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**Yucca Mountain Site Characterization Project:  
Summary of Socioeconomic Data Analyses  
Conducted in Support of the Radiological Monitoring Program,  
April 1997 to April 1998**

**June 1998**

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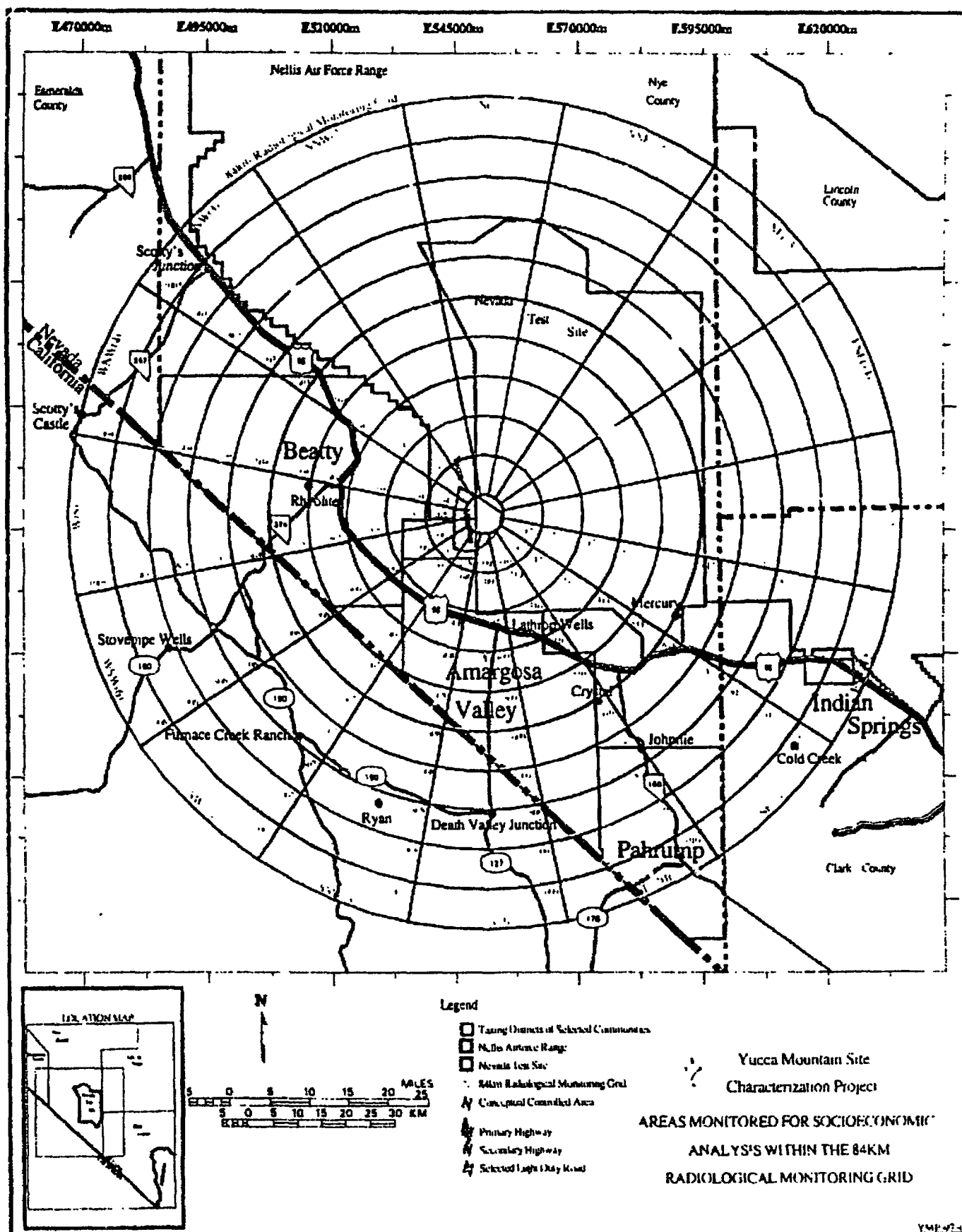
## **1.0 INTRODUCTION**

This document is the eighth in a series of annual reports that provides information about the spatial distribution of population and agricultural activities within an 84 kilometer radius of Yucca Mountain (Figure 1-1). The ongoing effort to monitor population and agriculture in this area was initiated under the auspices of the Radiological Monitoring Plan for the purpose of providing site-specific data that could be used in dose and risk assessment (DOE, 1990). The time series data compiled for the Radiological Monitoring Program (RadMP) has become an integral component of studies conducted in support of the Environmental Impact Statement (EIS), the Total System Performance Assessment (TSPA), and Viability Assessment (TRW, 1998).

### **1.1 BACKGROUND**

In the "General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories" (Code of Federal Regulations 10 960), there are several specific references to population distributions and densities, to the socioeconomic conditions in the study area, and to the relative importance of these data for licensing and related purposes. A principal RadMP objective is the development and compilation of site-specific data. The technical guidance states "...because of the arid characteristics of the Yucca Mountain area, site-specific data are very important because most generic data (e.g., Regulatory Guide 1.109 [NRC, 1977]) were developed for non-arid environments" (DOE, 1990).

Figure 1-1. Radiological Monitoring Program Grid (RadMP Grid)



The Environmental Protection Agency (EPA) has stated that "knowledge of population densities and spatial distribution of farm animals is necessary to assess protective measures required in the event of an accidental release of radioactivity..." (EPA, 1990). Based on regulatory requirements, knowledge of the radiological pathways to humans within the study area is essential to ensure adherence to the Federal standards. The objective of this guidance is to "minimize risk to the public and permit compliance with the EPA and NRC regulations" (10 CFR 960, p. 47741). These regulations require that protective measures be assessed and that exposure to members of the public in unrestricted areas not only be limited, but be "further reduced below the limits to the extent reasonably achievable" (10 CFR 60, p. 47741). Based on these requirements as summarized and set forth in the Radiological Monitoring Plan (DOE, 1990), this support for the RadMP was initiated for the purpose of providing the data necessary for

the scope of the RadMP data collection efforts and reporting remain more inclusive than the input needs of GENII-S.

The agricultural data collected in support of the RadMP are intended to identify plants and animals that could become contaminated with radionuclides within the 84-km grid in the event of future releases to the environment. This type of information also is used as input for the GENII-S model (SNL, 1993). The factors taken into consideration include the location and quantity of commercial fruits and vegetables grown within the study area, the quantity of dairy products produced, and the number of meat-producing animals raised within the study area, which requires feed crops. Because the focus of the data collection is on commercial agricultural activities, home gardens are not included. However, grazing animals are included because the Environmental Protection Agency (EPA) notes, "grazing animals ingest forage from large areas of ground surface and so represent a concentration mechanism" (EPA, 1990).

## **1.2 METHODOLOGICAL AND DATA IMPROVEMENTS**

Methodological and data improvements are an integral feature of the RadMP support, as are changes intended to meet emerging EIS and TSPA requirements. One of the notable improvements is the use of Global Positioning System (GPS) technology to accurately locate population and agricultural activities within the 84-km grid. Prior to the use of GPS technology it was not possible to precisely determine the grid cells in which

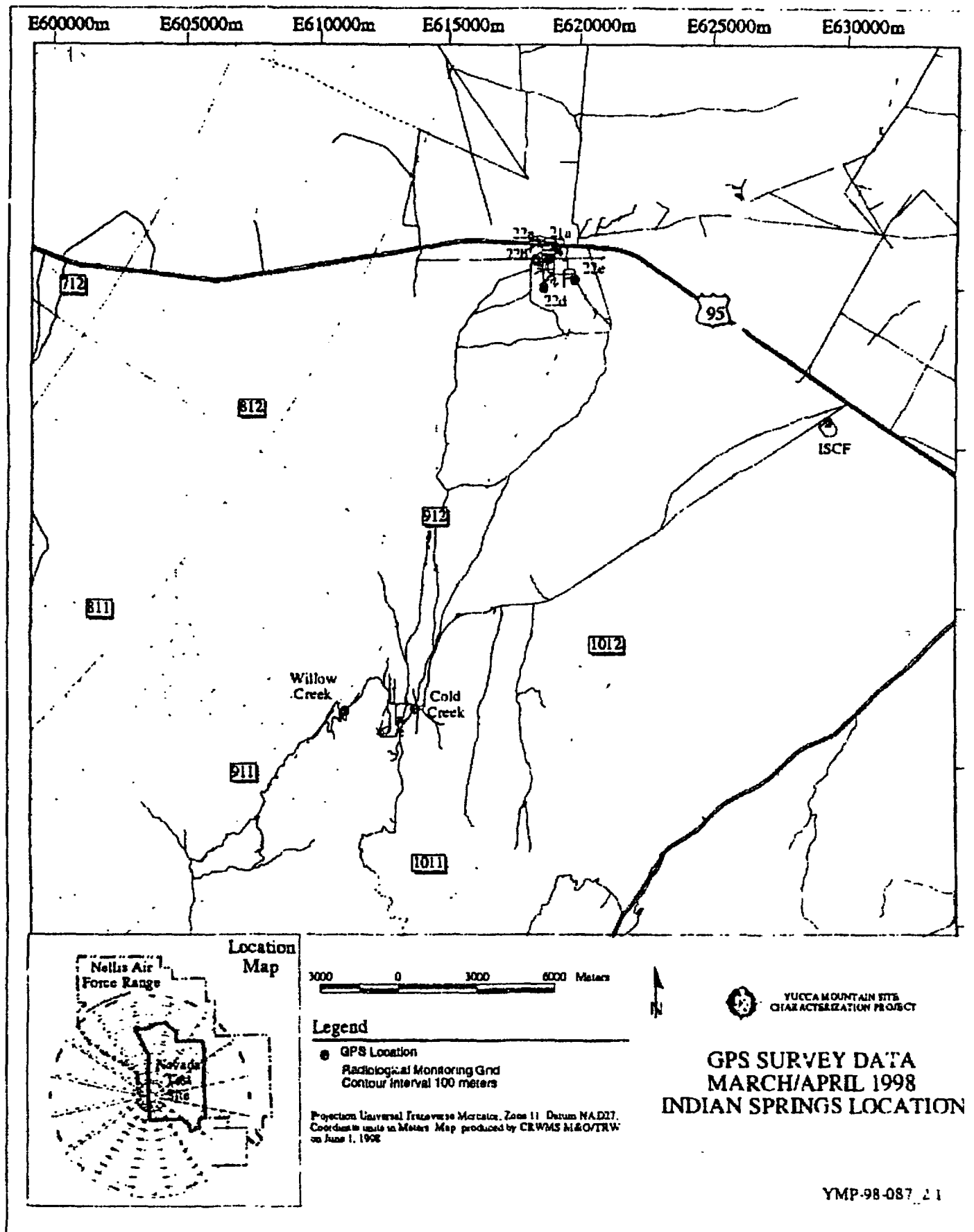


populations and agricultural activities were located when they fell on or near the borders of the cells comprising the RadMP grid. GPS data were first recorded in spring 1997 for "borderline" populations and agricultural activities in the vicinity of Beatty, Scotty's Junction, Pahrump, and Death Valley National Park (TRW, 1997). The most recent GPS data were recorded in spring 1998 for borderline populations and agricultural activities in the vicinity of Amargosa Valley, Ash Meadows, Cold Creek, Crystal, Indian Springs, and Johnnie, as well as in Inyo County.

Figure 1-2 provides an example of the GPS survey that illustrates the precision with which populations and other features can be identified relative to RadMP grid cells. It shows GPS recordings (identified as 22a through 22d) made in Indian Springs, which confirmed that its population is entirely within grid cell 912. Other recordings shown in Figure 1-2 confirmed that the populations in the Cold Creek and Willow Creek areas are fully within grid cell 1011 and that the Indian Springs Correctional Facility (ISCF) is outside of the grid altogether.

The accuracy of housing and related data used to generate RadMP population estimates also has improved. Procedures were developed to automatically identify and record the grid cell number that corresponds to the location of each residential electric meter. These procedures, which have been in use since 1997, significantly reduced the manual aspect of this task and improved the validity and reliability of population estimates based on

Figure 1-2. GPS Survey Data, Indian Springs Area



these data. Another improvement to the population estimates is the use of post-1990 information on the number of persons per household, which was obtained from a 1997 survey (TRW, 1997).

Improvements and revisions in the collection of agricultural data include the use of water permits. Groundwater pumpage inventories from the Nevada Division of Water Resources (Nevada, 1997b) were inspected to identify locations of previously unidentified agricultural activities. The pumpage inventories from Amargosa Valley, Pahrump, and Indian Springs provided the location, the number of acres, and in a few cases, the types of crops grown on permitted irrigated land.

### **1.3 CONSISTENCY WITH PAST REPORTS**

The concepts used to define resident population and daytime population remain in accordance with previous reports, as do related concepts such as housing unit, household, and group quarters. The concepts used to define agricultural activity also remain in accordance with previous reports.

In previous reports, information was reported for populated areas that extended just outside the grid. These areas included the southern portion of Pahrump and Sandy. Although this information can still be generated, it is not shown in this report in order to maintain focus on the RadMP grid.

In July 1995, there was a change made in the reporting of on-site employment for the Nevada Test Site (NTS) and the YMP, which affects Table 3-4 in this report. Prior to July 1995, employment for both sites was reported in a single category, while subsequent NTS and YMP employment figures are reported separately (DOE/NV, 1996: 1995). As a consequence of this change, historical data are not reported for the NTS and the YMP.

Estimates shown in Tables 3-1 through 3-3 for first quarter 1997 (1Q/97) are different than those shown for 1Q/97 in the previous report (TRW, 1997) because of: (1) the discovery of four previously undetected clusters of residential population; (2) the use of Valley Electric Association (VEA) data to cover grid cells north of Beatty; and (3) and re-assignments into correct grid cells using the GPS findings and fieldwork.

In 1998, agricultural data collection was more focused on commercial agricultural activities than in previous years. Fruit trees and grapes were included in the report only if the size of the orchard was at least one acre. One acre was large enough to be identified from current data collection sources, such as aerial photographs and groundwater pumpage inventories.

#### **1.4 REPORT ORGANIZATION**

The following section of this document (Section 2) provides a description of the procedures and methods used to compile information about the distribution of population

and agricultural activities within the 84-km RadMP grid. A summary of these and related data is presented in the third section. References for this document are shown in Section 4. Appendix A describes the RadMP grid and explains how to read it.

## **2.0 PROCEDURES AND METHODS**

### **2.1 THE RadMP GRID AND STUDY AREA**

Figure 1-1 shows the 84-km RadMP grid relative to state, county and community boundaries, the Nevada Test Site, Nellis Air Force Range, and state and federal highways. Included within the area of analysis are sections of Clark, Lincoln, Nye, and Esmeralda counties in southern Nevada and a portion of Inyo County, California. The boundaries shown for the communities of Amargosa Valley, Beatty, and Pahrump are the tax boundaries specified by the Nye County Board of Commissioners. The boundary for Indian Springs is the legal description specified for the unincorporated town by the Clark County Commissioners.

The RadMP grid is centered on the western side of Exile Hill at the Yucca Mountain site with the coordinates of Easting 551135.7, Northing 4078351.6 on the Universal Transverse Mercator (UTM) Projection Grid Zone 11 of the North American continent. The "North Portal Pad" is located over this point. The 84-km grid is divided into 16 equal sections of 22.5 degree arcs. Beginning with an undivided 4-km radius circle at the center, (grid cell no. 1) there are ten concentric rings, each 8-km in width. Including the center, there are 161 grid cells, each identified by a unique grid cell number. The dimensions of the RadMP grid are based on requirements and technical guidelines set

forth by the Nuclear Regulatory Commission, the Environmental Protection Agency, and the U. S. Department of Energy (DOE, 1990).

Because the RadMP requires the location of population and agricultural activities by grid cell, information in this report is compiled primarily by grid cell, and secondarily by reference to the state, county and community in which the grid cell, or in some cases a portion of the grid cell, is located. The term "area" (such as "Beatty area") is used in the tables for geographic orientation.

## **2.2 POPULATION**

Annual post-censal population estimates are produced for areas within Nevada by federal, state, and local government agencies. Estimates produced by these agencies are not suitable for use in the RadMP for two reasons: (1) they do not conform to the boundaries of the RadMP grid; and (2) they lack the geographic specificity of cells within the RadMP grid. For example, annual estimates are produced by the Nevada State Demographer (1998) for Nye County's tax boundary definition of Pahrump (Nye County, 1988). However, this definition does not conform to the RadMP boundaries and lacks the geographic detail required for the grid cells in the "Pahrump Area" (Figure 1-1, Tables 3-1 to 3-3).

The population of potential interest for long term exposure consists of two related, but distinguishable, components: (1) daytime population; and (2) resident population.

Daytime populations are comprised of groups of employees and school age children who are repeatedly found at the same specific locations within the grid. The estimates of daytime populations were obtained by collecting employment and enrollment information for locations within the grid. The sources of this employment and enrollment information are described in Tables 3-4 to 3-7.

The resident population and housing concepts and definitions are in accordance with those used by the U.S. Bureau of the Census (1993). The Housing Unit Method (HUM) was used to develop resident population estimates. It is the most commonly used method for estimating the population of small areas in the United States (Smith, 1995) and is used by nearly 90 percent of the state and local agencies responsible for preparing population estimates (Byerly, 1990). One of the desirable features of the HUM is that it can be implemented in a variety of forms, which allows it to be adapted to a range of data environments (Martin and Serow, 1978; Smith, 1995; Swanson, Baker and Van Patten, 1983). In a set of tests using 1990 census data, a form of the HUM known as the "Local Expert Procedure" was found to provide accurate population estimates for areas within the YMP grid (Swanson et al., 1995; Roe, Carlson, and Swanson, 1992).

The HUM depends on four variables: (1) a count of housing units; (2) occupancy rate; (3) the average number of persons per household; and (4) the number of persons in



group quarters (Smith, 1986, 1995). The HUM can be represented as a mathematical identity:

$$P = [(H) * (OR) * (PPH)] + GQ$$

where

P = total population

H = housing unit count

OR = occupancy rate (occupied units/total units)

PPH = average number of persons per household

GQ = population in group quarters

### **2.2.1 Housing Units**

The spatial distribution of residential housing units within the grid is derived annually from three sources: (1) utility records; (2) direct (windshield) surveys; and (3) administrative records. Estimates for 2Q/97 through 4Q/97 are derived by interpolating between 1Q/97 and 1Q/98. Utility data are obtained from the Valley Electric Association (VEA), which provides power to most, but not all of the areas within the RadMP Grid. These data describe the number and location of "active residential accounts," and are utilized to identify approximately 75 percent of the total housing units within the RadMP grid. The areas for which VEA data are used include Pahrump, Amargosa Valley, and, beginning this year, the area north of Beatty.

Direct (windshield) surveys, which provide accurate estimates of housing and occupancy rates (Smith, 1995), are conducted annually to compile housing data for the areas of the grid in which VEA data are not used. During the 1998 survey, four previously undetected small clusters of housing and resident population were discovered. Two of these clusters are in the portion of grid cell 1010 identified as Stewart Valley, which extends from Nevada into California. One of the clusters is in the Nevada part of Stewart Valley and the other in the California part. The third previously undetected cluster is located in grid cell 710 (Ash Meadows) and the fourth in grid cell 711 (Johnnie).

Administrative records maintained by the National Park Service and AMFAC, Inc., a concessionaire vendor, provide housing information in the portion of the RadMP grid comprised of Death Valley National Park, excluding Timbisha Village. This information is obtained by telephone and direct personal interviews.

#### **2.2.2 Occupancy Rate**

The occupancy rate of residential housing units in Beatty (grid cells 404 and 405) is derived from the annual windshield survey, as is that for Indian Springs (grid cell 912) and Cold Creek (grid cell 1011). A 95-percent occupancy rate is applied to housing unit counts compiled from VEA data. The use of a 95 percent occupancy rate has been a standard practice in RadMP reports. This occupancy rate was derived from data reported in the 1990 census for the Amargosa Census Division, the Crystal Census Division, and

the Pahrump Census Division (U.S. Bureau of the Census, 1993). Specifically, the 95-percent occupancy rate was found by multiplying the cumulative number of reported housing units found for these three census divisions (3,550) by 0.95, which yielded an estimated 3,373 occupied housing units, a difference of less than 1 percent from the 3,349 occupied housing units reported for these same three census divisions (U.S. Bureau of the Census, 1993). The occupancy rates are applied to the quarterly housing data from 1Q/97 to 1Q/98 to obtain quarterly household estimates for the same period.

### 2.2.3 Persons Per Household

The PPH values used in this report are provided in Table 2-1. The 1998 values shown for Amargosa Valley, Beatty, Pahrump, and Indian Springs are derived from a 1997 survey of households located within the study area (TRW, 1997). A random sampling technique was used in this survey, which means the PPH values, as well as the population estimates that result from using them, are subject to sampling variation.

Table 2-1. Resident Population Per Household, By Area, 1990 and 1998

Area	1990 PPH	1998 PPH	1998 PPH, 95% Confidence Interval
Amargosa Valley Area	2.73	2.85	2.61 to 3.09
Beatty Area	2.21	2.46	2.28 to 2.64
Pahrump Area	2.43	2.56	2.44 to 2.68
Indian Springs Area	2.73	2.75	2.30 to 3.20

Sources: 1990 PPH values are taken from Table 76 (U.S. Bureau of the Census, 1992). The 1990 value shown for Indian Springs is the value for the Clark County Census Division. 1998 PPH values are from the 1997 Survey (TRW, 1997). The 95 percent confidence interval is formed using the normal approximation:  $PPH \pm 1.96 \times (\text{standard error})$ .

To illustrate the effect of sampling variation, Table 2-1 provides a 95-percent confidence interval for each 1998 PPH value, which can be used to construct approximate 95-percent confidence intervals around the estimated populations (Roe, Carlson, and Swanson, 1992). The confidence interval provides an indication of estimation precision due to the uncertainty caused by sampling variation. For example, using the HUM formula, an approximate 95-percent confidence interval for the estimated household population in grid cell 404 is  $(2.28 \times 455) = 1.037$  and  $(2.64 \times 455) = 1.201$ . When the group quarters population (3 persons) is added, the resulting 95-percent confidence interval for the total population is 1,040 to 1,204. That is, it is approximately 95-percent certain that a full census of grid cell 404 would have yielded a resident population between 1,040 and 1,204. Although there are limiting assumptions, this approach will yield reasonable approximations of 95-percent confidence intervals for grid cells with 30 or more households.

Table 2-1 also includes 1990 PPH values from the U.S. Census count of 1990 (U.S. Bureau of the Census 1992). Given the 95-percent confidence intervals for the 1997 PPH values, it appears that PPH values are likely to have remained constant, or, at most, increased only slightly for each of these communities.

The PPH values from the 1997 survey are applied to the quarterly household estimates from 1Q/97 to 1Q/98 to obtain quarterly estimates of the resident household population for the same period.

#### **2.2.4 Group Quarters**

All members of the resident population not living in households are classified by the Census Bureau as living in group quarters. Two general categories of persons in group quarters are recognized: (1) institutionalized persons and (2) other persons in group quarters (also referred to as "noninstitutional group quarters" (U.S. Bureau of the Census, 1993).

The number of persons residing in group quarters in Beatty and Pahrump is taken from the U.S. Census count of 1990 (U.S. Bureau of the Census, 1992). Seven persons in group quarters reported for Beatty were added each quarter to obtain the total resident population by quarter. Four of the seven persons in group quarters in Beatty for 1990 were allocated to grid cell 405; the remaining three were allocated to grid cell 404. All 81 of Pahrump's group quarters population reported for 1990 were allocated each quarter to grid cell 1010. There are 25 residents in grid cell 906 (Stovepipe Wells in Death Valley) classified as a group quarters population each quarter because they live in a dormitory-style arrangement. No other group quarters populations are known to be elsewhere within the RadMP grid.

## **2.3 AGRICULTURE**

Agriculture data for spring 1997 and spring 1998 were obtained by examination of the agricultural activities within the RadMP grid during the period from April to June of each year. The method used to compile agricultural data consisted of the following four steps: (1) previously-collected information regarding agricultural activities within the RadMP grid was compiled and entered into a database, including the type of agriculture (i.e., type of crop or livestock), the number of acres of cropland or number of animals, and the location of the agricultural activity; (2) location of agricultural activities listed in the database (including the RadMP grid cell number) was identified on color aerial photographs of southern Nye County taken during 1997 (USDA, 1997); (3) 1996 groundwater pumpage inventories from the Nevada Division of Water Resources (Nevada, 1997b) were inspected to identify locations of previously unidentified agricultural activities; and (4) several field trips were conducted between April and June 1998 to verify the current existence of, or changes to, previously observed agriculture, and to identify any agricultural activity not yet recorded. These data were verified, where possible, with the land owner or other individuals knowledgeable about specific agricultural activities.

### 3.0 SUMMARY OF SOCIOECONOMIC AND AGRICULTURAL DATA

#### 3.1 HOUSING AND RESIDENT POPULATION

##### Housing Units

Table 3-1 presents quarterly estimates of residential housing units located within the grid by state, county, area, and grid cell for the period from first quarter 1997 (1Q/97) to first quarter 1998 (1Q/98). The data in Table 3-1 show that housing stock increased by 6.4 percent within the RadMP grid from 1Q/97 to 1Q/98, from 7,662 units to 8,150 units. Gains were not spread evenly over the grid, however. The largest absolute (534) and relative increase (10.2 percent) in housing stock occurred within grid cells in the Pahrump area. The primary source of this increase in the Pahrump area was in the Nevada portion of grid cell 1010, which posted a gain of 341 units. These gains, although not as pronounced, are similar to those found for Pahrump during the period 1Q/96 to 1Q/97 (TRW, 1997). Grid cells in the Amargosa Valley area also showed a gain in housing units, although more moderate than the Pahrump area. Housing units in the Amargosa Valley area went from 463 in 1Q/97 to 478 in 1Q/98, an increase of 3.2 percent.

The housing data for the RadMP cells in the Beatty area show a decline of 3.8 percent, from 871 units to 838 units. This area also showed a decline in housing between 1Q/96

and 1Q/97 (TRW, 1997). These declines reflect downsizing at the Barrick Bullfrog mine, which is just west of Beatty (See Table 3-5). It is likely that this decline will continue next year because Barrick, Inc., recently announced that, with the exception of milling operations, which employs about 35 persons, the Barrick Bullfrog mine will cease operations next year (1999). This will result in a loss of around 270 jobs.

Housing units in grid cell 912 (Indian Springs) also declined, from 588 to 555. At least part of the decline is a response to declines in employment associated with changes in mission and scope at the Nevada Test Site (See Table 3-4).

Keep in mind that much of the housing within the entire RadMP grid is "mobile," ranging from fifth wheels and small trailers to large modular units; and what can be moved in can be moved out. Thus, it is not surprising to see the number of housing units increase when economic conditions are good and decline when jobs become fewer. This positive relationship between housing stock and employment is more highly correlated than is the housing/employment relationship in areas where mobile homes and trailers make up a lower proportion of the total housing stock. In these other areas declines in housing stock are not as closely linked to declines in employment.

Inyo County, California shows a slight increase in housing stock, up 5 units from the 1Q/97 count of 405. With the exception of the small development in the southern end of Stewart Valley (seven units in the California portion of grid cell 1010) and Death Valley



Table 3-1. Estimates of Residential Housing Units Located Within the Grid by State, County, Area, and Grid Cell, First Quarter 1997 to First Quarter 1998\*

NEVADA					
Clark County	1Q/97	2Q/97	3Q/97	4Q/97	1Q/98
Grid Cell 912 (Indian Springs and Cactus Springs)	588	580	572	563	554
Grid Cell 1011 (Cold Creek and Willow Creek)	75	75	75	75	75
Clark County Total	663	655	647	638	629
Emeralda County					
Emeralda County Total	0	0	0	0	0
Lincoln County					
Lincoln County Total	0	0	0	0	0
Nye County					
Amargosa Valley Area					
Grid Cell 309 (Lathrop Wells)	6	6	6	6	6
Grid Cell 408 (Farming Triangle)**	108	109	109	110	110
Grid Cell 409 (Farming Triangle)**	84	82	81	84	85
Grid Cell 508 (Farming Triangle)**	14	14	14	14	14
Grid Cell 509 (Farming Triangle)**	143	144	148	152	147
Grid Cell 510 (Crystal Heights)	9	9	9	9	9
Grid Cell 511 (Specter Range)	0	0	0	0	1
Grid Cell 609 (State Line)	38	40	39	40	40
Grid Cell 610 (Crystal)	55	56	58	60	60
Grid Cell 710 (Ash Meadows)	6	6	6	6	6
Amargosa Valley Area Total	463	467	470	482	478
Beatty Area					
Grid Cell 403 (Oasis Valley)	12	12	12	13	12
Grid Cell 404 (Beatty)	499	494	487	483	477
Grid Cell 405 (Beatty)	338	335	333	330	327
Grid Cell 503 (Oasis Valley)	1	1	1	1	1
Grid Cell 505 (Rhyolite)	7	7	7	7	7
Grid Cell 903 (Scotty's Junction)	14	14	14	14	14
Beatty Area Total	871	863	854	847	838
Mercury					
Mercury Total	0	0	0	0	0
Pahrump Area					
Grid Cell 711 (Johannic)	5	5	5	5	5
Grid Cell 810 (Pahrump)	7	7	7	7	7
Grid Cell 910 (Pahrump and Stewart Valley)	1,669	1,721	1,755	1,814	1,862
Grid Cell 1010, NV Portion (Pahrump)	3,579	3,666	3,712	3,822	3,920
Pahrump Area Total	5,260	5,399	5,479	5,648	5,794
Nye County Total	6,594	6,728	6,803	6,977	7,110
NEVADA TOTAL	7,257	7,383	7,449	7,615	7,740
CALIFORNIA					
Inyo County					
Grid Cell 707 (Furnace Creek and Cow Creek)	355	356	358	359	360
Grid Cell 808 (Ryan)	3	3	3	3	3
Grid Cell 809 (Death Valley Junction)	4	4	4	4	4
Grid Cell 906 (Stovepipe Wells)	28	28	28	28	28
Grid Cell 1004 (Scotty's Castle)	8	8	8	8	8
Grid Cell 1010, CA Portion (Stewart Valley)	7	7	7	7	7
Inyo County Total	405	406	408	409	410
CALIFORNIA TOTAL	405	406	408	409	410
GRAND TOTAL IN THE GRID	7,662	7,789	7,857	8,024	8,150

\*Estimates for 2Q/97 through 4Q/97 are interpolated

\*\*This area is approximately bounded by Amargosa Farm Road, State Highway 373, and the California border

Junction (four units in grid cell 809), all housing within the Inyo County portion of the RadMP grid is within the boundaries of Death Valley National Park.

### Households

Table 3-2 shows the estimated quarterly number of households (occupied housing units) located within the grid by state, county, area, and grid cell from 1Q/97 to 1Q/98. There was an increase of 5.9 percent over the 7,257 households estimated for 1Q/97. The largest increase occurred in the Pahrump area, which fueled the increase in households for the grid as a whole. The grid cells in Amargosa Valley, as well as those in Inyo County, also showed slight increases, 2.8 percent and 2.5 percent, respectively.

Given their declines in total housing units, it is not surprising that both the Beatty area and the Indian Springs area also showed declines in the number of households: -5.7 percent and -9.5 percent, respectively. These declines exceed the decline in total housing units in each area: -3.8 percent for Beatty; and -5.6 percent for Indian Springs. This is because not all departing households were in housing units that could be moved. In 1Q/97 the occupancy rate in the Beatty area was 95.4 percent; by 1Q/98 it had fallen to 93.6 percent. During the same period, the occupancy rate fell from 95 percent to 90.1 percent in Indian Springs.

Table 3.2. Estimates of Households (Occupied Housing Units) Located Within the Grid by State, County, Area, and Grid Cell, First Quarter 1997 to First Quarter 1998\*

NEVADA	1Q/97	2Q/97	3Q/97	4Q/97	1Q/98
<b>Clark County</b>					
Grid Cell 912 (Indian Springs and Cactus Springs)	558	535	532	518	505
Grid Cell 1011 (Cold Creek and Willow Creek)	75	75	75	74	74
Clark County Total	633	620	607	593	580
<b>Esmeralda County</b>					
Esmeralda County Total	0	0	0	0	0
<b>Lincoln County</b>					
Lincoln County Total	0	0	0	0	0
<b>Nye County</b>					
<b>Amargosa Valley Area</b>					
Grid Cell 309 (Lathrop Wells)	6	6	6	6	6
Grid Cell 408 (Farming Triangle)**	103	104	104	105	105
Grid Cell 409 (Farming Triangle)**	80	78	77	80	81
Grid Cell 508 (Farming Triangle)**	13	13	13	14	13
Grid Cell 509 (Farming Triangle)**	136	137	141	144	140
Grid Cell 510 (Crystal Heights)	8	9	8	8	8
Grid Cell 511 (Specter Range)	0	0	0	0	1
Grid Cell 609 (Stateline)	36	38	37	38	37
Grid Cell 610 (Crystal)	44	45	46	47	48
Grid Cell 710 (Ash Meadows)	5	5	5	4	4
Amargosa Valley Arc. Total	431	433	436	446	443
<b>Beatty Area</b>					
Grid Cell 403 (Oasis Valley)	11	11	11	12	11
Grid Cell 404 (Beatty)	486	478	469	462	455
Grid Cell 405 (Beatty)	313	309	305	301	297
Grid Cell 503 (Oasis Valley)	1	1	1	1	1
Grid Cell 505 (Rhyolite)	7	7	7	7	7
Grid Cell 703 (Scotty's Junction)	13	13	13	13	13
Beatty Area Total	831	819	807	797	784
<b>Mercury</b>					
Mercury Total	0	0	0	0	0
<b>Pahrump Area</b>					
Grid Cell 711 (Johnnie)	5	5	5	5	5
Grid Cell 810 (Pahrump)	7	7	7	7	7
Grid Cell 910 (Pahrump and Stewart Valley)	1,586	1,635	1,668	1,724	1,769
Grid Cell 1010, NV Portion (Pahrump)	3,400	3,483	3,526	3,631	3,724
Pahrump Area Total	4,998	5,130	5,206	5,366	5,505
Nye County Total	6,259	6,382	6,448	6,609	6,732
<b>NEVADA TOTAL</b>	<b>6,892</b>	<b>7,002</b>	<b>7,055</b>	<b>7,202</b>	<b>7,312</b>
<b>CALIFORNIA</b>					
<b>Inyo County</b>					
Grid Cell 707 (Furnace Creek and Cow Creek)	318	320	323	325	327
Grid Cell 808 (Ryan)	3	3	3	3	3
Grid Cell 809 (Death Valley Junction)	4	4	4	4	4
Grid Cell 906 (Stovepipe Wells)	25	25	25	25	25
Grid Cell 1004 (Scotty's Castle)	8	9	8	8	8
Grid Cell 1010, CA Portion (Stewart Valley)	7	7	7	7	7
Inyo County Total	365	367	370	372	374
<b>CALIFORNIA TOTAL</b>	<b>365</b>	<b>367</b>	<b>370</b>	<b>372</b>	<b>374</b>
<b>GRAND TOTAL IN THE GRID</b>	<b>7,257</b>	<b>7,369</b>	<b>7,424</b>	<b>7,574</b>	<b>7,686</b>

\*Data shown are subject to rounding error

\*\*This area is approximately bounded by Amargosa Farm Ro

adhighway 373, and the California border

### Resident Population

Table 3-3 shows the quarterly estimates of resident population located within the grid by state, county, area, and grid cell from 1Q/97 to 1Q/98. In accordance with the overall increase in housing units and households, the population in the RadMP grid also showed an increase. As shown in Table 3-3, it went from 18,817 to 19,912, an increase of 5.8 percent. Grid cell 1010 in the Pahrump area had the largest 1Q/98 population, 9,614. Keep in mind that the 95-percent confidence interval for this grid cell suggests that the actual population could have been anywhere between about 9,162 and 10,061. Given that the 1Q/98 population was 9,614 and the 1Q/97 population was 8,785, this grid cell gained 829 people, an increase of 9.4 percent. Slight population gains also were posted for grid cells in the Amargosa Valley area and in Inyo County, 2.9 percent and 2.4 percent, respectively.

The grid cells in the Beatty area, as well as grid cell 912, which comprises Indian Springs, experienced resident population declines. Indian Springs exhibited the largest relative loss, 9.5 percent, from 1,535 residents to 1,389. Beatty declined by 5.7 percent during the same period, from 2,052 residents to 1,936. Additional declines are anticipated next year for Beatty as operations wind down at the Barnack Bullfrog mine. It is not clear at this time if the resident population of Indian Springs will continue to decline.

Table 3-3. Estimates of Resident Population Located Within the Grid by State, County, Area, and Grid Cell, First Quarter 1997 to First Quarter 1998\*

NEVADA					
County	1Q/97	2Q/97	3Q/97	4Q/97	1Q/98
<b>Clark County</b>					
Grid Cell 912 (Indian Springs and Cactus Springs)	1,535	1,498	1,462	1,424	1,389
Grid Cell 1011 (Cold Creek and Willow Creek)	206	206	206	206	206
Clark County Total	1,741	1,704	1,668	1,631	1,595
<b>Esmeralda County</b>					
Esmeralda County Total	0	0	0	0	0
<b>Lincoln County</b>					
Lincoln County Total	0	0	0	0	0
<b>Nye County</b>					
<b>Amargosa Valley Area</b>					
Grid Cell 309 (Lathrop Wells)	16	16	16	16	16
Grid Cell 408 (Farming Triangle)**	292	293	293	298	298
Grid Cell 409 (Farming Triangle)**	227	222	219	227	230
Grid Cell 508 (Farming Triangle)**	38	38	38	41	38
Grid Cell 509 (Farming Triangle)**	387	390	401	412	398
Grid Cell 510 (Crystal Heights)	23	23	23	23	23
Grid Cell 511 (Specter Range)	0	0	0	0	3
Grid Cell 609 (Stateline)	103	108	106	108	108
Grid Cell 610 (Crystal)	126	129	131	134	137
Grid Cell 710 (Ash Meadows)	14	14	13	12	11
Amargosa Valley Area Total	1,227	1,235	1,242	1,271	1,262
<b>Beatty Area</b>					
Grid Cell 403 (Oasis Valley)	28	28	28	30	28
Grid Cell 404 (Beatty)	1,197	1,178	1,157	1,140	1,121
Grid Cell 405 (Beatty)	774	764	754	744	735
Grid Cell 503 (Oasis Valley)	2	2	2	2	2
Grid Cell 505 (Rhyolite)	17	17	17	17	17
Grid Cell 903 (Scotty's Junction)	33	33	33	33	33
Beatty Area Total	2,052	2,023	1,991	1,967	1,936
<b>Mercury</b>					
Mercury Total	0	0	0	0	0
<b>Pahrump Area</b>					
Grid Cell 711 (Johnnie)	13	13	13	13	13
Grid Cell 810 (Pahrump)	17	17	17	17	17
Grid Cell 910 (Pahrump and Stewart Valley)	4,060	4,186	4,269	4,413	4,529
Grid Cell 1010, NV Portion (Pahrump)	8,785	8,997	9,109	9,376	9,614
Pahrump Area Total	12,875	13,213	13,407	13,818	14,174
<b>Nye County Total</b>	<b>16,153</b>	<b>16,471</b>	<b>16,641</b>	<b>17,057</b>	<b>17,372</b>
<b>NEVADA TOTAL</b>	<b>17,894</b>	<b>18,175</b>	<b>18,309</b>	<b>18,688</b>	<b>18,967</b>
CALIFORNIA					
<b>Inyo County</b>					
Grid Cell 707 (Furnace Creek and Cow Creek)	782	788	793	799	800
Grid Cell 808 (Ryan)	7	7	7	7	
Grid Cell 809 (Death Valley Junction)	10	10	10	10	1
Grid Cell 906 (Stovepipe Wells)	87	87	87	87	8
Grid Cell 1004 (Scotty's Castle)	20	20	20	20	2
Grid Cell 1010, CA Portion (Stewart Valley)	17	17	17	17	1
Inyo County Total	923	929	934	940	92
<b>CALIFORNIA TOTAL</b>	<b>923</b>	<b>929</b>	<b>934</b>	<b>940</b>	<b>92</b>
<b>GRAND TOTAL IN THE GRID</b>	<b>18,817</b>	<b>19,103</b>	<b>19,243</b>	<b>19,628</b>	<b>19,959</b>

\*Data shown are subject to rounding error

\*\*This area is approximately bounded by Amargosa Farm Road, State Highway 373, and the California border

### **Race and Ethnic Composition of the Resident Population**

Information gained from a recent survey conducted in Nye County (TRW, 1997) suggests that the white population makes up about 95 percent of the racial composition in the RadMP grid. The largest single identified racial group after white is American Indian, with about 2 percent of the resident population in the RadMP grid. In regard to ethnic composition, residents of Hispanic origin represent about six percent of the resident population in the RadMP Grid. Virtually all of Hispanic origin are classified as white in terms of race. Thus, minorities comprise about 11 percent of the resident population in the RadMP Grid.

### **3.2 DAYTIME POPULATION: EMPLOYMENT**

The major sources of daytime populations due to employment in the RadMP grid are the NTS, the YMP, and mines. Estimates of the on-site NTS and YMP employment are shown in Table 3-4 (DOE/NV, 1998). For purposes of the RadMP, the NTS daytime population is located at grid cell 512 (Mercury). Similarly, The YMP daytime population is located at the center of the RadMP grid in grid cell 1, which contains the "North Portal Pad." From January to December 1997, employment decreased at the NTS by 8.4 percent, from 1,366 to 1,251. Table 3-4 indicates that the YMP employment increased during 1997, from 131 in January to 152 in December.

Table 3-5 provides estimates of the employment levels for the major mines in southern Nye County and in Inyo County. These figures indicate an overall decline in these daytime populations, from 495 in 1996 to 476 in 1997. The Barrick Bullfrog Mine (grid cell 504) is the single largest employer among these mines. It experienced a 20-percent employment decline, from 382 in 1996 to 305 in 1997.

Table 3-4. Daytime Population: Nevada Test Site and YMP Monthly Employment (Number of Persons), January 1997 to December 1997

NEVADA												
Nye County	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Grid Cell 512 (NTS)	1366	1,220	1,217	1,223	1,221	1,219	1,220	1,223	1,230	1,243	1,244	1,241
Grid Cell 1 (YMP)	131	131	130	137	136	157	156	150	151	154	154	152
Nye County Total	1,497	1,351	1,347	1,360	1,357	1,376	1,376	1,373	1,381	1,397	1,408	1,403
NEVADA TOTAL	1,497	1,351	1,347	1,360	1,357	1,376	1,376	1,373	1,381	1,397	1,408	1,403
GRAND TOTAL IN THE GRID	1,497	1,351	1,347	1,360	1,357	1,376	1,376	1,373	1,381	1,397	1,408	1,403

Source: DOE/NV, 1998. Note that prior to July 1995, NTS and YMP employment were reported as one category (DOE/NV August, 1995). For purposes of this report, all NTS employment is assigned to Mercury (Grid Cell 512) and all YMP employment to the N. Portal Pad (Grid Cell 1).

Table 3-5. Daytime Population: Employment Figures for Major Mines Located Within the Grid by State, County, and Grid Cell, 1990 to 1997

Nye County	1990	1991	1992	1993	1994	1995	1996	1997
Grid Cell 509 (IMV Pits)	74	54	53	46	37	38	37	35
Grid Cell 504 (Barrick Bullfrog)	310	330	268	266	290	372	382	305
Grid Cell 405 (New Discovery, Gold Bar, Daisy, Motherlode)	128	32	10	6	48	58	41	108
Grid Cell 309 (Cind-R-Lite)	2	2	n/a	n/a	n/a	4	4	1
Grid Cell 609 (American Borate)	n/a	n/a	n/a	n/a	n/a	37	31	25
Nye County Total	514	418	331	318	375	509	495	476
NEVADA TOTAL	514	418	331	318	375	509	495	476
CALIFORNIA								
Inyo County								
Grid Cell 808 (Billie Mine/Ryan)	8	8	8	8	8	8	8	8
Inyo County Total	8	8	8	8	8	8	8	8
CALIFORNIA TOTAL	8	8	8	8	8	8	8	8
GRAND TOTAL IN THE GRID	522	426	339	326	383	517	503	484

Source: Cind-R-Lite information was obtained from on-site visits in 1997 and 1998. It was information for American Borate (ABC) and the Billie Mine for 1997. The 1996 figure for ABC is an average of 1995 and 1997. The 1990 to 1995 data are otherwise from an annual report Major Mines of Nevada (Year) published by the Nevada Bureau of Mines and Geology, Nevada Division of Minerals, Annual Publications, 1990-1995, Reno, Nevada. Data for 1996 and 1997 are generally taken from a web site maintained by the Nevada Bureau of Mines and Geology, Nevada Division of Minerals: the 1996 data are located at <http://www.nbmng.unr.edu/mm/mm96>, the 1997 data are located at <http://www.nbmng.unr.edu/mm/mm97.htm>. "n/a" indicates that there is no information in the source document for the mine in question. Information for the Gold Bar, Daisy, and Motherlode mines is not available from the Nevada Bureau of Mines web site for 1996 and 1997.

### **3.3 DAYTIME POPULATION: SCHOOL ENROLLMENT**

Primary concentrations of daytime populations occur at the schools within the RadMP grid. Table 3-6 indicates the number of schools in particular grid cells. Within the RadMP grid there are six grid cells that contain one or more schools. Four of these ten schools are located in the Pahrurap area. There is a fifth school in the Pahrump area, Mt. Charleston, but the GPS survey conducted in April 1997 confirmed that this school is outside of the RadMP grid.

Table 3-7 provides school enrollment estimates of the ten schools by grid cell from 1Q/97 to 1Q/98. During this period, overall school enrollment in the grid increased from 3,578 to 4,292, a net gain of 714 students (20.0 percent). Both the Beatty area and Indian Springs area experienced declines in enrollment. In grid cells 404 and 405 (Beatty), the student daytime population declined by 6.1 percent, from 445 to 418. In grid cell 912 (Indian Springs), it went from 397 to 365, a decline of 8.1 percent. The student population in grid cell 1010 (Pahrump) increased by 753 students (30.0 percent). Grid cells 409 (Amargosa Valley) and 707 (Inyo County) also showed slight increases, 16 and 4 students, respectively.



Table 3-6. Daytime Populations: Public Schools Located Within the Grid by State, County, and Grid Cell, First Quarter 1997 to First Quarter 1998

NEVADA	
Clark County	Number of Public Schools
Grid Cell 912 (Indian Springs)	2
Clark County Total	2
Nye County	
Grid Cell 409 (Amargosa Valley)	1
Grid Cell 404 (Beatty)	1
Grid Cell 405 (Beatty)	1
Grid Cell 1010 (Pahrump)	4
Nye County Total	7
NEVADA TOTAL	9
CALIFORNIA	
Inyo County	
Grid Cell 707 (Death Valley)	1
Inyo County Total	1
CALIFORNIA TOTAL	1
GRAND TOTAL IN THE GRID	10

SOURCES: Nye County School District (1998) and Clark County School District, Nevada (1998); Inyo County School District, California (1998), and Pahrump Valley, 1998 Phone Directory (Phone Directories Company, 1998)

Table 3-7. Daytime Population: Public School Enrollment Located Within the Grid by State, County and Grid Cell, First Quarter 1997 to First Quarter 1998

NEVADA					
Clark County	1Q/97	2Q/97	3Q/97	4Q/97	1Q/98
Grid Cell 912 (Indian Springs)	397	389	381	373	
Clark County Total	397	389	381	373	
Nye County					
Grid Cell 409 (Amargosa Valley)	174	178	182	186	
Grid Cell 404 (Beatty)	264	263	261	260	
Grid Cell 405 (Beatty)	181	176	170	165	
Grid Cell 1010 (Pahrump)	2,549	2,738	2,928	3,117	
Nye County Total	3,168	3,355	3,541	3,728	
NEVADA TOTAL	3,565	3,744	3,922	4,101	
CALIFORNIA					
Inyo County					
Nye County 707 (Death Valley)	13	14	15	16	
Inyo County Total	13	14	15	16	
CALIFORNIA TOTAL	13	14	15	16	
GRAND TOTAL IN THE GRID	3,578	3,758	3,937	4,117	

Sources: 1Q/97 taken from TRW (1997). 1Q/98 data are from: Inyo County School District (1998), Nye County School District (1998), Clark County School District (1998). The grid cell figures for 2Q/97 through 4Q/97 are based on linear interpolation between the grid figures reported for 1Q/97 and 1Q/98. The grid cell figures for 2Q/97 to 4Q/98 were summed to obtain the "Total In Grid" figures.

### **3.4 AGRICULTURAL CHARACTERISTICS**

Tables 3-8 and 3-9 show estimates of livestock within the RadMP grid for spring 1997 and spring 1998. The distribution of beef cattle reported in these tables includes cattle grazing on privately-owned land and/or Bureau of Land Management (BLM)-administered lands within the study area. The number of beef cattle increased only slightly from 275 in spring 1997 to 296 in spring 1998. Other observations in the livestock inventory from spring 1997 to spring 1998 include newly identified cattle in grid cell 803 in the Beatty Area and a newly identified fish pond in grid cell 1010 in the Pahrump Area.

Tables 3-10 and 3-11 provide estimates of the number of acres of agriculture crops by RadMP grid cell for spring 1997 and spring 1998. The decrease in alfalfa acreage in 1998 was accompanied by a nearly corresponding increase in "other hay" acreage. The overall estimated increase from 2,659 acres of plant agriculture in spring 1997 to 3,084 acres in spring 1998, is largely a reflection of newly identified areas of agriculture, and does not necessarily indicate the expansion of, or changes in, crops previously reported.

Table 3-12 provides estimates of 1997 agricultural yields by RadMP grid cell. The figures in this table are derived from estimates provided in Nevada Agricultural Statistics for 1996-1997; thus, they may not reflect actual yields.

Table 3-8. Estimates of Livestock Located Within the Grid by State, County, Area, and Grid Cell, Spring 1997

NEVADA							
Clark County	Cattle	Milk Cows	Pigs	Goats	Ostriches	Poultry	Catfish
Grid Cell 912 (Indian Springs)	4			30			
Clark County Total	4			30			
Nye County							
Amargosa Valley Area							
Grid Cell 408 (Farming Triangle)*	6		52	7		25	15,000
Grid Cell 409 (Farming Triangle)*	12				4		
Grid Cell 508 (Farming Triangle)*					26		
Grid Cell 509 (Farming Triangle)*		4,429					
Grid Cell 611 (Point of Rocks)	100						
Amargosa Area Total	118	4,429	52	7	30	25	15,000
Beatty Area							
Grid Cell 403 (Oasis Valley)	95				30		
Grid Cell 404 (Beatty)							
Grid Cell 504 (Rhyolite)	50						
Beatty Area Total	145				30		
Pahrump Area							
Grid Cell 910 (Pahrump)	8				97		
Grid Cell 1010 (Pahrump)		2,301				46	
Pahrump Area Total	8	2,301			97	46	
Nye County Total	271	6,730	52	7	157	71	15,000
NEVADA TOTAL	275	6,730	52	37	157	71	15,000
GRAND TOTAL IN THE GRID	275	6,730	52	37	157	71	15,000

Notes: The count of cattle includes those grazing on privately-owned land or BLM-administered land. The number of milk cows is from SMPA (1998). "Poultry" includes chickens, turkeys, geese, and ducks.

\*This area is approximately bounded by Amargosa Farm Road, State Highway 373, and the California border.

Table 3-9. Estimates of Livestock Located Within the Grid by State, County, Area, and Grid Cell, Spring 1998

NEVADA							
Clark County	Cattle	Milk Cows	Pigs	Goats	Ostriches	Poultry	Catfish
Grid Cell 912 (Indian Springs)				15			
Clark County Total				15			
Nye County							
Amargosa Valley Area							
Grid Cell 408 (Farming Triangle)*	18		75	8		12	15,000
Grid Cell 409 (Farming Triangle)*	5				1		
Grid Cell 508 (Farming Triangle)*					61		
Grid Cell 509 (Farming Triangle)*		4,400					
Grid Cell 611 (Point of Rocks)	125						
Amargosa Area Total	148	4,400	75	8	65	12	15,000
Beatty Area							
Grid Cell 403 (Oasis Valley)	95						
Grid Cell 404 (Beatty)							
Grid Cell 504 (Rhyolite)	45						
Grid Cell 504 (Rhyolite)	8						
Beatty Area Total	148						
Pahrump Area							
Grid Cell 910 (Pahrump)					155		
Grid Cell 1010 (Pahrump)		2,100					300
Pahrump Area Total		2,100			155		300
Nye County Total	296	6,500	75	8	220	12	15,300
NEVADA TOTAL	296	6,500	75	23	220	12	15,300
GRAND TOTAL IN THE GRID	296	6,500	75	23	220	12	15,300

Notes: The count of cattle includes those grazing privately-owned land or BLM-administered land. The number of milk cows is from SMPA (1998). "Poultry" includes chickens, turkeys, geese, and ducks. "Catfish" in grid cell 1010 includes catfish and bass. This area is approximately bounded by Amargosa Farm Road, State Highway 373, and the California border.

Table 3-10. Acres of Plant Agriculture Located Within the Grid by State, County, Area, and Grid Cell, Spring 1997

NEVADA									
Clark County	Alfalfa Hay	Other Hay	Barley	Oats	TBP	Pistachios	Fruit Trees	Grapes	Garlic
Grid Cell 912 (Indian Springs)							1		
Clark County Total							1		
Nye County									
Amargosa Valley Area									
Grid Cell 408 (Farming Triangle)*	649		32			68	5		1
Grid Cell 409 (Farming Triangle)*	251	23							
Grid Cell 508 (Farming Triangle)*	404						2	1	
Grid Cell 509 (Farming Triangle)*	192	62				12		81	
Amargosa Area Total	1,496	85	32			80	7	9	1
Pahrump Area									
Grid Cell 910 (Pahrump)	42	40	95	32	82				
Grid Cell 1010 (Pahrump)	374	131			52				
Pahrump Area Total	416	171	95	32	234				
Nye County Total	1,912	256	127	32	234	80	7	9	1
NEVADA TOTAL	1,912	256	127	32	234	80	8	9	1
GRAND TOTAL IN THE GRID	1,912	256	127	32	234	80	8	9	1

Notes: "Other hay" is a mixed crop that may include alfalfa, clover, timothy, and legumes or tame grasses. "TBP" refers to "To Be Planted" and describes acreage prepared; however, the crop type is unidentified. "Fruit Trees" include peaches, nectarines, and pomegranates. \*This area is approximately bounded by Amargosa Farm Road, State Highway 373, and the California border.

Table 3-11. Acres of Plant Agriculture Located Within the Grid by State, County, Area, and Grid Cell, Spring 1998

NEVADA	Alfalfa Hay	Other Hay	Barley	Oats	TBP	Pistachios	Fruit Trees	Grapes	Garlic
Clark County									
Grid Cell 912 (Indian Springs)							1		
Clark County Total							1		
Nye County									
Amargosa Valley Area									
Grid Cell 408 (Farming Triangle)*	539	216	34		17	86	6		0
Grid Cell 409 (Farming Triangle)*	238	43					5		
Grid Cell 508 (Farming Triangle)*	347	298			44		5	1	
Grid Cell 509 (Farming Triangle)*	154	77			66	12	2	9	
Amargosa Area Total	1,278	634	34		127	98	18	10	0
Pahrump Area									
Grid Cell 910 (Pahrump)	30	47		5	49	10			
Grid Cell 1010 (Pahrump)	38	198		68	439				
Pahrump Area Total	68	245		73	488	10			
Nye County Total	1,346	879	34	73	615	108	18	10	0
NEVADA TOTAL	1,346	879	34	73	615	108	19	10	0
GRAND TOTAL IN THE GRID	1,346	879	34	73	615	108	19	10	0

Notes. "Other hay" is a mixed crop that may include alfalfa, clover, timothy, and legumes or tame grasses. "TBP" refers to "To Be Planted" describes acreage prepared; however, the crop type is unidentified. "Fruit Trees" include peaches, nectarines, and pomegranates.

\*This area is approximately bounded by Amargosa Farm Road, State Highway 373, and the California border.

Table 3-12. Estimates of 1997 Agricultural Yields Located Within the Grid by State, County, and Grid Cell

NEVADA	Alfalfa Hay	Other Hay	Barley	MILK
Clark County				
Grid Cell 912 (Indian Springs)				
Clark County Total				
Nye County				
Amargosa Valley Area				
Grid Cell 408 (Farming Triangle)*	2791		1,920	
Grid Cell 409 (Farming Triangle)*	1,079	60		
Grid Cell 508 (Farming Triangle)*	1,737			
Grid Cell 509 (Farming Triangle)*	826	161		85
Amargosa Area Total	6,433	221	1,920	85
Pahrump Area				
Grid Cell 910 (Pahrump)	181	104	5,718	
Grid Cell 1010 (Pahrump)	1,608	341		44
Pahrump Area Total	1,789	445	5,718	44
Nye County Total	8,222	666	7,638	129
NEVADA TOTAL	8,222	666	7,638	129
GRAND TOTAL IN THE GRID	8,222	666	7,638	129

Notes. Yields for Alfalfa Hay are in tons per year and estimates at 4.3 tons per acre in Nye County for 1996 (Nevada, 1997a). Yields for "Other Hay" are in tons per year and estimated at 2.6 tons per acre in Nye County for 1996 (Nevada, 1997a). Barley yields are in bushels per year and estimated at 60 bushels per acre in northeastern and southern Nevada counties in 1996 (Nevada, 1997a). Milk yields are in millions of pounds per year and estimated at 19,300 pounds per cow in Nye County in 1996 (Nevada, 1997a).

\*This area is approximately bounded by Amargosa Farm Road, State Highway 373, and the California border.

#### 4.0 REFERENCES

- Byerly, E., 1990. "State and Local Agencies Preparing Population and Housing Estimates." *Current Population Reports*. Series P.25 No. 1063. U.S. Bureau of the Census.
- Clark County School District. 1998. Personal conversation (May ) with M. Bauhaus.
- Code of Federal Regulations 10 Part 960, 1984. *Title 10, "Energy," Part 960. General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories*. Washington, D.C.: U.S. Government Printing Office.
- Code of Federal Regulations 40 61, 1989. *Title 40, "Protection of Environment," Part 61. National Emission Standards for Hazardous Air Pollutants*. Washington, D.C.: U.S. Government Printing Office.
- DOE (U.S. Department of Energy). 1990. *Yucca Mountain Site Characterization Project Radiological Monitoring Plan, Revision 1*. Las Vegas, Nevada: U.S. Department of Energy, Yucca Mountain Site Characterization Project Office.
- DOE/NV (U.S. Department of Energy/Nevada Operations). 1996. *Report of Nevada Test Site and Other Related Employment*. Las Vegas, NV: Human Resources Division (since April, 1996; prior to April, 1996, reports were issued by the Industrial Relations Division), Nevada Operations Office, U.S. Department of Energy (monthly) 1996.
- DOE/NV. 1995. *Report of Nevada Test Site and Other Related Employment, July, 1995*. Las Vegas, NV: Industrial Relations Division, Nevada Operations Office, U.S. Department of Energy (monthly).
- DOE/NV. 1998. (WorldWideWeb Website <http://invhome.hrd.contractor/nts.htm>). Maintained by Human Resources Division, DOE/NV.

## REFERENCES (Continued)

- EPA (Environmental Protection Agency) 1990. *Radiation Monitoring Around United States Nuclear Test Areas, Calendar Year 1990*. Las Vegas, Nevada: U.S. Environmental Protection Agency.
- Inyo County School District. 1998. Personal conversation (May ) with M. Bauhaus.
- Martin, J. and Serow, W. 1978, "Virginia's State-local Cooperative Program: Conflict and Cooperation in Producing Population Estimates." *State Government*: 182-186.
- Nevada Bureau of Mines and Geology. 1990-1996. *Major Mines of Nevada, 1989 - 1995*. Reno, Nevada: Nevada Bureau of Mines and Geology, Nevada Department of Minerals.
- Nevada Bureau of Mines and Geology. 1997. *Major Mines of Nevada, 1996*. (WorldWideWeb Website <http://www.nbmng.unr.edu/mm>). Maintained by the Nevada Bureau of Mines and Geology, Nevada Division of Minerals. Reno, Nevada.
- Nevada State Demographer. 1998. Population of Nevada's Unincorporated Towns. (WorldWideWeb Website <http://www.scs.unr.edu/demographer/product3.htm>). Maintained by the Nevada State Demographer, University of Nevada Reno. Reno, Nevada.
- Nevada 1996. *Nevada Agricultural Statistics 1995-1996*. Reno, Nevada: Nevada Agricultural Statistics Service.
- Nevada. 1997a. *Nevada Agricultural Statistics 1996-1997*. Reno, Nevada: Nevada Agricultural Statistics Service.

## REFERENCES (Continued)

- Nevada. 1997b. Department of Conservation and Natural Resources. Division of Water Resources, 555 East Washington Avenue, Las Vegas, Nevada. 1996 Groundwater Pumpage Inventory for Amargosa Valley, Pahrump, and Indian Springs.
- NRC (Nuclear Regulatory Commission). 1977. Regulatory Guide 1.109. "Calculation of Annual Doses to Man From Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I." Washington, D.C.: U.S. Nuclear Regulatory Commission.
- Nye County school District. 1998. Personal communication (May) with M. Bauhaus.
- Nye County, Nye County Assessor's Office. 1986. "Resolution No. R88-38, Beatty Taxing District Boundaries." Information received from Robin Rivero, Chief Deputy. Tonopah, Nevada, October 1993.
- Phone Directories Company. 1998. *Pahrump Valley 1998 Phone Directory*. Provo UT: Phone Directories Company, Inc.
- Roe, L., Carson, J., and Swanson, D. 1992. "A Variation of The Housing Unit Method for Estimating the Population of Small, Rural Areas: A Case Study of the Local Expert Procedure" *Survey Methodology* 18: 155-163.
- Smith, S. 1986. "A Review and Evaluation of the Housing Unit Method of Population Estimation." *Journal of The American Statistical Association* 81: 287-296.
- Smith, S. 1995. "The Housing Unit Method." pp. 89-117 in N. W. Rives, W. J. Serow, A. Lee, H. F. Goldsmith, and P. Voss (eds.) *Basic Methods for Preparing Small-Area Population Estimates*. Madison, Wisconsin: Applied Population Laboratory, University of Wisconsin.



## REFERENCES (Continued)

- SMPA (Security Milk Producers Association). 1998. Unpublished data provided by L. Sharfi, SMPA Accounting Coordinator, (909) 947-8782, to S. LeStrange on June 6, 1997, and May 1, 1998.
- SNL (Sandia National Laboratories). 1993. *User's Guide for GENII-S: A Code for Statistical and Deterministic Simulations of Radiation Doses to Humans from Radionuclides in the Environment*. SAND91-0561 UC-721. Albuquerque, New Mexico: Sandia National Laboratories.
- Swanson, D., Carlson, J., Roe, L., and Williams, C. 1995. "Estimating the Population of Rural Communities by Age and Gender: A Case Study of the Local Expert Procedure." *Small Town* (May-June): 14-21.
- Swanson, D., Baker, B., and Van Patten, J. 1983. "Municipal Population Estimation: Conceptual and Practical Features of the Housing Unit Method." Pp. 99-105 in *Alaska Population Overview, 1982*. Juneau, AK: Alaska Department of Labor.
- TRW. 1997. *Yucca Mountain Site Characterization Project: Summary of Socioeconomic Data Analyses Conducted in Support of the Radiological Monitoring Program, April, 1996 to April, 1997*. June. Las Vegas, Nevada: TRW Environmental Safety Systems Inc.
- TRW. 1998. *Preliminary Biosphere TSPA-VA Chapter*. Report B00000000-01717-2200-00203. February 4. Las Vegas, Nevada: TRW Environmental Safety Systems Inc.
- U.S. Bureau of the Census, 1993. *Population and Housing Unit Counts, Nevada, 1990 Census of Population and Housing*. 1990 CPH-2-30. Washington D.C.: U.S. Government Printing Office.

**APPENDIX A**  
**READING THE RadMP GRID**

## **APPENDIX A**

### **A.1 Reading the RadMP Grid**

The RadMP Grid is a circle whose radius is 84 kilometers. It is centered on coordinates defined as "Easting 551135.7" and "Northing 4078351.6," Universal Transverse Mercator Grid Zone 11. The RadMP Grid is divided into 16 equal sections of 22.5 degree arcs.

Beginning with an undivided circle whose radius is 4 km, the RadMP Grid is comprised of ten additional concentric rings, each 8-km wide. Including the undivided 4-km circle at its center, the RadMP Grid consists, therefore, of 161 cells ( $16 \times 10 + 1$ ).

The grid data contained in Tables 3-1, 3-2, 3-5, and elsewhere where data are reported for grid cells are read as follows:

1. The center of the circle is grid cell 1.
2. Each concentric ring is numbered sequentially from 100 (the first ring surrounding the center grid cell) to 1000 (the last ring of the radiological circle).
3. The 16 sections are numbered sequentially beginning with number 1, which is centered on due north. Thereafter, each subsequent section is numbered counterclockwise, so that, Section 5 is due west, Section 9 is due south, and Section 13 is due east.
4. Grid cell identifiers consist of the number of the ring followed by the number of the section. For example (refer to Figure 1-1, p. 1-2), Death Valley Junction is found in Grid cell 809 and the community of Cold Creek is contained in grid cell 1011.

WBS 1.2.13.6  
QA: N/A

**Yucca Mountain Site Characterization Project  
Summary of Socioeconomic Data Analysis  
Conducted in Support of the Radiological Monitoring Program  
During Calendar Year 1994**

**June 1995**

**Prepared for:**

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## 1.0 INTRODUCTION

The Radiological Monitoring Plan (DOE, 1990) for the Yucca Mountain Site Characterization Project (YMP) is the controlling document for the radiological monitoring activities associated with the YMP. That plan outlines the Radiological Monitoring Program (RadMP) and the data necessary to support radiological impact analysis.

The objective of this annual report is to provide detailed demographic and economic information, as defined in the YMP Socioeconomic Plan, on the area surrounding Yucca Mountain in support of the Radiological Monitoring Plan. These data can then be uploaded into a computer model to perform radiation dose and risk assessments. As these assessments are made using a circular grid incorporating both distance and direction, defining an appropriate study area requires knowledge of the spatial distribution of these population, economic, and agricultural characteristics.

Since March 1989, efforts have been ongoing to collect data input into the socioeconomic database established in support of the RadMP. For calendar years 1990 through 1993, the annual reports documented quarterly estimates of community characteristics including housing units by type, population, and employment, as well as the economic characteristics of the grid area as defined by agricultural activities. This report of calendar year 1994 is the fifth in the series of reports discussing the data collection efforts used in the development and refinement of the RadMP database.

For calendar year 1994, the methods used to develop and update the housing and population databases are distinctly different from those documented in the previous reports. Chapter 2.0 describes in detail the revised data collection process. Also within this current document, various socioeconomic characteristics of the study area, such as estimates of housing units, population, and economic activities are presented. Appendix A presents summaries of the information collected for the database during the 1994 calendar year.

## 1.1 Background

The Radiological Monitoring Plan is written in compliance with the Nuclear Waste Policy Amendments Act (NWPAA). Within 10 Code of Federal Regulations (CFR) 960, there are several parts that make specific reference to population distributions and densities, to the socioeconomic conditions in the study area, and to the relative importance of these data. Based on the regulatory requirements and guidelines, knowledge of the radiological pathways to man within the study area is essential to ensure adherence to the Federal standards. The objective of this guidance is to "minimize risk to the public and permit compliance with the EPA and NRC regulations" (10 CFR 960, p. 47741). These regulations require that protective measures be assessed and that exposure to members of the public in unrestricted areas not only be limited, but be "further reduced below the limits to the extent reasonably achievable" (10 CFR 960, p. 47741).

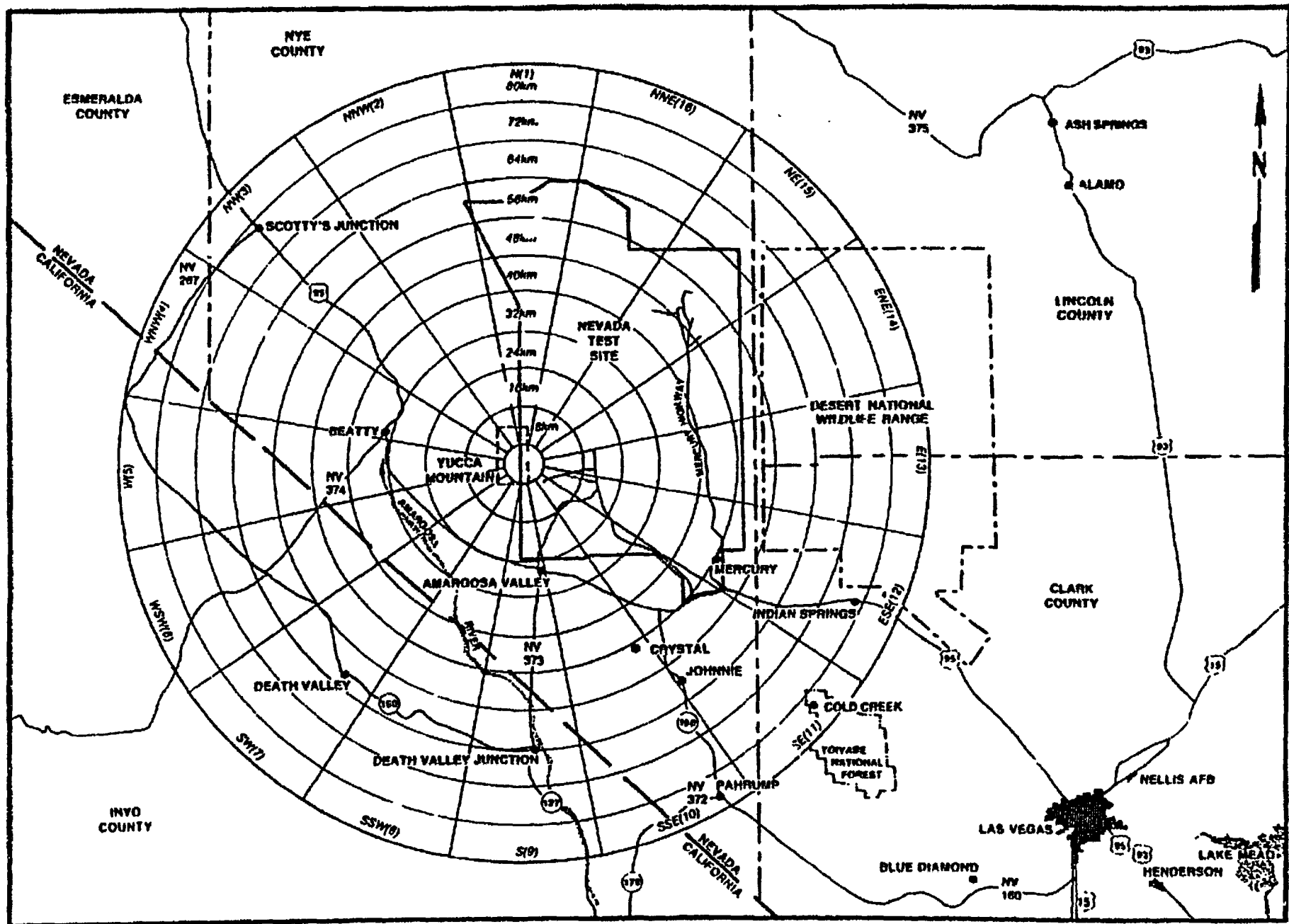
The purpose for which the socioeconomic data are being collected is to be used in the calculation of potential "long-term" radiation doses to the populations within a 50-mile radius of Yucca Mountain. The primary data required for the socioeconomic support of radiological impact analyses are those used in computer models that assess radiation dose estimates for an individual or a population (DOE, 1990). These computer programs, along with the associated databases provide techniques used in the estimation of dose and risk from radionuclide emissions to air (EPA, 1992b, p.1-1). A computer model that incorporates distance and direction, with meteorological data, allows analysis of potential exposure doses to members of the public through atmospheric dispersion of radionuclide releases.

One such program, the CAP88-PC (Clean Air Act Assessment Package-1988 for a personal computer), allows users to perform dose and risk assessments for the purpose of demonstrating compliance with 40 CFR 61.93(a). CAP88-PC provides the methodology for "assessments of both collective populations and maximally-exposed individuals" (EPA, 1992b, p 1-1). It should be noted however, that the "dose and risk estimates from CAP88-PC are applicable only to low-level chronic exposures, since the health effects and dosimetric data are based on low-level chronic intakes. CAP88-PC cannot be used for either short-term or high-level radionuclide intakes" (EPA, 1992b, p. 1-3).

## 1.2 The RadMP Grid and Study Area

The grid, or the RadMP grid circle, is defined in the YMP Radiological Monitoring Plan (DOE, 1990) as an area with a radius of 84 kilometers (km) (approximately 50 miles). The grid is centered on a point on the western side of Exile Hill at Yucca Mountain site with the coordinates of Easting 551135.7, Northing 4078351.6 on the Universal Transverse Mercator (UTM) Projection Grid Zone 11 of the North American continent (see Figure 1).

The study area includes the communities of Pahrump, Beatty, and Amargosa Valley in southern Nye County, Nevada and Indian Springs in Clark County, Nevada, as well as Death Valley Junction in Inyo County, California. Also contained within the study area are portions of Death Valley National Park (DVNP), the Nevada Test Site (NTS), and the Nellis Air Force Range (NAFR). Although the southern portion of Pahrump falls outside the 84-km RadMP grid circle, the entire community of Pahrump is included in the analysis as population and economic characteristics refer to the entire community.



## 2.0 DATA REQUIREMENTS

Radiation is a part of our natural environment. Each year, the average "dose" to a person from natural or background radiation sources is approximately 360 millirem. Natural radiation exposure occurs through a variety of pathways, including absorption through external radiation exposure, as well as inhalation and/or ingestion of radioactive materials. Possible sources of this exposure consist of cosmic radiation from space, terrestrial radiation, including radon gas, foods, and man-made sources such as medical and dental X-ray treatments and smoke detectors.

The primary data required for the socioeconomic support of radiological impact analyses are those that allow assessment of radiation dose and exposure estimates for an individual or a population. The exposure and risk associated with the radiation absorbed can vary due to many factors -- the location and elevation of the place of residence, the type of house, and the types of foods consumed. Fruits and vegetables grown locally and meats from locally raised grazing animals represent potential "concentration mechanisms" or sources of possible concentrations of radionuclides from local origins. "Grazing animals ingest forage from large areas of ground surface and so represent a concentration mechanism. Home garden vegetables may be a direct route of exposure for humans" (EPA, 1990, p. 38). Milk, one of the most universally consumed food products, represents a particularly important source for assessing ingestion of radioactive material; this is due to the relatively rapid turnaround, and thus the

shortened decay period of radioactivity, from time of feed ingestion by the milk cows to the time the milk appears on grocery shelves for human consumption.

Information regarding the distribution of both the population and the possible sources of food supplies within the study area allows use of an appropriate model to calculate effective dose equivalents for an individual or an entire population (EPA, 1990). "Knowledge of population densities and spatial distribution of farm animals is necessary to assess protective measures required in the event of an accidental release of radioactivity...." (EPA, 1990, p. 11).

## 2.1 Site-Specific Data

Technical guidance recommends the use of site-specific data rather than generic data.

"Because of the arid characteristics of the Yucca Mountain area, site-specific data are very important because most generic data (e.g., Regulatory Guide 1.109 (NRC, 1977)) were developed for non-arid environments" (DOE, 1990, p. 5-2). Site-specific data for the Yucca Mountain area, include the characteristics of radioactive aerosols, the meteorology, agricultural and cultural characteristics, population demographics, and general biota data (DOE, 1990, p. 5-3).



## 2.2 Data Compilation Methodology

It was discovered from previous efforts that detailed information on the existing communities within the defined grid area was difficult to acquire, at best. This was particularly true of "socioeconomic" information (i.e., data on housing, population, and employment), due to the absence of regulatory mandates, such as building permits, and detailed records of the population composition.

During the initial data collection effort, the total number of housing units in southern Nye County was estimated using information from Valley Electric Association (VEA), a rural co-operative that provides electrical service to residents in the area. It was assumed that nearly all occupied housing units in the VEA service area would be connected to the electric service. Windshield surveys were conducted in early 1989 and the residential data collected were mapped by quarter Section (of the Township-Range-Section classification) for the various communities.

In 1990, local experts were employed to assist in the identification of community characteristics and in determining the precise location of residential and commercial activities. In doing so, the accuracy of the data concerning exact locations of residences and businesses was greatly improved.

For 1994, the method of collecting data on housing has changed again. The use of local experts over extended periods of time presumed the continued availability of those or other knowledgeable individuals. In both Pahrump and Indian Springs, however, local expert participation in the collection of housing data has become increasingly difficult to maintain. In Pahrump, both the size of the community and the rapid rate of growth have complicated this data collection process and it has become somewhat unmanageable for any single individual.

The amended method for collecting information on housing units for the 1994 calendar year pertained to the three communities in southern Nye County and required modification of the reporting of housing units within the entire study area. For the communities of Amargosa Valley, Beatty, and Pahrump, VEA records were used to identify new electrical meter installations. However, in the absence of specific assistance from meter readers in Pahrump, innovative methods were sought to identify and locate new housing starts in that community, and for consistency, were also employed for the other two communities in Nye County.

In order to maintain consistency and continuity within the database over time, methods were chosen that would be capable of being replicated. Therefore, VEA administrative records, Monthly Growth Reports (VEA, 1994-1995) and VEA Staking Sheets (VEA, 1993-1995), were employed to identify newly established accounts. The Monthly Growth Reports list all of those accounts that began service during each month, with the newly installed accounts having a unique identifying number. These accounts were then associated with a VEA

Staking Sheet. Aerial photography interpretation was used in conjunction with street maps to help locate new housing units within the general area illustrated on the Staking Sheets (bounded by existing streets). In addition, the Staking Sheets were examined for information that indicated if a meter installation was for a house, building, or for some other use i.e., security lights, well pumps, garage, etc. However, information on the type of housing unit located on the property, i.e., mobile home or stick built, was not specified. Because the exact location of each new meter was not always described, windshield surveying to identify housing type was not considered at this time. Therefore, the housing information in this document has been reported only as single family, multi-family, or group quarters.

### 2.3 Population Estimates

If a census were taken every year and this information were made public, it could be used to build a consistent database. However, as the U.S. census is taken only once a decade, updated estimates are essential when current demographic and socioeconomic data are required.

In the absence of detailed census data for small rural areas, the development of population estimates can be accomplished using a variation of the Housing Unit Method (HUM) of estimation. The formula employed by this method states that the population of the study area will be equal to the total number of occupied housing units multiplied by the average number of persons per occupied housing unit plus the total number of persons in group quarters. The

methodology used to estimate populations within the RadMP grid area has been detailed in the report entitled "Summary of Socioeconomic Data Analyses Conducted in Support of the Radiological Monitoring Program During Calendar Year 1990" (DOE, 1991b). Within that report, comparisons have been made with the U.S. Bureau of the Census 1990 population figures and community population estimates generated using a variation of the Housing Unit Method of identifying households in conjunction with the Local Expert Method. The analysis documented in that report has indicated that the combination of these methodologies produces highly accurate population estimates. Therefore, the use of the "persons per household" figures generated from the Local Expert Method to estimate population figures within the grid area has been continued.

As specific information on the residents within the study area is limited, assumptions are made concerning the composition of the population. The age distributions and proportions reported in the 1990 Census of Population are held constant for the calculation of age distributions in Tables A-9 through A-12 of Appendix A. The method used to determine these distributions is documented in the report entitled "Summary of Socioeconomic Data Analyses Conducted in Support of the Radiological Monitoring Program During Calendar Year 1991" (DOE, 1992).

## **2.4 Identification of Establishments versus Employment**

Within this report, there has been a notable change in the technique of reporting economic characteristics. In past reports, employment information has been reported by RadMP grid cell and Standard Industrial Classification (SIC) using a survey conducted by the Center for Business and Economic Research (CBER) at the University of Nevada, Las Vegas (UNLV, 1991) as the base data. Each year, the list of business establishments and the corresponding employment estimation have been updated to reflect existing conditions. As time has passed further and further from this survey date and the mix of the local economy potentially has changed, the reliability of the employment estimates have been questioned. Therefore, the number and location of business establishments within the RadMP grid area have been reported instead of the estimated employment levels of these establishments.

## **2.5 Identification of Potential Dust Generators**

Efforts were begun late in the data collection process to address potential Preclosure Radiological Safety issues concerning public health and safety. These concerns require knowledge of the spatial distribution of dust generating activities as possible sources of emissions of naturally occurring radionuclides. The potential for radionuclide releases into the atmosphere is increased in the vicinity of various activities. These activities include, but are not limited to, ones which disrupt the ground surface, i.e., grading, dredging, mining, clearing, trenching, and landfills, as well as those which increase the potential for dust (particulate

matter) to be in an airborne state, i.e., aircraft operations, cropdusting, general construction, and agricultural activities.

### 3.0 COMMUNITY CHARACTERISTICS

Community characteristic data are collected for use as input to the calculation of "long-term" radiation doses to the affected populations within an 84-km radius of Yucca Mountain. The calculations are part of a computer model that estimates radiation dose and risk assessment for an individual or a population. Estimates of radiation dose and risk exposure developed using these models "are applicable only to low-level chronic [long-term] exposures, since the health effects and dosimetric data are based on low-level chronic [long-term] intakes" (EPA, 1992b, p. 1-3).

"Long-term" populations can be expressed in terms of day-time populations and permanent night-time populations. Day-time populations are comprised of concentrations of employees and school age children located within the grid area; while night-time populations are a function of the number of occupied housing units multiplied by an appropriate persons per household factor. "Short-term" populations, or persons visiting or residing in the area on a temporary basis, such as those staying in recreational vehicle (RV) parks or jail facilities, are not included in the population estimates reported in the tables. Knowledge of these populations is necessary to assess protective and emergency response measures; however, their inclusion in the population estimates for radiological impact analyses would be misleading as the computer models "cannot be used for either short-term or high-level radionuclide intakes" (EPA, 1992b, p. 1-3).

### 3.1 The Four Communities Within the Study Area

Table 1 provides a summary of the housing, population, and business establishment characteristics for each community for the end of the first quarter of 1994. This date, March 31, best approximates the April 1 date used in the 1990 Census of Population so that estimates of each community's annual growth can be derived for purposes of comparison. The boundaries used to delineate Amargosa Valley, Beatty, and Pahrump are the tax boundaries specified by the Nye County Board of Commissioners. The boundary for Indian Springs is the legal description specified for the unincorporated town by the Clark County Commissioners. Taxation boundaries and town boundaries do not correspond directly to the RadMP grid cell boundaries used to compile data for RadMP analyses. Therefore, information within Table 1 is not directly comparable to the information presented in the Appendix. Due to the changes in data collection methodology, the information presented in this table is not directly comparable to previous reports.

Figure 2 exhibits the community boundaries within the RadMP grid area. Community boundaries encompass many partial grid cells, whole grid cells and, in some cases, extend beyond the 84-km grid delineation; therefore, community information is not directly comparable to grid-specific information, i.e., the information presented for the grids cannot be summed to community totals. This is most clearly demonstrated in the data for the community of Pahrump. In Table 1, the information for the housing units of the community



**Table 1. Summary of Socioeconomic Characteristics Compiled by Community  
for the First Quarter of 1994 (January 1 to March 31)\***

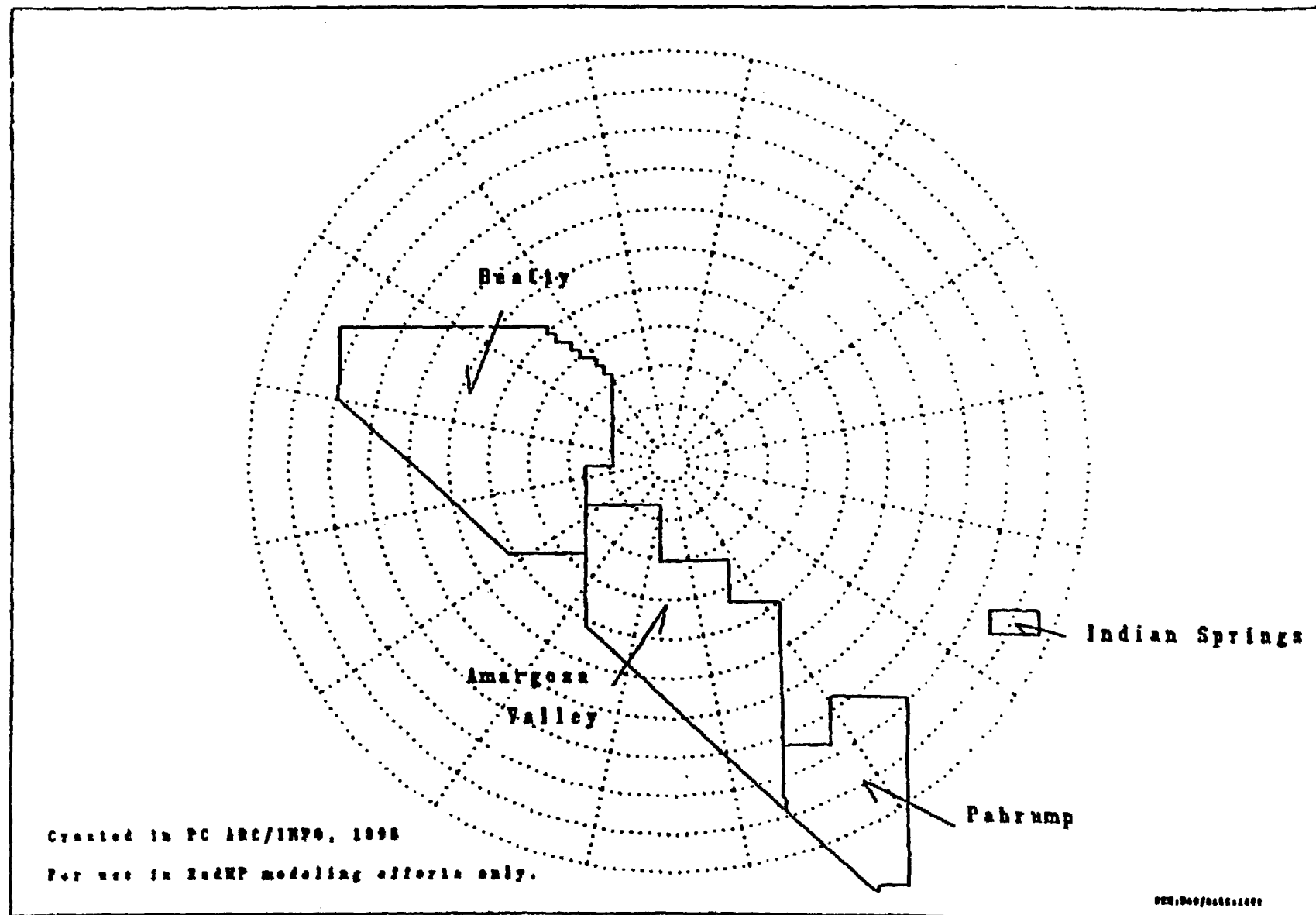
<b>Socioeconomic Characteristics</b>	<b>Pahrump</b>	<b>Beatty</b>	<b>Amargosa Valley</b>	<b>Indian Springs</b>
Square Miles	298	692.5	499	18
Acreage (1)	190,720	443,200	319,360	11,520
Total Occupied Housing Units:	4,879	788	352	492
Single Family(2)	4,692	719	344	492
Multi Family	187	69	8	
Group Quarters (3)	2	4		
Total Estimated Population:	10,892	1,947	909	1,200
Single Family(2)	10,463	1,747	888	1,200
Multi Family	417	168	21	
Group Quarters (3)	12	32		
Establishments by Standard Industrial Classification Group:	660	134	60	37
Ag/For/Fishing (4)	20	6	7	
Mining/Construction	98	15	6	
Manufacturing	21	2	1	
TCEGSS (5)	42	8	7	2
Wholesale & Retail Trade	178	29	15	5
FIRE (6)	67	17		7
Services	209	47	20	13
Government	25	10	4	10

SOURCE: VEA, 1990-1995; VEA, 1993-1995; VEA, 1994-1995; State of Nevada, 1995a; Pahrump Town Office, 1994; PhoneDisc USA, 1994.

\* Tax boundaries specified by the Nye County Board of Commissioners are used to delineate the boundaries for Pahrump, Beatty, and Amargosa Valley. For Indian Springs, the legal description specified by the Clark County Commissioners for the unincorporated town is used.

Please note: Community boundaries encompass many whole, as well as some partial, cells. Therefore, information within this table is not directly comparable to the information presented in the Appendix. For Pahrump, the information included in this table is for the entire community both inside and outside of the RadMP grid.

- (1) Acreages for the communities in Nye County were supplied by the Nye County Assessor's Office, and are the best estimate of the actual acreages encompassed within the taxation boundaries (Nye County Assessor's Office, 1988)
- (2) This category was redefined to include all single-family dwellings and mobile homes, due to the new method of data collection. Units housing persons visiting or residing in the area on a "short-term" temporary basis, such as in RV parks, are not included.
- (3) This category includes the group quarters in Pahrump and the employee housing in Beatty, reported as the number of facilities in the housing section (not included in total) and number of residents in the population section (included in total and not used to calculate the PPH).
- (4) Agriculture/Forestry/Fishing
- (5) TCEGSS refers to Transportation, Communications, Electric, Gas, and Sanitary Services.
- (6) FIRE refers to Finance, Insurance, Real Estate



Map of the Communities Within the RadMP Grid

differs from the information in Table 2 which represents only that portion of the community contained within the 84-km RadMP grid.

### 3.2 Housing

In the absence of post-census allocations of the population and housing mix of Nye County, other estimation methods were utilized to locate housing units. These methods included: consultation with local experts; windshield surveys; local utility administrative records; and the use of assessor's parcel files, subdivision plots, aerial photo interpretation, and community road maps. These methods provided input to the estimates of the total number of housing units, and to the occupancy rates, for the communities within the grid.

In Pahrump, housing is comprised of single-family structures, duplexes, apartments, and condominiums/townhomes. In addition to the year-round housing stock, there are RV parks in Pahrump that provide facilities for both seasonal/snowbird residents (people residing in the area for a short time) and temporary visitors. Much of the recent growth in Pahrump is attributable to a change in the perception of Pahrump as a bedroom community of Las Vegas. "Growth in rural towns is usually fueled by major employment opportunities, but not in Pahrump. The impetus there has been the quality of life. Minimal regulations, no zoning, low crime, wide open spaces and inexpensive land" are key reasons the housing stock has increased in recent years (Pledger, 1995).

**Table 2. Housing Types by Community, 1994**  
(Only for Those Areas of the Communities Contained Within the RadMP Grid)

Total Occupied Housing Units By Type	Pahrump	Beatty	Amargosa Valley	Indian Springs
<b>First Quarter:</b>				
Total Units	3,392	788	352	492
Single Family	3,215	719	344	492
Multi-Family	177	69	8	
Group Quarters***	2	4		
<b>Second Quarter:</b>				
Total Units	3,539	791	359	492
Single Family	3,356	722	351	492
Multi-Family	183	69	8	
Group Quarters***	2	4		
<b>Third Quarter:</b>				
Total Units	3,661	792	361	492
Single Family	3,464	723	353	492
Multi-Family	197	69	8	
Group Quarters***	2	4		
<b>Fourth Quarter:</b>				
Total Units	3,765	793	365	492
Single Family	3,568	724	357	492
Multi-Family	197	69	8	
Group Quarters***	2	4		

SOURCE: VEA, 1990-1993; VEA, 1993-1993; VEA, 1994-1993.

- \* The information reported in this table reflects only those areas of Pahrump included within both the taxation boundaries and the 84-km RadMP grid; therefore, the information in this table is not comparable to the information presented in Table 1.
- \*\* Units housing persons visiting or residing in the area on a "short-term" temporary basis, such as in RV parks, are not included.
- \*\*\* This category includes the group quarters in Pahrump and the employee housing in Beatty.

NOTE: These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts.

The total number of housing units within the RadMP grid area increased from 7 to 5,979 units from the first to fourth quarter of 1994, representing a gain of 432 units (approximately an 8% increase). The communities of Amargosa Valley, Beatty, and Indian Springs exhibited little change for the year, while Pahrump continued to demonstrate a steady increase in housing stock each quarter (see Table 2). The number of housing units in the entire community of Pahrump increased by approximately 13% from the first to the fourth quarter of 1994, increasing by 625 units from 4,879 to 5,504. In 1994, the housing units in Pahrump contained within the RadMP grid increased by 373 units, growing from 3,392 to 3,765 units, representing approximately an 11% increase.

In Beatty, the permanent housing units remain relatively constant. Beatty's housing units are comprised of single-family permanent and mobile home units, RV parks, and apartment complexes. Most of the mobile-home parks are established in the southern part of town. There are seven hotels, motels, and RV parks in the Beatty area that provide for both seasonal inhabitants and overnight visitors.

In Amargosa Valley, there are primarily single-family structures. One motel and one apartment building are located on the south end of the valley and are used essentially as long term residences. As of the end of 1994, construction had begun on a new facility located near the Nevada/California border, designed to accommodate seasonal/tourist populations in Death Valley, as well as in Amargosa Valley.

The single-family housing stock in Indian Springs is also comprised primarily of mobile homes, although there are permanent structures scattered throughout the community.

Unoccupied military family housing units are located in the northwest section of town that can accommodate up to 340 persons; however, they have not been occupied since 1987. Barracks that can accommodate 215 enlisted personnel are used throughout the year to house personnel participating in NAFR exercises. Indian Springs also has motel and RV facilities that provide 60 spaces for seasonal residents.

### 3.3 Population

The methodology used to estimate populations within the RadMP grid area is detailed in the report entitled "Summary of Socioeconomic Data Analyses Conducted in Support of the Radiological Monitoring Program During Calendar Year 1990" (DOE, 1991b). Within that report, comparisons were made between the 1990 Census of Population figures and community population estimates generated using the RadMP variation of the Housing Unit Method. The analysis documented in that report indicates that the combination of these methodologies produces highly accurate population estimates. Therefore, applying these methods, and incorporating the "persons per household" multiplier generated from the Local Expert Method (refer to Table 3), is used again to develop estimates of the population within the grid in the absence of more current data.

**Table 3. Evaluation of Population per Household by Community  
(All Housing Units)**

Community	1985 (1)	1988 (2)	1990 (3)
Amargosa Valley	2.6	2.66	2.58
Beatty	1.79	2.55	2.43
Pahrump	2.28	2.47	2.33
Indian Springs	N/A	2.95	2.44

N/A indicates not available.

- (1) University of Nevada-Reno, 1985. Special Census of Nye County, Summary Report. Bureau of Business and Economic Research, College of Business Administration, Reno, Nevada.
- (2) State of Nevada, 1988. Southern Nevada Communities and Nuclear Waste Survey, Nevada: Nevada Nuclear Waste Project Office.
- (3) DOE, 1991b.

The distribution of long-term population within the RadMP grid area for the first quarter of 1994 is shown in Figure 3. Between the first and fourth quarter of 1994, the estimated total population within the RadMP grid area grew by 785 persons, from 13,220 to 14,005, approximately a 6% increase (see tables A-5 and A-8 in Appendix A), excluding the population in group quarters at Mercury on the NTS. The group quarters population for Mercury, grid cells 512 and 612, displayed a decrease of 182 persons, dropping from 537 people in the first quarter to 355 persons in the fourth quarter of 1994.

The majority of the population change during the year occurred in Pahrump (see Table 4). Pahrump's estimated population within the RadMP grid cells increased by an estimated 831 people, increasing from 7,576 persons in the first quarter to 8,407 in the fourth quarter of 1994. This represented an 11% increase in the Pahrump population within the RadMP grid

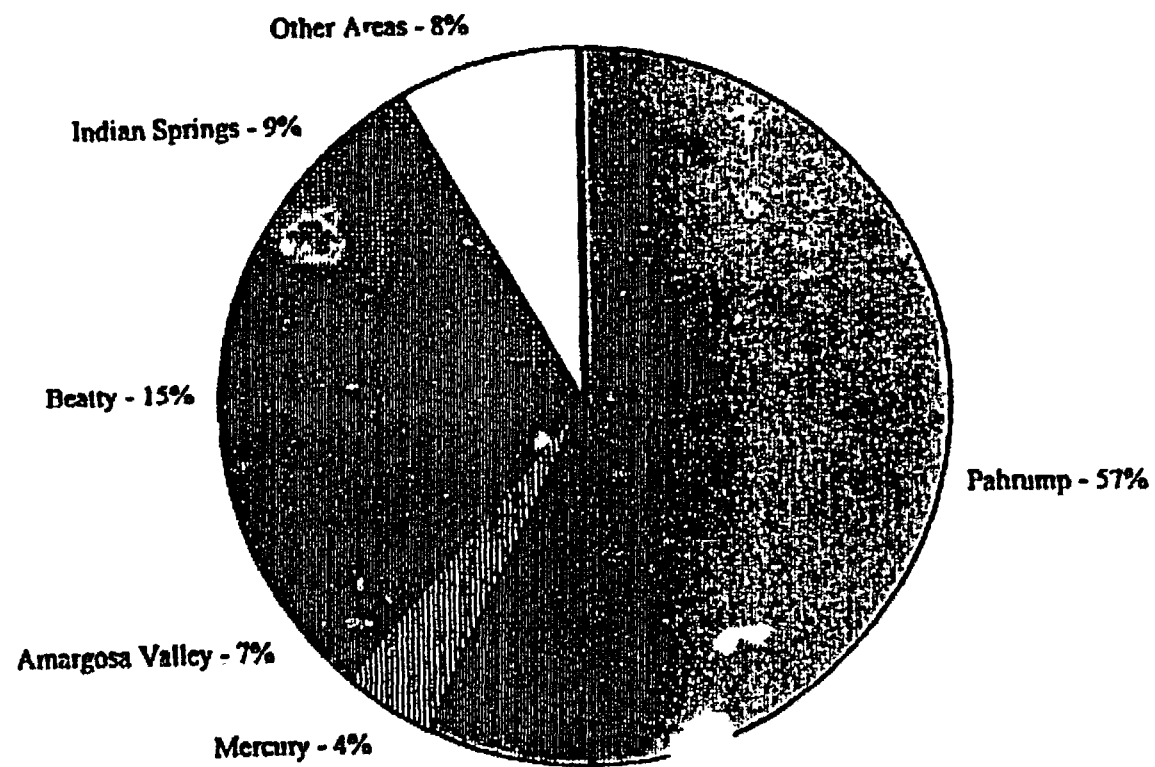


Figure 3. Distribution of Estimated Population for Designated Communities Within the RadMP Grid Area, First Quarter 1994



**Table 4. Population Estimates by Housing Types by Community, 1994**  
(Only for Those Areas of the Communities Contained Within the RadMP Grid)

Population Estimate by Housing Type	Pahrump*	Beatty	Amargosa Valley	Indian Springs
<b>First Quarter:</b>				
Total Population**	7,576	1,947	909	1,200
Single Family	7,169	1,747	888	1,200
Multi-Family	395	168	21	
Group Quarters***	12	32		
<b>Second Quarter:</b>				
Total Population**	7,903	1,954	927	1,200
Single Family	7,484	1,754	906	1,200
Multi-Family	408	168	21	
Group Quarters***	11	32		
<b>Third Quarter:</b>				
Total Population**	8,175	1,957	932	1,200
Single Family	7,725	1,757	911	1,200
Multi-Family	439	168	21	
Group Quarters***	11	32		
<b>Fourth Quarter:</b>				
Total Population**	8,407	1,959	942	1,200
Single Family	7,957	1,759	921	1,200
Multi-Family	439	168	21	
Group Quarters***	11	32		

SOURCE: VEA, 1990-1993; VEA, 1993-1995; VEA, 1994-1995; DOE, 1991b.

\* The information reported in this table reflects only those areas of Pahrump included within both the taxation boundaries and the 84-km RadMP grid; therefore, the information in this table is not comparable to the information presented in Table 1.

\*\* Units housing persons visiting or residing in the area on a "short-term" temporary basis, such as in RV parks, are not included.

\*\*\* This category includes persons residing in group quarters in Pahrump and in employee housing in Beatty.

NOTE: These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts.

area. Both Amargosa Valley and Beatty showed marginal growth in the estimated long-term population over the same time period (approximately 4% and 1%, respectively).

### 3.4 Other Daytime Population Concentrations

It is also important to identify those segments of the day- and night-time population that are grouped in concentrations. These populations include: children attending school or enrolled in day-care facilities; those persons attending group functions, eg. churches, community centers, or fraternal organizations; persons gathered in hotels/motels and casinos; persons in medical clinics; and individuals at community detention facilities.

Determination of the school-age population is also an important component in daily population distributions. Concentrations of weekday day-time populations are located at the 13 schools and daycare facilities located within the grid area (see Table 5). The highest concentration appears in grid cell 1010, one of the grid cells representing Pahrump. All five public school buildings in Pahrump, a private school, and a nursery school are located in this grid cell (see Table 6).

There are numerous other group-function facilities located within the RadMP study area. These consist of churches, community and senior centers, fraternal organization meeting

Table 5. Number of School Facilities Within the RadMP Grid, 1994

RadMP Grid Cell	Number of Facilities by Community				
	Pahrump	Beatty	Amerposa Valley	Indian Springs	Death Valley
404		1			
405		2			
409			1		
707					1
912				1	
1013	7				

SOURCE: PhoneDisc USA, 1994.

Table 6. Average Number of Students per Weekday Within the RadMP Grid, 1994

RadMP Grid Cell	Number of Students			
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
404	235	232	229	231
405	141	140	154	155
409	141	147	150	147
707	n/a	n/a	n/a	n/a
912	378	387	390	400
1010	2,124	2,131	2,340	2,355

SOURCE: Nye County, 1994-1995; Clark County, 1994-1995

n/a indicates information not available

places, and the community detention facilities. The hotels/motels and casinos classification also includes other locations which provide gaming facilities.

There were no hospitals identified within the grid area at this time. Small medical clinics in both Beatty and Amargosa Valley were recognized, although the clinic in Amargosa Valley is only open on a part-time basis. In addition, construction on a new urgent care facility in Pahrump was begun in 1994.

## 4.0 ECONOMIC CHARACTERISTICS

Within a radiological impact modeling program, knowledge of the spatial distribution of human populations, farm animals, and agricultural activities is "necessary to assess protective measures required in the event of an accidental release of radioactivity" within the study area (EPA, 1990, p. 11). The human population considered at risk at any one time is composed of people in their residence, place of work, and any other form of temporary assembly (schools, hospitals, churches, etc.). The agricultural component of a radiological impact model is considered in order to assess the "concentrations i.e. food and intake rates to people from ingestion of food produced in the assessment area" (EPA, 1992b, p.1-2).

### 4.1 Employment Characteristics

During 1991, a comprehensive place-of-work survey was conducted by the Center for Business and Economic Research (CBER) at the University of Nevada, Las Vegas, (UNLV, 1991). From that one-time survey, CBER provided employment information by RadMP grid cell and Standard Industrial Classification (SIC) as presented within the RadMP report for calendar year 1991 (DOE, 1992). This effort reflected a single "snapshot in time" of the employment levels within southern Nye County.

No comparable data for employment levels within the RadMP grid area was available in 1994. As such, revision of the employment estimates presented in the 1991 report was not

considered a viable representation of current employment characteristics. Therefore, employment levels were reported only for the major employment centers through information collected from administrative records of the DOE and the State of Nevada Department of Minerals (Tables 7, 8, and 9). In order to demonstrate where there are potential employment concentrations, the number of operating commercial establishments was reported both by community (Table 1) and grid cell (Tables A-13 and A-14).

#### 4.1.1 The Nevada Test Site

The NTS is discussed independently in this report because it represents a high concentration of employment in southern Nye County. Although there have been fluctuations in the employment levels at the NTS over the years, this work force represents a substantial portion of the total employment in Nye County.

Employment at the NTS for the past nine years is presented in Table 7 (DOE/NV, 1986-1995). For January of 1994, NTS employment is reported as 3,286 workers; by December 1994 employment had declined to 3,017 workers. This represents approximately an 8% loss in work force for the NTS, or a net loss of 269 workers from the RadMP area.

An NTS work force survey was conducted by Planning Information Corporation (PIC) for the Nevada Nuclear Waste Project Office in April 1988 (PIC, 1988) to evaluate the distribution of NTS employment. In previous reports, the distributions of NTS employment based on percent

Table 7. Nevada Test Site Monthly Employment Levels: 1986 - 1994

Month	YEAR								
	1986	1987	1988	1989	1990	1991	1992	1993	1994
January	5,378	5,323	4,791	5,027	4,823	4,524	4,434	3,832	3,286
February	5,363	5,410	4,868	5,105	4,765	4,518	4,503	4,134	3,286
March	5,287	5,387	4,907	5,098	4,705	4,489	4,502	4,592	3,224
April	5,148	5,387	4,949	5,114	4,794	4,388	4,474	3,742	3,205
May	5,058	5,250	5,094	5,151	4,783	4,367	4,487	3,757	3,161
June	5,140	5,441	5,067	5,086	4,788	4,417	4,429	3,781	3,234
July	5,122	5,405	5,066	5,036	4,776	4,466	4,457	3,711	3,177
August	5,131	5,407	5,168	5,021	4,780	4,464	4,479	3,679	3,223
September	5,284	5,390	5,211	5,013	4,758	4,553	4,382	3,638	3,242
October	5,236	5,253	5,283	4,949	4,604	4,520	4,173	3,468	3,128
November	5,262	5,235	5,195	4,893	4,589	4,465	4,037	3,421	3,062
December	5,323	4,869	5,067	4,834	4,492	4,421	3,922	3,319	3,017

SOURCE: DOE/NV, 1986-1995

Table 8. YMP Monthly Employment Levels at the Nevada Test Site: 1988 - 1994

Month	YEAR						
	1988	1989	1990	1991	1992	1993	1994
January	n/a	34	20	16	46	149	307
February	n/a	27	16	17	50	183	356
March	n/a	32	15	17	53	183	344
April	n/a	54	15	17	54	232	336
May	n/a	34	14	17	54	238	309
June	38	23	22	17	5	243	322
July	36	24	22	21	59	261	324
August	40	25	22	27	59	262	352
September	41	24	22	97	107	304	444
October	42	23	21	99	108	300	302
November	46	23	17	44	149	302	306
December	36	23	17	45	149	305	478

SOURCE: DOE/NV, 1986-1995

n/a indicates information not available.

**Table 9. Employment Figures for the Major Mines Within the RadMP Grid**

Major Mine Reported Within RadMP Grid	1989	1990	1991	1992	1993	1994
IMV Pits	72	74	54	53	46	37
Lac Minerals, Bullfrog Mine	280	310	330	268	266	290
Sterling Mine (Saga Explorations)	35	42	n/a	n/a	n/a	42
Vanderbilt, New Discovery Mine	7	8	10	10	6	6
Angst Mining (Gold Bar)	42	36	22	n/a	n/a	n/a
Crowell Mine(Daisy Mine)	2	n/a	n/a	n/a	n/a	n/a
Dagerstrom's Motherlode Mine	46	42	n/a	n/a	n/a	n/a
Cind-R-Lite	n/a	2	2	n/a	n/a	n/a
ABC Mill	26	n/a	n/a	n/a	n/a	n/a
<b>TOTAL</b>	<b>510</b>	<b>514</b>	<b>418</b>	<b>331</b>	<b>318</b>	<b>375</b>

SOURCE: State of Nevada, 1989-1994, State of Nevada, 1995a.

n/a indicates information not available from the source document.



distributions obtained from this survey were documented. However, as the length of time increased from the date of the original survey, the validity of applying this employment distribution diminished. As the scope of work at the NTS has changed recently (represented by the decrease of 269 NTS workers and the increase of 171 YMP workers in 1994), the need to reevaluate the use of this distribution was recognized. The dramatic increase in YMP employment since 1988 served to substantiate this argument (see Table 8); YMP employment in Area 25 of the NTS increased from 38 workers in June of 1988 to 478 workers by December of 1994. The numbers for both Table 7 and Table 8 were based on estimates of full-time equivalents (FTEs) provided by the DOE.

#### 4.1.2 The Town of Pahrump

In Pahrump, agricultural activities historically were the dominant economic sector in the community. More recently, the growing population in Pahrump led to the demand for additional business and personal services, as well as retail establishments. Consequently, many of the new employment opportunities are within the retail and service sectors.

In July of 1994, a new business license ordinance was instituted to identify those local businesses with annual revenues in excess of \$6,000 (Pahrump, 1994). By December of 1994, 570 business owners had filed for licenses with the Pahrump Town Office (information prior to this date was unavailable, Pahrump Town Office, 1994). Of these, 496 were registered to owners with Pahrump addresses, 62 were registered to owners with addresses in other areas of

Nevada, and 12 were registered to owners outside Nevada. Another 200 to 300 businesses were estimated by the Town Manager to exist in Pahrump, but licenses were not issued because they did not generate the required revenues (Pledger, 1995).

During 1994, several notable commercial establishments either opened or expanded service. One of the more conspicuous arrivals was the November opening of the Smith's Food & Drug Center at the intersection of Highways 160 and 372. In addition, the Double Eagle Casino was built; Saddlewest Casino and Mountain View Casino both expanded; D&D Tire moved and expanded; and Big O Tire opened. Also, a 24-hour health clinic, Pahrump Valley Urgent Care sponsored by the Pahrump Valley Hospital Board, broke ground.

During 1994, the Pahrump Dairy reached production capacity with a reported 2,456 milk cows (Ferria, 1995). This dairy has represented an opportunity for the local feed producers, and to date six farms located in Nye County have contributed to the feed mix consumed at the dairy. Of this total, three are located within the RadMP grid area. These farmers produced alfalfa, oats, baled hay and hayfine. The Nye County farmers represented approximately 14% of the total feed utilized by the dairy, while another farm in central Lincoln County produced 34%. The remainder of the feed was obtained from out-of-state sources: a single farm in Utah produced 24% of the feed, and a grouping of farms in California produced approximately 28%.

#### **4.1.3 The Town of Beatty**

Historically, mining operations in the area surrounding Beatty have been the primary economic activity for that community. The frequent and sometimes dramatic changes in the work force employed in the mining industry have, in the past, resulted in rapid changes in Beatty's population, which in turn has produced an economic boom or bust for local businesses. The service industry (hotels and motels) is also important to Beatty. With its proximity to Death Valley National Park, the area benefits from tourist traffic and overnight visitors.

Employment reported at the mines within the area changed since 1993. The Nevada Department of Minerals (State of Nevada, 1995b) reported an increase from last year's figures of almost 18% in total employment at the mines located within the RadMP grid area. However, part of this dramatic increase resulted from the reporting of employees at the Sterling Mine for the first time since 1990 (refer to Table 9). Most of the actual change in 1994 employment occurred at the Bullfrog Mine.

#### **4.1.4 The Town of Amargosa Valley**

In the early 1980s, Amargosa Valley was primarily an agricultural area with a highly dispersed residential community. During this period, the American Borate Company (ABC) plant was also in full operation and provided employment opportunities for residents of the

community. However, in the late 1980s, a decrease in production at the ABC plant and a decline in crop production contributed to the economic decline in Amargosa Valley, which resulted in an out-migration of population .

Today, with the building of a new dairy at the southern end of the valley, the community has seen a resurgence in crop production, with the principal crop being alfalfa. The dairy has provided the resident farmers in the area with a local and constant consumer (Goucher, 1994-1995). Conversely, the local crop production has presented the dairy with a feed supply without the high transportation costs.

#### 4.1.5 The Town of Indian Springs

The economic structure of Indian Springs is comprised primarily of local service oriented businesses and retail trade establishments that generate few employment opportunities in the community. The Indian Springs Air Force Base is used primarily for temporary duty exercises and has few personnel permanently stationed at the base. Due to the limited number of employment opportunities in the community, many Indian Springs residents commute to the NTS, the NAFR, the Southern Desert Correctional Facility, and the Las Vegas metropolitan area for employment (DOE, 1991b).

## 4.2 Agricultural Characteristics

Data on the distribution of livestock and agricultural activities within the grid area are included in Tables A-19, A-20, and A-21 in Appendix A. The majority of livestock in the area consisted of bee colonies in Pahrump used in honey production, a "catfish farm" in Amargosa Valley used to stock lakes throughout Nevada, dairy cows in Pahrump and Amargosa Valley used in the production of milk shipped to southern California, pigs raised for commercial consumption in Amargosa Valley, and range cattle. The amount of land being used for alfalfa production increased from 2,265 acres to 2,276, a total of 11 acres, less than 1%. The acreage planted in barley and oats decreased by 95 acres, representing a loss of 20%. This decrease may be explained, in part, by the amount of acreage (655 acres) reported as fallow in 1994. These acres may or may not represent "new" lands used for agricultural production as fallow acreages were not included in previous RadMP documents. The opening of the dairy on the south end of Amargosa Valley represented additional local demand for agricultural products .

## 4.3 Activities Associated with Dust Generation

Within the RadMP grid area, four potential dust generation categories were identified: Agricultural Activities, Mining & Open Pit Operations, Construction & Drilling Operations, and Airports & Airfields. Within the study area, the currently operational activities are widely dispersed and are prevalent in varying concentrations (see Table 10).

**Table 10. Activities Associated with Potential Dust Generation Within the RadMP Grid, 1994**

RadMP Grid Cell	Activities Associated with Dust Generation	Number of Activities	Estimated Dust Generated (Tons/Year)	Alameda County Airshed
1			1	
206		1		
208		1		
304	1	1		
305		1		
309				1
403	2			
404		2	2	1
405		2	1	1
408	3		2	
409	1			
414				1
503	1			
505		1		
508	2			
509	2	1		
512			1	
513				1
609		1		
610				1
611				1
710		1		
810			1	
903	1			1
910	16		11	
912				1
1010	16		52	
<b>TOTAL</b>	<b>45</b>	<b>12</b>	<b>71</b>	<b>9</b>

SOURCE: PhoneDisc USA, 1994; Pahump Town Office, 1994; local expert information.

Agricultural activities are associated with dust emissions in many ways. As acreage is cleared and prepared for cultivation, the ground surface is, in many cases, considerably disturbed. Also included in agricultural activities are cropdusting and harvesting. Even grazing methods associated with some livestock activities can result in potential dust emission.

Forty-five agricultural operations were identified within the RadMP study area. Included within this grouping are: specialty pet care operations; small nurseries; vineyards; livestock; and alfalfa, oats, hay, sod, onions, and specialty food (nuts) production.

There are 12 mining & open pit operations and 71 construction & drilling operations located in the RadMP grid area. The activities associated with these businesses include above- and under-ground mining, sand and gravel operations, construction, drilling, and landfills. As materials are excavated, drilled, or ground and sorted, the potential exists for generation of particulate matter from both surface and subsurface sources.

Within the grid area, nine airfields are identified. Activities primarily involve small, private planes, with the exception of the Air Force activities. Activities associated with the NAFR occur over a wide geographic range, both displacing and transporting dust particles. In addition, NAFR activities often involve bombing simulations that cause ground-surface disturbance.

## **APPENDIX A**

### **SOCIOECONOMIC DATA BY RadMP GRID CELL**



## APPENDIX A

### SOCIOECONOMIC DATA BY RadMP GRID CELL

#### A.1 Reading the RadMP Grid

The RadMP grid is divided into 16 equal sections of 22.5 degree arcs. Beginning with an undivided 4-km circle at the center, there are ten concentric rings each 8-km in width. The RadMP grid is 84 kilometers from its center point, whose coordinates are defined as Easting 551135.7, Northing 4078351.6 Universal Transverse Mercator (UTM) Grid Zone 11.

The grid data from the tables contained in Appendix A are read as follows:

1. The center of the circle is grid cell 1.
2. Each concentric ring is numbered sequentially from 100 (the first ring surrounding the center grid cell) to 1000 (the last ring of the radiological circle).
3. The 16 sections are numbered sequentially beginning with number 1, which is centered on due north. Thereafter, each subsequent section is numbered counterclockwise, so that, Section 5 is due west, Section 9 is due south, and Section 13 is due east.
4. Grid cell identifiers consist of the number of the ring followed by the number of the section.

As an example (refer to Figure 1, p. 1-5), the community of Indian Springs is contained in grid cell 912.

## **A.2 Data Compiled by RadMP Grid**

This section contains the data tables for specific economic/demographic characteristics within the RadMP grid. In each case, only those grids containing activity are included. Exclusion of a grid cell indicates zero activity.

Tax boundaries and town boundaries used for reporting community data in Tables 1, 2, and 4 are not equivalent to the RadMP grid cell boundaries used to compile data for RadMP analyses. Community boundaries encompasses many partial grid cells, and in some cases whole cells. Grid-specific data, therefore, are not directly comparable to community data.

**TABLE A-1. Occupied Housing Units by Type by RadMP Grid Cells for the First Quarter of 1994**

RadMP Grid Cell	Housing Units by Type			
	Single Family	Multi- Family	Group Quarters*	Cell Total
303	2			2
304	16			16
309	7			7
403	4			4
404	464	61	GQ*	525
405	227	8	GQ*	235
408	93			93
409	64			64
503	5			5
504				0
505	4			4
508	15			15
509	126	8		134
510	5			5
512			GQ*	GQ*
603	2			2
609	30			30
610	42			42
612			GQ*	GQ*
703	2			2
707**	206	118		324
710	8			8
711	3			3
803	4			4
809		2		2
810	7			7
904	1			1
906	19	35		54
910	1,036	4		1,040
912	504			504
1004**		16		16
1010	2,168	173	GQ*	2,341
1011	58			58
<b>TOTAL</b>	<b>5,122</b>	<b>425</b>	<b>GQ*</b>	<b>5,547</b>

SOURCE: VEA, 1990-1995; VEA, 1993-1995; VEA, 1994-1995.

\* This category includes the group quarters in Fahrump, as well as the employee housing in Beatty. None of these units are included in the totals as they relate to beds and not housing units. The Group Quarters at Mercury are located in two grid cells, 512 and 612, and also are not included in the housing totals. However, the population estimates for all these group quarters are included in Table A-5

\*\* For Grid Cells 707 and 1004, the reported number of units includes 114 and 19 trailer spaces available at Furnace Creek Ranch and Stovepipe Wells, respectively, which are occupied by employees of the Fred Harvey Corporation from November through April

NOTE: These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts. Due to the new method of data collection, the housing types have been redefined.

**TABLE A-2. Occupied Housing Units by Type by RadMP Grid Cells for the Second Quarter of 1994**

RadMP Grid Cell	Housing Units by Type			
	Single Family	Multi- Family	Group Quarters*	Cell Total
303	2			2
304	16			16
309	7			7
403	5			5
404	464	61	GQ*	525
405	228	8	GQ*	236
408	94			94
409	65			65
503	5			5
504	1			1
505	4			4
508	15			15
509	130	8		138
510	5			5
512			GQ*	GQ*
603	2			2
609	31			31
610	43			43
612			GQ*	GQ*
703	2			2
707**	206	118		324
710	8			8
711	3			3
803	4			4
809		2		2
810	7			7
904	1			1
906	19	35		54
910	1,091	4		1,095
912	504			504
1004**		16		16
1010	2,254	179	GQ*	2,433
1011	58			58
<b>TOTAL</b>	<b>5,274</b>	<b>431</b>	<b>GQ*</b>	<b>5,705</b>

SOURCE: VEA, 1990-1995; VEA, 1993-1995; VEA, 1994-1995.

\* This category includes the group quarters in Pahump, as well as the employee housing in Beatty. None of these units are included in the totals as they relate to beds and not housing units. The Group Quarters at Mercury are located in two grid cells, 512 and 612, and also are not included in the housing totals. However, the population estimates for all these group quarters are included in Table A-6.

\*\* For Grid Cells 707 and 1004, the reported number of units includes 114 and 19 trailer spaces available at Furnace Creek Ranch and St. Joseph Wells, respectively, which are occupied by employees of the Fred Harvey Corporation from November through April.

NOTE: These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts. Due to the new method of data collection, the housing types have been redefined.

**TABLE A-3. Occupied Housing Units by Type by RadMP Grid Cells for the Third Quarter of 1994**

RadMP Grid Cell	Housing Units by Type			Cell Total
	Single Family	Multi- Family	Group Quarters*	
303	2			2
304	16			16
309	7			7
403	5			5
404	464	61	GQ*	525
405	229	8	GQ*	237
408	94			94
409	65			65
503	5			5
504	1			1
505	4			4
508	15			15
509	132	8		140
510	5			5
512			GQ*	GQ*
603	2			2
609	31			31
610	43			43
612			GQ*	GQ*
703	2			2
707**	206	118		324
710	8			8
711	3			3
803	4			4
809		2		2
810				7
904				1
906	19	35		54
910	1,131	4		1,135
912	504			504
1004**		16		16
1010	2,362	193	GQ*	2,555
1011	58			58
<b>TOTAL</b>	<b>5,425</b>	<b>445</b>	<b>GQ*</b>	<b>5,870</b>

SOURCE: VEA, 1990-1993; VEA, 1993-1995; VEA, 1994-1995.

\* This category includes the group quarters in Pahump, as well as the employee housing in Beatty. None of these units are included in the totals as they relate to beds and not housing units. The Group Quarters at Mercury are located in two grid cells, 512 and 612, and also are not included in the housing totals. However, the population estimates for all these group quarters are included in Table A-7.

\*\* For Grid Cells 707 and 1004, the reported number of units includes 114 and 19 trailer spaces available at Furnace Creek Ranch and Stovepipe Wells, respectively, which are occupied by employees of the Fred Harvey Corporation from November through April.

NOTE: These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts. Due to the new method of data collection, the housing types have been redefined.

**TABLE A-4. Occupied Housing Units by Type by RadMP Grid Cells for the Fourth Quarter of 1994**

RadMP Grid Cell	Housing Units by Type			
	Single Family	Multi- Family	Group Quarters*	Cell Total
303	2			2
304	16			16
309	8			8
403	5			5
404	464	61	GQ*	525
405	229	8	GQ*	237
408	95			95
409	66			66
503	5			5
504	1			1
505	4			4
508	15			15
509	134	8		142
510	5			5
512			GQ*	GQ*
603	2			2
609	31			31
610	43			43
612			GQ*	GQ*
703	2			2
707**	206	118		324
710	8			8
711	3			3
803	4			4
809		2		2
810	7			7
904	1			1
906	19	35		54
910	1,170	4		1,174
912	504			504
1004**		16		16
1010	2,427	193	GQ*	2,620
1011	58			58
<b>TOTAL</b>	<b>5,534</b>	<b>445</b>	<b>GQ*</b>	<b>5,979</b>

SOURCE: VEA, 1990-1995; VEA, 1993-1995; VEA, 1994-1995.

\* This category includes the group quarters in Fahrump, as well as the employee housing in Beatty. None of these units are included in the totals as they relate to beds and not housing units. The Group Quarters at Mercury are located in two grid cells, 512 and 612, and also are not included in the housing totals. However, the population estimates for all these group quarters are included in Table A-8.

\*\* For Grid Cells 707 and 1004, the reported number of units includes 114 and 19 trailer spaces available at Furnace Creek Ranch and Stovepipe Wells, respectively, which are occupied by employees of the Fred Harvey Corporation from November through April.

NOTE: These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts. Due to the new method of data collection, the housing types have been redefined.

**TABLE A-5. Population Estimates by Housing Type by RadMP Grid Cells for the First Quarter of 1994**

RadMP Grid Cell	Estimates by Housing Type			
	Single Family	Multi- Family	General Quarters*	Cell Total
303	5			5
304	39			39
309	18			18
403	10			10
404*	1,128	148	21	1,297
405*	552	19	11	582
408	240			240
409	165			165
503	12			12
504				0
505	10			10
508	39			39
509	325	21		346
510	13			13
512**			268	268
603	5			5
609	77			77
610	108			108
612**			269	269
703	5			5
707	381	218		599
710	21			21
711	7			7
803	10			10
809		4		4
810	16			16
904	2			2
906	35	65		100
910	2,310	9		2,319
912	1,230			1,230
1004		30		30
1010*	4,835	386	12	5,233
1011	142			142
<b>TOTAL</b>	<b>11,740</b>	<b>900</b>	<b>580</b>	<b>13,220</b>

SOURCE: VEA, 1990-1995; VEA, 1993-1995; VEA, 1994-1995; DOE, 1991b.

Population estimates presented in this table were prepared using a variation of the Housing Unit Method (HUM). See DOE, 1991b, for documentation of this methodology.

\* Population figures for these cells include individuals in group quarters in Fabrum, Beatty, and Mercury.

\*\* Population figures for Mercury (grid cells 512 & 612) presented in this table represent actual occupancy as of March 31, 1994 (REEC, 1994).

NOTE: These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts. Due to the new method of data collection, the housing types have been redefined.

**TABLE A-6. Population Estimates by Housing Type by RadMP Grid Cells for the Second Quarter of 1994**

RadMP Grid Cell	Estimates by Housing Type			
	Single Family	Multi- Family	General Quarters*	Cell Total
303	5			5
304	39			39
309	18			18
403	12			12
404*	1,128	148	21	1,297
405*	554	19	11	584
408	243			243
409	168			168
503	12			12
504	2			2
505	10			10
508	39			39
509	335	21		356
510	13			13
512**	0		225	225
603	5			5
609	80			80
610	111			111
612**	0		225	225
703	5			5
707	381	218		599
710	21			21
711	7			7
803	10			10
809	0	4		4
810	16			16
904	2			2
906	35	65		100
910	2,433	9		2,442
912	1,230			1,230
1004	0	30		30
1010*	5,026	399	11	5,436
1011	142			142
<b>TOTAL</b>	<b>12,082</b>	<b>913</b>	<b>493</b>	<b>13,488</b>

SOURCE: VEA, 1990-1995; VEA, 1993-1995; VEA, 1994-1995; DOE, 1991b.

Population estimates presented in this table were prepared using a variation of the Housing Unit Method (HUM). See DOE, 1991b, for documentation of this methodology.

\* Population figures for these cells include individuals in group quarters in Pahump, Beatty, and Mercury.

\*\* Population figures for Mercury (grid cells 512 & 612) presented in this table represent actual occupancy as of June 30, 1994 (REEC, 1994).

NOTE: These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts. Due to the new method of data collection, the housing types have been redefined.



**TABLE A-7. Population Estimates by Housing Type by RadMP Grid Cells for the Third Quarter of 1994**

RadMP Grid Cell	Estimates by Housing Type			
	Single Family	Multi- Family	General Quarters*	Cell Total
303	5			5
304	39			39
309	18			18
403	12			12
404*	1,128	148	21	1,297
405*	556	19	11	586
408	243			243
409	168			168
503	12			12
504	2			2
505	10			10
508	39			39
509	341	21		362
510	13			13
512**	0		209	209
603	5			5
609	80			80
610	111			111
612**	0		210	210
703	5			5
707	381	218		599
710	21			21
711	7			7
803	10			10
809	0	4		4
810	16			16
904	2			2
906	35	65		100
910	2,522	9		2,531
912	1,230			1,230
1004	0	30		30
1010*	5,267	430	11	5,708
1011	142			142
<b>TOTAL</b>	<b>12,420</b>	<b>944</b>	<b>461</b>	<b>13,825</b>

SOURCE: VEA, 1990-1993; VEA, 1993-1993; VEA, 1994-1993; DOE, 1991b.

Population estimates presented in this table were prepared using a variation of the Housing Unit Method (HUM). See DOE, 1991b, for documentation of this methodology.

\* Population figures for these cells include individuals in group quarters in Fahrump, Beatty, and Mercury

\*\* Population figures for Mercury (grid cells 512 & 612) presented in this table represent actual occupancy as of September 30, 1994 (REEC, 1994).

NOTE: These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts. Due to the new method of data collection, the housing types have been redefined.

**TABLE A-3. Population Estimates by Housing Type by RadMP Grid Cells for the Fourth Quarter of 1994**

RadMP Grid Cell	Estimates by Housing Type			
	Single Family	Multi- Family	General Quarters*	Cell Total
303	5			5
304	39			39
309	21			21
403	12			12
404*	1,128	148	21	1,297
405*	556	19	11	586
408	245			245
409	170			170
503	12			12
504	2			2
505	10			10
508	39			39
509	346	21		367
510	13			13
512**	0		177	177
603	5			5
609	80			80
610	111			111
612**	0		178	178
703	5			5
707	381	218		599
710	21			21
711	7			7
803	10			10
809	0	4		4
810	16			16
904	2			2
906	35	65		100
910	2,609	9		2,618
912	1,230			1,230
1004	0	30		30
1010*	5,412	430	11	5,853
1011	142			142
<b>TOTAL</b>	<b>12,664</b>	<b>944</b>	<b>397</b>	<b>14,005</b>

SOURCE: VEA, 1990-1995; VEA, 1993-1995; VEA, 1994-1995; DOE, 1991b.

Population estimates presented in this table were prepared using a variation of the Housing Unit Method (HUM). See DOE, 1991b, for documentation of this methodology.

\* Population figures for these cells include individuals in group quarters in Fahrump, Beatty, and Mercury.

\*\* Population figures for Mercury (grid cells 512 & 612) presented in this table represent actual occupancy as of December 31, 1994 (REECo, 1995).

NOTE. These data are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts. Due to the new method of data collection, the housing types have been redefined.

TABLE A-9. Estimated Population by Age by RadMP Grid Cells for the First Quarter 1994

RadMP Grid Cell	Age Characteristics					Cell Total
	Under 18 months	18 months to < 5 yrs	5 yrs to < 18 yrs	18 yrs to < 65 yrs	Over 65 yrs	
303			1	3		5
304	1	2	7	26	3	39
309		1	3	12	1	18
403		1	2	7	1	10
404	30	78	242	848	99	1,297
405	14	35	109	381	44	582
408	6	14	45	157	18	240
409	4	10	31	108	13	165
503		1	2	8	1	12
504						0
505		1	2	7	1	10
508	1	2	7	26	3	39
509	8	21	65	226	26	346
510		1	2	7	3	13
512				263	4	268
603			1	3		5
609	2	5	14	50	6	77
610	2	5	17	62	23	108
612				264	5	269
703			1	3		5
707	6	17	52	396	127	599
710		1	3	12	4	21
711			1	4	1	7
803		1	2	7	1	10
809				3	1	4
810			3	9	3	16
903				1		2
906	1	3	9	66	21	100
910	36	100	364	1,323	495	2,319
912	33	66	293	747	91	1,230
1004		1	3	20	6	30
1010	81	226	822	2,987	1,117	5,233
1011	2	6	22	81	30	142
TOTAL	229	598	2,125	8,116	2,152	13,220

TABLE A-10. Estimated Population by Age by RadMP Grid Cells for the Second Quarter 1994

RadMP Grid Cell	Age Characteristics					Cell Total
	Under 18 months	18 months to < 5 yrs	5 yrs to < 18 yrs	18 yrs to < 65 yrs	Over 65 yrs	
303			1	3		5
304	1	2	7	26	3	39
309		1	3	12	1	18
403		1	2	8	1	12
404	30	78	242	848	99	1,297
405	14	35	109	382	45	584
408	6	15	45	159	19	243
409	4	10	31	110	13	168
503		1	2	8	1	12
504						2
505		1	2	7	1	10
508	1	2	7	26	3	39
509	8	21	66	233	27	356
510		1	2	7	3	13
512				221	4	225
603			1	3		5
609	2	5	15	52	6	80
610	2	5	17	63	24	111
612				221	4	225
703			1	3		5
707	6	17	52	396	127	599
710		1	3	12	4	21
711			1	4	1	7
803		1	2	7	1	10
809				3	1	4
810			3	9	3	16
903				1		2
906	1	3	9	66	21	100
910	38	105	384	1,394	521	2,442
912	33	66	293	747	91	1,230
1004		1	3	20	6	30
1010	84	235	854	3,102	1,161	5,436
1011	2	6	22	81	30	142
<b>TOTAL</b>	<b>235</b>	<b>614</b>	<b>2,181</b>	<b>8,235</b>	<b>2,223</b>	<b>13,488</b>

TABLE A-11. Estimated Population by Age by RadMP Grid Cells for the Third Quarter 1994

RadMP Grid Cell	Age Characteristics					Cell Total
	Under 18 months	18 months to < 5 yrs	5 yrs to < 18 yrs	18 yrs to < 65 yrs	Over 65 yrs	
303			1	3		5
304	1	2	7	26	3	39
309		1	3	12	1	18
403		1	2	8	1	12
404	30	78	242	848	99	1,297
405	14	35	109	383	45	586
408	6	15	45	159	19	243
409	4	10	31	110	13	168
503		1	2	8	1	12
504						2
505		1	2	7	1	10
508	1	2	7	26	3	39
509	8	22	68	237	28	362
510		1	2	7	3	13
512				205	3	209
603			1	3		5
609	2	5	15	52	6	80
610	2	5	17	63	24	111
612				206	4	210
703			1	3		5
707	6	17	52	396	127	599
710		1	3	12	4	21
711			1	4	1	7
803		1	2	7	1	10
809				3	1	4
810			3	9	3	16
903				1		2
906	1	3	9	66	21	100
910	39	109	398	1,444	540	2,531
912	33	66	293	747	91	1,230
1004		1	3	20	6	30
1010	88	247	897	3,258	1,219	5,708
1011	2	6	22	81	30	142
<b>TOTAL</b>	<b>241</b>	<b>630</b>	<b>2,239</b>	<b>8,415</b>	<b>2,300</b>	<b>13,825</b>

SOURCE DOE, 1992.

**TABLE A-12. Estimated Population by Age by RadMP Grid Cells for the Fourth Quarter 1994**

RadMP Grid Cell	Age Characteristics					Cell Total
	Under 18 months	18 months to < 5 yrs	5 yrs to < 18 yrs	18 yrs to < 65 yrs	Over 65 yrs	
303			1	3		5
304	1	2	7	26	3	39
309		1	4	14	2	21
403		1	2	8	1	12
404	30	78	242	848	99	1,297
405	14	35	109	383	45	586
408	6	15	46	160	19	245
409	4	10	32	111	13	170
503		1	2	8	1	12
504						2
505		1	2	7	1	10
508	1	2	7	26	3	39
509	9	22	68	240	28	367
510		1	2	7	3	13
512				174	3	177
603			1	3		5
609	2	5	15	52	6	80
610	2	5	17	63	24	111
612				174	3	178
703			1	3		5
707	6	17	52	396	127	599
710		1	3	12	4	21
711			1	4	1	7
803		1	2	7	1	10
809				3	1	4
810			3	9	3	16
903				1		2
906	1	3	9	66	21	100
910	40	113	411	1,494	559	2,618
912	33	66	293	747	91	1,230
1004		1	3	20	6	30
1010	91	253	920	3,340	1,250	5,853
1011	2	6	22	81	30	142
<b>TOTAL</b>	<b>244</b>	<b>641</b>	<b>2,278</b>	<b>8,492</b>	<b>2,349</b>	<b>14,005</b>

SOURCE: BUREAU OF THE CENSUS

Table A-13. Establishments by SIC\* by RadMP Grid Cells for 1994 (page 1 of 2)

RadMP Grid Cell	Standard Industrial Classifications								Cell Total
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-99
206		1							1
208		1							1
212								1	1
304	1	2						1	4
305		1							1
306					1				1
309					1	4		2	7
403	2								2
404	1	6	2	6	25	16	34	8	98
405		3		2	2	1	8	2	18
408	3	2	1		4		3		13
409				2	1		8	2	13
503	1				1				2
505		1			1		1		3
508	2						1		3
509	2	2		2	2		5		13
512								1	1
609		2		2	4		1	2	11
610	1			1	1	2	5		10
703							2		2
707				2	1		3	4	10
710		1							1
711					1				1
809							2		2
810		1							1
903	1						1		2
906							1	1	2
910	7	18	3	11	21	3	27		90
912				2	5	7	13	10	37
1004							1	2	3
1010	6	50	16	23	124	50	131	23	423
<b>TOTAL</b>	<b>27</b>	<b>91</b>	<b>22</b>	<b>55</b>	<b>197</b>	<b>79</b>	<b>250</b>	<b>56</b>	<b>777</b>

SOURCE: VEA, 1990-1995; VEA, 1994-1995; State of Nevada, 1995a; PhoneDisc USA, 1994.

\* SIC (Standard Industrial Classification).

... of establishments and are not comparable with past reports.

**Table A-13. Establishments by SIC\* by RadMP Grid Cells for 1994 (page 2 of 2)**

0 - 09:	Agriculture, Forestry, and Fishing.
10 - 19:	Mining and Construction. Revised to include construction employment not previously reported.
20 - 39:	Manufacturing.
40 - 49:	Transportation, Communications, Electric, Gas, and Sanitary Services.
50 - 59:	Wholesale and Retail Trade.
60 - 69:	Finance, Insurance, and Real Estate.
70 - 89:	Services (Hotels, Personal, Business, Automotive, Miscellaneous Repair, Motion Pictures, Amusement and Recreation, Health, Legal, Educational, Social, Museums, Membership Organizations, Engineering, Private, and Miscellaneous). Revised to include educational services employment not previously reported.
90 - 99:	Public Administration and Nonclassifiable Establishments.



Table A-14. Establishments Unable to be Accurately Located, by SIC\* by RadMP Grid Cells, 1994

	00-09	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Unknown	Total
404											2	2
509											1	1
810	1											1
910	10	4		4	14	1	10				3	46
1010	12	2		11	54	9	33				14	135
Unknown											13	13
<b>TOTAL</b>	<b>23</b>	<b>6</b>	<b>0</b>	<b>15</b>	<b>68</b>	<b>10</b>	<b>43</b>	<b>0</b>			<b>33</b>	<b>198</b>

SOURCE: VEA, 1990-1995; VEA, 1994-1995; State of Nevada, 1993a; PhoneDisc USA, 1994.

\* SIC (Standard Industrial Classification).

NOTE: These data reflect the change in reporting from number of employees to number of establishments and are not comparable with past reports.

They are for use in RadMP modeling efforts only and are not directly applicable to economic development or community planning efforts.

0 - 09: Agriculture, Forestry, and Fishing.

10 - 19: Mining and Construction. Revised to include construction employment not previously reported.

20 - 39: Manufacturing.

40 - 49: Transportation, Communications, Electric, Gas, and Sanitary Services.

50 - 59: Wholesale and Retail Trade.

60 - 69: Finance, Insurance, and Real Estate.

70 - 89: Services (Hotels, Personal, Business, Automotive, Miscellaneous Repair, Motion Pictures, Amusement and Recreation, Health, Legal, Educational, Social, Museums, Membership Organizations, Engineering, Private, and Miscellaneous). Revised to include educational services employment not previously reported.

90 - 99: Public Administration and Nonclassifiable Establishments.

**TABLE A-15. Visitors to Death Valley National Park by Quarter**

Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Annual Totals
1975	164,676	139,416	95,439	168,733	568,264
1976	213,774	161,480	95,787	135,617	606,658
1977	209,495	157,585	101,883	169,724	646,287
1978	210,770	198,723	133,661	158,524	701,678
1979	186,509	196,835	130,460	143,645	657,449
1980	183,703	200,522	112,726	146,946	643,897
1981	174,109	169,496	141,478	171,585	656,668
1982	218,963	205,427	132,767	151,167	708,324
1983	184,647	196,567	104,394	176,457	662,065
1984	211,075	199,676	98,180	138,151	647,082
1985	204,695	157,904	92,814	145,296	600,709
1986	187,317	138,251	141,478	144,067	611,113
1987	180,990	185,189	149,576	177,209	692,964
1988	210,885	185,987	154,696	165,405	716,973
1989	178,100	188,040	151,946	174,050	692,136
1990	205,623	217,984	139,719	156,428	719,754
1991	139,976	187,520	201,246	245,849	774,591
1992	240,525	219,544	206,306	239,024	905,399
1993	218,926	319,442	262,621	236,055	1,037,044
1994	214,983	263,275	275,214	255,126	1,008,598

SOURCE: DOI (1975-1995).

TABLE A-16. Estimates of Livestock by RadMP Grid Cells for 1994

RadMP Grid Cell	Number of Head by Type							
	Cattle (1)	Camels (2)	Sheep	Bees (3)	Milk Cows	Pigs	Family Goats (4)	Goats (5)
203		11						
204		17						
205		13						
303		25						
304		10						
305		3						
403		23						
404		66						
408	30,000		6			200	40	
409		8						
503		36						
504		92						
508		72						
509					2,376	100		6
603		27						
604		29						
703		26						
704		47						
711		25						
803		37						
804		58						
811		25						
903		25						
904		70						
910		5		210			39	
911		13						
1003		48						
1004		76						
1010		36			2,456		3	
1011		19						
<b>TOTAL</b>	<b>30,000</b>	<b>942</b>	<b>6</b>	<b>210</b>	<b>4,832</b>	<b>300</b>	<b>82</b>	<b>6</b>

SOURCE. Local experts within the communities; Ferris, 1993; Goucher, 1995; Harris, 1994; Kennel, 1995.

(1) The catfish reported here are contained in a series of holding tanks. It is estimated that there are approximately 30,000 fish per year.

(2) These values are calculated based on the permitted number of cattle allowed on current grazing allotments on BLM land, as well as any pastured cattle in the study area.

(3) These values indicate the number of bee hives. There are approximately 50,000 bees per hive.

**TABLE A-17. Estimates of Agricultural Acreages by RadMP Grid Cells for 1994**

RadMP Grid Cell	Agricultural Activity in Acres											
	Cash/Thru	Alfalfa	Other Hay	Barley & Oats	Trucks	Wheat	Produce	Fruit Trees	Dates	Grapes	Potatoes Not Producing	Fallow Fields
408		361	20	125	60		5	20			90	240
409		205					10					
508		145		80				6				290
509	140	415						5		15	10	125
707									20			
910		330	5	250								
1010		820				18		1			30	
<b>TOTAL</b>	<b>140</b>	<b>2,276</b>	<b>25</b>	<b>455</b>	<b>60</b>	<b>18</b>	<b>15</b>	<b>32</b>	<b>20</b>	<b>15</b>	<b>130</b>	<b>655</b>

SOURCE: M. Berry, 1993, aerial photography, local experts within the communities.

TABLE A-18. Estimates of Agricultural Yields by RadMP Grid Cells for 1994

RadMP Grid Cell	Agricultural Yield Estimates						
	Alfalfa(1)	Other Hay(2)	Barley (3) Oats(3)	Onions(4)	Wheat(5)	Milk(6)	Honey(7)
408	1,650	30	11,875	1,680			
409	937						
508	663		7,600				
509	1,897					42	
707							
910	1,508	8	23,750				11
1010	3,747				1,440	43	
<b>TOTAL</b>	<b>10,401</b>	<b>38</b>	<b>43,225</b>	<b>1,680</b>	<b>1,440</b>	<b>85</b>	<b>11</b>

(1) Yields for alfalfa are given in tons per year. Yields are estimated at 4.5 tons per acre in Nye County in 1993. SOURCE: State of Nevada, 1995b.

(2) Yields for other hays are given in tons per year. Yields are estimated at 1.51 tons per acre in Nye County in 1993. SOURCE: State of Nevada, 1995b.

(3) Yields for barley are given in bushels per year. Yields are estimated at 95 bushels per acre per year. SOURCE: State of Nevada, 1995b.

(4) Yields for onions are given in tons per year. Yields are estimated at 28 tons per acre per year. SOURCE: State of Nevada, 1995b.

(5) Yields for wheat are given in bushels per year. Yields are estimated at 80 bushels per acre per year. SOURCE: State of Nevada, 1995b.

(6) Yields for milk are given in million pounds per year. Yields are estimated at 17,550 pounds per cow per year. SOURCE: State of Nevada, 1995b.

(7) Yields for honey bee colonies (hives) are given in thousand pounds per year. Yields are estimated at 52 pounds per hive per year. SOURCE: State of Nevada, 1995b.

## **GLOSSARY OF TERMS**

## GLOSSARY OF TERMS

### Dosimetric

Measurement for registering the total accumulated dose of ionizing radiation.

### Effective Dose Equivalents

Summation of Dose Equivalents to specific organs or tissues that would be received from an intake of radioactive material by an individual during a 50-year period following the intake, multiplied by the appropriate weighting factor.

### Full-Time Equivalent (FTE)

The translation of total hours worked into a standardized employment figure. As many establishments hire part-time employees, it would be inappropriate to count the total number of employees in employment statistics. Therefore, information is provided in FTE positions, where one FTE represents one full-time employee working 40 hours per week for a year.

### Grid Area

The specific geographic area to be addressed as the affected environment as defined by EPA.

### Group Quarters

All Persons not living in households and classified by the Census Bureau as living in group quarters. For purposes of this document, this information is reported in "beds" and does not include jail facilities. Two general categories of persons in group quarters are recognized: (1) institutionalized persons and (2) other persons in group quarters (also referred to as "noninstitutional group quarters").

### Institutionalized Persons

Includes persons under formally authorized, supervised care or custody in institutions at the time of enumeration. Such persons are classified as "patients or inmates" of an institution regardless of the availability of nursing or medical care, the length of stay, or the number of persons in the institution. Generally, institutionalized persons are restricted to the institutional buildings and grounds (or must have passes or escorts to leave) and thus have limited interaction with the surrounding community. Also, they are generally under the care of trained staff who have responsibility for their safekeeping and supervision.

## **GLOSSARY OF TERMS (Continued)**

### **Other Persons in Group Quarters (also referred to as "noninstitutional group quarters")**

Includes all persons who live in group quarters other than institutions. Persons who live in the following living quarters are classified as "other persons in group quarters" when there are 10 or more unrelated persons living in the unit; otherwise, these living quarters are classified as housing units: rooming houses, group homes (homes for the mentally ill, homes for the mentally retarded, homes for the physically handicapped, homes or halfway houses for drug/alcohol abuse, maternity homes for unwed mothers, and other group homes), religious group quarters, college quarters off campus (dormitories), military quarters, agricultural workers' dormitories, other workers' dormitories, emergency shelters for homeless persons (shelters with sleeping facilities, shelters for runaway, neglected, and homeless children, shelters for abused women, and visible in street locations), dormitories for nurses and interns in general military hospitals, crews of maritime vessels, staff residents of institutions, living quarters for victims of natural disasters, and other nonhousehold living situations.

### **Housing Units**

Housing structures that are determined to be occupied on a permanent basis. For the purpose of the RadMP study, occupancy of a housing structure is assumed through the existence of an active utility (electric or water/sewer account) connection.

### **Long-Term Population**

Persons whose primary place of residence is within the RadMP grid area, excluding those who are visiting or residing in the area on a temporary basis, such as those staying in RV Parks; also persons whose place of employment is within the grid area, as well as children attending schools located within the RadMP grid.

### **Maximally-Exposed Individual**

A hypothetical person who is exposed to a release of radioactivity in such a way that he receives the maximum possible individual radiation dose or dose commitment. This term is not meant to imply that there really is such a person; it is used only to indicate the maximum exposure a person could receive.

### **Millirem**

One-thousandth part of a roentgen. The unit of dose of any ionizing radiation that produces the same biological effect as a unit of absorbed dose of ordinary X-rays.



## **GLOSSARY OF TERMS (Continued)**

### **Multi-Family Residential Unit**

Residential structures containing two or more units, including duplexes, condominiums, and apartments.

### **Natural Background Radiation**

Radiation that occurs naturally in the environment from such sources as cosmic rays, the naturally occurring radioactive elements in the earth, and naturally occurring radionuclides in living organisms.

### **Persons Per Household (PPH)**

A computed value derived by dividing the population living in housing units by the number of occupied housing units.

### **Radiation Dose**

Quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body.

### **Radionuclide**

A radioactive nuclide. There are several hundred known radionuclides, both produced and naturally occurring; radionuclides are characterized by the number of neutrons and protons in the nucleus of an atom.

### **Radionuclide Emissions**

Releases of airborne radioactive materials to the environment.

### **Short-Term Population**

Persons who are visiting or residing in the area on a temporary basis, such as those staying in recreational vehicle (RV) parks or in local jail (not prison) facilities.

### **Single-Family Residential Unit**

All structures which stand alone as single-family residences. This includes permanent structures as well as mobile homes and pre-fabricated, or pre-formed, units such as Boise Cascade.

## **GLOSSARY OF TERMS (Continued)**

### **Standard Industrial Classification (SIC)**

Terminology developed by the Federal government for use in the classification of establishments by economic activity. Use of SIC encoding promotes uniformity and comparability between data sets.

### **Windshield Surveying**

Method of recording activities of interest in a chosen area by means of observation from a motor vehicle.

## LIST OF ACRONYMS

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ABC	American Borate Company
BLM	Bureau of Land Management
CAP88-PC	Clean Air Act Assessment Package-1988 for a personal computer
CBER	Center for Business and Economic Research
CFR	Code of the Federal Register
DOE	Department of Energy
DVNP	Death Valley National Park
EPA	Environmental Protection Agency
FTE	Full-Time Equivalent
HUM	Housing Unit Method
km	Kilometers
NAFR	Nellis Air Force Range
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NPS	National Park Service
NRC	U. S. Nuclear Regulatory Commission
NTS	Nevada Test Site
NWPAA	Nuclear Waste Policy Amendments Act
PIC	Planning Information Corporation
RadMP	Radiological Monitoring Program
RV	Recreational Vehicles

## LIST OF ACRONYMS (Continued)

SIC	Standard Industrial Classification
UNLV	University of Nevada, Las Vegas
UTM	Universal Transverse Mercator
VEA	Valley Electric Association
YMP	Yucca Mountain Site Characterization Project

## REFERENCES

## REFERENCES

- 10 CFR Part 960, 1984. Title 10, "Energy," Part 960, "General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories," Washington, D.C.: U.S. Government Printing Office.
- 40 CFR 61, 1989. Title 40, "Protection of Environment," Part 61, "National Emission Standards for Hazardous Air Pollutants," Washington, D.C.: U.S. Government Printing Office.
- Atterbury, B., 1995. Residents at F & P Corporation Group Home. Personal communication with S. Majewski, SAIC, Las Vegas, Nevada.
- Berry, M., 1992-1993. Death Valley Dates. Personal communication with S. Majewski, SAIC, Las Vegas, Nevada.
- Clark County, Clark County School District, 1994-1995. School attendance information received from personnel at Indian Springs Elementary and High Schools, Las Vegas Nevada.
- DOE (U.S. Department of Energy), 1990. Yucca Mountain Site Characterization Project Radiological Monitoring Plan, Revision 1. Las Vegas, Nevada: U.S. Department of Energy, Yucca Mountain Site Characterization Project Office.
- DOE (U.S. Department of Energy), 1991a. Yucca Mountain Site Characterization Project Socioeconomic Plan, Revision 0. Las Vegas, Nevada: U.S. Department of Energy, Yucca Mountain Site Characterization Project Office.
- DOE (U.S. Department of Energy), 1991b. Yucca Mountain Site Characterization Project Summary of Socioeconomic Data Analyses Conducted in Support of the Radiological Monitoring Program During Calendar Year 1990. Las Vegas, Nevada: U.S. Department of Energy, Yucca Mountain Site Characterization Project Office.
- DOE (U.S. Department of Energy), 1992. Yucca Mountain Site Characterization Project Summary of Socioeconomic Data Analyses Conducted in Support of the Radiological Monitoring Program During Calendar Year 1991. Las Vegas, Nevada: U.S. Department of Energy, Yucca Mountain Site Characterization Project Office.
- DOE/NV (U.S. Department of Energy/Nevada Operations), 1986-1995. "Report of NTS Related Employment, Monthly January 1986 through December 1994." Las Vegas, Nevada: U.S. Department of Energy, Nevada Operations Office.

## REFERENCES (Continued)

- CDPA (California Desert Protection Act), 1994. "California Desert Protection Act of 1994," Public Law 103-832. Washington, D.C.
- DOI (U.S. Department of the Interior), 1986-1995. "Monthly Public Use Report," National Park Service, Death Valley National Park, California.
- EPA (Environmental Protection Agency), 1990. Radiation Monitoring Around United States Nuclear Test Areas, Calendar Year 1990, Las Vegas Nevada: U.S. Environmental Protection Agency.
- EPA (Environmental Protection Agency), 1992a. Radiation Monitoring Around United States Nuclear Test Areas, Calendar Year 1992, Las Vegas Nevada: U.S. Environmental Protection Agency.
- EPA (Environmental Protection Agency), 1992b. User's Guide for CAP88-PC, Revision 1, Las Vegas Nevada: U.S. Environmental Protection Agency.
- Ferria, D., 1995. Pahrump Dairy Production Information. Personal communication with M. Nicoletti, SAIC, Las Vegas, Nevada.
- Goucher, P., 1994-1995. Amargosa Valley and Beatty Socioeconomic Information. Personal communication with S. Majewski, SAIC, Las Vegas, Nevada.
- Hafen, T., 1994. Pahrump Agricultural Information. Personal communication with S. Majewski, SAIC, Las Vegas, Nevada.
- Harris, H., 1994. Pahrump Agricultural Information. Personal communications with S. Majewski, SAIC, Las Vegas, Nevada.
- Kennel, P., 1995. Bee Colony Information. Personal communication with M. Nicoletti, SAIC, Las Vegas, Nevada.
- NEPA (National Environmental Policy Act), 1969. "National Environmental Policy Act of 1969," Public Law 91-190. Washington, D.C.
- NWPA (Nuclear Waste Policy Act), 1983. "Nuclear Waste Policy Act of 1982," [as amended by the Nuclear Waste Policy Amendments Act (NWPAA) of 1987], Public Law 97-425. Washington, D.C.



## REFERENCES (Continued)

- Nye County, Nye County Assessor's Office, 1988. "Resolution No. R88-38, Beatty Taxing District Boundaries." Information received from Robin Rivero, Chief Deputy, Tonopah Nevada, October 1993.
- Nye County, Nye County Board of Commissioners, 1994. Nye County Comprehensive Plan, Tonopah Nevada.
- Nye County, Nye County School District, 1994-1995. Personnel and attendance information received from the Office of the Superintendent, Tonopah Nevada.
- Pahrump, Town of, 1994. "Pahrump Town Ordinance No. 35," Pahrump Nevada.
- Pahrump Town Office, 1994. Listing of Commercial Establishments with Business Licenses, Town of Pahrump, Pahrump, Nevada.
- PhoneDisc USA, Winter 1994. Listing of Businesses and Phone Numbers. Bethesda, Maryland: Data Supplied by Database America, Digital Directory Assistance, Inc.
- PIC (Planning Information Corporation), 1994. Population Estimates Through the First Quarter, 1994, prepared for the Nye County Board of Commissioners, Tonopah Nevada.
- Pledger, Marcia, 1995. "Pahrump: Business booms as hundreds flock monthly to the rural town", Las Vegas-Review Journal, Business Section, Sunday, February 5, 1995, Section E, Page 14E.
- REECO, 1994-1995. Written communication received from E. Lavonne Lewis, Human Resources Department, REECO, Las Vegas Nevada.
- State of Nevada, 1988. "Southern Nevada Communities and Nuclear Waste Survey." Nevada: Nevada Nuclear Waste Project Office.
- State of Nevada, 1990-1994. Major Mines of Nevada, 1989 - 1993. Reno, Nevada: Nevada Bureau of Mines and Geology, Nevada Department of Minerals.
- State of Nevada, 1995a. Major Mines of Nevada, 1994. Reno, Nevada: Nevada Bureau of Mines and Geology, Nevada Department of Minerals.
- State of Nevada, 1995b. Nevada Agricultural Statistics 1994. Reno, Nevada: Nevada Agricultural Statistics Service.