8.0 GROUNDWATER MONITORING

The Nevada Test Site (NTS) has a history of underground nuclear testing and continues to operate radioactive waste storage and disposal sites, a hazardous material testing facility, and conducts environmental restoration activities. Groundwater monitoring on and near the NTS is of particular importance due to the existing and potential groundwater contamination resulting from historical nuclear testing activities.

In calendar year (CY) 2000, Bechtel Nevada (BN) contracted with an offsite analytical laboratory. BN has received some results for radioactivity analyses from this laboratory which are somewhat higher than historical data. The organization providing oversight groundwater monitoring operations has also experienced similar difficulty in obtaining accurate analytical data. These laboratory problems have resulted in the reanalysis of some samples and provided the impetus to increase the use of quality control measures. Although some analytical data received in 2000 are of questionable quality, they are generally in good agreement with data collected by the oversight organization and indicate that radionuclides have traveled less than one mile from testing areas and in some locations, significantly less than one mile. Activities conducted within the Underground Testing Area (UGTA) program for year 2000 are described in Chapter 4.0 of this report.

8.1 INTRODUCTION

There have been 828 underground nuclear tests conducted at the NTS. Approximately one third of these tests were detonated near or below the water table (U.S. Department of Energy [DOE] 1996b; DOE 2000). This legacy of nuclear testing has resulted in the contamination of groundwater in some areas. Figure 8.1 indicates the locations of underground nuclear tests and areas of potential groundwater contamination. To safeguard the public's health and safety and comply with applicable federal, state, and local environmental protection regulations as well as DOE directives, groundwater on and near the NTS is monitored for radioactivity. Monitoring in the past has been conducted by the U.S. Public Health Service, USGS, Environmental Protection Agency and others. In 1998, BN was tasked by the U.S. Department of Energy, National Nuclear Security Administration, Nevada Operations Office (NNSA/NV), to establish and manage the NTS Routine Radiological Environmental Monitoring Plan (RREMP), a single integrated and comprehensive monitoring program. The RREMP details groundwater monitoring objectives, regulatory drivers, and quality assurance protocols which are also summarized in Chapter 4.0.

The NTS groundwater monitoring network consists of a variety of monitoring locations to determine if and to what extent aquifers have been impacted by radionuclides originating from activities on the NTS. These locations include onsite supply wells, wells specifically designed to monitor groundwater, natural springs, domestic offsite wells and point of opportunity locations. The onsite and offsite locations sampled in 2000 along with the predicted groundwater flow paths are presented in Figures 8.2 and 8.3, respectively. The NTS groundwater monitoring locations are located in a complex hydrogeologic setting which has been described in Chapter 7.0.

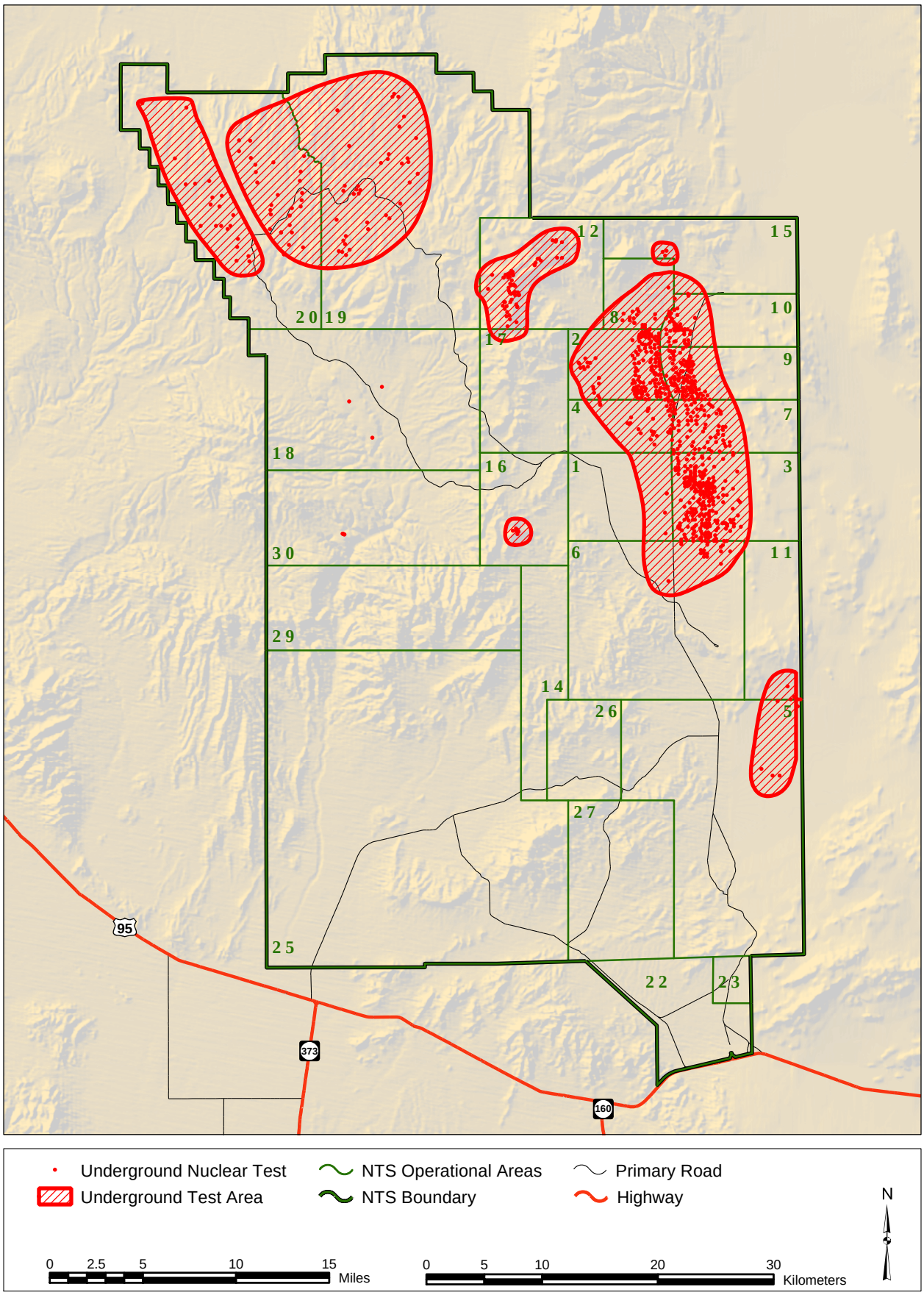

Figure 8.1 Areas of Potential Groundwater Contamination on the Nevada Test Site

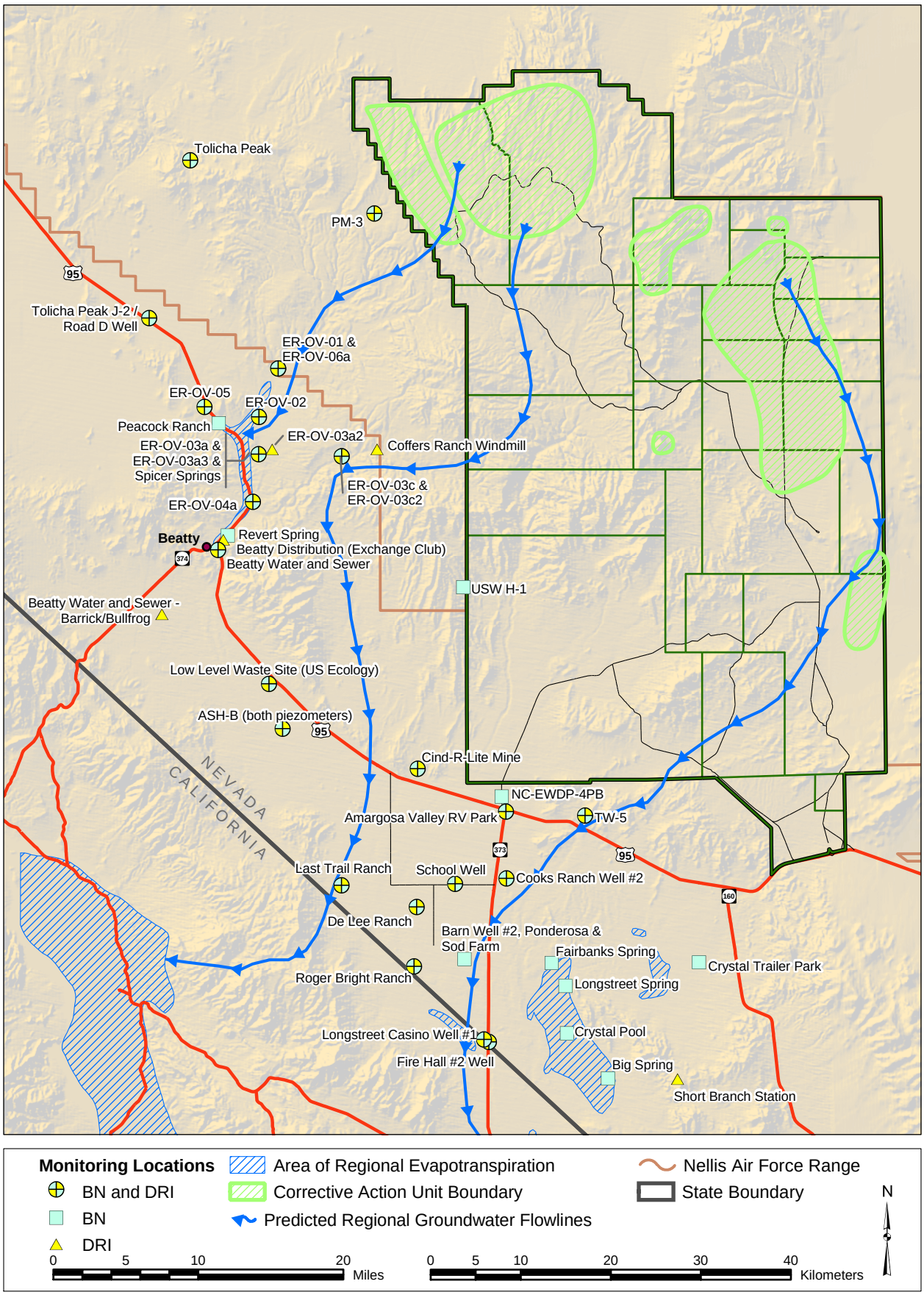

Figure 8.3 Nevada Test Site Offsite Groundwater Monitoring Locations - 2000

8.2 GROUNDWATER MONITORING ANALYTES

The analytes of interest for groundwater monitoring are based on the radiological source term from historical nuclear testing, regulatory/permit requirements, and characterization needs. Typical analyses are presented in Table 8.1 and include both radiological and chemical parameters to assess impacts to aquifers from past nuclear testing and to characterize the groundwater system. The sampling frequency presented in Table 8.1 is based on well type and location. The isotopic inventory remaining from nuclear testing is presented in the NTS Environmental Impact Statement (DOE, 1996c) and a recent Lawrence Livermore National Laboratory (LLNL) document (Smith, 2001). Many of the radioactive species generated from subsurface testing have very short half-lives, sorb strongly onto the solid phase or are bound into what is termed "puddle glass" and are not available for groundwater transport in the near term (Smith, 1993 and Smith *et al.*, 1995). Tritium is the radioactive species created in the greatest quantities and is widely believed to be one of the most mobile. Tritium is therefore the primary target analyte and represents the greatest concern to users of groundwater on and around the NTS for at least the next 100 years due to its high mobility and concentration (DOE 1996c; International Technology [IT] 1997).

The majority of tritium results presented in this chapter are from enriched samples. Tritium samples are enriched to achieve a very low detection limit. The enrichment process concentrates tritium in the samples to give an effective minimum detectable concentration (MDC) of near 10 pCi/L whereas the MDC for a standard (non-enriched) tritium analysis ranges from 200-400 pCi/L. The uncertainty/error values presented in the summary tables at the end of this chapter represent the counting uncertainty/error of the analytical method. Although the uncertainty associated with the enrichment process has not yet been quantified, it is estimated to be up to 20 percent and is not encompassed by the counting uncertainty/error. It is therefore important to note that the total or system error associated with the enrichment and analysis process for tritium samples is somewhat higher than the values presented in the summary tables.

8.3 GROUNDWATER MONITORING RESULTS

TRITIUM

Onsite Supply Wells

Results from all samples collected from the water supply wells for tritium analyses were well below the regulatory standard of 20,000 pCi/L. Only wells 4, 4A, J-12, J-13 and C-1 had reported concentrations above the MDC. Wells 4, 4A, J-12 and J-13 had fourth quarter results of less than 35 pCi/L and do not have a history of detectable levels of tritium. The fourth quarter tritium analyses were performed by a newly contracted laboratory. This change in analytical laboratories may account for the variability as compared to past results due to differences in instrumentation and concentration of background samples. In consideration of these differences, it is not believed that the onsite water supply network has been impacted by subsurface nuclear testing .

Water Well C-1 was injected with approximately 0.1 to 0.2 Curies of tritium by a researcher conducting a tracer test in 1962 (Lyles, 1990). Figure 8.4 is a time series plot of tritium concentrations for locations sampled in 2000 that have a history of detectable tritium. This plot illustrates the decrease of the annually averaged tritium concentrations in Well C-1 over time.

Analytical results for all tritium analyses are presented in Table 8.2. Figure 8.5 shows the locations of wells with a history of detectable tritium that were sampled in 2000.

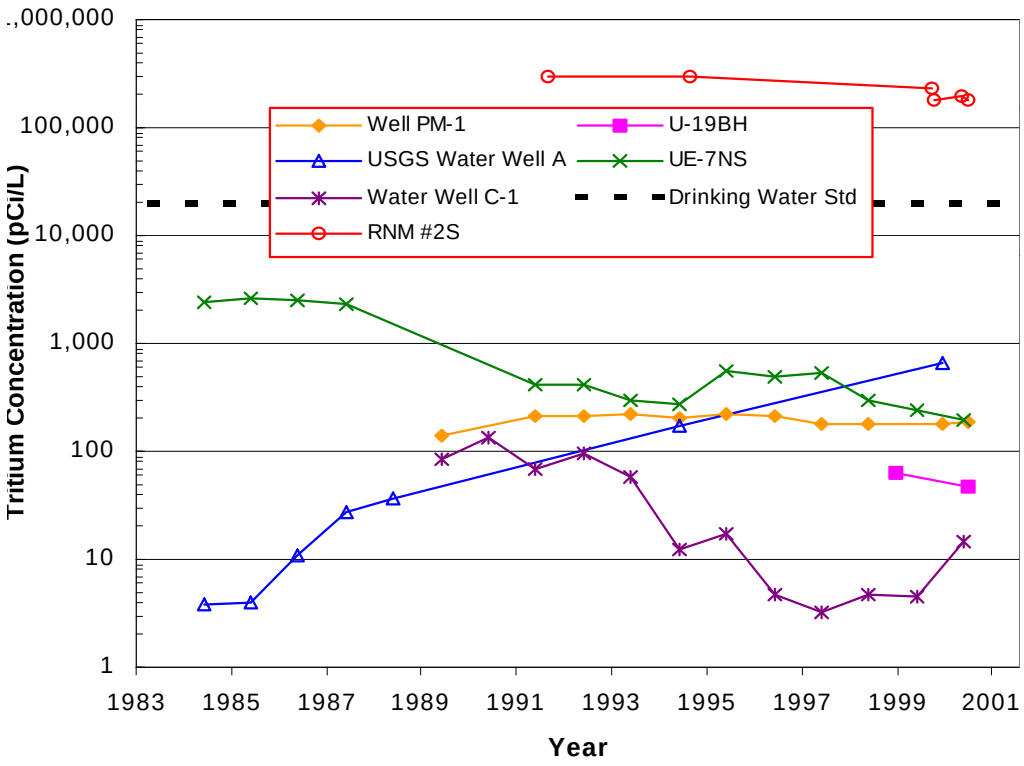

Figure 8.4 Wells with a History of Detectable Tritium

Onsite Monitoring Wells

Of the twenty-three onsite monitoring wells sampled in year 2000, only four had results above the MDC for tritium. These locations are RNM #2S, UE-7nS, U-19bh and PM-1 (see Figure 8.5). These locations are located within 1 km of underground nuclear tests.

Well RNMS #2s was constructed to investigate radionuclide migration from the CAMBRIC (emplacement hole U-5e) underground nuclear test conducted in Frenchman Flat and is located less than 70 m from the emplacement hole. This well has a history of tritium concentrations roughly ten times the regulatory standard and has been studied extensively by the Los Alamos National Laboratory (LANL) and Lawerence Livermore National laboratory (LLNL). Details of LANL's investigations can be found in the Laboratory and Field Studies Related to Radionuclide Migration Project publication series (e.g. LANL LA-13787-PR).

Well PM-1, located on Pahute Mesa, has a history of tritium concentrations near 200 pCi/L over the last ten years. Due to equipment limitations, samples have been collected from depths which are not open to the aquifer. This well has an unslotted casing from ground surface to a depth of 2,300 m and open hole from 2,300-2,356 m below ground surface. Sampling depths have historically ranged from 3-100 m below the static water level (~643 m below ground surface). The casing was perforated in some locations to squeeze cement into the annulus. Although these perforations are generally filled with cement and are therefore relatively impermeable, cracks or incomplete grouting may exist which permits water from the formation to enter the casing. Future sampling events will collect samples along the borehole profile to aid in determining where tritium is entering the casing.

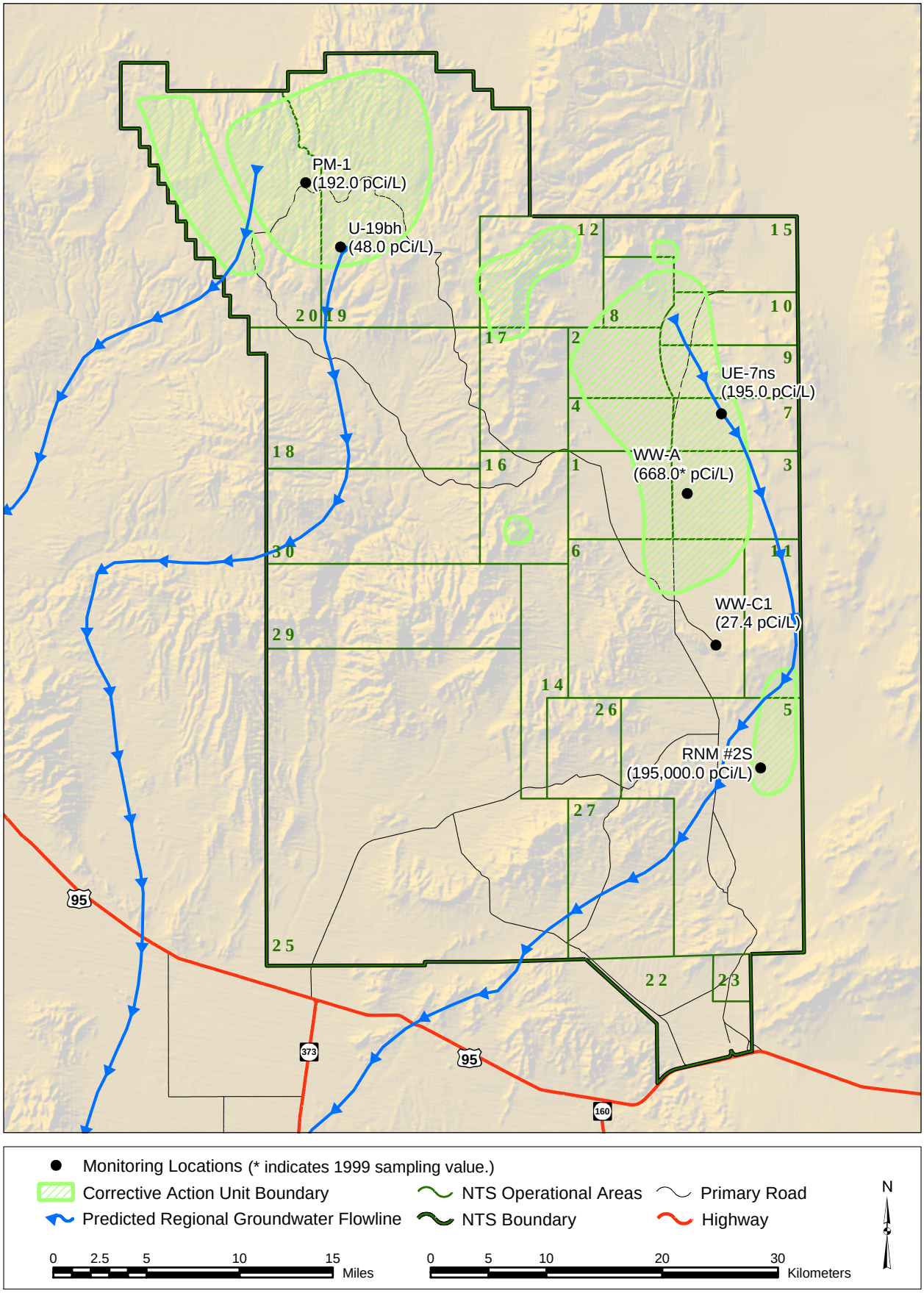

Figure 8.5 Nevada Test Site Groundwater Monitoring Locations With a History of Detectable Tritium - 2000

Potential sources of the tritium detected in Well PM-1 include the FARM (U-20ab), GREELEY (U-20g), and KASSERI (U-20z) underground nuclear tests. The FARM test, although believed to be downgradient, is the closest test detonated near or below the water table to PM-1. The GREELEY and KASSERI tests were of relatively large magnitude and detonated 2,429 and 1,196 m, upgradient of PM-1, respectively.

Well UE-7nS was drilled 137 m from the BOURBON underground nuclear test (U-7n) conducted in Yucca Flat in 1967. This well was routinely sampled between 1978 and 1987 and again since 1992. In year 2000, approximately 240 pCi/L of tritium was detected in water samples from Well UE-7nS. This represents a decreasing trend in tritium concentrations, yet marks the second known site on the NTS where the regionally important carbonate aquifer has been impacted by radionuclides from nuclear testing (Smith *et al.*, 1999). Well Ue-2CE is the first known location on the NTS where the regionally important carbonate aquifer has been impacted. This well is located less than 200 m from the NASH test (conducted in Yucca Flat in 1967) and is not currently configured for sampling.

U-19bh is an inventory emplacement borehole on Pahute Mesa, which is currently used for sampling. This location has a tritium concentration slightly above the MDC. The origin of the tritium is unclear. Investigations at this location suggest that the water in this borehole is from a perched aquifer (Brikowski *et al.*, 1993). There were several nuclear detonations conducted near the U-19bh borehole; however, identifying the likely source of tritium is particularly difficult due to a lack of data regarding the perched system.

Water Well A, located in Yucca Flat, has a reported tritium concentration below the MDC for the year 2000 sample. This result is likely erroneous. This location has a history of rising tritium concentrations over the last six years and had a reported concentration of 668 pCi/L in 1999 (see Figure 8.4). Water Well A is completed in alluvium and located within 1 km of 14 underground nuclear tests, most of which appear to be upgradient of Well A. It is therefore not likely that the tritium concentration in Water Well A is now below the MDC. Additional quality control measures will be instituted for the next sampling event at this location to investigate the year 2000 result.

It is significant to note that radionuclide contamination has not been detected in well U-3cn #5. This well is completed in the regionally significant carbonate aquifer 60 m from the BILBY (U-3cn) test. BILBY was conducted in 1963 in a zeolitic volcanic tuff confining unit (see section 7.4) less than 120 m above the carbonate aquifer.

Figure 8.4 is a time series plot of tritium concentration for locations sampled in 2000 with a history of detectable tritium. Data presented in Figure 8.4 prior to 1999 for wells PM-1, Water Well A and UE-7nS are annual averages obtained from EPA. Figure 8.5 shows the locations of wells with detectable tritium from samples collected in the CY 2000. Results for all onsite monitoring well samples are presented in Table 8.2.

Offsite Locations

Thirty-eight offsite locations were sampled for tritium analyses in 2000. Three of these locations had results above the MDC but well below the regulatory standard (all results are less than 25 pCi/L). These locations are Spicer's Ranch spring, Ash-B piezometer #1, and Ponderosa Dairy Barn Well #2. The uncertainty of the Ash-B piezometer # 1 result encompasses the MDC. The Spicer's Ranch location sample is above the MDC; however, tritium was not detected in a sample replicate. The Longstreet Casino well value presented in Table 8.2 is the result determined by internal screening. The result received from the contracted laboratory was over 400 pCi/L and believed to be erroneous. The original sample collected and a resample aliquot were analyzed by internal personnel and found the concentration of tritium in the samples to be at instrument background levels.

All of the tritium detections from the offsite sampling locations were results reported from the new laboratory. It is likely that these results are the product of analytical error/uncertainty, as historical data and data collected by oversite organizations indicate these locations have not been impacted by tritium originating from the NTS. Future sampling events will include more quality control measures to assess analytical accuracy and precision. Table 8.2 presents results from all tritium analyses for CY 2000.

GROSS ALPHA

Onsite Supply Wells

Quarterly samples were collected from the supply wells for gross alpha analyses in CY 2000. All results were below the regulatory standard of 15 pCi/L, with the exception of the fourth quarter result from Water Well 5C, which slightly exceeded the standard with a value of 15.5 pCi/L. Safe Drinking Water Act (SDWA) regulations require annual averages to be below the standard; therefore, the well was within compliance for 2000 when the quarterly results were averaged. In addition to man-made radionuclides, many naturally occurring minerals/elements contribute to alpha radiation (e.g. minerals containing uranium). These elements are more abundant in volcanic source rocks and therefore wells producing water from these rocks will likely have relatively higher gross alpha values. Results of all gross alpha analyses for samples collected in 2000 are presented in Table 8.3.

Figure 8.6 shows the annual averages of gross alpha analyses for the supply wells from the past ten years. This figure illustrates that the regulatory standard for gross alpha has not been exceeded since 1991.

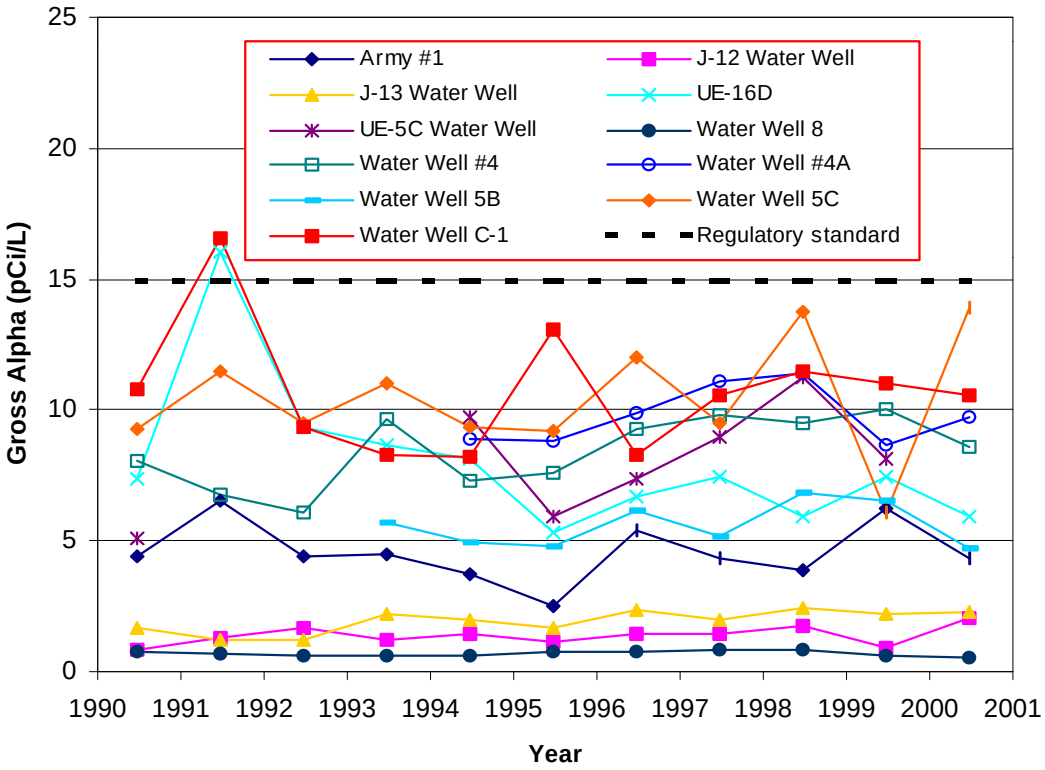

Figure 8.6 Annual Averages of Gross Alpha in Supply Wells

A statistical analysis was performed to evaluate the gross alpha data for trends. Using regression analysis, two locations (Water Wells J-12 and #4) were identified to have statistically significant increasing slopes (using a 5 percent significance level). Neither of these two trends were identified as being practically significant; however, the largest correlation coefficient (R^2) for these trend lines is less than 12 percent.

Drinking Water Endpoints

Samples for radioactivity analyses are no longer collected at drinking water endpoints (taps). Collection of these data has proven less useful than those collected at the wellhead due to the fact that several wells may be supplying the endpoint. For example, previous reports have presented gross alpha results from samples collected from the Areas 6 and 23 cafeteria taps (see Figure 8.7). These data give the appearance that the gross alpha levels have been rising at the Area 23 location. These data are somewhat misleading. Prior to 1995, roughly 75 percent of the water supplying the Area 23 cafeteria was from Army well #1; Well 5C provided the other 25 percent. From 1995 to 1996 Army well use was gradually reduced to a negligible amount due to elevated water hardness. Since 1996, the Area 23 cafeteria location has been supplied primarily by Wells 5B and 5C (~80 percent) with Wells 4 and 4A providing the balance (~20 percent). Army well #1 is completed in a carbonate aquifer, while Wells 5B and 5C produce water from the alluvial aquifer (composed of detritus derived from volcanic rocks), and Wells 4 and 4A produce water from volcanic aquifers. As pointed out in the previous section, volcanic rocks contain relatively higher quantities of natural alpha-yielding elements, which will likely produce higher concentrations of gross alpha radiation in water pulled from these formations. From inspection of Figure 8.6 and evaluation of the data, it is evident that the concentrations of gross alpha at the Area 23 cafeteria are higher than in previous years simply because the source of water supplying the endpoint has changed to wells that have slightly higher naturally occurring gross alpha concentrations than the previous combination of wells. Samples are now collected solely from the source wells to quantify concentrations of radioactive analytes entering the drinking water distribution system.

Onsite Monitoring Wells/Offsite Locations

During 2000, five onsite monitoring wells and thirty-seven offsite locations were sampled for gross alpha analyses. All samples were below the regulatory standard with the exception of offsite wells ER-OV-02 and ER-OV-03A, which are used solely as monitoring locations. These elevated gross alpha values may be a result of decay from naturally occurring uranium as well as local variations in mineralogy due to hydrothermal alteration of the volcanic host rock. Table 8.3 presents all gross alpha results for samples collected in 2000.

It should be noted that Nye County well (NC-EWDP-4PB) is not a RREMP well. This location was sampled at the request of NNSA/NV to confirm an anomalously high gross alpha result obtained by a local government agency. Gross alpha results obtained by BN were below the regulatory standard and confirmed the previous result as a false positive. Suspected causes for the erroneously high value are poor well development and inadequate purging prior to sample collection.

GROSS BETA

Onsite Supply Wells

Results for all gross beta analyses collected from the supply wells in 2000 were well below the drinking water standard of 50 pCi/L. Figure 8.8 is a plot of historical gross beta annual averages. A regression analysis was performed to evaluate the gross beta data for trends. One location

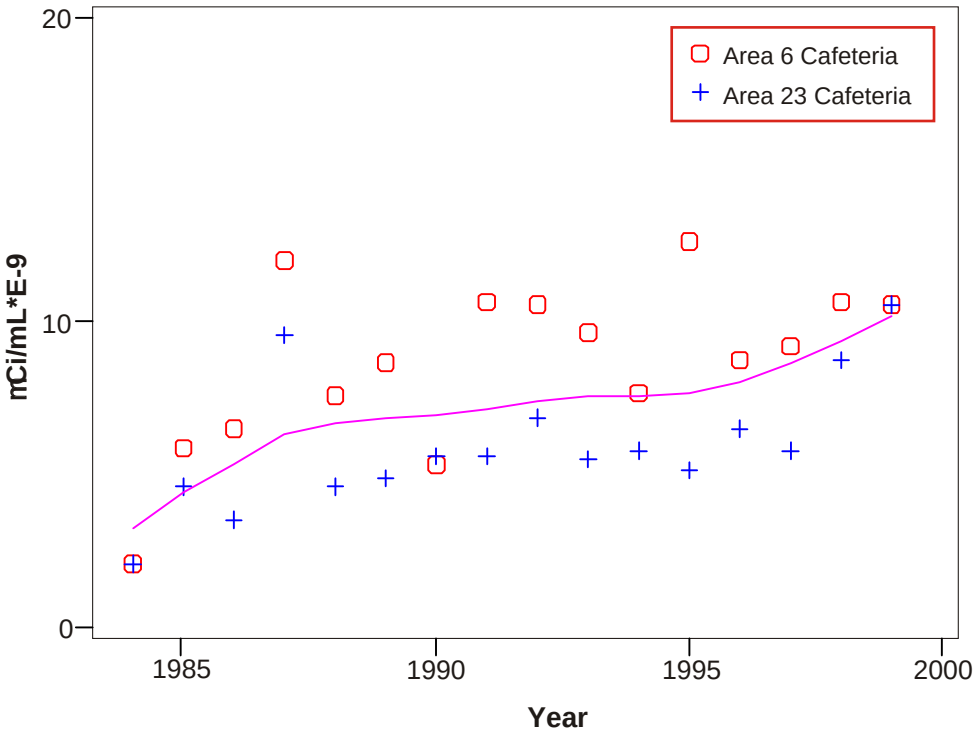

Figure 8.7 Historical Time Series for Gross Alpha in Tap Water

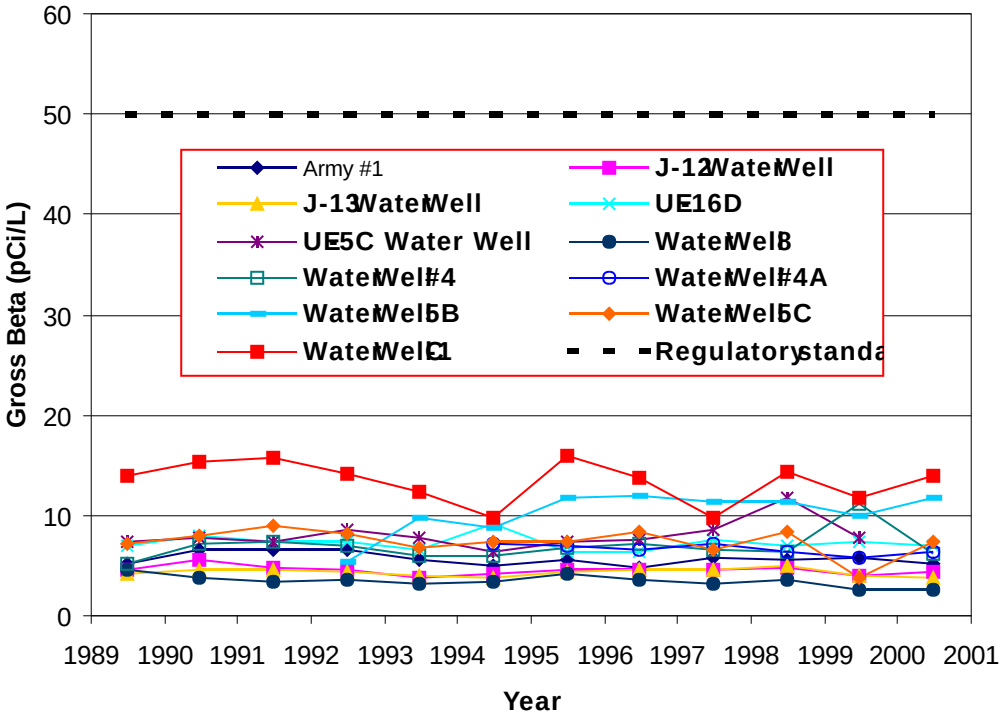

Figure 8.8 Annual Averages of Gross Beta in Supply Wells

(Water Well 5B) was identified as having a statistically significant increasing slope (using a 5 percent significance level). This trend has little practical significance; however, as the correlation coefficient (R^2) for this trend line is less than 20 percent. Additionally, the Well 5B location shows initial low values which have stabilized and remained relatively constant since 1995. Actual gross beta values for CY 2000 analyses are presented in Table 8.4.

Onsite Monitoring Wells/Offsite Locations

During 2000, samples were collected for gross beta analyses from five onsite monitoring wells and thirty-seven offsite locations. All results were below drinking water standards and are presented in Table 8.4.

GAMMA SPECTROSCOPY

Ten supply wells, five onsite monitoring locations and thirty-eight offsite locations were sampled for gamma-emitting radionuclides in 2000. There were no gamma-emitting radionuclides detected in any supply well or onsite location sampled. Ten offsite locations had detectable concentrations of radionuclides, results are presented in Table 8.5. All gamma results, when accounting for analytical uncertainty, were below MDCs with the exception of the Nye County well (NC-EWDP-4PB) and Peacock Ranch locations which had detections of the naturally-occurring ^{40}K, ^{214}Pb, and ^{214}Bi isotopes. The Nye County well is not in the RREMP and was sampled at the request of NNSA/NV as previously discussed.

RADIUM

During 2000, five onsite monitoring wells, twenty-five offsite locations and ten supply wells were sampled for radium analyses. All results from the onsite monitoring wells and offsite locations were below the drinking water standard of 5 pCi/L for the combined ^{226}Ra and ^{228}Ra concentrations. Quarterly samples were taken from the supply wells and the annually averaged results are well below the drinking water standard. The fourth quarter sample from Army Well #1 had a result of 5.97 pCi/L for ^{226}Ra and 2.0 pCi/L for ^{228}Ra. These values seem to be a result of analytical error as the gross alpha result from the same sample is 3.49 pCi/L and historic results for radium analyses at this location have been dominated by values well below the combined 5 pCi/L standard. Results from CY 2000 radium analyses are presented in Tables 8.6 and 8.7.

PLUTONIUM

Ten supply wells, four onsite monitoring locations and thirty-seven offsite locations were sampled for ^{238}Pu and $^{239+240}Pu$ in 2000. All plutonium results (±2 sigma uncertainty/error) were at or below the MDC and are presented in Tables 8.8 and 8.9.

STRONTIUM

During 2000, five onsite monitoring wells, thirty-seven offsite locations and ten supply wells were sampled for ^{90}Sr analyses. All results (±2 sigma uncertainty/error) were below the MDC with the exception of onsite well RNM#1 (5.8 pCi/L). RNM#1 is a post shot hole installed to investigate radionuclide migration from the CAMBRIC (emplacement hole U-5e) underground nuclear test. ^{90}Sr results for RNM #1 were below the drinking water standard of 8 pCi/L, even though it is located less than 150 m from U-5e. Results for CY 2000 ^{90}Sr analyses are presented in Table 8.10.

8.4 SUMMARY OF GROUNDWATER MONITORING

In 2000, over 60 groundwater monitoring locations were sampled for radioactivity. Of the over 60 locations sampled, there was only one location sampled which exceeded of the SDWA regulatory limit for the primary target analyte, tritium. This location is RNM #2S and is a post-shot hole located less than 70 m from the CAMBRIC underground nuclear test. Although some analytical data received in 2000 are of questionable quality, they are generally in good agreement with data collected by the oversight organization and indicate that radionuclides have traveled less than one mile from testing areas and in some locations, significantly less than one mile.

8.5 GROUNDWATER MONITORING OVERSIGHT ACTIVITIES

COMMUNITY ENVIRONMENTAL MONITORING PROGRAM - WATER MONITORING PROJECT

The Desert Research Institute (DRI) was tasked by the U. S. Department of Energy, during fiscal year 2000, to provide independent verification of the level of radioactivity within some of the offsite groundwater wells drilled to the south and west of the Nevada Test Site. Samples collected by DRI personnel provide not only an independent measure of the levels of radioactivity within these wells, but also a direct comparison to the results obtained by the RREMP.

The primary analyte for this project was tritium. Tritium is one of the most abundant radionuclides generated by an underground nuclear test, and since it is incorporated into the water molecule itself, it is also one of the most mobile. Samples from a few of the wells were analyzed for additional measures of radioactivity. The intent of the additional analyses was to provide a more comprehensive suite of radionuclides for a portion of the wells being monitored. As such, samples were collected for additional analyses from one third of all sample locations.

Sample Locations

Twenty-eight wells and one spring were sampled during the period of May 8 to October 11, 2000, utilizing a combination of bailers, pumps, windmills, or grab samples. Table 8.11 lists all of the wells, the date they were sampled, sampling methodology, and the analysis conducted. The locations of the wells and spring are also presented in Figure 8.3. Not all offsite RREMP groundwater sample locations were accessible to DRI. Replacement locations were sampled if possible.

Procedures and Quality Assurance

DRI utilized several methods to ensure that radiological results reported herein conform to current quality assurance protocols. This was achieved through the use of standard operating procedures, field quality assurance samples, and laboratory quality assurance procedures.

DRI standard operating procedures are detailed instructions that describe the method and materials, using step-by-step instructions, that are required to decontaminate and operate the sample equipment, collect field water quality samples, and protect the samples from tampering and environmental conditions that may alter their chemistry.

The second tier of quality assurance utilized on this project consisted of field quality assurance samples. The intent of these samples and procedures was to provide direct measures of the contribution of radioactive material that was derived from the bottles, sampling equipment, and the environment to the activity of tritium measured within the samples. In addition, duplicate samples were collected to establish a measure of the repeatability of the analysis. Field quality assurance samples were collected solely to support the interpretation of the tritium samples. Five samples (17 percent of the sample load) were collected for the purposes of meeting field quality assurance requirements. Laboratory quality assurance controls consisted of the utilization of published laboratory techniques for the analysis of each radionuclide, method blanks, laboratory control samples, and laboratory duplicates. The laboratory quality assurance samples provide a measure of the accuracy, and limit of detection of the reported results.

A comparison of laboratory quality assurance results to field quality assurance results indicated problems associated with the analyses determined by Severn Trent Laboratories. The analyses appeared to overestimate the quantity of tritium within field quality assurance samples and duplicate analyses from some of the wells differed by up to 111 pCi/L. In addition, the reported levels of tritium from several of the ER-OV wells significantly exceeded results previously obtained from these wells by BN and Lawrence Livermore National Laboratory. The problems associated with the results from the quality assurance samples and the consistently greater concentration reported for all of the wells (relative to previous analyses) inspired a low degree of confidence for this first set of analyses.

For this reason, samples from the wells with the highest reported quantities of tritium were resubmitted to a second laboratory (University of Waterloo) for analysis along with additional quality assurance samples. Results from the quality assurance samples associated with the second set of analyses allowed a high degree of confidence to be associated with them.

Tritium Results

The results of tritium analyses from Severn Trent, the University of Waterloo, and BN are presented in Table 8.12. Tritium activities reported by Severn Trent laboratories averaged 29 pCi/L and ranged from 5.3 to 142 pCi/L. All sample analyses were well below the safe drinking water limit of 20,000 pCi/L. Comparison of the results from Severn Trent to those from the University of Waterloo and BN indicates that in almost all cases the Severn Trent results exceeded the other results, typically by 5 to 15 pCi/L. However, Severn Trent Results from several of the wells (Ash B#1, TW-5, ER-OV-2, ER-OV-3a, ER-OV-4a, ER-OV-05, and ER-OV-6a) significantly exceeded the other analyses.

A second set of analyses, by the University of Waterloo on the same samples, directly refuted the results of Severn Trent. The results reported by the University of Waterloo were non-detects for tritium from all of the reanalyzed samples and for an additional sampling point within the Beatty water distribution system. Quality assurance samples associated with the University of Waterloo analyses were well within project requirements.

Comparison of the Severn Trent analyses to BN results shows that the Severn Trent analyses exceeded BN results in all but one case (Cooks Ranch Well #2). However, the low degree of confidence associated with these samples and the tendency of the Severn Trent analyses to overestimate the tritium concentration places considerable doubt that tritium was actually present in these wells at activities exceeding BN reported results. Comparison of the University of Waterloo results with the results from BN shows that both sets of analyses were below the limit of detection, with the exception of BN's analysis of Ash-B#1. The results, although not identical, are undifferentiable.

It is important to note that DRI quality assurance protocols were able to identify problems associated with the first laboratories analyses. This in turn led to the reanalysis of questionable samples so that major uncertainties associated with the first sample analyses were resolved.

Gross Alpha, Gross Beta, Gamma Spectrum and Plutonium Results

In addition to tritium, samples for gross alpha, gross beta, gamma spectroscopy, and plutonium analyses were collected at six locations (Coffers Ranch Windmill, ER-OV-1, ER-OV-2, ER-OV-3c, ER-OV-3c2, and ER-OV-6a). These samples were taken with the intent of providing a more comprehensive radiological analysis of a portion of the RREMP wells. The results of these analyses are presented in Table 8.13.

Gross beta analysis from the wells ranged from 4.8 to 36.2 pCi/L with a mean of 15.57 pCi/L and a standard deviation of 8.4 pCi/L. All of the analyses were below national drinking water standards. The gross alpha analysis ranged from below MDC to 37.1 pCi/L. The mean concentration was 14.31 pCi/L and the standard deviation was 10.8 pCi/L. Three wells, ER-OV-01, ER-OV-02, and ER-OV-3c2 exceeded the national drinking water standard of 15 pCi/L. The elevated alpha concentration may be due to the decay of natural uranium and its daughter products.

8.6 SUMMARY OF GROUNDWATER MONITORING OVERSIGHT ACTIVITIES

Twenty-eight wells and one spring were sampled during the period of May 8 to October 11, 2000. Tritium results from these wells indicated all analyses were well below the national drinking water standard. Initial results from all but one well exceeded CY 2000 BN results. Abnormalities associated with the quality assurance samples led to the reanalysis of the samples from the wells with the highest reported concentration. Quality assurance samples associated with the second set of analysis were acceptable and tritium was not detected in any of the samples. None of the wells contained plutonium isotopes, nor did any of the wells, with the exception of one sample from ER-OV-02, contain gamma-emitting radionuclides. The initial result from ER-OV-02 was contradicted by a sample collected 20 days later. All of the wells contained gross beta concentrations below the national drinking water standard. Three wells had gross alpha concentrations that exceeded the national drinking water standard.

8.7 VADOSE ZONE MONITORING

As explained in Chapter 4.0 of this report, the vadose zone is monitored at three general types of sites on the NTS: RWMSs, RCRA closure sites, and permitted sanitary landfills. Vadose zone monitoring is conducted at various locations in addition to, or in lieu of, groundwater monitoring for the purpose of protecting groundwater resources.

A vadose zone monitoring dataset has been collected for the past seven years at the Area 5 weighing lysimeter facility. This facility consists of two weighing lysimeters located about 400 m (1312 ft) southwest of the Area 5 RWMS. Each lysimeter consists of a steel box 2 m (6.6 ft) deep, filled with soil and having an area of 2 m x 4 m (6.6 ft x 13 ft). Each lysimeter is mounted on a sensitive scale, which is continuously monitored using an electronic loadcell. One lysimeter is vegetated with native plant species at the approximate density of the surrounding desert, and one lysimeter is kept bare to simulate the bare operational waste covers at the Area 5 RWMS. Each of the lysimeters is instrumented with soil water content (TDR) and soil water potential (HD)

sensors at depths ranging from 10 to 170 cm (0.3 to 5.6 ft). The facility has been in continuous operation since March 1994, providing measurements of the near-surface water balance components including depths of infiltration, water content and water potential profiles, evapotranspiration, bare-soil evaporation, total soil water storage, and drainage. This facility has provided data to support the important assumption made in the Area 3 and Area 5 PAs of no downward movement of water beyond plant rooting depths. This facility has also provided data to justify other NTS closure covers (DOE, 2000c, d).

Total soil water storage is illustrated in Figure 8.9 for the period of March 30, 1994, through July 30, 2001. Daily precipitation totals are also illustrated in Figure 8.9. The soil water storage increases, early in the data record for the vegetated lysimeter, were due to irrigations to ensure that transplanted vegetation survived. Note the steep decrease in soil water storage in the vegetated lysimeter following high-rainfall periods. Also note that the vegetated lysimeter is considerably drier than the bare-soil lysimeter, despite the paucity of plants in the vegetated lysimeter (about 15 percent cover). Data from the vegetated weighing lysimeter indicate that rainwater rarely infiltrates past a depth of 1 m (3 ft) and is quickly returned to the atmosphere by plant transpiration, even during wet years. No drainage has ever been measured from the permeable bottoms of either lysimeter to date. However, volumetric water content at a depth of 170 cm (5.6 ft) in the bare-soil lysimeter has increased from about 9 to 14 percent in the past seven years.

In addition to the weighing lysimeter facility, a new drainage lysimeter facility was recently installed next to the U-3ax/bl disposal unit at the Area 3 RWMS, and vadose zone monitoring of waste cell covers and floors using automated systems has been conducted at the Area 5 RWMS since late 1998. Soil water content at various depths with time is illustrated in Figure 8.10 for an automated waste cover monitoring system on the cover of Pit 3 at the Area 5 RWMS. Note the depth of infiltration has not exceeded 90 cm (3 ft) before that water was returned to the atmosphere by evaporation. Slight fluxuations in water contents are seen at greater depths, but these are the result of water vapor flow rather than liquid wetting fronts.

For further details on, and data from, the RWMS VZM program, refer to BN (2001b).

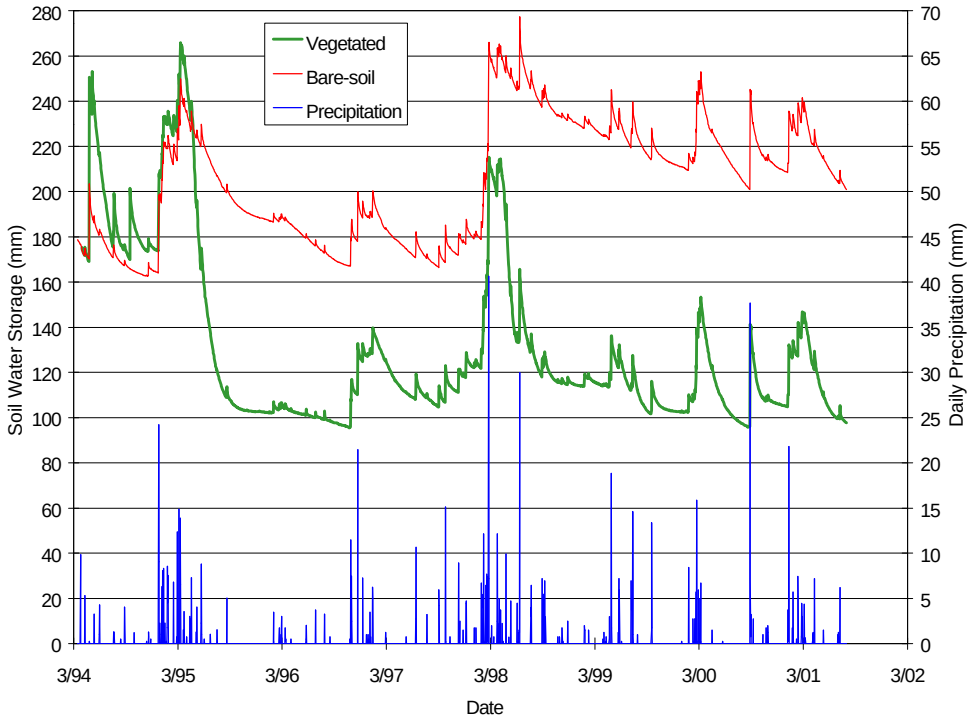

Figure 8.9 Weighing Lysimeter and Precipitation Data from March 1994 through July 2001

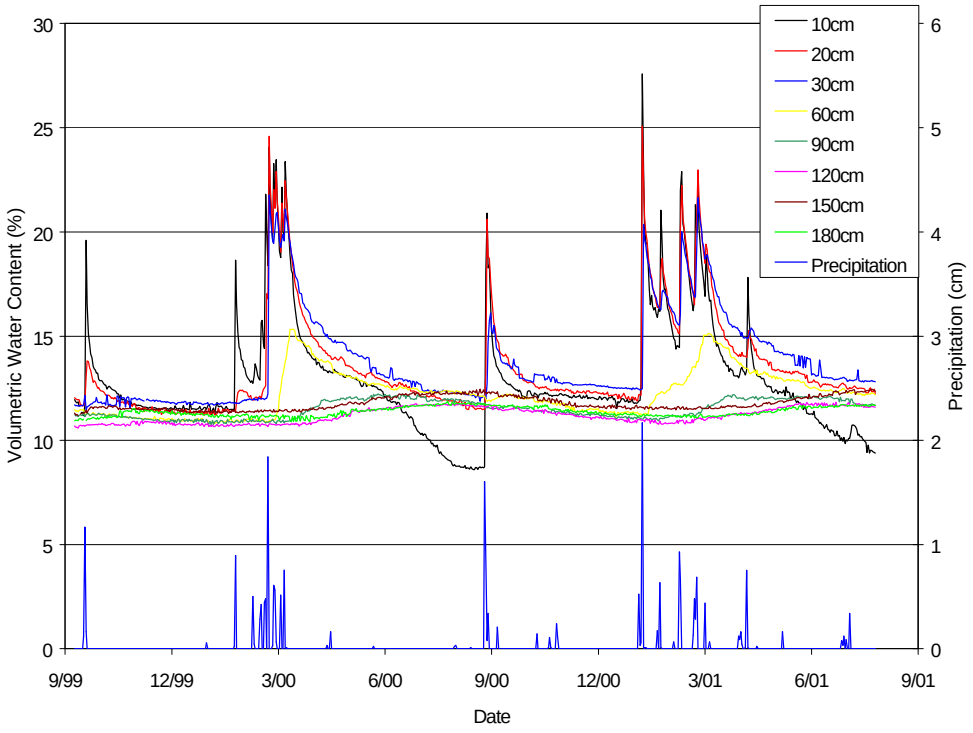

Figure 8.10 Soil Water Content in Pit 3 Waste Cover (North Site) Using an Automated Monitoring System

Table 8.1 Sampling and Analysis Schedule for RREMP Groundwater Monitoring

Sample Location Type		Analysis	Sample Frequency	Regulatory Driver
Onsite Locations	Potable water supply well within CAU	Ie & II	Quarterly	40 CFR 61 and DOE Order 5400
		III & IV	Annually	"
	Other potable water supply well	I & II	Quarterly	DOE Order 5400 Series
		III & IV	Annually	"
	CAU non-potable water supply well	Ie	Quarterly	DOE Order 5400 Series
		II, III, & IV	Annually	"
	Other non-potable water supply well	I	Semiannually	DOE Order 5400 Series
		II, III, & IV	Biennially	"
	Monitoring Well (Non-water supply)	I	Annually	DOE Order 5400 Series
		II, III, & IV	Biennially	"
	Source Characterization Well[a]	I, II, III, & IV	Biennially[b]	DOE Order 5400 Series
	New Wells	Ie, II, III, & IV	Quarterly[c]	DOE Order 5400 Series
	Group A locations (Oasis Valley and vicinity)	Ie, IIg	Quarterly	40 CFR 61 and DOE Order 5400
		II, III+	Annually	"
Offsite Locations[d]	Group B locations (more distant)	I, IIg	Semiannually	DOE Order 5400 Series
	Group C locations (most distant)	I, IIg	Annually	DOE Order 5400 Series
	New locations	Ie, II, III+, IV	First sample	40 CFR 61 and DOE Order 5400

(a) Source Characterization Wells are currently known as the Hot Well Network. Additional sampling parameters may be specified for each hot well.
(b) Biennial frequency can be modified for well-specific sampling program.
(c) After four quarterly samples are acquired, sampling parameters and frequency will be based on the well type.
(d) Offsite locations include both drilled wells and natural springs.

Note: All parameters and frequencies of analysis are subject to revision after data are acquired and reviewed, if justified.
Corrective Action Units (CAUs) are as defined by Underground Testing Area (UGTA) Project (IT, 1996c).

Type I Analysis include Standard Tritium; at select wells enriched tritium analysis (Type Ie) will be performed.
Type II Analysis include Gross Alpha and Gross Beta. For drinking water wells, also includes Ra-226 & 228 analyses. Type IIg analysis includes only Gamma emitters.
Type III Analysis include Gamma emitters, Plutonium. Type III+ analysis includes Type III plus Sr-90.
Type IV Analysis include pH, Specific Conductivity, Temperature, Principal Cations/Anions, Total Dissolved Solids, Alkalinity, and Bicarbonate.

Table 8.2 Summary of Tritium Results - 2000

Area	Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Onsite Supply Wells							
5	Water Well 5B	(a)	19-Jun-00	-0.37	9.43	5.65	pump
5	Water Well 5B	(b)	19-Jun-00	3.08	11.50	6.93	pump
5	Water Well 5B	(a)	25-Oct-00	4.89	12.40	7.30	pump
5	Water Well 5C	(a)	26-Jan-00	-3.34	10.20	6.11	pump
5	Water Well 5C	(a)	19-Apr-00	4.54	11.50	6.99	pump
5	Water Well 5C	(a)	19-Jun-00	-1.16	9.61	5.77	pump
5	Water Well 5C	(a)	25-Oct-00	2.70	11.30	6.70	pump
6	Water Well #4	(a)	23-Mar-00	-1.44	11.30	6.81	pump
6	Water Well #4	(a)	19-Apr-00	0.44	10.30	6.22	pump
6	Water Well #4	(a)	19-Jul-00	3.29	8.98	5.46	pump
6	Water Well #4	(a)	25-Oct-00	19.50	11.30	7.00	pump
6	Water Well #4A	(a)	26-Jan-00	-3.87	10.70	6.39	pump
6	Water Well #4A	(a)	19-Apr-00	0.17	11.00	6.66	pump
6	Water Well #4A	(a)	19-Jul-00	-0.40	9.31	5.59	pump
6	Water Well #4A	(a)	25-Oct-00	14.10	11.30	6.90	pump
6	Water Well C-1	(a)	26-Jan-00	27.40	9.94	6.33	pump
6	Water Well C-1	(a)	19-Jul-00	2.24	10.90	6.56	pump
6	Water Well C-1	(a)	25-Oct-00	15.50	13.90	8.40	pump
16	UE-16d Eleana Water Well	(a)	26-Jan-00	-5.26	8.96	5.31	pump
16	UE-16d Eleana Water Well	(a)	19-Apr-00	-3.83	10.00	5.97	pump
16	UE-16d Eleana Water Well	(a)	19-Jul-00	-3.33	10.10	6.03	pump
16	UE-16d Eleana Water Well	(a)	25-Oct-00	5.90	9.60	5.70	pump
18	Water Well 8	(a)	26-Jan-00	-6.56	11.50	6.82	pump
18	Water Well 8	(a)	19-Apr-00	0.53	11.40	6.82	pump
18	Water Well 8	(a)	19-Jul-00	-3.69	11.00	6.57	pump
18	Water Well 8	(a)	25-Oct-00	9.20	13.20	7.90	pump
18	Water Well 8	(b)	25-Oct-00	4.40	11.60	6.90	pump
22	Army #1 Water Well	(a)	26-Jan-00	-3.06	9.59	5.72	pump
22	Army #1 Water Well	(a)	19-Apr-00	-4.91	9.91	5.89	pump
22	Army #1 Water Well	(a)	19-Jul-00	-1.48	9.49	5.70	pump
22	Army #1 Water Well	(a)	24-Oct-00	-2.50	10.70	6.20	pump
25	J-12 Water Well	(a)	26-Jan-00	-1.02	11.10	6.64	pump
25	J-12 Water Well	(a)	19-Apr-00	4.92	10.60	6.45	pump
25	J-12 Water Well	(b)	19-Apr-00	-2.23	11.60	6.98	pump
25	J-12 Water Well	(a)	25-Jul-00	-3.72	9.95	5.95	pump
25	J-12 Water Well	(b)	25-Jul-00	3.96	21.20	12.80	pump
25	J-12 Water Well	(a)	24-Oct-00	32.70	13.50	8.50	pump
25	J-13 Water Well	(a)	26-Jan-00	-2.05	9.38	5.60	pump
25	J-13 Water Well	(a)	25-Jul-00	0.80	8.90	5.36	pump
25	J-13 Water Well	(a)	24-Oct-00	21.40	11.20	7.00	pump

(a) Normal sample.

(b) Field duplicate.

(c) Result is from internal screening.

Table 8.2 (Summary of Tritium Results - 2000, cont.)

Area Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Onsite Monitoring						
1 UE-1q	(a)	17-Feb-00	-1.34	10.2	6.12	bailer
2 Water Well 2	(a)	08-Jun-00	-2.83	13	7.78	bailer
2 Water Well 2	(a)	08-Jun-00	0.84	11.4	6.86	bailer
3 ER-3-2	(a)	15-Jun-00	2.04	9.92	6	bailer
3 ER-3-2	(a)	15-Jun-00	-2.55	11.3	6.78	bailer
3 U-3cn #5	(a)	19-Jul-00	1.19	10.9	6.58	pump
3 U-3cn #5	(b)	19-Jul-00	2.07	9.49	5.73	pump
3 USGS Water Well A	(a)	17-Feb-00	-35.40	9.89	5.49	bailer
4 UE-4t	(a)	08-Jun-00	-2.21	10.4	6.19	bailer
4 UE-4t	(a)	08-Jun-00	1.14	8.4	5.06	bailer
4 USGS Test Well D	(a)	17-Feb-00	2.86	10.7	6.49	bailer
5 RNM #1	(a)	28-Jun-00	424.00	514	317	pump
5 RNM #1	(b)	28-Jun-00	255.00	514	311	pump
5 RNM #2S	(a)	17-May-00	195,000	1570	6220	pump
5 RNM #2S	(a)	13-Jun-00	194,000	5.12E+0	1.77E+0	pump
5 RNM #2S	(a)	29-Jun-00	178,000	2130	5910	pump
5 UE-5c Water Well	(a)	19-Apr-00	2.84	10.1	6.11	pump
5 UE-5c Water Well	(a)	19-Jul-00	6.79	20.3	12.3	pump
5 UE5PW-1	(a)	26-Apr-00	-3.49	10.2	6.07	pump
5 UE5PW-1	(b)	26-Apr-00	-1.62	11.4	6.82	pump
5 UE5PW-1	(a)	09-Aug-00	-2.50	10.9	6.5	pump
5 UE5PW-1	(b)	09-Aug-00	-2.55	11.3	6.76	pump
5 UE5PW-2	(b)	26-Apr-00	1.30	10.6	6.37	pump
5 UE5PW-2	(a)	26-Apr-00	1.03	10.3	6.2	pump
5 UE5PW-2	(a)	09-Aug-00	5.20	10.2	6.19	pump
5 UE5PW-2	(b)	09-Aug-00	8.74	10.2	6.25	pump
5 UE5PW-3	(b)	26-Apr-00	0.28	12.2	7.33	pump
5 UE5PW-3	(a)	26-Apr-00	-0.44	10.4	6.26	pump
5 UE5PW-3	(a)	09-Aug-00	6.41	12.9	7.82	pump
5 UE5PW-3	(b)	09-Aug-00	2.28	9.3	5.61	pump
6 ER-6-1	(a)	15-Jun-00	0.38	8.95	5.39	bailer
6 ER-6-1	(b)	15-Jun-00	-4.36	22.9	13.7	bailer
6 ER-6-1	(a)	15-Jun-00	1.17	10.8	6.49	bailer
6 ER-6-1	(a)	15-Jun-00	-1.03	10.6	6.37	bailer
7 UE-7nS	(a)	07-Jun-00	195.00	10.4	6.49	bailer
17 USGS HTH #1	(b)	12-Jul-00	1.16	10.6	6.41	bailer
17 USGS HTH #1	(a)	12-Jul-00	2.25	9.97	6.03	bailer
17 USGS HTH #1	(a)	12-Jul-00	-3.37	11.9	7.08	bailer
17 USGS HTH #1	(a)	12-Jul-00	1.43	10.2	6.15	bailer
17 USGS HTH #1	(a)	12-Jul-00	1.90	11.6	7.01	bailer
17 USGS HTH #1	(a)	12-Jul-00	3.84	9.75	5.91	bailer
18 UE-18r	(a)	13-Jul-00	-0.62	9.41	5.65	bailer
18 UE-18r	(a)	13-Jul-00	-0.80	9.41	5.65	bailer
18 UE-18r	(b)	13-Jul-00	-0.44	7.99	4.78	bailer
19 ER-19-1	(a)	29-Jun-00	3.39	12.5	7.56	bailer
19 ER-19-1	(a)	29-Jun-00	-4.69	12.2	7.27	bailer
19 U-19bh	(a)	05-Jul-00	48.00	9.08	6.05	bailer
20 ER-20-1	(a)	05-Jul-00	0.75	9.14	5.51	bailer
20 ER-20-2 #1	(a)	06-Jul-00	-2.60	9.03	5.41	bailer
20 Well PM-1	(a)	29-Jun-00	192.00	11.3	8.93	bailer
20 Well PM-1	(b)	29-Jun-00	176.00	12.3	9.36	bailer
23 SM-23-1	(a)	13-Mar-00	-245.00	505	294	pump

(a) Normal sample.

(b) Field duplicate.

(c) Result is from internal screening.

Table 8.2 (Summary of Tritium Results - 2000, cont.)

Area Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Offsite Wells and Springs						
95 Amargosa Valley RV Park	(a)	14-Nov-00	1.40	11.10	6.60	pump
95 Ash-B Piezom #1	(a)	09-Nov-00	16.40	14.00	7.80	bailer
95 Ash-B Piezom #2	(a)	14-Nov-00	-8.60	11.10	6.40	bailer
95 Ash-B Piezom #2	(b)	14-Nov-00	-4.00	11.80	6.80	bailer
95 Barn Well #2-Ponderosa Dairy	(a)	06-Dec-00	19.30	11.40	7.00	pump
95 Beatty Water and Sewer	(a)	04-Dec-00	3.30	13.20	7.80	pump
95 Beatty Water and Sewer	(b)	04-Dec-00	10.20	13.40	8.00	pump
95 Big Springs	(a)	16-Jun-00	-9.50	13.50	8.01	grab
95 Big Springs	(a)	06-Nov-00	-5.50	12.60	7.40	grab
95 Cind-R-Lite Mine	(a)	15-Nov-00	-1.60	12.40	7.20	pump
95 Cook's Ranch Well #2	(a)	05-Dec-00	9.50	11.30	6.80	pump
95 Crystal Pool	(a)	16-Jun-00	-0.66	12.10	7.31	grab
95 Crystal Pool	(a)	06-Nov-00	-8.70	10.30	5.90	grab
95 Crystal Trailer Park	(a)	06-Dec-00	-7.90	11.60	6.70	pump
95 Crystal Trailer Park	(b)	06-Dec-00	-11.60	11.70	6.60	pump
95 De Lee Ranch	(a)	05-Dec-00	3.60	7.70	7.70	pump
95 De Lee Ranch	(b)	05-Dec-00	4.10	7.90	13.40	pump
95 ER-OV-01	(a)	09-May-00	-1.96	10.4	6.23	bailer
95 ER-OV-01	(b)	09-May-00	1.07	11.1	6.7	bailer
95 ER-OV-01	(a)	06-Nov-00	-4.40	11	6.3	bailer
95 ER-OV-02	(a)	11-May-00	-7.71	11.3	6.67	bailer
95 ER-OV-02	(a)	07-Nov-00	-4.00	18	10.6	bailer
95 ER-OV-03A	(a)	07-Nov-00	-6.20	10.8	6.3	bailer
95 ER-OV-03A3	(a)	07-Nov-00	-5.60	11.1	6.4	bailer
95 ER-OV-03C	(a)	09-May-00	-5.99	9.26	5.49	bailer
95 ER-OV-03C	(a)	08-Nov-00	-3.20	11.7	6.8	bailer
95 ER-OV-03C2	(a)	09-May-00	-6.71	9.79	5.8	bailer
95 ER-OV-03C2	(a)	08-Nov-00	-6.60	10.8	6.2	bailer
95 ER-OV-03C2	(b)	08-Nov-00	-5.90	11.1	6.4	bailer
95 ER-OV-04A	(a)	08-Nov-00	-3.10	10.8	6.3	bailer
95 ER-OV-04A	(b)	08-Nov-00	-8.80	11	6.3	bailer
95 ER-OV-05	(a)	08-Nov-00	-9.80	11.5	6.6	bailer
95 ER-OV-06A	(a)	09-May-00	0.45	10.5	6.33	bailer
95 ER-OV-06A	(b)	09-May-00	-4.34	11.5	6.86	bailer
95 ER-OV-06A	(a)	06-Nov-00	-8.50	11.7	6.7	bailer
95 Fairbanks Spring	(a)	16-Jun-00	-2.57	11.80	7.07	grab
95 Fairbanks Spring	(a)	06-Nov-00	-7.30	9.40	5.40	grab
95 Fire Hall #2 Well	(a)	05-Dec-00	-7.90	11.10	6.30	pump
95 Last Trail Ranch	(a)	05-Dec-00	-7.00	10.70	6.20	pump
95 Longstreet Casino Well #1	(a)	15-Nov-00	0.20[(c)]	105.0	63.5	pump
95 Longstreet Spring	(a)	16-Jun-00	-1.81	10.60	6.35	grab

(a) Normal sample.
(b) Field duplicate.
(c) Result is from internal screening.

Table 8.2 (Summary of Tritium Results - 2000, cont.)

Area Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Offsite Wells and Springs, cont.						
95 Longstreet Spring	(b)	06-Nov-00	-6.80	11.10	6.40	grab
95 Longstreet Spring	(a)	06-Nov-00	-4.20	10.70	6.20	grab
95 Nye County Well	(b)	02-Mar-00	-0.04	10.60	6.38	pump
95 Nye County Well	(b)	02-Mar-00	128.00	526.00	316.00	pump
95 Nye County Well	(a)	02-Mar-00	141.00	526.00	316.00	pump
95 Nye County Well	(a)	02-Mar-00	3.16	9.96	6.04	pump
95 Peacock Ranch	(a)	07-Nov-00	-2.50	10.20	5.90	grab
95 Peacock Ranch	(b)	07-Nov-00	0.57	9.20	5.40	grab
95 PM-3	(b)	10-Nov-00	-0.25	9.90	5.78	bailer
95 PM-3	(a)	10-Nov-00	-4.69	9.70	5.60	bailer
95 PM-3	(a)	10-Nov-00	1.28	10.00	5.90	bailer
95 Revert Spring	(a)	07-Nov-00	-2.10	10.00	5.90	grab
95 Road D Well	(a)	09-Nov-00	0.26	10.10	5.90	bailer
95 Road D Well	(b)	09-Nov-00	3.40	10.60	6.20	bailer
95 Roger Bright Ranch	(a)	05-Dec-00	-4.70	10.70	6.20	pump
95 School Well	(a)	04-Dec-00	-7.00	11.00	6.30	pump
95 Sod Farm	(a)	06-Dec-00	-6.20	11.50	6.60	pump
95 Spicer Ranch	(a)	04-Dec-00	-15.20	14.30	8.20	grab
95 Spicer Ranch	(b)	04-Dec-00	24.40	11.80	7.40	grab
95 Tolicha Peak	(a)	21-Nov-00	5.60	10.60	6.30	pump
95 Tolicha Peak	(b)	21-Nov-00	3.80	9.00	5.30	pump
95 TW-5	(a)	08-May-00	-2.68	11.20	6.67	bailer
95 U.S. Ecology	(a)	15-Nov-00	0.40	10.70	6.30	pump
95 U.S. Ecology	(b)	15-Nov-00	-0.30	10.40	6.10	pump
95 USW H-1	(a)	21-Jun-00	1.64	12.50	7.49	bailer
95 USW H-1	(a)	22-Jun-00	-0.57	13.40	8.07	bailer
95 USW H-1	(a)	22-Jun-00	2.46	11.90	7.23	bailer
95 USW H-1	(b)	22-Jun-00	2.55	12.60	7.62	bailer

(a) Normal sample.

(b) Field duplicate.

(c) Result is from internal screening.

Table 8.3 Summary of Gross Alpha Results - 2000

Area	Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Onsite Supply Wells							
5	Water Well 5B	(a)	19-Jul-00	5.33	1.63	1.41	pump
5	Water Well 5B	(b)	19-Jul-00	6.15	1.72	1.53	pump
5	Water Well 5B	(a)	25-Oct-00	3.72	0.54	3.71	pump
5	Water Well 5C	(a)	26-Jan-00	14.20	1.56	2.03	pump
5	Water Well 5C	(a)	26-Jan-00	13.60	1.60	2.03	pump
5	Water Well 5C	(a)	19-Apr-00	10.70	1.70	1.86	pump
5	Water Well 5C	(a)	19-Jul-00	7.88	1.75	1.67	pump
5	Water Well 5C	(a)	25-Oct-00	15.50	0.77	4.67	pump
6	Water Well #4	(a)	23-Mar-00	8.57	1.49	1.59	pump
6	Water Well #4	(a)	23-Mar-00	10.50	1.48	1.71	pump
6	Water Well #4	(a)	19-Apr-00	10.80	1.55	1.77	pump
6	Water Well #4	(a)	19-Jul-00	9.01	1.59	1.65	pump
6	Water Well #4	(a)	25-Oct-00	5.02	0.42	2.33	pump
6	Water Well #4A	(a)	26-Jan-00	8.49	1.44	1.58	pump
6	Water Well #4A	(a)	26-Jan-00	10.10	1.44	1.69	pump
6	Water Well #4A	(a)	19-Apr-00	12.60	1.56	1.88	pump
6	Water Well #4A	(a)	19-Jul-00	9.24	1.55	1.64	pump
6	Water Well #4A	(a)	25-Oct-00	7.71	0.64	3.32	pump
6	Water Well C-1	(a)	26-Jan-00	14.20	3.08	3.08	pump
6	Water Well C-1	(a)	26-Jan-00	14.50	3.01	3.07	pump
6	Water Well C-1	(a)	19-Jul-00	7.71	1.90	1.75	pump
6	Water Well C-1	(a)	25-Oct-00	9.76	1.52	4.41	pump
16	UE-16d Eleana Water Well	(a)	26-Jan-00	8.01	1.71	1.72	pump
16	UE-16d Eleana Water Well	(a)	19-Apr-00	6.29	1.74	1.57	pump
16	UE-16d Eleana Water Well	(a)	19-Jul-00	4.19	1.81	1.42	pump
16	UE-16d Eleana Water Well	(a)	25-Oct-00	5.24	1.12	2.36	pump
18	Water Well 8	(a)	26-Jan-00	0.97	1.00	0.67	pump
18	Water Well 8	(a)	26-Jan-00	0.57	0.92	0.57	pump
18	Water Well 8	(a)	19-Apr-00	1.12	0.89	0.61	pump
18	Water Well 8	(a)	19-Jul-00	-0.03	0.85	0.46	pump
18	Water Well 8	(a)	25-Oct-00	0.35	0.43	0.31	pump
18	Water Well 8	(b)	25-Oct-00	0.48	0.39	0.30	pump
22	Army #1 Water Well	(a)	26-Jan-00	5.77	1.53	1.43	pump
22	Army #1 Water Well	(a)	26-Jan-00	4.19	1.50	1.27	pump
22	Army #1 Water Well	(a)	19-Apr-00	5.41	1.64	1.44	pump
22	Army #1 Water Well	(a)	19-Jul-00	3.48	1.65	1.26	pump
22	Army #1 Water Well	(a)	24-Oct-00	3.49	0.74	1.11	pump
25	J-12 Water Well	(a)	26-Jan-00	3.46	1.33	1.11	pump
25	J-12 Water Well	(a)	19-Apr-00	2.08	1.40	1.00	pump
25	J-12 Water Well	(b)	19-Apr-00	2.57	1.29	0.98	pump
25	J-12 Water Well	(a)	25-Jul-00	1.56	1.43	0.96	pump
25	J-12 Water Well	(a)	24-Oct-00	1.01	0.43	0.38	pump
25	J-13 Water Well	(a)	26-Jan-00	3.72	1.33	1.13	pump
25	J-13 Water Well	(a)	25-Jul-00	2.32	1.45	1.04	pump
25	J-13 Water Well	(a)	24-Oct-00	0.91	0.23	0.85	pump
Onsite Monitoring Wells							
3	U-3cn #5	(a)	19-Jul-00	4.53	1.75	1.41	pump
5	RNM #1	(a)	28-Jun-00	7.51	1.55	1.52	pump
7	UE7nS	(a)	07-Jun-00	1.29	1.72	1.09	bailer
17	USGS HTH #1	(a)	12-Jul-00	11.60	1.64	1.84	bailer
23	SM-23-1	(a)	13-Mar-00	3.58	1.68	1.31	pump

(a) Normal sample.
(b) Field duplicate.

Table 8.3 (Summary of Gross Alpha Results - 2000, cont.)

Area Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Offsite Wells and Springs						
95 Amargosa Valley RV Park	(a)	14-Nov-00	0.78	0.50	0.50	pump
95 Ash-B Piezom #1	(a)	09-Nov-00	0.62	0.71	0.71	bailer
95 Ash-B Piezom #2	(a)	14-Nov-00	0.72	0.73	0.73	bailer
95 Barn Well #2-Ponderosa Dairy	(a)	06-Dec-00	2.69	0.63	0.63	pump
95 Beatty Water and Sewer	(a)	04-Dec-00	11.50	1.82	1.82	pump
95 Big Springs	(a)	16-Jun-00	4.32	2.16	2.16	grab
95 Big Springs	(a)	06-Nov-00	3.86	0.80	0.80	grab
95 Cind-R-Lite Mine	(a)	15-Nov-00	1.83	0.40	0.40	pump
95 Cook's Ranch Well #2	(a)	05-Dec-00	0.28	2.71	2.71	pump
95 Crystal Pool	(a)	16-Jun-00	4.68	2.22	2.22	grab
95 Crystal Pool	(a)	06-Nov-00	4.95	0.90	0.90	grab
95 Crystal Trailer Park	(a)	06-Dec-00	3.78	1.59	1.59	pump
95 De Lee Ranch	(a)	05-Dec-00	1.65	0.45	0.45	pump
95 ER-OV-01	(a)	06-Nov-00	14.80	0.89	0.89	bailer
95 ER-OV-02	(a)	07-Nov-00	31.00	0.90	0.90	bailer
95 ER-OV-03A	(a)	07-Nov-00	20.30	1.19	1.19	bailer
95 ER-OV-03A3	(a)	07-Nov-00	9.86	0.97	0.97	bailer
95 ER-OV-03C	(a)	08-Nov-00	6.88	0.73	0.73	bailer
95 ER-OV-03C2	(a)	08-Nov-00	5.94	0.69	0.69	bailer
95 ER-OV-04A	(a)	08-Nov-00	3.93	0.58	0.58	bailer
95 ER-OV-05	(a)	08-Nov-00	3.15	1.34	1.34	bailer
95 ER-OV-06A	(a)	06-Nov-00	7.42	1.41	1.41	bailer
95 Fairbanks Spring	(a)	16-Jun-00	3.72	2.21	2.21	grab
95 Fairbanks Spring	(a)	06-Nov-00	2.01	1.21	1.21	grab
95 Fire Hall #2 Well	(a)	05-Dec-00	2.75	0.84	0.84	pump
95 Last Trail Ranch	(a)	05-Dec-00	11.80	2.82	2.82	pump
95 Longstreet Casino Well #1	(a)	15-Nov-00	1.31	0.96	0.96	pump
95 Longstreet Spring	(a)	16-Jun-00	3.80	2.13	2.13	grab
95 Longstreet Spring	(a)	06-Nov-00	5.26	0.68	0.68	grab
95 NYE County Well	(b)	02-Mar-00	6.77	1.21	1.21	pump
95 NYE County Well	(a)	02-Mar-00	7.03	1.17	1.17	pump
95 Peacock Ranch	(a)	07-Nov-00	4.72	1.93	1.93	grab
95 PM-3	(a)	10-Nov-00	1.21	0.81	0.81	bailer
95 PM-3	(a)	10-Nov-00	0.34	0.46	0.46	bailer
95 Revert Spring	(a)	07-Nov-00	4.66	0.55	0.55	grab
95 Road D Well	(a)	09-Nov-00	3.72	0.77	0.77	bailer
95 Roger Bright Ranch	(a)	05-Dec-00	6.28	1.78	1.78	pump
95 School Well	(a)	04-Dec-00	1.82	0.54	0.54	pump
95 Sod Farm	(a)	06-Dec-00	1.11	0.32	0.32	pump
95 Spicer Ranch	(a)	07-Nov-00	9.16	0.578	3.8	grab
95 Tolicha Peak	(a)	21-Nov-00	3.38	2.05	2.05	pump
95 TW-5	(a)	08-May-00	12.40	3.17	3.17	bailer
95 U.S. Ecology	(a)	15-Nov-00	7.13	1.29	1.29	pump
95 USW H-1	(a)	22-Jun-00	4.40	1.33	1.33	bailer
95 USW H-1	(a)	22-Jun-00	3.68	8.17	8.17	bailer
95 USW H-1	(a)	21-Jun-00	-0.30	4.36	4.36	bailer

(a) Normal sample.

(b) Field duplicate.

Table 8.4 Summary of Gross Beta Results - 2000

Area Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Onsite Supply Wells						
5 Water Well 5B	(a)	19-Jul-00	11.50	1.21	1.00	pump
5 Water Well 5B	(b)	19-Jul-00	13.30	1.27	1.07	pump
5 Water Well 5B	(a)	25-Oct-00	11.20	1.40	1.46	pump
5 Water Well 5C	(a)	26-Jan-00	7.71	1.28	0.96	pump
5 Water Well 5C	(a)	26-Jan-00	6.74	1.28	0.93	pump
5 Water Well 5C	(a)	19-Apr-00	7.04	1.26	0.93	pump
5 Water Well 5C	(a)	19-Jul-00	7.39	1.26	0.94	pump
5 Water Well 5C	(a)	25-Oct-00	8.10	1.38	1.34	pump
6 Water Well #4	(a)	23-Mar-00	7.80	1.25	0.94	pump
6 Water Well #4	(a)	23-Mar-00	7.32	1.24	0.92	pump
6 Water Well #4	(a)	19-Apr-00	6.28	1.28	0.92	pump
6 Water Well #4	(a)	19-Jul-00	4.92	1.24	0.87	pump
6 Water Well #4	(a)	25-Oct-00	6.30	0.50	0.51	pump
6 Water Well #4A	(a)	26-Jan-00	6.67	1.27	0.93	pump
6 Water Well #4A	(a)	26-Jan-00	6.62	1.27	0.93	pump
6 Water Well #4A	(a)	19-Apr-00	6.80	1.28	0.93	pump
6 Water Well #4A	(a)	19-Jul-00	5.51	1.24	0.88	pump
6 Water Well #4A	(a)	25-Oct-00	6.88	1.10	1.10	pump
6 Water Well C-1	(a)	26-Jan-00	15.20	2.55	1.90	pump
6 Water Well C-1	(a)	26-Jan-00	16.30	2.51	1.91	pump
6 Water Well C-1	(a)	19-Jul-00	15.20	1.23	1.09	pump
6 Water Well C-1	(a)	25-Oct-00	11.30	2.20	2.29	pump
16 UE-16d Eleana Water Well	(a)	26-Jan-00	7.05	1.28	0.95	pump
16 UE-16d Eleana Water Well	(a)	19-Apr-00	6.83	1.27	0.93	pump
16 UE-16d Eleana Water Well	(a)	19-Jul-00	6.90	1.27	0.93	pump
16 UE-16d Eleana Water Well	(a)	25-Oct-00	7.29	1.68	1.55	pump
18 Water Well 8	(a)	26-Jan-00	3.26	1.26	0.84	pump
18 Water Well 8	(a)	26-Jan-00	3.13	1.26	0.83	pump
18 Water Well 8	(a)	19-Apr-00	3.13	1.24	0.82	pump
18 Water Well 8	(a)	19-Jul-00	1.07	1.23	0.76	pump
18 Water Well 8	(a)	25-Oct-00	2.64	0.53	0.46	pump
18 Water Well 8	(b)	25-Oct-00	3.37	0.57	0.48	pump
22 Army #1 Water Well	(a)	26-Jan-00	4.94	1.28	0.89	pump
22 Army #1 Water Well	(a)	26-Jan-00	5.31	1.25	0.88	pump
22 Army #1 Water Well	(a)	19-Apr-00	4.22	1.26	0.86	pump
22 Army #1 Water Well	(a)	19-Jul-00	5.89	1.21	0.87	pump
22 Army #1 Water Well	(a)	24-Oct-00	5.40	1.11	0.86	pump
25 J-12 Water Well	(a)	26-Jan-00	4.67	1.27	0.87	pump
25 J-12 Water Well	(a)	19-Apr-00	3.85	1.24	0.84	pump
25 J-12 Water Well	(b)	19-Apr-00	4.62	1.26	0.87	pump
25 J-12 Water Well	(a)	25-Jul-00	4.78	1.18	0.83	pump
25 J-12 Water Well	(a)	24-Oct-00	4.14	0.49	0.43	pump
25 J-13 Water Well	(a)	26-Jan-00	3.97	1.27	0.86	pump
25 J-13 Water Well	(a)	25-Jul-00	3.88	1.20	0.82	pump
25 J-13 Water Well	(a)	24-Oct-00	3.65	0.41	0.36	pump
Onsite Monitoring Wells						
3 U-3cn #5	(a)	19-Jul-00	10.10	1.24	0.99	pump
5 RNM #1	(a)	28-Jun-00	24.60	1.22	1.25	pump
7 UE7nS	(a)	07-Jun-00	3.45	1.39	0.92	bailer
17 USGS HTH #1	(a)	12-Jul-00	9.12	1.26	0.99	bailer
23 SM-23-1	(a)	13-Mar-00	7.22	1.28	0.95	pump

(a) Normal sample.
(b) Field duplicate.

Table 8.4 (Summary of Gross Beta Results - 2000, cont.)

Area	Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Offsite Wells and Springs							
95	Amargosa Valley RV Park	(a)	14-Nov-00	1.78	1.04	0.67	pump
95	Ash-B Piezom #1	(a)	09-Nov-00	5.48	1.03	0.84	bailer
95	Ash-B Piezom #2	(a)	14-Nov-00	7.64	0.984	0.94	bailer
95	Barn Well #2-Ponderosa Dairy	(a)	06-Dec-00	11.10	0.73	1.14	pump
95	Beatty Water and Sewer	(a)	04-Dec-00	15.70	2.55	3.52	pump
95	Big Springs	(a)	16-Jun-00	9.15	1.55	1.15	grab
95	Big Springs	(a)	06-Nov-00	7.74	1.13	0.99	grab
95	Cind-R-Lite Mine	(a)	15-Nov-00	3.33	0.523	0.42	pump
95	Cook's Ranch Well #2	(a)	05-Dec-00	9.18	2.58	2.50	pump
95	Crystal Pool	(a)	16-Jun-00	10.60	1.63	1.23	grab
95	Crystal Pool	(a)	06-Nov-00	10.60	0.985	1.11	grab
95	Crystal Trailer Park	(a)	06-Dec-00	7.09	1.80	1.56	pump
95	De Lee Ranch	(a)	05-Dec-00	6.99	0.75	2.76	pump
95	ER-OV-01	(a)	06-Nov-00	9.40	1.13	1.32	bailer
95	ER-OV-02	(a)	07-Nov-00	17.00	1.05	4.58	bailer
95	ER-OV-03A	(a)	07-Nov-00	13.80	2.17	2.62	bailer
95	ER-OV-03A3	(a)	07-Nov-00	8.27	1.08	2.33	bailer
95	ER-OV-03C	(a)	08-Nov-00	2.94	0.975	0.68	bailer
95	ER-OV-03C2	(a)	08-Nov-00	3.78	1.01	0.74	bailer
95	ER-OV-04A	(a)	08-Nov-00	7.93	0.980	0.94	bailer
95	ER-OV-05	(a)	08-Nov-00	11.40	1.08	1.18	bailer
95	ER-OV-06A	(a)	06-Nov-00	10.60	2.43	2.42	bailer
95	Fairbanks Spring	(a)	16-Jun-00	8.61	1.61	1.18	grab
95	Fairbanks Spring	(a)	06-Nov-00	8.41	1.34	1.47	grab
95	Fire Hall #2 Well	(a)	05-Dec-00	13.80	1.48	4.39	pump
95	Last Trail Ranch	(a)	05-Dec-00	13.40	4.81	1.83	pump
95	Longstreet Casino Well #1	(a)	15-Nov-00	7.98	1.10	1.23	pump
95	Longstreet Spring	(a)	16-Jun-00	8.02	1.55	1.13	grab
95	Longstreet Spring	(a)	06-Nov-00	7.94	1.16	1.38	grab
95	Nye County Well	(b)	02-Mar-00	6.16	1.14	0.84	pump
95	Nye County Well	(a)	02-Mar-00	6.51	1.14	0.84	pump
95	Peacock Ranch	(a)	07-Nov-00	10.10	2.37	2.19	grab
95	PM-3	(a)	10-Nov-00	13.50	1.13	1.81	bailer
95	PM-3	(a)	10-Nov-00	1.41	0.962	0.61	bailer
95	Revert Spring	(a)	07-Nov-00	5.59	0.990	0.82	grab
95	Road D Well	(a)	09-Nov-00	9.47	1.04	1.05	bailer
95	Roger Bright Ranch	(a)	05-Dec-00	14.30	3.91	1.94	pump
95	School Well	(a)	04-Dec-00	8.34	0.80	1.01	pump
95	Sod Farm	(a)	06-Dec-00	6.94	0.77	0.94	pump
95	Spicer Ranch	(a)	07-Nov-00	5.63	1.06	0.854	grab
95	Tolicha Peak	(a)	21-Nov-00	9.93	4.32	3.82	pump
95	TW-5	(a)	08-May-00	20.00	2.45	1.95	bailer
95	U.S. Ecology	(a)	15-Nov-00	7.92	2.12	1.76	pump
95	USW H-1	(a)	22-Jun-00	2.95	1.27	0.84	bailer
95	USW H-1	(a)	22-Jun-00	16.50	5.37	3.63	bailer
95	USW H-1	(a)	21-Jun-00	0.38	2.93	1.75	bailer

(a) Normal sample.
(b) Field duplicate.

Table 8.5 Summary of Gamma Results - 2000

Area Location	Sample Type	Date Sampled	Result (pCi/L)	Analyte	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Offsite Wells and Springs							
95 Big Springs	(a)	06-Nov-00	6.76	Lead-212	5.76	6.35	grab
95 Big Springs	(a)	06-Nov-00	6.76	Lead-212	5.76	6.35	grab
95 ER-OV-03A3	(a)	07-Nov-00	10.1	Lead-212	6.53	8.27	bailer
95 ER-OV-03A3	(a)	07-Nov-00	63.2	Potassium-40	56.3	43.4	bailer
95 ER-OV-03A3	(a)	07-Nov-00	10.1	Lead-212	6.53	8.27	bailer
95 ER-OV-06A	(a)	06-Nov-00	32.9	Potassium-40	30.6	39.6	bailer
95 Last Trail Ranch	(a)	05-Dec-00	47.7	Potassium-40	30	43.9	pump
95 Longstreet Casino Well #1	(a)	15-Nov-00	7.73	Lead-212	5.75	6.32	pump
95 Longstreet Casino Well #1	(a)	15-Nov-00	7.73	Lead-212	5.75	6.32	pump
95 Nye County Well	(b)	02-Mar-00	39.4	Bismuth-214	6.64	8.16	pump
95 Nye County Well	(a)	02-Mar-00	22.7	Bismuth-214	6.66	6.13	pump
95 Nye County Well	(b)	02-Mar-00	34.5	Lead-214	11.6	8.69	pump
95 Nye County Well	(a)	02-Mar-00	27.5	Lead-214	9.96	7.81	pump
95 Peacock Ranch	(a)	07-Nov-00	60.2	Potassium-40	18.8	35.4	grab
95 PM-3	(a)	10-Nov-00	47.4	Potassium-40	34.1	30.4	bailer
95 School Well	(a)	04-Dec-00	52.1	Potassium-40	32.6	29.1	pump
95 Spicer Ranch	(a)	07-Nov-00	195	Thorium-234	147	153	grab
95 Spicer Ranch	(a)	07-Nov-00	195	Uranium-238	147	153	grab

(a) Normal sample.

(b) Field duplicate.

Table 8.6 Summary of ^{226}Ra Results - 2000

Area Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Supply Wells						
5 Water Well 5B	(a)	25-Oct-00	0.37	0.34	0.27	pump
5 Water Well 5B	(a)	19-Jul-00	-0.01	0.15	0.06	pump
5 Water Well 5B	(b)	19-Jul-00	0.01	0.11	0.04	pump
5 Water Well 5C	(a)	26-Jan-00	0.18	0.12	0.11	pump
5 Water Well 5C	(a)	25-Oct-00	0.16	0.57	0.32	pump
5 Water Well 5C	(a)	19-Jul-00	-0.02	0.19	0.08	pump
5 Water Well 5C	(a)	19-Apr-00	0.04	0.14	0.08	pump
6 Water Well #4	(a)	25-Oct-00	0.06	0.42	0.22	pump
6 Water Well #4	(a)	23-Mar-00	0.12	0.17	0.12	pump
6 Water Well #4	(a)	19-Jul-00	0.02	0.15	0.07	pump
6 Water Well #4	(a)	19-Apr-00	0.05	0.20	0.11	pump
6 Water Well #4A	(a)	26-Jan-00	0.31	0.11	0.14	pump
6 Water Well #4A	(a)	25-Oct-00	0.11	0.29	0.17	pump
6 Water Well #4A	(a)	19-Jul-00	0.05	0.20	0.11	pump
6 Water Well #4A	(a)	19-Apr-00	0.13	0.16	0.11	pump
6 Water Well C-1	(a)	26-Jan-00	1.00	0.19	0.25	pump
6 Water Well C-1	(a)	25-Oct-00	1.31	0.60	0.55	pump
6 Water Well C-1	(a)	19-Jul-00	1.30	0.19	0.30	pump
16 UE-16d Eleana Water Well	(a)	26-Jan-00	1.45	0.18	0.29	pump
16 UE-16d Eleana Water Well	(a)	25-Oct-00	0.04	0.56	0.28	pump
16 UE-16d Eleana Water Well	(a)	19-Jul-00	1.53	0.16	0.31	pump
16 UE-16d Eleana Water Well	(a)	19-Apr-00	0.76	0.15	0.23	pump
18 Water Well 8	(a)	26-Jan-00	0.12	0.14	0.10	pump
18 Water Well 8	(a)	25-Oct-00	1.07	0.41	0.46	pump
18 Water Well 8	(b)	25-Oct-00	0.22	0.44	0.27	pump
18 Water Well 8	(a)	19-Jul-00	0.02	0.18	0.08	pump
18 Water Well 8	(a)	19-Apr-00	0.05	0.10	0.06	pump
22 Army #1 Water Well	(a)	26-Jan-00	0.64	0.15	0.21	pump
22 Army #1 Water Well	(a)	24-Oct-00	5.97	1.09	1.81	pump
22 Army #1 Water Well	(a)	19-Jul-00	0.47	0.12	0.18	pump
22 Army #1 Water Well	(a)	19-Apr-00	0.24	0.21	0.16	pump
25 J-12 Water Well	(a)	26-Jan-00	0.01	0.14	0.06	pump
25 J-12 Water Well	(a)	25-Jul-00	0.03	0.14	0.07	pump
25 J-12 Water Well	(a)	24-Oct-00	0.21	0.50	0.30	pump
25 J-12 Water Well	(a)	19-Apr-00	0.07	0.11	0.07	pump
25 J-12 Water Well	(b)	19-Apr-00	0.23	0.10	0.12	pump
25 J-13 Water Well	(a)	26-Jan-00	-0.06	0.19	0.07	pump
25 J-13 Water Well	(a)	25-Jul-00	0.01	0.16	0.07	pump

(a) Normal sample.
(b) Field duplicate.

Table 8.6 (Summary of ^{226}Ra Results - 2000, cont.)

Area	Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Onsite Monitoring Wells							
3	U-3cn #5	(a)	19-Jul-00	1.61	.158	.298	pump
5	RNM #1	(a)	28-Jun-00	-0.147	.163	.0657	pump
7	UE7nS	(a)	07-Jun-00	0.21	0.14	0.12	bailer
17	USGS HTH #1	(a)	12-Jul-00	0.31	0.14	0.16	bailer
23	SM-23-1	(a)	13-Mar-00	0.30	0.20	0.17	pump
Offsite Wells and Springs							
95	Amargosa Valley RV Park	(a)	14-Nov-00	0.59	0.43	0.40	pump
95	Barn Well #2-Ponderosa Dairy	(a)	06-Dec-00	0.79	0.50	0.44	pump
95	Beatty Water and Sewer	(a)	04-Dec-00	0.17	0.45	0.26	pump
95	Big Springs	(a)	16-Jun-00	0.15	0.15	0.11	grab
95	Big Springs	(a)	06-Nov-00	0.68	0.51	0.39	grab
95	Cind-R-Lite Mine	(a)	15-Nov-00	0.41	0.59	0.39	pump
95	Cook's Ranch Well #2	(a)	05-Dec-00	0.80	0.14	0.39	pump
95	Crystal Pool	(a)	16-Jun-00	0.46	0.15	0.17	grab
95	Crystal Pool	(a)	06-Nov-00	0.16	0.08	0.14	grab
95	Crystal Trailer Park	(a)	06-Dec-00	-0.10	0.58	0.23	pump
95	De Lee Ranch	(a)	05-Dec-00	1.18	0.67	0.56	pump
95	Fairbanks Spring	(a)	16-Jun-00	0.34	0.15	0.16	grab
95	Fairbanks Spring	(a)	06-Nov-00	0.19	0.54	0.31	grab
95	Fire Hall #2 Well	(a)	05-Dec-00	1.79	0.76	0.73	pump
95	Last Trail Ranch	(a)	05-Dec-00	0.64	0.64	0.45	pump
95	Longstreet Casino Well #1	(a)	15-Nov-00	0.65	1.01	0.65	pump
95	Longstreet Spring	(a)	16-Jun-00	0.30	0.13	0.15	grab
95	Longstreet Spring	(a)	06-Nov-00	0.06	0.28	0.15	grab
95	Peacock Ranch	(a)	07-Nov-00	-0.19	0.45	0.15	grab
95	Revert Spring	(a)	07-Nov-00	-0.09	0.44	0.18	grab
95	Road D Well	(a)	09-Nov-00	0.79	0.62	0.47	bailer
95	Roger Bright Ranch	(a)	05-Dec-00	1.08	0.47	0.48	pump
95	School Well	(a)	04-Dec-00	0.35	0.69	0.42	pump
95	Sod Farm	(a)	06-Dec-00	0.05	0.66	0.33	pump
95	Spicer Ranch	(a)	07-Nov-00	0.4	0.524	0.351	grab
95	Tolicha Peak	(a)	21-Nov-00	0.49	0.84	0.53	pump
95	TW-5	(a)	08-May-00	0.73	0.33	0.38	bailer
95	U.S. Ecology	(a)	15-Nov-00	-0.05	0.64	0.30	pump
95	USW H-1	(a)	22-Jun-00	0.91	0.17	0.25	bailer
95	USW H-1	(a)	22-Jun-00	0.04	0.17	0.09	bailer
95	USW H-1	(a)	21-Jun-00	0.03	0.16	0.08	bailer

(a) Normal sample.

(b) Field duplicate.

Table 8.7 Summary of ^{228}Ra Results - 2000

Area Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Onsite Supply Wells						
5 Water Well 5B	(a)	25-Oct-00	0.91	1.95	1.17	pump
5 Water Well 5B	(a)	19-Jul-00	0.12	0.16	0.16	pump
5 Water Well 5B	(b)	19-Jul-00	-0.18	0.98	0.46	pump
5 Water Well 5C	(a)	25-Oct-00	1.12	1.61	0.99	pump
5 Water Well 5C	(a)	19-Jul-00	0.06	1.03	0.54	pump
5 Water Well 5C	(a)	19-Apr-00	0.11	0.64	0.34	pump
5 Water Well 5C	(a)	26-Jan-00	0.31	1.12	0.65	pump
6 Water Well #4	(a)	25-Oct-00	1.26	1.72	1.06	pump
6 Water Well #4	(a)	19-Jul-00	0.51	0.77	0.51	pump
6 Water Well #4	(a)	19-Apr-00	0.06	1.21	0.65	pump
6 Water Well #4	(a)	23-Mar-00	0.51	2.18	1.28	pump
6 Water Well #4A	(a)	25-Oct-00	0.82	1.87	1.12	pump
6 Water Well #4A	(a)	19-Jul-00	0.25	0.75	0.43	pump
6 Water Well #4A	(a)	19-Apr-00	0.27	0.65	0.39	pump
6 Water Well #4A	(a)	26-Jan-00	0.39	0.93	0.56	pump
6 Water Well C-1	(a)	25-Oct-00	0.81	1.68	1.01	pump
6 Water Well C-1	(a)	19-Jul-00	0.54	0.72	0.49	pump
6 Water Well C-1	(a)	26-Jan-00	0.93	0.91	0.65	pump
16 UE-16d Eleana Water Well	(a)	25-Oct-00	0.76	1.66	1.00	pump
16 UE-16d Eleana Water Well	(a)	19-Jul-00	0.45	0.67	0.45	pump
16 UE-16d Eleana Water Well	(a)	19-Apr-00	0.20	1.09	0.60	pump
16 UE-16d Eleana Water Well	(a)	26-Jan-00	-0.05	0.91	0.45	pump
18 Water Well 8	(a)	25-Oct-00	0.01	1.69	0.96	pump
18 Water Well 8	(b)	25-Oct-00	-0.01	1.38	0.78	pump
18 Water Well 8	(a)	19-Jul-00	0.07	1.27	0.67	pump
18 Water Well 8	(a)	19-Apr-00	0.20	0.13	0.20	pump
18 Water Well 8	(a)	26-Jan-00	0.06	0.82	0.41	pump
22 Army #1 Water Well	(a)	24-Oct-00	2.00	1.77	1.15	pump
22 Army #1 Water Well	(a)	19-Jul-00	0.56	1.04	0.64	pump
22 Army #1 Water Well	(a)	19-Apr-00	0.18	0.71	0.39	pump
22 Army #1 Water Well	(a)	26-Jan-00	0.30	1.08	0.62	pump
25 J-12 Water Well	(a)	24-Oct-00	1.26	1.58	0.99	pump
25 J-12 Water Well	(a)	25-Jul-00	0.26	0.69	0.41	pump
25 J-12 Water Well	(a)	19-Apr-00	0.35	0.75	0.46	pump
25 J-12 Water Well	(b)	19-Apr-00	0.24	0.58	0.35	pump
25 J-12 Water Well	(a)	26-Jan-00	0.22	0.78	0.44	pump
25 J-13 Water Well	(a)	24-Oct-00	0.30	1.51	0.88	pump
25 J-13 Water Well	(a)	25-Jul-00	0.29	0.16	0.26	pump
25 J-13 Water Well	(a)	26-Jan-00	0.28	0.15	0.25	pump

(a) Normal sample.
(b) Field duplicate.

Table 8.7 (Summary of ^{228}Ra Results - 2000, cont.)

Area	Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Onsite Monitoring Wells							
3	U-3cn #5	(a)	19-Jul-00	1.27	0.66	0.62	pump
5	RNM #1	(a)	28-Jun-00	0.06	0.78	0.39	pump
7	UE7nS	(a)	07-Jun-00	0.05	0.62	0.31	bailer
17	USGS HTH #1	(a)	12-Jul-00	0.22	0.20	0.25	bailer
23	SM-23-1	(a)	13-Mar-00	-0.06	2.24	1.27	pump
Offsite Wells and Springs							
95	Amargosa Valley RV Park	(a)	14-Nov-00	0.43	1.34	0.79	pump
95	Barn Well #2-Ponderosa Dairy	(a)	06-Dec-00	0.07	1.35	0.78	pump
95	Beatty Water and Sewer	(a)	04-Dec-00	-0.17	1.03	0.58	pump
95	Big Springs	(a)	06-Nov-00	0.00	1.14	0.66	grab
95	Big Springs	(a)	16-Jun-00	0.58	0.64	0.46	grab
95	Cind-R-Lite Mine	(a)	15-Nov-00	0.21	2.19	1.28	pump
95	Cook's Ranch Well #2	(a)	05-Dec-00	0.32	1.01	0.60	pump
95	Crystal Pool	(a)	06-Nov-00	-0.06	1.53	0.89	grab
95	Crystal Pool	(a)	16-Jun-00	0.21	1.07	0.60	grab
95	Crystal Trailer Park	(a)	06-Dec-00	0.69	0.83	0.52	pump
95	De Lee Ranch	(a)	05-Dec-00	0.61	1.19	0.72	pump
95	Fairbanks Spring	(a)	06-Nov-00	0.17	1.14	0.66	grab
95	Fairbanks Spring	(a)	16-Jun-00	0.11	0.95	0.51	grab
95	Fire Hall #2 Well	(a)	05-Dec-00	0.02	1.02	0.59	pump
95	Last Trail Ranch	(a)	05-Dec-00	0.67	1.10	0.67	pump
95	Longstreet Casino Well #1	(a)	15-Nov-00	-0.73	1.08	0.61	pump
95	Longstreet Spring	(a)	06-Nov-00	0.09	1.13	0.66	grab
95	Longstreet Spring	(a)	16-Jun-00	0.53	1.10	0.67	grab
95	Peacock Ranch	(a)	07-Nov-00	-1.40	1.49	0.86	grab
95	Revert Spring	(a)	07-Nov-00	0.12	1.30	0.76	grab
95	Road D Well	(a)	09-Nov-00	0.35	1.40	0.83	bailer
95	Roger Bright Ranch	(a)	05-Dec-00	1.46	0.91	0.67	pump
95	School Well	(a)	04-Dec-00	-0.02	0.99	0.57	pump
95	Sod Farm	(a)	06-Dec-00	0.40	1.28	0.76	pump
95	Spicer Ranch	(a)	07-Nov-00	-0.24	1.43	0.825	grab
95	Tolicha Peak	(a)	21-Nov-00	0.95	1.80	1.09	pump
95	TW-5	(a)	08-May-00	0.65	1.40	0.86	bailer
95	U.S. Ecology	(a)	15-Nov-00	1.34	3.02	1.81	pump
95	USW H-1	(a)	22-Jun-00	0.59	0.71	0.50	bailer
95	USW H-1	(a)	22-Jun-00	0.35	1.04	0.60	bailer
95	USW H-1	(a)	21-Jun-00	0.36	0.72	0.45	bailer

(a) Normal sample.
(b) Field duplicate.

Table 8.8 Summary of ^{238}Pu Results - 2000

Area	Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Onsite Supply Wells							
5	Water Well 5B	(a)	19-Jul-00	-0.0011	0.013	0.0029	pump
5	Water Well 5B	(b)	19-Jul-00	-0.0015	0.017	0.0040	pump
5	Water Well 5C	(a)	19-Jul-00	-0.0011	0.014	0.0031	pump
6	Water Well #4	(a)	19-Jul-00	0.0011	0.017	0.0064	pump
6	Water Well #4A	(a)	19-Jul-00	-0.0011	0.014	0.0031	pump
6	Water Well C-1	(a)	19-Jul-00	-0.0011	0.013	0.0031	pump
16	UE-16d Eleana Water Well	(a)	19-Jul-00	-0.0012	0.015	0.0033	pump
18	Water Well 8	(a)	19-Jul-00	0.0011	0.015	0.0057	pump
22	Army #1 Water Well	(a)	19-Jul-00	0.0010	0.014	0.0054	pump
25	J-12 Water Well	(a)	25-Jul-00	-0.0011	0.014	0.0031	pump
25	J-13 Water Well	(a)	25-Jul-00	-0.0012	0.015	0.0034	pump
Onsite Monitoring Wells							
3	U-3cn #5	(a)	19-Jul-00	-0.0011	0.014	0.0031	pump
5	RNM #1	(a)	28-Jun-00	-0.0011	0.014	0.0031	pump
7	UE7nS	(a)	07-Jun-00	-0.0021	0.025	0.0058	bailer
17	USGS HTH #1	(a)	12-Jul-00	-0.0011	0.013	0.0029	bailer
Offsite Wells and Springs							
95	Amargosa Valley RV Park	(a)	14-Nov-00	-0.0071	0.039	0.0098	pump
95	Ash-B Piezom #1	(a)	09-Nov-00	0.0084	0.036	0.0166	bailer
95	Ash-B Piezom #2	(a)	14-Nov-00	0.0000	0.012	0.0000	bailer
95	Barn Well #2-Ponderosa Dairy	(a)	06-Dec-00	0.0047	0.014	0.0093	pump
95	Beatty Water and Sewer	(a)	04-Dec-00	0.0038	0.059	0.0292	pump
95	Big Springs	(a)	16-Jun-00	0.0011	0.016	0.0062	grab
95	Big Springs	(a)	06-Nov-00	0.0035	0.034	0.0155	grab
95	Cind-R-Lite Mine	(a)	15-Nov-00	0.0069	0.021	0.0136	pump
95	Cook's Ranch Well #2	(a)	05-Dec-00	0.0000	0.028	0.0102	pump
95	Crystal Pool	(a)	16-Jun-00	0.0035	0.016	0.0079	grab
95	Crystal Pool	(a)	06-Nov-00	0.0059	0.018	0.0116	grab
95	Crystal Trailer Park	(a)	06-Dec-00	0.0467	0.0286	0.029	pump
95	De Lee Ranch	(a)	05-Dec-00	-0.0046	0.036	0.0091	pump
95	ER-OV-01	(a)	06-Nov-00	-0.0007	0.044	0.0166	bailer
95	ER-OV-02	(a)	07-Nov-00	0.0626	0.043	0.0383	bailer

(a) Normal sample.

(b) Field duplicate.

Table 8.8 (Summary of ^{238}Pu Results - 2000, cont.)

Area	Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Offsite Wells and Springs, cont.							
95	ER-OV-03A	(a)	07-Nov-00	-0.0049	0.060	0.0219	bailer
95	ER-OV-03A3	(a)	07-Nov-00	0.0014	0.035	0.0120	bailer
95	ER-OV-03C	(a)	08-Nov-00	0.0067	0.020	0.0130	bailer
95	ER-OV-03C2	(a)	08-Nov-00	0.0125	0.013	0.0141	bailer
95	ER-OV-04A	(a)	08-Nov-00	-0.0033	0.058	0.0281	bailer
95	ER-OV-05	(a)	08-Nov-00	0.0118	0.012	0.0133	bailer
95	ER-OV-06A	(a)	06-Nov-00	0.0050	0.015	0.0097	bailer
95	Fairbanks Spring	(a)	16-Jun-00	0.0009	0.013	0.0051	grab
95	Fairbanks Spring	(a)	06-Nov-00	0.0014	0.034	0.0117	grab
95	Fire Hall #2 Well	(a)	05-Dec-00	-0.0072	0.035	0.0100	pump
95	Last Trail Ranch	(a)	05-Dec-00	-0.0042	0.040	0.0142	pump
95	Longstreet Casino Well #1	(a)	15-Nov-00	-0.0064	0.035	0.0089	pump
95	Longstreet Spring	(a)	16-Jun-00	-0.0014	0.016	0.0037	grab
95	Longstreet Spring	(a)	06-Nov-00	-0.0070	0.041	0.0096	grab
95	Nye County Well	(b)	02-Mar-00	-0.0014	0.017	0.0038	pump
95	Nye County Well	(a)	02-Mar-00	-0.0012	0.014	0.0032	pump
95	Peacock Ranch	(a)	07-Nov-00	0.0000	0.022	0.0000	grab
95	PM-3	(a)	10-Nov-00	0.0037	0.029	0.0127	bailer
95	PM-3	(a)	10-Nov-00	0.0235	0.018	0.0231	bailer
95	Revert Spring	(a)	07-Nov-00	0.0000	0.015	0.0000	grab
95	Road D Well	(a)	09-Nov-00	0.0111	0.011	0.0126	bailer
95	Roger Bright Ranch	(a)	05-Dec-00	0.0040	0.012	0.0078	pump
95	School Well	(a)	04-Dec-00	0.0036	0.035	0.0159	pump
95	Sod Farm	(a)	06-Dec-00	-0.0119	0.044	0.0135	pump
95	Spicer Ranch	(a)	07-Nov-00	0.0162	0.0244	0.0225	grab
95	Tolicha Peak	(a)	21-Nov-00	0.0408	0.042	0.0315	pump
95	TW-5	(a)	08-May-00	-0.0013	0.016	0.0035	bailer
95	U.S. Ecology	(a)	15-Nov-00	0.0000	0.017	0.0000	pump
95	USW H-1	(a)	22-Jun-00	-0.0011	0.013	0.0030	bailer
95	USW H-1	(a)	22-Jun-00	-0.0020	0.024	0.0056	bailer
95	USW H-1	(a)	21-Jun-00	-0.0011	0.014	0.0031	bailer

(a) Normal sample.

(b) Field duplicate.

Table 8.9 Summary of $^{239+240}$Pu Results - 2000

Area	Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Supply Wells							
5	Water Well 5B	(a)	19-Jul-00	0.0026	0.0141	0.0067	pump
5	Water Well 5B	(b)	19-Jul-00	0.0008	0.0183	0.0069	pump
5	Water Well 5C	(a)	19-Jul-00	0.0027	0.0150	0.0071	pump
6	Water Well #4	(a)	19-Jul-00	-0.0018	0.0175	0.0043	pump
6	Water Well #4A	(a)	19-Jul-00	0.0049	0.0149	0.0083	pump
6	Water Well C-1	(a)	19-Jul-00	0.0173	0.0146	0.0131	pump
16	UE-16d Eleana Water Well	(a)	19-Jul-00	0.0075	0.0159	0.0099	pump
18	Water Well 8	(a)	19-Jul-00	-0.0017	0.0162	0.0040	pump
22	Army #1 Water Well	(a)	19-Jul-00	-0.0016	0.0153	0.0037	pump
25	J-12 Water Well	(a)	25-Jul-00	0.0049	0.0150	0.0083	pump
25	J-13 Water Well	(a)	25-Jul-00	0.0098	0.0160	0.0110	pump
Onsite Monitoring Wells							
3	U-3cn #5	(a)	19-Jul-00	-0.0016	0.0149	0.0037	pump
5	RNM #1	(a)	28-Jun-00	0.0091	0.0148	0.0102	pump
7	UE7nS	(a)	07-Jun-00	0.0010	0.0275	0.0103	bailer
17	USGS HTH #1	(a)	12-Jul-00	0.0065	0.0139	0.0087	bailer
Offsite Wells And Springs							
95	Amargosa Valley RV Park	(a)	14-Nov-00	0.0130	0.0130	0.0148	pump
95	Ash-B Piezom #1	(a)	09-Nov-00	0.0169	0.0169	0.0192	bailer
95	Ash-B Piezom #2	(a)	14-Nov-00	0.0000	0.0114	0.0000	bailer
95	Barn Well #2-Ponderosa Dairy	(a)	06-Dec-00	-0.0095	0.0582	0.0227	pump
95	Beatty Water and Sewer	(a)	04-Dec-00	0.0077	0.0115	0.0107	pump
95	Big Springs	(a)	16-Jun-00	0.0031	0.0173	0.0082	grab
95	Big Springs	(a)	06-Nov-00	0.0141	0.0106	0.0139	grab
95	Cind-R-Lite Mine	(a)	15-Nov-00	0.0069	0.0207	0.0136	pump
95	Cook's Ranch Well #2	(a)	05-Dec-00	-0.0037	0.0281	0.0072	pump
95	Crystal Pool	(a)	16-Jun-00	-0.0018	0.0172	0.0043	grab
95	Crystal Pool	(a)	06-Nov-00	0.0059	0.0177	0.0116	grab
95	Crystal Trailer Park	(a)	06-Dec-00	0.0074	0.0284	0.0146	pump
95	De Lee Ranch	(a)	05-Dec-00	0.0000	0.0139	0.0000	pump
95	ER-OV-01	(a)	06-Nov-00	0.0160	0.0386	0.0218	bailer
95	ER-OV-02	(a)	07-Nov-00	0.0028	0.0427	0.0170	bailer

(a) Normal sample.

(b) Field duplicate.

Table 8.9 (Summary of $^{239+240}$Pu Results - 2000, cont.)

Area Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Offsite Wells And Springs, cont.						
95 ER-OV-03A	(a)	07-Nov-00	-0.0104	0.0604	0.0191	bailer
95 ER-OV-03A3	(a)	07-Nov-00	0.0064	0.0345	0.0155	bailer
95 ER-OV-03C	(a)	08-Nov-00	-0.0096	0.0570	0.0133	bailer
95 ER-OV-03C2	(a)	08-Nov-00	0.0008	0.0299	0.0105	bailer
95 ER-OV-04A	(a)	08-Nov-00	0.0033	0.0251	0.0111	bailer
95 ER-OV-05	(a)	08-Nov-00	0.0000	0.0118	0.0000	bailer
95 ER-OV-06A	(a)	06-Nov-00	0.0099	0.0149	0.0138	bailer
95 Fairbanks Spring	(a)	16-Jun-00	-0.0015	0.0144	0.0036	grab
95 Fairbanks Spring	(a)	06-Nov-00	0.0048	0.0145	0.0095	grab
95 Fire Hall #2 Well	(a)	05-Dec-00	-0.0072	0.0346	0.0100	pump
95 Last Trail Ranch	(a)	05-Dec-00	0.0125	0.0125	0.0142	pump
95 Longstreet Casino Well #1	(a)	15-Nov-00	-0.0032	0.0284	0.0063	pump
95 Longstreet Spring	(a)	16-Jun-00	0.0006	0.0170	0.0064	grab
95 Longstreet Spring	(a)	06-Nov-00	-0.0070	0.0414	0.0096	grab
95 Nye County Well	(b)	02-Mar-00	-0.0021	0.0183	0.0046	pump
95 Nye County Well	(a)	02-Mar-00	0.0004	0.0153	0.0057	pump
95 Peacock Ranch	(a)	07-Nov-00	0.0075	0.0224	0.0146	grab
95 PM-3	(a)	10-Nov-00	-0.0037	0.0285	0.0073	bailer
95 PM-3	(a)	10-Nov-00	0.0000	0.0176	0.0000	bailer
95 Revert Spring	(a)	07-Nov-00	0.0151	0.0151	0.0172	grab
95 Road D Well	(a)	09-Nov-00	0.0000	0.0111	0.0000	bailer
95 Roger Bright Ranch	(a)	05-Dec-00	-0.0079	0.0379	0.0110	pump
95 School Well	(a)	04-Dec-00	0.0109	0.0109	0.0123	pump
95 Sod Farm	(a)	06-Dec-00	0.0119	0.0119	0.0135	pump
95 Spicer Ranch	(a)	07-Nov-00	0.00812	0.0243	0.0159	grab
95 Tolicha Peak	(a)	21-Nov-00	0.0000	0.0398	0.0173	pump
95 TW-5	(a)	08-May-00	-0.0019	0.0174	0.0043	bailer
95 U.S. Ecology	(a)	15-Nov-00	0.0057	0.0171	0.0112	pump
95 USW H-1	(a)	22-Jun-00	0.0006	0.0142	0.0054	bailer
95 USW H-1	(a)	22-Jun-00	0.0087	0.0265	0.0147	bailer
95 USW H-1	(a)	21-Jun-00	0.0006	0.0148	0.0056	bailer

(a) Normal sample.

(b) Field duplicate.

Table 8.10 Summary of ^{90}Sr Results - 2000

Area	Location	Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Supply Wells							
5	Water Well 5B	(a)	19-Jul-00	0.057	0.278	0.160	pump
5	Water Well 5B	(b)	19-Jul-00	0.053	0.394	0.225	pump
5	Water Well 5C	(a)	19-Jul-00	0.103	0.362	0.213	pump
5	Water Well 5C	(a)	19-Apr-00	0.028	0.253	0.144	pump
6	Water Well #4	(a)	19-Jul-00	0.291	0.585	0.355	pump
6	Water Well #4	(a)	19-Apr-00	-0.032	0.232	0.126	pump
6	Water Well #4A	(a)	19-Jul-00	-0.025	0.309	0.170	pump
6	Water Well #4A	(a)	19-Apr-00	-0.007	0.246	0.136	pump
6	Water Well C-1	(a)	19-Jul-00	0.027	0.482	0.271	pump
16	UE-16d Eleana Water Well	(a)	19-Jul-00	0.012	0.462	0.260	pump
16	UE-16d Eleana Water Well	(a)	19-Apr-00	-0.032	0.201	0.110	pump
18	Water Well 8	(a)	19-Jul-00	-0.173	0.490	0.256	pump
18	Water Well 8	(a)	19-Apr-00	0.024	0.276	0.156	pump
22	Army #1 Water Well	(a)	19-Jul-00	-0.122	0.394	0.210	pump
22	Army #1 Water Well	(a)	19-Apr-00	0.090	0.237	0.140	pump
25	J-12 Water Well	(a)	25-Jul-00	0.140	0.339	0.202	pump
25	J-12 Water Well	(a)	19-Apr-00	0.183	0.503	0.298	pump
25	J-12 Water Well	(b)	19-Apr-00	0.072	0.190	0.113	pump
25	J-13 Water Well	(a)	25-Jul-00	0.049	0.321	0.185	pump
Onsite Monitoring Wells							
3	U-3cn #5	(a)	19-Jul-00	-0.065	0.591	0.323	pump
5	RNM #1	(a)	28-Jun-00	5.800	0.291	0.448	pump
5	UE-5c Water Well	(a)	19-Apr-00	0.111	0.328	0.194	pump
7	UE7nS	(a)	07-Jun-00	-0.129	0.402	0.209	bailer
17	USGS HTH #1	(a)	12-Jul-00	0.337	1.020	0.600	bailer
Offsite Wells and Springs							
95	Amargosa Valley RV Park	(a)	14-Nov-00	-0.053	0.515	0.296	pump
95	Ash-B Piezom #1	(a)	09-Nov-00	0.130	0.293	0.175	bailer
95	Ash-B Piezom #2	(a)	14-Nov-00	0.019	0.633	0.369	bailer
95	Barn Well #2-Ponderosa Dairy	(a)	06-Dec-00	-0.289	1.110	0.610	pump
95	Barn Well #2-Ponderosa Dairy	(a)	06-Dec-00	-0.289	1.110	0.610	pump
95	Beatty Water and Sewer	(a)	04-Dec-00	0.093	0.957	0.545	pump
95	Big Springs	(a)	16-Jun-00	0.092	0.263	0.155	grab
95	Big Springs	(a)	06-Nov-00	0.165	0.404	0.239	grab
95	Cind-R-Lite Mine	(a)	15-Nov-00	0.061	0.503	0.294	pump
95	Cook's Ranch Well #2	(a)	05-Dec-00	-0.146	0.738	0.406	pump
95	Crystal Pool	(a)	16-Jun-00	0.015	0.267	0.150	grab
95	Crystal Pool	(a)	06-Nov-00	0.185	0.459	0.272	grab

(a) Normal sample.

(b) Field duplicate.

Table 8.10 (Summary of ^{90}Sr Results - 2000, cont.)

Area Location		Sample Type	Date Sampled	Result (pCi/L)	MDC (pCi/L)	Error (2 sigma)	Sampling Method
Offsite Wells and Springs, cont.							
95	Crystal Trailer Park	(a)	06-Dec-00	0.086	0.616	0.352	pump
95	De Lee Ranch	(a)	05-Dec-00	-0.339	1.100	0.604	pump
95	ER-OV-01	(a)	06-Nov-00	0.182	0.639	0.373	bailer
95	ER-OV-02	(a)	07-Nov-00	0.156	0.822	0.477	bailer
95	ER-OV-03A	(a)	07-Nov-00	0.285	0.670	0.399	bailer
95	ER-OV-03A3	(a)	07-Nov-00	0.382	0.706	0.425	bailer
95	ER-OV-03C	(a)	08-Nov-00	0.027	0.574	0.332	bailer
95	ER-OV-03C2	(a)	08-Nov-00	-0.026	0.288	0.166	bailer
95	ER-OV-04A	(a)	08-Nov-00	-0.043	0.285	0.164	bailer
95	ER-OV-05	(a)	08-Nov-00	-0.013	0.285	0.164	bailer
95	ER-OV-06A	(a)	06-Nov-00	0.164	0.729	0.427	bailer
95	Fairbanks Spring	(a)	16-Jun-00	0.008	0.286	0.161	grab
95	Fairbanks Spring	(a)	06-Nov-00	0.225	0.627	0.373	grab
95	Fire Hall #2 Well	(a)	05-Dec-00	0.593	0.931	0.568	pump
95	Last Trail Ranch	(a)	05-Dec-00	0.557	0.988	0.596	pump
95	Longstreet Casino Well #1	(a)	15-Nov-00	0.049	0.699	0.407	pump
95	Longstreet Spring	(a)	16-Jun-00	0.028	0.265	0.151	grab
95	Longstreet Spring	(a)	06-Nov-00	0.044	0.437	0.250	grab
95	Nye County Well	(b)	02-Mar-00	0.117	0.457	0.267	pump
95	Nye County Well	(a)	02-Mar-00	0.106	0.325	0.192	pump
95	Peacock Ranch	(a)	07-Nov-00	0.034	0.721	0.407	grab
95	PM-3	(a)	10-Nov-00	0.031	0.275	0.160	bailer
95	PM-3	(a)	10-Nov-00	-0.146	0.479	0.269	bailer
95	Revert Spring	(a)	07-Nov-00	0.286	0.792	0.467	grab
95	Road D Well	(a)	09-Nov-00	-0.105	0.334	0.192	bailer
95	Roger Bright Ranch	(a)	05-Dec-00	0.139	0.822	0.474	pump
95	School Well	(a)	04-Dec-00	0.425	0.791	0.475	pump
95	Sod Farm	(a)	06-Dec-00	-0.258	1.260	0.698	pump
95	Spicer Ranch	(a)	07-Nov-00	-0.101	0.817	0.457	grab
95	Tolicha Peak	(a)	21-Nov-00	0.256	0.644	0.383	pump
95	TW-5	(a)	08-May-00	0.092	0.303	0.177	bailer
95	U.S. Ecology	(a)	15-Nov-00	0.295	0.541	0.324	pump
95	USW H-1	(a)	22-Jun-00	0.124	0.264	0.160	bailer
95	USW H-1	(a)	22-Jun-00	0.413	0.266	0.186	bailer
95	USW H-1	(a)	21-Jun-00	-0.034	0.434	0.240	bailer

(a) Normal sample.
(b) Field duplicate.

Table 8.11 Summary of the DRI Groundwater Monitoring Program - 2000

Monitoring Location	Date	Sampling Method	Analysis
Amargosa Valley RV-Park	07/25/00	pump	Enriched Tritium
Ash-B#1[(a)]	05/11/00	bail	Enriched Tritium
Beatty Water and Sewer	07/26/00	pump	Enriched Tritium
Beatty Water and Sewer - Barrick/Bullfrog[(b)]	08/24/00	pump	Enriched Tritium
Cinderlite Mine	07/25/00	pump	Enriched Tritium
Coffers Ranch Windmill	09/06/00	windmill	Enriched Tritium, Gross Alpha, Gross Beta, Gamma Spectroscopy, ^{238}Pu, $^{239+240}Pu$
Cooks Ranch Well #2	07/25/00	pump	Enriched Tritium
De Lee Ranch	08/03/00	pump	Enriched Tritium
ER-OV-01	05/09/00	bail	Enriched Tritium, Gross Alpha, Gross Beta, Gamma Spectroscopy, ^{238}Pu, $^{239+240}Pu$
ER-OV-02	05/31/00 and 05/11/00	Bennet pump and bailed	Enriched Tritium, Gross Alpha, Gross Beta, Gamma Spectroscopy, ^{238}Pu, $^{239+240}Pu$
ER-OV-03a	05/31/00	bail	Enriched Tritium
ER-OV-03a2[(c)]	05/31/00	bail	No analysis conducted, sample too muddy.
ER-OV-03c	05/09/00	bail	Enriched Tritium, Gross Alpha, Gross Beta, Gamma Spectroscopy, ^{238}Pu, $^{239+240}Pu$

(a) Diameter of Ash B#2 was too small to allow access for DRI sampling tool. An alternative sample point was not selected.

(b) Beatty Water and Sewer - Barrick/Bullfrog was utilized as a supplemental sample point for Beatty.

(c) ER-OV-3a3 casing was pinched 80 ft. below ground surface. ER-OV-03a2 was selected as its replacement.

(d) Road D Well Spicer was misnamed. Actual sample point is Tolicha Peak J-2. Spicer Springs provided a cover sample point closet to an intended sample point near Spicer Ranch.

(e) Access to the Cherry Patch Ranch Well was denied by the owner. The Short Branch Saloon Well was selected as an alternative.

Table 8.11 (Summary of the DRI Groundwater Monitoring Program - 2000, cont.)

Monitoring Location	Date	Sampling Method	Analysis
ER-OV-03c2	05/09/00	bail	Enriched Tritium, Gross Alpha, Gross Beta, Gamma Spectroscopy, ^{238}Pu, $^{239+240}Pu$
ER-OV-04a	05/31/00	bail	Enriched Tritium
ER-OV-05	05/31/00	bail	Enriched Tritium
ER-OV-06a	05/09/00	bail	Enriched Tritium, Gross Alpha, Gross Beta, Gamma Spectroscopy, ^{238}Pu, $^{239+240}Pu$
Fire Hall #2	07/25/00	pump	Enriched Tritium
Last Trail Ranch	07/26/00	pump	Enriched Tritium
Long Street Casino Well #1	07/25/00	pump	Enriched Tritium
U.S. Ecology	07/26/00	pump	Enriched Tritium
pm-3#1	09/26/00	bail	Enriched Tritium, Gross Alpha, Gross Beta, Gamma Spectroscopy
pm-3#2	10/11/00	Bennet Pump	Enriched Tritium, Gross Alpha, Gross Beta, Gamma Spectroscopy
Tolicha Peak J-2[d]	08/30/00	Bennet Pump	Enriched Tritium
Roger Bright Ranch	07/25/00	pump	Enriched Tritium
School Well	07/25/00	pump	Enriched Tritium
Short Branch Saloon[e]	08/03/00	pump	Enriched Tritium
Spicer Springs[d]	08/03/00	hand sampled	Enriched Tritium
Tolicha Peak	08/03/00	pump	Enriched Tritium
TW-5	05/08/00	bail	Enriched Tritium

(a) Diameter of Ash B#2 was too small to allow access for DRI sampling tool. An alternative sample point was not selected.

(b) Beatty Water and Sewer - Barrick/Bullfrog was utilized as a supplemental sample point for Beatty.

(c) ER-OV-3a3 casing was pinched 80 ft. below ground surface. ER-OV-03a2 was selected as its

(d) Road D Well Spicer was misnamed. Actual sample point is Tolicha Peak J-2. Spicer Springs provided

(e) Access to the Cherry Patch Ranch Well was denied by the owner. The Short Branch Saloon Well was

Table 8.12 Summary of DRI Groundwater Tritium Results - 2000

Wells Sampled	Severn Trent Enriched Tritium Results (pCi/L) ± Total Error, MDC [a]	University of Waterloo Enriched Tritium Results (pCi/L) ± Total Error, MDC	CY 2000 BN Results [b]
pm-3#1	5.27 ± 4.8, 6.48		-4.69 ± 5.6, 9.7
pm-3#2 - bailed	10.7 ± 5.1, 6.45		1.28 ± 5.9, 10
pm-3#2 - pumped	12.1 ± 5.1, 6.39		
Amargosa Valley RV-Park	7.89 ± 3.8, 4.45		1.46 ± 6.6, 11.1
Ash-B#1	34.2 ± 5.4, 4.45	<2.55 ± 1.60	16.4 ± 7.8, 14
Cooks Ranch Well #2	9.07 ± 3.8, 4.39		9.5 ± 6.8, 11.3
Beatty Water an Sewer	16.2 ± 4.2, 4.4		3.3 ± 7.8, 13.2
Beatty Water an Sewer-Barrick/Bullfrog	5.36 ± 3.6, 4.41		
Beatty Distribution System - Exchange Club		<2.55 ± 1.60	
Short Branch Saloon	21.3 ± 4.5, 4.39		
Cinderlite Mine	6.8 ± 3.7, 4.42		-1.6 ± 7.2, 12.4
Coffers Ranch Windmill	6.29 ± 4.8, 6.4		
De Lee Ranch	5.98 ± 3.7, 4.42		3.6 ± 7.7, 7.7
Fire Hall #2	7.81 ± 3.7, 4.4		-7.9 ± 6.3, 11.1
Last Trail Ranch	14.6 ± 4.1, 4.4		-7 ± 6.2, 10.7
Long Street Casino Well #1	12.5 ± 4.0, 4.42		0.2 ± 63.5, 105.05
U.S. Ecology	14.3 ± 4.1, 4.41		0.4 ± 6.3, 10.7
Tolicha Peak J-2	12.7 ± 4.0, 4.42		0.26 ± 5.9, 10.1
Spicer Springs	5.49 ± 3.6, 4.36		-15.2 ± 8.2, 14.3
Roger Bright Ranch	15.4 ± 4.2, 4.43		-4.7 ± 6.2, 10.7
School Well	15 ± 4.1, 4.3		-7 ± 6.3, 11
TW-5	33.5 ± 5.4, 4.47	<2.55 ± 1.60	-2.68 ± 6.67, 11.2
Tolicha Peak	15 ± 4.1, 4.36		5.6 ± 6.3, 10.6
ER-OV-01	20.6 ± 4.5, 4.4	<2.55 ± 1.60	-4.4 ± 6.3, 11
ER-OV-02 - bailed	19.4 ± 4.4, 4.41	<2.55 ± 1.60	-7.7 ± 6.67, 11.3
ER-OV-02 - pumped	114 ± 12.0, 4.48	<2.55 ± 1.60	
ER-OV-03a	138 ± 14.00, 4.53	<2.55 ± 1.60	-6.2 ± 6.3, 10.8
ER-OV-03a - duplicate	26.6 ± 4.91, 4.43	<2.55 ± 1.60	
ER-OV03c	19.7 ± 4.4, 4.36	<2.55 ± 1.60	-5.99 ± 5.49, 9.26
ER-OV-03c2	10 ± 3.9, 4.36		-6.71 ± 5.8, 9.79
ER-OV-04a	142 ± 14.00, 4.39	<2.55 ± 1.60	3.1 ± 6.3, 10.8
ER-OV-05	114 ± 12.00, 4.47	<2.55 ± 1.60	-9.8 ± 6.6, 11.5
ER-OV-6a	34.7 ± 5.50, 4.47	<2.55 ± 1.60	0.446 ± 6.3, 10.5

(a) Results of associated field quality assurance samples demonstrated a large degree of variability between analyses and overestimated tritium concentrations in field control samples. All analyses have a low degree of confidence and may overestimate the actual amount of tritium present.

(b) Results from collection date nearest DRI collection date are displayed if more than one sampling event occurred.

Table 8.13 Summary of DRI Monitoring Results - 2000 (pCi/L)

Locations	Gross Alpha	Gross Alpha Error	Gross Alpha MDC	Gross Beta	Gross Beta Error	Gross Beta MDC	Gamma Spectrum	Gamma Spectrum Error	Gamma Spectrum MDC	^{238}Pu	^{238}Pu Error	^{238}Pu MDC	$^{239+240}$Pu	$^{239+240}$Pu Error	$^{239+240}$Pu MDC
pm-3#1	8.3	3.8	5	15.5	4	5.2	-2	11	21						
pm-3#2	1.2	1.8	3	17.3	3.7	4.5	5	6.2	12						
pm-3#2	1.9	2	3.2	13.8	3.5	4.7	-6.8	7.3	15						
Coffers	9.1	2.2	1.7	4.8	1.5	2.1	-3.3	8.4	15	0.005	0.077	0.22	0.025	0.05	0.067
ER-OV-01	24.2	4.7	2.4	20.8	3.6	3.7	-16	11	19	-0.03	0.036	0.27	-0.01	0.02	0.21
ER-OV-02 (bailed)	37.1	7.2	4	36.2	5.7	5.3	^{137}Cs 2.4, ^{210}Pb 200	7.0, 200	13, 120	-0.028	0.091	0.22	0.014	0.07	0.15
ER-OV-02 (pumped)	20	2.5	0.9	10.1	1.5	1.6	4.4	8.2	16	-0.131	0.076	0.38	0.12	0.2	0.31
ER-OV-03c	14.6	3.2	1.8	11.9	2.7	3.3	5.5	9.4	20	0.12	0.23	0.39	-0.011	0.023	0.23
ER-OV-03c2	15.2	3.8	3.2	11.3	2.7	3.5	14.7	9.6	16	0.042	0.088	0.16	-0.02	0.21	0.16
ER-OV-6a	11.5	3.7	3.7	14	2.9	3.4	-2.2	9.7	19	0.06	0.2	0.37	-0.064	0.051	0.3

Pahute Mesa (No Date Provided)