

**A COUNTY AT RISK:
THE SOCIO-ECONOMIC IMPACTS OF THE
PROPOSED YUCCA MOUNTAIN HIGH-LEVEL
NUCLEAR WASTE REPOSITORY
ON INYO COUNTY, CALIFORNIA**

A Report to

THE COUNTY OF INYO, CALIFORNIA

From

**Gruen Gruen + Associates
*Urban Economists, Market Strategists
And Land Use/Public Policy Analysts***

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EXECUTIVE SUMMARY

Impacts on Visitor Expenditures, Jobs, Income and Output, and Public Revenues

Should the Yucca Mountain repository for high level nuclear waste become operational, its impacts on Inyo County's people, economy and local public sector fiscal base will be unique in that these impacts will all be negative. We found no evidence that the project, with the repository located about fifteen miles from southeast Inyo County, will provide any benefits to the County's socio-economic base. The evidence is clear, however, that as soon as the repository becomes operational, visitation to the County will decline.

- Upon initial announcement of the repository's operation, we estimate a drop in visitation of between 17.3 and 26.3 percent.
- If the repository operates for ten years with no incident of radiation leakage, we estimate the drop in visitation will be between 5 and 14.7 percent.
- If a minor radiation release occurs anywhere in the transportation system in which material is transported from the many nationwide sites where it is now stored to the repository, we estimate a drop in visitation of between 29 and 57 percent.

Those choosing not to visit Death Valley National Park (DVNP) under each of these three scenarios consist disproportionately of visitors with the highest incomes and those visiting from Western Europe.

Because tourism is the primary driver of the present Inyo County economy, the surveys used to provide a basis for predicting the effect of an operating repository at Yucca Mountain on visitation to Inyo County by recreational visitors to DVNP were a key part of our research on the likely socio-economic impact of the proposed Yucca repository. Employment in the leisure and hospitality industry constitutes 25 percent of the County's private job base, and generates significant spillover to other private sectors, particularly the retail trade sector, which makes up 23 percent of the County's private job base. Our estimate of the minimum and maximum predicted annual expenditures, loss of jobs and labor income, economic output and revenue loss to the County is presented below. Chapter V presents breakouts of the losses for the scenarios, from the minimum impact in the tenth year "best case" safe operation of the proposed repository, to the maximum impact, which is predicted to result should there be an occurrence of a transportation incident resulting in a "minor" release of radiation.



Table ES-1 Range of Annual Losses to Inyo County Likely to be Induced by the Operation of the Proposed Nuclear Repository at Yucca Mountain		
	Minimum Annual Loss	Maximum Annual Loss
Loss of Expenditures by Visitors to DVNP	\$16,141,000	\$184,009,000
Loss of Jobs, Income and Economic Output		
Jobs	156	1,771
Labor Income	\$4,176,000	\$47,609,000
Economic Output	\$11,998,000	\$136,778,000
Revenue Loss to Inyo County Treasury	\$343,497	\$4,002,388
Source: Gruen Gruen + Associates		

Risk and the Possibility of Additional Negative Impacts

The loss predictions summarized above and presented in more detail in Chapter V of this report are based primarily on the direct expenditures estimated to be lost due to decreased visitations to DVNP. An inter-industry input-output economic model was used to forecast the net cumulative effect of this expenditure loss on other sectors of the Inyo County economy. The range between the minimum and maximum predicted losses shown above, and the uncertainties within this range of estimates, to which we cannot assign probabilities, imposes a considerable risk on the County's economy. Not quantified in our analysis are losses stemming from investment and hiring decisions discouraged by the actual or perceived risk itself. Further, our analysis cannot quantify the full results of damage done to those local businesses that serve tourism jointly with other sources of demand, who will find their gross business receipts falling faster than their fixed costs as tourist demand declines. Such unpredicted decreases in economies of scale work to further increase the risks to the County's economy expected to result from the operation of the proposed nuclear repository.

Mitigation

As discussed in more detail in Chapter VI of this report, the only option that would mitigate the risks to the economy and public fiscal base of Inyo County would be a successful diversification of the economy from its present reliance on tourism. We believe this can be accomplished if the natural resources of the County, including mining, solar and geothermal energy, are more intensively utilized. Given the high level of federal and state land ownership in the County, this is only likely to occur if a concentrated effort is spearheaded and funded by the federal government to increase and speed up the use of the County's natural resources.



CHAPTER I

PURPOSE, METHODOLOGY AND SETTING

The Gruen Gruen Associates (GG+A) led program of research and analysis summarized in this report, was authorized by the Inyo County California Board of Supervisors to assess the likely socio-economic impacts of the proposed Yucca Mountain repository for high level nuclear waste. The County also requested that, in the event our analysis suggested the potential for negative impacts, GG+A was to consider and recommend possible mitigations to such impacts. Our research included:

1. Visiting South East Inyo County and adjoining areas in Nevada.
2. Reviewing previous studies related to the proposed Yucca Mountain project and the literature of negative externalities and stigmatization.
3. Conducting surveys supervised by our sub-contractor, Urban Environmental Research (UER), in April and July at Death Valley National Park, and one July survey at the Eastern Sierra Interagency Visitor Center.
4. With the cooperation of officials in the City of Bishop and Inyo County, collected estimates of the public costs likely to be induced by the operations of the repository, historical data on public expenditures and revenues with particular emphasis on the revenues received from the visitors and private sector businesses whose behavior and economic opportunities were indicated as likely to be altered by the operation of the repository.
5. Mailed letter and held telephone and in-person interviews requesting information and comments concerning business opportunities and the relative importance of tourism on differing businesses in the County.
6. Studied data from the United States Forest Services and apposite economic data collecting agencies on industry outputs, visitations, employment, population characteristics and commutation patterns in Inyo County.
7. Purchased and utilized the IMPLAN inter-industry input-output model and economic data on Inyo County employment, product outputs and income by sector for 1990 through 2004, 2006, 2007 and 2008.

Information from tasks 4, 5, 6 and 7 above were drawn on to provide a base line of Inyo County's economic, social and public fiscal base from which the potential changes to those aspects of the County could be identified and measured. This chapter summarizes our findings with regard to that base. The next chapter reviews some of the observations in the



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existing literature about the likely effect of a Yucca Mountain repository on the County's future level of economic and social activity. The chapters following that present our findings on the changes in the behavior of the major sources of economic and social opportunities in Inyo County likely to result should the proposed Yucca Mountain repository become operational. The final chapters of this report summarize our findings about the economic and social costs to the County of these changes in behavior and how they could be mitigated.

The Economy and Population Base of Inyo County

Inyo County is geographically huge, with over 10,000 square miles, making it the second largest county in the state. But only a little under 2 percent of this land is privately owned; the City of Los Angeles controls close to 4 percent of County land, the State of California owns 3.5 percent, and the remaining lands are owned by the federal government and administered by various federal agencies. Inyo County and Indian Reservations own .03 percent. Included in these federal lands is Death Valley National Park, the largest national park in the country. Inyo County contains Mount Whitney and Death Valley, providing it with both the highest and lowest points in the state.

In January of 2010, the California Department of Finance estimated Inyo County's population as 18,110, the fourth smallest population of the state's counties. Table I-1, below, lists total County income and per capita personal income for 2006 through 2008. The civilian labor force in 2010 and the unemployment rate early that year are shown on Table I-2.

Table I-1 Total County and Per Capita Income		
	Total County Income	Per Capita Personal Income
2006	\$606 million	\$34,605
2007	\$632 million	\$36,218
2008	\$652 million	\$37,883
Source: Table 3, page 39, Survey of Current Business May 2010 Bureau of Economic Analysis, U.S. Dept. of Commerce		

Table I-2 Inyo County Civilian Labor Force 2010	
Civilian Labor Force (by place of residence)	9,850
Civilian Employment	1,030
Unemployment rate	10.4% (California was 12.1%)
Source: Bureau of Economic Analysis, U.S. Dept. of Commerce	

The per capita income shown on Table I-1 for 2008 is about 90 percent of the average per capita income in the state, while the County's personal income is less than one-half of one percent of total personal income in the state.

Table I-3 presents a time trend of Inyo County employment by industry sector for the years



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1996 through 2008. These same data, which relate to total employment in the County, not employed Inyo County residents, are part of the database contained in the IMPLAN model discussed later in this report. GG+A uses this IMPLAN model to estimate the economic impact of changes in the behavior of visitation to Inyo County under alternative estimates concerning the operation of the Yucca Mountain repository. As indicated on Table I-3, only retail trade, government and utilities show a positive growth of employment during the 12-year period presented (1996-2008). The utilities employment includes workers at the previously mentioned Los Angeles Department of Water and Power facilities in the County. Retail trade grew very slightly during the period, with the big increase in workers accounted for by the government. Most of the growth in government during the period was made up of workers employed by the State of California and local governments within the County.



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**Table I-3
INYO COUNTY EMPLOYMENT BY INDUSTRY SECTOR: 1996-2008¹**

Industry Sector	1996	1997	1998	1999	2000	2001	2002	2003	2004	2006	2007	2008	Change	Avg. Annual Growth Rate
Ag, Forestry, Fish & Hunting	138	136	169	179	160	181	115	70	78	78	64	78	-60	-4.6%
Mining	84	80	189	214	348	178	130	12	16	15	14	18	-65	-11.8%
Utilities	77	79	71	120	114	104	32	51	62	49	204	127	50	4.2%
Construction	477	468	484	545	478	523	360	390	421	448	426	398	-79	-1.5%
Manufacturing	370	272	277	215	229	239	257	196	116	76	197	189	-181	-5.4%
Wholesale Trade	208	306	348	369	338	112	142	164	132	111	80	88	-121	-7.0%
Retail trade	1,325	1,414	1,282	1,313	1,300	1,364	1,338	1,343	1,306	1,488	1,348	1,402	77	0.5%
Transportation & Warehousing	186	186	187	193	189	180	114	141	133	106	69	85	-101	-6.3%
Information	161	139	144	120	126	131	92	144	159	213	244	144	-16	-0.9%
Finance, Insurance & Real Estate	326	318	304	293	355	458	286	282	306	358	301	307	-19	-0.5%
Professional & Business Services	615	563	567	596	601	729	358	453	580	561	493	448	-167	-2.6%
Educational & Health Care Services	741	776	711	713	759	731	763	479	475	507	483	538	-203	-2.6%
Leisure & Hospitality	2,006	2,090	2,167	2,191	2,250	1,817	1,586	1,312	1,443	1,530	1,451	1,501	-505	-2.4%
Other Services	532	510	622	678	721	730	464	1,166	825	636	660	687	155	2.2%
Government	2,234	2,484	2,510	2,448	2,511	2,606	2,378	2,994	2,992	2,916	3,219	3,465	1,231	3.7%
TOTAL	9,479	9,823	10,032	10,187	10,479	10,084	8,412	9,197	9,046	9,090	9,254	9,477	-2	0.0%

¹ Total may not sum due to rounding. Employment data for 2005 is unavailable.

Sources: Minnesota Implan Group; Gruen Gruen + Associates.



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The employees counted in Table I-3 include jobs held by about 153 people who commute into the County from Kern and Mono Counties in California. A much smaller number of workers commute into Inyo County from Nevada.

From the perspective of private sector employment, and, as will be discussed later, this is also true of output, the driving engine of the Inyo County economy is tourism. As shown in Table I-4, even after an annualized decline of 2.4 percent per year, employment in the leisure and hospitality industry made up 25 percent of total private employment in the County in 2008; this activity also generates particularly significant spillover into the retail trade sector, which constitutes 23 percent of the County's employment base.



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**Table I-4
INYO COUNTY OUTPUT BY INDUSTRY SECTOR: 1996-2008¹
(in Millions of 2010 Dollars)**

Industry Sector	1996 \$	1997 \$	1998 \$	1999 \$	2000 \$	2001 \$	2002 \$	2003 \$	2004 \$	2006 \$	2007 \$	2008 \$	Change \$	Avg. Annual Growth Rate
Ag, Forestry, Fish & Hunting	13.6	10.5	10.9	8.7	8.4	12.3	17.1	20.2	22.0	21.0	22.4	20.7	7.1	3.5%
Mining	20.3	14.1	51.2	53.8	69.0	39.3	25.2	1.5	3.3	3.4	3.6	6.4	-13.9	-9.1%
Utilities	36.4	55.1	32.9	40.8	45.0	16.2	19.2	24.0	27.3	27.3	110.3	63.1	26.6	4.7%
Construction	56.7	55.2	66.0	79.1	72.0	56.8	50.8	52.1	55.3	61.3	66.4	54.7	-2.0	-0.3%
Manufacturing	96.8	72.7	70.6	59.7	61.4	73.1	59.6	32.7	18.1	15.6	90.2	83.4	-13.4	-1.2%
Wholesale Trade	21.2	31.1	38.5	38.7	37.9	8.3	13.7	15.4	13.5	12.5	10.8	11.8	-9.4	-4.8%
Retail trade	70.6	73.4	69.2	75.9	77.1	80.4	89.2	84.2	91.1	99.7	86.8	94.7	24.1	2.5%
Transportation & Warehousing	21.8	21.7	22.6	22.4	22.8	16.7	13.1	15.1	14.8	12.0	8.7	8.4	-13.4	-7.7%
Information	25.6	23.4	25.1	21.2	23.3	19.6	18.5	31.4	30.0	43.2	70.8	29.8	4.2	1.3%
Finance, Insurance & Real Estate	55.5	50.2	48.5	48.2	62.1	36.2	46.0	42.3	46.5	57.7	109.2	103.5	48.0	5.3%
Professional & Business Services	39.6	36.3	34.8	39.6	42.8	45.5	26.8	50.7	58.1	63.2	49.4	50.6	10.9	2.1%
Educational & Health Care Services	57.1	60.7	54.2	54.8	58.4	44.3	51.9	34.5	37.8	42.1	42.5	41.9	-15.2	-2.5%
Leisure & Hospitality	113.6	112.5	132.9	111.9	126.4	89.0	81.6	76.5	88.4	97.1	98.0	115.4	1.8	0.1%
Other Services	34.2	32.2	31.6	35.0	38.7	62.8	36.5	59.9	60.9	32.6	39.4	32.9	-1.3	-0.3%
Government	161.7	178.4	192.7	201.7	215.2	236.3	261.5	266.5	340.7	345.2	278.0	331.4	169.7	6.2%
TOTAL	824.8	827.4	881.4	891.2	960.4	836.7	810.6	807.0	907.8	933.9	1,086.6	1,048.6	223.9	2.0%

¹ Total may not sum due to rounding. Data for 2005 is unavailable. Estimates of output by sector have been adjusted to current 2010 dollars using the Bureau of Labor Statistics' Consumer Price Index for the Western United States.

Sources: Minnesota Implan Group; Gruen Gruen + Associates.



Turning to the consideration of Inyo County output by industry sector, shown in Table I-3, the leisure and hospitality industry constitutes the largest contributor to County economic output. In 2008, this was \$115,400,000. When output from retail trade is added to the indicated employment of the leisure and hospitality industry, the two together constitute 30 percent of total output. Other sectors, including professional services, health care, construction, and forestry, fishing and hunting, are also linked to the demands created by visitors to Inyo County.

While at one time mining and related natural resource-based industries constituted a more significant share of employment and output in Inyo County, that sector has been declining at an average annual rate of 9.1 percent during the 12-year period covered in Tables I-3 and I-4. Mining hit its peak output in 2000 during the 12-year period we've used as an indicator.

The interviews and surveys we conducted with knowledgeable local business people also confirmed that even those whose activities included the export of agricultural and other products outside of Inyo County, their ability to be viable was heavily dependent upon the larger portion of their businesses being supported by tourist activities. From an economic perspective, Inyo County now is a one-industry town, and that industry is visitor-driven tourism.

Natural resources, which, particularly when one considers the possibility of solar energy, are relatively plentiful in Inyo County, offer the greatest potential for much-needed diversification. In the context of the study reported on herein, natural resource activities offer the most important possibility for the mitigation of possible further declines in tourism should a high level nuclear waste repository at Yucca become operational.

Inyo County's Public Fiscal Base

Inyo County, exclusive of the City of Bishop, had total revenues of \$76,449,209 in the fiscal year ending June 30, 2009. This amount was about 9.7 percent greater than total County revenues in the previous fiscal year. Most of the increased revenue was from financing sources, changes from current services, property taxes and other taxes. Table I-5 lists the amount and percent of major revenue sources for the County in the two fiscal years. Budget approved revenues for the year ending 6/30/10 totaled \$2,181,638 less than actual revenue the previous year.



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Table I-5 Amount and Percent of Revenue Sources for Inyo County				
Source	7/1/07 – 6/30/08		7/1/08 – 6/30/09	
	\$	%	\$	%
Taxes – Property	10,855,748	15.6	12,932,663	16.9
Taxes – Other	4,828,857	6.9	5,083,631	6.6
Licenses and Permits	494,731	0.7	529,868	0.6
Fines and Forfeitures	1,220,935	1.8	1,267,982	1.7
Rents and Leases	645,907	0.3	588,688	0.8
Rev. Use of Money & Property	1,696,071	2.4	941,515	1.2
Aid from other Govt. Agencies	35,488,927	50.1	36,964,802	48.4
Charges for Current Services	11,694,571	16.8	12,090,862	15.8
Other Financing Sources	2,234,992	3.2	5,745,617	7.5
Other Revenue	506,820	0.7	303,583	0.4
County Totals*	69,667,560	99.1	76,449,209	99.1
* Totals do not equal 100% due to rounding.				
Source: County of Inyo Final Budget for Fiscal Year Ending June 30, 2010; Gruen Gruen + Associates				

The vast majority of the revenue sources summarized on Table I-5 would be affected by exogenously induced changes in the economy of places within Inyo County, but some vary much more than others. Examples of major change include all of the sources included within the category shown on Table I-5 as “Aid from Other Government Agencies.” The total of this category increased by \$1,475,875 between the fiscal year 2007-2008 and fiscal year 2008-2009, from \$35,488,927 to \$36,964,802. However, some components of this very broad category increased, while some decreased. One example of a subcomponent of this category that decreased in correlation with the business cycle was the State Motor Vehicle In-Lieu Fees received by the County, which declined by \$148,732, from \$1,614,284 in the fiscal year ending 6/30/08 to \$1,465,552 in the fiscal year ending 6/30/09. Conversely, State public assistance aid increased contra-cyclically by \$535,541, from \$1,809,108 in the fiscal year ending 6/30/08 to \$2,395,108 in the fiscal year ending 6/30/09.

Important sources of revenues for the County of Inyo and the County’s largest city, Bishop, whose revenue was not included in Table I-5, include the revenue sources shown below in Table I-6 for the County and Bishop for the fiscal year ended on June 30, 2009. Revenues likely to be affected by changes in the attractions to visitors potentially affected by an operating nuclear repository, such as the \$6,700 earned in fiscal 2009 by services provided by films, movies and TV productions in scenic Inyo County have not been included in Table I-6.



Table I-6 Revenues in 2009 for Bishop and the Remainder of Inyo County that are Particularly Sensitive to Potential Decrease in Visitation		
Revenue Source	City of Bishop	County of Inyo
Sales Taxes	\$1,254,364	\$805,891
Property Tax	496,000	12,932,663
Transient Occupancy Tax	1,707,889	1,825,010
Source:		

The transient occupancy tax is particularly sensitive to changes in visitation to Southern Inyo County, the border of which is about fifteen miles from Yucca Mountain. Approximately 65 percent of the County's transient occupancy taxes are collected in and around Death Valley National Park in Southeast Inyo County.

While difficult to estimate, we have worked with County officials to approximate cost increases likely to be imposed on the County operating budget should the Yucca Mountain nuclear repository be made operational. These estimates are shown in Chapter V of this report.



CHAPTER II

ISSUES AND PERSPECTIVES PROVIDED BY PAST STUDIES

Since the passage of the Nuclear Waste Policy Act in 1982 by the U.S. Congress, there has been considerable research on the likely effects that operating a high level nuclear waste repository at Yucca Mountain in Nevada would have on the people and economies of nearby places. The largest program of research was carried out by the State of Nevada Nuclear Waste Program Office (NWPO) for more than 15 years, from the mid-1980s through the 1990s. That program was funded by the federal government, with an annual budget of \$7 million; thereafter, federal funding of that program was reduced and then eliminated.

Before proceeding with the studies reported on in this report, we reviewed the research conducted by social scientists around the country for the NWPO program, as well as research that deals with the impact of nuclear storage and related activities elsewhere – including locations outside the U.S. Abstracts of some of the relevant research literature we reviewed are included as Appendix A to this report. We also spoke with some of the writers of papers in the relevant literature in order to draw from their experiences, and to avoid “reinventing the wheel” in our own survey research methodologies.

None of the literature we reviewed dealt directly with impacts on Inyo County. The NWPO-sponsored research dealt specifically only with counties in Nevada. Their studies also went beyond the socio-economic impacts on local areas to consider national policy matters, including the long run cost of the program to the nation. Our own study stuck to forecasting socio-economic impacts and the consideration of the on-going public fiscal costs likely to be induced because of possible environmental effects. If the repository becomes operational, there would be a need for Inyo to pay for the monitoring of ground water, because hydrologists have raised the possibility of water contamination. Ongoing local public fiscal costs would also be induced because of the need to staff, train and equip for possible toxic spills and related accidents from the daily transport of material to Yucca Mountain.

A very large number of studies in the literature, including some sponsored by the NWPO project that specifically considered the effect of the proposed repository at Yucca Mountain, provided evidence to suggest that the operation of the proposed repository could stigmatize nearby areas, particularly those areas through which nuclear waste would be transported to reach the repository. “Stigmatization” is the term social scientists use to describe extreme instances of situations under which people tend to avoid risk. While there are many examples of risky situations that people tend to avoid, the dangers associated with the transportation and storage of high level nuclear waste represent a very extreme instance of such avoidance. A paper written by one scientist, who questions the existence of stigmatization, has been very heavily criticized by other scientists in the field, and we believe a consensus exists that the operation of a nuclear repository could stigmatize at least the



southeast portion of Inyo County, if not beyond.

However, the research did not suggest that just because a nuclear repository was in operation the area around it would be permanently stigmatized. Instead, if there was not even a minor incident from the transportation and storage of the high level nuclear waste at Yucca in ten or more years, the number of people who would be likely to alter their travel plans to avoid the area would be quite small. As was explained to us by Dr. Douglas Easterling, currently the Chair of the Department of Public Health Sciences at Wake Forest University, the plausibility and intensity of impacts on visitors to an area will depend upon the severity and number of incidents that occur.

Both the induction and intensification of such impacts increased when the news of an unpleasant or dangerous incident or fear was amplified through publicity. An example of such amplification is the drop in sales of a particular food, such as spinach or apples, when the news of an isolated poisoning by that food spreads throughout the country. Studies other than Dr. Easterling's tend to confirm his conclusions. Further, the stigmatization resulting from incidents that people wish to avoid can be mitigated, if not eliminated, over time if no incidents occur. Such findings about stigmatization have included the effect of other socially off-putting "disamenities" such as the presence of noxious odors, crime, and dangers of toxic leakages. There is also general agreement among researchers that once stigmatization is induced, economic activities and property values decline. And should there be repeated incidents, these impacts could last a significant amount of time.

What we learned from the literature points to the use of scientifically and statistically valid survey research procedures targeted to find out whether and under what conditions stigmatization would occur, resulting in reduced visitation to Inyo County – particularly southeast Inyo County and its greatest attraction, Death Valley National Park (DVNP). We also sought to obtain enough valid responses from today's visitors to indicate the amount or degree of effect on visitation, and under what conditions there would be no such, or very limited, effect. Many of the effects of any changes in visitation can be estimated through the economic research tool of input-output analysis, which measures how a change in the monetary expenditures by input into the economic system, in this case the expenditures on goods and services by visitors, affects and works its way through all the producing sectors of an area's economy. But in this case, it was also important to check on destinations other than DVNP that would be affected if there were a decrease in visitation to DVNP -- if the repository caused some to avoid the Park itself or one of the Park's most important "feeder" locations, Las Vegas.

We did include one research goal that was rejected by the NWPO research team. We analyzed the information we collected about the local economy and the travel and trip purposes of visitors to Inyo County, in order to identify potential mitigations to the operation of a repository at Yucca Mountain. NWPO's research, which, as mentioned previously above, covered the wider area of national public policy not included in our



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research, made the following comments in their preface to their February 2003 report on the impacts: “It is Nevada’s position that there is no form or amount of compensation that will make this fatally flawed and dangerous program acceptable for Nevada or for the nation as a whole.”¹ The mitigations we suggest are discussed in Chapter VI of this report.



¹ “A Mountain of Trouble: A Nation at Risk” The Nevada Agency for Nuclear Projects, Office of the Governor, February 2002 Vol. 1, p. ii

CHAPTER III

**THE EFFECT OF THE YUCCA MOUNTAIN HIGH LEVEL NUCLEAR
WASTE REPOSITORY ON VISITOR BEHAVIOR**

Visitor Reactions to the Yucca Mountain Repository

In order to test the potential socio-economic impact of a high level nuclear waste repository being located at Yucca Mountain, three surveys with out-of-county visitors were conducted. Information drawn from these visitor responses is used to identify likely economic impacts of a nuclear repository at Yucca Mountain. This is a critical concern, since tourism is currently, and has for many years, been the number one industry in the County. A significant decrease due to stigmatization – even if for only a limited number of years – could have a significant economic and fiscal impact on Inyo County.

Gruen Gruen + Associates (GG+A) conducted three visitor surveys, along with their subcontractor, Urban Environmental Research (UER). An April 10-11, 2010 survey and a July 8-9, 2010 survey were conducted in Death Valley National Park (DVNP). In addition, a July 22-24, 2010 survey was conducted at the Eastern Sierra Interagency Visitor Center (ESIVC). The primary purpose of the two DVNP surveys differed somewhat from the primary purpose for conducting the ESIVC survey. It is important to point out that Inyo County residents were excluded from the three survey samples. We presume if these residents do not move from the County as a result of a potential or actual Yucca Mountain-related accident, their day trip visitation to DVNP and other visitor locations is not likely to be substantially reduced, if at all. The three survey reports, along with the two questionnaires utilized, can be found in Appendices B through F.

All three surveys provided demographic and other pertinent visitor trip information. The two DVNP surveys' primary purpose, however, was to test potential behavioral changes that are likely to be induced by the operation of the Yucca Mountain high level nuclear waste repository. The ESIVC survey was also designed to allow inferences to be tested concerning the socio-economic effect of the repository. However, the primary purpose of the ESIVC survey was to gain a broader perspective on the makeup of visitors to Inyo County and the purpose of their trips to the County. Therefore, the ESIVC survey asked a broader range of general tourism questions than did the two DVNP questionnaires, and somewhat fewer questions on attitudes toward the Yucca Mountain Nuclear Repository. This decision was based on the fact that the Visitor Center, located in Lone Pine, is a stopping off point for those visitors typically entering Inyo from the County's southern border.

The primary purpose for conducting one DVNP survey in spring (April) and one in summer (July) was to test whether the visitor population did, in fact, differ by season. Specifically, we were told by Inyo County and DVNP staff that foreign visitors – particularly those from Western Europe – were far more likely to visit over the summer months. This hypothesis



was verified.

In the April 2010 DVNP visitor survey, approximately 14 percent of the visitors resided outside the United States. In the July 2010 DVNP visitor survey, 55 percent of the respondent trips originated outside of the country, with 45 percent of the visitors residing in Western Europe. These differences in place of origin (U.S. versus foreign) also appear to reflect a profound difference in potential trip behavior in response to the possibility of a high level nuclear repository being located at Yucca Mountain.

Tables III-1, III-2 and III-3, below, present the April and July DVNP visitor sample responses to the three Yucca Mountain scenarios. Scenario 1 presents the visitor responses to the following question: “If a nuclear waste repository were currently located at the Yucca Mountain site, would you have still visited DVNP?” Scenario 2 presents the DVNP visitor responses to, “What if the repository had been open for ten years and operated safely without any problems. Would you still have visited DVNP?” The third scenario posed the following question: “What if there had been a transportation incident in which a truck carrying high level nuclear waste to the repository resulted in a ‘minor’ release of radiation? Would you still have visited DVNP?”

In Scenario One, 67 percent of the April visitors, as compared with 57 percent of the July respondents, indicated they would still visit DVNP if they were to learn of the repository. Thirty-one percent of the July and 24 percent of the April visitor respondents indicated they would either probably not or definitely not visit DVNP.

In Scenario Two, a ten-year successful operation of the repository at Yucca, 78 percent of the April and 75 percent of the July visitor samples indicated they probably or definitely would visit DVNP.

Under Scenario Three, in which there were to be a minor transportation accident, the July sample was far more negative about the possibility of visitation. Forty-two percent of the April survey would still be willing to visit, as compared to only 31 percent of the July survey respondents.

The responses to the three scenarios suggest that summer visitation to DVNP would be far more adversely affected than would spring visitation, should the Yucca repository go forward, under all three scenarios.



Table III-1 Likely DVNP Visitation if there were to be a Nuclear Repository at Yucca Mountain		
	April %	July %
Definitely would	45	27
Probably would	22	30
Probably Not	15	22
Definitely Not	9	9
Don't Know	9	13
Total*	101	101
*Totals do not equal 100 due to rounding.		
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)		

Table III-2 Likely DVNP Visitation if No Nuclear Incident After 10 Years of Operation at Yucca Mountain		
	April %	July %
Definitely would	48	32
Probably would	30	43
Probably Not	9	10
Definitely Not	5	5
Don't Know	8	10
Total	100	100
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)		

Table III-3 Likely DVNP Visitation if There Were to Be a Minor Release of Radiation		
	April %	July %
Definitely would	20	9
Probably would	22	22
Probably Not	27	28
Definitely Not	25	31
Don't Know	6	10
Total	100	100
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)		

The ESIVC July respondents were asked only two questions about the possibility of a nuclear repository being established at Yucca Mountain. They were:

1. Have you heard or read anything about the possibility of a nuclear waste repository to be located at Yucca Mountain near Las Vegas?



2. If a nuclear waste repository were currently located at the Yucca Mountain site, would you have altered your present trip's plans?

Approximately 37 percent of the ESIVC sample indicated they had heard about the possibility of a nuclear repository being established at Yucca Mountain. The visitor responses as to whether the ESIVC visitors would have altered their current trip plans if there was a nuclear repository at Yucca fell in between the two DVNP survey samples. Sixty-one percent of the ESIVC sample indicated they would probably not or definitely not alter their present trip plans. Sixty-seven percent of the April DVNP sample also indicated they would not have altered their travel plans, while 57 percent of the July DVNP sample said they would not have changed their travel plans based on this knowledge.

The Relationship Between Attitudes Toward Global Warming and Likely Behavioral Shifts Resulting from the Establishment of a High Level Nuclear Repository at Yucca Mountain

In order to test whether there is a relationship between the visitor respondents' general attitudes towards environmental issues and their likelihood of altering their visitation patterns under the assumption that a high level nuclear repository be built at Yucca Mountain, we asked the following question:

“Do you believe more of the government’s resources should be spent on decreasing global warming, at the cost of reducing other expenditures?”
 Yes Maybe No Don't know

Table III-4 presents the percent of responses within the three samples to this global warming question.

Table III-4 Visitor Response to Whether They Would Favor More Government Resources Allocated to Combat Global Warming			
	April DVNP Survey %	July DVNP Survey %	July ESIVC Survey %
Yes	43	52	50
Maybe	21	19	21
No	26	15	19
Don't Know	10	14	10
Total	100	100	100

Source: Gruen Gruen + Associates; Urban Environmental Resources

It is interesting to note that the responses to the two summer surveys are closer in alignment than are the spring and summer DVNP responses to this global warming question.



In order to test whether there is a statistically significant relationship between those respondents who believe the government should allocate more revenues to combat global warming and those who are likely to reduce their visitation to DVNP and other Inyo County visitor locations, we ran the statistical test – the Pearson chi square. This statistic is used to test whether there is a high probability (.05 or greater) that the null hypothesis (that there is no statistical difference) can be safely rejected.² There is a very high correlation between those who indicated concern under the three Yucca Mountain scenarios and those who support more government resources to combat global warming, as well as between those whose behavior is not likely to be affected by a Yucca Mountain repository and also do not want more resources expended for global warming. Because there is such a high correlation between these two sets of attitudes, we felt confident in substituting the global warming question for two of the three Yucca Mountain scenarios in the ESIVC survey.

We ran a series of chi square cross tabulations between the visitor respondents' demographic characteristics and their attitudes towards global warming resource allocation. Regarding the July DVNP survey, none of the tested demographic characteristics – zip code or country, gender, ethnicity, age, and income – were found to be statistically significant at the .05 level or greater. Point of origin (zip code or country) and household income came closest at .10 and .11 significance levels respectively. Respondents from California and Northwest United States, as well as those from Europe, appear to be the most concerned about global warming, along with those households falling within the highest income category, over \$120,000.

Visitor Travel Patterns

Day vs. Overnight Trips

Day trips and overnights spent in DVNP differed from visitors surveyed in the spring and those surveyed in the summer. In the April sample, 39 percent of the DVNP visitors anticipated spending less than a day, while 61 percent expected to spend at least one night in the park. In the July DVNP sample, 74 percent of the visitor sample expected to make a day trip, with a four- to six-hour stay the most dominant pattern. Only 21 percent of the July sample anticipated spending one or more nights in DVNP. It is important to point out some of the respondents who did not intend to spend one or more night in DVNP did plan to spend one or more nights at a location within a three-hour drive of the park.

The ESIVC respondents were asked to name all of their destination locations. Because the ESIVC is located in Lone Pine, it is not surprising that almost 53 percent anticipated visiting this city. Mt. Whitney is the number two destination, with 49 percent indicating they would be visiting Mt. Whitney, while Bishop ranked third. Death Valley National Park was ranked fourth, with an estimated 37 percent visitation rate. These results are shown in Table III-5 below.



² The null hypothesis was rejected at the .000 level.

Table III-5 Respondents' Ranked Destination Locations		
	Number	Percent
Downtown Lone Pine	206	53
Mt. Whitney	192	49
Bishop	163	42
Death Valley National Park	146	37
Mammoth Lakes	143	37
Las Vegas	139	36
Other Northern Inyo County	137	35
Northern California	135	35
Southern California	129	33
Mono Lake	126	32
Other Nevada	69	18
Manzanar	61	16
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)		

Table III-6 specifies the number of nights respondents indicated they plan to spend at the six grouped locations. If a respondent indicated they will be visiting three destinations during their present visit, then their response to this question will have been recorded three times.

Mt. Whitney appears to be the number one destination within Inyo County. One hundred thirty, or a third of the sample, anticipated visiting this location, and of these 130, 71 percent anticipated spending one or more nights. The second dominant location is “Other Inyo County Locations” (excluding DVNP and Lone Pine). Seventy-two percent of those indicating other Inyo County locations anticipate spending one or more nights. Fifteen percent of the sample anticipates visiting DVNP and 14 percent Lone Pine. Approximately 73 and 63 percent expect to spend one or more nights at DVNP and Lone Pine, respectively.

Table III-6 Number of Overnights by Location												
	None		One Night		Two Nights		Three Nights		Unsure		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
DVNP	13	22	28	47	7	12	8	14	3	5	59	100
Mt. Whitney	23	18	22	17	29	22	41	31.5	15	11.5	130	100
Other California	15	9	29	17	24	14	76	45	25	15	169	100
Inyo County	21	20	29	28	21	20	25	24	8	8	104	100
Lone Pine	12	21	25	45	7	13	3	5	9	16	56	100
Western U.S.	10	16	12	19	16	26	20	32	4	7	62	100
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)												



Number in Travel Party

There were no large differences between the April and July DVNP samples with respect to the number of persons in the travel party. For example, 4 percent of both samples consisted of one-person groups, and approximately 20-21 percent of four or five-person travel parties. The April survey had a somewhat higher percent of two-person groups (39%) and lower three-person groups (16%) than did the July sample, which had approximately 32 percent two-person and 22 percent three-person groups. The ESIVC sample had a higher percent of one-person travel parties (6%), fewer four-person parties (18%) and more five-person travel parties (44%) than did the DVNP survey samples.

Trip Expenditure Patterns

Table III-7 presents a percentage breakdown of the per person, per day lodging expenditure patterns for those respondents spending at least one night inside and/or outside DVNP. Some respondents indicated spending the night inside DVNP, as well as at a facility within a three-hour drive time of the Park. The mean (average) expenditure is shown in the bottom row. In the April survey, the mean per person, per day lodging expenditure differs by approximately \$7.00, while the July expenditures have a larger, over \$23 differential as to whether the lodging facilities are within or outside the Park.

Table III-7 Per Person Lodging Expenditures Inside and Outside DVNP*				
Expenditures per Person Per Day	April Sample		July Sample	
	Inside DVNP %	Outside DVNP %	Inside DVNP %	Outside DVNP %
Less than \$25.00	41	23	49	12
\$25.00 – 49.99	14	20	9	15
\$50.00 – 74.99	10	22	4	15
\$75.00 – 99.99	9	12	7	21
\$100.00 +	26	23	31	36
Total	100	100	100	99
Mean	\$65.50	\$73.25	\$65.50	\$88.75
*62% of the respondents indicated they were lodging inside DVNP and 63% outside the park. Some respondents were planning to stay at facilities both inside and outside the park. Many of those respondents who indicated neither are day trippers – many living in Nevada.				
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)				

Table III-8 presents the mean (average) per person, per day trip expenditures by the following categories: lodging, travel-related (i.e. gas), food, and other expenditures (i.e. souvenirs).

Travel-related average per person mean expenditures differed by \$3.00 for the April visitor sample, and \$5.00 for the July sample. April travelers had somewhat higher average travel-related expenditures.



Food-related expenditures in the April survey were very consistent for food purchased inside and outside DVNP. The highest average per person food-related expenditures were those purchased outside the Park by the July visitor sample (\$63.50). However, other expenditures were substantially higher for the April sample than the July sample.

The total per person, per day expenditures for all goods ranged from \$240.25 (inside DVNP) to \$247.50 (outside DVNP) in the April sample. The July sample had a higher expenditure differential between the per person, per day lodging expenditure from inside the Park (\$211.75) and those outside the Park (\$254.75).

Table III-8 Total Per Person Per Day Mean Expenditures for Spring and Summer DVNP Samples				
Expenditures Per Person Per Day	April DVNP Sample		July DVNP Sample	
	Inside DVNP Mean \$	Outside DVNP Mean \$	Inside DVNP Mean \$	Outside DVNP Mean \$
Lodging	\$65.50	\$73.25	\$65.50	\$88.75
Travel-Related	\$64.25	\$61.50	\$53.00	\$58.25
Food	\$59.75	\$59.00	\$55.50	\$63.50
Other Expenditures	\$50.75	\$53.75	\$37.75	\$44.25
Total	\$240.25	\$247.50	\$211.75	\$254.75

Source: Gruen Gruen + Associates; Urban Environmental Research (UER)

We grouped the per person expenditures for lodging in the ESIVC summer survey into three per person expenditure categories. These data did not make any distinction as to where the respondent spent the night. Forty-two percent of the ESIVC sample spent less than \$25.00 per person per night; 22 percent between \$25.00 and \$49.99, and 35 percent over \$50.00 per person per night. We know many of the ESIVC visitor respondents were also likely to be camping, since 32 percent of the sample indicated that camping was the primary purpose of their trip and 65 percent selected hiking as their primary trip purpose.

A Comparison of the Demographic Characteristics of the April and July DVNP Samples with the July ESIVC Visitor Respondents

Gender

The April DVNP sample consisted of more female respondents (53.3%), and the July DVNP sample consisted of more male respondents (55.3%). It is interesting to note that the July ESIVC sample was almost identical to the July DVNP sample, with 55.4 percent male visitors. We, therefore, can conclude that summer attracts more male visitation.



Ethnicity

All three samples primarily consisted of Caucasian visitors. The April DVNP sample consisted of 83 percent Caucasian visitors; the July DVNP sample close to 87 percent Caucasian; and once again, the ESIVC sample was quite close to the July DVNP sample with 86 percent Caucasian visitors.

Age of Visitor

The April DVNP visitor sample tended to be older than the July DVNP sample. For example, only 14 percent of the April respondents were under 30 years of age, while 32 percent of the July DVNP sample fell within this age category. Age 46-65 was the dominant group for both DVNP samples. This age group accounted for 47 percent of the April and 33 percent of the July DVNP visitor respondents.

The age distribution of the July ESIVC visitor sample fell in between the two DVNP samples. Twenty-four percent of the sample were visitors under 30 years of age, while almost 40 percent were between the ages of 46 and 65.

Education

All three samples were skewed to the highly educated, or those with a four-year college degree combined with those with professional or other advanced degrees. Seventy percent of the April and 62 percent of the July DVNP respondents fell into this highly educated category. Sixty-seven percent of the ESIVC sample also had, at a minimum, graduated from a four-year college or university.

Household Income

Table III-9 presents the percent of the DVNP samples that fall into the five income categories.

Table III-9 2009 Before-Tax Household Income		
	DVNP April Survey %	DVNP July Survey %
Under \$39,999	15	16
\$40,000 - \$79,999	28	30
\$80,000 - \$119,999	27	31
\$120,000 - \$159,000	12	12
\$160,000 and above	17	12
Total*	99	101
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)		



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Over half of both the April (56%) and July (55%) DVNP samples had a 2009 household income, before taxes, of \$80,000 and above. Twenty-nine percent of the April and 24 percent of the July DVNP sample have incomes in excess of \$120,000. It is these highest income visitors who are also most likely to be negatively affected by the Yucca Mountain nuclear repository.



CHAPTER IV

**THE VISITATION-DECREASING (STIGMATIZATION) EFFECT
OF A NUCLEAR REPOSITORY AT YUCCA MOUNTAIN**

Forecasting Methodology

The primary purpose of the DVNP visitor surveys, conducted during the months of April and July, was to provide a basis for forecasting behavioral responses to the presence of an operational high level nuclear waste repository at Yucca Mountain. As reported in Chapter III, while a significant percentage of visitors would still visit DVNP under some circumstances after the proposed repository was made operational, a stigmatization effect would be induced by the repository. Once the public became aware of the operational repository at Yucca Mountain there would be a reduction in visitation.

To obtain data on the intensity of that effect under alternative circumstances, our surveys posed the three assumptions or scenarios about the repository operating with or without an incident, described in the previous chapter. Below, we have restated the three scenarios posed to the respondents in the survey and included tables that display the percentage of respondents from the two surveys who indicate they would probably or definitely not have visited DVNP under each of the posed scenarios.

As also discussed in the previous chapter, the demographic characteristics of the respondents to the two surveys did differ somewhat, with a far higher proportion of foreign visitors in the July survey.

The tables and narratives included in the next three sections of this chapter present the percentage of responses to each of the posed scenarios from those who answered that they would probably or definitely not have taken the trip. The final section of this chapter combines the responses of the two groups with a weighted average, which is then used to forecast the reduction in visitation that would follow, assuming each of the hypothetically posed scenarios were to become a future reality. Chapter V will use these forecasts to estimate the direct loss of expenditures that would result from the three levels of drops in visitation. That chapter employs an input-output model to translate the forecasts of changes in visitation and tourist or visitor expenditures into a forecast of the impact they would have on the Inyo County economy, as the expenditure effects work their way through the various sectors of the local economic base.

The No Incident Scenario

The first in this series of questions about reactions to the operation of a nuclear repository made no mention of incidents or dangers, and simply asked the interviewees:



“If a nuclear waste repository were currently located at the Yucca Mountain site, would you have still visited DVNP?”

Twenty-four percent (24%) of the April visitors and thirty one percent (31%) of the July visitors answered that they would probably not or definitely not have visited DVNP. This surprised the researchers on our team, as the literature review summarized in Chapter II of this report had led us to expect a lower rate of trip avoidance in the absence of any amplified incident. But most of the research we reviewed had been conducted earlier than 2002, and concern about global warming has increased since then. Answers to our own survey’s question about global warming found that Europeans, who constituted a larger part of the July survey pool (approximately 55%) were more likely to believe that governments should spend more to decrease global warming at the costs of reducing other expenditures than the U.S. citizens included in the surveys. As discussed in the Chapter III, analysis of survey results found that individuals greatly concerned about global warming also stated they were far more likely to avoid traveling if the repository was made operational than were those less concerned about global warming. Our conclusions after studying the data and the correlations between concerns about global warming and the desire to avoid proximity to a repository for high level nuclear waste suggest the responses we received to the first scenario posed, which gave no indication of any dangerous incidents, are credible. The responses to this question are shown in Table IV-1.

Table IV-1 Percent of Respondents Who Would Not Have Visited DVNP Under Scenario 1: Knowledge of the Existence of the Yucca Mountain Repository		
	April Survey %	July Survey %
Probably Not	15	22
Definitely Not	9	9
Total	24	31
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)		

The Ten Years of Safe Operation Scenario

The second in the trinity of questions about reaction to a repository located at Yucca asked:

“What if the repository had been open for ten years and had operated safely without any problems. Would you still have visited DVNP?”

The responses received were in line with expectations based on previous research, which also suggested that long periods of no threatening incident would tend to reduce previously present stigmatization. Fourteen percent (14%) of the respondents to the April survey and fifteen percent (15%) of respondents to the July survey said they would have been unlikely to have visited DVNP if there were no nuclear incident after ten years of operation. The



responses to this question are shown in Table IV-2.

Table IV-2 Percent of Respondents Who Would Not Have Visited DVNP Under Scenario 2: Ten Years of Safe Operation		
	April Survey %	July Survey %
Probably Not	9	10
Definitely Not	5	5
Total	14	15
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)		

The Minor Release Incident Scenario

Fifty-two percent (52%) of the April respondents and 59 percent (59%) of the July respondents told our interviewers they would probably not or definitely not have visited DVNP in response to the question:

“What if there had been a transportation incident in which a truck carrying high level nuclear waste to the repository resulted in a “minor” release of radiation? Would you still have visited DVNP?”

The responses to this question are shown in Table IV-3 below.

Table IV-3 Percent of Respondents Who Would Not Have Visited DVNP Under Scenario 3: Minor Release of Radiation		
	April Survey %	July Survey %
Probably Not	27	28
Definitely Not	25	31
Total	52	59
Source: Gruen Gruen + Associates; Urban Environmental Research (UER)		

Previous research has suggested that should an incident occur, locations near Yucca Mountain would be strongly stigmatized. Such a possibility was also confirmed by the personal experience of Nina and Claude Gruen, who were traveling in Russia during August of 2010 when fires that scorched forests near Moscow activated fears that had been dormant since Chernobyl’s Reactor Number 4 had exploded on April 26, 1986. While the Gruens were in Russia, concerns were raised in all areas that may have received some windblown contamination twenty-four years earlier. Kim Holmen, the head of the Norwegian Polar Institute, was quoted by Reuters as saying, “The sins of our fathers revisit us.”³ The basis of this concern was the fear that the fires might remobilize Chernobyl material in Bryansk province, which borders the Ukraine southwest of Moscow, and other areas of Russia and Europe possibly affected by wind-driven Chernobyl contaminants.

³ Anishchuk, Alexei, “Russia says fires burn Chernobyl-tainted forests” *Reuters*, August 11, 2010



Forecast of Trip Reduction That Would Be Induced if Yucca Mountain High Level Nuclear Waste Repository Becomes Operational

Table IV-4 displays the number and percent of total annual visitation represented by April and July visitors between 2005 and 2009. Totaling this five-year period to estimate an average indicates that the two months are roughly similar in terms of their proportion of annual visits. July visits averaged a little over nine percent (9.02%) of total annual visitation to DVNP, while April visitation averaged just under ten percent (9.74).

Table IV-4 Number and Percent of Annual Visitations to DVNP Occurring in April and July				
Year	April		July	
	Number	Percent of Annual	Number	Percent of Annual
2009	68,675	8.3	59,806	7.2
2008	79,141	8.7	107,479	12.3
2007	62,265	8.8	57,166	8.1
2006	77,945	10.5	56,990	7.6
2005	99,117	12.4	79,828	9.9
Average	77,429	9.74	72,254	9.02

Source: National Park Service Public Use Statistics Office; Gruen Gruen + Associates

However, we believe demographic characteristics of visitors during the eight cooler months of the year (October – May) are likely to be more similar to the April visitors than the heavily foreign-based July visitors typical of the summer months (June – September). Therefore, in order to calculate a conservative measure of our research findings with regard to the degree of stigmatization-driven trip reduction under each of the scenarios, we have calculated a normalized average for each of the scenarios by multiplying the April responses for each scenario by eight and the July responses by four, and then dividing the total by twelve to arrive at an average effect from each scenario on total annual visitation to DVNP. These normalized or weighted averages are shown on Table IV-5.

Table IV-5 Weighted Average of Percent of Decrease in Visitation to DVNP Under Alternative Scenarios			
	Knowledge of the Existence of the Yucca Mountain Repository %	No Accident after 10 Years %	Minor Radiation Accident %
Probably Not Visit	17.3	9.7	28.0
Definitely Not Visit	9.0	5.0	29.0
Total	26.3	14.7	57.0

Source: Gruen Gruen + Associates; Urban Environmental Research (UER)

The National Park Services Public Use Statistics Office report, found on <http://www.nature.nps.gov/stats/viewReport.cfm>, indicates that in the five-year period



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starting in 2005 through 2009, 3,949,187 recreational visits were made to DVNP. Thus, for this five-year period, recreational visits averaged 789,837 per year. This figure excludes an average of 27,984 annual non-recreational visitors to DVNP during the same five-year period, and does not extrapolate forward to indicate any future growth or decline in visitors in the absence of the repository considered in this study. Our survey excludes County residents who visited the Park, and interviewed no business visitors. Our estimates of the multiplier effect or interrelationship between the recreational visitors and the totality of the County economy will be presented in the following chapter. Below, the weighted average percentage of the decrease in visitation likely to be induced by the nuclear repository under each of the three scenarios is shown in a table that also repeats the percentages shown in Table IV- 5 above, but includes a quantitative forecast of the reduction of visitors.

	Scenario 1: Knowledge of Repository		Scenario 2: Ten Years Safe Operation		Scenario 3: Minor Radiation Release Accident	
	% Loss	# Visitors Lost	% Loss	# Visitors Lost	% Loss	# Visitors Lost
Probably Not Visit	17.3	136,640	9.7	76,614	28.0	221,155
Definitely Not Visit	9.0	71,085	5.0	39,490	29.0	229,055
Total	26.3	207,725	14.7	116,105	57.0	450,210

Source: Gruen Gruen + Associates; Urban Environmental Research (UER)

The range of visitor decrease summarized in Table IV-6 is quite large. The size of the range is caused by two types of future conditions, to which we cannot assign probabilities with a high degree of certainty. One such risk is that we cannot predict now which of the three posed scenarios about the operation of the nuclear repository would actually occur in the future. As indicated in the array of possible visit reductions shown in Table IV-7, the greatest risk is the unknown of whether there will be an incident in which some radiation leaks during the transport of high level nuclear wastes from their present sites to the repository. Assuming we utilize the percentage of potential visitors who would not come because of the repository to include only those who said they would **definitely not** visit after ten years of no incident, the loss of visitors would be only 5 percent. The loss would climb to 29 percent if there were an incident, still using only the stigmatization percentage from those who said they would **definitely not** visit.

The second risk results from our inability to feel certain that all those representative respondents who said they would probably not have visited would actually avoid the area. If the responses of those who were definite were added to those who answered “probably,” then the range of loss varies from a low of 14.7 percent, under the scenario with no incident after ten years of operation, to 57 percent following an incident.



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The risk range between the two risks summarized above and in Table IV-7 is greater for the uncertainty connected with whether there will be an incident in the future, than with the degree of certainty about the proportion of those who answered “probably” to the survey. Further, while it is possible, but we do not believe cost effective, for further research to narrow the uncertainty connected with the “probably” responses, there is no way to narrow the uncertainty of the future likelihood of incidents that will actually be associated with the operation of the repository.

In the following chapter, we predict the direct loss and cumulative loss to the economy and public fiscal base of Inyo County under the two extremes shown in Table IV-7.

Table IV-7 Summary of Possible Visitation Loss Arranged from Best to Worst Case*		
Scenario	Number of Visitors	Percent of Annual Visitation
“Definitely Not” visit after no incident in 10 years	39,490	5.0
“Definitely Not” and “Probably Not” visit inclusive after no incident in 10 years	116,105	14.7
“Definitely Not” visit when the repository opens	71,085	9.0
“Definitely Not” and “Probably Not” visit when the repository opens	207,725	26.3
“Definitely Not” visit after minor radiation release	229,055	29.0
“Definitely Not” and “Probably Not” visit after minor radiation release	450,210	57.0
*Assumes annual recreational visitation of 789,873, the average between 2005 and 2009.		
Source: Gruen Gruen + Associates; National Park Service		



CHAPTER V

**DIRECT AND CUMULATIVE NET ECONOMIC AND FISCAL IMPACT OF
OPERATIONAL NUCLEAR REPOSITORY AT YUCCA MOUNTAIN**

Table V-1 lists the average per day expenditures on the four categories of goods and services respondents were asked about in the surveys discussed in Chapter II of this report. In order to derive a per day expenditure estimate for visitors during the year, the data for expenditures inside and outside the Park drawn from the two DVNP visitor surveys were averaged. These averages were then weighted by four to cover the four summer months (June -- September) represented by the July survey, and by eight to cover the eight months (October – May) represented by the responses taken from the April survey at DVNP. Data from all three surveys were also used to estimate that the average Inyo County visitor spent one night and two days in the County. Finally, the per-day expenditures were multiplied times the average attendance of 789,837 per year from 2005 through 2009.

Table V-1 Estimated Annual Direct Expenditures in Inyo County from Recreational Visitation to Death Valley National Park			
Type of Expenditure	Average per Person per Day \$	Average Number of Days	Total Annual Expenditures
Lodging and Camping	\$71.96	1	\$56,836,670
Travel	\$60.46	2	\$95,507,090
Food	\$59.42	2	\$93,864,229
Other	\$48.50	2	\$76,614,189
Total Expenditures			\$322,822,178
Source: Gruen Gruen + Associates			

As discussed in Chapter IV, there will be a drop in visitation once the operation of a nuclear waste repository begins operations and is announced. At a minimum, there would be a 9 percent drop in visitation. That estimate is taken from the responses to our surveys (see Table IV-6), which indicated that 9 percent of current visitors definitely would not visit in the event the repository were open. If, in addition to the “definitely not,” all those respondents who said they would “probably not” visit were to be included, then the initial estimated annual monetary loss would increase from the \$29,054,000 shown in Table V-2 to an annual loss of \$84,902,200. After ten years, assuming that throughout that period there were no incidents involving the repository, the minimum loss would drop to \$16,141,000. If we were to include the percentage of those who indicated they would “probably not” visit even after ten years of no incidents, that loss would be \$31,313,800. Should there be a transportation incident somewhere in the system moving nuclear waste material to the repository, the minimum loss under this scenario, only counting the percentage of visitor respondents who claimed they would “definitely not” have made their present trip to DVNP, would be \$93,618,400. If one added in the greater percentage of respondents who



stated they would “probably not” have made their current DVNP trip, this maximum loss would increase to approximately \$184,000,000. The minimum and maximum losses under the three Yucca Mountain repository scenarios are shown in Table V-2 below.

Table V-2 Range of Annual Loss in Direct Expenditures within Inyo County From Potential Loss of Visitation Induced by Operation Of a Nuclear Waste Repository at Yucca Mountain		
	Minimum loss based on “definitely not”	Maximum loss based on “definitely not” and “probably not”
Estimated loss at initial opening of repository	\$29,054,000	\$89,902,200
Estimated loss, safe operation for ten years	\$16,141,000	\$31,313,800
Estimated loss, transportation incident	\$93,618,400	\$184,009,000
Source: Gruen Gruen + Associates		

Net Cumulative Economic Impact of Proposed Nuclear Waste Repository

Before moving on to the description of the methodology and estimates of the net cumulative economic damage or costs imposed upon employment and economic opportunity generated by the Inyo County economy, the reader is asked to consider the limitations of the quantitative estimates and the rationale behind our failure to include any project benefits. Taking the latter first, we have not followed our usual practice of considering both the costs or damages and benefits or positive effects of the project, because we found no evidence to suggest that the operation or announcement of the repository becoming operational would have any positive effect on the Inyo County economy, its people, or public treasuries.

For the most part, when a large and expensive project is being built, the local economy experiences at least a temporary boom, as some local workers obtain employment and some local vendors are able to sell supplies and equipment to the project. There is no evidence that this will be the case, or for that matter, has been the case, during the construction that has already taken place at the Yucca Mountain site. With regard to employment patterns, referred to in Chapter 1, the net pattern of worker commutation is from Nevada to southeast Inyo County, not the reverse. In other words, while some employees in southeast Inyo County do live in Nevada, usually in Pahrump, there seems to be no commutation accounted by the Census moving from southeast Inyo County to jobs in Nevada. While we think the conclusion reached by the statements contained in the Department of Energy’s description of the project, which was that there would be no socio-economic impact on Inyo County, was extremely erroneous, they based this conclusion on what we believe is the correct statement that neither employees nor equipment and material would be taken from Inyo County to the project site. Thus, the project represents an unusual situation in that in terms of the socio-economic impact of the project on Inyo County, it will be a lose-lose



situation for the County.

In calculating the estimates shown below, we have considered only the extremes of the direct expenditure losses that would be induced by a nuclear waste repository at Yucca Mountain. That is, we have considered the minimum estimated loss of \$16,141,000 in expenditures, which is based upon the combination of two key assumptions. First, we have assumed that this loss occurs annually after ten years of safe operation, during which time interval there are no incidents involving any leakage of radioactive material. Secondly, we have assumed that none of the respondents to our two DVNP surveys, who are representative of visitors to Inyo County, and who responded that they would probably not have visited DVNP, would actually have avoided visiting southeast Inyo County. The reader should keep in mind that this, in effect, “double minimum,” would actually not occur until ten years after the announcement or actual operation of a nuclear waste repository.

During the first year, or after the announcement, an annual loss of between \$29,054,000 and \$89,902,200 is estimated to occur. Then, as the potential visitors became more secure about safety issues, those annual damages would drop down to the above stated loss representing only the percentages derived from our surveys from people who said they would definitely not visit, even after ten years of safe operation.

Finally, the maximum estimated annual expenditure loss, which is one of the two differing assumptions we have made in reaching the estimates concerning the net cumulative effect of the drop in visitation, would only occur if there were an incident somewhere in the transportation system. That estimate assumes both those visitor respondents who indicated they would definitely not visit Death Valley National Park, as well as those who said they would probably not visit DVNP, would avoid visitation.

In terms of gaining a perspective or understanding of both the capabilities and limitations of the estimates we present, it is important to recognize that the input-output inter-industry model we use to reach a qualitative assessment, like all models, has its limitations. The IMPLAN model is a refined and improved version of a tool for inter-industry analysis that was invented in the 1930's by Wassily Leontief, the brilliant pioneer of inter-industry economics. The model, which is loaded with historical data on a sector-by-sector timed series of employment and output statistics, connects the relationships, or inputs and outputs, of each sector in the local economy with every other sector, and calculates the changes that work through the economy as a result of the relationships between the various sectors. Unfortunately, even in its current modern refined version, it cannot consider the effect of exogenous changes that alter the mood of investments in the local economy. The appearance of a major risk of future damages, even those that are in excess of what appears initially, will most certainly discourage would-be investors in any of the sectors affected by a decline in visitation.

As this is written in September of 2010, we can look back on the larger United States, and



even worldwide economy, to see the effect that the recognition of risks that first appears in December of 2007 has had on both the financing and the equity requirements of investment. Once the financial crunch hit and the fear of further damages to the economy became pervasive, financing sources seized up and equity sources became bargain hunters who dramatically slowed the demand for new, durable, and even some non-durable goods. We have no doubt that the potential, as well as the actual drop in visitation induced by the operation of the repository, and even its announcement, will magnify the net negative effect we have estimated and shown below.

Finally, no input-output model can take cognizance of changes brought about by declines in one source of demand that acts to alter the scale of activities in related sectors. That is, the mathematical formula in the IMPLAN model essentially assumes a linear relationship, based on historical data between the sectors, and cannot estimate damages caused by induced diseconomies of scale. For example, the basic mechanics of the input-output model are such that a \$5 million decline in sales at one particular establishment is, quantitatively, no different than a \$500,000 decline in sales across ten different establishments. In reality, when one considers the fixed costs that are incurred by those purveyors of goods and services most likely to be impacted by a decline in tourist visitation, the two scenarios are unlikely to result in the same cumulative effect.

We have seen in the course of our interviews and studies of the local economy in Inyo County that the County has many business activities of all sorts that require access to a broad customer base in order to cover their fixed costs. As an example, one business we interviewed in southeast Inyo County provided food, souvenirs, and lodging to visitors with a workforce that also dealt with the care, growing and harvesting of plants, some of which were exported outside the County to developments that included major landscaping. A drop in visitation, which only accounts for one part of this particular business' receipts (but an important part), would lower the overall level or scale of activities, thereby threatening the profitability and possibly the survival of the business. At a minimum, such induced diseconomies of scale would cause a larger downsizing of employment and output than would be caught in an input-output model. We know of no statistical method of accounting for such factors, although they will most certainly act to increase the damage estimates provided below in Tables V-3 and V-4.



Table V-3 Annual Economic Impact of a 5% Decline in DVNP Visitation on the Inyo County Economy¹			
	Employment ² Loss # Jobs	Labor Income ³ Loss \$	Output ⁴ Loss \$
Direct	131	3,263,000	8,911,000
Indirect	12	495,000	1,634,000
Induced	13	418,000	1,453,000
Total	156	4,176,000	11,998,000
¹ Figures are rounded. Presented in current 2010 dollars. ² Full and part-time jobs. ³ All forms of employment income, including wages/salaries, benefits and proprietor Income. ⁴ Value of all goods and services produced.			
Sources: Minnesota Implan Group; Gruen Gruen + Associates.			

Table V-4 Annual Economic Impact of a 57% Decline in DVNP Visitation on the Inyo County Economy¹			
	Employment ² Loss # Jobs	Labor Income ³ Loss \$	Output ⁴ Loss \$
Direct	1,488	37,195,000	101,586,000
Indirect	140	5,644,000	18,630,000
Induced	143	4,770,000	16,562,000
Total	1,771	47,609,000	136,778,000
¹ Figures are rounded. Presented in current 2010 dollars. ² Full and part-time jobs. ³ All forms of employment income, including wages/salaries, benefits and proprietor Income. ⁴ Value of all goods and services produced.			
Sources: Minnesota Implan Group; Gruen Gruen + Associates.			

The reader will also note that the net damage estimates (dollars of output lost) for both the minimum possible decline after ten years (Table V-3) and the maximum annual economic impact after an incident occurs somewhere in the transportation system serving the repository (Table V-4), are smaller than the direct expenditure losses shown in the above tables. The reason for these differences is that we are considering here only those losses that actually pertain to Inyo County. Thus, for example, if a vendor of an item that will be sold to tourists for \$100 loses the possibility of the sale, the loss to the Inyo County economy will be less than \$100. No profit, wages, or loss to the vendor or other income would be derived from the Inyo County economy from materials, equipment or labor bought from outside the County used to produce and transport the good or service that would have been sold to the visitor. The inter-industry model, IMPLAN, considers this reality.



Because the Inyo County economy is quite small, a relatively large amount of the components of goods and services sold in Inyo are actually imported from elsewhere. As a result, if one excludes the risk in this economy of scale factors, the range of annual loss will be between a little under \$12 million in output and 156 jobs during the tenth year of operation in the event of no incident, under the assumption that only the percent of respondents indicating they would definitely not come would be representative of the loss, and the maximum output loss of \$136,778,000 which would follow an incident, under the assumption of visitation loss from all those who said they would probably not visit and definitely not visit. In the worst case scenario, approximately 18.7 percent of the current job base would join the ranks of the unemployed. Under the best case scenario, again ignoring all the other negative factors discussed above, another 1.6 percent of local job holders would lose their employment.

Public Cost and Revenue Impacts

The operation of the proposed repository at Yucca Mountain will increase local public sector costs and decrease the revenues flowing into local treasuries. The costs one can estimate at this time would include the need to prepare emergency service providers in the County for a possible incident, and to monitor water quality in the aquifer that the County's hydrologist indicates receives runoff from Yucca Mountain. Table V-5 below presents these estimated costs, totaling \$190,962 per year.



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Table V-5 Estimated Costs to Inyo County for Emergency Responders and Water Monitoring if the Nuclear Repository Becomes Operational			
Southern Inyo Fire Protection District	Unit Cost	Replacement Interval (Years)	Annualized Cost
Tyvek Suits (Case of 25)	\$ 115	7.5	\$ 15
Clothing/Gear (15)	850	7.5	1,700
Extra Gear Testing (15)	150	1	2,250
Training (all 15 personnel – 24 hours every 2 years)	720	2	5,400
Training (Tuition Costs – all 15 personnel every 2 years)	1,500	2	11,250
Radiation Badges (15)	250	5	750
Radiation Meter (2)	925	7.5	247
Calibration/Testing	250	1	500
Personnel Costs (10% of Chief's time)			3,200
Planning Costs	5,000	5	1,000
Exercises (15 personnel, 2 days, 2 times per year)	480	0.5	14,400
Outreach	5,000	1	5,000
Miscellaneous			5,000
Subtotal			\$50,712
Sheriff: Training (2 x per year, 15 officers), administration, equipment			\$50,000
Environmental Health: Training (\$2,000), Planning (\$2,000)			\$4,000
Planning Department: Planning			\$2,000
Public Works Department: Planning			\$2,000
Health and Human Services Department: Planning			\$2,000
Long Term Water Quality Monitoring			
Water Department			
Staff (1 at 25%, Range 78)			\$18,250
Equipment/supplies/software/office space/etc.			5,000
Planning			2,000
Consultant			50,000
Subtotal			\$75,250
Overall Program Administration			\$5,000
GRAND TOTAL			\$190,962

Source: Inyo County Agencies



Potential Loss in Sales Tax

As mentioned in Chapter I, three revenue sources are particularly sensitive to potential decreases in visitation: sales taxes, property taxes and transient occupancy taxes. There are two sales tax collecting entities in the County – the City of Bishop and the County itself. As shown in Table I-7, in 2009, \$1,254,364 of sales taxes were collected by the City of Bishop, which represents 61 percent of the total Inyo County sales taxes of \$2,060,255. In 2009, 65 percent of the County’s total sales tax receipts of \$805,891 (excluding Bishop) were collected on sales made in Southeast Inyo County. This 65 percent, or \$523,309, is most vulnerable to visitation decreases induced by the operation of the proposed repository. We have assumed also that an estimated 15 percent of the sales tax collected elsewhere in the County, as well as the sales tax collected in the City of Bishop, are dependent upon sales made to visitors whose trip would not be made if they wished to avoid Southeast Inyo County. Therefore, continuing to use the sales tax revenues collected in the fiscal year ending June, 2009 as a base, the amount of sales tax we assumed would be vulnerable to changes in DVNP visitation are shown in Table V-6 below.

Table V-6 Sales Tax Dependent on Visitation	
65% of County sales tax collected in Southeast	\$523,309
15% of County sales tax collected elsewhere	120,884
15% of sales tax collected in Bishop	188,154
Total Sales Tax dependent on DVNP visits	832,347
<small>Source: Gruen Gruen + Associates</small>	

Decreasing the total sales tax shown in Table V-6 by 5 percent, which represents the minimum loss of visitation after ten years of safe repository operation, results in an estimated drop of \$41,617. Under the maximum visitation decrease of 57 percent following the report of a minor radiation leak somewhere in the transportation system, the sales tax decrease would be \$474,437. Both of these estimates are included in Table V-7. The reader is asked to note that the sales tax estimate included in Table V-7 is only one of the estimates shown on that table, and includes losses to the fiscal base of the City of Bishop as well as the County.

Potential Loss in Transient Occupancy Tax (TOT)

We have assumed the proportion of transient occupancy tax (TOT) collected in Southeast Inyo County and the City of Bishop that would be vulnerable to a decrease in DVNP is similar to the previously explained assumption about the vulnerability of sales taxes. Thus, 65 percent of the County transient occupancy tax, or \$1,186,256, is collected in or near DVNP, all of which would change in direct proportion to visitation drops at DVNP, while only 15 percent of the remaining County TOT, or \$95,800, would be affected as a result of changes in visitation to Southeast Inyo County. The lost TOT would be \$64,103 (\$1,186,256



+ \$95,800 x .05) under the minimum 5 percent visitation loss resulting after ten years of safe operation. The maximum TOT loss to the County, resulting from a 57 percent DVNP visitation drop following an incident somewhere in the transportation system, would be \$730,772. Both of these minimum and maximum estimates are shown in Table V-7. Not included in the decreases shown in Table V-7 is an estimated loss in TOT to the City of Bishop of \$12,802 under the minimum loss assumption and \$146,000 under the maximum loss assumption. In both of these calculations for City of Bishop TOT, we assumed that only 15 percent of their TOT would be affected by decreases in visitation to DVNP. As is the case in all of these estimates, the fiscal year 7/1/08 to 6/30/09 was used as the base for total revenue received. These revenues are also shown also in Table I-7.

Potential Loss in Property Tax

The only assessed value we have estimated to be affected by a drop in visitation to DVNP is the value of secured property within and immediately around the Park. The total assessed value in that area includes \$97,715,153 secured real estate, much of which is resort property, and \$25,170,957 unsecured property, much of which is related to the extraction or use of natural resources, such as geothermal energy and gold. We have made no deduction for this unsecured property. However, we have estimated that 5 percent of the 1 percent per year tax on the secured property, or \$977,153, would be affected by a drop in visitation. Decreasing that annual tax revenue by 5 percent to reflect the minimum loss of visitation after ten years of safe operation yields an estimate of a \$48,858 loss; decreasing that annual revenue by the maximum 57 percent loss in visitation following an incident yields a loss of \$556,997. Both of these estimates are shown in Table V-7. Should the loss of jobs and income fall within the middle range of loss estimates discussed in this report, the maximum property value losses shown in Table V-7 would be exceeded, as the demand for housing and properties decreases throughout the County.

Potential Loss in Other Taxes and Charges for Services

The County's two revenue sources of "other taxes" and "charges for current services" totaled to \$17,174,495 in the fiscal year 7/1/08 -- 6/30/09. We believe this revenue source will tend to correlate with the cumulative annual output loss of the Inyo County economy. Tables V-3 and V-4 show the estimated annual net cumulative output loss of \$11,998,000 for the minimum visitation decrease of 5 percent induced by the repository. This loss is equal to 1.1 percent of the total County output that year. Applying that percent to the \$17,174,495 of other taxes and charges for current services results in an estimate of loss of \$188,919, which is shown in Table V-7. The output loss resulting from a 57 percent decline in DVNP visitation is \$136,777,000; this equals 13 percent of total output. Applying the 13 percent to the \$17,174,495 of current charges and other taxes results in the estimate of \$2,240,202 loss shown on Table V-7.



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Table V-7 Estimated Minimum and Maximum Revenue Decreases to Inyo County Induced by Visitation Decreases Due to Operation of a Nuclear Repository at Yucca Mountain		
	Minimum (5% visitation reduction after 10 years safe operation)	Maximum (57% visitation reduction after minor radiation leak)
Sales Tax	\$41,617	\$474,437
Transient Occupancy Tax	\$64,103	\$730,772
Property Tax	\$48,858	\$556,977
Charges for Current Services and Other Taxes	\$188,919	\$2,240,202
Total Annual Loss	\$343,497	\$4,002,388
Source: Gruen Gruen + Associates		

Adding the loss in revenues shown in Table V-6 to the estimated costs, discussed above, that will have to be borne by the County should the repository be made operational increases the estimated total of costs and losses to a minimum of \$534,459 and a maximum of \$4,193,350.

Estimated Range of Minimum and Maximum Induced Loss and Risk

The width of the range of induced losses shown above actually reflects only some of the risks the operation of the repository would impose on the County. That range of possible losses is increased by the currently unquantifiable but likely effects that the resulting diseconomies of scale will impose on local businesses, and the possibility that the risk itself will impose investment disincentives.



**CHAPTER VI
ECONOMIC DIVERSIFICATION AS A MITIGATION OPTION**

The economy and public fiscal base of Inyo County will be negatively affected if the proposed repository for high level nuclear waste at Yucca Mountain becomes operational as discussed in Chapter V, the range of damage to the County's private economic output and employment is quite large. Probabilities cannot be assigned to the possible amounts or level of damage because, as explained in this report, they depend upon whether (a) there are no safety-related incidents after the repository opens; or (b) at some future time there are reports of an incident somewhere in the transportation system between the original location of the material and its storage in the repository. This would include an incident taking place anywhere in the country.

If there is no incident, the initial damage estimated in Chapter V will decline after ten years. Should there be an incident, the damage will be more than ten times the damage level estimated should there be no radiation leakage incident associated with the repository for more than ten years after it begins operation. The uncertainty, or risk, that the repository places on the County is extremely large.

The only option that might lower this risk would be a successful diversification of the County's present "one industry" basic economy. The most likely route to such diversification is available in the form of the natural resources that, while being only minimally exploited now, have the potential for once again becoming a significant part of the economy in Inyo County.

As shown in Tables I-4 and I-5 of Chapter I, both employment and output in mining has actually been declining since 2000. One reason for the decline, of course, is the drop in the price of aggregates and some metals since 2000. But even when the prices of materials that can be mined in Inyo County increase, the administrative mechanism for reopening mines is complex and slow. More importantly, since 91.6 percent of the land in Inyo County is owned by the federal government and under the management of federal agencies such as the Bureau of Land Management and the National Park Service, opportunities for the exploitation of natural resources are not readily discerned or acted upon quickly. Proposals have been made for expanding the mining of zeolite, gravel and gold. It is difficult to predict whether these proposals will receive the necessary approvals, and if so, when.

An even more diversifying opportunity exists in the field of energy. Major opportunities may well exist in the County for both solar and geothermal. For some time, there have been three lease applications on approximately 4,460 acres of federal land under the jurisdiction of the Bureau of Land Management. Should these lease applications be approved and geothermal resources exploited, the EIS now being reviewed by the BLM suggests the potential for the addition of significant employment and output gains to the County. But in discussions with representatives of the BLM, they point out that not only has the Environmental Impact



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Statement, originally written in response to an August 31, 2009 BLM proposal, not been approved, but no decision has been made whether geothermal use of the site would be appropriate.

This is not written as a criticism of either the BLM or any of the other federal and state agencies whose approval for leases and mining must be obtained before any available resources can be exploited. The reality is that the primary mission of both federal and state agencies is not to maximize either the amount or timing of natural resource use. In the course of our work, we have also met with representatives of the Los Angeles Department of Water and Power, who have considered the development of what would be one of the world's largest solar energy facilities on the Owens Valley lakebed. This program should be encouraged in order to facilitate in important mitigation.

Unless significant efforts, which would almost certainly have to be spearheaded by the federal government, are made to encourage the exploitation of the natural resource opportunities that exist in Inyo County, it is unlikely that the diversification of the local economy that would provide an offset to the risks of damage to the present economy by the proposed nuclear repository will take place. In the case of solar and geothermal energy opportunities, the loss of any federal or state efforts to encourage the exploitation of those activities is not only the County's, but the State's and the nation's as well. The opportunities that the Los Angeles Department of Water and Power have been studying to exploit the potential for solar energy in Owens Valley could produce one of the largest and most productive sustainable energy sources in the country, if not the world. But neither these opportunities nor the geothermal and other natural resource assets are likely to be exploited without the active support of the state and federal government, operating with a specially-funded task force, to benefit the nation and the County by streamlining the process and, where necessary, "salting the mine" of presently available high value resources in Inyo County.



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Since its founding in 1970, GG+A has pioneered the integration of behavioral research and econometric analysis to provide a sound foundation for successful land use policy and economic development actions. GG+A has also pioneered the use of economic, social and fiscal impact analysis. GG+A impact studies accurately and comprehensively portray the effects of public and private real estate developments, land use plans, regulations, annexations and assessments on the affected treasuries, taxpayers, consumers, other residents and property owners.

