WBS 1.2.21
QA: QA

**Yucca Mountain Site Characterization Project:
Summary of Socioeconomic Data Analyses
Conducted in Support of the Radiological Monitoring Program,
During FY 2000**

TDR-MGR-EV-000013 REV 00

October 2000

Prepared for:

U.S. Department of Energy
Yucca Mountain Site Characterization Office
P.O. Box 30307
North Las Vegas, Nevada 89036-0307

Prepared by

TRW Environmental Safety Systems Inc.
1180 Town Center Drive
Las Vegas, Nevada 89144

Under Contract Number
DE-AC08-91RW00134

**Yucca Mountain Site Characterization Project:
Summary of Socioeconomic Data Analyses
Conducted in Support of the Radiological Monitoring Program,
During FY 2000**

TDR-MGR-EV-000013 REV 00

October 2000

Prepared by:

Linda K. Roe
Social Scientist, Regional Data Analysis Section

10/30/00
Date

Checker:

Dale S. Ambos
Senior Scientist, Regional Data Analysis Section

10/30/00
Date

Approved by:

Robert L. Kimble
Manager, Regional Data Analysis Section

10/30/00
Date

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

EXECUTIVE SUMMARY

This report is a summary of socioeconomic data analyses conducted in support of the Radiological Monitoring Program during fiscal year 2000. Socioeconomic data contained in this report include estimates, for the year 2000, of housing units, households (occupied housing units), and resident population in the vicinity of Yucca Mountain.

The study area is delineated by a radial grid, consisting of 160 grid cells, that is suitable for evaluating the pathways and potential impacts of a release of radioactive materials to the environment within a distance of 84 kilometers from Yucca Mountain. Data are presented in a tabular format by the county, state, area, and grid cell in which housing units, households, and resident population are located.

A visual representation of the distribution of the 2000 residential population is provided on a map of the study area. This figure shows the 84-kilometer Radiological Monitoring Grid, 1990 U.S. Census geography (tracts and block group boundaries), county boundaries, and taxing district boundaries for selected communities.

INTENTIONALLY LEFT BLANK

CONTENTS

	Page
EXECUTIVE SUMMARY	v
ACRONYMS AND ABBREVIATIONS	xiii
1. INTRODUCTION	1
1.1 BACKGROUND	1
1.2 METHODOLOGICAL AND DATA IMPROVEMENTS.....	1
1.3 CONSISTENCY WITH PAST REPORTS	2
1.4 REPORT ORGANIZATION.....	2
2. PROCEDURES AND METHODS.....	3
2.1 STUDY AREA	3
2.2 DEVELOPMENT OF POPULATION ESTIMATES.....	4
3. SUMMARY OF SOCIOECONOMIC DATA	5
4. REFERENCES	8
4.1 DOCUMENTS CITED.....	8
4.2 CODES, STANDARDS, REGULATIONS, AND PROCEDURES.....	8
4.3 DATA	8
4.4 SOFTWARE.....	9
APPENDIX A - RADMP REPORT SOFTWARE ROUTINE V.1.0.....	A-1

INTENTIONALLY LEFT BLANK

FIGURES

	Page
1. Population Distribution Within the 84km Radiological Monitoring Grid	7

INTENTIONALLY LEFT BLANK

TABLES

	Page
1. 2000 Estimates of Housing Units, Households (Occupied Housing Units), and Resident Population Located Within the 84-km Radiological Monitoring Grid	6

INTENTIONALLY LEFT BLANK

ACRONYMS AND ABBREVIATIONS

CRWMS	Civilian Radioactive Waste Management System
FY	Fiscal Year
GIS	Geographic Information System
HU	Housing Unit
km	kilometer
M&O	Management and Operating Contractor
PPH	Persons per household
QA	Quality Assurance
RadMP	Radiological Monitoring Program
RDAS	Regional Data Analysis Section
VEA	Valley Electric Association
WS	Windshield survey

INTENTIONALLY LEFT BLANK

1. INTRODUCTION

This document is the tenth in a series of annual reports that present site-specific socioeconomic data compiled for the Radiological Monitoring Program (RadMP). Data compiled for the Radiological Monitoring Program (RadMP) are an integral component of studies conducted in support of the Environmental Impact Statement, the Total System Performance Assessment, Site Recommendation, and License Application. This report presents estimates, for the year 2000, of the distribution of the population residing within an 84-km radius of Yucca Mountain.

Socioeconomic support for the RadMP performed by Civilian Radioactive Waste Management System (CRWMS) Management and Operating Contractor (M&O) Regional Data Analysis Section (RDAS) personnel is subject to the requirements in *Quality Assurance Requirements and Description*, DOE/RW-0333P (DOE 2000). Quality-affecting activities include the collection, analysis, and reporting of socioeconomic data suitable for use in the RadMP. The *Technical Work Plan Socioeconomic Support for the Radiological Monitoring Program (RadMP)* (CRWMS M&O 2000a) was prepared in accordance with AP-2.21Q, *Technical Product Development Planning*. The requirements of this plan were addressed during the collection and analysis of data. This report was prepared in accordance with AP-3.11Q, *Technical Reports*.

1.1 BACKGROUND

Data requirements for the RadMP are based on the "General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories" (10 CFR 960). These guidelines specify the socioeconomic data necessary for evaluating the suitability of the Yucca Mountain site for development as a repository, which are to include a description of the population density and distribution of the region surrounding the site.

RadMP data also must be suitable for input to analyses conducted in support of Total System Performance Assessment, Site Recommendation, and License Application. To evaluate potential radiation exposure, performance assessments use biosphere models that describe the pathways by which individuals might receive radiation doses. Area-specific population data are required to estimate potential radiation exposure to the resident population within approximately 50 miles of the Yucca Mountain site. The specifications for these analyses are determined, in part, by technical guidelines set forth by the Nuclear Regulatory Commission in Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations*.

1.2 METHODOLOGICAL AND DATA IMPROVEMENTS

The collection and analysis of the data presented in this report were performed to Quality Assurance (QA) standards, and in accordance with QA procedures. Implementation of NWI-RSD-002Q, *Scientific Investigation of Economic, Demographic, and Agricultural Characteristics in the Vicinity of Yucca Mountain* incorporates detailed checklists and crosschecks which constitute sufficient documentation of the methodology to ensure the accuracy, precision, and representativeness of collected data.

Data developed for this report are suitable for use in Arc/Info (Geographic Information System (GIS) software) to create coverages of the spatial distribution of individual residential housing

units within an 84-km radius of Yucca Mountain. This allows for analysis of data by census geography and other administrative boundaries. It also provides the flexibility to analyze and display data as needed for Yucca Mountain Site Characteristic Project activities that require area-specific population data, including potential use in the emergency planning section of the License Application.

1.3 CONSISTENCY WITH PAST REPORTS

Estimates of the resident population and occupied housing units previously reported (through 1999) were not developed as quality-affecting data.

Previous reports contained quarterly estimates of population distribution and occupied housing units. Beginning with this report, data are reported as annual estimates. The estimates provided in this report are based on data compiled during August 2000.

The FY 2000 scope of work associated with socioeconomic support for the RadMP focused on establishing and implementing quality-affecting methodologies related to the collection and analysis of resident population data. Daytime population estimates and a summary of agricultural activities are not included in this report.

1.4 REPORT ORGANIZATION

The following section of this document (Section 2) provides a description of the procedures and methods used to develop estimates of the spatial distribution of the resident population and occupied housing units within an 84-km radius of Yucca Mountain. A summary of these data is presented in the third section. References for this document are shown in Section 4.

2. PROCEDURES AND METHODS

All data presented in this report are qualified and were collected and developed in accordance with NWI-RSD-002Q, *Scientific Investigation of Economic, Demographic, and Agricultural Characteristics in the Vicinity of Yucca Mountain* (CRWMS M&O 2000b). Appendix A, RadMP Report Software Routine V.1.0, provides documentation of the steps and software techniques used to process and organize information for this report. Appendix A also addresses the methods used to control the electronic management of data, in accordance with AP-SV.1Q, *Control of the Management of Electronic Data*.

2.1 STUDY AREA

The study area consists of a radial grid, developed in accordance with AP-3.12Q, *Calculations*, that is suitable for evaluating the pathways and potential impacts of a release of radioactive materials to the environment within a distance of 84 km (MO9912COV97202.000). The center of the grid is located on Nevada State Plane coordinates Northing 765621.5, and Easting 570433.6, which is on the eastern side of Exile Hill at the Yucca Mountain site. The North Portal Pad is located over this point. This 84-km Radiological Monitoring Grid consists of 160 cells formed by 10 concentric rings and 16 sixteen evenly-spaced sections (22.5 degrees each) radiating from the center. The cell labels are derived from a concatenation of the numbering system of the rings and sections. The 16 sections are numbered counterclockwise beginning with the section directly north. Example: Ring 6 and section 4 = cell 604.

The dimensions of this study area are based on requirements and technical guidelines set forth by the Nuclear Regulatory Commission in Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations*.

A visual representation of the distribution of the 2000 residential population, within the 84-km radiological monitoring grid presented in section 3 (Figure 1) was created using Arc/Info V7.2.1, STN: 10033-7.2.1-00. This GIS software was added to the M&O Baseline of Qualified Software on February 10, 2000 (CRWMS M&O 2000c) in accordance with AP-SI.1Q, *Software Management*. Arc/Info V7.2.1 was obtained from Configuration Management, run on a SGI-LV platform, on workstation ID 110889, identified as the appropriate software for this application, and used within the range of the validation documentation.

2.2 DEVELOPMENT OF POPULATION ESTIMATES

The housing unit (HU) method was used to calculate the population estimates reported in Section 3 of this report. The basis for this method is that the population of any given geographic area is equal to the number of households (occupied housing units) times the average number of persons per household, plus the number of persons living in group quarters (Smith 1986):

$$P = (H * PPH) + GQ \quad (\text{Eq. 1})$$

where,

P = total population

H = number of households

PPH = average number of persons per household

GQ = number of persons living in group quarters

Data used in the housing unit method to produce population estimates for areas within the 84-km Radiological Monitoring Grid are derived from two sources: 1) RDAS Investigation ID: 7/12/00 Residential Population Estimate 2000 (CRWMS M&O 2000b), and 2) the 1990 U.S. Census (U.S. Census Bureau 2000). RDAS Investigation ID: 7/12/00 Residential Population estimate 2000 includes qualified windshield survey (WS) data that were collected by means of a systematic, block-by-block canvassing of housing units by teams operating from automobiles, and residential utility data obtained from Valley Electric Association (VEA) (CRWMS M&O 2000b). The acquired VEA data are "accepted," and approved for quality-affecting work (Mellington, S.P. 1999a). U.S. Census data also are accepted, and approved for quality-affecting work (Mellington, S.P. 1999b).

This section gives a brief description of how each component of the housing unit method was developed. Appendix A, RadMP Report Software Routine V.1.0, provides a detailed account of this process. Definitions of the U.S. Census terminology (such as household, housing unit, and group quarters) also are provided in Appendix A (Step 3).

HOUSEHOLDS

Number of households is equal to the count of occupied housing units. For WS data, an estimate of the total number of occupied and vacant housing units is known; for VEA data, the total number of occupied and vacant housing units is based on the 1990 Census occupancy rate for the census tract and block group in which each housing unit is located.

PERSONS PER HOUSEHOLD

The estimate of PPH that is applied to both WS and VEA data is derived from the 1990 Census. For each tract and block group in which a household is located, PPH is equal to the number of persons divided by the number of households reported by the 1990 Census (for that particular tract and block group).

PERSONS LIVING IN GROUP QUARTERS

Group quarters include places where people live or stay other than the usual house, apartment, or mobile home. The number of persons living in group quarters within the 84-km Radiological Monitoring Grid are reported only for Clark and Inyo counties.

3. SUMMARY OF SOCIOECONOMIC DATA

Estimates, for the year 2000, of housing units, households (occupied housing units), and resident population located within the 84-km Radiological Monitoring Grid, are presented in Table 1. Data are organized in this table by the county, state, area, and grid cell in which housing units, households, and resident population are located.

Figure 1 provides a visual representation of the distribution of residential housing, and therefore, the residential population, within the 84-km Radiological Monitoring Grid. This figure includes 1990 U.S. Census geography (tracts and block group boundaries), county boundaries, and taxing district boundaries for selected communities.

The information reported in this section is not an exhaustive account of the housing units, households, and resident population located within the 84-km Radiological Monitoring Grid. The findings are simply descriptive, no inferences or conclusions are presented in this report, and there are no particular restrictions on the use of these data.

Table 1. 2000 Estimates of Housing Units, Households (Occupied Housing Units), and Resident Population Located Within the 84-km Radiological Monitoring Grid^{a,b}

	Housing Units	Households	Population
Nye County, NV			
Amargosa Valley area			
Grid Cell 309 (Lathrop Wells)	9	7	19
Grid Cell 408 (Amargosa Valley)	144	115	363
Grid Cell 409 (Amargosa Valley)	104	83	258
Grid Cell 508 (Amargosa Valley)	28	22	70
Grid Cell 509 (Amargosa Valley)	215	172	538
Grid Cell 510 (Crystal)	11	11	16
Grid Cell 610 (Crystal)	51	51	73
Grid Cell 609 (Stateline)	72	56	142
Grid Cell 710 (Ash Meadows)	10	8	19
Amargosa Valley area subtotal	644	525	1,498
Beatty area			
Grid Cell 304 (Hot Springs)	14	11	24
Grid Cell 403 (Hot Springs)	11	9	19
Grid Cell 404 (Beatty)	379	323	702
Grid Cell 405 (Beatty)	233	194	419
Grid Cell 505 (Rhyolite)	2	2	4
Grid Cell 803 (Scotty's Junction)	1	1	2
Grid Cell 903 (Scotty's Junction)	10	9	19
Beatty area subtotal	650	548	1,189
Pahrump area			
Grid Cell 711 (Johnnie)	9	9	13
Grid Cell 810 (Pahrump)	19	17	46
Grid Cell 910 (Pahrump)	2,149	1,902	4,730
Grid Cell 1010 (Pahrump)	4,324	3,746	9,080
Pahrump area subtotal	6,501	5,673	13,870
Mercury			
Mercury subtotal	0	0	0
Clark County, NV			
Indian Springs			
Grid Cell 912 (Indian Springs & Cactus Springs)	569	490	1,343
Grid Cell 1011 (Cold Creek)	70	69	543
Indian Springs subtotal	639	559	1,886
Esmeralda County, NV			
Esmeralda County subtotal	0	0	0
Lincoln County, NV			
Lincoln County subtotal	0	0	0
NEVADA			
Nevada subtotal	8,434	7,306	18,443
Inyo County, CA			
Death Valley area			
Grid Cell 707 (Furnace Creek)	206	162	467
Grid Cell 807 (Timbisha)	17	17	49
Grid Cell 808 (Ryan)	1	1	3
Grid Cell 809 (Death Valley Junction)	6	6	15
Grid Cell 906 (Stovepipe Wells)	38	29	84
Grid Cell 1004 (Scotty's Castle)	2	2	9
Grid Cell 1010 (Stewart Valley)	6	5	9
California subtotal	276	222	635
GRAND TOTAL IN THE 84KM GRID	8,710	7,528	19,078

NOTES: ^a Appendix A, RadMP Report Software Routine V.1.0, provides a detailed account of the process and data (including all data tracking numbers) used to develop estimates.

^b Figures reported in this table have been rounded, therefore, they may not add to the totals and subtotals for the table.

Location Map

Legend

- Amargosa Valley Taxing District
- Beatty Taxing District
- Indian Springs Taxing District
- Pahrump Taxing District
- Nevada Test Site
- 2000 Residential Population
- 1990 Census Geography
- 84km Radiological Monitoring Grid
- County Boundary
- U.S. Highway
- State Highway

Yucca Mountain Site
Characterization Project

Population Distribution
Within the 84km Radiological
Monitoring Grid

4. REFERENCES

4.1 DOCUMENTS CITED

CRWMS M&O 2000a. *Technical Work Plan Socioeconomic Support for the Radiological Monitoring Program (RadMP)*. DI: TWP-MGR-MD-000003, Rev. 00. Las Vegas, Nevada. CRWMS M&O. ACC: MOL.20001005.0002.

CRWMS M&O 2000b. *Table of Contents for Regional Data Analysis Section Investigation ID: 7/12/00 Residential Population Estimate 2000*. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.20000929.0221.

Mellington, S.P. 1999a. "Office of Project Execution (OPE) Approval of LV.ESR.RLK.03/99-046 as Accepted Data." Letter from S.P. Mellington (DOE/YMSCO) to M.W. Harris (CRWMS M&O), October 1, 1999, with enclosure. ACC: MOL.20000207.0122; MOL.19990329.0145.

Mellington, S.P. 1999b. "Office of Project Execution (OPE) Approval of LV.ESR.RLK.03/99-042 as Accepted Data." Letter from S.P. Mellington (DOE/YMSCO) to M.W. Harris (DOE/OCRWM), October 1, 1999, OPE:ERC-2084, with enclosure. ACC: MOL.19991104.0063.

Smith, S.K. 1986. "A Review and Evaluation of the Housing Unit Method of Population Estimation." *Journal of the American Statistical Association*, 81, (394), 287-296. [Washington, D.C.]: American Statistical Association. TIC: 249009

4.2 CODES, STANDARDS, REGULATIONS, AND PROCEDURES

10 CFR 960. Energy: General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories. Readily available.

AP-2.21Q, *Quality Determinations And Planning For Scientific, Engineering, And Regulatory Compliance Activities*. Washington, D.C.: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. ACC: MOL.20000802.0003.

AP-3.11Q, *Technical Reports*. Washington, D.C.: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. ACC: MOL.20001026.0083.

AP-3.12Q, *Calculations*, D.C.: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. ACC: MOL.20001026.0084.

AP-SI.1Q, *Software Management*. Washington, D.C.: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. ACC: MOL.20001019.0023.

AP-SV.1Q, *Control of the Electronic Management of Data*. Washington, D.C.: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. ACC: MOL.20000831.0065.

DOE (U.S. Department of Energy) 2000. *Quality Assurance Requirements and Description*. DOE/RW-0333P, Rev. 10. Washington, D.C.: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. ACC: MOL.20000427.0422.

Regulatory Guide 4.2, Rev. 2. 1976. *Preparation of Environmental Reports for Nuclear Power Stations*. Washington, D.C.: U.S. Nuclear Regulatory Commission. Readily Available.

NWI-RSD-002Q, Rev 0. *Scientific Investigation of Economic, Demographic, and Agricultural Characteristics in the Vicinity of Yucca Mountain*. Office of Civilian Radioactive Waste Management. ACC: MOL.19990517.0135.

4.3 DATA

MO0009COV00330.000. COVERAGE: RADTOWNS. Submittal date: 9/25/2000.

MO0009GISVEA13.002. VEA_WS DATA. Submittal date: 09/29/2000.

MO0010COV00333.000. COVERAGE: BLKGP90S. Submittal date: 10/04/2000.

MO0010COV00334.000. COVERAGE: RADHAUS. Submittal date: 10/04/2000.

MO0010YMP00102.000. Population Distribution Within the 84km Radiological Monitoring Grid. Submittal date: 10/12/2000.

MO9912COV97202.000. Coverage: RADGRIDU. Submittal date: 12/07/1999.

U.S. Census Bureau 2000. "1990 Census Lookup." Various Locations: Clark, Esmeralda, Lincoln, Nye and Inyo Counties. Washington, D.C.: U.S. Census Bureau. Accessed 09/27/00. TIC: 248889. <http://venus.census.gov/cdrom/lookup/>

4.4 SOFTWARE

CRWMS M&O 2000c. *Software Baseline Request for LV-1999-006, ARC/INFO V.7.2.1*. 10033-7.2.1-00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.20000519.0018.

APPENDIX A
RADMP REPORT SOFTWARE ROUTINE V.1.0

INTENTIONALLY LEFT BLANK

APPENDIX A

RADMP REPORT SOFTWARE ROUTINE V.1.0

This documentation provides a detailed account of steps and software techniques used in the RadMP Report Software Routine V.1.0. The purpose of this routine is to organize and perform queries on data compiled during RDAS Investigation ID: 7/12/00 Residential Population Estimate 2000 (CRWMS M&O 2000b) for presentation in the report, Summary of Socioeconomic Data Analyses Conducted in Support of the Radiological Monitoring Program, During FY 2000.

The RadMP Report Software Routine V.1.0 was developed for single use, pursuant to the direction of the responsible manager and in accordance with AP-SI.1Q, *Software Management*. The software used to perform the steps detailed in the RadMP Report Software Routine V.1.0 is Microsoft Access 97 (YMP Product ID 53062-325-0832206-04078) which operates on Windows 95, Version 4.0. The name of the database in which this routine was performed is RadMP Report.mdb, located on CPU 112178 on the H Drive under _RadMP2000 in the Access DB folder. Access to the data used in this routine is controlled by password protection in accordance with AP-SV.1Q, *Control of the Management of Electronic Data*.

Step 1 also involves the use of Arc/Info V7.2.1, STN: 10033-7.2.1-00. This GIS software was added to the M&O Baseline of Qualified Software on February 10, 2000 (CRWMS M&O 2000c) in accordance with AP-SI.1Q, *Software Management*. Arc/Info V.7.2.1 was obtained from Configuration Management, run on a SGI-LV platform on workstation ID 110889, identified as the appropriate software for this application, and used within the range of the validation documentation.

STEP 1

Objective: Develop a table using Arc/Info GIS software that includes the HU location ID, the data source (WS or VEA), the HU Type, grid cell number, town name, and the U.S. Census tract and block group numbers, in which each housing unit is located. This table should not include dilapidated/vacant lot locations, housing units that are located outside of the 84km grid, or HU Location ID 36-00a and HU Location ID 36-00b (which overlap with residential utility service locations HU Location ID 4849B2254 and HU Location ID 4849B4186).

Description of how this table was created and verification of the results: The following qualified GIS coverages were identified for use in this application:

RADGRIDU	(MO9912COV97202.000)	84km Radiological Monitoring Grid
RADHAUS	(MO0010COV00334.000)	Housing Unit Locations
BLKGR90S	(MO0010COV00333.000)	U.S. Census Tiger File Data
RADTOWNS	(MO0009COV00330.000)	Towns within the Radiological Monitoring Grid

The Arc/Info IDENTITY function was used to compute the geometric intersection of the RADHAUS coverage with RADGRIDU; the RADHAUS coverage with BLKGR90S; and the RADHAUS coverage with RADTOWNS, resulting in three feature attribute tables. Data from the three feature attribute tables were organized into a single table, titled ARCINFO HU DATA,

that contains the following information: HU Location ID, Data Source, HU Type, Total Occupied HU, Total Vacant HU, Grid Cell, Tract, Block Group, Town Name, and Persons in Group Quarters. 4288 Housing units that are located out of the RADGRIDU coverage area, 44 locations where HU Type is "Dilapidated/Vacant Lot," and HU Location ID 36-00a and HU Location ID 36-00b are not included in this table. The ARCINFO HU DATA table contains 8672 records. Verification was performed using a checksum method. The checksum method consisted of comparing the number and type of housing unit records in ARCINFO HU DATA with the number and type of housing unit records contained in the source data table for the RADHAUS coverage—which is VEA_WSDATA (MO0009GISVEA13.002). The results of the checksum (figures provided below) show that the number of Group quarters in ARCINFO HU DATA (3) is the same as in the source data table for the RADHAUS coverage—which is VEA_WSDATA. Also, the 44 Dilapidated/Vacant Lot locations are not found in the ARCINFO HU DATA table (as expected), and finally, when the 4288 Housing units that are located out of the RADGRIDU coverage area, plus the 2 locations (HU Location ID 36-00a and HU Location ID 36-00b) are subtracted from the number of Separate Living Quarters in the original VEA_WSDATA table, the result is equal to the number of Separate Living Quarters found in ARCINFO HU DATA (12959 -(4288+2) = 8669).

Count of HU Type in VEA_WSDATA	
HU Type	Total
Dilapidated/Vacant Lot	44
Group Quarters	3
Separate Living Quarters	12959
Grand Total	13006

HU Type	Count of HU Type in ARCINFO HU DATA
Group Quarters	3
Separate Living Quarters	8669

The ARCINFO HU DATA table was saved in an Excel spreadsheet and zipped using WinZip software. The size of the zipped file is 280KB. This file was transmitted electronically from Erika Provost, to Linda Roe on 10/11/00 in accordance with AP-SV.1Q, *Control of the Management of Electronic Data*. This was accomplished by transmitting the data in a WinZip format. WinZip uses a lossless compression scheme, which maintains the integrity of the zipped file. The zipped file, ARCINFO HU DATA.zip, was detached and saved to the H Drive of CPU: 112178, which is password protected, under _RadMP2000 in the RadMP Report 2000 folder. ARCINFO HU DATA.zip was unzipped, creating an Excel spreadsheet, ARCINFO HU DATA.xls in the RadMP Report 2000 folder. This file consists of 8672 records.

STEP 2

Objective: Import ARCINFO HU DATA.xls into RadMP Report.mdb.

Access task performed: Get external data/Import function

Description of the Access tasks performed and verification of the results: All fields in ARCINFO HU DATA.xls were imported. If Access encounters errors when trying to import a spreadsheet, an import errors table is automatically created that includes field names and row numbers that indicate which data have caused errors. No errors occurred while importing these data. Data from ARCINFO HU DATA.xls were successfully imported and a new table named ARCINFO HU DATA was created in RadMP Report.mdb consisting of 8672 records.

Table created in Access: ARCINFO HU DATA

STEP 3

Objective:

Create a new table that includes applicable 1990 US Census data for those Census Tracts and Block Groups included within the 84-km Radiological Monitoring Grid.

Access task performed: Table Design

Description of the Access tasks performed: A new table (Census dbt) was created that consists of 18 records. The structure and contents of the Census dbt table in RadMP Report.mdb are identified below:

Field Name	Definition
STATE	State
COUNTY	County
TRACT	Small, relatively permanent statistical subdivisions of counties delineated by local committees of census data users in accordance with Census Bureau guidelines for the purpose of collecting and presenting decennial census data. Tracts are designed to have homogeneous population characteristics, economic status, and living conditions at the time they are established. Census tract boundaries normally follow visible features but may follow governmental unit boundaries and other nonvisible features.
BLOCK GROUP	A combination of census blocks that is a statistical subdivision of a census tract. Geographic block groups never cross census tracts but may cross the boundaries of county subdivisions, places, urbanized areas, voting districts, and so forth.
PERSONS PER HOUSEHOLD	The number of persons divided by the number of households.
OCCUPANCY RATE	The number of occupied housing units divided by the number of housing units.
PERSONS	Persons
HOUSEHOLDS	A person or group of persons who live in a housing unit. These equal the count of occupied housing units in a traditional census.
HOUSING UNITS	A house, an apartment, a mobile home or trailer, a group of rooms, or a single room that is occupied as a separate living quarters, or, if vacant, is intended for occupancy as a separate living quarters.
OCCUPIED HOUSING UNITS	A housing unit is classified as occupied if it is the usual place of residence of the person or group of persons living in it at the time of enumeration or if the occupants are only temporarily absent. Occupied rooms or suites of rooms in hotels, motels, and similar places are classified as housing units only when occupied by permanent residents, that is, individuals for whom the facility is their usual place or residence.
VACANT HOUSING UNITS	A housing unit is vacant if no one is living in at the time of enumeration, unless the occupants are only temporarily absent.
GROUP QUARTERS Includes the following fields: Persons in GQ-Juv Inst Persons in GQ-Correct Inst Persons in GQ-Military Persons in GQ-Other non-inst	A place where people live or stay other than the usual house, apartment, or mobile home. Two general types of group quarters are recognized: institutional (for example, nursing homes, mental hospitals or wards, hospitals or wards for chronically ill patients, hospices, and prison wards) and noninstitutional (for example, college or university dormitories, military barracks, group homes, shelters, missions, and flophouses). Group quarters may have housing units on the premises for staff or guests.

Data entry and verification of results: Data for this table were retrieved from the 1990 US Census Data, Database: C90STF3A, Summary Level: State--County--Census Tract. PERSONS PER HOUSEHOLD and OCCUPANCY RATE are computed as described in Table 1. Data entries were verified against a print out of the original 1990 US Census Data tables (TIC: 248889) and no errors were detected.

Table created in Access: Census dbt.

STEP 4

Objective: Add a new field (Total Housing Units) to ARCINFO HU DATA to store the total number of housing units (per Housing Unit ID). Update the value in this field to Total Occupied HU + Total Vacant HU. NOTE: Each separate living quarters, or single unit in a multiple-unit housing structure represents one housing unit. Group quarters do not include separate living quarters, thus Total Housing Units for group quarters is zero.

1st Access task performed: A new field called Total Housing Units was added (in table design).

2nd Access task performed: Update query

2nd task, query name: UDAQ Step 4

Computer-generated SQL expression of 2nd task, query commands: UPDATE [ARCINFO HU DATA] SET [ARCINFO HU DATA].[Total Housing Units] = [Total Occupied HU]+[Total Vacant HU];

Description of the Access tasks performed and verification of the results: In the 1st Access task, a new field called Total Housing Units was added (in table design). In the 2nd Access task, 8672 records were updated with the value in Total Occupied HU plus the value in Total Vacant HU. The results of this task are easily verified by visual inspection of the values in Total Occupied HU, Total Vacant HU and the calculated (updated) field Total Housing Units. For example, for HU Location ID 90-00o (shown below) Total Housing Units = 10+1.

HU Location ID	Total Occupied HU	Total Vacant HU	Total Housing Units
90-00o	10	1	11

STEP 5

Objective: Add a new field (Occupancy Rate) to ARCINFO HU DATA, and update all records in this field where Data Source = VEA, with the occupancy rate in the Census dbt table, based on matched tract and block group numbers. NOTE: Where Data Source = WS, the total number of occupied and vacant housing units is known, thus it is unnecessary to update the occupancy rate derived from the U.S. Census data to those records.

1st Access task performed: A new field called Occupancy Rate was added to ARCINFO HU DATA (in table design).

2nd Access task performed: Update query

2nd task, query name: UDQ Step 5

Computer-generated SQL expression of 2nd task, query commands: UPDATE [ARCINFO HU DATA] INNER JOIN [Census dbt] ON ([ARCINFO HU DATA].[Block Group] = [Census dbt].[BLOCK GROUP]) AND ([ARCINFO HU DATA].Tract = [Census dbt].TRACT) SET [ARCINFO HU DATA].[VEA OCCUPANCY RATE] = [Census dbt].[occupancy rate] WHERE ((([ARCINFO HU DATA].[Data Source])="VEA"));

Description of the Access tasks performed and verification of the results: In the 1st Access task, a new field called Occupancy Rate was added (in table design). In the 2nd Access task, 7779 records in ARCINFO HU DATA were updated where Data Source = VEA, with the percent from the Occupancy Rate field in the Census dbt table. One anomaly was encountered, where Tract 9805 BG 6 (Nellis Air Force Range area) was identified with a single housing unit location (4744C9188). The coordinates for this particular location placed it just inside the U.S. Census geography for Tract 9805 BG 6. Since Nellis Air Force Range is not a residential area, an adjustment was made to the tract and block group number, placing it on the other side of census tract boundary in Tract 9803 BG 1. Verification was performed by comparing the percent occupancy entered in ARCINFO HU DATA (for all unique combinations of tract and blocks) with the percent in Census dbt. No errors were detected.

TRACT	BLOCK GROUP	OCCUPANCY RATE	Data Source	Tract	Block Group	VEA OCCUPANCY RATE
9803	BG 1	86.14%	VEA	9803	BG 1	86.14%
9803	BG 2	81.21%	VEA	9803	BG 2	81.21%
9803	BG 3	80.07%	VEA	9803	BG 3	80.07%
9803	BG 4	77.78%	VEA	9803	BG 4	77.78%
9804	BG 2	100.00%	VEA	9804	BG 2	100.00%
9804	BG 3	83.65%	VEA	9804	BG 3	83.65%
9804	BG 4	88.84%	VEA	9804	BG 4	88.84%
9804	BG 5	82.73%	VEA	9804	BG 5	82.73%
9804	BG 6	100.00%	VEA	9804	BG 6	100.00%

STEP 6

Objective: Add a new field (Adjusted Occupied HU) to ARCINFO HU DATA, and update all records in this field where Data Source = WS, with the value in the Total Occupied HU field. Update all records in this field where Data Source = VEA, with the value in the Total Occupied HU * the value in Occupancy Rate.

1st Access task performed: A new field called Adjusted Occupied HU was added to ARCINFO HU DATA (in table design).

2nd Access task performed: Update query

2nd task, query name: UDQ Step 6-Task 2

Computer-generated SQL expression of 2nd task, query commands: UPDATE [ARCINFO HU DATA] SET [ARCINFO HU DATA].[Adjusted Occupied HU] = [Total Occupied HU]

WHERE ((([ARCINFO HU DATA].[Data Source])="WS"));

3rd Access task performed: Update query

3rd task, query name: UDQ Step 6-Task 3

Computer-generated SQL expression of 3rd task, query commands: UPDATE [ARCINFO HU DATA] SET [ARCINFO HU DATA].[Adjusted Occupied HU] = [Total Occupied HU]*[VEA OCCUPANCY RATE]

WHERE ((([ARCINFO HU DATA].[Data Source])="VEA"));

Description of the Access tasks performed and verification of the results: In the 1st Access task, a new field called Adjusted Occupied HU was added (in table design). In the 2nd Access task, 893 records in ARCINFO HU DATA (where Data Source = WS) were updated with the value in the Total Occupied HU field. In the 3rd Access task, 7779 records in ARCINFO HU DATA (where Data Source = VEA) were updated with the value in the Total Occupied HU field. Verification was performed by running a select query to check the entries in the Adjusted Occupied HU. As shown below, in every case, where Data Source = WS, the value in the Adjusted Occupied HU = Total Occupied HU field; and where Data Source = VEA, the value in the Adjusted Occupied HU = Total Occupied HU * Occupancy Rate. No errors were detected.

Data Source	Total Occupied HU	VEA OCCUPANCY RATE	Adjusted Occupied HU
VEA	1	77.78%	0.78
VEA	1	80.07%	0.80
VEA	1	81.21%	0.81
VEA	1	82.73%	0.83
VEA	1	83.65%	0.84
VEA	1	86.14%	0.86
VEA	1	88.84%	0.89
VEA	1	100.00%	1.00
WS	0		0.00
WS	1		1.00
WS	2		2.00
WS	3		3.00
WS	4		4.00
WS	6		6.00
WS	10		10.00

STEP 7

Objective: Add a new field (PPH) to ARCINFO HU DATA, and update all records in this field with the value in Persons Per Household from the Census dbt table, matching tract and block group numbers, and where Adjusted Occupied HU is greater than 0, and NOT where HU Type = Group Quarters.

1st Access task performed: A new field called PPH was added to ARCINFO HU DATA (in table design).

2nd Access task performed: Update query

2nd task, query name: UDQ Step 7

Computer-generated SQL expression of 2nd task, query commands: UPDATE [ARCINFO HU DATA] INNER JOIN [Census dbt] ON ([ARCINFO HU DATA].[Block Group] = [Census dbt].[BLOCK GROUP]) AND ([ARCINFO HU DATA].Tract = [Census dbt].TRACT) SET [ARCINFO HU DATA].PPH = [census dbt].[persons per household] WHERE ((([ARCINFO HU DATA].[Adjusted Occupied HU])>0) AND (([ARCINFO HU DATA].[HU Type])<>"Group Quarters"));

Description of the Access tasks performed and verification of the results: In the 1st Access task, a new field called PPH was added (in table design). In the 2nd Access task, 8546 records in ARCINFO HU DATA were updated with the Persons Per Household value from the Census dbt table. Verification was performed by running a select query to check the entries in PPH against Persons Per Household in the Census dbt, based on matched tract and block group numbers. The results are shown below. No errors were detected.

TABLE: ARCINFO HU DATA			Table: Census dbt		
TRACT	BLOCK GROUP	PPH	TRACT	BLOCK GROUP	PERSONS PER HOUSEHOLD
5	BG 2	4.64	5	BG 2	4.64
7	BG 1	2.88	7	BG 1	2.88
7	BG 2	1.74	7	BG 2	1.74
59	BG 9	4.09	59	BG 9	4.09
5898	BG 1	2.63	5898	BG 1	2.63
5898	BG 2	8.28	5898	BG 2	8.28
9803	BG 1	2.19	9803	BG 1	2.19
9803	BG 2	2.12	9803	BG 2	2.12
9803	BG 3	3.14	9803	BG 3	3.14
9803	BG 4	2.50	9803	BG 4	2.50
9804	BG 2	1.41	9804	BG 2	1.41
9804	BG 3	3.53	9804	BG 3	3.53
9804	BG 4	2.41	9804	BG 4	2.41
9804	BG 5	2.44	9804	BG 5	2.44
9804	BG 6	1.22	9804	BG 6	1.22

STEP 8

Objective: Add a new field (Total Persons) to ARCINFO HU DATA, and update all records in this field with $([Adjusted\ Occupied\ HU] * [PPH]) + [Persons\ in\ Group\ Quarters]$.

1st Access task performed: A new field called Total Persons was added to ARCINFO HU DATA (in table design).

2nd Access task performed: Update query

2nd task, query name: UDQ Step 8

Computer-generated SQL expression of 2nd task, query commands: UPDATE [ARCINFO HU DATA] SET [ARCINFO HU DATA].[Total Persons] = [Adjusted Occupied HU]*[PPH]+[Persons in Group Quarters];

Description of the Access tasks performed and verification of the results: In the 1st Access task, a new field called Total Persons was added (in table design). In the 2nd Access task, 8672 records in ARCINFO HU DATA were updated with ([Adjusted Occupied HU]*[PPH])+[Persons in Group Quarters]. Verification was performed by running a select query to check all unique combinations of the values in Adjusted Occupied HU, PPH, and Persons in Group Quarters (shown below). Total persons were verified by hand calculation. No errors were detected.

Adjusted Occupied HU (1)	PPH (2)	Persons in Group Quarters (3)	Total Persons = (1 * 2)+3
0.00	0.00	0.00	0.00
1.00	1.22	0.00	1.22
1.00	1.41	0.00	1.41
0.81	2.12	0.00	1.72
1.00	1.74	0.00	1.74
0.86	2.19	0.00	1.89
0.78	2.50	0.00	1.94
0.83	2.44	0.00	2.02
0.89	2.41	0.00	2.14
1.00	2.41	0.00	2.41
0.80	3.14	0.00	2.52
1.00	2.63	0.00	2.63
1.00	2.88	0.00	2.88
0.84	3.53	0.00	2.96
0.00	0.00	3.00	3.00
1.00	4.09	0.00	4.09
1.00	4.64	0.00	4.64
2.00	2.88	0.00	5.76
1.00	8.28	0.00	8.28
3.00	2.88	0.00	8.65
4.00	2.88	0.00	11.53
6.00	2.88	0.00	17.29
0.00	0.00	18.00	18.00
10.00	2.88	0.00	28.82
0.00	0.00	80.00	80.00

STEP 9

Objective: Create a table that shows the sum of Total Housing Units by State, County, and Grid Cell. These data are for use in Table 1 of the report.

Access task performed: Make table query

Query Name: MTQ Report Table 1

Computer-generated SQL expression of query commands: SELECT [Census dbt].STATE, [Census dbt].COUNTY, [ARCINFO HU DATA].[Grid Cell], Sum([ARCINFO HU DATA].[Total Housing Units]) AS [SumOfTotal Housing Units], Sum([ARCINFO HU DATA].[Adjusted Occupied HU]) AS [SumOfAdjusted Occupied HU], Sum([ARCINFO HU DATA].[Total Persons]) AS [SumOfTotal Persons] INTO [REPORT DATA] FROM [ARCINFO HU DATA] INNER JOIN [Census dbt] ON ([ARCINFO HU DATA].Tract

= [Census dbt].TRACT) AND ([ARCINFO HU DATA].[Block Group] = [Census dbt].[BLOCK GROUP]) GROUP BY [Census dbt].STATE, [Census dbt].COUNTY, [ARCINFO HU DATA].[Grid Cell] ORDER BY [Census dbt].STATE DESC , [Census dbt].COUNTY, [ARCINFO HU DATA].[Grid Cell];

Description of the Access task performed and verification of results: A new table (REPORT DATA) was created that consists of 29 records. To verify the results, three separate tables were created to check the sum values of 1) Total Housing Units, 2) Adjusted Occupied Units, and 3) Total persons (all by State, County, and Grid Cell) against the values in REPORT DATA (that were produced in a single query). A comparison of the values in the individual tables to REPORT DATA (shown below) found no differences.

Table created in Access: REPORT DATA

REPORT DATA						Verification Table 1				Verification Table 2				Verification Table 3			
STATE	COUNTY	Grid Cell	SumOf Total Housing Units	SumOf Adjusted Occupied HU	SumOf Total Persons	STATE	COUNTY	Grid Cell	SumOf Total Housing Units	STATE	COUNTY	Grid Cell	SumOf Adjusted Occupied HU	STATE	COUNTY	Grid Cell	SumOf Total Persons
NV	Clark	1011	70	69	543	NV	Clark	1011	70	NV	Clark	1011	69	NV	Clark	1011	543
NV	Clark	912	569	490	1343	NV	Clark	912	569	NV	Clark	912	490	NV	Clark	912	1343
NV	Nye	1010	4324	3746	9080	NV	Nye	1010	4324	NV	Nye	1010	3746	NV	Nye	1010	9080
NV	Nye	304	14	11	24	NV	Nye	304	14	NV	Nye	304	11	NV	Nye	304	24
NV	Nye	309	9	7	19	NV	Nye	309	9	NV	Nye	309	7	NV	Nye	309	19
NV	Nye	403	11	9	19	NV	Nye	403	11	NV	Nye	403	9	NV	Nye	403	19
NV	Nye	404	379	323	702	NV	Nye	404	379	NV	Nye	404	323	NV	Nye	404	702
NV	Nye	405	233	194	419	NV	Nye	405	233	NV	Nye	405	194	NV	Nye	405	419
NV	Nye	408	144	115	363	NV	Nye	408	144	NV	Nye	408	115	NV	Nye	408	363
NV	Nye	409	104	83	258	NV	Nye	409	104	NV	Nye	409	83	NV	Nye	409	258
NV	Nye	505	2	2	4	NV	Nye	505	2	NV	Nye	505	2	NV	Nye	505	4
NV	Nye	508	28	22	70	NV	Nye	508	28	NV	Nye	508	22	NV	Nye	508	70
NV	Nye	509	215	172	538	NV	Nye	509	215	NV	Nye	509	172	NV	Nye	509	538
NV	Nye	510	11	11	16	NV	Nye	510	11	NV	Nye	510	11	NV	Nye	510	16
NV	Nye	609	72	56	142	NV	Nye	609	72	NV	Nye	609	56	NV	Nye	609	142
NV	Nye	610	51	51	73	NV	Nye	610	51	NV	Nye	610	51	NV	Nye	610	73
NV	Nye	710	10	8	19	NV	Nye	710	10	NV	Nye	710	8	NV	Nye	710	19
NV	Nye	711	9	9	13	NV	Nye	711	9	NV	Nye	711	9	NV	Nye	711	13
NV	Nye	803	1	1	2	NV	Nye	803	1	NV	Nye	803	1	NV	Nye	803	2
NV	Nye	810	19	17	46	NV	Nye	810	19	NV	Nye	810	17	NV	Nye	810	46
NV	Nye	903	10	9	19	NV	Nye	903	10	NV	Nye	903	9	NV	Nye	903	19
NV	Nye	910	2149	1902	4730	NV	Nye	910	2149	NV	Nye	910	1902	NV	Nye	910	4730
CA	Inyo	1004	2	2	9	CA	Inyo	1004	2	CA	Inyo	1004	2	CA	Inyo	1004	9
CA	Inyo	1010	6	5	9	CA	Inyo	1010	6	CA	Inyo	1010	5	CA	Inyo	1010	9
CA	Inyo	707	206	162	467	CA	Inyo	707	206	CA	Inyo	707	162	CA	Inyo	707	467
CA	Inyo	807	17	17	49	CA	Inyo	807	17	CA	Inyo	807	17	CA	Inyo	807	49
CA	Inyo	808	1	1	3	CA	Inyo	808	1	CA	Inyo	808	1	CA	Inyo	808	3
CA	Inyo	809	6	6	15	CA	Inyo	809	6	CA	Inyo	809	6	CA	Inyo	809	15
CA	Inyo	906	38	29	84	CA	Inyo	906	38	CA	Inyo	906	29	CA	Inyo	906	84