

Mineral County Impact Report

**A Preliminary Assessment of
The Proposed Yucca Mountain Project and the
Transportation and Socioeconomic Impacts
To Mineral County, Nevada**

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1.0 INTRODUCTION

Mineral County is one of ten affected units of local government participating in the oversight and monitoring of the Yucca Mountain project. Located in west central Nevada, the County is sparsely populated. Most residents live along the U.S. 95 corridor in the Walker Lake Valley. The Town of Hawthorne is the largest population center. In recent years, changing economic conditions and personnel reductions at the Hawthorne Army Ammunition Depot (HAAAD) has reduced the population somewhat. HWAAD has and continues to play an important role in the socioeconomic conditions of Mineral County and the Town of Hawthorne. In addition to HWAAD, outdoor recreation, tourism, mining, and agriculture all play important roles in the Mineral County economy.

Because most communities are adjacent to the U.S. Highway 95 corridor, travelers, tourists, and commercial vehicle traffic provide a significant amount of expenditures and economic activity for local communities. Each year thousands of visitors pass through the area on their way to other locations, and to visit and use Walker Lake. Hotel occupancy rates are fairly high. There are several campgrounds and RV trailer parks in the local area that also provide opportunities for visitors and travelers passing through or coming to the area for recreation. Each year retirees (snowbirds) move through the area during the spring and fall because U.S. 95 provides easy access to locations in southwest, west and northwestern areas of the country.

The northern portion of Mineral County is almost entirely contained within the Walker Lake Indian Reservation. Currently, the reservation has a population of approximately 900. Major transportation facilities including truck and rail transportation traverse the Reservation.

Movement of high level nuclear waste and spent nuclear fuel could have a significant impact on Mineral County because nearly all areas of commerce and population are located on the U.S. 95 corridor.

Purpose and Need

This report is a preliminary investigation into the potential social, economic impact, and transportation impacts that could occur in Mineral County as a result of the Yucca Mountain Repository program and related transportation activities. The analysis considers direct, indirect and risk induced impacts associated with the repository program and more specifically the transportation program. Impacts discussed in this report are primarily related to transportation impacts. Although U.S. Highway 95 is not currently a preferred route to Yucca Mountain, states have the ability to select alternative routes that could place waste shipments to Yucca Mountain on a host of alternative routes other than U.S. DOT preferred transportation routes (Interstate System).

In two DOE shipping campaigns including the Waste Isolation Pilot Project in New Mexico and the Nevada Test Site, western states have been very active in the selection of transportation routes. A similar situation will likely occur with Yucca Mountain where

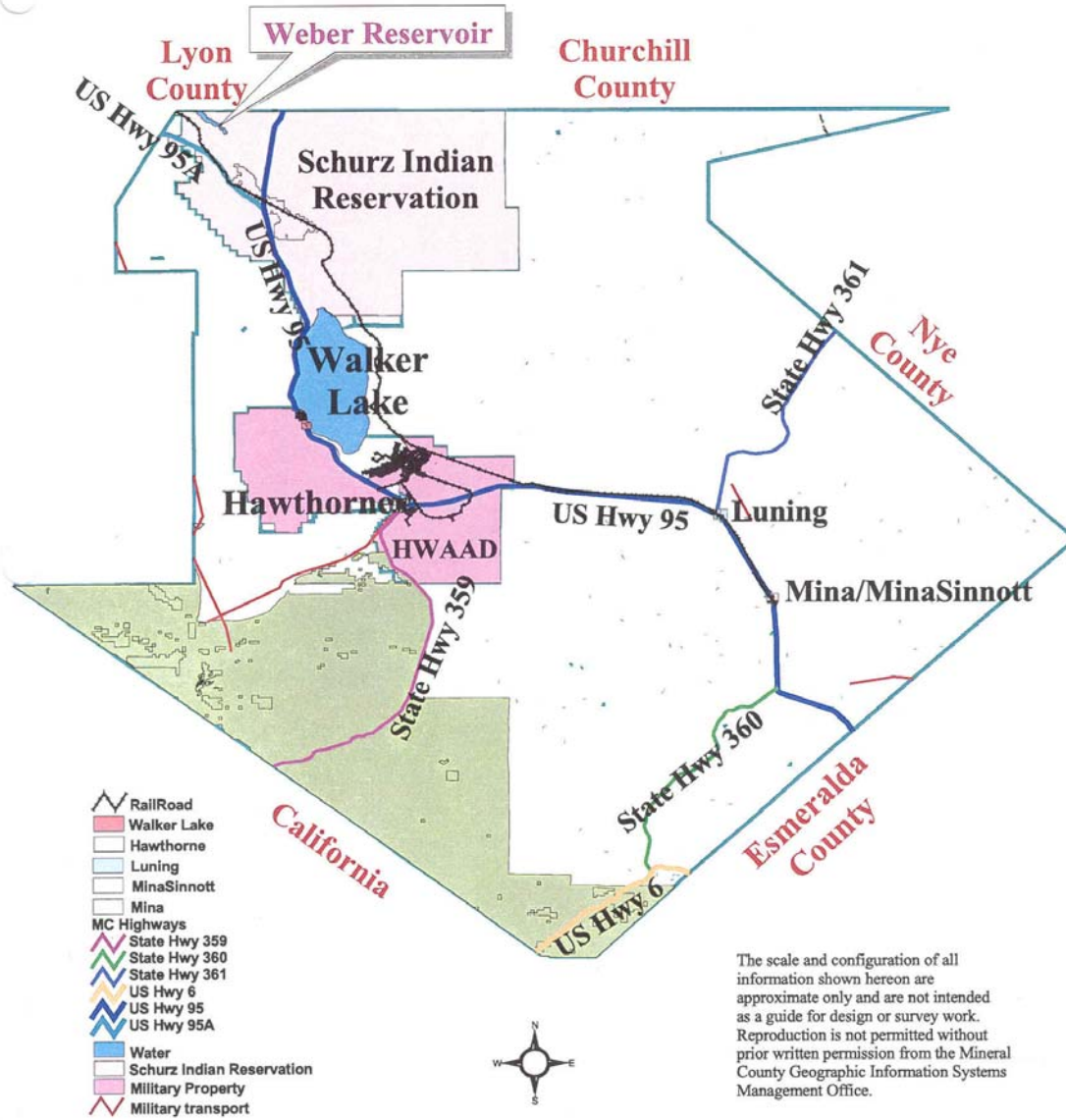
states become active in route selection in order to avoid major population centers. U.S. Highway 95 provides a logical substitute for certain generator sites throughout West and Northwestern areas of the country. As a result, Mineral County could experience a sizeable number of waste shipments to the Yucca Mountain site, if it were to be built.

Rail shipments through Mineral County are currently not expected although the branch line through Mineral County provides one of the shortest and least expensive rail alternatives for Yucca Mountain. At one time rail operations from the Mina Branch line extended almost all the way to Yucca Mountain. Much of the right-of-way currently exists today. The Walker River Piate Tribe currently owns a part of the existing the right of way in Mineral County. They remain opposed to any shipments through the Tribal lands. As a result, the rail line is currently not being considered as a transportation option to Yucca Mountain.

Organization of the Report

This report contains two major sections. Section 2.0 discusses existing and projected transportation activities and highway corridor characteristics associated with U.S. 95 in Mineral County. It identifies critical features of the corridor that could be adversely impacted by highway shipments to Yucca Mountain. Section 3.0 focuses primarily on the potential economic and fiscal implications of Yucca Mountain and the transportation program on Mineral County.

Figure 1-1 Mineral County



2.0 TRANSPORTATION

2.1 Waste Transportation Through Mineral County

This section identifies potential radioactive waste transportation scenarios associated with the Yucca Mountain project that may affect Mineral County. This report identifies the generators sites and prospective routes connecting to U.S. 95 through Mineral County. Currently, U.S. 95 is being used by the U.S. Department of Energy for low-level waste shipments to the Nevada Test Site. Use of rail through Mineral County is not considered a viable transportation option at this time. The DOE in its Draft Environmental Impact Statement identified the Mina rail route as no longer being under consideration for Yucca Mountain shipments.

2.1.1 Background for Waste Transportation Routes

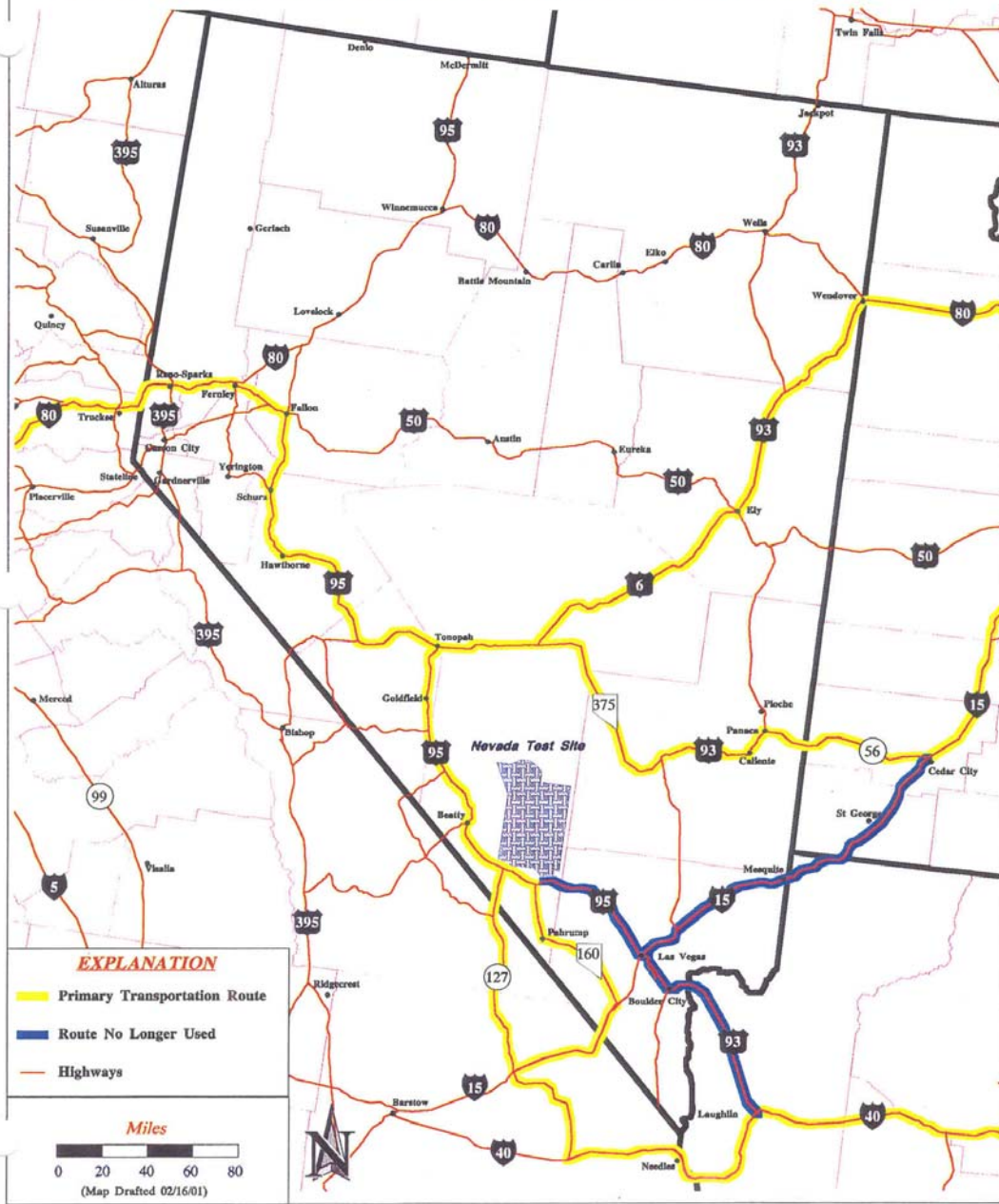
Since 1999, low-level waste (LLW) shipments from Lawrence Livermore and Sandia National Laboratories have entered Nevada on I-80 at Verdi and connected to U.S. 95 at Fallon in route to the Nevada Test Site (NTS). Previously, shipments from the California generators moved south through Los Angeles to Southern Nevada and then to the Nevada Test Site (NTS). Use of a northern route has probably been influenced by Clark County's desire to eliminate all radioactive material shipments through their area. Similar rerouting is occurring around the state. Interstate 80 and U.S. 93 are becoming the principal points of entry for LLW shipments from eastern generators to the NTS. The routes used for LLW shipments could become high-level waste/spent nuclear fuel (HLW) shipments to Yucca Mountain.

To avoid Las Vegas Valley, shipments from southern generators now use I-40 and enter California near Lake Havasu and then travel north on Highway 127 and 373 to Amargosa Valley. Shipments have even been made over the Spring Mountains west of Las Vegas on Highway 160, a two-lane highway passing through mountainous terrain. Utilization of a southern route makes southeastern California a point of entry for LLW and Yucca Mountain HLW shipments from generator sites across the U.S.

The Waste Isolation Pilot Project (WIPP) in Carlsbad, New Mexico stands as another example of likely route selection to be enacted by states and the DOE. WIPP shipments occur primarily through the mountain states. The central theme of the WIPP transportation program is the avoidance of major metropolitan areas. As a result, transportation routes to WIPP have become a patchwork of roadway segments creating essentially a "bubble" around major metropolitan areas. For the low-level program at the Nevada Test Site (NTS), a variety of routes are now being utilized in order to avoid the Las Vegas Valley. NTS shipment routes show a similar pattern of utilization where a metropolitan area becomes a node in the transportation network. Routes being utilized for shipments to NTS are shown on Figure 2-1.

Figure 2-1

Primary Low-Level Waste Routes to the Nevada Test Site



Even low-level waste shipments from northern California generator sites that originally traveled through the Los Angeles area in the past several years have been rerouted to Interstate 80 and U.S. 95. The low-level waste transportation routing process appears to be unfolding in a manner very similar to the WIPP shipments where the avoidance of major metropolitan areas is the primary objective.

Given the experience at WIPP and more recently with the low-level waste program, the Mineral County area stands a very good chance of seeing shipments to the Yucca Mountain site. It is very likely that the state of Nevada as well as other states in the west and across the country will move to protect the most populous areas as they have with WIPP and more recently with NTS shipments.

Department of Transportation regulations specify that states and tribes can designate preferred routes that are alternatives, or in addition to, interstate system highways including bypasses or beltways for the transportation of highway route-controlled quantities of radioactive materials. Highway route controlled quantities include spent nuclear fuel and high-level radioactive wastes in quantities that would be shipped on a truck or railcar to the repository. Nevada has not designated alternative preferred routes for highway route-controlled quantities of radioactive materials. If and when Yucca Mountain shipments begin, the State of Nevada will probably designate alternative routes similar to those now being used by the LLW program. As a result, Mineral County will probably be impacted by Yucca Mountain shipments as described in the following scenario.

2.1.2 Generator Sites and Shipment Volumes

There are a number of generator sites in the Western United States that will be shipping spent nuclear fuel and high-level waste to Yucca Mountain. These sites are comprised of commercial reactor sites, and DOE facilities in four western states. Figure 2-2 shows the location of generator sites and the likely routes connecting to U.S. 95 and Yucca Mountain. Table 2-1 lists the generator site and the number of truck shipments likely to occur through Mineral County.

The greater amounts shown in modules 1 & 2 (Table 2-1) generally reflect continued operations at nuclear power plants across the country and projected waste generation volumes at other DOE facilities.

2.1.3 Private Fuel Storage-Skull Valley, Utah

One unknown is the influence that an interim storage facility will have on transportation routes. A consortium of nuclear power utilities and the Goshute Indians are seeking a license to construct and operate an interim storage facility for spent nuclear fuel. Private Fuel Storage L.L.C (PFS) is a limited liability company owned by eight U.S. power utilities. PFS has applied to the Nuclear Regulatory Commission (NRC) for a license to receive, transfer, and possess spent nuclear fuel (SNF) from commercial nuclear power plants at a privately owned independent spent nuclear fuel storage facility.

Figure 2-2
**Transportation Routes to Yucca Mountain
 From Western Generator Sites Using US95**



Mineral County

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**Table 2-1
Potential Generator Sites and Shipment Volumes
To Utilize U.S. 95 Through Mineral County**

Reactor Site	Yucca Mountain Shipments	
	(2010 – 2033) Proposed Action	(2010 – 2048) Modules 1 & 2
Humboldt Bay (Eureka, CA.)-SNF	44	44
Rancho Seco (Sacramento, CA)-SNF	124	124
Diablo Canyon I (San Luis Obispo, CA)-SNF	327	617
Diablo Canyon II (San Luis Obispo, CA)-SNF	305	691
INEEL (Twin Falls, ID)-SNF	1,388	1,467
INEEL (Twin Falls, ID)-HLW	0	1,300
Trojan (Astoria, OR.)-SNF	195	195
Hanford (Hanford, WA.)-SNF	754	809
Hanford (Hanford, WA.)-HLW	1,960	14,500
WPSS 2 (Keniwick WA.)-SNF	353	736
Total	5,450	19,193

Source: DOE 1999, Draft EIS Yucca Mountain Project. SNF-Spent Nuclear Fuel, HLW-High-Level Waste.

PFS has identified a location for this facility on the Reservation of the Skull Valley Band of Goshute Indians approximately 27 miles west-southwest of Tooele, Utah. Skull Valley lies just south of Interstate 80 approximately one hour from the Nevada border.

The proposal involves the construction and operation of a storage facility that would be designed to store up to 40,000 metric tons of uranium (MTU) of SNF. The capacity of the facility would be sufficient enough to store all the SNF from the PFS member utilities, as well as SNF from utilities that are not members of PFS. The proposed repository at Yucca Mountain is currently allowed to store up to 70,000 MTUs. With an interim site shipments would probably begin before the repository opens in 2010. The interim site could become operational as early as 2003. The operation of a interim site at Skull Valley could potentially reduce the number of truck shipments moving through Mineral County to Yucca Mountain. California sites may choose to ship wastes first to the interim site. Once waste arrives at the interim site, it will be shipped by rail to an intermodal site or by truck utilizing Interstate 80 and U.S. 93 through Ely and Tonopah, Nevada.

Section (2-2) describes key transportation characteristics of the U.S. Highway 95 corridor that passes through Mineral County and more specifically through the Hawthorne and Walker Lake area. This assessment provides a more realistic basis for the determination of hazards and risks associated with shipments to the proposed Yucca Mountain site.

2.2 U.S. 95 Corridor in Mineral County

The corridor profile in Section 2.2 focuses primarily on characteristics of the U.S. 95 Highway corridor through Mineral County and more specifically the characteristics of the highway corridor from the Town of Walker Lake to Hawthorne which is approximately 12 miles in length. Most of the County's population lives in this area.

2.2.1 Population Along the Transportation Corridor

The largest population center in Mineral County is located in the Hawthorne and Walker Lake area. Population estimates for the affected areas are shown in Table 2-2.

Table 2-2
Mineral County Population
2000 Estimate and 2010 Projection

Area	2000 Population Estimate	% of County	2010 Population
Mineral County	6,270	100%	7,643
Hawthorne	3,875	62.0%	4,739
Mina	380	6.1%	466
Luning	106	1.7%	129
Walker Lake	412	6.6%	504
Schurz	860	13.7	1,047
Hawthorne Area (1)			
Total Population	4,287	68.4%	5,228
Effective Population	4,778	76.2%	5,824

Source: Nevada State Demographer, 1999 and GIS Department, (1) Includes Walker Lake and Hawthorne.

Population estimates were made for corridor widths of 1 mile (.5 mile on each side of the centerline). Total population in the 1-mile corridor area between Walker Lake and Hawthorne is estimated to be approximately 4,287. The corridor is approximately 12.4 miles in length from the Town of Walker Lake to Hawthorne. Using a 2 percent growth rate, population growth for Mineral County is projected to reach 7,643 in 2010. Projections for other areas in Table 2-2 are based upon the percentage of County population in 2000.

Population density is considerably higher along certain portions of the corridor. In the Hawthorne area most residents live within one square mile surrounding the highway. As a result, population density for Hawthorne is approximately 3,875 persons per square mile. The same is true for portions of the corridor within the community of Walker Lake where current population density is 412. The population density along the entire corridor from Walker Lake to Hawthorne (345 per square mile) is more similar to the suburban density used by RADTRAN in the risk assessment for the Yucca Mountain Draft Environmental Impact Statement. The population density of Hawthorne falls between the suburban and urban population densities shown in Table 2-8.

Because there are several local motels and recreational vehicle parks in the corridor, the total population is somewhat higher. There are 276 motel rooms in Hawthorne that have an average occupancy rate of 70 percent. As a result, on any given day there are approximately 386 overnight visitors. On average, there are 105 overnight visitors at local RV parks. Therefore, the effective population in the Hawthorne corridor area is 4,778 resulting in a population density of 385 people per square mile.

2.2.2 Corridor Land Use

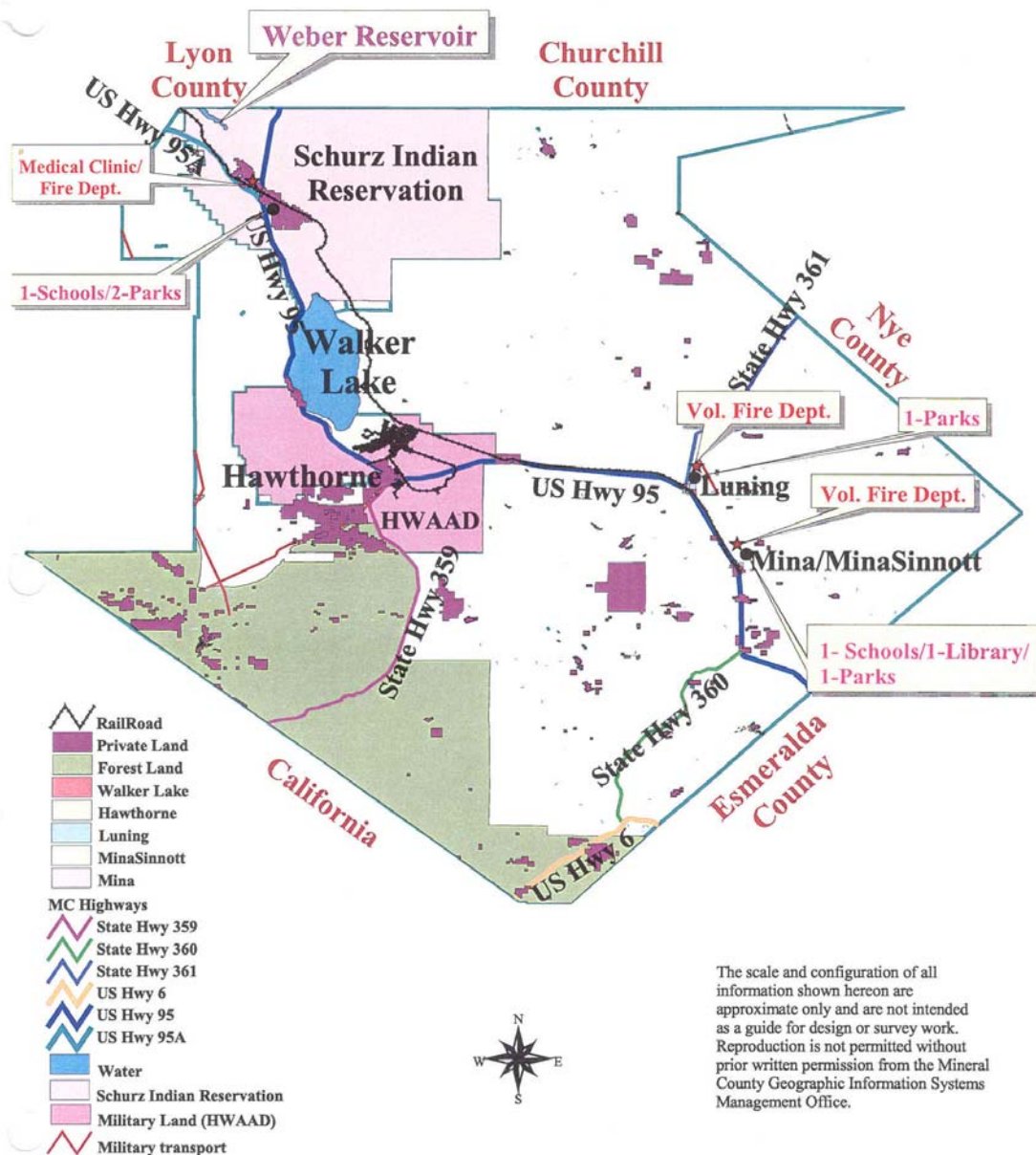
Figure 2-3 shows land use along the corridor in Mineral County. Outside the 12.4 mile corridor, the highway segments in Mineral County pass through primarily rural open space where the population density is extremely low. Most land is public land used for livestock grazing, mining, and recreation. In the Hawthorne area, the Department of Defense has large land holdings used for storage of conventional weapons. At the very northern end of Mineral County there is the Walker River Piaute/Shoshone reservation that has a population of approximately 860. Within the reservation there is residential housing, small commercial establishments, and a few Tribal administration buildings. There is a Tribal school just south of the intersection with U.S. Highway 95A.

South of the Reservation, the Highway corridor runs parallel to Walker Lake for approximately 14 miles. There are two camp/rest areas along the highway near Walker Lake. The Highway passes through the community of Walker Lake. There are a small number of tourist commercial uses along the Highway as well as residential housing.

The predominate land use from the community of Walker Lake to Hawthorne is Department of Defense lands. The Hawthorne Army Ammunition Depot (HWAAD) is a government owned contractor operation that encompasses 147,044 acres including the southern one-third of Walker Lake. The mission of HWAAD is to serve as an ammunition depot; produce, assemble, test, and demilitarize munitions; maintain equipment; and provide tenant support. HWAAD has 1,793 permanent, earth covered munitions magazines and 97 permanent explosive storehouses, with a combined storage capability of 92,250,000 cubic feet (U.S. Department of the Air Force, 1991).

In the town of Hawthorne land uses are mixed. There are primarily commercial and residential developments on the highway corridor. Development encroaches upon the highway corridor in some areas at a distance of less than 30 feet and sometimes less than 15 feet. Several of the commercial establishments along the corridor are motels. Many of the major motels in the area are located adjacent to the highway effectively increasing the population density of the corridor. There are also a number of RV parks along in the corridor. Most of these parks are adjacent to the highway. Their presence, particularly in the summer and fall months effectively increases the permanent population along the corridor. In all there are approximately 75 RV spaces in the corridor. Most are located in Hawthorne. Lands immediately south and east of Hawthorne are under the control of the Department of Defense

Figure 2-3 Mineral County Land Use



In the Towns of Mina and Luning, which are located adjacent to U.S. 95, there are a variety of land uses. The most predominate land use are small tourist commercial and residential. The location of many residential and commercial establishments within the corridor is much closer than default assumed in the Radtran Analysis used in the Yucca Mountain DEIS. In the Town of Hawthorne, commercial establishments along U.S. 95 are generally within 15 to 30 feet of the highway. Figure 2-4 and 2-5 show land use in Hawthorne and Walker Lake.

2.2.3 Public Facilities

Population density within the corridor generally increases due to a number of public facilities (Table 2-3). There are three elementary, one middle school, and one high school within .5 miles of the highway. These facilities are generally less than .25 miles from the highway. There are approximately 865 children enrolled in public schools. Figure 2-4 shows the locations of public facilities in relation to the U.S. Highway 95 corridor.

**Table 2-3
Public Facilities Adjacent to U.S. Highway 95 Corridor
Mineral County:2001**

Area	Number in Corridor
Hawthorne to Walker Lake	
Elementary Schools	1
Middle/Secondary Schools	1
Fire Station/Public Safety Building	2
Library	1
Parks	4
Campgrounds	3
Hospital	1
Schurz Area	
Elementary Schools	1
Middle Schools	0
Fire Station/Public Safety	1
Library	0
Parks	2
Medical Clinic	1
Mina to Luning	
Elementary Schools	1
Middle Schools	0
Fire Station/Public Safety	2
Library	1
Parks	1
Total Facilities	24

Figure 2-4 Hawthorne Land Use and Public Facilities

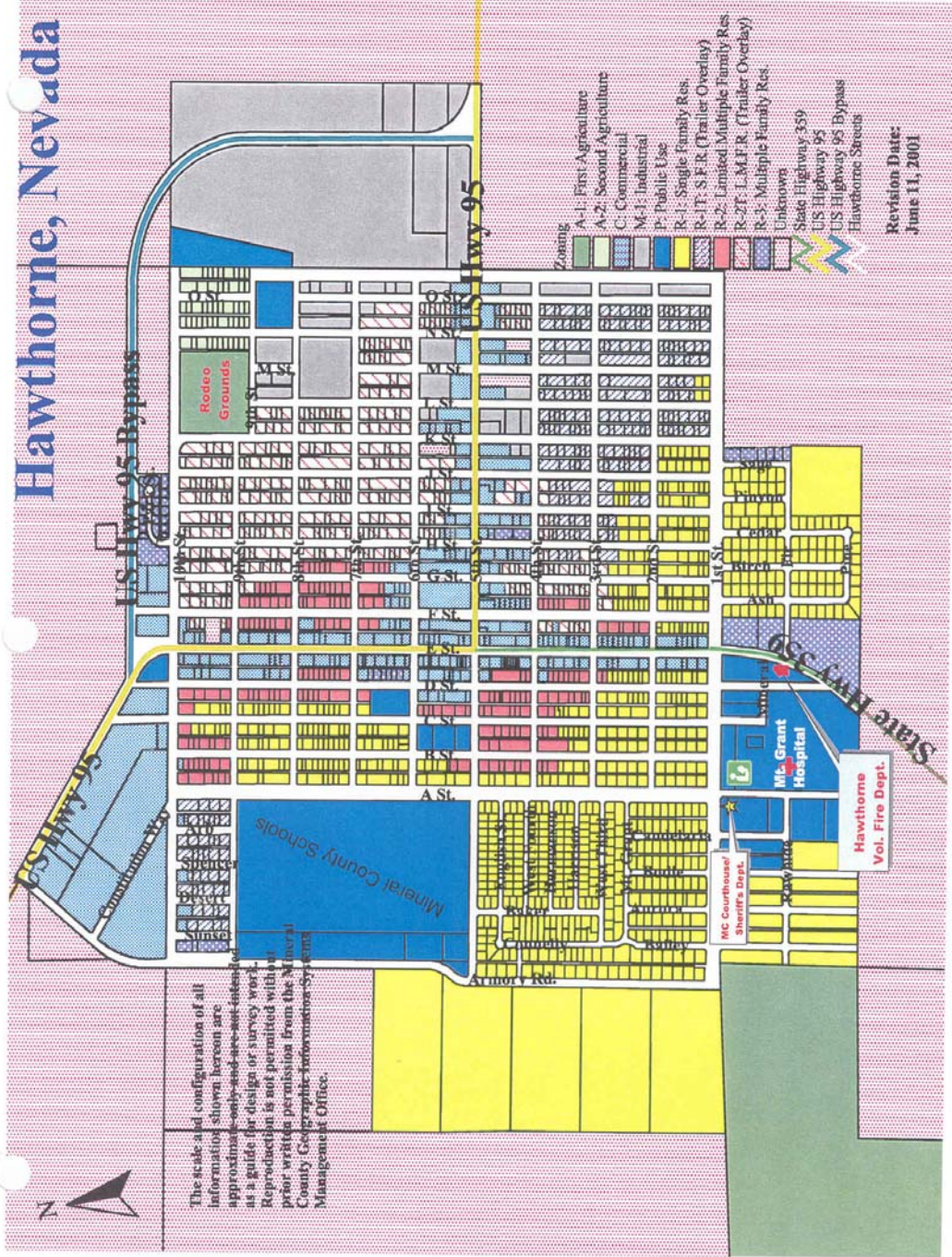
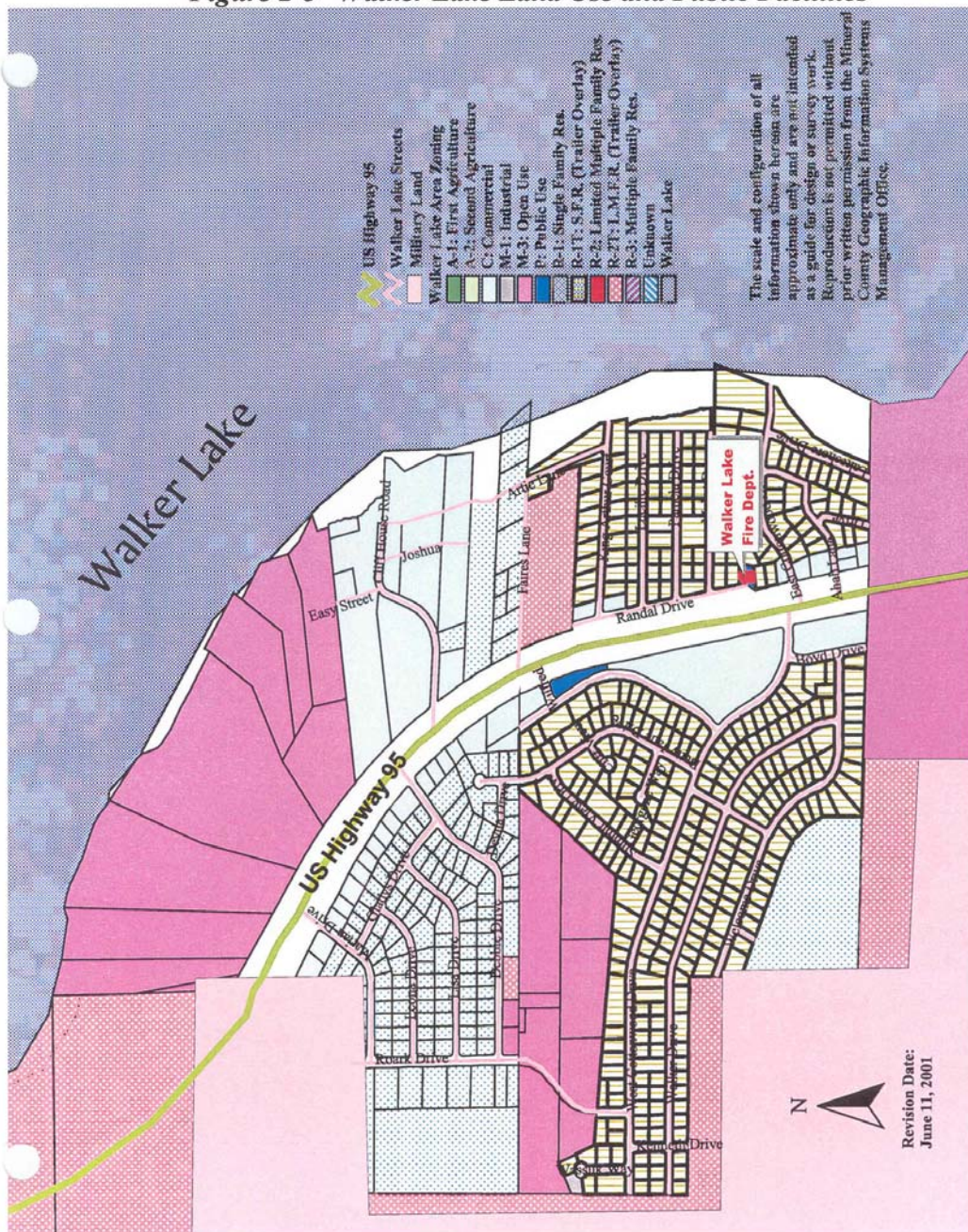


Figure 2-5 Walker Lake Land Use and Public Facilities



2.2.4 Corridor Characteristics

Corridor characteristics are summarized in Table 2-4. The information in Table 2-4 is part of a transportation risk analysis for Mineral County. The entire County is broken down into three segments. They include: (1) Churchill County line to the Town of Walker Lake, (2) Walker Lake to the Town of Hawthorne, (3) Town of Hawthorne to the Nye County Line.

Table 2-4
Corridor Characteristics Mineral County

Characteristics	Churchill County to Walker Lake	Walker Lake to Hawthorne	Hawthorne to Nye County
Travel Time (Min.)	31.33	15.4	43
Total with Stops (min)	0	.5	0
Distance (miles)	33.6	12.4	50
Distance at Posted Speeds			
70 mph	27.1 miles	7.7 miles	<50 miles
60 mph	2.7	.3	-
55mph	.9	.3	Minor
50mph	.5	1.7	Minor
45mph	.5	1.5	Minor
40mph	1.3	-	Minor
35mph	-	.3	Minor
30mph	.6		Minor
25mph	-	.6	-
Lanes	2	2-4	2
Travel Lane Width	12	12	12
Shoulder Width	4	4	4
ADT 1999	3,450	5,500	2,150
ADT 2010 (Estimated)	4,205	6,704	2,620
Level of Service			
2000-NDOT Estimate	A	A-B	A
2015-NDOT Estimate	A	A-B	A
Signalized Stops	0	1	0
Stop Times (Sec)	0	.5	0
Avg. Peds @ Stop	0	2	0
Avg Cars @ Stop	0	5	0
Population			
2000	1,497	4,287	486
2010	1,824	5,228	592

2.2.5 Population Density

Table 2-5 shows population density for various population zones across the United States. Population density along the U.S. 95 corridor varies by location. Within the mile or so that passes through the Hawthorne area population density reaches 4,778 persons per square mile. These values are similar to the suburban population densities used by RADTRAN. Overall, the 12.4 mile corridor has a current overall population density of 385 persons per square mile with a projected increase to 422 persons per square mile in 2010.

**Table 2-5
Comparison of Population Density Data
persons/km² By Density Zone for the United States
persons/square mile shown in ()**

Pop. Zone	Average Route Truck-a	Average Route Rail-b	NUREG 0170-c	1990 Census
Urban	2,260 (8,725)	2,390 (9,228)	3,861 (14,907)	1,282 (4,950)
Suburban	349 (1,347)	361 (1,394)	719 (2,776)	766 (2,957)
Rural	10 (39)	10 (39)	6 (23)	7 (27)

Sources: a Average population density from 1,258 routes generated using Highway, b- Average population density from 1,088 routes generated using interline, c- NRC 1977.

Collective population dose

The RADTRAN calculations of risk for routine highway and rail transportation include exposures of the following population groups:

- *Persons along the route (off-link population).* Collective doses are calculated for all persons living and working within 0.8 km (0.5 mi) on each side of a transportation route.
- *Persons sharing the route (on-link population).* Collective doses are calculated for persons in all vehicles sharing the transportation route.
- *Persons at stops.* Collective doses are calculated for people who may be exposed while a shipment is stopped en route.
- *Crew members.* Collective doses are calculated for truck and rail transportation crew members.

The RISKIND model is used to estimate risk to maximum exposed individual (MEI) for a number of hypothetical exposure scenarios. The dose to each MEI considered is calculated with RISKIND for an exposure scenario defined by a given distance, duration, and frequency of exposure to that receptor. A very common exposure scenario in the

corridor is a resident or person working at a business adjacent to a transportation route. There are areas where the distance of residential housing and business are less than 30 feet from the highway route. Shipments in these areas will generally travel at a speed that would not exceed 25-40 miles per hour.

2.2.6 Vehicle Speeds

Table 2-6 includes RADTRAN 4 default vehicle speeds. Along the U.S. 95 corridor posted vehicle speeds range from 25 mph to 70 mph. Within the Walker Lake to Hawthorne segment the average speed is just over 49 miles per hour. Much of the posted speed limit through Hawthorne is 25mph. There is one signal in Hawthorne with a total stop time of approximately 30 seconds.

**Table 2-6
RADTRAN 4 Default Vehicle Speeds
And Average Speeds in the U.S 95 Corridor (Legal Weight Trucks)**

Population Zone	Truck (MPH)	Corridor Segment	Average Speeds (MPH)	Total Distance
Rural	55	Hawthorne/Walker Lake Corridor	49.3	12.4 miles
Suburban	25	Town of Hawthorne	25.00	.7 miles

2.2.7 Average Daily Traffic Volumes

Average daily traffic volumes on the U.S. Interstate System are shown in Table 2-7 and one-way traffic volumes for population zones are shown in Table 2-8. Most interstate systems have at least two lanes in each direction. The one-way traffic volumes represent two lanes of traffic. In comparison, portions of the corridor have average daily traffic volumes similar to larger urbanized areas along interstate routes (Table 2-9). One-way traffic volumes in the Hawthorne area are similar to those used for RADTRAN for small urban areas.

Traffic volumes will probably increase by the year 2010 and beyond due to population increases in the Hawthorne and Walker Lake area. Using a ratio of traffic volume to population, the average annual daily traffic for locations in Table 2-8 could increase somewhat, but traffic is not projected to increase to a point where the total number of cars would near the urban thresholds by the time shipments would begin in 2010.

**Table 2-7
Average Traffic Volumes on the U.S. Interstate System**

Population Zone	Average AADT Per Lane		Hourly Average per Lane Based on a 17 Hour Day	
	1993	1994	1993	1994
Rural Area	4,329	4,511	255	265
Small Urban Area	6,252	6,269	368	369
Urbanized Area (pop.50,000-199,999)	10,341	8,435	608	496
Urbanized Area (pop.200,000+)	14,446	14,489	850	852
Urbanized Area (pop. 50,000+)	13,243	13,508	779	795

Source: U.S. DOT

**Table 2-8
One-Way Traffic Volumes for Truck Transport**

Population Zone	NUREG-0170
Urban	2,800/hr.
Suburban	780/hr.
Rural	470/hr.

Source: Nuclear Regulatory Commission, 1977

**Table 2-9
Average Daily Traffic
Locations along the U.S. 95 Corridor-
1999 Actuals and 2010 Estimates**

Location	AADT 1999/2010	Cars Per hour (17h-day)
U.S. 95 200' North of SR 359	5,900/7,190	347/423
U.S. 95 S/B 100 N of C St.	5,500/6,705	324/394
U.S @ Babbit	4,500/5,485	265/323
U.S. 95 .3 Mi. North of Babbit	3,200/3,900	188/229
U.S. 95 .4 Mi. South of Schruz	3,450/4,205	203/247
U.S. 95 .1 Mi. South of SR 361	2,150/2,620	126/154

Source: NDOT, 1999

2.2.8 Delays Caused By Accidents not Involving Yucca Mountain Shipments

Truck shipments to Yucca Mountain will experience minor delays caused by vehicle accidents in the corridor. Under current conditions the Hawthorne corridor is expected to accommodate over 18,104,000 vehicle miles annually. By 2010 the corridor is projected to see some 27,156,000 vehicle miles, annually. Over the last three years Mineral County had averaged 168.7 accidents per year. Based upon the total number of vehicle miles,

approximately 17 percent or 28.8 accidents would have occurred in the corridor. Because higher traffic volumes occur along U.S. 95, particularly in the Hawthorne area, higher accidents rates can occur. Because U.S. 95 functions more as an arterial route, particularly between Hawthorne and Walker Lake, crash rates could be more similar to urban principal arterial where crash rates are 295 per 100,000,000 vehicle miles resulting in a estimated 80.1 crashes by 2010.

Under scenario I, trucks would be in the corridor (Walker Lake to Hawthorne) approximately .62 hours per day and 3.04 hrs under scenario II. Using a 17 hour day, Yucca Mountain shipments could be expected to be delayed less than 2 hours per year, assuming an average accident delay of 30 minutes.

2.2.9 Accidents Involving Yucca Mountain Shipments

The total number of Yucca Mountain shipments under Scenario I and II is expected to range from approximately 5,450 to 19,193. The total number of accidents involving Yucca Mountain shipments is expected to range from .3 to as high as 1.02 accidents over the life of the campaign.

2.2.10 Risk Analysis

Table 2-10 summarizes some of the important risk analysis parameters for the Hawthorne Corridor.

2.2.11 Radiation Exposure and Accident Scenario

The maximally exposed individual in the corridor at 2010 will be exposed to all shipments and will probably reside at a location within 30 feet of the highway and sometimes as close as 15 feet to the highway. There are several locations in the corridor where this situation is likely to happen. An individual living and working in and around the signalized intersection would most likely be the maximally exposed individual.

A very likely accident scenario would include a collision with another truck. U.S. 95 is a high speed undivided two-lane highway through much of Mineral County. A credible accident resulting in a release of radioactive materials could occur in one of the high speed areas just north or south of the Town of Hawthorne.

Table 2-10
Summary of Risk Analysis Inputs
.5 Miles of the Highway Route

	Walker Lake North	Hawthorne Corridor	South County
Roadway Classification	Rural Highway	Suburban Arterial	Rural Highway
Land Use			
Current	Rural	Suburban	Rural
2010	Rural	Suburban	Rural
Population			
Current	1,497	4,287	486
2010	1,824	5,228	592
Employment			
Current	450	1,300	150
2010	550	1,585	180
School Enroll.			
Current	122	763	7
2010	150	930	9
Vehicle Speed	64.35mph	49 mph	69.7mph
Routine Delays	NA	NA	NA
Accidents Delays			
Current ScenI- Scenario II		< 2hrs/yr	
2010 Scen.- Iscenario II		< 2hrs/yr	
Distance to Receptors			
	15-30 ft	15-30ft	30 feet
Traffic Density			

Current	3,450	5,500	2,150
2010	4,205	6,705	2,620

2.12 Summary of Potential Impacts

As discussed throughout this section, the transportation of waste through Mineral County has the potential for significant adverse impacts. Although the DOE considers the area rural for purposes of its risk assessment, transportation characteristics show that Mineral County has numerous features that are more similar to suburban and even urban areas.

Although the U.S. 95 corridor passes through areas of low population density, the Hawthorne area has a population density more in line with suburban and urban areas. In addition to total population, there are special populations such as elementary and secondary schools located adjacent to the highway route. Additionally, the area receives a relatively large number of overnight visitors to the area which further increases the effective population of the Town of Hawthorne.

The existing highway corridor is largely characterized as a high speed undivided highway throughout much of its length in Mineral County. As a result, there is a potential for vehicle collisions that are severe enough to breach a container having radioactive wastes destined for Yucca Mountain. The maximum posted speed limit is 70 miles per hour. There are areas where speed limits in the corridor are reduced to as low as 25 miles per hour particularly in areas in and around population zones. Accident rates for Mineral County are slightly higher than those identified for rural areas in the Yucca Mountain EIS. Given the estimated number of shipments and the accident rates, transportation accidents involving shipments to Yucca Mountain are likely to occur in Mineral County. Conditions in Mineral County could support a category 4 and possibly a category 5 accident. Also because U.S. 95 passes through urbanized areas, principally in Hawthorne, individuals will be exposed in a non-accident scenario. Slow corridor speeds, traffic movements, and a signalized intersection along U.S. 95 through Mineral County can cause an increase in the amount of exposure in a non-accident situation.

The route currently serves as a major commerce and trucking route connecting northern and southern Nevada. There are a variety of hazardous material shipments already occurring on U.S. 95 including occasional shipments of ammunition associated with the HWAAD. This facility stores approximately 300,000 to 400,000 tons of primarily conventional munitions. An accident involving HAAAD activities with a truck hauling radioactive waste to Yucca Mountain could potentially have severe consequences for the Hawthorne area.

Transportation activity through Mineral County will also result in a variety of social and economic impacts. Impacts experienced by Mineral County will be similar to those experienced in other Nevada Counties. Section 3.0 of this report provides more detail on the potential social and economic impacts expected to occur in Mineral County.

3.0 SOCIOECONOMIC IMPACTS

This section focuses on local community fiscal and economic impacts to Mineral County as a result of the construction and operation of a proposed repository at Yucca Mountain including the related transportation impacts. In general, the socioeconomic analysis considers both direct impacts and impacts occurring as a result of special or risked induced behavior. The State of Nevada has conducted several research efforts in the area of risk-induced behaviors. Their findings shows that a high-level nuclear waste repository will be colored by the very powerful negative imagery historically associated with radioactivity. From this, it follows that the repository site, the waste transport routes, and other locations linked to the repository may become affected by the negative perceptions and imagery associated with nuclear waste, if this occurs, these places could become less desirable in the eyes of both residents and nonresidents of Nevada. Some of the principal concerns raised by the State include potential reduction in short-term visits to the region by vacationers, gamers, and convention-goers; effects on potential migrants to the state; and reduced ability to attract new business.

The socioeconomic analysis has been divided into two general sections, which include general economic and fiscal impacts. Most of the socioeconomic impacts will occur as a result of transportation through Mineral County. However, there are several areas where the well-being of Mineral County residents and the socioeconomic conditions will be directly or indirectly linked to Yucca Mountain and transportation related activity in southern Nevada.

3.1 Economic Impacts

Mineral County could incur direct economic impacts as a result of Yucca Mountain shipments. Economic impacts including reduced economic activity, a loss of income and jobs, and lower property values will be the result of :

- A decline of visitors willing to stay overnight in Mineral County
- A decline of property value along the waste transportation routes through Mineral County.

3.1.1 Loss of Local Visitors

Risk induced behavior can occur locally as a result of Yucca Mountain shipments through Mineral County. In addition to loss of economic activity, there are a host of state and local taxes generated in Mineral County that can be adversely impacted in the event of risk-induced behavior by visitors occurs. The loss of local visitation is primarily measured in terms of overnight visitors staying at local motels in the Hawthorne area. No attempt was made to value the impacts of other visitors to the area such as those related to outdoor recreational use.

There are approximately 276 motel rooms in Hawthorne. Based upon discussions with local operators, the overall occupancy rate could be as high as 70 percent resulting in as many as 70,518 room nights per year. The average number of persons per room is assumed to be 2 based upon the Reno/Sparks Visitor Convention Authority's Annual Survey of Visitors. Therefore, the total number of estimated visitor days in the Mineral County is 141,036 annually. A portion of said visitors attend special events in the Hawthorne area each year. It is important to make this distinction because visitors who attend special events tend to spend more and stay longer as compared to overnight travelers passing through the area.

- **Special Events**

Table 3-1 shows the estimated number of special event visitors to the Hawthorne area based upon attendance estimates by the Mineral County Chamber of Commerce.

**Table 3-1
Special Event Visitors
Mineral County: 2001**

Event	Days	Visitors	Visitor Days
Armed Forces Day	6	2,000	12,000
Loon Festival	2.5	500	1,250
Fishing Derby	2	600	1,200
Arts Festival	1	600	600
Total Visitor Days			15,100
Total Room Nights			7,050

Source: Mineral County Chamber of Commerce: 2001

- **RV Park Visitors**

There are approximately 75 RV spaces in the Hawthorne area. Average cost per night is approximately \$12.00. Assuming average occupancy is similar to the hotel/motel rate, there would be approximately 19,162 RV space rentals per year. With an average of 2 persons per RV rental would result in 38,324 visitors per year.

- **Total Visitation**

Total visitation and expenditures by type of visitor are shown in Table 3-2. Fiscal impacts could also occur as a result of special or risk induced behavior in Mineral County. Risk induced behavior could directly affect Mineral County as a result of transportation of high-level nuclear waste through the area.

Table 3-2
Total Visitation and Per Capita Day Expenditures
Mineral County: 2001

	Travelers	Special Event Visitors	R.V. Parks
Visitor Days	110,836	30,200	38,324
Expenditures:			
Gaming	\$25	\$100	\$25
Food/Drinks	\$25	\$36	\$25
Shows/Ent.	\$ 2	\$2	\$2
Shopping/gifts	\$5	\$5	\$30
Sightseeing	\$ 1	\$1	\$1
Recreation	\$ 1	\$1	\$1
Lodging	\$20	\$20	\$6
Fuel	\$5	\$5	\$5

Results

The analysis simulates the fiscal and economic impacts due to the loss of visitors to the Mineral County area. Table 3-3 shows the economic impact associated with a 10 percent decline in visitor volume each year over the course of the shipping campaign through Mineral County. As a result, total economic activity in Mineral County could be reduced by \$385.8 to \$989.1 million. Total labor income could be reduced by nearly \$113.5 to \$290.9 million during the shipment campaign, and state and local taxes generated locally could be reduced a total of \$15.1 to \$38.6 million.

Table 3-3
10 Percent Loss of Visitors Volume
Economic Impacts to Mineral County
During the Shipment Campaign in \$Millions

	2010-2033	2010-2048
Total Industry Impact	-\$272.3 million	-\$698.2 million
Labor Income	-\$113.5 million	-\$290.9 million
Employment (Loss)	51-157 jobs	51-326 jobs
Total Economic	-\$385.8 million	-\$989.1 million
State/Local Taxes	-\$15.1 million	-\$38.6 million

Total industry impact is the direct, indirect and induced reductions in spending that would occur in Mineral County. In addition to the spending, labor income earned by Mineral County residents could be reduced substantially as well. The reductions in spending and labor income combine to generate a total economic loss that is projected to range from \$385.8 to \$989.1 million over the life of the shipping campaign.

If Mineral County were to suffer even greater losses in visitor volume such as 20 percent or more, the results in Table 3-3 could more than double.

Risk induced behavior could also affect the desirability of the area for current and future residents. No attempts were made to quantify this impact for Mineral County. However, the State of Nevada attempted to address this issue in its *Yucca Mountain Socioeconomic Project An Interim Report The State of Nevada Socioeconomic Studies, 1989*. The analysis in Chapter 2 of the report indicated that the repository could have “special impacts” (i.e those resulting from the hazardous characteristics of radioactive waste) on the Nevada economy. More over, the studies indicate that populations important to Nevada’s economic well-being may be highly sensitive to the radioactive characteristics of the repository, and that the attractiveness of the state as a place to visit, move to, or invest could be reduced. The same can be said for Mineral County.

3.1.2 Property Diminution

Studies (Nevada Nuclear Waste Project Office, 2000) have been sponsored by the State of Nevada’s Nuclear Waste Project Office (NWPO), as part of its ongoing activities to assess the impacts of the United States Department of Energy’s DOE’s) program to transport High-Level Nuclear Waste (HLNW) and Spent Nuclear Fuel (SNF) from civilian nuclear power plants and the nation’s weapons complex to a repository at Yucca Mountain, Nevada. The study sought to determine the extent of property value diminution that may occur in Clark County, Nevada as a result of the Yucca Mountain and associated transportation activities. The results and methodology have been applied to Mineral County property values to determine the potential overall impact both in terms of potential property value and property tax revenue loss.

Methodology

Recent work on property value diminution has been completed for the Las Vegas area. Stigma resulting from an amplified perception of risk has been associated with all aspects of nuclear energy including nuclear waste transport and it’s also been associated with a decline in property values (Gawande and Jenkins-Smith 1999). In order to evaluate the range of potential property value diminution that may result from the transportation of HLNW and SNF, a face-to-face survey was conducted of real estate appraisers and lenders for residential, commercial, and industrial property in Clark County. Results of the survey provide a potential range of property value diminution that real estate appraisers and lenders indicate may occur under various scenarios if the DOE proceeds with its plans to transport SNF and HLNW through Clark County, Nevada (see Table 3-4). Results of the survey were also used as variables in an income capitalization model to determine the range of potential impacts on commercial and industrial properties.

The survey results indicate that even under the most benign non-event scenario, property value losses are likely along the corridor, as well as, at distances of up to three miles. The

survey results indicate that an accident even without a release of radioactive waste will significantly increase the rate of property value diminution. Further, if a major accident were to occur, the property value loss would be devastating according to those surveyed in Clark County. The results of the Clark County survey were then applied to private property ownership along the transportation corridor in Mineral County.

Findings Related to Lenders and Appraisers Evaluations Under Three Scenarios

One important observation in the survey responses is the strong consistency in the estimates of property value changes provided by the two professional groups. For example, the largest difference in percent diminution of a property within the residential sector between the two groups is only 5.5 percent. The fact that two different groups, both with strong expertise in the real estate market, could be so consistent in their estimation of likely diminution effects for three different scenarios and for three different types of properties is significant. It provides one check for internal validity and lends credibility to the results.

Table 3-4 Scenario Summaries

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

Source: State of Nevada, 2001

What are the results? First, as the following tables show, even under Scenario 1, a no-event characterization, diminution will likely result in all three market segments of the economy—residential, commercial, and industrial (Table 3-5 and Table 3-6). The largest

declines (around 4 percent) will be experienced in the residential sector within one mile of shipment routes. Declines will also be realized in both commercial and industrial properties, but less than what is likely in the residential sector. Based on survey results, property value diminution will result from the implementation of the shipment program alone along designated routes even without accident events.

Amplification of the transportation risks through heightened media attention and non-serious transportation mishaps, as shown in Scenario 2 will have the effect of further increasing losses in property values of up to eight percent for residential properties and up to seven percent for commercial office properties. Under Scenario 3 conditions, property declines may reach up to 30 percent for residential properties in the shipment corridors; large diminution factors between 20 and 30 percent may also be anticipated for commercial office and industrial buildings as well.

For the residential property sector, appraisers and lenders suggested fear, risk, and stigma factors as principal reasons for the diminution. While worker fear may be partly responsible for some loss in property values, other factors including higher risk premiums, loss of prestige location, product tainting, and the loss of productivity in case of accidents were recognized as influencing the value of office and industrial properties according to the real estate professionals interviewed.

Table 3-5 Property Value Diminutions Under Three Scenarios, Within One-Mile Distance of a Shipment Route, and by Professional Groups

Groups	Residential		Commercial		Industrial	
	Lenders	Appraisers	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	2.00%	3.50%	.56%	3.21%	0.56%	1.25%
Scenario 2	6.18%	7.96%	4.00%	7.39%	4.00%	5.29%
Scenario 3	29.00%	33.79%	22.00%	31.88%	21.25%	25.54%

Source: Nuclear Waste Project Office, 2000

Table 3-6 Property Value Diminutions Under Three Scenarios, Within One to Three -Mile Distance of a Shipment Route, and by Professional Groups

Groups	Residential		Commercial		Industrial	
	Lenders	Appraisers	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	.50%	1.46%	0.56%	1.25%	0.56%	0.83%
Scenario 2	1.64%	4.00%	1.00%	3.04%	1.00%	2.08%
Scenario 3	20.00%	23.65%	16.67%	20.50%	10.00%	16.73%

Source: Nuclear Waste Project Office, 2000

Property Value in Mineral County

Using information from the County Assessor, all parcels within approximately three miles of proposed transportation routes were identified. The Assessor's database contains appraised values for land and improvements. Because there is no depreciation schedule for land, appraised values are actual market values. Improvements (housing and buildings) on the other hand decline in value each year based upon a schedule set forth in Nevada Revised Statutes (NRS). In order to adjust the appraised values back to market value, the County Assessor and appraisers provided rough estimates of average adjustments need to bring improvements in line with actual market conditions. In general, appraised values in Mineral County are about 90 percent of market value. Total appraised value was divided by 90 percent to create total market value. Table 3-7 shows the total amount of property value within three miles of either side of the U.S. Highway 95 in Mineral County, which is estimated to be just over \$432 million.

Table 3-7
Property Values within 3 miles of U.S. 95
Mineral County: April 2001

Land Use	Land	Improvements	Appraised Value-Land	Appraised Value-Improvements	Market Value
Residential	\$50,561,371	\$77,793,945	\$144,461,060	\$222,268,414	\$391,425,965
Commercial	\$ 2,040,041	\$ 9,218,884	\$ 5,828,689	\$ 26,339,669	\$ 35,094,987
Industrial	\$ 600,530	\$ 1,266,583	\$ 1,715,800	\$ 3,618,809	\$ 5,736,698
Total	\$53,561,371	\$88,279,412	\$152,005,549	\$252,226,891	\$ 432,257,650

Source: Mineral County Assessor, 2001

Most development currently is centered in and around U.S. Highway 95 and the Town of Hawthorne. Future development is likely to continue to be concentrated along the highway corridor. As a result, future property values are expected to grow in relation to the population growth of Mineral County. Total property values was inflated 3 percent per year throughout the shipment campaign.

Property Value Loss

Using estimated losses in Table 3-5 and 3-6, property value loss in Mineral County could be significant. Under scenario I property value loss would occur with the commencement of shipping and continue throughout the shipment period. In addition to the initial loss incurred at the beginning of the shipment campaign, other property losses occur as well each year. New development along the route would not reach its full value until the shipment campaign has ended. As a result, property owners suffer a temporary loss of property value. Table 3-8 shows projected property value loss for Mineral County for the period of the shipment campaign. Loss in property value is determined by appreciating existing property at approximately 3 percent per year. The forecasted value is then multiplied by the estimate of property value diminution in Tables 3-5 and 3-6.

Scenario I

Initial losses (first year of the shipping campaign) are approximately \$20 to \$3 million in property value for all types including residential, commercial and industrial property. The cumulative loss under Scenario I (Table 1) amounts to \$39.5 million to \$5.8 million for a shipment campaign extending from 2010 to 2033, and a loss of \$61.6 million to \$9.03 million for a campaign shipment from 2010 to 2048.

The initial loss in property value occurs because all existing proper along the corridor declines in value. Additionally, new property being developed also loses value when it is constructed. The initial loss plus subsequent losses associated with new construction and development results in a cumulative impact.

Scenario II

The losses in Scenario II are significantly higher. The methodology used to calculate such loss is the same as used in Scenario I. Accident rates and traffic volumes in the corridor suggest that at least one accident involving Yucca Mountain shipment could occur. Because an accident could occur over a period of time, arguably Scenario II could affect property value throughout the life of the shipment campaign. Projected property value loss and the resulting loss in property taxes under a non-release accident scenario (Scenario II) are shown in Table 3-8.

Table 3-8
Property Value and Tax Loss
Resulting from Property Value Diminution
Mineral County

	Shipping Campaign 2010-2033		Shipping Campaign 2010-2048	
	High	Low	High	Low
Scenario I				
Value Loss	\$ 39.5 million	\$5.8 million	\$61.6 million	\$9.03 million
Tax Loss	\$ 6.15 million	\$.902 million	\$12.9 million	\$1.89 million
Scenario II				
Value Loss	\$90.3 million	\$18.11 million	\$140.7 million	\$28.2 million
Tax Loss	\$14.1 million	\$ 2.82 million	\$29.5 million	\$ 5.92 million

3.2 Fiscal Impacts

There are five general categories of fiscal impacts. They include: (1) costs incurred by Mineral County for emergency management and response capabilities, (2) general governmental and administrative impacts, (3) losses in state services due to resources allocated to oversee and monitor Yucca Mountain related activities, (4) losses in visitors

and declines in visitor related tax revenues, and (5) losses in property value and associated declines in property tax revenues.

3.2.1 Emergency Management and Response Costs

With the total number of radioactive waste shipments possibly ranging from 5,450 to 19,200, local emergency response personnel need to be adequately trained and equipped to handle potential accident situations. This analysis focuses on emergency response capabilities of local agencies in Mineral County and the financial resources required to develop and maintain adequate capabilities throughout the lifetime of the Yucca Mountain shipping campaign. It identifies the type of equipment, personnel needs, and planning and coordination requirements. Currently, Mineral County is not adequately equipped or trained to respond to incidents involving radioactive materials.

Information contained within this cost analysis is intended to provide a realistic future cost estimate to adequately equip and maintain emergency response capabilities for Mineral County over the life of the Yucca Mountain shipping campaign. Additionally, the analysis provides a suggested inventory of the types of equipment, personnel and training needs for Mineral County.

There are three principal cost categories considered in this analysis. They include communications, response equipment, and management/training.

Equipment and Costs

Table 3-9 summarizes the type of communications equipment needed, the quantity or number of units required, estimated cost per unit and total costs for acquisition. Additionally, a replacement estimate is made for each type of communications equipment. The replacement period generally ranges from 3 to 7 years depending on the type of equipment. Local emergency management personnel made cost estimates for communications and response equipment. The quantity of equipment required is generally based upon estimates of the number of response personnel likely to be involved in a situation or who will likely utilize such equipment during an emergency. Other miscellaneous communications equipment generally includes service charges, equipment maintenance and repair, battery reconditioning, and various minor equipment needs.

Table 3-10 shows specialized response equipment needed for emergency situations involving radioactive wastes. This table generally includes the types of equipment that Mineral County either currently does not have or must spend additional funding in order to acquire and maintain adequate response capabilities. The cost estimate in Table 3-10 assumes that Geiger counters and dosimeters will be donated and maintained by DOE.

To acquire a sufficient number of dosimeters may cost an additional \$100,000. Other miscellaneous equipment and supplies include traffic control equipment, foam, spill containment supplies, and other minor items needed to adequately equip emergency responders.

Table 3-9
Mineral County
Communications Equipment Requirements (in 2000 dollars)

Equipment	Quantity	Cost/Unit	Total Cost	Replacement
Pagers with service	100	\$500	\$50,000	5yrs
Satellite Phone	3	\$14,000	\$42,000	5yrs
Radio Repeaters	1	\$15,000	\$15,000	Life Time
Hand Held Multi-Ch. Radios	30	\$1,400	\$42,000	7yrs
Portable Computers	4	\$2,500	\$10,000	3yrs
Vehicle Radios	22	\$2,000	\$44,000	5yrs
Cellular Phone-service charge	4	\$300	\$1,200	Annual
Other Miscellaneous			\$2,500	Annual

Table 3-10
Mineral County
Response Equipment

Equipment	Quantity	Cost/Unit	Total Cost	Replacement
Vehicles/Trailer	1	\$30,000	\$60,000	7yrs
Ion Chamber Survey Meter	4	\$1,585	\$6,340	5yrs
Confined Space Gas Detector	4	\$1,845	\$7,390	5yrs
CMS Chemical Analyzing Kits	1	\$2,641	\$2,641	5yrs
Binoculars	22	\$150	\$3,300	7yrs
Geiger Counters	20	NA	DOE	NA
Dosimeters	350	NA	DOE	NA
Personal Protective Eq. II Suits	25	\$750	\$18,750	3yrs
Personal Protective Eq. I Suits	10	\$5,250	\$52,000	3yrs
Air Cylinders 60 minutes	40	\$1,000	\$40,000	5yrs
Other Miscellaneous			\$22,500	5yrs

Table 3-11 shows related planning, management and training expenditures. The analysis assumes that approximately .5 FTE of the emergency management director's position will be dedicated to the management of Yucca Mountain related shipments. Local law enforcement will provide a smaller planning and management effort, about .1FTE, respectively. Costs for these positions are based upon current wages and benefits paid by Mineral County. The planning and supply category contains expenditures related to notification and coordination of exercises, reproduction of printed materials, public awareness programs, and plan updates and revisions. The costs for training instructors for courses held in Mineral County is estimated to be \$45,000 annually.

This analysis also assumes that reimbursement of lost wages and benefits due to training requirements will occur. The analysis contains an estimated number of training days for

local emergency response personnel. For awareness level training it is assumed that training 2 days for approximately 100 volunteers will be required annually. The number of training days (595) multiplied by the average wage per day (\$114 per day) results in the total training cost reimbursement required. The average wage per day is provided by the Nevada Employment Security Department, Research Division. Annual per diem expense is calculated by multiplying the total number of training days (595 days) by \$100 per day. Per diem includes mileage, meals, and accommodations.

**Table 3-11
Planning/Management and Training Requirements
Mineral County-Annual Expenditures**

Equipment	Quantity	Cost/Unit	Total Cost
Emergency Management Dir.	.5	\$54,000	\$27,000
Sheriff's Department	.10	\$54,000	\$5,400
Fire Department	.10	\$56,700	\$5,670
Planning-Supplies			\$15,000
Training Requirements:			
Training Course Instructors			\$45,000
Awareness Level Training Days	100 training days	\$114/day	\$11,360
Operations Level Training Days	100 Training days	\$114/day	\$11,360
Technician Level Training Days	150 training days	\$114/day	\$17,040
Hospital/EMS	40 training days	\$114/day	\$4,544
Radiology	60 training days	\$114/day	\$6,816
Other	20 training days	\$114/day	\$2,272
Exercises	50 Training Days	\$114/day	\$5,680
Per Diem/travel	595 training days	\$100/day	\$59,500

Results

Current cost estimates in Table 3-9, 3-10 and 3-11 were inflated by 3 percent annually throughout the life of the proposed shipment campaign to determine an annual costs beginning in 2010 through 2048. The three percent inflation rate was also used to inflate replacements items. Table 3-12 shows the results of the analysis both in terms of the total amount of funding required of the shipment campaign and as a discounted current dollar amount. Total annual expenditures were discounted by 5 percent over the life of the shipment campaign to derive a current dollar amount. In other words the current dollar amount would be a one-time payment made at the beginning of the shipment campaign which would provide a sufficient level of funding to meet the expenditure requirements over the shipment campaign.

**Table 3-12
Funding Requirements
Mineral County Emergency Response**

	2010-2030	2010-2048
Total Expenditures	\$14,874,228	\$28,167,841
Current Dollar @5%	\$ 9,454,290	\$12,684,660

3.2.2 General Government

In addition to the emergency response functions required, Mineral County is likely to incur costs related to general administrative functions. It is uncertain as to what extent such impacts will occur, but they could be substantial over time. Many of the governmental impacts are captured in the emergency response cost analysis described in the previous section.

3.2.3 Loss of State Services

Increases in state expenditures have already occurred and will likely continue to occur in the future. Initial estimates of state expenditures were first estimated in 1989 and again in 2000. Estimates of expenditures incurred by various state agencies including NDOT, NDMV, and the Public Service Commission, etc. Additional expenditures made by the State of Nevada for oversight of the Yucca Mountain Site result in “lost benefit” for residents of the State of Nevada. Nevada residents will forgo benefits in the form of services, state funded programs, and capital improvements in order to fund additional oversight activities associated with the repository program. Since most of Nevada’s tax revenues are distributed based on population estimates and population growth, it is appropriate to use a per capita method to allocate lost benefit to Mineral County residents.

Recent estimates made by the State of Nevada in a report entitled *The Fiscal Effects of Proposed Transportation of Spent Nuclear Fuel on Nevada State Agencies, 1998* calculated the estimated cost for four state agencies for the first three years of an accelerated shipment campaign which was approximately \$498 million. Many of the costs incurred by these state agencies are recurring costs. As a result, they were projected forward through the shipment campaign period at an appreciated rate of 3 percent resulting in a total estimated cost of \$1.2 to \$1.66 trillion over the life of the shipping campaign. The Mineral County portion of the estimated cost based upon the per capita method of allocation is \$3.5 to \$5.0 million in lost benefit.

Additionally, the State could incur fiscal impacts as a result of risk-induced behavior associated with repository transportation through Clark County and the proximity of the repository to this growing urban area. Because the State relies heavily upon gaming related revenues substantial losses to the State’s revenue resources could occur from risk

induced behavior and the decline in the number of visitors willing to come to Clark County. In the State of Nevada's Interim Report for the Yucca Mountain Socioeconomic Project, initial estimates of losses to the State's General Fund as a result of risk induced behavior was estimated to be as high as \$70,000,000 annually in 2010. Such losses would likely continue throughout the shipment campaign and perhaps even longer. The reductions in State general fund revenues would result in lower governmental services to local jurisdictions such as Mineral County. Using estimates in the State's Interim report cumulative losses in benefit to Mineral County residents over the course of the shipping campaign could range from \$10.9 million to \$21.3 million.

3.2.4 Fiscal Impact from Risk Induced Behavior

3.2.4.1 Property Tax Revenue

In addition to the loss in property value described in Section 3.1.2, Mineral County could incur declines in property tax revenues as well. The total estimated loss of property tax revenues from the beginning of the shipment campaign and covering a period of 24 to 48 years is shown in Table 3-8. Total property tax revenue losses to Mineral County could be as high as \$30 million of the length of the shipment campaign.

The losses in property value and hence property tax revenue could be significantly higher if an accident situation as described under Scenario III in Section 3.1.2 occurred. The extent of the losses is difficult to estimate without knowing when an accident might occur and or the prolonged effects of a release scenario.

The total number of Yucca Mountain shipments through Mineral County is expected to range from approximately 5,450 to 19,193. As a result, the total number of accidents involving Yucca Mountain shipments is expected to range from .3 to 1 over the life of the campaign. Because there appears to be at least 1 accident in Mineral County, it is reasonable to assume that Scenario II as described in Section 3.1.2 could apply throughout the shipment campaign. It is uncertain as to how many, if any, accidents would result in a release of radioactivity. Therefore, it is difficult to make any estimates at all for Scenario III.

3.2.4.2 Fiscal Linkages to other Local Governments (Clark County) and State of Nevada

Waste transportation in other areas of the State, particularly in Clark County, has the potential to affect Mineral County if risk-induced behavior actually occurs. There are a number of tax revenue sources that are generated locally and redistributed or shared through formula allocation with all areas of the State. In cases where tax revenues are exported from Clark County, a decline in economic activity and visitor volume as a result of risk induced and stigma affects has the potential to impact other areas of the State. Visitors are an important component of the Nevada and Clark County employment. Directly and indirectly gaming and tourism accounts for about 44 percent of all

employment in Clark County. Five tax revenues sources have been identified as potential exports from Clark County to Mineral County and other counties in Nevada. They include:

Sales Taxes

This tax is based on 1.75% of gross receipts from taxable sales and on sales price of taxable items purchased out of state. This tax is mandatory statewide. The revenue distribution to each county and city is based on statutory formula that is comprised of guaranteed and non-guaranteed counties. In accordance with the statutory formula, the guaranteed counties are guaranteed their current level of receipts plus the lesser of the increase in statewide SCCRT collections or the sum of the growth in population and the change in CPI. The non-guaranteed counties share in the remaining distribution basis on their proportionate share of collections. As such, it is expected that the percentage of the rural guarantee payment is likely to increase as a percentage. It has averaged 6.72% of the total collection over the past four years. If there were significant decreases in SCCRT collections, the non-guaranteed counties' distributions would directly bear the financial burden. The non-guaranteed counties would probably be frozen at their current distribution for some time and feel the effects of the loss of purchasing power due to the change in CPI. Inflation loss could average 2 to 3 percent per year for the length of the shipping campaign.

Mineral County's proportionate share of SCCRT distributions has been declining as its local growth in taxable sales has not kept pace with the statewide growth. Assuming an annual growth factor of 2.5% of SCCRT collections over the period of analysis the following is the estimated loss in SCCRT revenues:

	SCCRT Tax
• Projected loss 2010-2033	\$1,508,602
• Projected loss 2010-2048	\$3,215,906

School Distributive Fund

Under the Nevada Plan the State guarantees basic support to school districts to insure each Nevada child receives a reasonably equal educational opportunity. The formula allows a guaranteed amount of basic support. Simplified, the districts receive a fixed dollar amount per pupil. The amount is established by the state legislature. The amount has increased an average of 2.83% for the past six years. The FY 2002 per pupil amount is \$4,894 and for FY 2003 the amount is \$5,017.

In order to determine the estimated fiscal linkage of negative impacts for the period under review, an enrollment growth rate of 2.5% was used for the next four years and no growth in enrollment thereafter. In light of the average increase of 2.83% in the per pupil funding, the model assumes an annual increase of 2.5%. Gaming and visitors to Clark County provide an estimated 35 percent of all revenues for k-12 schools in Nevada. A 10

percent reduction (3.5%) in the amount provided by visitors/gaming to Clark County could have significant impacts on all school districts in Nevada. To estimate individual impacts to the Mineral County School District, it is assumed that the ratio of Mineral County students to all students would remain the same over the course of the shipment campaign. Students enrolled in Mineral County schools comprise about .25 percent of all students in K-12 public schools in Nevada. Therefore, the loss to Mineral County schools would be approximately .25 percent of the total projected loss to the Distributive School Account.

	Mineral County Schools
• Projected loss 2010-2033	\$5,389,133
• Projected loss 2010-2048	\$19,449,029

Cigarette and liquor tax

This tax is levied upon the purchase or possession of cigarettes by a consumer in the State of Nevada at the rate of 17.5 mills per cigarette as allowed in N.R.S. 370.165. This revenue is remitted to the Department of Taxation and apportioned to the first tier based on population. Based on projected growth of Cigarette Tax revenue at 3% annually and Mineral County maintaining a proportionate share of population to the state at .3 % for the period of analysis the following is the estimated loss in cigarette tax revenue:

This tax is levied upon the purchase or possession of liquor as outlined in chapter 369 of the N.R.S. This revenue is remitted to the Department of Taxation and apportioned to the County in proportion to their respective populations. Based on projected growth of Liquor Tax revenue at 2.25% annually and Mineral County maintaining a proportionate share of population to the state at .3% for the period of analysis the following is the estimated loss in cigarette tax revenue over the course of the shipping campaign:

	Cigarette/Liquor Tax
• Projected loss 2010-2033	\$131,357
• Projected loss 2010-2048	\$274,214

State Games License

State Games License is distributed equally to all Nevada Counties. State Games License is an annual fee on all games to be operated in any calendar year. Clark County is estimated to provide about 78 percent of gaming revenues in the State. As a result, an equal distribution of State Games License creates a situation where Clark County exports tax revenues to other counties. Therefore a 10 percent reduction in gaming activity could result in a loss to Mineral County of \$463,386 to \$854,743 over the course of the shipping campaign.

Fuel Taxes

Gas taxes are levied at the Federal, State and Local level. Currently, there is a 51.5 cents per gallon excise tax on the purchase of gasoline in the State of Nevada in Mineral County. Various laws govern the collection and distribution of this tax.

State 5.35 cents: Of the total gas taxes levied at the state level, 5.35 cents is apportioned back to the counties. The apportionment of the 5.35 cents is broken down into three separate levies: 1.25 cents, 2.35 cents and 1.75 cents. The 1.25 and 2.35 cent levies are governed by N.R.S. 365.180 as to creation and 365.550 for distribution. The current distribution formula is based on $\frac{1}{4}$ of proportionate area, population, vehicle miles traveled and road miles. The 1.75-cent levy is created in N.R.S. 365.190. The distribution in accordance with N.R.S. 365.560 is based upon proportionate assessed value. For the sake of this fiscal linkage study, these three tax sources were blended using historical data to determine the proportionate share of Mineral County to the overall statewide collection based on the current formulas. As such, Mineral County's proportionate share is 1.13% of the state total. Applying a historical growth rate of 2.5% annually to the total collections, Mineral County would experience a reduction in gas tax over the course of the shipping campaign as follows:

	Fuel Taxes
• Projected loss 2010-2033	\$1,105,603
• Projected loss 2010-2048	\$2,214,107

Summary of Fiscal Impacts

Table 3-13 summarizes the various fiscal impacts expected to occur in Mineral County as a result of waste being shipped directly through Mineral County as well as other areas of the State, and the construction and operation of a repository. The fiscal impacts are calculated for the length of the shipping campaign. Certain impacts such as those described in the fiscal linkages discussion could continue beyond the shipping campaign because they are also tied to the operation of a repository, and could continue indefinitely.

In summary, there are five categories of fiscal impacts associated with the repository program. Emergency management identifies the total cumulative costs incurred by Mineral County every year during the course of the shipping campaign. The loss of State services relates to the lost benefit Mineral County would have received because State resources are being used to monitor, oversee and mitigate certain elements of the repository. Fiscal linkages identify current tax revenues received by Mineral County which are partly generated in Clark County. As a result, transportation through Clark County and the operation of a repository could limit economic activity. In turn reduced economic activity will produce lower tax revenues. Property value loss as a result of waste shipments along Nevada corridors will result in a temporary reduction in property

tax revenues. Finally, risk induced behaviors could reduce the number of visitors willing to stay in the Mineral County area. As a result, both the loss of economic activity and generation of tax revenues could result.

Table 3-13
Total Fiscal Impacts

Type of Impact	2010-2033	2010-2048
Emergency Management	\$14.9 million	\$28.2 million
Loss of State Services	\$14.4 million	\$26.3 million
Fiscal Linkages	\$ 8.6 million	\$26.0 million
Property Diminution Scenario I	\$.902-\$6.15 million	\$1.89-\$12.9 million
Scenario II	\$2.82-\$14.1 million	\$5.92-\$29.5million
Visitor Spending	\$15.1 million +	\$38.6 million +
Total Fiscal Impacts	\$56.7-\$73.3 million	\$126.9-\$161.5 million

References

Nevada Department of Transportation, 1998 , *Nevada Traffic Crashes, 1998*. Safety Engineering Division, Carson City, NV.

Nevada Nuclear Waste Project Office, 2000. *Results from Key Informant Interviews About Potential Property Value Impacts From the Shipment of High-Level Nuclear Waste and Spent Nuclear Fuel through Clark County, Nevada*, Carson City, NV.

Nevada Nuclear Waste Project Office, 1998, *The Fiscal Effects of Proposed Transportation of Spent Nuclear Fuel on Nevada State Agencies*, Carson City, NV.

Nevada Nuclear Waste Project Office, 1989, *Yucca Mountain Socioeconomic Project: An Interim Report on the State of Nevada Socioeconomic Studies*, Carson City, NV.

Nuclear Regulatory Commission, 1977, *Final Environmental Impact Statement on the Transportation of Radioactive Material by Air and Other Modes*, NUREG-0170, Office of Standards Development, Washington D.C., Dec.

U.S. Department of Air Force, 1991, *Special Nevada Report*, Carson City, NV.

U.S. Department of Energy, Nevada Operations, *Low-Level Waste Routing Quarterly Report*, Various Years. Las Vegas, NV.

U.S. Department of Energy Transportation Risk Assessment Working Group, 1999, *A Resource Handbook on DOE Transportation Risk Assessment*, Albuquerque, NM.
Nevada Nuclear Waste Project Office, *The Fiscal Effects of Proposed Transportation of Spent Nuclear Fuel on Nevada State Agencies*, June 1998.

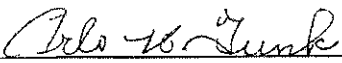
U.S. Department of Energy Yucca Mountain Project, 1999, *Draft Environmental Impact Statement for A Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste At Yucca Mountain, Nye County, Nevada*, Carson City, NV.

1 **ADDENDUM TO**
2 **MINERAL COUNTY IMPACT REPORT**
3 **FOR THE YUCCA MOUNTAIN PROJECT**

4 **Section 1.** Mineral County, by and through its undersigned representative, does hereby
5 expressly declare its intention to be HELD HARMLESS in the event of any transport, enroute
6 parking or field warehousing of any high level nuclear waste, spent nuclear fuel or any other
7 hazardous material be it in liquid, solid or gaseous forms, if such above-described materials, while
8 being transported through Mineral County, should cause or be a factor in the causation of any
9 harm, injury or damage to any persons, animals or property, both real and personal.
10

11 **Section 2:** FURTHER, Mineral County hereby expressly declares its right for full
12 indemnification, including legal costs, attorneys fees and general, special and punitive damages,
13 from either government, private or corporate carriers engaging in the above-described
14 transportation activities, should Mineral County incur any such cost or expense in any emergency
15 or non-emergency response to such transportation activities resulting in any harm, injury or
16 damage as described in section 1 above.
17

18 **Section 3.** FURTHER, Mineral County hereby expressly declares that all carriers of the
19 materials described in section 1 above do hereby ADMIT LIABILITY for any harm, injury or
20 damage by virtue of engaging in the transport, enroute parking or field warehousing of the
21 subject materials, AND FURTHER thereby subject themselves to the jurisdiction of Nevada
22 State and federal courts, with respect to legal costs, attorneys fees and general, special and
23 punitive damages.
24
25

26
27 
28 Arlo K. Funk, Chairman
Mineral County Commission
July 30, 2001