation routes under *any conditions* (Figure 6). These responses are more negative than those expressed by respondents in the earlier Santa Fe, New Mexico study.

Figure 5 Perceptions of Property Value Impacts on Commercial or Business Properties

Response Category	Nevada	New Mexico
	Percent (N)	Percent *
Decrease in value	40.7% (231)	37.0%
No effect	33.9% (192)	38.0%
Do not know	7.2% (41)	9.0%
Affect businesses**	6.2% (35)	NA
Negative effect**	5.8% (33)	NA
Increase in value	1.6% (9)	13.0%
Dangerous**	1.6% (9)	NA
Other	3.0% (17)	3.0%
TOTAL	100.0% (567)	100.0% (496)

*All Santa Fe, New Mexico responses are rounded to the nearest whole number and only the total number of respondents (N) was available for comparison.
** NA - Categories not included in the Santa Fe, New Mexico survey.

Figure 6 Conditions Under Which Residents Would Consider Purchasing Residential Property near a Highway to be used for the Shipment of High-Level Radioactive Nuclear Waste in Clark County

Environmental Condition	Nevada	New Mexico
	Percent (N)	Percent *
Under no condition	74.9% (355)	59.0%
Do not know	2.5% (12)	8.0%
Depends on location**	3.2% (15)	NA
Would consider conditions	3.6% (17)	19.0%
Depends on safety measures**	3.2% (15)	NA
Other	6.1% (29)	5.0%
Would Not Affect Decision to Purchase***	NA	9.0%
TOTAL	100.0% (474)	100.0% (489)

* All Santa Fe, New Mexico responses are rounded to the nearest whole number and only the total number of respondents (N) was available for comparison.
** NA - Categories not included in the Santa Fe, New Mexico survey.
*** NA - Category not included in the Clark County, Nevada survey.

Clark County residents were asked whether residential property near a highway used for transporting high level radioactive waste would sell for more, the same, or less, than an identical property that *is not near* such a route (Figure 7). Eighty-two percent of the respondents believe such a property would sell for less; 15% think it would not make a difference; and only the remaining 3% believe it would sell for more. This pattern of response was similar to the earlier Santa Fe County, New Mexico study which found 71% of the respondents indicating that residential property would sell for less (ZIA Research Associates, 1991).

Figure 7 Perceptions of Direction of Impact on Property Values

Residential Property Near Nuclear Waste Shipment Routes would sell for...	Nevada	New Mexico
	Percentage (N)	Percentage (N)*
More money	3.3% (13)	3.0%
Same amount of money	14.5% (57)	20.0%
Less money	82.2% (324)	71.0%
Not Sure**	NA	6.0%
TOTAL	100.0% (394)	100.0% (501)

* All Santa Fe, New Mexico responses are rounded to the nearest whole number and only the total number of respondents (N) was available.
** NA - Categories not included in the Clark County, Nevada survey.

Respondents answering that a residential property would sell for more than or less than a comparable property not near a shipment route were then asked how much more or less they would expect the price to be. Of the 369 Clark County respondents who expect lower selling prices for homes near shipment routes, the mean expected drop in selling price in Clark County is estimated at approximately 25% compared to identical homes not near a highway that transports high-level radioactive nuclear waste (Figure 8).

Figure 8 Percentage of Diminution in Selling Price of Residential Properties Near a High Level Radioactive Nuclear Waste Shipment Route Compared to an Identical Property Not Near Such a Route

Diminution Amount	Nevada		New Mexico	
	Percent (N)	Cumulative Percent*	Percent (N)**	Cumulative Percent**
Less than 1 percent	12.4% (47)			
1-5 percent	6.1% (23)	18.5%		
6-10 percent	10.3% (39)	28.8%	11.0%***	11.0%***
11-20 percent	18.9% (72)	47.7%	22.0%	33.0%
21-30 percent	17.6% (67)	65.3%	19.0%	52.0%
31-40 percent	8.2% (31)	73.5%	13.0%	65.0%
41-50 percent	12.4% (47)	85.9%	10.0%	75.0%
51-60 percent	2.9% (11)	88.8%	5.0%	80.0%
61-75 percent	1.8% (7)	90.6%	2.0%	82.0%
More than 75 percent	6.6% (25)	97.2%	6.0%	88.0%
Not sure/refused	2.9% (11)	100.1%	12.0% (357)	100.0%

* Percents are rounded to the nearest tenth
** All percents are rounded to the nearest whole number and only the total number of respondents (N) is available for comparison.
*** The Santa Fe, New Mexico survey classification was Less Than Ten Percent.

When the 25% mean diminution rate reported by Clark County survey respondents is applied to all residential properties within one mile of the northern and western Beltway routes suggested in the DEIS, the resulting diminution in fair market value utilizing current assessed residential valuations is $1.4 billion (Figure 9). Alternatively, if the Beltway is not expected to be completed before high level radioactive nuclear waste shipments commence, the application of the 25% mean property value diminution along the I-15 transportation corridor in Clark County could result in a loss of $1.7 billion of fair market residential valuation.

Figure 9 Application of Property Value Survey to Clark County Residential Fair Market Value

		Nevada Transportation Corridor	
Clark County Property Value Survey	Rate	Beltway	I-15
Residential at One Mile	25.00%	$1,406,531,814	$1,727,460,214

It is important to note that these ranges represent the application of the mean rate of property value diminution to current residential fair market valuation within one mile of the beltway and I-15 routes through Clark County as reported by those Clark County residents who were surveyed. These rates are based on the respondent's current perception of likely property

value diminution and are based on extrapolating current residential assessed valuation data to fair market value. Obviously, perceptions are dynamic and thus are likely to change over time. In addition, the current assessed residential valuation within Clark County does not account for the significant developments that are proposed over the next decade especially along the northern beltway. Thus, these figures are best understood as representing the intensity of public concern about the effect of DOE's proposal to construct the proposed Yucca Mountain repository and ship high level radioactive nuclear waste through Clark County.

The results of focused interviews with Clark County lenders and appraisers are described in detail in the report, *Clark County Residents and Key Informant Surveys: Beliefs, Opinions, and Perceptions about Property Value Impacts from the Shipment of High-level Nuclear Waste through Clark County, Nevada*. The results are applied to the assessed valuation data for three groups of land uses within Clark County. UER conducted a survey of 18 Clark County lenders and 35 certified appraisers in May 2000.

Under the first scenario, the appraisers and lenders were asked to evaluate whether there would be any changes in property values along the corridor if "no event" occurred, but there was adverse publicity, particularly, at the onset of the shipment campaign. This scenario was assigned to three discreet residential, commercial, and industrial properties that were characterized in terms of size, location, lease fees, and other factors. As noted above, the lenders and appraisers were also asked to differentiate the level of impact, if any, that might be experienced at two varying distances along the corridor (within 1 mile of the shipment route and within 1 to 3 miles of shipment routes).

According to the lenders and appraisers, residential properties would lose the most value in percentage terms. Appraisers indicated that within one mile of a shipment route, residential properties would decline on the average by 3.50%, while lenders indicated the decline would be approximately 2.00% (Figure 10). When these rates of diminution are applied to residential fair market valuation data for these property types within one mile of the beltway route, the potential property value loss for residential property ranges from $112.5 million to $196.9 million (Figure 10). In contrast, if these rates are applied to fair market property value data within one mile of the I-15 route then diminution could range from $138.2 million to $241.8 million (Figure 11).

According to the appraisers and lenders, residential properties at a distance of one to three miles from the routes would continue to experience the greatest decline in value relative to the other two property types. When the rates of property value diminution are applied to residential

fair market value data at a distance of one to three miles from the Beltway route, the diminution ranges from $91 million to $265.6 million. From the I-15 route, the diminution ranges from $105.4 million to $307.7 million. Thus, under Scenario 1, lenders and appraisers indicated that the rate of residential property value diminution when applied to fair market value data along the beltway might be as high as $203.5 million to $462.5 million, while along the I-15 route the diminution could range from $243.6 million to $549.5 million.

Figure 10 Scenario 1 Mean Property Value Diminutions within 1 Mile and at 1 to 3 Miles of the Beltway Route

	Residential Property Value Diminution				
	1 mile		1 - 3 miles		Totals
Lenders (N*)	2.00% (11)	$112,522,546	0.50% (11)	$90,954,074	$203,476,617
Appraisers (N*)	3.50% (13)	$196,914,454	1.46% (12)	$265,585,894	$462,500,346
	Commercial Property Value Diminution				
	1 mile		1 - 3 miles		Totals
Lenders (N*)	0.56% (10)	$447,457	0.56% (10)	$5,167,840	$5,615,300
Appraisers (N*)	3.21% (14)	$2,564,894	1.25% (14)	$11,535,360	$14,100,251
	Industrial Property Value Diminution				
	1 mile		1 - 3 miles		Totals
Lenders (N*)	0.56% (10)	$993,494	0.56% (10)	$4,925,689	$5,919,186
Appraisers (N*)	1.25% (12)	$2,217,623	0.83% (12)	$7,300,577	$9,518,200

* All percents are rounded to the nearest whole number and only the total number of respondents (N) is available for comparison.

Figures 12 and 13 summarize the results of the property value loss under each of the scenarios as estimated by the Clark County bankers and lenders. What these figures suggest is that among those most experienced with estimating Clark County property values, there is a perception that significant adverse impacts will occur along either of the Clark County routes proposed, for all property types examined, even under the most benign scenario.

Figure 11 Scenario 1 Mean Property Value Diminution within 1 Mile and at 1 to 3 Miles of the I-15 Route

	Residential Property Value Diminution				
	1 mile		1 - 3 miles		Totals
Lenders (N*)	2.00% (11)	$138,196,817	0.50% (11)	$105,370,546	$243,567,363
Appraisers (N*)	3.50% (13)	$241,844,431	1.46% (12)	$307,681,997	$549,526,426
	Commercial Property Value Diminution				
	1 mile		1 - 3 miles		Totals
Lenders (N*)	0.56% (10)	$5,478,700	0.56% (10)	$8,625,117	$14,103,817
Appraisers (N*)	3.21% (14)	$12,229,240	1.25% (14)	$12,783,654	$24,498,609
	Industrial Property Value Diminution				
	1 mile		1 - 3 miles		Totals
Lenders (N*)	0.56% (10)	$7,082,897	0.56% (10)	$14,305,271	$21,388,171
Appraisers (N*)	1.25% (12)	$40,600,186	0.83% (12)	$31,931,411	$72,531,594

* All percents are rounded to the nearest whole number and only the total number of respondents (N) is available for comparison.

Figure 12 Property Value Diminutions under Three Scenarios within 3-Mile Distance of the Proposed Beltway Route

	Residential		Commercial		Industrial	
Groups	Lenders	Appraisers	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	$203,219,474	$462,500,346	$5,615,300	$14,100,251	$5,919,186	$9,518,200
Scenario 2	$646,024,023	$1,175,472,314	$12,424,417	$33,873,129	$15,892,269	$27,680,400
Scenario 3	$5,269,739,823	$6,203,196,049	$171,414,257	$189,179,886	$125,658,343	$192,465,463

Figure 13 Property Value Diminutions under Three Scenarios within 3-Miles of the I-15 Shipment Route, by Professional Group (Lenders and Appraisers)

	Residential		Commercial		Industrial	
Groups	Lenders	Appraisers	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	$243,567,363	$549,526,426	$21,388,171	$72,531,494	$14,103,817	$25,012,894
Scenario 2	$772,643,577	$1,392,987,706	$76,137,260	$171,126,151	$54,535,563	$83,790,291
Scenario 3	$6,218,675,720	$7,318,862,089	$704,094,009	$926,894,417	$361,917,017	$507,543,183

The findings also indicate that increasing the severity of events within the scenarios, as illustrated in Scenario 2 and 3, results in significantly larger rates of impact. Under Scenario 3, the most serious accident event evaluated, residential property diminution rises to $5.3 billion - $6.2 billion within 3 miles of the Beltway route and $6.2 billion - $7.3 billion within 3 miles of the I-15 route.

The City of Las Vegas is the largest incorporated city within Clark County. Thus, it is reasonable to expect that the largest potential dollar decrease in property values would be experienced in this jurisdiction (Figure 14). According to the lenders and appraisers, residential properties within the City of Las Vegas, like all other jurisdictions within Clark County, are likely to experience the largest loss in property values along both the I-15 route and the Beltway.

Figure 14 Total Property Value Diminutions by Route, Property Type, Scenario, and Professional Group (Lenders and Appraisers) for Las Vegas

	Beltway Route		I-15 Route	
Residential	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	$90,541,066	$205,191,963	$156,784,337	$340,430,714
Scenario 2	$287,362,977	$520,964,800	$495,190,989	$850,970,611
Scenario 3	$2,331,648,849	$2,744,464,529	$3,713,101,297	$4,365,535,780
Commercial				
Scenario 1	$3,037,806	$6,972,709	$13,237,277	$49,171,100
Scenario 2	$6,004,080	$16,916,829	$53,674,129	$115,411,900
Scenario 3	$90,950,803	$112,319,546	$447,409,589	$598,515,980
Industrial				
Scenario 1	$51,203	$75,889	$2,117,549	$3,789,223
Scenario 2	$91,431	$190,177	$8,429,277	$12,838,477
Scenario 3	$914,320	$1,529,657	$55,243,149	$76,911,223

Lenders and appraisers repeatedly remarked that the future economic growth of the area is inextricably linked to the development of the Northern and Western Beltway, i.e., the Beltway route. Thus, while property value impacts may be lower today along the Beltway, it is expected to play a major role in the Valley's future development (see C*ity of Las Vegas Governmental Fiscal Impact Report*, UER, 2001). If the DOE selects the Beltway as its preferred route, as it has suggested in the DEIS, then the future economic growth of Las Vegas and in fact the entire Valley may be diminished.

In North Las Vegas, the largest property value impacts are estimated for residential properties along the I-15 route (Figure 15). For these properties, the loss in fair market value could reach $521.6 million - $614.8 million. In contrast, residential property value losses along the Beltway could reach $305.8 million - $361.6 million. However, like Las Vegas, North Las Vegas expects its primary future economic growth to occur along the Beltway route.

Figure 15 Total Property Value Diminutions by Route, Property Type, Scenario, and Professional Group (Lenders and Appraisers) for North Las Vegas

	Beltway Route		I-15 Route	
Residential	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	$7,859,509	$22,557,620	$18,084,091	$43,549,057
Scenario 2	$2,572,649	$61,528,697	$57,812,634	$112,868,383
Scenario 3	$305,833,589	$361,564,006	$521,619,643	$614,827,454
Commercial				
Scenario 1	$56,694	$126,551	$883,334	$3,295,426
Scenario 2	$101,243	$307,774	$3,603,451	$7,733,040
Scenario 3	$1,687,703	$2,075,460	$29,894,617	$40,021,897
Industrial				
Scenario 1	$701,063	$1,039,077	$3,837,409	$7,016,377
Scenario 2	$1,251,900	$2,603,951	$16,343,883	$24,408,994
Scenario 3	$12,518,997	$20,944,283	$104,117,777	$142,515,549

Residential properties in unincorporated Clark County vary from the pattern in Las Vegas and Clark County as a whole. In unincorporated Clark County the larger property value losses are found along the Beltway, when one applies the results of the lenders and appraisers survey to fair market residential valuation (Figure 16). Along the Beltway route, the losses could range from $96.7 million - $218 million under Scenario 1 and $306.8 million - $552.6 million under Scenario 2. Along this same route, the losses rise to $2.47 billion to $3 billion, under Scenario 3. In contrast, along I-15, they range from $60.4 - $149 million under Scenario 1; $193.7 million - $389.3 million under Scenario 2; and $1.8 billion - $2.1 billion under Scenario 3.

Figure 16 Total Property Value Diminutions by Route, Property Type, Scenario, and Professional Group (Lenders and Appraisers) for Unincorporated Clark County

	Beltway Route		I-15 Route	
Residential	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	$96,721,051	$218,055,049	$60,411,103	$149,047,049
Scenario 2	$306,791,731	$552,598,249	$193,706,420	$389,305,446
Scenario 3	$2,465,897,000	$3,004,957,211	$1,820,280,886	$2,146,608,183
Commercial				
Scenario 1	$2,255,291	$5,943,709	$7,002,051	$19,007,780
Scenario 2	$3,429,466	$14,261,703	$17,674,380	$45,508,674
Scenario 3	$69,608,637	$87,840,826	$217,622,694	$275,939,337
Industrial				
Scenario 1	$4,725,197	$7,687,794	$7,707,137	$13,491,854
Scenario 2	$13,326,246	$22,781,314	$28,539,711	$44,437,863
Scenario 3	$102,710,006	$155,520,860	$193,041,071	$273,645,749

In Henderson, the primary property value impacts are likely to be felt by industrial properties along the I-15 (Figure 17). These properties could see a drop in fair market value of $279,414 to $414,000 under Scenario 1 and these losses would grow from half a million to 1 million under Scenario 2. In the event of a Scenario 3 accident, these losses could reach $5 million to $8.4 million.

Figure 17 Total Property Value Diminutions by Route, Property Scenario, and Professional Group (Lenders and Appraisers) for Henderson

	I-15 Route	
Residential	Lenders	Appraisers
Scenario 1	$108,483	$297,531
Scenario 2	$352,697	$801,763
Scenario 3	$3,920,037	$4,631,311
Industrial		
Scenario 1	$279,731	$414,603
Scenario 2	$499,520	$1,039,003
Scenario 3	$4,995,209	$8,356,983

Since all of Mesquite lies within three miles of the I-15 corridor, the community would experience significant impacts under all of the scenarios. The most significant impacts are estimated for residential properties (Figure 18). These properties can anticipate losses in fair market value of between $8.2 million - $16.4 million under Scenario 1. If an accident without a release, such as described in Scenario 2 were to occur, the loss to residential property values could grow to $25.8 million - $40 million.

Figure 18 Total Property Value Diminutions by Route, Property Type, Scenario, and Professional Group (Lenders and Appraisers) for Mesquite

	I-15 Route	
Residential	Lenders	Appraisers
Scenario 1	$8,246,511	$16,398,186
Scenario 2	$25,801,111	$39,578,803
Scenario 3	$162,440,351	$190,436,134
Commercial		
Scenario 1	$265,509	$1,057,289
Scenario 2	$1,185,300	$2,472,537
Scenario 3	$9,167,111	$12,417,203
Industrial		
Scenario 1	$161,991	$300,840
Scenario 2	$723,171	$1,065,951
Scenario 3	$3,693,951	$6,113,680

The literature clearly indicates that knowledge of an undesirable environmental condition is closely associated with declines in property values. Surveys of Clark County residents show that 77% of Clark County residents are familiar with the DOE's plans. This finding is consistent with earlier surveys conducted for over a decade. The media attention that is sure to accompany any final decision to construct the repository and the transport of high level radioactive nuclear waste will certainly maintain, if not increase, public awareness of this issue.

Perception, especially the perception of risk, also has been positively correlated with property value diminution. When Clark County residents were asked about their perception of what will happen to residential property values if the DOE proceeds with its plans, over 80% indicated the effects in negative terms and almost two-thirds described the impacts on commercial properties in similar negative terms. Moreover, two expert groups, Clark County lenders and appraisers (with an average of over a decade of experience in Clark County determining property values), also overwhelmingly indicated that property values are likely to suffer as a result of the DOE's proposed actions.

In fact, even under the most benign scenario where no incident of any type occurs, the Clark County lenders and appraisers projected that residential property values would decline by 2.00% - 3.50%, resulting in losses of $243.6 million to $549.5 million along the I-15 route and $203.3 million – $462.5 million along the Beltway route. These experts indicate that if an event

were to occur, even with no release of radioactive material, the rate of residential property value diminution would increase to 6% to 8% within one mile and 1.64% - 4.00% within one to three miles. This also is consistent with actual experience that has demonstrated that distance is associated with the rate of diminution with the largest drops occurring closest to the undesirable environmental condition.

When one considers the findings from the lenders and appraisers for the most severe accident event studies, Scenario 3, the level of diminution indicated is substantially higher than for the other two scenarios. Under this scenario, lenders and appraisers indicate that residential property losses would likely reach approximately 30%. This is consistent with findings in the literature that show that the increasing magnitude of an event influences the degree of property value diminution.

The Clark County residents surveyed indicated on average that they expect a 25% drop in residential property values. This rate of diminution is consistent with an earlier survey of residents in Santa Fe, New Mexico along the transportation corridor for waste shipments to WIPP. This rate of diminution is substantially higher than what has been demonstrated around landfills, and is remarkably close to the level of diminution indicated as likely by the experts under Scenario 3.

The DEIS assumes that there will be no event of any kind during the shipment period. This would be consistent with the level of losses indicated by the experts under Scenario 1. Thus, Scenario 1 appears to be an appropriate lower boundary for the level of impact that may be experienced. Using Scenario 1 as the lower boundary means that at a minimum, property value diminution is likely to range from $214.8 million to $647 million.

Clark County is ranked as the fasted growing county in the nation. This growth has led to increasing congestion along the transportation routes being considered. This in turn increases the likelihood of an incident. While the probability of Scenario 3 may be small, if it were to occur the consequences of such an event would be devastating.

It is important to note that these estimates of potential property value damage are based on "fair market value." From the private property owner's perspective, these projected rates of diminution imply that there will likely be a loss of personal wealth and either increased property tax rates and/or reduced governmental services, even if the shipment of high level radioactive waste occurs without an incident of any type. If an incident occurs and there is a release of radioactive material, the diminution could be devastating.

As this study has shown, the extent of property value diminution varies by land use and route. This has important implications. If the I-15 route were selected, the total impact would likely be highest using the current value of developed land. This is because the area is almost fully developed; however, in unincorporated Clark County there is already a greater impact on residential properties along the Beltway. The Beltway has also been identified as critical to future economic growth within the Las Vegas Valley. The DOE's selection of a route for shipping high level radioactive waste has very significant consequences that vary by land use and jurisdiction.

In conclusion, the Yucca Mountain transportation campaign, even under the DOE's own scenario that postulates no *incidents of any type*, will likely result in significant property value losses within Clark County.

This research supports Clark County's findings that property values are likely to be affected adversely by the DOE's proposed actions. It is impossible to estimate the exact property value reductions as a result of the DOE's proposals for Yucca Mountain absent a FEIS, description of transportation routes throughout the valley, and final repository design. However, there is no doubt that the Yucca Mountain program poses a significant threat to property values in Clark County.

Economic Losses Based Upon Property Values and Population Estimates

As noted previously in this report, the consulting firm of UER interviewed experienced lenders and appraisers within Clark County regarding the effects three transportation scenarios would have on local property values.

UNLV's CBER was requested to utilize these results as input into the Regional Economic Model, Inc. (REMI) and compare these outputs to the normal REMI outputs (Appendix D). CBER was specifically tasked with:

a. Estimating employment, income and expenditure impacts of property value losses under three alternative scenarios; and

b. Estimating lost property taxes.

Within each scenario are both minimum and maximum impacts that can be expected to occur within the community. There are, therefore, six options. However, only two options will be discussed. These options are Scenario 1 (minimum impact) and Scenario 3 (maximum impact). This will allow the reader to gain a sense of economic impacts and provides a potential bounding of economic impacts on Clark County.

Two benchmarks that can be utilized when comparing this study are:

- During the Great Depression one in three persons were unemployed.
- The terrorist attacks of September 11, 2001, resulted in layoffs of over 11,000 Clark County residents.

The REMI model utilizes 1992 dollars. Therefore, all dollars reflected in this section are in 1992 constant dollars. This results in estimates that are extremely conservative.

Impacts Based Upon Scenario 1

The impacts identified as minimum impacts within Scenario 1 (trucks utilizing the Clark County transportation system without incident) are as follows:

a. Employment would be reduced by 5,393 jobs.
b. Gross Regional Product (Spending) would be reduced by $185 million. This is a one-year figure and will be cumulative over the life of the project to $5.6 billion.
c. Real Disposable Income would be reduced by $136 million for one year. Cumulatively, over the life of the project, losses of Real Disposable Income could exceed $4.7 billion.
d. Population would be reduced by 11,294 people. This is an average population loss over the life of the project. Of interest to note is that over this last decade, the population within Clark County has never declined and in fact has grown, on average, 6.27% per year.

Impacts Based Upon Scenario 3

The impacts identified as maximum impacts within Scenario 3 (a serious accident including the release of radioactive materials involving the Clark County transportation system) are as follows:

a. Employment would be reduced by 54,429 jobs. It should be noted that this is equivalent to increasing the current unemployment rate by approximately 6.5% (roughly 10 times the impact under Scenario 1) to more than 13%.
b. Gross Regional Product (Spending) would be reduced by $1.4 billion. This is a one-year figure and will be cumulative over the life of the project to $68.1 billion. This is the equivalent expenditures made by over 30 major hotel properties.
c. Real Disposable Income would be reduced by $686 million for one year. Cumulatively, over the life of the project, this figure rises to $42.1 billion.
d. Population would be reduced by 90,718 people, more than 8 times the loss under Scenario 1. This is an average population loss over the life of the project.

These estimates under Scenario 3 reflect an expected magnitude of impact. However, it is difficult to verify the duration and likelihood of this impact based upon the information provided

by the DOE to date. Unlike most accidents that cause brief disruptions to our every day lives, a nuclear release will result in a much more prolonged disruption than other hazardous incidents or events. Figure 19 below summarizes the minimum and maximum expected economic losses based on the REMI model.

Figure 19 Economic Impacts Based Upon Property Values and Population Estimates from Years 2010 through 2035

Economic Losses	Scenario 1	Scenario 3
	Minimum Impact	Maximum Impact
Population	11,294	90,718
Job	5,393	54,429
Gross Regional Product		
Annual	$182 million*	$1.4 billion*
Cumulative***	$5.6 billion**	$68.1 billion**
Disposable Personal Income		
Annual	$136 million*	$686 million*
Cumulative***	$4.7 billion**	$42.1 billion**

* Projected for 2010 in constant 1992 dollars.
** All dollars are in constant 1992 dollars due to the REMI model. Therefore, all dollars represented are conservative estimates.
*** For period from 2010 through 2035; dollars are in constant 1992 dollars.

4.3 Transportation Impacts

Introduction

This subchapter provides an interim assessment of six of the fourteen transportation route (rail and truck) alternatives that DOE identified in its DEIS. The DEIS, although seriously deficient in its transportation analysis, provided the first indication of how the DOE proposes to move the waste to Yucca Mountain for disposal. The information contained in the DEIS serves as the basis for the following assessment of transportation impacts to Clark County.

The DEIS identified 14 "implementing alternatives" for possible use in transporting high level radioactive waste and spent nuclear fuel from generating sites to the proposed repository at Yucca Mountain, Nevada. These implementing alternatives are potential rail, heavy-haul, or legal-weight truck routes that may be used to transport high level radioactive nuclear waste and spent nuclear fuel. Of these 14 transportation route alternatives, 6 travel through Clark County, Nevada. The impacts addressed in this subchapter include impacts such as routine radiation exposure, accident costs, incident delay, transportation planning impacts, land use impacts, and monitoring impacts. The maps and transportation scenarios used in this report are included in Appendix E.

Although the DEIS provided a cursory examination of 14 "implementing alternatives," it did not identify a best alternative. Consequently, it is difficult to prepare a definitive assessment of the transportation impacts attributable to the Yucca Mountain Project since the DOE failed to provide specific information about its program. The DEIS itself acknowledges this failure when it indicates that additional studies must be completed before transportation system impacts can be assessed.

These impacts, defined as changes to the operation, condition, and performance of the Yucca Mountain Project that adversely affect the transportation network in Clark County, Nevada, are organized to coincide with the Yucca Mountain Project completion phases.

The proposed repository would be completed in three phases: construction, operation, and post-closure. Although this chapter does not examine post-closure transportation system impacts, it does address the cumulative impacts attributable to the additional burden of the DOE's low-level radioactive waste disposal operations at the Nevada Test Site (NTS).

Further, this report does not address the mitigation of the impacts described herein, and should not be used as a "baseline" for impact mitigation. The DOE should use this estimate as a guide for identifying and addressing future issues related to transportation. Future studies will be necessary to identify specific routes and impact assessment should Yucca Mountain be selected as the nation's repository for high level radioactive nuclear waste.

The transportation system impacts fit within the Council on Environmental Quality's (CEQ) interpretation of NEPA as indirect and cumulative. In NEPA, certain standards for evaluating impacts and determining their significance have evolved. These standards were applied here in order to determine probable and significant impacts. Within these limits, Clark County estimated which impacts were reasonably foreseeable based on their probability and significance. Impacts that were not reasonably foreseeable were not considered. Two types of NEPA-defined impacts were examined in this report: indirect and cumulative.

Indirect Impacts

Transportation of high level radioactive nuclear waste to Yucca Mountain is an indirect effect of the Yucca Mountain Project under NEPA because (1) the effects are a consequence of the proposed action (i.e., construction of the proposed Yucca Mountain high level radioactive nuclear waste disposal facility), and (2) the effects of this transportation are removed in time and location from the proposed repository, itself. The impacts assessed in this report were found to meet the

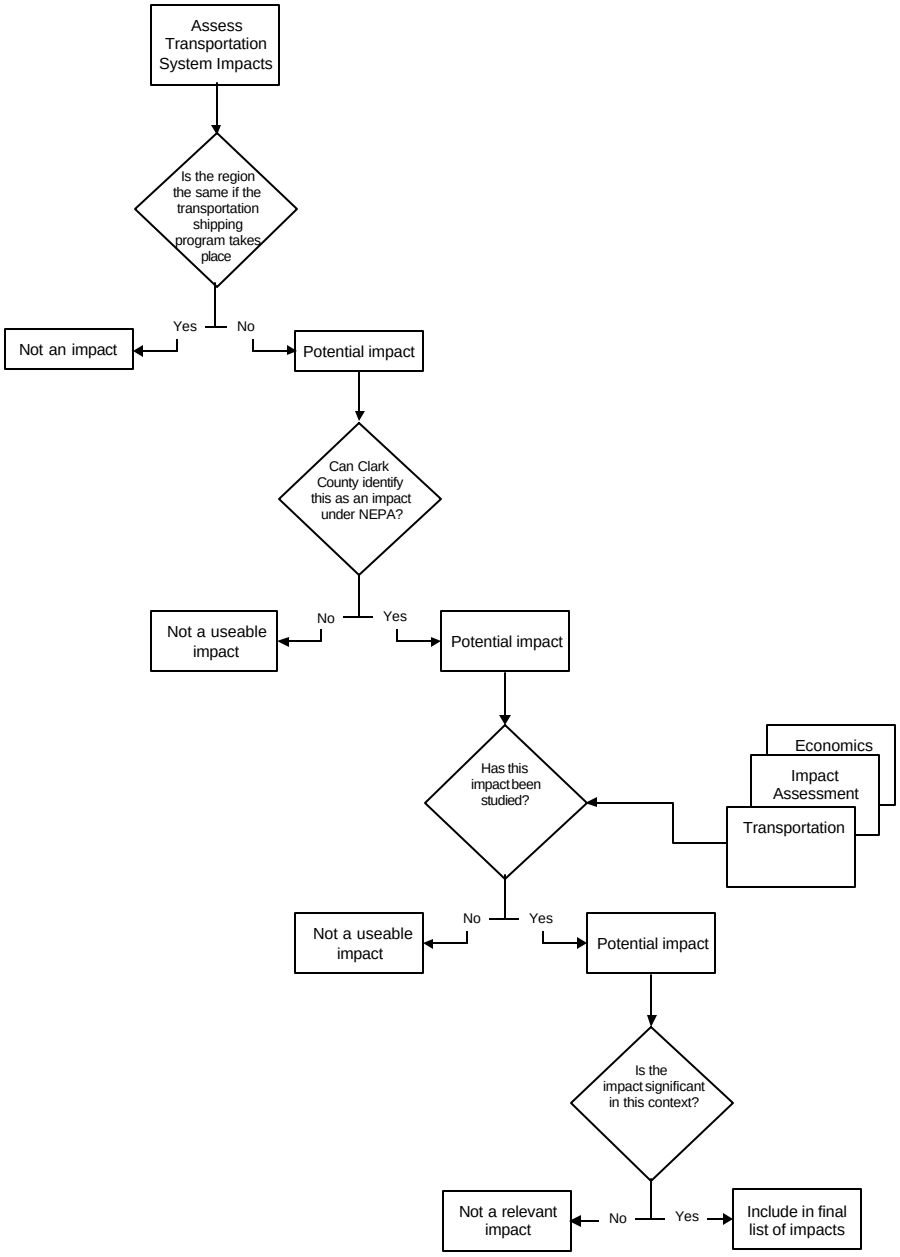
three-step test established for indirect effects in *Sierra Club v. Marsh*, 808 F. Supp. 852, 875 (D. Mass., 1984).

This test is:

1. *Can one say with confidence that the impacts are likely to occur?*
2. *Can one describe them now with sufficient specificity to make their consideration useful?*
3. *Will the decision maker be able to take account of the impacts now, before the agency is so firmly committed to the project that further environmental knowledge, as a practical matter, will prove irrelevant to the government's decision?*

The impacts were identified through literature review, professional judgment, and consultation with other agencies, and chosen based on the logic model presented on page 43:

Figure 20 Logic Model Used to Define Indirect Impacts



The impacts described in this subchapter also satisfy the other requirements of being both probable and significant should the Yucca Mountain Project proceed.

Cumulative Impacts

The cumulative impacts examined in this subchapter are based on the DOE's use of the NTS as a disposal site for the ongoing program to clean up nuclear weapons production facilities through the United States. The CEQ defines cumulative impact as ". . . the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions. . .." The use of the NTS as a low level radioactive waste disposal site fits this definition. Most of the low level radioactive waste from these sites will be shipped to the NTS for permanent disposal. For the foreseeable future, the most likely mode of transport for these wastes is by legal-weight truck on the highway system. However, the use of heavy-haul trucks or rail has not been excluded from consideration by the DOE.

Definition of the Region of Influence

Clark County is within the region of influence of the Yucca Mountain Project for transportation because Congress identified the interstate highway system as the default route for the transportation of high level radioactive nuclear waste. The most direct route from power generating sites to Yucca Mountain is the interstate highway system through Clark County. Therefore most of the transportation routes from shipping sites would likely pass through Clark County.[1]

[1] The State of Nevada does have the ability to designate a preferred route if an analysis done in accordance with the provisions contained in *Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials* (August 1992), which demonstrates that the alternate route has no negative effect on public health and safety. Whether or not Nevada will choose to perform such an analysis, or whether or not that analysis will show positive effects on health and safety is not clear. Therefore, it is reasonable to assume that the default route will be used.

Figure 21 Cross-Country High Level Radioactive Nuclear Waste Shipments on the Interstate Highway System

The shortest routes from the waste generating sites to Yucca Mountain pass through Clark County en route to Yucca Mountain. Congress anticipated efforts to avoid transportation of waste through particular areas. In all likelihood, that is why Congress designated, in the NWPAA, the interstate highway system as the default transportation route for the movement of high level radioactive nuclear waste to a repository. If the proposed repository is approved, Clark County would likely request that the shipment be rerouted to avoid populated areas of the county. Other similarly affected entities would also be likely to request that the shipments be rerouted. The likely result of changing the route will be an uneconomical routing process that is both circuitous and expensive.

Because the majority of the truck-transported high level radioactive waste would pass through Clark County en route to Yucca Mountain, the transportation impacts would be concentrated in Clark County. The Nuclear Regulatory Commission identified Clark County as

part of the maximally affected region in the nation in an Environmental Impact Statement (NUREG 1437) because it sought to identify the maximum impact scenario. Following are the areas of impact most significant to the residents and visitors of Clark County.

Routine Radiation

In order to examine the effects of the routine transportation of high level radioactive nuclear waste, the State of Nevada hired M. H. Chew & Associates to examine the health effects of a routine rail shipment of high level radioactive nuclear waste to Yucca Mountain. A portion of the Chew report is excerpted below. The entire report is included as Appendix F.

The Union Pacific Railroad will routinely make extended stops for train assembly, safety inspections, etc. Some of the stops are quite extended. Since the stop doses of radiation will be considerably larger than the passing doses, the latter were not examined. Three locations that are affected by the stopped doses are considered in the impact analysis. Two of the locations are hotel/casinos and the third is the Clark County Government Center.

According to the DEIS, DOE's rail routing analysis for Jean, Nevada indicates that about 87% of all rail shipments to Yucca Mountain would use the Union Pacific mainline through downtown Las Vegas. According to the DOE'S SDEIS, There would be 17,364 rail cask shipments through Las Vegas over 38 years, an average of 457 cask shipments per year.

The DEIS assumes that spent nuclear fuel rail casks will be shipped in general freight service. However, for purposes of evaluating a maximum credible incident-free scenario, this analysis assumes each rail cask is shipped through Las Vegas separately by general freight service in a different train. Thus, there would be 457 rail cask shipments per year through Las Vegas for 38 years. There are a number of locations along the Union Pacific railroad through Las Vegas where entire trains and groups of freight cars are routinely stopped for varying periods of time. For this analysis the state of Nevada selected three such locations.

Stops for carrier interchange or train assembly could require from 2 to 24 hours. Stops for crew changes, car changes, engine refueling, train maintenance, regulatory inspections, and traffic control, could range from 15 minutes to more than 2 hours. In planning for receipt of casks shipped by general freight service, the DOE has indicated its intention to take advantage of U.S. Department of Transportation regulations that allow stoppage of rail cars in transit for periods of up to 48 hours.

A major portion of the analysis finds significant annual doses at the designated locations. The figure below summarizes the findings for the cumulative annual doses (457 hours) at each of three locations.

The M. H. Chew report concludes that the shipment of high level radioactive nuclear waste will impose measurable doses of radiation on people living or employed with one-half mile of any proposed route. These doses are summarized in Figure 22:

Figure 22 Routine Radiation Doses

Building/Maximally Exposed Individual	Distance (meters)	457 hour Dose (mrem)
Casino 1, MEI 1	40	27.6
Casino 1, MEI 2	15	200
Casino 2, MEI 1	35	36.2
Casino 2, MEI 2	160	1.05
Clark County Government Center	20	114
Clark County Government Center	30	49.5
Clark County Government Center	100	3.43

Accident Costs

Vehicular traffic accident costs include deaths, injuries, pain, disabilities, lost productivity, grief, material damage, and crash prevention expenses. Previous studies that evaluate the relationship between financial expenses and safety make it possible to assign a value to marginal changes in traffic risk. The National Highway Traffic Safety Administration estimates traffic accident costs at .065 dollars per mile. This estimate excludes pain and lost quality of life. The Federal Highway Cost Allocation Study performed in 1997 made a more detailed estimate of external costs for combination trucks on urban highways. The external costs are costs not borne by the carrier. By definition then, they are costs imposed on the local community. This analysis uses the more detailed FHWA estimate.

Construction Phase Accident Costs

The construction phase accident costs are calculated for the percentage of the routes that will traverse Clark County. The volumes of shipments are taken from the DEIS and are included for each route. The FHWA estimate of costs for combination trucks on urban highways (adjusted to year 2000 dollars) is $1.24 per vehicle mile. These costs are summarized in Figure 23.

Figure 23 Construction Phase Accident Costs

Alternative	DEIS listed length of the rail corridor	Length of the rail corridor in Clark County	Percent of the Corridor in Clark County	Total Shipping Miles for Construction Projects	Total Shipping Miles in Clark County	Forecasted accident costs
Jean Rail Corridor	112	88	0.79	38,524,940	30,269,596	$102,912,425
Valley Modified Rail Corridor	98	90	0.92	19,262,470	17,690,023	$70,655,344
Apex Dry Lake Heavy Haul Route	114	91	0.80	19,883,840	15,872,188	$134,270,347
Caliente Heavy-Haul Route	234	66	0.71	37,903,570	26,888,857	$170,443,822
Sloan-Jean Heavy-Haul Route	117	66	0.56	19,883,840	11,216,525	$97,891,418

Approximately 30% of these costs would likely not be reimbursed to the affected parties. Using the 30% figure, the amount of unreimbursed accident costs is estimated below.

Operation Phase Accident Costs

The operation phase accident costs are calculated for the heavy-haul and legal weight truck routes that traverse Clark County. Figure 24 below contains unreimbursed accident costs to Clark during the period Yucca Mountain repository would be operational.

Figure 24 Operation Phase Unreimbursed Accident Costs

Operation	Shipments through Clark County	Shipment Miles in Clark County	Accident Costs	Unreimbursed Accident Costs
Apex Dry Lake	10,815	1121948.1	$1,391,216	$417,365
Caliente Heavy-Haul Route	10,815	1670268.6	$2,071,133	$621,340
Sloan-Jean Heavy-Haul Route	10,815	835134.3	$1,035,567	$310,670
Legal-weight truck	49,523	4902777	$6,079,443	$1,823,833

Total unreimbursed accident costs due to the construction and operation of the Yucca Mountain repository are summarized in Figure 25 below.

Figure 25 Unreimbursed Accident Costs in Clark County

Jean Rail Corridor	$30,873,728
Valley Modified Rail Corridor	$21,196,603
Apex Dry Lake Heavy Haul Route	$40,281,104
Caliente Heavy-Haul Route	$51,133,147
Sloan-Jean Heavy-Haul Route	$29,367,425

Cumulative Impact Accident Costs

The cumulative impact of the DOE's shipments to the NTS is also significant. The volumes of shipments are from the DEIS and are included for each route. The FHWA estimate of costs for combination trucks on urban highways (adjusted to year 2000 dollars) is $1.24 per vehicle mile. The numbers presented in Figure 26 represent the unreimbursed costs to Clark County due to low level waste disposal activities at the NTS.

Figure 26 Cumulative Unreimbursed Accident Costs

	Accident Costs	Unreimbursed Accident Costs
Cumulative Impact	$32,899,680	$9,869,904

Incident Delay

Incident delay is the change to traffic system performance due to traffic incidents. This subsection includes delays due to drivers stuck in traffic as well as "gaper-lock" - the tendency for drivers in opposing lanes to slow down to observe the scene of an incident. Two types of incidents are considered: Traffic accidents, and incidents in which radiation contamination is released beyond the vehicle. Clark County's analysis assumes that when radiation is released and is confined to the vehicle, it will be detected at a routine stop instead of "in transit." Clark County's analysis differentiates between two types of delay. The first is incident delay in which the delay associated with specific incidents or a specific type of incident can be assessed. The second type of delay, system delay, is the impact a major incident will have on the function of a regional transportation system. Delay impacts occur when drivers are stuck in traffic immediately behind an incident waiting for it to clear. This section measures the traffic delay costs due to design incidents. The purpose is to establish an upper boundary on the impacts due to delay.

Construction Phase Incident Delay

During the construction phase of the Yucca Mountain Project, various rail and/or heavy-haul routes will be constructed. Accidents that occur during this construction will cause traffic delays. The upper bound of the expenses are calculated for each of the various implementing alternatives the DOE proposes to construct through Clark County. The DEIS anticipates the need for up to 1,800 new jobs.

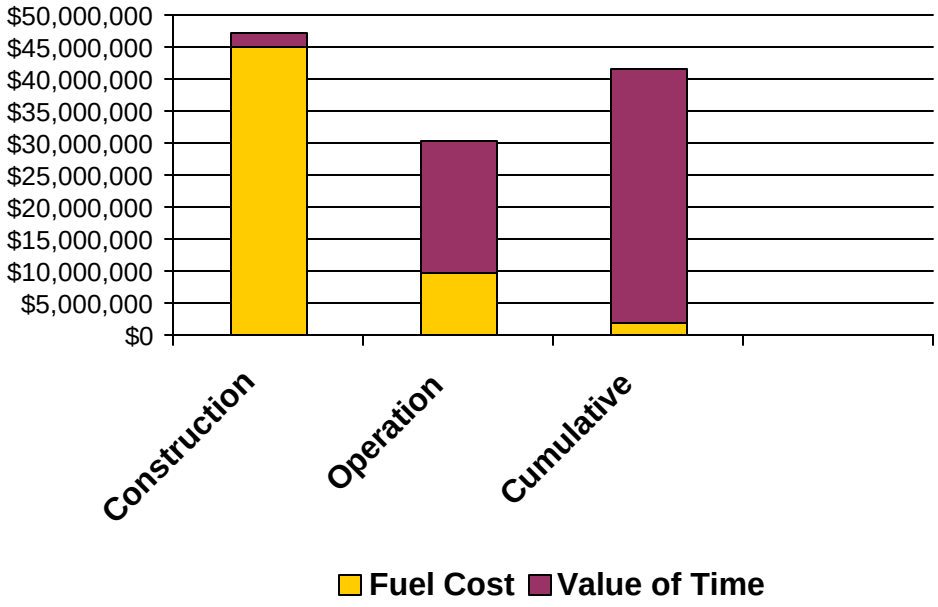
Summary of Incident Delay Impacts

The upper boundary of the delay costs to the residents of Clark County due to traffic delays caused by the Yucca Mountain Project and the disposal of low level waste at the NTS are shown below:

Travel time variability

When travelers are diverted from routes due to accidents and incidents, it reduces the reliability of that route system. For example, travelers to time sensitive events such as meetings or airplane flights may choose a more circuitous route that has a reliable travel time over a more direct or faster route that is less reliable.

Figure 27 Incident Delay Costs to Clark County Residents



Transportation Planning Impacts

The absence of a coherent plan to transport the high level radioactive nuclear waste is a significant impact that is already affecting Clark County. Without definitive knowledge of the DOE's transportation plan, Clark County decision-makers cannot engage in planning practices that will minimize harm in the event of an incident. It is difficult to anticipate, for example, appropriate land uses along possible routes. It is also difficult to plan in advance for emergency evacuation routes and strategic locations for emergency services. This plan should be prepared in accordance with the Statewide Planning/Metropolitan Planning regulation issued by FHWA on Oct 28, 1993. These statutes require a continuing, comprehensive, and coordinated transportation planning process for the metropolitan areas and states. The plan should recognize - as does the Nuclear Regulatory Commission - that Clark County is within the Area of Influence of Yucca Mountain and that its transportation network must be considered in this report.

The plan ultimately produced by the DOE must describe how the following items will affect Clark County's transportation system and how the DOE will provide the following:

- Evacuation Planning Zone Maps
- Logistical Support for shipping operations
- Recovery Operations
- Institutional Commitments
- Incident Management System
- Incident Command system
- Truck and rail (identify) routes by volume, mode, waste type, time of day and date
- Impacts (assessment) caused by the unique configuration of the rail classification yards northeast of Las Vegas to facilitate rail movement
- Hazards (mitigation) along the routes
- Equitable dispersion of radiological risks nationally

Serious land use and transportation planning considerations exist within potential routes. For instance, the following land uses within one-half mile of high level radioactive waste routes would be affected by daily anticipated truck trips along Clark County's highways:

- 37 schools
- 2 major health facilities
- 1 special event center

- 23 hotels

It should be noted that the population sectors such as children and seniors would be most directly affected. As noted in Chapter 4, Section 4.5, public safety and preparedness for potential accidents are primary concerns.

Construction Phase Land Use Impacts

The construction of various routes through Clark County will impose a burden on Clark County's public facilities. The workers and their families will require public services and Clark County will have to pay for these services. Standard impact fee assessment methods were used to determine the following impacts for various categories of public facilities (Figure 28).

Figure 28 Summary of Public Facility Costs

Alternative Public Facility	Jean Rail Corridor	Valley Siding Rail	Apex-Dry Lake Heavy Haul	Caliente Heavy-Haul	Apex Heavy Haul
Parks	$806,380	$368,130	$613,550	$911,560	$262,950
Fire Station	$150,000	$75,000	$50,000	$175,000	$50,000
Police Station	$62,000	$31,000	$31,000	$62,000	$31,000
Traffic Signal	$27,360	$12,730	$20,520	$30,780	$8,740
Elementary School	$4,900,000	$2,300,000	$3,600,000	$5,500,000	$1,600,000
Middle School	$2,200,000	$1,600,000	$1,800,000	$2,600,000	$800,000
High School	$3,200,000	$2,400,000	$2,400,000	$3,600,000	$1,200,000

Construction, Operation, and Cumulative Phase Monitoring Impacts

The transportation of high level radioactive nuclear waste through Clark County will require the county to embark on an extensive program to monitor the impacts the program will have on the transportation system and the community. These costs will vary with the program phase. During the construction phase of the proposed high level radioactive nuclear waste repository, a minimum requirement of two additional staff members will be needed to monitor the transportation aspects of the DOE's program. Additionally, a modest consulting budget is required in order to engage unique, outside technical expertise.

In the operation phase of the repository, staff would be required to monitor compliance with state and federal laws, and guidelines. These costs will be incurred throughout the lifetime of the program. Transportation impacts to Clark County are indeed significant, even considering the limited information provided in the DEIS and SDEIS. Clark County officials would have been better able to estimate and evaluate potential impacts had the DOE completed a transportation plan prior to site recommendation.

4.4 Impacts Due to Yucca Mountain Operations

Sec.116 (b)(B)(ii) of the NWPAA states in part that the Secretary shall make funds available to the Affected Units of Local Government "to develop a request for impact assistance under paragraph (2). Section (B) of paragraph 2 defines the areas of concern for the impacts as "economic, social, public health and safety, and environmental impacts."

The following is a summary of Clark County's concerns related to the construction, operation and closure of the Yucca Mountain repository. Absent a final repository design and FEIS, it is impossible to fully identify all possible impacts in this regard. Clark County's concerns in this area relate to quality assurance, work force health and safety, impacts to species, and air quality impacts.

The construction, operation and eventual closure of a repository could have severe economic consequences on Clark County. The most severe and immediate impacts would likely be due to transportation, either routine or with possible and likely accidents.

Beyond transportation, there are however, construction and operational issues that could also have extremely negative economic effects on the County. Even though the actual operation of the proposed repository will occur in Nye County, the effects of stigma and perceived risk are not that easily separated, and thus must be recognized.

Accidents, whether serious or not, will be portrayed by the press as occurring "in the vicinity of, or near Las Vegas." Considering the known effects of stigma and perceived risk, these accidents may as well occur in downtown Las Vegas. Survey results contained in *Clark County Visitor Survey Report* (UER, 2002) clearly demonstrate the tourists' perception regarding perceived risks.

Quality Assurance Concerns

The Yucca Mountain program has a long history of quality assurance problems, problems that in the past have been a consistent inability to follow their own procedures, and lately (May 17, 2001 letter W. Reamer to S. Brocoum) have included computational errors in critical site suitability documents (*Total System Performance Assessment for Site Recommendation*). In addition to these failures there are also Corrective Action Reports issued that deal with model validation and the control of software. The effects of these have not been fully evaluated.

Inability to follow quality control procedures during site characterization can, and has led to the collection of data that either has to be qualified or that cannot be used at all. Inability to follow quality assurance procedures during the loading and sealing of casks with high level radioactive nuclear waste can lead to immediate loss of life, exposure to elevated levels of radiation, or premature and unanticipated failure of disposal casks. The premature failure of disposal casks will most likely not have immediate effects on Clark County, as even a worst case failure would most likely not occur for hundreds of years. An accident involving the release of radiation or the exposure of individuals to levels of radiation beyond that allowed for in regulations could have severe and negative impacts on Clark County. Here again, the role of the media and the effects of stigma and perceived risk become critical elements in evaluating impacts to Clark County from site operations.

For additional details on discrepancies in the areas of mathematical computations, modeling and quality assurance see the following OCRWM-02-D-016, OQA-01-D-146, OQA-01-D-147, BSC-02-D-008, BSC-01-D-142, LVMO-98-D-038, LVMO-00-D-119, LVMO-00-D-118, LVMO-00-D-007, LVMO-00-D-028, BSC-01-D-050, BSC-01-D-051, BSL-01-C-002, BSC-01-D-078, BSC-01-D-088, BSC-01-C-001, BSC-01-D-063, and BSC-01-D-078 (Appendix G).

All of these discrepancies and incomplete studies amount to an unacceptable level of uncertainty as to the suitability of Yucca Mountain as a high level radioactive nuclear waste repository.

Clark County Workforce Impacts

Negative health impacts on the workers involved with the proposed repository at Yucca Mountain are expected to be much more extensive than the DEIS indicated. With the issuance of the SDEIS and the large proposed fuel blending facility, it is clear that work force exposure during normal operations will increase. It is not possible to fully define this increase as neither the DEIS nor the SDEIS contains a detailed description of the processes involved. Without this information it is impossible to realistically analyze health impacts to the workforce.

The likely employment during the lifecycle of the facility is expected to reach 1,800 persons. Approximately 90% of these workers will, based on historical trends, live in Clark County.

The handling of highly radioactive nuclear waste in the pool storage building will create additional opportunities for accidents. Releases of radioactive materials from accidents may or

may not be contained in the pool storage and blending area. The mixing of spent nuclear fuel assemblies of different sizes and different radiological characteristics from different fuel batches and/or reactors will create numerous opportunities for errors (e.g. insertion of incorrect assembly in disposal canister, insertion of assembly in incorrect disposal canister cell, etc). Deliberate sabotage also becomes easier and more likely with the additional step of fuel handling. Cleanup after accidents will likely increase worker exposures and generate additional health problems.

Impacts to Species

The DOE's assessment of impacts to species in the DEIS is incomplete (see Appendix C). Clark County recently completed a *Multi-Species Habitat Conservation Plan and Environmental Impact Statement* that covers over 80 threatened or endangered species. Further, the county has achieved compliance with the Federal Endangered Species Act. Specifically, Clark County has been able to achieve and maintain a Federal Section 10A Permit as required under the Act. The DOE's activities related to construction, operation, monitoring and closure of a repository could severely compromise Clark County's ability to retain this permit. Loss of this permit, which allows ongoing development and construction activity in Clark County, would severely impact Southern Nevada's economic stability.

Specific concerns about the DOE's proposals in the DEIS and SDEIS are outlined below. These issues are of concern to Clark County because it is engaged in supporting significant conservation actions in areas adjacent to and in the regional vicinity of the repository. For example:

- The regional and range-wide implications of the loss of the unique desert tortoise (*Gopherus agassizii*) populations and the genetic potential of these populations at the northern extremes of this species range, particularly with respect to the implications of increased traffic and habitat disturbance due to construction and operation activities have not been fully considered by the DOE.
- Range-wide implications exist due to increases in raven populations and their increased levels of predation on unique desert tortoise (*Gopherus agassizii*) populations at the northern extremes of this species range due to this activity.
- Discharge of radioactive and toxic effluent would pose a more significant threat than is currently being considered.

- When considering rail corridor routes, particularly in the area of Jean, Nevada, the DOE does not recognize that this corridor would pass through or near the Clark County Desert Tortoise Large-Scale Translocation Study Site (LSTSS) west of Jean. Clark County has invested significant resources in establishing this site and funding studies to investigate the efficacy of translocating displaced desert tortoises. Currently more than 2,000 displaced desert tortoises have been successfully translocated to this site and many more will be translocated over the coming several years. This site is crucial to desert tortoise conservation and management in Clark County. Clark County residents have overwhelmingly supported desert tortoise conservation actions because, in part, displaced tortoises have been humanely provided a wild home at the LSTSS. Threats to the integrity of the LSTSS would jeopardize public support for tortoise conservation efforts.
- The contribution of truck traffic related to this activity and its impact on desert tortoise populations is lacking a consideration of noise and low frequency vibrations.

Air Quality Impacts

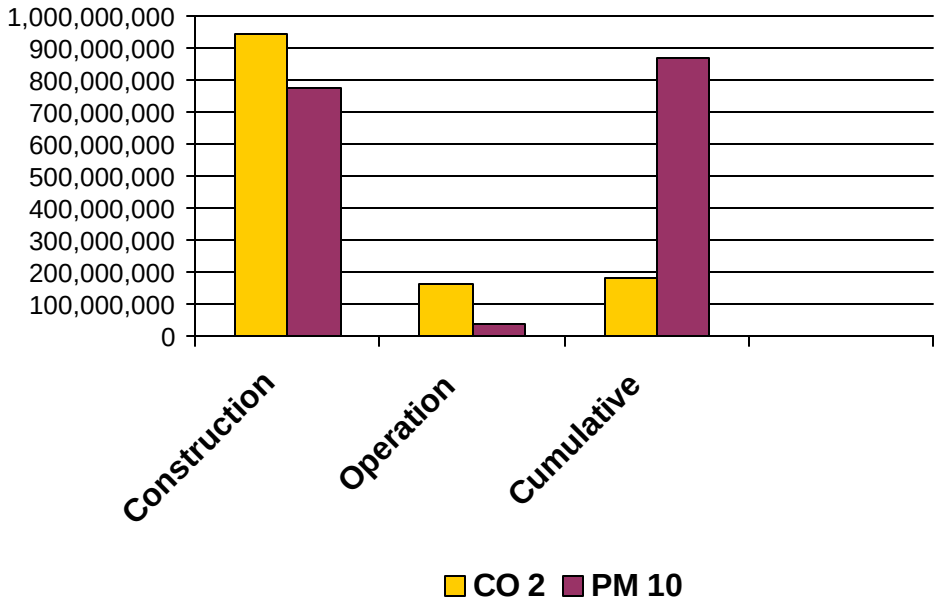
The EPA issued transportation conformity regulations on November 24, 1993 to implement Section 176(c) (4) of the Clean Air Act as amended. The transportation conformity regulations apply to actions of the FHWA and Federal Transit Administration. Actions of other federal agencies, including other transportation agencies are covered by the general conformity regulations issued by the U.S. Environmental Protection Agency (EPA) on November 30, 1993. The DOE is covered by these general conformity regulations.

The Las Vegas valley is classified by the EPA as a serious non-attainment area for carbon monoxide (CO) and particulate matter (PM_{10}). The Clark County Regional Transportation Commission is responsible for establishing CO and PM_{10} emissions and for demonstrating conformity. Because Clark County is in non-attainment for air quality emissions, the pollutants to be generated by the proposed Yucca Mountain repository project are of concern. The DEIS translated some of the air quality impacts into an estimate of the fatalities caused by the pollutants. However, air quality impacts are important to Clark County for regulatory purposes that are not considered in the DEIS. The construction and operation of Yucca Mountain Project transportation facilities impacts the ability of Clark County to meet national air quality standards. Failure to meet these standards will harm Clark County's ability to obtain federal funding for transportation facilities and will generally harm the quality of life in Clark County.

Vehicular emissions are the primary source of CO pollutants, whereas construction activities are the primary source of dust (PM_{10}) in the Las Vegas valley. In addition to vehicle miles of travel, traffic congestion is a significant contributor to increased CO emissions.

The upper boundary of the air quality impacts on the residents of Clark County due to air quality pollution caused by the Yucca Mountain Project and the disposal of low level waste at the Nevada Test Site are shown in Figure 29:

Figure 29 Grams of Air Pollutants Released in Clark County During the Yucca Mountain Project



Proposed Yucca Mountain Project activities will substantially degrade Clark County's air quality. Clark County air quality goals would therefore be difficult to achieve and could cause other federal agencies to take punitive action on Clark County due to violations caused by the actions of the DOE over which Clark County would have no authority.

4.5 Public Safety Impacts

The following fiscal impacts reflect an integrated view of impacts to public safety agencies in Southern Nevada. The agencies represented include Las Vegas Metropolitan Police Department (LVMPD), Clark County Fire Department, Clark County Office of Emergency Management, Clark County Health District, Las Vegas Fire Department, Las Vegas Office of Emergency Management, North Las Vegas Police, North Las Vegas Fire Department, Henderson Police Department, Henderson Fire Department, Henderson Office of Emergency Management, Mesquite Police Department, Mesquite Fire Department, Boulder City Police Department, Boulder City Fire Department, Moapa Fire Department, and Moapa Office of Emergency Management, and seven major Southern Nevada hospitals.

These impacts are more fully addressed by UER in the individual agency reports as well as its report entitled *Impacts to Clark County and Local Governmental Public Safety Agencies Resulting From the Yucca Mountain Project* (UER, 2001).

The integrated impact study does not attempt to estimate the total costs to public safety agencies within Clark County government and its local jurisdictions from the Department of Energy's shipping of high level radioactive nuclear waste. Rather, only the incremental or additional costs to governmental entities that would be directly attributable to the siting of the repository at Yucca Mountain and the subsequent shipping campaign are projected. This fiscal impact study of public safety agencies uses a case study approach that provides each county and local government public safety personnel with the three transportation scenarios described in Chapter 3. Public safety personnel were asked to describe how the events would impact their agency. Public safety personnel were then asked to compile a list of resources, training, personnel, equipment, and capital outlays necessary for them to be able to ensure the public health, safety, and welfare and to carry out their agency's mission for each of the three scenarios.

The integrated impact study demonstrates major negative impacts on the public safety agencies within Clark County and its local jurisdictions. Potential vulnerabilities to these agencies and the hospitals in Southern Nevada as well as the fiscal impacts to the public safety agencies have been evaluated. Because of the length of time between now and when shipments may actually begin, the ambiguities surrounding the actual shipment routes and the modal mix, the estimated fiscal projections are tentative. The potential fiscal impacts and vulnerabilities to Clark

County public safety agencies alone, just to the year 2007 when the shipping is proposed to begin, include over $67.6 million for police services, over $195.8 million for fire services, and over $10.6 million for emergency management.

Despite the high degree of professionalism and organization, none of the public safety agencies are currently adequately prepared, trained, or equipped to respond to any of the three high level radioactive nuclear waste shipping scenarios used in the study. This finding is consistent with the 1995 Public Safety Advisory Committee's report that examined public safety needs in Clark County.

The current County Emergency Operations Center that would be the focal point of the County's response to an incident involving high level radioactive nuclear waste is only adequate for a very short duration event.

Southern Nevada hospitals are not adequately equipped, nor are personnel properly trained to effectively manage a high level radioactive nuclear waste incident like that contained in Scenario 3. The hospital system is already strained under current needs, and the projected hospital needs for the area are daunting. This system will not be adequate to handle the events described in the scenarios in this study.

The total projected cost to just the public safety agencies examined in this study to be adequately prepared for a Scenario 3 event is $359,986,630.

This $359,986,630 projected fiscal cost for public safety agencies includes $274.1 million for Clark County; $45.1 million for the City of Las Vegas; $23.3 million for North Las Vegas; $1.3 million for Henderson; almost $7.0 million for Mesquite; approximately $400,000 for Boulder City; and $8.5 million for the Moapa Band of Paiutes. The estimate for Clark County includes all of the fiscal impacts estimated for the LVMPD have been attributed to the County. However, it should be observed that LVMPD annual operating and capital costs are shared between Clark County and the City of Las Vegas.

The largest projected costs to these public safety agencies fall under the categories of facilities, equipment, personnel, and training. For police services, the projected fiscal cost is over $72.5 million for the communities examined in this study. The Fire Departments' projected fiscal costs total over $275.3 million, and the Offices of Emergency Management fiscal cost projections total over $12 million. These cost projections are for the agencies to be prepared for a Scenario 3 incident beginning in 2010. The projections do not include costs that will be recurring such as vehicle and equipment replacement costs or the dollar costs of training new employees after 2007.

Hence, the fiscal cost projections in the report will tend to underestimate (are conservative) some of the fiscal impacts to the public safety agencies.

Additional Haz/Mat Radiological personnel, training, and equipment are viewed as critical needs among the public safety agencies. The hospitals lack sufficient decontamination facilities, equipment, and trained personnel.

Current planning activities are progressing, regional public safety organizations are beginning to grapple with the problems posed by high level radioactive nuclear waste shipments, and a Southern Nevada hospital system approach is developing with the help of the Clark County Health District. There is a critical need for a strong regional effort to ensure that the County, the municipalities, and the Moapa Band of Paiutes are prepared for high level radioactive nuclear waste shipments. Additional resources for the hospitals and the Health District are not projected in this study, only their training and equipment needs.

Figures 30 through 33 below list additional anticipated public safety costs resulting from the repository. These costs reflect combined estimated personnel, training, and equipment costs for police, fire and emergency management for the Southern Nevada jurisdictions covered by this analysis.

Figure 30 Total Projected Costs by Community/County

	Police	Fire	Emergency Management	Cost
Clark County	$67,686,369	$195,896,055	$10,614,385	$274,196,809
Las Vegas	*	$44,596,793	$561,265	$45,158,058
North Las Vegas	$711,021	$22,421,402	$207,623	$23,340,046
Henderson	$952,427	$285,933	$148,569	$1,386,929
Mesquite	$2,828,960	$4,151,451	***	$6,980,411
Boulder City	$404,880	**	**	$404,880
Moapa	N/A	$8,038,644	$480,853	$8,519,497
Totals	$72,583,657	$275,390,278	$12,012,695	$359,986,630

* Las Vegas Metro provides services to both Clark County and the City of Las Vegas
** Because of the projected distance to the high level radioactive nuclear waste shipment corridor, Boulder City estimated impacts only for the Police Department.
*** In Mesquite, Emergency Management is a function of the Fire Department and thus costs are combined under Fire.

Figure 31 Projected Fiscal Impact Costs on Metro Police Department

	Personnel	Training	Equipment	Cost
Clark County	$17,582,464	$8,080,604	$42,023,301**	$67,686,369
Las Vegas	*	*	*	*
North Las Vegas	0	$711,021	0	$711,021
Henderson	$510,195	0	$442,232	$952,427
Mesquite	$1,876,446	$34,754	$917,760	$2,828,960
Boulder City	$186,000	$18,880	$200,000	$404,880
Moapa	0	0	0	0
Totals	$20,155,105	$8,845,259	$43,583,293	$72,583,657

*Las Vegas Metro Police Department provides services to both Clark County and the City of Las Vegas
** Equipment includes capital costs

Figure 32 Projected Fiscal Impact Costs on Fire Department

	Personnel	Training	Equipment	Cost
Clark County	$25,991,241	$13,615,031	$156,289,783**	$195,896,055
Las Vegas	$5,711,370	$4,044,588	$34,840,835	$44,596,793
North Las Vegas	$3,851,129	$5,121,073	$13,449,200	$22,421,402
Henderson	$140,592	$70,296	$75,045	$285,933
Mesquite	$1,874,429	$333,133	$1,943,889	$4,151,451
Boulder City	0	0	0	0
Moapa	$1,791,292	$94,584	$6,152,768	$8,038,644
Totals	$39,360,053	$23,278,705	$212,751,520	$275,390,278

** Equipment includes capital costs

Figure 33 Projected Fiscal Impact Costs on Offices of Emergency Management

	Personnel	Training	Equipment	Cost
Clark County	$340,340	$9,552	$10,264,493**	$10,614,385
Las Vegas	$561,265	0	0	$561,265
North Las Vegas	0	$207,623	0	$207,623
Henderson	$61,463	$13,401	$73,705	$148,569
Mesquite	0	0	0	0
Boulder City	0	0	0	0
Moapa	$203,353	0	$277,500	$480,853
Totals	$1,166,421	$230,576	$10,615,698	$12,012,695

** Equipment includes capital costs

The health and safety of Clark County residents and visitors are of paramount concern to local elected officials. The analysis contained in this report is conservative and realistic, having been based on the experience and knowledge of public safety professionals. This analysis should be carefully considered by those who are a part of the decision-making process for Yucca Mountain, as it is an integral component to the implementation of the Yucca Mountain Project.

4.6 Non-Public Safety Governmental Impacts

The following Clark County non-public safety governmental departments provided the projections contained in this subchapter: Administrative Services, Assessor, Aviation, Building Department, Business License, Comprehensive Planning, County Clerk, District Attorney, Finance, General Services, Health District, Parks and Recreation, Public Communications, Public Works, Recorder's Office, Social Services, and Treasurer's Office.

In addition, information was provided by the following agencies: Regional Flood Control District, Regional Transportation Commission, Clark County Sanitation District, and Clark County School District. Although these agencies are separate from general Clark County government, it is important to demonstrate the interdependent nature among them. Further, it is important to understand the combined impacts to Clark County as a region.

This study provides a first estimation of the range and magnitude of potential impacts to Clark County non-public safety governmental agencies as a result of the DOE's proposal and compliments an earlier study of potential impacts to the public safety agencies within Clark County and its incorporated jurisdictions, summarized in Chapter 4.5.

This study does not attempt to estimate the total costs to the Clark County government from the DOE's shipping of high level radioactive nuclear waste, but only the incremental or additional costs to governmental entities that would be directly attributable to the siting of the proposed repository at Yucca Mountain and the subsequent shipping campaign. The analysis for this set of impacts used the same case study approach as Clark County's public safety agencies and is similar to the methodology used by the State of Nevada over the last decade to identify impacts to governmental agencies. County agency personnel were presented with the three transportation scenarios described in Chapter 3, and were asked to describe how each of the events would influence their agency. County personnel then provided a first estimation of the additional

resources, training, personnel, equipment, and capital outlays that would be required by their agency to carry out their responsibilities under each of the three scenarios.

The results of the study indicate significant negative impacts on many of Clark County governmental agencies. The potential vulnerabilities, as well as a first estimation of the likely fiscal impacts to these agencies, are described in the report entitled *Non-Public Safety Governmental and Fiscal Impact Report* (UER, 2001). Because of the length of time between now and when shipments may actually begin, the ambiguities surrounding the actual shipment routes, and the modal mix, the results are very tentative.

The potential fiscal impacts to these non-public safety governmental agencies in order to prepare for the commencement of the high level radioactive waste shipments to Yucca Mountain (adjusted to the year 2007 as reflected in the DEIS) are likely to reach almost $40 million. These include almost $6.3 million in additional personnel costs; almost $20 million in expenditures for radiation health and safety, approximately $13 million in equipment and capital expenditures, as well as communication training, changes to various County planning documents, and public outreach.

Over the proposed 24-year duration of the shipment campaign, the cost for personnel would reach $229 million, while the cost for training, plan development and public outreach would reach almost $123 million. Other capital and equipment costs were only estimated through the commencement of the proposed program in 2007 since projecting the diverse nature of these costs were beyond the scope of this report.

In addition, these estimates are quite conservative. Although most agencies indicated that they would likely experience adverse fiscal impacts on their personnel costs in order to prepare for the proposed repository and its related high level radioactive nuclear waste shipment campaign, only eight agencies were able to quantify the potential fiscal impacts to their agencies. Many of the agencies identified additional studies required to forecast the impacts to their agencies.

If a Scenario 2 type of high level radioactive nuclear waste incident were to occur, many of the agencies indicated that they would experience additional impacts. However, only three of the agencies felt that they could quantify these impacts based on the available information. According to the estimates provided by these three agencies, a Scenario 2 event would result in another $1 million in expenditures, primarily for overtime and some additional training. As studies are completed, agencies should be better able to more accurately and completely define vulnerabilities.

The potential magnitude of a Scenario 3 high level radioactive nuclear waste accident was the most troubling to those interviewed. The fiscal impacts within just a one-year period were estimated by twelve non-public safety agencies at almost $122 million. These include an additional $6 million in personnel costs; over $645 thousand in additional training costs; and almost $47 million in equipment and capital costs, a decline in revenues of $7 million and additional medical expenditures of $61.5 million. It should be noted that many of these costs would likely last for well over the year that has been estimated in this report.

Preparedness Impacts

Among the 21 agencies interviewed, only three indicated that they are unlikely to incur impacts as a result of needing to prepare for the DOE's proposed repository and its related shipment campaign. Among the eighteen other agencies, extensive lists of impacts were identified that were likely to occur as a result of their need to prepare for the high level radioactive nuclear waste shipment campaign. Approximately half of these agencies were able to identify at least to a limited extent, the magnitude of potential fiscal impacts to their agency. The nature of the impacts can be grouped into the following categories:

Personnel

Training, Planning, and Public Outreach

County Expenditures and Revenues

Public and Environmental Health

These costs are summarized in Figure 34 below

Figure 34 Summary Preparedness Costs for Non-Public Safety Agencies

AGENCY	PERSONNEL*	EQUIPMENT AND CAPITAL COSTS**	TRAINING AND PLANS*	FISCAL IMPACTS
Administrative Services			$184,481	$184,481
Aviation	$3,137,924	$9,849,703	$1,506,596	$14,494,223
Comprehensive Planning	$882,058		$2,248,560	$3,130,618
District Attorney	$139,406			$139,406
General Services	$143,896			$143,896
Health District	$383,721	$3,000,000	$1,048,083	$4,431,804
Parks and Recreation	$263,808	$112,568	$491,950	$868,326
Public Communications			$368,962	$368,962
Regional Transportation Commission*, **	$455,658		$12,500,000	$12,955,658
School District	$863,371		$1,430,763	$2,294,134
Social Services			$119,913	$119,913
TOTALS*, **	$6,269,842	$12,962,271	$19,899,308	$39,131,421
CUMULATIVE TOTALS 2007 - 2031	$228,593,827		$122,669,481	$351,263,108

***** Personnel, training, information development/distribution, and plan development costs are adjusted using a 3% inflation factor through 2007.

** Equipment, Facilities/Capital costs are adjusted using 5% inflation factor through 2007.

Personnel Impacts

Thirteen agencies indicated that they would experience personnel impacts merely to prepare for the DOE's proposed high level radioactive nuclear waste shipment campaign. Among the eight agencies that estimated the fiscal impacts in the area of personnel, the largest impact was estimated by the Department of Aviation.

- Department of Aviation would require 60 bus drivers and 40 buses to be maintained for evacuation purposes if the DOE proceeds with the high level radioactive waste shipments. The airport's current evacuation plan calls for the use of public buses and school buses and that if a nuclear waste incident were to occur, it would be unlikely that these buses would be available, since the School District would need to prioritize transporting students instead of airport passengers and staff. The personnel costs associated with hiring these drivers would be over $3.1 million.

- Department of Comprehensive Planning would require over $880,000 to maintain program oversight staff through the Yucca Mountain licensing phase. This includes the addition of a regulatory analyst and a geographic information systems technician.
- Department of Parks and Recreation would require four additional police officers and an information management specialist.
- General Services would require additional staff to process contracts and manage purchase and lease agreements from other County agencies affected by the high level radioactive nuclear waste shipment campaign.
- District Attorney's Office needs to provide support for the increased litigation that is expected, particularly along the northern Beltway if that route is selected for the high level radioactive nuclear waste shipment campaign.
- Regional Transportation Commission identified the need for a transportation modeler, engineer, and planner as well as support staff if the DOE proceeds.
- The Clark County School District would require over $860,000 to implement their policy of "shelter in place," if the DOE proceeds with the high level radioactive waste shipments.
- The Clark County Health District would require an additional four staff to conduct the extensive education and public information program that will be needed to inform Clark County residents about the nature and risk associated with high level radioactive nuclear waste shipments.

County departments such as the Assessors Office, the Clerk's Office, Finance, and the Recorder, all indicated that they would also have personnel impacts that would require further study to quantify the magnitude of these impacts.

Among those agencies who did make a first estimation of impacts, the personnel requirements to prepare for the commencement of the program was almost $6.27 million. When these personnel costs are forecast out over the 24 year life cycle of the shipment campaign described in the DEIS, the fiscal cost to Clark County reaches almost $229 million.

Preparedness: Training, Planning, and Public Outreach Impacts

The largest category of fiscal impact for the non-public safety agencies is in the area of training and plan development. The Regional Transportation Commission indicated that they will need upwards of $12.5 million to conduct impact analysis of the alterative routes, as well as to conduct impact studies including pavement, air quality, and land use studies once the DOE has

selected the transportation routes they would use for the high level radioactive nuclear waste shipments.

The Department of Comprehensive Planning will likely need upwards of $2.25 million a year through the site characterization phase in order to perform oversight studies and detailed fiscal impact analysis, develop a monitoring program, and carry out regulatory and policy analysis. If the DOE proceeds with its shipment campaign, Clark County will need to continue to provide monitoring of key indicators in order to identify impacts and to provide policy support as the proposed Yucca Mountain Project evolves. The Department of Comprehensive Planning, as well as the Assessor's Office, Department of Parks and Recreation, Department of Social Services and the School District all commented on the impacts the high level radioactive nuclear waste shipment campaign will have on the planning process. They all noted that current planning activities are largely driven by accessibility. Thus, facilities such as hospitals, intermediate care facilities, child and adult daycare, schools, parks, and other recreational facilities are located in areas that are easily accessible to highways. If the high level radioactive nuclear waste shipment campaign proceeds, the County will likely have to reassess its entire approach to planning to incorporate the additional risk factors associated with high level radioactive nuclear waste transport.

The Department of Aviation noted that they would need to make additions to their emergency response plan and would require a detailed risk assessment in order to update their airport evacuation plan. The current evacuation plan calls for utilizing school buses to evacuate McCarran Airport. In the event of a high level radioactive waste accident, it is unlikely that the Clark County School District would make these busses available, needing instead to provide for the safe transport of their students. The costs for these studies were forecast at over $675,000. The Department of Aviation also noted "Rad 1" training will be needed for the approximately 300-security and traffic control personnel at the airport. This will result in additional costs of $830,000 per year throughout the duration of the shipment campaign.

The Department of Parks and Recreation identified the need to conduct detailed analysis of current and future park and recreation facilities to determine potential visitor impacts, as well as, evacuation and closure strategies. These studies were forecast to cost upwards of $490,000.

The Neighborhood Services Division within Administrative Services and Public Communications also noted the need for ongoing public outreach activities, including outreach through neighborhood groups, and other appropriate education and outreach activities in order to

address residents' concerns about the shipment campaign. The Public Communications staff also noted that all Clark County public information personnel would need risk communication training on an annual basis so that they would be prepared to communicate effectively with the public in case of a high level radioactive waste incident. The additional public information and risk communication costs were forecast at over $550,000 annually throughout the duration of the shipment campaign. These costs are in addition to the four personnel identified by the Health District as needed to provide information and education about the health risks associated with the shipment campaign.

The Clark County School District indicated that they would require approximately $1 million in order to conduct a study detailing the impacts to the school system and to their finances that will result if the DOE proceeds with the high level radioactive nuclear waste shipment campaign. In addition, they believe that training costs and annual training exercises will result in another $430,000 in expenses for the District. The Department of Social Services also indicated that their 65 social workers would also need "Rad 1" training at a cost of almost $120,000 per year.

Among the nine agencies that were able to provide first cut cost estimations for training, planning, and public outreach, the fiscal impacts just to prepare for commencement of the program is almost $20 million. Over the 24-year lifecycle of the shipment campaign discussed in the DEIS, these additional costs to Clark County will grow to almost $123 million.

Preparedness: Clark County Expenditures and Revenues

The Department of Aviation indicated that in order to develop an effective evacuation plan for the airport to respond to a high level radioactive nuclear waste accident event, if it occurred in proximity to the McCarran Airport, would require the acquisition of 40 buses at a cost of over $2.8 million. As noted previously, currently the Department is dependent on the Clark County School District to supply buses for an airport evacuation. This would not be a viable alternative in the event of a high level radioactive waste incident. The Department of Aviation also indicated that they would need 50 early warning monitoring instruments in order to protect the airport if the DOE proceeds with the high level radioactive nuclear waste shipment campaign along I-15 adjacent to the McCarran Airport. The cost for these monitors would be approximately $7 million.

The Department of Parks and Recreation noted that they would need 4 vehicles for the additional Parks Police that will be required at a cost of approximately $113,000.

The Health District indicated that they would need a computer system for environmental health inspection data and enhancements to the Emergency Management System communication system currently being deployed at costs of upwards of $3 million.

It was also noted that Clark County pays for additional services through the additional funds that are generated from growth in the local economy. Based on current growth rates, it was estimated that it would take 50 years for the County to be able to provide the additional $275 million identified in the *Review of Impacts to Clark County Public Safety Agencies Resulting from the Yucca Mountain Project* (UER, 2001).

It was further pointed out that the County would need to determine whether insurance rates would go up on County facilities and for employee health insurance because of the DOE's proposed high level radioactive nuclear waste shipment campaign. There could be an increase in residential property insurance rates that could make living in the County less attractive.

A direct link exists between revenues and the level of County services that can be provided. If the high level radioactive nuclear waste shipment campaign results in a reduction in revenues from property value diminution and stigma related reductions in visitor generated taxes, staffing levels would be reduced and the quality of County services would subsequently decline. The debt rating for the County could suffer, leading to an increase in the cost of capital.

Preparedness: Clark County Public and Environmental Health

In order to establish a baseline for monitoring radiation relaxed health impacts, the Health District might consider testing all school children. Air Quality State Implementation Plans may require adjustment in the future to account for air quality issues associated with the high level radioactive nuclear waste shipments.

Scenario 2: Additional Personnel Impacts

While many of the agencies interviewed indicated that they would experience personnel impacts from a Scenario 2 high level radioactive nuclear waste shipment event, only General Services and the Recorder's Office felt that they could provide a first cut estimation of the fiscal level of impacts (Figure 35). Under this scenario, General Services indicated that they would likely need another $50,000 to support temporary overtime costs related to contract management activities associated with an incident. The Recorder's Office indicated that they would likely experience a 10% increase in personnel costs during the period immediately following the incident as a result of the transference of property from County residents migrating from the area.

Scenario 2: Additional Training, Planning, and Public Outreach Impacts

The Public Communications office noted that there would need to be additional public outreach activities if a Scenario 2 high level radioactive nuclear waste shipment incident occurred. They estimated that the costs of such activities would be greater than $600,000 (Figure 35).

Figure 35 Summary of Scenario 2 Additional Needs, Vulnerabilities, and Impacts

AGENCY	PERSONNEL*	TRAINING AND PLANS*	FISCAL IMPACTS
General Services	$50,000		$50,000
Public Communications		$614,937	$614,937
Recorder	$284,984		$284,984
Social Services			
TOTALS*, **	$334,984	$614,937	$949,921

* Personnel, training, information development/distribution, and plan development costs are adjusted using a 3% inflation factor through 2007.

** Equipment, Facilities/Capital costs are adjusted using 5% inflation factor through 2007.

Based on the available data, Clark County agencies identified almost another $1 million in impacts above those costs associated with preparedness if a Scenario 2 type event occurred during the shipment campaign.

Scenario 3: Additional Personnel Impacts

If a Scenario 3 level event were to occur, virtually all of the County departments and agencies interviewed would experience adverse personnel impacts:

- The Business License Department indicated that they would require 15 additional auditors, 7 investigators, and support staff to handle the larger number of audits that would result as tourism downturns resulted in turnover in business ownership and the termination of business operations. Associated personnel costs for these activities could reach almost $1.7 million.
- The Department of General Services estimated that they would need another 18 staff to handle all of the purchasing and contract activities that would result from this type of event costing upwards of $1.3 million.
- The District Attorney's Office stated that a Scenario 3 event would significantly increase the level of litigation likely requiring three additional civil attorneys and one criminal attorney, as well as support staff. The cost for these services would run approximately $578,000 per year for two years.

- The Department of Administrative Services noted that they would likely need four analysts within the Center for Strategic Management to deal with policy related issues and 6 additional public outreach personnel to work with the plethora of community issues that would arise from an event of this type. The Administrative Services personnel costs associated with these activities could be $575,000 or more per year.

Similarly, other agencies including the Health District, the County Clerk, the Treasurer, the Recorder, the Department of Parks and Recreation, and Public Communications identified significant fiscal impacts on their personnel costs. In total, those agencies that were able to provide a first estimation of impacts forecast additional personnel costs of nearly $6 million above those previously identified related to preparedness.

Scenario 3: Additional Training, Planning, and Public Outreach Impacts

The Department of Administrative Services emphasized that if a Scenario 3 event were to occur, the magnitude and type of public outreach efforts that would be required would grow dramatically. While it is very difficult to estimate costs for an event of this type, the first cut estimation for only the Neighborhood Services needs were for an additional $370,000 above those costs identified for preparedness. As noted above, Public Communications also identified additional public outreach needs that they would address through the hiring of two additional staff.

Scenario 3: Clark County Expenditures and Revenues

The Department of Social Services estimated that their entire Medical Assistance budget would be exhausted in a few days if a Scenario 3 event occurred. It was noted that the demand for medical services to address both accident and stress related injuries would far exceed resources. This could result in expenditures in the period immediately following the accident of over $61.5 million. Further, it was noted only Social Services is authorized to write County checks without prior Board of Commissioner's authorization and thus, would likely be called on to make expenditures for other critical services. The County Clerk indicated that her office generates significant revenues from issuing marriage licenses and from deputy clerks solemnizing marriages. A great deal of this revenue is generated from tourists who come to Las Vegas to get married. If a Scenario 3 event were to occur, the number of tourists requesting marriage licenses will drop substantially. The County Clerk estimates that this could reduce revenues by almost $7 million a year. Figure 36 summarizes these impacts.

Figure 36 Summary of Scenario 3 Additional Needs, Vulnerabilities, and Impacts

AGENCY	PERSONNEL *	EQUIPMENT AND CAPITAL COSTS**	TRAINING AND PLANS*	REVENUE ***	RANGE OF FISCAL IMPACTS
Administrative Services	$575,580		$368,962		$944,542
Aviation			$276,722		$276,722
Business License	$1,678,778	$422,130			$2,100,908
County Clerk	$383,721			$6,946,328	$7,330,049
District Attorney	$578,041				$578,041
General Services	$1,295,057				$1,295,057
Health District	$503,633	$307,468			$811,101
Parks and Recreation	$191,860	$46,073,792			$46,265,652
Public Communications	$167,878				$167,878
Recorder	$284,984				$284,984
Social Services				$61,493,693	$61,493,693
Treasurer	$287,790				$287,790
TOTALS*, **	$5,947,322	$46,803,390	$645,684	$68,440,021	$121,836,417

* Personnel, training, information development/distribution, and plan development costs are adjusted using a 3% inflation factor through 2007.
** Equipment, Facilities/Capital costs are adjusted using 5% inflation factor through 2007.
*** Shown as a positive number to identify the total impacts to Clark County

This non-public safety impact analysis is, as noted, of a preliminary nature. As more is discovered about the DOE's final program proposal these figures would likely require modification.

5.0 Native American Concerns

To provide a complete understanding of impacts to all communities addressed in the Clark County Impact Assessment Report, the effects on Native American communities must be considered in ways that identify and reflect the range of impacts from a tribal perspective.

From a tribal perspective, the Yucca Mountain area holds special significance to the Native Americans most likely to be impacted by the project. The mountain itself is a very old border between the Western Shoshone and the Southern Paiute. Yucca Mountain is considered sacred, holy ground by the Western Shoshone, Southern Paiute, and Owens Valley tribes. This area is home to many traditional plant and animal species, rock art, and burial sites. Beyond the spiritual significance of Yucca Mountain, the Native Americans place historical and political significance to the area as well, especially with respect to the Treaty of Ruby Valley, established in 1863. Many legal and political battles have been fought over the issues stemming from this treaty over the years.

Federal guidelines CEQ define "adverse effects" for minority populations as follows:

> ". . . the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to, bodily impairment; infirmity; illness or death; air, noise, and water pollution and soil contamination; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality."

Considering this definition, then, it is not surprising that the DOE fails to recognize impacts to minority populations, including Native Americans.

Arguably, minority populations in Southern Nevada would be most negatively affected by transportation of high level radioactive nuclear waste. For example, both Native American communities located within Clark County, the Moapa Band of Southern Paiutes (the Moapa) and the Las Vegas Paiutes, are located adjacent to highway and rail routes for the transport of high level radioactive nuclear waste to Yucca Mountain. Beyond the potential for adverse socioeconomic consequences to the tribes due to the transportation of nuclear waste common to all communities, it is appropriate to consider impacts related to the cultural and spiritual aspects specific to Native Americans.

In the Las Vegas urbanized area, a large percentage of minority and low-income residents live near truck and rail transportation routes. It is estimated, therefore, that these communities

would also be further negatively influenced by decreases in property values, the defection of local banks and businesses, as well as being subject to a disincentive to invest in these communities. A negative effect on the economy could result in job losses, especially at entry-level and low-level positions, which would most quickly and severely affect low-income and minority individuals.

Clark County has, for several years, entered into interlocal agreements with both the Las Vegas and Moapa Paiute bands in order to facilitate program oversight, information sharing, and impact assessment. This has resulted in the opportunity for the affected Native American communities to participate in the impact assessment process. For example, Clark County's consultants, UER, helped the Moapa to prepare an extensive public safety report to assess their preparedness and response requirements (see Chapter 4, Subchapter 4.5). Negative impacts to Native American populations can also be derived from the property value report prepared by UER (see Chapter 4, Subchapter 4.2).

The assessment of impacts on the Moapa shows that shipments of nuclear waste through or near the Moapa Reservation will have adverse impacts on the tribe's culture and spiritual traditions as well as social well being. Some of these concerns focus on the possible loss of tribal farms which are not only important economically but also culturally as it represents renewed economic independence, a return to farming and a possible return of tribal members who have previously left the reservation. There is concern that because of the small population and earlier displacements, that a transportation accident near the community may result in permanent displacement from their traditional lands and restricting access to traditional areas for food gathering and other activities.

Because there is minimal public safety capacity on tribal lands today, basic capacity building to prepare for a possible accident will require major investments in equipment, facilities, planning, and training. In addition, the Moapa are dependent on revenues from their gaming center/store that is located along I-15. If the spent fuel shipments result in fewer customers, especially in the event of an accident, then the financial well being of the Moapa could be adversely impacted.

Further, documented evidence of past practice indicates that the DOE has had difficulty providing financial support through new jobs, highway funding, or the impacts caused by emergency conditions in related nuclear waste projects such as the WIPP site in New Mexico. Understandably, the Native American communities of Southern Nevada do not have much confidence their needs would be considered any differently.

6.0 Public Involvement and Outreach

Introduction

Clark County's Nuclear Waste Program began in earnest in 1988 after Clark County was designated as an Affected Unit of Local Government. The provision of public information and outreach are approved activities under the federal appropriation that funds the County's program.

Clark County can point to many examples of effective public involvement over the course of its Nuclear Waste Program. For example, in 1999 and 2000, the Nuclear Waste Division conducted an extensive outreach effort focused on the release of the DOE's DEIS and Clark County's response to the DEIS. Town advisory boards, citizens advisory councils, city councils, and community groups all had opportunities to receive information and to submit their comments for consideration by the DOE. As a matter of interest, Clark County has received no response from the DOE to any of the comments submitted on the DEIS.

In January 2001, Clark County launched a program known as "INFORM." This program was designed and implemented to establish and maintain an informative, proactive community relations effort directed to all residents of Clark County. Key objectives of the program included raising the level of knowledge and awareness of the proposed Yucca Mountain Project. Equally important has been the notion of providing a means for meaningful public involvement and opportunities to comment on not only various aspects of the DOE's program, but Clark County's efforts as well. Clark County officials recognized the need for public participation and actively sought to improve public involvement, as well as provide opportunities for residents to make their opinions known.

Based on a public perception analysis conducted at the beginning of the INFORM program, key issues were identified, and tactics were employed to establish a dialogue with the public, with emphasis on public participation.

The INFORM program presented timely and accurate information that was accomplished through a strategic plan, and tactics that included the following: informational presentations, public response mediums, mass media, and the mailing and distribution of fact sheets and other information.

Clark County's public outreach efforts have achieved the desired results. One key result is heightened awareness of Yucca Mountain issues and concerns (Appendix H). Another is the growing list of resolutions in opposition to the project (Appendix A).

Public Response

Public response was gathered in several ways, including testimony during County-sponsored public meetings, e-mail, hotline calls, and questionnaires available at public meetings. Additionally, two community-wide surveys were conducted. The complete results of these surveys are included in Appendix H.

Seventy-three percent of these overall responses reflect opposition to the proposed Yucca Mountain Project. Nine percent of the overall responses were in favor of the project, and the remaining 18% are undecided. Eighty-seven percent of Clark County's residents are extremely concerned about transporting high-level nuclear waste through the County. Approximately 92% indicated concern about emergency response in case of a nuclear waste transportation accident. Financial impact of a potential transportation accident is of extreme importance to 88.5% of respondents. A vast majority, 91%, rated potential exposure to radiation along the transportation route as "extremely important."

Seventy-one percent of the hotline responses accounted for those who oppose the project. Reasons for opposition included fears of transportation accidents, radiation leakage, health risks, safety and overall quality of life in Nevada for present and future generations.

Community Opinion Surveys

In December 2000 a research team from UNLV was used to obtain a random sample of public opinion by Clark County residents from the Las Vegas valley. The survey goals were to determine the level of awareness about the Yucca Mountain Project, determine the public's perception of Clark County's position on the Yucca Mountain Project, and obtain comments from the general public about the Yucca Mountain Project.

A total of 1,018 responses were obtained from the 2000 survey. In face-to-face interviews based on a standard set of questions, surveys were conducted in English, Spanish, and Mandarin Chinese. Nearly 80% of the respondents were aware of the Yucca Mountain Project. Most (632) want more information. While the majority of residents did not know what Clark County's position on Yucca Mountain Project is, most (606) wanted to know where Clark County Commissioners stand on this issue. More than half of the respondents consider the transportation of nuclear waste unsafe or very unsafe. Of those interviewed, 304, or approximately 30% of the

total offered comments. Opinions ranged from "Don't bring it here," to "It's good for the economy." A significant number expressed the need for more and better information. Several suggested nuclear waste be stored where it is currently generated. When given an opportunity to make a comment, opinions against the project outnumbered those in favor of it by 10 to 1. Approximately 100 responses were either neutral or not applicable in terms of a position about the Yucca Mountain Project.

The 2000 survey was a benchmark survey. In November 2001, another survey under identical conditions using a similar team of UNLV students, surveyed 1,018 residents in similar locations. Comparatively, public awareness about the Yucca Mountain Project rose 4% over the one-year period. Public concerns about transportation of high-level nuclear waste was down by 5%; however, the public's desire for additional information was up by 7% on transportation issues and 9% on Clark County's position. Public awareness of the County's position on the project rose by 8%. Both surveys indicated a clear desire for more and better information. For example, in the November 2001 survey, more than 55% asked for additional public information.

Responses from the 2001 survey were again varied. Of the 1,018 total respondents interviewed, 31% volunteered additional comments. Among those, only 5% (15 of 314 comments) were clearly in favor of the project, with the overwhelming majority against the project. Comments ranged from "Not in Nevada," to "OK if made safe." Many people requested additional information. There seems to be a perception that the Board of County Commissioners has the decision-making authority to allow or reject the Yucca Mountain Project. It is also clear from the results that the public is unsure about the County's role and responsibility in the Yucca Mountain Project.

Public comments obtained in the surveys are significant because they were taken randomly, rather than from individuals motivated to attend a public meeting and express a view for or against the project. A complete transcript of public comments received through both surveys as well as survey statistical summaries are included in Appendix H. Other feedback mechanisms should be conducted in 2002 to measure the INFORM program effectiveness.

Clark County will continue its outreach efforts to ensure public participation, and to disseminate information on the County's position roles and findings related to the proposed Yucca Mountain Project. Significantly, the impacts over which the public has continually expressed concern correspond to those focused on for many years by Clark County, and are addressed in this Impact Assessment Report.

7.0 Summary and Recommendations

7.1 Summary

Clark County, home of "The Entertainment Capital of the World," has enjoyed many years of economic growth. The continued economic vitality of the Southern Nevada region depends on an intricate balance of factors all coming together to achieve a strong sense of community and high quality of life for all residents. Any significant threat to that balance could topple the region's economy.

It is hoped that the decision makers who will act on the proposed high level radioactive nuclear waste repository at Yucca Mountain over the next several years will consider the following as outlined in the Impact Assessment Report:

Gaming Impacts

According to virtually every gaming industry representative interviewed for the County's gaming impacts study, the most serious risk is from the stigma that will result if there is any accident of any kind involving the shipment of high level radioactive nuclear waste. Transportation of high level radioactive nuclear waste along Clark County's roadways, even without a serious accident, could seriously compromise Clark County's tourism based economy.

Property Value Impacts

Stable property values are a necessary component for the stability of Clark County's tax structure. Any threat to a government entity's ability to rely on property taxes as a stable source of income impacts not only that entity's ability to operate, but has a "domino" effect on all aspects of what people expect and deserve in terms of community livability.

Depending on the transportation scenario applied, property value decreases directly resulting from transportation of nuclear waste through Clark County range from 2% to 30%, resulting in property value losses up to $1 billion. An additional economic analysis by UNLV estimates potential economic impacts over the course of the DOE's proposed shipping campaign to be in the billions of dollars.

Transportation Impacts

Transportation system impacts are defined as changes to the operation, condition, and performance of the County's transportation network. The DOE must address the direct, indirect,

and cumulative impacts of transporting waste through Clark County to Yucca Mountain. Several impacts addressed in this report dovetail from the issues surrounding the transportation of high level waste through Clark County.

Impacts Due to Yucca Mountain Operations

Although several impacts addressed in this report relate to transportation, impacts due to Yucca Mountain operations also pose significant risk. Absent a final repository design and the issuance of a FEIS, it is impossible to identify the full range of impacts. Concerns over quality assurance issues, workforce impacts, impacts to species, and air quality impacts are substantial.

Public Safety Impacts

This assessment of these impacts includes the incremental or additional costs to governmental entities that would be directly attributable to the proposed repository. Under Scenario 3, costs would likely approach $360 million. The majority of these costs are attributable to Clark County, with the largest portions designated for facilities, equipment, personnel, and training. Clark County's costs alone would be over $274 million.

Non-Public Safety Impacts

Most county departments and related agencies interviewed expressed concern over the magnitude of the impacts they each anticipate. These impacts, calculated in the millions of dollars for most agencies, are attributed to preparedness, personnel, equipment, planning, training, and public outreach.

Native American Concerns

While many of the concerns of Native Americans are similar to others potentially affected by the Yucca Mountain Project, it is important to recognize that Native American concerns must be considered in ways that identify and reflect the range of impacts from a tribal perspective.

7.2 Recommendations

The large number of unanswered questions, inadequacies, inaccuracies, and findings related to impacts call into question the appropriateness of Yucca Mountain as a suitable repository site. Therefore, the site should be disqualified in compliance with the NWPAA. However, in light of the Secretary of Energy's intent to move forward with a positive site recommendation, Clark County recommends the DOE do the following:

- Complete an EIS process which ensures compliance with NEPA and other federal regulations, and which is based on a final repository design. This could include withdrawal

of the current DEIS and SDEIS, and a new EIS process which includes the preparation of an FEIS with full hearings prior to further action by the U. S. Secretary of Energy.

- Conduct a national transportation study and develop a plan to address concerns of all affected jurisdictions nationwide. This plan should ensure coordination of roles and responsibilities among government entities, and sufficiently address public safety issues such as radiation exposure and terrorism.
- Acknowledge the nature and extent of the impacts to all local, state, and tribal governments nationwide before making a final decision to approve a high level radioactive nuclear waste repository at Yucca Mountain.

Acknowledgements

This report was written and produced by the staff of the Nuclear Waste Division of the Comprehensive Planning Department, at the direction of the Board of County Commissioners:

Barbara Blumer, Administrative Secretary
Fred Dilger, Principal Planner
Harry Kelman, Senior Management Analyst
Babs McGehee, Management Analyst
Irene Navis, Planning Manager
Engelbrecht von Tiesenhausen, Senior Nuclear Waste Engineer

The following consultants assisted with research, analysis, and the public outreach information contained in the report: Aztec Communication, Brown & Bain, P.A., Caliper Corporation, M. H. Chew & Associates, S. Cohen & Associates, Latir Energy Consultants, University of Nevada Las Vegas, and Urban Environmental Research, LLC.

The Board of County Commissioners would also wish to express appreciation to the following for their cooperation providing information, statistics, and other support in the preparation of this report: Boulder City, City of Henderson, City of Las Vegas, City of Mesquite, City of North Las Vegas, the Las Vegas Band of Paiutes, the Moapa Band of Paiutes, the State of Nevada, and the Yucca Mountain Citizens Advisory Committee. The Board would also wish to recognize the following County departments for their assistance in completing the Non-Public Safety Report: Clark County Administrative Services, Assessor, Aviation, Building, Business License, County Clerk, Comprehensive Planning, District Attorney, Office of Emergency Management, Fire, General Services, Health District, Finance, the Las Vegas Metropolitan Police Department, Parks and Recreation, Public Works, the County Recorder, Social Service, and the County Treasurer. We would also like to thank the Regional Flood Control District, the Regional Transportation Commission, the Sanitation District, and the Clark County School District.

The Board of County Commissioners is especially grateful to all those individuals who contributed their time and knowledge to this program, including: Dennis A. Bechtel, former Clark County Nuclear Waste Division Planning Manager, for his dedication to Clark County and nuclear waste issues over the past 18 years, former Senator Richard H. Bryan, for his unique insights concerning Yucca Mountain issues, and Stephen Cloobeck, the leader of the SAVENEVADA effort, in assisting with the *Gaming Industry Revenue Impacts Resulting from the DOE's Yucca Mountain Project* and in working with Clark County to achieve its public outreach objectives.

Appendices

Appendix A	Resolutions in Opposition to Yucca Mountain by Groups Other Than Clark County, Nevada
Appendix B	Clark County, Nevada's Resolutions in Opposition to Yucca Mountain
Appendix C	Clark County, Nevada's Comments to U.S. Department of Energy's Draft Environmental Impact Statement (DEIS), Formal Response to Supplemental Draft Environmental Impact Statement (SDEIS), and Formal Response to Preliminary Site Suitability Evaluation (PSSE)
Appendix D	University of Nevada, Las Vegas, The Center for Business and Economic Research Report (December 26, 2001): *Regional Economic Model, Inc. (REMI) Analysis Utilizing Urban Environmental Research, L.L.C. (UER) Property Losses to Determine Economic Impacts on Clark County's Scenarios*
Appendix E	Maps and Descriptions of Transportation Scenarios 1, 2 and 3
Appendix F	G. Roger Gathers, M. H. Chew & Associates Report (July 16, 2001 Revision A): *Calculations with RISKIND for Rail Transport of Spent Nuclear Fuel Casks Via Las Vegas, Nevada*
Appendix G	U.S. Department of Energy Deficiency/Corrective Action Reports
Appendix H	Public Involvement, Outreach and Comments
Appendix I	References

Appendix A – Resolutions in Opposition to Yucca Mountain by Groups other than Clark County, Nevada

RESOLUTION OF
THE SOUTHERN NEVADA REGIONAL PLANNING COALITION
TO COORDINATE STRATEGIES ON YUCCA MOUNTAIN

This Resolution is made and entered into this 22nd day of March 2001 by the Southern Nevada Regional Planning Coalition (SNRPC).

WITNESSETH:

WHEREAS, the Department of Energy (DOE) is evaluating Yucca Mountain in Nye County as a potential site for the permanent storage of 70,000 metric tons of commercial spent nuclear fuel and high-level radioactive defense waste; and

WHEREAS, the opening of a repository at Yucca Mountain could result in as many as 70-90,000 shipments of nuclear waste to Yucca Mountain, mostly through Southern Nevada, over a twenty four year shipping campaign; and

WHEREAS, the Department of Energy (DOE) prepared a draft Environmental Impact Statement (EIS) which will accompany the Secretary of Energy's decision on the potential recommendation of Yucca Mountain to the President later this year; and,

WHEREAS, the draft EIS lists the planned western and northern "Beltways," and Interstate 15 and U.S. Route 95 through the "Spaghetti bowl," all in the Las Vegas Valley, as potential truck routes for the transport of nuclear waste to Yucca Mountain; and

WHEREAS, the draft EIS also lists the Union Pacific Railroad, which traverses urbanized metropolitan Las Vegas, as a potential rail option for the shipment of waste; and

WHEREAS, recent Clark County studies and information, including legal case law from other communities, provide compelling evidence that such shipments could result in negative effects to the health and safety of residents, and impacts to property values, Las Vegas' tourist-based economy and cost of government services; and

WHEREAS, Southern Nevada continues to be one of the nation's fastest growing region and is experiencing significant construction and traffic congestion, inconsistent with the transportation of nuclear waste through the Las Vegas Valley; and

WHEREAS, the governments representing the Southern Nevada Regional Planning Coalition (SNRPC) together constitute almost 70 percent of Nevada's population and economic revenue and negative effects to the economy of Clark County would also impact State of Nevada revenues; and

WHEREAS, it is of utmost importance to preserve and enhance the quality of life for the citizens and the future generations of Southern Nevada; and

WHEREAS, intergovernmental collaboration has proven to be an efficient and effective approach to address many of these challenges; and

WHEREAS, there is a need for collaboration and regional recommendations to address the challenges facing Southern Nevada, on the Yucca Mountain issues enumerated above; and

WHEREAS, the Southern Nevada Regional Planning Coalition can provide regional strength in addressing these potentially significant Yucca Mountain issues.

NOW, THEREFORE, be it resolved by the Southern Nevada Regional Planning Coalition that the Coalition opposes the location of a high-level nuclear waste repository in Southern Nevada.

And be it further resolved by the Southern Nevada Regional Planning Coalition that:

1. The SNRPC serve as a forum to develop and coordinate strategies on regional Yucca Mountain Program issues.

2. The Coalition provide regional guidance on policy issues affecting the area and ensure that constant opposition will be maintained among governmental units in Clark County and with the State of Nevada.

3. The staff of the Clark County Comprehensive Planning Department, Nuclear Waste Division, and incorporated city representatives of the Clark County Yucca Mountain Advisory meet periodically and develop and present issues and recommendations to the SNPRC.

4. The incorporated City of Mesquite be invited to participate in the discussions because of potentially significant impacts to that Clark County community.

IN WITNESS WHEREOF, the Southern Nevada Regional Planning Coalition endorses this resolution.

Oscar Goodman, Chairman
Southern Nevada Regional Planning Coalition

Approved as to form:

Robert Warhola, Deputy District

RESOLUTION NO. 2001-4

A RESOLUTION OF THE LAS VEGAS CONVENTION AND VISITORS AUTHORITY FOR SUPPORT OF OPPOSITION TO THE USE OF YUCCA MOUNTAIN AS A NUCLEAR WASTE REPOSITORY

WHEREAS, the Las Vegas Convention and Visitors Authority, in Clark County, State of Nevada (the "Authority") is duly organized, existing and operating as a fair and recreation board under the laws of the State;

WHEREAS, the Nevada Resort Association has adopted a resolution opposing the use of Yucca Mountain as a Nuclear Waste Repository;

WHEREAS, the Greater Las Vegas Chamber of Commerce has adopted a resolution opposing the use of Yucca Mountain as a Nuclear Waste Repository;

NOW THEREFORE, be it resolved that the Las Vegas Convention and Visitors Authority hereby supports the above referenced positions opposing the use of Yucca Mountain as a nuclear waste repository.

PASSED and ADOPTED on this 13th day of February, 2001.

(SEAL)
Attest:

Mary Kincaid, Chair
LVCVA Board of Directors

Secretary
Las Vegas Convention and Visitors Authority

NRA
Nevada Resort
Association

RESOLUTION

WHEREAS, visitors from outside the State of Nevada constitute the economic life blood for this state's continued prosperity with their expenditures directly and indirectly accounting for more than half of the state's economic activity; and

WHEREAS, the emergence of gaming in new jurisdictions throughout the United States and the rest of the world has intensified the competition for tourists who seek to make gaming a part of their leisure experiences; and

WHEREAS, any diminution in the image that Nevada now conveys to the prospective visitor as an exciting, attractive, healthy and safe destination would reduce tourism and severely damage the welfare of Nevada's citizens; and

WHEREAS, the establishment of a high-level, nuclear waste repository in Nevada is inconsistent with the positive image the state seeks to present to the world; and

WHEREAS, because Las Vegas, the principal resource in Nevada's tourism product, has earned international recognition as the recreation capital of the world and would be the closest population center to the proposed nuclear waste repository, any news story about the repository and the associated transportation of radioactive materials to it could cause special damage to the reputation enjoyed by Las Vegas and the success of its tourism promotion efforts; now, therefore, be it

3930 West Sahara #440 Box 32 Las Vegas, Nevada 89102
Phone (702) 362-2472 Fax (702) 362-9273

RESOLVED, by its Board of Directors this 11th day of September, 1991, that the Nevada Resort Association objects to the establishment of a high-level, nuclear waste repository in the State of Nevada; and be it further

RESOLVED, that copies of this Resolution be transmitted to Nevada's Congressional delegation.

Robert H. Baldwin
Chairman of the Board

Richard W. Bunker
President

Las Vegas Chamber of Commerce
The Voice of Business

DRAFT

Resolution Stating Opposition to Storage of Nuclear Waste In Nevada

Whereas Nevada has been identified as the most favored site for relocation of the nation's nuclear waste;

Whereas the vast majority of nuclear waste is generated thousands of miles from Nevada by non-Nevadans and would have to be transported great distances to reach our state;

Whereas Southern Nevada is the fastest growing community in the United States according to the past three censuses and is now home to well over one million men, women and children;

Whereas the livelihood of the majority of Southern Nevadans is dependent on the health of the tourism industry and the continued growth in visitor volume and increased popularity of Las Vegas as a destination;

Whereas Southern Nevada is one of the world's leading tourist destinations attracting more than 33 million visitors a year who may elect to choose elsewhere for their vacations if even the perception that the valley is unsafe exists;

Whereas one accident involving the transportation of nuclear waste, no matter how minor, could create fears and hysteria among the general public and cause fewer tourists to travel to Southern Nevada, even if scientists determine these fears are unfounded;

Whereas the resort-hotel industry of Southern Nevada has invested tens of billions of dollars in infrastructure and capital improvements to build the world's most incredible resorts with the expectation that visitor volume will continue to increase;

Whereas the corporations that have made these investments are publicly traded entities whose securities are held by thousands of Americans who depend upon the financial success of these properties for their own financial security;

Whereas the mere threat of a nuclear waste accident could have a significant adverse impact on the property values of Las Vegas residents;

Whereas there is no clear scientific consensus that storage of nuclear waste less than 100 miles from Las Vegas will not result in any adverse health impacts to the region in the long-term;

Now, therefore be it resolved, The Las Vegas Chamber of Commerce expresses its strong opposition to the storage of nuclear waste in Nevada.

Approved,

Board of Trustees
January 31, 2001

Statement by Gary Coles, President of the Greater Las Vegas Association of REALTORS®

A statement of the Greater Las Vegas Association of REALTORS® in opposition to the use of Yucca Mountain as a repository for high-level nuclear waste and the proposed transportation of that waste through Clark County and surrounding areas.

The Greater Las Vegas Association of REALTORS® joins with other government, business and civic organizations in general objection to the use of Yucca Mountain as a nuclear waste site and specific objection to the validity of the Department of Energy's Impact Statement (DEIS) concerning transportation routes of nuclear waste through and around Clark County.

Since its inception in 1947, the Association of REALTORS® has been a prime proponent of private property rights, quality of living, respect of the environment and issues such as education, safety and community planning.

The 1,400 page Department of Energy's Impact Statement contains many sections that can be considered either inadequate or incomplete.

Specfically:

1. Use of 1990 population figures result in gross underestimation of people that maybe put at risk by nuclear waste transport.

2. Land use and strategic plans that guide area development have not been considered in the DOE program. Some routes actually dissect large planned developments.

3. There is evidence in other areas of the country that property and business values may be reduced severely just by the designations of nuclear waste routes.

In specific reference to the proposed routes of transportation, present and future homeowners face the problem of:

- The lack of proper equipment and training for the control of spilled or leaked nuclear waste in a community neighborhood.

- Residential/neighborhood panic following the report of a nuclear waste accident near a school where their children attend.

- Effective loss of the use of major arterials because of the congestion caused by slow moving overdimensional vehicles.

- Lack of a federal facility or program to protect or compensate communities and individuals in case of a nuclear waste accident.

In addition to these safety aspects of a nuclear waste incident you also have an economic impact of waste being routed by established residential areas.

- A route near an established neighborhood will immediately devalue the price of the home.
- Projected services for that area such as additional schools, medical and commercial services would be of questionable value.
- Resale value of residences along a nuclear route will plummet.
- Desirability of a home in the Greater Las Vegas valley will drop to a new low.
- Construction of new homes will also drop drastically.
- Businesses that considered Southern Nevada as a possible site for production and employment will reconsider due to the negative perceptions of the area.
- The gaming, tourist and convention interests that employ so many homeowners would see a definite decline in visitors at the perceived risk or report of even a minor nuclear waste accident.

Homeowners are the one stable force in any community, city or county. Homeowners are the tax base; they provide the need of many services, water, power, food, medical, home insurance, repair services.

As REALTORS® we are very much aware that if you disrupt the option and opportunity of a family to have their most serious investment in a safe and secure home threatened you will find that the Greater Las Vegas valley area will rapidly become a depressed area.

REALTORS® OPPOSE NUCLEAR WASTE IN NEVADA!

Southern Nevada Home Builders Association

2/24/00

Wendy Dixon, EIS Manager
Yucca Mountain Site Characterization Office
Office of Civilian Radioactive Waste Management
U.S. Department of Energy M/S 010
P.O. Box 30307
North Las Vegas, NV 89036-0307

Dear Ms. Dixon:

This letter is a response to the draft Environmental Impact Statement for the proposed nuclear waste repository at Yucca Mountain. The Southern Nevada Home Builders Association consists of 750 member companies involved in the residential building industry and is an affiliate of the National Home Builders Association. These companies employ thousands of Southern Nevada residents and are truly community stakeholders. Our comments will address the industry concerns of nuclear waste transportation and storage within Southern Nevada.

It is clear that while transportation of nuclear waste to Yucca Mountain remains an uncertainty, nuclear power industry executives are fixated on pushing the process forward with little or no concern for the residents of Southern Nevada. This point is displayed by Rod McCullum of the Nuclear Energy Institute when stating the process should move forward recognizing there is an "involuntary risk" in disposing of nuclear waste. The transportation of nuclear waste poses a clear and undeniable risk to the residents and economy of Southern Nevada. Furthermore, such comments undermine and trivialize the very real concerns we have about the impacts on our communities for years to come.

Given Clark County's potential role in the transportation of nuclear waste, adverse impacts to property values and tourism have not been adequately addressed. As demonstrated in New Mexico, perceived risk can lead to a decrease in property values. With that in mind, we can be reasonably assured that additional health consequences or a nuclear waste-related accident along the transportation corridor would have severe ramifications on public health, safety and property values in Southern Nevada. The DEIS does not include current populations figures or future projections along the proposed routes. Without question significant growth along the corridor, in a County that holds 70% of the state's residents, will have very serious implications for future generations of Southern Nevadans.

The population element in the DEIS should also include visitors to our county. More than 32 million tourists annually augment the population of the metro Las Vegas area, situated directly along the proposed truck route. This is not to be overshadowed by the fact that tourism as a whole is the lifeblood of Southern Nevada. The economy of our region and state depends on these visitors, visitors who may choose not to come if nuclear waste is transported through the Las Vegas Valley.

In the view of many thousands of residents and visitors who use the local roadways, driving alongside shipments of nuclear waste is unacceptable. These routes are essential to both commerce and residents in the valley. Should either highway be compromised by an accident involving the shipment of nuclear waste, impacts to the community would be devastating.

In economic terms, the construction of a repository in our region can only be viewed in a negative light. Job creation at the proposed repository, even at periods of peak employment, is greatly outweighed by the negative impacts of nuclear waste transportation and storage. Additionally, we enjoy very robust economic conditions in the region. Our unemployment figures are some of the lowest in the country and future projections are very positive. Quite simply, any job creation at the proposed repository is easily mitigated by current and future growth in the regional economy.

Many concerns relative to public health have not been adequately investigated. The DOE's projections for latent cancer fatalities are only estimations and cannot provide accurate assessments of the long-term health consequences. And as we know, the aftereffects of a nuclear waste-related accident would have far-reaching impacts for the current and future citizens of Southern Nevada.

As home builders, it is imperative that we remain sensitive to the needs and interests of current and future residents of Southern Nevada. Some would say that this effort is made merely to enhance the position of our industry. But it is much more than strategic planning. It is our obligation as community stakeholders and a duty that we hold in very high regard. The time has come for our voices to be heard in this debate. Decisions made today will touch the hearts, minds, and lives of Southern Nevadans for many years to come.

Sincerely,

Irene Porter

Irene Porter
Executive Director

Clark County
Comprehensive Plan Steering Committee

January 10, 2000

Clark County
Board of County Commissioners
500 S. Grand Central Parkway, 6th Floor
Las Vegas, NV 89155-1601

Dear Board of County Commissioners;

We, the Clark County Comprehensive Plan Steering Committee, want to express our concern about the inadequacy of the recently released Yucca Mountain Draft Environmental Impact Statement (DEIS). Among other concerns, some of the key items we don't believe are adequately addressed are the following:

- The majority of the transportation options would affect Clark County (Interstate-15, the Beltway, a rail line in the northern part of the Las Vegas Valley and, possibly the Spaghetti Bowl). Despite this, no analyses are performed of potential impacts to our economy and quality of life from these transportation options.

- The NEPA process requires that "reasonable" impacts from the project be recognized. Although Clark County could experience a large number of shipments there is no recognition of potential impacts from these shipments. Potential impacts to our tourist-based economy, for example, are not even considered.

- The Department of Energy was one of the first federal agencies to develop an *Environmental Justice* policy. It is unfortunate, then, that the evaluation of effects on minority, low-income and Native-American groups is totally ignored in the *DEIS*. For example, U.S. 95, a major proposed routing option bisects the Las Vegas Paiute reservation. No statement is made of potential impacts. Other routes through the Las Vegas metropolitan area are adjacent to minority and low-income populations. However, there is no recognition of potential impacts to these populations in the *DEIS*.

In addition, we have receive reports from DOE staff and contractors, and from Clark County staff about the Yucca Mountain program. We support the Clark County Board of Commissioners in their efforts and the detailed comments they will submit.

The DEIS does not meet the letter or the spirit of NEPA. It does not provide the information that is needed to be able to assess the real impacts, not only to the citizens of Clark County, but to the nation as a whole. For example, no national transportation routes are suggested - how can an assessment of the environmental impacts be made? Likewise, in Nevada, so many routes and modes of transportation are made - time and resources do not allow an adequate assessment of environmental impacts along the routes.

We would strongly suggest that at a minimum, a supplemental document is needed to address the concerns that we have raised. We also know that other people and groups are concerned because of the inadequacy of the document. The spirit of NEPA requires that all environmental impacts be addressed. We are hopeful that DOE can meet that objective, in creating a document that fulfills the spirit and technical challenges of NEPA.

Sincerely,

Michael Dias
Chair
Clark County Comprehensive Plan Steering Committee

CPSC BCC ltr.wpd

Laughlin Town Advisory Board

REGIONAL GOVERNMENT CENTER
101 CIVIC WAY
LAUGHLIN, NV 89029
(702) 298-0828
FAX (702) 298-6132

January 11, 2000

Wendy R. Dixon, EIS Project Manager
Yucca Mountain Site Characterization Office
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
P.O. Box 30307, M/S 010
North Las Vegas, NV 89036-0307

Dear Ms. Dixon:

The Laughlin Town Advisory Board met on November 9, 1999, and voted to voice its numerous concerns regarding the proposed Yucca Mountain nuclear waste storage site and accompanying transportation dangers.

In spite of the opinions of many easterners and a long-standing myth, Nevada is not a wasteland that everyone with unwanted, radioactive and nuclear waste should use as their out-of-sight-out-of mind dump. As the fastest growing state, and with Clark County being the fastest growing county, we have a proven record that spans decades: Southern Nevada is attractive to thousands of new residents monthly and many millions of visitors from around the world annually.

By opening Yucca Mountain and transporting nuclear waste to this site, you not only could adversely affect the groundwater in our state, but our citizens will have to be exposed daily on our highways to slow, escorted transport vehicles that could have and cause accidents. Although the studies and estimates thus far indicate such accidents would likely be rare, it only takes one real disaster to ruin for the rest of our lifetimes the place we call "home."

We realize Yucca Mountain has been the subject of numerous studies and discussions for more than a decade but apparently there have not been honest and forthright answers given to the American people, Congress and, specifically, Nevada citizens by the scientific community and the Department of Energy on the nature and extent of the impacts that Yucca Mountain could have on the long- and short-term.

Therefore, the Laughlin Town Advisory Board can in no way support the opening of Yucca Mountain as a nuclear waste repository and urge more in-depth study be given to alternatives.

Sincerely,

LAUGHLIN TOWN ADVISORY BOARD

Lorraine Haywood

LORRAINE HAYWOOD
Chair

JAB:/rmr

cc: Laughlin Town Advisory Board members
County Commissioner Bruce Woodbury
Jacquelyne A. Brady, Town Manager
Kevin Smedley, Current Planning
U.S. Senator Harry Reid
U.S. Senator Richard Bryan
U.S. Congressman Jim Gibbons

Winchester Town Advisory Board

The Winchester Town Board meets twice a monthly and these meetings include business owners, students, grandparents, and young families. The topics are numerous dealing from zoning to community to quality of life. We have heard many different views on the subject of Nuclear Waste / Yucca Mountain.

We have reviewed the Environmental Impact Draft Study (EIDS), and have found many areas have been completely over looked.

There were no studies or surveys done in the following areas:

Economic Effects –
Special Taxing Districts & Special Taxes - that are collected from Auto Rental, Trucking, Amusement, fees, just to name a few.
Tax Base - over 50 % of our tax base comes from gaming revenues.
Visitor Volume - the reduction of a world wide visitor volume based on a by country by region or state.
Property Taxes and Property Values

Cost Effectiveness
Existing Storage -versus - the cost of encasement, trucking, roadway repair, etc.

General and Emergency Health and Safety Issues
At any given time our population can double. If a minor or major accident occurs are the Emergency Medical, Fire and Police more than adequately equipped and trained to handle the situation. Are the Hospitals equipped, adequately staffed, and are there enough rooms to care for injured whether or not our population is inflated?

Faults, Possible Earthquakes, Underground Water
" The builders of the Titanic believed it was unsinkable, so did those who purchased tickets, so did the press." Now, we know different. Several months ago we experienced an earthquake. It took place at an unnamed fault, unnamed because it was believed by "authorities" in the field to be inactive. Now, we know different.

We would ask that you complete the proper research of the above concerns. We also asked that other sites, including those already in existence be evaluated.

Sincerely

Kristine Makowsky
Vice Chairperson

RESOLUTION OF THE CLARK COUNTY, NEVADA BOARD OF COMMISSIONERS REGARDING THE DRAFT DEPARTMENT OF ENERGY ENVIRONMENTAL IMPACT STATEMENT FOR A GEOLOGIC REPOSITORY AT YUCCA MOUNTAIN, NYE COUNTY, NEVADA

WITNESSETH:

WHEREAS, the Department of Energy (DOE) in August 1999 released a Draft Environmental Impact Statement (DEIS) intended to provide information on potential environmental impacts that could result from the proposed action to construct, operate and monitor, and close a geologic repository at Yucca Mountain, Nevada, and

WHEREAS, Clark County is specified in the DEIS as being in the *Region of Influence,* defined as the specific area of study for each of the resource areas that DOE assessed for the EIS analyses, and

WHEREAS, DOE in 1988 designated Clark County as an "affected unit of local government," under provisions of the Nuclear Waste Policy Act, as amended, in further recognition of the potential impacts to Clark County, its citizens and economy, and

WHEREAS, Clark County, which includes the incorporated cities of Las Vegas, Boulder City, Henderson, North Las Vegas and Mesquite, is one of the fastest growing counties in the nation with 1.3 million residents, and 32 million visitors, is experiencing severe traffic congestion, and extensive construction activities, and

WHEREAS, the DEIS lists potential options in Clark County for the transportation of commercial spent nuclear fuel and high-level radioactive waste including Interstate 15, the Las Vegas Valley Beltway transportation alignment, currently under construction, rail lines connecting to the Union Pacific Railroad at Valley modified and Jean, and sidings at Apex/Dry Lake and Sloan/Jean, and

WHEREAS, the DEIS fails to consider potential public health and safety effects from the transportation of nuclear waste through Clark County, in particular the Las Vegas Valley, and

WHEREAS, despite the dependence of Clark County on the volatile economic sector of tourism, the DEIS fails to evaluate impacts to Clark County's economy due to repository operation and transportation, and

WHEREAS, notwithstanding the potential impacts that could occur from the transportation of the nuclear waste, other socioeconomic issues such as impact on quality of life and stigma affects are also not evaluated in the DEIS, and

WHEREAS, DOE failed to interact appropriately with Clark County government to receive accurate and complete local information during the preparation of the DEIS, and

WHEREAS, DOE effectively excluded members of minority and low-income groups from the public information process, and

WHEREAS, The failure of the DEIS to adequately consider the potential impacts to Clark County's economy, public health and safety and quality of life to its citizens is not in the spirit and intent of national environmental policy and requirements.

NOW, THEREFORE, BE IT RESOLVED THAT

1. Since Clark County and other issues, appropriately required by the National Environmental Policy Act, are not adequately addressed in the DEIS, a new DEIS or a supplemental EIS for Yucca Mountain must be prepared by DOE to address failures in the current draft DEIS.

2. Clark County's written comments and concerns regarding the DEIS shall be transmitted to the President, Nevada's Congressional delegation, the Council on Environmental Quality, and the leadership of the Senate and House of Representatives.

PASSED, ADOPTED AND APPROVED this 15th Day of February 2000

CLARK COUNTY BOARD OF COMMISSIONERS

By: _____
BRUCE L. WOODBURY
Chairman

ATTEST:

SHIRLEY B. PARRAGUIRRE, County Clerk

RESOLUTION NO. 1506

A RESOLUTION OF THE CITY OF HENDERSON CITY COUNCIL OPPOSING THE PROPOSED NEW NATIONAL ENERGY POLICY THAT WOULD ELIMINATE STATE ENFORCEMENT OF ENVIRONMENTAL LAWS WHICH CONTROL ACTIVITIES OF THE DEPARTMENT OF ENERGY, INCLUDING STUDIES OF YUCCA MOUNTAIN AS A HIGH-LEVEL NUCLEAR WASTE REPOSITORY; AND OTHER MATTERS RELATING THERETO.

WHEREAS, Public Laws have been enacted to protect public health, property, and environmental quality, including laws relating to clean air, clean water, safe drinking water, and solid waste management; and

WHEREAS, these Public Laws provide for the delegation to states of certain permitting and enforcement authority; and

WHEREAS, the State of Nevada has accepted this delegated authority and is responsible for a broad scope of environmental regulation, including review and consideration of environmental permits requested by the Department of Energy for site characterization of Yucca Mountain as a high-level nuclear waste repository; and

WHEREAS, the Department of Energy, through a proposed new National Energy Policy, now seeks to eliminate the State of Nevada's environmental oversight of Department of Energy activities, particularly those at Yucca Mountain; and

WHEREAS, the City of Henderson, an active anti-repository jurisdiction within a designated local government, opposes the Administrations' proposal to preempt the State of Nevada's right to issue permits relating to site characterization.

NOW, THEREFORE, BE IT RESOLVED that the Henderson City Council opposes the proposed new National Energy Policy that would eliminate State enforcement of environmental laws which control activities of the Department of Energy, including studies of Yucca Mountain as a high-level nuclear waste repository.

PASSED, ADOPTED, AND APPROVED this 21st day of May, 1991 by the following vote:

Those voting Aye: Mayor Lorna Kesterson
Councilmembers Andy Hafen, Michael Harris, and Larry Scheffler

Those voting Nay: None

Those Absent: Lorin L. Williams

LORNA KESTERSON, MAYOR

ATTEST:

DOROTHY A. VONDENBRINK, CMC, CITY CLERK

RESOLUTION NO. 2257
(Transportation of Radioactive/Hazardous Waste)

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF HENDERSON, NEVADA, REQUESTING THE DEPARTMENT OF ENERGY TO AVOID TRANSPORTING RADIOACTIVE AND/OR HAZARDOUS WASTE THROUGH CLARK COUNTY USING INTERSTATE HIGHWAY 15 (I-15) US HIGHWAY 95 (95), STATE ROUTE 146 (LAKE MEAD DRIVE), OR STATE ROUTE 160 (BLUE DIAMOND HIGHWAY).

WHEREAS, the Nevada Test Site is currently used by the Department of Energy as a site for the final disposal of low-level radioactive waste, and is being considered for use as a site for the disposal of low-level radioactive waste and mixed low-level radioactive and hazardous waste from the cleanup of the Department of Energy Weapons Complex; and

WHEREAS, the Department of Energy Fernald Environmental Management Project curtailed shipments of radioactive waste from the Fernald Environmental Management Project subsequent to the December 1997 incident in Kingman, Arizona; and

WHEREAS the Department of Energy Fernald Environmental Management Project located in Ohio proposes resuming shipments of low-level radioactive waste to the Nevada Test Site; and

WHEREAS, the Department of Energy Fernald Environmental Management Project has solicited bids from trucking companies to transport the waste, and these bids propose routes through Nevada to the Nevada Test Site; and

WHEREAS, some of the bids include routes that traverse Clark County that avoid using Hoover Dam and the interchange at US Highway 95 and Interstate Highway 15; and

WHEREAS, some of the proposed routes would use State Route 146 (Lake Mead Drive) and State Route 160 (Blue Diamond Highway); and

WHEREAS, these routes will be undergoing construction for the next several years and currently carry high volumes of traffic; and

WHEREAS, the recent radioactive waste incident at Kingman, Arizona involving radioactive wastes destined for final disposal at the Nevada Test Site illustrate the potential for accidents that could result in the release of radioactive waste, a problem that could be exacerbated by the high speeds and traffic volumes on State Route 146 and State Route 160.

THEREFORE, BE IT RESOLVED that the City Council of the City of Henderson, Nevada, urges the Department of Transportation to select a carrier who does not propose routes that traverse Clark County using Interstate Highway 15 (I-15) US Highway 95 (95), State Route 146 (Lake Mead Drive), or State Route 160 (Blue Diamond Highway); and

Resolution No. 2257
Transportation of Radioactive/Hazardous Waste

BE IT FURTHER RESOLVED that the City Council of the City of Henderson, Nevada, encourages the Department of Energy to specify highway routes for the transport of radioactive and mixed radioactive and hazardous waste that avoid these high-speed, high-volume, high-accident routes.

PASSED, ADOPTED, AND APPROVED THIS 11TH DAY OF MAY 1999, BY THE FOLLOWING ROLL-CALL VOTE OF COUNCIL:

Those voting aye: James B. Gibson, Mayor

Councilmembers:
Jack Clark
Amanda M. Cyphers
Arthur "Andy" Hafen
David A. Wood

Those voting nay: None
Those abstaining: None
Those absent: None

James B. Gibson, Mayor

ATTEST:

Monica M. Simmons, City Clerk

RESOLUTION NUMBER 224

A RESOLUTION OF THE CITY OF MESQUITE, NEVADA REGARDING THE TRANSPORTATION OF NUCLEAR WASTE, RADIOACTIVE MATERIAL AND NUCLEAR SPENT FUEL THROUGH THE CITY OF MESQUITE

WHEREAS, the United States Department of Energy has attempted for over two decades to store nuclear waste, radioactive material and nuclear spent fuel in the State of Nevada at Yucca Mountain which is located less than 100 miles north of Las Vegas, Nevada; and

WHEREAS, if the Department of Energy ultimately prevails in its efforts to make Yucca Mountain a nuclear storage facility, one likely route for the transportation of nuclear waste, radioactive material and nuclear spent fuel on its way to Yucca Mountain, per documents prepared by the Department of Energy, would be on Interstate 15 through the City of Mesquite; and

WHEREAS, if the route for the transportation of nuclear waste, radioactive material and nuclear spent fuel does go through the City of Mesquite via Interstate 15, that route would also be through the Virgin River Gorge via Interstate 15 which is in the State of Arizona is only ten miles north of the City of Mesquite; and

WHEREAS, the path of Interstate 15 through the Virgin River Gorge is an extremely narrow passage, barely wide enough to accommodate the lanes of Interstate 15 at several points; and

WHEREAS, Interstate 15 is a major traffic artery through Utah, Arizona, Nevada and California, a spill of nuclear waste, radioactive material or nuclear spent fuel in the Virgin River Gorge on Interstate 15 could have catastrophic effects on the environment of the Virgin River which travels through the Virgin River Gorge along Interstate 15 and on interstate travel and commerce, perhaps for decades; and

WHEREAS, the Virgin River may be the home of certain endangered species of fish, other wildlife and fauna; and

WHEREAS, the City of Mesquite is the fastest growing community in the United States of America by percentage of growth and currently is home to 15,000 residents and will double in size within the next four years if the current growth rate continues as is expected; and

WHEREAS, the City of Mesquite has experienced $700 million in new home construction in the past decade and has become a favored residential destination for golf enthusiasts and senior citizens; and

WHEREAS, if an accident occurred on Interstate 15 at Nevada Exit 122 which caused Pioneer Boulevard to be blocked at Interstate 15, an accident such as occurred in Kingman, Arizona in 1997, approximately seven thousand citizens of Mesquite would be stranded for an indefinite

period of time since Pioneer Boulevard is the only road from Interstate 15 and the City of Mesquite to approximately 7,000 residents living above Pioneer Boulevard; and

WHEREAS, Interstate 15 goes through the center of the population of the City of Mesquite and many businesses and homes are adjacent or in close proximity to Interstate 15; and

WHEREAS, the undeclared transportation routes planned by the Department of Energy are of particular concern to the City of Mesquite since the Department of Energy does not even acknowledge the existence of the City of Mesquite on its official maps of the area; and

WHEREAS, Nuclear Regulatory Commission Regulation 1437, dated February of 1999, does not acknowledge or recognize the City of Mesquite in its discussion of a proposed route through our City and the stated proposed route mistakenly states it would go through the unincorporated Township of Overton, Nevada which is over ten miles off Interstate 15 in a rural farm community on an extremely dangerous and narrow road system; and

WHEREAS, the actions of the Department of Energy to date show a complete ignorance of the location of the City of Mesquite and a total lack of concern about what an accident involving the spilling of nuclear waste, radioactive material or nuclear spent fuel in the City of Mesquite or the Virgin River Gorge would have on the City of Mesquite, its citizens, its commerce and its environment.

NOW, THEREFORE, the Mesquite City Council declares by Resolution the following:

1. The City of Mesquite opposes the establishment of a storage facility at Yucca Mountain for nuclear waste, radioactive material and nuclear spent fuel.

2. The City of Mesquite opposes the transportation of any nuclear waste, radioactive material and nuclear spent fuel through the Virgin River Gorge or the City of Mesquite.

3. The City of Mesquite resolves to resist the storage of nuclear waste, radioactive materials and spent nuclear fuel at Yucca Mountain and the transportation of the same through the State of Nevada generally and the City of Mesquite specifically and to lend its support toward efforts to oppose said project by all lawful means.

Passed and Adopted this 14th day of September, 1999.

THE CITY OF MESQUITE

By: Charles Horne

Charles Horne, Mayor

ATTEST:

By: Carol Woods

Carol Woods, City Clerk

City of North Las Vegas

2200 Civic Center Drive
North Las Vegas, Nv 89030
633-1033
FAX: 702-649-3846

RESOLUTION NO7 2019

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF NORTH LAS VEGAS REQUESTING THE DEPARTMENT Of ENERGY TO EXCLUDE THE USE OF HIGHWAY ROUTES THROUGH NORTH LAS VEGAS AND THE METROPOLITAN LAS VEGAS VALLEY FOR THE TRANSPORT OF OF LOW-LEVEL RADIOACTIVE WASTE TO THE NEVADA TEST SITE.

WHEREAS, the Department of Energy has made a formal determination to prepare an Environmental Assessment for intermodal transportation of low-level radioactive waste the Nevada Test Site; and

WHEREAS, according to this determination, the Department of Energy is proposing to institutionalize and encourage intermodal transportation of Department of Energy complex-wide generated low- level nuclear waste to the Nevada Test Site; and

WHEREAS, the Environmental Assessment will not, as it is currency planned, result in a decision by the Department of Energy to require all shipments of low-level radioactive waste destiny for the Nevada Test Site to avoid North Las Vegas and the metropolitan Las Vegas Valley; and

WHEREAS, Sate and local officials in Nevada contend that the continued transportation of these wastes not only poses risks to public health and safety, but could also adversely affect the State's tourist- based economy; and

WHEREAS, if a transportation accident involving radioactive waste were to occur, it could have a devastating impact on our community as well as a devastating socioeconomic impact on the State's economy.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of North Las Vegas, Nevada, that the City supports the position that the Environmental Assessment must address the use of intermodal transportation in combination with highway routes that avoid entirely North Las Vegas and the Las Vegas Metropolitan area; and

BE IT FURTHER RESOLVED that any transport of low-level radioactive waste using trucks only must avoid transport of waste through North Las Vegas and the Las Vegas Valley; and

IT IS FURTHER RESOLVED that nay transport of low-level radioactive waste by the department of Energy or their contractors or trucks to the Nevada Test Site must avoid routes through North Las Vegas and the Las Vegas Valley.

PASSED, ADOPTED AND APPROVED THIS 1st day of April, 1998

/s/ Michael L. Montandon, Mayor

ATTEST:
/s/ Eileen M. Sevigny, CMC City Clerk

...

Return to the
Nuclear Waste Project Office
Home Page

State of Nevada
Nuclear Waste Project Office
Capitol Complex
Carson City, NV 89710
(702) 687-3744 voice
(702) 687-5277 fax
nwpo@govmail.state.nv.us e-mail

*

RESOLUTION NO. 2182

A RESOLUTION BY THE CITY COUNCIL OF NORTH LAS VEGAS OBJECTING TO THE DEPARTMENT OF ENERGY SHIPPERS USING SURFACE ARTERIAL STREETS FOR SHIPPING LOW-LEVEL RADIOACTIVE WASTE THROUGH NORTH LAS VEGAS TO THE NEVADA TEST SITE, OBJECTING TO THE DEPARTMENT OF ENERGY'S UNILATERAL DECISION TO CEASE NOTIFYING THE CITY OF NORTH LAS VEGAS PRIOR TO TRANSPORTING LOW-LEVEL RADIOACTIVE WASTE THROUGH NORTH LAS VEGAS, AND AGAIN REQUESTING THAT THE DEPARTMENT OF ENERGY EXCLUDE THE USE OF HIGHWAY ROUTES THROUGH NORTH LAS VEGAS AND THE METROPOLITAN LAS VEGAS VALLEY FOR THE TRANSPORT OF LOW-LEVEL RADIOACTIVE WASTE TO THE NEVADA TEST SITE.

WHEREAS, the Department of Energy is responsible for the environmental cleanup of its various sites around the country which involves shipping low-level radioactive waste from those sites to the Nevada Test Site; and,

WHEREAS, the Department of Energy contracts with shippers, who are required by federal regulation to use the route with the lowest risk, to move the low-level radioactive waste; and

WHEREAS, all of the shipments to the Nevada Test Site must use routes to and through Nevada; and

WHEREAS, several years ago the Department of Energy met with the City Council representatives and agreed to direct their shippers to avoid non-Interstate routes through North Las Vegas; and

WHEREAS, after that meeting the Department of Energy created the Transportation Protocol Working Group to address low-level radioactive waste transportation through Nevada; and

WHEREAS, a cooperative relationship based on information sharing and open discussion was established between the Department of Energy and the local entities, including Department of Energy notification to the local entities of low-level radioactive waste shipments through the area; and

WHEREAS, the Transportation Protocol Working Group, which included representatives from the City of North Las Vegas, was instrumental in defining alternate routes and the risks and hazards associated with transporting low-level radioactive waste on those routes, which was to be part of an environmental assessment but which the Department of Energy published as a study titled *Intermodal and Highway Transportation of Low-level Radioactive Waste to the Nevada Test Site;* and

WHEREAS, the risk associated with using Craig Road and Cheyenne Avenue was not evaluated as those streets were not included in the published study as potential routes; and

WHEREAS, the Department of Energy through unilateral action has chosen to ignore long-standing agreements for notification by directing their shippers to avoid the Spaghetti Bowl (Interstate 15/US 95 interchange) through Las Vegas without notifying the affected entities; and

WHEREAS, at the February 17, 2000, meeting of the Transportation Protocol Working Group the Department of Energy admitted that they had told their shippers to avoid the Spaghetti Bowl which resulted in the shippers diverting those shipments to the surface arterial streets of Craig Road or Cheyenne Avenue as alternates, and that they had deliberately failed to notify the local entities based on the year 2006 deadline for cleaning up the Rocky Flats Plant site in Colorado; and

WHEREAS, it has long been the position of the City of North Las Vegas that no radioactive waste shipments should use North Las Vegas streets, and

WHEREAS, on April 1, 1998, the City of North Las Vegas City Council adopted a resolution requesting the Department of Energy to exclude the use of highway routes through North Las Vegas and the metropolitan Las Vegas Valley for the transport of low-level radioactive waste to the Nevada

Test Site.

NOW, THEREFORE, BE IT RESOLVED that the City of North Las Vegas emphatically objects to the use of surface arterial streets for shipments of low-level nuclear waste through North Las Vegas to the Nevada Test Site; and

BE IT FURTHER RESOLVED that the City of North Las Vegas strongly objects to the Department of Energy's decision to avoid notifying the affected entities about the low-level radioactive shipments through their borders, which has jeopardized the cooperative atmosphere that has slowly developed over the past few years; and

BE IT FURTHER RESOLVED that the City of Las Vegas again requests the Department of Energy to exclude the use of highway routes through North Las Vegas and the metropolitan Las Vegas Valley for the transport of low-level radioactive waste to the Nevada Test Site.

PASSED, ADOPTED AND APPROVED this _____ day of _____, 2000

_____
Michael L. Montandon, Mayor
North Las Vegas

ATTEST:

_____
Eileen M. Sevigny

RA-5-2000

RESOLUTION

RESOLUTION TO DESIGNATE LAS VEGAS A NUCLEAR-FREE ZONE

WHEREAS, Congress has designated Yucca Mountain, Nevada, the only site to be studied for a high-level nuclear waste repository; and

WHEREAS, the proposed Yucca Mountain site should be disqualified from consideration due to scientifically proven geologic and technical factors; and

WHEREAS, billions of taxpayer dollars have already been spent on the Yucca Mountain project; and

WHEREAS, the governments of the State of Nevada and the City of Las Vegas are opposed to Yucca Mountain; and

WHEREAS, the State of Nevada has already made countless sacrifices for the nation's nuclear programs; and

WHEREAS, the Nevada Test Site is currently used by the Department of Energy as a site for the final disposal of low-level radioactive waste from the cleanup of the Department of Energy's weapons complex; and

WHEREAS, high-level nuclear waste, as well as some low-level nuclear waste, is extremely dangerous, containing long-lived radioactive isotopes; and

WHEREAS, this high-level nuclear waste would consist of irradiated nuclear fuel rods and other radioactive waste; and

WHEREAS, legislation is introduced each year and is currently being debated which, if adopted by Congress and signed into law by the President of the United States, will allow for the transport of radioactive waste through the City of Las Vegas and other towns in Nevada; and

WHEREAS, this legislation would create an above-ground interim storage facility for high-level nuclear waste at the Nevada Test Site; and

WHEREAS, this legislation would begin the largest nuclear waste transportation campaign in history, possibly endangering residents in 43 states and thousands of towns and cities; and

WHEREAS, the Department of Energy predicts that there will be nuclear waste accidents occurring during this transportation campaign; and

WHEREAS, lives, health, and properties of Las Vegas residents living and working along transportation routes will be unnecessarily endangered by accidents or incidents; and

WHEREAS, the City of Las Vegas will have limited funding for training of emergency response personnel and for purchase of necessary equipment to cope with a radiological emergency; and

WHEREAS, the City of Las Vegas does not have the independent resources required to effectively cope with a radiological disaster that could occur as a result of radioactive waste transported through Las Vegas; and

WHEREAS, tourism has long been the life-blood of Nevada's economy with over half of the state's economic activity resulting directly or indirectly from tourism related expenditures; and

WHEREAS, the transportation of nuclear waste through Las Vegas would diminish the safe and attractive image the city now conveys, poses a possible health risk to potential visitors, and would damage the city and state's economy; and

WHEREAS, since the production of both high- and low-level waste continues, transportation to either an interim or permanent repository does nothing to solve the nuclear waste problem in our country; and

WHEREAS, the City of Las Vegas supports basing nuclear waste disposal decisions that will impact future generations on sound science, long-term safety considerations, and a thorough evaluation of all possible options; and

WHEREAS, at or near reactor above-ground monitored retrievable dry cask storage technology can be used to safely and economically store high-level radioactive wastes on site for at least 100 years; and

NOW THEREFORE, BE IT RESOLVED by the Mayor and Council of the City of Las Vegas as follows:

SECTION 1: That the Mayor and City Council of Las Vegas oppose all legislation that would require or allow transportation of radioactive waste near or through the City of Las Vegas;

SECTION 2: That the Mayor and City Council of Las Vegas support at reactor, on-site storage of spent nuclear fuel and high-level nuclear waste and a shift in funding to find a scientifically defensible and publicly acceptable method of disposal;

SECTION 3: That the Mayor and City Council of Las Vegas support the research and use of alternative renewable energy sources;

SECTION 4: That radioactive waste and nuclear waste, as referred to in this Resolution, is principally intended to include fuel materials utilized in nuclear power production. This Resolution does not relate to radioactive materials used, in the City of Las Vegas, for medical applications, industrial radiography and personal purposes such as time pieces or smoke detectors;

SECTION 5: That in opposition to legislation that would allow the transportation, storage or production of spent nuclear fuel, high-level nuclear waste, and low-level radioactive waste within the City of Las Vegas, the Mayor and City Council of Las Vegas designate the City of Las Vegas as a Nuclear Free Zone;

PASSED, ADOPTED, and APPROVED this 6 day of SEPTEMBER, 2000.

CITY OF LAS VEGAS

By _____
OSCAR B. GOODMAN, Mayor

ATTEST:

_____
BARBARA JO RONEMUS, City Clerk

APPROVED AS TO FORM:

Valdteed 8-28-00
Date

BILL NO. 2000-4

ORDINANCE NO. 5196

AN ORDINANCE TO PROHIBIT THE TRANSPORTATION OF HIGH-LEVEL NUCLEAR WASTE WITHIN THE CITY LIMITS, AND TO PROVIDE FOR OTHER RELATED MATTERS.

Sponsored by:
Mayor Oscar B. Goodman

Summary: Prohibits the transportation of high-level nuclear waste within the City limits.

THE CITY COUNCIL OF THE CITY OF LAS VEGAS DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1: Title 9 of the Municipal Code of the City of Las Vegas, Nevada, 1983 Edition, is hereby amended by adding thereto a new chapter, designated as Chapter 37, consisting of Sections 10 and 20, reading as follows:

9.37.010: For purposes of this Chapter, the following terms have the meanings ascribed to them:

"High-level nuclear waste" means highly radioactive material:

(A) That results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing, and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; or

(B) That the Nuclear Regulatory Commission, consistent with existing law, determines by rule requires permanent isolation.

"Spent nuclear fuel" means fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

9.37.020: It is unlawful for any person to transport, within or through the corporate boundaries of the City, any high-level nuclear waste for delivery to a repository for nuclear waste.

SECTION 2: If any section, subsection, subdivision, paragraph, sentence, clause or phrase in this ordinance or any part thereof, is for any reason held to be unconstitutional, or invalid or ineffective by any court of competent jurisdiction, such decision shall not affect the validity or effectiveness of the remaining portions of this ordinance or any part thereof. The City Council of the City of Las Vegas hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase thereof irrespective of the fact that any one or more sections,

subsections, subdivisions, paragraphs, sentences, clauses or phrases be declared unconstitutional, invalid or ineffective.

SECTION 3: Whenever in this ordinance any act is prohibited or is made or declared to be unlawful or an offense or a misdemeanor, or whenever in this ordinance the doing of any act is required or the failure to do any act is made or declared to be unlawful or an offense or a misdemeanor, the doing of such prohibited act or the failure to do any such required act shall constitute a misdemeanor and upon conviction thereof, shall be punished by a fine of not more than $1,000.00 or by imprisonment for a term of not more than six months, or by any combination of such fine and imprisonment. Any day of any violation of this ordinance shall constitute a separate offense.

SECTION 4: All ordinances or parts of ordinances or sections, subsections, phrases, sentences, clauses or paragraphs contained in the Municipal Code of the City of Las Vegas, Nevada, 1983 Edition, in conflict herewith are hereby repealed.

PASSED, ADOPTED and APPROVED this 2nd day of February, 2000.

APPROVED:

By _____
OSCAR B. GOODMAN, Mayor

ATTEST:

_____
BARBARA JO RONEMUS, City Clerk

APPROVED AS TO FORM:

_____ 12-21-99
Date

The above and foregoing ordinance was first proposed and read by title to the City Council on the 5th day of January, 2000 and referred to the following committee composed of the Full Council for recommendation; thereafter the said committee reported favorably on said ordinance on the 2nd day of February, 2000 which was a regular meeting of said Council; that at said regular meeting, the proposed ordinance was read by title to the City Council as introduced and adopted by the following vote:

VOTING "AYE": Mayor Goodman and Councilmembers Reese, Brown, L. McDonald, Weekly and Mack

VOTING "NAY": NONE

EXCUSED: Councilmember M. McDonald

APPROVED:

OSCAR B. GOODMAN, Mayor

ATTEST:

BARBARA JO RONEMUS, City Clerk

RESOLUTION R-40-98

A RESOLUTION REQUESTING THE DEPARTMENT OF ENERGY TO EXCLUDE THE USE OF HIGHWAY ROUTES OVER HOOVER DAM AND THROUGH THE METROPOLITAN LAS VEGAS VALLEY FOR THE TRANSPORT OF LOW-LEVEL RADIOACTIVE WASTE TO THE NEVADA TEST SITE.

WHEREAS, the Nevada Test Site (The Site) is currently used as a site for the final disposal of low-level radioactive waste and is being considered as a Regional or Centralized site for the disposal of low-level radioactive waste from the cleanup of the Department of Energy Weapons Complex; and

WHEREAS, the naming of the Nevada Test Site as a Regional or Centralized disposal site for low-level radioactive waste could increase the number of shipments of low-level radioactive waste into Southern Nevada considerably; and

WHEREAS, The Department of Energy is proposing to transport much of the waste by rail; and

WHEREAS, The Department of Energy is currently preparing an Environmental Assessment to evaluate sites outside the Las Vegas Valley for the transfer of low-level radioactive waste from rail to truck for shipment to the Nevada Test Site; and

WHEREAS, according to this determination, the Department of Energy is proposing to institutionalize and encourage the use of the intermodal transfer facility and highway routes outside the Las Vegas Metropolitan Area for the transport of the low-level nuclear waste to the Nevada Test Site; and

WHEREAS, the Environmental Assessment will not result in a decision by the Department of Energy to require all shipments of low-level radioactive waste destined for the Nevada Test Site to avoid Metropolitan Las Vegas; and

WHEREAS, State and local officials in Nevada contend that the continued transportation of these wastes, particularly over Hoover Dam and through the rapidly growing Las Vegas Metropolitan area, provides a greater opportunity for accidents which not only pose risks to the public health and safety of our citizens, but could also adversely affect the State's tourist-based economy; and

WHEREAS, the recent incident in Kingman, Arizona, among others, illustrates that the potential exists for the release of potentially dangerous material, a problem that could be exacerbated if it occurred on Hoover Dam or in Metropolitan Las Vegas.

A RESOLUTION REQUESTING THE DEPARTMENT OF ENERGY TO EXCLUDE THE USE OF HIGHWAY ROUTES OVER HOOVER DAM AND THROUGH THE METROPOLITAN LAS VEGAS VALLEY FOR THE TRANSPORT OF LOW-LEVEL RADIOACTIVE WASTE TO THE NEVADA TEST SITE.

NOW, THEREFORE, BE IT RESOLVED by the City of Las Vegas, Nevada, that the City supports the position that the Environmental Assessment must address the use of intermodal transportation in combination with highway routes that avoid entirely Hoover Dam and the Las Vegas Metropolitan area; and

BE IT FURTHER RESOLVED that any transport of low-level nuclear waste by the Department of Energy or their contractors or trucks to the Nevada Test Site must avoid routes over Hoover Dam and through the Las Vegas Valley.

PASSED, ADOPTED AND APPROVED on this 13th day of APRIL, 1998.

BY_____

MICHAEL J. MCDONALD, MAYOR PRO-TEM

ATTEST:

BARBARA JO RONEMUS, CITY CLERK

APPROVED AS TO FORM:

DEPUTY CITY ATTORNEY

Res4-13-98

RESOLUTION

RESOLUTION SUPPORTING THE CREATION OF A CITY OF LAS VEGAS YUCCA MOUNTAIN NUCLEAR REPOSITORY COMMITTEE

WHEREAS, in 1987 Congress amended the Nuclear Waste Policy Act and selected Yucca Mountain as the only site to be studied as a potential geologic repository for high level nuclear waste; and

WHEREAS, the City of Las Vegas has been involved in oversite of the Department of Energy activities since 1984 and has played an active and visible role in that oversight; and

WHEREAS, the City of Las Vegas desires to continue its active role of oversight as the studies of Yucca Mountain continue and work level by the Department of Energy expands; and

WHEREAS, the City Council of the City of Las Vegas desires to provide more formalized policy guidance, advice and direction and assist staff in performing the City's oversite role;

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Las Vegas affirms the creation of a City of Las Vegas Yucca Mountain Repository Committee to provide policy guidance and direction to staff and assist in planning the City's oversight activities.

PASSED, ADOPTED, AND APPROVED this 16 day of DECEMBER, 1992.

JAN LAVERTY JONES, Mayor

ATTEST:

KATHLEEN M. TIGHE, City Clerk

R-59-95

RESOLUTION

RESOLUTION OPPOSING THE RAIL SPUR ALIGNMENT THROUGH THE LAS VEGAS VALLEY AS PROPOSED IN SENATE BILL (S-167) AND HOUSE BILL (HR-1020)

WHEREAS, the Congress of the United States is attempting to site a high level waste repository at Yucca Mountain and an interim storage facility at the Nevada Test Site against the will of the majority of Nevadans; and

WHEREAS, the development of the Yucca Mountain repository and the interim storage facility, as mandated in these two bills, would require the transportation of such waste through Las Vegas and Clark County; and

WHEREAS, transportation of such waste by rail would require the construction of a rail spur through the Las Vegas valley to the interim storage facility and the repository; and

WHEREAS, our quality of life in the fastest growing city in America and our tourism-based economy could be seriously harmed by any accident involving high level nuclear waste and the resulting media coverage; and

WHEREAS, Nevada is not a generator of high level nuclear waste products and has done its fair share by contributing substantially to the United States by providing the nation's site for nuclear weapons testings; and

NOW THEREFORE, BE IT RESOLVED by the Las Vegas City Council that we affirm our strong opposition to the forced siting of an interim storage facility and geologic repository in Nevada and to the alignment and construction of a rail spur in the Las Vegas valley from existing rail systems to any interim storage facility or repository.

BE IT FURTHER RESOLVED that we adamantly oppose, as well, the transportation of nuclear waste by truck through our streets, past our homes, schools, and businesses.

BE IT FURTHER RESOLVED that we remain strongly opposed to the transportation of high level radioactive waste anywhere in Clark County and attempts by the Congress of the United States to force the siting of the Yucca Mountain repository or an interim storage facility at the Nevada Test Site.

PASSED, ADOPTED AND APPROVED this 17th day of MAY, 1995.

CITY OF LAS VEGAS NEVADA

BY _____
JANLAVERTY JONES, MAYOR

5/19/95

ATTEST:

_____
KATHLEEN M. TIGHE, CITY CLERK

RESOLUTION RESTATING THE CITY'S OPPOSITION TO THE LOCATION OF A HIGH LEVEL NUCLEAR WASTE REPOSITORY AT YUCCA MOUNTAIN

WHEREAS, the Nuclear Waste Policy Act of 1982 established a process for the establishment of the nation's first geologic repository for the storage of high level nuclear waste; and

WHEREAS, in December 1987, the Congress of the United States amended the Nuclear Waste Policy Act and unfairly selected Yucca Mountain as the only site to be characterized as a potential high level nuclear waste repository; and

WHEREAS, on April 20, 1983, and January 2, 1985, the Las Vegas City Council unanimously adopted a resolution opposing the location of a high level nuclear waste repository in Southern Nevada and the transportation of high level nuclear waste anywhere in Southern Nevada; and

WHEREAS, the Congress of the United States is attempting to pre-empt the legitimate rights of the State of Nevada to issue environmental permits needed to construct a high level nuclear waste repository at Yucca Mountain; and

WHEREAS, the development of Yucca Mountain as a high level nuclear waste repository would require the transportation of such waste through Las Vegas and Clark County; and

WHEREAS, our tourism based economy could be seriously harmed by an accident involving high level nuclear waste and the resulting media coverage; and

WHEREAS, Nevada is not a generator of high level nuclear waste products and has done its fair share by contributing substantially to the United States by providing the nation's site for nuclear weapons testing.

NOW, THEREFORE, BE IT RESOLVED by the Las Vegas City Council that we reaffirm our strong opposition to the location of a high level nuclear waste repository in Southern Nevada at Yucca Mountain.

BE IT FURTHER RESOLVED that we remain strongly opposed to the transportation of high level radioactive waste anywhere in Clark County and attempts by the Congress of the United States to pre-empt Nevada's legitimate permitting authority for Yucca Mountain.

PASSED, ADOPTED, AND APPROVED this 21st day of August, 1991.

JAN LAVERTY JONES, Mayor

ATTEST:

KATHLEEN M. TIGHE, City Clerk

Item # 1791

RESOLUTION RECONFIRMING OPPOSITION TO LOCATION
OF A NUCLEAR WASTE DEPOSIT FACILITY IN SOUTHERN NEVADA

WHEREAS, the United States Department of Energy has tentatively identified Yucca Mountain, located in Southern Nevada, as one of three possible sites for the establishment of a National Nuclear Waste Deposit Facility; and

WHEREAS, on April 20, 1983 the Las Vegas City Council unanimously adopted a resolution opposing the construction of a high-level radioactive waste storage in Southern Nevada and the transportation of high-level radioactive waste anywhere in Southern Nevada; and

WHEREAS, the development of Yucca Mountain as a radioactive waste dump would require the transportation of such waste through Las Vegas and Clark County; and

WHEREAS, a tourist-recreation based economy could be seriously harmed by an accident involving high-level radioactive material and the resulting media coverage; and

WHEREAS, Nevada is not a generator of nuclear waste products and has contributed substantially to the United States nuclear program by providing the nation's site for nuclear weapons testing.

NOW, THEREFORE, BE IT RESOLVED by the Las Vegas City Council that we reaffirm our opposition to the location of a high-level nuclear waste deposit facility in Southern Nevada.

BE IT FURTHER RESOLVED that we remain opposed to the transportation of high-level radioactive waste anywhere in Clark County.

PASSED, ADOPTED AND APPROVED THIS 2nd day of January 1985.

William H. Briare
WILLIAM H. BRIARE, MAYOR

ATTEST:

Carol A Hawley
Carol Ann Hawley, City Clerk

RESOLUTION REGARDING THE POSSIBLE
LOCATION OF A NUCLEAR WASTE DEPOSIT
FACILITY IN SOUTHERN NEVADA

WHEREAS, the United States Department of Energy has been examining locations on the Nevada Test Site in Southern Nevada for storing high-level radioactive waste; and

WHEREAS, Southern Nevada has contributed substantially to the nation's nuclear program by providing a site for above and below ground nuclear weapons testing and also a site for the disposal of low-level nuclear waste; and

WHEREAS, Nevada is not a generator of nuclear waste products; and

WHEREAS, the possibility of an accident involving nuclear waste would be significantly more probable in Las Vegas if the Nevada Test Site is chosen as the nation's high-level radioactive waste dump; and

WHEREAS, Southern Nevada's economy is based upon tourism and the possibility of an accident and media coverage thereof could seriously affect the economic vitality of Las Vegas residents not to mention their very lives.

NOW THEREFORE BE IT RESOLVED by the Las Vegas Board of Commissioners that we oppose the construction of a storage site for high-level radioactive waste in Southern Nevada.

BE IT FURTHER RESOLVED that we oppose the transportation of nuclear waste on our streets, past our homes, schools and businesses.

BE IT FURTHER RESOLVED that we oppose the transportation of high-level radioactive waste anywhere in Clark County or Southern Nevada.

Dated this 20th day of April, 1983.

William H. Briare

William H. Briare, Mayor

ATTEST:

Carol A. Harley

City Clerk

PROCLAMATION

WHEREAS; Yucca Mountain, Nevada has been designated by the U.S. Congress as the only site to be studied as a potential high-level nuclear waste repository in the United States; and

WHEREAS; numerous geologic and technical factors make Yucca Mountain a poor candidate for such a repository and should disqualify it as such; and

WHEREAS; the creation of a high-level nuclear waste repository at Yucca Mountain would pose a deadly risk to millions of people along waste shipment routes across the country and would directly threaten the health and safety of hundreds of generations of Nevadans; and

WHEREAS; tourism has long been the life-blood of Nevada's economy, with over half of the state's economic activity resulting directly or indirectly from tourism-related expenditures; and

WHEREAS; the establishment of a high-level nuclear waste repository in Nevada would diminish the safe and attractive image the state now conveys to potential visitors worldwide; and

WHEREAS; Citizen Alert has been the primary source of grassroots opposition to the siting of high-level nuclear waste in the State of Nevada since the project's inception; and

WHEREAS; the Shundahai Network, Nevada Nuclear Waste Task Force, and the Nevada Desert Experience have worked closely with Citizen Alert in the fight to keep Nevada from becoming the nation's nuclear garbage dump; now

THEREFORE; We, the Mayor and City Council of Las Vegas, do hereby proclaim Saturday, September 30, 2000, and annually thereafter until such time as the Yucca Mountain high-level nuclear waste repository project is defeated, as:

Nevada is Not a Wasteland Day

Oscar B. Goodman
Mayor of Las Vegas

Michael J. McDonald, Mayor Pro-Tem

Gary Reese, Councilman

Larry Brown, Councilman

Lynette B. McDonald, Councilwoman

c/c

RESOLUTION NO. 738

RESOLUTION OF THE CITY COUNCIL OF BOULDER CITY, NEVADA OPPOSING THE TRANSPORTING AND DUMPING OF NUCLEAR AND OTHER HAZARDOUS WASTE AT THE BEATTY DUMPSITE

WHEREAS, the State of Nevada is one of only three states which allow the disposal of commercial radioactive and other hazardous waste within their boundaries and is rapidly becoming the nuclear dumping ground for the entire nation; and

WHEREAS, leaks in shipments arriving at the dumpsite and the transportation of these radioactive wastes and materials through the cities and towns of our State pose a serious threat to the health, safety and welfare of our residents and visitors; and

WHEREAS, those federal agencies responsible for the regulation of interstate transport of nuclear and other hazardous waste have given a low priority to enforcement of the regulations governing the safety of the transportation of radioactive materials;

NOW, THEREFORE, BE IT RESOLVED, that the City Council call upon the Governor of the State of Nevada and the State Board of Health to close the Beatty dumpsite and to refuse to allow the transportation of nuclear and other hazardous waste on any road or highway in our State until we can be assured that the shippers of such waste will be forced to comply with strict safety standards and inspections.

DATED this 11th day of November, 1980.

/s/ Robert S. Ferraro

Robert S. Ferraro, Mayor

ATTEST:

/s/ Delia H. Estes

Delia H. Estes, City Clerk

(City Seal)

11/12 D
11/13 To Governor: John H Carr, M.D., State Health Officer, 505 E. King St. (Rm 201) Carson C NV. 8971

AMENDED 2-12-85

C/C

RESOLUTION NO. 1187

RESOLUTION OF THE CITY COUNCIL OF BOULDER CITY, NEVADA REFLECTING BOULDER CITY'S POSITION WITH REGARD TO PROPOSED NUCLEAR WASTE SITE ON YUCCA MT.

WHEREAS, the Nuclear Waste Policy Act of 1982 delineates a procedure and time schedule for the establishment of the nation's first geologic repository for the storage of high level nuclear waste; and

WHEREAS, one of three sites under final consideration for siting of the repository is Yucca Mountain adjacent to the Nevada Test Site; and

WHEREAS, as a result of the location of Yucca Mountain and the limited transportation network in the southwest United States and into Nevada, two of the major accesses to Yucca Mountain will be Highways 93 and 95, potentially over Hoover Dam and through Boulder City; and

WHEREAS, an accident on the site of Hoover Dam and the heavily traveled U.S. Highways 93 and 95 through Southern Nevada, which carry millions of tourists each year, would create a direct physical and economic risk for residents as well as travelers alike; and

WHEREAS, Nevada already has contributed substantially to the United States nuclear program in the form of the nation's nuclear weapons testing center;

NOW, THEREFORE, BE IT RESOLVED by the City Council of Boulder City, Nevada, that it opposes the location of a high-level nuclear waste repository in Southern Nevada.

APPROVED AND ADOPTED this 12th day of February, 1985.

/s/ Robert S. Ferraro

Robert S. Ferraro, Mayor

ATTEST:

/s/ Delia H. Estes

Delia H. Estes, City Clerk

D 2-19-85 + Nuclear Waste Project off. Carson City

CIC

RESOLUTION NO. 1655

RESOLUTION OF THE CITY COUNCIL OF BOULDER CITY, NEVADA
FOR APPROVAL OF AMENDED MAP OF A PORTION OF VILLA DEL PRADO
UNIT 7 (A PORTION OF BOULDER CITY SUBDIVISION NO. 33)

WHEREAS, On November 11, 1982, by Resolution No. 907, City Council approved the Tentative Map, and;

WHEREAS, On January 26, 1988, by Resolution No. 1525, City Council approved the Final map, and;

WHEREAS, DDL, the Developer, through VTN of Nevada, Consulting Engineers has submitted to the City, an Amended Map of a portion of Villa Del Prado, Unit 7, which is a portion of Boulder City Subdivision No. 33 and;

WHEREAS, The Amended Map shows a property line relocation between Lots 10 and 11, and ;

WHEREAS, said Amended Map is in compliance with Title 11, Chapter 39 of the City Code and the Subdivision Act of the State of Nevada.

NOW, THEREFORE BE IT RESOLVED that the City Council approve the submitted Amended Map.

DATED and APPROVED this 11th day of April, 1989.

/s/ Jon C. Porter

Jon C. Porter, Mayor

ATTEST:

/s/ Delia H. Estes

Delia H. Estes, City Clerk

D 4/12/89 + maps

RESOLUTION NO. 1724

AGREEMENT WITH THE BOARD OF COUNTY COMMISSIONERS OF CLARK COUNTY AND THE CITY OF BOULDER CITY FOR CARRYOVER RESEARCH GRANT FUNDS FOR THE YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY

WHEREAS, The Federal Government has selected Yucca Mountain, Nevada, for site characterization for the location of a high level nuclear waste repository; and

WHEREAS, The Yucca Mountain Nuclear Waste Repository has the potential to impact the social and economic characteristic of southern Nevada; and

WHEREAS, The location of the Repository at Yucca Mountain has the potential to adversely impact the City of Boulder City; and

WHEREAS, The City of Boulder City needs to determine the present capabilities and evaluate the future needs for concentrated emergency management and develop a plan to acquire up-to-date equipment and material to enhance the level of these capabilities; and

WHEREAS, The City of Boulder City needs to be able to participate in the determination of the potential impact of the Yucca Mountain Repository along with other units of local government; and

WHEREAS, The City of Boulder City has received FY 89 funding from Clark County and has demonstrated a definite need for pass through funding; and

WHEREAS, Due to the timeframe from the expenditure of the FY 89 funds, carryover of a portion of these funds into FY 90 is necessary; and

WHEREAS, This Agreement will authorize the expenditure of FY 89 funds in FY 90;

NOW, THEREFORE, BE IT RESOLVED that the appropriate officers of the City are hereby authorized and directed to take the necessary and appropriate action to execute an agreement for the carryover of funds from Clark County for the Yucca Mountain Nuclear Waste Repository.

DATED and APPROVED this 26th day of September, 1989.

/s/ Jon C. Porter

Jon C. Porter, Mayor

ATTEST:

/s/ Delia H. Estes

Delia H. Estes, City Clerk

(SEAL)

D 9/29/89

C1C

RESOLUTION NO. 1908

AGREEMENT WITH THE BOARD OF COUNTY COMMISSIONERS OF CLARK COUNTY AND THE CITY OF BOULDER CITY FOR RESEARCH GRANT FUNDS FOR THE YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY

WHEREAS, The Federal Government has selected Yucca Mountain, Nevada, for site characterization for the location of a high level nuclear waste repository; and

WHEREAS, The Yucca Mountain Nuclear Waste Repository has the potential to impact the social and economic characteristic of the City of Boulder City and southern Nevada; and

WHEREAS, The City of Boulder City needs to participate in the review of the Depart of Energy's activities and proposals and to provide more detailed information regarding existing local conditions; and

WHEREAS, The City of Boulder City needs to be able to participate in the determination of the potential impact of the Yucca Mountain Repository along with other units of local government;

NOW, THEREFORE, BE IT RESOLVED that the appropriate officers of the City are hereby authorized and directed to take the necessary and appropriate action to make application of funds from Clark County for the Yucca Mountain Nuclear Waste Repository.

DATED and APPROVED this 11th day of December, 1990.

/s/ Jon C. Porter

Jon C. Porter, Mayor

ATTEST:

/s/ Delia H. Estes

Delia H. Estes, City Clerk

(SEAL)

D 12/12/90

RESOLUTION NO. 1930

A RESOLUTION OF THE CITY COUNCIL OF BOULDER CITY, NEVADA, APPROVING AGREEMENT NO. 91-A143 WITH CAD SCAN, INC., FOR CONVERSION OF THE CITY'S BASE MAPS TO DIGITIZED FORM FOR THE CLARK COUNTY NUCLEAR WASTE REPOSITORY PROGRAM, AS A SOLE SOURCE PURCHASE

WHEREAS, The City and Clark County entered into an agreement on January 22, 1991 in regards to grant funds for the Yucca Mountain Nuclear Waste Repository Program; and

WHEREAS, In preparing and submitting the grant request, the only CAD Scan, Inc., was identified as being able to provide the requested work; and

WHEREAS, As a result, the approved grant agreement identifies CAD Scan Inc., of Rio Rancho, New Mexico, as a sole source purchase to perform the requested work task;

NOW THEREFORE, BE IT RESOLVED that the City Council approve Agreement No. 91-A143 with CAD Scan, Inc., as a sole source purchase to perform the specified work task in an amount not to exceed $128,500.00;

BE IT FURTHER RESOLVED that the City Manager be authorized to sign the agreement with CAD Scan, Inc.

DATED and APPROVED this 12th day of February, 1991.

/s/ Jon C. Porter

Jon C. Porter, Mayor

ATTEST:

/s/ Sarah Forrest

Sarah Forrest, Deputy City Clerk

(SEAL)

D & M 2/14/91

RESOLUTION NO. 2049

AGREEMENT WITH THE BOARD OF COUNTY COMMISSIONERS OF CLARK COUNTY AND THE CITY OF BOULDER CITY FOR RESEARCH GRANT FUNDS FOR THE YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY

WHEREAS, The Federal Government has selected Yucca Mountain, Nevada, for site characterization for the location of a high level nuclear waste repository; and

WHEREAS, The Yucca Mountain Nuclear Waste Repository has the potential to impact the social and economic characteristic of the City of Boulder City and southern Nevada; and

WHEREAS, The City of Boulder City needs to participate in the review of the Department of Energy's activities and proposals and to provide more detailed information regarding existing local conditions; and

WHEREAS, The City of Boulder City needs to be able to participate in the determination of the potential impact of the Yucca Mountain Repository along with other units of local government;

NOW, THEREFORE, BE IT RESOLVED that the Mayor is hereby authorized and directed to sign Agreement No. 91-A184, an agreement for funds from Clark County for the Yucca Mountain Nuclear Waste Repository for Fiscal Year 1991.

DATED and APPROVED this 22nd day of October, 1991.

Eric L. Lundgaard, Mayor

ATTEST:

Carol Ann Hawley, City Clerk

(SEAL)

Amended 5-12-92

c/c

RESOLUTION NO. 2117

AGREEMENT WITH THE BOARD OF COUNTY COMMISSIONERS OF CLARK COUNTY AND THE CITY OF BOULDER CITY FOR RESEARCH GRANT FUNDS FOR THE YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY

WHEREAS, The Federal Government has selected Yucca Mountain, Nevada, for site characterization for the location of a high level nuclear waste repository; and

WHEREAS, The Yucca Mountain Nuclear Waste Repository has the potential to impact the social and economic characteristics of the City of Boulder City and southern Nevada; and

WHEREAS, The City of Boulder City needs to participate in the review of the Department of Energy's activities and proposals and to provide more detailed information regarding existing local conditions; and

WHEREAS, The City of Boulder City needs to be able to participate in the determination of the potential impact of the Yucca Mountain Repository along with other units of local government; and

WHEREAS, On October 22, 1991, the City Council passed resolution No. 2049, entering into an agreement with Clark County for research grant funds for Fiscal Year 1991. The City and Clark County have agreed that it is in the best interest of both parties to enter into a revised agreement for the remainder of FY91 to allow:

1. The City to enter into a separate agreement with Planning Information Corporation (PIC) in an amount of $20,000.00 to develop Boulder City's PEDaL (Parcel-based Database of Local Economic, Demographic and Land Use information) System.

2. The City to continue to use a local consultant for Data Base Management in an amount of $4,500.00 from FY91 funds.

NOW, THEREFORE, BE IT RESOLVED that the Mayor is hereby authorized and directed to sign Agreement No. 92-A210, a revised agreement for funds from Clark County for the Yucca Mountain Nuclear Waste Repository for Fiscal Year 1991.

5/18/92 D

DATED and APPROVED this 12th day of May, 1992.

/s/ Eric L. Lundgaard
Eric L. Lundgaard, Mayor

ATTEST:

/s/ Sarah Forrest
Sarah Forrest, Deputy City Clerk

(SEAL)

RESOLUTION NO. 2118

AGREEMENT WITH PLANNING INFORMATION CORPORATION AND THE CITY OF BOULDER CITY FOR DEVELOPMENT OF THE CITY'S DATABASE FOR THE YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY PROGRAM

WHEREAS, The Federal Government has selected Yucca Mountain, Nevada, for site characterization for the location of a high level nuclear waste repository; and

WHEREAS, The Yucca Mountain Nuclear Waste Repository has the potential to impact the social and economic characteristics of the City of Boulder City and southern Nevada; and

WHEREAS, The City of Boulder City needs to participate in the review of the Department of Energy's activities and proposals and to provide more detailed information regarding existing local conditions; and

WHEREAS, The City of Boulder City needs to be able to participate in the determination of the potential impact of the Yucca Mountain Repository along with other units of local government; and

WHEREAS, On October 22, 1991, the City Council passed Resolution No. 2049, entering into an agreement with Clark County for research grant funds for Fiscal Year 1991. The City and Clark County have agreed that it is in the best interest of both parties to enter into a revised agreement for the remainder of FY91 to allow, in part, the City to enter into a separate agreement with Planning Information Corporation (PIC) in an amount of $20,000.00 to develop Boulder City's PEDaL (Parcel-based Database of Local Economic, Demographic and Land Use information) System.

NOW, THEREFORE, BE IT RESOLVED that the Mayor is hereby authorized and directed to sign Agreement No. 92-A211, an agreement with Planning Information Corporation for development of the City's database for the Yucca Mountain Nuclear Waste Repository for Fiscal Year 1991 in an amount of $20,000.00.

DATED and APPROVED this 12th day of May, 1992.

/s/ Eric L. Lundgaard
Eric L. Lundgaard, Mayor

ATTEST:

/s/ Sarah Forrest
Sarah Forrest, Deputy City Clerk
(SEAL)

5/18/92D

C/C

RESOLUTION NO. 2125

AGREEMENT WITH THE BOARD OF COUNTY COMMISSIONERS OF CLARK COUNTY AND THE CITY OF BOULDER CITY FOR RESEARCH GRANT FUNDS FOR THE YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY

WHEREAS, The Federal Government has selected Yucca Mountain, Nevada, for site characterization for the location of a high level nuclear waste repository; and

WHEREAS, The Yucca Mountain Nuclear Waste Repository has the potential to impact the social and economic characteristic of the City of Boulder City and southern Nevada; and

WHEREAS, The City of Boulder City needs to participate in the review of the Department of Energy's activities and proposals and to provide more detailed information regarding existing local conditions; and

WHEREAS, The City of Boulder City needs to be able to participate in the determination of the potential impact of the Yucca Mountain Repository along with other units of local government;

NOW, THEREFORE, BE IT RESOLVED that the Mayor is hereby authorized and directed to sign Agreement No. 92-A213, an agreement for funds from Clark County for the Yucca Mountain Nuclear Waste Repository for Fiscal Year 1992.

DATED and APPROVED this 9th day of June, 1992.

/s/ Eric L. Lundgaard
Eric L. Lundgaard, Mayor

ATTEST:

/s/ Sarah Forrest
Sarah Forrest, Deputy City Clerk

(SEAL)

D 6/22/92

RESOLUTION NO. 2208

AGREEMENT WITH THE BOARD OF COUNTY COMMISSIONERS OF CLARK COUNTY AND THE CITY OF BOULDER CITY FOR RESEARCH GRANT FUNDS FOR THE YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY

WHEREAS, The Federal Government has selected Yucca Mountain, Nevada, for site characterization for the location of a high level nuclear waste repository; and

WHEREAS, The Yucca Mountain Nuclear Waste Repository has the potential to impact the social and economic characteristic of the City of Boulder City and southern Nevada; and

WHEREAS, The City of Boulder City needs to participate in the review of the Department of Energy's activities and proposals and to provide more detailed information regarding existing local conditions; and

WHEREAS, The City of Boulder City needs to be able to participate in the determination of the potential impact of the Yucca Mountain Repository along with other units of local government;

NOW, THEREFORE, BE IT RESOLVED that the Mayor is hereby authorized and directed to sign Agreement No. 92-A235, an agreement for funds from Clark County for the Yucca Mountain Nuclear Waste Repository for Fiscal Year 1992.

DATED and APPROVED this 8th day of December, 1992.

John F. Pilgrim, Assistant Mayor

ATTEST:

Vicki G. Bergdale, City Clerk

(SEAL)

RESOLUTION NO. 3364

A RESOLUTION REQUESTING THE DEPARTMENT OF ENERGY TO REQUIRE SHIPPERS AND CARRIERS OF LOW LEVEL RADIOACTIVE WASTE TO THE NEVADA TEST SITE TO USE ROUTES THAT DO NOT INCLUDE U.S. 93 AND THE TRANSPORT OF WASTE OVER HOOVER DAM AND THROUGH BOULDER CITY

WHEREAS, the Department of Energy's (DOE) Fernald Environmental Management Project (FEMP) anticipates resuming shipments of low level radioactive waste (LLW) to the Nevada Test Site (NTS) at the end of April, 1999, and it is anticipated that other carriers will be added as low-level radioactive waste contractors in the near future; and

WHEREAS, FEMP has solicited bids from carriers to transport the waste and are considering five of the bids, some of which include routes that avoid Hoover Dam and the City of Boulder City; and

WHEREAS, it is likely that other future carriers who transport low-level radioactive waste will likely select the same routes that are selected as a result of the current bid process; and

WHEREAS, the City Council of Boulder City had previously approved Resolution No. 3117 on March 24, 1998, requesting that the routes for transport of such waste avoid Hoover Dam and the City of Boulder City; and

WHEREAS, State and local officials in Nevada contend that the continued transportation of these wastes not only poses risks to public health and safety, but could also adversely affect the State's tourist-based economy; and

WHEREAS, if a transportation accident involving radioactive waste were to occur at Hoover Dam, it could have a devastating impact on the State's water supply and the Colorado River; and

NOW, THEREFORE BE IT RESOLVED by the City Council of Boulder City, Nevada, that supports the position that under no circumstances should U.S. 93 be utilized for transport of low level radioactive waste into the State of Nevada.

APPROVED on this 27th day of April, 1999.

Robert S. Ferraro, Mayor

ATTEST:

Vicki G. Mayes, City Clerk

RESOLUTION NO. 3622

RESOLUTION APPROVING AGREEMENT NO. 00-662 BETWEEN THE CITY OF BOULDER CITY AND CLARK COUNTY FOR NUCLEAR WASTE REPOSITORY PROGRAM PARTICIPATION FROM AUGUST, 2000, THROUGH THE COMPLETION OF THE SCOPE OF WORK

WHEREAS, The Federal Government has selected Yucca Mountain, Nevada, for site characterization for the location of a high level nuclear waste repository; and

WHEREAS, The Yucca Mountain Nuclear Waste Repository has the potential to impact the social and economic characteristic of the City of Boulder City and Southern Nevada; and

WHEREAS, The City of Boulder City needs to participate in the review of the Department of Energy's activities and proposals and to provide more detailed information regarding existing local conditions; and

WHEREAS, The City of Boulder City needs to be able to participate in the determination of the potential impact of the Yucca Mountain Repository along with other units of local government;

NOW, THEREFORE, BE IT RESOLVED that the Mayor is hereby authorized and directed to sign Agreement No. 00-662, an agreement for funds from Clark County for participation in the Yucca Mountain Nuclear Waste Repository Program for a period beginning August 1, 2000 in an amount not to exceed $3,500.00.

DATED and APPROVED this 8th day of August, 2000.

Robert S. Ferraro

Robert Ferraro, Mayor

ATTEST:

Vicki G. Mayes, City Clerk

(SEAL)

Appendix B – Clark County, Nevada's Resolutions in Opposition to Yucca Mountain

CLARK COUNTY BOARD OF COMMISSIONERS
AGENDA ITEM

Issue:	**Yucca Mountain Nuclear Waste Repository**	**Back-up:**
Petitioner:	John L. Schlegel, Director, Comprehensive Planning	**Clerk Ref.#**

Recommendation:

That the Board of County Commissioners approve, adopt, and authorize the Chairman to sign a resolution reaffirming its opposition to the siting of a Nuclear Waste Repository at Yucca Mountain, Nye County, Nevada.

FISCAL IMPACT:

None by this action.

BACKGROUND:

Goal A. Create partnerships with common interest groups and the people within our community.

In January 1983 the President signed into law the Nuclear Waste Policy Act of 1982 (NWPA), which established a process and time schedule for developing the nation's first high level nuclear waste geologic repository. Yucca Mountain in Nye County was, subsequently, named as one of nine sites to be evaluated to determine its suitability for the permanent isolation of the highly toxic nuclear waste. In reacting to the Yucca Mountain designation, the Commission on January 8, 1985, adopted a resolution opposing the siting of a nuclear waste repository at Yucca Mountain.

On December 22, 1987, Congress enacted the Nuclear Waste Policy Amendments Act (NWPAA), which designated Yucca Mountain as the sole site to be characterized for permanent nuclear waste storage. The NWPAA also abandoned the important original objectives of the NWPA to establish and utilize a process that would equitably site a facility of this danger and controversy. Given these circumstances, on April 5, 1988, the Board of County Commissioners, by resolution, further reaffirmed its opposition to the siting of a repository at Yucca Mountain.

Recent actions by the Department of Energy (DOE) warrant Clark County's reconfirmation of its opposition to the Yucca Mountain site. It is apparent, for example, in the Yucca Mountain Draft Environmental Impact Statement (DEIS) that a major objective of the DEIS is to minimize the description and consideration of any potential impacts resulting from Yucca Mountain Program activities. It is also evident that a major component of the Yucca Mountain Program is the transportation of the nuclear waste. Despite the huge volume of shipments that are projected to occur and the listing of numerous rail and highway routing options in Clark County, potential impacts in Clark County are ignored. It is almost impossible to separate the transportation of the nuclear waste, which creates substantial potential risks to Clark County, from the siting of a repository at Yucca Mountain. It is, therefore, not in the public interest of the citizens of Clark County to have a repository constructed in Southern Nevada.

Respectfully submitted,

APPROVED/ADOPTED/AUTHORIZED AS RECOMMENDED

Cleared for Agenda

3/7/00 DU

JOHN L. SCHLEGEL
Director, Comprehensive Planning

JLS/DB/jt

Agenda Item # 73

RESOLUTION
OF THE
CLARK COUNTY BOARD OF COMMISSIONERS
REAFFIRMING ITS OPPOSITION TO THE SITING OF A NUCLEAR WASTE REPOSITORY AT YUCCA MOUNTAIN, NYE COUNTY, NEVADA

WHEREAS, the Nuclear Waste Policy Act of 1982 established a process and time schedule for the establishment of the nation's first geologic repository for the permanent disposal of spent commercial nuclear fuel and high-level nuclear waste; and

WHEREAS, on December 22, 1987, the Congress of the United States amended the Nuclear Waste Policy Act of 1982, identifying Yucca Mountain in Nye County, Nevada as the sole site to be characterized as a permanent repository for the storage of spent commercial nuclear fuel and high-level nuclear waste; and

WHEREAS, because of these actions by Congress the Clark County Board of Commissioners approved resolutions on January 8, 1985, and April 5, 1988, opposing the location of a repository in Southern Nevada; and

WHEREAS, the transportation of nuclear waste is a major component of the Yucca Mountain Program; and

WHEREAS, the Department of Energy, in the draft *Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DEIS)*, lists numerous potential truck and rail routing alternatives in Clark County, and the Las Vegas Valley; and

WHEREAS, if Yucca Mountain is developed as a repository, the listing of these transportation alternatives in the DEIS would result in the Las Vegas Valley, with over 1.3 million residents and 33 million annual visitors and considerable congestion, becoming a major access point to Yucca Mountain; and

WHEREAS, the transportation of nuclear waste in the highly developed Las Vegas Valley would create a direct and significant risk to the health, safety and quality of life of both residents and visitors, as well as a substantial economic risk to Clark County's tourist-based economy, the major revenue source to Clark County and the State of Nevada; and

WHEREAS, because of the integration of the transportation of the nuclear waste with the development of the Yucca Mountain repository site, and the impossibility of separating these activities it is, therefore, not in the public interest of the citizens of Clark County to have a repository located at Yucca Mountain in Southern Nevada.

NOW, THEREFORE, BE IT RESOLVED, by the Clark County Board of County Commissioners that

1. The Clark County Board of Commissioners reaffirms its opposition to the siting of a high-level nuclear waste repository at Yucca Mountain in Nye County in Southern Nevada.

2. The signed resolution be transmitted to the President of the United States, the Nevada Congressional representatives, and the Governor of the State of Nevada.

PASSED, ADOPTED, AND APPROVED this 7TH day of MARCH, 2000.

CLARK COUNTY, NEVADA

By: B L Woodbury

BRUCE L. WOODBURY, CHAIRMAN
BOARD OF COUNTY COMMISSIONERS

ATTEST:

Shirley B Parraguirre

SHIRLEY B. PARRAGUIRRE, COUNTY CLERK

BOARD OF COUNTY COMMISSIONERS
AGENDA ITEM

SUBJECT: ☐ Public Hearing ☒ Resolution ☐ Agreement ☐ Information ☐ Other ☐ Proceedings	Clerk Ref. # XIII 03
NUCLEAR WASTE POLICY AMENDMENTS ACT OF 1987.	
PETITIONER: DONALD L. SHALMY, COUNTY MANAGER	Commission Backup

RECOMMENDATION:

THAT THE BOARD OF COUNTY COMMISSIONERS ADOPT THE ATTACHED RESOLUTION REAFFIRMING ITS OPPOSITION TO THE NUCLEAR WASTE REPOSITORY AT YUCCA MOUNTAIN, DECLARING CLARK COUNTY AS AN "AFFECTED UNIT OF LOCAL GOVERNMENT" PURSUANT TO THE NUCLEAR WASTE POLICY AMENDMENTS ACT OF 1987 AND DIRECTING THE COUNTY MANAGER TO PURSUE WITH THE DEPARTMENT OF ENERGY (DOE), THE CERTIFICATION OF CLARK COUNTY AS AN AFFECTED UNIT OF LOCAL GOVERNMENT, FOR GRANTS, FINANCIAL AND TECHNICAL ASSISTANCE, AND AN IMPACT REPORT UNDER THE PROVISIONS OF THE NUCLEAR WASTE AMENDMENTS ACT OF 1987.

FISCAL IMPACT:

Not applicable.

BACKGROUND:

In January 1983 the President signed into law the Nuclear Waste Policy Act which provided a process and time schedule for establishing the nation's first high level nuclear waste geologic repository. Yucca Mountain, adjacent to the Nevada Test Site, was one of nine sites chosen for initial screening assessments.

In a reaction opposing the Yucca Mountain designation, the Clark County Board of Commissioners officially adopted a resolution opposing the siting of a nuclear waste repository at Yucca Mountain in January of 1985.

In May 1986, the President approved the Secretary of Energy's recommendation that Yucca Mountain and two other western sites be characterized as a potential repository.

On December 22, 1987, the Congress passed, and the President signed the Nuclear Waste Policy Amendments Act of 1987, defining certain grants, impact assistance, and payments-equal-to-taxes funds available to contiguous, affected counties. Clark County became a contiguous affected county to the Yucca Mountain site in Nye County when the formation of a new Nevada county (Bullfrog) was ruled unconstitutional by a District Court in early 1988, and the State Legislative Committee determined not to appeal this decision.

In March 1988, the DOE's Nevada Nuclear Waste Storage Investigations Project identified six potential railway transportation routes for hazardous material to the proposed Yucca Mountain repository site. Five of the six routes pass through Clark County.

CLEARED FOR AGENDA

4-5-88 JaB

County Manager

ADOPTED AS RECOMMENDED

The Clark County Board of Commissioners has affirmed its opposition to a nuclear waste repository at Yucca Mountain. With presidential approval of characterization and with identification of nuclear waste rail routes through Clark County, it is imperative that the Board undertake every available means to protect the interests of Clark County residents.

Pursuit of the guaranteed provisions of the Nuclear Waste Amendments Act of 1987 will ensure the County an active role in the characterization process and adequate information to determine potential future impacts. In the event a repository is indeed developed at Yucca Mountain, Clark County will receive grants and financial aid to mitigate these impacts on local residents and interests.

The Nuclear Waste Amendment Act of 1987 requires Department of Energy certification of Clark County as an affected unit of local government and the filing of an impact report. With this certification Clark County would become eligible for grants to:

1. Review DOE activities to determine economic, social, public health and safety, and environmental impacts of a repository or site characterization.

2. Develop a request for impact mitigation assistance.

3. Engage in monitoring, testing, or evaluation of site characterization activities.

4. Provide information to residents on program activities.

5. Request information from and make comments and recommendations to DOE.

6. Prepare and file an application for a grant for payment-equal-to-taxes for site characterization and repository development activities and operations by DOE in Clark County.

The Nuclear Waste Policy Amendments Act allows Clark County to ensure maximum protection for its residents without acceptance or implied agreement to the location of a nuclear repository at the Yucca Mountain site.

The attached resolution suggests an evolved policy stance by the Board of County Commissioners which recognizes the amendments to the Nuclear Waste Policy Act. The policy represents a strong reaffirmation of the Board's opposition to the nuclear waste repository. It also deals pragmatically with the political realities of congressional action in amending the Nuclear Waste Policy Act, by directing the pursuit of all supplemental financial assistance available as a means of protecting Clark County residents and interests.

Respectfully submitted,

DONALD L. SHALMY
County Manager

CLARK COUNTY, NEVADA

DONALD L. "PAT" SHALMY
County Manager

DALE W. ASKEW, CPA
Assistant County Manager

MICHAEL P. COOL
Assistant County Manager

AGENDA ITEM DEVELOPMENT REPORT

NO. 1379

DATE: March 22, 1988

Subject: NUCLEAR WASTE POLICY AMENDMENTS ACT OF 1987

Federal action on siting a high level nuclear waste repository has escalated with passage of the Nuclear Waste Policy Amendments Act of 1987 (NWPAA) last year. Through this act, siting of a nuclear waste repository was focused on Yucca Mountain. Further, in February the Legislative Commission decided not to appeal a District Court ruling that the formation of Bullfrog County was unconstitutional. Clark County then became a contiguous, affected county to the Yucca Mountain site in Nye County. This has opened up financial assistance opportunities provided by the NWPAA.

The Board has long expressed a unified stance in opposition to the repository. But, with changes in the federal law focusing attention on Yucca Mountain, it is now appropriate and indeed prudent for the Board to consider all options necessary to protect the residents and business interests of Clark County.

Background:

In January 1983 the President signed into law the Nuclear Waste Policy Act. The Act provided a process and time schedule for establishing the nation's first high level nuclear waste repository. Yucca Mountain, adjacent to the Nevada Test Site, was one of the nine sites chosen for initial screening as a repository. The Clark County Board of Commissioners adopted a resolution in January of 1985 opposing the siting of a nuclear waste repository at Yucca Mountain.

In May of 1986, the President approved the Secretary of Energy's recommendation that Yucca Mountain and two other Western sites be characterized as a potential repository.

On December 12, 1987, the Congress passed, and the President signed the Nuclear Waste Policy Amendments Act (NWPAA) of 1987. This law identified Yucca Mountain as the prime site for locating a repository.

In February of this year the Legislative Commission chose not to appeal a District Court ruling that the formation of Bullfrog County was unconstitutional.

-continued-

Impacts to Clark County:

Clark County may experience a number of impacts from the proposed Yucca Mountain repository. Among these are risk to the health and safety of our citizens from transportation impacts, demands on services from the influx of thousands of workers and their families, and the allocation of scarce financial resources for emergency preparedness. If Yucca Mountain is selected, current plans would permit thousands of truck loads and rail shipments of high level nuclear waste to traverse Las Vegas. For example, in March of 1988, the Department of Energy's Nevada Nuclear Waste Storage Investigations Project identified six potential railway transportation routes for hazardous material to the proposed Yucca Mountain repository site. Five of the six routes pass through Clark County.

Affected Local Governments/Financial Assistance

The NWPAA provides for the characterization of the Yucca Mountain site, through a process anticipated to require five to seven years. The NWPAA also provides for certain grant monies, impact assistance and involvement in the process for "affected units of local government."

An affected local government is defined as "the unit of local government with jurisdiction over the site of a repository ..." or, "may, at the discretion of the Secretary of the Department of Energy, include units of local government that are contiguous with such unit." With the ruling on Bullfrog County, Clark County is in a position to be identified as an affected local government.

Impact assistance is authorized to affected local governments during site characterization and repository development. An impact report must be submitted to the Department of Energy (DOE) to request such assistance.

Under the NWPAA, affected local governments are guaranteed the following financial assistance considerations:

1) Grants and PETT (payments equal to taxes)

   DOE is required to grant to the State of Nevada and any affected unit of local government an amount, each year, equal to the amount the state or local government would receive if they were authorized to tax site characterization activities and repository development and operation as they would tax non-federal real property and industrial actitivies with the state or unit of local government. The assistance amounts are as yet undefined.

-continued-

2) Negotiations

Local governments are also included in negotiations for a negotiator's agreement. A federal negotiator will be appointed to consult with affected units of local government. The negotiated agreement would specify the terms and conditions under which a local government would agree to host a repository, including financial and institutional arrangements. The agreement may include terms and conditions related to the affected unit of local government's interests. Under a benefits agreement, affected units of local government must also be consulted in negotiations, and must receive at least one-third of the benefits. Total benefits are limited to $10 million per year.

3) Impact Assistance

Affected units of local government can develop impact assistance reports and request financial and technical assistance to address those impacts. The assistance amounts available are as yet undefined.

It is important to note that the NWPAA states clearly that acceptance of grants and PETT does not imply acceptance of the program and that "the submittal of an impact assistance report to DOE in no way implies that the state (local government) agrees with the program or is volunteering to host the repository."

Current Program:

Clark County has worked closely over the past several years with the State of Nevada and local governments in Clark, Lincoln and Nye counties to monitor DOE's activities and to determine impacts from the program. Clark County has received annual grants from the State and participated in the development and implementation of a program to evaluate impacts. Preliminary results from these studies will be available in the near future.

Recommendation:

The Clark County Board of Commissioners has affirmed its opposition to a nuclear waste repository at Yucca Mountain. Nonetheless, with the changes contained in the NWPAA which focus investigation on one repository site at Yucca Mountain, it is only prudent that the Board consider the options available to protect the interests of Clark County residents.

-continued-

Pursuit of the guaranteed financial assistance provided in the Nuclear Waste Policy Amendments Act of 1987 will provide the County with the opportunity to chart an independent course of action to determine potential future impacts without depleting limited local tax dollars. In the event a repository is developed at Yucca Mountain, Clark County has several options by which to receive grants and financial aid to mitigate these impacts on local residents and interests. Documentation of reports and needs will be necessary to support impact assistance requests.

Staff is preparing an agenda item seeking Board approval to file a request with the Department of Energy for Clark County certification as an "affected unit of local government."

With the Board's direction staff can develop an operational plan to pursue the funding options available. Pursuit and acceptance of assistance does not imply acceptance of a repository at Yucca Mountain. Nonetheless, given the amendments to the Nuclear Waste Policy Act it is only prudent that Clark County pursue the supplemental assistance available to ensure maximum protection for its residents and interests. Richard Holmes and Robert Broadbent will be available to brief the Board on the program and issues.

DONALD L. SHALMY
County Manager

jbn
A-5

RESOLUTION

(OF THE CLARK COUNTY BOARD OF COMMISSIONERS)

WHEREAS, the Nuclear Waste Policy Act of 1982 delineated a procedure and time schedule for the establishment of the nation's first geologic repository for the storage of high level nuclear waste; and

WHEREAS, on January 8, 1985, the Clark County Board of Commissioners adopted a resolution opposing the location of a high-level nuclear waste repository in Southern Nevada; and

WHEREAS, Yucca Mountain in Nye County was selected in May of 1986 to be one of three sites to be considered for placement of the repository; and

WHEREAS, in December 1987, the Congress of the United States amended the Nuclear Waste Policy Act identifying Yucca Mountain as the preferred site for a high-level nuclear waste repository; and

WHEREAS, the amendments defined "affected units of local government", which could include Clark County; and

WHEREAS, the amendments established a procedure whereby such local governments could receive grants and impact mitigation assistance and could become directly involved in decision-making for the high level nuclear waste program; and

WHEREAS, designation as an affected unit of local government and acceptance of grant assistance in no way implies or requires acceptance of the placement of a high-level nuclear waste repository in Southern Nevada.

NOW, THEREFORE, BE IT RESOLVED by the Clark County Board of Commissioners that:

1. The Board continues to oppose the location of a high-level nuclear waste repository in Southern Nevada; and

-continued-

2. Pursuant to this opposition, and because Congress has directed the Department of Energy to apply its repository resources towards site characterization at Yucca Mountain, it is prudent and responsible for the Board to seek all supplemental financial assistance available to undertake the studies necessary to support impact assistance requests, to support a staff and program to monitor Department of Energy activities, and to provide a negotiating presence so that potential impacts on local residents and business interests can be mitigated.

AND BE IT FURTHER RESOLVED THAT the Board hereby declares Clark County to be an "affected unit of local government" pursuant to the Nuclear Waste Policy Act Amendments of 1987 and directs the County Manager to pursue such certification from the Department of Energy and to pursue all financial or other assistance available to Clark County under the high-level nuclear waste program.

PASSED, ADOPTED, AND APPROVED this 5th day of April, 1988.

CLARK COUNTY, Nevada

By: _____
PAUL J. CHRISTENSEN, Chairman
Board of County Commissioners

ATTEST:

_____
LORETTA BOWMAN, County Clerk

BOARD OF COUNTY COMMISSIONERS
AGENDA ITEM

Subject:	Clerk Ref.#
YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY	IV C.2
Petitioner: DONALD L. SHALMY COUNTY MANAGER	Commission Backup

Recommendation:

THAT THE BOARD OF COUNTY COMMISSIONERS CONSIDER A RESOLUTION STATING THE BOARD'S POSITION ON THE POTENTIAL SITING OF A NUCLEAR WASTE REPOSITORY AT YUCCA MOUNTAIN, ADJACENT TO THE NEVADA TEST SITE.

Fiscal Impact:

NONE

Background:

In January 1983 the President signed into law the Nuclear Waste Policy Act. The Act set up a process and time schedule for establishing the nation's first high level nuclear waste geologic repository. Yucca Mountain, adjacent to the Nevada Test Site, was one of nine sites chosen for initial screening assessments. MIR #1351 details the process and the original time schedule.

As a result of federal legislation identifying a potential site in Nevada, the 1983 legislature established a subcommittee to track federal efforts and to consider a policy stance for Nevada. Also, the Nuclear Waste Project Office was established within the Office of the Governor. The Nuclear Waste Project Office is responsible for technical review of federal studies and liaison with local governments. The Nuclear Waste Project Office is funded by a federal grant and passes a portion of that funding through to various local governments so that they too may track federal proposals.

In late December 1984, the Department of Energy issued the environmental assessments for each of the nine candidate sites and suggested three of those nine for a four or five year detailed geologic investigation called a site characterization study. Yucca Mountain was one of the three selected for final consideration. MIR #1500 provides further detail on this proposed decision and its time frame.

Attached is a proposed resolution which highlights the concerns of the Board regarding this matter.

Respectfully submitted,

ADOPTED RESOLUTION

Cleared for Agenda

1-8-85 cdf

mp Pace for
DONALD L. SHALMY
COUNTY MANAGER

DLS:sg

OFFICE OF THE COUNTY MANAGER

CLARK COUNTY NEVADA

BRUCE W. SPAULDING
County Manager

JOSEPH C. DENNY
Assistant County Manager

MANAGER'S INFORMATION REPORT

NO. 1351

DATE: DECEMBER 30, 1988

SUBJECT: HIGH LEVEL NUCLEAR WASTE REPOSITORY
ISSUES AFFECTING CLARK COUNTY

The State of Nevada was notified in February of 1983 that Yucca Mountain, North of Las Vegas in Nye County, was being considered for nomination as one of five candidate sites* for a high-level nuclear waste repository. Formal nomination of the five sites will occur by summer 1984. The list of five sites will be further reduced to three by mid-1985, with the recommended site being presented to Congress in April of 1987. Nevada appears to be a strong candidate for the repository given its low population density, high percentage of federal land ownership, favorable hydrogeologic setting, and history of prior nuclear activity. Given the likelihood of Nevada's selection, a number of issues become evident:

1) Does Nevada have to accept the nuclear waste?

2) What is the relationship between state and federal law on nuclear waste siting and transport?

3) What sort of flexibility is present in federal regulations to address local concerns?

4) What issues are important to consider locally?

5) What role should Clark County play with the state and federal governments to ensure that local issues are considered?

These issues are discussed briefly in the remainder of this report. Comprehensive Planning will provide a more detailed briefing at your convenience.

*Other areas of the country being considered are Utah, West Texas, Louisiana and Mississippi.

1) Does Nevada have to accept the nuclear waste?

The federal government appears to be preeminent in matters dealing with nuclear waste. The Atomic Energy Act of 1954 and amendments, and the Energy Reorganization Act of 1974 all specify federal authority. The Nuclear Waste Policy Act of 1982 further centers this responsibility in the Department of Energy. In litigation the "Commerce Clause" and "Supremacy Clause" are cited in providing evidence that the United States has licensing authority and regulatory power over the transfer, storage or disposal of radioactive waste material. The several states that have attempted to prevent or restrict the movement or storage of nuclear waste into or through their jurisdictions (Washington State Building and Construction Trades Council vs. Spellman and Illinois vs. General Electric) have had these clauses cited by courts to prevent state intervention actions.

Perhaps for cosmetic purposes, the Nuclear Waste Policy Act of 1982 provides a method by which a state could conceivably reject its selection as a waste repository. The process begins by a state governor vetoing his state's selection as a repository site. If both houses of Congress can override this veto by a simple majority, however, the state nonetheless becomes a repository state, despite the gubernatorial veto. Once selected, it seems unlikely that a state will be able to overturn the process.

2) What is the relationship between state and federal law on nuclear waste siting and transport?

This is a relatively complicated issue because there are both federal and state laws which regulate nuclear waste. Chapter 459 of the Nevada Revised Statutes (NRS) regulates nuclear affairs, with regulations cited in the Nevada Administrative Code. NRS 706.441 regulates the transport of radioactive waste in Nevada and NRS 408.125 enables the state to designate routes for the transport of hazardous materials.

On the other hand, the Atomic Energy Act (AEA) of 1954 and amendments grant specific powers to the federal government to license and regulate all facets of nuclear waste. These regulations are specified in 10 CFR Parts 1 to 199 (Energy). Section 274(b) of the AEA permits "Agreements with states." The Nuclear Regulatory Commission can "enter into agreements with the Governor of any State providing for discontinuance of the regulatory authority of the Commission under Subchapters V, VI, VII and Section 2201 of Title 42 (Public Health and Welfare)." Such an agreement permits a state to regulate byproduct materials, source materials and special nuclear materials (plutonium, uranium 233, etc.). Nevada has signed such an agreement with the federal government and it forms the basis for NRS 459 and other related statutes. Section 274(b), however, appears to be more concerned with nuclear waste generated and transported within the state rather than between states as envisioned in the Yucca Mountain project.

In answering Washington and Illinois' attempt to limit out-of-state deliveries for storage (see cases cited on Page 2), the courts have specifically noted that regulating nuclear waste is a federal decision and federal licensing requirements would apply.

In one area, namely the selection of routes for the conveyance of nuclear waste, the federal government appears to allow states some flexibility. For example, the federal government consulted with several states closely this past year on route selection in the shipment of high-level wastes to interim sites in Wisconsin and Illinois.

Part 397.9(a) of the Nuclear Regulatory Commission regulations also notes that "unless there is no practicable alternative, a motor vehicle which contains hazardous material must be operated over routes which do not go through or near heavily populated areas, places where crowds are assembled: tunnels, narrow streets [Hoover Dam?]. Operating convenience is not a basis for determining whether it is practicable to operate a motor vehicle." This regulation would appear to provide the state some flexibility in addressing intrastate transport matters.

In general, however federal law appears to have precedence over State of Nevada law.

3) What sort of flexibility is present in federal regulations to address local concerns?

The Nuclear Waste Policy Act of 1982 (97-425) (particularly Section 215(a)), defines interaction with local governments as that which occurs at the state level and affected Indian Tribes. Local involvement will also consist of a series of public hearings to be sponsored by the Department of Energy, at which time the public will be afforded opportunity for comment. The first public hearing in Las Vegas took place in March 1983.

A more substantive process through which local concerns can be addressed is available from the state.

Section 215(b) of the Nuclear Waste Policy Act of 1982 specifies that the Secretary (of the Department of Energy) and Governor of a state shall enter into a written agreement which can specify "procedures by which such Governor or governing body may study, determine, comment or make recommendation with regard to the possible health, safety and economic impacts of the test and evaluation facility." The Nevada Department of Minerals, which is coordinating the Nevada response to the federal government, feels that local entities can be included in the substantive review process vis-a-vis the written agreement.

Federal monies funneled through the State of Nevada Department of Energy would likewise be available for Clark County to investigate potential local impacts. The State of Nevada received $350,000 for FY 1983 for investigative studies and $1.9 million for FY 1984, $1.1 million of which is slated for an analysis of the Department of Energy site plan for Yucca Mountain. It is anticipated that some monies from the $700,000 remaining will be available for local impact analysis.

4) What issues are important to consider locally?

It is important that issues pertinent to Clark County and local entities are considered at the earliest date. In addition to ensuring that impacts are minimized, it is also important to make the federal government aware of the degree of local concern about: a) the project, and b) the fact that Clark County and its citizens would be the best judge on determining what local impacts would result (as opposed to the state making those decisions).

Among the issues which should be considered in Clark County are:

A. Emergency response issues in the event of an accident (security, clean-up, evacuation of people, financial responsibility, etc.).

B. The transportation of the nuclear waste through the County (mode, routes and magnitude of the shipments).

C. Socioeconomic considerations (employment impacts associated with construction and operations, demographics, facilities needs, service requirements, security, and financial considerations).

D. Perceptual issues (influence on tourism, quality of life, general hazard).

E. Environmental impact (impact on the environment because of an accident, for example).

F. Mitigation funds to minimize impacts if the Yucca Mountain site is selected (how much, availability prior to site construction, funds for impact analysis).

5) What role should Clark County play with the state and federal governments to ensure that local issues are considered?

The nuclear waste issue is largely a no-win proposition. If we assume that the Yucca Mountain site is to be selected and plan accordingly we may run the risk of having the public feel that we approve of the project and are tacitly working with the federal government to bring the project to Nevada. If we ignore the project and let the state do our planning for us we face the equally untenable position of having the state specify impacts and

solutions. While this is a difficult question to answer and one that could be delayed because of the long time frame of the project (commencement of operations is not scheduled until 1997) we should recognize that either stance will be criticized.

Nonetheless, because of the significance of the issue, it is important that we determine what influence the project would have on Clark County. At a minimum we could be a coordinative vehicle for citizens and groups in Clark County to ensure that all concerns are noted; at the other end of the spectrum staff could provide substantive technical input similar to that provided by the County in its evaluation of the M-X project. Whatever the role, it is important that the County determine which course of action it will pursue in a relatively timely manner.

Bruce W. Spaulding
County Manager

BWS:sg

REPORT #1351

OFFICE OF THE COUNTY MANAGER

CLARK COUNTY, NEVADA

DONALD L. "PAT" SHALMY
County Manager

DALE W. ASKEW, CPA
Assistant County Manager

MICHAEL P. COOL
Assistant County Manager

MANAGER'S INFORMATION REPORT

NO. 1500

DATE: JANUARY 4, 1985

SUBJECT: HIGH-LEVEL NUCLEAR WASTE REPOSITORY

Recently, the Department of Energy (DOE) released a series of evironmental assessments for each of the nine sites being considered to establish the nation's first high-level radioactive waste repository. Of these nine, the DOE has recommended three for detailed investigations called site characterizations. These three are Yucca Mountain adjacent to the Nevada Test Site, Hanford, Washington, and the Deaf Smith site in Texas. The selection of those three sites is subject to public review and comment received over a period ending on March 20, 1985. DOE will hold a public briefing on the Yucca Mountain assessment on January 22, 1985 in Las Vegas. A public hearing will be held in Las Vegas on February 26, 1985. Time and locations have not been announced.

The site characterization studies will involve construction of deep shafts 1,000 to 4,000 feet below ground to further study the geology of each site on a hands on basis. From these studies, one site will be recommended for the repository.

The schedule and process of selection for these sites is governed by the Nuclear Waste Policy Act of 1982. The site characterization will take four to five years at which time the DOE will recommend one site to the President for approval. A decision will probably not occur before 1990.

The Governor of the selected state may reject a selection. This rejection may be overriden by a resolution of both Houses of Congress.

Comprehensive Planning has been tracking and will continue to track this process very closely. Comprehensive Planning's staff is currently reviewing the 1,500 page Yucca Mountain draft assessment and will be preparing comments on the report for those aspects which influence Clark County. Transportation and tourism related issues will be their prime focus.

Donald L. Shalmy
County Manager

DLS:ll
Attachment

RESOLUTION

(of the Clark County Board of Commissioners)

WHEREAS, the Nuclear Waste Policy Act of 1982 delineates a procedure and time schedule for the establishment of the nation's first geologic repository for the storage of high level nuclear waste; and

WHEREAS, one of three sites under final consideration for siting of the repository is Yucca Mountain adjacent to the Nevada Test Site; and

WHEREAS, as a result of the location of Yucca Mountain and the limited transportation network in the southwest United States, major access to Yucca Mountain will be through the heavily populated Las Vegas Valley, which will be home to approximately one million people and a destination for 25 million visitors by the year 2000; and

WHEREAS, an accident within the highly developed Las Vegas Valley would create a direct physical and economic risk for residents and visitors alike; and

WHEREAS, Nevada already has contributed substantially to the United States nuclear program in the form of the nation's nuclear weapons testing center.

NOW, THEREFORE, BE IT RESOLVED by the Clark County Board of Commissioners that the Board opposes the location of a high-level nuclear waste repository in Southern Nevada.

PASSED, ADOPTED, AND APPROVED this 8th day of January, 1985.

CLARK COUNTY, NEVADA

By: Thalia M. Dondero
Thalia M. Dondero, Chairman
Board of County Commissioners

ATTEST:

Loretta Bowman
LORETTA BOWMAN, County Clerk

/sg

Appendix C – Clark County Comments to Draft Environmental Impact Statement (DEIS), Formal Response to Supplemental Draft Environmental Impact Statement (SDEIS) and Formal Response to Preliminary Site Suitability Evaluation (PSSE)

Appendix C

Clark County, Nevada

Executive Summary Comments

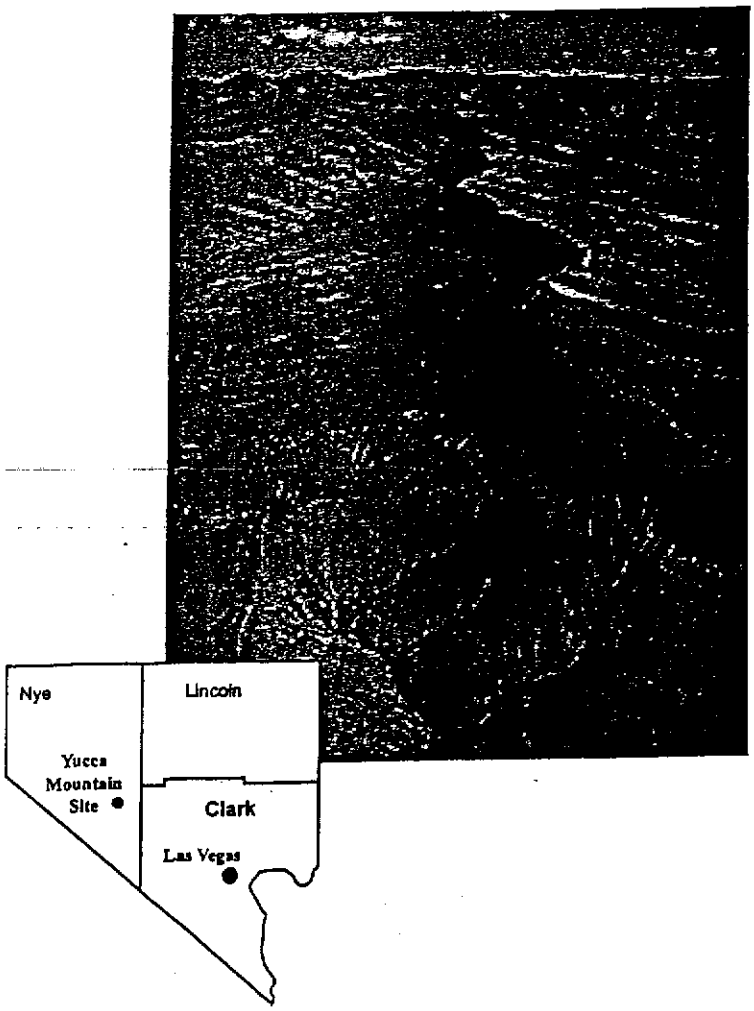
Dated February 25, 2000

to

DOE's Draft Environmental Impact Statement (DEIS)

Clark County Comments

U.S. Department of Energy's Draft Environmental Impact Statement for a Geologic Repostitory for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada



Executive Summary

Department of Comprehensive Planning
Nuclear Waste Division

CLARK COUNTY NEVADA

BRUCE L. WOODBURY
Chairman

Board of County Commissioners

CLARK COUNTY GOVERNMENT CENTER
500 S GRAND CENTRAL PKY
PO BOX 551601
LAS VEGAS NV 89155-1601
(702) 455-3500 FAX: (702) 383-6041

February 25, 2000

Wendy R. Dixon, EIS Project Manager
Yucca Mountain Site Characterization Office
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
P.O. Box 30307, Mail Stop 010
North Las Vegas, Nevada 89036-0307

Clark County, Nevada Comments on the Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada

Dear Ms. Dixon:

Attached are comments by Clark County, Nevada to the *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DEIS)*. The comments are the culmination of an extensive review of the DEIS by staff from the Department of Comprehensive Planning, Nuclear Waste Division, supported by outside expertise from other County departments and organizations, and consultants. Clark County also received considerable input from citizens, from nineteen Clark County Town Advisory Boards and Citizen Councils, as well as the incorporated cities, other citizens and advisory committees, and private organizations.

Clark County has, of course, been an active participant since 1983 in monitoring the high-level nuclear waste program. In 1988, Clark County was designated as an "affected unit of local government," under provisions of the Nuclear Waste Policy Act of 1987, in full recognition by DOE that impacts could occur to our citizens and community from activities associated with the Yucca Mountain Program. The concern about potential impacts was manifested in the Board approval of resolutions opposing the siting of a repository in Southern Nevada on January 8, 1985 and April 5, 1988.

As the attached comments will fully attest, the Board of Commissioners of Clark County has considerable substantive concerns with the Yucca Mountain DEIS. The deficiencies range from a lack of adherence to the spirit and principles of the National Environmental Policy Act (NEPA) to, specifically, an insufficiency in analysis of potentially significant Clark County impact areas including adverse affects on public health and safety and tourism, among others.

The avoidance of these important Clark County issues in the DEIS is especially perplexing. For almost two decades Clark County has interacted closely with DOE to ensure that the agency was aware of the many issues and concerns that Clark County has had with a project of this scope and controversy. Clark County staff has provided substantial evidence over the years that certain aspects of the project, notably associated with the transportation of the nuclear waste, could have, among other potential impacts, substantial negative consequences to Clark County's tourist-based economy. It is difficult, therefore, to understand why these issues were virtually ignored in the DEIS.

RESOLUTION OF THE
CLARK COUNTY, NEVADA BOARD OF COMMISSIONERS
REGARDING THE DRAFT DEPARTMENT OF ENERGY
ENVIRONMENTAL IMPACT STATEMENT FOR A GEOLOGIC REPOSITORY
AT YUCCA MOUNTAIN, NYE COUNTY, NEVADA

WITNESSETH:

WHEREAS, the Department of Energy (DOE) in August 1999 released a Draft Environmental Impact Statement (DEIS) intended to provide information on potential environmental impacts that could result from the proposed action to construct, operate and monitor, and close a geologic repository at Yucca Mountain, Nevada, and

WHEREAS, Clark County is specified in the DEIS as being in the *Region of Influence,* defined as the specific area of study for each of the resource areas that DOE assessed for the EIS analyses, and

WHEREAS, DOE in 1988 designated Clark County as an "affected unit of local government," under provisions of the Nuclear Waste Policy Act, as amended, in further recognition of the potential impacts to Clark County, its citizens and economy, and

WHEREAS, Clark County, which includes the incorporated cities of Las Vegas, Boulder City, Henderson, North Las Vegas and Mesquite, is one of the fastest growing counties in the nation with 1.3 million residents, and 32 million visitors, is experiencing severe traffic congestion, and extensive construction activities, and

WHEREAS, the DEIS lists potential options in Clark County for the transportation of commercial spent nuclear fuel and high-level radioactive waste including Interstate 15, the Las Vegas Valley Beltway transportation alignment, currently under construction, rail lines connecting to the Union Pacific Railroad at Valley modified and Jean, and sidings at Apex/Dry Lake and Sloan/Jean, and

WHEREAS, the DEIS fails to consider potential public health and safety effects from the transportation of nuclear waste through Clark County, in particular the Las Vegas Valley, and

WHEREAS, despite the dependence of Clark County on the volatile economic sector of tourism, the DEIS fails to evaluate impacts to Clark County's economy due to repository operation and transportation, and

WHEREAS, notwithstanding the potential impacts that could occur from the transportation of the nuclear waste, other socioeconomic issues such as impact on quality of life and stigma affects are also not evaluated in the DEIS, and

WHEREAS, DOE failed to interact appropriately with Clark County government to receive accurate and complete local information during the preparation of the DEIS, and

EXECUTIVE SUMMARY

Introduction

In its capacity as an affected unit of local government under the Nuclear Waste Policy Act, As Amended, Clark County, Nevada, has completed an extensive review of the *Draft EIS*. This document was published in August 1999 and is available for public comment until February 28, 2000. After all comments are reviewed, DOE staff will prepare a final EIS that should reflect consideration of all relevant issues.

The Final EIS will be a key document in the federal approval and licensing process for the proposed repository at Yucca Mountain. Therefore it is of utmost importance that *all* potential impacts of the repository on Clark County are identified and analyzed in the EIS since it will be used by DOE, Congress, DOE and other federal entities to recommend, plan and implement mitigation strategies and programs.

As a result of this review and other interactions with the U.S. Department of Energy [the "DOE"], the Clark County Board of County Commissioners recently passed a resolution requesting that the DOE prepare a new *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada [the Draft EIS]*. This action was taken because of a number of major insufficiencies that were identified during the county's review of the Draft EIS.

In preparing the Draft EIS, DOE has virtually ignored the standing of Clark County and other affected units of local government. Not only did they fail to acknowledge the comments provided by Clark County, the State of Nevada and other AULGs in 1995 during the scoping phase of DEIS development, they have also disregarded more accurate local information (e.g., demographics, development and strategic plans, transportation system) that was readily available for use in the DEIS

In addition, DOE did not make a diligent effort to involve the public and implement NEPA procedures. In particular, no substantial effort was made by DOE to involve groups that would be affected by the Yucca Mountain Program, especially low-income and minority populations. DOE failed to comply with Executive Order 12898 that directs the agency to consult with states, Native American tribes and local governments to assist in identifying minority and low-income groups so that they may have significant input.

Because of the lack of compliance with NEPA requirements, consideration of important individual and cumulative impacts, and inclusion of affected groups in the process, the DEIS is inadequate and incomplete. Therefore, the DEIS does not provide enough scope and detail to allow for meaningful mitigation planning.

The rationale for this statement takes into account the following points. The Draft EIS:

- does not comply with the letter and intent of NEPA since it did not provide a realistic alternative that allows for consideration of a No Action Alternative,
- provided insufficient scope and detail to allow for impact determination that could result in the planning and implementation of mitigation and management plans,
- narrowly defined the scope and nature of impacts, thus assuring that few impacts of significance would be identified. For example, the DEIS ignored potential impact categories important to Clark County's economy and (e.g., stigma effects on tourism, land use conflicts, property diminution and unfunded mandates on local government) although there is credible evidence that shows that these may occur, and,
- failed to include minorities and low-income groups in the scoping, interactive and hearing processes related to the EIS.

- There were no estimates of the costs necessary to mitigate the impacts of emergency planning, response, evacuation and cleanup. This approach does not conform to best practice in the field of impact assessment.
- The DEIS used outdated databases, geographic data files, and inaccurate or misleading maps to support the conclusions of the transportation, health effects and public safety analyses.

- ***Impacts of Importance to Clark County Not Considered in the DEIS***

This section addresses a number of impact areas of importance to Clark County not considered by DOE. If these areas are not addressed in sufficient detail and scope, a meaningful understanding of potential impacts may not take place, and effective mitigation planning and negotiation strategies could not occur. A number of examples are provided to illustrate potential impacts from Yucca Mountain activities.

- There are a number of potential impacts that could be adverse to Clark County residents, visitors, and businesses, harm the quality of life of residents and adversely affect the economic well-being of the County and State.
- In view of Clark County government's objective to sustain the vibrancy of our area, we must take steps to maintain the economic base for its residents, managing its rapid growth, assuring healthy communities and opportunities for its residents, and preserving the natural environment.
- The DEIS does not consider "stigma induced" impacts. As an example, there exists substantial evidence that demonstrates the real potential for serious property value declines and disinvestment from similar programs. Data indicate that stigma induced changes can occur even under incident-free transportation conditions. At a minimum, stigma-induced impacts if present can result in diminution of property values and business performance, development and investment along routes, and decreases in tourism. The importance of this is underscored by the fact that a number of organizations whose constituencies may be adversely affected have expressed their deep concerns. These organizations include the Southern Nevada Home Builders Association, the Greater Las Vegas Association of Realtors®, the Howard Hughes Corporation, and others.

Public Participation in the Draft EIS Review Process

Clark County staff met with 19 Town Advisory Boards / Citizens' Advisory Councils, representatives from local jurisdictions and other groups to exchange information and receive comments on the Draft EIS. It is clear from the comments recorded that not only county officials, but also citizens, are very concerned about the negative impacts that the Yucca Mountain Program may have on Southern Nevada.

- Specific issues raised in the comments include the need to acknowledge and assess the impacts on Native Americans, and more fully consider public safety, environmental impacts, environmental justice, funding to local governments, effects on land use, perception-based impacts of DOE activities, performance assessment, interaction of the repository program of local and regional plans, public participation, regulatory standards, schedule & licensing, socio-economic impacts, storage, and transportation issues.

DARIO HERRERA
Chairman

Board of County Commissioners

CLARK COUNTY GOVERNMENT CENTER
500 S GRAND CENTRAL PKY
PO BOX 551601
LAS VEGAS NV 89155-1601
(702) 455-3500 FAX: (702) 383-6041

July 5, 2001

Jane R. Summerson, EIS Document Manager
Yucca Mountain Site Characterization Office
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
P.O. Box 30307, M/S 010
North Las Vegas, NV 89036-0307

RE: Supplement to the Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada

Dear Ms. Summerson:

Clark County has been designated an "affected unit of local government" under the 1987 amendments to the Nuclear Waste Policy Act. The attached comments to the Department of Energy's Supplement to the Draft Environmental Impact Statement (SDEIS) are hereby submitted as formal comments on behalf of the Clark County Board of Commissioners. The comments, as prepared by our staff, focus on both general and specific issues related to the new proposed action described in the SDEIS. Our most serious concerns relate to the new proposed repository design, the fuel blending proposal, transportation impacts, environmental impacts, and concerns over public input and other procedural issues.

We request that the Department of Energy consider and formally respond to our comments, as well as the comments we previously submitted in response to the Draft Environmental Impact Statement.

Sincerely,

Dario Herrera
Chairman

Clark County, Nevada

Formal Response

Dated July 5, 2001

to

DOE's Supplement to

Draft Environmental Impact Statement (SDEIS)

SUPPLEMENT TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR A GEOLOGIC REPOSITORY FOR THE DISPOSAL OF SPENT NUCLEAR FUEL AND HIGH-LEVEL RADIOACTIVE WASTE AT YUCCA MOUNTAIN, NYE COUNTY, NEVADA (DOE/EIS-0250D-S)

FORMAL RESPONSE SUBMITTED BY
CLARK COUNTY, NEVADA
July 5, 2001

FORMAL RESPONSE SUBMITTED BY CLARK COUNTY, NEVADA July 5, 2001

Background

This formal response is submitted on behalf of the Clark County Board of Commissioners. It should be considered in addition to previously submitted formal responses to previous Department of Energy (DOE) documents, including the Environmental Assessment (1985), Scoping Document (1994) and the Draft Environmental Impact Statement (DEIS). All previous comments made by Clark County are hereby incorporated by reference.

Since 1983 Clark County has been an active participant in monitoring the DOE Yucca Mountain nuclear waste program efforts. In 1988, DOE designated Clark County as an *"affected unit of local government* (AULG)" under provisions of the Nuclear Waste Policy Act of 1987. The designation was an acknowledgement that activities associated with the Yucca Mountain Program could result in considerable impacts to our citizens and community. The concern about potential impacts was further emphasized by the Clark County Board of Commissioners' (the Board) approval of resolutions on January 8, 1985, April 5, 1988 and March 7, 2000 opposing the siting of a repository at Yucca Mountain. The Department of Comprehensive Planning has been designated by the Board to monitor Yucca Mountain Program activities.

On February 15, 2000 Clark County submitted to DOE an extensive document detailing comments associated with the DEIS. The Board also approved a resolution expressing concerns about the inadequacies of the DEIS in describing and analyzing potential impacts to our community. Of primary concern was the identification of a number of transportation routing and rail options in Clark County and Southern Nevada without a commensurate evaluation of the potential impacts to our tourist-based economy and quality of life.

Subsequently, the Board requested in its February 15, 2000 resolution that *"Since Clark County and other issues, appropriately required by the National Environmental Policy Act, are not adequately addressed in the DEIS, a new DEIS or a supplemental EIS for Yucca Mountain must be prepared by DOE to address failures in the current DEIS."*

General Comments

Clark County officials continue to be concerned that the DOE has failed to formally respond to any of the concerns raised in the past, in particular the formal response by Clark County to the DEIS. There was an expectation on behalf of commentors to previous documents that the SDEIS would attempt to address these concerns. Instead, the SDEIS is focused on a new proposal for repository design, and at best inadequately addresses, or at worst ignores, the issues that have been identified as problematic in previous formal responses and comments. In our opinion, the SDEIS is an inappropriate vehicle to introduce a "*new proposed action*" such as the flexible repository design described in the SDEIS.

Further, the new design seems to violate the terms of the Nuclear Waste Policy Act in two key areas. One area is the fact that the new design heavily relies on engineered barriers, and not on the geology of the mountain itself, as required under the Act. The fuel blending and

cooling facilities referred to in the SDEIS are *de facto* interim storage. The Act prohibits operating of an interim storage facility and a permanent repository on the same site. Another glaring omission that flies in the face of both NEPA and the NWPA is the lack of consideration of a programmatic EIS process, particularly for construction of the required infrastructure to support the project. Similarly, life cycle cost estimates for should have been included to reflect this *new proposed action.*

Clark County concurs with the Nuclear Regulatory Commission (NRC) and the Nuclear Waste Technical Review Board (NWTRB) that the introduction of a flexible design at this stage of the site characterization process offers nothing more than a moving target. This forces oversight agencies and the public to continually reevaluate data and reassess impacts that many times are vaguely addressed, or not at all addressed, by the DOE.

The SDEIS once again fails to address a multitude of issues of concern to the public elected officials and others in Clark County. Given that the DEIS listed a number of potential transportation routing options in Nevada, and in particular the Las Vegas Valley (e.g., the Beltway), it is unconscionable that these issues and related potential primary and secondary socioeconomic impacts have not yet been evaluated.

Clark County, the State of Nevada and the other affected governments are currently in the process of developing "Impact Assessment Reports" (IAR) that are intended to substantively address a host of significant community impact not evaluated in the DEIS. Affected government IAR information will accompany the *Site Recommendation.* As part of the National Environmental Policy Act (NEPA) DOE is preparing a *Public Response Document* (PRD) to inform the public and others on how comments to the DEIS were addressed. It is our understanding that current plans are to release the PRD at the same time as the Final Environmental Impact Statement (FEIS.) Clark County, however, has requested that DOE release the PRD well in advance of the FEIS release date to enable IAR preparation efforts to be more focused.

The Yucca Mountain Project is national in scope. It creates the potential for impacts in much of the United States, largely with respect to the transportation of the waste. By limiting the scope of inquiry, however, the SDEIS perpetuates an incomplete and inadequate understanding of the potential effects of a project of this magnitude and complexity. Moreover, it discounts the views expressed by a large number of concerned citizens throughout the nation who participated in last year's DEIS public meetings. Similarly, it conveys the message that these issues are not important.

Since the SDEIS does not describe a specific design for the repository, the information provides nothing to increase the public's knowledge of potential environmental impacts. Also uncertain is how DOE can provide a "site recommendation" when the SDEIS and Science and Engineering Report (S&ER) are still examining "flexible" repository concepts. Absent a specific design, it is also unclear how the site can be evaluated against a specific Environmental Protection Agency exposure standard siting guidelines.

Current TSPA analysis, as communicated to the Nuclear Waste Technical Review Board, during their June meeting showed that the DOE is now using an analysis that includes early waste canister failures. This means that the base case scenario, not including disruptive events, now shows releases during the expected compliance period. This is an outcome that has not been included in either the DEIS or the SDEIS. This is a major change in the long-term performance of the proposed repository and should be open for public comment prior to the release of the final EIS.

The following comments related to specific concerns with respect to those issues that have not been adequately addressed in the SDEIS, and that are of the most critical concern to Clark County.

Repository Engineering/Design

The site suitability decision on Yucca Mountain should be made with the confidence that the researchers building the predictive tools are adhering to high professional standards. Likewise, there should be strong assurances that the tools employed in the decision-making process have some validity. Reliance on these basic issues, however, is also questionable. The DOE Office of Quality Assurance, for example, issued a corrective action report on May 3, 2001, which, under the description of Condition #6 noted that *"Yucca Mountain personnel failed to consistently implement . . . requirements (AP-3.10Q) for model validation. Based on the lack of progress to resolve this deficient area through various deficiency reports the area of model validation is considered to be a significant condition adverse to quality."* Based on these deficiencies, both of which impact the TSPA-SR, it is imperative that the SDEIS and the Science and Engineering Report (S&ER) be reissued after the full impact of these conditions on the TSPA-SR and supporting documentation have been evaluated.

Page 3-19, Section 3.2. *Total System Performance Assessment* (TSPA-SR) will be the vehicle that is used to predict the long-term performance of the proposed repository. It is, therefore, one of the more critical elements in a Site Recommendation decision. On May 17, 2001 the NRC, in correspondence to the DOE, noted calculation errors and inconsistencies during a review of TSPA-SR documentation. The errors and inconsistencies in the TSPA-SR and the model validation issues, however, basically will cast a doubt on any conclusions reached using the TSPA-SR. With no confidence in the calculations it places the data in Table 3-14 in question, and makes statements such as the "*waste packages would remain intact for as long as or longer than for the higher temperature mode"* suspect.

Page 2-8 (Lower-Temperature Repository Operating Mode), notes that "placing younger fuel in surface aging facility" could vary thermal outputs. In essence this is recommending the development of an interim storage facility at the Yucca Mountain site. Construction of such a facility, of course, violates the provisions of the 1987 Amendments to the Nuclear Waste Policy Act (NWPAA), which prohibits the siting of a repository and an interim storage facility in the same state. In addition to its illegality, the construction of such a facility would require a separate EIS process. Certainly, it must be acknowledged that any additional surface facilities necessary to implement the *new proposed action* would require a separate EIS process. Indeed, as is the case with the Private Storage Facility in Utah, proposed for the Skull Valley Goshute

Reservation, it would require a separate EIS. Ideally, the EIS processes for the DEIS and the SDEIS would have been programmatic in nature, and more comprehensively addressed all of the environmental issues inherent in what the DOE recognizes as "the largest public works project in history."

Page 2-20 illustrates a number of repository layouts. The "Flexible Design" and "Low Thermal Load" layout options extend further north than the proposed design. These, therefore, appear to extend closer to a location where, in previous analyses, the groundwater level would be closer to the repository horizon. This is not discussed or described, however, in the SDEIS.

One of the primary reasons for issuing the SDEIS would appear to be to evaluate the performance of a lower temperature repository option. It is not clear to Clark County how this evaluation can be made when some of the near field models used are not coupled and do not consider the critical temperature dependence of coupled chemical hydrological processes and their subsequent effect on corrosion.

On Page 3-20 Section 3.2.2 the DOE indicates that the software for the integration of the TSPA has been changed. Even though this is an important and major change from the DEIS no analyses were shown that would indicate the scope and effect of this change on the TSPA.

Fuel Blending Proposal

The Fuel Blending process mentioned in the SDEIS is not discussed in detail in either the DEIS nor in the SDEIS. The SDEIS should contain a full description of the proposed fuel blending process. This description should include a complete estimate of the NEPA cognizable impacts that will occur as a result of the proposal. This information is not contained in the SDEIS. Clark County has two specific concerns with regard to the fuel blending facility. The first is impact related. The second is perceptual.

The fuel handling facility necessary to implement the action proposed by the SDEIS is itself a significant impact that is not assessed in the SDEIS. There are numerous unanswered questions about the facility. These questions should have been addressed in the SDEIS.

- How many rods will the facility handle at a time?
- What operations are performed on the rods?
    - Inspection
    - Removal from packaging
    - Characterization
- Replacement into packaging
- How many people are employed?
- What is the size of the budget for the facility?
- How long did it take to construct? License? Etc…
- What special emergency management precautions are provided to surrounding communities?

Employment at the facility is expected to reach 2000 persons. Approximately ninety percent of the 2000 persons expected to be employed at the fuel handling facility will live in Clark

County. Based on traditional planning calculations the following impacts on municipal services are likely to be experienced.

$1,972,125	Park Cost
$375,000	Fire Station Costs
$155,000	Police Station Costs
$68,400	Traffic Signal Costs
$12,236,574	Elementary School Cost
$5,760,000	Middle School Cost
$7,860,262	High School Cost
$28,427,361	Total Direct Costs to Clark County

Figure 1 Direct Costs to Governments in Clark County due to Fuel Blending

Clark County is also concerned about the increased likelihood of stigma associated with the fuel blending proposal. The SDEIS proposes to construct a vast, complex nuclear fuel handling facility unlike any other in the world. The nearest similar type of facility is the controversial B-205 plant at Sellafield, England. The B-205 facility has a capacity of 1,500 tons per year. The fuel blending facility proposed in the SEIS will require handling 3,000 tons per year.

The handling of highly radioactive HLW in the pool building will create additional opportunities for accidents. Releases of radioactive materials from accidents may or may not be contained in the pool storage and blending area. The mixing of SNF assemblies of different sizes and different radiological characteristics, from different fuel batches and/or reactors, will create numerous opportunities for errors (e.g. insertion of incorrect assembly in disposal canister, insertion of assembly in incorrect disposal canister cell, etc). Deliberate sabotage also becomes easier and more likely with the additional step of fuel handling. Cleanup after accidents will likely increase worker exposures and generate additional streams of LLW, Mixed Wastes, and possibly HLW.

Publicity about these errors will naturally draw public scrutiny to Las Vegas and to the program itself. Nevada will continue to be stigmatized as a "garbage state." Clark County will naturally be harmed by this activity. The SDEIS does not examine this problem. It does not state how the DOE proposes to mitigate these stigma effects and it does not provide persuasive evidence that they do not exist.

Transportation Impacts

Transportation system impacts are defined as: changes to the operation, condition, and performance of the transportation network in Clark County, Nevada that are attributable to the Yucca Mountain Project or the Department of Energy's (DOE) Environmental Management operations. These comments are organized as a discussion of significant issues. After a brief introduction each issue area is discussed.

Unfortunately, it is impossible to prepare definitive comments on the impacts attributable to the *new proposed action* (NPA) due to the DOE's failure to provide specific information about its program. The SDEIS fails to respond to criticism leveled at the DEIS's transportation

analysis. For example the SDEIS fails to describe the mix of modes (i.e. rail and truck) necessary to implement the NPA. Another qualification is necessary. The drastic changes to the proposed action contained in the SDEIS invalidate any conclusions contained in the DEIS. To avoid confusion, the Proposed Action described by the DEIS is abbreviated as the PA and the *New proposed action* described by the SDEIS is abbreviated as NPA. Clark County has provided extensive comments about the inadequacies of the DEIS in our comments on that document. These comments will not be repeated here. The salient point is that not enough is known about the DOE's transportation program to adequately assess it. The SDEIS is deficient because it fails to rectify the shortcomings identified in the DEIS.

Transportation of HLW to Yucca Mountain is an indirect effect of the NPA under NEPA because 1) the effects are a consequence of the proposed action (i.e. construction of the Yucca Mountain HLW disposal facility) 2) the effects of this transportation are removed in time and location from the repository itself. The Council on Environmental Quality defines cumulative impact as "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions..." The use of NTS as a Low Level Waste (LLW) disposal site fit this definition. The Waste Management Programmatic EIS (WMPEIS) made it clear that most of the LLW from these sites will be shipped to the NTS for permanent disposal. For the foreseeable future, the most likely mode of transport for these wastes is by legal-weight truck on the highway system. Although the DOE has engaged in a cooperative effort with Clark County to avoid transporting LLW over the Hoover Dam and through downtown Las Vegas, it is clear that if HLW is transported through Las Vegas, the DOE will have little incentive to incur extra expense shipping LLW away from Clark County. Therefore the cumulative impact examined in this report is the effect an 268,000 shipments of LLW from DOE nuclear weapons production sites to the Nevada Test Site (NTS) will have on the transportation system that will be used to transport HLW to Yucca Mountain.

Clark County is within the region of influence of Yucca Mountain Program (YMP) for transportation because Congress identified the interstate highway system as the default route for the transportation of HLW. The most direct route from power generating sites to Yucca Mountain is the interstate highway system through Clark County. Therefore most of the truck trips from shipping sites will pass through Clark County.

The shortest routes from the waste generating sites to Yucca Mountain pass through Clark County en route to Yucca Mountain. Congress anticipated efforts to avoid transportation of waste through particular areas. That is why they designated the Interstate highway system as the default transportation route for the movement of HLW to a repository in the NWPAA. Therefore, any effort to avoid shipping any of these waste streams through Clark County will be met with requests from other similarly affected areas. The result of these requests will be an uneconomical routing process that will be both circuitous and expensive. Clark County assumes that the interstate highway system through Clark County will be the primary route used to transport waste to Yucca Mountain.

Because the majority of the truck-transported HLW will pass through the county en route to Yucca Mountain, the transportation impacts will be concentrated in Clark County. The

Nuclear Regulatory Commission identified Clark County as part of the maximally affected region in the nation in an Environmental Impact Statement.

The DEIS assumed that DOE would be able to ship HLW using Clark County's planned northern and western beltways. However, these "beltways" are unlike beltways in other communities in several important respects. First, Clark County's beltway system is entirely paid for with local tax dollars and is not part of the Federal Highway System. As a result, Clark County's beltway is ineligible as a HLW route under Appendix A of HM 164. Another concern is that the beltway is being constructed as a frontage road rather than as a typical beltway facility. This is another reason Clark County's beltway system is ineligible as a transportation route. This means the primary route used for the truck transportation of HLW is likely to be Interstate 15 and US Highway 95 through Las Vegas. The SDEIS did not consider our comments in this area. However, the assumption that DOE cannot use the Clark County beltway system was used in this assessment.

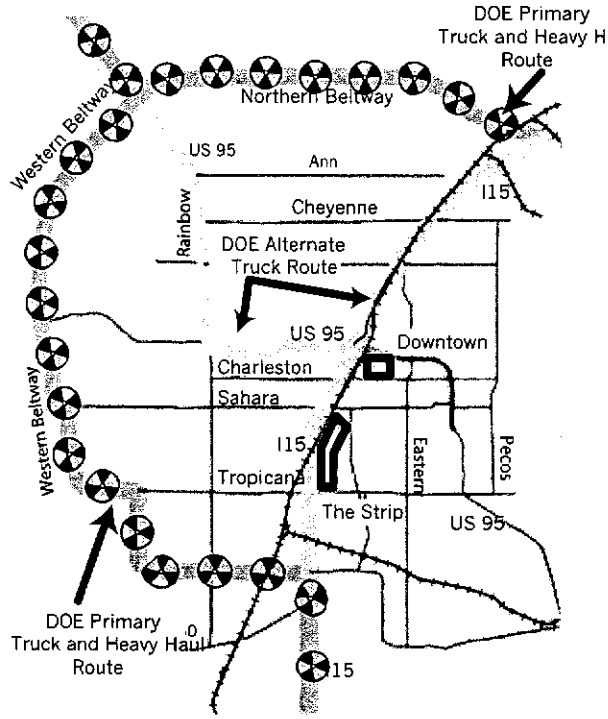


Figure 2 Truck Transportation Routes Through Urban Clark County

The SDEIS fails to examine the consequences of the fuel-blending proposal that is the heart of the NPA. In order to implement fuel-blending, younger, hotter spent fuel will have to be transported to mix with older, cooler fuel. The addition of hotter fuel has enormous impacts on the transportation system that were not considered in the SDEIS.

Truck transportation casks are licensed to transport five-year old fuel. Rail casks are licensed to transport ten year-old fuel. As a result, the fuel-blending proposal in the NPA requires truck transportation and may eliminate the justification for rail transportation entirely. It is likely that constructing a rail line for a relatively modest number of shipments will be uneconomical. Additionally, moving hotter, younger fuel will prevent the maximum number of

fuel assemblies from being transported in each waste package. The likely increase in truck trips cascades through the transportation system. A conservative estimate suggests that the number of truck shipments will double from 2100 shipments per year to 4200 shipments per year. A total of 100,000 truck shipments for the NPA is a reasonable estimate.

The DEIS estimated the consequences of the maximum reasonably foreseeable accident (MRFA) based on 26 year-old spent fuel. The change to shipping younger fuel invalidates the risk assessment provided in the DEIS. The SDEIS should have contained a risk assessment based on the types of fuel that will be shipped. A better analytical approach would establish boundaries of the worst case. That is, the SDEIS should have provided a risk assessment of the MRFA with five-year old fuel and twenty-six year old fuel to describe the effects of both the best and worst cases. The SDEIS fails to describe the fuel shipping campaign. The SDEIS should have contained specific information about the timing and composition of the shipments. The SDEIS fails to provide a description of the national routes that will be used to transport the waste from the reactors to Yucca Mountain.

The fuel-blending proposal may not be feasible because of the standard contracts with utilities that describe the order in which the DOE must accept the SNF from the utilities. It is entirely possible that the fuel-handling facilities will have to be significantly different than described in the SDEIS in order to accommodate a wide range of significantly different types of fuel necessary to make fuel-blending possible. The SDEIS should have carefully described how the NPA will avoid these problems.

The changed numbers of truck shipments increases the number of traffic accidents that can be expected to take place in Clark County. The Bureau of Transportation Statistics accident rate for legal-weight trucks is 233 accidents for every 100,000,000 shipping miles. Therefore, a forecasted number of accidents that will take place in Clark County due to the NPA is approximately 23. None of the costs or transportation system effects due to the NPA are assessed by the SDEIS. These accidents are directly attributable to the NPA. The cumulative impact of the NPA and the shipment of LLW to the Nevada Test also increases.

The number of accidents due to the transportation of LLW to the Nevada Test Site (NTS) for disposal is estimated at 72. Based on historical accident rates, up to eighty-five accidents involving DOE radioactive materials shipments will take place in Clark County. Approximately 3 accidents involving DOE radioactive materials will take place in Clark County each year. The DEIS does not discuss the consequences of these accidents anywhere.

The EPA issued transportation conformity regulations on Nov 24, 1993 to implement section 176(c) (4) of the Clean Air Act as amended. The transportation conformity regulations apply to actions of the FHWA and FTA. Actions of other federal agencies, including other transportation agencies are covered by the general conformity regulations issued by the EPA on November 30, 1993. The DOE is covered by these general conformity regulations.

The Las Vegas Valley is classified by the U.S. Environmental Protection Agency as a serious non-attainment area for carbon monoxide (CO) and particulate matter (PM_{10}). The Clark County Regional Transportation Commission is responsible for establishing CO and PM_{10}

emissions and for demonstrating conformity. Because Clark County is a non-attainment area for air quality emissions, the pollutants generated by the NPA are of concern. Air quality impacts are important to Clark County for regulatory purposes that are not considered in the SDEIS. The construction and operation of NPA transportation facilities effects the ability of Clark County to meet national air quality standards. Failure to meet these standards will harm Clark County's ability to obtain Federal funding for transportation facilities and will generally harm the quality of life in Clark County.

Vehicular emissions are the primary source of CO pollutants, whereas construction activities are the primary source of dust (PM_{10}) in the Valley. In addition to vehicle miles of travel, congestion is a significant contributor to increased CO emissions.

Projected carbon monoxide emissions calculated by the Regional Transportation Commission for the projected roadway types, travel speed characteristics, and emission factors using the Mobile 5b model are:

Facility Type	Major Arterial (four lane)
Posted Speed	45 mph
Free Flow Speed	45 mph
Average Travel Speed	35 mph
Congested Speed	20 mph

Figure 3 Uncongested Travel Speed Characteristics and Carbon Monoxide Emissions

45 mph	4.87 grams/mile
35 mph	6.82 grams/mile
20 mph	13.51 grams/mile

Figure 2 Emission Factors and carbon dioxide emission factors

These emission factors are used to calculate the amount of air quality impact on Clark County attributable to the YMP.

The emissions for the construction phase air quality impact cannot be calculated because not enough information is provided by the SDEIS on the vehicle trips required to construct and operate the facility. During the operational phase of the NPA there will be significant air quality problems. The impacts on air quality due to legal-weight truck shipments will be very substantial. The results of the analysis are presented below.

Pollutants	Truck Air Quality Impacts
CO2	48,213,000
PM10	47,223,000

Figure 3 Total Grams of Air Pollutants During the Operational Phase

The cumulative impacts due to the shipment of LLW to the NTS are assumed to be the emissions from the legal-weight trucks that will traverse the valley en route to the NTS. Because these shipments take place on the region's freeways, the emission factors for higher speeds are used. The cumulative impacts of LLW transportation are below.

Air Quality Impact	Cumulative Impacts
CO2	182,274,840
PM10	869,450,987

Figure 4 Cumulative Air Quality Impacts

The upper boundary of the air quality impacts on the residents of Clark County due to air quality pollution caused by the NPA and the disposal of LLW at the NTS are:

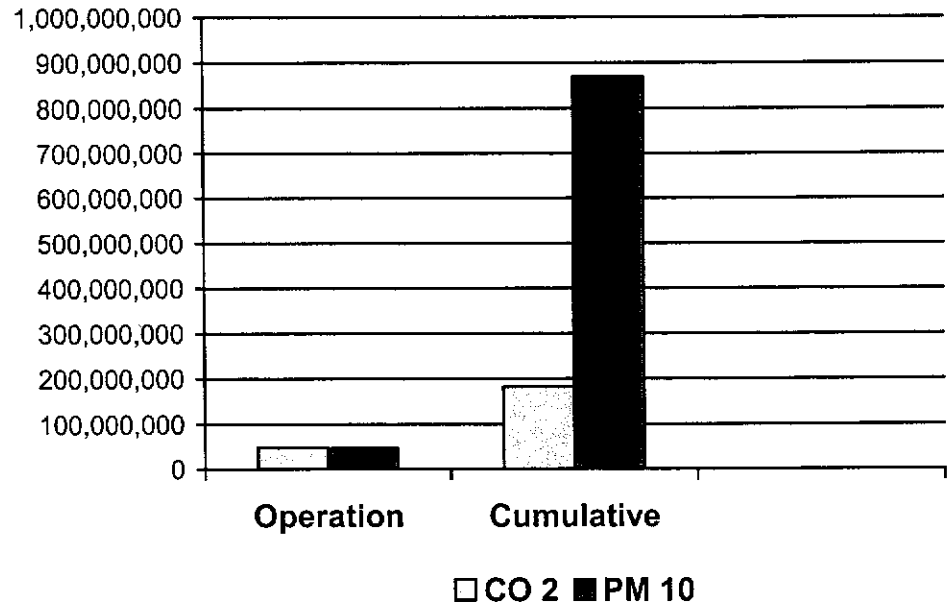


Figure 5 Air Quality Impacts on Clark County

The air quality impacts due to the YMP will substantially degrade Clark County's air quality. They will make it increasingly difficult for local government to meet air quality goals and could cause other Federal agencies to take punitive action on Clark County due to the YMP. The NPA should have been prepared to accommodate the regional transportation plans and conform to the FHWA's regulations for statewide planning.

Public Involvement/Procedure

Clark County's comments to the DEIS were submitted to DOE on February 15, 2000, well over a year ago. The DOE has not responded to the issues raised in our review. In fact, the DOE asserts that they will not be making any formal response back to any of the comments, and have stated that they intend to merely append the public comments to the Final Environmental Impact Statement (FEIS) that will be submitted to the Secretary of Energy. The DOE's failure to respond to the public comments could suggest a lack of recognition of public concern.

Finally, it is interesting to note that national stakeholders do not appear to have an opportunity to express their views on the SDEIS at public hearings. In the original review of the DEIS, citizens in venues throughout the nation, appropriately, had opportunities to offer public comments. Hearings held in other parts of the nation will enable others to consider the SDEIS, important since its treatment or non-treatment of issues will affect them as well. Furthermore, since there are ten affected units of local government in Nevada and California, DOE should hold also hearings in other areas of Nevada, or in Inyo County in California.

Conclusion

The SDEIS lacks sufficient verifiable data to be relied upon, properly analyzed, or even commented on in a comprehensive manner. The SDEIS lacks sufficient analysis and full consideration with respect to repository engineering/design, transportation impacts, environmental impacts, and public involvement and procedural considerations. There is serious doubt as to compliance with both NEPA and the NWPA with respect to the proposed "flexible" repository design. Clark County's position is that sufficient unanswered questions exist to call into question the accuracy, adequacy and appropriateness of the SDEIS. The DOE is therefore urged to withdraw the SDEIS until such time as the DOE is prepared to submit a SDEIS that adequately address both the concerns raised in the DEIS process and the gaps and errors found in the SDEIS in its present form. Further, we urge the DOE to republish the SDEIS incorporating the S&ER to ensure compliance with NEPA regulations.

Clark County, Nevada

Formal Response

Dated October 19, 2001

to

DOE's Preliminary Site Suitability Evaluation (PSSE)

PRELIMINARY SITE SUITABILITY EVALUATION FOR A GEOLOGIC REPOSITORY FOR THE DISPOSAL OF SPENT NUCLEAR FUEL AND HIGH-LEVEL RADIOACTIVE WASTE AT YUCCA MOUNTAIN, NYE COUNTY, NEVADA

FORMAL RESPONSE SUBMITTED BY
CLARK COUNTY, NEVADA
October 19, 2001

FORMAL RESPONSE SUBMITTED BY CLARK COUNTY, NEVADA October 19, 2001

Background

This formal response to the Department of Energy's (DOE) Preliminary Site Suitability Evaluation (PSSE) is submitted on behalf of the Clark County Board of Commissioners. It should be considered in addition to previously submitted formal responses to previous Department of Energy documents, including the Environmental Assessment (1985), Scoping Document (1994), the Draft Environmental Impact Statement (DEIS), and the Supplemental Draft Environmental Impact Statement (SDEIS). All previous comments made by Clark County are hereby incorporated by reference.

Since 1983 Clark County has been an active participant in monitoring the DOE Yucca Mountain nuclear waste program efforts. In 1988, DOE designated Clark County as an *"affected unit of local government* (AULG)" under provisions of the Nuclear Waste Policy Act of 1987. The designation was an acknowledgement that activities associated with the Yucca Mountain Program could result in considerable impacts to our citizens and community. The concern about potential impacts was further emphasized by the Clark County Board of Commissioners' approval of resolutions on January 8, 1985, April 5, 1988 and March 7, 2000 opposing the siting of a repository at Yucca Mountain. The Department of Comprehensive Planning has been designated by the Board to monitor Yucca Mountain Program activities.

General Comments

Prior to outlining specific comments on the PSSE, it should be noted that Clark County has joined the other affected units of local government in requesting a minimum sixty day extension of time for the public comment period, originally scheduled to close on September 20, 2001. As it stands now, the response time was only extended to October 19, 2001, less than one week after the conclusion of hearings scheduled at various locations in Nevada. Only one formal hearing was scheduled in Clark County, on September 5, 2001.

The PSSE is premature and incomplete. It does not provide an adequate basis for consideration of the site recommendation by the Secretary of Energy, the President of the United States, or Congress. Further, absent the existence of a Final Environmental Impact Statement and final siting guidelines, it is inappropriate for these public hearings to go forward at this time.

Too many unanswered questions remain. Heavy reliance on engineered barriers and the absence of adequately tested, full-scale waste packages creates an unacceptable level of uncertainty where there is the greatest level of performance expectation.

The PSSE fails to address a multitude of issues of concern to the public, elected officials, and others in Clark County. Given that the DEIS listed a number of potential transportation routing options in Nevada, and in particular the Las Vegas Valley (e.g., the Beltway), it is

unconscionable that these issues and related potential primary and secondary socioeconomic impacts have not yet been evaluated.

Clark County's comments to the DEIS were submitted to DOE on February 15, 2000, well over a year ago. Clark County, along with the City of Las Vegas, and the State of Nevada, submitted comments to the SDEIS on July 5, 2001. It is still uncertain, however, how (or whether) DOE has considered the issues raised in our reviews of these documents. The DOE's plan to merely categorize and append the thousands of comments received to the DEIS and SDEIS in response to our concerns is an unacceptable procedure under the requirements for the Final Environmental Impact Statement.

The DOE continues to disregard the notion that the Yucca Mountain Program is national in scope. The magnitude of this program creates the potential for impacts in much of the United States, largely with respect to the protection of public health and safety of over 50 million United States residents affected by the transportation of high-level nuclear waste through at least 43 states. The DOE continues to discount the views expressed by a large number of concerned citizens throughout the nation who participated in last year's DEIS public meetings. By its own actions it conveys the message that these issues are not important.

Since the PSSE does not describe a specific design for the repository, the information provides nothing to increase the public's knowledge of potential environmental impacts. Also uncertain is how DOE can provide a "site recommendation" when "flexible" repository concepts are still in the planning and design phases. Absent a specific design, it is also unclear how the site can be evaluated against DOE's siting guidelines.

Specific Comments

Repository Design

Attached as Appendix A is a report dated October 4, 2001. This report, prepared by SC&A, Inc., is entitled "Final Report on Review of the U.S. Department of Energy Yucca Mountain Preliminary Site Suitability Evaluation and Supporting Documents." This review resulted in the following key technical findings:

- ***The regulatory framework for site suitability findings is incomplete and the validity of DOE findings is therefore uncertain.***

- ***The PSSE and its principal supporting documents do not describe a specific engineered system design to serve as basis for the performance evaluations. A specific basis for performance expectations has therefore not been provided.***

- ***Repository system performance factors depend strongly on temperature, but DOE's evaluations show no significant dependence of performance on temperature. The validity of DOE's performance assessment models and results is therefore highly uncertain.***

- ***Performance of the repository during the regulatory period is, under DOE analyses, totally dependent on the performance of the Alloy 22 outer wall of the waste package, but the technical basis for confidence in performance of Alloy 22 is weak and will remain uncertain.***

- ***DOE's performance assessment results to assess compliance with radiation protection standards show great variations which depend on modeling methods and assumptions. The reliability of the models, and of the results as a measure of performance, is therefore suspect.***

- ***DOE uses "one-off" analyses to assess the contributions of individual performance factors to overall system performance, but has not reported an analysis in which the contribution of the most important performance barrier, the Alloy 22 wall on the waste packages, is clearly evaluated.***

- ***Interactions between thermal, hydrologic, chemical, and mechanical phenomena may control repository performance and performance-evaluation uncertainty, but DOE's models for these phenomena cannot be confirmed.***

- ***Comprehensive, independent peer technical review of all aspects of DOE's analyses and results is needed in order to have a defensible scientific basis for the site suitability evaluation.***

Transportation Impacts

This section contains Clark County's comments on PSSE as they relate to transportation system impacts. Transportation system impacts are defined as: changes to the operation, condition, and performance of the transportation network in Clark County, Nevada that are attributable to the Yucca Mountain Project or the Department of Energy's (DOE) Environmental Management operations. These comments are organized as a discussion of significant issues. After a brief introduction each issue area is discussed.

The PSSE reveals a critical flaw in the DOE's site characterization strategy. The DOE has proceeded from the assumption that transporting waste to Yucca Mountain is not an inherently difficult or expensive problem and that characterization of the site is possible without considering the difficulties of transporting the waste to a remote site without rail access. This approach deemphasizes critical components of the overall program (transportation, cask fabrication, etc.). Instead, it focuses primarily on geology and the engineered barriers related to the mountain itself. This failure to provide a systematic evaluation of important characteristics of the site will ultimately increase the risks and costs and, at the same time, further decrease public confidence in the feasibility of the program. This gap in DOE's site characterization strategy ensures that the PSSE is an incomplete document and that the public does not possess a realistic assessment of the suitability of the site.

Environmental Concerns

Another issue the PSSE did not address is the suitability of the site for a massive "fuel blending" facility that will be required due to the changes in the Yucca Mountain Program described by the Supplemental EIS. It is clear that the facility required will be substantial. It will require, at a minimum, a fuel handling facility capable of handling three times the capacity of fuel as any currently existing facility. A huge spent fuel pool will also be required to cool fuel rods prior to emplacement in the mountain. Because of the remoteness of the site, the support facilities for thousands of employees will also be necessary. The ability and location of these facilities is nowhere described in the PSSE.

The analysis for this proposed "fuel blending facility" is not adequate, because it fails to adequately address impacts related to air quality, water quality and supply, sanitation, and the consequences of interference with multiple species habitat conservation.

Public Involvement/Procedure

In addition to the hearings held throughout Nevada and Inyo County, California, we urge the DOE and the Secretary of Energy to include stakeholders throughout the United States, and allow them to have an opportunity to express their views on the PSSE at public hearings. Hearings held in other parts of the nation will enable others to express their opinions on the PSSE. This is important since the DOE's consideration of these issues affects them as well.

Conclusion

The significant changes included in the Supplement to the Yucca Mountain Draft EIS fundamentally change the impacts and characteristics of the program. These changes invalidate the conclusions in the *Report on Assessment of Fee Adequacy Based on FY 1999 TSLCC of December 1999 and the Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program* (May 2001). The failure to consider the site in a systematic way in the PSSE and by the Yucca Mountain Program guarantee that elected officials will receive an incomplete and misleading assessment of the feasibility and impacts of the Yucca Mountain Program. Clark County believes the PSSE should be withdrawn until an integrated analysis of the site's suitability can be conducted. An assessment of this type should examine both the effects on lifecycle costs and on the potentially difficult interactions between the new surface facilities and the disposal site itself. This assessment should also be part of a document that falls within the NEPA framework with the necessary public access and review.

Final Report on Review of the U.S. Department of Energy
Yucca Mountain Preliminary Site Suitability Evaluation
and Supporting Documents

Prepared by:

SC&A, Inc.
6858 Old Dominion Drive
McLean, Virginia 22101

Under

P.O. Number 156281

Prepared for:

Nuclear Waste Division
Clark County, Nevada

October 4, 2001

APPENDIX A
CLARK COUNTY PSSE COMMENTS
OCTOBER 15, 2001

Final Report on Review of the U.S. Department of Energy
Yucca Mountain Preliminary Site Suitability Evaluation
and Supporting Documents
for
Clark County, Nevada

October 4, 2001

S. Cohen & Associates, Inc. (SC&A) has reviewed, for Clark County, Nevada, the Yucca Mountain Preliminary Site Suitability Evaluation (PSSE; released by the U.S. Department of Energy (DOE) in August 2001) and numerous documents previously issued and stated by DOE to support the PSSE. This report presents the principal results of the reviews.

I. SYNOPSIS OF PRINCIPAL FINDINGS

The regulatory framework is currently incomplete, and the proposed repository can meet regulatory requirements only if the DOE siting guidelines are revised to make total system performance assessment (TSPA) the basis for site suitability evaluation.

DOE has not provided a specific repository design to serve as the basis for site suitability evaluation.

The validity of DOE's performance assessment models and results that support the PSSE is uncertain. Results do not show expected dependence on temperature, and available information does not permit determination of the validity of the models.

A high temperature repository may be unacceptable because of uncertainty issues associated with the effects of temperature on the physical features of the repository, and a low-temperature repository may be unacceptable because of site characterization uncertainty issues associated with need to expand the repository footprint.

Performance of the proposed repository during the regulatory period is directly dependent on the performance of the Alloy 22 outer wall of the waste package. An independent peer review panel has determined that: the data base for Alloy 22 performance is currently weak; current corrosion models are inadequate to support the necessary extrapolations of performance; and there are three sources of potential for changes in the passive film that provides corrosion resistance, but potential for film changes is currently unknown.

Performance assessment results to assess compliance with radiation protection standards show variations for alternative models which suggest that the results are more an artifact of the models used than a realistic reflection of actual performance.

Although performance of the proposed repository depends on the Alloy 22 performance during the regulatory period, DOE has not clearly and singularly characterized the role of the Alloy 22 in overall system performance.

Models that describe the effects of temperature on the physical features of the repository cannot be validated.

Because all program technologies are on the cutting edge of knowledge and understanding, independent peer review of all aspects of DOE's analyses and results is needed in order to have confidence in the scientific basis for site suitability evaluation. Peer review of the supplemental TSPA models and results is especially needed in order to assess the scientific basis for the site suitability evaluation.

II. PRINCIPAL REVIEW FINDINGS

1. The regulatory framework for site suitability findings is incomplete and the validity of DOE findings is therefore uncertain.

The Nuclear Waste Policy Act of 1982 assigned responsibility for generally applicable environmental protection standards for radioactive waste disposal to the U.S. Environmental Protection Agency (EPA). The U.S. Nuclear Regulatory Commission (NRC) was assigned responsibility for regulations to implement the EPA standards and for licensing of disposal facilities, and DOE was given authority to develop regulatory guidelines for determining the suitability of candidate disposal locations. The Nuclear Waste Policy Amendments Act of 1987 directed that only the Yucca Mountain site be initially characterized, and the Energy Policy Act of 1992 (EnPA) directed EPA to develop site-specific radiation protection standards for Yucca Mountain.

The EPA radiation protection standards for Yucca Mountain, 40 CFR Part 197, were made final in June 2001. These standards will be implemented by the NRC regulations, 10 CFR Part 63, and DOE's site suitability guidelines, 10 CFR Part 963. These NRC and DOE regulations will be revisions of previous NRC and DOE regulations (10 CFR Part 60 and 10 CFR Part 960, respectively) that were established prior to enactment of the EnPA; the revisions will be intended to conform to the EPA standards.

At the time the PSSE was issued, neither the NRC nor the DOE regulations had been made final. This is particularly important because DOE's original, and currently effective, siting guidelines, 10 CFR Part 960, state that natural features of the repository system should be the principal basis for performance of the repository system. In contrast, the proposed 10 CFR Part 963 guidelines

call for use of total system performance assessments (TSPA) to evaluate performance and do not favor natural barriers over engineered barriers in achieving compliance with the radiation protection standards.

The TSPA approach is essential to the validity of DOE's suitability findings reported in the PSSE because, with the current engineered design, performance of the proposed Yucca Mountain repository is totally dependent on performance of the engineered barriers, rather than the natural barriers, during the 10,000-year regulatory period. Only if the DOE regulations are revised can the proposed repository meet regulatory requirements.

2. The PSSE and its principal supporting documents do not describe a specific engineered system design to serve as basis for the performance evaluations. A specific basis for performance expectations has therefore not been provided.

In response to comments on the Viability Assessment (VA), issued in December 1998, DOE devised and characterized five alternative repository designs for future consideration. The design option selected from this suite to be the basis for subsequent studies had, as its principal features, an areal thermal loading of 85 metric tons of uranium (MTU) per acre; spacing between parallel drifts of 81 meters; end-to-end horizontal emplacment of waste packages, each approximately six feet in diameter and 18 feet long, in the drifts; and waste-package designs involving an outer wall of Alloy 22 (a highly-corrosion-resistant nickel-based alloy), an inner wall of stainless steel, and a surface temperature limit of 160 degrees Centigrade. This is a "hot" repository for which water in the pore spaces and fractures in the geologic medium surrounding the drifts would boil and be driven away from the repository horizon.

Reviewers of the Yucca Mountain program (e.g., the Nuclear Waste Technical Review Board, NWTRB) expressed concern that the temperatures associated with the hot repository could cause coupling of thermal, chemical, hydrologic, and mechanical effects, and that this coupling could produce significant uncertainty in performance-assessment results because it is poorly understood and cannot be modeled with confidence. Consideration of a low temperature repository was recommended to DOE.

In response to these recommendations, DOE examined means to achieve a cool repository using the hot repository design. The PSSE states that DOE "...has developed a flexible design..." that permits operation over a range of thermal modes. The thermal mode can be selected by adjustment of factors such as ventilation rates and distance between waste packages in the

excavated drifts. The actual performance of the repository system may depend strongly on which operating factors are selected.

DOE performed analyses in support of the PSSE using the hot repository design and conditions that were termed the "high-temperature operating mode" (HTOM) and the "low-temperature operating mode" (LTOM). The basic difference between the two modes was the waste package surface temperature limit of 160 and 85 degrees Centigrade, respectively, for the HTOM and the LTOM.

The temperature limits could be met by various means, including alternative designs and alternative operating conditions. One major option would be to vary the spacing between drifts, but all HTOM and LTOM analyses were done for a drift spacing of 81 meters, i.e., the design parameter previously established by DOE for analysis of post-VA design options. Preservation of the 81-meter spacing simplified DOE's analysis of options; i.e., it enabled use of the same basic design to investigate alternative operating conditions. In adopting this approach, DOE did not consider a design specifically selected for a low temperature repository.

As suggested by the NWTRB, it could be advantageous to select the LTOM option in order to reduce performance uncertainties associated with coupled effects. Operating characteristics to achieve this objective with what is basically a high temperature design (e.g., use of the HTOM design with high ventilation rates) could, however, be impractical and unacceptable.

An alternative, designed-to-the-purpose way to achieve a low temperature repository would be to increase the drift spacing beyond 81 meters. This strategy could, however, require DOE to increase the repository footprint beyond the site area that has been characterized to date as the basis for TSPA evaluations.

Expansion of the repository footprint would necessitate investment of an extended schedule and expanded fiscal resources for site characterization. Additional area would have to be characterized at least to the same extent as has been accomplished for the current repository footprint. Because of the characteristics of the geologic features in the vicinity of Yucca Mountain, it would be necessary to characterize and use, for a low-temperature repository, the area to the north of the current repository footprint. This is the location of a large ground-water hydraulic gradient and is a region of high geologic complexity. The uncertainties in repository performance introduced by having to include this region in the repository footprint could more than offset the uncertainty reduction associated with avoiding the coupled effect issues.

In sum, a high temperature repository at the Yucca Mountain site may be unacceptable because of the coupled effect uncertainty issues and a low-temperature repository may be unacceptable because of site characterization uncertainty issues.

DOE's analyses to date have not, however, been based on a specific design for either the HTOM or the LTOM. A specific basis for obtaining performance assessment results and characterizing their uncertainties for HTOM and LTOM repositories has therefore not been provided.

3. Repository system performance factors depend strongly on temperature, but DOE's evaluations show no significant dependence of performance on temperature. The validity of DOE's performance assessment models and results is therefore highly uncertain.

All of the processes and phenomena important to repository system performance are temperature- dependent. For example, chemical reaction-rate processes, such as corrosion, typically double in rate for every 10 degrees Centigrade increase in temperature. For the temperature range considered in DOE's HTOM and LTOM analyses, it would therefore be expected that, from 85 degrees Centigrade to 160 degrees Centigrade, the corrosion rate of the waste package outer wall, Alloy 22, would double by seven-fold, or approximately a factor of 125. DOE's analyses show however, that overall system performance is virtually independent of temperature. The analyses also showed that system performance during the regulatory period is essentially totally dependent on the Alloy 22 performance and that performance of some sub-system elements is dependent on temperature.

DOE 's performance assessments showed a small difference between HTOM and LTOM performance in the first few thousand years, which was attributed to differences in Alloy 22 corrosion rates at HTOM and LTOM temperature conditions. Beyond about 8,000 years, overall performance for the HTOM and LTOM systems was essentially the same.

One possible explanation for the inconsistency between expectation of repository performance on temperature and DOE's finding that performance is essentially independent of temperature is that, because so many factors are involved in total system performance (on the order of 2,000), the effect of changes in Alloy 22 corrosion rate are masked by the combined effect of other factors and the complexity of the integrated and interactive performance models for the various elements of the repository system. If this is the case, DOE's models and results do not distinguish and identify the relevant factors. The compensating effect of each of the factors should be assessed so that there is confidence that the effects of temperature have been adequately considered in the analyses.

DOE has developed a temperature-dependent model for Alloy 22 corrosion and stated that it is a key factor in the performance-assessment results supporting the PSSE. However, as discussed in Section 4 below, available data are not sufficient to serve as a reliable basis for the model or to confirm that the model is realistic. It is possible that corrosion of Alloy 22 does not follow the usual rules for chemical reaction phenomena because it forms a highly passive corrosion film that inhibits "normal" corrosion processes; a model based on conventional corrosion phenomena would then be incorrect. As has been noted by the NWTRB, a fundamental understanding of the mechanisms of formation and stability of the Alloy 22 passive film is essential for reliability in extrapolation of its presence and effectiveness for long periods of time. To date, the essential understanding has not been achieved.

The temperature-dependent Alloy 22 corrosion model may have had a profound impact on DOE's performance assessment results. In the TSPA for the Site Recommendation, which was published by DOE in December 2000 and did not use the temperature-dependent model, the projected annual radiation dose rate at 100,000 years was 10 mrem/yr. In the supplemental TSPA, which was published in July 2001 and did use the temperature-dependent corrosion model, the projected dose rate at 100,000 years was a factor of one million less, i.e., 0.0001 mrem/yr. The basis for the difference in these results may lie in the temperature-dependent corrosion model, but it has not been explicitly addressed by DOE.

Another possible explanation for the lack of difference in HTOM and LTOM results is that use of the same repository design for both types of analyses, with emphasis on differences in operating conditions, did not capture the different effects of temperature that would exist in repositories specifically designed for the different temperature limits. A low-temperature repository, with drift spacings greater than 81 meters, could, for example, have coupled effects impacts on the hydrogeologic regime around the drifts that are significantly different from those for the high-temperature repository.

After about 10,000 years, when the shorter-lived radionuclides have decayed away, the temperature regimes for alternative repository designs would be similar. For performance assessment results for periods beyond 10,000 years to be similar, it would be necessary for there to be no long-term effects of short-term temperature differences, or for performance models to not adequately capture the long-term effects of short-term differences. Available information does not permit determination of the validity of DOE's models with respect to long-term temperature effects.

4. Performance of the repository during the regulatory period is, under DOE analyses, totally dependent on the performance of the Alloy 22 outer wall of the waste package, but the technical basis for confidence in performance of Alloy 22 is and weak and will remain uncertain.

DOE has only recently initiated a comprehensive program for testing the corrosion performance of Alloy 22. Available experience indicates that the alloy is highly corrosion resistant under service conditions that have been experienced to date (e.g., in the chemical industry), but past experience is limited in comparison with the data base for other alloys, and the service conditions have not been comparable to those that might be experienced for disposal in Yucca Mountain.

The EPA standards for Yucca Mountain specify a 10,000-year regulatory time period, for which confidence in understanding of the performance of the engineered and natural barriers (especially the single most important barrier in the repository system, Alloy 22) is required. The DOE testing program has to date developed only about a three-year data base for performance of Alloy 22, and, under present program schedules, the time period for development of the data base could only be extended for a few more years before a license application is to be submitted to the NRC.

Moreover, the service conditions in the repository, in terms of temperatures, ground-water contaminations conditions, and changes in repository conditions with time, are uncertain, and the basis for testing conditions is therefore also uncertain. The basis for expectations for Alloy 22 performance in the repository during the regulatory period is therefore uncertain and, as discussed below, will remain so.

A core technical issue for Alloy 22 performance is the long-term stability of the protective surface film that provides the corrosion resistance that has been observed in service conditions and durations to date. It will never be possible to experimentally demonstrate performance of the corrosion film for the regulatory period and repository service conditions; it will be necessary to use judgment to extrapolate data by a factor of 1,000 or more. This is an highly fragile basis for asserting performance expectations for the barrier that is singularly responsible for repository performance and compliance with the radiation protection standards.

DOE established an independent Waste Package Materials Performance Peer Review Panel which issued an Interim Report on September 4, 2001. The Panel report stated that "...significant technical issues remain to be settled; the Project staff needs to enhance the technical basis for assessing the long-term performance of the proposed waste packages at this

site". The Panel report also "...identifies specific areas worthy of attention or increased emphasis".

The Panel report noted that whether or not the waste package will resist significant general corrosion for 10,000 years depends on what changes take place in the passive films. The report described three potential causes for changes in the passive film: changes in the intrinsic nature of the film; changes that result from changes in the environment, and changes that result from changes in the alloy. DOE is planning experimental work and development of models to address these potential causes of change in the protective film. The Panel report notes that extrapolation of data over three orders of magnitude will be greatly aided by models, but the report states that the Project has not clearly identified experiments that will test the validity of particular models.

The Panel report also addresses issues of localized corrosion, such as pitting or crevice corrosion, and stress corrosion cracking. These types of corrosion can occur as a result of factors such as surface roughness or weld-related stresses. The report identified issues related to localized corrosion that have not been addressed sufficiently, and also identifies deficiencies in the current program concerning stress corrosion cracking.

Overall, the Panel's Interim Report confirmed that the current basis for projecting the future performance of Alloy 22 is weak; that there are deficiencies in the current DOE program; that extrapolation over three orders of magnitude of time will be necessary; and that reliable models will be needed to justify and defend the extrapolations. The fundamental issue at present is whether or not the present data base and models are sufficient to make and defend a site suitability evaluation, especially when the performance of the repository system depends critically on the performance factor, Alloy 22, for which the information base is weak and uncertain.

5. DOE's performance assessment results to assess compliance with radiation protection standards show great variations which depend on modeling methods and assumptions. The reliability of the models, and of the results as a measure of performance, is therefore suspect.

DOE has issued six comprehensive TSPA reports since 1991. DOE intended early reports to be guides for efforts such as site characterization and engineered design selection. The TSPA for the Viability Assessment (TSPA-VA), issued in December 1998, provided the basis for determining, at that time, that work to evaluate the Yucca Mountain site should go forward. Critiques of the TSPA-VA led to major revisions of the repository engineered design concept; the design concept that emerged, which had as a principal feature the design parameter of 81-

meter spacing between excavated drifts, has been the basis for the TSPA evaluations associated with the Site Recommendation.

The TSPA to support the Site Recommendation, TSPA-SR, was issued in December 2000. In response to criticisms of major weaknesses in the technical basis for the TSPA-SR (e.g., comments from the NWTRB), DOE made major revisions to the models and assumptions used in the TSPA-SR, and also updated the scientific basis for the analyses by incorporating recent data additions. DOE also quantified uncertainties that had not been quantified in the TSPA-SR. Results of these efforts were described in the "supplemental TSPA", herein termed the S-TSPA, which was issued in July 2001 and supported by the "FY01 Supplemental Science and Performance Analyses (SSPA), Volume 1". The S-TSPA is Volume 2 of the SSPA.

The technical differences between the TSPA-SR and the S-TSPA models are extremely difficult to identify and characterize on the basis of the DOE documentation. Technical factors are described only in overview in the documents supporting the PSSE and are referred downward through as many as four tiers of documentation. Many of the documents in the tiers are not available for public review.

The effects of the changes between the TSPA-SR and the S-TSPA are most evident in the results of the TSPA evaluations. DOE states, in the PSSE, that the principal difference in the models is in adoption of a temperature-dependent model for Alloy 22 corrosion and revision of solubility parameters for radionuclides such as Neptunium 237 in the S-TSPA evaluations. "Other model changes" are also noted but not specifically identified.

There are large differences in the performance evaluation results for the TSPA-SR and the S-TSPA. For example:

> The TSPA-SR results show no doses until after 20,000 years; the S-TSPA shows doses on the order of 0.0001 mrem/yr for periods from about 2,000 years all the way out to 100,000 years. The S-TSPA doses for time periods less than 10,000 years are the result of assumed waste package weld failures.
>
> In the TSPA-SR analyses, projected dose levels rise by a factor of one million in the time interval from 10,000 to 100,000 years, i.e., from 0.0001 to 100 mrem/yr. As noted above, the S-TSPA analyses show constant dose levels of about 0.0001 mrem/yr during this period.

The cause for the difference between TSPA-SR and S-TSPA dose results for the 10,000 to 100,000-year time frame is not stated and cannot readily be inferred from the documentation. However, information presented in Figure 4.1-8 of the S-TSPA document (Volume 2 of the SSPA) can be interpreted to show that the contribution of Np-237 to the dose at 100,000 years is a factor of about 2 million less for the S-TSPA results in comparison with the TSPA-SR results. This finding would suggest that the solubility of neptunium was revised downward by about a factor of one million for the S-TSPA evaluations.

As noted earlier, the S-TSPA found dose evaluation results to be virtually independent of temperature, even though the processes and phenomena important to performance are temperature-dependent.

These findings suggest that DOE's TSPA results are much more an artifact of the models used than a realistic reflection of actual performance. For example, the S-TSPA dose history results are virtually totally dependent on highly contrived assumptions concerning waste-package weld failures, and they suggest that values for Np-237 solubilities used in prior TSPA evaluations must have been in error by about a factor of one million.

The comparisons of the TSPA-SR and S-TSPA results, and recognition of the factors and assumptions that give rise to the results, reduce confidence in the results. Better explanation and justification of the performance models, data, and assumptions are needed in order to have confidence that the TSPA evaluations provide a realistic evaluation of repository performance and that the S-TSPA results provide a reliable basis for the PSSE.

6. DOE uses "one-off" analyses to assess the contributions of individual performance factors to overall system performance, but has not reported an analysis in which the contribution of the most important performance barrier, the Alloy 22 wall on the waste packages, is clearly evaluated.

The "one-off" analyses involve one-at-a-time removal of models for individual performance factors from the total system performance model in order to assess the contribution of that factor to overall performance. DOE has performed these analyses for a large number of repository system performance factors. Results for many of the analyses are reported graphically, in terms of the effect of removal of the performance factor on mean annual dose, in Section 3 of the S-TSPA document (Volume 2 of the SSPA).

The results of the one-off analyses vary widely in terms of their indication of the effects of the individual performance factors on mean annual dose. For example, removal of the performance factor termed "in-drift chemistry" had no effect on mean annual dose. This result indicates that this barrier does not contribute to system performance.

In contrast, accounting for the temperature dependence of Alloy 22 corrosion has a dramatic effect on mean annual dose (Figure 3.2.5.3-2, page 3F-28, of the S-TSPA document). These results show that accounting for the temperature dependence of Alloy 22 corrosion changed the time at which mean annual dose is initiated at the 0.001 level from about 16,000 years to about 26,000 years, and the predicted dose at 100,000 years decreased from about 70 mrem/yr to 0.1 mrem/yr. Without accounting for the temperature dependence of Alloy 22, the EPA individual protection standard of 15 mrem/yr is exceeded at about 60,000 years; with temperature dependence accounted for, the dose at this time is about 0.03 mrem/yr. Overall, therefore, these results indicate that accounting for the temperature dependence of Alloy 22 corrosion in the general corrosion models greatly decreased the predicted radiation doses.

DOE has also performed one-off analyses for "sub-system" Alloy 22 performance factors such as localized corrosion and stress-corrosion cracking. DOE has not, however, reported S-TSPA results for total removal of the Alloy 22 barrier from the repository. In view of the importance of this barrier to system performance during the compliance period, it is important to know what the performance of the repository system would be in comparison with radiation standards, using the S-TSPA model, if the Alloy 22 barrier were assumed not to be present at all. Only this analysis would give a true picture of the effect of the Alloy 22 on overall system performance under present modeling assumptions that provide the basis for the PSSE.

7. Interactions between thermal, hydrologic, chemical, and mechanical phenomena may control repository performance and performance-evaluation uncertainty, but DOE's models for these phenomena cannot be confirmed.

Temperature-driven hydrologic, chemical and mechanical phenomena and interactions (so-called "coupled effects") are expected in the geologic formations around the repository. Such interactions are, for example, the basis for DOE's high-temperature repository concept, in which high temperatures within the repository would drive water in the rocks away from the repository until temperatures are low. Water might then flow back to, and into, the repository under low-temperature conditions, which would be attained after about 10,000 years. Thermal driving forces for corrosion and radionuclide release would be reduced at that time and beyond, but mechanical and chemical alterations might have occurred at the high temperatures so that flow

paths for water in the rocks have been altered and the contaminant characteristics of the water, which affect its capacity to corrode engineered materials in the repository, are changed.

DOE has developed performance models for coupled effects, but their validity is highly uncertain. Because of the heterogeneity and variability of the geologic formations and flow paths, a reliable model of the physical system and its potential for alteration, e.g., by chemical mineralization in fractures, cannot be established and tested experimentally. Similarly, the theoretical and experimental data bases for alterations to contaminant characteristics of water that can enter the repository and would corrode the engineered materials, such as the drip shields and the Alloy 22 outer wall of the waste packages, are weak, cannot be experimentally verified, and cannot be extrapolated reliably, especially for long periods of time.

Therefore, the effects of temperature on the physical characteristics of the natural system, their variation with time, and their effects on repository system performance cannot be reliably assessed. As a result, the reliability of DOE models addressing these performance factors cannot be assessed. Moreover, the reliability of models and assessment results cannot be significantly improved through experimental programs. "Residual uncertainty" factors associated with these coupled phenomena can be identified, and they may dominate the uncertainty in predictions of repository performance, but this uncertainty also cannot be assessed.

As noted and discussed in Section 3 above, results of DOE's HTOM and LTOM analyses show no difference in repository-system performance for the high- and low-temperature repositories after about 10,000 years. These results imply that coupled effects during the period up to 10,000 years, when repository temperatures differ significantly, either had no significance or no persistent consequences, e.g., no permanent changes in the geohydrologic flow paths. DOE's coupled effect models were used to produce these results; as stated above, the reliability of the DOE models cannot be assessed.

8. Comprehensive, independent peer technical review of all aspects of DOE's analyses and results is needed in order to have a defensible scientific basis for the site suitability evaluation.

DOE's technical work for the Yucca Mountain program involves unprecedented model development, data extrapolation, application of assumptions, and use of judgment. Independent assessment of these efforts is essential in order to establish a measure of confidence in the methods used and the results obtained.

The DOE program has made use of peer reviews in selected areas (e.g., the Waste Package Materials Performance Peer Review Panel cited above). Because all program technologies are on the cutting edge of knowledge and understanding, similar efforts are needed in each of the technical areas important to the scientific basis for site-suitability evaluation.

Accomplishment of independent peer review will require expert personnel and a significant investment of time and fiscal resources. The information to be addressed will be difficult to extract and assess because of the way it is scattered throughout the DOE documents and tiers of documents. Use of information and concepts by DOE has evolved with the sequence of documents as they have been issued, and substantive information that is the basis for what was done (which is only described in overview in documents such as the PSSE) can only be obtained by tracing back through the time sequence of documents.

Much of the substantive information is contained in the Analysis Model Reports (AMRs), the Process Model Reports (PMRs), and topical technical reports that underlie the AMRs and PMRs. There are nearly 200 AMRs and PMRs, and apparently there are several thousand topical reports. The topical reports are referenced in the AMRs and PMRs and are not generally available.

In order to assure that the peer reviews themselves are effective and defensible, DOE will have to make all essential documents available. DOE will also have to expect and plan that the scientific basis for site-suitability evaluation is not adequate until all essential peer reviews are completed. In particular, because the S-TSPA methods and results, which are the basis for the PSSE, differ significantly from those for the TSPA-SR, DOE must accomplish a comprehensive, independent peer review for the S-TSPA.

Appendix D – University of Nevada, Las Vegas, The Center for Business and Economic Research Report (December 26, 2001): Regional Economic Model, Inc. (REMI) Analysis Utilizing Urban Environmental Research, L.L.C. (UER) Property Losses to Determine Economic Impacts on Clark County's Scenarios

REMI Analysis Utilizing UER Property Losses to Determine Economic Impacts on Clark County's Scenarios

Prepared by

R. Keith Schwer, PhD

The Center for Business and Economic Research

Prepared for

Clark County Comprehensive Planning

December 26, 2001

The Center for Business and Economic Research
University of Nevada, Las Vegas

Economic impacts work through backward and forward linkages. Backward linkages have been referred to as indirect effects and follow from the basics of production activities. For example, an expansionary change calls for increased inputs, thereby adding additional activity to the original direct change. On the other hand, the indirect effects associated with an initial adversity will further affect conditions negatively. In short, initial effects do not fully reflect final economic impacts. Forward linkages also may create effects. For example, the sale of goods and services increases incomes, thereby inducing additional expenditures. Rising employment and wages create opportunities for additional consumer spending, thus, measuring the full impacts of an event calls for an accounting of direct, indirect, and induced effects.

A full accounting of economic impacts can be reached through modeling forward and backward linkage, the degree of respending of dollars within an economy, and spending leakages. Input-output and econometric models have proved useful in accomplishing this task for studying the full impacts of changes in regional economies.

Clark County asked the Center for Business and Economic Research (CBER) at UNLV to estimate the full-employment, income, and expenditure effects resulting from estimated direct effects for three scenarios associated with the transportation of nuclear waste through Clark County. This report details estimates of these alternative scenarios using a modeling scheme developed by Regional Economic Models, Inc (REMI) and calibrated to local conditions by CBER. The initial impacts, reductions to specific property values, used in this analysis were developed and estimated by Urban Environmental Resource, LLC (UER) in conjunction with lenders and appraisers within Clark County. We have taken these estimates as prepared by UER and developed estimates for leading economic indicators.

Each of the three scenarios have possible outcomes, ranging from a minimum to a maximum, altogether resulting in six separate direct impacts that we modeled. The three scenarios are as follows:

1. Scenario I -- The identification of nuclear waste transported through Clark County.
2. Scenario II -- The occurrence of an accident without a nuclear spill within Clark County.
3. Scenario III-- The occurrence of an accident with a nuclear spill in Clark County.

The minimum and maximum estimates reflect separate valuation efforts from lenders and appraisers. The valuations comprise estimates associated with residential property losses, commercial and industrial property losses, and the permanent loss in gaming revenue (revenue from the region's major industry).

These initial impacts were transformed for estimation with the REMI model. The loss of residential property values is transformed to an economic flow through consumer spending. A loss of wealth (residential property) is estimated to cut the level of spending by 4 percent per year. This wealth-to-spending adjustment follows a long-established relationship associated with the wealth impact on consumer spending. The loss of business activity from a loss of commercial and industrial property and gaming revenue is estimated from ratios of the number of employees per dollar of property value (estimated from the historical data associated with the REMI model) and the number of employees in hotel and gaming (as reported by the Nevada state government) and gaming revenue for Clark County reported by Nevada's Gaming Control Board.

The full impacts are measured by the differences in the level of employment, income, population, and expenditures without the identified options (identified as the baseline) and with

the impacts of an option (identified as a simulation). The specifics associated with this analysis as they relate to the use of the REMI model are specified in George Treyz's book, Regional Economic Modeling: A Systematic Approach to Economic Forecasting and Policy Analysis. The relationship between impact analysis with REMI and the other two major model schemes (identified as IMPLAN and RIMS) as they relate to Clark County has been discussed in a series of academic publications by Rickman and Schwer. A summary of the key issues relating to impact analysis for Clark County, Nevada, is in Rickman and Schwer's paper, "A Comparison of the Multipliers of IMPLAN, REMI, and RIMSII: Benchmarking Ready-made Models for Comparison," The Annals of Regional Science, (1995) 29: 363-374.

Model Inputs

The model inputs, the loss of consumer spending and the loss of jobs, were introduced in six separate sets of estimates, that is, six separate simulations (three scenarios with two sets of estimates). The job and spending losses were introduced beginning in 2010 and additionally for each year until 2035. Consumer-spending estimates were introduced in terms of inflation-adjusted dollar amounts, what economists refer to as constant dollars. In measuring income and expenditure impacts the distinction between current-dollar measures (unadjusted for inflation) and constant dollars (adjusted for inflation) is important. In addition, the adjustment for inflation can be made with a number of deflators, for example, the GDP deflator or CPI deflator. Deflators were also developed for local areas. The model estimates values in constant 1992 dollars. Values in current dollars will be greater; therefore, these estimates are extremely conservative.

Estimates for lenders and appraisers were made for these options and are shown in Table 1.

Table 1

Property Impacts on Clark County in 2001$

Scenario 1

	Appraisers	Lenders
Residential	$161,875,121	$85,248,577
Commercial	4,935,088	4,936,336
Industrial	3,331,370	7,485,860
Sub-total	170,141,579	97,670,773
Gaming Revenue	172,106,274	136,300,947
TOTAL	342,247,853	233,971,720

Scenario 2

	Appraisers	Lenders
Residential	$411,415,310	$270,425,245
Commercial	11,885,595	26,648,041
Industrial	9,688,140	19,087,447
Sub-total	432,989,045	316,160,733
Gaming Revenue	451,327,642	300,885,093
TOTAL	884,316,687	617,045,826

Scenario 3

	Appraisers	Lenders
Residential	$2,171,118,617	$2,176,536,502
Commercial	75,128,562	246,432,903
Industrial	67,362,912	126,670,956
Sub-total	2,313,610.091	2,549,640,361
Gaming Revenue	992,920,810	752,212,735
TOTAL	$3,306,530,901	$3,301,853,096

Source: UER

An increasing number of possible scenarios also brings a range of additional estimates. Whereas these additional options are of note, their introduction does not appreciably help policy makers understand the impacts better. As a result, the redundancy of alternative options was reduced to selecting the largest and smallest initial impacts for each scenario. In so doing, each scenario has only one estimate by lenders (minimum estimate) and one estimate by appraisers (maximum estimate). The direct impacts provided by UER, shown in Table 1, were translated into impacts described above, and for purposes of analysis are shown in Table 2 on an annual basis.

Table 2

Model Inputs

Scenario 1		
Lender	Translation Ratio	Annual Impact in Lost Spending in Current Dollars or Number of Job Losses
Consumer Spending	4% of loss	$2,848,672.64
Jobs Lost	1 job/$36,323	111.1436280043
Gaming Jobs Lost	1 job/$40,606	3356.670122642
Appraiser		
Consumer Spending	4% of loss	$7,693,369.96
Jobs Lost	1 job/$36,323	934.9605208821
Gaming Jobs Lost	1 job/$40,606	4238.444417081
Scenario 2		
Lender		
Consumer Spending	4% of loss	$9,044,336.32
Jobs Lost	1 job/$36,323	272.8530132423
Gaming Jobs Lost	1 job/$40,606	7409.867827415
Appraiser		
Consumer Spending	4% of loss	$19,501,827.88
Jobs Lost	1 job/$36,323	2462.484958048
Gaming Jobs Lost	1 job/$40,606	11114.80180269
Scenario 3		
Lender		
Consumer Spending	4% of loss	$73,776,357.52
Jobs Lost	1 job/$36,323	2862.522644055
Gaming Jobs Lost	1 job/$40,606	18524.6696301
Appraiser		
Consumer Spending	4% of loss	$102,464,069.24
Jobs Lost	1 job/$36,323	13821.90785453
Gaming Jobs Lost	1 job/$40,606	24452.56390681

The information provided by UER does not directly relate to the set of variables of the model which we may change.

As such, we translated the loss of residential property value to reduced consumer spending through the wealth effect. The lost commercial and industrial property translated to job losses using a fixed ratio between capital and labor through production, one job loss per $36,223 of property value lost. In addition, we distributed the jobs losses proportional to the percentage of jobs in each two digit industry. Lastly, we estimated the impact of the losses to hotels and casinos using a fixed ratio of gaming revenue per worker. Using gaming revenue and employment data, we estimate the ratio as one job for each $40,606 of gaming revenue.

Model Outputs

REMI, an eclectic model combining an input-output structure and econometric relationships, enables the estimation of a long list of impacts. Again, wishing to focus on the most important impacts, we have limited our output evaluation to the four most often used measures—employment, income, expenditures, and population. With respect to income and expenditures, however, we show cumulative effects. We show both the short-term effects (the losses for a given year) and longer-term effects (the cumulative impacts over 25 years). Employment impacts can be cumulated and shown on a job-year basis; but, we did not do so, thereby avoiding possible confusion of interpretation between jobs and job-years measures. The detailed output from the models (which could be used to measure impacts across a host of measures) is appended. The output for the select measures is shown in Table 3.

Table 3

Economic Impacts on Clark County's Scenarios

	Job Losses(1)	Population Losses (1)	Cumulative Economic Losses: 2010-2035 (in 1992 Dollars) Spending (2)	Income (3)
Scenario 1				
Lender	5,393	11,294	$5,663,400,000	$4,700,200.000
Appraiser	7,426	12,707	$8,490,300,000	$5,819,100,000
Scenario 2				
Lender	11,193	19,573	$11,852,400,000	$8,856,500,000
Appraiser	19,522	33,419	$22,333,300,000	$15,300,400,000
Scenario 3				
Lender	31,305	53,984	$35,131,000,000	$24,611,600,000
Appraiser	54,429	90,718	$68,116,000,000	$42,128,000,000

Notes (1). (Average Annual)
(2). (Gross Regional Product)
(3). (Disposable Personal Income)

Findings

The minimum impacts are associated with the lender estimates of Scenario I (trucks utilizing the transportation system of Clark County) and are as follows:

1. Job loss of 5,393 jobs.
2. Expenditure loss of $185 million per year, on average, in 1992 dollars and a cumulation loss of $5.6 billion in1992 dollars.
3. Personal income loss of $282 million per year, on average, in 1992 dollars.
4. Real disposable income loss (accounting for taxes and inflation) of $136 million per year, on average, in 1992 dollars and a cumulative 25-year loss of $4.7 billion in constant 1992 dollars.
5. A population loss of 11,294 persons.

The minimum impact estimates are decidedly less onerous than the impacts expected under Scenario 3 (an accident occurs involving the release of radioactive materials along Clark County roads). The maximum impacts are as follows:

1. Employment loss of 54,429 jobs.
2. Average annual expenditure loss of $1.4 billion and a 25-year cumulative loss of $68.1 billion.
3. Personal income loss of $776 million per year.
4. Real disposable income loss of $686 million per year and a 25-year cumulative loss of $42.1 billion in constant dollars.
5. A population loss of 90,718 persons.

Conclusion

The transportation of nuclear waste without an accident of spillage of radioactive material through a large urban community will have adverse impacts on a community such as Las Vegas which depends on travel and tourism for its economic livelihood. The maximum economic impact of a transportation accident, based upon current available information is devastating to any community, especially one which depends upon travel and tourism as its economic engine. The loss of 54,429 jobs and 90,718 people is of grave concern to this community and greatly exceeds the adverse, but temporary impacts of the September 11, 2001 terrorist attacks on travel and tourism..

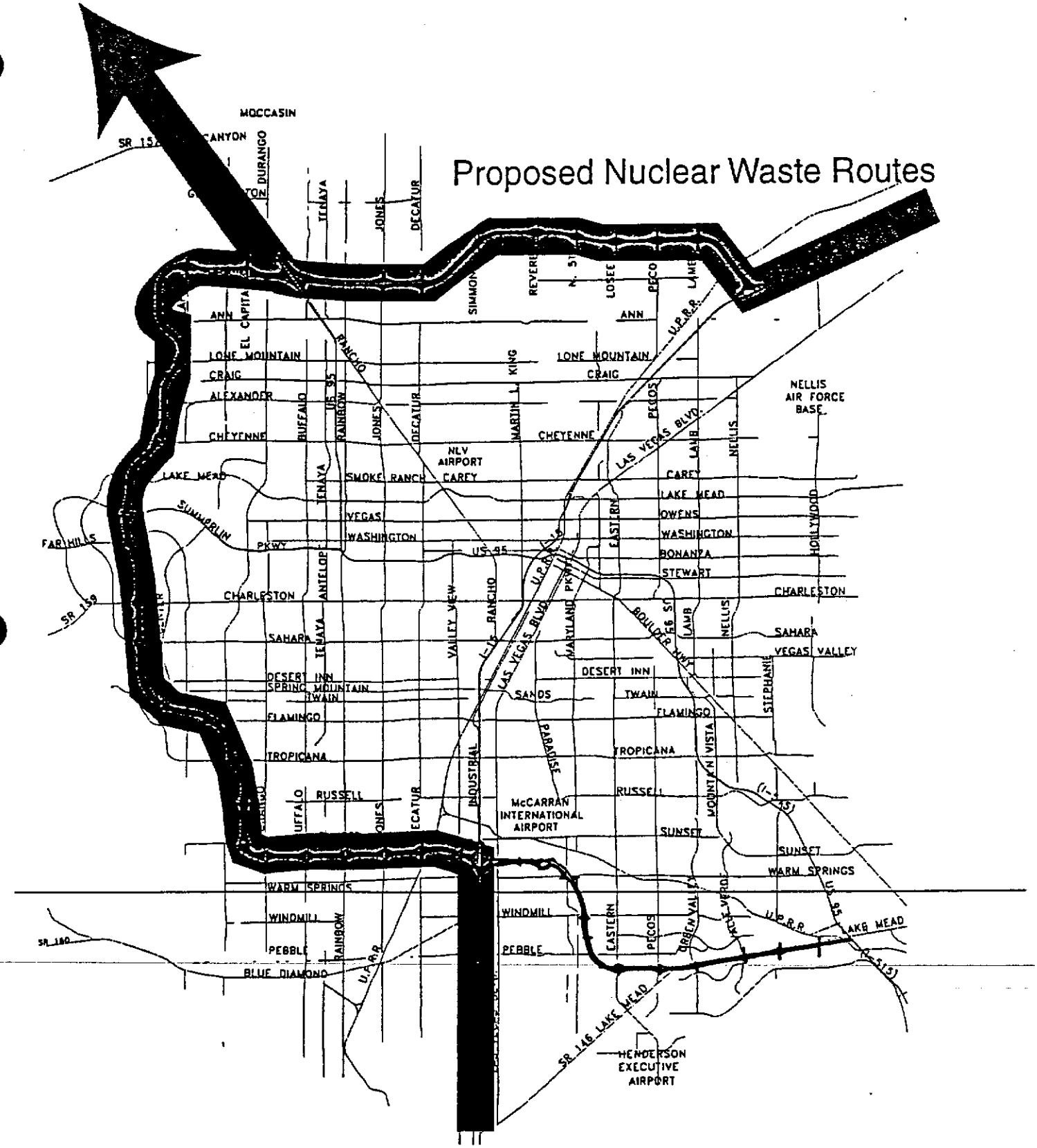
UNLV

UNIVERSITY OF NEVADA LAS VEGAS

The University of Nevada, Las Vegas,
is an affirmative action/equal opportunity institution.

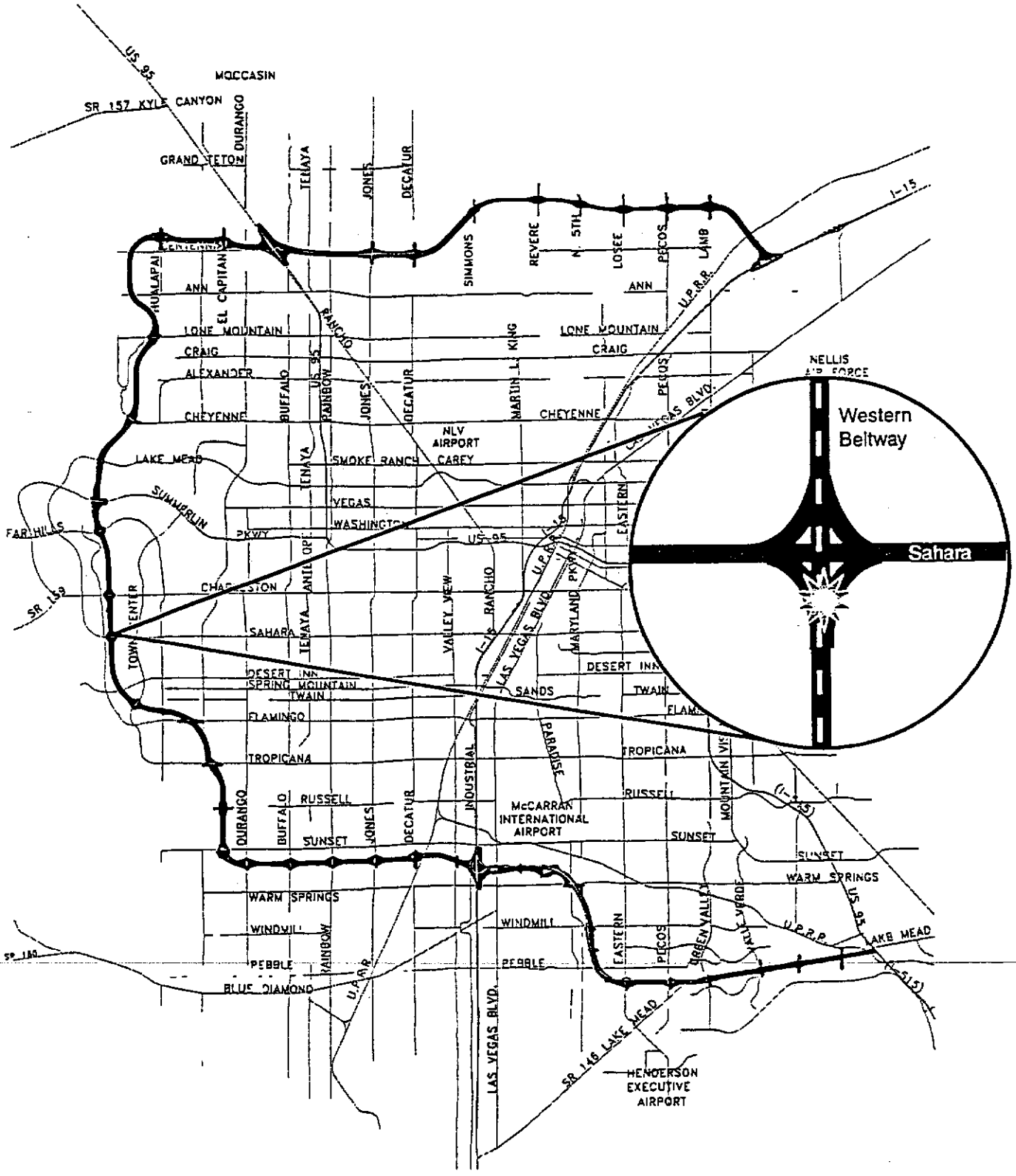
Appendix E – Maps and Descriptions of Transportation Scenarios 1, 2, and 3

Nuclear Waste Scenario Map



Nuclear Waste Scenario Map

Clark County



Scenario 1 – All Communities

Over the next 24 years, beginning July 2007, the U.S. Department of Energy plans to ship high-level nuclear waste through Clark County to a repository to be built at Yucca Mountain, Nevada. The U.S.DOE plans to ship:

Number of Highway Shipments Expected - All Truck Scenario

Total number of truck shipments projected over a 24 year shipping period:	**49,500**
Number of shipments per year:	**2,063**
Number of shipments per week:	**40**
Number of shipments per day:	**5.7**

The shipment routes are as follows: (See attached map for route depictions)

- **I-15 south from the Utah border to U.S. 95 north**
- **I-15 south from the Utah border to the northern Las Vegas Beltway to U.S. 95 north**
- **I-15 north from the California border to U.S. 95 north**
- **I-15 north from the California border to the southern Las Vegas Beltway to U.S. 95 north**

At the end of the third year of shipments, no accident of any kind has occurred and the probability of an accident is remote. However, interested parties have generated considerable adverse publicity. Residential property values have declined an average of 3.5% within one mile of the transportation corridor, while commercial properties have declined an average of 3.2% and industrial properties have declined an average of 1.25% within one mile of the transportation corridor.

Scenario 2 – Clark County

Over the next 24 years, beginning July 2007, the U.S. Department of Energy plans to ship high-level nuclear waste through Clark County to a repository to be built at Yucca Mountain, Nevada. The U.S.DOE plans to ship:

Number of Highway Shipments Expected - All Truck Scenario

Total number of truck shipments projected over a 24 year shipping period:	**49,500**
Number of shipments per year:	**2,063**
Number of shipments per week:	**40**
Number of shipments per day:	**5.7**

The shipment routes are as follows: (See attached map for route depictions)

- **I-15 south from the Utah border to U.S. 95 north**
- **I-15 south from the Utah border to the northern Las Vegas Beltway to U.S. 95 north**
- **I-15 north from the California border to U.S. 95 north**
- **I-15 north from the California border to the southern Las Vegas Beltway to U.S. 95 north**

Shipments of nuclear waste to the Yucca Mountain repository site progress for three years without incident. Three days after New Year's Day 2010, the driver of a truck transporting nuclear waste loses control of the vehicle and overturns at the Sahara exit of the Western Beltway. The cask containing the nuclear waste breaks away from the trailer and skids 50 yards. **The cask remains intact and no radiation is released,** but the local and national media cover the event heavily. Emergency management personnel respond effectively to the incident and redirect traffic until it is determined that no radiation was released. Within one day traffic resumed on the Western Beltway.

Residential property values decline an average of 7.96% within one mile and an average of 4% between 1 and 3 miles of the transportation corridor; commercial property values decline an average of 7.4% within one mile and an average of 3% between 1 and 3 miles of the transportation corridor. Finally, industrial property values decline an average of 5.3% within one mile and an average of 2% between 1 and 3 miles of the transportation corridor.

Scenario 3 – Clark County

Over the next 24 years, beginning July 2007, the U.S. Department of Energy plans to ship high-level nuclear waste through Clark County to a repository to be built at Yucca Mountain, Nevada. The U.S.DOE plans to ship:

Number of Highway Shipments Expected - All Truck Scenario

Total number of truck shipments projected over a 24 year shipping period:	**49,500**
Number of shipments per year:	**2,063**
Number of shipments per week:	**40**
Number of shipments per day:	**5.7**

The shipment routes are as follows: (See attached map for route depictions)

- **I-15 south from the Utah border to U.S. 95 north**
- **I-15 south from the Utah border to the northern Las Vegas Beltway to U.S. 95 north**
- **I-15 north from the California border to U.S. 95 north**
- **I-15 north from the California border to the southern Las Vegas Beltway to U.S. 95 north**

In the third year of the shipping campaign, a truck carrying one cask of nuclear waste from a reactor destined for the Yucca Mountain high-level radioactive waste repository is involved in a major accident on the Western Beltway at the Sahara exit. The spent fuel truck overturns at 60 mph. Seconds later, a fully loaded gasoline tanker crashes into the wreckage and bursts into flames. The fire burns for more than two hours.

Winds carry the fire plume towards populated areas, dispersing radioactive materials over a wide area. Five persons receive doses of radiation at levels that result in cancer fatalities.

The affected highway is closed for seven days. The two drivers of the spent fuel hauler and the gasoline tanker, and one driver-escort, die from head injuries and burns. Six months later the cleanup effort is still under way and is completed within one year. The accident receives repeated worldwide news coverage.

Residential property values decline an average of 33.8% within one mile and an average of 23.6% between 1 and 3 miles of the transportation corridor; commercial property values decline and average of 31.9% within one mile and an average of 20% between 1 and 3 miles of the transportation corridor. Finally, industrial property values decline an average of 25.5% within one mile and an average of 16.7% between 1 and 3 miles of the transportation corridor.

Appendix F – G. Roger Gathers, M. H. Chew & Associates Report (July 16, 2001 Revision A): *Calculations with RISKIND for Rail Transport of Spent Nuclear Fuel Casks via Las Vegas, Nevada*

Calculations with RISKIND for Rail Transport of Spent Nuclear Fuel Casks Via Las Vegas, Nevada

G. Roger Gathers, M. H. Chew & Associates
July 16, 2001
Revision A

Calculations with RISKIND[1] for Rail Transport of Spent Nuclear Fuel Casks Via Las Vegas, Nevada

Introduction

This report describes calculations for the routine exposure of individuals located at several locations in Las Vegas, Nevada. The calculations were made using the code RISKIND 1.11. The Union Pacific Rail Road (UPRR) trains will routinely make extended stops for train assembly, safety inspections, etc. Some of the stops are quite extended. The cases of 48 hr and 457 hr stops will be examined. Since the stop doses will be considerably larger than passing doses, the latter were not examined. Three locations are considered. Two of them are Hotel-Casinos and the third is the Clark County Government Center. Two or more positions for individuals are considered. The cask is assumed to be the (21 PWR) MPC. Table G.4 in the RISKIND users manual gives a length of 5.29 meters and a radius of 1.086 meters. No gamma fraction was listed, so the value of 0.83 was taken. The loading is assumed to give 10 mrem/hr at a distance of 2 meters from the cask surface.

Under the mostly rail transportation scenario in the Draft Environmental Impact Statement (DEIS) for Yucca Mountain, the Department of Energy (DOE) evaluated the impacts of 19,800 rail cask-shipments to four potential rail spur originations and three potential intermodal transfer stations. The heaviest routine rail transportation impacts on downtown Las Vegas would likely occur if DOE proceeds with the Jean rail spur or Sloan/Jean intermodal transfer options. DOE's rail routing analysis for Jean indicates that about 87% of all rail shipments to Yucca Mountain would use the Union Pacific mainline through downtown Las Vegas. There would be 17,364 rail cask-shipments through Las Vegas over 38 years, an average of 457 cask-shipments per year.

The DEIS assumes that SNF rail casks will be shipped in general freight service, although the railroads and many stakeholders believe that all SNF shipments should be made by dedicated train. Indeed, many experts believe DOE will be forced to use dedicated trains. However, for purposes of evaluating a credible maximum incident-free scenario, this analysis assumes each rail cask is shipped through Las Vegas separately by general service in a different train. Thus there are 457 rail cask-shipments per year through Las Vegas over 38 years.

There are a number of locations along the Union Pacific through Las Vegas where entire trains and groups of freight cars are routinely stopped for varying periods of time. For this analysis, the State of Nevada Agency for Nuclear Projects selected three such locations near large commercial and government buildings.

The DEIS provides few details about expected rail operations, other than the decision that dedicated trains will not be required. Train stops occur for many reasons. Stops for carrier interchange or train assembly could require from 2 to 24 hours. Stops for crew changes, car changes, engine refueling, train maintenance, regulatory inspections, and traffic control, could range from 15 minutes to more than 2 hours. In planning for receipt of

casks shipped by general freight service, DOE has indicated its intention to take advantage of USDOT regulations that allow stoppage of SNF cars in transit for periods of up to 48 hours (DEIS, p. 2-50).

This analysis evaluates exposures under to two rail-stop scenarios: (1) a one time cask-car stoppage at the designated location for 48 hours, the regulatory maximum; and (2) the cumulative annual exposure assuming that each cask-shipment stops at the designated location one time for one-hour only (a total of 457 hours per year). We assume in all cases that the cask involved is the large DOE MPC containing 21 PWR assemblies (RISKIND, p. G-30) or a similar large rail cask as described in the DEIS.

Locations

LV#1: Hotel-Casino #1

This is an older, downtown hotel-casino. Numerous locations in the ground-level parking lot are less than 20 meters from the side of the stopped rail cask. We calculate the 48 hr dose and the 457 hr dose for MEI#1 located 40 m from the cask wall at the exterior wall of the first floor of the hotel-casino, and for MEI#2 located 15 m from the cask wall. Figure 1 shows a diagram of the location. MEI#2 is in the parking lot.

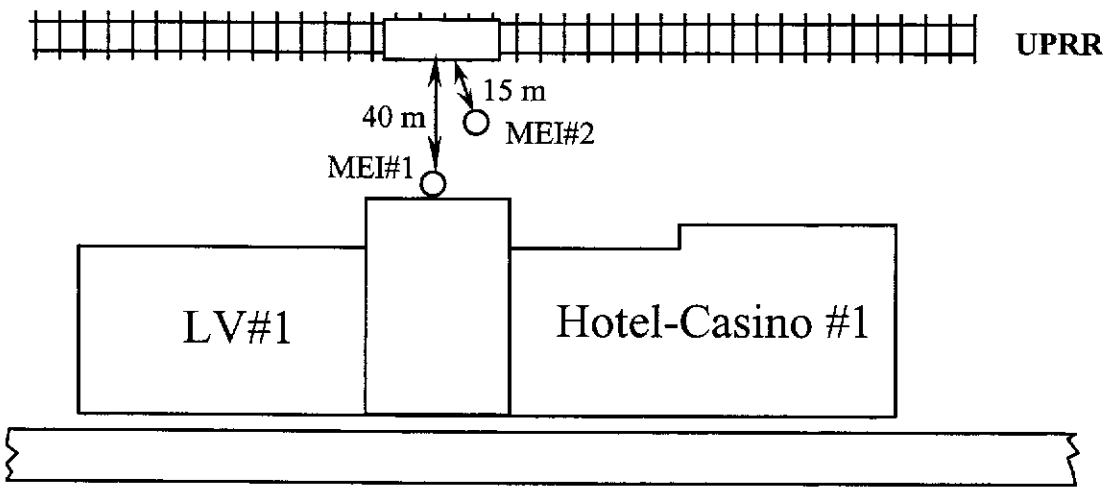


Fig. 1 Diagram of location #1. MEI#1 is located 40 m from the side of the cask. MEI#2 is 15 m from the side of the cask. and is located in the hotel parking lot.

LV#2: Hotel-Casino #2

This is a newer, off-strip hotel-casino with nearly 3000 rooms in multiple high-rise towers. Some locations in the ground level parking lot east of the parking building are less than 20 m from the nearest track of the Union Pacific Rail Road (UPRR). We calculate the 48 hr dose and the 457 hr dose for MEI#1 located 35 m from the stopped rail cask wall at the interior corner of the first floor of the self-service parking building (it has four or five stories). We also calculate the 48 hr dose and the 457 hr dose for MEI#2 located 160 m from the stopped rail cask wall at an exterior first floor entrance to the hotel casino. Figure 2 shows a diagram of the location.

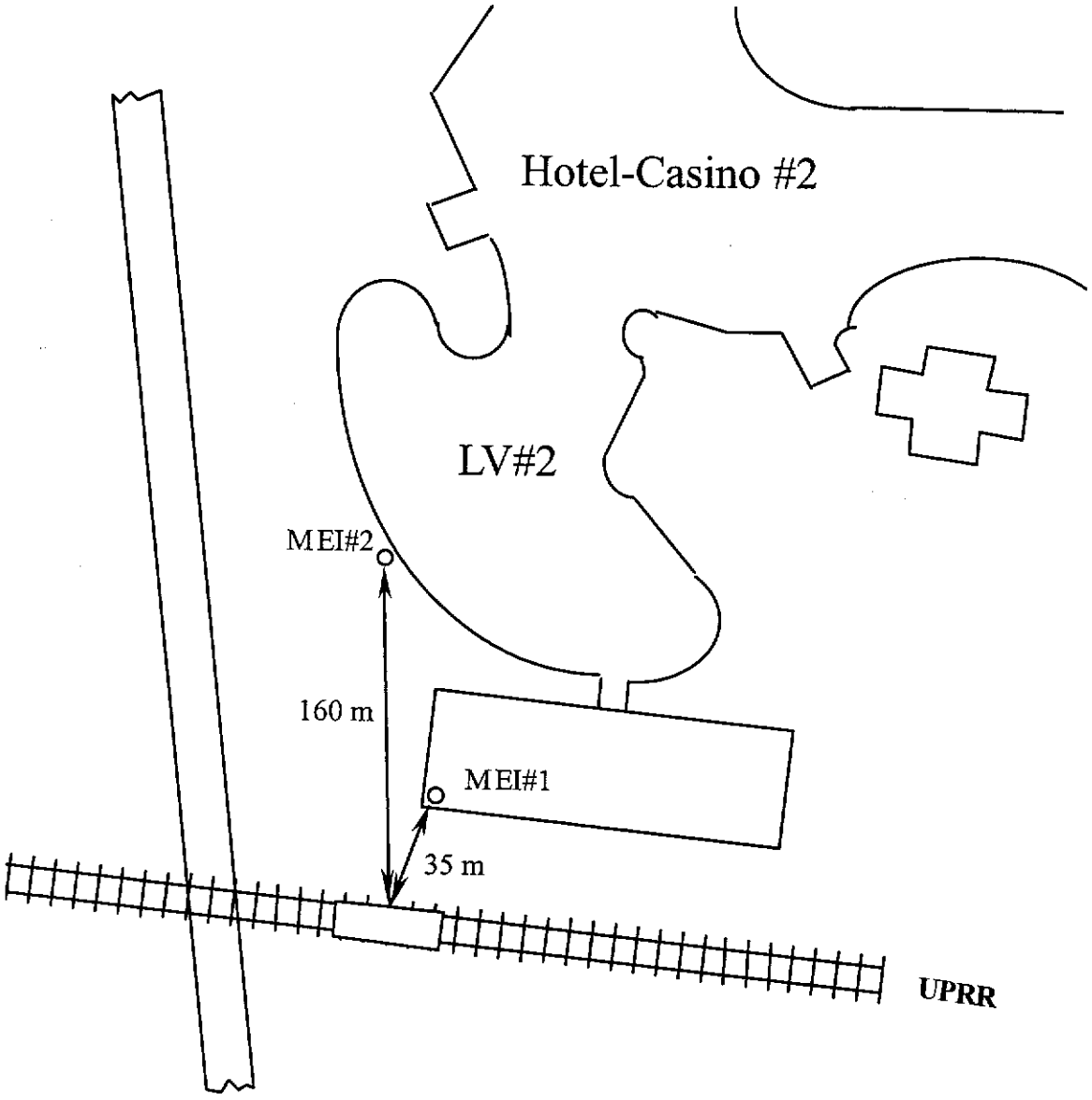


Fig. 2 Diagram of location #2. The two individuals are located as shown.

LV#3: Clark County Government Center

This is the Clark County Government Center in downtown Las Vegas. We calculate the 48 hr dose and the 457 hr dose for MEI#1 located 20 m from the stopped rail cask wall at the extreme southern end of the southern parking lot. We also calculate the 48 hr dose and the 457 hr dose for MEI#2, located about 30 m from the stopped rail cask wall at the exterior of the southern first floor entrance. We also calculate the 48 hr dose and the 457 hr dose for MEI#3, located 100 m from the stopped rail cask wall at the exterior of the first floor entrance to the County Commission Chambers. Figure 3 shows a diagram of the location. Figure 4 shows a view of the center.

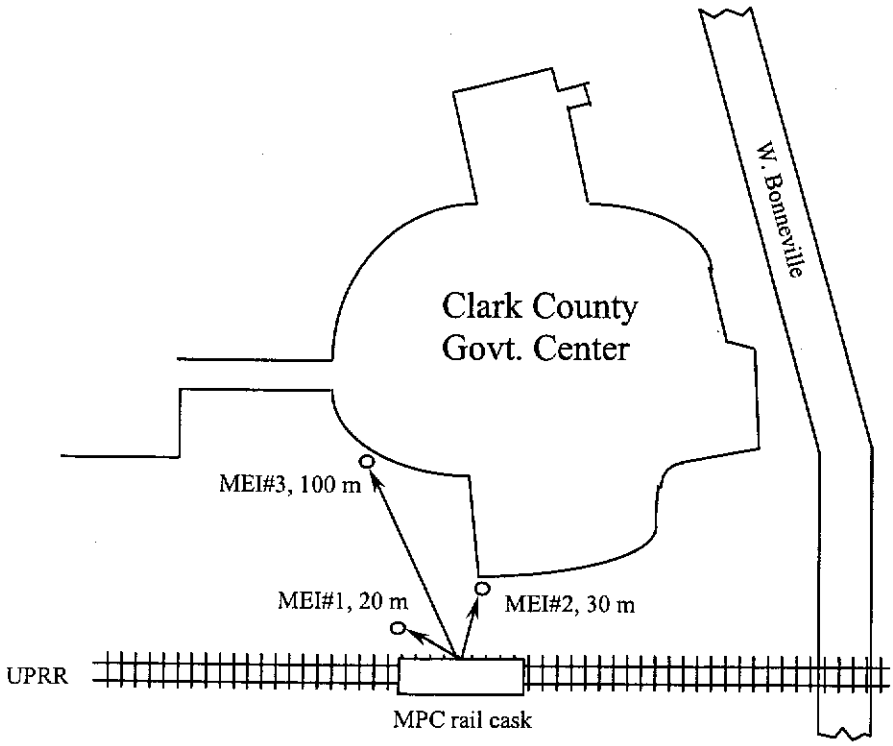


Fig. 3 Diagram of location #3. The three individuals are located as shown.

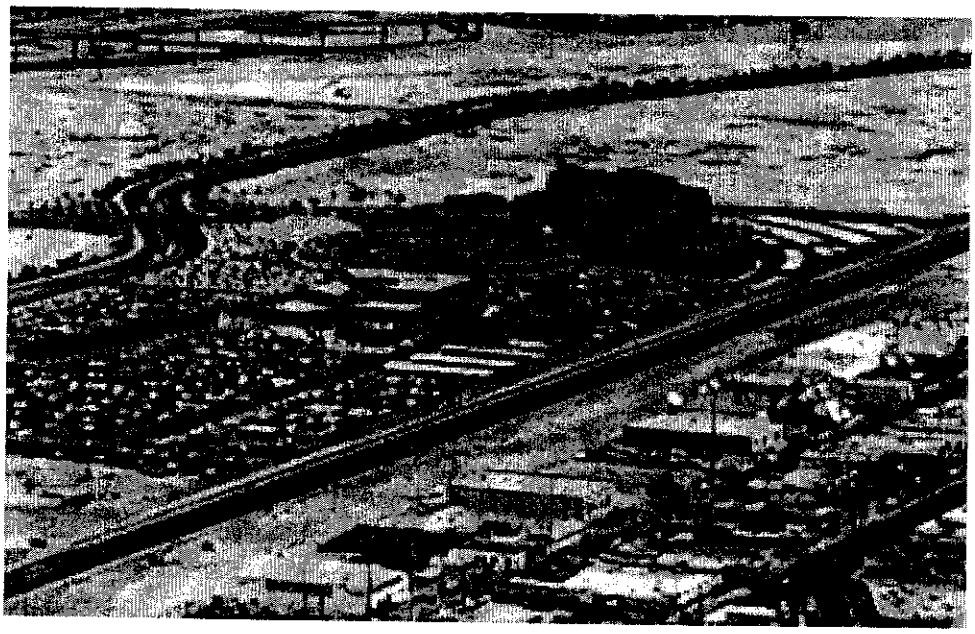


Fig. 4 Clark County Government Center. The railroad crosses diagonally from the lower left-hand side of the picture, and passes adjacent to the parking lot area.

Calculations

RISKIND does not allow calculations for stop times greater than 100 hr, so the 48 hr doses will be multiplied by (457/48) to give the doses for the longer time. Since the doses are only reported to two significant figures, this may slightly degrade the accuracy of the results for 457 hr due to round-off problems. Only three problems need to be run since multiple individuals can be considered for a given shipment in RISKIND.

Run#1 considers Hotel-Casino #1 for MEI#1 and MEI#2.

Run #2 considers Hotel-Casino #2 for MEI#1 and MEI#2.

Run#3 considers the Clark County Government Center (CCGC) for MEI#1, MEI#2, and MEI#3.

The calculations will assume the RISKIND default dose curve for the GA-4 cask, with 10 mrem/hr at 2 m from the cask surface. The gamma fraction is taken as 0.83 and the cask dimensions are length 5.29 m , radius 1.09 m. Only the *Stop* calculations will be used. The speed of 64 km/hr is set so that the code will calculate a *Passing* calculation which shows that the passing dose is trivial by comparison. Table 1 shows the results.

Table 1. 48 hr and 457 hr doses for three locations with various MEIs. The doses are in mrem. The 457 hr dose is calculated form (457/48)*48 hr dose. CCGC is the Clark County Government Center.

Bulding/MEI	Distance (m)	48 hr dose (mrem)	457 hr dose (mrem)
Casino#1, MEI#1	40	2.9	27.6
Casino#1, MEI#2	15	21	200
Casino #2, MEI#1	35	3.8	36.2
Casino #2, MEI#2	160	0.11	1.05
CCGC, MEI#1	20	12	114
CCGC, MEI#2	30	5.2	49.5
CCGC, MEI#3	100	0.36	3.43

Appendix A shows the results of the RISKIND calculations. Note that the doses listed in the RISKIND output files are in rem. Appendix B lists the input files for the three runs.

References

1. Y. C. Yuan, S. Y. Chen, B. M. Biwer, and D. J. LePoire, "*RISKIND – A Computer Program for Calculating Radiological Consequences and Health Risks from Transportation of Spent Nuclear Fuel*", ANL/EAD-1 (1995), Argonne National Laboratory

Appendix A: Calculation Results

Run #1

Title : Hotel-Casino#1, MEI#1-2, 48 hour dose

Shipment Parameters

Transport Mode [IMOD]:	Rail	
Population Zone [IZONE]:	Urban	
Dose at 2 m [TD2M]:	10.00	mrem/hr
Measurement Offset [TIOFF]:	0.00	m
Gamma Fraction [FRAD(1)]:	0.83	
Neutron Fraction [FRAD(2)]:	0.17	
Cask Length [HSIZE]*:	5.29	m
Cask Radius [RSIZE]*:	1.09	m
Traveling speed [SPEED]:	64.00	km/hr
Individual type [INDTYPE]:	Public	

Risk Conversion Factors

Non-Fatal Cancers/rem:	1.0E-04
Fatal Cancers/rem:	5.0E-04
Genetic Effects/rem:	1.3E-04

#	Individual Name	Stop Distance [DISTSTOP] [km]	Stop Time [TSTP] [hr]	Passing Distance [DISTPASS] [km]
1	MEI#1	4.0E-02	48.00	4.0E-02
2	MEI#2	1.5E-02	48.00	1.5E-02

		Stop			
#	Individual Name	Dose (rem)	Expected Non-Fatal Cancers	Expected Cancer Fatalities	Expected Genetic Effects
1	MEI#1	2.9E-03	2.9E-07	1.4E-06	3.7E-07
2	MEI#2	2.1E-02	2.1E-06	1.0E-05	2.7E-06

		Passing			
#	Individual Name	Dose (rem)	Expected Non-Fatal Cancers	Expected Cancer Fatalities	Expected Genetic Effects
1	MEI#1	9.5E-08	9.5E-12	4.7E-11	1.2E-11
2	MEI#2	3.0E-07	3.0E-11	1.5E-10	3.9E-11

Run #2

Title : Hotel-Casino#2, MEI#1, MEI#2, 48 hour dose

Shipment Parameters

Transport Mode [IMOD]:	Rail	
Population Zone [IZONE]:	Urban	
Dose at 2 m [TD2M]:	10.00	mrem/hr
Measurement Offset [TIOFF]:	0.00	m
Gamma Fraction [FRAD(1)]:	0.83	
Neutron Fraction [FRAD(2)]:	0.17	
Cask Length [HSIZE]*:	5.29	m
Cask Radius [RSIZE]*:	1.09	m
Traveling speed [SPEED]:	64.00	km/hr
Individual type [INDTYPE]:	Public	

Risk Conversion Factors

Non-Fatal Cancers/rem:	1.0E-04
Fatal Cancers/rem:	5.0E-04
Genetic Effects/rem:	1.3E-04

#	Individual Name	Stop Distance [DISTSTOP] [km]	Stop Time [TSTP] [hr]	Passing Distance [DISTPASS] [km]
1	MEI#1	3.5E-02	48.00	3.5E-02
2	MEI#2	1.6E-01	48.00	1.6E-01

========== Stop ==========

#	Individual Name	Dose (rem)	Expected Non-Fatal Cancers	Expected Cancer Fatalities	Expected Genetic Effects
1	MEI#1	3.8E-03	3.8E-07	1.9E-06	4.9E-07
2	MEI#2	1.1E-04	1.1E-08	5.3E-08	1.4E-08

========== Passing ==========

#	Individual Name	Dose (rem)	Expected Non-Fatal Cancers	Expected Cancer Fatalities	Expected Genetic Effects
1	MEI#1	1.1E-07	1.1E-11	5.6E-11	1.5E-11
2	MEI#2	1.0E-08	1.0E-12	5.2E-12	1.4E-12

Run #3

Title : Clark Cty Gov. Ctr, MEI#1, 2 & 3, 48 hour dose

Shipment Parameters

Transport Mode [IMOD]:	Rail	
Population Zone [IZONE]:	Urban	
Dose at 2 m [TD2M]:	10.00	mrem/hr
Measurement Offset [TIOFF]:	0.00	m
Gamma Fraction [FRAD(1)]:	0.83	
Neutron Fraction [FRAD(2)]:	0.17	
Cask Length [HSIZE]*:	5.29	m
Cask Radius [RSIZE]*:	1.09	m
Traveling speed [SPEED]:	64.00	km/hr
Individual type [INDTYPE]:	Public	

Risk Conversion Factors

Non-Fatal Cancers/rem:	1.0E-04
Fatal Cancers/rem:	5.0E-04
Genetic Effects/rem:	1.3E-04

#	Individual Name	Stop Distance [DISTSTOP] [km]	Stop Time [TSTP] [hr]	Passing Distance [DISTPASS] [km]
1	MEI#1	2.0E-02	48.00	2.0E-02
2	MEI#2	3.0E-02	48.00	3.0E-02
3	MEI#3	1.0E-01	48.00	1.0E-01

========== Stop ==========

#	Individual Name	Dose (rem)	Expected Non-Fatal Cancers	Expected Cancer Fatalities	Expected Genetic Effects
1	MEI#1	1.2E-02	1.2E-06	5.9E-06	1.5E-06
2	MEI#2	5.2E-03	5.2E-07	2.6E-06	6.8E-07
3	MEI#3	3.6E-04	3.6E-08	1.8E-07	4.6E-08

========== Passing ==========

#	Individual Name	Dose (rem)	Expected Non-Fatal Cancers	Expected Cancer Fatalities	Expected Genetic Effects
1	MEI#1	2.2E-07	2.2E-11	1.1E-10	2.8E-11
2	MEI#2	1.4E-07	1.4E-11	6.8E-11	1.8E-11
3	MEI#3	2.5E-08	2.5E-12	1.2E-11	3.2E-12

Appendix B: Problem Input Files

Run #1

```
&INDATA
 VERSION = '1.11R'
 TITLE = 'Hotel-Casino#1, MEI#1-2,48 hour dose',
 ACTA =          1              ,
 METFREQ =       1              ,
 PPVH =         -1              ,
 TRAF_DEN =     -1              ,
 PAG =           5              ,
 QA =           50              ,
 STATEN = '',
 HS =            1              ,
 HZLM =          .01            ,
 IACDT =         0              ,
 IACFOD =        0              ,
 IBOUND =        2              ,
 IMOD =          2              ,
 IRDTY =         1              ,
 IRUTIN =        1              ,
 ICONSQ =        0              ,
 NISOPL =        10             ,
 IACOEF =        0              ,
 ISPENT =        1              ,
 ITREAT =        1              ,
 ISTATE =        26             ,
 IZONE =         3              ,
 WDTHMED =      -1              ,
 NUMLANES =     -1              ,
 OUTFIL ='output\laveg1.out',
 EFF_SURF_DEN =                  240          ,
 PHALF =         50             ,
 RSALF =         .137           ,
 UF =   3*1,
 SEXT =   40*1,
 IDISPMOD =      0              ,
 SPEED =        64              ,
 SHIPDIST =      1              ,
 BRTPOP =        8000           ,
 SUFI =          .00001         ,
 SUFF =          .000000001     ,
 TD2M =          10             ,
 TIDX =                         ,
 TIOFF =         0              ,
 VDEP =          .01            ,
 VDEPNUC =   4*.01, 0 ,
 YEVD =          50             ,
 BURNUP =        35000          ,
 CACTD =        -1              ,
 CAREA =        -1              ,
 FRAD = 0.83, .17 ,
 HSIZE =        5.29            ,
 RSIZE =        1.09            ,
 RTYPE ='PWR',
```

```
 TFUEL =        10              ,
 TYPCSK ='Modal Rail',
 UMT =         -1               ,
 IADD =         2               ,
 POPTYPE =      1               ,
 DECAY_WEATHER =               .0495          ,
 F_RETAIN =     .2              ,
 F_EDBL_COW =   1               ,
 F_EDBL_HUM =   1               ,
 T_HARVEST_COW =               15              ,
 T_HARVEST_HUM =               30              ,
 YIELD_COW =    .7              ,
 YIELD_HUM =    2               ,
 T_GROW_COW =   30              ,
 T_GROW_HUM =   60              ,
 IDFOOD =   2*0, 18*1,
 IDPG =   1 , 5 , 3*1, 5*5, 6*1, 2*5, 16*1, 2*5, 6*1, 3*2, 7*1, 4 , 5 ,
3 , 30*1, 5 , 14*1, 10*0,
 IRTP =   20*1,
 ISHLT =   20*0,
 LSHLT =   20*0,
 INDTYPE =   20*1,
 WSHLT =   .36 , .38 , .21 , .05 , 0 ,
 SHLDVAL =   .36 , .38 , .21 ,
 IWATER =   20*0,
 OCUPF =   20*.62, 20*.02,
 POPW =   20*1,
 TEXT =   20*2,
 TSTP =   2*48, 18*1,
 BRTIND =   20*8000,
 DISTSTOP = .04,.015, 18*1,
 DISTPASS = .04,.015, 18*1,
 WBDYD =   20*2,
 WBDYW =   20*50,
 WEXCG =   20*1,
 XRECEP =   1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 ,
2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 ,
2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0,
 XNAME =     'MEI#1',
   'MEI#2',
    18*'',

 NUTYPE =     'Particulate',
   'Ru',
   'Cs',
   'I',
   'Gas',

 ANH =          10              ,
 TABK =         283             ,
 IYOURW =       1               ,
 DMIX =         1000            ,
 ITYPE =        4               ,
 RAIN =         0               ,
 WSM =          4               ,
 AMIX =         400             ,
 PMIX =         1600            ,
 DFREQ =   36*.0278,
```

```
 WS =  .89 , 2.46 , 4.47 , 6.93 , 9.61 , 12.52 ,
 DFACT =       .5            ,
 PFIN =  5*1,
 TREATM =      0             ,
 XIN =  .3 , .85 , 1.6 , 0 , 2 ,
 IYOURS =     -1             ,
 VCASK =       65            ,
 ALPHA =       90            ,
 BETA =        90            ,
 IHARD =       1             ,
 TFLAME =      1350          ,
 DFIRE =       .75           ,
 FLOCA =       0             ,
 DSTP =  2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 ,
2 , 90 , 2 , 90 , 2 , 90 ,
 FARM =       -1             ,
 GMEAT =      -1             ,
 GMILK =      -1             ,
 GVEGE =      -1             ,
 HSTP =  10*1,
 HTEXP =       2             ,
 IPFOD =       1             ,
 IPWATR =      0             ,
 NSTP =  10*1,
 NSTY =        0             ,
 POPD =        6             ,
 PSTP =  10*50,
 RDWTH =      -1             ,
 RFIE =        0             ,
 XING =  .26 , .3 , .52 , 0 , 1 ,
 XPZ =  .05 , 80 ,
 NSV =         20            ,
 FRELS =  3*.000002, .00002 , 3*.000002, .00002 , 3*.000002, .00002 ,
3*.000002, 5*.00002, 3*.000027, .00027 , 3*.000027, .00027 , 3*.000027,
.00027 , 3*.000048, 5*.00048, 3*.0002, .002 , 3*.0002, .002 , 3*.0002,
.002 , 3*.0002, 5*.002, 3*.0025, .043 , 3*.0025, .043 , 3*.0025, .043 ,
3*.0043, 5*.043, 3*.33, .63 , 3*.33, .63 , 3*.33, .63 , 3*.39, 5*.63,
 FDISP =  0 , 19*1, 0 , 19*1, 0 , 19*1, 0 , 19*1, 0 , 19*1,
 FSEV =  .994316 , .0038192 , .0017984 , .0000001532 , .00001687 ,
.000000233 , .0000001574 , 3.926E-14 , .00002362 , .0000003008 ,
.0000002034 , 1.495E-14 , .00001525 , .0000001592 , .0000001076 ,
7.681E-16 , .00000957 , .00000007201 , .00000004873 , 1E-16 , .993962 ,
.0027204 , .0005545 , .000000001786 , .0012275 , .0000005011 ,
.0000001021 , .000000000000329 , .00079511 , .0000003255 , .00000006634
, 2.137E-13 , .000614 , .0000002531 , .00000005162 , 1.644E-13 ,
.0001249 , .00000001075 , .00000005296 , 3.459E-14 , 20*.0000000001,
 FAILS =  .03 , .1 , 2*1, .03 , .1 , 2*1, .03 , .1 , 10*1,
 FSPAL =  0 , 3*1, .15 , 3*1, .15 , 3*1, .15 , 3*1, .15 , 3*1,
 FRCRUD =  20*1,
 HEATF =  500 , 19*2000000,
&END
```

Run #2

```
&INDATA
 VERSION = '1.11R'
 TITLE = 'Hotel-Casino#2, MEI#1,MEI#2, 48 hour dose',
 ACTA =          1              ,
 METFREQ =       1              ,
 PPVH =         -1              ,
 TRAF_DEN =     -1              ,
 PAG =           5              ,
 QA =            50             ,
 STATEN = '',
 HS =            1              ,
 HZLM =          .01            ,
 IACDT =         0              ,
 IACFOD =        0              ,
 IBOUND =        2              ,
 IMOD =          2              ,
 IRDTY =         1              ,
 IRUTIN =        1              ,
 ICONSQ =        0              ,
 NISOPL =        10             ,
 IACOEF =        0              ,
 ISPENT =        1              ,
 ITREAT =        1              ,
 ISTATE =        26             ,
 IZONE =         3              ,
 WDTHMED =      -1              ,
 NUMLANES =     -1              ,
 OUTFIL ='output\laveg2.out',
 EFF_SURF_DEN =                  240          ,
 PHALF =         50             ,
 RSALF =         .137           ,
 UF =  3*1,
 SEXT =  40*1,
 IDISPMOD =      0              ,
 SPEED =        64              ,
 SHIPDIST =      1              ,
 BRTPOP =        8000           ,
 SUFI =          .00001         ,
 SUFF =          .000000001     ,
 TD2M =          10             ,
 TIDX =                         ,
 TIOFF =         0              ,
 VDEP =          .01            ,
 VDEPNUC =  4*.01, 0 ,
 YEVD =          50             ,
 BURNUP =        35000          ,
 CACTD =        -1              ,
 CAREA =        -1              ,
 FRAD = 0.83, .17 ,
 HSIZE =        5.29            ,
 RSIZE =        1.09            ,
 RTYPE ='PWR',
 TFUEL =         10             ,
 TYPCSK ='Modal Rail',
 UMT =          -1              ,
```

```
 IADD =          2              ,
 POPTYPE =       1              ,
 DECAY_WEATHER =                 .0495          ,
 F_RETAIN =      .2             ,
 F_EDBL_COW =    1              ,
 F_EDBL_HUM =    1              ,
 T_HARVEST_COW =                 15             ,
 T_HARVEST_HUM =                 30             ,
 YIELD_COW =     .7             ,
 YIELD_HUM =     2              ,
 T_GROW_COW =    30             ,
 T_GROW_HUM =    60             ,
 IDFOOD =  2*0, 18*1,
 IDPG =  1 , 5 , 3*1, 5*5, 6*1, 2*5, 16*1, 2*5, 6*1, 3*2, 7*1, 4 , 5 ,
3 , 30*1, 5 , 14*1, 10*0,
 IRTP =  20*1,
 ISHLT =  20*0,
 LSHLT =  20*0,
 INDTYPE =  20*1,
 WSHLT =  .36 , .38 , .21 , .05 , 0 ,
 SHLDVAL =  .36 , .38 , .21 ,
 IWATER =  20*0,
 OCUPF =  20*.62, 20*.02,
 POPW =  20*1,
 TEXT =  20*2,
 TSTP =  2*48, 18*1,
 BRTIND =  20*8000,
 DISTSTOP = 0.035,0.160, 18*1,
 DISTPASS = 0.035,0.160, 18*1,
 WBDYD =  20*2,
 WBDYW =  20*50,
 WEXCG =  20*1,
 XRECEP =  1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 ,
2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 ,
2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0,
 XNAME =    'MEI#1',
   'MEI#2',
    18*'',

 NUTYPE =    'Particulate',
   'Ru',
   'Cs',
   'I',
   'Gas',

 ANH =           10             ,
 TABK =          283            ,
 IYOURW =        1              ,
 DMIX =          1000           ,
 ITYPE =         4              ,
 RAIN =          0              ,
 WSM =           4              ,
 AMIX =          400            ,
 PMIX =          1600           ,
 DFREQ =  36*.0278,
 WS =  .89 , 2.46 , 4.47 , 6.93 , 9.61 , 12.52 ,
 DFACT =         .5             ,
 PFIN =  5*1,
```

```
 TREATM =      0             ,
 XIN =  .3 , .85 , 1.6 , 0 , 2 ,
 IYOURS =     -1             ,
 VCASK =       65            ,
 ALPHA =       90            ,
 BETA =        90            ,
 IHARD =       1             ,
 TFLAME =      1350          ,
 DFIRE =       .75           ,
 FLOCA =       0             ,
 DSTP =  2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 ,
2 , 90 , 2 , 90 , 2 , 90 ,
 FARM =       -1             ,
 GMEAT =      -1             ,
 GMILK =      -1             ,
 GVEGE =      -1             ,
 HSTP =  10*1,
 HTEXP =       2             ,
 IPFOD =       1             ,
 IPWATR =      0             ,
 NSTP =  10*1,
 NSTY =        0             ,
 POPD =        6             ,
 PSTP =  10*50,
 RDWTH =      -1             ,
 RFIE =        0             ,
 XING =  .26 , .3 , .52 , 0 , 1 ,
 XPZ =  .05 , 80 ,
 NSV =         20            ,
 FRELS =  3*.000002, .00002 , 3*.000002, .00002 , 3*.000002, .00002 ,
3*.000002, 5*.00002, 3*.000027, .00027 , 3*.000027, .00027 , 3*.000027,
.00027 , 3*.000048, 5*.00048, 3*.0002, .002 , 3*.0002, .002 , 3*.0002,
.002 , 3*.0002, 5*.002, 3*.0025, .043 , 3*.0025, .043 , 3*.0025, .043 ,
3*.0043, 5*.043, 3*.33, .63 , 3*.33, .63 , 3*.33, .63 , 3*.39, 5*.63,
 FDISP =  0 , 19*1, 0 , 19*1, 0 , 19*1, 0 , 19*1, 0 , 19*1,
 FSEV =  .994316 , .0038192 , .0017984 , .0000001532 , .00001687 ,
.000000233 , .0000001574 , 3.926E-14 , .00002362 , .0000003008 ,
.0000002034 , 1.495E-14 , .00001525 , .0000001592 , .0000001076 ,
7.681E-16 , .00000957 , .00000007201 , .00000004873 , 1E-16 , .993962 ,
.0027204 , .0005545 , .000000001786 , .0012275 , .0000005011 ,
.0000001021 , .000000000000329 , .00079511 , .0000003255 , .00000006634
, 2.137E-13 , .000614 , .0000002531 , .00000005162 , 1.644E-13 ,
.0001249 , .00000001075 , .00000005296 , 3.459E-14 , 20*.0000000001,
 FAILS =  .03 , .1 , 2*1, .03 , .1 , 2*1, .03 , .1 , 10*1,
 FSPAL =  0 , 3*1, .15 , 3*1, .15 , 3*1, .15 , 3*1, .15 , 3*1,
 FRCRUD =  20*1,
 HEATF =  500 , 19*2000000,
&END
```

Run #3

```
&INDATA
 VERSION = '1.11R'
 TITLE = 'Clark Cty. Gov. Ctr., MEI#1, 2 & 3, 48 hour dose',
 ACTA =          1              ,
 METFREQ =       1              ,
 PPVH =         -1              ,
 TRAF_DEN =     -1              ,
 PAG =           5              ,
 QA =           50              ,
 STATEN = '',
 HS =            1              ,
 HZLM =          .01            ,
 IACDT =         0              ,
 IACFOD =        0              ,
 IBOUND =        2              ,
 IMOD =          2              ,
 IRDTY =         1              ,
 IRUTIN =        1              ,
 ICONSQ =        0              ,
 NISOPL =        10             ,
 IACOEF =        0              ,
 ISPENT =        1              ,
 ITREAT =        1              ,
 ISTATE =        26             ,
 IZONE =         3              ,
 WDTHMED =      -1              ,
 NUMLANES =     -1              ,
 OUTFIL ='output\laveg3.out',
 EFF_SURF_DEN =                  240          ,
 PHALF =         50             ,
 RSALF =         .137           ,
 UF =   3*1,
 SEXT =   40*1,
 IDISPMOD =      0              ,
 SPEED =        64              ,
 SHIPDIST =      1              ,
 BRTPOP =        8000           ,
 SUFI =          .00001         ,
 SUFF =          .000000001     ,
 TD2M =          10             ,
 TIDX =                         ,
 TIOFF =         0              ,
 VDEP =          .01            ,
 VDEPNUC =   4*.01, 0 ,
 YEVD =          50             ,
 BURNUP =        35000          ,
 CACTD =        -1              ,
 CAREA =        -1              ,
 FRAD = 0.83, .17 ,
 HSIZE =        5.29            ,
 RSIZE =        1.09            ,
 RTYPE ='PWR',
 TFUEL =         10             ,
 TYPCSK ='Modal Rail',
 UMT =          -1              ,
```

```
 IADD =          3              ,
 POPTYPE =       1              ,
 DECAY_WEATHER =                 .0495          ,
 F_RETAIN =      .2             ,
 F_EDBL_COW =    1              ,
 F_EDBL_HUM =    1              ,
 T_HARVEST_COW =                 15             ,
 T_HARVEST_HUM =                 30             ,
 YIELD_COW =     .7             ,
 YIELD_HUM =     2              ,
 T_GROW_COW =    30             ,
 T_GROW_HUM =    60             ,
 IDFOOD =  3*0, 17*1,
 IDPG =  1 , 5 , 3*1, 5*5, 6*1, 2*5, 16*1, 2*5, 6*1, 3*2, 7*1, 4 , 5 ,
3 , 30*1, 5 , 14*1, 10*0,
 IRTP =  20*1,
 ISHLT =  20*0,
 LSHLT =  20*0,
 INDTYPE =  20*1,
 WSHLT =  .36 , .38 , .21 , .05 , 0 ,
 SHLDVAL =  .36 , .38 , .21 ,
 IWATER =  20*0,
 OCUPF =  20*.62, 20*.02,
 POPW =  20*1,
 TEXT =  20*2,
 TSTP =  3*48, 17*1,
 BRTIND =  20*8000,
 DISTSTOP = 0.02,0.03,0.100, 17*1,
 DISTPASS = 0.02,0.03,0.100, 17*1,
 WBDYD =  20*2,
 WBDYW =  20*50,
 WEXCG =  20*1,
 XRECEP =  1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 ,
2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 ,
2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0, 1 , 2*0,
 XNAME =    'MEI#1',
   'MEI#2',
   'MEI#3',
    17*'',

 NUTYPE =    'Particulate',
   'Ru',
   'Cs',
   'I',
   'Gas',

 ANH =           10             ,
 TABK =          283            ,
 IYOURW =        1              ,
 DMIX =          1000           ,
 ITYPE =         4              ,
 RAIN =          0              ,
 WSM =           4              ,
 AMIX =          400            ,
 PMIX =          1600           ,
 DFREQ =  36*.0278,
 WS =  .89 , 2.46 , 4.47 , 6.93 , 9.61 , 12.52 ,
 DFACT =         .5             ,
```

```
 PFIN =  5*1,
 TREATM =       0              ,
 XIN =  .3 , .85 , 1.6 , 0 , 2 ,
 IYOURS =      -1              ,
 VCASK =        65             ,
 ALPHA =        90             ,
 BETA =         90             ,
 IHARD =        1              ,
 TFLAME =       1350           ,
 DFIRE =        .75            ,
 FLOCA =        0              ,
 DSTP =  2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 , 2 , 90 ,
2 , 90 , 2 , 90 , 2 , 90 ,
 FARM =        -1              ,
 GMEAT =       -1              ,
 GMILK =       -1              ,
 GVEGE =       -1              ,
 HSTP =  10*1,
 HTEXP =        2              ,
 IPFOD =        1              ,
 IPWATR =       0              ,
 NSTP =  10*1,
 NSTY =         0              ,
 POPD =         6              ,
 PSTP =  10*50,
 RDWTH =       -1              ,
 RFIE =         0              ,
 XING =  .26 , .3 , .52 , 0 , 1 ,
 XPZ =  .05 , 80 ,
 NSV =          20             ,
 FRELS =  3*.000002, .00002 , 3*.000002, .00002 , 3*.000002, .00002 ,
3*.000002, 5*.00002, 3*.000027, .00027 , 3*.000027, .00027 , 3*.000027,
.00027 , 3*.000048, 5*.00048, 3*.0002, .002 , 3*.0002, .002 , 3*.0002,
.002 , 3*.0002, 5*.002, 3*.0025, .043 , 3*.0025, .043 , 3*.0025, .043 ,
3*.0043, 5*.043, 3*.33, .63 , 3*.33, .63 , 3*.33, .63 , 3*.39, 5*.63,
 FDISP =  0 , 19*1, 0 , 19*1, 0 , 19*1, 0 , 19*1, 0 , 19*1,
 FSEV =  .994316 , .0038192 , .0017984 , .0000001532 , .00001687 ,
.000000233 , .0000001574 , 3.926E-14 , .00002362 , .0000003008 ,
.0000002034 , 1.495E-14 , .00001525 , .0000001592 , .0000001076 ,
7.681E-16 , .00000957 , .00000007201 , .00000004873 , 1E-16 , .993962 ,
.0027204 , .0005545 , .000000001786 , .0012275 , .0000005011 ,
.0000001021 , .000000000000329 , .00079511 , .0000003255 , .00000006634
, 2.137E-13 , .000614 , .0000002531 , .00000005162 , 1.644E-13 ,
.0001249 , .00000001075 , .00000005296 , 3.459E-14 , 20*.0000000001,
 FAILS =  .03 , .1 , 2*1, .03 , .1 , 2*1, .03 , .1 , 10*1,
 FSPAL =  0 , 3*1, .15 , 3*1, .15 , 3*1, .15 , 3*1, .15 , 3*1,
 FRCRUD =  20*1,
 HEATF =  500 , 19*2000000,
&END
```

Appendix G – U.S. Department of Energy Deficiency/Corrective Action Reports

Appendix G

Department of Energy
Washington, DC 20585

QA: QA

NOV 19 2001

J. A. McNeish
Bechtel SAIC Company, LLC
1180 Town Center Drive, M/S 423
Las Vegas, NV 89144

ISSUANCE OF DEFICIENCY REPORT (DR) BSC-02-D-022 RESULTING FROM THE OFFICE OF QUALITY ASSURANCE (OQA) SURVEILLANCE BSC-SR-02-03

Enclosed is DR BSC-02-D-022 generated as a result of OQA Surveillance BSC-SR-02-03.

Please provide a response to this deficiency that meets the applicable requirements of Administrative Procedure (AP) 16.1Q, *Management of Conditions Adverse to Quality*. Send the original of your responses to Deborah G. Opielowski, NQS, P.O. Box 364629, Mail Stop 455, North Las Vegas, Nevada 89036-8629. Initial response to the DR is due ten working days from the date of this letter. Any extensions to this due date must be requested in accordance with AP-16.1Q.

The Responsible Individual for this Condition Adverse to Quality (CAQ) should sign below and return to Ms. Opielowski within five working days.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Samuel E. Archuleta at (702) 794-1476.

James Blaylock for
Robert D. Davis, Acting Director
Office of Quality Assurance

OQA:JB-0280

Enclosure:
DR BSC-02-D-022

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒ DEFICIENCY REPORT ☐ CORRECTIVE ACTION REPORT

ORIGINAL IS A RED STAMP

NO. BSC-02-D-022

PAGE 1 OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT

1. Controlling Document: AP-SI.1Q, Rev 3, ICN 1, ECN 1

2. Related Report No.: BSC-SR-02-03

3. Responsible Organization: BSC

4. Discussed With: Jerry McNeish, Stephen Splawn, William Watson, Judy Gebhart

5. Requirement:

1. AP-SI.1Q, Section 5.10 establishes controls for the interim use of unqualified software.

2 AP-SI.1Q, Section 5.10.1c) refers users of the procedure to Sections 5.4 or 5.5 for the preparation and processing of a Software Activity Plan (SAP), Section 5.10.1c) also includes a requirement that the SAP shall include "special consideration and discussion on how the unqualified software will be used, a schedule for qualification, and comparison confirmation methodologies, including acceptance criteria to be used to determine the extent of impact evaluations that may be applicable once the software is qualified." Sections 5.4.1.2.1 or 5.5.1.2.1 further refer users of the procedure to Section 5.2.1 for requirements for developing the SAP.

3. AP-SI.1Q, Section 5.2.1 establishes the requirements for documentation of software activity planning.

4. AP-SI.1Q, Section 5.4.1.2.2 or 5.5.1.2.2 require that the Responsible Manager's Supervisor review the SAP and concur or resolve issues with the Responsible Manager.

5. Technical Work Plan (TWP) TWP-MGR-MD-000014, Rev 01, Section 13.0 states in part: "...Unqualified software, or software that has been modified as a result of executing work contained in this TWP, will be submitted to Software Configuration Management in accordance with AP-SI.1Q, Section 5.10, Interim Use...."

6. Description of Condition:

During Surveillance BSC-DR-02-03, the Configuration Control Documents for the following software codes were reviewed: (a). ANCpHMIX.BAS V1.0; (b) BATH_10 V1.0; (c) PATCH_FAIL_LAG V1.0; (d) PDFCDF V1.0; (e) SEEPAGEDLLMK2_UU V1.0; (f) SEEPAGEDLLV2UU V1.0; and (g) GoldSim V7.17-200; and (h) LAG_WPFAILURE_T1 V1.0

1. Contrary to requirement 1, the Software Activity Plans for software codes (b) through (h) referenced above were deficient in that, contrary to requirement 2, the SAPs did not effectively address the schedule for qualification, nor did they describe the confirmation methodologies and acceptance criteria.

Continued on Page 2, Continuation Page

7. Initiator: Sam E. Archuleta Date 11-5-01

9. Does a stop work condition exist? (Not required for a DR) ☐ Yes ☒ No
If Yes, Check One: ☐ A ☐ B ☐ C ☐ D

10. Recommended Actions:

None

11. QA Review: QAR Sam E. Archuleta Date 11-5-01

12. Response Due Date: 10 Working Days From Issuance

13. DOQA Issuance Approval:

Printed Name Robert D. Davis Signature James B. Blaylock for Date 11/19/01

22. Corrective Actions Verified:

QAR Date

23. Closure Approved by:

DOQA Date

ENCLOSURE

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☑ DR/CAR
☐ Stop Work Order

NO. BSC-02-D-022

PAGE OF
QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Block 6 - Description of Condition: Continued

2. Contrary to requirement 3, the Work Scope statements in all seven SAPs (b through h) are inaccurate in that they state that the non-qualified code will be utilized in non-quality affecting activities until final decisions on the modeling approach for LA are made, yet all seven codes (b through h) were already used in the FY01 Supplemental Science and Performance Analyses (SSPA), Vol 2, which is a "QA: QA " designated document, and therefore represents quality affecting work. In addition, this use of software conflicts with the planned course of action. that is documented in Section 13 of the TWP, requirement 5.

3. Contrary to requirement 4, the review of the SAPs by the Responsible Manager was ineffective in that it failed to detect the deficiencies cited in number 1, above.

Acknowledgement of Understanding of the CAQ (DR BSC-02-D-022) by the Responsible Individual:

_____ _____

Responsible Individual Date

cc w/encl:
W. L. Belke, NRC, Las Vegas, NV
N. K. Stablein, NRC, Rockville, MD
S. W. Lynch, State of Nevada, Carson City, NV
Engelbrecht von Tiesenhausen, Clark County, Las Vegas, NV
R. W. Andrews, BSC, Las Vegas, NV
G. K. Beall, BSC, Las Vegas, NV
J. E. Gebhart, BSC, Las Vegas, NV
Norman Graves, BSC, Las Vegas, NV
S. H. Horton, BSC, Las Vegas, NV
R. P. Keele, BSC, Las Vegas, NV, M/S 280
D. T. Krisha, BSC, Las Vegas, NV
D. M. Kunihiro, BSC, Las Vegas, NV
N. H. Williams, BSC, Las Vegas, NV
S. E. Archuleta, NQS, Las Vegas, NV
W. J. Glasser, NQS, Las Vegas, NV
K. A. Hodges, NQS, Las Vegas, NV
D. G. Opielowski, NQS, Las Vegas, NV
J. R. Dyer, DOE/YMSCO, Las Vegas, NV
C. E. Hampton, DOE/YMSCO, Las Vegas, NV
D. G. Horton, DOE/YMSCO, Las Vegas, NV
J. M. Replogle, DOE/YMSCO, Las Vegas, NV
B. M. Terrell, DOE/YMSCO, Las Vegas, NV
R. N. Wells, DOE/YMSCO (RW-60), Las Vegas, NV

DOE F1325.8
(08-89)
EFG (07-90)

United States Government | Department of Energy

Memorandum

QA: QA

DATE: OCT 30 2001

REPLY TO:
ATTN OF: RW-3 (R. D. Davis/4-1460)

SUBJECT: ISSUANCE OF DEFICIENCY REPORT (DR) OCRWM-02-D-016 RESULTING FROM AN OBSERVATION BY ROCHELLE RUCINSKI

TO: YMSCO/OIM (R. N. Wells)

Enclosed is DR OCRWM-02-D-016 generated as a result of an observation.

Please provide a response to this deficiency that meets the applicable requirements of Administrative Procedure (AP) 16.1Q, *Management of Conditions Adverse to Quality.* Send the original of your responses to Deborah G. Opielowski, NQS, P.O. Box 364629, Mail Stop 455, North Las Vegas, Nevada 89036-8629. Initial response to the DR is due ten working days from the date of this letter. Any extensions to the due date must be requested in accordance with AP-16.1Q.

The Responsible Individual for this Condition Adverse to Quality (CAQ) should sign below and return to Ms. Opielowski within five working days.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Samuel E. Archuleta at (702) 794-1476.

James Blaylock for

Robert D. Davis, Acting Director
Office of Quality Assurance

OQA:JB-0168

Enclosure:
DR OCRWM-02-D-016

ORIGINAL

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.

8. [X] DEFICIENCY REPORT [ ] CORRECTIVE ACTION REPORT

NO. OCRWM-02-D-016

PAGE 1 OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT

1. Controlling Document: QARD, Rev. 10

2. Related Report No.: N/A

3. Responsible Organization: OCRWM OIM

4. Discussed With: Sam Archuleta, Lyle Southworth, ALESIA BOONE 10-25-01

5. Requirement:

1) QARD, Rev. 10, Section I.2.1.A.1, requires that "A defined software life cycle methodology shall address the following phases: requirements, design, implementation, testing installation and checkout, operations and maintenance, and retirement."

2) QARD, Rev. 10, Section I.2.1.A, requires that "Software acquisition, development, and maintenance shall proceed in a planned, traceable, and orderly manner utilizing a defined software life cycle methodology."

6. Description of Condition:

1) Contrary to the requirement above, software developed and qualified in accordance with Section 5.3 ("Level 3 software") of the QARD Supplement I implementing procedure, AP-SI.1Q, Rev. 3, ICN 1, is not subjected to the requirements and design phases of software life cycle development. Although the QARD allows for variations of the number of phases and relative emphasis placed on each of the phases, it does not appear to allow for elimination of life cycle methodology phases for different types of software. AP-SI.1Q, Rev. 3, ICN 1, Section 5.3, states no requirement for developing requirements or design documents, nor is there any requirement to document these phases.

2) Contrary to the requirement above, software developed and qualified in accordance with the Section 5.3 ("Level 3 software") of the QARD Supplement I implementing procedure, AP-SI.1Q, Rev. 3, ICN 1, is not subjected to requirements mandating that software development be planned. AP-SI.1Q, Rev. 3, ICN 1, Section 5.3, states no requirement for planning documents, nor is there any requirement to document the planning phase of the life cycle.

7. Initiator: Rochelle Rucinski 10/24/01
Rochelle Rucinski Date

9. Does a stop work condition exist? (Not required for a DR) [ ] Yes [ ] No
If Yes, Check One: [ ] A [ ] B [ ] C [ ] D

10. Recommended Actions: NONE

11. QA Review:
QAR Samuel E Archuleta Date 10-25-01

12. Response Due Date: 10 Working Days From Issuance

13. DOQA Issuance Approval:
Printed Name R. D. Davis Signature James Blaylock for Date 10/29/01

22. Corrective Actions Verified:
QAR Date

23. Closure Approved by:
DOQA Date

Exhibit AP-16.1Q.1

Rev. 12/20/1999

Enclosure

Acknowledgement of Understanding of the CAQ (DR OCRWM-02-D-016) by the Responsible Individual:

_____ _____

Responsible Individual Date

cc w/encl:
N. K. Stablein, NRC, Rockville, MD
W. L. Belke, NRC, Las Vegas, NV
S. W. Lynch, State of Nevada, Carson City, NV
Engelbrecht von Tiesenhausen, Clark County, Las Vegas, NV
W. J. Wooley, MTS, Las Vegas, NV
J. F. Pelletier, BSC/SNL, Las Vegas, NV
S. H. Horton, BSC, Las Vegas, NV
R. P. Keele, BSC, Las Vegas, NV, M/S 280
D. T. Krisha, BSC, Las Vegas, NV
D. M. Kunihiro, BSC, Las Vegas, NV
R. E. Rucinski, BSC, Las Vegas, NV
L. C. Southworth, BSC, Las Vegas, NV
S. E. Archuleta, NQS, Las Vegas, NV
W. J. Glasser, NQS, Las Vegas, NV
K. A. Hodges, NQS, Las Vegas, NV
D. G. Opielowski, NQS, Las Vegas, NV
Alesia Boone, DOE/YMSCO, Las Vegas, NV
J. R. Dyer, DOE/YMSCO, Las Vegas, NV
C. E. Hampton, DOE/YMSCO, Las Vegas, NV
D. G. Horton, DOE/YMSCO, Las Vegas, NV
J. M. Replogle, DOE/YMSCO, Las Vegas, NV
B. M. Terrell, DOE/YMSCO, Las Vegas, NV

DOE F1325.8
(08-89)
EFG (07-90)

United States Government | Department of Energy

Memorandum

QA: QA

DATE: OCT 25 2001

REPLY TO:
ATTN OF: RW-3 (James Blaylock/4-1420)

SUBJECT: ISSUANCE OF DEFICIENCY REPORTS (DR) OQA-01-D-146 AND OQA-01-D-147 RESULTING FROM THE OFFICE OF QUALITY ASSURANCE (OQA) AUDIT OQA-ARC-01-015

TO: RW-3 (R. D. Davis)

Enclosed are DRs OQA-01-D-146 and OQA-01-D-147 generated as a result of OQA Audit OQA-ARC-01-015.

Please provide responses to these deficiencies that meet the applicable requirements of Administrative Procedure (AP) 16.1Q, *Management of Conditions Adverse to Quality*. Send the original of your responses to Deborah G. Opielowski, NQS, P.O. Box 364629, Mail Stop 455, North Las Vegas, Nevada 89036-8629. Initial responses to the DRs are due ten working days from the date of this letter. Any extension to the due dates must be requested in accordance with AP-16.1Q.

The Responsible Individual for these Conditions Adverse to Quality (CAQ) should sign below and return to Ms. Opielowski within five working days.

If you have any questions, please contact James Blaylock at (702) 794-1420.

James Blaylock
Office of Quality Assurance

OQA:JB-0145

Enclosure:
DRs OQA-01-D-146 and
OQA-01-D-147

ORIGINAL
THIS IS A RED STAMP

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒ DEFICIENCY REPORT
☐ CORRECTIVE ACTION REPORT

NO. OQA-01-D-146

PAGE 1 OF 2
QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT

1. Controlling Document:
- QARD Rev 10 Eff Date 04/28/00
- AP-2.1Q Revision 1, ICN 0 Eff Date 06/30/00

2. Related Report No.:
OQA-ARC-01-015

3. Responsible Organization:
Office of Quality Assurance (OQA)

4. Discussed With:
R. D. Davis, J. Blaylock, R. Hasson

5. Requirement:

- Quality Assurance Requirements and Description QARD Rev 10 Eff Date 04/28/00
- Procedure Indoctrination and Training of Personnel AP-2.1Q Revision 1, ICN 0 Eff Date 06/30/00

(Continued on page 2)

6. Description of Condition:

Contrary to the above, complete individual training requirements and history were not retrievable from record storage and the training organization does not reflect the status of training for OQA.

- Individual training requirements could not be determined for five personnel in OQA (DOE personnel)
- DOE Individual Development Plans (IDPs) have not been submitted to the Training Organization (TO)
- Current training matrices could not be retrieved from the records organization or the training organization for three (of three sampled) OQA (Navarro) personnel

(Continued on page 2)

7. Initiator:
T. L. Morgan Date 10/01/01

9. Does a stop work condition exist? (Not required for a DR)
☐ Yes ☒ No
If Yes, Check One: ☐ A ☐ B ☐ C ☐ D

10. Recommended Actions:

None Identified.

11. QA Review:
QAR Date 10/24/01

12. Response Due Date:
10 Working Days From Issuance

13. DOQA Issuance Approval:

Printed Name ROBERT D DAVIS Signature James B Blaylock for Date 10/25/0

22. Corrective Actions Verified:

QAR Date

23. Closure Approved by:

DOE/OQA Date

ENCLOSURE

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.	8. ☒DR/CAR ☐ Stop Work Order NO. OQA-01-D-146 PAGE 2 OF 2 QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

5. Requirement: (continued)

QARD Subsection 2.2.13 *Qualification of Personnel Who Perform Inspection, Nondestructive Examination, Testing, and Auditing* states "Personnel who perform inspection, nondestructive examination, testing, and auditing shall be qualified in accordance with the requirements of the applicable QARD section covering the activity and QARD Subsection 2.2.12, Personnel Qualification"

Subsection 2.2.12.A. states "Each Affected Organization shall indoctrinate and train personnel as follows:

1. Determine required indoctrination and training."
4. "Ensure indoctrination and training are completed prior to performing the work."

17.2.1 Classifying Quality Assurance Records

Subsection 17.2.1.A states "Documents that meet the following requirements shall be classified as lifetime QA records:

7. "Personnel training and qualification documents for individuals executing QA program requirements."

AP-2.1Q Section5.2 *Training Requirements Documentation*

5.4.1 Manager:

a) Ensure that indoctrination and training requirements, including those indoctrination and training requirements for ES&H and work subject to the QARD as determined in Subsection 5.1, are documented for each Employee or the Employee's job function. Document training requirements on an IDP or on a matrix that indicates Training Requirements against job functions, or employee.

c) Submit a copy of the IDP or Training Requirements Matrix to the TO.

5.4.2 Employee

b) Document completed indoctrination and training.... and ensure a copy is provided to the TO.

5.4.3 TO:

b) Submit completed training records and training exemption records in accordance with Section 6.0. [Records].

6. Description of Condition (continued):

- The training organization records do not show completion of required training for three (of three sampled) OQA (Navarro) personnel

QAS 1 (3590)

- Working File showed training matrix requirements for Manager should have been for a QAS
- TO showed two classes as having expired and retraining required.
- TO did not show two classes as being required that management had indicated as being required for initial job qualification.
- Records storage only showed a few completed classes, no matrix on file.

QAS 2 (2526)

- TO showed two classes as having expired and retraining required.
- TO did not show six classes as being required that management had indicated as being required for initial job qualification.
- TO showed one job function related/QA training requirement class as not having been completed
- Records storage only showed a few completed classes, no matrix on file.

QAS 3 (6989)

- TO showed one classes as having expired and retraining required.
- TO did not show fourteen classes as being required that management had indicated as being required for initial job qualification.
- TO showed three job function related/QA training requirement class as not having been completed
- Records storage only showed a few completed classes, no matrix on file.

ORIGINAL
IS IN A RED STAMP

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒ DEFICIENCY REPORT
☐ CORRECTIVE ACTION REPORT

NO. OQA-01-D-147

PAGE 1 OF
QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT

1. Controlling Document:
AP-16.1Q, Rev. 4, ICN 1

2. Related Report No.:
OQA-ARC-01-15

3. Responsible Organization:
Office of Quality Assurance (OQA)

4. Discussed With:
R. D. Davis, J. Blaylock, W. Glasser

5. Requirement:
Paragraph 5.2.4.e states: "Identify the results of the Stop Work evaluation in Block 9."

"Attachment 4, Instructions For Completing The Office Of civilian Radioactive Waste Management Deficiency/Corrective Action Report" states in step 9: "Check 'Yes' or 'No' as applicable indicating whether a stop work condition exists."

6. Description of Condition:
Contrary to the above requirement, DR/CAR form Block 9 is not filled in for the following Deficiency Reports:

BSC-01-D-071
OQA—01-D-001
BSC-01-D-082
USSGS-01-D-004

7. Initiator:
R. W. Hendrickson Date 10/03/01

9. Does a stop work condition exist? (Not required for a DR)
☐ Yes ☒ No
If Yes, Check One: ☐ A ☐ B ☐ C ☐ D

10. Recommended Actions:
Revise existing paragrah 5.2.4 e) and step 9 of Attachment 4 of AP-16.1Q to make stop work considerations applicable only to Corrective Action Reports

11. QA Review:
QAR Sam Horton Date 10/23/01

12. Response Due Date:
10 Working Days From Issuance

13. DOQA Issuance Approval:
Printed Name Robert D. Davis Signature James Blaylock for Date 10/25/01

22. Corrective Actions Verified:
QAR Date

23. Closure Approved by:
DOE/OQA Date

Department of Energy
Washington, DC 20585

QA: QA

OCT 25 2001

G. S. Bodvarsson, Laboratory Lead
Lawrence Berkeley National Laboratory
University of California
One Cyclotron Road, Building 50E
Berkeley, CA 94720

ISSUANCE OF DEFICIENCY REPORT (DR) BSC-02-D-008 RESULTING FROM AN OBSERVATION BY MICHELLE PRATER AND KENNETH O. GILKERSON

Enclosed is DR BSC-02-D-008 generated as a result of an observation.

Please provide a response to this deficiency that meets the applicable requirements of Administrative Procedure (AP) 16.1Q, *Management of Conditions Adverse to Quality*. Send the original of your responses to Deborah G. Opielowski, NQS, P.O. Box 364629, Mail Stop 455, North Las Vegas, Nevada 89036-8629. Initial response to the DR is due ten working days from the date of this letter. Any extensions to this due date must be requested in accordance with AP-16.1Q.

The Responsible Individual for this Condition Adverse to Quality (CAQ) should sign below and return to Ms. Opielowski within five working days.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Christian M. Palay at (702) 794-1486.

James Blaylock
Robert D. Davis, Acting Director
Office of Quality Assurance

OQA:JB-0146

Enclosure:
DR BSC-02-D-008

Acknowledgement of Understanding of the CAQ (DR BSC-02-D-008) by the Responsible Individual:

_____ _____

Responsible Individual Date

cc w/encl:
N. K. Stablein, NRC, Rockville, MD
W. L. Belke, NRC, Las Vegas, NV
S. W. Lynch, State of Nevada, Carson City, NV
Engelbrecht von Tiesenhausen, Clark County, Las Vegas, NV
Nancy Aden-Gleason, BSC/LBNL, Berkeley, CA
J. A. Blink, BSC/LLNL, Las Vegas, NV
R. W. Andrews, BSC, Las Vegas, NV
G. K. Beall, BSC, Las Vegas, NV
David Dobson, BSC, Las Vegas, NV
K. O. Gilkerson, BSC, Las Vegas, NV
H. T. Greene, BSC, Las Vegas, NV
S. H. Horton, BSC, Las Vegas, NV
C. A. Humphries-Alder, BSC, Las Vegas, NV, M/S 280
R. P. Keele, BSC, Las Vegas, NV, M/S 280
D. T. Krisha, BSC, Las Vegas, NV
D. M. Kunihiro, BSC, Las Vegas, NV
W. W. Watson, BSC, Las Vegas, NV
N. H. Williams, BSC, Las Vegas, NV
W. J. Glasser, NQS, Las Vegas, NV
K. A. Hodges, NQS, Las Vegas, NV
D. G. Opielowski, NQS, Las Vegas, NV
C. M. Palay, NQS, Las Vegas, NV
J. R. Dyer, DOE/YMSCO, Las Vegas, NV
C. E. Hampton, DOE/YMSCO, Las Vegas, NV
D. G. Horton, DOE/YMSCO, Las Vegas, NV
S. P. Mellington, DOE/YMSCO, Las Vegas, NV
J. M. Replogle, DOE/YMSCO, Las Vegas, NV
B. M. Terrell, DOE/YMSCO, Las Vegas, NV

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒ DEFICIENCY REPORT
☐ CORRECTIVE ACTION REPORT

ORIGINAL
...NG IS A RED STAMP

NO. BSC-02-D-008

PAGE 1 OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT

1. Controlling Document:
AP-2.21Q, Revision 0; AP-2.21Q Revision 1, BSCN 1

2. Related Report No.:
CIRS Item # 1982

3. Responsible Organization:
Science & Analyses

4. Discussed With:
Jim Blink, Hank Greene, Bill Watson, Cindy Humphries-Alder, Dave Dobson

5. Requirement:
1) AP-2.21Q, R-1, BSCN1 Section 5.6 a) states: "For existing Work Packages being modified (e.g., by a Change Request, Baseline Change Proposal, etc.) with work scope changes, determine if the current TWP is consistent with the work package."
2) AP-2.21Q, R-1, BSCN1 Section 5.6 b) states: "When a revision to the TWP is necessary, develop the revised TWP in accordance with Subsections 5.2 through 5.5 and 5.8."
3) AP-2.21Q, R-1, BSCN1 Section 5.5.2.e states: "Conduct a review of the TWP including any addenda (i.e., Activity Evaluation, etc.). Review of the TWP may be accomplished via hard copy or electronically, at the discretion of the TWP Manager or Designee. Comments and resolution may be accomplished via electronic mail or by using a Review Record and Comment Sheet, such as the forms in AP-5.1Q, *Plan and Procedure Preparation, Review, and Approval.* Reviews conducted via electronic mail require a signed hard copy." Section 6.0 requires these reviews to be submitted to records. (NOTE: AP-2.21Q R-0 required that a AP-6.28Q review be performed.)
4) AP-2.21Q, R-1, BSCN1 Section 5.8a) states: "Upon completion of the TWP, TWP Manager or Designee: a) Forward the TWP to Document Control for issuance in accordance with AP-6.1Q."

6. Description of Condition:
TWP-NBS-TH-000001, R-0, ICN 1, "Technical Work Plan for Nearfield Environment Thermal Analyses and Testing" was not prepared and processed in accordance the requirements of AP-2.21Q.

1) Subject TWP was modified to add a scope of work not authorized (funded) by Work Package #4301213NML. This WP only lists 6 approved activities. The addition of the 7th activity to prepare and complete the Large Block Final Report (TDR-NBS-HS-000012) is not part of subject work package and thus an improper modification to subject TWP. This report was however prepared in FY 01 with LLNL funding (not YMP). NOTE: There is no FY 02 funding for this product either.

2) The modification to subject TWP was accomplished by an "ICN". The AP-2.21Q process for revising TWP's does not allow for revising with "ICNs".

3) An extensive review of the RISWEB does not disclose any objective evidence that subject TWP (nor Revision 0 of subject TWP) were reviewed in accordance with AP-2.21Q. No comment sheets or associated resolution of comments could be located in any record package associated with TWP-NBS-TH-000001 Revision 0 or Revision 0, ICN 1.

4) TWP-NBS-TH-000001, R-0, ICN 1 was approved on 2/12/01. The document was never submitted to Document Control as required.

7. Initiator:
Michelle Prater/K. O. Gilkerson Date 10/19/01
M. Prater K. Gilkerson

9. Does a stop work condition exist? (Not required for a DR)
☐ Yes ☒ No
If Yes, Check One: ☐ A ☐ B ☐ C ☐ D

10. Recommended Actions:
None.

11. QA Review: Christian Palay
QAR Chris Palay Date 10/19/01

12. Response Due Date:
10 Working Days From Issuance

13. DOQA Issuance Approval:
Printed Name Robert D. Davis Signature James Blink for Date 10/25/01

22. Corrective Actions Verified:
QAR Date

23. Closure Approved by:
DOQA Date

Exhibit AP-16.1Q.1
Rev. 12/20/1999

ENCLOSURE

Department of Energy
Washington, DC 20585

QA: QA

OCT 04 2001

R. L. Howard
Manager of Projects
Bechtel SAIC Company, LLC
1180 Town Center Drive, M/S 423
Las Vegas, NV 89144

ISSUANCE OF DEFICIENCY REPORT (DR) BSC-01-D-142 RESULTING FROM AN OBSERVATION BY ROCHELLE RUCINSKI

Enclosed is DR BSC-01-D-142 generated as a result of an observation.

Please provide a response to this deficiency that meets the applicable requirements of Administrative Procedure (AP) 16.1Q, *Management of Conditions Adverse to Quality*. Send the original of your responses to Deborah G. Opielowski, OQA/NQS, P.O. Box 364629, Mail Stop 455, North Las Vegas, Nevada 89036-8629. Initial response to the DR is due ten working days from the date of this letter. Any extensions to this due date must be requested in accordance with AP-16.1Q.

The Responsible Individual for this Condition Adverse to Quality (CAQ) should sign below and return to Ms. Opielowski within five working days.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Christian M. Palay at (702) 794-1486.

James Blaylock for
Robert D. Davis, Acting Director
Office of Quality Assurance

OQA:JB-0034

Enclosure:
DR BSC-01-D-142

8) On page II-6, the 4th paragraph, discusses 150 random samples of a lognormal distribution and Table II-4 is referenced. Table II-4 is for a shifted lognormal test.

9) The last paragraph on page II-6 discusses 2 distributions (not all three) and states that "As expected, both distributions provide acceptable fits to the random data (Section 6.1.3)". In sections 6.1.3 and 6.2.6, the accept/reject cutoff for chi squared is 12 for the normal and lognormal distributions and 10.6 for the shifted lognormal distribution. Looking at the chi squared values in table II-5 it appears that only the shifted lognormal distribution with a value of 9.1604 is acceptable. The other 2 chi squared values are 14.6770 (lognormal), and 25.0131 (normal). The conclusion has to change to state that only the shifted lognormal distribution provides an acceptable fit.

10) In the same paragraph discussed in 9 above, a shift of 0.32 is noted. The shift on Table II-5 is actually 4.9968.

11) On page II-7, only 2 distributions are mentioned, the normal distribution is missing ~~form~~ from the discussion. e.p. 10/04/01

12) On page IV-2, 2nd to the last line of the 1st paragraph, B4:B154 should be B4:B153.

ANL-EBS-MD-000029 Rev 00 ICN 01 (E0070)

1) The reference in attachment II to the source code listing for *chim_wt_TP.f* (attachment VI) is incorrect. The routine *chim_wt_TP.f* is not listed in attachment VI.

2) Essentially all of the cross-references to figures in the AMR are incorrect. There are two "Figure 1" figures. The first is on pages 13 and 14, and the second is on page 29. The numerous figure references on pages 25, 26, 31, 32 (in Table 7), and 36 are all incorrect.

3) On Table III-1, the Northing and Easting coordinates are reversed.

ANL-EBS-MD-000033 Rev 01 (E0100)

1) Table 3-1, the first routine listed has an incorrect name, there should be a "12" after Sd.

2) Page 22, first line, "Attachment IV" should be "Attachment II".

3) Page II-1, section II.3.1, a DTN is referenced for the "Groundwater Flow Model (GFM) V3.0". The DTN referenced is in support of the Geologic Framework Model V3.0.

Page III-2, second line, "tree" should be "three", and line 6, "as positive" should be "is positive".

5) Page IX-1, the use of "routines" (plural) appears to be incorrect since the attachment only discusses one routine.

ANL-EBS-HS-000003 Rev 00 ICN 02 (E0130)

1) Page II-1, in the code listing, under "Nomenclature for this processor", the line starting "temp (8)", 3emps should be Temps. In the same section, the last entry in the line starting "time23" should be 22.64 meters instead of 22.14 meters.

2) Page II-10, 2nd line from the top should read " for use with the no-backfill SR base case high (not low) infiltration flux -----"; also on the 5th line, "csnflow" should be csnfhigh since this version is for the high infiltration flux case.

3) Page III-1, the first line of the 2nd paragraph states that three versions of the routine maxtwp are used in the AMR. This should be six versions as six versions are documented in attachment III. The last line of the paragraph should read that all 6 routines are presented on the next 15 pages.

4) Page III-8, the text paragraph at the bottom of the page, 2nd sentence, there are not seven data columns, there are five.

5) Page III-11, the text paragraph near the middle of the page, 2nd sentence, there are not seven data columns, there are five, and the headers are shifted such that "time" is above temperature values and there is no information in the temperature column.

6) Page III-13, top of the page, 2nd sentence, the statement is made that this routine is for the high infiltration flux case. This is not correct; version 1.05 is for the low infiltration case.

7) Page III-14, the text paragraph near the middle of the page, 2nd sentence, there are not seven data columns, there are five.

8) Page IV-21, first line of text, computed should be computer.

9) Page VII-1, last paragraph, 2nd sentence, there is a reference to input files for six routines, it should be for three routines.

10) Page VIII-25, last paragraph, the second line reads "-----for both input and input files", it should indicate input and output files.

ANL-NBS-HS-000022 Rev 00 ICN 01 (S0015)

1) On the Revision Record (page 2 of the AMR), opposite "REV 00 ICN 01", it states "Initial issue: 7/26/00". It should indicate that ICN 01 was issued sometime after 8/30/00 when the document was approved.

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

ANL-WER-ME-000001 Rev 01

1) The hand calculations on Page II-7 show that 1237.87*4.448222= 55506.32 (0.00% error), but it actually equals 5506.32. Further, the spreadsheet (for Scenario 1, delta h = 3.3) uses different inputs and shows that the result is 1222.56*4.448222=5438.24.

ANL-WIS-MD-000017 Rev 00 ICN 01 (T0070)

1) Page 11, section 4, 3rd paragraph, end of the 3rd line, the period should be after "events", "and receives in" should be deleted.

2) Page 17, section 5.1.2, 4th line of "rationale", "wind speed" should be wind direction.

3) Page 22, section 5.3.5, there is no "Use in Analysis" section for this assumption.

4) Page 30, section 6.1.1, first line, "represented" should be deleted.

5) Page 33; first line after equation 5, the "is" in the middle of the line should be deleted.

6) Page 51, Table 4, 4th entry (down) on the table, "x-axis" should be y-axis.

7) Page 55, Table 5, the same mistake noted in 6 above is repeated.

8) On DTN SN0010T0502900.003, the same mistake noted in 6 and 7 above is repeated.

9) On DTN SN0010T0502900.003, the DTN indicates that it is for Rev 01 of the AMR, it should indicate Rev 00 ICN 01.

ANL-NBS-HS-000032 Rev 00 ICN 01 (U0010)

1) On page V-4, the descriptions for the files DAILY09.CTL, DAILY09.FOR, and DAILY09.EXE have been incorrectly replaced by descriptions of BLOCKR7 files.

2) On page VI-20 is an example listing of the file "30MSOIL.ASC", or so states the text at the top of the page. However, this exact same text describing the file "30MSOIL.ASC", is repeated on page VI-21 but a different file is presented below the text.

3) On page VII-12 an excerpt of the file "GEOMAP7.INP" is provided. This is the output file of GEOMAP7 that is to include updated bedrock geology. However the output file is identical to the input file "30MSITE.INP" provided on page VII-9 and no explanation is provided.

4) Similar to item 3 above, it is unclear whether the input and output files on pages VIII-7 and VIII-9 are correct file excerpts. All of the rock-type designations are "201" or "202", while a quick look at tables VII-4, VII-6, VIII-2, and VIII-4 indicates that the majority of rock-type designations are in the expected 301 to 345 range. Also, the input (GEOMAP7.INP on page VIII-7) and output (GEOMOD4.INP on page VIII-9) files are again identical, indicating that there were no modifications to the soil depth class by the routine. As it is, given the routine functions that are being documented, the excerpts provide no indication of routine function and no explanation is provided.

5) On page XII-2, the description of what the routine VEGCOV01 does (item 4) is surprising given the name of the routine and a reading of the code. Item 4 indicates that the only purpose of the routine is to change the saturated hydraulic conductivity of the Yucca Mountain Tuff, there is no mention of vegetation cover or type. It appears that what is actually changed is the rock type designation of the tuff to account for the change in welding from welded in the northern part of the area to non-welded in the south. More parameters than just hydraulic conductivity will change with the rock type, but table XII-1 demonstrates that the rock type was changed correctly. Though not mentioned at all in the attachment text, the routine also does add terms for vegetation cover and type. The input file (30MGRD01.SR1 on page XII-3 contains "-99" placeholders for vegetation, and the output file (30MGRD04.SR1 on page XII-4) shows these placeholders replaced with integers (4 and 30 in several cases). The auxiliary input file "vegtyp01.xyz" listed at the top of page XII-3 is neither described nor provided in the attachment yet it apparently was used by the routine. The full functionality of the routine needs to be described and demonstrated in the attachment, and it is not.

6) On page XIII-4, item 6, the perimeter cell identifier should always be -3.

7) On page XIII-7, top of the page, third line, Attachment VII should be Attachment XII.

8) On page XIII-8, second paragraph, third line, "WATSHD20.INP" should probably be "WATSHD20.CTL".

9) On page XIII-8 an example input file (30MGRD04.SR1) is provided. This file is said to be from VEGCOV01. However the output file from VEGCOV01 (30MGRD04.SR1 on page XII-4) does not match the file on page XIII-8. The "-99" placeholder values that were changed to integers by VEGCOV01 (see comment 5 above) are here in part placeholders. The 4 and 30 in the first line for example, is now -99 and 30. An explanation as to why these file excerpts which should match but do not needs to be provided, or a correct excerpt needs to be provided if that is the problem.

10) On page XIII-9 the reference to Attachment XII in bold text should be to Attachment XI.

11) On page XV-5, the listing of electronic files at the top of the page is not complete. Files such as MAPSUM01.EXE, MAPSUM01.CTL and perhaps others need to be added to the list.

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

CAL-WIS-TH-000001 Rev 01

1) The text of attachment I on page I-26 states that for the no-backfill case "response surfaces are provide only for relatively short ventilation periods". Yet two tables are provided, Table I-5 (Response Surface Coefficients for No Backfill (long term)), and Table I-7 (Response Surface Coefficients for No Backfill (short term)). Inspection reveals that the contents of the two tables are identical.

2) Figure I-5 is indicated to be for the no backfill case according to the text on page I-31 yet the figure itself clearly indicates that backfill with a thermal conductivity of 0.20 W/m k is included.

3) The density of the backfill is assumed to be essentially the same as the intact welded tuff of the repository horizon. This is a high value for a granular material and no explanation is provided.

4) The density of the invert ballast is indicated to be much less than that of the backfill; yet the effective thermal conductivity of these materials are stated to be identical (Table I-9) and no explanation is provided.

) Table I-3 provides design basis and average factors for heat generation, drift wall temperatures, and WP temperatures. As expected the design basis is equal to or higher than the average in all cases, with the notable exception of heat generation for 24-BWR waste packages. In that case the design basis is less than one tenth of the average and no explanation is provided.

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

(Continued from Block 5 – Requirement)

Additional applicable requirements:

AP-3.12Q Rev. 0 ICN 3, Attachment 2, Section 5, requires that "The calculation shall be presented such that any qualified individual could review the calculation without recourse to the Originator."

AP-3.12Q Rev. 0 ICN 3, Section 5.2.3.a.1, requires that the checker "Check for completeness, mathematical correctness, and technical adequacy of the calculation method used."

Initiator: Rochelle Rucinski 10/3/01

Rochelle Rucinski Date

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. BSC-01-D-142

PAGE 9 OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Recommendations for BSC-01-D-142:

1. Evaluate adequacy of checkers with regards to their qualifications for technical and compliance checking.
2. Given the frequency of "editorial" errors in the description of condition for this deficiency report, BSC should consider the incorporation of a more rigorous technical editing process being made available for all future mission critical technical documents.
3. Given that an AP-3.10Q revision is currently underway , BSC should coordinate this corrective action with the revision of that procedure
4. Evaluate the errors for technical impact.

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8 ☐ Performance Report
☑ Deficiency Report

NO. LVMO-98-D-038

PAGE 1 OF 3

QA: L DS

PERFORMANCE/DEFICIENCY REPORT

6/19/98

1 Controlling Document:
Geokon Quality Assurance (QA) Manual, Revision 08/07/97

2 Related Report No.
OQA-SA-98-005

3 Responsible Organization:
CRWMS M&O/Geokon, Inc.

4 Discussed With:
Marty Gibson

5 Requirement/Measurement Criteria:

A. QA Manual, Section 1.1, states in part, "All employees are required to read and understand Geokon's Quality Policy and Manual."

B. QA Manual, Section 15.0, states in part, "It is the company's policy to hire and/or to ensure that all personnel are suitably educated, professionally qualified or experienced, or suitably skilled or experienced to fulfill responsibilities of the position that they occupy or are hired for."

Continued on Page 3

6 Description of Condition:

A. No objective evidence could be provided to support that Geokon's employees have read and understand the Geokon Quality Policy and Manual.

B. No objective evidence could be provided to reflect that personnel performing the calibrations of ambient/low temperature MPBXs and SPBXs are qualified to fulfill the responsibilities and position they occupy.

Continued on Page 3

7 Initiator
Richard L. Maudlin Date 02/04/98

9 Is condition an isolated occurrence?
☐ Yes ☐ No ☑ Unknown; Must be Yes if PR

10 Recommended Actions: (Not required for PR)

A. Take the necessary action to have all Geokon personnel read and understand the Geokon Quality Policy and Manual. Document this training. As an alternative, consider development of a training class which summarizes the QA program and indoctrinate all personnel. Document this training. Revise the QA Manual accordingly.

B. Take immediate action to train and qualify personnel, if not presently qualified, to perform calibrations of the MPBX and SPBX. Assure that documented qualifications satisfy minimum requirement as defined in the Position Description for the assigned position that the individual occupies.

Continued on Page 3

11 QA Review:
QAR Richard L. Maudlin Date 02/04/98

12 Response Due Date
20 days from issuance

13 Director, OQA Issuance Approval: (QAR for PR)
Printed Name Catherine Hampton Signature Catherine Hampton Date 2/11/98

22 Corrective Actions Verified
QAR Richard L. Maudlin Date 05/19/98

23 Closure Approved by: (N/A for PR)
OQA Catherine Hampton Date 5/29/98

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

PR/DR NO. LVMO-98-D-038
PAGE 2 OF 3 4 9
FQS 3/6/98 QA: L
FS 6/19/98

PERFORMANCE/DEFICIENCY REPORT RESPONSE

14 Remedial Actions:

See continuation page

15 Extent of Condition: (Not required for PR)

See continuation page

16 Root Cause Determination: (Not required for PR) Required: ☐ Yes ☒ No

17 Action to Preclude Recurrence: (Not required for PR) Required: ☐ Yes ☒ No

18 Corrective Action Completion Due Date:	19 Response by:
4/30/98	F.J. Schelling Date 3/6/98 Phone (505) 848-0693

20 Response Accepted	21 Response Accepted (N/A for PR)
QAR N/A Date	DOQA N/A Date

Exhibit AP-16.10.2 Rev. 06/02/97

3/10/98 Schelling & Horton

5 Requirement/Measurement Criteria: (Continued)

C. Quality Assurance Operating Procedure (QAOP) 430, Revision A, Section 6.2.10, states in part: "The document owner will assign a sequential DCR number from the DCR Logbook using the next available number, utilizing the last two digits of the calendar year .... "

D. QA Manual, Section 10.0, states in part, "The company operates a program that controls, calibrates, and maintains M&TE which can effect product quality, in compliance with the United States of America, Department of Defense, MIL-STD-45662A." MIL-STD-45662A, Section 5.9, Records, states in part, "... The records shall include an individual record of calibration or other means of control for each item of M&TE and measurement standard, providing a description or identification of the item, calibration interval, date calibrated, identification of the calibration source, calibration procedures used, calibration results, and calibration actions taken."

E. QA Manual, Section 14.0, states in part, "The company performs planned and documented Internal QA audits to verify compliance with the QA Program and Quality System ... Normal time periods for a complete program audit are not to exceed one year."

6 Description of Condition: (Continued)

C. To date, Geokon has not instituted a DCR Logbook for tracking changes to documents other than drawings or sketches.

D. QAOP 1100, Revision: Initial, does not address requirements for the contents of Certificates of Calibration or calibration data when documenting internal Geokon calibrations.

E. To date, no documented evidence could be provided to reflect a complete program audit of the Geokon QA Program has been performed.

10 Recommended Actions: (Continued)

C. Take action to develop a DCR Logbook and implement this log in tracking changes to documents other than drawings and sketches. An alternative may be to just use the Engineering Change Notice system for documenting all changes to all documents, including procedures.

D. Revise QAOP 1100 to address content of Certificates of Calibration or calibration data, which consist of MIL-STD-45662A or ANSI/NCSL Z540-1, 1994.

E. Implement your documented audit plan to assure that the entire QA Program is audited in FY98.

14 Remedial Action (Continued)

1. A revision to the Geokon Quality Policy and Manual is being processed to replace the "read and understand" requirement with new employee training, which is implemented by QAOP1800. The revised manual is expected to be released by mid-April 1998. A training plan was prepared and all employees hired since June, 1996 were trained to it, as documented by training records.
2. A position description has been developed to establish minimum qualifications for any new hires for this type of work and documentation of calibration personnel being trained and qualified to perform the task is maintained. At the present time, an extensive "hands-on" training program has been completed by the individual calibrating vibrating wire transducers for YMP SPBX and MPBX instrumentation. This individual was hired prior to the establishment of qualifications for new hires, but has considerable experience in performing this work and is considered qualified for the position.
3. QAOP430 is being revised to eliminate the DCR Logbook and document changes using the Engineering Change Notice system. This revision should be completed by mid-April 1998.
4. QAOP1100 has been revised to reflect the calibration documentation requirements and is presently in review for an expected release by mid-April 1998.
5. The documented audit plan is being implemented and is being performed as scheduled. To date, one internal audit has been done and is being closed, and two are scheduled to be performed in February, 1998.

15 Extent of Condition (Continued)

1. The draft Geokon Quality Policy and Manual which contained the "read and understand" requirement has been replaced by one that requires personnel to be aware of and work to the quality program. An implementing document, QAOP 1800, has been released which implements training and includes using the Quality Manual as a guide.
2. The qualification and training status of the four technicians was evaluated, and it has been determined that these individuals are adequately qualified on the basis of their experience and/or education, and trained for their assignments. The qualifications of the individual performing the YMP calibrations, for example, include a Bachelor degree, ten years of related experience, and several years of on-the-job training and experience in calibration. The Job descriptions maintained by the Geokon Human Resources organization are used as a guide for posting openings, but should not be interpreted as minimum standards to perform the work.
3. It was determined that an Engineering Change Notice (ECN) is the standard practice at Geokon for tracking document changes. QAOP 430 is therefore being revised to replace the DCR Log with ECNs.
4. Geokon is in the process of finalizing their implementation of an ANSI Z540 program. With respect to the content of calibration certificates, their intention is to solicit feedback on content requirements from known customers and develop an updated standard certificate for the purposes of efficiency and cost savings.
5. An investigation showed that the lack of internal audits also results from Geokon being in the final stages of implementing the ANSI Z 540 program; audit procedures have been written, audit personnel qualified, and the first program audit is currently in process.

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

PR/DR NO. LVMO-98-D-038
PAGE 25 OF 349
FQS 3/16/98 QA: L
DS 6/19/98

PERFORMANCE/DEFICIENCY REPORT RESPONSE

14 Remedial Actions:

See continuation page

15 Extent of Condition: (Not required for PR)

See continuation page

16 Root Cause Determination: (Not required for PR) Required: ☐ Yes ☒ No

17 Action to Preclude Recurrence: (Not required for PR) Required: ☐ Yes ☒ No

18 Corrective Action Completion Due Date:	19 Response by:		
4/30/98	F.J. Schelling	Date 3/16/98	Phone (505) 848-0693
20 Response Accepted QAR [signature] Date 04/07/98	21 Response Accepted (N/A for PR) DOQA R.W. Carp	Date 4/7/98	

Exhibit AP-16.1Q.2 Rev. 06/02/97

5 Requirement/Measurement Criteria: (Continued)

C. Quality Assurance Operating Procedure (QAOP) 430, Revision A, Section 6.2.10, states in part: "The document owner will assign a sequential DCR number from the DCR Logbook using the next available number, utilizing the last two digits of the calendar year .... "

D. QA Manual, Section 10.0, states in part, "The company operates a program that controls, calibrates, and maintains M&TE which can effect product quality, in compliance with the United States of America, Department of Defense, MIL-STD-45662A." MIL-STD-45662A, Section 5.9, Records, states in part, "... The records shall include an individual record of calibration or other means of control for each item of M&TE and measurement standard, providing a description or identification of the item, calibration interval, date calibrated, identification of the calibration source, calibration procedures used, calibration results, and calibration actions taken."

E. QA Manual, Section 14.0, states in part, "The company performs planned and documented Internal QA audits to verify compliance with the QA Program and Quality System ... Normal time periods for a complete program audit are not to exceed one year."

6 Description of Condition: (Continued)

C. To date, Geokon has not instituted a DCR Logbook for tracking changes to documents other than drawings or sketches.

D. QAOP 1100, Revision: Initial, does not address requirements for the contents of Certificates of Calibration or calibration data when documenting internal Geokon calibrations.

E. To date, no documented evidence could be provided to reflect a complete program audit of the Geokon QA Program has been performed.

10 Recommended Actions: (Continued)

C. Take action to develop a DCR Logbook and implement this log in tracking changes to documents other than drawings and sketches. An alternative may be to just use the Engineering Change Notice system for documenting all changes to all documents, including procedures.

D. Revise QAOP 1100 to address content of Certificates of Calibration or calibration data, which consist of MIL-STD-45662A or ANSI/NCSL Z540-1, 1994.

E. Implement your documented audit plan to assure that the entire QA Program is audited in FY98.

14 Remedial Action (Continued)

1. A revision to the Geokon Quality Policy and Manual is being processed to replace the "read and understand" requirement with new employee training, which is implemented by QAOP1800. The revised manual is expected to be released by mid-April 1998. A training plan was prepared and all employees hired since June, 1996 were trained to it, as documented by training records.
2. A position description has been developed to establish minimum qualifications for any new hires for this type of work and documentation of calibration personnel being trained and qualified to perform the task is maintained. At the present time, an extensive "hands-on" training program has been completed by the individual calibrating vibrating wire transducers for YMP SPBX and MPBX instrumentation. This individual was hired prior to the establishment of qualifications for new hires, but has considerable experience in performing this work and is considered qualified for the position.
3. QAOP430 is being revised to eliminate the DCR Logbook and document changes using the Engineering Change Notice system. This revision should be completed by mid-April 1998.
4. QAOP1100 has been revised to reflect the calibration documentation requirements and is presently in review for an expected release by mid-April 1998.
5. The documented audit plan is being implemented and is being performed as scheduled. To date, one internal audit has been done and is being closed, and two are scheduled to be performed in February, 1998.

15 Extent of Condition (Continued)

1. The draft Geokon Quality Policy and Manual which contained the "read and understand" requirement has been replaced by one that requires personnel to be aware of and work to the quality program. An implementing document, QAOP 1800, has been released which implements training and includes using the Quality Manual as a guide.
2. The qualification and training status of the four technicians was evaluated, and it has been determined that these individuals are adequately qualified on the basis of their experience and/or education, and trained for their assignments. The qualifications of the individual performing the YMP calibrations, for example, include a Bachelor degree, ten years of related experience, and several years of on-the-job training and experience in calibration. The Job descriptions maintained by the Geokon Human Resources organization are used as a guide for posting openings, but should not be interpreted as minimum standards to perform the work.
3. It was determined that an Engineering Change Notice (ECN) is the standard practice at Geokon for tracking document changes. QAOP 430 is therefore being revised to replace the DCR Log with ECNs.
4. Geokon is in the process of finalizing their implementation of an ANSI Z540 program. With respect to the content of calibration certificates, their intention is to solicit feedback on content requirements from known customers and develop an updated standard certificate for the purposes of efficiency and cost savings.
5. An investigation showed that the lack of internal audits also results from Geokon being in the final stages of implementing the ANSI Z 540 program; audit procedures have been written, audit personnel qualified, and the first program audit is currently in process.

PR/DR CONTINUATION PAGE

VERIFICATION OF CORRECTIVE ACTION AND CLOSURE OF DEFICIENCY REPORT (DR) LVMO-98-D-038

On May 19, 1998, a follow-up verification was performed to verify implementation of corrective action to DR LVMO-98-D-038. This follow-up verification is based on a review of documentation provided by Geokon, Inc. as follows:

A. A review the current approved Geokon Quality Assurance Manual, Training Plan for New Hires (TP-QAPROG) and Geokon Memorandum dated 02/04/98 revealed that training to the QA Program for Geokon personnel involved in Yucca Mountain Site Characterization Project activities has been completed and documentation supports compliance with the Geokon Quality Assurance Manual. Implementation of corrective action is considered satisfactory.

B. Reviewed documentation, (i.e.; Employee Training Record dated 02/05/98, Employee Qualification Investigation dated 04/07/98, Geokon, Inc. Job Description for Calibration Technician, and the Summary of Qualifications) supporting the qualification of the Geokon individual responsible for the calibration of the Vibrating Wire Transducers for the Model 4400. The results of the review, along with the on-the-job training indicate that the responsible calibration technician satisfies the Job Description requirements. Implementation of corrective action is considered satisfactory.

C. A review of Geokon procedure QAOP 430, "Document Change Request/Order Procedure", Revision A, approved 04/07/98, revealed that the requirement for the maintenance of a Document Change Request (DCR) Log has been deleted. Changes to both engineering and non-engineering documents will be maintained through the Engineering Change Request (ECR) logbook. Implementation of corrective action is considered satisfactory.

D. A review of Geokon procedure QAOP 1100, "Control of Inspection, Measuring, and Test Equipment", Revision B, approved 02/24/98, identified requirements for the content of Certificates of Calibration. Implementation of corrective action is considered satisfactory.

E. A review of the Geokon FY1998 Internal Audit Schedule and two internal audit reports, (I-1980306 and I-2980313), support that Geokon is implementing its internal audit program as required by the Geokon QA Manual. Future audits/surveillances of Geokon will monitor continued compliance with the Geokon internal audit schedule.

Based on the documented evidence provided by Geokon and the above verification results, this DR is considered closed.

Richard L. Maudlin 05/19/98
Richard L. Maudlin, QAR

RADIOACTIVE WASTE MAN[illegible]MENT
U.S. DEPARTMENT OF E[illegible]RGY
WASHINGTON, D.C.

DEFICIENCY DOCUMENT SUMMARY SHEET

	Date	Letter Reference
Issuance Letter/Memo	2/11/98	OQA:JB-0919
Response Extension Request	N/A	N/A
Acceptance	↓	↓
Response Received	3/16/98	Schellingto Horton
Acceptance	~~3/23/98~~ DP 4/14/98 4/8/98	OQA-JB-1382
Request Amended Response	N/A	N/A
Response	↓	↓
Acceptance	↓	↓
C/A Extension Request	↓	↓
Acceptance	↓	↓
C/A Extension Request	↓	↓
Acceptance	↓	↓
Unsatisfactory Verification	↓	↓
Response	↓	↓
Acceptance	↓	↓
Closure Letter	6/2/98	OQA:JB-1858
Other	N/A	

ORIGINAL
THIS IS A RED STAMP

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.

8. ☑ DEFICIENCY REPORT
☐ CORRECTIVE ACTION REPORT
NO. LVMO-00-D-119
PAGE 1 OF 3
QA: ~~N~~ QA
8/3/00

DEFICIENCY/CORRECTIVE ACTION REPORT

1. Controlling Document:	2. Related Report No.:
AP-3.10Q, Rev. 2, ICN 2	Audit Report M&O-ARP-00-13
3. Responsible Organization:	**4. Discussed With:**
CRWMS M&O	Robert Andrews, Rob Howard

5. Requirement:
AP-3.10Q, Rev. 2, ICN 2, Para. 5.3 a) states in part, "The appropriate level of confidence for a model shall be determined based on the intended use of the model and the importance of the model for assessing post-closure system performance."
AP-3.10Q, Rev. 2, ICN 2, Para. 5.3 b) states in part, "The criteria used to evaluate the appropriateness and adequacy of the model for its intended use may be qualitative or quantitative but must be justified in the model documentation."
AP-3.10Q, Rev. 2, ICN 2, Attachment 1, Section 6, states in part ," For model validation, include the validation criteria and methods for conducting model validation, the specific tests to be conducted, and the results of those tests (or results of alternative validation method)."
AP-3.10Q, Rev. 2, ICN 2, Para 5.3 c), states in part, "If data from sources such as those identified in Paragraph 5.3b) are not available to support validation of the model, utilize or document an alternative approach."

6. Description of Condition:
The TSPA-SR Model is supported by twenty-six (26) abstraction-level Analysis and Model Reports (AMR). A sampling of the AMRs shows that validation (confidence building) is not in all cases documented in accordance with AP-3.10Q. The following are examples of AMRs that do not address/adequately address model validation/confidence building; i.e., validation criteria and methods, tests conducted, and results are not documented within the AMRs; nor is an alternative approach suggested when validation is impractical based on lack of available data to support validation.

a) ANL-EBS-PA-000001, Rev. 00, "WAPDEG Analysis of Waste Package and Drip Shield Degradation" (W0050) (Validation criteria were not documented. Model validation is not addressed. Based on discussion with the AMR author, this model may require an alternative approach to validation ; e.g., peer review.)
b) ANL-WIS-MD-000010, Rev. 00, "Summary of Dissolved Concentration Limits" (F0095) (Validation criteria were not documented. Model validation is not addressed. Based on discussion with the author, progress is being made toward validation in Rev. 01.)
c) ANL-NBS-HS-000026, Rev. 00, "Particle tracking Model and Abstraction of Transport Processes" (U0065) (Validation criteria were not documented. The AMR discussed verification but not validation.) (Continued on P.3)

7. Initiator:	9. Does a stop work condition exist? (Not required for a DR)
Kristi A. Hodges / F. Harvey Dove Kristi A. Hodges/Harvey Dove Date 8/3/00	☐ Yes ☑ No If Yes, Check One: ☐ A ☐ B ☐ C ☐ D

10. Recommended Actions:
Review the 26 abstraction-level AMRs to identify additional AMRs that do not address/adequately address model validation requirements.
Determine which AMRs are currently being revised, or are prioritized for revision.
Ensure that the AMR revision includes or enhances the model validation section (Section 6).
Review the various punchlists to determine the status of the process-level AMRs that were identified as requiring revision/ICN per CAR-010.
For models that are deemed problematic/difficult to validate, consider alternative methods as indicated in Para. 5.3c).

11. QA Review:	12. Response Due Date:
Kristi A. Hodges 8/8/00 QAR Kristi A. Hodges Date	10 working days from issuance

13. DOQA Issuance Approval:
Printed Name Robert W. Clark Signature R.W. Clark Date 8/21/00

22. Corrective Actions Verified	23. Closure Approved by:
QAR Date	DOQA Date

Exhibit AP-16.1Q.1 Rev. 12/20/1999

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☑ DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-119
PAGE 3 OF 3
QA: L QA-N/A 8/3/02

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Block 6 (Continued)

In addition, the approach to building confidence in the TSPA-SR model (in draft) is to rely upon the validation of the supporting process and/or abstraction-level AMRs. Because the TSPA-SR model is an AMR, and validation of the process/abstraction-level models does not address validation as a system, the requirements of AP-3.10Q for validation also apply to that system-level model. Appropriate confidence based on documented qualitative/quantitative criteria, validation methods, specific tests, and results of those tests, or an alternative validation approach when sufficient data are not available is required . There are differing perceptions of what constitutes model validation, and validation at all levels (process/abstraction/system) can be problematic; however, AP-3.10Q requires validation to be addressed prior to document approval, regardless of model level and/or complexity of the validation.

Corrective Action Report (CAR) LVMO-98-C-010 (CAR-010) addressed inadequate procedure for model/analysis development and documentation, however, it was expanded to address model validation. The CAR was closed when AP-3.10Q was revised, training occurred, and impacted AMRs, developed prior to February 25, 2000, were identified and evaluated. Based on the evaluation, 19 process-level AMRs were determined to require revision/ICN to address model validation issues. These AMRs are being tracked on a punchlist pending AMR revision/ICN. Corrective action for this DR should include an evaluation of the status of the 19 AMRs and a path forward for removing them from the punchlist status. Note that CAR-010 focused on establishing a process for model/analysis development however, this DR documents deficiencies in implementation of the AP-3.10Q process.

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

DIR 00-21

QA: QA

DEFICIENCY IDENTIFICATION AND REFERRAL

Date:	DR/CAR Referred to:
9/6/00	DR LVMO-00-D-119

Description of Deficiency:

AMR U0100 (Unsaturated Zone and Saturated Zone Transport Properties) is used to predict the transport of radionuclides through the unsaturated zone (UZ). A UZ Transport Test will confirm the predictions using field measurements. The model validation section confuses code qualification with model validation, and the existing text is inadequate in the following areas:

1. The text of Section 6.6.8 is directed towards code qualification and not model validation. Model validation should demonstrate that the model is appropriate and adequate for its intended use. This demonstration is not obtained by pointing to the qualification of individual parts. The demonstration that the model is appropriate and adequate for its intended use is to exercise the model (make predictions) and show that the predictions agree (within specified tolerances) with measured values.

2. While briefly referring to Phase-1A predictions and a Phase-2 model, the author does not present any staged plan over time for model validation in sufficient detail to build any confidence in the intended validation process. Because there appears to be a timed process associated with validating this model, a validation plan needs to be presented that clearly defines the phases, objectives of the phases, and specific model evaluation criteria.

3. Criteria are not established to compare the predictions with the measured data in terms of concentration tolerances, breakthrough-time intervals, and tracer-recovery percentages. For model credibility purposes, the criteria used to evaluate the appropriateness and adequacy of the model need to be established, up front, before the comparisons between predictions and measured data are performed.

Note that F. Harvey Dove assisted in the technical evaluation of this AMR.

How Identified:

During verification of DR LVMO-00-D-046, it was determined that the completed corrective action was not adequate to address model validation requirements. DR LVMO-00-D-119 applies to model validation (confidence building) in all AMRs; therefore, it was determined that this deficiency document, which addresses one AMR (U0100), should be closed and referred to LVMO-00-D-119 for resolution.

Existing Open DR/CAR:
DR LVMO-00-D-119

Open DR/CAR QAR's Concurrence Kristi A. Hodges Kristi A. Hodges	Date: 9/18/00
Initiator: Kristi A. Hodges Kristi A. Hodges	Date: 9/18/00

TYPE RESPONSE:
☐ Initial
☑ Complete
☐ Amended

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

DR/CAR NO. LVMO-00-D-119
PAGE 2 OF 4

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT (RESPONSE)

14a. Immediate Actions: All PAD AMRs, including the 26 listed as feeding the TSPA model and those AMRs belonging to PA that were associated with the CAR-10 closure, will be reviewed with respect to the completeness of the documentation related to model validation and confidence building. Additionally, guidance on best business practices related to the documentation of model validation will be communicated to all PAD staff.

Compliance Date: November 15, 2000.

14. Remedial Actions: This DR and DIR 00-21, identifies four AMRs (W0050, F0095, U0100 and U0065) that fall short of adequate model validation (confidence building). These AMRs will be updated, as appropriate to include/enhance text addressing model validation (per AP-3.10Q, Section 5.3).

15. Extent of Condition: Many of PAD's AMRs are currently being revised to incorporate design changes and to address data qualification issues and as much as possible, address the issues listed in internal self-assessments (SA-PA-2000-005). Below is a list of AMRs that are not undergoing revision that have been identified as having potential validation issues.

ANL-NBS-MD-000006 Groundwater Usage by the Proposed Farming Community

ANL-EBS-MD-000039 Seepage Backfill Interactions

ANL-EBS-MD-000040 In-Drift Gas Flux & Composition

ANL-EBS-MD-000044 Seepage Invert Interactions

ANL-NBS-HS-000022 Modeling Sub Gridlock Scale Dispersion in Three Dimensional Heterogeneous Fractured Media

ANL-EBS-MD-000028 Water Diversion Model

ANL-EBS-MD-000029 Water Drainage (see continuation page).

Cause: (Attach results of root cause determination prepared in accordance with AP-16.4Q for a significant deficiency.) AP-3.10Q does not clearly describe a process for validating models at the various model levels; i.e., conceptual, process, abstraction, and system). In addition, in some instances AMR authors are confusing software code qualification with model validation; in other instances, the model is considered too difficult and/or problematic to validate with the current requirements. .

17. Action to Preclude Recurrence: For AMRs prepared by the Performance Assessment Department that are undergoing ICN or revision, the AMRs will be subjected to an AP-2.14Q review that includes an OQA (QATSS) reviewer. For the AMRs identified above that are not being changed in the current budget cycle, there are no impacts to TSPA.

AP-3.10Q will be revised to facilitate the model validation process so that it includes modifications for conceptual models, abstraction models, and system- and subsystem-level models. Some possible actions to accomplish the development and implementation of a defensible and reasonable procedure revision include a) creating a small working group with representatives from the interested parties, b) reviewing defensible validation efforts of system and subsystem models and c) discussing the issue with NRC during the upcoming technical exchange on the TSPAI IRSR (Currently planned for February 2001).

Closure of this DR will be complete upon revision/change of PA AMRs (ETC December 14, 2000), QA verification of adequate model validation in the currently planned revisions/changes and a revision to AP-3.10Q to add additional model validation criteria (ETC April 15, 2001).

18. Due Date: April 30 , 2001
☐ For submittal of complete response
☑ For completion of corrective action

19. Response by:
Robert W. Andrews
Date Oct 20, 2000
Phone 295-5549

20. Evaluation: ☑ Accept ☐ Partially Accept ☐ Reject
QAR Kristi A. Hodges Date 10/25/00

21. Concurrence:
DOQA James Blaylock Date 11/2/00

Exhibit AP-16.1Q.1 Rev. 12/20/1999

10/23/00 LV.PA.RWA.10/00-180

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

15. Extent of Condition: Continuation

There is no impact to TSPA-SR from any potential model validation issues associated with these seven AMRs based on the following:

The Groundwater Usage by the Proposed Farming Community AMR is not a model and does not need to be revised. It has used parameters and assumptions consistent with guidance provided in the proposed 10 CFR Part 63.

The Seepage Backfill Interactions AMR is no longer relevant based on current design requirements which do not include backfill.

The appropriateness of the In-Drift Gas Flux & Composition and Seepage Invert Interactions AMRs will either be addressed in the next ICN or revision or they will be eventually merged with the Physical and Chemical Environment Abstraction Model as they are not directly used in TSPA.

The three last AMRs identified above were part of the CAR 10 closure activity and are not being revised. There is no impact to TSPA as the TSPA model does not use these 3 AMRs as input.

In light of the recommended actions, a review of the current requirements for model validation in AP-3.10Q limits alternative methodologies for model validation. For example, system- and subsystem-level models are difficult to validate using the comparative requirements (e.g. comparison to lab, *in situ*, field, or natural analog data) that are applied to process models. Other alternatives need to be considered in order to take credit for the extent of technical review that goes along with the development and implementation of integrating models such as the TSPA model. Subjecting system-level models to such reviews enhances the validity or confidence of these models.

In addition to the issues associated with integrating models (such as system- or subsystem-level models), other issues deal with how conceptual models are validated. Appropriate alternatives for validating conceptual models are not present in AP-3.10Q.

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☐DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-119

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Request for Extended Processing

A significant integration is required to assure appropriate procedure changes to address the model validation issue on integrated models and system models as well as conceptual models

The immediate actions is expected to be completed on schedule.
The remedial actions are underway and are expected to be completed by the end of November depending on Volume 3 of the SRCR actions.
The first action to preclude will occur as part of the ongoing revisions of AMR products in the coming weeks. The second, and most significant action to preclude will occupy most of the time and energy and require the integration mentioned above.

There is no impact of the added time, as this issue is viewed as a licensing issue, not an SR issue.

R. W. Andrews

Robert Andrews

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-119

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

APPROVAL SIGNATURES FOR REQUEST FOR EXTENDED PROCESSING FOR LVMO-00-D-119

DOE Project Manager for — Date 1/25/01

Director, Office of Quality Assurance — Date 12/14/00

APPROVAL SIGNATURE FOR REQUEST FOR EXTENDED PROCESSING GREATER THAN 365 DAYS FOR N/A

N/A
Director of OCRWM — Date N/A

TYPE RESPONSE:
☐ Initial
☐ Complete
☑ Amended

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

DR/CAR NO. LVMC-00-D-119
PAGE 2 OF 3
5/1/01 QA: L QA
Rwb 5/1/01

DEFICIENCY/CORRECTIVE ACTION REPORT (RESPONSE)

14a. Immediate Actions:
Same as 10/20/2000 Response

Compliance Date:

14. Remedial Actions:
Same as 10/20/2000 Response

15. Extent of Condition:
A recently completed Suspect Trend Investigation has resulted in the issue of model validation being raised to the level of a CAR. A pending CAR (BSC-01-C-001) is being reviewed by the Office of Quality Assurance. Assuming this CAR is approved, the BSC intent is to consolidate all open model validation related DRs into the CAR, necessitating a more thorough review of the extent of condition in accordance with the CAR response.

16. Cause: (Attach results of root cause detemination prepared in accordance with AP-16.4Q for a significant deficiency.)
Same as 10/20/2000 Response

17. Action to Preclude Recurrence:
Same as 10/20/2000 Response. Note that additional actions to preclude may result due to the actions associated with the pending CAR BSC-01-C-001, which may also include an evaluation of the requiements for model validation in the QA Requirements and Description Document.

18. Due Date: July 31, 2001
☐ For submittal of complete response
☒ For completion of corrective action

19. Response by: RP RWAndrews 5/1/01
Robert Andrews Date 5/1/01 Phone 5-5549

20. Evaluation: ☑ Accept ☐ Partially Accept ☐ Reject
QAR Kristen A. Hodgson Date 5/4/01

21. Concurrence:
DOQA James Blaylock for Date 5/8/01

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☑ DR/CAR
☐ Stop Work Order
5/31/01
NO. LVMO-CO-D-119
PAGE 3 OF 3
QA: K QA 5/31/01

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Request for Extended Processing

Developing the licensing-based definitions and appropriate implementation process for "model validation" by BSC for application in scientific investigations documentation involves coordination between numerous affected organizations. In addition, a Pending Corrective Action Request (BSC-01-C-001) is expected to significantly modify the scope of the actions to preclude recurrence for this deficiency. Once BSC management receives and has reviewed the above referenced CAR on this subject, a position as to the disposition of this deficiency and associated actions will be developed. This is expected to require a different approach than the original activity planned by the previous M&O contractor.

There is no impact of the added time required for closure, as this issue is viewed as involving the documentation to be submitted as part of the License Application, not a Site Recommendation issue.

Robert W. Andrews

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-119

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

APPROVAL SIGNATURES FOR REQUEST FOR EXTENDED PROCESSING FOR
LVMO-00-D-119

[signature] 5/30/01

DOE Project Manager Date

R.W. Clark 5/14/01

Director, Office of Quality Assurance Date

APPROVAL SIGNATURE FOR REQUEST FOR EXTENDED PROCESSING GREATER THAN 365 DAYS FOR N/A

N/A N/A

Director of OCRWM Date

TYPE RESPONSE:
☐ Initial
☒ Complete
☒ Amended

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.

DR/CAR NO.
LVMO-00-D-119
PAGE OF
QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT (RESPONSE)

14a. Immediate Actions:

The following supercedes the 1 May 2001 response in entirety.

The Extent of Condition investigation discussed in Block 15 below will be performed in lieu of any previously planned reviews.

Completion Date: 8 August 2001

14. Remedial Actions:

The following supercedes the 1 May 2001 response in entirety.

Following identification of the models where the existing documentation does not establish sufficient confidence with the suitability of the model (Bin 3 in the Extent of Condition review below), either an impact assessment will be performed or model validation/confidence building documentation will be prepared and issued.

15. Extent of Condition:

The following supercedes the 1 May 2001 response in entirety.

A systematic review will be performed of all Analysis and Model Reports (AMRs) by an independent team under the direction of a senior scientist with oversight by the BSC Chief Science Officer. The review will include the following actions:

- Identification of all AMRs, including analyses, that contain models

See Continuation Page

16. Cause: (Attach results of root cause determination prepared in accordance with AP-16.4Q for a significant deficiency.)

Same as 20 October 2000 response.

17. Action to Preclude Recurrence:

The following supercedes the 1 May 2001 response in entirety.

AP-3.10Q – *Analyses and Models* will be revised to make the procedure specific to scientific modeling. The procedure will be revised to include the following:

- Simplification/clarification of the model validation requirements and techniques, including removal of any overly prescriptive requirements

See Continuation Page

18. Due Date: 10 October 2001
☐ For submittal of complete response
☒ For completion of corrective action (all actions are complete)

19. Response by: William W. Watson
William W. Watson
Date: June 12, 2001 Phone: 5-5550

20. Evaluation: ☐ Accept ☒ Partially Accept ☐ Reject
QAR J. Harvey Dove Date 06/28/01

21. Concurrence:
DOQA James Blaylock for Date 9/7/01

Exhibit AP-16.1Q.1 Rev. 12/20/1999

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-119

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Block 15 (cont.) Extent of Condition

- Assignment of a unique identification (short text description) for each model identified
- Determination of which models were adequately validated in accordance with the AP-3.10Q, Rev. 2, ICN 3 (Bin 1)
- Determination of models where existing documentation, although not necessarily within the AMR, results in adequate confidence of the suitability of the model per the intent of AP-3.10Q (Bin 2)
- Determination of models for which existing documentation does not provide sufficient confidence of the suitability of the model per the intent of AP-3.10Q (Bin 3)

This review will be completed by 8 August 2001.

Work was initiated by BSC Science & Analysis Project and Quality Engineering personnel to identify all AMRs, including analyses AMRs, that contain models, and determine which models were adequately validated in accordance with the current version of AP-3.10Q. This effort was completed on 5 June 2001 and is being incorporated into the above review.

Following identification of the models where the existing documentation does not establish sufficient confidence in the adequacy of the model (Bin 3), either an impact assessment will be performed or model validation/confidence building documentation will be prepared and issued.

Block 17 (cont.) Action to Preclude Recurrence

- Requirement for a stand-alone section in the AMR as the sole place model validation is documented
- Requirement that, for any AMR containing a model, BSC QE must be a mandatory AP-2.14Q reviewer

Concurrent with the AP-3.10Q revision, the Chief Science Office has initiated the development of the Scientific Processes Guidance Manual to be used by all project staff performing scientific activities. The Guidance Manual will provide additional clarification and guidance on model validation techniques to model developers and AMR authors to ensure that the requirements of AP-3.10Q will be met.

Following completion of the revision of AP-3.10Q and the issue of the Guidance Manual, training in model validation techniques will be given to all personnel performing scientific activities involving model development and validation. The training will include the availability of assistance in model validation methods and techniques to be provided by the Chief Science Office as noted below.

As a further enhancement of the model validation effort, the BSC Chief Science Office will provide assistance in model validation to personnel performing scientific activities involving model development and validation. This assistance will be provided by senior scientists, with expertise in model validation methods and techniques, who are not involved with the development of the subject model(s). The assistance will include, as appropriate, meetings with AMR authors to assist in planning model validation and review of in-process work on model validation.

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-119

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Request for Extended Processing

Reason:
The revision of AP-3.10Q specific to scientific activities and the development of the Scientific Processes Guidance Manual has been initiated by the Chief Science Office. A detailed schedule of activities has been developed to ensure that numerous interviews with personnel involved in preparation of AMR documentation are completed as part of this work. The schedule includes time for the development of the procedure revision and the guidance manual such that internal consistency is assured. In addition, sufficient time has been allowed for development of the combined training, as well as the training itself. The scheduled activities result in the date of 10 October 2001 for completion of the corrective action.

Impact:
There is no impact as a result of the extended processing time since the review and impact assessment/additional validation documentation effort discussed in Block 15 will assure that any inadequate model validation documentation is corrected. During the period between completion of the review and completion of training, any new models documented in an AMR will be validated to the existing version of AP-3.10Q.

Dr. Robert W. Andrews, Science and Analysis Project Manager

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-119

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

APPROVAL SIGNATURES FOR REQUEST FOR EXTENDED PROCESSING FOR DR LVMO-00-D-119

DOE Project Manager for — Date 7/19/01

Director, Office of Quality Assurance — Date 7/10/01

APPROVAL SIGNATURE FOR REQUEST FOR EXTENDED PROCESSING GREATER THAN 365 DAYS FOR DR LVMO-00-D-119

Director of OCRWM — Date

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-119

PAGE 1 OF 1

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Block 20 (Cont'd) Evaluation

Accept amended response (dated June 12) with the following condition noted:

1. In Block 15, first paragraph, bullet four:

   The inadequate documentation identified in Bin 2 will be brought into conformance with the validation requirements of AP-3.10Q during the next scheduled revision to each AMR.

   T. Harvey Doe 06-27-01

TYPE RESPONSE:
☐ Initial
☒ Complete
☒ Amended

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.

DR/CAR NO.
LVMO-00-D-119
PAGE OF
QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT (RESPONSE)

14a. Immediate Actions:

Same as 12 June 2001 response.

14. Remedial Actions:

Same as 12 June 2001 response.

15. Extent of Condition:

Same as 12 June 2001 response.

16. Cause: (Attach results of root cause determination prepared in accordance with AP-16.4Q for a significant deficiency.)

Same as 12 June 2001 response.

17. Action to Preclude Recurrence:

The following revises the 12 June 2001 response.

Revise the last paragraph to read as follows:

As a further enhancement of the model validation effort, the BSC Chief Science Office (CSO) will identify CSO staff scientist(s) that will provide assistance in model validation to personnel performing scientific activities involving model development and validation. The CSO staff senior scientist(s) will have expertise in model validation methods and techniques. The assistance will include, as appropriate, meetings with AMR authors to assist in planning model validation and review of in-process work on model validation.

Originator 10/10/01

18. Due Date: 30 ~~November~~ 2001
☐ For submittal of complete response
☒ For completion of corrective action (all actions are complete)

19. Response by: William W. Watson
Date: 5 October 2001 Phone: 5-5550

20. Evaluation: ☒ Accept ☐ Partially Accept ☐ Reject
QAR J. Harvey Done Date 10/17/01

21. Concurrence:
DOQA James Blaylock Date 10/18/01

Exhibit AP-16.1Q.1 Rev. 12/20/1999

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00D-119

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

REQUEST FOR EXTENDED PROCESSING

Extended Actions: (Identify those corrective actions planned for completion beyond 100 days from issuance of the deficiency)

The following actions will require additional time to complete:

1. Completion of the new procedure AP-SIII.10Q that replaces AP-3.10Q
2. Development of the training program & actual training (requires #1 above)
3. Finalization of the Guidance Manual (also requires #1 above)

Expected Completion Date: 30 November 2001

Justification: (Provide an explanation as to why the required actions can not be completed within 100 days)

The mandatory comment resolution process involved a number of comments that required dispute resolution to proceed. The extent and nature of the comments lead to the decision to require a tabletop walk-through of the procedure before finalization. This walk-through will enhance the model validation process by identifying any procedural steps that are subject to differing interpretations.

Impact: (Provide an impact statement to indicate what affect not completing within 100 days will have relative to waste isolation and safety, and impact on other work, if any)

There will be no impact to waste isolation and safety since the models that will be used for a potential future license application will comply with the revised procedure. No impact on other work exists since no final license application AMRs are scheduled to be completed by 30 November 2001.

Approvals Manager ~~Individual~~ 10/9/01

Responsible ~~Individual~~:			Senior Management:		
Robert W. Andrews	RWA	10/9/01	Nancy Williams	NAWilliams	10/9/01
Printed Name	Signature	Date	Printed Name	Signature	Date
DOE Project Management:			Director, OQA:		
Printed Name	Signature	Date	Printed Name	Signature	Date

Director, OCRWM (required for scheduled completion dates one year or more from initial issue)

Printed Name	Signature	Date

ORIGINAL
~~THIS IS A RED STAMP~~

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☑ DEFICIENCY REPORT
☐ CORRECTIVE ACTION REPORT
NO. LVMO-00-D-118
PAGE 1 OF 4
QA: L QA

8/3/00

DEFICIENCY/CORRECTIVE ACTION REPORT

1. Controlling Document:	2. Related Report No.:
QARD, DOE/RW-0333P, Rev. 10	M&O-ARP-00-13
3. Responsible Organization:	**4. Discussed With:**
CRWMS M&O	Robert Andrews, Rob Howard

5. Requirement:
QARD, Rev. 10, Supplement III.2.6B. states, "Documentation shall be transparent and identify principal lines of investigation considered."

6. Description of Condition:
The rational for exclusion (documentation of consideration) of uncertainties, assumptions, and alternative conceptual models contained in the process-level Analysis and Model Reports (AMR) is not being documented. Therefore, it is not transparent in the documentation whether these uncertainties, assumptions, and/or alternative conceptual models were considered while developing the abstraction-level AMRs that directly feed the TSPA-SR model.

There is no established project approach to "roll up" relevant assumptions, uncertainties, and alternative conceptual models to higher-level documents; i.e., abstraction-level AMRs; nor is there an established approach for dispositioning assumptions, uncertainties, and alternative conceptual models contained within process-level AMRs that were considered but not used for the TSPA-SR. Project requirement documents and procedures do not specify this level of detail; however, it is imperative that there be an integrated approach that ensures defensibility of decisions made during the abstraction process; one that ensures consistency within/between AMR families (e.g., WP, UZ) , and an overall approach that ensures consistency within/between the abstraction-level AMRs that are direct inputs to the TSPA-SR model.

(Continued on Page 3)

7. Initiator:	9. Does a stop work condition exist? (Not required for a DR)
Kristi A. Hodges/Harvey Dove Date 8/3/00	☐ Yes ☑ No If Yes, Check One: ☐ A ☐ B ☐ C ☐ D

10. Recommended Actions:
Revise AP-3.10Q to establish an integrated/transparent approach to addressing IRSRs and documenting decisions regarding assumptions, and uncertainties, alternative conceptual models. The revision should consider the use of summary tables for assumptions and alternative conceptual models drawn from supporting AMRs, particularly those associated with developed data from another model or analysis. The summary tables should also include the rationale for exclusion of less significant assumptions and less favorable conceptual models.
AP-3.10Q should be revised to include the requirement to discuss the effects of alternative conceptual models, assumptions, and uncertainties in the AMR results when the analysis or model uses associated TBVdata as input.

11. QA Review:	12. Response Due Date:
QAR F. Harvey Dove Date 8/8/00	10 working days from issuance

21. DOQA Issuance Approval:		
Printed Name Robert W. Clark	Signature R.W. Clark	Date 8/21/00

22. Corrective Actions Verified	23. Closure Approved by:
QAR Date	DOQA Date

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Examples of documentation that is not transparent/does not identify principal lines of investigation considered:

Uncertainty/variability: Recommended uncertainty and variability values that are specified in process-level AMRs were not used in abstraction-level AMR ANL-EBS-PA-000001, "WAPDEG Analysis of Waste Package and Drip Shield Degradation," Rev. 00 (W0050). Regardless of the appropriateness of selected values, the evidence of consideration and/or rational for deviating from the recommended uncertainty/variability values was not documented within W0050. A rationale for the change is needed for traceability and transparency. Examples are included in the attached table (Uncertainty & Variability Values).

Note that this AMR was not subjected to an AP-2.14Q technical review because it did not impact another organization; i.e., the AMR was developed by the PA organization for the PA organization. This exception afforded by AP-3.10Q allowed a change of uncertainty/variability values to be made without recourse to the supporting AMR author.

Assumptions: Lack of transparency of assumptions can be seen in abstraction-level AMR ANL-NBS-MD-000005 "Abstraction of Drift Seepage," Rev. 00 (U0120). The seven assumptions included in U0120 are stated to be based on the results and the six assumptions contained in process-level AMR ANL-NBS-HS-000002, "Seepage Model for PA Including Drift Collapse," Rev. 00 (U0075). The six assumptions documented in U0075 are not discussed/detailed in U0120; therefore, it is difficult to determine how the six assumptions evolved into the seven assumptions that are included in the U0120. In addition, the DTNs used in U0120 are also developed data obtained from five other process-level AMRs: U0035 (contains eight assumptions), U0080 (contains eight assumptions, U0050 (contains eleven assumptions), U0170 (contains four assumptions) & U0000 (contains six assumptions). AP-3.10Q, "Analyses and Models" does not require a roll-up or summary roll-up of assumptions; therefore, the forty-three assumptions under pinning U0120 were not acknowledged/discussed within that abstraction-level AMR.

For example, U0035, assumption eight, states, "Because of data limitations and the way data are interpreted, estimates of uncertainty cannot be directly calculated for some of the data. In these cases, an appropriate uncertainty is selected (assumed) based on the uncertainties of similar data. The specific values and the rationale for each value are documented in Sections 6.1.2." Thus, in order to determine if developed data; i.e., DTNs LB997141233129.001, LB997141233129.002, & LB997141233129.003, are carrying calculated or assumed uncertainties, one must pursue the issue in an AMR below U0120. Three of the five AMRs (U0000, U0050, and U0170) from which developed data were obtained were not referenced in U0120; therefore, it is difficult to defend that all relevant assumptions were even considered at the abstraction level. Note that transparency could be obtained if relevant assumptions were listed in a table that references the supporting AMRs and reasons for exclusion of the less significant assumptions.

Alternative Conceptual Models: Lack of transparency of alternative conceptual models can be seen in AMR ANL-NBS-MD-000005, "Abstraction of Drift Seepage," Rev. 00 (U0120). This abstraction assumes (in assumption No. 2) that the "active fracture" conceptual flow model (discussed in a professional journal) is the applicable conceptual model for purposes of the drift seepage abstraction. The reader is directed to AMR ANL-NBS-HS-000002, "Seepage Model for PA Including Drift Collapse," Rev. 00 (U0075), Section 6.7 for discussion of other "possible alternative conceptual models." In Section 6.7 of U0075, the reader is introduced to the "discrete fracture-network model (DFNM)" as the main alternative conceptual model and is directed to Section 6.7 of AMR MDL-NBS-HS-000004, "Seepage Calibration Model and Seepage Testing Data," Rev. 00 (U0080) for a thorough discussion of the DFNM. Section 6.7 of U0075 introduces new nomenclature beyond the DFNM and concentrates the AMR discussion on the "fracture continuum model (FCM)." The reader must then proceed to Section 5.3 of U0080 for an understanding of the appropriateness of using the FCM and then to Section 6.7 of U0080 to establish the reasons for not using the DFNM.

The Project must demonstrate that alternative modeling approaches consistent with available data and current scientific understanding were investigated and the results and limitations appropriately considered in the abstractions (IRSR TSPAI). The task will be hindered if the AMR documentation is not transparent and does not identify principal lines of investigation that were considered (QARD, Supplement III.2.6B). This transparency is currently not available at the abstraction level for drift seepage.

(Continued on Page 4)

Three conceptual models have been introduced in the three AMRs listed above; they are: (1) the active fracture conceptual model, (2) the discrete fracture-network model, (3) the fracture continuum model. Other alternative conceptual models (not listed in U0120) such as the equivalent continuum, dual permeability, and dual continuum are listed in other AMRs related to flow in unsaturated rock of Yucca Mountain. Note that transparency could be obtained if the alternative conceptual models were all listed in a table in the "Abstraction of Drift Seepage" (U0120) that references the supporting AMRs and reasons for exclusion of the less favorable alternatives.

NRC IRSRs: In addition to weaknesses in the transparency of decisions made regarding uncertainties, assumptions, and alternative conceptual models, transparency/integration of Nuclear Regulatory Commission Issue Resolution Status Reports (IRSR) issues/subissues within the AMRs, particularly at the abstraction-level, is minimal. IRSR, Key Technical Issue: Total System Performance Assessment and Integration (TSPAI), Revision 2 establishes acceptance criteria and review methods, which will be used by the NRC to review DOE's TSPA. Although this TSPAI revision was not issued in sufficient time to incorporate several of its criteria into Revision 00 AMRs, it is evident that the current approach to addressing IRSR acceptance criteria is not entirely comprehensive. Note that some AMRs include IRSR criteria by citation and others by reiteration; however, few AMRs address relevant IRSRs with the intent of resolving an open key technical issue/subissue. Although the Process Model Reports do address IRSRs, it is not clear which criteria are being addressed (or should be addressed) within the TSPA-SR model abstractions.

The following are excerpts from the TSPAI IRSR that suggest a transparent/integrated PA approach:

"Resolution of Subissue 3, model abstraction, ensures that the assumptions, conceptual approaches, data, models and abstractions used in DOE's TSPA are appropriately integrated and technically defensible." (Section 3.2)

"The levels and method(s) of abstraction are described starting from assumptions defining the scope of the assessment down to assumptions concerning specific processes and the validity of given data." (Section 4.1.1.3, Criterion T1)

"The staff will determine that sufficient basis for all information is available that allows an adequate understanding of the basis for all decisions and assumptions made during the abstraction process." (Section 4.1.1.3, Criterion T2)

"The staff will determine that sufficient information is available to allow an adequate understanding of how problems, limitations, and uncertainties are identified and isolated . . . " (Section 4.1.1.3, Criterion T3)

"The NRC staff will evaluate DOE's model and data justification and associated uncertainty to ensure that the degree of technical support for models and data abstractions is commensurate with contribution to risk. The entire abstraction process, from fundamental source information (e.g., FEPs, field data, laboratory results, and others) needs to be recorded, together with uncertainties and biases accumulated and resolved at each stage of the process, and evidence used, for example expert elicitation." (Section 4.1.1.3, Technical Basis)

"PA results can be traced back to applicable analyses that identify the FEPs, assumptions, input parameters and models in the PA. The staff will determine that sufficient documentation is available to trace back to the origin of important assumptions and decisions and verify that the results obtained can be clearly linked to these decisions and assumptions." (Section 4.1.1.5, Criterion T1)

". . . enough information should be presented for reviewers to be able to understand why the results came out as they did. It should be clear which assumptions and subsystems are driving system performance so that staff can focus their review in these areas." Section 4.1.1.5, Technical Basis)

ATTACHMENT TO DR LVMO-00-D-118
UNCERTAINTY & VARIABILITY VALUES

Model	AMR Recommends	WAPDEG Uses
Aging/Phase Stability AMR W0035 (Section 6.7.3)	Uncertainty = 50% Variability = 50%	Uncertainty = 0% Variability = 100%
MIC AMR W0035 (Section 6.8)	Uncertainty = 50% Variability = 50%	Uncertainty = 0% Variability = 100%
General Corrosion AMR W0035 (Section 6.5.3)	Uncertainty = 4-sigma	Uncertainty = 0% Variability = 100%
SCC AMR W0095 (Section 6.2.2.5)	Uncertainty = 100% Variability = 0% Mitigated Residual Stress Range Uncertainty = ±5%	Uncertainty = 100% Variability = 0% Mitigated Residual Stress Range Uncertainty = ±30%

AMR W0035: (ANL-EBS-MD-000003)

AMR W0095: (AMR ANL-EBS-MD-000005)

TYPE RESPONSE:
☐ Initial
☑ Complete
☐ Amended

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

DR/CAR NO. LVMO-00-D-118
PAGE 2 OF 4

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT (RESPONSE)

14a. Immediate Actions: Develop a plan that provides a path forward to resolving the issues and concerns associated with the need for and implementation of the requirements for "transparent documentation" specified in the QARD Rev 10, Supplement III.2.6B. This plan should include, at a minimum a schedule of activities such as: (1) an evaluation of the requirement (its genesis in the QARD), (2) the traceability of this requirement to any and all applicable procedures, (3) the definition of the term "transparent" or "transparency", (4) a review of regulatory guidance contained in IRSR acceptance criteria, (5) a legal review of the interpretation of the term transparency in related regulatory uses, (6) the revision (if necessary) of the requirements in the QARD and/or the applicable implementing procedure(s) (in particular AP-3.10Q, but also AP-3.11Q and AP-3.12Q), and (7) any required training to assure consistent interpretation of the requirements. This plan should be reviewed by a small working group with representatives from OQA, QATSS, M&O R&L, and M&O PAD.

Compliance Date: November 15, 2000

14. Remedial Actions: Two AMRs have been identified that could be improved in the "transparency" of their documentation. These two AMRs are ANL-EBS-PA-000001, Rev 00 "WAPDEG Analysis of Waste Package and Drip Shield Degradation" and ANL-NMS-MD-00005, Rev 00 "Abstraction of Drift Seepage". Although both of these products were found to be technically adequate, they both contain instances where the documentation could be improved to provide evidence of (a) how uncertainty/variability were evaluated, (b) how assumptions of supporting AMRs were evaluated as to their relevance and/or impact, and (c) how alternative models were evaluated and dispositioned.

These two AMRs are being revised to support the SR. Improving the transparency of these documents will be added to the scope of the revisions of these 2 documents. In addition, both documents will be subject to AP-2.14Q reviews, including a review from QATSS, to assure the documentation is adequate to address the concern raised.

15. Extent of Condition: Various reviews of different AMR products, including those conducted during the audit of the Performance Assessment Department, as well as (a) legal reviews of FEPs AMRs, (b) product enhancement reviews by QATSS of different AMRs, (c) internal AP-2.14Q reviews of technical products, and (d) preliminary NRC reviews of AMRs have indicated that "transparency" has been unevenly treated in most if not all of the products reviewed. Although these reviews have found that the technical results and conclusions are adequate, appropriate and defensible; the issue identified is that the technical basis for assumptions, the selection of alternative models and the treatment of uncertainty and variability has not been adequately or consistently documented. As the result of the lack of documentation, it is difficult for reviewers to ascertain how these issues have been considered and addressed by the authors. This condition is believed to be widespread across all technical products and an area for improvement in all products used to support the License Application.

16. Cause: (Attach results of root cause determination prepared in accordance with AP-16.4Q for a significant deficiency.) Inadequate definition of the requirement for "transparency" in the QARD and therefore difficulty in defining the process steps necessary to effectively and consistently implement this requirement in applicable administrative procedures. Given the difficulty in defining the term and process steps, the products produced have a varying level of "transparency".

17. Action to Preclude Recurrence: Develop a project-wide definition of the term transparency that addresses NRC expectations as defined in the TSPAI IRSR. Include this definition in (or, if necessary, appropriately revise) the QARD. Conduct a survey (utilizing ongoing efforts by QATSS on product enhancement, by MTS on evaluating unquantified uncertainty, by the M&O on documenting major assumptions in TSPA-SR models, by legal reviews of FEPs AMRs and PMRs, and the NRC comments in IRSR TE's) to identify good examples of "transparent" documentation and best business practices in developing "transparent" documentation. Present proposed definition and approach to satisfying "transparency" acceptance criteria within TSPAI IRSR to NRC staff and management at the TSPAI IRSR TE (currently planned for February 2001) [Goal is to gain NRC approval of process/approach.] Revise AP-3.10Q to more clearly and transparently define process for implementing the "transparency" requirement. [NOTE: Training and Implementation of the revised procedure is outside the scope of the actions required.]

18. Due Date: April 30 , 2001
☐ For submittal of complete response
☑ For completion of corrective action

19. Response by:
Robert W. Andrews
Date Oct 20, 2000
Phone 295-5549

20. Evaluation: ☒ Accept ☐ Partially Accept ☐ Reject
QAR T. Harvey Dove Date 10/25/00

21. Concurrence:
DOQA James Blaylock Date 11/2/00

Exhibit AP-16.1Q.1 Rev. 12/20/1999

Attachment 1 to LV.QA.RWA 10/00-179

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☐DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-118

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Request for Extended Processing

Request for extended processing of subject DR. Developing a project-wide definition of "transparency" that is suitable for appropriate implementation in subject documents is a major task that requires coordination between DOE, OQA, the M&O and NRC. The later is important because the acceptance criteria for the TSPAI IRSR subissue on model abstraction is the only place where this requirement is explicitly raised, with the exception of the QARD. This integration will take significantly longer than the normal 100 days.

The immediate actions is expected to be completed on schedule.
The remedial actions are underway and are expected to be completed by the end of November depending on Volume 3 of the SRCR actions.
The actions to preclude will occupy most of the time and energy and require the integration mentioned above.

There is no impact of the added time, as this issue is viewed as a licensing issue, not an SR issue.

Robert Andrews

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-118

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

APPROVAL SIGNATURES FOR REQUEST FOR EXTENDED PROCESSING FOR LVMO-00-D-118

DOE Project Manager for — Date: 1/25/01

Director, Office of Quality Assurance — Date: 12/14/00

APPROVAL SIGNATURE FOR REQUEST FOR EXTENDED PROCESSING GREATER THAN 365 DAYS FOR N/A

N/A
Director of OCRWM — Date: N/A

TYPE RESPONSE:
☐ Initial
☒ Complete
☒ Amended

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.

DR/CAR NO. LVMO-00-D-118
PAGE 2 OF 3
QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT (RESPONSE)

14a. Immediate Action:
BSC Licensing Application Project will develop the proposed project-wide definition of the term "transparency" and "transparent" as it relates to documentation of scientific investigations. The definition will be based on NRC regulatory guidance and past nuclear industry practice. The definition will be submitted to the DOE Office of Licensing and Regulatory Compliance, Office of Project Execution and Office of Quality Assurance for their concurrence. After approval for issue, the definition will be provided to each member of the BSC Science and Analysis Project for use in preparation of future documentation.

Compliance Date: May 28, 2001

14. Remedial Actions:

Same as 10/20/2000 response.

15. Extent of Condition:

Same as 10/20/2000 response.

Cause: (Attach results of root cause determination prepared in accordance with AP-16.4Q for a significant deficiency.)

Same as 10/20/2000 response.

17. Action to Preclude Recurrence:

Revise AP-3.10Q to make the procedure specific to Scientific Investigations performed by BSC and clarify the requirement for transparent documentation by including the definition(s) developed as described in Block 14a. Concurrent with the revision, develop a guidelines manual for Scientific Investigations (comparable to the Design Guidelines Manual for Engineering) that provides additional guidance to individuals documenting scientific investigations to assist in preparing transparent documentation.

Note: training and implementation of the revised AP-3.10Q and guidelines manual is outside of the scope of the actions required under this DR.

Activities performed (revision of AP-3.10Q and the development of the guidelines manual) shall be concurrent with the Action to Preclude Recurrence for DR LVMO-00-D-119.

18. Due Date: July 27, 2001
☐ For submittal of complete response
☒ For completion of corrective action

19. Response by: Robert Andrews
Date 4/26/01 Phone (702) 295-5549

20. Evaluation: ☒ Accept ☐ Partially Accept ☐ Reject
QAR Donald J. Harris Date 5-1-01

21. Concurrence:
DOQA James B. Taylor for Date 5/3/01

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Request for Extended Processing

Developing the licensing-based project-wide definition of "transparency" and "transparent" by BSC for implementation in scientific investigation documentation involves research and coordination between numerous affected parties. This coordination involves a different approach than the original activity planned by the previous M&O contractor.

There is no impact of the added time, as this issue is viewed as involving the documentation to be submitted as part of the License Application, not an SR issue.

Robert W. Andrews

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-118

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

APPROVAL SIGNATURES FOR REQUEST FOR EXTENDED PROCESSING FOR
LVMO-00-D-118

[signature] 5/30/01

DOE Project Manager Date

[signature] 5/8/01

Director, Office of Quality Assurance Date

APPROVAL SIGNATURE FOR REQUEST FOR EXTENDED PROCESSING GREATER THAN 365 DAYS FOR N/A

N/A N/A

Director of OCRWM Date

TYPE RESPONSE:
☐ Initial
☒ Complete
☒ Amended

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

DR/CAR NO. LVMO-00-D-118
PAGE OF
QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT (RESPONSE)

14a. Immediate Action:
BSC Licensing Application Project developed the proposed project-wide definition of the term "transparency" and "transparent" as it relates to documentation of scientific investigations. The definition is based on NRC regulatory guidance and past nuclear industry practice. The definition was submitted to the DOE Office of Licensing and Regulatory Compliance, Office of Project Execution and Office of Quality Assurance with their concurrence received in a letter dated June 11, 2001 (OL&RC:CMN-1265. To ensure that the definition is considered by AMR authors in proper context, the definition will be incorporated into the general revision of AP-3.10Q discussed in block 17.

Compliance Date: October 31, 2001

14. Remedial Actions:

Same as 10/20/2000 response.

15. Extent of Condition:

Same as 10/20/2000 response.

16. Cause: (Attach results of root cause determination prepared in accordance with AP-16.4Q for a significant deficiency.)

Same as 10/20/2000 response.

17. Action to Preclude Recurrence:

Revise AP-3.10Q to make the procedure specific to Scientific Investigations performed by BSC and clarify the requirement for transparent documentation by including the definition(s) developed as described in Block 14a. Concurrent with the revision, develop a guidelines manual for Scientific Investigations (comparable to the Design Guidelines Manual for Engineering) that provides additional guidance to individuals documenting scientific investigations to assist in preparing transparent documentation.

Note: training and implementation of the revised AP-3.10Q and guidelines manual is outside of the scope of the actions required under this DR.

Activities performed (revision of AP-3.10Q and the development of the guidelines manual) shall be concurrent with the Action to Preclude Recurrence for DR LVMO-00-D-119.

18. Due Date: October 31, 2001
☐ For submittal of complete response
☒ For completion of corrective action

19. Response by: William W. Watson for N. Williams
William W. Watson
Date 7/31/01 Phone (702) 295-5550

20. Evaluation: ☒ Accept ☐ Partially Accept ☐ Reject
QAR T. Harvey Dove Date 08/03/01

21. Concurrence:
DOQA James Blaylock Date 8/7/01

OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

8. ☒DR/CAR
☐ Stop Work Order

NO. LVMO-00-D-118

PAGE OF

QA: QA

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Request for Extended Processing

As noted in the 26 April 2001 response to DR LVMO-00-D-118, the corrective action associated with the revision of AP-3.10Q and the development of the guidelines manual are to be performed in conjunction with the corrective action for DR LVMO-00-D-119. The need to ensure that the definition of transparency is understood in context with the DR 119 changes to procedure AP-3.10Q precludes issuing a procedure change for the sole reason of including the definition of transparency. Therefore the corrective action completion date for DR 118 has been changed to 31 October 2001.

There is no impact of the added time, as this issue is viewed as involving the documentation to be submitted as part of the License Application, not an SR issue.

Robert W. Andrews