DOE/NV/11718-038
UC-600

U.S. DEPARTMENT OF ENERGY NEVADA OPERATIONS OFFICE ENVIRONMENTAL DATA REPORT FOR THE NEVADA TEST SITE - 1995

October 1997

Work Performed Under
Contract No. DE-C08-96NV11718

Prepared for the

U.S. Department of Energy
Nevada Operations Office

Prepared by

Bechtel Nevada
Post Office Box 98521
Las Vegas, Nevada 89193-8521

DISCLAIMER

DOE/NV/11718-038
UC-600

U.S. DEPARTMENT OF ENERGY NEVADA OPERATIONS OFFICE ENVIRONMENTAL DATA REPORT FOR THE NEVADA TEST SITE - 1995

Author: Robert R. Kinnison

Editors: Stuart C. Black and Yvonne E. Townsend

October 1997

Work Performed Under
Contract No. DE-AC08-96NV11718

Prepared for the

U.S. Department of Energy
Nevada Operations Office

Prepared by

Bechtel Nevada
Post Office Box 98521
Las Vegas, Nevada 89193-8521

FOREWORD

These chapters contain 1995 Nevada Test Site (NTS) onsite and offsite environmental monitoring results. Other offsite data collected by the U.S. Environmental Protection Agency (EPA) are available from the EPA Radiation Sciences Laboratory, Las Vegas, Nevada. Most of the onsite data are accompanied by summaries and statistical evaluations of the data.

In previous years, data reports contained chapters covering summaries of the offsite data collected by the EPA and on the quality assurance program that accompanied the collection and laboratory analysis of onsite samples. This year these two chapters have been moved to the "U.S. Department of Energy, Nevada Operations Office (DOE/NV), Annual Site Environmental Report (ASER) - 1995", DOE/NV/11718-037.

TABLE OF CONTENTS

LIST OF TABLES

List of Tables, cont. Page

LIST OF FIGURES

List of Figures, cont. Page

EXECUTIVE SUMMARY

INTRODUCTION

The U.S. Department of Energy (DOE) Order 5400.1, "General Environmental Protection Program," establishes environmental protection program requirements, authorities, and responsibilities for DOE operations. These mandates require compliance with applicable federal, state, and local environmental protection regulations. During calendar year (CY) 1995 environmental protection and monitoring programs were conducted at the Nevada Test Site (NTS) and other DOE Nevada Operations Office (DOE/NV) managed sites in Nevada and across the United States. A detailed discussion of these environmental protection and monitoring programs, and summary data and assessments for environmental monitoring results at these sites in CY 1995 are provided in the DOE/NV, Annual Site Environmental Report - 1995, (ASER) DOE/NV/11718-037. A brief description of the scope of this environmental monitoring is provided below, categorized by "on-NTS" and "off-NTS" monitoring.

ON-NTS ENVIRONMENTAL MONITORING

Environmental surveillance on the 3500 km^2 (1350 mi^2) NTS is designed to cover the entire area with some emphasis on areas of past nuclear testing and present operational activities. In CY 1995, monitoring included: (1) air sampling for particulates, halogen gases, tritium in atmospheric moisture, and noble gases; (2) water sampling from supply wells, natural springs and seeps, open reservoirs, containment ponds, and sewage lagoons; and (3) ambient radiation levels using thermoluminescent dosimeters (TLDs).

AIR MONITORING

Air sampling units for particulates and halogen gases were located at 60 stations on the NTS. Inside the radioactive waste management facilities the number of units varied from 15 to 20; these were reconfigured several times during the year and monitored a total of 25 locations. Samples were collected weekly and analyzed for gross beta activity and by gamma spectroscopy. Additionally, the weekly samples were composited either monthly or quarterly and analyzed for plutonium-238 and 239 + 240 isotopes. Airborne tritiated water (HTO) vapor was sampled at 21 permanent locations throughout the NTS. Samples were collected for two-week periods and analyzed for HTO content. Samples were collected for radioactive noble gas analysis at six permanent locations across the NTS.

WATER MONITORING

Surface water sampling was conducted annually at 12 open reservoirs and 8 natural springs and quarterly at 11 sewage lagoons and 2 containment ponds. Samples were analyzed for gross beta, tritium, gamma-emitting radionuclides, and plutonium-238, and 239 + 240 activity. Additionally, an annual sample from each location was analyzed for strontium-90 activity. Water samples were collected quarterly from 10 potable water supply wells and 7 potable water distribution system end points and annually from 3 non-potable water supply wells. All samples were analyzed for gross alpha, gross beta, tritium, gamma emitting radionuclides, and plutonium activity. All potable water supply well samples were also analyzed for strontium-90 and radium-226 and -228 activity. One annual sample from each potable water distribution end point was analyzed for strontium-90.

AMBIENT RADIATION LEVELS

Ambient gamma radiation level monitoring was conducted at 181 stations within the NTS using Panasonic UD-814AS environmental TLDs. The TLDs were deployed in a holder placed about one meter above the ground and exchanged quarterly.

OFF-NTS ENVIRONMENTAL MONITORING

Environmental monitoring was conducted in areas adjacent to the NTS, and other DOE/NV-managed sites, by the U.S. Environmental Protection Agency's Radiation & Indoor Environments National Laboratory, Las Vegas (R&IE-LV). This environmental monitoring included measurements of radioactivity in air, milk, animals, and groundwater, as well as measurements of ambient radiation levels.

AIR SAMPLING

The Air Surveillance Network (ASN) is made up of 14 sampling locations surrounding the NTS and 89 standby stations in all states west of the Mississippi River. Samples were collected weekly from the ASN stations and analyzed for gross alpha, gross beta, and gamma emitting activity. Samples from selected locations were composited quarterly and analyzed for ^{238}Pu, and $^{239+240}Pu$.

The Noble Gas and Tritium Surveillance Network was placed in standby status in September of 1994. This network consists of 21 noble gas samplers and 21 tritium-in-air samplers located outside the NTS in Nevada, California, and Utah.

MILK AND FOODSTUFFS SAMPLING

The Milk Surveillance Network (MSN) consists of 14 sampling locations within 300 km (186 mi) of the NTS, and the Standby Milk Surveillance Network (SMSN) consists of 102 locations throughout the major milk producing areas west of the Mississippi River. Samples were collected quarterly from each MSN location but not from the SMSN. All samples were analyzed for gamma-emitting activity and selected samples were analyzed for tritium and ^{89}Sr and ^{90}Sr.

Biomonitoring in 1995 consisted of only one deer collected on the NTS.

GROUNDWATER SAMPLING

Supply wells and surface waters around the NTS were sampled as part of the Long-Term Hydrological Monitoring Program (LTHMP). The LTHMP also included groundwater and surface water monitoring at locations in Colorado, Mississippi, Nevada, and New Mexico where underground tests have been previously conducted. Samples from specific locations are collected monthly, biannually, annually, or biennially in accordance with a preset schedule. Samples are analyzed for gamma emitting radionuclides and tritium activity.

AMBIENT RADIATION LEVELS

In CY 1995, ambient gamma radiation levels were monitored by a network of 127 TLDs and 27 pressurized ion chambers (PICs). This network used Panasonic UD-814 environmental TLDs, and Reuter-Stokes Models 1011, 1012, and 1013 PICs. The TLDs were exchanged and processed quarterly. The PICs provided near real-time data. PIC data are collected and transmitted through the Geostationary Operational Environmental Satellite directly to an NTS receiver and then to R&IE-LV by a dedicated telephone line. In addition to telemetry retrieval, PIC data are also recorded on either magnetic tapes and hard copy strip charts or on magnetic cards.

1.0 ONSITE GROSS BETA IN AIR

Sixty air sampling locations were monitored on the Nevada Test Site (NTS) in 1995. The sampling units were equipped with fiberglass and charcoal filters and had an air flow rate of 140 L/min (5 cfm). The filters were changed after one week of operation. The fiberglass filter was analyzed by gamma spectroscopy and, after a five- to seven-day delay for radon progeny decay, the filter was analyzed for gross beta activity.

A number of changes were made to the gross beta in the air sampling network during 1995. Sampling at the gravel pit, Building 6-900, Pahute Substation, East Boundary, Gate 200 South, and Area 3 were discontinued in October due to inactivity at these sites. Sampling at well ER 3-1 was initiated in August using a solar powered sampling unit. Sampling at Bunker T-4, Schooner and Well UE-18T was initiated in December. The Radiological Waste Management Site (RWMS) Pit 4 was closed in May and its air sampler was moved to the newly opened Pit 5. RWMS Pit 3 was inactivated but remains open, and monitoring at this pit was discontinued in October. RWMS No. 2, located at the Greater Confinement Test Facility, was closed in October when this facility was closed. The RWMS Transuranic Pad was reconfigured for sampling in April and October resulting in a change from a configuration of six perimeter stations at the beginning of the year to two stations at the end of the year, located just inside the storage building doors. Monitoring at the Gas Station and Substation 6-9, located in Area 6 close to the Control Point (CP), was initiated late in the third quarter of 1995 due to planned construction near these sites; this monitoring was discontinued in December when construction plans were canceled.

Sampling locations, sampling dates (given as the date sampling started, samples were typically collected weekly), measured concentrations, analytic standard deviations, and analytic detection limits for gross beta in air samples collected in 1995 appear in Attachment 1.1. The locations of air sampling stations in 1995 are shown in Figure 1.1. Descriptive statistics (μCi/mL) for the entire network are:

Number of data values =	2313
Number of missing values =	162
Arithmetic mean =	2.0×10^{-14}
Median =	1.9×10^{-14}
Standard deviation =	7.4×10^{-15}
Minimum value =	5.0×10^{-16}
Maximum value =	6.2×10^{-14}
Median MDC =	1.6×10^{-15}

All concentrations were positive, and all but one sample was above the individual limits of detection; this was the minimum value given above.

In Figure 1.2, natural logarithms of gross beta concentrations recorded at the Area 3 Mud Plant are plotted versus normal scores. The Anderson-Darling statistic, A^2, a statistic useful for testing for normality, provides no evidence for nonnormality of the logarithms of the concentrations. The plot presented here is typical of plots made for all sampling locations. The straightness of the plot indicates that lognormality is an adequate distributional assumption for concentrations of gross beta in air.

A two-way analysis of variance (ANOVA) table, comparing natural logarithms of concentrations among sampling stations and among weeks of sampling (first week of year equals one, second week of year equals two, etc.) appears in Table 1.1. The ANOVA table shows that

concentrations differ both by sampling location and by week of sampling. The program used for the two-way analysis does not provide for an investigation of patterns in the data that contribute to the significance found in this ANOVA. To accomplish such an investigation, one-way ANOVA were done for each of the factors used in the two-way analysis.

A one-way ANOVA table, comparing natural logarithms of concentrations among sampling stations appears in Table 1.2. Tukey's multiple comparison test separated Area 19 Echo Peak, the sampling station with the smallest mean logarithmic concentration, from Area 5 RWMS Pit 5, Area 5 RWMS No. 8, Area 6 Gas Station, Area 25 Engine Maintenance, Assembly, and Disassembly building (E-MAD) North and Area 10 SEDAN Crater, the sampling stations with the largest mean logarithmic concentrations. Tukey's multiple comparison test found six other pairs of sampling stations statistically significantly different at the 0.05 level, which were differences between stations with very low and very high means. Thus the only differences that could be identified were among the extremes. It is not surprising that larger concentrations of gross beta in air were observed at some Area 5 RWMS stations. The use of heavy equipment near these stations stirs up dust, which caused elevated gross beta in air readings.

A sense of the spatial distribution of gross beta concentrations is shown in Table 1.3, which shows an ANOVA of natural logarithms of gross beta concentrations, compared among NTS operational areas. Tukey's multiple comparison test found, at the 0.05 level of significance, that there were two overlapping sets of operational areas that were different from each other and not different within the sets. One set is composed of Areas 19 through 11, and the other of Areas 2 through 13. The wide confidence intervals for Areas 4, 18, and 13 are due to the very small sample size for these areas. The width of the confidence interval is proportional to the standard error of the mean, which in turn is inversely proportional to the square root of the sample size. Sampling in these three areas was initiated in mid December.

In Figure 1.3, box plots by NTS operational area of the natural logarithms of gross beta concentrations ($\mu Ci/mL \times 10^{-15}$) appear. Other than a tendency for outliers to occur, little pattern can be observed among NTS operational areas. Note that the box plots in Figure 1.3 show much more overlap of data from each operational area than is suggested by the confidence intervals in Table 1.3. This is because confidence intervals measure the accuracy of the estimate of the mean values, while the box plots measure the variability of each data subset. The box plots in Figure 1.3 suggest that there are no practical differences among NTS areas.

As samples to detect gross beta in air are collected weekly, concentrations were compared among weeks. An ANOVA table comparing concentrations among weeks of sampling appears in Table 1.4. This table clearly shows a concentration difference among weeks. The portion of the analysis plotting the means of the logarithms and the corresponding confidence intervals has been left out; it showed that most means were different from all others. This difference can best be described graphically. A plot of the concentrations, as $\mu Ci/mL$ scaled by 10^{-15}, from all sampling stations versus week of collection appears in Figure 1.4. Two features immediately catch the eye: the continuation of the trend noted in 1993 and 1994 of a sudden decrease in concentrations at the beginning of the year from the level at the end of the previous year, followed by a steady increase throughout the year, and a few weeks that are obviously higher or lower than surrounding weeks. Both are discussed below.

Despite extensive efforts, no explanation has been found for the saw-tooth trend observed in previous years and in 1995. It corresponded with no known weather pattern or change in NTS activities. Comparison of 1993 results from the NTS with those of nearby offsite samplers showed that results from offsite samplers displayed a similar trend. Further, an examination of historical records showed that similar trends have often occurred in the past, although the trend

was not noted until 1993. Data are readily available from 1990 to the present, and all six years from 1990 through 1995 show this pattern. All evidence indicates that the trend is real and not an artifact of NTS laboratory practices.

Sudden increases and decreases in concentrations have been observed in previous years' data, as was observed in 1995. Such changes are thought attributable to some peculiarity in the manner in which samples for these weeks were handled; however, no specific explanation has been determined.

Time trends in the data can be further illustrated by considering results from a single sampling station. Area 5 RWMS No. 1 was chosen as typical. In Figure 1.4, the observed concentrations for all stations are plotted, versus week of sample collection, as circles. A similar plot is given in Figure 1.5; here data for a single station, RWMS No. 1, is plotted with additional statistical information. Approximate 95 percent confidence bounds, based on analytic error, are shown as dotted lines. Limits of detection are indicated by a solid line. It can be seen that all concentrations are well above the sample limits of detection and that the confidence bounds are close to the data values. Typical data values are around 20, typical standard deviations are 1, and typical detection limits are 2, all scaled by 10^{-15}. At Area 5 RWMS No. 1, concentrations tend to steadily increase during the year starting at values around 15 and increasing to values around 30, showing the saw-toothed trend discussed above. At this particular station, the variability appears to increase during the last months of the year.

A sense of the accuracy of measured gross beta in air concentration can be obtained from the empirical coefficients of variation, the analytic standard deviation divided by the measured concentration. A histogram of the empirical coefficients of variation appears in Figure 1.6. Two empirical coefficients of variation of value greater than 0.3 (maximum 2.1, which occurred with the minimum value of concentration) were omitted. In more than 95 percent of the observations, the empirical coefficient of variation was less than 0.10, indicating that the analytic standard deviation tends to be at least an order of magnitude smaller than the measured concentration.

HISTORICAL TRENDS

In 1995, there were 63 air sampling stations. Counting those stations at which samplers were in place at one time but are no longer, the number is even larger. Were a complete analysis of historical trends for all sampling stations included, in addition to the analysis of current results, the resulting document would be unwieldy. Accordingly, historical trends at ten representative sampling stations were studied. These stations, chosen for spatial dispersion are:

NTS Operational Area	Sampling Station	Approximate Location
10	Gate 700 South	Northeast corner of NTS
15	EPA Farm	Northeast corner of NTS
19	Echo Peak	Northwest corner of NTS
20	Area 20 Dispensary	Northwest corner of NTS
25	E-MAD North	Southwest corner of NTS
27	Cafeteria	South-central region of NTS
5	DOD Yard	Southeast corner of NTS
23	H&S Building	Southeast corner of NTS
6	CP-6	Central to NTS
16	3545 Substation	Central to NTS

Relatively few stations are located in the northwestern corner of the NTS, and even fewer are located in the northeastern corner. Choosing different sampling stations to report in detail would result in large portions of the NTS not being accounted for. Scatterplots of annual average concentrations of gross beta (10^{-14} µCi/mL) appear in Figures 1.7 through 1.17. For some years at some sampling stations, no data exist. Placement of sampling stations is determined from health physics considerations, not to give a uniform coverage of the NTS. Hence in some years, samplers were removed from some stations to other locations, which at that time, were judged of greater concern.

Four noticeable peaks of annual average gross beta concentrations occur:

- A significant peak occurred in 1971. This is probably attributable to the 1970 BANEBERRY event, in which radioactive particles were accidently vented to the atmosphere.
- A peak occurred in 1977. This is probably attributable to foreign nuclear testing.
- A peak occurred in 1981. This is probably attributable to foreign nuclear testing.
- An increase in annual average gross beta concentrations occurred in 1986. This is probably attributable to the accident at Chernobyl.

From 1982 onward, concentrations of gross beta in air have been influenced by nuclear testing only a small amount. Concentrations measured during this period, with the exception of the peak occurring in 1986, have been uniformly low, although subject to normal statistical variation.

CONCLUSION

Since about 1982, gross beta in air levels at the NTS have been uniformly low, essentially at world-wide background levels, except for a slight increase in 1986 that can be attributed to the Chernobyl accident. Almost all values are well above analytical detection levels; thus the data values are valid measurements of environmental exposure levels. Statistically significant differences are found between stations, operational areas, and week of the year; however, these differences do not appear to follow any meaningful pattern and their magnitude is too small to be of any operational significance.

Table 1.1 Two-Way ANOVA on the Natural Log of Gross Beta Concentrations between Sampling Stations and Weeks of Sampling

Source	Degrees of Freedom	Sequential Sum of the Squares	Adjusted Sum of Squares	Adjusted Mean Square	F-Statistic	p-Value
Week	51	245.415	245.415	4.812	128.54	0.000
Sampling Station	60	27.903	16.278	0.271	7.25	0.000
Error	2199	82.324	82.324	0.037		
Total	2310	355.642				

Table 1.2 One-Way ANOVA on the Natural Log of Gross Beta Concentrations Among Sampling Stations

Source	Degrees of Freedom	Sum of Squares	Mean Square	F-Statistic	p-Value
Sampling Station	60	28.239	0.471	3.29	0.000
Error	2250	321.623	0.143		
Total	2310	349.862			

Table 1.3 One-Way ANOVA on the Natural Logs of Gross Beta Concentrations Among NTS Operational Areas

Source	Degrees of Freedom	Sum of Squares	Mean Square	F-Statistic	p-Value
NTS Area	19	11.303	0.595	4.03	0.000
Error	2291	338.559	0.148		
Total	2310	349.862			

Area	N	Mean	Standard Deviation
19	35	2.6726	0.2590
16	46	2.7802	0.4173
3	288	2.8178	0.3928
1	87	2.8185	0.4368
12	44	2.8269	0.4348
7	50	2.8306	0.4506

Pooled Standard Deviation = 0.3844

Individual 95% Confidence Interval for Mean Based on Pooled Standard Deviation

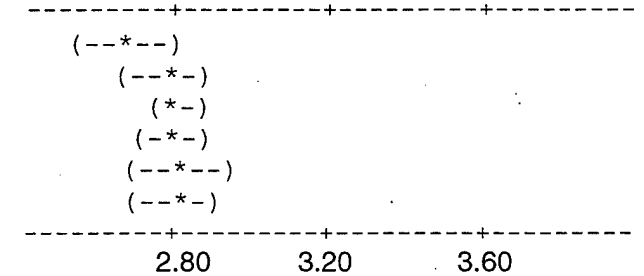


Table 1.3 (One-Way ANOVA on the Natural Logs of Gross Beta Concentrations Among NTS Operational Areas, cont.)

Area	N	Mean	Standard Deviation	Individual 95% Confidence Interval for Mean Based on Pooled Standard Deviation
2	81	2.8680	0.5451	(-*-)
15	52	2.8723	0.3669	(--*-)
9	50	2.8755	0.3557	(--*--)
27	44	2.8966	0.3602	(-*--)
11	52	2.9167	0.4236	(--*--)
23	138	2.9322	0.3989	(*-)
5	932	2.9397	0.3537	(*)
6	208	2.9452	0.3581	(-*)
10	68	2.9523	0.4197	(-*-)
20	34	2.9500	0.3834	(--*--)
25	96	3.0682	0.3975	(-*-)
4	2	3.1930	0.6764	(----------*----------)
18	2	3.2336	0.8010	(----------*----------)
13	2	3.3480	0.7281	(----------*----------)
				2.80 3.20 3.60

Pooled Standard Deviation = 0.3844

Table 1.4 One-Way ANOVA on the Natural Log of Gross Beta Concentrations Among Weeks of Sampling

Source	Degrees of Freedom	Sum of Squares	Mean Square	F-Statistic	p-Value
Sampling Station	60	28.239	0.471	3.29	0.000
Error	2250	321.623	0.143		
Total	2310	349.862			

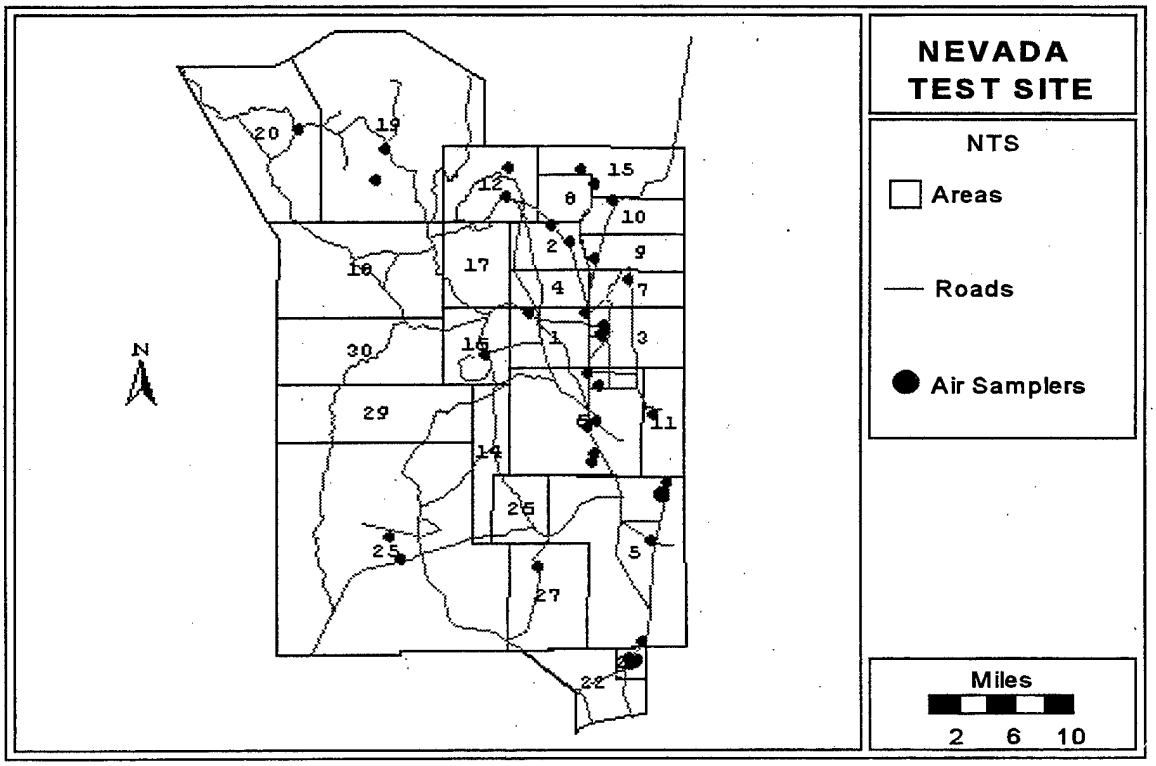


Figure 1.1 Locations of Air Sampling Stations on NTS - 1995

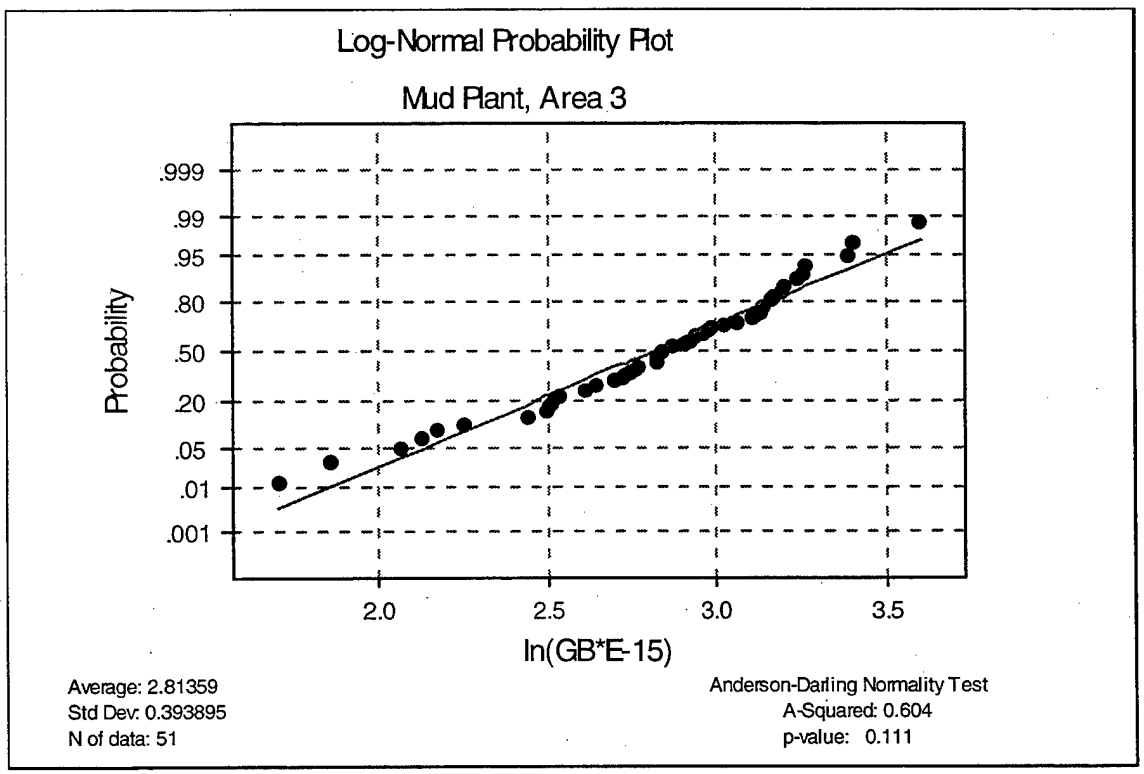


Figure 1.2 Log-Normal Probability Plot

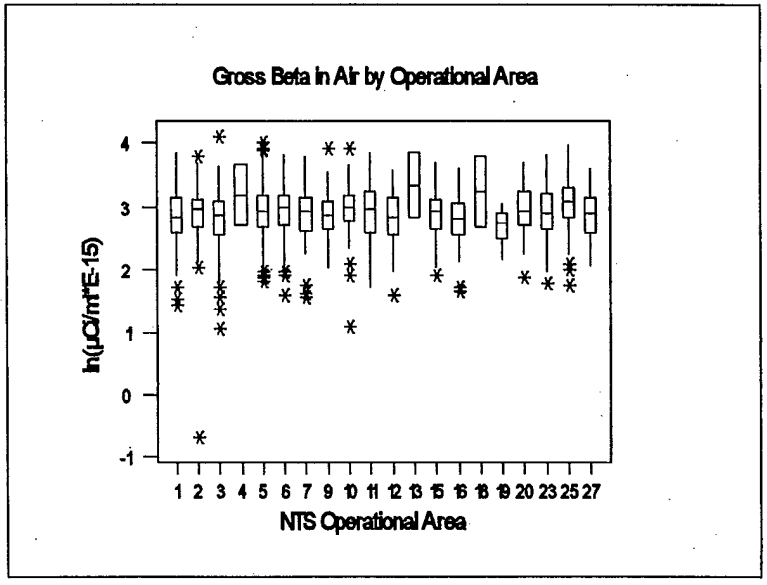


Figure 1.3 Box Plots of Ln Gross Beta vs. Area

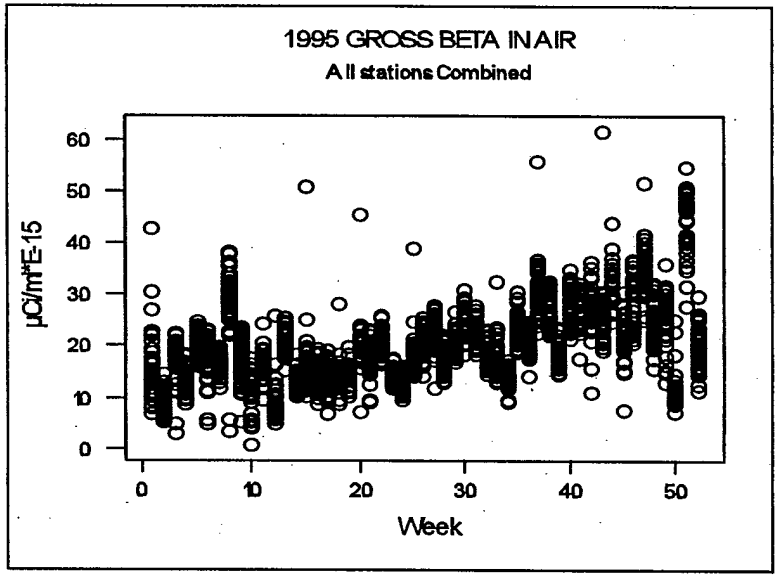


Figure 1.4 Time Series Plot of Gross Beta in Air

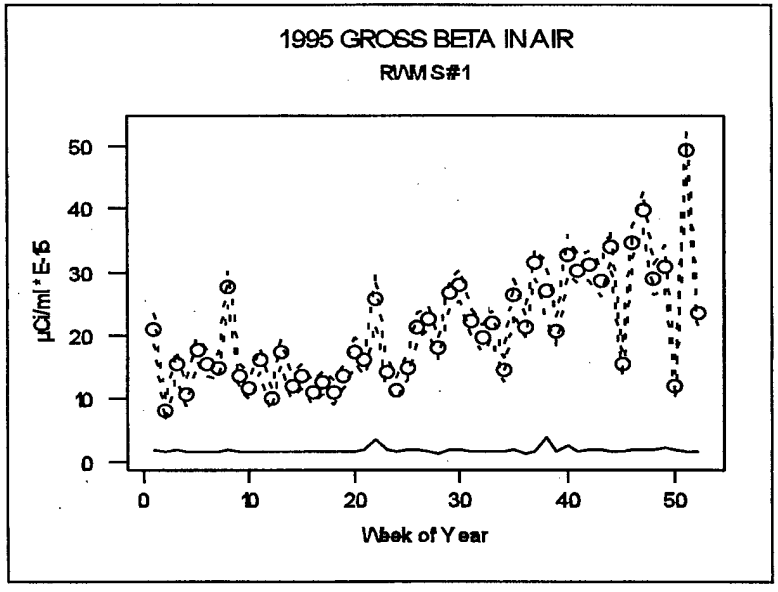


Figure 1.5 Time Series Plot of RWMS No. 1

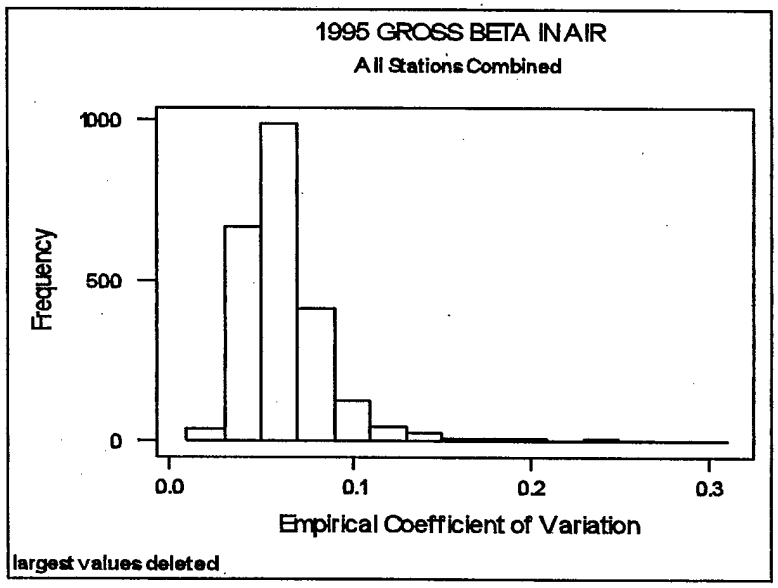


Figure 1.6 Histogram of Coefficients of Variation

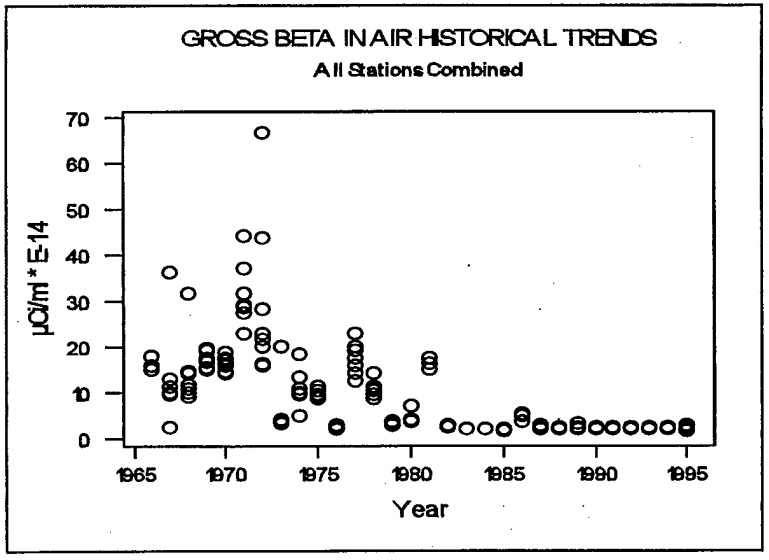


Figure 1.7 Historical Trends, All Representative Stations Combined

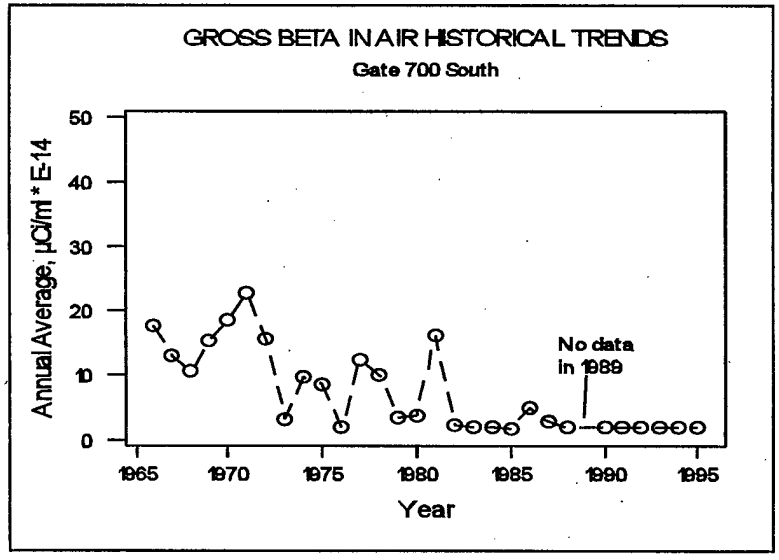


Figure 1.8 Historical Trend, Gate 700 South, Area 10

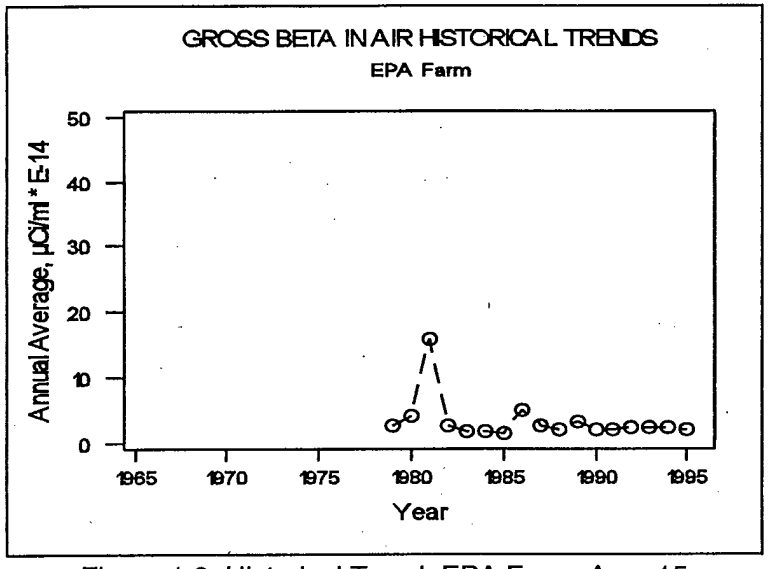


Figure 1.9 Historical Trend, EPA Farm, Area 15

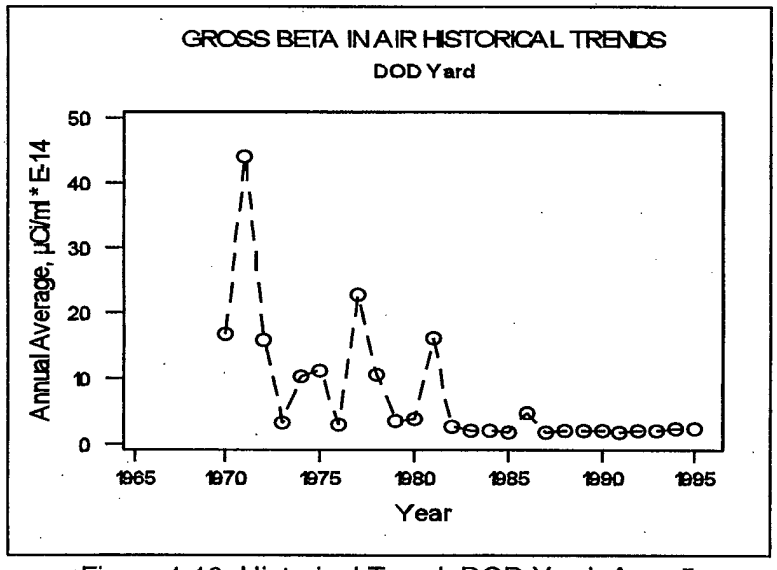


Figure 1.10 Historical Trend, DOD Yard, Area 5

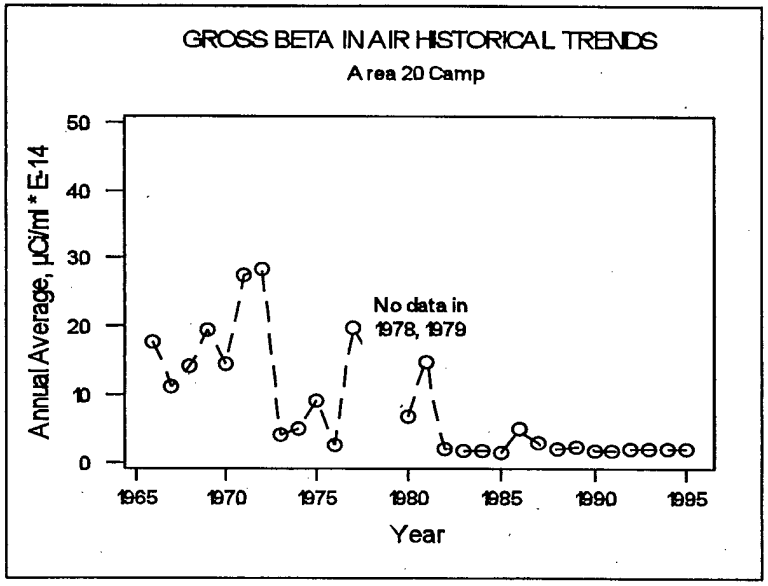


Figure 1.11 Historical Trend, Area 20 Camp

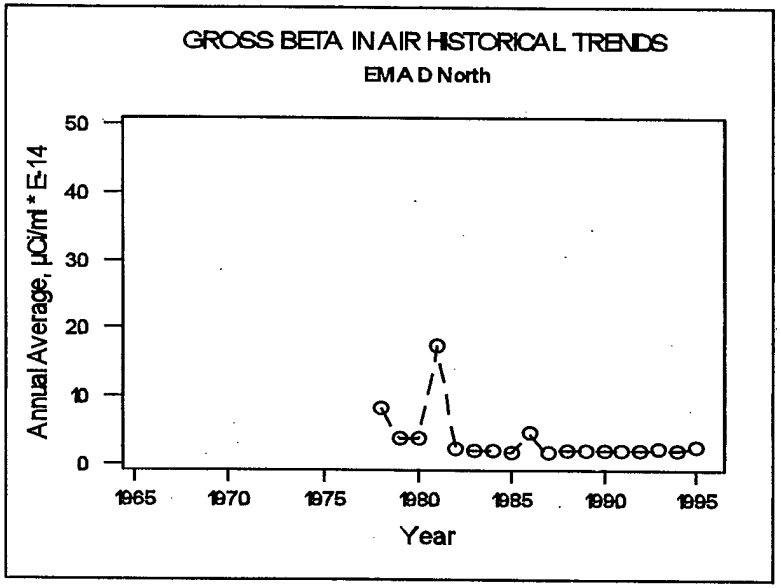


Figure 1.12 Historical Trend, E-MAD North, Area 25

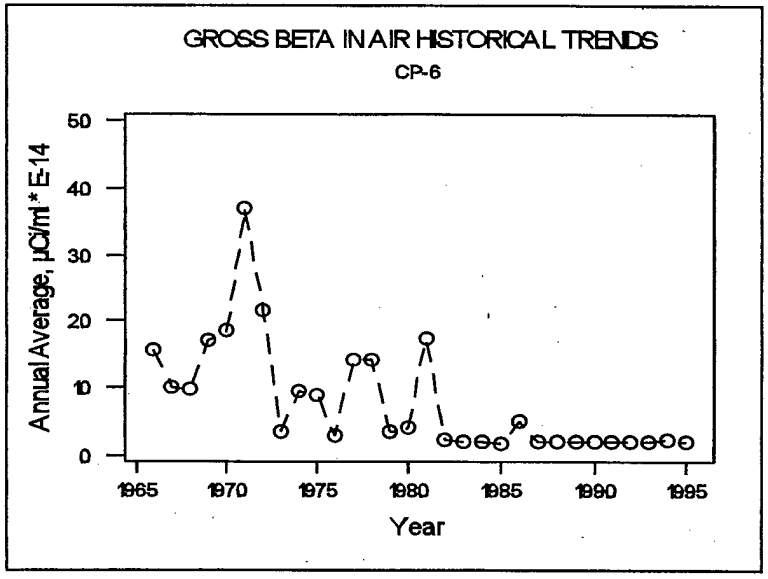


Figure 1.13 Historical Trend, CP-6, Area 6

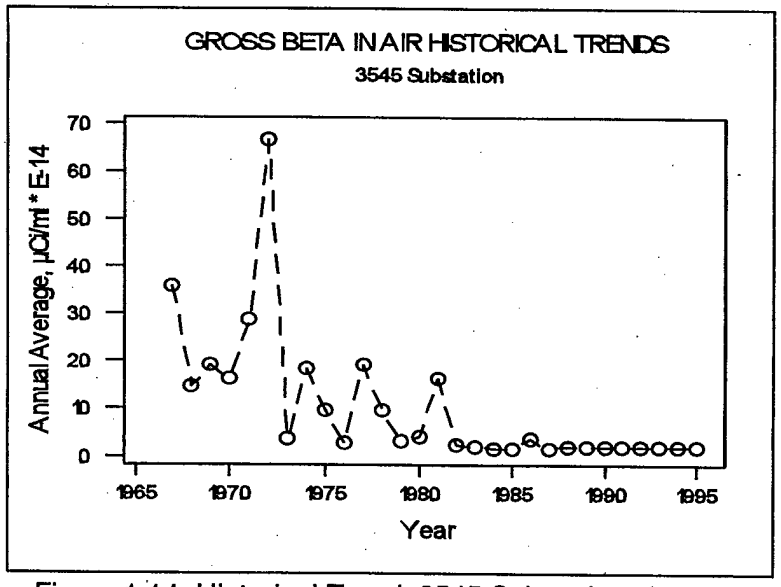


Figure 1.14 Historical Trend, 3545 Substation, Area 16

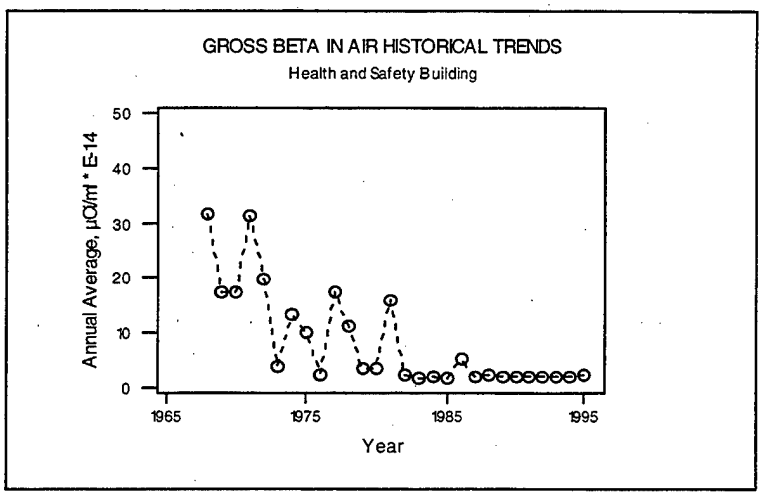


Figure 1.15 Historical Trend, H&S Building, Area 23

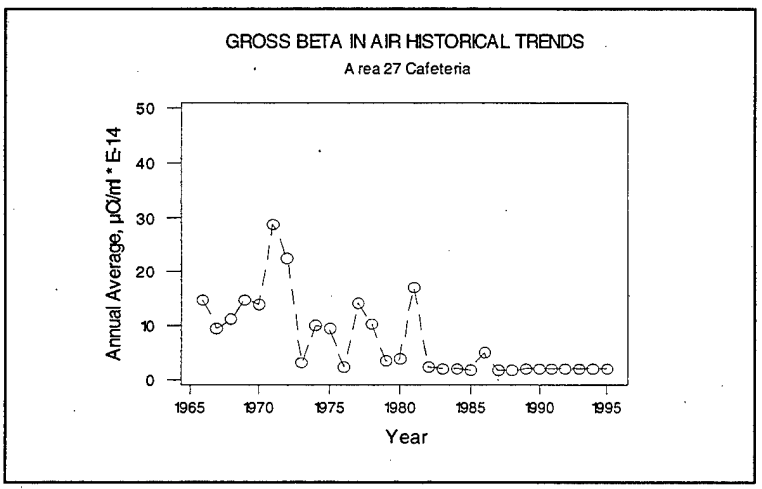


Figure 1.16 Historical Trend, Area 27 Cafeteria

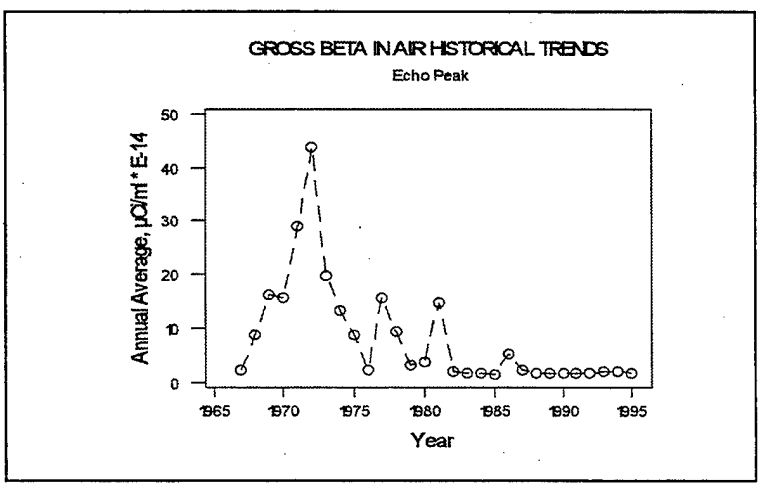


Figure 1.17 Historical Trends, Echo Peak, Area 19

Attachment 1.1 Gross Beta in Air - 1995

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation(s)	Detection Limit
Area 1, BJY	01/03/95	14.60	1.01	1.58
Area 1, BJY	01/09/95	14.20	1.28	2.14
Area 1, BJY	01/17/95	4.60	0.53	0.94
Area 1, BJY	01/23/95	13.00	0.86	1.32
Area 1, BJY	01/30/95	15.80	0.81	1.16
Area 1, BJY	02/07/95	16.60	0.91	1.33
Area 1, BJY	02/14/95	14.50	0.88	1.32
Area 1, BJY	02/21/95	26.20	1.16	1.56
Area 1, BJY	02/27/95	12.50	0.86	1.34
Area 1, BJY	03/06/95	4.23	1.04	2.01
Area 1, BJY	03/13/95	16.30	0.92	1.33
Area 1, BJY	03/20/95	6.78	0.79	1.38
Area 1, BJY	03/27/95	17.20	0.95	1.37
Area 1, BJY	04/03/95	12.40	0.87	1.37
Area 1, BJY	04/10/95	14.10	0.90	1.36
Area 1, BJY	04/17/95	10.70	0.85	1.38
Area 1, BJY	04/24/95	12.00	0.86	1.35
Area 1, BJY	05/01/95	10.70	0.85	1.37
Area 1, BJY	05/08/95	14.10	0.91	1.39
Area 1, BJY	05/15/95	19.50	1.34	2.08
Area 1, BJY	05/22/95	14.30	0.79	1.14
Area 1, BJY	05/30/95	18.30	1.09	1.63
Area 1, BJY	06/05/95	13.10	0.90	1.41
Area 1, BJY	06/12/95	12.20	0.89	1.42
Area 1, BJY	06/19/95	15.90	0.95	1.44
Area 1, BJY	06/26/95	18.70	1.28	2.01
Area 1, BJY	07/03/95	17.00	1.90	3.31
Area 1, BJY	07/11/95	(a)	(g)	(g)
Area 1, BJY	07/19/95	19.40	1.02	1.45
Area 1, BJY	07/27/95	(b)	(g)	(g)
Area 1, BJY	08/02/95	21.10	0.99	1.36
Area 1, BJY	08/09/95	16.10	0.91	1.33
Area 1, BJY	08/16/95	13.80	0.85	1.27
Area 1, BJY	08/23/95	13.50	0.88	1.33
Area 1, BJY	08/30/95	23.00	1.11	1.54
Area 1, BJY	09/05/95	18.10	0.79	1.03

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 1, BJY	09/14/95	26.40	1.03	1.28
Area 1, BJY	09/21/95	24.10	1.03	1.36
Area 1, BJY	09/28/95	15.90	0.90	1.31
Area 1, BJY	10/05/95	24.80	1.33	1.89
Area 1, BJY	10/10/95	24.30	1.17	1.61
Area 1, BJY	10/17/95	29.90	1.32	1.74
Area 1, BJY	10/24/95	(c)	(g)	(g)
Area 1, BJY	10/24/95	25.80	0.76	0.83
Area 1, BJY	11/07/95	22.60	1.18	1.66
Area 1, BJY	11/14/95	31.50	1.33	1.75
Area 1, BJY	11/21/95	39.00	1.54	1.95
Area 1, BJY	11/27/95	26.80	1.26	1.72
Area 1, BJY	12/04/95	26.70	1.64	2.08
Area 1, BJY	12/11/95	(b)	(g)	(g)
Area 1, BJY	12/18/95	47.70	1.37	1.45
Area 1, BJY	12/26/95	19.80	1.04	1.47
Area 1, Gravel Pit	01/03/95	10.80	1.07	1.83
Area 1, Gravel Pit	01/09/95	5.52	0.75	1.33
Area 1, Gravel Pit	01/17/95	17.90	1.17	1.80
Area 1, Gravel Pit	01/23/95	(a)	(g)	(g)
Area 1, Gravel Pit	01/30/95	17.20	1.10	1.69
Area 1, Gravel Pit	02/07/95	5.52	1.04	1.95
Area 1, Gravel Pit	02/14/95	15.60	1.26	2.05
Area 1, Gravel Pit	02/21/95	29.90	1.44	1.98
Area 1, Gravel Pit	02/27/95	15.00	1.16	1.88
Area 1, Gravel Pit	03/06/95	17.50	1.71	2.90
Area 1, Gravel Pit	03/13/95	17.70	1.29	2.02
Area 1, Gravel Pit	03/20/95	6.99	0.88	1.56
Area 1, Gravel Pit	03/27/95	18.70	1.06	1.55
Area 1, Gravel Pit	04/03/95	12.00	0.95	1.56
Area 1, Gravel Pit	04/10/95	13.10	0.97	1.54
Area 1, Gravel Pit	04/17/95	10.80	0.94	1.55
Area 1, Gravel Pit	04/24/95	14.00	0.98	1.53
Area 1, Gravel Pit	05/01/95	12.30	0.95	1.54
Area 1, Gravel Pit	05/08/95	13.30	0.98	1.55
Area 1, Gravel Pit	05/15/95	19.20	1.08	1.58

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 1, Gravel Pit	05/22/95	17.80	0.93	1.32
Area 1, Gravel Pit	05/30/95	23.80	1.27	1.85
Area 1, Gravel Pit	06/05/95	15.50	1.05	1.62
Area 1, Gravel Pit	06/12/95	13.00	0.99	1.59
Area 1, Gravel Pit	06/19/95	18.40	1.14	1.73
Area 1, Gravel Pit	06/26/95	21.70	1.17	1.71
Area 1, Gravel Pit	07/03/95	24.40	1.09	1.48
Area 1, Gravel Pit	07/11/95	13.20	0.95	1.50
Area 1, Gravel Pit	07/19/95	18.10	1.04	1.54
Area 1, Gravel Pit	07/27/95	26.50	2.23	3.63
Area 1, Gravel Pit	08/02/95	23.70	1.21	1.71
Area 1, Gravel Pit	08/09/95	20.70	1.15	1.65
Area 1, Gravel Pit	08/16/95	23.70	1.18	1.65
Area 1, Gravel Pit	08/23/95	13.50	1.03	1.62
Area 1, Gravel Pit	08/30/95	23.20	1.31	1.93
Area 1, Gravel Pit	09/05/95	20.20	0.95	1.29
Area 1, Gravel Pit	09/14/95	29.40	1.24	1.61
Area 1, Gravel Pit	09/21/95	28.70	1.28	1.72
Area 1, Gravel Pit	09/28/95	18.20	1.12	1.67
Area 1, Gravel Pit	10/05/95	31.30	1.67	2.39
Area 2	01/03/95	21.00	1.23	1.81
Area 2	01/09/95	8.24	0.81	1.38
Area 2	01/17/95	16.80	1.16	1.81
Area 2	01/23/95	17.80	1.06	1.58
Area 2	01/30/95	18.50	1.06	1.57
Area 2	02/08/95	(a)	(g)	(g)
Area 2	02/14/95	(a)	(g)	(g)
Area 2	02/21/95	(a)	(g)	(g)
Area 2	02/28/95	(a)	(g)	(g)
Area 2	03/06/95	(a)	(g)	(g)
Area 2	03/13/95	15.20	1.00	1.54
Area 2	03/20/95	8.16	0.91	1.59
Area 2	03/27/95	20.30	1.06	1.51
Area 2	04/03/95	12.90	1.01	1.63
Area 2	04/10/95	(b)	(g)	(g)
Area 2	04/17/95	18.70	0.99	1.39

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 2	04/26/95	15.30	1.25	2.03
Area 2	05/02/95	(a)	(g)	(g)
Area 2	05/08/95	(d)	(g)	(g)
Area 2	05/16/95	45.40	2.36	3.30
Area 2	05/23/95	22.60	1.06	1.46
Area 2	05/31/95	20.30	1.27	1.92
Area 2	06/06/95	12.00	1.58	2.82
Area 2	06/14/95	16.00	1.29	2.07
Area 2	06/20/95	19.10	1.05	1.50
Area 2	06/27/95	20.90	1.22	1.80
Area 2	07/03/95	27.40	1.17	1.51
Area 2	07/10/95	19.70	0.89	1.18
Area 2	07/19/95	23.70	1.22	1.71
Area 2	07/26/95	(a)	(g)	(g)
Area 2	08/02/95	(a)	(g)	(g)
Area 2	08/10/95	(a)	(g)	(g)
Area 2	08/17/95	(a)	(g)	(g)
Area 2	08/24/95	(a)	(g)	(g)
Area 2	08/31/95	30.40	1.75	2.55
Area 2	09/06/95	(a)	(g)	(g)
Area 2	09/13/95	(d)	(g)	(g)
Area 2	09/20/95	28.90	1.21	1.59
Area 2	09/27/95	23.10	1.12	1.54
Area 2	10/04/95	24.30	1.46	2.16
Area 2	10/09/95	(e)	(g)	(g)
Area 2	10/16/95	(e)	(g)	(g)
Area 2	10/23/95	(e)	(g)	(g)
Area 2	10/30/95	(e)	(g)	(g)
Area 2	11/06/95	(e)	(g)	(g)
Area 2	11/13/95	22.60	1.02	1.38
Area 2	11/20/95	30.70	1.11	1.33
Area 2	11/27/95	20.60	0.99	1.37
Area 2	12/04/95	22.20	1.33	1.67
Area 2	12/11/95	9.17	0.83	1.38
Area 2	12/18/95	40.80	1.13	1.18
Area 2	12/26/95	17.30	0.93	1.32

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 2, 2-1 Substation	01/03/95	13.80	1.07	1.71
Area 2, 2-1 Substation	01/09/95	7.62	0.75	1.28
Area 2, 2-1 Substation	01/17/95	17.40	1.11	1.69
Area 2, 2-1 Substation	01/23/95	10.80	0.90	1.47
Area 2, 2-1 Substation	01/30/95	19.90	0.85	1.11
Area 2, 2-1 Substation	02/08/95	14.60	1.07	1.69
Area 2, 2-1 Substation	02/14/95	14.80	0.94	1.43
Area 2, 2-1 Substation	02/21/95	27.30	1.12	1.46
Area 2, 2-1 Substation	02/28/95	12.40	1.01	1.64
Area 2, 2-1 Substation	03/06/95	0.50	1.06	2.18
Area 2, 2-1 Substation	03/13/95	15.10	0.97	1.49
Area 2, 2-1 Substation	03/20/95	10.50	0.91	1.51
Area 2, 2-1 Substation	03/27/95	18.00	1.02	1.49
Area 2, 2-1 Substation	04/03/95	12.10	0.93	1.48
Area 2, 2-1 Substation	04/10/95	12.10	0.99	1.59
Area 2, 2-1 Substation	04/17/95	15.70	0.79	1.10
Area 2, 2-1 Substation	04/26/95	9.93	0.97	1.64
Area 2, 2-1 Substation	05/02/95	13.70	1.07	1.73
Area 2, 2-1 Substation	05/08/95	14.70	0.85	1.25
Area 2, 2-1 Substation	05/16/95	20.90	1.03	1.42
Area 2, 2-1 Substation	05/23/95	17.40	0.91	1.31
Area 2, 2-1 Substation	05/31/95	19.90	1.16	1.74
Area 2, 2-1 Substation	06/06/95	13.20	0.85	1.31
Area 2, 2-1 Substation	06/14/95	12.00	1.02	1.67
Area 2, 2-1 Substation	06/20/95	16.70	0.96	1.41
Area 2, 2-1 Substation	06/27/95	21.30	1.19	1.76
Area 2, 2-1 Substation	07/03/95	25.80	1.11	1.44
Area 2, 2-1 Substation	07/10/95	14.90	0.80	1.14
Area 2, 2-1 Substation	07/19/95	(a)	(g)	(g)
Area 2, 2-1 Substation	07/26/95	21.70	1.04	1.41
Area 2, 2-1 Substation	08/02/95	21.80	0.97	1.30
Area 2, 2-1 Substation	08/10/95	18.10	1.01	1.48
Area 2, 2-1 Substation	08/17/95	21.60	1.06	1.47
Area 2, 2-1 Substation	08/24/95	13.20	0.93	1.47
Area 2, 2-1 Substation	08/31/95	24.70	1.44	2.15
Area 2, 2-1 Substation	09/06/95	(a)	(g)	(g)

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 2, 2-1 Substation	09/13/95	(d)	(g)	(g)
Area 2, 2-1 Substation	09/20/95	27.10	1.11	1.44
Area 2, 2-1 Substation	09/27/95	19.40	1.00	1.41
Area 2, 2-1 Substation	10/04/95	22.30	1.35	2.00
Area 2, 2-1 Substation	10/09/95	26.60	1.11	1.46
Area 2, 2-1 Substation	10/16/95	25.80	1.09	1.41
Area 2, 2-1 Substation	10/23/95	21.10	1.03	1.45
Area 2, 2-1 Substation	10/30/95	29.60	1.16	1.46
Area 2, 2-1 Substation	11/06/95	20.90	1.02	1.41
Area 2, 2-1 Substation	11/13/95	21.20	1.06	1.48
Area 2, 2-1 Substation	11/20/95	34.50	1.20	1.41
Area 2, 2-1 Substation	11/27/95	20.10	1.04	1.47
Area 2, 2-1 Substation	12/04/95	24.30	1.45	1.79
Area 2, 2-1 Substation	12/11/95	8.57	1.09	1.80
Area 2, 2-1 Substation	12/18/95	41.10	1.18	1.26
Area 2, 2-1 Substation	12/26/95	17.80	1.30	2.04
Area 3	01/03/95	(a)	(g)	(g)
Area 3	01/09/95	(a)	(g)	(g)
Area 3	01/17/95	(a)	(g)	(g)
Area 3	01/23/95	10.70	1.00	1.67
Area 3	01/30/95	16.70	0.88	1.25
Area 3	02/07/95	18.40	0.99	1.43
Area 3	02/14/95	14.70	0.93	1.43
Area 3	02/21/95	27.60	1.23	1.66
Area 3	02/27/95	(a)	(g)	(g)
Area 3	03/06/95	(a)	(g)	(g)
Area 3	03/13/95	(a)	(g)	(g)
Area 3	03/20/95	6.92	0.81	1.42
Area 3	03/27/95	(d)	(g)	(g)
Area 3	04/03/95	12.80	0.90	1.41
Area 3	04/10/95	12.40	0.89	1.40
Area 3	04/17/95	11.90	0.89	1.41
Area 3	04/24/95	14.70	0.92	1.39
Area 3	05/01/95	12.40	0.89	1.40
Area 3	05/08/95	13.70	0.91	1.40
Area 3	05/15/95	18.60	0.99	1.41

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 3	05/22/95	16.70	0.84	1.17
Area 3	05/30/95	20.40	1.13	1.66
Area 3	06/05/95	13.80	0.93	1.44
Area 3	06/12/95	12.30	0.89	1.42
Area 3	06/19/95	16.30	0.96	1.43
Area 3	06/26/95	19.20	0.99	1.41
Area 3	07/03/95	21.40	0.93	1.23
Area 3	07/11/95	16.00	0.85	1.22
Area 3	07/19/95	19.20	0.91	1.26
Area 3	07/27/95	25.50	1.18	1.58
Area 3	08/02/95	21.40	1.01	1.39
Area 3	08/09/95	19.30	0.98	1.37
Area 3	08/16/95	15.00	0.92	1.36
Area 3	08/23/95	13.90	0.90	1.36
Area 3	08/30/95	22.20	1.13	1.61
Area 3	09/05/95	18.10	0.99	1.41
Area 3	09/14/95	(a)	(g)	(g)
Area 3	09/21/95	(a)	(g)	(g)
Area 3	09/28/95	(a)	(g)	(g)
Area 3	10/05/95	(a)	(g)	(g)
Area 3, Mud Plant	01/03/95	7.85	1.10	1.99
Area 3, Mud Plant	01/09/95	8.76	0.74	1.22
Area 3, Mud Plant	01/17/95	15.80	1.03	1.57
Area 3, Mud Plant	01/23/95	9.45	0.83	1.38
Area 3, Mud Plant	01/30/95	17.00	0.87	1.22
Area 3, Mud Plant	02/07/95	15.70	0.93	1.39
Area 3, Mud Plant	02/14/95	15.10	0.92	1.39
Area 3, Mud Plant	02/21/95	26.10	1.20	1.63
Area 3, Mud Plant	02/27/95	12.10	0.89	1.41
Area 3, Mud Plant	03/06/95	5.55	0.78	1.41
Area 3, Mud Plant	03/13/95	17.00	0.94	1.35
Area 3, Mud Plant	03/20/95	6.40	0.78	1.39
Area 3, Mud Plant	03/27/95	19.30	0.98	1.39
Area 3, Mud Plant	04/03/95	12.20	0.89	1.42
Area 3, Mud Plant	04/10/95	14.00	0.90	1.38
Area 3, Mud Plant	04/17/95	11.40	0.88	1.41

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 3, Mud Plant	04/24/95	13.60	0.91	1.41
Area 3, Mud Plant	05/01/95	12.40	0.90	1.41
Area 3, Mud Plant	05/08/95	14.00	0.92	1.42
Area 3, Mud Plant	05/15/95	19.70	1.01	1.44
Area 3, Mud Plant	05/22/95	15.50	0.92	1.37
Area 3, Mud Plant	05/30/95	20.50	1.17	1.71
Area 3, Mud Plant	06/05/95	12.60	0.92	1.46
Area 3, Mud Plant	06/12/95	12.30	0.91	1.45
Area 3, Mud Plant	06/19/95	16.70	0.99	1.48
Area 3, Mud Plant	06/26/95	18.20	1.01	1.48
Area 3, Mud Plant	07/03/95	21.40	0.96	1.29
Area 3, Mud Plant	07/11/95	16.80	0.88	1.27
Area 3, Mud Plant	07/19/95	19.60	0.95	1.31
Area 3, Mud Plant	07/27/95	23.00	1.18	1.65
Area 3, Mud Plant	08/02/95	23.00	1.08	1.48
Area 3, Mud Plant	08/09/95	16.70	0.99	1.45
Area 3, Mud Plant	08/16/95	15.30	0.95	1.42
Area 3, Mud Plant	08/23/95	14.80	0.93	1.40
Area 3, Mud Plant	08/30/95	22.90	1.17	1.65
Area 3, Mud Plant	09/05/95	18.50	0.82	1.08
Area 3, Mud Plant	09/14/95	29.50	1.10	1.35
Area 3, Mud Plant	09/21/95	24.50	1.06	1.41
Area 3, Mud Plant	09/28/95	17.00	0.94	1.35
Area 3, Mud Plant	10/05/95	22.60	1.31	1.92
Area 3, Mud Plant	10/10/95	25.90	1.04	1.31
Area 3, Mud Plant	10/17/95	23.70	1.04	1.37
Area 3, Mud Plant	10/24/95	(c)	(g)	(g)
Area 3, Mud Plant	10/24/95	24.40	0.65	0.67
Area 3, Mud Plant	11/07/95	18.80	0.96	1.35
Area 3, Mud Plant	11/14/95	25.50	1.07	1.40
Area 3, Mud Plant	11/21/95	30.00	1.24	1.62
Area 3, Mud Plant	11/27/95	22.30	1.01	1.37
Area 3, Mud Plant	12/04/95	23.50	1.36	1.67
Area 3, Mud Plant	12/11/95	8.36	0.81	1.38
Area 3, Mud Plant	12/18/95	36.60	1.07	1.15
Area 3, Mud Plant	12/26/95	17.60	0.84	1.14

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 3, U-3ah/at E	01/03/95	11.40	1.29	2.25
Area 3, U-3ah/at E	01/09/95	7.64	0.93	1.64
Area 3, U-3ah/at E	01/17/95	2.88	1.09	2.15
Area 3, U-3ah/at E	01/23/95	16.00	1.17	1.85
Area 3, U-3ah/at E	01/30/95	17.40	1.10	1.66
Area 3, U-3ah/at E	02/07/95	10.90	1.10	1.87
Area 3, U-3ah/at E	02/14/95	15.60	1.17	1.88
Area 3, U-3ah/at E	02/21/95	26.50	1.48	2.15
Area 3, U-3ah/at E	02/27/95	11.80	1.12	1.88
Area 3, U-3ah/at E	03/06/95	3.91	0.96	1.83
Area 3, U-3ah/at E	03/13/95	14.10	1.16	1.90
Area 3, U-3ah/at E	03/20/95	5.91	1.00	1.85
Area 3, U-3ah/at E	03/27/95	18.80	1.18	1.78
Area 3, U-3ah/at E	04/03/95	10.20	1.09	1.89
Area 3, U-3ah/at E	04/10/95	9.95	1.07	1.85
Area 3, U-3ah/at E	04/17/95	11.70	1.12	1.89
Area 3, U-3ah/at E	04/24/95	12.00	0.90	1.44
Area 3, U-3ah/at E	05/03/95	12.70	1.55	2.73
Area 3, U-3ah/at E	05/08/95	13.60	1.14	1.89
Area 3, U-3ah/at E	05/15/95	18.80	1.13	1.69
Area 3, U-3ah/at E	05/23/95	8.96	1.17	2.09
Area 3, U-3ah/at E	05/30/95	20.10	1.44	2.27
Area 3, U-3ah/at E	06/05/95	13.00	1.16	1.94
Area 3, U-3ah/at E	06/12/95	10.80	1.12	1.92
Area 3, U-3ah/at E	06/19/95	16.10	1.22	1.95
Area 3, U-3ah/at E	06/26/95	19.30	1.35	2.13
Area 3, U-3ah/at E	07/03/95	24.10	1.45	2.18
Area 3, U-3ah/at E	07/11/95	17.40	1.07	1.62
Area 3, U-3ah/at E	07/19/95	18.60	1.12	1.66
Area 3, U-3ah/at E	07/27/95	24.20	1.44	2.12
Area 3, U-3ah/at E	08/02/95	21.30	1.28	1.91
Area 3, U-3ah/at E	08/09/95	17.10	1.35	2.16
Area 3, U-3ah/at E	08/16/95	22.20	1.38	2.07
Area 3, U-3ah/at E	08/23/95	9.16	0.85	1.42
Area 3, U-3ah/at E	08/31/95	23.70	1.64	2.56
Area 3, U-3ah/at E	09/05/95	19.50	1.00	1.41

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 3, U-3ah/at E	09/14/95	26.40	1.29	1.77
Area 3, U-3ah/at E	09/21/95	22.00	1.25	1.85
Area 3, U-3ah/at E	09/28/95	(c)	(g)	(g)
Area 3, U-3ah/at E	09/28/95	18.50	0.80	1.04
Area 3, U-3ah/at E	10/10/95	24.80	1.24	1.72
Area 3, U-3ah/at E	10/17/95	23.70	1.26	1.79
Area 3, U-3ah/at E	10/24/95	(c)	(g)	(g)
Area 3, U-3ah/at E	10/24/95	24.70	0.78	0.88
Area 3, U-3ah/at E	11/07/95	24.90	1.25	1.75
Area 3, U-3ah/at E	11/14/95	23.00	1.25	1.82
Area 3, U-3ah/at E	11/21/95	32.30	1.52	2.07
Area 3, U-3ah/at E	11/27/95	19.80	1.20	1.79
Area 3, U-3ah/at E	12/04/95	22.10	1.61	2.19
Area 3, U-3ah/at E	12/11/95	(c)	(g)	(g)
Area 3, U-3ah/at E	12/11/95	22.70	0.70	0.77
Area 3, U-3ah/at E	12/27/95	15.30	1.10	1.73
Area 3, U-3ah/at N	01/03/95	12.30	1.47	2.59
Area 3, U-3ah/at N	01/09/95	8.51	1.10	1.95
Area 3, U-3ah/at N	01/17/95	16.00	1.55	2.63
Area 3, U-3ah/at N	01/23/95	16.30	1.38	2.26
Area 3, U-3ah/at N	01/30/95	16.30	1.26	2.03
Area 3, U-3ah/at N	02/07/95	19.50	1.44	2.31
Area 3, U-3ah/at N	02/14/95	15.00	1.38	2.32
Area 3, U-3ah/at N	02/21/95	32.10	1.81	2.66
Area 3, U-3ah/at N	02/27/95	14.20	1.38	2.34
Area 3, U-3ah/at N	03/06/95	9.84	1.26	2.24
Area 3, U-3ah/at N	03/13/95	14.70	1.35	2.25
Area 3, U-3ah/at N	03/20/95	6.22	1.20	2.25
Area 3, U-3ah/at N	03/27/95	23.50	1.43	2.13
Area 3, U-3ah/at N	04/03/95	10.90	1.28	2.26
Area 3, U-3ah/at N	04/10/95	18.90	1.41	2.23
Area 3, U-3ah/at N	04/17/95	11.40	1.30	2.27
Area 3, U-3ah/at N	04/24/95	(b)	(g)	(g)
Area 3, U-3ah/at N	05/03/95	11.40	1.72	3.12
Area 3, U-3ah/at N	05/08/95	14.20	1.35	2.27
Area 3, U-3ah/at N	05/15/95	17.10	1.27	2.02

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 3, U-3ah/at N	05/23/95	17.60	1.51	2.48
Area 3, U-3ah/at N	05/30/95	20.10	1.62	2.64
Area 3, U-3ah/at N	06/05/95	13.00	1.33	2.29
Area 3, U-3ah/at N	06/12/95	12.20	1.30	2.23
Area 3, U-3ah/at N	06/19/95	19.00	1.41	2.24
Area 3, U-3ah/at N	06/26/95	(b)	(g)	(g)
Area 3, U-3ah/at N	07/03/95	21.70	1.30	1.96
Area 3, U-3ah/at N	07/11/95	21.60	1.30	1.94
Area 3, U-3ah/at N	07/19/95	19.90	1.30	2.01
Area 3, U-3ah/at N	07/27/95	22.90	1.42	2.13
Area 3, U-3ah/at N	08/02/95	18.90	1.26	1.94
Area 3, U-3ah/at N	08/09/95	16.20	1.39	2.29
Area 3, U-3ah/at N	08/16/95	19.70	1.35	2.07
Area 3, U-3ah/at N	08/23/95	12.30	0.93	1.47
Area 3, U-3ah/at N	08/31/95	21.90	1.63	2.59
Area 3, U-3ah/at N	09/05/95	19.20	1.02	1.45
Area 3, U-3ah/at N	09/14/95	25.40	1.04	1.32
Area 3, U-3ah/at N	09/21/95	23.50	1.02	1.35
Area 3, U-3ah/at N	09/28/95	(c)	(g)	(g)
Area 3, U-3ah/at N	09/28/95	17.40	0.63	0.76
Area 3, U-3ah/at N	10/10/95	26.10	1.01	1.25
Area 3, U-3ah/at N	10/17/95	23.20	1.00	1.30
Area 3, U-3ah/at N	10/24/95	(c)	(g)	(g)
Area 3, U-3ah/at N	10/24/95	23.30	0.62	0.64
Area 3, U-3ah/at N	11/07/95	16.70	0.89	1.26
Area 3, U-3ah/at N	11/14/95	25.90	1.02	1.30
Area 3, U-3ah/at N	11/21/95	32.10	1.21	1.49
Area 3, U-3ah/at N	11/27/95	21.20	0.96	1.29
Area 3, U-3ah/at N	12/04/95	22.30	1.29	1.58
Area 3, U-3ah/at N	12/11/95	(c)	(g)	(g)
Area 3, U-3ah/at N	12/11/95	22.60	0.56	0.55
Area 3, U-3ah/at N	12/27/95	(b)	(g)	(g)
Area 3, U-3ah/at S	01/03/95	10.00	1.21	2.14
Area 3, U-3ah/at S	01/09/95	8.53	0.91	1.58
Area 3, U-3ah/at S	01/17/95	13.50	1.24	2.08
Area 3, U-3ah/at S	01/23/95	10.80	1.05	1.78

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 3, U-3ah/at S	01/30/95	18.90	1.28	1.98
Area 3, U-3ah/at S	02/07/95	17.80	1.02	1.51
Area 3, U-3ah/at S	02/14/95	11.40	1.09	1.84
Area 3, U-3ah/at S	02/21/95	22.10	1.39	2.11
Area 3, U-3ah/at S	02/27/95	21.80	1.26	1.87
Area 3, U-3ah/at S	03/06/95	10.10	1.05	1.79
Area 3, U-3ah/at S	03/13/95	11.80	1.12	1.89
Area 3, U-3ah/at S	03/20/95	4.80	0.98	1.85
Area 3, U-3ah/at S	03/27/95	17.40	1.16	1.77
Area 3, U-3ah/at S	04/03/95	11.10	1.10	1.88
Area 3, U-3ah/at S	04/10/95	19.70	1.22	1.86
Area 3, U-3ah/at S	04/17/95	9.75	1.08	1.87
Area 3, U-3ah/at S	04/24/95	(b)	(g)	(g)
Area 3, U-3ah/at S	05/03/95	18.20	2.19	3.86
Area 3, U-3ah/at S	05/08/95	10.80	1.10	1.88
Area 3, U-3ah/at S	05/15/95	16.90	1.10	1.68
Area 3, U-3ah/at S	05/23/95	15.20	1.28	2.09
Area 3, U-3ah/at S	05/30/95	17.60	1.39	2.25
Area 3, U-3ah/at S	06/05/95	11.50	1.14	1.93
Area 3, U-3ah/at S	06/12/95	11.80	1.13	1.91
Area 3, U-3ah/at S	06/19/95	13.90	1.17	1.95
Area 3, U-3ah/at S	06/26/95	15.90	1.61	2.75
Area 3, U-3ah/at S	07/03/95	17.80	1.21	1.89
Area 3, U-3ah/at S	07/11/95	12.80	1.00	1.62
Area 3, U-3ah/at S	07/19/95	17.70	1.11	1.69
Area 3, U-3ah/at S	07/27/95	18.30	1.35	2.12
Area 3, U-3ah/at S	08/02/95	19.20	1.25	1.92
Area 3, U-3ah/at S	08/09/95	15.50	1.33	2.19
Area 3, U-3ah/at S	08/16/95	16.90	1.28	2.04
Area 3, U-3ah/at S	08/23/95	8.94	0.87	1.46
Area 3, U-3ah/at S	08/31/95	19.40	1.58	2.57
Area 3, U-3ah/at S	09/05/95	18.10	1.00	1.42
Area 3, U-3ah/at S	09/14/95	25.60	1.60	2.40
Area 3, U-3ah/at S	09/21/95	22.70	1.53	2.39
Area 3, U-3ah/at S	09/28/95	(c)	(g)	(g)
Area 3, U-3ah/at S	09/28/95	17.10	0.90	1.28

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 3, U-3ah/at S	10/10/95	26.30	1.42	2.04
Area 3, U-3ah/at S	10/17/95	22.70	1.38	2.07
Area 3, U-3ah/at S	10/24/95	(c)	(g)	(g)
Area 3, U-3ah/at S	10/24/95	24.30	0.86	1.03
Area 3, U-3ah/at S	11/07/95	16.80	1.29	2.06
Area 3, U-3ah/at S	11/14/95	23.70	1.41	2.11
Area 3, U-3ah/at S	11/21/95	30.50	1.66	2.39
Area 3, U-3ah/at S	11/27/95	20.10	1.30	1.98
Area 3, U-3ah/at S	12/04/95	21.80	1.74	2.48
Area 3, U-3ah/at S	12/11/95	(c)	(g)	(g)
Area 3, U-3ah/at S	12/19/95	(d)	(g)	(g)
Area 3, U-3ah/at S	12/27/95	(d)	(g)	(g)
Area 3, U-3ah/at W	01/03/95	22.20	1.43	2.19
Area 3, U-3ah/at W	01/09/95	7.83	0.91	1.59
Area 3, U-3ah/at W	01/17/95	17.20	1.31	2.10
Area 3, U-3ah/at W	01/23/95	11.10	1.06	1.79
Area 3, U-3ah/at W	01/30/95	21.60	1.33	2.00
Area 3, U-3ah/at W	02/07/95	11.20	0.93	1.52
Area 3, U-3ah/at W	02/14/95	14.70	1.15	1.85
Area 3, U-3ah/at W	02/21/95	25.30	1.44	2.11
Area 3, U-3ah/at W	02/27/95	11.70	1.09	1.84
Area 3, U-3ah/at W	03/06/95	12.10	1.08	1.80
Area 3, U-3ah/at W	03/13/95	13.10	1.12	1.85
Area 3, U-3ah/at W	03/20/95	5.56	0.96	1.79
Area 3, U-3ah/at W	03/27/95	18.70	1.20	1.81
Area 3, U-3ah/at W	04/03/95	12.90	1.12	1.86
Area 3, U-3ah/at W	04/10/95	17.90	1.19	1.84
Area 3, U-3ah/at W	04/17/95	10.50	1.08	1.86
Area 3, U-3ah/at W	04/24/95	12.00	0.91	1.46
Area 3, U-3ah/at W	05/03/95	12.80	1.47	2.58
Area 3, U-3ah/at W	05/08/95	10.80	1.10	1.87
Area 3, U-3ah/at W	05/15/95	16.60	1.09	1.68
Area 3, U-3ah/at W	05/23/95	17.10	1.31	2.07
Area 3, U-3ah/at W	05/30/95	17.10	1.38	2.25
Area 3, U-3ah/at W	06/05/95	15.40	1.19	1.93
Area 3, U-3ah/at W	06/12/95	10.90	1.12	1.91

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 3, U-3ah/at W	06/19/95	16.00	1.21	1.93
Area 3, U-3ah/at W	06/26/95	18.60	1.25	1.94
Area 3, U-3ah/at W	07/03/95	21.90	1.17	1.69
Area 3, U-3ah/at W	07/11/95	14.80	1.05	1.66
Area 3, U-3ah/at W	07/19/95	17.70	1.12	1.72
Area 3, U-3ah/at W	07/27/95	23.00	1.44	2.16
Area 3, U-3ah/at W	08/02/95	22.00	1.31	1.96
Area 3, U-3ah/at W	08/09/95	18.80	1.41	2.23
Area 3, U-3ah/at W	08/16/95	20.20	1.39	2.15
Area 3, U-3ah/at W	08/23/95	8.88	0.87	1.45
Area 3, U-3ah/at W	08/31/95	23.50	1.75	2.78
Area 3, U-3ah/at W	09/05/95	18.40	1.06	1.54
Area 3, U-3ah/at W	09/14/95	25.00	1.35	1.93
Area 3, U-3ah/at W	09/21/95	24.80	1.39	2.03
Area 3, U-3ah/at W	09/28/95	(c)	(g)	(g)
Area 3, U-3ah/at W	09/28/95	20.50	0.88	1.14
Area 3, U-3ah/at W	10/10/95	24.80	1.33	1.89
Area 3, U-3ah/at W	10/17/95	10.80	0.60	0.88
Area 3, U-3ah/at W	10/24/95	61.60	2.12	2.50
Area 3, U-3ah/at W	10/24/95	(c)	(g)	(g)
Area 3, U-3ah/at W	11/07/95	19.40	1.26	1.92
Area 3, U-3ah/at W	11/14/95	23.00	1.35	1.99
Area 3, U-3ah/at W	11/21/95	32.30	1.63	2.27
Area 3, U-3ah/at W	11/27/95	19.70	1.28	1.97
Area 3, U-3ah/at W	12/04/95	22.50	1.73	2.41
Area 3, U-3ah/at W	12/11/95	(c)	(g)	(g)
Area 3, U-3ah/at W	12/11/95	25.20	0.76	0.84
Area 3, U-3ah/at W	12/27/95	(b)	(g)	(g)
Area 3, Well ER-3-1	08/10/95	18.10	0.92	1.31
Area 3, Well ER-3-1	08/17/95	17.30	0.99	1.46
Area 3, Well ER-3-1	08/24/95	12.30	0.92	1.47
Area 3, Well ER-3-1	08/31/95	22.60	1.21	1.71
Area 3, Well ER-3-1	09/06/95	19.80	1.00	1.39
Area 3, Well ER-3-1	09/13/95	(a)	(g)	(g)
Area 3, Well ER-3-1	09/20/95	25.90	1.24	1.72
Area 3, Well ER-3-1	09/27/95	18.50	1.01	1.45

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 3, Well ER-3-1	10/04/95	24.70	1.38	2.01
Area 3, Well ER-3-1	10/09/95	22.20	1.07	1.49
Area 3, Well ER-3-1	10/16/95	30.00	1.15	1.43
Area 3, Well ER-3-1	10/23/95	24.00	1.09	1.49
Area 3, Well ER-3-1	10/30/95	29.10	1.17	1.50
Area 3, Well ER-3-1	11/06/95	24.30	1.09	1.46
Area 3, Well ER-3-1	11/13/95	24.00	1.12	1.53
Area 3, Well ER-3-1	11/20/95	39.10	1.28	1.46
Area 3, Well ER-3-1	11/27/95	24.80	1.12	1.52
Area 3, Well ER-3-1	12/04/95	24.40	1.48	1.85
Area 3, Well ER-3-1	12/11/95	11.70	1.21	1.86
Area 3, Well ER-3-1	12/18/95	(c)	(g)	(g)
Area 3, Well ER-3-1	12/18/95	36.60	0.79	0.69
Area 4, Bunker T-4	12/18/95	39.30	1.20	1.32
Area 4, Bunker T-4	12/26/95	15.10	0.88	1.29
Area 5, DOD	01/03/95	22.00	1.28	1.90
Area 5, DOD	01/09/95	11.00	0.93	1.52
Area 5, DOD	01/17/95	20.30	1.12	1.61
Area 5, DOD	01/23/95	16.60	1.04	1.58
Area 5, DOD	01/30/95	23.40	1.06	1.43
Area 5, DOD	02/07/95	18.50	1.08	1.60
Area 5, DOD	02/14/95	19.30	1.08	1.57
Area 5, DOD	02/21/95	32.50	1.39	1.82
Area 5, DOD	02/27/95	15.60	1.04	1.60
Area 5, DOD	03/06/95	13.30	1.00	1.60
Area 5, DOD	03/13/95	20.50	1.09	1.53
Area 5, DOD	03/20/95	7.14	0.90	1.60
Area 5, DOD	03/27/95	22.90	1.14	1.62
Area 5, DOD	04/03/95	13.50	0.99	1.58
Area 5, DOD	04/10/95	13.20	1.00	1.59
Area 5, DOD	04/17/95	14.10	1.02	1.60
Area 5, DOD	04/24/95	17.10	1.06	1.60
Area 5, DOD	05/01/95	13.80	1.01	1.60
Area 5, DOD	05/08/95	14.50	1.03	1.61
Area 5, DOD	05/15/95	21.10	1.10	1.58
Area 5, DOD	05/22/95	22.00	1.00	1.33

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	μCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, DOD	05/30/95	21.00	1.24	1.85
Area 5, DOD	06/05/95	14.80	1.03	1.60
Area 5, DOD	06/12/95	13.80	0.99	1.58
Area 5, DOD	06/19/95	18.80	1.08	1.61
Area 5, DOD	06/26/95	(b)	(g)	(g)
Area 5, DOD	07/03/95	23.70	1.03	1.38
Area 5, DOD	07/11/95	17.40	0.96	1.40
Area 5, DOD	07/19/95	23.20	1.06	1.43
Area 5, DOD	07/27/95	24.90	2.00	3.23
Area 5, DOD	08/02/95	25.90	1.13	1.51
Area 5, DOD	08/09/95	(d)	(g)	(g)
Area 5, DOD	08/16/95	16.00	0.97	1.44
Area 5, DOD	08/23/95	14.50	0.93	1.40
Area 5, DOD	08/30/95	26.10	1.27	1.77
Area 5, DOD	09/05/95	20.50	0.86	1.10
Area 5, DOD	09/14/95	32.50	1.18	1.41
Area 5, DOD	09/21/95	26.40	1.12	1.49
Area 5, DOD	09/28/95	19.80	1.03	1.46
Area 5, DOD	10/05/95	33.30	1.55	2.08
Area 5, DOD	10/10/95	31.40	1.16	1.41
Area 5, DOD	10/17/95	30.30	1.18	1.48
Area 5, DOD	10/24/95	30.60	1.18	1.50
Area 5, DOD	10/31/95	35.00	1.35	1.68
Area 5, DOD	11/07/95	21.60	0.98	1.31
Area 5, DOD	11/14/95	34.90	1.25	1.52
Area 5, DOD	11/21/95	39.00	1.40	1.67
Area 5, DOD	11/27/95	30.00	1.18	1.51
Area 5, DOD	12/04/95	29.90	1.58	1.84
Area 5, DOD	12/11/95	11.10	0.92	1.52
Area 5, DOD	12/18/95	49.70	1.28	1.27
Area 5, DOD	12/26/95	25.10	1.03	1.33
Area 5, Gate 200 South	01/03/95	6.54	1.03	1.89
Area 5, Gate 200 South	01/09/95	6.16	0.78	1.39
Area 5, Gate 200 South	01/17/95	10.80	1.10	1.87
Area 5, Gate 200 South	01/23/95	10.40	0.95	1.58
Area 5, Gate 200 South	01/30/95	16.70	0.96	1.41

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	μCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, Gate 200 South	02/07/95	13.40	1.00	1.61
Area 5, Gate 200 South	02/14/95	14.30	1.02	1.61
Area 5, Gate 200 South	02/21/95	26.00	1.33	1.88
Area 5, Gate 200 South	02/27/95	13.70	1.01	1.61
Area 5, Gate 200 South	03/06/95	10.30	0.97	1.62
Area 5, Gate 200 South	03/13/95	15.60	1.03	1.57
Area 5, Gate 200 South	03/20/95	6.75	0.86	1.52
Area 5, Gate 200 South	03/27/95	19.20	1.10	1.63
Area 5, Gate 200 South	04/03/95	12.30	0.98	1.56
Area 5, Gate 200 South	04/10/95	15.80	1.03	1.56
Area 5, Gate 200 South	04/17/95	12.50	0.97	1.54
Area 5, Gate 200 South	04/24/95	14.70	1.02	1.57
Area 5, Gate 200 South	05/01/95	9.42	0.96	1.64
Area 5, Gate 200 South	05/08/95	11.20	0.96	1.57
Area 5, Gate 200 South	05/15/95	18.50	1.13	1.70
Area 5, Gate 200 South	05/22/95	15.30	0.96	1.47
Area 5, Gate 200 South	05/30/95	20.50	1.29	1.97
Area 5, Gate 200 South	06/05/95	12.70	1.03	1.68
Area 5, Gate 200 South	06/12/95	9.27	0.95	1.61
Area 5, Gate 200 South	06/19/95	19.20	1.12	1.64
Area 5, Gate 200 South	06/26/95	17.80	1.13	1.74
Area 5, Gate 200 South	07/03/95	19.90	1.01	1.43
Area 5, Gate 200 South	07/11/95	15.90	0.98	1.46
Area 5, Gate 200 South	07/19/95	18.70	1.03	1.51
Area 5, Gate 200 South	07/27/95	22.70	1.35	1.99
Area 5, Gate 200 South	08/02/95	22.00	1.19	1.72
Area 5, Gate 200 South	08/09/95	15.90	1.09	1.70
Area 5, Gate 200 South	08/16/95	16.20	1.11	1.73
Area 5, Gate 200 South	08/23/95	12.20	1.02	1.69
Area 5, Gate 200 South	08/30/95	18.90	1.28	1.98
Area 5, Gate 200 South	09/05/95	20.00	0.95	1.28
Area 5, Gate 200 South	09/14/95	27.90	1.24	1.63
Area 5, Gate 200 South	09/21/95	24.70	1.21	1.69
Area 5, Gate 200 South	09/28/95	16.20	1.06	1.62
Area 5, Gate 200 South	10/05/95	25.60	1.55	2.29
Area 5, RWMS No. 1	01/03/95	21.00	1.27	1.90

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 1	01/09/95	7.75	0.81	1.38
Area 5, RWMS No. 1	01/17/95	15.30	1.14	1.81
Area 5, RWMS No. 1	01/23/95	10.60	0.95	1.57
Area 5, RWMS No. 1	01/30/95	17.50	0.97	1.42
Area 5, RWMS No. 1	02/07/95	15.50	1.03	1.59
Area 5, RWMS No. 1	02/14/95	14.80	1.01	1.55
Area 5, RWMS No. 1	02/21/95	27.50	1.32	1.81
Area 5, RWMS No. 1	02/27/95	13.40	1.00	1.58
Area 5, RWMS No. 1	03/06/95	11.50	0.97	1.58
Area 5, RWMS No. 1	03/13/95	16.00	1.01	1.51
Area 5, RWMS No. 1	03/20/95	9.75	0.90	1.50
Area 5, RWMS No. 1	03/27/95	17.20	1.05	1.59
Area 5, RWMS No. 1	04/03/95	11.90	0.97	1.58
Area 5, RWMS No. 1	04/10/95	13.40	0.99	1.58
Area 5, RWMS No. 1	04/17/95	10.70	0.95	1.57
Area 5, RWMS No. 1	04/24/95	12.40	0.97	1.56
Area 5, RWMS No. 1	05/01/95	10.80	0.95	1.58
Area 5, RWMS No. 1	05/08/95	13.50	0.99	1.58
Area 5, RWMS No. 1	05/15/95	17.30	1.06	1.59
Area 5, RWMS No. 1	05/22/95	15.90	1.11	1.74
Area 5, RWMS No. 1	05/30/95	25.70	2.03	3.29
Area 5, RWMS No. 1	06/05/95	14.20	1.02	1.60
Area 5, RWMS No. 1	06/12/95	11.30	0.95	1.56
Area 5, RWMS No. 1	06/19/95	14.70	1.03	1.62
Area 5, RWMS No. 1	06/26/95	21.20	1.11	1.60
Area 5, RWMS No. 1	07/03/95	22.60	1.01	1.36
Area 5, RWMS No. 1	07/11/95	17.80	0.86	1.20
Area 5, RWMS No. 1	07/19/95	26.60	1.22	1.67
Area 5, RWMS No. 1	07/27/95	27.90	1.30	1.75
Area 5, RWMS No. 1	08/02/95	22.10	1.12	1.59
Area 5, RWMS No. 1	08/09/95	19.40	1.06	1.52
Area 5, RWMS No. 1	08/16/95	21.70	1.11	1.55
Area 5, RWMS No. 1	08/23/95	14.40	0.98	1.51
Area 5, RWMS No. 1	08/30/95	26.20	1.34	1.90
Area 5, RWMS No. 1	09/05/95	21.30	0.91	1.19
Area 5, RWMS No. 1	09/14/95	31.50	1.22	1.52

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 1	09/21/95	26.90	2.29	3.78
Area 5, RWMS No. 1	09/28/95	20.60	1.10	1.56
Area 5, RWMS No. 1	10/05/95	32.80	1.63	2.25
Area 5, RWMS No. 1	10/10/95	30.30	1.20	1.50
Area 5, RWMS No. 1	10/17/95	31.10	1.26	1.60
Area 5, RWMS No. 1	10/24/95	28.50	1.22	1.61
Area 5, RWMS No. 1	10/31/95	34.20	1.29	1.59
Area 5, RWMS No. 1	11/07/95	15.20	1.03	1.59
Area 5, RWMS No. 1	11/14/95	34.80	1.30	1.62
Area 5, RWMS No. 1	11/21/95	40.00	1.50	1.84
Area 5, RWMS No. 1	11/27/95	28.80	1.23	1.62
Area 5, RWMS No. 1	12/04/95	31.00	1.67	1.98
Area 5, RWMS No. 1	12/11/95	11.70	0.99	1.64
Area 5, RWMS No. 1	12/18/95	49.80	1.34	1.37
Area 5, RWMS No. 1	12/26/95	23.50	1.07	1.43
Area 5, RWMS No. 2	01/03/95	13.60	1.04	1.66
Area 5, RWMS No. 2	01/09/95	9.12	0.74	1.22
Area 5, RWMS No. 2	01/17/95	19.20	1.11	1.64
Area 5, RWMS No. 2	01/23/95	13.70	0.90	1.38
Area 5, RWMS No. 2	01/30/95	19.70	0.92	1.25
Area 5, RWMS No. 2	02/07/95	18.30	0.97	1.40
Area 5, RWMS No. 2	02/14/95	16.80	0.94	1.37
Area 5, RWMS No. 2	02/21/95	27.90	1.21	1.59
Area 5, RWMS No. 2	02/27/95	16.70	0.94	1.39
Area 5, RWMS No. 2	03/06/95	10.60	0.85	1.39
Area 5, RWMS No. 2	03/13/95	16.80	0.93	1.34
Area 5, RWMS No. 2	03/20/95	7.58	0.77	1.31
Area 5, RWMS No. 2	03/27/95	21.10	1.01	1.39
Area 5, RWMS No. 2	04/03/95	13.30	0.87	1.32
Area 5, RWMS No. 2	04/10/95	12.20	0.87	1.38
Area 5, RWMS No. 2	04/17/95	13.00	0.88	1.38
Area 5, RWMS No. 2	04/24/95	14.00	0.90	1.37
Area 5, RWMS No. 2	05/01/95	13.00	0.88	1.38
Area 5, RWMS No. 2	05/08/95	14.30	0.91	1.38
Area 5, RWMS No. 2	05/15/95	18.50	0.97	1.39
Area 5, RWMS No. 2	05/22/95	15.80	0.83	1.17

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 2	05/30/95	21.50	1.13	1.63
Area 5, RWMS No. 2	06/05/95	13.90	0.91	1.41
Area 5, RWMS No. 2	06/12/95	12.20	0.87	1.38
Area 5, RWMS No. 2	06/19/95	14.80	0.93	1.41
Area 5, RWMS No. 2	06/26/95	18.70	1.07	1.58
Area 5, RWMS No. 2	07/03/95	21.40	0.97	1.31
Area 5, RWMS No. 2	07/11/95	17.30	0.92	1.31
Area 5, RWMS No. 2	07/19/95	19.30	1.07	1.56
Area 5, RWMS No. 2	07/27/95	25.00	1.24	1.71
Area 5, RWMS No. 2	08/02/95	21.80	1.09	1.53
Area 5, RWMS No. 2	08/09/95	18.80	1.02	1.47
Area 5, RWMS No. 2	08/16/95	14.50	0.99	1.54
Area 5, RWMS No. 2	08/23/95	13.00	0.94	1.49
Area 5, RWMS No. 2	08/30/95	25.20	1.27	1.79
Area 5, RWMS No. 2	09/05/95	20.70	0.87	1.12
Area 5, RWMS No. 2	09/14/95	29.70	1.15	1.44
Area 5, RWMS No. 2	09/21/95	27.80	1.16	1.52
Area 5, RWMS No. 2	09/28/95	19.60	1.03	1.45
Area 5, RWMS No. 2	10/05/95	29.10	1.48	2.08
Area 5, RWMS No. 3	01/03/95	(a)	(g)	(g)
Area 5, RWMS No. 3	01/09/95	11.20	1.05	1.77
Area 5, RWMS No. 3	01/17/95	19.70	1.16	1.74
Area 5, RWMS No. 3	01/23/95	14.10	0.97	1.50
Area 5, RWMS No. 3	01/30/95	20.10	0.98	1.37
Area 5, RWMS No. 3	02/07/95	18.60	1.04	1.53
Area 5, RWMS No. 3	02/14/95	14.30	0.97	1.49
Area 5, RWMS No. 3	02/21/95	28.70	1.29	1.74
Area 5, RWMS No. 3	02/27/95	18.70	1.05	1.53
Area 5, RWMS No. 3	03/06/95	11.90	0.95	1.53
Area 5, RWMS No. 3	03/13/95	15.90	0.98	1.46
Area 5, RWMS No. 3	03/20/95	10.00	0.88	1.44
Area 5, RWMS No. 3	03/27/95	19.10	1.05	1.53
Area 5, RWMS No. 3	04/03/95	13.10	0.93	1.44
Area 5, RWMS No. 3	04/10/95	11.50	0.93	1.52
Area 5, RWMS No. 3	04/17/95	12.00	0.94	1.53
Area 5, RWMS No. 3	04/24/95	14.80	0.97	1.50

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 3	05/01/95	13.10	0.96	1.52
Area 5, RWMS No. 3	05/08/95	14.30	0.97	1.51
Area 5, RWMS No. 3	05/15/95	20.40	1.07	1.52
Area 5, RWMS No. 3	05/22/95	17.40	0.91	1.28
Area 5, RWMS No. 3	05/30/95	21.30	1.21	1.79
Area 5, RWMS No. 3	06/05/95	13.90	0.99	1.56
Area 5, RWMS No. 3	06/12/95	13.00	0.95	1.50
Area 5, RWMS No. 3	06/19/95	15.60	1.01	1.55
Area 5, RWMS No. 3	06/26/95	18.60	1.05	1.55
Area 5, RWMS No. 3	07/03/95	22.40	0.98	1.31
Area 5, RWMS No. 3	07/11/95	14.40	1.00	1.57
Area 5, RWMS No. 3	07/19/95	19.20	0.96	1.36
Area 5, RWMS No. 3	07/27/95	26.00	1.24	1.69
Area 5, RWMS No. 3	08/02/95	22.60	1.10	1.53
Area 5, RWMS No. 3	08/09/95	18.10	1.01	1.47
Area 5, RWMS No. 3	08/16/95	16.30	1.02	1.55
Area 5, RWMS No. 3	08/23/95	12.50	0.94	1.52
Area 5, RWMS No. 3	08/30/95	23.10	1.26	1.82
Area 5, RWMS No. 3	09/05/95	19.40	0.87	1.15
Area 5, RWMS No. 3	09/14/95	(b)	(g)	(g)
Area 5, RWMS No. 3	09/21/95	25.40	1.15	1.56
Area 5, RWMS No. 3	09/28/95	18.40	1.04	1.51
Area 5, RWMS No. 3	10/05/95	32.90	1.69	2.38
Area 5, RWMS No. 3	10/10/95	17.40	0.96	1.37
Area 5, RWMS No. 3	10/17/95	26.70	1.18	1.57
Area 5, RWMS No. 3	10/24/95	25.70	1.15	1.55
Area 5, RWMS No. 3	10/31/95	31.60	1.23	1.54
Area 5, RWMS No. 3	11/07/95	24.10	1.13	1.54
Area 5, RWMS No. 3	11/14/95	30.30	1.23	1.59
Area 5, RWMS No. 3	11/21/95	37.10	1.40	1.73
Area 5, RWMS No. 3	11/27/95	25.80	1.16	1.57
Area 5, RWMS No. 3	12/04/95	28.20	1.59	1.92
Area 5, RWMS No. 3	12/11/95	11.80	0.97	1.59
Area 5, RWMS No. 3	12/18/95	46.10	1.27	1.32
Area 5, RWMS No. 3	12/26/95	20.50	1.00	1.37
Area 5, RWMS No. 4	01/03/95	16.60	1.17	1.83

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 4	01/09/95	10.50	0.83	1.34
Area 5, RWMS No. 4	01/17/95	22.00	1.21	1.75
Area 5, RWMS No. 4	01/23/95	15.00	0.99	1.52
Area 5, RWMS No. 4	01/30/95	20.40	0.99	1.38
Area 5, RWMS No. 4	02/07/95	19.30	1.06	1.54
Area 5, RWMS No. 4	02/14/95	15.90	0.99	1.50
Area 5, RWMS No. 4	02/21/95	30.30	1.32	1.74
Area 5, RWMS No. 4	02/27/95	14.90	1.00	1.54
Area 5, RWMS No. 4	03/06/95	12.00	0.95	1.55
Area 5, RWMS No. 4	03/13/95	19.40	1.05	1.49
Area 5, RWMS No. 4	03/20/95	8.66	0.87	1.48
Area 5, RWMS No. 4	03/27/95	22.10	1.12	1.57
Area 5, RWMS No. 4	04/03/95	13.30	0.96	1.49
Area 5, RWMS No. 4	04/10/95	19.20	1.09	1.61
Area 5, RWMS No. 4	04/17/95	12.60	0.95	1.50
Area 5, RWMS No. 4	04/24/95	15.60	1.02	1.57
Area 5, RWMS No. 4	05/01/95	13.20	0.99	1.58
Area 5, RWMS No. 4	05/08/95	13.40	1.00	1.59
Area 5, RWMS No. 4	05/15/95	21.10	1.12	1.61
Area 5, RWMS No. 4	05/22/95	18.00	0.94	1.34
Area 5, RWMS No. 4	05/30/95	23.50	1.29	1.89
Area 5, RWMS No. 4	06/05/95	15.30	1.05	1.64
Area 5, RWMS No. 4	06/12/95	13.50	1.01	1.60
Area 5, RWMS No. 4	06/19/95	18.20	1.06	1.57
Area 5, RWMS No. 4	06/26/95	21.20	1.10	1.58
Area 5, RWMS No. 4	07/03/95	23.10	1.00	1.32
Area 5, RWMS No. 4	07/11/95	20.00	0.96	1.34
Area 5, RWMS No. 4	07/19/95	21.20	0.99	1.37
Area 5, RWMS No. 4	07/27/95	24.40	1.22	1.69
Area 5, RWMS No. 4	08/02/95	24.10	1.12	1.54
Area 5, RWMS No. 4	08/09/95	17.40	1.01	1.49
Area 5, RWMS No. 4	08/16/95	(a)	(g)	(g)
Area 5, RWMS No. 4	08/23/95	13.30	0.96	1.53
Area 5, RWMS No. 4	08/30/95	23.80	1.27	1.84
Area 5, RWMS No. 4	09/05/95	21.80	0.90	1.15
Area 5, RWMS No. 4	09/14/95	29.20	1.17	1.48

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 4	09/21/95	28.30	1.19	1.57
Area 5, RWMS No. 4	09/28/95	19.00	1.04	1.51
Area 5, RWMS No. 4	10/05/95	29.90	1.54	2.16
Area 5, RWMS No. 4	10/10/95	30.40	1.17	1.46
Area 5, RWMS No. 4	10/17/95	28.90	1.20	1.55
Area 5, RWMS No. 4	10/24/95	27.50	1.18	1.56
Area 5, RWMS No. 4	10/31/95	34.50	1.27	1.54
Area 5, RWMS No. 4	11/07/95	19.90	1.07	1.54
Area 5, RWMS No. 4	11/14/95	32.60	1.26	1.61
Area 5, RWMS No. 4	11/21/95	41.60	1.47	1.74
Area 5, RWMS No. 4	11/27/95	28.10	1.20	1.59
Area 5, RWMS No. 4	12/04/95	29.10	1.62	1.94
Area 5, RWMS No. 4	12/11/95	12.20	0.99	1.62
Area 5, RWMS No. 4	12/18/95	49.10	1.32	1.34
Area 5, RWMS No. 4	12/26/95	23.70	1.05	1.39
Area 5, RWMS No. 5	01/03/95	13.60	1.09	1.78
Area 5, RWMS No. 5	01/09/95	10.30	0.81	1.30
Area 5, RWMS No. 5	01/17/95	20.90	1.20	1.78
Area 5, RWMS No. 5	01/23/95	12.20	0.93	1.48
Area 5, RWMS No. 5	01/30/95	22.60	1.01	1.36
Area 5, RWMS No. 5	02/07/95	18.30	1.03	1.52
Area 5, RWMS No. 5	02/14/95	18.60	1.03	1.49
Area 5, RWMS No. 5	02/21/95	31.20	1.33	1.73
Area 5, RWMS No. 5	02/27/95	19.90	1.16	1.73
Area 5, RWMS No. 5	03/06/95	11.20	0.88	1.43
Area 5, RWMS No. 5	03/13/95	20.30	1.00	1.37
Area 5, RWMS No. 5	03/20/95	11.10	0.86	1.37
Area 5, RWMS No. 5	03/27/95	20.60	1.02	1.44
Area 5, RWMS No. 5	04/03/95	13.70	0.90	1.37
Area 5, RWMS No. 5	04/10/95	15.70	0.97	1.47
Area 5, RWMS No. 5	04/17/95	14.40	0.91	1.36
Area 5, RWMS No. 5	04/24/95	15.20	0.95	1.43
Area 5, RWMS No. 5	05/01/95	13.10	0.92	1.44
Area 5, RWMS No. 5	05/08/95	14.40	0.93	1.43
Area 5, RWMS No. 5	05/15/95	22.10	1.05	1.45
Area 5, RWMS No. 5	05/22/95	18.90	0.89	1.21

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 5	05/30/95	22.80	1.19	1.70
Area 5, RWMS No. 5	06/05/95	14.30	0.96	1.48
Area 5, RWMS No. 5	06/12/95	11.40	0.88	1.43
Area 5, RWMS No. 5	06/19/95	16.40	0.98	1.47
Area 5, RWMS No. 5	06/26/95	19.90	1.03	1.47
Area 5, RWMS No. 5	07/03/95	19.70	0.92	1.25
Area 5, RWMS No. 5	07/11/95	15.00	0.86	1.27
Area 5, RWMS No. 5	07/19/95	20.40	0.95	1.30
Area 5, RWMS No. 5	07/27/95	26.10	1.19	1.60
Area 5, RWMS No. 5	08/02/95	23.70	1.07	1.45
Area 5, RWMS No. 5	08/09/95	17.80	0.97	1.39
Area 5, RWMS No. 5	08/16/95	16.10	0.97	1.46
Area 5, RWMS No. 5	08/23/95	15.10	1.96	3.50
Area 5, RWMS No. 5	08/30/95	24.80	1.23	1.72
Area 5, RWMS No. 5	09/05/95	17.80	0.81	1.08
Area 5, RWMS No. 5	09/14/95	30.00	1.13	1.38
Area 5, RWMS No. 5	09/21/95	29.10	1.15	1.47
Area 5, RWMS No. 5	09/28/95	18.30	1.00	1.42
Area 5, RWMS No. 5	10/05/95	29.20	1.46	2.03
Area 5, RWMS No. 5	10/10/95	28.30	1.10	1.37
Area 5, RWMS No. 5	10/17/95	28.10	1.14	1.45
Area 5, RWMS No. 5	10/24/95	26.40	1.10	1.45
Area 5, RWMS No. 5	10/31/95	32.30	1.18	1.43
Area 5, RWMS No. 5	11/07/95	19.40	1.01	1.43
Area 5, RWMS No. 5	11/14/95	36.40	1.24	1.47
Area 5, RWMS No. 5	11/21/95	34.80	1.31	1.62
Area 5, RWMS No. 5	11/27/95	28.30	1.14	1.47
Area 5, RWMS No. 5	12/04/95	28.30	1.51	1.78
Area 5, RWMS No. 5	12/11/95	14.20	0.97	1.52
Area 5, RWMS No. 5	12/18/95	47.60	1.23	1.23
Area 5, RWMS No. 5	12/26/95	21.50	0.96	1.28
Area 5, RWMS No. 6	01/03/95	16.10	1.17	1.84
Area 5, RWMS No. 6	01/09/95	10.40	0.84	1.36
Area 5, RWMS No. 6	01/17/95	22.30	1.23	1.78
Area 5, RWMS No. 6	01/23/95	10.60	0.93	1.54
Area 5, RWMS No. 6	01/30/95	20.80	1.02	1.42

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 6	02/07/95	20.40	1.09	1.57
Area 5, RWMS No. 6	02/14/95	17.00	1.04	1.55
Area 5, RWMS No. 6	02/21/95	31.10	1.34	1.76
Area 5, RWMS No. 6	02/27/95	16.60	1.00	1.49
Area 5, RWMS No. 6	03/06/95	13.50	0.95	1.50
Area 5, RWMS No. 6	03/13/95	17.80	1.00	1.44
Area 5, RWMS No. 6	03/20/95	13.70	0.93	1.43
Area 5, RWMS No. 6	03/27/95	21.00	1.06	1.51
Area 5, RWMS No. 6	04/03/95	14.40	0.94	1.42
Area 5, RWMS No. 6	04/10/95	18.40	1.02	1.48
Area 5, RWMS No. 6	04/17/95	15.90	0.96	1.42
Area 5, RWMS No. 6	04/24/95	17.60	0.98	1.41
Area 5, RWMS No. 6	05/01/95	12.00	0.93	1.50
Area 5, RWMS No. 6	05/08/95	15.60	0.98	1.49
Area 5, RWMS No. 6	05/15/95	21.10	1.07	1.51
Area 5, RWMS No. 6	05/22/95	18.30	0.91	1.26
Area 5, RWMS No. 6	05/30/95	23.60	1.24	1.79
Area 5, RWMS No. 6	06/05/95	15.80	1.01	1.54
Area 5, RWMS No. 6	06/12/95	13.40	0.94	1.50
Area 5, RWMS No. 6	06/19/95	16.90	1.01	1.51
Area 5, RWMS No. 6	06/26/95	18.40	1.03	1.52
Area 5, RWMS No. 6	07/03/95	20.60	0.94	1.28
Area 5, RWMS No. 6	07/11/95	17.50	0.91	1.29
Area 5, RWMS No. 6	07/19/95	(a)	(g)	(g)
Area 5, RWMS No. 6	07/27/95	25.10	1.19	1.62
Area 5, RWMS No. 6	08/02/95	19.70	1.03	1.48
Area 5, RWMS No. 6	08/09/95	15.70	0.98	1.49
Area 5, RWMS No. 6	08/16/95	19.70	1.05	1.52
Area 5, RWMS No. 6	08/23/95	13.50	0.94	1.48
Area 5, RWMS No. 6	08/30/95	20.00	1.19	1.79
Area 5, RWMS No. 6	09/05/95	20.60	0.87	1.12
Area 5, RWMS No. 6	09/14/95	(d)	(g)	(g)
Area 5, RWMS No. 6	09/21/95	26.60	1.14	1.51
Area 5, RWMS No. 6	09/28/95	16.90	1.00	1.47
Area 5, RWMS No. 6	10/05/95	30.50	1.51	2.10
Area 5, RWMS No. 6	10/10/95	27.70	1.13	1.43

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 6	10/17/95	26.30	1.16	1.53
Area 5, RWMS No. 6	10/24/95	26.50	1.14	1.52
Area 5, RWMS No. 6	10/31/95	29.60	1.19	1.50
Area 5, RWMS No. 6	11/07/95	21.50	1.09	1.51
Area 5, RWMS No. 6	11/14/95	32.40	1.24	1.56
Area 5, RWMS No. 6	11/21/95	37.80	1.39	1.69
Area 5, RWMS No. 6	11/27/95	28.80	1.19	1.54
Area 5, RWMS No. 6	12/04/95	29.20	1.59	1.88
Area 5, RWMS No. 6	12/11/95	12.00	0.97	1.59
Area 5, RWMS No. 6	12/18/95	48.30	1.28	1.30
Area 5, RWMS No. 6	12/26/95	22.20	1.01	1.36
Area 5, RWMS No. 7	01/03/95	18.50	1.11	1.66
Area 5, RWMS No. 7	01/09/95	7.67	0.72	1.21
Area 5, RWMS No. 7	01/17/95	16.40	1.04	1.59
Area 5, RWMS No. 7	01/23/95	12.80	0.88	1.38
Area 5, RWMS No. 7	01/30/95	18.70	0.92	1.28
Area 5, RWMS No. 7	02/07/95	17.50	0.96	1.40
Area 5, RWMS No. 7	02/14/95	16.40	0.94	1.39
Area 5, RWMS No. 7	02/21/95	29.70	1.28	1.68
Area 5, RWMS No. 7	02/27/95	23.40	1.05	1.42
Area 5, RWMS No. 7	03/06/95	12.70	0.90	1.41
Area 5, RWMS No. 7	03/13/95	16.80	0.95	1.37
Area 5, RWMS No. 7	03/20/95	8.33	0.79	1.32
Area 5, RWMS No. 7	03/27/95	19.10	0.99	1.42
Area 5, RWMS No. 7	04/03/95	12.40	0.87	1.36
Area 5, RWMS No. 7	04/10/95	15.40	0.92	1.35
Area 5, RWMS No. 7	04/17/95	13.00	0.87	1.33
Area 5, RWMS No. 7	04/24/95	15.80	0.93	1.36
Area 5, RWMS No. 7	05/01/95	13.50	0.92	1.42
Area 5, RWMS No. 7	05/08/95	13.80	0.92	1.43
Area 5, RWMS No. 7	05/15/95	19.00	1.02	1.45
Area 5, RWMS No. 7	05/22/95	16.30	0.86	1.20
Area 5, RWMS No. 7	05/30/95	18.40	1.14	1.73
Area 5, RWMS No. 7	06/05/95	15.20	0.97	1.48
Area 5, RWMS No. 7	06/12/95	13.10	0.92	1.45
Area 5, RWMS No. 7	06/19/95	17.50	1.01	1.50

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 7	06/26/95	15.70	1.00	1.53
Area 5, RWMS No. 7	07/03/95	22.70	0.97	1.29
Area 5, RWMS No. 7	07/11/95	17.80	0.92	1.30
Area 5, RWMS No. 7	07/19/95	18.70	0.94	1.32
Area 5, RWMS No. 7	07/27/95	25.20	1.21	1.64
Area 5, RWMS No. 7	08/02/95	21.90	1.07	1.50
Area 5, RWMS No. 7	08/09/95	15.40	0.99	1.50
Area 5, RWMS No. 7	08/16/95	19.10	1.04	1.50
Area 5, RWMS No. 7	08/23/95	11.60	0.91	1.46
Area 5, RWMS No. 7	08/30/95	23.40	1.24	1.77
Area 5, RWMS No. 7	09/05/95	18.10	0.83	1.10
Area 5, RWMS No. 7	09/14/95	(a)	(g)	(g)
Area 5, RWMS No. 7	09/21/95	25.90	1.10	1.46
Area 5, RWMS No. 7	09/28/95	17.40	0.97	1.41
Area 5, RWMS No. 7	10/05/95	27.00	1.42	1.99
Area 5, RWMS No. 7	10/10/95	24.70	1.04	1.34
Area 5, RWMS No. 7	10/17/95	22.80	1.04	1.39
Area 5, RWMS No. 7	10/24/95	24.00	1.05	1.40
Area 5, RWMS No. 7	10/31/95	29.00	1.09	1.34
Area 5, RWMS No. 7	11/07/95	19.50	0.97	1.35
Area 5, RWMS No. 7	11/14/95	29.90	1.12	1.40
Area 5, RWMS No. 7	11/21/95	33.70	1.24	1.51
Area 5, RWMS No. 7	11/27/95	24.70	1.03	1.35
Area 5, RWMS No. 7	12/04/95	27.00	1.42	1.65
Area 5, RWMS No. 7	12/11/95	9.99	0.83	1.36
Area 5, RWMS No. 7	12/18/95	41.20	1.10	1.12
Area 5, RWMS No. 7	12/26/95	17.90	0.85	1.17
Area 5, RWMS No. 8	01/03/95	13.20	1.14	1.88
Area 5, RWMS No. 8	01/09/95	8.51	0.81	1.38
Area 5, RWMS No. 8	01/17/95	19.10	1.19	1.81
Area 5, RWMS No. 8	01/23/95	14.10	1.01	1.58
Area 5, RWMS No. 8	01/30/95	23.70	1.06	1.42
Area 5, RWMS No. 8	02/07/95	19.00	1.08	1.60
Area 5, RWMS No. 8	02/14/95	17.90	1.07	1.57
Area 5, RWMS No. 8	02/21/95	30.50	1.46	2.01
Area 5, RWMS No. 8	02/27/95	15.60	1.08	1.70

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 8	03/06/95	13.60	1.06	1.71
Area 5, RWMS No. 8	03/13/95	19.40	1.13	1.64
Area 5, RWMS No. 8	03/20/95	11.30	0.99	1.62
Area 5, RWMS No. 8	03/27/95	22.40	1.20	1.73
Area 5, RWMS No. 8	04/03/95	15.10	1.06	1.64
Area 5, RWMS No. 8	04/10/95	19.50	1.12	1.64
Area 5, RWMS No. 8	04/17/95	19.20	1.12	1.64
Area 5, RWMS No. 8	04/24/95	17.20	1.09	1.63
Area 5, RWMS No. 8	05/01/95	12.80	1.05	1.72
Area 5, RWMS No. 8	05/08/95	15.40	1.09	1.72
Area 5, RWMS No. 8	05/15/95	20.80	1.19	1.74
Area 5, RWMS No. 8	05/22/95	19.90	1.03	1.46
Area 5, RWMS No. 8	05/30/95	23.30	1.37	2.05
Area 5, RWMS No. 8	06/05/95	17.20	1.15	1.78
Area 5, RWMS No. 8	06/12/95	14.60	1.08	1.72
Area 5, RWMS No. 8	06/19/95	18.60	1.16	1.77
Area 5, RWMS No. 8	06/26/95	21.80	1.21	1.77
Area 5, RWMS No. 8	07/03/95	24.90	1.11	1.50
Area 5, RWMS No. 8	07/11/95	18.60	1.04	1.52
Area 5, RWMS No. 8	07/19/95	21.00	1.09	1.55
Area 5, RWMS No. 8	07/27/95	25.50	1.35	1.91
Area 5, RWMS No. 8	08/02/95	24.50	1.24	1.75
Area 5, RWMS No. 8	08/09/95	18.10	1.15	1.75
Area 5, RWMS No. 8	08/16/95	18.70	1.16	1.76
Area 5, RWMS No. 8	08/23/95	14.60	1.09	1.73
Area 5, RWMS No. 8	08/30/95	23.60	1.40	2.09
Area 5, RWMS No. 8	09/05/95	20.50	0.97	1.31
Area 5, RWMS No. 8	09/14/95	55.80	1.61	1.70
Area 5, RWMS No. 8	09/21/95	31.30	1.34	1.77
Area 5, RWMS No. 8	09/28/95	18.10	1.14	1.73
Area 5, RWMS No. 8	10/05/95	30.90	1.71	2.46
Area 5, RWMS No. 8	10/10/95	28.30	1.26	1.68
Area 5, RWMS No. 8	10/17/95	28.80	1.32	1.78
Area 5, RWMS No. 8	10/24/95	28.00	1.29	1.76
Area 5, RWMS No. 8	10/31/95	33.50	1.37	1.75
Area 5, RWMS No. 8	11/07/95	24.40	1.26	1.76

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 8	11/14/95	33.10	1.39	1.81
Area 5, RWMS No. 8	11/21/95	38.80	1.56	1.98
Area 5, RWMS No. 8	11/27/95	30.20	1.34	1.80
Area 5, RWMS No. 8	12/04/95	27.10	1.30	1.79
Area 5, RWMS No. 8	12/11/95	11.40	1.07	1.80
Area 5, RWMS No. 8	12/18/95	50.10	1.43	1.51
Area 5, RWMS No. 8	12/26/95	26.00	1.18	1.57
Area 5, RWMS No. 9	01/03/95	14.10	1.09	1.74
Area 5, RWMS No. 9	01/09/95	9.62	0.78	1.27
Area 5, RWMS No. 9	01/17/95	18.40	1.11	1.67
Area 5, RWMS No. 9	01/23/95	14.30	0.93	1.43
Area 5, RWMS No. 9	01/30/95	21.30	0.97	1.31
Area 5, RWMS No. 9	02/07/95	18.40	1.00	1.46
Area 5, RWMS No. 9	02/14/95	16.40	0.98	1.44
Area 5, RWMS No. 9	02/21/95	31.20	1.33	1.73
Area 5, RWMS No. 9	02/27/95	23.50	1.08	1.47
Area 5, RWMS No. 9	03/06/95	11.80	0.91	1.47
Area 5, RWMS No. 9	03/13/95	18.90	1.00	1.42
Area 5, RWMS No. 9	03/20/95	9.57	0.85	1.40
Area 5, RWMS No. 9	03/27/95	22.00	1.07	1.49
Area 5, RWMS No. 9	04/03/95	15.00	0.94	1.41
Area 5, RWMS No. 9	04/10/95	15.20	0.94	1.41
Area 5, RWMS No. 9	04/17/95	15.40	0.95	1.41
Area 5, RWMS No. 9	04/24/95	16.00	0.95	1.40
Area 5, RWMS No. 9	05/01/95	13.40	0.94	1.47
Area 5, RWMS No. 9	05/08/95	15.10	0.97	1.48
Area 5, RWMS No. 9	05/15/95	20.60	1.05	1.49
Area 5, RWMS No. 9	05/22/95	23.30	0.98	1.26
Area 5, RWMS No. 9	05/30/95	22.40	1.21	1.76
Area 5, RWMS No. 9	06/05/95	14.60	0.99	1.54
Area 5, RWMS No. 9	06/12/95	14.60	0.96	1.49
Area 5, RWMS No. 9	06/19/95	17.10	1.02	1.53
Area 5, RWMS No. 9	06/26/95	22.00	1.09	1.52
Area 5, RWMS No. 9	07/03/95	22.80	0.96	1.24
Area 5, RWMS No. 9	07/11/95	14.00	0.90	1.38
Area 5, RWMS No. 9	07/19/95	17.20	0.96	1.41

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 9	07/27/95	23.70	1.23	1.72
Area 5, RWMS No. 9	08/02/95	20.50	1.10	1.58
Area 5, RWMS No. 9	08/09/95	14.90	1.01	1.57
Area 5, RWMS No. 9	08/16/95	16.60	1.05	1.59
Area 5, RWMS No. 9	08/23/95	12.00	0.95	1.55
Area 5, RWMS No. 9	08/30/95	18.50	1.22	1.88
Area 5, RWMS No. 9	09/05/95	23.70	0.94	1.18
Area 5, RWMS No. 9	09/14/95	26.70	1.15	1.50
Area 5, RWMS No. 9	09/21/95	23.30	1.14	1.59
Area 5, RWMS No. 9	09/28/95	18.30	1.05	1.54
Area 5, RWMS No. 9	10/05/95	27.90	1.53	2.20
Area 5, RWMS No. 9	10/10/95	25.80	1.13	1.49
Area 5, RWMS No. 9	10/17/95	20.90	1.11	1.58
Area 5, RWMS No. 9	10/24/95	23.60	1.14	1.58
Area 5, RWMS No. 9	10/31/95	26.10	1.17	1.56
Area 5, RWMS No. 9	11/07/95	7.25	0.88	1.56
Area 5, RWMS No. 9	11/14/95	27.90	1.22	1.62
Area 5, RWMS No. 9	11/21/95	32.40	1.36	1.76
Area 5, RWMS No. 9	11/27/95	23.90	1.15	1.60
Area 5, RWMS No. 9	12/04/95	22.00	1.12	1.60
Area 5, RWMS No. 9	12/11/95	9.51	0.94	1.61
Area 5, RWMS No. 9	12/18/95	40.50	1.22	1.34
Area 5, RWMS No. 9	12/26/95	18.90	0.98	1.39
Area 5, RWMS Pit-3	01/03/95	21.90	1.70	2.74
Area 5, RWMS Pit-3	01/09/95	9.03	0.84	1.42
Area 5, RWMS Pit-3	01/17/95	16.50	1.19	1.89
Area 5, RWMS Pit-3	01/23/95	12.90	1.00	1.61
Area 5, RWMS Pit-3	01/30/95	17.40	1.01	1.49
Area 5, RWMS Pit-3	02/07/95	15.00	1.04	1.63
Area 5, RWMS Pit-3	02/14/95	12.70	1.01	1.64
Area 5, RWMS Pit-3	02/21/95	28.20	1.37	1.90
Area 5, RWMS Pit-3	02/27/95	14.70	1.04	1.63
Area 5, RWMS Pit-3	03/06/95	11.20	0.99	1.64
Area 5, RWMS Pit-3	03/13/95	14.50	1.06	1.67
Area 5, RWMS Pit-3	03/20/95	7.74	0.92	1.62
Area 5, RWMS Pit-3	03/27/95	20.90	1.12	1.58

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS Pit-3	04/03/95	10.50	0.98	1.65
Area 5, RWMS Pit-3	04/10/95	14.00	1.04	1.66
Area 5, RWMS Pit-3	04/17/95	11.30	0.99	1.64
Area 5, RWMS Pit-3	04/24/95	17.70	1.28	2.03
Area 5, RWMS Pit-3	05/01/95	12.90	1.17	1.96
Area 5, RWMS Pit-3	05/08/95	15.70	1.15	1.83
Area 5, RWMS Pit-3	05/15/95	19.60	0.99	1.40
Area 5, RWMS Pit-3	05/22/95	17.80	0.86	1.17
Area 5, RWMS Pit-3	05/30/95	18.10	1.10	1.65
Area 5, RWMS Pit-3	06/05/95	14.50	0.94	1.43
Area 5, RWMS Pit-3	06/12/95	13.70	0.90	1.40
Area 5, RWMS Pit-3	06/19/95	17.00	0.99	1.47
Area 5, RWMS Pit-3	06/26/95	20.00	1.14	1.69
Area 5, RWMS Pit-3	07/03/95	19.30	0.80	1.05
Area 5, RWMS Pit-3	07/11/95	15.40	0.85	1.24
Area 5, RWMS Pit-3	07/19/95	20.30	0.93	1.27
Area 5, RWMS Pit-3	07/27/95	25.00	1.16	1.56
Area 5, RWMS Pit-3	08/02/95	20.70	1.01	1.41
Area 5, RWMS Pit-3	08/09/95	16.70	0.94	1.36
Area 5, RWMS Pit-3	08/16/95	16.70	0.95	1.39
Area 5, RWMS Pit-3	08/23/95	14.30	0.90	1.35
Area 5, RWMS Pit-3	08/30/95	23.00	1.18	1.70
Area 5, RWMS Pit-3	09/05/95	20.80	0.83	1.05
Area 5, RWMS Pit-3	09/14/95	(b)	(g)	(g)
Area 5, RWMS Pit-3	09/21/95	28.20	1.10	1.39
Area 5, RWMS Pit-3	09/28/95	18.50	0.98	1.38
Area 5, RWMS Pit-3	10/05/95	23.40	1.36	1.98
Area 5, RWMS Pit-4	01/03/95	11.70	1.08	1.83
Area 5, RWMS Pit-4	01/09/95	9.89	0.80	1.29
Area 5, RWMS Pit-4	01/17/95	19.70	1.18	1.76
Area 5, RWMS Pit-4	01/23/95	14.60	0.96	1.47
Area 5, RWMS Pit-4	01/30/95	21.40	0.99	1.35
Area 5, RWMS Pit-4	02/07/95	23.10	1.09	1.51
Area 5, RWMS Pit-4	02/14/95	16.70	1.00	1.50
Area 5, RWMS Pit-4	02/21/95	28.20	1.28	1.72
Area 5, RWMS Pit-4	02/27/95	21.60	1.08	1.52

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS Pit-4	03/06/95	15.00	0.98	1.52
Area 5, RWMS Pit-4	03/13/95	17.30	1.02	1.53
Area 5, RWMS Pit-4	03/20/95	7.65	0.87	1.52
Area 5, RWMS Pit-4	03/27/95	24.20	1.10	1.47
Area 5, RWMS Pit-4	04/03/95	18.00	1.03	1.53
Area 5, RWMS Pit-4	04/10/95	25.10	1.17	1.61
Area 5, RWMS Pit-4	04/17/95	11.40	0.93	1.51
Area 5, RWMS Pit-4	04/24/95	16.20	1.00	1.51
Area 5, RWMS Pit-4	05/01/95	14.40	0.99	1.53
Area 5, RWMS Pit-4	05/08/95	14.10	0.98	1.54
Area 5, RWMS Pit-5	05/15/95	(a)	(g)	(g)
Area 5, RWMS Pit-5	05/22/95	(d)	(g)	(g)
Area 5, RWMS Pit-5	05/30/95	(a)	(g)	(g)
Area 5, RWMS Pit-5	06/05/95	(a)	(g)	(g)
Area 5, RWMS Pit-5	06/12/95	13.60	0.99	1.56
Area 5, RWMS Pit-5	06/19/95	17.00	1.05	1.59
Area 5, RWMS Pit-5	06/26/95	20.30	1.15	1.69
Area 5, RWMS Pit-5	07/03/95	19.00	0.96	1.37
Area 5, RWMS Pit-5	07/11/95	19.50	0.98	1.40
Area 5, RWMS Pit-5	07/19/95	22.90	1.06	1.44
Area 5, RWMS Pit-5	07/27/95	26.40	1.28	1.76
Area 5, RWMS Pit-5	08/02/95	24.80	1.16	1.60
Area 5, RWMS Pit-5	08/09/95	20.50	1.09	1.53
Area 5, RWMS Pit-5	08/16/95	19.90	1.09	1.57
Area 5, RWMS Pit-5	08/23/95	16.90	1.02	1.52
Area 5, RWMS Pit-5	08/30/95	24.80	1.31	1.90
Area 5, RWMS Pit-5	09/05/95	19.50	0.89	1.19
Area 5, RWMS Pit-5	09/14/95	30.80	1.25	1.59
Area 5, RWMS Pit-5	09/21/95	29.30	1.21	1.58
Area 5, RWMS Pit-5	09/28/95	18.50	1.07	1.58
Area 5, RWMS Pit-5	10/05/95	31.90	1.61	2.24
Area 5, RWMS Pit-5	10/10/95	23.10	1.15	1.62
Area 5, RWMS Pit-5	10/17/95	29.00	1.25	1.63
Area 5, RWMS Pit-5	10/24/95	28.80	1.22	1.62
Area 5, RWMS Pit-5	10/31/95	(b)	(g)	(g)
Area 5, RWMS Pit-5	11/07/95	20.60	1.10	1.57

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS Pit-5	11/14/95	35.40	1.34	1.68
Area 5, RWMS Pit-5	11/21/95	38.50	1.46	1.81
Area 5, RWMS Pit-5	11/27/95	32.20	1.28	1.64
Area 5, RWMS Pit-5	12/04/95	31.40	1.70	2.00
Area 5, RWMS Pit-5	12/11/95	13.10	1.03	1.66
Area 5, RWMS Pit-5	12/18/95	50.90	1.36	1.39
Area 5, RWMS Pit 5	12/26/95	25.90	1.10	1.43
Area 5, RWMS TP Building N	04/24/95	15.00	0.96	1.46
Area 5, RWMS TP Building N	05/01/95	14.70	0.97	1.50
Area 5, RWMS TP Building N	05/08/95	15.90	0.99	1.51
Area 5, RWMS TP Building N	05/15/95	17.40	1.04	1.54
Area 5, RWMS TP Building N	05/22/95	14.20	0.86	1.28
Area 5, RWMS TP Building N	05/30/95	22.00	1.25	1.84
Area 5, RWMS TP Building N	06/05/95	14.00	0.99	1.56
Area 5, RWMS TP Building N	06/12/95	11.60	0.93	1.52
Area 5, RWMS TP Building N	06/19/95	16.40	1.02	1.57
Area 5, RWMS TP Building N	06/26/95	16.00	1.04	1.60
Area 5, RWMS TP Building N	07/03/95	20.10	0.97	1.35
Area 5, RWMS TP Building N	07/11/95	16.20	0.92	1.35
Area 5, RWMS TP Building N	07/19/95	20.20	0.99	1.38
Area 5, RWMS TP Building N	07/27/95	27.40	1.28	1.74
Area 5, RWMS TP Building N	08/02/95	26.20	1.16	1.56
Area 5, RWMS TP Building N	08/09/95	18.80	1.03	1.49
Area 5, RWMS TP Building N	08/16/95	16.60	1.01	1.51
Area 5, RWMS TP Building N	08/23/95	15.20	0.97	1.47
Area 5, RWMS TP Building N	08/30/95	24.10	1.27	1.80
Area 5, RWMS TP Building N	09/05/95	19.40	0.85	1.12
Area 5, RWMS TP Building N	09/14/95	34.60	1.23	1.47
Area 5, RWMS TP Building N	09/21/95	30.70	1.16	1.45
Area 5, RWMS TP Building N	09/28/95	15.40	0.95	1.42
Area 5, RWMS TP Building N	10/05/95	28.50	1.44	2.01
Area 5, RWMS TP Building N	10/10/95	30.00	1.14	1.44
Area 5, RWMS TP Building N	10/17/95	22.80	1.06	1.44
Area 5, RWMS TP Building N	10/24/95	26.00	1.10	1.44
Area 5, RWMS TP Building N	10/31/95	26.50	1.10	1.42
Area 5, RWMS TP Building N	11/07/95	24.10	1.06	1.39

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP Building N	11/14/95	31.70	1.19	1.48
Area 5, RWMS TP Building N	11/21/95	39.50	1.34	1.56
Area 5, RWMS TP Building N	11/27/95	31.80	1.15	1.41
Area 5, RWMS TP Building N	12/04/95	31.50	1.54	1.73
Area 5, RWMS TP Building N	12/11/95	10.60	0.87	1.43
Area 5, RWMS TP Building N	12/18/95	40.90	1.12	1.17
Area 5, RWMS TP Building N	12/26/95	22.60	0.94	1.21
Area 5, RWMS TP Building S	04/24/95	18.80	1.21	1.85
Area 5, RWMS TP Building S	05/01/95	12.30	0.95	1.54
Area 5, RWMS TP Building S	05/08/95	14.20	0.98	1.53
Area 5, RWMS TP Building S	05/15/95	17.90	1.05	1.56
Area 5, RWMS TP Building S	05/22/95	15.90	0.89	1.29
Area 5, RWMS TP Building S	05/30/95	19.50	1.26	1.92
Area 5, RWMS TP Building S	06/05/95	12.70	0.98	1.58
Area 5, RWMS TP Building S	06/12/95	13.60	0.98	1.55
Area 5, RWMS TP Building S	06/19/95	14.90	1.04	1.63
Area 5, RWMS TP Building S	06/26/95	16.60	1.06	1.64
Area 5, RWMS TP Building S	07/03/95	23.60	1.02	1.37
Area 5, RWMS TP Building S	07/11/95	18.50	0.96	1.38
Area 5, RWMS TP Building S	07/19/95	21.50	1.02	1.40
Area 5, RWMS TP Building S	07/27/95	28.40	1.32	1.78
Area 5, RWMS TP Building S	08/02/95	23.40	1.14	1.59
Area 5, RWMS TP Building S	08/09/95	18.70	1.05	1.52
Area 5, RWMS TP Building S	08/16/95	16.90	1.03	1.54
Area 5, RWMS TP Building S	08/23/95	12.90	0.95	1.50
Area 5, RWMS TP Building S	08/30/95	25.80	1.30	1.84
Area 5, RWMS TP Building S	09/05/95	19.60	0.86	1.14
Area 5, RWMS TP Building S	09/14/95	34.40	1.25	1.51
Area 5, RWMS TP Building S	09/21/95	31.80	1.20	1.49
Area 5, RWMS TP Building S	09/28/95	18.60	1.02	1.46
Area 5, RWMS TP Building S	10/05/95	30.20	1.50	2.07
Area 5, RWMS TP Building S	10/10/95	30.10	1.16	1.48
Area 5, RWMS TP Building S	10/17/95	28.50	1.16	1.49
Area 5, RWMS TP Building S	10/24/95	26.00	1.11	1.47
Area 5, RWMS TP Building S	10/31/95	30.10	1.16	1.45
Area 5, RWMS TP Building S	11/07/95	24.10	1.07	1.43

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP Building S	11/27/95	28.90	1.14	1.45
Area 5, RWMS TP Building S	11/21/95	39.40	1.36	1.61
Area 5, RWMS TP Building S	11/14/95	32.40	1.22	1.52
Area 5, RWMS TP Building S	12/04/95	31.80	1.57	1.77
Area 5, RWMS TP Building S	12/11/95	12.20	0.92	1.47
Area 5, RWMS TP Building S	12/18/95	(c)	(g)	(g)
Area 5, RWMS TP Building S	12/26/95	(c)	(g)	(g)
Area 5, RWMS TP N	01/03/95	16.20	1.18	1.87
Area 5, RWMS TP N	01/09/95	12.00	0.86	1.36
Area 5, RWMS TP N	01/17/95	19.60	1.20	1.80
Area 5, RWMS TP N	01/23/95	16.50	1.03	1.56
Area 5, RWMS TP N	01/30/95	23.20	1.05	1.42
Area 5, RWMS TP N	02/07/95	16.70	1.04	1.57
Area 5, RWMS TP N	02/14/95	15.20	1.01	1.57
Area 5, RWMS TP N	02/21/95	32.40	1.38	1.80
Area 5, RWMS TP N	02/27/95	21.40	1.11	1.58
Area 5, RWMS TP N	03/06/95	13.10	0.97	1.53
Area 5, RWMS TP N	03/13/95	16.90	1.05	1.60
Area 5, RWMS TP N	03/20/95	7.98	0.90	1.57
Area 5, RWMS TP N	03/27/95	23.60	1.12	1.52
Area 5, RWMS TP N	04/03/95	13.80	1.00	1.58
Area 5, RWMS TP N	04/10/95	12.90	0.98	1.57
Area 5, RWMS TP N	04/17/95	13.40	0.99	1.58
Area 5, RWMS TP N	04/24/95	17.00	1.04	1.56
Area 5, RWMS TP N	05/01/95	13.10	0.98	1.58
Area 5, RWMS TP N	05/08/95	15.90	1.03	1.58
Area 5, RWMS TP N	05/15/95	19.40	1.09	1.59
Area 5, RWMS TP N	05/22/95	17.50	0.96	1.40
Area 5, RWMS TP N	05/30/95	23.90	1.28	1.85
Area 5, RWMS TP N	06/05/95	17.10	1.08	1.64
Area 5, RWMS TP N	06/12/95	14.60	1.01	1.58
Area 5, RWMS TP N	06/19/95	20.10	1.10	1.60
Area 5, RWMS TP N	06/26/95	22.50	1.14	1.61
Area 5, RWMS TP N	07/03/95	23.00	1.02	1.37
Area 5, RWMS TP N	07/11/95	20.80	1.00	1.38
Area 5, RWMS TP N	07/19/95	22.60	1.04	1.41

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP N	07/27/95	27.60	1.29	1.75
Area 5, RWMS TP N	08/02/95	22.90	1.13	1.58
Area 5, RWMS TP N	08/09/95	21.70	1.10	1.53
Area 5, RWMS TP N	08/16/95	19.00	1.07	1.56
Area 5, RWMS TP N	08/23/95	13.70	0.97	1.52
Area 5, RWMS TP N	08/30/95	23.70	1.29	1.88
Area 5, RWMS TP N	09/05/95	(b)	(g)	(g)
Area 5, RWMS TP N	09/14/95	35.40	1.30	1.57
Area 5, RWMS TP N	09/21/95	30.90	1.22	1.56
Area 5, RWMS TP N	09/28/95	18.20	1.06	1.55
Area 5, RWMS TP N	10/05/95	33.30	1.62	2.22
Area 5, RWMS TP NE	01/03/95	13.50	1.04	1.67
Area 5, RWMS TP NE	01/09/95	8.82	0.75	1.22
Area 5, RWMS TP NE	01/17/95	17.50	1.08	1.62
Area 5, RWMS TP NE	01/23/95	14.70	0.92	1.39
Area 5, RWMS TP NE	01/30/95	23.20	0.97	1.28
Area 5, RWMS TP NE	02/07/95	21.00	1.02	1.41
Area 5, RWMS TP NE	02/14/95	17.30	0.99	1.46
Area 5, RWMS TP NE	02/21/95	30.30	1.29	1.68
Area 5, RWMS TP NE	02/27/95	19.10	1.02	1.46
Area 5, RWMS TP NE	03/06/95	13.20	0.92	1.41
Area 5, RWMS TP NE	03/13/95	17.40	1.00	1.49
Area 5, RWMS TP NE	03/20/95	8.44	0.86	1.47
Area 5, RWMS TP NE	03/27/95	24.60	1.08	1.41
Area 5, RWMS TP NE	04/03/95	14.20	0.95	1.47
Area 5, RWMS TP NE	04/10/95	13.30	0.93	1.47
Area 5, RWMS TP NE	04/17/95	13.50	0.94	1.47
Area 5, RWMS TP NE	04/24/95	17.30	0.99	1.46
Area 5, RWMS TP NE	05/01/95	14.70	0.96	1.47
Area 5, RWMS TP NE	05/08/95	15.50	0.97	1.46
Area 5, RWMS TP NE	05/15/95	21.40	1.06	1.48
Area 5, RWMS TP NE	05/22/95	17.90	0.91	1.30
Area 5, RWMS TP NE	05/30/95	21.60	1.19	1.74
Area 5, RWMS TP NE	06/05/95	15.80	1.00	1.51
Area 5, RWMS TP NE	06/12/95	13.20	0.94	1.49
Area 5, RWMS TP NE	06/19/95	18.50	1.02	1.49

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP NE	06/26/95	21.60	1.07	1.51
Area 5, RWMS TP NE	07/03/95	11.50	0.82	1.28
Area 5, RWMS TP NE	07/11/95	18.80	0.93	1.31
Area 5, RWMS TP NE	07/19/95	22.00	0.99	1.33
Area 5, RWMS TP NE	07/27/95	27.70	1.25	1.65
Area 5, RWMS TP NE	08/02/95	23.80	1.10	1.50
Area 5, RWMS TP NE	08/09/95	20.80	1.04	1.45
Area 5, RWMS TP NE	08/16/95	20.10	1.05	1.46
Area 5, RWMS TP NE	08/23/95	14.60	0.94	1.43
Area 5, RWMS TP NE	08/30/95	22.50	1.23	1.78
Area 5, RWMS TP NE	09/05/95	13.90	0.77	1.12
Area 5, RWMS TP NE	09/14/95	31.50	1.20	1.48
Area 5, RWMS TP NE	09/21/95	28.30	1.14	1.47
Area 5, RWMS TP NE	09/28/95	18.90	1.02	1.46
Area 5, RWMS TP NE	10/05/95	30.60	1.51	2.09
Area 5, RWMS TP NW	01/03/95	12.30	1.03	1.68
Area 5, RWMS TP NW	01/09/95	8.81	0.74	1.22
Area 5, RWMS TP NW	01/17/95	20.10	1.11	1.61
Area 5, RWMS TP NW	01/23/95	13.80	0.90	1.37
Area 5, RWMS TP NW	01/30/95	19.40	0.92	1.27
Area 5, RWMS TP NW	02/07/95	20.00	1.00	1.41
Area 5, RWMS TP NW	02/14/95	(a)	(g)	(g)
Area 5, RWMS TP NW	02/21/95	32.40	1.38	1.81
Area 5, RWMS TP NW	02/27/95	15.40	0.98	1.49
Area 5, RWMS TP NW	03/06/95	14.30	0.96	1.49
Area 5, RWMS TP NW	03/13/95	16.60	0.95	1.41
Area 5, RWMS TP NW	03/20/95	7.70	0.81	1.40
Area 5, RWMS TP NW	03/27/95	20.30	0.98	1.34
Area 5, RWMS TP NW	04/03/95	(b)	(g)	(g)
Area 5, RWMS TP NW	04/10/95	16.60	1.00	1.48
Area 5, RWMS TP NW	04/17/95	13.90	0.95	1.49
Area 5, RWMS TP NW	04/24/95	17.00	0.99	1.49
Area 5, RWMS TP NW	05/01/95	15.00	0.98	1.50
Area 5, RWMS TP NW	05/08/95	14.50	0.96	1.50
Area 5, RWMS TP NW	05/15/95	21.60	1.08	1.51
Area 5, RWMS TP NW	05/22/95	20.40	0.95	1.27

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP NW	05/30/95	25.40	1.26	1.77
Area 5, RWMS TP NW	06/05/95	15.80	1.00	1.54
Area 5, RWMS TP NW	06/12/95	13.30	0.96	1.51
Area 5, RWMS TP NW	06/19/95	38.80	2.25	3.35
Area 5, RWMS TP NW	06/26/95	13.90	0.70	0.99
Area 5, RWMS TP NW	07/03/95	24.30	1.00	1.31
Area 5, RWMS TP NW	07/11/95	18.50	0.94	1.33
Area 5, RWMS TP NW	07/19/95	23.00	1.01	1.36
Area 5, RWMS TP NW	07/27/95	27.70	1.25	1.67
Area 5, RWMS TP NW	08/02/95	23.70	1.11	1.52
Area 5, RWMS TP NW	08/09/95	19.20	1.03	1.46
Area 5, RWMS TP NW	08/16/95	19.00	1.04	1.49
Area 5, RWMS TP NW	08/23/95	14.70	0.96	1.45
Area 5, RWMS TP NW	08/30/95	24.80	1.28	1.82
Area 5, RWMS TP NW	09/05/95	21.10	0.88	1.13
Area 5, RWMS TP NW	09/14/95	35.90	1.27	1.51
Area 5, RWMS TP NW	09/21/95	27.70	1.15	1.50
Area 5, RWMS TP NW	09/28/95	19.00	1.04	1.49
Area 5, RWMS TP NW	10/05/95	29.10	1.51	2.14
Area 5, RWMS TP S	01/03/95	12.20	1.06	1.76
Area 5, RWMS TP S	01/09/95	7.03	0.74	1.28
Area 5, RWMS TP S	01/17/95	19.00	1.13	1.69
Area 5, RWMS TP S	01/23/95	12.00	0.91	1.45
Area 5, RWMS TP S	01/30/95	19.30	0.95	1.34
Area 5, RWMS TP S	02/07/95	17.80	1.00	1.46
Area 5, RWMS TP S	02/14/95	14.10	0.95	1.48
Area 5, RWMS TP S	02/21/95	30.30	1.30	1.70
Area 5, RWMS TP S	02/27/95	16.00	0.98	1.48
Area 5, RWMS TP S	03/06/95	12.00	0.92	1.49
Area 5, RWMS TP S	03/13/95	16.60	1.00	1.49
Area 5, RWMS TP S	03/20/95	6.51	0.83	1.47
Area 5, RWMS TP S	03/27/95	19.60	1.02	1.43
Area 5, RWMS TP S	04/03/95	12.50	0.93	1.48
Area 5, RWMS TP S	04/10/95	12.60	0.93	1.49
Area 5, RWMS TP S	04/17/95	12.60	0.93	1.48
Area 5, RWMS TP SE	01/03/95	13.50	1.24	2.07

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP SE	01/09/95	9.40	0.83	1.38
Area 5, RWMS TP SE	01/17/95	22.00	1.28	1.89
Area 5, RWMS TP SE	01/23/95	12.80	1.02	1.66
Area 5, RWMS TP SE	01/30/95	24.70	1.12	1.51
Area 5, RWMS TP SE	02/07/95	20.50	1.15	1.67
Area 5, RWMS TP SE	02/14/95	18.00	1.12	1.70
Area 5, RWMS TP SE	02/21/95	34.00	1.48	1.96
Area 5, RWMS TP SE	02/27/95	18.10	1.13	1.71
Area 5, RWMS TP SE	03/06/95	16.20	1.12	1.75
Area 5, RWMS TP SE	03/13/95	18.30	1.15	1.75
Area 5, RWMS TP SE	03/20/95	11.90	1.05	1.75
Area 5, RWMS TP SE	03/27/95	23.30	1.21	1.69
Area 5, RWMS TP SE	04/03/95	16.10	1.13	1.76
Area 5, RWMS TP SE	04/10/95	20.80	1.20	1.78
Area 5, RWMS TP SE	04/17/95	14.10	1.10	1.78
Area 5, RWMS TP SW	01/03/95	12.80	1.16	1.94
Area 5, RWMS TP SW	01/09/95	11.30	0.88	1.41
Area 5, RWMS TP SW	01/17/95	22.00	1.28	1.88
Area 5, RWMS TP SW	01/23/95	14.20	1.02	1.61
Area 5, RWMS TP SW	01/30/95	23.20	1.09	1.49
Area 5, RWMS TP SW	02/07/95	22.60	1.15	1.63
Area 5, RWMS TP SW	02/14/95	17.20	1.09	1.66
Area 5, RWMS TP SW	02/21/95	33.00	1.45	1.92
Area 5, RWMS TP SW	02/27/95	16.10	1.08	1.67
Area 5, RWMS TP SW	03/06/95	12.80	1.03	1.68
Area 5, RWMS TP SW	03/13/95	16.40	1.09	1.69
Area 5, RWMS TP SW	03/20/95	11.90	1.02	1.68
Area 5, RWMS TP SW	03/27/95	22.30	1.16	1.63
Area 5, RWMS TP SW	04/03/95	13.80	0.94	1.46
Area 5, RWMS TP SW	04/10/95	16.70	0.99	1.48
Area 5, RWMS TP SW	04/17/95	13.50	0.94	1.47
Area 5, RWMS TP SW	04/24/95	14.30	0.95	1.46
Area 5, RWMS TP SW	05/01/95	12.70	0.93	1.47
Area 5, RWMS TP SW	05/08/95	14.10	0.95	1.48
Area 5, RWMS TP SW	05/15/95	19.50	1.03	1.49
Area 5, RWMS TP SW	05/22/95	18.10	0.90	1.25

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP SW	05/30/95	19.60	1.18	1.76
Area 5, RWMS TP SW	06/05/95	17.20	1.13	1.75
Area 5, RWMS TP SW	06/12/95	10.00	0.82	1.34
Area 5, RWMS TP SW	06/19/95	16.60	1.01	1.52
Area 5, RWMS TP SW	06/26/95	19.00	1.04	1.53
Area 5, RWMS TP SW	07/03/95	20.80	0.96	1.30
Area 5, RWMS TP SW	07/11/95	16.00	0.90	1.33
Area 5, RWMS TP SW	07/19/95	19.70	0.96	1.35
Area 5, RWMS TP SW	07/27/95	25.00	1.21	1.67
Area 5, RWMS TP SW	08/02/95	22.50	1.09	1.51
Area 5, RWMS TP SW	08/09/95	17.70	1.00	1.46
Area 5, RWMS TP SW	08/16/95	23.00	1.29	1.88
Area 5, RWMS TP SW	08/23/95	12.50	0.80	1.21
Area 5, RWMS TP SW	08/30/95	25.00	1.27	1.82
Area 5, RWMS TP SW	09/05/95	17.50	0.83	1.13
Area 5, RWMS TP SW	09/14/95	29.40	1.19	1.51
Area 5, RWMS TP SW	09/21/95	27.00	1.14	1.50
Area 5, RWMS TP SW	09/28/95	18.20	1.03	1.50
Area 5, RWMS TP SW	10/05/95	27.40	1.49	2.15
Area 5, Well 5B	01/03/95	17.30	1.20	1.89
Area 5, Well 5B	01/09/95	10.80	0.84	1.35
Area 5, Well 5B	01/17/95	20.20	1.22	1.84
Area 5, Well 5B	01/23/95	12.90	0.96	1.54
Area 5, Well 5B	01/30/95	23.30	1.05	1.41
Area 5, Well 5B	02/07/95	20.50	1.10	1.58
Area 5, Well 5B	02/14/95	17.90	1.06	1.56
Area 5, Well 5B	02/21/95	37.90	1.45	1.81
Area 5, Well 5B	02/27/95	18.80	1.07	1.59
Area 5, Well 5B	03/06/95	14.00	1.01	1.60
Area 5, Well 5B	03/13/95	20.40	1.08	1.54
Area 5, Well 5B	03/20/95	8.81	0.89	1.52
Area 5, Well 5B	03/27/95	21.20	1.12	1.61
Area 5, Well 5B	04/03/95	13.70	0.98	1.52
Area 5, Well 5B	04/10/95	16.80	1.03	1.53
Area 5, Well 5B	04/17/95	14.10	0.98	1.51
Area 5, Well 5B	04/24/95	15.70	0.93	1.36

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 5, Well 5B	05/01/95	16.00	1.06	1.65
Area 5, Well 5B	05/08/95	19.50	1.20	1.79
Area 5, Well 5B	05/15/95	20.40	1.03	1.46
Area 5, Well 5B	05/22/95	18.40	0.90	1.23
Area 5, Well 5B	05/30/95	20.50	1.16	1.71
Area 5, Well 5B	06/05/95	14.60	0.96	1.49
Area 5, Well 5B	06/12/95	13.50	0.93	1.45
Area 5, Well 5B	06/19/95	16.70	0.99	1.48
Area 5, Well 5B	06/26/95	20.20	1.04	1.48
Area 5, Well 5B	07/03/95	23.90	0.96	1.21
Area 5, Well 5B	07/11/95	(a)	(g)	(g)
Area 5, Well 5B	07/19/95	19.30	0.93	1.29
Area 5, Well 5B	07/27/95	21.50	1.17	1.68
Area 5, Well 5B	08/02/95	22.00	1.03	1.42
Area 5, Well 5B	08/09/95	18.50	1.00	1.45
Area 5, Well 5B	08/16/95	15.80	0.98	1.48
Area 5, Well 5B	08/23/95	14.50	0.95	1.46
Area 5, Well 5B	08/30/95	26.10	1.24	1.70
Area 5, Well 5B	09/05/95	21.20	0.86	1.09
Area 5, Well 5B	09/14/95	31.40	1.16	1.41
Area 5, Well 5B	09/21/95	27.70	1.30	1.80
Area 5, Well 5B	09/28/95	23.60	1.51	2.29
Area 5, Well 5B	10/05/95	27.70	1.23	1.63
Area 5, Well 5B	10/10/95	(e)	(g)	(g)
Area 5, Well 5B	10/17/95	(e)	(g)	(g)
Area 5, Well 5B	10/24/95	(e)	(g)	(g)
Area 5, Well 5B	10/31/95	(e)	(g)	(g)
Area 5, Well 5B	11/07/95	25.50	1.11	1.45
Area 5, Well 5B	11/14/95	33.20	1.22	1.50
Area 5, Well 5B	11/21/95	41.80	1.43	1.67
Area 5, Well 5B	11/27/95	31.00	1.17	1.47
Area 5, Well 5B	12/04/95	29.30	1.55	1.81
Area 5, Well 5B	12/11/95	10.50	0.89	1.47
Area 5, Well 5B	12/18/95	34.90	1.10	1.23
Area 5, Well 5B	12/26/95	25.50	1.02	1.29
Area 6, Building 6-900	01/03/95	20.80	1.30	1.97

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 6, Building 6-900	01/09/95	10.80	0.91	1.49
Area 6, Building 6-900	01/17/95	18.20	1.25	1.94
Area 6, Building 6-900	01/23/95	12.60	1.02	1.66
Area 6, Building 6-900	01/30/95	23.90	0.99	1.29
Area 6, Building 6-900	02/08/95	20.10	1.28	1.95
Area 6, Building 6-900	02/14/95	17.20	1.09	1.67
Area 6, Building 6-900	02/21/95	34.10	1.33	1.69
Area 6, Building 6-900	02/28/95	23.20	1.32	1.93
Area 6, Building 6-900	03/06/95	13.90	1.08	1.75
Area 6, Building 6-900	03/13/95	20.60	1.21	1.80
Area 6, Building 6-900	03/20/95	9.07	0.86	1.45
Area 6, Building 6-900	03/27/95	20.60	1.03	1.45
Area 6, Building 6-900	04/03/95	12.40	0.91	1.45
Area 6, Building 6-900	04/10/95	16.00	0.98	1.46
Area 6, Building 6-900	04/17/95	15.10	0.75	1.03
Area 6, Building 6-900	04/26/95	(b)	(g)	(g)
Area 6, Building 6-900	05/02/95	13.90	1.28	2.14
Area 6, Building 6-900	05/08/95	14.30	0.83	1.21
Area 6, Building 6-900	05/16/95	21.80	1.02	1.38
Area 6, Building 6-900	05/23/95	18.20	1.02	1.49
Area 6, Building 6-900	05/31/95	18.60	1.13	1.70
Area 6, Building 6-900	06/06/95	14.50	0.86	1.28
Area 6, Building 6-900	06/14/95	13.40	1.03	1.63
Area 6, Building 6-900	06/20/95	17.20	0.95	1.38
Area 6, Building 6-900	06/27/95	20.00	1.13	1.64
Area 6, Building 6-900	07/03/95	22.70	1.04	1.39
Area 6, Building 6-900	07/10/95	17.30	0.81	1.09
Area 6, Building 6-900	07/19/95	20.00	1.00	1.39
Area 6, Building 6-900	07/26/95	24.30	1.05	1.38
Area 6, Building 6-900	08/02/95	21.60	0.95	1.27
Area 6, Building 6-900	08/10/95	16.50	0.98	1.46
Area 6, Building 6-900	08/17/95	16.50	0.97	1.46
Area 6, Building 6-900	08/24/95	16.00	0.96	1.44
Area 6, Building 6-900	08/31/95	23.90	1.18	1.62
Area 6, Building 6-900	09/06/95	20.60	1.02	1.42
Area 6, Building 6-900	09/13/95	31.80	1.15	1.38

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 6, Building 6-900	09/20/95	23.40	1.07	1.47
Area 6, Building 6-900	09/27/95	19.00	1.02	1.44
Area 6, Building 6-900	10/04/95	23.40	1.35	1.97
Area 6, CP-6	01/03/95	13.60	1.14	1.86
Area 6, CP-6	01/09/95	8.66	0.83	1.40
Area 6, CP-6	01/17/95	17.50	1.20	1.86
Area 6, CP-6	01/23/95	15.00	1.03	1.60
Area 6, CP-6	01/30/95	19.80	0.90	1.21
Area 6, CP-6	02/08/95	18.30	1.20	1.85
Area 6, CP-6	02/14/95	16.00	1.17	1.85
Area 6, CP-6	02/21/95	25.00	1.05	1.39
Area 6, CP-6	02/28/95	20.40	5.89	11.40
Area 6, CP-6	03/06/95	(d)	(g)	(g)
Area 6, CP-6	03/13/95	16.80	1.04	1.58
Area 6, CP-6	03/20/95	6.75	0.90	1.61
Area 6, CP-6	03/27/95	21.90	1.13	1.61
Area 6, CP-6	04/03/95	12.30	0.99	1.60
Area 6, CP-6	04/10/95	15.60	1.01	1.53
Area 6, CP-6	04/17/95	16.80	0.87	1.20
Area 6, CP-6	04/26/95	12.40	1.08	1.76
Area 6, CP-6	05/02/95	14.00	1.13	1.85
Area 6, CP-6	05/08/95	14.90	0.90	1.34
Area 6, CP-6	05/16/95	21.30	1.13	1.60
Area 6, CP-6	05/23/95	15.90	0.97	1.47
Area 6, CP-6	05/31/95	20.00	1.28	1.95
Area 6, CP-6	06/06/95	13.60	1.14	1.89
Area 6, CP-6	06/14/95	(a)	(g)	(g)
Area 6, CP-6	06/20/95	(a)	(g)	(g)
Area 6, CP-6	06/27/95	(a)	(g)	(g)
Area 6, CP-6	07/03/95	(a)	(g)	(g)
Area 6, CP-6	07/10/95	(a)	(g)	(g)
Area 6, CP-6	07/19/95	(d)	(g)	(g)
Area 6, CP-6	07/26/95	22.80	1.03	1.36
Area 6, CP-6	08/02/95	22.10	0.95	1.26
Area 6, CP-6	08/10/95	16.70	0.97	1.44
Area 6, CP-6	08/17/95	17.30	0.98	1.43

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 6, CP-6	08/24/95	12.30	0.90	1.41
Area 6, CP-6	08/31/95	23.50	1.16	1.60
Area 6, CP-6	09/06/95	20.10	1.00	1.38
Area 6, CP-6	09/13/95	30.40	1.12	1.36
Area 6, CP-6	09/20/95	28.50	1.12	1.44
Area 6, CP-6	09/27/95	18.80	1.00	1.41
Area 6, CP-6	10/04/95	23.60	1.33	1.94
Area 6, CP-6	10/09/95	(e)	(g)	(g)
Area 6, CP-6	10/16/95	(e)	(g)	(g)
Area 6, CP-6	10/23/95	(e)	(g)	(g)
Area 6, CP-6	10/30/95	(e)	(g)	(g)
Area 6, CP-6	11/06/95	(e)	(g)	(g)
Area 6, CP-6	11/13/95	24.70	1.13	1.53
Area 6, CP-6	11/20/95	36.60	1.27	1.51
Area 6, CP-6	11/27/95	28.10	1.91	2.95
Area 6, CP-6	12/04/95	26.40	2.48	3.72
Area 6, CP-6	12/11/95	9.43	1.62	3.00
Area 6, CP-6	12/18/95	46.90	1.97	2.54
Area 6, CP-6	12/26/95	21.90	1.04	1.42
Area 6, Gas Station	08/16/95	16.30	1.33	2.16
Area 6, Gas Station	08/23/95	13.90	1.07	1.72
Area 6, Gas Station	08/30/95	24.40	1.21	1.67
Area 6, Gas Station	09/05/95	20.50	0.89	1.16
Area 6, Gas Station	09/14/95	31.40	1.18	1.43
Area 6, Gas Station	09/21/95	30.30	1.21	1.55
Area 6, Gas Station	09/28/95	16.90	1.00	1.47
Area 6, Gas Station	10/05/95	31.40	1.54	2.12
Area 6, Gas Station	10/10/95	28.40	1.16	1.51
Area 6, Gas Station	10/17/95	26.80	1.16	1.52
Area 6, Gas Station	10/24/95	26.60	1.14	1.50
Area 6, Gas Station	10/31/95	32.80	1.24	1.53
Area 6, Gas Station	11/07/95	21.30	1.06	1.48
Area 6, Gas Station	11/14/95	31.00	1.21	1.52
Area 6, Gas Station	11/21/95	32.70	1.37	1.80
Area 6, Gas Station	11/27/95	25.20	1.14	1.55
Area 6, Gas Station	12/04/95	27.30	1.54	1.86

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 6, Gas Station	12/11/95	9.67	1.17	1.90
Area 6, Substation 6-9	09/21/95	23.40	1.36	2.01
Area 6, Substation 6-9	09/28/95	14.50	1.17	1.88
Area 6, Substation 6-9	10/05/95	29.00	1.80	2.69
Area 6, Substation 6-9	10/10/95	24.00	2.12	3.54
Area 6, Substation 6-9	10/17/95	24.80	1.36	1.97
Area 6, Substation 6-9	10/24/95	23.60	1.33	1.96
Area 6, Substation 6-9	10/31/95	(a)	(g)	(g)
Area 6, Substation 6-9	11/07/95	14.80	1.52	2.60
Area 6, Substation 6-9	11/14/95	32.30	1.24	1.54
Area 6, Substation 6-9	11/21/95	35.30	1.40	1.79
Area 6, Substation 6-9	11/27/95	27.00	1.16	1.53
Area 6, Substation 6-9	12/04/95	24.50	1.47	1.84
Area 6, Substation 6-9	12/11/95	12.40	1.43	2.28
Area 6, Well 3	01/03/95	10.30	0.94	1.57
Area 6, Well 3	01/09/95	7.40	0.70	1.18
Area 6, Well 3	01/17/95	15.70	1.02	1.56
Area 6, Well 3	01/23/95	14.10	0.89	1.35
Area 6, Well 3	01/30/95	17.20	0.77	1.03
Area 6, Well 3	02/08/95	20.20	1.09	1.57
Area 6, Well 3	02/14/95	19.50	0.96	1.35
Area 6, Well 3	02/21/95	22.70	1.00	1.35
Area 6, Well 3	02/28/95	22.50	1.11	1.54
Area 6, Well 3	03/06/95	12.80	0.89	1.40
Area 6, Well 3	03/13/95	15.20	0.90	1.34
Area 6, Well 3	03/20/95	7.18	0.78	1.35
Area 6, Well 3	03/27/95	18.70	0.96	1.37
Area 6, Well 3	04/03/95	12.90	0.87	1.35
Area 6, Well 3	04/10/95	13.30	0.85	1.29
Area 6, Well 3	04/17/95	12.40	0.69	0.99
Area 6, Well 3	04/26/95	12.70	0.95	1.50
Area 6, Well 3	05/02/95	12.30	0.97	1.57
Area 6, Well 3	05/08/95	12.10	0.76	1.13
Area 6, Well 3	05/16/95	23.60	1.12	1.51
Area 6, Well 3	05/23/95	19.00	0.97	1.37
Area 6, Well 3	05/31/95	20.80	1.22	1.81

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 6, Well 3	06/06/95	15.20	0.91	1.37
Area 6, Well 3	06/14/95	15.30	1.11	1.74
Area 6, Well 3	06/20/95	20.20	1.05	1.48
Area 6, Well 3	06/27/95	23.90	1.25	1.77
Area 6, Well 3	07/03/95	25.10	1.13	1.51
Area 6, Well 3	07/10/95	19.50	0.88	1.18
Area 6, Well 3	07/19/95	23.70	1.12	1.51
Area 6, Well 3	07/26/95	25.50	1.14	1.50
Area 6, Well 3	08/02/95	24.30	1.05	1.39
Area 6, Well 3	08/10/95	19.70	1.09	1.58
Area 6, Well 3	08/17/95	18.60	1.08	1.59
Area 6, Well 3	08/24/95	14.60	1.01	1.58
Area 6, Well 3	08/31/95	29.20	1.32	1.75
Area 6, Well 3	09/06/95	24.50	1.15	1.55
Area 6, Well 3	09/13/95	(a)	(g)	(g)
Area 6, Well 3	09/20/95	(d)	(g)	(g)
Area 6, Well 3	09/27/95	18.00	0.94	1.34
Area 6, Well 3	10/04/95	21.10	1.24	1.83
Area 6, Well 3	10/09/95	30.00	1.00	1.15
Area 6, Well 3	10/17/95	27.60	1.17	1.52
Area 6, Well 3	10/23/95	20.90	0.98	1.35
Area 6, Well 3	10/30/95	26.60	1.05	1.32
Area 6, Well 3	11/06/95	22.60	0.98	1.29
Area 6, Well 3	11/13/95	21.80	1.00	1.36
Area 6, Well 3	11/20/95	32.60	1.10	1.29
Area 6, Well 3	11/27/95	22.10	0.98	1.31
Area 6, Well 3	12/04/95	21.20	1.28	1.60
Area 6, Well 3	12/11/95	8.87	0.79	1.32
Area 6, Well 3	12/18/95	38.00	1.06	1.11
Area 6, Well 3	12/26/95	18.50	0.91	1.25
Area 6, Yucca	01/03/95	16.60	1.29	2.07
Area 6, Yucca	01/09/95	11.40	0.95	1.54
Area 6, Yucca	01/17/95	11.30	1.18	2.03
Area 6, Yucca	01/23/95	13.60	1.09	1.78
Area 6, Yucca	01/30/95	23.50	1.03	1.37
Area 6, Yucca	02/08/95	18.40	2.65	4.79

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 6, Yucca	02/14/95	(d)	(g)	(g)
Area 6, Yucca	02/21/95	(d)	(g)	(g)
Area 6, Yucca	02/28/95	4.89	0.69	1.24
Area 6, Yucca	03/06/95	(d)	(g)	(g)
Area 6, Yucca	03/13/95	24.40	1.59	2.44
Area 6, Yucca	03/20/95	8.99	1.30	2.35
Area 6, Yucca	03/27/95	17.70	1.48	2.42
Area 6, Yucca	04/03/95	13.10	1.44	2.50
Area 6, Yucca	04/10/95	10.20	1.29	2.27
Area 6, Yucca	04/17/95	13.80	1.50	2.56
Area 6, Yucca	04/26/95	14.50	1.59	2.73
Area 6, Yucca	05/02/95	13.90	1.61	2.81
Area 6, Yucca	05/08/95	14.40	1.27	2.08
Area 6, Yucca	05/16/95	23.10	1.56	2.40
Area 6, Yucca	05/23/95	12.50	1.62	2.89
Area 6, Yucca	05/31/95	19.70	1.77	2.97
Area 6, Yucca	06/06/95	13.90	1.38	2.34
Area 6, Yucca	06/14/95	15.60	1.67	2.87
Area 6, Yucca	06/20/95	17.10	1.53	2.52
Area 6, Yucca	06/27/95	23.80	1.86	2.98
Area 6, Yucca	07/03/95	25.40	1.71	2.62
Area 6, Yucca	07/10/95	18.80	0.86	1.16
Area 6, Yucca	07/19/95	21.20	1.05	1.46
Area 6, Yucca	07/26/95	23.90	1.09	1.45
Area 6, Yucca	08/02/95	23.20	1.00	1.32
Area 6, Yucca	08/10/95	18.00	1.02	1.50
Area 6, Yucca	08/17/95	15.60	1.56	2.66
Area 6, Yucca	08/24/95	12.00	0.88	1.38
Area 6, Yucca	08/31/95	25.90	1.18	1.59
Area 6, Yucca	09/06/95	21.10	1.00	1.36
Area 6, Yucca	09/13/95	32.50	1.14	1.34
Area 6, Yucca	09/20/95	26.20	1.08	1.40
Area 6, Yucca	09/27/95	17.80	0.95	1.36
Area 6, Yucca	10/04/95	25.50	1.33	1.85
Area 6, Yucca	10/09/95	27.00	1.02	1.25
Area 6, Yucca	10/17/95	25.00	1.10	1.46

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 6, Yucca	10/23/95	24.00	1.02	1.35
Area 6, Yucca	10/30/95	26.20	1.06	1.35
Area 6, Yucca	11/06/95	26.80	1.08	1.37
Area 6, Yucca	11/13/95	24.10	1.04	1.38
Area 6, Yucca	11/20/95	34.00	1.13	1.30
Area 6, Yucca	11/27/95	24.70	1.02	1.33
Area 6, Yucca	12/04/95	23.80	1.34	1.63
Area 6, Yucca	12/11/95	11.20	0.97	1.60
Area 6, Yucca	12/18/95	40.30	1.09	1.11
Area 6, Yucca	12/26/95	20.30	0.94	1.27
Area 7, UE-7ns	01/03/95	9.28	0.97	1.68
Area 7, UE-7ns	01/09/95	5.05	0.71	1.27
Area 7, UE-7ns	01/17/95	16.50	1.09	1.68
Area 7, UE-7ns	01/23/95	9.81	0.87	1.44
Area 7, UE-7ns	01/30/95	16.10	0.79	1.11
Area 7, UE-7ns	02/08/95	4.79	0.91	1.69
Area 7, UE-7ns	02/14/95	13.60	0.93	1.44
Area 7, UE-7ns	02/21/95	22.50	1.06	1.45
Area 7, UE-7ns	02/28/95	20.50	1.15	1.66
Area 7, UE-7ns	03/06/95	9.76	0.89	1.50
Area 7, UE-7ns	03/13/95	13.00	0.92	1.45
Area 7, UE-7ns	03/20/95	5.68	0.81	1.46
Area 7, UE-7ns	03/27/95	18.10	1.00	1.46
Area 7, UE-7ns	04/03/95	10.70	0.89	1.45
Area 7, UE-7ns	04/10/95	13.10	0.90	1.39
Area 7, UE-7ns	04/17/95	14.20	0.75	1.06
Area 7, UE-7ns	04/26/95	12.50	0.98	1.55
Area 7, UE-7ns	05/02/95	15.30	1.12	1.77
Area 7, UE-7ns	05/08/95	13.70	0.83	1.22
Area 7, UE-7ns	05/16/95	18.80	0.99	1.39
Area 7, UE-7ns	05/23/95	15.60	0.87	1.27
Area 7, UE-7ns	05/31/95	18.90	1.17	1.77
Area 7, UE-7ns	06/06/95	13.60	0.84	1.29
Area 7, UE-7ns	06/14/95	14.30	1.04	1.64
Area 7, UE-7ns	06/20/95	15.30	0.94	1.39
Area 7, UE-7ns	06/27/95	19.50	1.16	1.71

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 7, UE-7ns	07/03/95	26.10	1.11	1.44
Area 7, UE-7ns	07/10/95	19.90	0.86	1.12
Area 7, UE-7ns	07/19/95	20.10	1.03	1.44
Area 7, UE-7ns	07/26/95	22.10	1.05	1.43
Area 7, UE-7ns	08/02/95	23.50	1.00	1.32
Area 7, UE-7ns	08/10/95	18.40	1.03	1.51
Area 7, UE-7ns	08/17/95	15.60	0.98	1.50
Area 7, UE-7ns	08/24/95	13.50	0.95	1.50
Area 7, UE-7ns	08/31/95	23.50	1.21	1.69
Area 7, UE-7ns	09/06/95	21.00	1.06	1.47
Area 7, UE-7ns	09/13/95	28.10	1.14	1.45
Area 7, UE-7ns	09/20/95	25.60	1.13	1.53
Area 7, UE-7ns	09/27/95	19.50	1.04	1.48
Area 7, UE-7ns	10/04/95	25.10	1.44	2.09
Area 7, UE-7ns	10/09/95	28.00	1.15	1.49
Area 7, UE-7ns	10/16/95	33.10	1.23	1.50
Area 7, UE-7ns	10/23/95	20.50	1.07	1.52
Area 7, UE-7ns	10/30/95	29.70	1.20	1.52
Area 7, UE-7ns	11/06/95	25.20	1.13	1.51
Area 7, UE-7ns	11/13/95	(a)	(g)	(g)
Area 7, UE-7ns	11/20/95	(a)	(g)	(g)
Area 7, UE-7ns	11/27/95	25.80	1.28	1.79
Area 7, UE-7ns	12/04/95	25.70	1.53	1.89
Area 7, UE-7ns	12/11/95	11.80	1.22	1.90
Area 7, UE-7ns	12/18/95	44.50	1.26	1.33
Area 7, UE-7ns	12/26/95	20.10	1.07	1.51
Area 9, Area 9-300	01/03/95	27.00	3.85	6.97
Area 9, Area 9-300	01/09/95	(a)	(g)	(g)
Area 9, Area 9-300	01/17/95	18.90	1.29	1.99
Area 9, Area 9-300	01/23/95	11.10	0.85	1.37
Area 9, Area 9-300	01/30/95	17.90	0.79	1.05
Area 9, Area 9-300	02/08/95	16.60	1.07	1.64
Area 9, Area 9-300	02/14/95	15.50	0.92	1.38
Area 9, Area 9-300	02/21/95	29.90	1.12	1.39
Area 9, Area 9-300	02/28/95	10.60	0.95	1.58
Area 9, Area 9-300	03/06/95	9.05	0.84	1.42

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 9, Area 9-300	03/13/95	14.30	0.90	1.37
Area 9, Area 9-300	03/20/95	7.64	0.79	1.36
Area 9, Area 9-300	03/27/95	19.60	1.00	1.42
Area 9, Area 9-300	04/03/95	12.90	0.92	1.45
Area 9, Area 9-300	04/10/95	51.00	3.03	4.47
Area 9, Area 9-300	04/17/95	15.10	0.74	1.01
Area 9, Area 9-300	04/26/95	11.40	0.94	1.53
Area 9, Area 9-300	05/02/95	11.80	0.98	1.61
Area 9, Area 9-300	05/08/95	14.70	0.81	1.15
Area 9, Area 9-300	05/16/95	19.40	1.10	1.58
Area 9, Area 9-300	05/23/95	18.70	1.00	1.45
Area 9, Area 9-300	05/31/95	16.80	1.18	1.85
Area 9, Area 9-300	06/06/95	13.10	0.96	1.52
Area 9, Area 9-300	06/14/95	12.10	1.11	1.85
Area 9, Area 9-300	06/20/95	17.60	1.08	1.61
Area 9, Area 9-300	06/27/95	18.30	1.28	2.01
Area 9, Area 9-300	07/03/95	22.70	1.16	1.62
Area 9, Area 9-300	07/10/95	16.30	0.88	1.25
Area 9, Area 9-300	07/19/95	17.70	1.10	1.67
Area 9, Area 9-300	07/26/95	23.30	1.16	1.61
Area 9, Area 9-300	08/02/95	21.80	1.06	1.48
Area 9, Area 9-300	08/10/95	14.40	1.06	1.68
Area 9, Area 9-300	08/17/95	14.30	1.04	1.66
Area 9, Area 9-300	08/24/95	13.50	1.03	1.65
Area 9, Area 9-300	08/31/95	21.70	1.30	1.96
Area 9, Area 9-300	09/06/95	19.10	1.10	1.60
Area 9, Area 9-300	09/13/95	30.40	1.25	1.59
Area 9, Area 9-300	09/20/95	22.50	1.16	1.65
Area 9, Area 9-300	09/27/95	14.40	1.02	1.59
Area 9, Area 9-300	10/04/95	23.10	1.48	2.23
Area 9, Area 9-300	10/09/95	(b)	(g)	(g)
Area 9, Area 9-300	10/16/95	23.10	1.14	1.58
Area 9, Area 9-300	10/23/95	21.30	1.12	1.61
Area 9, Area 9-300	10/30/95	24.60	1.17	1.60
Area 9, Area 9-300	11/06/95	21.20	1.10	1.56
Area 9, Area 9-300	11/13/95	20.50	1.13	1.64

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 9, Area 9-300	11/20/95	29.80	1.21	1.55
Area 9, Area 9-300	11/27/95	19.30	1.08	1.59
Area 9, Area 9-300	12/04/95	17.60	1.38	1.95
Area 9, Area 9-300	12/11/95	10.80	1.22	1.95
Area 9, Area 9-300	12/18/95	35.30	1.17	1.34
Area 9, Area 9-300	12/26/95	15.90	1.01	1.52
Area 10, Gate 700 South	01/03/95	14.50	1.21	1.98
Area 10, Gate 700 South	01/09/95	8.16	0.87	1.50
Area 10, Gate 700 South	01/17/95	17.60	1.25	1.97
Area 10, Gate 700 South	01/23/95	14.20	1.07	1.70
Area 10, Gate 700 South	01/30/95	19.50	0.94	1.30
Area 10, Gate 700 South	02/08/95	21.50	1.31	1.97
Area 10, Gate 700 South	02/14/95	16.00	0.94	1.40
Area 10, Gate 700 South	02/21/95	2.96	0.79	1.52
Area 10, Gate 700 South	02/28/95	14.50	1.10	1.76
Area 10, Gate 700 South	03/06/95	6.71	0.89	1.59
Area 10, Gate 700 South	03/13/95	15.70	0.94	1.42
Area 10, Gate 700 South	03/20/95	12.40	0.91	1.43
Area 10, Gate 700 South	03/27/95	20.30	1.01	1.43
Area 10, Gate 700 South	04/03/95	12.10	0.88	1.41
Area 10, Gate 700 South	04/10/95	(d)	(g)	(g)
Area 10, Gate 700 South	04/17/95	16.80	0.78	1.04
Area 10, Gate 700 South	04/26/95	13.30	0.99	1.56
Area 10, Gate 700 South	05/02/95	16.70	1.28	2.04
Area 10, Gate 700 South	05/08/95	10.90	0.69	1.03
Area 10, Gate 700 South	05/16/95	22.00	1.01	1.35
Area 10, Gate 700 South	05/23/95	19.10	0.90	1.24
Area 10, Gate 700 South	05/31/95	19.20	1.11	1.66
Area 10, Gate 700 South	06/06/95	14.10	0.83	1.25
Area 10, Gate 700 South	06/14/95	13.40	1.00	1.59
Area 10, Gate 700 South	06/20/95	17.50	0.94	1.35
Area 10, Gate 700 South	06/27/95	19.70	1.11	1.61
Area 10, Gate 700 South	07/03/95	22.20	1.02	1.36
Area 10, Gate 700 South	07/10/95	16.70	0.78	1.06
Area 10, Gate 700 South	07/19/95	21.40	1.00	1.36
Area 10, Gate 700 South	07/26/95	22.60	1.59	2.47

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 10, Gate 700 South	08/02/95	24.20	1.20	1.68
Area 10, Gate 700 South	08/10/95	18.40	1.26	1.96
Area 10, Gate 700 South	08/17/95	17.00	1.22	1.92
Area 10, Gate 700 South	08/24/95	11.80	1.10	1.85
Area 10, Gate 700 South	08/31/95	25.10	1.43	2.10
Area 10, Gate 700 South	09/06/95	21.60	1.24	1.81
Area 10, Gate 700 South	09/13/95	31.90	1.38	1.79
Area 10, Gate 700 South	09/20/95	24.50	1.30	1.87
Area 10, Gate 700 South	09/27/95	20.60	1.23	1.81
Area 10, Gate 700 South	10/04/95	25.20	1.69	2.60
Area 10, Gate 700 South	10/09/95	26.60	1.36	1.92
Area 10, Gate 700 South	10/16/95	29.10	1.33	1.79
Area 10, Gate 700 South	10/23/95	21.50	1.27	1.89
Area 10, Gate 700 South	10/30/95	29.20	1.38	1.87
Area 10, Gate 700 South	11/06/95	23.30	1.28	1.84
Area 10, Gate 700 South	11/13/95	22.60	1.28	1.87
Area 10, Gate 700 South	11/20/95	35.90	1.43	1.80
Area 10, Gate 700 South	11/27/95	22.90	1.28	1.88
Area 10, Gate 700 South	12/04/95	26.10	1.74	2.28
Area 10, Gate 700 South	12/11/95	12.50	1.44	2.32
Area 10, Gate 700 South	12/18/95	50.50	1.55	1.71
Area 10, Gate 700 South	12/26/95	16.50	0.92	1.33
Area 10, Sedan Crater	09/06/95	20.80	1.01	1.38
Area 10, Sedan Crater	09/13/95	29.40	1.11	1.36
Area 10, Sedan Crater	09/20/95	26.00	1.09	1.43
Area 10, Sedan Crater	09/27/95	19.20	0.99	1.39
Area 10, Sedan Crater	10/04/95	22.30	1.33	1.96
Area 10, Sedan Crater	10/09/95	23.40	1.06	1.44
Area 10, Sedan Crater	10/16/95	27.30	1.09	1.38
Area 10, Sedan Crater	10/23/95	19.80	1.00	1.43
Area 10, Sedan Crater	10/30/95	30.00	1.15	1.43
Area 10, Sedan Crater	11/06/95	23.20	1.05	1.40
Area 10, Sedan Crater	11/13/95	20.30	1.38	2.15
Area 10, Sedan Crater	11/20/95	33.80	1.33	1.66
Area 10, Sedan Crater	11/27/95	20.60	1.03	1.44
Area 10, Sedan Crater	12/04/95	20.10	1.34	1.76

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 10, Sedan Crater	12/11/95	10.50	1.13	1.76
Area 10, Sedan Crater	12/18/95	39.50	1.16	1.24
Area 10, Sedan Crater	12/26/95	18.50	0.97	1.38
Area 11, Gate 293	01/03/95	13.70	1.02	1.61
Area 11, Gate 293	01/09/95	7.47	0.72	1.22
Area 11, Gate 293	01/17/95	16.00	1.05	1.61
Area 11, Gate 293	01/23/95	11.30	0.86	1.38
Area 11, Gate 293	01/30/95	18.70	0.84	1.12
Area 11, Gate 293	02/08/95	18.70	1.17	1.76
Area 11, Gate 293	02/14/95	16.20	0.94	1.39
Area 11, Gate 293	02/21/95	5.55	0.77	1.39
Area 11, Gate 293	02/28/95	18.20	1.06	1.58
Area 11, Gate 293	03/06/95	11.50	0.89	1.43
Area 11, Gate 293	03/13/95	9.11	0.83	1.39
Area 11, Gate 293	03/20/95	9.57	0.84	1.40
Area 11, Gate 293	03/27/95	20.90	1.01	1.40
Area 11, Gate 293	04/03/95	12.40	0.88	1.39
Area 11, Gate 293	04/10/95	12.30	0.86	1.33
Area 11, Gate 293	04/17/95	14.70	0.74	1.02
Area 11, Gate 293	04/26/95	12.00	0.96	1.54
Area 11, Gate 293	05/02/95	13.50	1.01	1.62
Area 11, Gate 293	05/08/95	13.10	0.79	1.17
Area 11, Gate 293	05/16/95	20.90	0.99	1.33
Area 11, Gate 293	05/23/95	16.60	0.85	1.22
Area 11, Gate 293	05/31/95	19.10	1.11	1.64
Area 11, Gate 293	06/06/95	13.80	0.86	1.30
Area 11, Gate 293	06/14/95	13.50	1.05	1.67
Area 11, Gate 293	06/20/95	19.30	1.00	1.41
Area 11, Gate 293	06/27/95	22.80	1.19	1.67
Area 11, Gate 293	07/03/95	25.20	1.08	1.42
Area 11, Gate 293	07/10/95	16.40	0.80	1.10
Area 11, Gate 293	07/19/95	21.30	1.03	1.41
Area 11, Gate 293	07/26/95	25.80	1.08	1.40
Area 11, Gate 293	08/02/95	23.30	0.98	1.29
Area 11, Gate 293	08/10/95	19.30	1.02	1.47
Area 11, Gate 293	08/17/95	17.00	0.99	1.47

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	μCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 11, Gate 293	08/24/95	13.40	0.93	1.46
Area 11, Gate 293	08/31/95	25.50	1.21	1.65
Area 11, Gate 293	09/06/95	20.80	1.04	1.43
Area 11, Gate 293	09/13/95	29.90	1.14	1.40
Area 11, Gate 293	09/20/95	26.40	1.12	1.48
Area 11, Gate 293	09/27/95	20.80	1.05	1.46
Area 11, Gate 293	10/04/95	24.10	1.39	2.02
Area 11, Gate 293	10/09/95	29.20	1.18	1.51
Area 11, Gate 293	10/16/95	33.40	1.21	1.46
Area 11, Gate 293	10/23/95	26.40	1.13	1.50
Area 11, Gate 293	10/30/95	31.90	1.22	1.51
Area 11, Gate 293	11/06/95	30.30	1.18	1.48
Area 11, Gate 293	11/13/95	26.90	1.16	1.53
Area 11, Gate 293	11/20/95	38.70	1.27	1.46
Area 11, Gate 293	11/27/95	25.50	1.13	1.52
Area 11, Gate 293	12/04/95	26.70	1.52	1.85
Area 11, Gate 293	12/11/95	12.30	0.95	1.52
Area 11, Gate 293	12/18/95	48.00	1.30	1.36
Area 11, Gate 293	12/26/95	25.30	1.12	1.48
Area 12	01/03/95	7.92	0.76	1.29
Area 12	01/09/95	12.80	1.43	2.49
Area 12	01/17/95	12.40	1.17	1.97
Area 12	01/23/95	14.20	1.07	1.71
Area 12	01/30/95	18.90	0.94	1.31
Area 12	02/08/95	13.10	0.88	1.37
Area 12	02/14/95	15.70	1.04	1.58
Area 12	02/21/95	31.00	1.30	1.68
Area 12	02/28/95	12.30	1.17	1.97
Area 12	03/06/95	4.88	0.95	1.79
Area 12	03/13/95	15.10	1.09	1.73
Area 12	03/20/95	16.20	1.86	3.26
Area 12	03/27/95	15.10	0.82	1.20
Area 12	04/03/95	14.70	1.09	1.72
Area 12	04/10/95	11.40	1.01	1.68
Area 12	04/17/95	18.10	1.04	1.53
Area 12	04/26/95	12.30	1.20	2.04

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 12	05/02/95	15.00	1.25	2.04
Area 12	05/08/95	14.60	0.99	1.54
Area 12	05/16/95	7.09	0.97	1.76
Area 12	05/23/95	17.50	1.02	1.49
Area 12	05/33/95	22.40	1.38	2.08
Area 12	06/06/95	17.40	1.05	1.58
Area 12	06/14/95	12.10	1.01	1.65
Area 12	06/20/95	24.70	1.54	2.35
Area 12	06/27/95	22.10	1.39	2.14
Area 12	07/03/95	27.30	1.30	1.80
Area 12	07/10/95	18.90	0.98	1.40
Area 12	07/19/95	(a)	(g)	(g)
Area 12	07/26/95	(a)	(g)	(g)
Area 12	08/02/95	24.80	1.14	1.56
Area 12	08/10/95	22.60	1.22	1.73
Area 12	08/17/95	20.20	1.18	1.73
Area 12	08/24/95	16.30	1.12	1.74
Area 12	08/31/95	26.70	1.44	2.10
Area 12	09/06/95	24.10	1.25	1.75
Area 12	09/13/95	34.80	1.38	1.73
Area 12	09/20/95	30.00	1.35	1.82
Area 12	09/27/95	18.80	1.18	1.77
Area 12	10/04/95	26.30	1.67	2.52
Area 12	10/09/95	(e)	(g)	(g)
Area 12	10/16/95	(e)	(g)	(g)
Area 12	10/23/95	(e)	(g)	(g)
Area 12	10/30/95	(e)	(g)	(g)
Area 12	11/06/95	(e)	(g)	(g)
Area 12	11/13/95	(e)	(g)	(g)
Area 12	11/20/95	31.60	1.18	1.44
Area 12	11/27/95	17.40	0.99	1.46
Area 12	12/04/95	14.90	1.24	1.80
Area 12	12/11/95	7.09	0.83	1.45
Area 12	12/18/95	36.60	1.11	1.22
Area 12	12/26/95	12.50	0.89	1.39
Area 13	12/19/95	47.60	1.27	1.30

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	μCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 13	12/27/95	17.00	1.00	1.48
Area 15, EPA Farm	01/03/95	14.40	1.31	2.18
Area 15, EPA Farm	01/09/95	6.74	0.65	1.10
Area 15, EPA Farm	01/17/95	15.40	1.08	1.69
Area 15, EPA Farm	01/23/95	8.42	0.86	1.47
Area 15, EPA Farm	01/30/95	18.90	0.83	1.10
Area 15, EPA Farm	02/08/95	20.90	1.21	1.79
Area 15, EPA Farm	02/14/95	15.20	0.93	1.39
Area 15, EPA Farm	02/21/95	28.80	1.14	1.45
Area 15, EPA Farm	02/28/95	10.90	1.00	1.67
Area 15, EPA Farm	03/06/95	11.70	0.92	1.49
Area 15, EPA Farm	03/13/95	15.40	0.96	1.45
Area 15, EPA Farm	03/20/95	7.59	0.84	1.46
Area 15, EPA Farm	03/27/95	20.00	1.03	1.47
Area 15, EPA Farm	04/03/95	14.30	0.94	1.45
Area 15, EPA Farm	04/10/95	12.90	0.92	1.44
Area 15, EPA Farm	04/17/95	16.50	0.79	1.07
Area 15, EPA Farm	04/26/95	12.60	1.00	1.60
Area 15, EPA Farm	05/02/95	13.20	1.05	1.69
Area 15, EPA Farm	05/08/95	11.30	1.13	1.91
Area 15, EPA Farm	05/16/95	20.50	1.01	1.39
Area 15, EPA Farm	05/23/95	16.70	0.89	1.28
Area 15, EPA Farm	05/31/95	18.60	1.13	1.72
Area 15, EPA Farm	06/06/95	14.30	0.86	1.28
Area 15, EPA Farm	06/14/95	12.50	1.01	1.63
Area 15, EPA Farm	06/20/95	18.40	0.98	1.38
Area 15, EPA Farm	06/27/95	20.20	1.13	1.65
Area 15, EPA Farm	07/03/95	23.50	1.05	1.39
Area 15, EPA Farm	07/10/95	21.30	0.86	1.08
Area 15, EPA Farm	07/19/95	19.50	0.99	1.39
Area 15, EPA Farm	07/26/95	22.80	1.03	1.37
Area 15, EPA Farm	08/02/95	22.30	0.96	1.28
Area 15, EPA Farm	08/10/95	18.30	1.00	1.45
Area 15, EPA Farm	08/17/95	16.30	0.97	1.45
Area 15, EPA Farm	08/24/95	13.40	0.92	1.44
Area 15, EPA Farm	08/31/95	24.10	1.18	1.64

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 15, EPA Farm	09/06/95	19.40	1.01	1.42
Area 15, EPA Farm	09/13/95	30.20	1.14	1.40
Area 15, EPA Farm	09/20/95	26.20	1.11	1.47
Area 15, EPA Farm	09/27/95	17.60	0.99	1.43
Area 15, EPA Farm	10/04/95	22.40	1.36	2.01
Area 15, EPA Farm	10/09/95	27.60	1.14	1.48
Area 15, EPA Farm	10/16/95	29.80	1.15	1.43
Area 15, EPA Farm	10/23/95	21.70	1.06	1.48
Area 15, EPA Farm	10/30/95	29.70	1.18	1.49
Area 15, EPA Farm	11/06/95	23.30	1.08	1.45
Area 15, EPA Farm	11/13/95	22.30	1.04	1.43
Area 15, EPA Farm	11/20/95	25.20	1.06	1.37
Area 15, EPA Farm	11/27/95	21.80	1.04	1.43
Area 15, EPA Farm	12/04/95	16.10	1.25	1.75
Area 15, EPA Farm	12/11/95	9.70	0.86	1.44
Area 15, EPA Farm	12/18/95	41.50	1.17	1.23
Area 15, EPA Farm	12/26/95	16.50	0.94	1.37
Area 16, 3545 Substation	01/03/95	10.80	1.03	1.73
Area 16, 3545 Substation	01/09/95	5.62	0.74	1.33
Area 16, 3545 Substation	01/17/95	17.00	1.14	1.75
Area 16, 3545 Substation	01/23/95	8.37	0.87	1.49
Area 16, 3545 Substation	01/30/95	17.20	0.83	1.14
Area 16, 3545 Substation	02/08/95	5.26	0.97	1.80
Area 16, 3545 Substation	02/14/95	14.80	0.98	1.49
Area 16, 3545 Substation	02/21/95	28.80	1.15	1.47
Area 16, 3545 Substation	02/28/95	12.10	1.06	1.76
Area 16, 3545 Substation	03/06/95	9.81	0.92	1.56
Area 16, 3545 Substation	03/13/95	16.80	0.99	1.49
Area 16, 3545 Substation	03/20/95	26.00	1.13	1.50
Area 16, 3545 Substation	03/27/95	18.10	1.01	1.48
Area 16, 3545 Substation	04/03/95	12.70	0.92	1.46
Area 16, 3545 Substation	04/10/95	11.60	0.93	1.51
Area 16, 3545 Substation	04/17/95	13.70	0.77	1.13
Area 16, 3545 Substation	04/26/95	9.50	1.02	1.75
Area 16, 3545 Substation	05/02/95	12.90	1.05	1.72
Area 16, 3545 Substation	05/08/95	14.00	0.86	1.29

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 16, 3545 Substation	05/16/95	16.50	0.99	1.48
Area 16, 3545 Substation	05/23/95	15.60	0.87	1.26
Area 16, 3545 Substation	05/31/95	16.70	1.12	1.73
Area 16, 3545 Substation	06/06/95	12.80	0.85	1.32
Area 16, 3545 Substation	06/14/95	11.00	1.04	1.75
Area 16, 3545 Substation	06/20/95	16.50	1.00	1.50
Area 16, 3545 Substation	06/27/95	19.90	1.18	1.78
Area 16, 3545 Substation	07/03/95	22.20	1.06	1.48
Area 16, 3545 Substation	07/10/95	17.30	0.85	1.19
Area 16, 3545 Substation	07/19/95	16.70	0.99	1.46
Area 16, 3545 Substation	07/26/95	23.30	1.07	1.43
Area 16, 3545 Substation	08/02/95	22.00	0.97	1.30
Area 16, 3545 Substation	08/10/95	19.20	1.02	1.45
Area 16, 3545 Substation	08/17/95	15.00	0.95	1.43
Area 16, 3545 Substation	08/24/95	14.20	0.94	1.44
Area 16, 3545 Substation	08/31/95	21.10	1.17	1.72
Area 16, 3545 Substation	09/06/95	20.50	1.04	1.44
Area 16, 3545 Substation	09/13/95	28.40	1.14	1.43
Area 16, 3545 Substation	09/20/95	24.20	1.10	1.49
Area 16, 3545 Substation	09/27/95	18.50	1.01	1.44
Area 16, 3545 Substation	10/04/95	26.60	1.44	2.06
Area 16, 3545 Substation	10/09/95	(e)	(g)	(g)
Area 16, 3545 Substation	10/16/95	(e)	(g)	(g)
Area 16, 3545 Substation	10/23/95	(e)	(g)	(g)
Area 16, 3545 Substation	10/30/95	(e)	(g)	(g)
Area 16, 3545 Substation	11/06/95	(e)	(g)	(g)
Area 16, 3545 Substation	11/13/95	23.10	1.12	1.55
Area 16, 3545 Substation	11/20/95	37.10	1.61	2.12
Area 16, 3545 Substation	11/27/95	21.00	1.39	2.15
Area 16, 3545 Substation	12/04/95	14.50	1.65	2.63
Area 16, 3545 Substation	12/11/95	8.86	1.17	2.09
Area 16, 3545 Substation	12/18/95	35.60	1.39	1.74
Area 16, 3545 Substation	12/26/95	(d)	(g)	(g)
Area 18, Well UE-18t	12/18/95	44.70	1.52	1.77
Area 18, Well UE-18t	12/26/95	14.40	1.01	1.56
Area 19, Echo Peak	01/03/95	(f)	(g)	(g)

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	μCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 19, Echo Peak	04/03/95	(f)	(g)	(g)
Area 19, Echo Peak	04/10/95	(f)	(g)	(g)
Area 19, Echo Peak	04/17/95	8.67	0.43	0.59
Area 19, Echo Peak	04/26/95	8.84	0.93	1.60
Area 19, Echo Peak	05/02/95	8.67	0.82	1.38
Area 19, Echo Peak	05/08/95	10.20	0.82	1.33
Area 19, Echo Peak	05/16/95	15.60	0.93	1.38
Area 19, Echo Peak	05/23/95	21.00	0.91	1.18
Area 19, Echo Peak	05/31/95	16.30	1.07	1.65
Area 19, Echo Peak	06/06/95	12.50	0.79	1.21
Area 19, Echo Peak	06/14/95	10.40	0.97	1.64
Area 19, Echo Peak	06/20/95	15.40	0.93	1.40
Area 19, Echo Peak	06/27/95	15.90	1.10	1.71
Area 19, Echo Peak	07/03/95	21.00	1.01	1.40
Area 19, Echo Peak	07/10/95	16.80	0.80	1.11
Area 19, Echo Peak	07/19/95	18.10	0.99	1.44
Area 19, Echo Peak	07/26/95	(a)	(g)	(g)
Area 19, Echo Peak	08/02/95	18.90	0.90	1.25
Area 19, Echo Peak	08/10/95	16.00	0.94	1.38
Area 19, Echo Peak	08/17/95	13.20	0.89	1.37
Area 19, Pahute Substation	01/03/95	(f)	(g)	(g)
Area 19, Pahute Substation	04/03/95	(f)	(g)	(g)
Area 19, Pahute Substation	04/10/95	(f)	(g)	(g)
Area 19, Pahute Substation	04/17/95	14.10	0.57	0.72
Area 19, Pahute Substation	04/26/95	9.39	1.10	1.93
Area 19, Pahute Substation	05/02/95	11.50	1.02	1.70
Area 19, Pahute Substation	05/08/95	14.40	1.04	1.65
Area 19, Pahute Substation	05/16/95	15.60	0.98	1.50
Area 19, Pahute Substation	05/23/95	14.40	0.86	1.26
Area 19, Pahute Substation	05/31/95	18.10	1.17	1.79
Area 19, Pahute Substation	06/06/95	11.90	0.83	1.30
Area 19, Pahute Substation	06/14/95	12.20	1.07	1.77
Area 19, Pahute Substation	06/20/95	14.10	0.97	1.52
Area 19, Pahute Substation	06/27/95	16.40	1.17	1.85
Area 19, Pahute Substation	07/03/95	20.20	1.06	1.51
Area 19, Pahute Substation	07/10/95	14.90	0.82	1.19

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 19, Pahute Substation	07/19/95	18.10	1.04	1.55
Area 19, Pahute Substation	07/26/95	20.20	1.05	1.48
Area 19, Pahute Substation	08/02/95	19.00	0.96	1.35
Area 19, Pahute Substation	08/10/95	17.90	1.03	1.49
Area 19, Pahute Substation	08/17/95	12.80	0.94	1.47
Area 20	01/03/95	(f)	(g)	(g)
Area 20	04/03/95	(f)	(g)	(g)
Area 20	04/10/95	(f)	(g)	(g)
Area 20	04/17/95	(d)	(g)	(g)
Area 20	04/26/95	6.39	0.85	1.52
Area 20	05/02/95	28.30	3.35	5.89
Area 20	05/08/95	14.90	1.16	1.88
Area 20	05/16/95	19.00	1.39	2.19
Area 20	05/23/95	17.40	1.20	1.85
Area 20	05/31/95	18.60	1.59	2.63
Area 20	06/06/95	13.80	1.18	1.95
Area 20	06/14/95	12.90	1.52	2.67
Area 20	06/20/95	17.40	1.36	2.19
Area 20	06/27/95	19.50	1.63	2.68
Area 20	07/03/95	22.50	1.46	2.25
Area 20	07/10/95	17.80	1.91	3.31
Area 20	07/19/95	(a)	(g)	(g)
Area 20	07/26/95	29.00	2.42	3.95
Area 20	08/02/95	19.40	1.87	3.16
Area 20	08/10/95	20.60	1.41	2.17
Area 20	08/17/95	(a)	(g)	(g)
Area 20	08/24/95	13.70	1.18	1.93
Area 20	08/31/95	21.80	1.56	2.47
Area 20	09/06/95	18.90	1.35	2.11
Area 20	09/13/95	30.90	1.58	2.20
Area 20	09/20/95	(a)	(g)	(g)
Area 20	09/27/95	17.00	1.36	2.19
Area 20	10/04/95	23.60	1.85	2.97
Area 20	10/09/95	26.60	1.53	2.28
Area 20	10/16/95	27.00	1.46	2.10
Area 20	10/23/95	19.00	1.35	2.13

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 20	10/30/95	33.90	1.63	2.22
Area 20	11/06/95	19.20	1.36	2.13
Area 20	11/13/95	(d)	(g)	(g)
Area 20	11/20/95	25.70	1.21	1.65
Area 20	11/27/95	15.40	1.07	1.68
Area 20	12/04/95	12.70	1.32	2.06
Area 20	12/11/95	9.35	0.98	1.68
Area 20	12/18/95	31.80	1.17	1.42
Area 20	12/26/95	11.20	0.97	1.60
Area 20, Schooner	12/18/95	41.70	1.24	1.35
Area 20, Schooner	12/26/95	18.00	1.03	1.50
Area 23, Building 790 No.2	01/03/95	15.10	1.22	1.99
Area 23, Building 790 No.2	01/09/95	5.92	0.83	1.49
Area 23, Building 790 No.2	01/17/95	22.30	1.35	2.01
Area 23, Building 790 No.2	01/23/95	16.40	1.14	1.77
Area 23, Building 790 No.2	01/30/95	22.90	1.09	1.51
Area 23, Building 790 No.2	02/07/95	21.30	1.19	1.73
Area 23, Building 790 No.2	02/14/95	16.90	1.12	1.73
Area 23, Building 790 No.2	02/21/95	36.40	1.52	1.98
Area 23, Building 790 No.2	02/27/95	17.20	1.14	1.75
Area 23, Building 790 No.2	03/06/95	17.40	1.13	1.75
Area 23, Building 790 No.2	03/13/95	18.90	1.15	1.75
Area 23, Building 790 No.2	03/20/95	9.81	1.02	1.76
Area 23, Building 790 No.2	03/27/95	24.60	1.23	1.73
Area 23, Building 790 No.2	04/03/95	14.00	1.09	1.74
Area 23, Building 790 No.2	04/10/95	16.70	1.13	1.74
Area 23, Building 790 No.2	04/17/95	12.40	1.06	1.75
Area 23, Building 790 No.2	04/24/95	17.20	1.12	1.72
Area 23, Building 790 No.2	05/01/95	13.50	1.05	1.68
Area 23, Building 790 No.2	05/08/95	16.40	1.16	1.81
Area 23, Building 790 No.2	05/15/95	21.00	1.20	1.76
Area 23, Building 790 No.2	05/22/95	19.30	1.03	1.46
Area 23, Building 790 No.2	05/30/95	22.70	1.36	2.06
Area 23, Building 790 No.2	06/05/95	15.80	1.09	1.70
Area 23, Building 790 No.2	06/12/95	14.10	1.13	1.85
Area 23, Building 790 No.2	06/19/95	19.70	1.19	1.78

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 23, Building 790 No.2	06/26/95	25.60	1.26	1.78
Area 23, Building 790 No.2	07/03/95	27.00	1.16	1.55
Area 23, Building 790 No.2	07/11/95	21.80	1.10	1.55
Area 23, Building 790 No.2	07/19/95	20.70	1.08	1.54
Area 23, Building 790 No.2	07/27/95	29.20	1.45	2.00
Area 23, Building 790 No.2	08/02/95	24.70	1.26	1.79
Area 23, Building 790 No.2	08/09/95	23.30	1.21	1.71
Area 23, Building 790 No.2	08/16/95	17.40	1.14	1.74
Area 23, Building 790 No.2	08/23/95	13.70	1.03	1.64
Area 23, Building 790 No.2	08/30/95	26.60	1.48	2.17
Area 23, Building 790 No.2	09/05/95	22.90	0.99	1.30
Area 23, Building 790 No.2	09/14/95	35.10	1.37	1.70
Area 23, Building 790 No.2	09/21/95	31.80	1.39	1.87
Area 23, Building 790 No.2	09/28/95	20.30	1.17	1.72
Area 23, Building 790 No.2	10/05/95	31.90	1.64	2.30
Area 23, Building 790 No.2	10/10/95	30.80	1.34	1.76
Area 23, Building 790 No.2	10/17/95	36.40	1.45	1.83
Area 23, Building 790 No.2	10/24/95	29.90	1.34	1.80
Area 23, Building 790 No.2	10/31/95	38.90	1.43	1.73
Area 23, Building 790 No.2	11/07/95	27.90	1.28	1.73
Area 23, Building 790 No.2	11/14/95	(d)	(g)	(g)
Area 23, Building 790 No.2	11/21/95	(d)	(g)	(g)
Area 23, Building 790 No.2	11/27/95	(d)	(g)	(g)
Area 23, Building 790 No.2	12/04/95	24.20	1.90	2.67
Area 23, Building 790 No.2	12/11/95	10.60	0.98	1.63
Area 23, Building 790 No.2	12/18/95	46.40	1.30	1.36
Area 23, Building 790 No.2	12/26/95	26.20	1.06	1.34
Area 23, East Boundary	01/03/95	18.50	1.08	1.61
Area 23, East Boundary	01/09/95	7.62	0.73	1.23
Area 23, East Boundary	01/17/95	17.80	1.09	1.65
Area 23, East Boundary	01/23/95	12.00	0.91	1.45
Area 23, East Boundary	01/30/95	18.70	0.88	1.22
Area 23, East Boundary	02/07/95	17.70	0.96	1.40
Area 23, East Boundary	02/14/95	13.70	0.91	1.40
Area 23, East Boundary	02/21/95	27.40	1.21	1.60
Area 23, East Boundary	02/27/95	16.80	0.96	1.42

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 23, East Boundary	03/06/95	11.10	0.88	1.42
Area 23, East Boundary	03/13/95	14.60	0.92	1.40
Area 23, East Boundary	03/20/95	7.94	0.83	1.42
Area 23, East Boundary	03/27/95	19.30	0.99	1.41
Area 23, East Boundary	04/03/95	12.50	0.89	1.39
Area 23, East Boundary	04/10/95	11.10	0.87	1.41
Area 23, East Boundary	04/17/95	12.50	0.89	1.41
Area 23, East Boundary	04/24/95	14.20	0.91	1.39
Area 23, East Boundary	05/01/95	10.90	0.84	1.34
Area 23, East Boundary	05/08/95	14.90	0.95	1.46
Area 23, East Boundary	05/15/95	17.20	0.96	1.40
Area 23, East Boundary	05/22/95	18.40	0.87	1.17
Area 23, East Boundary	05/30/95	18.00	1.10	1.65
Area 23, East Boundary	06/05/95	14.20	0.89	1.35
Area 23, East Boundary	06/12/95	10.80	0.90	1.48
Area 23, East Boundary	06/19/95	14.50	0.94	1.44
Area 23, East Boundary	06/26/95	18.00	0.98	1.43
Area 23, East Boundary	07/03/95	20.50	0.92	1.25
Area 23, East Boundary	07/11/95	15.30	0.85	1.24
Area 23, East Boundary	07/19/95	(b)	(g)	(g)
Area 23, East Boundary	07/27/95	24.40	1.17	1.60
Area 23, East Boundary	08/02/95	18.20	0.98	1.43
Area 23, East Boundary	08/09/95	17.10	0.95	1.36
Area 23, East Boundary	08/16/95	13.90	0.90	1.38
Area 23, East Boundary	08/23/95	13.00	0.86	1.31
Area 23, East Boundary	08/30/95	20.50	1.17	1.73
Area 23, East Boundary	09/05/95	17.30	0.78	1.04
Area 23, East Boundary	09/14/95	24.00	1.04	1.36
Area 23, East Boundary	09/21/95	24.10	1.10	1.49
Area 23, East Boundary	09/28/95	16.40	0.94	1.38
Area 23, East Boundary	10/05/95	24.00	1.28	1.84
Area 23, H & S Building	01/03/95	30.60	1.58	2.25
Area 23, H & S Building	01/09/95	7.60	0.78	1.33
Area 23, H & S Building	01/17/95	17.10	1.17	1.83
Area 23, H & S Building	01/23/95	11.50	1.03	1.72
Area 23, H & S Building	01/30/95	19.30	1.00	1.43

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	μCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 23, H & S Building	02/07/95	17.80	1.09	1.66
Area 23, H & S Building	02/14/95	15.80	1.03	1.57
Area 23, H & S Building	02/21/95	29.30	1.38	1.88
Area 23, H & S Building	02/27/95	13.90	1.08	1.76
Area 23, H & S Building	03/06/95	9.62	0.92	1.57
Area 23, H & S Building	03/13/95	13.40	1.08	1.76
Area 23, H & S Building	03/20/95	7.05	0.93	1.68
Area 23, H & S Building	03/27/95	19.70	1.10	1.59
Area 23, H & S Building	04/03/95	11.50	0.99	1.64
Area 23, H & S Building	04/10/95	11.90	1.02	1.68
Area 23, H & S Building	04/17/95	12.30	1.01	1.65
Area 23, H & S Building	04/24/95	14.40	1.04	1.64
Area 23, H & S Building	05/01/95	14.00	1.00	1.58
Area 23, H & S Building	05/08/95	13.60	1.07	1.74
Area 23, H & S Building	05/15/95	19.00	1.11	1.65
Area 23, H & S Building	05/22/95	9.44	0.51	0.74
Area 23, H & S Building	05/30/95	18.80	1.25	1.93
Area 23, H & S Building	06/05/95	14.70	1.01	1.58
Area 23, H & S Building	06/12/95	12.30	1.06	1.77
Area 23, H & S Building	06/19/95	15.80	1.07	1.68
Area 23, H & S Building	06/26/95	24.60	1.22	1.72
Area 23, H & S Building	07/03/95	24.00	1.10	1.50
Area 23, H & S Building	07/11/95	18.80	0.99	1.42
Area 23, H & S Building	07/19/95	23.40	1.05	1.42
Area 23, H & S Building	07/27/95	27.30	1.33	1.84
Area 23, H & S Building	08/02/95	24.30	1.18	1.65
Area 23, H & S Building	08/09/95	20.30	1.11	1.58
Area 23, H & S Building	08/16/95	15.30	1.04	1.60
Area 23, H & S Building	08/23/95	16.30	1.02	1.52
Area 23, H & S Building	08/30/95	25.20	1.39	2.02
Area 23, H & S Building	09/05/95	24.30	1.03	1.34
Area 23, H & S Building	09/14/95	(d)	(g)	(g)
Area 23, H & S Building	09/21/95	(d)	(g)	(g)
Area 23, H & S Building	09/28/95	20.70	1.14	1.65
Area 23, H & S Building	10/05/95	30.00	1.68	2.43
Area 23, H & S Building	10/10/95	32.20	1.38	1.80

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 23, H & S Building	10/17/95	35.00	1.39	1.76
Area 23, H & S Building	10/24/95	29.40	1.33	1.82
Area 23, H & S Building	10/31/95	37.20	1.41	1.75
Area 23, H & S Building	11/07/95	26.20	1.23	1.67
Area 23, H & S Building	11/14/95	36.40	1.43	1.81
Area 23, H & S Building	11/21/95	40.90	1.68	2.15
Area 23, H & S Building	11/27/95	25.70	1.24	1.71
Area 23, H & S Building	12/04/95	35.70	1.96	2.33
Area 23, H & S Building	12/11/95	18.20	1.40	2.24
Area 23, H & S Building	12/18/95	46.50	1.34	1.43
Area 23, H & S Building	12/26/95	29.70	1.27	1.66
Area 25, E-MAD N	01/03/95	42.90	1.45	1.72
Area 25, E-MAD N	01/09/95	5.64	0.74	1.32
Area 25, E-MAD N	01/17/95	15.60	1.09	1.71
Area 25, E-MAD N	01/23/95	18.00	1.04	1.55
Area 25, E-MAD N	01/30/95	20.80	1.06	1.51
Area 25, E-MAD N	02/07/95	21.80	1.20	1.75
Area 25, E-MAD N	02/14/95	18.90	1.16	1.75
Area 25, E-MAD N	02/21/95	35.60	1.53	2.04
Area 25, E-MAD N	02/27/95	22.60	1.21	1.74
Area 25, E-MAD N	03/06/95	13.30	1.08	1.76
Area 25, E-MAD N	03/13/95	17.60	1.15	1.77
Area 25, E-MAD N	03/20/95	7.30	0.99	1.78
Area 25, E-MAD N	03/27/95	25.60	1.24	1.68
Area 25, E-MAD N	04/03/95	13.80	1.09	1.77
Area 25, E-MAD N	04/10/95	15.20	1.12	1.77
Area 25, E-MAD N	04/17/95	13.00	1.09	1.77
Area 25, E-MAD N	04/24/95	16.80	1.13	1.75
Area 25, E-MAD N	05/01/95	15.10	1.12	1.78
Area 25, E-MAD N	05/08/95	18.10	1.16	1.77
Area 25, E-MAD N	05/15/95	23.80	1.25	1.79
Area 25, E-MAD N	05/22/95	19.50	1.04	1.49
Area 25, E-MAD N	05/30/95	23.10	1.40	2.10
Area 25, E-MAD N	06/05/95	17.30	1.14	1.76
Area 25, E-MAD N	06/12/95	14.20	1.14	1.86
Area 25, E-MAD N	06/19/95	21.30	1.24	1.82

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 25, E-MAD N	06/26/95	24.40	1.27	1.81
Area 25, E-MAD N	07/03/95	27.80	1.19	1.58
Area 25, E-MAD N	07/11/95	22.00	1.11	1.57
Area 25, E-MAD N	07/19/95	24.40	1.14	1.56
Area 25, E-MAD N	07/27/95	30.80	1.49	2.03
Area 25, E-MAD N	08/02/95	27.60	1.31	1.81
Area 25, E-MAD N	08/09/95	23.20	1.22	1.73
Area 25, E-MAD N	08/16/95	32.30	1.37	1.77
Area 25, E-MAD N	08/23/95	15.50	1.11	1.74
Area 25, E-MAD N	08/30/95	25.60	1.43	2.11
Area 25, E-MAD N	09/05/95	22.50	0.97	1.27
Area 25, E-MAD N	09/14/95	(d)	(g)	(g)
Area 25, E-MAD N	09/21/95	32.50	1.38	1.82
Area 25, E-MAD N	09/28/95	21.80	1.22	1.77
Area 25, E-MAD N	10/05/95	34.70	1.73	2.39
Area 25, E-MAD N	10/10/95	(e)	(g)	(g)
Area 25, E-MAD N	10/17/95	(e)	(g)	(g)
Area 25, E-MAD N	10/24/95	(e)	(g)	(g)
Area 25, E-MAD N	10/31/95	44.00	1.52	1.79
Area 25, E-MAD N	11/07/95	26.60	1.28	1.76
Area 25, E-MAD N	11/14/95	36.80	1.47	1.89
Area 25, E-MAD N	11/21/95	51.70	1.77	2.07
Area 25, E-MAD N	11/27/95	28.60	1.33	1.82
Area 25, E-MAD N	12/04/95	31.70	1.84	2.24
Area 25, E-MAD N	12/11/95	12.40	1.10	1.84
Area 25, E-MAD N	12/18/95	54.60	1.52	1.59
Area 25, E-MAD N	12/26/95	21.40	0.97	1.29
Area 25, NRDS	01/03/95	19.10	1.24	1.90
Area 25, NRDS	01/09/95	9.46	0.88	1.47
Area 25, NRDS	01/17/95	20.80	1.28	1.93
Area 25, NRDS	01/23/95	15.70	1.11	1.76
Area 25, NRDS	01/30/95	21.80	1.06	1.47
Area 25, NRDS	02/07/95	19.80	1.15	1.70
Area 25, NRDS	02/14/95	17.50	1.12	1.71
Area 25, NRDS	02/21/95	38.30	1.55	2.00
Area 25, NRDS	02/27/95	(d)	(g)	(g)

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 25, NRDS	03/06/95	15.30	1.04	1.63
Area 25, NRDS	03/13/95	19.10	1.10	1.62
Area 25, NRDS	03/20/95	8.01	0.93	1.63
Area 25, NRDS	03/27/95	23.00	1.12	1.54
Area 25, NRDS	04/03/95	13.50	1.01	1.63
Area 25, NRDS	04/10/95	15.00	1.04	1.63
Area 25, NRDS	04/17/95	13.50	1.03	1.64
Area 25, NRDS	04/24/95	15.40	1.04	1.62
Area 25, NRDS	05/01/95	(b)	(g)	(g)
Area 25, NRDS	05/08/95	(d)	(g)	(g)
Area 25, NRDS	05/15/95	21.80	1.16	1.66
Area 25, NRDS	05/22/95	19.30	0.99	1.39
Area 25, NRDS	05/30/95	22.40	1.31	1.96
Area 25, NRDS	06/05/95	15.90	1.06	1.63
Area 25, NRDS	06/12/95	15.10	1.09	1.73
Area 25, NRDS	06/19/95	20.60	1.15	1.69
Area 25, NRDS	06/26/95	23.30	1.19	1.68
Area 25, NRDS	07/03/95	27.40	1.13	1.48
Area 25, NRDS	07/11/95	21.90	1.06	1.47
Area 25, NRDS	07/19/95	23.60	1.08	1.47
Area 25, NRDS	07/27/95	29.40	1.40	1.90
Area 25, NRDS	08/02/95	26.90	1.24	1.70
Area 25, NRDS	08/09/95	22.00	1.15	1.62
Area 25, NRDS	08/16/95	19.90	1.13	1.65
Area 25, NRDS	08/23/95	13.90	1.04	1.63
Area 25, NRDS	08/30/95	28.50	1.41	1.98
Area 25, NRDS	09/05/95	23.00	0.98	1.28
Area 25, NRDS	09/14/95	36.80	1.36	1.65
Area 25, NRDS	09/21/95	32.20	1.56	2.17
Area 25, NRDS	09/28/95	(d)	(g)	(g)
Area 25, NRDS	10/05/95	26.70	1.33	1.85
Area 25, NRDS	10/10/95	24.10	1.07	1.40
Area 25, NRDS	10/17/95	26.50	1.08	1.39
Area 25, NRDS	10/24/95	25.30	1.08	1.43
Area 25, NRDS	10/31/95	35.80	1.19	1.37
Area 25, NRDS	11/07/95	21.40	0.99	1.33

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 25, NRDS	11/14/95	30.40	1.16	1.45
Area 25, NRDS	11/21/95	36.50	1.31	1.57
Area 25, NRDS	11/27/95	22.60	1.01	1.36
Area 25, NRDS	12/04/95	25.60	1.41	1.68
Area 25, NRDS	12/11/95	11.60	0.88	1.41
Area 25, NRDS	12/18/95	41.10	1.12	1.16
Area 25, NRDS	12/26/95	17.30	0.84	1.16
Area 27	01/03/95	22.60	1.22	1.76
Area 27	01/09/95	7.93	0.80	1.36
Area 27	01/17/95	17.10	1.15	1.79
Area 27	01/23/95	12.60	0.96	1.55
Area 27	01/30/95	18.50	0.96	1.37
Area 27	02/07/95	18.10	1.03	1.52
Area 27	02/14/95	14.90	0.99	1.53
Area 27	02/21/95	29.20	1.32	1.78
Area 27	02/27/95	19.80	1.06	1.52
Area 27	03/06/95	11.30	0.93	1.51
Area 27	03/13/95	15.80	0.97	1.45
Area 27	03/20/95	8.46	0.89	1.53
Area 27	03/27/95	22.40	1.08	1.46
Area 27	04/03/95	12.70	0.95	1.52
Area 27	04/10/95	13.90	0.97	1.51
Area 27	04/17/95	12.50	0.97	1.56
Area 27	04/24/95	(c)	(g)	(g)
Area 27	04/24/95	12.30	0.56	0.76
Area 27	05/08/95	13.30	0.96	1.52
Area 27	05/15/95	19.30	1.06	1.54
Area 27	05/22/95	18.20	0.92	1.28
Area 27	05/30/95	18.70	1.18	1.80
Area 27	06/05/95	14.30	0.97	1.52
Area 27	06/12/95	12.40	0.98	1.58
Area 27	06/19/95	17.70	1.04	1.55
Area 27	06/26/95	(c)	(g)	(g)
Area 27	06/26/95	20.00	0.63	0.72
Area 27	07/11/95	18.00	0.94	1.33
Area 27	07/19/95	19.40	0.96	1.34

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

Attachment 1.1 (Gross Beta in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-15} Concentration	Standard Deviation (s)	Detection Limit
Area 27	07/27/95	26.00	1.27	1.75
Area 27	08/02/95	23.60	1.11	1.54
Area 27	08/09/95	(c)	(g)	(g)
Area 27	08/09/95	15.90	0.60	0.74
Area 27	08/23/95	13.30	0.95	1.49
Area 27	08/30/95	(b)	(g)	(g)
Area 27	09/05/95	21.70	0.91	1.17
Area 27	09/14/95	(c)	(g)	(g)
Area 27	09/21/95	(c)	(g)	(g)
Area 27	09/14/95	22.50	0.54	0.51
Area 27	10/05/95	27.80	1.45	2.04
Area 27	10/10/95	27.80	1.18	1.53
Area 27	10/17/95	15.60	0.65	0.83
Area 27	10/24/95	25.30	1.14	1.56
Area 27	10/31/95	31.80	1.22	1.53
Area 27	11/07/95	23.40	1.11	1.50
Area 27	11/14/95	32.20	1.25	1.59
Area 27	11/21/95	37.30	1.41	1.74
Area 27	11/27/95	(c)	(g)	(g)
Area 27	11/27/95	24.20	0.96	0.95
Area 27	12/11/95	9.83	0.92	1.56
Area 27	12/18/95	(c)	(g)	(g)
Area 27	12/18/95	27.90	0.69	0.66

(a) Power off.
(b) Filter or sample head missing.
(c) No access, next line is for a two-week sample.
(d) Sampler mechanical problem.
(e) Sampling temporarily discontinued.
(f) Inaccessible because of snow.
(g) Missing data.

2.0 ONSITE ^{238}PU AND $^{239+240}$PU IN AIR

Air sampling units were deployed at 60 locations on the Nevada Test Site (NTS) in 1995. These units were equipped with fiberglass and charcoal filters and had an air flow rate of 140 L/min (5 cfm). The filters were changed after one week of operation. The fiberglass filter was analyzed by gamma spectroscopy and, after a five- to seven-day delay, for radon progeny decay and for gross beta activity. Filters from 55 stations were then composited periodically and analyzed for plutonium. Site environmental monitoring stations were composited for each quarter, and radiological waste management stations were composited for each month. In Attachments 2.1 and 2.2, the successive sampling dates indicate the beginning of the sampling period of the data for that line and the end of the sampling period on the next line. If the successive dates are about three months apart, that station was composited quarterly and if about a month apart the composites were done monthly. The charcoal filters were analyzed only if analysis of the fiberglass filter indicated the presence of radioiodine.

A number of changes were made to the air sampling network in 1995, and also the change was made to compositing quarterly for some stations. These are described at the beginning of Chapter 1 of this volume and account for the varying number of results for the stations given in the data tables. In 1994, 551 results were reported. This report for 1995 contains 284 results, a 48 percent reduction.

Sampling locations, sampling dates, measured concentrations, and analytic standard deviations for ^{238}Pu and $^{239+240}$Pu in air samples collected in 1995 appear in Attachments 2.1 and 2.2 respectively. Negative values in these tables indicate samples which had counts less than the corresponding analytical background. An alphabetic notation indicates a missing value. The locations of air sampling stations in 1995 are shown in Figure 2.1. Statistical analyses of these data are given below.

PLUTONIUM-238

Descriptive statistics (μCi/mL) for the entire air sampling network are:

Number of data values =	284
Number of missing values =	5
Arithmetic mean =	6.3×10^{-19}
Median =	-7.8×10^{-20}
Standard deviation =	1.5×10^{-18}
Minimum value =	-9.5×10^{-19}
Maximum value =	10.2×10^{-18}
Median MDC =	3.7×10^{-18}

Of the measured concentrations, none were 0.0, and 58 percent were negative. This is a marked change from the 1994 results, when 38 percent of the observations were 0.0, and 25 percent were negative. This change is attributable to a change in analytical laboratory procedures for reporting data.

Ninety-five percent of the observed concentrations were below their individual limits of detection, indicating that very little ^{238}Pu was actually detected in air. At three sampling stations (Area 9 9-300 Bunker, Area 10 SEDAN Crater, and Area 15 U.S. Environmental Protection Agency [EPA] Farm), more than 50 percent of the individual concentrations were greater than the individual limits of detection, and at most sampling stations, none were. In view of this, a comprehensive statistical analysis is thought to be of little value.

Some sense of variability among operating areas can be obtained from simple descriptive statistical summaries of ^{238}Pu concentrations by NTS operational areas (see Table 2.1). In Figure 2.2, box plots of the ^{238}Pu concentrations (10^{-18} µCi/mL) by NTS operational area appear. (Box plots, also called "box and whisker diagrams," are simple graphical representations of data; lines are drawn at the 25th, 50th, and 75th percentiles. "Whiskers" extend from the quartiles for a length of one and one half times the inter-quartile range, and values outside this range are denoted by asterisks.) A larger proportion of the observations from Area 5 are denoted by asterisks (outliers) than those from other areas. This is attributable to the large number of negative and near-zero observations in those areas causing the inter-quartile range to be comparatively small.

Before 1994, air samples were collected and composited for Pu analyses on a monthly basis. For the fourth quarter of 1994, composite samples at most stations were converted to a quarterly basis, with monthly composite sampling continuing at the 12 stations associated with the radioactive waste management sites (RWMSs) in Areas 3 and 5. At the beginning of 1995, many of the RWMS stations were composited quarterly. Later some of these stations were switched back to monthly composites at midyear. This accounts for the absence of samples started in March.

In Figure 2.3, concentrations (10^{-18} µCi/mL) from all sampling stations are plotted versus the month that sample collection began. No temporal trend is suggested by the display. The largest concentration occurred at Area 5 Well 5B for the sample collection beginning September 28, 1995. This value is inconsistent with the other values measured at this station.

In Figure 2.4, individual concentrations (10^{-18} µCi/mL) from a typical sampling station (Area 3 U-3ah/at North) are plotted versus the month of collection. Observed concentrations are plotted as circles. Approximate 95 percent confidence bounds, based on analytic error, are shown as dotted lines. Limits of detection are indicated by a solid line. It can be seen that all concentrations are below the sample limits of detection and that the upper confidence bound usually stays below the sample limit of detection.

A sense of the accuracy of measured ^{238}Pu concentrations in air samples can be obtained from the empirical coefficients of variation, also called relative errors. These are defined as the analytic standard deviation divided by the measured concentration. Empirical coefficients of variation appear in Figure 2.5. It can be readily seen that analytic standard deviations are often as large as or larger than the concentrations, and there is no pattern for the shape of this histogram. Hence, as noted in the discussion of limits of detection, ^{238}Pu concentrations are so small, that statistical "noise" from normal laboratory procedures frequently overwhelms any "signal" in the data.

PLUTONIUM-239+240

Descriptive statistics (µCi/mL) for the entire network are:

Number of data values =	279
Number of missing values =	10
Arithmetic mean =	2.6×10^{-17}
Median =	4.7×10^{-18}
Standard deviation =	6.0×10^{-17}
Minimum value =	-1.5×10^{-18}
Maximum value =	4.2×10^{-16}
Median MDC =	4.8×10^{-18}

Subtraction of background can result in concentrations that have a non-positive value. Of the measured concentrations, nine percent were zero or negative. This is roughly comparable to the 1993 results, in which 86 percent of the observations were positive and to the 1994 results, in which 90 percent of the observations were positive.

Unlike ^{238}Pu, for which almost all observed concentrations were below individual limits of detection, 44 percent of the $^{239+240}Pu$ concentrations were below the individual detection limits. Accordingly, formal statistical methods are used to compare concentrations over space and time.

In Figure 2.6, natural logarithms of observed concentrations at Area 3 U-3ah/at East are plotted versus normal scores. Note that the logarithmic transformation converts negative values to missing value codes. The Anderson-Darling statistic, A^2, a statistic useful for testing for normality, provides no evidence for nonnormality of the logarithms of the concentrations. Normal scores plots of positive concentrations from all stations combined and those sampling stations with more than quarterly samples appear similar to this one. Hence, statistical analyses are performed using the natural logarithms of $^{239+240}Pu$ concentrations.

As previously discussed, for the fourth quarter of 1994, sample compositing at most stations was converted to a quarterly basis. For purposes of this analysis, samples collected over a quarter will be identified by the month number that is closest to the beginning of the sample period.

To simultaneously compare differences in sampling stations and months, a two-way analysis of variance (ANOVA) was conducted, and the results are shown in Table 2.2. This two-way ANOVA table shows that concentrations differ both among sampling stations and among months.

Differences among sampling locations and among months of sampling are assessed by means of one-way ANOVAs. The ANOVA table comparing sampling locations appears in Table 2.3. Differences among sampling stations are highly statistically significant. Much of the difference is attributable to the relatively large concentrations observed at Area 9 9-300 Bunker, at which greater concentrations of Pu have historically been observed and to the comparatively greater concentrations observed in Area 3 contrasted to the lesser concentrations observed in the remote Areas 19, 20, 25, and 27. However, the large differences in sample sizes for the stations and areas makes a rigorous determination of the pattern of differences impossible. A sense of the spatial variability of $^{239+240}Pu$ is shown in Table 2.4, where descriptive statistics are calculated for data from each NTS operational area. In Figure 2.7, box plots of the $^{239+240}Pu$ concentrations (10^{-18} µCi/mL) by NTS operational area appear. The larger and more variable concentrations in Areas 3 and 5, where radioactive waste is managed, can be clearly seen. Further, the box plots show the data's right-skewed nature, which is characteristic of the log-normal distribution. In Table 2.4, note that all but the Area 7 mean and median are less than two standard deviations different from zero, and most means and medians are less than one standard deviation from zero.

The ANOVA table comparing months of sampling appears in Table 2.5. Individual confidence intervals show concentrations were lower at the beginning of the year, rose in mid year, and then went back down at the year's end. Similar patterns have been observed in previous years. This is probably attributable to weather patterns.

Results from a single sampling station serve to illustrate temporal patterns. In Figure 2.8, individual observed concentrations (µCi/mL x 10^{-18}) from a typical sampling station (Area 3, U-3ah/at East) are plotted versus month of collection. Observed concentrations are plotted as circles. Approximate 95 percent confidence bounds, based on analytic error, are shown as dotted lines. Limits of detection are indicated by a solid line. Figure 2.8 shows lower

concentrations in the early parts of the years and an obvious increase in values for the second half. The U3-ah/at east site is a radiological waste management facility. At mid year, one of the storage layers was completed and heavy earth-moving equipment was then used to cap that layer and build new roads. This activity continued during the last two quarters of 1995.

For those sampling stations for which compositing has been switched to quarterly, roughly half the measured concentrations are above the individual limits of detection. A sense of the accuracy of measured $^{239+240}$Pu concentrations in air samples can be obtained from the empirical coefficients of variation, the analytic standard deviation divided by the absolute value of the measured concentration. Empirical coefficients of variation for all concentrations are illustrated in Figure 2.9. It can be seen from Figure 2.9 that analytic standard deviations for $^{239+240}$Pu are typically smaller than the calculated concentrations.

HISTORICAL TRENDS

In 1995, there were sixty air sampling stations. Were a complete analysis of historical trends for all sampling stations included, in addition to the analysis of current results, the resulting document would be unwieldy. Accordingly, historical trends at ten representative sampling stations are studied. These stations, chosen for spatial dispersion, are:

NTS Operational Area	Sampling Station	Approximate Location
10	Gate 700 South	Northeast corner of NTS
15	EPA Farm	Northeast corner of NTS
19	Echo Peak	Northwest corner of NTS
20	Area 20 Dispensary	Northwest corner of NTS
25	E-MAD North	Southwest corner of NTS
27	Cafeteria	South-central region of NTS
5	DOD Yard	Southeast corner of NTS
23	H&S Building	Southeast corner of NTS
6	CP-6	Central to NTS
16	3545 Substation	Central to NTS

In some cases, the choice of sampling stations is not arbitrary. Relatively few stations are located in the northwestern corner of the NTS, and even fewer are located in the northeastern corner. Choosing different sampling stations to report in detail would result in large portions of the NTS not being accounted for. The historical data for the representative stations is given in Tables 2.6 and 2.7. Scatterplots of annual average concentrations of ^{238}Pu (10^{-18} µCi/mL) and $^{239+240}$Pu (10^{-18} µCi/mL) appear in Figures 2.10 and 2.11. For some years at some sampling stations, no data exist. Placement of sampling stations is determined from health physics considerations, not to give a uniform coverage of the NTS. Hence, in some years, samplers were removed from some stations to other locations which, at that time, were judged of greater concern.

The solid lines in Figures 2.10 and 2.11 are "locally weighted scatter plot smoother" lines. These lines give the overall trend of the data and limit the influence of outliers. Concentrations of ^{238}Pu show a consistent pattern of decreasing concentrations over time. The pattern for $^{239+240}$Pu is consistently close to zero but does show some decrease. The $^{239+240}$Pu concentrations at Area 15 EPA Farm are the highest values for all seven years shown in Figure 2.11. This location is

close to the SEDAN Crater and may have been influenced by that event. An anomaly worth commenting on is the large concentration of $^{239+240}Pu$ observed at Area 23 Health & Safety Building (H&S), in 1994. This large average is primarily due to a single outlying observation out of a total of 12 monthly samples, occurring in the month of June. If the average was recalculated with this value removed, the average concentration of $^{239+240}Pu$ in air at Area 23 H&S Building would be 3.55×10^{-19} µCi/mL.

CONCLUSION

Measurements of ^{238}Pu and $^{239+240}Pu$ continue to be made on the NTS, although less frequently than in past years because observed concentrations are low. Except for the RWMSs, there are no new sources of environmental plutonium. The plutonium measurements have a log-normal statistical distribution, as has been seen in previous years. Levels of ^{238}Pu are essentially below detection limits and have been so for a number of years. Forty-four percent of the $^{239+240}Pu$ levels were below the individual detection limits. Except for a few monitoring locations in known areas of contamination, the $^{239+240}Pu$ concentrations are close to zero.

Table 2.1 ^{238}Pu Concentrations, in Units of µCi/mL, Compared Among NTS Operational Areas

NTS Operational Area	Number of Samples	Mean	Median	Standard Deviation
1	7	7.3×10^{-19}	4.7×10^{-19}	1.0×10^{-18}
2	8	6.5×10^{-19}	3.8×10^{-19}	9.2×10^{-19}
3	56	1.5×10^{-18}	1.1×10^{-18}	1.9×10^{-18}
5	140	2.0×10^{-19}	-1.6×10^{-19}	1.2×10^{-18}
6	15	9.2×10^{-19}	-5.1×10^{-20}	2.0×10^{-18}
7	4	2.2×10^{-18}	3.6×10^{-19}	3.9×10^{-18}
9	4	2.2×10^{-18}	1.6×10^{-18}	1.7×10^{-18}
10	5	1.7×10^{-18}	8.0×10^{-19}	2.5×10^{-18}
11	4	1.5×10^{-19}	9.5×10^{-20}	3.0×10^{-19}
12	4	3.7×10^{-19}	3.5×10^{-19}	4.6×10^{-19}
15	4	2.1×10^{-18}	1.3×10^{-18}	2.3×10^{-18}
16	4	-9.7×10^{-20}	-9.2×10^{-20}	4.9×10^{-20}
19	4	7.0×10^{-20}	6.1×10^{-20}	2.4×10^{-19}
20	3	1.3×10^{-18}	4.2×10^{-19}	1.9×10^{-18}
23	11	8.8×10^{-20}	-8.6×10^{-20}	3.2×10^{-19}
25	7	1.3×10^{-19}	-7.9×10^{-20}	4.5×10^{-19}
27	4	-1.0×10^{-19}	-9.2×10^{-20}	4.5×10^{-20}

Table 2.2 Two-Way ANOVA on the Natural Log of 1995 $^{239+240}Pu$ Concentrations between Sampling Stations and Month Sampling Commenced

Source	Degrees of Freedom	Sequential Sum of the Squares	Adjusted Sum of Squares	Mean Square	F-Statistic	p Value
Sampling Station	54	398.329	396.716	7.347	7.06	0.000
Month	11	97.380	97.380	8.853	8.51	0.000
Error	187	194.480	194.480	1.040		
Total	252	690.189				

Table 2.3 One-Way ANOVA on the Natural Log of 1995 $^{239+240}Pu$ Concentrations between Sampling Stations

Source	Degrees of Freedom	Sum of Squares	Mean Square	F-Statistic	p-Value
Sampling Station	54	398.33	7.38	5.00	0.000
Error	198	291.86	1.47		
Total	252	690.19			

Table 2.4 $^{239+240}$Pu Concentrations, in Units of µCi/mL, Compared Among NTS Operational Areas

NTS Operational Area	Number of Samples	Mean	Median	Standard Deviation
1	7	2.7×10^{-17}	2.0×10^{-17}	2.3×10^{-17}
2	8	1.1×10^{-17}	7.2×10^{-18}	1.2×10^{-17}
3	56	8.5×10^{-17}	6.1×10^{-17}	9.5×10^{-17}
5	138	4.9×10^{-18}	2.9×10^{-18}	7.4×10^{-18}
6	14	2.0×10^{-17}	1.0×10^{-17}	2.8×10^{-17}
7	3	9.2×10^{-18}	1.1×10^{-17}	4.4×10^{-18}
9	4	1.6×10^{-16}	1.2×10^{-16}	1.7×10^{-16}
10	5	2.0×10^{-17}	1.4×10^{-17}	1.7×10^{-16}
11	4	2.5×10^{-17}	2.8×10^{-17}	1.9×10^{-17}
12	4	3.9×10^{-18}	1.8×10^{-18}	4.9×10^{-18}
15	4	7.3×10^{-17}	6.4×10^{-17}	6.7×10^{-17}
16	4	4.4×10^{-18}	1.4×10^{-18}	6.3×10^{-18}
19	4	6.5×10^{-19}	7.3×10^{-19}	7.0×10^{-19}
20	2	3.8×10^{-18}	3.8×10^{-18}	3.3×10^{-18}
23	11	3.2×10^{-18}	2.1×10^{-18}	3.6×10^{-18}
25	7	1.9×10^{-18}	2.1×10^{-18}	2.0×10^{-18}
27	4	1.6×10^{-18}	1.2×10^{-18}	1.1×10^{-18}

Table 2.5 One-Way ANOVA on the Natural Log of 1995 $^{239+240}$Pu Concentrations Among Months

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F-Statistic	p-Value
Month	11	98.99	9.00	3.67	0.000
Error	241	591.20	2.45		
Total	252	690.19			

Month	Number	Mean of Logs	Standard Deviation
January	32	0.712	1.004
February	9	1.732	1.799
March	12	1.318	0.899
April	42	1.922	1.554
May	15	1.377	1.352
June	12	1.928	1.346
July	42	2.320	1.740
August	12	2.630	1.786
September	13	2.591	1.857
October	37	2.688	1.560
November	13	2.402	1.761
December	14	1.782	2.059

Pooled Standard Deviation = 1.566

Individual 95 Percent Confidence Intervals for Mean Based on Pooled Standard Deviation

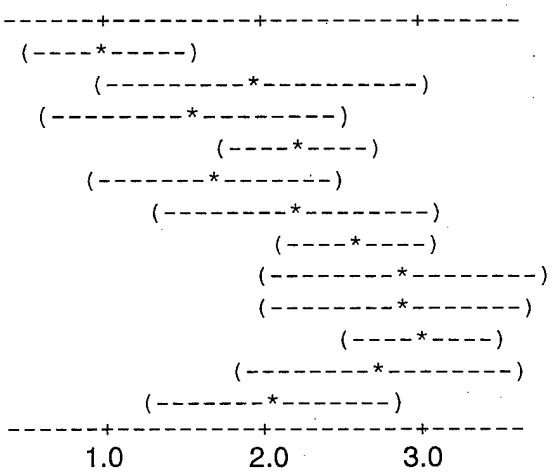


Table 2.6 Historical ^{238}Pu Annual Averages Data for Representative Sampling Stations

Location	μCi/mL x 10^{-18} by Year						
	1989	1990	1991	1992	1993	1994	1995
DOD Yard	4.6	4.4	2.1	0.8	0.6	0.0	0.0
CP-6	3.4	4.8	0.3	0.4	0.6	0.1	0.6
Gate 700 South	4.7	4.3	4.3	0.5	1.1	0.6	0.6
EPA Farm	4.0	-1.9	1.5	1.5	2.0	3.0	2.1
3545 Substation	6.8	3.6	-0.7	0.0	-0.1	0.1	-0.1
Echo Peak	-0.1	3.2	2.1	0.0	0.1	1.8	0.0
Area 20 Camp	3.3	0.4	1.5	0.7	0.2	0.7	1.3
H&S Building	1.6	4.9	-1.2	0.0	-0.1	0.7	0.3
E-MAD North	5.5	-0.1	1.5	0.3	0.3	0.4	-0.1
Area 27 Cafeteria	4.8	-1.2	1.9	1.0	-0.1	0.3	-0.1

Table 2.7 Historical $^{239+240}Pu$ Annual Averages Data for Representative Sampling Stations

Location	μCi/mL x 10^{-18} by Year						
	1989	1990	1991	1992	1993	1994	1995
DOD Yard	2.5	2.0	15.5	1.7	5.5	8.1	3.9
CP-6	5.7	6.8	9.3	6.8	22.8	6.8	8.1
Gate 700 South	13.0	11.4	13.7	44.2	22.8	12.0	12.3
EPA Farm	18.0	33.2	52.4	129.0	93.1	100.0	73.4
3545 Substation	2.4	2.0	4.3	5.5	3.7	2.7	4.4
Echo Peak	1.3	3.5	4.7	2.4	1.0	1.2	0.9
Area 20 Camp	13.0	6.7	7.3	3.8	1.4	1.1	3.8
H&S Building	3.3	24.9	2.3	4.3	1.6	68.0	2.1
E-MAD North	1.6	4.4	3.2	4.1	1.3	2.1	2.2
Area 27 Cafeteria	2.2	7.2	2.1	17.4	2.7	1.9	1.6

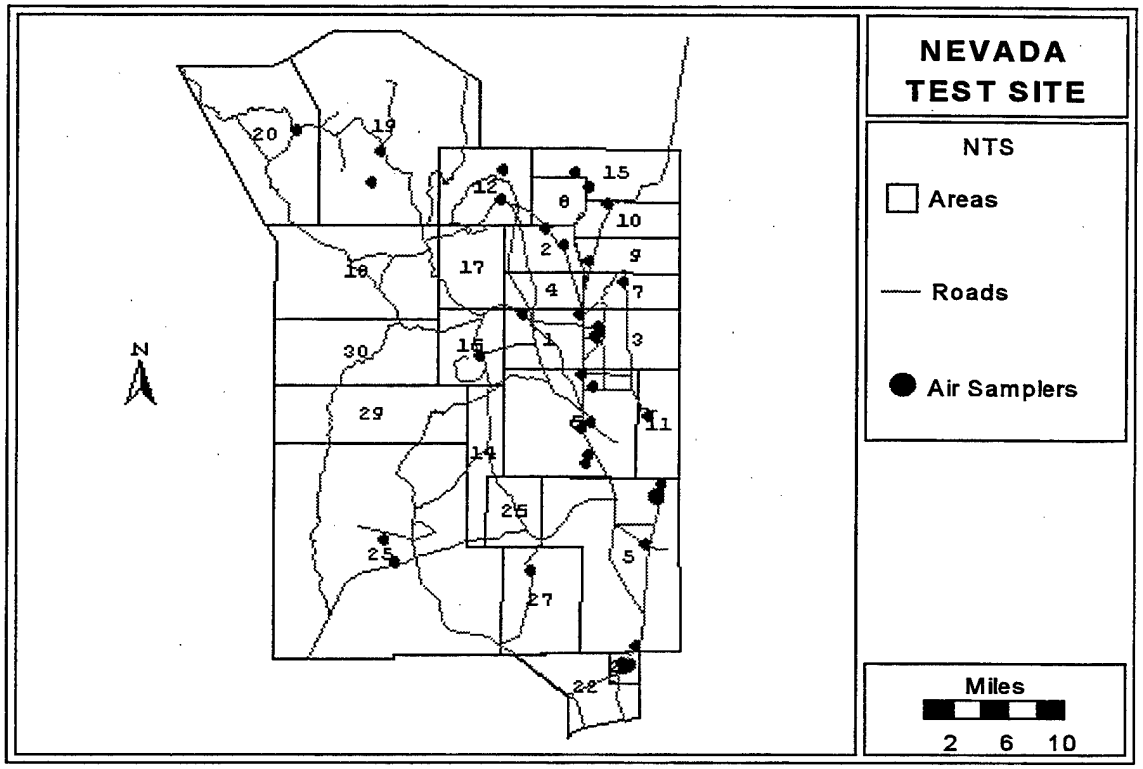


Figure 2.1 Locations of Air Sampling Stations on NTS - 1995

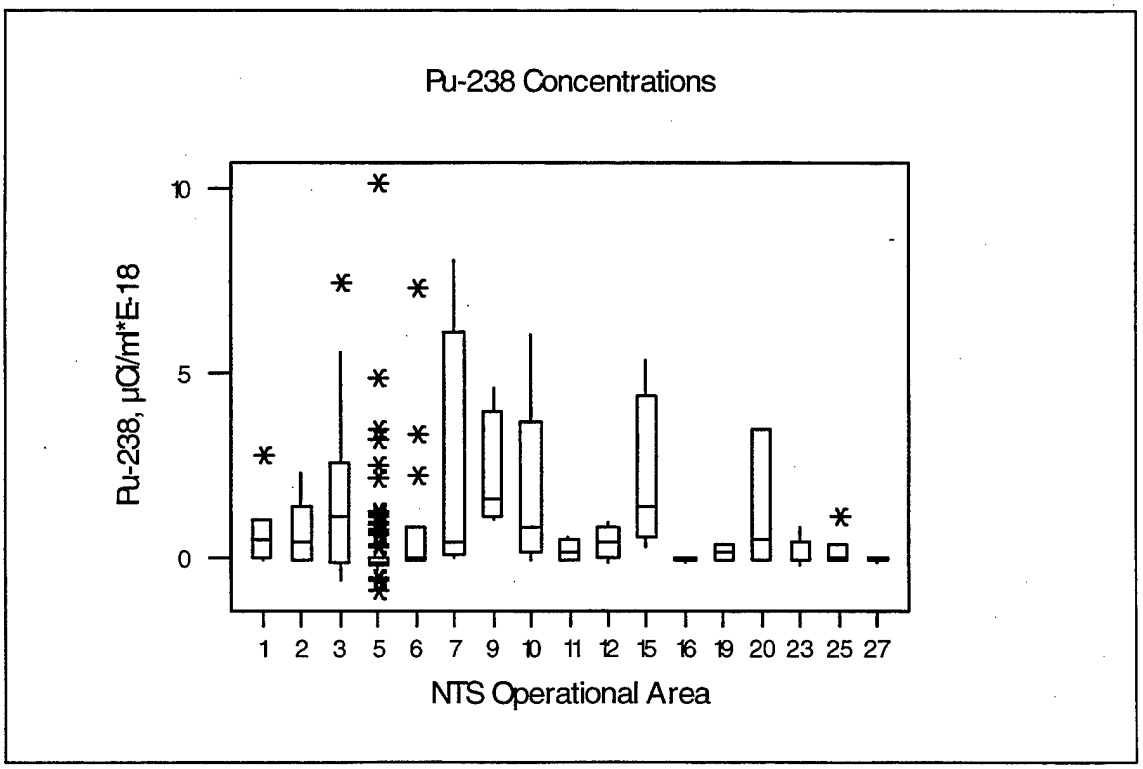


Figure 2.2 Box Plots of ^{238}Pu Concentrations by NTS Operational Areas

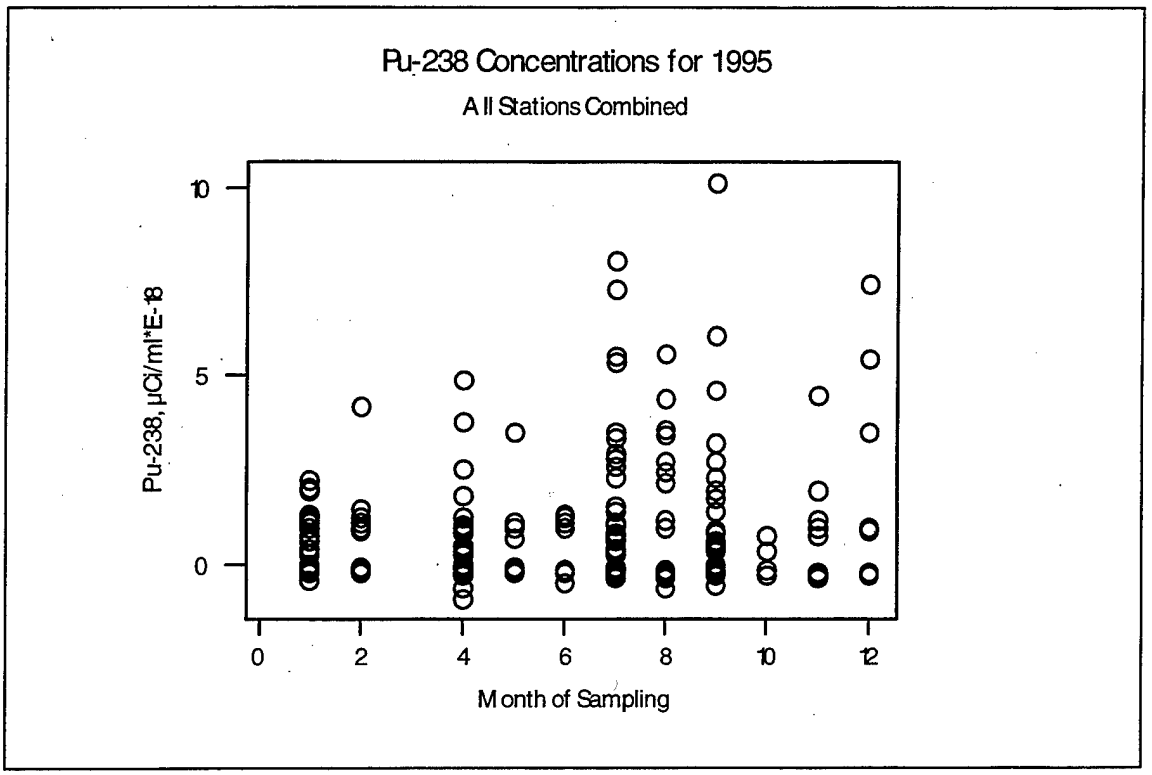


Figure 2.3 Time Series Plot of ^{238}Pu Concentrations for 1995

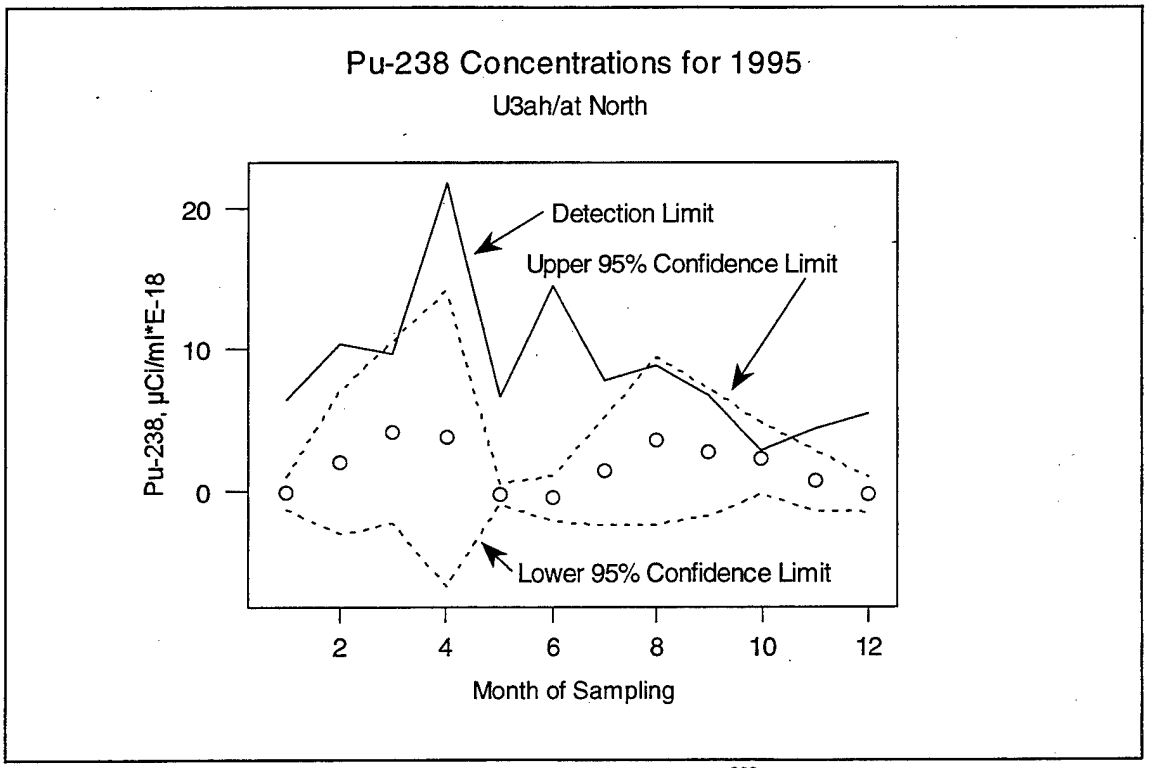


Figure 2.4 Time Series Plot of Area 3, U3-ah/at North ^{238}Pu Concentrations for 1995

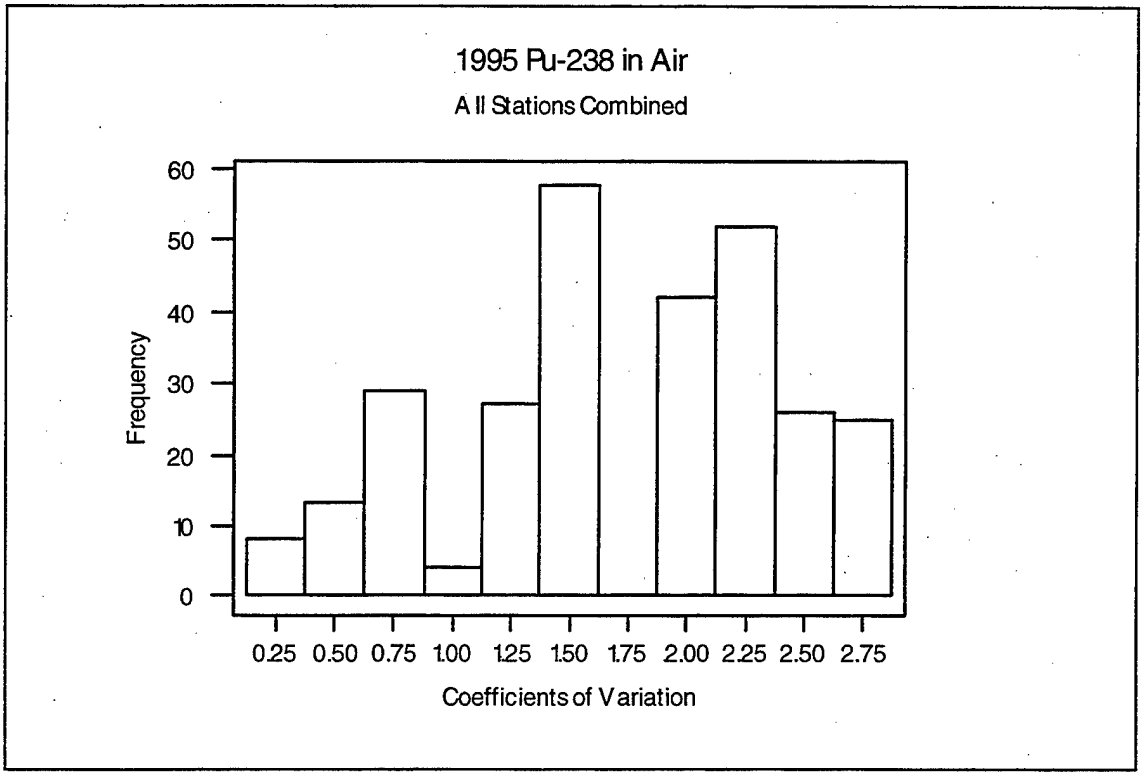


Figure 2.5 Histogram of Empirical Coefficients of Variation (Unitless)

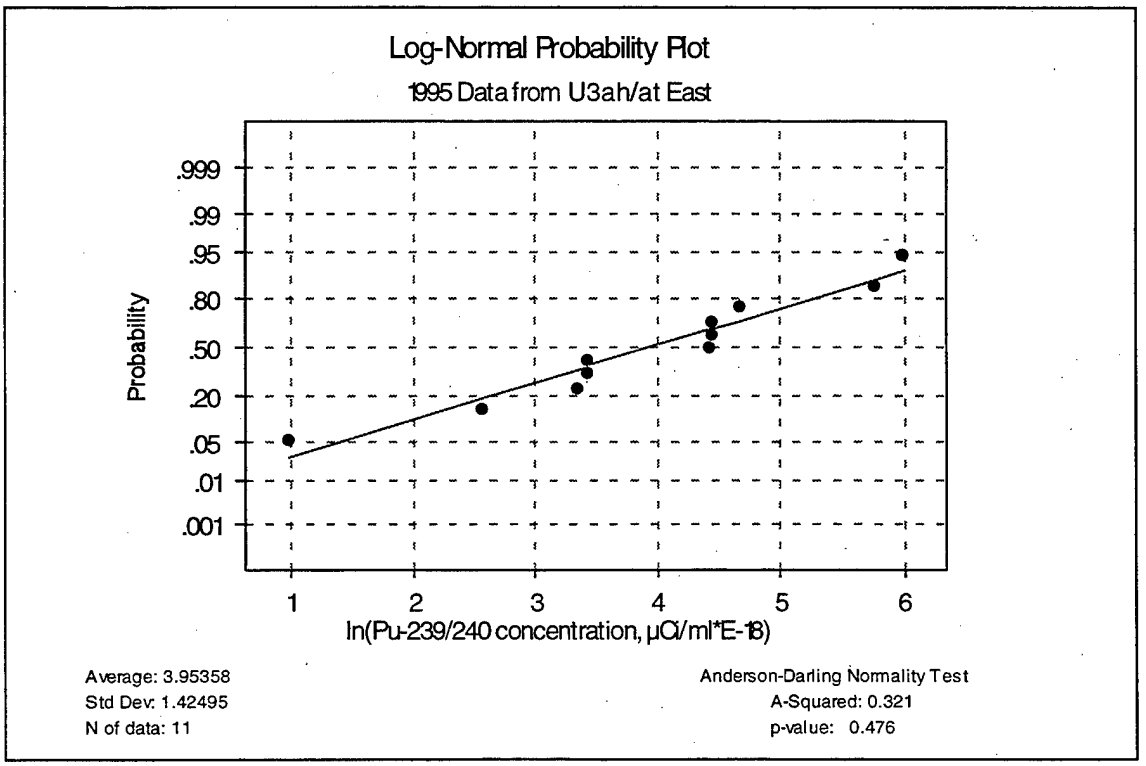


Figure 2.6 Probability Plot of $^{239+240}$Pu Concentrations for U3-ah/at East

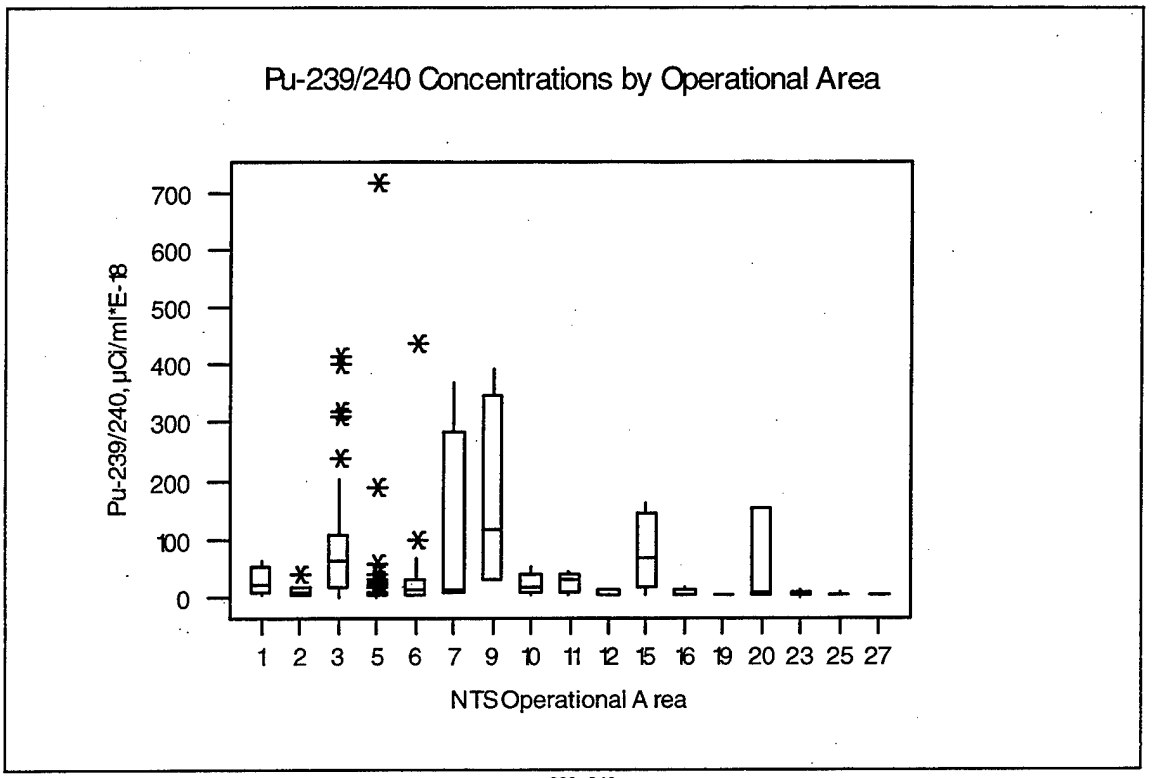


Figure 2.7 Box Plot of 1995 $^{239+240}$Pu Concentrations by Area

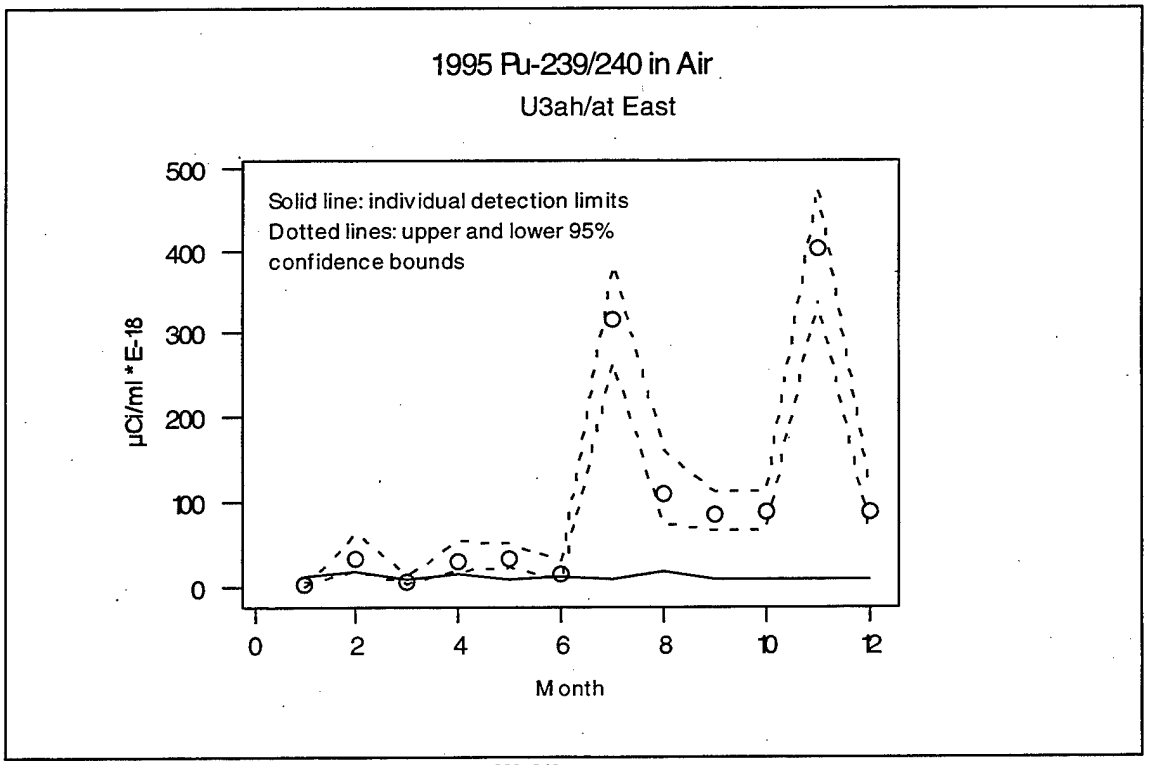


Figure 2.8 Time Series Plot of $^{239+240}$Pu in Air Concentrations at Area 3, U3-ah/at East for 1995

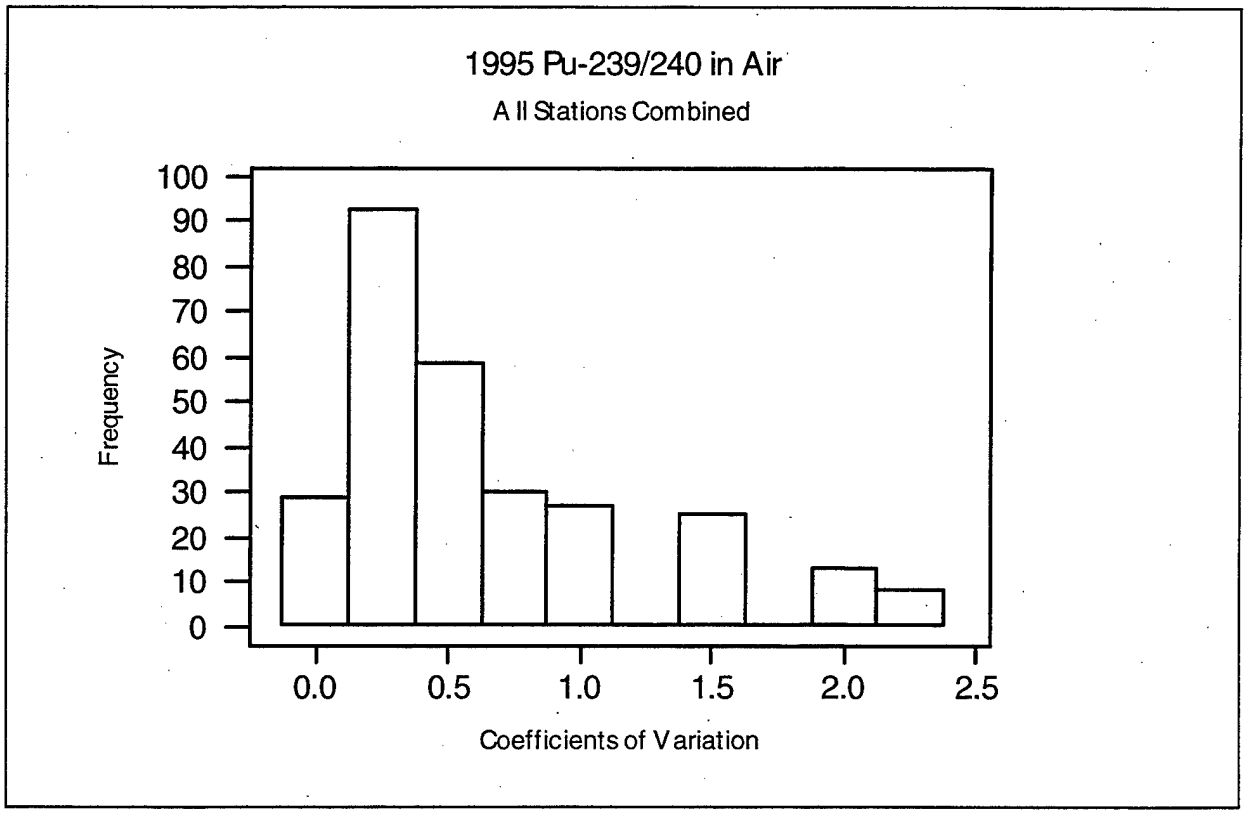


Figure 2.9 Histogram of Empirical Coefficients of Variation

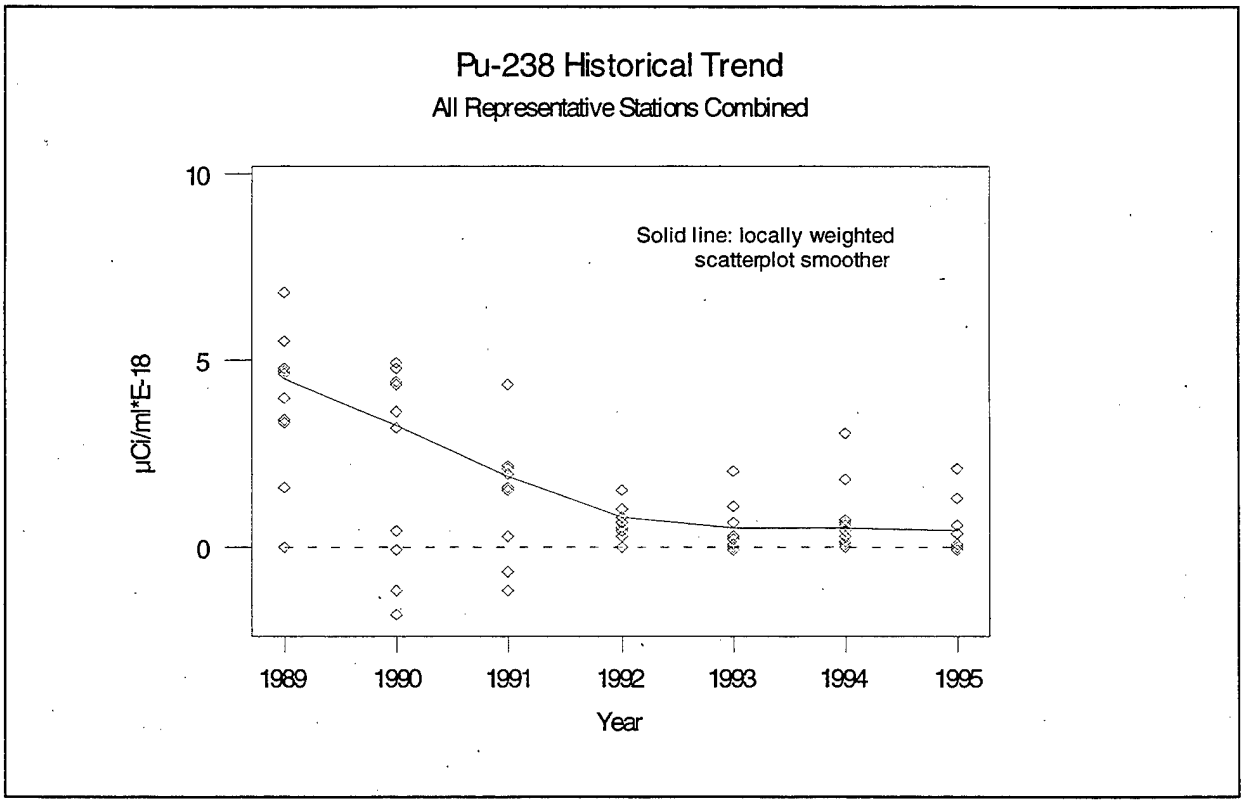


Figure 2.10 Time Series Plot of ^{238}Pu Annual Averages

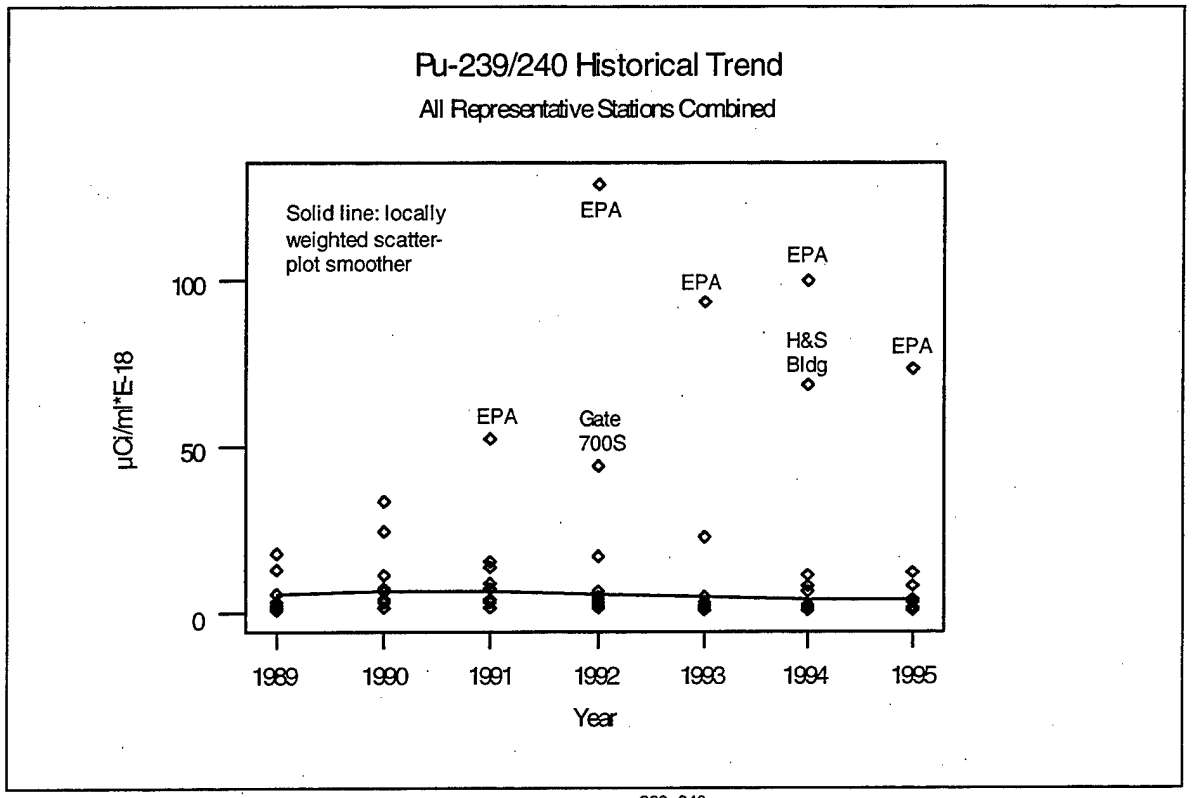


Figure 2.11 Time Series Plot of $^{239+240}$Pu Annual Averages

Attachment 2.1 ^{238}Pu in Air - 1995

Sampling Location	Sampling Date	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 1, BJY	01/03/95	0.25	0.31	1.28
Area 1, BJY	04/03/95	0.98	0.64	1.59
Area 1, BJY	07/03/95	2.79	1.06	1.66
Area 1, BJY	09/28/95	0.47	0.41	1.23
Area 1, Gravel Pit	01/03/95	-0.11	0.30	3.50
Area 1, Gravel Pit	04/03/95	-0.08	0.18	1.71
Area 1, Gravel Pit	07/03/95	0.79	0.66	1.97
Area 2	01/03/95	-0.13	0.30	3.28
Area 2	04/03/95	-0.09	0.21	2.20
Area 2	07/03/95	1.48	1.31	3.96
Area 2	09/27/95	-0.15	0.29	2.56
Area 2, 2-1 Substation	01/03/95	-0.09	0.21	2.27
Area 2, 2-1 Substation	04/03/95	1.04	0.66	1.63
Area 2, 2-1 Substation	07/03/95	2.28	1.13	2.22
Area 2, 2-1 Substation	09/27/95	0.85	0.57	1.42
Area 3	01/23/95	0.57	0.71	2.89
Area 3	04/03/95	0.22	0.31	1.27
Area 3	07/03/95	2.57	1.05	1.76
Area 3, Mud Plant	01/03/95	-0.05	0.12	1.29
Area 3, Mud Plant	04/03/95	0.91	0.59	1.47
Area 3, Mud Plant	07/03/95	2.90	1.04	1.53
Area 3, Mud Plant	09/28/95	1.95	1.09	2.42
Area 3, U-3ah/at E	01/03/95	-0.23	0.60	6.87
Area 3, U-3ah/at E	01/30/95	-0.46	1.22	14.40
Area 3, U-3ah/at E	02/27/95	0.90	1.08	4.49
Area 3, U-3ah/at E	04/03/95	1.79	2.51	10.30
Area 3, U-3ah/at E	05/03/95	1.09	1.36	5.69
Area 3, U-3ah/at E	06/05/95	-0.30	0.41	7.47
Area 3, U-3ah/at E	07/03/95	5.52	2.66	5.16
Area 3, U-3ah/at E	08/02/95	-0.69	1.51	14.90
Area 3, U-3ah/at E	08/31/95	0.92	1.28	5.17
Area 3, U-3ah/at E	09/28/95	2.66	1.77	4.44
Area 3, U-3ah/at E	11/07/95	1.90	1.65	4.97
Area 3, U-3ah/at E	12/04/95	0.94	1.43	5.81
Area 3, U-3ah/at N	05/03/95	-0.26	0.36	6.55
Area 3, U-3ah/at N	01/03/95	-0.21	0.56	6.37
Area 3, U-3ah/at N	01/30/95	2.02	2.54	10.40
Area 3, U-3ah/at N	02/27/95	4.16	3.22	9.68
Area 3, U-3ah/at N	04/03/95	3.73	5.22	21.80
Area 3, U-3ah/at N	06/05/95	-0.57	0.80	14.50
Area 3, U-3ah/at N	07/03/95	1.36	1.90	7.80

(a) Missing data.

Attachment 2.1 (^{238}Pu in Air - 1995, cont.)

Sampling Location	Sampling Date	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 3, U-3ah/at N	08/02/95	3.54	2.96	8.86
Area 3, U-3ah/at N	08/31/95	2.69	2.25	6.77
Area 3, U-3ah/at N	09/28/95	2.26	1.25	2.75
Area 3, U-3ah/at N	11/07/95	0.70	1.06	4.30
Area 3, U-3ah/at N	12/04/95	-0.31	0.61	5.46
Area 3, U-3ah/at S	01/03/95	1.23	1.54	6.32
Area 3, U-3ah/at S	01/30/95	1.13	1.42	5.78
Area 3, U-3ah/at S	02/27/95	-0.18	0.27	5.28
Area 3, U-3ah/at S	04/03/95	-0.37	0.80	7.74
Area 3, U-3ah/at S	05/03/95	-0.18	0.25	4.53
Area 3, U-3ah/at S	06/05/95	1.26	1.57	6.56
Area 3, U-3ah/at S	07/03/95	-0.34	0.75	7.28
Area 3, U-3ah/at S	08/02/95	3.38	2.82	8.48
Area 3, U-3ah/at S	08/31/95	5.58	3.04	6.58
Area 3, U-3ah/at S	09/28/95	1.72	1.50	4.51
Area 3, U-3ah/at S	11/07/95	4.44	2.95	7.41
Area 3, U-3ah/at S	12/04/95	5.45	8.31	33.90
Area 3, U-3ah/at W	01/03/95	-0.21	0.56	6.44
Area 3, U-3ah/at W	01/30/95	1.17	1.47	5.98
Area 3, U-3ah/at W	02/27/95	1.42	1.70	7.17
Area 3, U-3ah/at W	04/03/95	-0.69	1.50	15.10
Area 3, U-3ah/at W	05/03/95	0.90	1.13	4.70
Area 3, U-3ah/at W	06/05/95	-0.23	0.32	5.82
Area 3, U-3ah/at W	07/03/95	0.99	1.39	5.64
Area 3, U-3ah/at W	08/02/95	2.44	3.42	14.00
Area 3, U-3ah/at W	08/31/95	4.35	2.81	6.98
Area 3, U-3ah/at W	09/28/95	0.83	1.27	5.16
Area 3, U-3ah/at W	11/07/95	1.12	1.71	6.90
Area 3, U-3ah/at W	12/04/95	7.47	4.18	9.14
Area 3, Well ER-3-1	09/27/95	0.29	0.44	1.79
Area 5, DOD	01/03/95	-0.06	0.15	1.80
Area 5, DOD	04/03/95	-0.08	0.17	1.67
Area 5, DOD	07/03/95	0.28	0.45	1.81
Area 5, DOD	09/28/95	-0.09	0.18	1.63
Area 5, Gate 200 S	01/03/95	-0.09	0.22	2.41
Area 5, Gate 200 S	04/03/95	-0.06	0.15	1.63
Area 5, Gate 200 S	07/03/95	(a)	(a)	(a)
Area 5, RWMS No. 1	01/03/95	(a)	(a)	(a)
Area 5, RWMS No. 1	04/03/95	-0.10	0.21	2.04
Area 5, RWMS No. 1	07/03/95	0.29	0.46	1.88
Area 5, RWMS No. 1	09/28/95	0.59	0.90	3.64

(a) Missing data.

Attachment 2.1 (^{238}Pu in Air - 1995, cont.)

Sampling Location	Sampling Date	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 1	11/07/95	-0.32	0.62	5.56
Area 5, RWMS No. 1	12/04/95	-0.29	0.57	5.11
Area 5, RWMS No. 2	01/03/95	0.26	0.34	1.39
Area 5, RWMS No. 2	04/03/95	-0.10	0.21	2.01
Area 5, RWMS No. 2	07/03/95	(a)	(a)	(a)
Area 5, RWMS No. 2	09/28/95	-0.60	1.32	13.00
Area 5, RWMS No. 3	01/09/95	-0.05	0.13	1.38
Area 5, RWMS No. 3	04/03/95	-0.09	0.19	1.85
Area 5, RWMS No. 3	07/03/95	-0.11	0.20	1.74
Area 5, RWMS No. 3	09/28/95	-0.21	0.40	3.59
Area 5, RWMS No. 3	11/07/95	-0.35	0.68	6.12
Area 5, RWMS No. 3	12/04/95	-0.27	0.53	4.76
Area 5, RWMS No. 4	01/03/95	-0.10	0.25	2.69
Area 5, RWMS No. 4	04/03/95	-0.08	0.17	1.64
Area 5, RWMS No. 4	07/03/95	-0.16	0.30	2.56
Area 5, RWMS No. 4	09/28/95	-0.26	0.50	4.50
Area 5, RWMS No. 4	11/07/95	-0.24	0.48	4.25
Area 5, RWMS No. 4	12/04/95	-0.32	0.63	5.59
Area 5, RWMS No. 5	01/03/95	-0.06	0.15	1.60
Area 5, RWMS No. 5	04/03/95	-0.06	0.13	1.27
Area 5, RWMS No. 5	07/03/95	0.24	0.38	1.55
Area 5, RWMS No. 5	09/28/95	3.19	1.79	3.92
Area 5, RWMS No. 5	11/07/95	0.90	1.37	5.58
Area 5, RWMS No. 5	12/04/95	-0.30	0.58	5.16
Area 5, RWMS No. 6	01/03/95	1.09	0.88	2.68
Area 5, RWMS No. 6	04/03/95	-0.16	0.35	3.49
Area 5, RWMS No. 6	07/03/95	0.33	0.52	2.11
Area 5, RWMS No. 6	09/28/95	-0.21	0.42	3.72
Area 5, RWMS No. 6	11/07/95	-0.28	0.55	4.90
Area 5, RWMS No. 6	12/04/95	0.89	1.35	5.49
Area 5, RWMS No. 7	01/03/95	-0.07	0.16	1.72
Area 5, RWMS No. 7	04/03/95	-0.07	0.16	1.56
Area 5, RWMS No. 7	07/03/95	-0.16	0.31	2.67
Area 5, RWMS No. 7	09/28/95	-0.19	0.37	3.31
Area 5, RWMS No. 7	11/07/95	-0.29	0.57	5.10
Area 5, RWMS No. 7	12/04/95	-0.27	0.54	4.80
Area 5, RWMS No. 8	01/03/95	-0.07	0.16	1.74
Area 5, RWMS No. 8	04/03/95	-0.08	0.18	1.72
Area 5, RWMS No. 8	07/03/95	0.72	0.64	1.94
Area 5, RWMS No. 8	09/28/95	-0.30	0.58	5.16
Area 5, RWMS No. 8	11/07/95	-0.33	0.65	5.81

(a) Missing data.

Attachment 2.1 (^{238}Pu in Air - 1995, cont.)

Sampling Location	Sampling Date	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 8	12/04/95	-0.32	0.62	5.52
Area 5, RWMS No. 9	01/03/95	-0.07	0.17	1.79
Area 5, RWMS No. 9	04/03/95	-0.05	0.13	1.40
Area 5, RWMS No. 9	07/03/95	-0.13	0.24	2.04
Area 5, RWMS No. 9	09/28/95	-0.23	0.46	4.07
Area 5, RWMS No. 9	11/07/95	-0.38	0.75	6.70
Area 5, RWMS No. 9	12/04/95	-0.28	0.54	4.82
Area 5, RWMS Pit-3	01/03/95	-0.19	0.51	5.81
Area 5, RWMS Pit-3	01/30/95	0.71	0.89	3.61
Area 5, RWMS Pit-3	02/27/95	-0.17	0.25	4.90
Area 5, RWMS Pit-3	04/03/95	-0.69	1.52	15.30
Area 5, RWMS Pit-3	05/01/95	-0.13	0.19	3.36
Area 5, RWMS Pit-3	06/05/95	0.91	1.13	4.74
Area 5, RWMS Pit-3	07/03/95	-0.22	0.48	4.67
Area 5, RWMS Pit-3	08/02/95	2.13	1.78	5.36
Area 5, RWMS Pit-3	08/30/95	1.18	1.64	6.69
Area 5, RWMS Pit-4	01/03/95	-0.13	0.35	3.98
Area 5, RWMS Pit-4	01/30/95	-0.15	0.39	4.45
Area 5, RWMS Pit-4	02/27/95	1.11	1.33	5.57
Area 5, RWMS Pit-4	04/03/95	(a)	(a)	(a)
Area 5, RWMS Pit-4	05/01/95	3.44	2.72	8.09
Area 5, RWMS Pit-5	06/12/95	-0.25	0.35	6.37
Area 5, RWMS Pit-5	07/03/95	1.06	1.48	6.07
Area 5, RWMS Pit-5	08/02/95	-0.35	0.77	7.54
Area 5, RWMS Pit-5	08/30/95	-0.29	0.63	6.17
Area 5, RWMS Pit-5	09/28/95	-0.21	0.42	3.73
Area 5, RWMS Pit-5	10/31/95	-0.30	0.59	5.27
Area 5, RWMS Pit-5	12/04/95	-0.28	0.56	4.95
Area 5, RWMS TP Building N	04/24/95	-0.95	2.05	19.90
Area 5, RWMS TP Building N	05/01/95	0.65	0.81	3.38
Area 5, RWMS TP Building N	06/05/95	0.97	1.20	5.03
Area 5, RWMS TP Building N	07/03/95	-0.32	0.69	6.81
Area 5, RWMS TP Building N	08/02/95	-0.23	0.49	4.81
Area 5, RWMS TP Building N	08/30/95	-0.26	0.57	5.60
Area 5, RWMS TP Building N	09/28/95	-0.23	0.45	4.01
Area 5, RWMS TP Building N	10/31/95	0.71	1.08	4.37
Area 5, RWMS TP Building N	12/04/95	-0.24	0.48	4.24
Area 5, RWMS TP Building S	04/24/95	4.88	6.81	27.80
Area 5, RWMS TP Building S	05/01/95	0.68	0.85	3.56
Area 5, RWMS TP Building S	06/05/95	-0.20	0.28	5.09
Area 5, RWMS TP Building S	07/03/95	-0.24	0.52	5.08

(a) Missing data.

Attachment 2.1 (^{238}Pu in Air - 1995, cont.)

Sampling Location	Sampling Date	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP Building S	08/02/95	-0.41	0.89	8.77
Area 5, RWMS TP Building S	08/30/95	-0.21	0.47	4.57
Area 5, RWMS TP Building S	09/28/95	-0.21	0.41	3.62
Area 5, RWMS TP Building S	10/31/95	-0.22	0.43	3.79
Area 5, RWMS TP Building S	12/04/95	3.48	3.03	9.13
Area 5, RWMS TP N	01/03/95	-0.16	0.42	4.79
Area 5, RWMS TP N	01/30/95	-0.19	0.49	5.60
Area 5, RWMS TP N	02/27/95	-0.16	0.25	4.83
Area 5, RWMS TP N	04/03/95	0.89	1.24	5.04
Area 5, RWMS TP N	05/01/95	-0.12	0.17	2.97
Area 5, RWMS TP N	06/05/95	1.08	1.34	5.61
Area 5, RWMS TP N	07/03/95	0.71	0.99	4.03
Area 5, RWMS TP N	08/02/95	-0.23	0.49	4.78
Area 5, RWMS TP N	08/30/95	-0.34	0.74	7.36
Area 5, RWMS TP NE	01/03/95	-0.17	0.45	5.14
Area 5, RWMS TP NE	01/30/95	-0.14	0.37	4.24
Area 5, RWMS TP NE	02/27/95	0.86	1.08	4.38
Area 5, RWMS TP NE	04/03/95	-0.20	0.43	4.18
Area 5, RWMS TP NE	05/01/95	-0.13	0.18	3.15
Area 5, RWMS TP NE	06/05/95	-0.22	0.31	5.66
Area 5, RWMS TP NE	07/03/95	-0.21	0.46	4.46
Area 5, RWMS TP NE	08/02/95	-0.21	0.46	4.47
Area 5, RWMS TP NE	08/30/95	-0.20	0.44	4.34
Area 5, RWMS TP NW	01/03/95	-0.13	0.34	3.93
Area 5, RWMS TP NW	01/30/95	-0.17	0.45	5.18
Area 5, RWMS TP NW	02/27/95	-0.14	0.22	4.17
Area 5, RWMS TP NW	04/10/95	2.46	3.44	14.40
Area 5, RWMS TP NW	05/01/95	-0.14	0.19	3.44
Area 5, RWMS TP NW	06/05/95	1.21	1.51	6.35
Area 5, RWMS TP NW	07/03/95	-0.27	0.59	5.77
Area 5, RWMS TP NW	08/02/95	-0.26	0.58	5.61
Area 5, RWMS TP NW	08/30/95	-0.29	0.64	6.41
Area 5, RWMS TP S	01/03/95	-0.20	0.52	6.00
Area 5, RWMS TP S	01/30/95	-0.12	0.31	3.56
Area 5, RWMS TP S	02/27/95	-0.17	0.25	4.90
Area 5, RWMS TP SE	01/03/95	0.92	1.16	4.71
Area 5, RWMS TP SE	01/30/95	-0.15	0.40	4.54
Area 5, RWMS TP SE	02/27/95	-0.23	0.35	6.83
Area 5, RWMS TP SW	01/03/95	-0.16	0.43	4.89
Area 5, RWMS TP SW	01/30/95	-0.19	0.50	5.77
Area 5, RWMS TP SW	02/27/95	1.24	1.49	6.22

(a) Missing data.

Attachment 2.1 (^{238}Pu in Air - 1995, cont.)

Sampling Location	Sampling Date	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP SW	04/03/95	-0.27	0.60	5.81
Area 5, RWMS TP SW	05/01/95	-0.11	0.15	2.63
Area 5, RWMS TP SW	06/05/95	-0.22	0.31	5.54
Area 5, RWMS TP SW	07/03/95	-0.38	0.82	8.05
Area 5, RWMS TP SW	08/02/95	-0.36	0.77	7.61
Area 5, RWMS TP SW	08/30/95	-0.27	0.60	5.95
Area 5, Well 5B	01/03/95	-0.09	0.23	2.46
Area 5, Well 5B	04/03/95	-0.06	0.14	1.51
Area 5, Well 5B	07/03/95	0.61	0.54	1.64
Area 5, Well 5B	09/28/95	10.20	2.68	2.79
Area 6, Building 6-900	01/03/95	-0.08	0.20	2.17
Area 6, Building 6-900	04/03/95	-0.05	0.12	1.30
Area 6, Building 6-900	07/03/95	3.34	1.03	1.31
Area 6, CP-6	01/03/95	2.22	1.81	5.60
Area 6, CP-6	04/03/95	-0.08	0.19	1.99
Area 6, CP-6	07/26/95	0.29	0.46	1.86
Area 6, CP-6	09/27/95	-0.15	0.29	2.59
Area 6, Well 3	01/03/95	-0.11	0.28	3.03
Area 6, Well 3	04/03/95	-0.05	0.11	1.16
Area 6, Well 3	07/03/95	7.31	1.70	1.62
Area 6, Well 3	09/27/95	0.81	0.54	1.36
Area 6, Yucca	01/03/95	-0.13	0.33	3.52
Area 6, Yucca	04/03/95	-0.09	0.23	2.42
Area 6, Yucca	07/03/95	0.66	0.59	1.78
Area 6, Yucca	09/27/95	-0.08	0.16	1.42
Area 7, Ue7ns	01/03/95	0.36	0.48	1.95
Area 7, Ue7ns	04/03/95	-0.05	0.11	1.18
Area 7, Ue7ns	07/03/95	8.09	1.62	1.29
Area 7, Ue7ns	09/27/95	0.35	0.53	2.16
Area 9, Area 9-300	01/03/95	1.93	0.92	1.76
Area 9, Area 9-300	04/03/95	1.21	0.65	1.39
Area 9, Area 9-300	07/03/95	1.01	0.68	1.72
Area 9, Area 9-300	09/27/95	4.60	1.66	2.43
Area 10, Gate 700 South	01/03/95	-0.12	0.29	3.14
Area 10, Gate 700 South	04/03/95	0.80	0.51	1.25
Area 10, Gate 700 South	07/03/95	1.33	0.89	2.27
Area 10, Gate 700 South	09/27/95	0.33	0.50	2.04
Area 10, Sedan Crater	09/27/95	6.08	1.36	1.22
Area 11, Gate 293	01/03/95	-0.12	0.29	3.20
Area 11, Gate 293	04/03/95	-0.07	0.16	1.72
Area 11, Gate 293	07/03/95	0.26	0.41	1.65

(a) Missing data.

Attachment 2.1 (^{238}Pu in Air - 1995, cont.)

Sampling Location	Sampling Date	μCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 11, Gate 293	09/27/95	0.53	0.46	1.38
Area 12	01/03/95	0.95	0.75	2.24
Area 12	04/03/95	0.35	0.50	2.02
Area 12	07/03/95	0.34	0.55	2.21
Area 12	09/27/95	-0.17	0.33	2.95
Area 15, EPA Farm	01/03/95	1.29	1.05	3.19
Area 15, EPA Farm	04/03/95	0.27	0.35	1.42
Area 15, EPA Farm	07/03/95	5.38	1.28	1.25
Area 15, EPA Farm	09/27/95	1.36	0.67	1.31
Area 16, 3545 Substation	01/03/95	-0.05	0.12	1.40
Area 16, 3545 Substation	04/03/95	-0.07	0.16	1.55
Area 16, 3545 Substation	07/03/95	-0.11	0.21	1.78
Area 16, 3545 Substation	09/27/95	-0.16	0.31	2.78
Area 19, Echo Peak	04/17/95	0.23	0.33	1.34
Area 19, Echo Peak	07/03/95	-0.16	0.34	3.34
Area 19, Pahute Sbstaion	04/17/95	0.31	0.44	1.79
Area 19, Pahute Sbstaion	07/03/95	-0.11	0.25	2.43
Area 20	04/26/95	0.42	0.60	2.41
Area 20	07/03/95	3.47	1.96	4.31
Area 20	09/27/95	-0.10	0.20	1.76
Area 23, Building 790 No. 2	01/03/95	-0.09	0.23	2.71
Area 23, Building 790 No. 2	04/03/95	-0.09	0.19	1.85
Area 23, Building 790 No. 2	07/03/95	-0.29	0.64	6.60
Area 23, Building 790 No. 2	09/28/95	-0.12	0.23	2.04
Area 23, East Boundary	01/03/95	0.35	0.44	1.80
Area 23, East Boundary	04/03/95	-0.06	0.13	1.30
Area 23, East Boundary	07/03/95	-0.10	0.23	2.26
Area 23, H & S Building	01/03/95	0.38	0.47	1.91
Area 23, H & S Building	04/03/95	0.80	0.52	1.28
Area 23, H & S Building	07/03/95	-0.09	0.19	1.84
Area 23, H & S Building	09/28/95	0.27	0.42	1.69
Area 25, E-MAD N	01/03/95	-0.10	0.26	3.03
Area 25, E-MAD N	04/03/95	-0.08	0.17	1.65
Area 25, E-MAD N	07/03/95	-0.09	0.21	2.01
Area 25, E-MAD N	09/28/95	(a)	(a)	(a)
Area 25, NRDS	01/03/95	-0.08	0.20	2.39
Area 25, NRDS	04/03/95	-0.11	0.23	2.27
Area 25, NRDS	07/03/95	1.09	0.91	2.75
Area 25, NRDS	10/05/95	0.28	0.43	1.75
Area-27	01/03/95	-0.17	0.45	5.50
Area-27	04/03/95	-0.07	0.14	1.40
Area-27	07/11/95	-0.10	0.23	2.25
Area-27	09/14/95	-0.08	0.15	1.37

(a) Missing data.

Attachment 2.2 $^{239+240}$Pu in Air - 1995

Sampling Location	Sampling Period	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 1, BJY	01/03/95	4.87	1.28	1.42
Area 1, BJY	04/03/95	37.00	4.66	1.71
Area 1, BJY	07/03/95	60.80	6.38	1.75
Area 1, BJY	09/28/95	51.20	4.97	1.28
Area 1, Gravel Pit	01/03/95	1.23	1.24	3.88
Area 1, Gravel Pit	04/03/95	15.40	2.73	1.84
Area 1, Gravel Pit	07/03/95	20.00	3.43	2.12
Area 2	01/03/95	-0.33	0.49	3.60
Area 2	04/03/95	4.75	1.65	2.44
Area 2	07/03/95	5.65	2.40	4.20
Area 2	09/27/95	8.73	2.38	2.69
Area 2, 2-1 Substation	01/03/95	3.33	1.42	2.49
Area 2, 2-1 Substation	04/03/95	10.50	2.17	1.81
Area 2, 2-1 Substation	07/03/95	37.90	5.19	2.35
Area 2, 2-1 Substation	09/27/95	14.80	2.43	1.48
Area 3	01/23/95	12.30	3.06	3.20
Area 3	04/03/95	29.40	3.59	1.37
Area 3	07/03/95	71.70	7.46	1.86
Area 3, Mud Plant	01/03/95	4.28	1.20	1.42
Area 3, Mud Plant	04/03/95	56.20	6.07	1.58
Area 3, Mud Plant	07/03/95	179.00	15.48	1.62
Area 3, Mud Plant	09/28/95	134.00	16.08	2.42
Area 3, U-3ah/at E	01/03/95	-0.71	1.06	7.65
Area 3, U-3ah/at E	01/30/95	30.50	10.92	16.00
Area 3, U-3ah/at E	02/27/95	2.69	1.88	4.86
Area 3, U-3ah/at E	04/03/95	28.40	8.80	11.30
Area 3, U-3ah/at E	05/03/95	31.00	6.93	6.14
Area 3, U-3ah/at E	06/05/95	13.00	5.03	8.01
Area 3, U-3ah/at E	07/03/95	318.00	29.42	5.55
Area 3, U-3ah/at E	08/02/95	107.00	21.61	16.00
Area 3, U-3ah/at E	08/31/95	83.00	11.45	5.56
Area 3, U-3ah/at E	09/28/95	85.20	11.29	4.43
Area 3, U-3ah/at E	11/07/95	403.00	34.46	5.21
Area 3, U-3ah/at E	12/04/95	84.70	12.32	6.09
Area 3, U-3ah/at N	01/03/95	0.80	1.77	7.09
Area 3, U-3ah/at N	01/30/95	74.50	15.05	11.60
Area 3, U-3ah/at N	02/27/95	14.70	6.14	10.50
Area 3, U-3ah/at N	04/03/95	310.00	51.92	23.70
Area 3, U-3ah/at N	05/03/95	16.00	5.23	7.08

(a) These values are statistical outliers and were not used in the statistical analyses.
(b) Missing data.

Attachment 2.2 ($^{239+240}$Pu in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 3, U-3ah/at N	06/05/95	41.80	12.69	15.60
Area 3, U-3ah/at N	07/03/95	119.00	17.49	8.39
Area 3, U-3ah/at N	08/02/95	78.30	13.86	9.53
Area 3, U-3ah/at N	08/31/95	150.00	19.95	7.28
Area 3, U-3ah/at N	09/28/95	240.00	21.00	2.75
Area 3, U-3ah/at N	11/07/95	55.20	8.34	4.50
Area 3, U-3ah/at N	12/04/95	98.70	13.32	5.72
Area 3, U-3ah/at S	01/03/95	-0.66	0.97	7.03
Area 3, U-3ah/at S	01/30/95	4.70	2.82	6.44
Area 3, U-3ah/at S	02/27/95	9.34	3.60	5.72
Area 3, U-3ah/at S	04/03/95	63.10	11.55	8.44
Area 3, U-3ah/at S	05/03/95	10.00	3.42	4.89
Area 3, U-3ah/at S	06/05/95	95.20	14.09	7.03
Area 3, U-3ah/at S	07/03/95	125.00	17.75	7.83
Area 3, U-3ah/at S	08/02/95	92.00	14.95	9.12
Area 3, U-3ah/at S	08/31/95	122.00	16.23	7.08
Area 3, U-3ah/at S	09/28/95	93.80	11.77	4.50
Area 3, U-3ah/at S	11/07/95	59.40	10.93	7.76
Area 3, U-3ah/at S	12/04/95	48.70	20.50	35.50
Area 3, U-3ah/at W	01/03/95	0.80	1.77	7.16
Area 3, U-3ah/at W	01/30/95	35.00	7.54	6.66
Area 3, U-3ah/at W	02/27/95	4.24	2.97	7.75
Area 3, U-3ah/at W	04/03/95	31.00	11.19	16.40
Area 3, U-3ah/at W	05/03/95	29.00	6.08	5.08
Area 3, U-3ah/at W	06/05/95	18.30	5.26	6.23
Area 3, U-3ah/at W	07/03/95	100.00	13.50	6.07
Area 3, U-3ah/at W	08/02/95	94.70	19.46	15.10
Area 3, U-3ah/at W	08/31/95	203.00	23.85	7.50
Area 3, U-3ah/at W	09/28/95	124.00	15.44	5.15
Area 3, U-3ah/at W	11/07/95	85.60	13.18	7.23
Area 3, U-3ah/at W	12/04/95	417.00	44.62	9.58
Area 3, Well ER-3-1	09/27/95	24.80	3.77	1.87
Area 5, DOD	01/03/95	0.23	0.49	1.99
Area 5, DOD	04/03/95	6.55	1.67	1.80
Area 5, DOD	07/03/95	5.72	1.60	1.91
Area 5, DOD	09/28/95	3.07	1.12	1.71
Area 5, Gate 200 S	01/03/95	-0.24	0.36	2.65
Area 5, Gate 200 S	04/03/95	0.19	0.45	1.81
Area 5, Gate 200 S	07/03/95	(b)	(b)	(b)

(a) These values are statistical outliers and were not used in the statistical analyses.
(b) Missing data.

Attachment 2.2 ($^{239+240}$Pu in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 1	01/03/95	(b)	(b)	(b)
Area 5, RWMS No. 1	04/03/95	2.97	1.26	2.19
Area 5, RWMS No. 1	07/03/95	15.40	2.81	2.00
Area 5, RWMS No. 1	09/28/95	19.80	4.29	3.64
Area 5, RWMS No. 1	11/07/95	9.27	3.61	5.83
Area 5, RWMS No. 1	12/04/95	1.79	1.74	5.35
Area 5, RWMS No. 2	01/03/95	2.07	0.88	1.53
Area 5, RWMS No. 2	04/03/95	5.14	1.63	2.17
Area 5, RWMS No. 2	07/03/95	(b)	(b)	(b)
Area 5, RWMS No. 2	09/28/95	1.68	3.45	14.00
Area 5, RWMS No. 3	01/09/95	1.43	0.74	1.52
Area 5, RWMS No. 3	04/03/95	0.64	0.64	1.99
Area 5, RWMS No. 3	07/03/95	2.47	1.05	1.84
Area 5, RWMS No. 3	09/28/95	8.45	2.72	3.58
Area 5, RWMS No. 3	11/07/95	3.47	2.48	6.41
Area 5, RWMS No. 3	12/04/95	4.80	2.45	4.99
Area 5, RWMS No. 4	01/03/95	0.93	0.94	2.95
Area 5, RWMS No. 4	04/03/95	5.70	1.55	1.77
Area 5, RWMS No. 4	07/03/95	4.71	1.75	2.71
Area 5, RWMS No. 4	09/28/95	4.64	2.28	4.49
Area 5, RWMS No. 4	11/07/95	187.00[a]	18.23	4.45
Area 5, RWMS No. 4	12/04/95	1.95	1.89	5.86
Area 5, RWMS No. 5	01/03/95	0.93	0.68	1.76
Area 5, RWMS No. 5	04/03/95	1.57	0.72	1.36
Area 5, RWMS No. 5	07/03/95	6.24	1.55	1.64
Area 5, RWMS No. 5	09/28/95	11.70	3.35	3.91
Area 5, RWMS No. 5	11/07/95	8.05	3.38	5.85
Area 5, RWMS No. 5	12/04/95	0.68	1.34	5.40
Area 5, RWMS No. 6	01/03/95	1.53	1.12	2.94
Area 5, RWMS No. 6	04/03/95	2.69	1.61	3.75
Area 5, RWMS No. 6	07/03/95	8.47	2.13	2.23
Area 5, RWMS No. 6	09/28/95	14.40	3.64	3.72
Area 5, RWMS No. 6	11/07/95	3.87	2.26	5.13
Area 5, RWMS No. 6	12/04/95	1.92	1.86	5.75
Area 5, RWMS No. 7	01/03/95	1.38	0.83	1.89
Area 5, RWMS No. 7	04/03/95	0.89	0.65	1.68
Area 5, RWMS No. 7	07/03/95	13.00	3.05	2.83
Area 5, RWMS No. 7	09/28/95	3.43	1.68	3.30
Area 5, RWMS No. 7	11/07/95	0.67	1.32	5.34

(a) These values are statistical outliers and were not used in the statistical analyses.
(b) Missing data.

Attachment 2.2 ($^{239+240}$Pu in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS No. 7	12/04/95	0.63	1.24	5.02
Area 5, RWMS No. 8	01/03/95	-0.17	0.26	1.91
Area 5, RWMS No. 8	04/03/95	7.50	1.82	1.85
Area 5, RWMS No. 8	07/03/95	18.70	3.18	2.05
Area 5, RWMS No. 8	09/28/95	5.33	2.62	5.16
Area 5, RWMS No. 8	11/07/95	5.86	2.99	6.08
Area 5, RWMS No. 8	12/04/95	3.15	2.25	5.79
Area 5, RWMS No. 9	01/03/95	17.60	3.07	1.97
Area 5, RWMS No. 9	04/03/95	0.80	0.60	1.55
Area 5, RWMS No. 9	07/03/95	5.99	1.76	2.16
Area 5, RWMS No. 9	09/28/95	6.00	2.44	4.07
Area 5, RWMS No. 9	11/07/95	3.80	2.72	7.01
Area 5, RWMS No. 9	12/04/95	1.69	1.64	5.05
Area 5, RWMS Pit-3	01/03/95	-0.60	0.90	6.47
Area 5, RWMS Pit-3	01/30/95	2.12	1.56	4.01
Area 5, RWMS Pit-3	02/27/95	2.92	2.04	5.30
Area 5, RWMS Pit-3	04/03/95	-1.56	2.28	16.70
Area 5, RWMS Pit-3	05/01/95	17.60	3.96	3.63
Area 5, RWMS Pit-3	06/05/95	7.21	2.99	5.08
Area 5, RWMS Pit-3	07/03/95	5.78	2.67	5.02
Area 5, RWMS Pit-3	08/02/95	6.64	3.07	5.77
Area 5, RWMS Pit-3	08/30/95	0.86	1.78	7.19
Area 5, RWMS Pit-4	01/03/95	-0.42	0.62	4.43
Area 5, RWMS Pit-4	01/30/95	1.58	1.60	4.95
Area 5, RWMS Pit-4	02/27/95	8.49	3.54	6.03
Area 5, RWMS Pit-4	04/03/95	(b)	(b)	(b)
Area 5, RWMS Pit-4	05/01/95	0.98	2.03	8.74
Area 5, RWMS Pit-5	06/12/95	2.30	2.17	6.83
Area 5, RWMS Pit-5	07/03/95	8.85	3.75	6.53
Area 5, RWMS Pit-5	08/02/95	4.28	3.10	8.11
Area 5, RWMS Pit-5	08/30/95	9.03	3.82	6.63
Area 5, RWMS Pit-5	09/28/95	39.00	6.30	3.91
Area 5, RWMS Pit-5	10/31/95	9.95	3.62	5.52
Area 5, RWMS Pit-5	12/04/95	1.74	1.69	5.19
Area 5, RWMS TP Building N	04/24/95	2.53	5.31	21.40
Area 5, RWMS TP Building N	05/01/95	0.41	0.85	3.65
Area 5, RWMS TP Building N	06/05/95	2.98	2.09	5.39
Area 5, RWMS TP Building N	07/03/95	0.86	1.80	7.33
Area 5, RWMS TP Building N	08/02/95	1.69	1.68	5.17

(a) These values are statistical outliers and were not used in the statistical analyses.
(b) Missing data.

Attachment 2.2 ($^{239+240}$Pu in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP Building N	08/30/95	1.97	1.95	6.01
Area 5, RWMS TP Building N	09/28/95	22.50	4.83	4.20
Area 5, RWMS TP Building N	10/31/95	-0.38	0.61	4.58
Area 5, RWMS TP Building N	12/04/95	-0.37	0.59	4.44
Area 5, RWMS TP Building S	04/24/95	3.25	7.51	30.30
Area 5, RWMS TP Building S	05/01/95	-0.40	0.33	3.84
Area 5, RWMS TP Building S	06/05/95	1.84	1.74	5.45
Area 5, RWMS TP Building S	07/03/95	1.78	1.77	5.47
Area 5, RWMS TP Building S	08/02/95	-0.83	1.26	9.43
Area 5, RWMS TP Building S	08/30/95	3.66	2.16	4.92
Area 5, RWMS TP Building S	09/28/95	5.25	2.19	3.79
Area 5, RWMS TP Building S	10/31/95	2.16	1.54	3.97
Area 5, RWMS TP Building S	12/04/95	3.20	3.10	9.57
Area 5, RWMS TP N	01/03/95	-0.50	0.74	5.33
Area 5, RWMS TP N	01/30/95	-0.58	0.86	6.23
Area 5, RWMS TP N	02/27/95	0.62	1.21	5.23
Area 5, RWMS TP N	04/03/95	-0.53	0.78	5.50
Area 5, RWMS TP N	05/01/95	3.82	1.74	3.21
Area 5, RWMS TP N	06/05/95	5.91	2.98	6.01
Area 5, RWMS TP N	07/03/95	4.12	2.12	4.33
Area 5, RWMS TP N	08/02/95	1.68	1.67	5.14
Area 5, RWMS TP N	08/30/95	4.19	3.04	7.90
Area 5, RWMS TP NE	01/03/95	-0.53	0.79	5.72
Area 5, RWMS TP NE	01/30/95	0.53	1.17	4.72
Area 5, RWMS TP NE	02/27/95	1.55	1.57	4.88
Area 5, RWMS TP NE	04/03/95	5.17	2.41	4.56
Area 5, RWMS TP NE	05/01/95	1.11	1.08	3.41
Area 5, RWMS TP NE	06/05/95	4.64	2.69	6.06
Area 5, RWMS TP NE	07/03/95	5.54	2.56	4.80
Area 5, RWMS TP NE	08/02/95	1.57	1.56	4.81
Area 5, RWMS TP NE	08/30/95	6.34	2.68	4.66
Area 5, RWMS TP NW	01/03/95	-0.41	0.61	4.37
Area 5, RWMS TP NW	01/30/95	-0.54	0.80	5.76
Area 5, RWMS TP NW	02/27/95	3.46	2.01	4.51
Area 5, RWMS TP NW	04/10/95	7.89	5.88	15.60
Area 5, RWMS TP NW	05/01/95	6.81	2.47	3.72
Area 5, RWMS TP NW	06/05/95	0.81	1.57	6.80
Area 5, RWMS TP NW	07/03/95	4.57	2.72	6.21
Area 5, RWMS TP NW	08/02/95	13.20	4.36	6.03

(a) These values are statistical outliers and were not used in the statistical analyses.
(b) Missing data.

Attachment 2.2 ($^{239+240}$Pu in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 5, RWMS TP NW	08/30/95	28.90	7.15	6.88
Area 5, RWMS TP S	01/03/95	0.75	1.65	6.68
Area 5, RWMS TP S	01/30/95	-0.37	0.55	3.96
Area 5, RWMS TP S	02/27/95	1.77	1.68	5.30
Area 5, RWMS TP SE	01/03/95	-0.49	0.73	5.25
Area 5, RWMS TP SE	01/30/95	-0.47	0.70	5.05
Area 5, RWMS TP SE	02/27/95	8.80	4.00	7.39
Area 5, RWMS TP SW	01/03/95	-0.51	0.76	5.44
Area 5, RWMS TP SW	01/30/95	0.72	1.59	6.42
Area 5, RWMS TP SW	02/27/95	3.69	2.58	6.73
Area 5, RWMS TP SW	04/03/95	4.55	2.75	6.34
Area 5, RWMS TP SW	05/01/95	2.77	1.40	2.84
Area 5, RWMS TP SW	06/05/95	5.83	2.94	5.93
Area 5, RWMS TP SW	07/03/95	4.54	3.29	8.66
Area 5, RWMS TP SW	08/02/95	4.32	3.13	8.19
Area 5, RWMS TP SW	08/30/95	19.10	5.48	6.39
Area 5, Well 5B	01/03/95	0.86	0.87	2.70
Area 5, Well 5B	04/03/95	2.91	1.08	1.67
Area 5, Well 5B	07/03/95	57.00	6.16	1.74
Area 5, Well 5B	09/28/95	718.00[a]	64.98	2.78
Area 6, Building 6-900	01/03/95	2.23	1.16	2.38
Area 6, Building 6-900	04/03/95	6.07	1.43	1.44
Area 6, Building 6-900	07/26/95	96.00	8.83	1.39
Area 6, CP-6	01/03/95	9.18	3.73	6.13
Area 6, CP-6	04/03/95	0.69	0.71	2.21
Area 6, CP-6	07/03/95	10.40	2.22	1.97
Area 6, CP-6	09/27/95	12.30	2.84	2.71
Area 6, Well 3	01/03/95	1.71	1.26	3.32
Area 6, Well 3	04/03/95	9.07	1.68	1.28
Area 6, Well 3	07/03/95	436.00[a]	31.83	1.71
Area 6, Well 3	09/27/95	28.40	3.66	1.42
Area 6, Yucca	01/03/95	1.23	1.24	3.86
Area 6, Yucca	04/03/95	16.70	3.31	2.68
Area 6, Yucca	07/03/95	65.40	7.13	1.88
Area 6, Yucca	09/27/95	17.50	2.72	1.48
Area 7, UE-7ns	01/03/95	4.20	1.47	2.14
Area 7, UE-7ns	04/03/95	10.80	1.87	1.30
Area 7, UE-7ns	07/03/95	371.00[a]	27.08	1.37
Area 7, UE-7ns	09/27/95	12.50	2.67	2.26
Area 9, Area 9-300	01/03/95	35.40	4.71	1.94

(a) These values are statistical outliers and were not used in the statistical analyses.
(b) Missing data.

Attachment 2.2 ($^{239+240}$Pu in Air - 1995, cont.)

Sampling Location	Sampling Period	µCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 9, Area 9-300	04/03/95	198.00	16.14	1.54
Area 9, Area 9-300	07/03/95	29.30	3.97	1.82
Area 9, Area 9-300	09/27/95	394.00	38.81	2.42
Area 10, Gate 700 S	01/03/95	1.78	1.31	3.45
Area 10, Gate 700 S	04/03/95	8.39	1.68	1.39
Area 10, Gate 700 S	07/03/95	25.30	4.12	2.40
Area 10, Gate 700 S	09/27/95	13.60	2.73	2.13
Area 10, Sedan Crater	09/27/95	50.40	5.09	1.27
Area 11, Gate 293	01/03/95	1.81	1.33	3.51
Area 11, Gate 293	04/03/95	17.30	2.99	1.91
Area 11, Gate 293	07/03/95	38.80	4.79	1.74
Area 11, Gate 293	09/27/95	40.50	4.62	1.45
Area 12	01/03/95	0.80	0.80	2.49
Area 12	04/03/95	11.10	2.45	2.18
Area 12	07/03/95	1.22	0.90	2.34
Area 12	09/27/95	2.32	1.37	3.09
Area 15, EPA Farm	01/03/95	3.91	1.84	3.49
Area 15, EPA Farm	04/03/95	46.80	5.22	1.57
Area 15, EPA Farm	07/03/95	162.00	12.80	1.32
Area 15, EPA Farm	09/27/95	80.70	7.67	1.37
Area 16, 3545 Substation	01/03/95	1.14	0.68	1.55
Area 16, 3545 Substation	04/03/95	1.57	0.81	1.66
Area 16, 3545 Substation	07/03/95	0.98	0.72	1.89
Area 16, 3545 Substation	09/27/95	13.80	3.11	2.91
Area 19, Echo Peak	04/17/95	1.37	0.71	1.44
Area 19, Echo Peak	07/03/95	0.43	0.89	3.59
Area 19, Pahute Substation	04/17/95	1.03	0.75	1.93
Area 19, Pahute Substation	07/03/95	-0.23	0.35	2.61
Area 20	04/26/95	150.00[a]	13.73	2.60
Area 20	07/03/95	6.11	2.60	4.57
Area 20	09/27/95	1.39	0.81	1.85
Area 23, Building 790 No. 2	01/03/95	0.96	0.96	3.00
Area 23, Building 790 No. 2	04/03/95	11.00	2.33	2.00
Area 23, Building 790 No. 2	07/03/95	-0.59	0.91	7.07
Area 23, Building 790 No. 2	09/28/95	0.27	0.53	2.13
Area 23, E Boundary	01/03/95	5.15	1.57	2.00
Area 23, E Boundary	04/03/95	8.27	1.68	1.40
Area 23, E Boundary	07/03/95	1.29	0.94	2.43
Area 23, H & S Building	01/03/95	2.43	1.13	2.12
Area 23, H & S Building	04/03/95	3.03	0.99	1.38

(a) These values are statistical outliers and were not used in the statistical analyses.
(b) Missing data.

Attachment 2.2 ($^{239+240}$Pu in Air - 1995, cont.)

Sampling Location	Sampling Period	μCi/mL x 10^{-18} Concentration	Standard Deviation (s)	Detection Limit
Area 23, H & S Building	07/03/95	1.06	0.76	1.98
Area 23, H & S Building	09/28/95	2.07	0.95	1.77
Area 25, E-MAD N	01/03/95	3.80	1.78	3.36
Area 25, E-MAD N	04/03/95	2.06	0.95	1.78
Area 25, E-MAD N	07/03/95	0.71	0.70	2.17
Area 25, E-MAD N	09/28/95	(b)	(b)	(b)
Area 25, NRDS	01/03/95	-0.24	0.36	2.65
Area 25, NRDS	04/03/95	2.30	1.18	2.44
Area 25, NRDS	07/03/95	-0.25	0.39	2.95
Area 25, NRDS	10/05/95	5.18	1.51	1.83
Area-27	01/03/95	3.05	2.26	6.08
Area-27	04/03/95	0.80	0.58	1.50
Area-27	07/11/95	0.80	0.79	2.42
Area-27	09/14/95	1.68	0.77	1.44

(a) These values are statistical outliers and were not used in the statistical analyses.
(b) Missing data.

3.0 ONSITE TRITIUM IN AIR

Twenty-one samplers for airborne tritiated water (HTO)vapor were placed at locations on the Nevada Test Site (NTS). For the fourth quarter of 1995, two sampling locations were added to Area 6, adjacent to the Control Point complex because of planned construction near the added locations. These locations are the Gas Station and Substation 6-9. These locations were then eliminated at the end of 1995 when the construction was canceled. In August of 1995, the Gate 700 South station was relocated to the SEDAN Crater, a move of 1.5 miles to the southwest. The Mud Plant, a concrete batch plant in Area 3 was added in October, and the E-Tunnel Pond was added in December. The station at the Radiological Waste Management Site (RWMS) No. 2, located at the Greater Confinement Disposal Test Facility, was eliminated in October after this test facility was closed and capped. Finally, the stations at Building 790 No. 2 and at the nuclear Engine Maintenance, Assembly, and Disassembly building (E-MAD) were eliminated at the end of August because of operational inactivity at these locations. Attachment 3.1 displays the sampling locations, dates that sampling began, observed concentrations in picocuries per milliliter (10^{-6} pCi/mL = pCi/m^3), and analytic standard deviation for the 414 analyses performed in 1995. Samples were collected over two-week periods. The analytic standard deviations are in the same units of measurement as the concentration. The simple descriptive statistics for all the data combined and for the detection limits minimum detectable concentration (MDC) are:

Number of data values =	414 including 12 missing values
Arithmetic mean =	3.75×10^{-6} pCi/mL
Median =	1.50×10^{-6}
Standard deviation =	6.95×10^{-6}
Minimum value =	-1.87×10^{-6}
Maximum value =	57.90×10^{-6}
MDC Mean ± s =	$1.72 \pm 0.82 \times 10^{-6}$

The first quartile of the data is 0.38×10^{-6} pCi/mL, and the third quartile is 4.79×10^{-6} pCi/mL. Half the data values are between these statistics. Forty-nine percent of the data values are below the individual detection limits. Most of the above detection limit results are from the RWMS stations, the U.S. Environmental Protection Agency (EPA) Farm, and the SEDAN Crater. These statistics are almost identical to those reported in the "U.S. Department of Energy, Nevada Operations Office (DOE/NV), Annual Site Environmental Report (ASER)-1994, DOE/NV11432-175."

Figure 3.1 shows the locations of the tritium in air sampling stations as black squares on a map of the NTS. The unnamed stations are currently inactive. In this figure, the major roads are indicated by the wavy lines. The nine RWMS stations are indicated by the large square in Area 5. These stations are numbered counter-clockwise from the lower right corner with three stations to a side. The three stations in Area 23 are Building 790 No. 2 on the upper left, East Boundary on the right, and the Health and Safety Building on the lower left. The East Boundary station is currently inactive. The Health and Safety Building is also called Building 650. Note that there is no tritium in air sampling in most of the test site areas. Sampling locations are chosen where tritium may be detected. The RWMS is a storage area for tritiated waste. Area 23 has laboratories that analyze samples for tritium. The EPA Farm and Gate 700 are close to the SEDAN Crater, which is a known source of low levels of tritium. The Area 12 Camp is close to several tunnel portals which have, in past years, discharged some HTO. BJY is a location within Yucca Valley, where many underground tests were conducted.

Figures 3.2 through 3.21 are time series plots of the data in Attachment 3.1. There is one figure for each sampling location. No time series plot is plotted for the E-Tunnel Pond No. 1 data because there are only two data values for this location which is not enough for a reasonable time series. The data values are represented by an "o". The solid lines show the detection limit, and the dotted lines give the approximate upper and lower 95 percent confidence intervals for the data (calculated as the data value plus or minus twice the analytical standard deviation). The abscissa gives the time that sampling started in terms of month of the year and fraction of the month. The fraction of the month was approximated as the day of the month divided by 32. Note that the values for the ordinate range from 0 to 60 for two of the RWMS sampling stations while the remaining plots have a range of 0 to 20. Figure 3.22 shows all the data combined in one plot; this plot does not contain any confidence intervals or detection limits. These plots seem to show occasional values that are higher than most values. The high values occur in the late summer and occur only at the RWMS stations, with the highest values occurring at the stations located along the north side of the RWMS. This pattern has consistently occurred for many years. This site contains significant amounts of tritium waste, and the late summer prevailing winds are from the south. Research work has been proposed to determine if the late summer increases are due to plant transpiration of groundwater contaminated with tritium. Near surface soil samples also have tritium at a level about an order of magnitude less than the plants and could contribute to tritium in air by evaporation. The spatial distribution of tritium in soil around plants is unknown. During the early summer there is adequate surface water for the vegetation, but by late summer the surface soil dries out and plants then seek moisture deeper in the soil. Examination of the time series figures shows that the stations seem to fall into two groups: (1) those stations with all values close to zero and most values below the corresponding detection limit, and those stations with many values obviously above the detection limits; and (2) those stations with known contamination - the RWMS stations, the EPA Farm, and the SEDAN Crater.

DATA ANALYSIS

The exploratory statistical analysis of these data for statistical distribution characteristics, illustrated in Figures 3.23 and 3.24, indicates that the data are lognormally distributed and a logarithmic transformation will cause those few high values seen in Figure 3.23 to appear less remarkable. Figure 3.23 shows a curvature increasing towards the right, which suggests that the logarithm of the data should be used. The correlation test indicates that these data are not distributed normally, which is the expected result because of the clearly defined curvature of the data shown in the figure. The same procedure was repeated using the natural logarithms of the data and the resulting plot is shown in Figure 3.24. This figure now shows the data approximately falling on a straight line. Since statistical tests are dependent on the data distribution, the natural logarithm of the data values was used for all of the following statistical testing. Note that there are 78 fewer data values in Figure 3.24 than in Figure 3.23; this is because the logarithmic transformation changes all negative values to missing values.

The correlation coefficient test for goodness of fit does not indicate a fit to a normal distribution for the logarithms of the data in Figure 3.24. However, if the lowest three and highest three data points are deleted, the data fits a log normal distribution. Since the low deleted data values are well below the detection limit, they cannot be assumed to be from the same distribution as the data above the detection limit. They are positive values that are very close to zero. Thus the conclusion of these tests is that this data set has a lognormal data distribution, except for a few values at the extremes of the range of values. The lognormal distribution was also found to be appropriate in last year's "ASER-1994, DOE/NV 11432-175". There are 21 sampling stations in this year's report; there were 17 in last year's report. The changes were described at the beginning of this chapter.

The distinctly high values indicated for some of the RWMSs are not remarkable when working with logarithms of the data, and thus do not seem to be high outliers. Simple descriptive statistics can be used to summarize the data for each sampling station. Table 3.1 gives these statistics. The first and third quartiles of the data are defined so that one quarter of the data have values lower than the first quartile and one quarter of the data have values higher than the third quartile. Note that the medians are smaller than the means, and the medians are closer to the first quartile than to the third quartile. This is typical of lognormally distributed data. A comparison of Table 3.1 with the corresponding Table 5.8 in last year's "ASER-1994, DOE/NV 11432-175," shows that concentrations were about the same for these two years.

An examination of Figures 3.2 to 3.22 indicates no reason to suspect any time trends within the tritium data, other than that described above, that is possibly due to tritium transpiration and evaporation. No formal statistical test for trend was performed. The significance of this possible trend awaits the testing of the transpiration and evaporation hypothesis. The final statistical test on these data was a one-way analysis of variance (ANOVA) to test for differences between group medians. The data were logarithmically transformed, using natural logarithms, before this test. Also, the negative values were removed by the transformation to logarithms. The output of this procedure is given in Tables 3.2 and 3.3. In Table 3.2, the "p" value gives the probability associated with the F-statistic and is the probability that there are no significant differences among the station means. Since the "p" value is essentially zero, the statistical conclusion is that there are statistically significant differences between the station medians. Note that the mean values and confidence intervals are of the natural logarithms of the data; thus the exponential transformation gives an estimate of the data median and the confidence interval of the median.

The medians in the ANOVA in Table 3.3 do not equal the corresponding medians in Table 3.1 for two reasons. First, the medians in Table 3.1 were derived from all the data, while the medians reported in the ANOVA are computed from only the data values above zero. This truncation of the data is necessary because logarithms of negative numbers are imaginary numbers and cannot be used in the ANOVA. Second, the medians are estimated in Table 3.3 from the mean of the logarithms of the data. Statistically, if the data are lognormally distributed, the anti-logarithm of the mean of the logarithms of the data is an estimator of the median of the data. The ANOVA table shows strong evidence of differences between group means, and the plot of confidence intervals suggests how the means are grouped.

The ANOVA "groupings" denotes the median data values that are statistically similar. Any geographical meaning to these groupings is secondary and interpretive. Tukey's multiple comparison procedure was used to simultaneously compare all medians for equality. This process identified three groupings in Table 3.3. The high grouping in Table 3.3 contains only RWMS No. 4, which was also in the high grouping last year. The rest of the stations are contained in two almost overlapping groups with the RWMS stations in the middle grouping and the remaining stations making up the low grouping. This is about the same grouping as was seen in the 1994 data. The list of stations has been rearranged by increasing the magnitude of the means to facilitate the comparison of the grouped medians in Table 3.3.

A much wider confidence interval is seen in Table 3.3 for the E-Tunnel station compared to the other stations. This is due to the small sample size for this station. These confidence intervals are based upon the standard errors of the group means, which are inversely proportional to the square root of the sample sizes.

HISTORICAL TRENDS

Annual averages are available for 17 of the tritium in air stations starting with 1982. Table 3.4 gives the data, and Figures 3.25 and 3.26 are plots of some of the data in this table. The laboratories, which were left out of the combined annual averages, are the Health and Safety Building 650 and Building 790. The high data values for these buildings from 1982 through 1987 are not indicative of environmental conditions, but rather reflect analytical activities of the laboratories. In Building 650, during those earlier years, many distillations of tritium and plutonium in water were performed. Building 790 was used as a soils laboratory. After 1987 the number of waste shipments into the RWMSs significantly decreased, and this is evident in the magnitude of the tritium concentrations measured at these locations. The somewhat high average for the RWMS in 1987 is due to the obviously high annual average for RWMS No. 4 in that year. No reason is known for this reading and it is possibly in error. The two negative values reported in 1988 are probably in error, and these two values were not used to compute the two annual averages reported in Table 3.4.

Figure 3.25 is a plot of the RWMS annual averages. It shows an obvious decrease in concentrations over the years with a rapid decline in the earlier years of the plot and a gradual decline in more recent years. The shape of this curve is typical of the exponential decay curve. The break in the pattern of exponential decreases is obvious for 1987; this was discussed in the previous paragraph. The rapid decrease in concentrations in the early 1980s is probably due to a decrease in all radiological activity over the entire NTS due to a decrease in testing and better confinement of the underground tests that were performed.

Figure 3.26 shows the annual tritium in air concentrations averaged over the entire NTS for the past 14 years, excluding the data from the laboratory buildings for the reasons discussed above and including the RWMS stations. The discussion of the pattern above for Figure 3.25 also describes the pattern in Figure 3.26; thus the pattern seen at the RWMS is not distinct from the pattern seen for the entire NTS. However, the levels at the RWMS have generally been higher than the average of the other stations since 1989. The slight increase seen in Figure 3.26 for 1987 could show a contribution through world-wide fallout from the Chernoble accident which occurred in mid 1986.

CONCLUSIONS

The typical tritium in air pattern seen in the environmental sampling locations is that almost all concentrations are below the individual detection limits. Concentrations substantially higher than detection limits are observed only at the RWMS locations, the EPA Farm, and the SEDAN Crater. Tritium was used as a biological tracer at the EPA farm, and the SEDAN Crater is an open crater produced by a nuclear device. The RWMS locations show a distinct pattern of near detection limit tritium concentrations in the cool months of the year, then increased levels during the late summer months. It has been hypothesized that this pattern is due to plant transpiration and soil evaporation of HTO from the deeper levels of soil within the RWMS after water in surface soils is depleted by summer heat.

Several general conclusions can be drawn from the historical annual average tritium in air data for the 17 stations of the NTS. All stations show the same general trend; thus that trend should be representative of the entire site. In the early 1980s, concentrations decreased rapidly; this decrease corresponds to a time of decreasing test activity. Current concentrations are typically very low and are within the statistical confidence interval of the detection limit. These levels are substantially below levels of regulatory concern thus are not a consideration for workers at the NTS.

Table 3.1 1995 Descriptive Statistics by Sampling Station

Station	Number	Mean (10^{-6} pCi/mL)	Standard Deviation (10^{-6} pCi/mL)	Median (10^{-6} pCi/mL)	1st Quartile (10^{-6} pCi/mL)	3rd Quartile (10^{-6} pCi/mL)
H&S Building 650	24	0.29	0.85	0.14	-0.33	0.62
Building 790 No. 2	15	0.32	0.88	0.37	-0.29	0.52
RWMS No. 1	24	3.2	3.1	2.5	0.66	5.1
RWMS No. 2	21	3.1	3.1	2.2	0.87	4.9
RWMS No. 3	24	4.1	3.7	2.7	1.9	6.0
RWMS No. 4	26	15.1	16.4	6.1	3.8	22.7
RWMS No. 5	20	3.0	3.1	2.0	0.74	4.8
RWMS No. 6	26	8.6	13.5	3.8	0.43	11.1
RWMS No. 7	26	3.4	3.0	2.6	0.97	4.8
RWMS No. 8	26	3.4	3.3	2.3	1.3	5.1
RWMS No. 9	25	6.0	4.2	4.8	2.3	8.5
BJY	25	0.86	1.2	0.71	-0.08	1.6
Area 12 Camp	26	0.25	0.65	0.24	-0.08	0.50
EPA Farm	25	5.1	2.6	5.1	3.1	7.6
E-MAD North	18	0.11	0.81	0.11	-0.40	0.73
Gate 700 South	17	0.64	0.90	0.64	0.39	1.4
SEDAN Crater	9	6.6	3.5	6.4	3.43	9.5
Gas Station	8	0.29	0.64	0.05	-0.21	1.0
Substation 6-9	9	0.13	0.32	0.04	-0.12	0.44
Mud Plant	6	0.93	0.45	9.94	0.47	1.4
E-Tunnel Pond No. 1	2	6.1	0.69	6.1	---	---
All	402	3.7	7.0	1.5	0.38	4.8

Table 3.2 ANOVA on the Natural Log of Tritium in Air Concentrations by Areas

Source	Degrees of Freedom	Sum of the Squares	Mean Square	F-Statistic	p Value
Area	20	5909.0	295.4	8.35	0.000
Error	381	13475.0	35.4		
Total	401	19384.0			

Table 3.3 Comparison of Station Medians for Significant Differences

Station	N	Ln of Median	Standard Deviation	Individual 95 Percent Confidence Intervals for Ln Median Based on Pooled Standard Deviation
E-MAD	18	0.107	0.806	(---*----)
Substation 6-9	9	0.133	0.317	(-----*------)
Area 12 Camp	26	0.250	0.654	(--*---)
H&S Building	24	0.286	0.846	(---*---)
Gas Station	8	0.293	0.643	(-----*------)
Bldg. 790 No. 2	15	0.315	0.876	(-----*----)
Gate 700 South	17	0.644	0.897	(----*----)
BJY	25	0.861	1.176	(--*---)
Mud Plant	6	0.928	0.469	(-------*-------)
RWMS No. 5	20	3.047	3.087	(---*---)
RWMS No. 2	21	3.145	3.087	(---*---)
RWMS No. 1	24	3.238	3.086	(---*---)
RWMS No. 8	26	3.383	3.258	(---*--)
RWMS No. 7	26	3.403	3.040	(---*--)
RWMS No. 3	24	4.097	3.727	(---*---)
EPA Farm	25	5.138	2.591	(---*--)
RWMS No. 9	25	6.027	4.207	(---*---)
E-Tunnel	2	6.130	0.693	(-------------*-------------)
SEDAN Crater	9	6.548	3.520	(------*-----)
RWMS No. 6	26	8.594	13.484	(--*---)
RWMS No. 4	26	15.101	16.417	(---*---)
				0.0 6.0 12.0

Pooled Standard Deviation = 5.947

Table 3.4 Historical Annual Station Averages, Tritium in Air (10^{-6} pCi/mL)

Station	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
RWMS No. 1	400.	74.	37.	78.	46.	25.	12.	9.4	4.8	6.1	4.2	4.3	4.2	3.2
RWMS No. 2	58.	46.	12.	10.	19.	24.	12.	7.3	5.7	4.8	6.7	4.4	4.3	3.1
RWMS No. 3	21.	23.	7.7	3.6	8.6	25.	16.	11.	5.8	4.0	4.2	3.8	4.5	4.1
RWMS No. 4	85.	36.	17.	4.5	11.	220.	38.	9.5	8.5	5.1	6.5	10.	13.6	15.1
RWMS No. 5	130.	170.	26.	15.	30.	25.	6.7	8.8	7.9	5.0	4.0	6.8	3.6	3.0
RWMS No. 6	160.	35.	7.9	3.9	7.2	13.	-180.	5.5	7.5	5.4	4.0	7.7	2.9	8.6
RWMS No. 7	30.	67.	6.5	4.7	11.	13.	8.7	5.1	12.	14.	12.	21.	2.9	3.4
RWMS No. 8	24.	73.	4.1	4.9	5.3	11.	9.4	10.	9.1	8.9	5.0	6.2	2.2	3.4
RWMS No. 9	24.	54.	29.	8.9	12.	27.	22.	12.	11.	14.	12.	6.6	5.8	4.8
Average of RWMS	104.	64.	16.	15.	17.	43.	16.	8.7	8.1	7.5	6.5	7.9	4.9	5.4
BJY	150.	21.	25.	34.	37.	17.	-120.	15.	2.4	1.8	1.4	1.7	1.0	0.86
Gate 700 South	-	420.	5.8	7.1	9.8	45.	42.	3.2	1.8	1.5	0.63	0.72	0.57	0.64
Area 12 Camp	420.	28.	19.	260.	21.	21.	11.	5.9	2.0	1.3	0.54	0.42	0.42	0.25
EPA Farm	140.	96.	220.	29.	32.	30.	35.	26.	10.	6.3	10.	8.6	9.6	5.1
H&S Building	6000.	2700.	560.	8000.	390	66.	7.5	5.7	15.	0.90	0.53	0.34	0.30	0.29
East Boundary	-	17.	5.3	3.0	2.9	4.6	2.6	2.3	7.2	0.78	0.36	0.13	0.44	
Building 790 No. 2	6300.	100.	120.	27.	3.9	6.6	0.8	2.4	2.5	0.54	0.76	0.78	0.75	0.31
E-MAD North	150.	29.	18.	2.9	3.8	6.7	3.8	3.0	5.5	4.5	7.6	0.17	0.25	0.11
All Stations, Except Laboratories, Combined (Includes RWMS)	140.	79.	29.	31.	17.	34.	17.	8.9	6.8	5.6	5.3	5.5	3.9	4.0

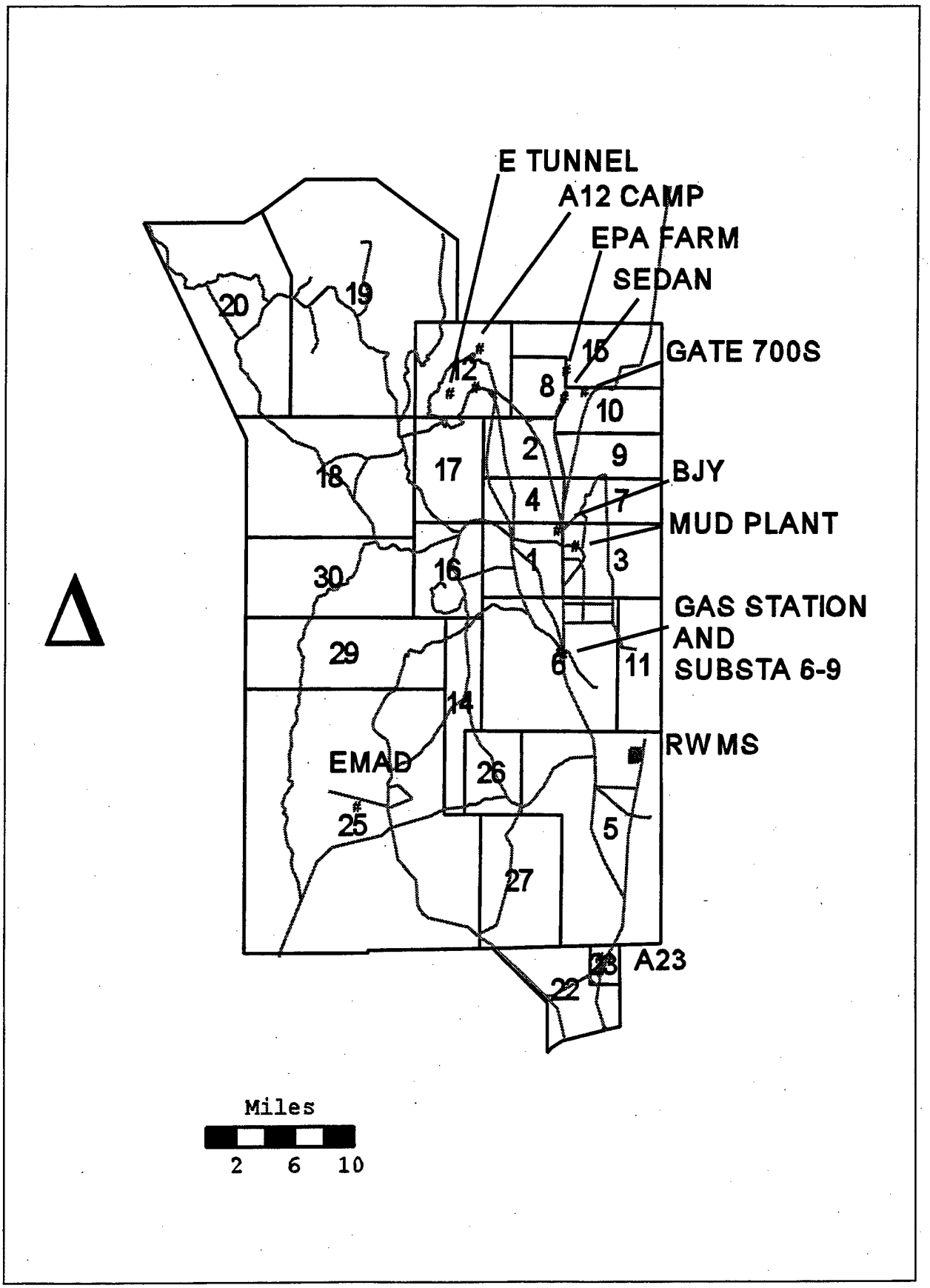


Figure 3.1 Tritium in Air Sampling Stations

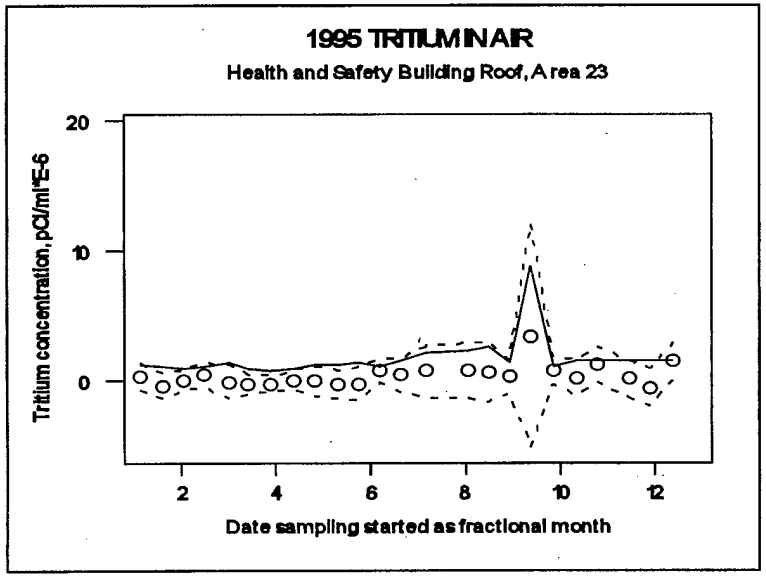


Figure 3.2 Time Series Plot for H&S Building

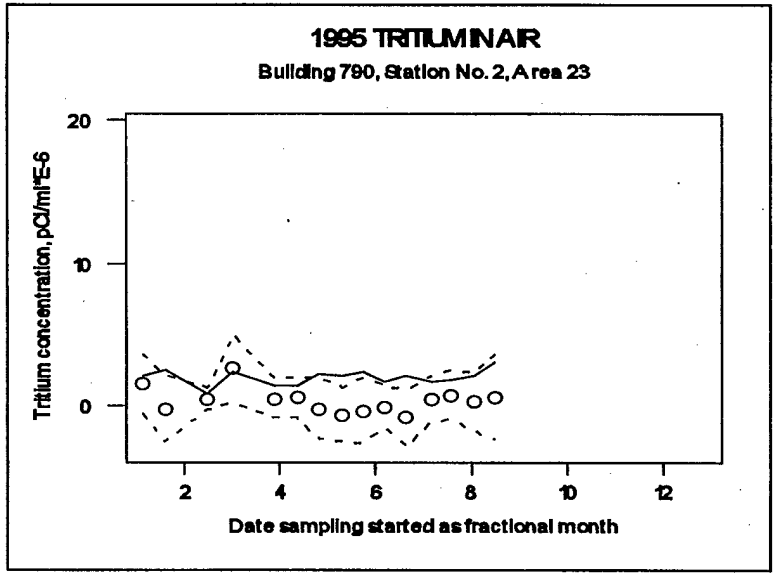


Figure 3.3 Time Series Plot for Building 790 No. 2

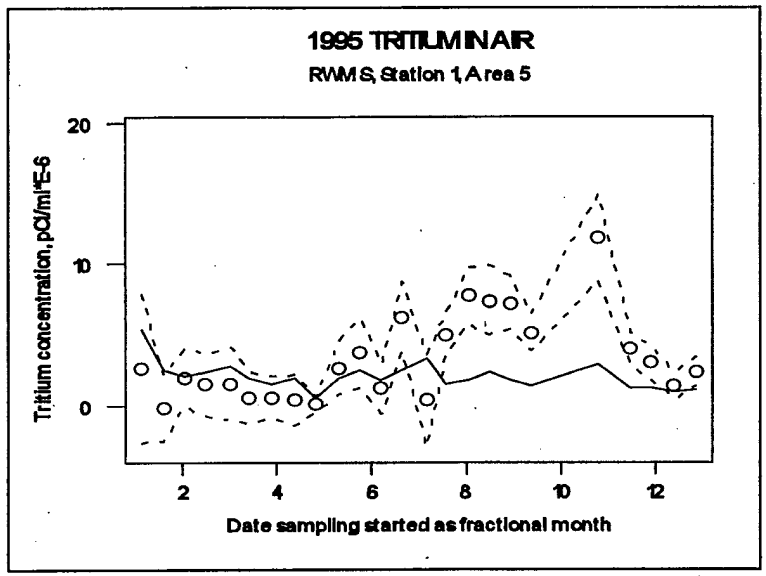


Figure 3.4 Time Series Plot for RWMS No. 1

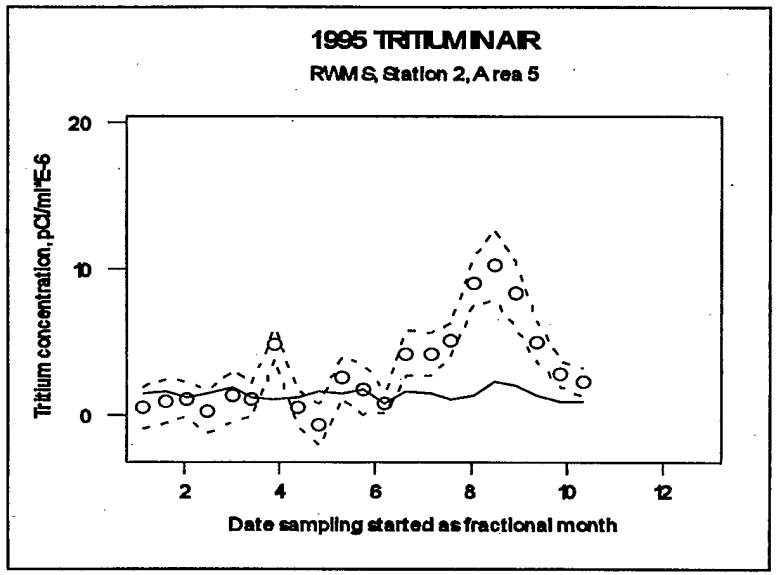


Figure 3.5 Time Series Plot for RWMS No. 2

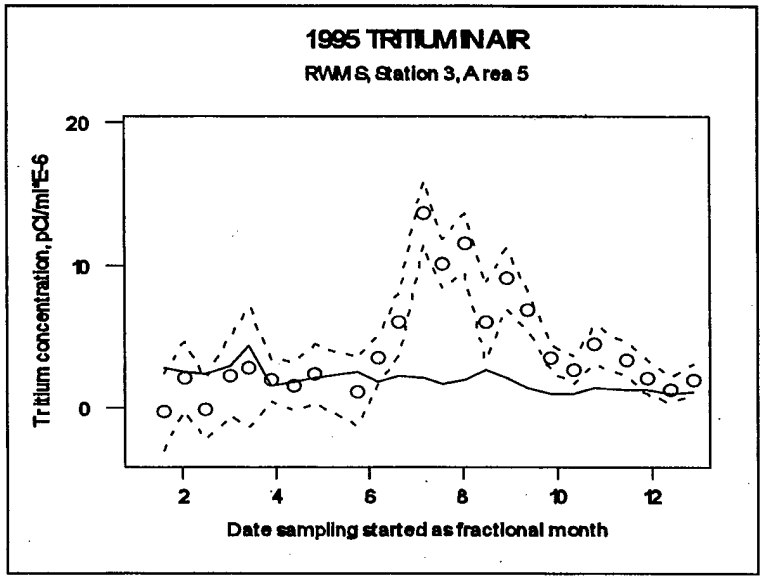


Figure 3.6 Time Series Plot for RWMS No. 3

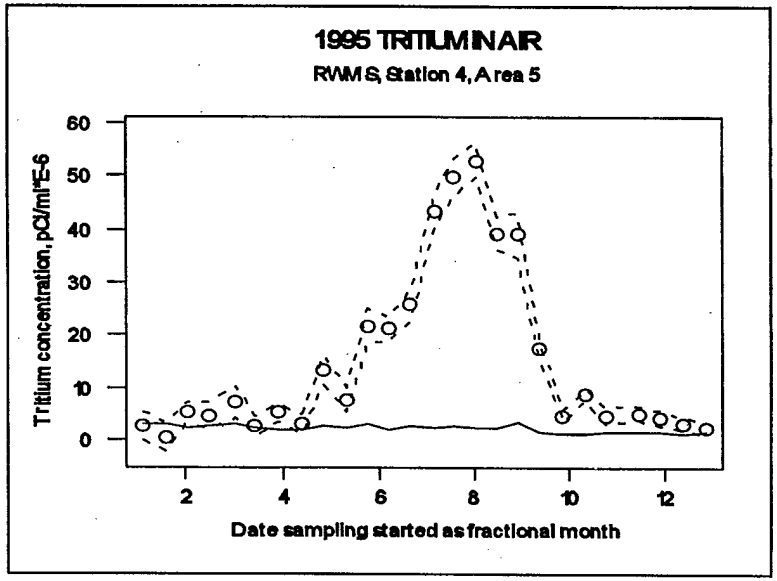


Figure 3.7 Time Series Plot for RWMS No. 4

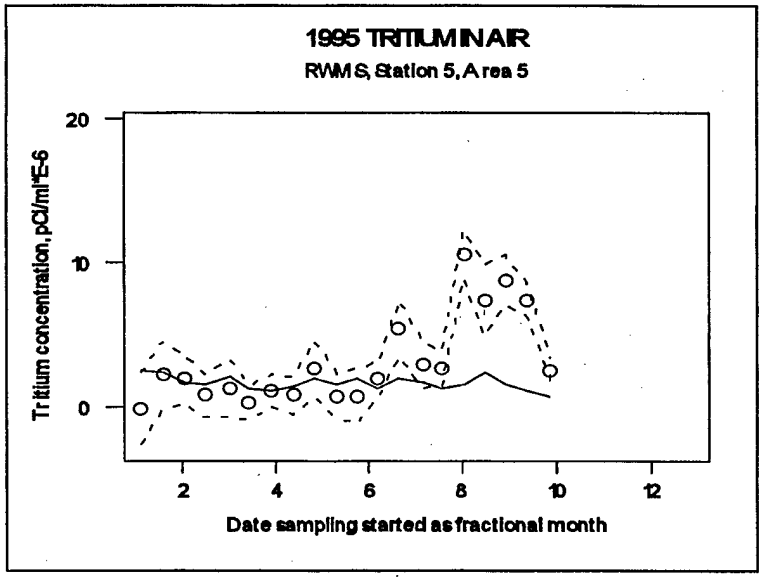


Figure 3.8 Time Series Plot for RWMS No. 5

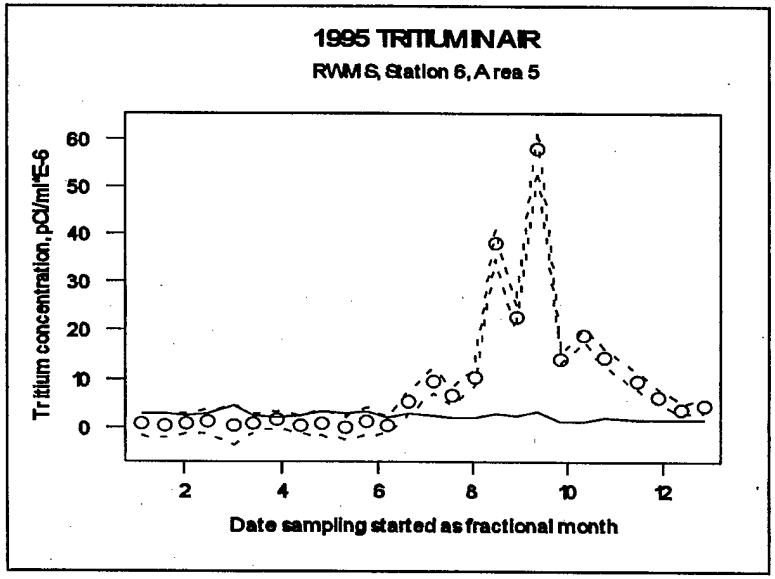


Figure 3.9 Time Series Plot for RWMS No. 6

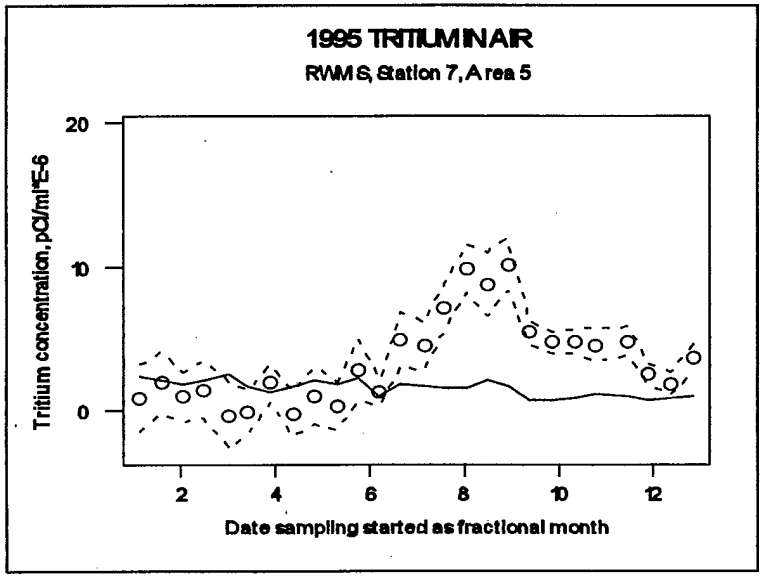


Figure 3.10 Time Series Plot for RWMS No. 7

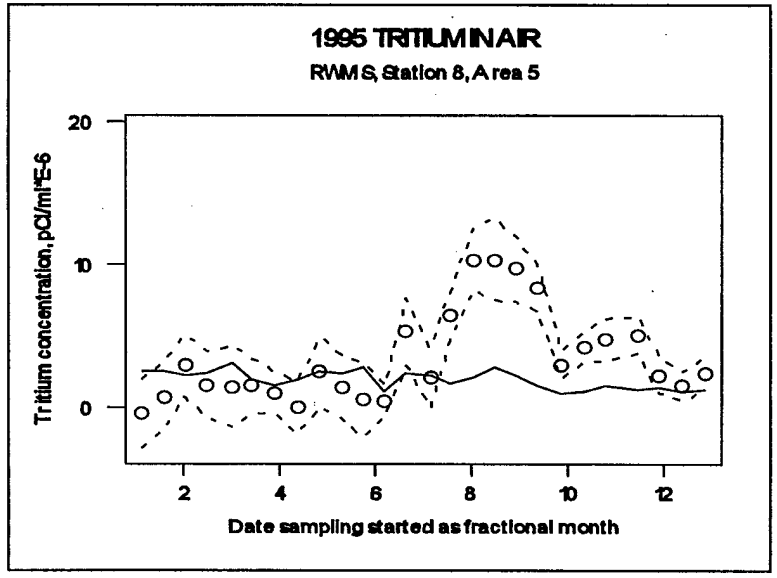


Figure 3.11 Time Series Plot for RWMS No. 8

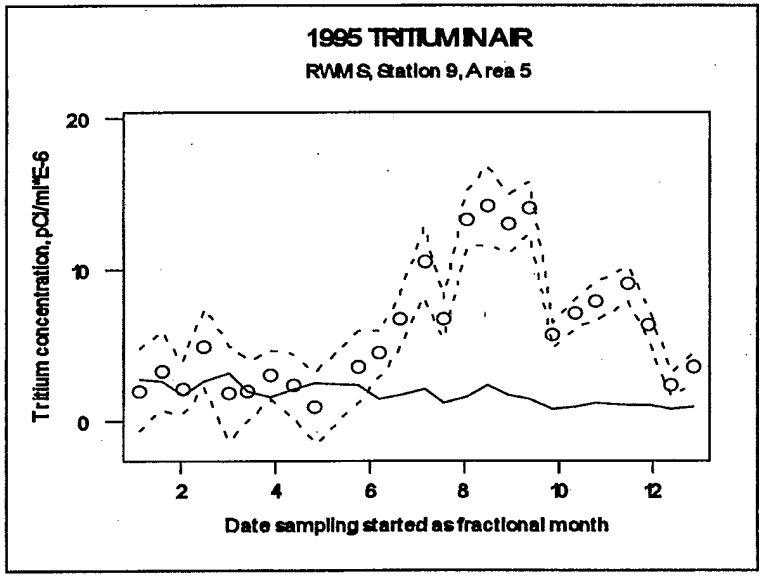


Figure 3.12 Time Series Plot for RWMS No. 9

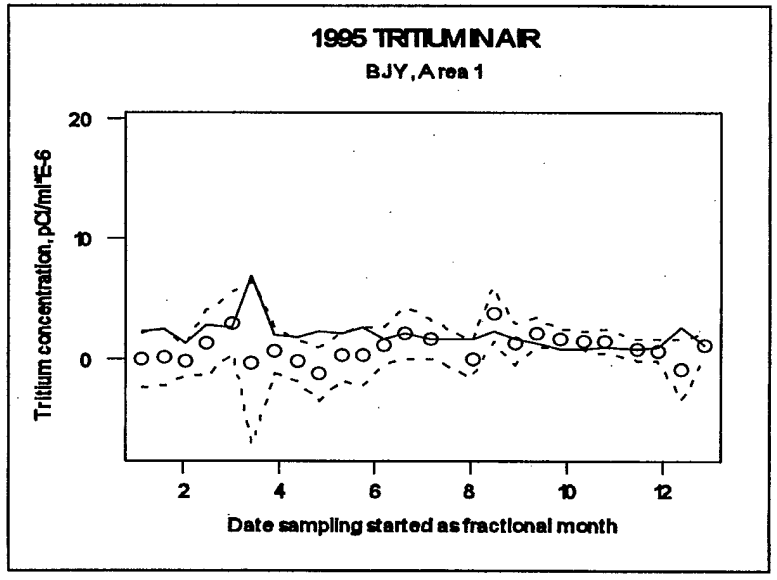


Figure 3.13 Time Series Plot for BJY

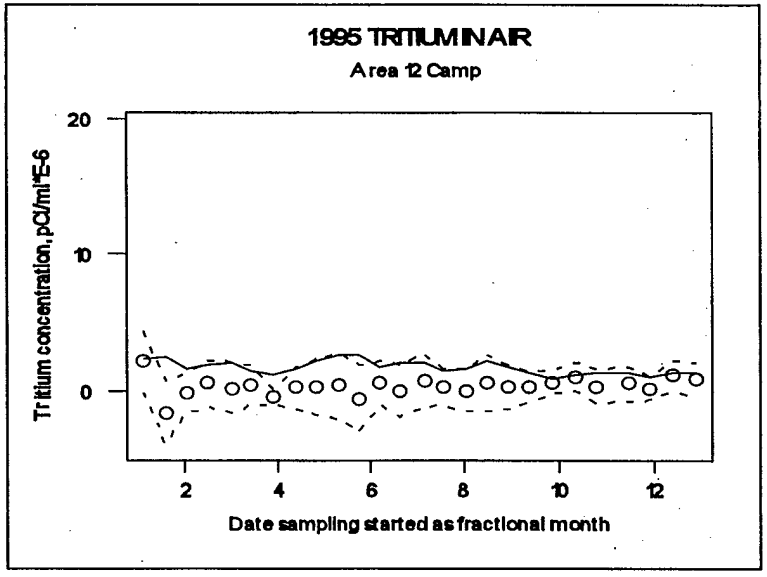


Figure 3.14 Time Series Plot of Area 12 Camp

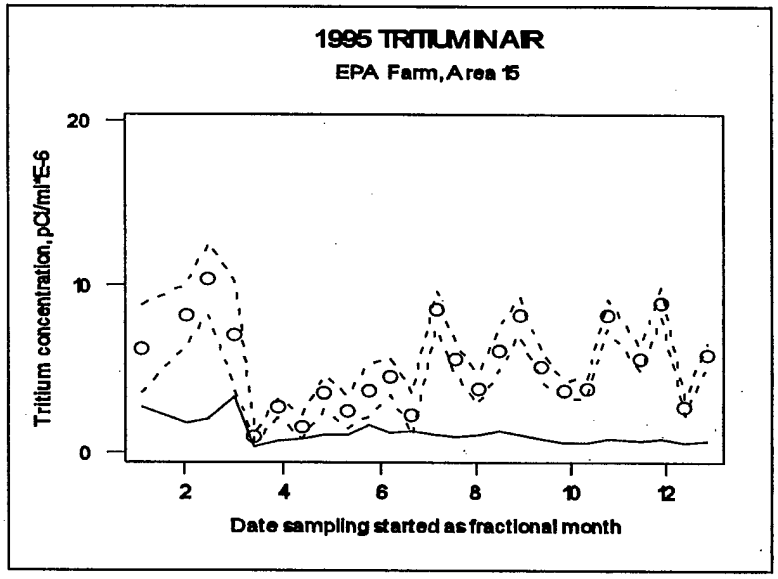


Figure 3.15 Time Series Plot for EPA Farm

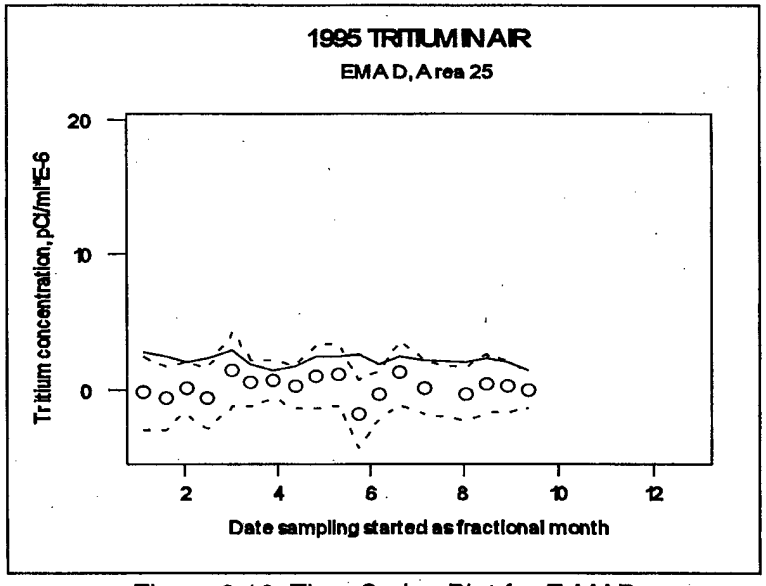


Figure 3.16 Time Series Plot for E-MAD

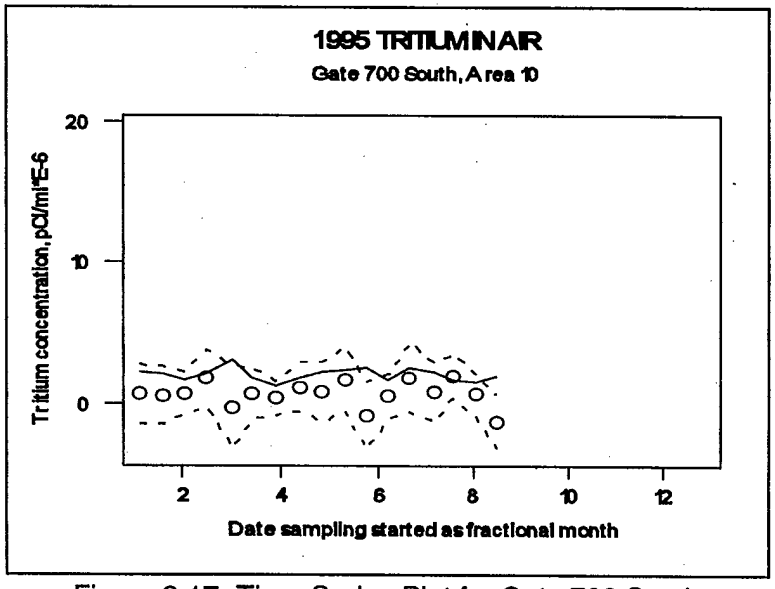


Figure 3.17 Time Series Plot for Gate 700 South

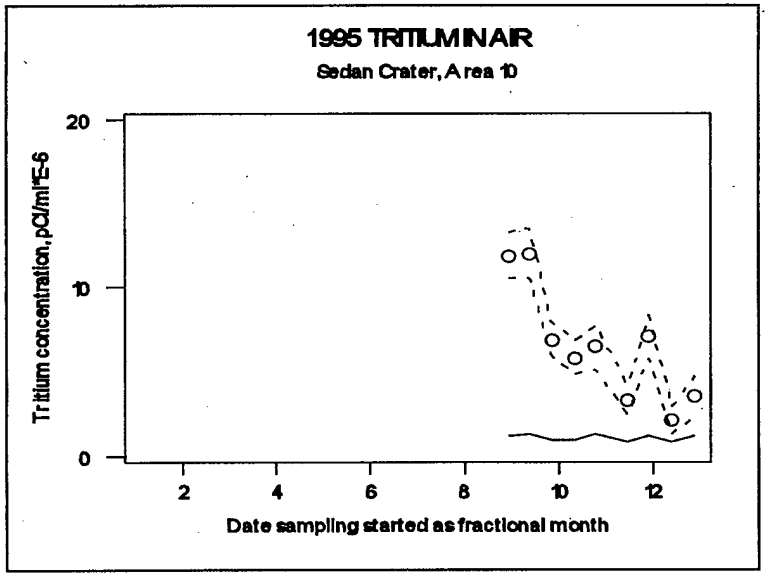


Figure 3.18 Time Series Plot for SEDAN Crater

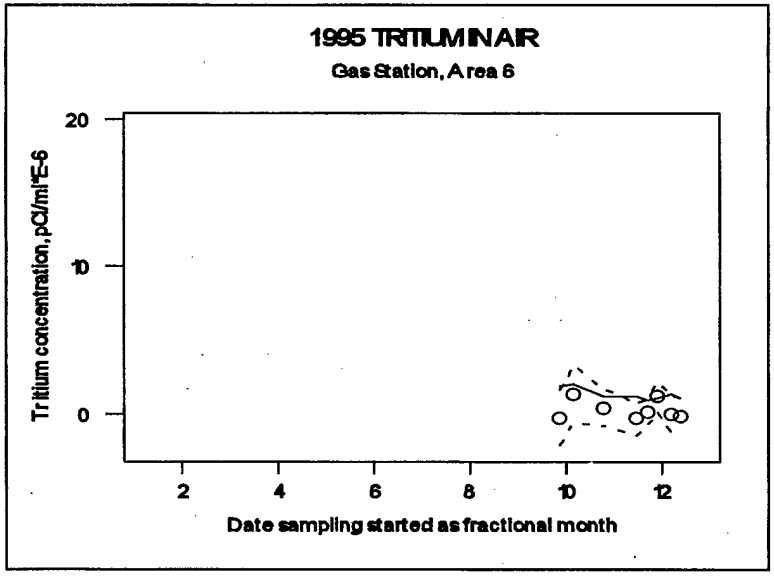


Figure 3.19 Time Series Plot for Gas Station

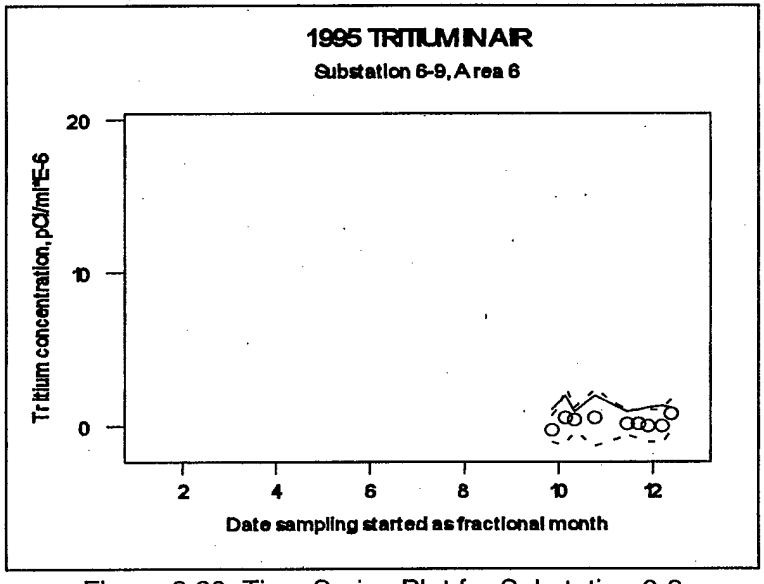


Figure 3.20 Time Series Plot for Substation 6-9

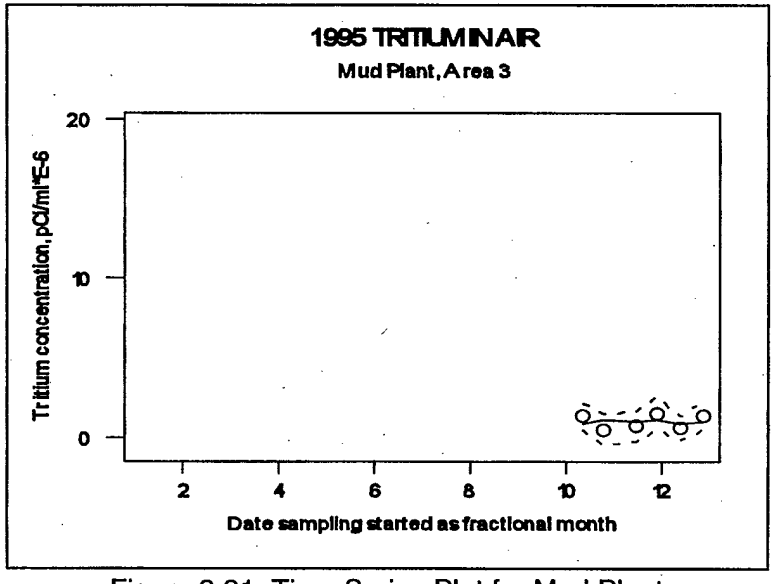


Figure 3.21 Time Series Plot for Mud Plant

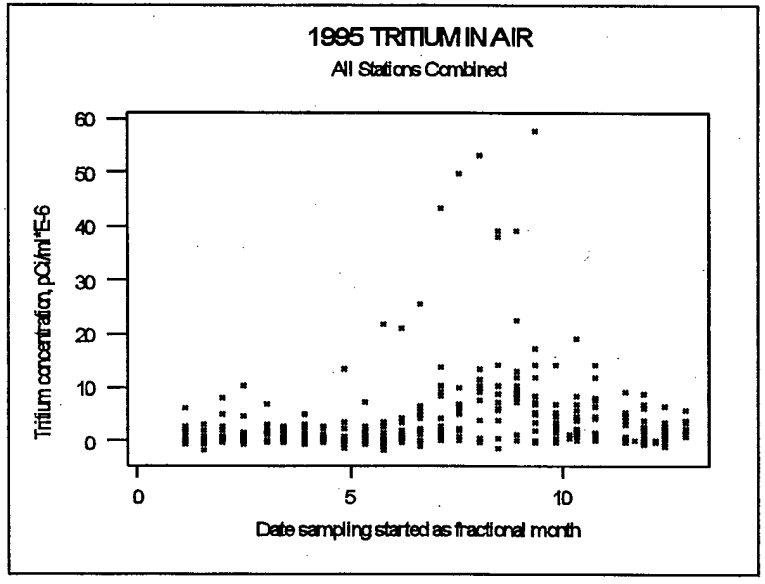


Figure 3.22 Time Series Plot for All Data Combined

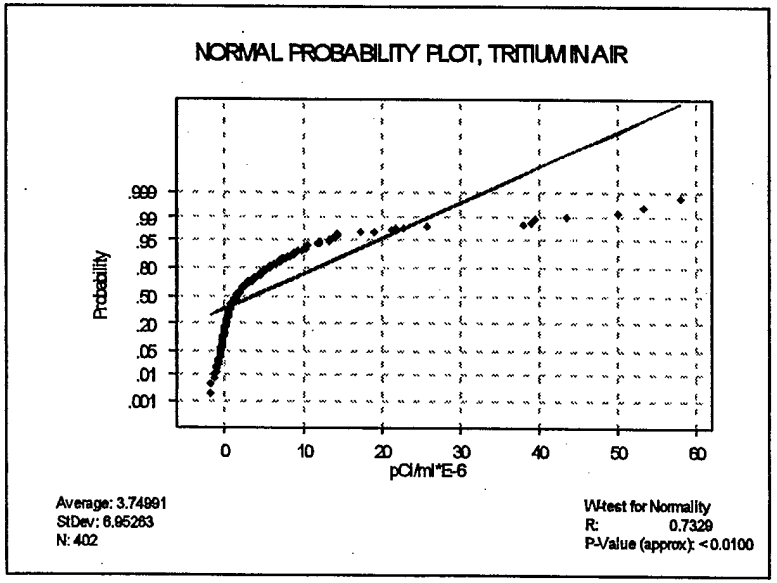


Figure 3.23 Probability Plot of All Tritium Data

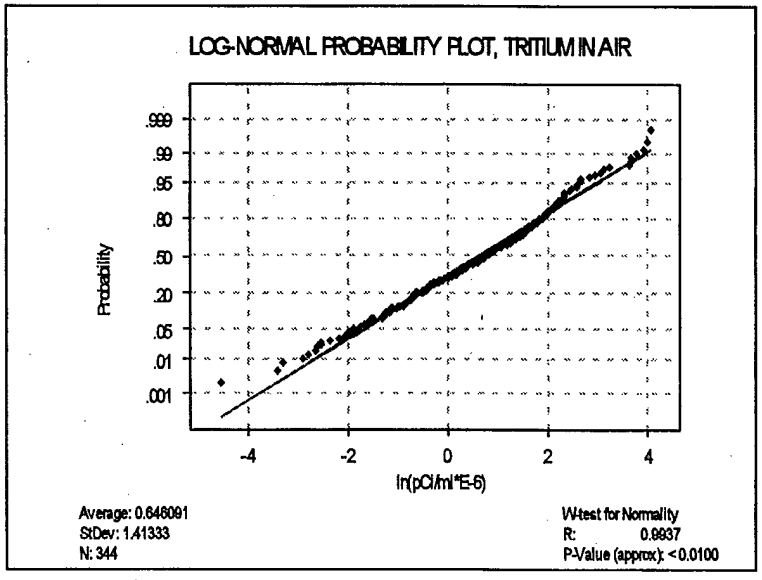


Figure 3.24 Log-Normal Probability Plot

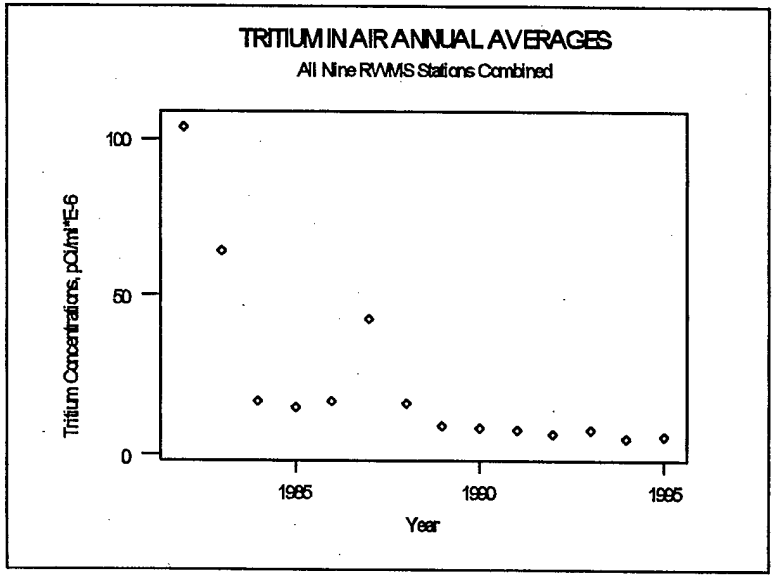


Figure 3.25 RWMS Annual Averages

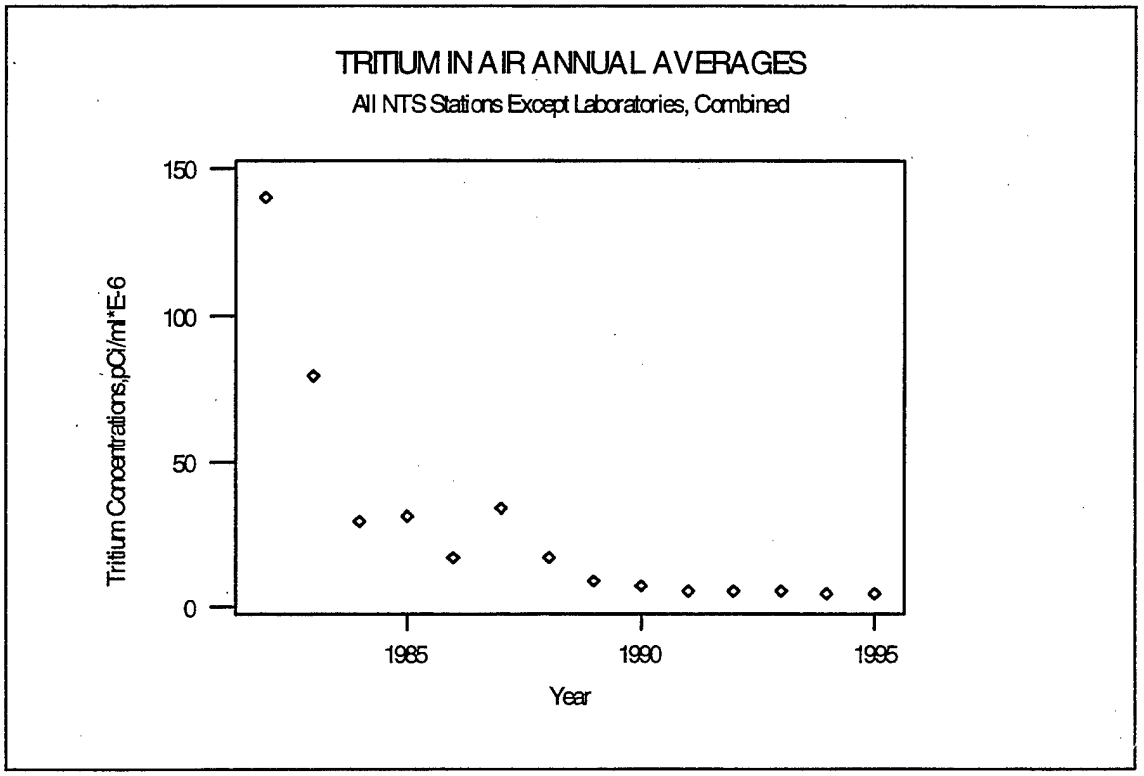


Figure 3.26 NTS Annual Averages, Laboratories Excluded

Attachment 3.1 Tritiated Water Vapor in Air Sampling Results - 1995

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 1, BJY	01/04/95	-0.109	1.112
Area 1, BJY	01/19/95	0.092	1.170
Area 1, BJY	02/01/95	-0.163	0.620
Area 1, BJY	02/16/95	1.310	1.375
Area 1, BJY	03/01/95	3.010	1.279
Area 1, BJY	03/14/95	-0.350	3.395
Area 1, BJY	03/29/95	0.676	0.963
Area 1, BJY	04/12/95	-0.148	0.829
Area 1, BJY	04/27/95	-1.280	1.101
Area 1, BJY	05/10/95	0.206	0.994
Area 1, BJY	05/24/95	0.211	1.245
Area 1, BJY	06/07/95	1.050	0.782
Area 1, BJY	06/21/95	2.140	1.091
Area 1, BJY	07/05/95	1.640	0.809
Area 1, BJY	07/14/95	Unit on loan	
Area 1, BJY	08/01/95	-0.055	0.752
Area 1, BJY	08/15/95	3.740	1.152
Area 1, BJY	08/29/95	1.200	0.834
Area 1, BJY	09/12/95	2.180	0.611
Area 1, BJY	09/27/95	1.660	0.401
Area 1, BJY	10/11/95	1.470	0.383
Area 1, BJY	10/25/95	1.470	0.509
Area 1, BJY	11/15/95	0.710	0.426
Area 1, BJY	11/29/95	0.663	0.457
Area 1, BJY	12/13/95	-0.898	1.253
Area 1, BJY	12/28/95	1.110	0.525
Area 3, Mud Plant	10/11/95	1.270	0.409
Area 3, Mud Plant	10/25/95	0.428	0.492
Area 3, Mud Plant	11/15/95	0.602	0.470
Area 3, Mud Plant	11/29/95	1.440	0.501
Area 3, Mud Plant	12/13/95	0.487	0.377
Area 3, Mud Plant	12/28/95	1.340	0.469
Area 5, RWMS No. 1	01/04/95	2.650	2.677
Area 5, RWMS No. 1	01/19/95	-0.283	1.194
Area 5, RWMS No. 1	02/01/95	1.920	1.027
Area 5, RWMS No. 1	02/16/95	1.390	1.119
Area 5, RWMS No. 1	03/01/95	1.510	1.321
Area 5, RWMS No. 1	03/14/95	0.502	0.934
Area 5, RWMS No. 1	03/29/95	0.501	0.741
Area 5, RWMS No. 1	04/12/95	0.282	0.925
Area 5, RWMS No. 1	04/27/95	0.078	0.246
Area 5, RWMS No. 1	05/10/95	2.600	0.952

Attachment 3.1 (Tritiated Water Vapor in Air Sampling Results - 1995, cont.)

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 5, RWMS No. 1	05/24/95	3.660	1.268
Area 5, RWMS No. 1	06/07/95	1.150	0.891
Area 5, RWMS No. 1	06/21/95	6.290	1.239
Area 5, RWMS No. 1	07/05/95	0.280	1.638
Area 5, RWMS No. 1	07/18/95	5.010	0.787
Area 5, RWMS No. 1	08/01/95	7.750	0.977
Area 5, RWMS No. 1	08/15/95	7.440	1.228
Area 5, RWMS No. 1	08/29/95	7.310	0.932
Area 5, RWMS No. 1	09/12/95	5.150	0.669
Area 5, RWMS No. 1	09/21/95	Temporarily shut down	
Area 5, RWMS No. 1	10/11/95	Temporarily shut down	
Area 5, RWMS No. 1	10/25/95	11.900	1.547
Area 5, RWMS No. 1	11/15/95	3.970	0.601
Area 5, RWMS No. 1	11/29/95	2.950	0.591
Area 5, RWMS No. 1	12/13/95	1.340	0.484
Area 5, RWMS No. 1	12/28/95	2.360	0.537
Area 5, RWMS No. 2	01/04/95	0.468	0.716
Area 5, RWMS No. 2	01/19/95	0.903	0.777
Area 5, RWMS No. 2	02/01/95	1.070	0.615
Area 5, RWMS No. 2	02/16/95	0.214	0.725
Area 5, RWMS No. 2	03/01/95	1.250	0.913
Area 5, RWMS No. 2	03/14/95	0.991	0.570
Area 5, RWMS No. 2	03/29/95	4.870	0.543
Area 5, RWMS No. 2	04/12/95	0.516	0.601
Area 5, RWMS No. 2	04/27/95	-0.704	0.732
Area 5, RWMS No. 2	05/10/95	2.540	0.721
Area 5, RWMS No. 2	05/24/95	1.760	0.873
Area 5, RWMS No. 2	06/07/95	0.831	0.369
Area 5, RWMS No. 2	06/21/95	4.220	0.800
Area 5, RWMS No. 2	07/05/95	4.160	0.745
Area 5, RWMS No. 2	07/18/95	5.140	0.571
Area 5, RWMS No. 2	08/01/95	9.110	0.765
Area 5, RWMS No. 2	08/15/95	10.300	1.215
Area 5, RWMS No. 2	08/29/95	8.380	1.098
Area 5, RWMS No. 2	09/12/95	5.020	0.695
Area 5, RWMS No. 2	09/28/95	2.800	0.454
Area 5, RWMS No. 2	10/11/95	2.200	0.483
Area 5, RWMS No. 2		Sampling discontinued 10/25/95	
Area 5, RWMS No. 3	01/04/95	Pump failure	
Area 5, RWMS No. 3	01/19/95	-0.465	1.358
Area 5, RWMS No. 3	02/01/95	2.070	1.242
Area 5, RWMS No. 3	02/16/95	-0.219	1.106

Attachment 3.1 (Tritiated Water Vapor in Air Sampling Results - 1995, cont.)

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 5, RWMS No. 3	03/01/95	2.150	1.462
Area 5, RWMS No. 3	03/14/95	2.760	2.139
Area 5, RWMS No. 3	03/29/95	1.840	0.732
Area 5, RWMS No. 3	04/12/95	1.450	0.870
Area 5, RWMS No. 3	04/27/95	2.280	1.045
Area 5, RWMS No. 3	05/10/95	Pump failure	
Area 5, RWMS No. 3	05/24/95	0.987	1.209
Area 5, RWMS No. 3	06/07/95	3.400	0.884
Area 5, RWMS No. 3	06/21/95	6.070	1.150
Area 5, RWMS No. 3	07/05/95	13.700	1.130
Area 5, RWMS No. 3	07/18/95	10.100	0.869
Area 5, RWMS No. 3	08/01/95	11.600	1.050
Area 5, RWMS No. 3	08/15/95	5.950	1.345
Area 5, RWMS No. 3	08/29/95	9.060	1.074
Area 5, RWMS No. 3	09/12/95	6.800	0.707
Area 5, RWMS No. 3	09/28/95	3.400	0.471
Area 5, RWMS No. 3	10/11/95	2.540	0.493
Area 5, RWMS No. 3	10/25/95	4.420	0.683
Area 5, RWMS No. 3	11/15/95	3.260	0.588
Area 5, RWMS No. 3	11/29/95	2.070	0.622
Area 5, RWMS No. 3	12/13/95	1.190	0.468
Area 5, RWMS No. 3	12/28/95	1.920	0.545
Area 5, RWMS No. 4	01/04/95	2.490	1.407
Area 5, RWMS No. 4	01/19/95	0.320	1.358
Area 5, RWMS No. 4	02/01/95	5.050	1.068
Area 5, RWMS No. 4	02/16/95	4.560	1.240
Area 5, RWMS No. 4	03/01/95	7.100	1.576
Area 5, RWMS No. 4	03/14/95	2.410	0.993
Area 5, RWMS No. 4	03/29/95	5.010	0.839
Area 5, RWMS No. 4	04/12/95	2.920	0.975
Area 5, RWMS No. 4	04/27/95	3.200	1.393
Area 5, RWMS No. 4	05/10/95	7.500	1.204
Area 5, RWMS No. 4	05/24/95	1.700	1.617
Area 5, RWMS No. 4	06/07/95	1.100	1.118
Area 5, RWMS No. 4	06/21/95	5.700	1.465
Area 5, RWMS No. 4	07/05/95	3.400	1.528
Area 5, RWMS No. 4	07/18/95	9.800	1.838
Area 5, RWMS No. 4	08/01/95	3.100	1.596
Area 5, RWMS No. 4	08/15/95	9.300	1.544
Area 5, RWMS No. 4	08/29/95	9.000	2.106
Area 5, RWMS No. 4	09/12/95	7.300	0.917
Area 5, RWMS No. 4	09/28/95	4.550	0.564

Attachment 3.1 (Tritiated Water Vapor in Air Sampling Results - 1995, cont.)

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 5, RWMS No. 4	10/11/95	8.600	0.615
Area 5, RWMS No. 4	10/25/95	4.580	0.776
Area 5, RWMS No. 4	11/15/95	4.920	0.686
Area 5, RWMS No. 4	11/29/95	4.070	0.714
Area 5, RWMS No. 4	12/13/95	2.920	0.553
Area 5, RWMS No. 4	12/28/95	2.020	0.618
Area 5, RWMS No. 5	01/04/95	-0.150	1.230
Area 5, RWMS No. 5	01/19/95	2.120	1.177
Area 5, RWMS No. 5	02/01/95	1.890	0.834
Area 5, RWMS No. 5	02/16/95	0.743	0.743
Area 5, RWMS No. 5	03/01/95	1.190	0.994
Area 5, RWMS No. 5	03/14/95	0.286	0.588
Area 5, RWMS No. 5	03/29/95	1.060	0.541
Area 5, RWMS No. 5	04/12/95	0.735	0.636
Area 5, RWMS No. 5	04/27/95	2.570	0.965
Area 5, RWMS No. 5	05/10/95	0.725	0.765
Area 5, RWMS No. 5	05/24/95	0.691	0.957
Area 5, RWMS No. 5	06/07/95	1.880	0.608
Area 5, RWMS No. 5	06/21/95	5.380	0.979
Area 5, RWMS No. 5	07/05/95	2.870	0.817
Area 5, RWMS No. 5	07/18/95	2.570	0.600
Area 5, RWMS No. 5	08/01/95	10.500	0.845
Area 5, RWMS No. 5	08/15/95	7.340	1.237
Area 5, RWMS No. 5	08/29/95	8.710	0.862
Area 5, RWMS No. 5	09/12/95	7.330	0.583
Area 5, RWMS No. 5	09/28/95	2.510	0.360
Area 5, RWMS No. 5		Unit on loan 10/11/95 to year end	
Area 5, RWMS No. 6	01/04/95	0.268	1.222
Area 5, RWMS No. 6	01/19/95	-0.063	1.200
Area 5, RWMS No. 6	02/01/95	0.509	1.087
Area 5, RWMS No. 6	02/16/95	0.835	1.219
Area 5, RWMS No. 6	03/01/95	0.054	2.043
Area 5, RWMS No. 6	03/14/95	0.481	0.988
Area 5, RWMS No. 6	03/29/95	1.230	0.824
Area 5, RWMS No. 6	04/12/95	0.200	0.982
Area 5, RWMS No. 6	04/27/95	0.493	1.356
Area 5, RWMS No. 6	05/10/95	-0.425	1.162
Area 5, RWMS No. 6	05/24/95	0.870	1.444
Area 5, RWMS No. 6	06/07/95	0.071	0.917
Area 5, RWMS No. 6	06/21/95	4.940	1.299
Area 5, RWMS No. 6	07/05/95	9.270	1.228
Area 5, RWMS No. 6	07/18/95	6.220	0.970

Attachment 3.1 (Tritiated Water Vapor in Air Sampling Results - 1995, cont.)

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 5, RWMS No. 6	08/01/95	10.100	0.889
Area 5, RWMS No. 6	08/15/95	38.000	1.634
Area 5, RWMS No. 6	08/29/95	22.600	1.198
Area 5, RWMS No. 6	09/12/95	57.900	2.125
Area 5, RWMS No. 6	09/28/95	14.000	0.565
Area 5, RWMS No. 6	10/11/95	18.900	0.703
Area 5, RWMS No. 6	10/25/95	14.100	0.895
Area 5, RWMS No. 6	11/15/95	9.300	0.818
Area 5, RWMS No. 6	11/29/95	6.030	0.754
Area 5, RWMS No. 6	12/13/95	3.490	0.588
Area 5, RWMS No. 6	12/28/95	4.080	0.659
Area 5, RWMS No. 7	01/04/95	0.813	1.159
Area 5, RWMS No. 7	01/19/95	1.880	1.062
Area 5, RWMS No. 7	02/01/95	0.898	0.867
Area 5, RWMS No. 7	02/16/95	1.440	1.008
Area 5, RWMS No. 7	03/01/95	-0.406	1.177
Area 5, RWMS No. 7	03/14/95	-0.164	0.792
Area 5, RWMS No. 7	03/29/95	1.860	0.646
Area 5, RWMS No. 7	04/12/95	-0.323	0.787
Area 5, RWMS No. 7	04/27/95	0.999	1.014
Area 5, RWMS No. 7	05/10/95	0.287	0.854
Area 5, RWMS No. 7	05/24/95	2.770	1.079
Area 5, RWMS No. 7	06/07/95	1.220	0.447
Area 5, RWMS No. 7	06/21/95	4.890	0.939
Area 5, RWMS No. 7	07/05/95	4.390	0.854
Area 5, RWMS No. 7	07/18/95	7.130	0.834
Area 5, RWMS No. 7	08/01/95	9.890	0.836
Area 5, RWMS No. 7	08/15/95	8.780	1.141
Area 5, RWMS No. 7	08/29/95	10.200	0.898
Area 5, RWMS No. 7	09/12/95	5.350	0.423
Area 5, RWMS No. 7	09/28/95	4.670	0.374
Area 5, RWMS No. 7	10/11/95	4.730	0.449
Area 5, RWMS No. 7	10/25/95	4.500	0.576
Area 5, RWMS No. 7	11/15/95	4.780	0.504
Area 5, RWMS No. 7	11/29/95	2.500	0.354
Area 5, RWMS No. 7	12/13/95	1.850	0.408
Area 5, RWMS No. 7	12/28/95	3.540	0.485
Area 5, RWMS No. 8	01/04/95	-0.565	1.209
Area 5, RWMS No. 8	01/19/95	0.657	1.202
Area 5, RWMS No. 8	02/01/95	2.840	1.089
Area 5, RWMS No. 8	02/16/95	1.520	1.163
Area 5, RWMS No. 8	03/01/95	1.370	1.459

Attachment 3.1 (Tritiated Water Vapor in Air Sampling Results - 1995, cont.)

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 5, RWMS No. 8	03/14/95	1.420	0.966
Area 5, RWMS No. 8	03/29/95	0.941	0.743
Area 5, RWMS No. 8	04/12/95	-0.118	0.926
Area 5, RWMS No. 8	04/27/95	2.390	1.207
Area 5, RWMS No. 8	05/10/95	1.360	1.108
Area 5, RWMS No. 8	05/24/95	0.419	1.332
Area 5, RWMS No. 8	06/07/95	0.381	0.533
Area 5, RWMS No. 8	06/21/95	5.260	1.183
Area 5, RWMS No. 8	07/05/95	2.020	1.060
Area 5, RWMS No. 8	07/18/95	6.390	0.875
Area 5, RWMS No. 8	08/01/95	10.400	1.097
Area 5, RWMS No. 8	08/15/95	10.400	1.456
Area 5, RWMS No. 8	08/29/95	9.720	1.171
Area 5, RWMS No. 8	09/12/95	8.380	0.851
Area 5, RWMS No. 8	09/28/95	2.900	0.502
Area 5, RWMS No. 8	10/11/95	4.190	0.557
Area 5, RWMS No. 8	10/25/95	4.660	0.750
Area 5, RWMS No. 8	11/15/95	5.030	0.654
Area 5, RWMS No. 8	11/29/95	2.230	0.651
Area 5, RWMS No. 8	12/13/95	1.410	0.501
Area 5, RWMS No. 8	12/28/95	2.350	0.585
Area 5, RWMS No. 9	01/04/95	1.970	1.349
Area 5, RWMS No. 9	01/19/95	3.300	1.313
Area 5, RWMS No. 9	02/01/95	2.130	0.866
Area 5, RWMS No. 9	02/16/95	4.820	1.311
Area 5, RWMS No. 9	03/01/95	1.790	1.566
Area 5, RWMS No. 9	03/14/95	2.000	0.982
Area 5, RWMS No. 9	03/29/95	3.010	0.819
Area 5, RWMS No. 9	04/12/95	2.290	1.037
Area 5, RWMS No. 9	04/27/95	0.838	1.198
Area 5, RWMS No. 9	05/10/95	Pump failure	
Area 5, RWMS No. 9	05/24/95	3.530	1.168
Area 5, RWMS No. 9	06/07/95	4.420	0.743
Area 5, RWMS No. 9	06/21/95	6.670	0.930
Area 5, RWMS No. 9	07/05/95	10.500	1.171
Area 5, RWMS No. 9	07/18/95	6.730	0.673
Area 5, RWMS No. 9	08/01/95	13.300	0.938
Area 5, RWMS No. 9	08/15/95	14.300	1.301
Area 5, RWMS No. 9	08/29/95	13.100	0.989
Area 5, RWMS No. 9	09/12/95	14.100	0.860
Area 5, RWMS No. 9	09/28/95	5.610	0.432
Area 5, RWMS No. 9	10/11/95	7.100	0.493

Attachment 3.1 (Tritiated Water Vapor in Air Sampling Results - 1995, cont.)

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 5, RWMS No. 9	10/25/95	7.860	0.641
Area 5, RWMS No. 9	11/15/95	9.090	0.586
Area 5, RWMS No. 9	11/29/95	6.320	0.556
Area 5, RWMS No. 9	12/13/95	2.370	0.410
Area 5, RWMS No. 9	12/28/95	3.520	0.466
Area 6, Gas Station	09/28/95	-0.245	0.944
Area 6, Gas Station	10/05/95	1.340	0.978
Area 6, Gas Station	10/25/95	0.441	0.615
Area 6, Gas Station	11/15/95	-0.349	0.558
Area 6, Gas Station	11/22/95	0.061	0.471
Area 6, Gas Station	11/29/95	1.180	0.519
Area 6, Gas Station	12/06/95	0.033	0.625
Area 6, Gas Station	12/13/95	-0.114	0.548
Area 6, Gas Station		Sampling discontinued 12/20/95	
Area 6, Substation 6-9	09/28/95	-0.343	0.424
Area 6, Substation 6-9	10/05/95	0.457	0.889
Area 6, Substation 6-9	10/11/95	0.273	0.410
Area 6, Substation 6-9	10/25/95	0.417	0.901
Area 6, Substation 6-9	11/15/95	0.011	0.414
Area 6, Substation 6-9	11/22/95	0.037	0.470
Area 6, Substation 6-9	11/29/95	-0.130	0.492
Area 6, Substation 6-9	12/06/95	-0.119	0.563
Area 6, Substation 6-9	12/13/95	0.599	0.533
Area 6, Substation 6-9		Sampling discontinued 12/20/95	
Area 10, Gate 700 South	01/04/95	0.593	1.061
Area 10, Gate 700 South	01/19/95	0.510	1.030
Area 10, Gate 700 South	02/01/95	0.642	0.799
Area 10, Gate 700 South	02/16/95	1.710	1.009
Area 10, Gate 700 South	03/01/95	-0.350	1.468
Area 10, Gate 700 South	03/14/95	0.663	0.895
Area 10, Gate 700 South	03/29/95	0.303	0.612
Area 10, Gate 700 South	04/12/95	1.110	0.866
Area 10, Gate 700 South	04/27/95	0.792	1.093
Area 10, Gate 700 South	05/10/95	1.650	1.138
Area 10, Gate 700 South	05/24/95	-0.917	1.206
Area 10, Gate 700 South	06/07/95	0.479	0.814
Area 10, Gate 700 South	06/21/95	1.820	1.247
Area 10, Gate 700 South	07/05/95	0.747	1.064
Area 10, Gate 700 South	07/18/95	1.900	0.805
Area 10, Gate 700 South	08/01/95	0.642	0.735
Area 10, Gate 700 South	08/15/95	-1.340	0.945
Area 10, Gate 700 South		Sampling discontinued 08/29/95	

Attachment 3.1 (Tritiated Water Vapor in Air Sampling Results - 1995, cont.)

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 10, SEDAN Crater	08/29/95	1.900	0.708
Area 10, SEDAN Crater	09/12/95	2.000	0.744
Area 10, SEDAN Crater	09/27/95	6.880	0.516
Area 10, SEDAN Crater	10/11/95	5.780	0.503
Area 10, SEDAN Crater	10/25/95	6.430	0.666
Area 10, SEDAN Crater	11/15/95	3.310	0.439
Area 10, SEDAN Crater	11/29/95	7.040	0.648
Area 10, SEDAN Crater	12/13/95	2.040	0.413
Area 10, SEDAN Crater	12/28/95	3.550	0.588
Area 12, Camp	01/04/95	2.050	1.117
Area 12, Camp	01/19/95	-1.700	1.156
Area 12, Camp	02/01/95	-0.288	0.729
Area 12, Camp	02/16/95	0.446	0.867
Area 12, Camp	03/01/95	0.123	0.935
Area 12, Camp	03/14/95	0.324	0.701
Area 12, Camp	03/29/95	-0.525	0.284
Area 12, Camp	04/12/95	0.132	0.739
Area 12, Camp	04/27/95	0.174	1.027
Area 12, Camp	05/10/95	0.317	1.225
Area 12, Camp	05/24/95	-0.633	1.234
Area 12, Camp	06/07/95	0.469	0.797
Area 12, Camp	06/21/95	-0.070	0.954
Area 12, Camp	07/05/95	0.675	0.996
Area 12, Camp	07/18/95	0.216	0.679
Area 12, Camp	08/01/95	-0.038	0.775
Area 12, Camp	08/15/95	0.513	1.054
Area 12, Camp	08/29/95	0.145	0.805
Area 12, Camp	09/12/95	0.173	0.592
Area 12, Camp	09/27/95	0.501	0.421
Area 12, Camp	10/11/95	0.924	0.531
Area 12, Camp	10/25/95	0.266	0.608
Area 12, Camp	11/15/95	0.429	0.637
Area 12, Camp	11/29/95	0.123	0.433
Area 12, Camp	12/13/95	1.010	0.576
Area 12, Camp	12/28/95	0.750	0.619
Area 12, E Tunnel Pond No. 1	12/13/95	6.620	0.649
Area 12, E Tunnel Pond No. 1	12/28/95	5.640	0.651
Area 15, EPA Farm	01/04/95	6.170	1.342
Area 15, EPA Farm	01/19/95	Pump failure	
Area 15, EPA Farm	02/01/95	8.190	0.905
Area 15, EPA Farm	02/16/95	10.400	1.087
Area 15, EPA Farm	03/01/95	6.970	1.669

Attachment 3.1 (Tritiated Water Vapor in Air Sampling Results - 1995, cont.)

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 15, EPA Farm	03/14/95	0.788	0.144
Area 15, EPA Farm	03/29/95	2.590	0.297
Area 15, EPA Farm	04/12/95	1.420	0.359
Area 15, EPA Farm	04/27/95	3.540	0.517
Area 15, EPA Farm	05/10/95	2.350	0.493
Area 15, EPA Farm	05/24/95	3.670	0.795
Area 15, EPA Farm	06/07/95	4.440	0.562
Area 15, EPA Farm	06/21/95	2.210	0.625
Area 15, EPA Farm	07/05/95	8.530	0.584
Area 15, EPA Farm	07/18/95	5.520	0.444
Area 15, EPA Farm	08/01/95	3.760	0.481
Area 15, EPA Farm	08/15/95	6.080	0.654
Area 15, EPA Farm	08/29/95	8.160	0.571
Area 15, EPA Farm	09/12/95	5.070	0.431
Area 15, EPA Farm	09/27/95	3.650	0.281
Area 15, EPA Farm	10/11/95	3.790	0.288
Area 15, EPA Farm	10/25/95	8.260	0.442
Area 15, EPA Farm	11/15/95	5.570	0.373
Area 15, EPA Farm	11/29/95	8.970	0.437
Area 15, EPA Farm	12/13/95	2.620	0.252
Area 15, EPA Farm	12/28/95	5.740	0.362
Area 23, Building 790 No. 2	01/04/95	1.480	1.066
Area 23, Building 790 No. 2	01/19/95	-0.248	1.178
Area 23, Building 790 No. 2	02/01/95	Pump failure	
Area 23, Building 790 No. 2	02/16/95	0.446	0.408
Area 23, Building 790 No. 2	03/01/95	2.600	1.193
Area 23, Building 790 No. 2	03/14/95	Pump failure	
Area 23, Building 790 No. 2	03/29/95	0.455	0.701
Area 23, Building 790 No. 2	04/12/95	0.513	0.700
Area 23, Building 790 No. 2	04/27/95	-0.287	1.069
Area 23, Building 790 No. 2	05/10/95	-0.668	0.982
Area 23, Building 790 No. 2	05/24/95	-0.390	1.143
Area 23, Building 790 No. 2	06/07/95	-0.159	0.770
Area 23, Building 790 No. 2	06/21/95	-0.904	1.012
Area 23, Building 790 No. 2	07/05/95	0.369	0.839
Area 23, Building 790 No. 2	07/18/95	0.738	0.893
Area 23, Building 790 No. 2	08/01/95	0.225	1.025
Area 23, Building 790 No. 2	08/15/95	0.552	1.510
Area 23, Building 790 No. 2		Sampling discontinued 08/29/95	
Area 23, H&S Building	01/04/95	0.169	0.534
Area 23, H&S Building	01/19/95	-0.565	0.506
Area 23, H&S Building	02/01/95	-0.042	0.405

Attachment 3.1 (Tritiated Water Vapor in Air Sampling Results - 1995, cont.)

Sampling Location	Start of Sampling Period	pCi/mL x 10^{-06} Concentration	Standard Deviation (s)
Area 23, H&S Building	02/16/95	0.322	0.488
Area 23, H&S Building	03/01/95	-0.242	0.652
Area 23, H&S Building	03/14/95	-0.401	0.405
Area 23, H&S Building	03/29/95	-0.353	0.309
Area 23, H&S Building	04/12/95	-0.048	0.381
Area 23, H&S Building	04/27/95	-0.130	0.592
Area 23, H&S Building	05/10/95	-0.400	0.544
Area 23, H&S Building	05/24/95	-0.402	0.657
Area 23, H&S Building	06/07/95	0.666	0.480
Area 23, H&S Building	06/21/95	0.306	0.696
Area 23, H&S Building	07/05/95	0.597	1.006
Area 23, H&S Building	07/14/95	Unit on loan	
Area 23, H&S Building	08/01/95	0.632	1.084
Area 23, H&S Building	08/15/95	0.528	1.206
Area 23, H&S Building	08/29/95	0.183	0.647
Area 23, H&S Building	09/12/95	3.370	4.347
Area 23, H&S Building	09/27/95	0.643	0.511
Area 23, H&S Building	10/11/95	0.114	0.735
Area 23, H&S Building	10/25/95	1.150	0.707
Area 23, H&S Building	11/15/95	-0.019	0.728
Area 23, H&S Building	11/29/95	-0.671	0.731
Area 23, H&S Building	12/13/95	1.450	0.716
Area 23, H&S Building	12/28/95	Pump failure	
Area 25, E-MAD	01/04/95	-0.332	1.355
Area 25, E-MAD	01/19/95	-0.719	1.183
Area 25, E-MAD	02/01/95	0.074	0.942
Area 25, E-MAD	02/16/95	-0.736	1.137
Area 25, E-MAD	03/01/95	1.440	1.382
Area 25, E-MAD	03/14/95	0.412	0.892
Area 25, E-MAD	03/29/95	0.663	0.693
Area 25, E-MAD	04/12/95	0.147	0.823
Area 25, E-MAD	04/27/95	0.917	1.188
Area 25, E-MAD	05/10/95	1.070	1.156
Area 25, E-MAD	05/24/95	-1.870	1.262
Area 25, E-MAD	06/07/95	-0.399	0.908
Area 25, E-MAD	06/21/95	1.190	1.196
Area 25, E-MAD	07/05/95	0.078	1.004
Area 25, E-MAD	07/14/95	Unit on loan	
Area 25, E-MAD	08/01/95	-0.402	0.961
Area 25, E-MAD	08/15/95	0.348	1.098
Area 25, E-MAD	08/29/95	0.149	0.961
Area 25, E-MAD	09/12/95	-0.104	0.660
Area 25, E-MAD		Sampling discontinued 08/29/95	

4.0 ONSITE THERMOLUMINESCENT DOSIMETER DATA

Thermoluminescent dosimeters (TLDs) were placed at 181 environmental monitoring stations at the Nevada Test Site (NTS) during 1995. The dosimeters were exchanged quarterly and processed at the Reynolds Electrical & Engineering Co., Inc., Radiological Laboratory in Mercury, Nevada. Attachments 4.1 and 4.2 show the individual and control data, respectively. Tables, figures, and attachments are found at the end of this chapter in that order. "Area" refers to the NTS operational area within which the sampling point is located, and "location" identifies the sampling station within each area. An alphabetic notation in this table denotes a missing data value; the reason is indexed by the abbreviation and is given at the bottom of the attachment.

A number of changes were made to the TLD network between 1994 and 1995. The two locations at the Radioactive Waste Management Site (RWMS) Pit 4, west and east sides, were moved to Pit 5 because Pit 4 was closed. The boundary stations which could only be reached by helicopter were eliminated and nearby locations that could be reached by truck were substituted. Boundary station 355 was renamed to Gold Meadows and remains in use since it can be reached by truck. Table 4.1 gives the boundary station changes to the network. Typically the new boundary locations are two to three miles closer to the center of the NTS than the previous locations that were reached by helicopter. The largest move was the replacement of station 347 by station 401, a move of 5.5 miles closer to the boundary. There were fewer TLD stations in 1995 than there were in 1994 but there were two more control stations in 1995 than there were in 1994.

Four new stations which encircle the recently completed Device Assembly Facility (DAF) were added at the beginning of the third quarter. These are named with the DAF abbreviation and the direction of their location from the building: DAF NE, DAF E, DAF SSE, and DAF W. This facility is a potential site for decommissioning nuclear weapons and it is prudent to collect preoperational environmental data. Note in Attachment 4.1 that 17 locations were removed from the network for the last quarter of 1995. The removal was necessitated by budget reductions. The stations chosen for removal historically had shown exposures that were essentially background levels and they also were reasonably close to other station locations.

The 26 control dosimeters are located in places thought to be at background exposure levels. In annual reports prior to 1993, the boundary stations were not included in the table of control data. Boundary stations were established in late 1989 and data were first reported in the 1990 annual report. Data from previous years confirm that these locations do represent background exposure levels. Thus, starting in 1994 the boundary data have been included with the control data. The control sampling locations used in Attachment 4.2 incorporate the changes listed in Table 4.1 for 1995.

The environmental TLDs contain three identical $CaSO_4$ elements and one LiB_4O_7 element. The element readings are converted into exposure values using an algorithm supplied with commercial software. The annual total was computed as the daily average multiplied by 365.25. The days of exposure in a quarter vary for the locations because of the schedule for exchanging the TLDs. It takes the technicians several weeks to visit all the locations.

DATA ANALYSIS

The data analysis was performed in two phases. The first phase used exploratory data analysis methods to determine the distribution of the data and to identify atypical values. The second phase used analysis of variance (ANOVA) to test for significant differences between groups of data values. Exploratory data analysis primarily consisted of probability plots of the data and logarithms of the data grouped by quarter. Figure 4.1 is a typical probability plot. In some statistics, text this type of plot is called a Q-Q (or quantile-quantile) plot because the data quantile is plotted on the abscissa and the corresponding expected value of the quantile, assuming a Gaussian distribution; is plotted on the ordinate. "Goodness of fit" was tested using the Ryan-Joiner correlation coefficient goodness of fit test, which is asymptotically equivalent to the Shapiro-Wilk test. This test is performed by calculating the product moment correlation coefficient between the data values and the corresponding expected quantiles, which is a measure of the linearity of the data plotted in Figure 4.1. Tables published in the statistics literature are then used to find the probability of a good fit from the calculated correlation coefficient.

Figure 4.1 shows a good fit to a Gaussian distribution. The correlation is 0.991 with a sample size of 156. Since the probability, or p-value, is larger than 0.05, it is assumed that a reasonable fit was achieved. Since Figure 4.1 uses the actual data values, this figure shows a reasonable fit to a normal statistical distribution.

Figure 4.2 is a typical probability plot indicating two distributions of data mixed together; this plot shows two straight lines joining together at an abscissa value of about 0.5. When a probability plot showed data points that were grossly higher or lower than most, they were removed and the goodness of fit test repeated. If the remaining data fit a normal or lognormal distribution, the high data points were assigned to Table 4.2 which lists all atypical values. The plots of all data in a quarter showed a change point at about 0.6 mR/day. Thus, this value was used to define the atypical values listed in Table 4.2. After atypical values were removed, the data for all quarters fit a normal distribution and none of the quarters fit a lognormal distribution. This is the same data pattern that was seen in the 1994 data, two distributions with a change point at 0.6 mR/day. Because of these findings, it was decided to do the statistical comparisons using the ANOVA on the actual data values. In annual reports prior to 1994, the TLD data fit a lognormal distribution best, and thus the statistical analysis of the data was performed on the logarithms of the data values. It should be noted that several of the other environmental variables reported in this report also changed from a lognormal distribution in previous years to a normal distribution in 1994 and 1995.

Figure 4.3 shows that the data in Table 4.2, the "atypical" or greater than 0.6 mR/day data, have a good fit to a lognormal distribution. This suggests that the exposure values below approximately an average of 0.6 mR/day belong to a statistical population with a normal distribution and perhaps this is a natural background population. Furthermore, exposure values above approximately an annual average of 0.6 mR/day belong to a statistical population with a lognormal distribution and perhaps this is a population that shows some effects of nuclear testing. The locations in Table 4.2 are mostly identified as contaminated. Recall that all nuclear testing ceased in October of 1992. The reason for the apparent change in statistical distribution between 1993 and 1994 could be that most contamination was minimal and natural decay, without replenishment from ongoing tests, practically eliminated its influence during 1993. Then in 1994, the statistical background population became evident and can now be distinguished from the more contaminated locations listed in Table 4.2.

In this and previous data reports, it was found that the data collected in Area 5 adjacent to the Mound Strategic Material (MSM) storage site; e.g., monitoring station names designated by a MSM-1 or MSM-2, were substantially higher than the environmental monitoring stations. This was to be expected because this storage site contains a substantial inventory of radioisotopes, and thus the data from these TLDs cannot be considered as environmental data. The data from the MSM monitoring stations were not used for the evaluation of environmental exposures in 1995. Data collected adjacent to the Transuranic Storage Pad (TRU PAD) were substantially higher than that from the environmental monitoring stations. This is also expected because the pad also contains an inventory of radioisotopes and these data also were not used in the analyses of environmental levels.

One way the special case of the data from the MSM monitoring stations, TRU PAD, and data in Table 4.2 was recognized was by the segmented shape of the data probability plot. Figure 4.2 is the probability plot for annual averages of all locations data. A vertical line has been drawn in at an exposure level of approximately 0.5 mRem per day. This line divides the data into two approximately straight line segments. This shape should be compared to Figure 4.1, which shows no segmentation. It contains the same data as Figure 4.2, but with all values above 0.6 deleted. The probability plots of all the data for the individual quarters were essentially the same as the shape of Figure 4.2.

Table 4.2 lists those data values that were found to be atypical and gives the arithmetic mean of the data for the operational area with all atypical values removed. For comparison, the arithmetic mean of all sampling stations with all data from atypical and RWMS MSM sampling stations removed was 0.34 mR/day compared to 0.33 mR/day in 1994 and 0.47 mR/day in 1993. Table 4.2 does not include the high data values associated with the MSM-1 and MSM-2 areas within Area 5 for two reasons: (1) these areas are posted as high radiation areas used for temporary storage of radioactive waste from other DOE facilities, and (2) the mean of these data is about ten times higher than the mean of other NTS areas.

Table 4.2 is similar to the corresponding tables in the 1991-1994 annual reports. The Area 10 atypical values are caused by the dosimeter's being located close to the SEDAN Crater. In Area 12, the tunnel ponds are known to contain fission products. The bay in Building 610 is used to store radiological calibration sources. The Area 5 sampling locations are all within the RWMS and are adjacent to storage containers containing radioisotopes.

Most of the remaining atypical values are from sampling stations located in Yucca Flat or in areas known to be contaminated from early atmospheric testing. One atypical value is from the sampling station at Stake J-31, in the far northwest corner of the NTS, about one mile north of the PALANQUIN and CABRIOLET test sites. These two tests occurred in the mid 1960s, and the plumes from them traveled northward.

The first step in the formal statistical analysis of these data was to perform a two-way ANOVA to simultaneously test for differences among areas and differences among quarters. Most applicable ANOVA programs require equal sample sizes within the cells of data and thus cannot be used with this data set. It was necessary to use a Generalized Linear Model program in order to calculate this ANOVA with variable sample sizes within the cells. The generalized linear model assumes that the ANOVA effects are fixed and fully crossed; these are reasonable assumptions for the TLD data. Since the data have a normal statistical distribution, the ANOVA

was calculated using the actual data values in mR/day. An analysis was performed after removing the atypical values and the data from known areas of high radiation. This showed

differences between areas, but no difference between quarters and no interactions. This is the same as the ANOVA results for the past several years. The ANOVA table for the data without atypical values and radiation areas, for all areas and all quarters, is shown in Table 4.3.

The ANOVA presented in Table 4.3 can only be considered as an approximate statistical test because the data is "rank deficient." This is a statistical problem caused by the many missing data cells in the ANOVA. Also because of rank deficiency, no analysis can be done on just the data in Table 4.2.

Since the two-way ANOVA indicated no differences between quarters, it is then proper to perform a one-way ANOVA to study the pattern of differences between operational areas. An important part of a one-way ANOVA is the use of multiple comparisons. Tukey's multiple comparison procedure was used to elucidate the significance of differences between areas. Because of the vastly differing number of data values for the areas (the "All" columns in Table 4.4), no consistent or interpretable patterns could be found. The reason for the vastly different number of data values for the areas is that the number of sampling stations is a reflection of the amount of activity in the area. Areas that have been used for testing, such as Yucca Valley, contain numerous sampling stations, while Area 29 contains none because it is a rugged mountainous area that has never been used for testing. Areas 14, 26, and 30 also contain no TLD stations.

Table 4.4 summarizes the data with the atypical values removed and gives the number of remaining data values and the mean with the data grouped by area and quarter. The column marked "All" gives the total number of samples for each row and the row mean, which averages over the quarters for each area. The penultimate row, marked "Column Means, All Data," gives the total number of samples for each column and the column mean, which averages over the areas for each quarter. The row and column means in Table 4.4 are almost identical to those in the corresponding table for 1994 except that in 1994 there was no data for the first and second quarters. In this table note that the row totals have sample sizes that range from 2 to 75, while the column totals have sample sizes of 130 to 142. This is statistically a very important characteristic because it strongly influences the way patterns of significant differences can be elucidated. Figure 4.4 is a thematic map visually summarizing the data in Table 4.4.

Statistically it would be desirable to aggregate the sampling locations into groups of more equal size; however, the grouping must be upon *a priori* considerations of sampling station characteristics. The current grouping, with the very unequal number of data per group, is based on *a priori* considerations. The NTS areas were originally established as areas for a particular testing program, but current usage is usually different from the original usage. The areas also have defined geological characteristics; many of the areas are totally contained in valley floors while others are mountainous or contain high plateaus. This is a good way to separate groups since the localized meteorology and geomorphology are consistent within areas.

Since the areas associated with a small number of sampling stations have obviously different localized meteorology and geomorphology, their data should not be combined into larger groupings.

The alternate approach would be to break up the groups containing many sampling stations into subgroups more equal in number of sampling stations to the currently defined groups containing few sampling stations. Using this approach would reduce the statistical power of the ANOVA test.

With the NTS data, such an alternative is statistically a poor choice. The sampling stations are close together in areas of high testing activity by choice for the purpose of localized detection of small releases. In areas where there are no potential sources of effluent, there is no reason to have sampling stations. There is little *a priori* information available to establish subsets of the areas with many sampling stations. The localized meteorology and geomorphology is similar for all sampling stations within these areas. In fact, it seems reasonable to combine the areas of Yucca Valley into one group, even though these areas already have the highest density of sampling stations, because of the almost identical meteorology and geomorphology. Each NTS area in Yucca Valley is used by a different testing organization and thus there may be a different potential for environmental contamination between the areas.

CONCLUSIONS

The exploratory data analysis part of the data analysis identified two mixed statistical distributions within the TLD data. One of these data sets has values less than 0.6 mR/day, has a normal distribution, and contains 89 percent of the data. This part of the data was labeled the environmental data and subjected to further statistical analyses. The second data set has values greater than 0.6 mR/day, has a log-normal statistical distribution, and contains 11 percent of the data. Only descriptive statistics are presented for this data set. The general conclusion from the ANOVA on the first data set for 1995 is that there are differences between NTS areas in levels of environmental exposure, but a pattern of differences cannot be elucidated because of vastly different numbers of samples from the many areas.

Table 4.1 Boundary Station Relocations for 1995

Old Station Number	New Station Number	New Station Area and Name	Distance and Direction From Old to New
346	400	Area 22, Army Well No. 1	2.6 Miles SE
347	401	Area 25, Junction of Jackass Flat Road and Area 27 Road	5.5 Miles S
348	404	Area 25, Yucca Mountain	0.3 Miles E
349	405	Area 18, Cat Canyon Road	1.6 Miles NE
350	384	Area 20, Stake A-118	2.6 Miles SE
351	382	Area 20, Stake J-41	3.3 Miles SSE
352	383	Area 20, Stake LC-4	2.2 Miles SSW
353	342	Area 19, Stake C-31	2.4 Miles SW
354	387	Area 19, Gate 19-3P	2.5 Miles SW
355	355	Area 12, Gold Meadows Hill Top	Same location
356	310	Area 15, Substation U15E	1.9 Miles SW
357	386	Area 9, Papoose Lake Road	2.3 Miles SSE
358	388	Area 3, Hill Top	2.1 Miles SSW
359	389	Area 11, East of U11b	2.6 Miles SE
360	402	Area 5, 3.3 Miles SE of Aggregate Pit	2.3 Miles NNE
	403	Area 25, Guard Station 510	New boundary station
	365	Area 19, Stake R-29	New boundary station

Table 4.2 Atypical Data Values (mR/day) - 1995 TLD Data

Area Location	Quarter	Atypical Data	Group Mean
Area 2, Stake N-8	1	(a)	0.38
Area 2, Stake N-8	2	2.46	0.36
Area 2, Stake N-8	3	2.31	0.36
Area 2, Stake N-8	4	2.14	0.34
Area 3, U3by North	1	0.65	0.37
Area 3, U3by North	2	0.60	0.37
Area 3, U3by North	3	0.64	0.42
Area 3, U-3co North	1	2.21	0.37
Area 3, U-3co North	2	(a)	0.37
Area 3, U-3co North	3	2.17	0.42
Area 3, U-3co North	4	1.95	0.37
Area 3, U-3co South	1	1.75	0.37
Area 3, U-3co South	2	(a)	0.37
Area 3, U-3co South	3	1.34	0.42
Area 3, U-3co South	4	1.27	0.37

(a) Missing data value.

Table 4.2 (Atypical Data Values [mR/day] - 1995 TLD Data, cont.)

Area Location	Quarter	Atypical Data	Group Mean
Area 3, U3-ah/at South	3	0.65	0.42
Area 3, U3-ax/bl Northeast	1	0.61	0.37
Area 3, U3-ax/bl Northeast	3	0.75	0.42
Area 3, U3-ax/bl Northeast	4	0.61	0.37
Area 3, Stake A6.5	4	0.63	0.37
Area 4, Stake 4A-9	1	2.90	0.40
Area 4, Stake 4A-9	2	(a)	0.28
Area 4, Stake 4A-9	3	(a)	0.31
Area 4, Stake 4A-9	4	(a)	0.29
Area 5, RWMS Pit 5 West	1	1.20	0.38
Area 5, RWMS Pit 5 West	2	(a)	0.34
Area 5, RWMS Pit 5 West	3	3.71	0.34
Area 5, RWMS Pit 5 West	4	1.65	0.34
Area 5, RWMS Pit 5 East	1	0.66	0.38
Area 5, RWMS Pit 5 East	3	1.81	0.34
Area 5, TRU South	1	0.76	0.38
Area 5, TRU North	2	1.00	0.34
Area 5, TRU North	3	0.91	0.34
Area 5, TRU North	4	0.86	0.34
Area 5, TRU Northeast	1	1.89	0.38
Area 5, TRU Northeast	3	1.31	0.34
Area 5, TRU Northeast	4	2.68	0.34
Area 5, TRU Southwest	1	1.04	0.38
Area 5, TRU Southwest	2	1.54	0.34
Area 5, TRU Southwest	3	1.26	0.34
Area 7, 7-300 Bunker	1	(a)	0.31
Area 7, 7-300 Bunker	2	(a)	0.35
Area 7, 7-300 Bunker	3	(a)	0.32
Area 7, 7-300 Bunker	4	0.77	0.35
Area 10, SEDAN W	1	0.96	0.38
Area 10, SEDAN W	2	0.88	0.36
Area 10, SEDAN W	3	0.86	0.32
Area 10, SEDAN W	4	0.90	0.38
Area 12, T Tunnel No. 2 Pond	1	0.77	0.32
Area 12, T Tunnel No. 2 Pond	2	0.67	0.29
Area 12, T Tunnel No. 2 Pond	3	0.76	0.32
Area 12, T Tunnel No. 2 Pond	4	0.73	0.31
Area 19, Stake C-31	1	0.89	0.38
Area 20, Stake J-31	1	0.71	0.36
Area 23 Building 610 Bay	1	(a)	0.22
Area 23 Building 610 Bay	2	(a)	0.17
Area 23 Building 610 Bay	3	1.68	0.18

(a) Missing data value.

Table 4.3 Average 1995 Data (mR/day) with Atypical Values Removed

	Quarter						Quarter				
Area	1	2	3	4	All	Area	1	2	3	4	All
1	3 0.30	3 0.25	3 0.27	4 0.27	13 0.27	12	6 0.32	7 0.29	8 0.32	5 0.31	26 0.31
2	4 0.38	4 0.36	5 0.36	5 0.34	18 0.36	15	4 0.35	4 0.28	4 0.30	3 0.30	15 0.31
3	17 0.37	19 0.38	18 0.42	19 0.37	73 0.39	17	2 0.36	2 0.33	2 0.37	1 0.38	7 0.35
4	2 0.40	1 0.28	2 0.31	2 0.29	7 0.33	18	4 0.39	5 0.35	4 0.40	3 0.40	16 0.38
5	2 0.24	1 0.28	2 0.22	2 0.24	7 0.24	19	19 0.38	19 0.41	20 0.42	17 0.40	75 0.40
5.1[a]	18 0.37	17 0.34	18 0.34	17 0.36	70 0.35	20	11 0.36	11 0.46	12 0.43	8 0.42	42 0.42
5.2[b]	2 0.47	4 0.39	3 0.36	4 0.32	13 0.37	22	1 0.22	0 (c)	0 (c)	1 0.16	2 0.19
6	10 0.25	11 0.23	15 0.23	14 0.23	50 0.24	23	8 0.22	7 0.17	6 0.18	6 0.18	27 0.18
7	1 0.31	2 0.35	2 0.32	1 0.35	6 0.33	25	11 0.34	6 0.33	11 0.31	11 0.31	39 0.32
8	1 0.33	0 (c)	1 0.28	1 0.23	3 0.28	27	0 (c)	0 (c)	1 0.33	1 0.33	2 0.33
9	3 0.31	1 0.36	3 0.29	4 0.28	11 0.30						
10	2 0.38	4 0.36	4 0.32	3 0.38	13 0.35	Column Means All Data	133 0.34	130 0.34	142 0.34	134 0.33	543 0.34
11	2 0.33	2 0.32	2 0.33	2 0.34	8 0.33	Column Means Excluding (a),(b)	113 0.33	109 0.34	125 0.34	113 0.32	460 0.34

(a) The area coded as 5.1 refers to only the non-TRU pad and non-MSM RWMS locations.
(b) The area coded as 5.2 refers to only the transuranic pad locations. The area coded as 5 refers to those stations in Area 5 away from the RWMS.
(c) Missing data value.

Table 4.4 ANOVA on Edited 1995 Data

Source	Degrees of Freedom	Sum of the Squares	Mean Square	F-Statistic	p Value
Area	20	2.09757	0.10488	30.029	0.000
Quarter	3	0.01026	0.00342	0.979	0.402
Area X Quarter	55	0.20148	0.00366	1.049	0.386
Error	464	1.62054	0.00349		

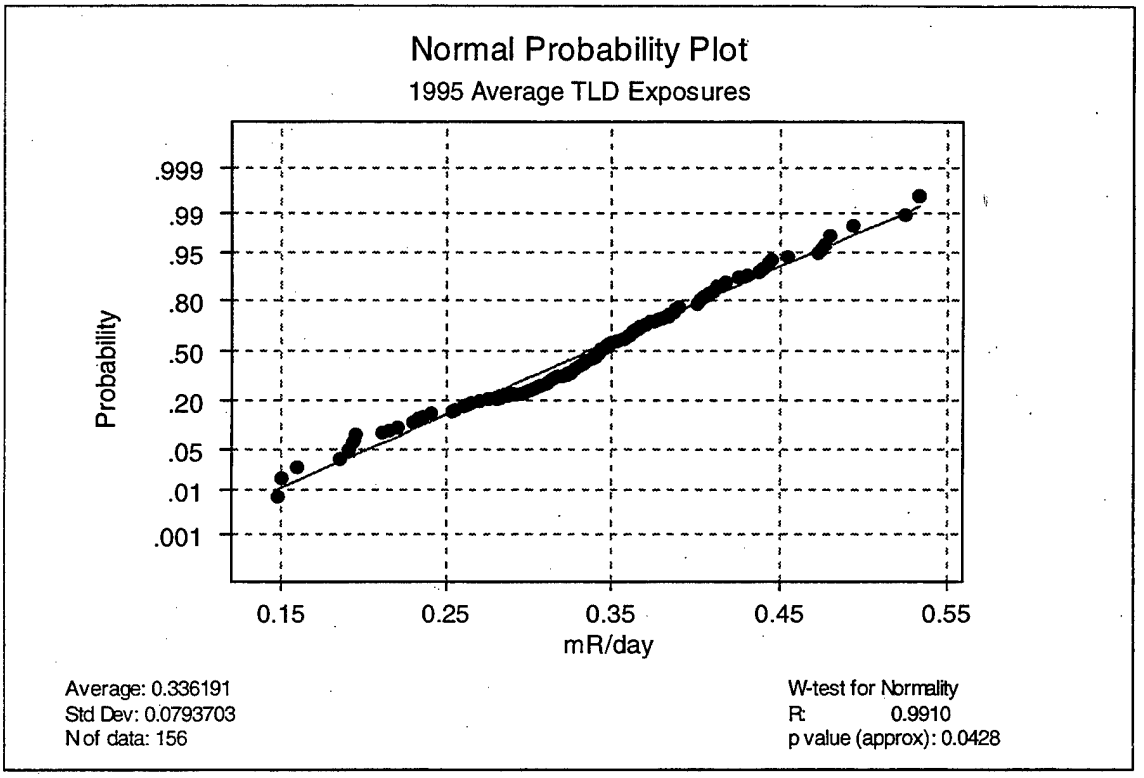


Figure 4.1 Normal Probability Plot of All Data Except Exposure Values Above 0.6 mR/day

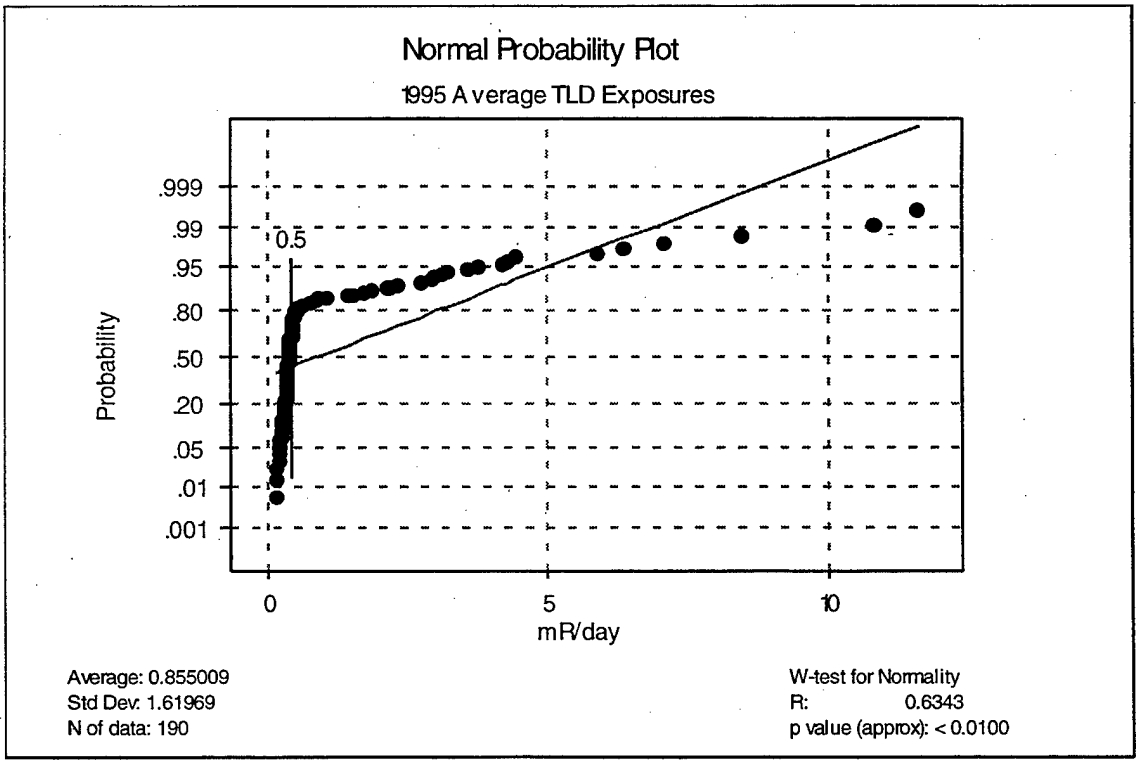


Figure 4.2 Normal Probability Plot of All 1995 TLD Annual Averages

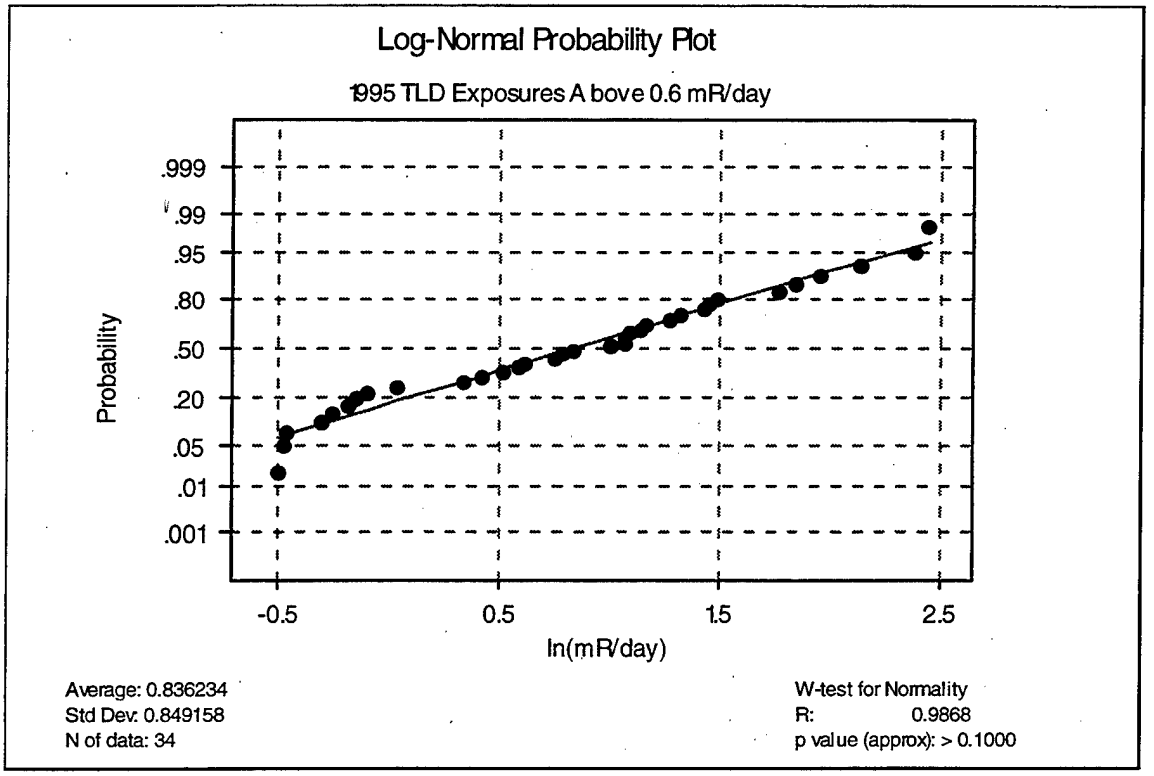


Figure 4.3 Log-Normal Probability Plot of All Data With Exposure Values Above 0.6 mR/day

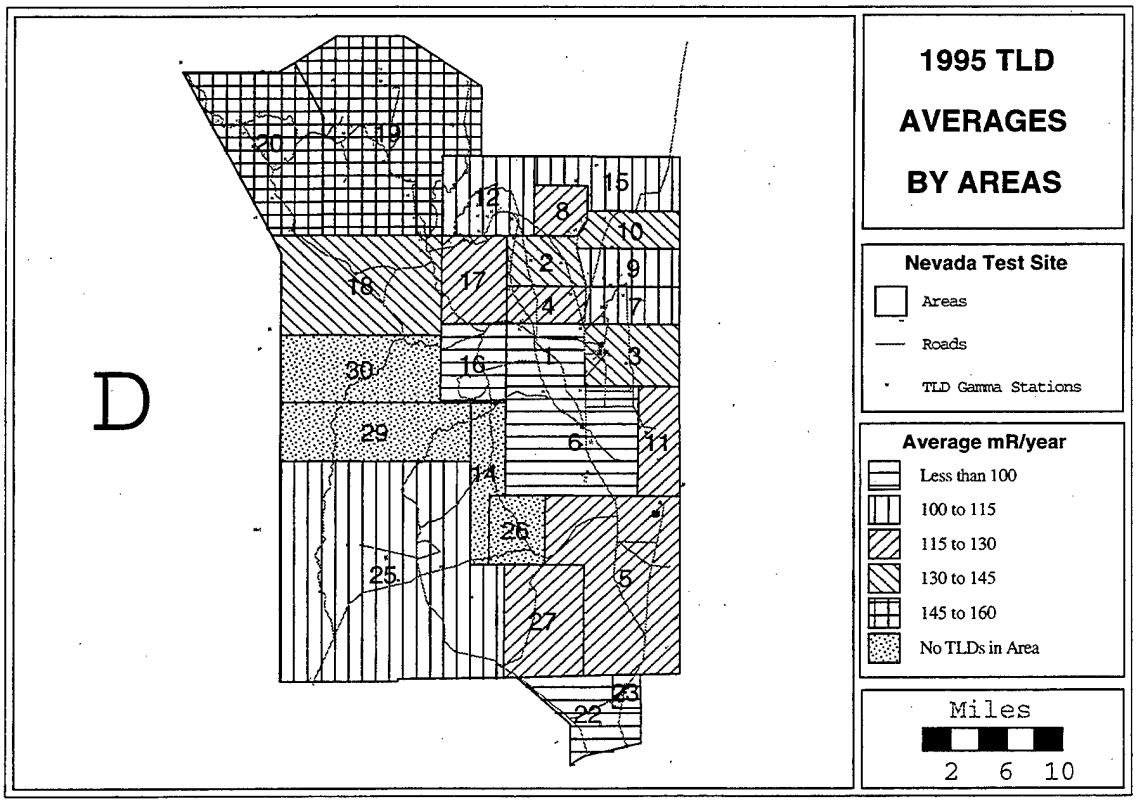


Figure 4.4 Thematic Map of NTS Environmental TLD Averages by Area

Attachment 4.1 TLD Network Gamma Exposure Rates - 1995

Sampling Location	1st Quarter (mR/day)	2nd Quarter (mR/day)	3rd Quarter (mR/day)	4th Quarter (mR/day)	Annual Average (mR/day)	Annual Total (mR/yr)
Area 1, Stake TH-28/27	0.28	0.25	0.27	0.24	0.26	95
Area 1, Stake TH-38	0.33	0.27	0.30	0.29	0.30	109
Area 1, Sandbag Storage Hut	(d)	(a)	(d)	0.31	0.31	113
Area 1, BJY	0.29	0.24	0.25	0.23	0.25	92
Area 2, Cable Yard	0.46	(a)	0.40	0.24	0.37	134
Area 2, Stake L-9	(d)	0.50	0.47	0.47	0.48	175
Area 2, Stake M-150	0.40	0.36	0.35	0.41	0.38	139
Area 2, Stake M-140	0.38	0.36	0.34	0.33	0.35	129
Area 2, Stake N-8	(d)	2.46	2.31	2.14	2.30	841
Area 2, Stake TH-58	0.26	0.22	0.25	0.23	0.24	88
Area 3, U-3ah/at East	0.37	0.33	0.45	0.24	0.35	127
Area 3, U-3ah/at North	0.34	0.32	0.47	0.23	0.34	124
Area 3, U-3ah/at South	(d)	0.45	0.65	0.34	0.48	175
Area 3, U-3ah/at South Gate	0.36	0.32	0.46	0.26	0.35	128
Area 3, U-3ah/at West	0.34	0.30	0.43	(d)	0.36	130
Area 3, Hill Top	(e)	(e)	0.36	0.36	0.36	131
Area 3, LANL Trailers	0.35	0.36	0.41	0.34	0.37	133
Area 3, Stake A-6.5	0.42	0.38	(d)	0.63	0.48	174
Area 3, Stake Ob-11.5	0.36	0.31	0.32	0.35	0.34	122
Area 3, Stake Ob-20 (3b Rd. 14.5)	0.24	0.22	0.22	0.24	0.23	84
Area 3, U-3ax/bl Northeast	0.61	0.53	0.75	0.61	0.62	228
Area 3, U-3ax/bl Northwest	0.44	0.40	0.54	0.44	0.46	166
Area 3, U-3ax/bl South	0.39	0.36	0.51	0.41	0.42	152
Area 3, U-3ax/bl Southeast	0.34	(d)	0.53	0.45	0.44	161
Area 3, U-3by North	0.65	0.60	0.64	0.57	0.62	225
Area 3, U-3by South	0.42	(d)	0.44	0.37	0.41	150
Area 3, U-3bz North	(d)	0.49	0.47	0.52	0.49	180
Area 3, U-3bz South	0.38	0.37	0.37	0.38	0.37	137
Area 3, U-3cj North	0.37	0.35	0.33	0.36	0.35	129
Area 3, U-3co North	2.21	(d)	2.17	1.95	2.11	771
Area 3, U-3co South	1.57	(d)	1.34	1.27	1.39	509
Area 3, U-3du North	0.39	0.40	0.40	0.43	0.41	148
Area 3, U-3du South	0.41	0.40	0.40	0.42	0.41	149
Area 3, U-3ey South	0.36	0.40	0.36	0.37	0.37	136
Area 4, Stake A-9	2.90	(d)	(d)	(d)	2.90	1059
Area 4, Stake M-130	0.48	(a)	0.31	0.29	0.36	131
Area 4, Stake TH-48	0.32	0.28	0.31	0.29	0.30	110
Area 5, 3.3 Miles SE of Aggregate Pit	0.16	(d)	0.16	0.16	0.16	58

(a) Rejected reading due to damaged or unreadable TLD.
(b) No access to the location, locked gate or door, snow on road.
(c) Removed from listing in the fourth quarter.
(d) Missing or lost TLD in the field.
(e) Location not found.
(f) No monitoring for that quarter.

Attachment 4.1 (TLD Network Gamma Exposure Rates - 1995, cont.)

Sampling Location	1st Quarter (mR/day)	2nd Quarter (mR/day)	3rd Quarter (mR/day)	4th Quarter (mR/day)	Annual Average (mR/day)	Annual Total (mR/yr)
Area 5, RWMS East 500'	0.33	0.31	0.33	0.34	0.33	120
Area 5, RWMS East 1500'	0.35	0.37	0.33	0.39	0.36	131
Area 5, RWMS East Gate	0.54	0.36	0.38	0.37	0.41	151
Area 5, RWMS MSM-1 East	3.72	3.08	2.87	3.09	3.19	1165
Area 5, RWMS MSM-1 NE	2.06	1.85	1.65	1.81	1.84	673
Area 5, RWMS MSM-1 NNE	9.18	9.06	7.25	8.31	8.45	3086
Area 5, RWMS MSM-1 NNW	2.87	2.74	2.54	2.74	2.72	994
Area 5, RWMS MSM-1 North	3.28	2.98	2.68	2.73	2.92	1066
Area 5, RWMS MSM-1 Southeast	2.00	1.83	1.70	1.72	1.81	662
Area 5, RWMS MSM-1 Southwest	3.50	3.03	3.03	2.95	3.13	1142
Area 5, RWMS MSM-1 SSE	5.38	3.98	3.25	(d)	4.20	1535
Area 5, RWMS MSM-1 SSW	3.34	2.98	2.64	(d)	2.99	1091
Area 5, RWMS MSM-1 West	7.61	6.97	6.55	7.05	7.05	2573
Area 5, RWMS MSM-2 East	12.03	11.52	9.96	12.74	11.56	4223
Area 5, RWMS MSM-2 NE	4.84	4.26	3.74	4.27	4.28	1562
Area 5, RWMS MSM-2 North	6.53	6.27	6.44	6.18	6.36	2321
Area 5, RWMS MSM-2 Northwest	5.08	4.46	3.84	4.35	4.43	1619
Area 5, RWMS MSM-2 South	6.76	5.78	5.32	5.67	5.88	2149
Area 5, RWMS MSM-2 Southeast	4.06	3.72	3.39	3.92	3.77	1378
Area 5, RWMS MSM-2 Southwest	3.92	3.65	3.27	3.41	3.56	1301
Area 5, RWMS MSM-2 West	11.66	11.41	9.47	10.69	10.81	3947
Area 5, RWMS NE Corner	0.33	0.29	0.32	0.32	0.31	115
Area 5, RWMS North 500'	0.37	0.34	0.36	0.37	0.36	131
Area 5, RWMS North 1000'	0.36	0.33	0.37	0.39	0.36	132
Area 5, RWMS North 1500'	0.34	0.32	0.34	0.35	0.34	123
Area 5, RWMS NW Corner	0.43	(a)	0.36	0.41	0.40	146
Area 5, RWMS Office	0.41	0.29	0.32	0.32	0.33	122
Area 5, RWMS Pit 3 North Side	0.37	0.36	0.36	(d)	0.36	133
Area 5, RWMS Pit 3 South Side	0.36	0.37	0.36	(d)	0.36	133
Area 5, RWMS Pit 5 East Side	0.66	0.51	1.81	0.45	0.86	313
Area 5, RWMS Pit 5 West Side	1.20	(d)	3.71	1.65	2.19	799
Area 5, RWMS South 500'	0.34	0.31	0.34	0.34	0.33	121
Area 5, RWMS South Gate	0.32	0.29	0.30	0.30	0.30	110
Area 5, RWMS Southwest Corner	0.34	0.30	0.33	0.32	0.32	118
Area 5, RWMS TRU Pad NE	1.89	0.37	1.13	2.68	1.52	554
Area 5, RWMS TRU Pad North	0.53	1.00	0.91	0.86	0.82	301
Area 5, RWMS TRU Pad NW	0.40	0.35	0.31	0.25	0.33	120
Area 5, RWMS TRU Pad SE	(d)	0.34	0.33	0.30	0.32	118

(a) Rejected reading due to damaged or unreadable TLD.
(b) No access to the location, locked gate or door, snow on road.
(c) Removed from listing in the fourth quarter.
(d) Missing or lost TLD in the field.
(e) Location not found.
(f) No monitoring for that quarter.

Attachment 4.1 (TLD Network Gamma Exposure Rates - 1995, cont.)

Sampling Location	1st Quarter (mR/day)	2nd Quarter (mR/day)	3rd Quarter (mR/day)	4th Quarter (mR/day)	Annual Average (mR/day)	Annual Total (mR/yr)
Area 5, RWMS TRU Pad South	0.76	0.48	0.44	0.42	0.52	192
Area 5, RWMS TRU Pad SW	1.04	1.54	1.26	0.30	1.03	378
Area 5, RWMS West 500'	0.34	(d)	0.34	0.39	0.36	130
Area 5, RWMS West 1000'	0.36	0.32	0.36	0.35	0.35	127
Area 5, RWMS West 1500'	0.33	0.31	0.34	0.35	0.33	121
Area 5, Well 5B	0.31	0.28	0.28	0.31	0.30	108
Area 6, CP-2 Logistic Desk	0.19	0.17	0.18	0.20	0.19	68
Area 6, CP-6	(d)	0.18	0.21	0.19	0.19	71
Area 6, CP-50 Calibration Bench	0.21	0.33	0.19	0.20	0.23	85
Area 6, CP-50 Calibration Door	0.34	0.19	0.28	0.23	0.26	95
Area 6, Decon Pad Back Room	0.20	0.18	0.19	(a)	0.19	69
Area 6, Decon Pad Office	0.25	0.27	0.27	0.27	0.27	97
Area 6, DAF E	(f)	(f)	0.22	0.22	0.22	80
Area 6, DAF NE	(f)	(f)	0.24	0.23	0.23	86
Area 6, DAF SSE	(f)	(f)	0.23	0.23	0.23	84
Area 6, DAF W	(f)	(f)	0.24	0.24	0.24	88
Area 6, Stake TH-1	0.20	0.18	0.19	0.20	0.19	70
Area 6, Stake TH-9	0.28	0.26	0.27	0.29	0.28	100
Area 6, Stake TH-18	0.24	0.22	0.24	0.22	0.23	84
Area 6, Well 3	0.34	0.29	0.29	0.27	0.30	109
Area 6, Yucca Oil Storage Area	0.27	0.24	0.26	0.28	0.26	96
Area 7, 7-300 Bunker	(e)	(e)	(e)	0.77	0.77	281
Area 7, Reitman Seep	0.31	0.33	0.32	0.35	0.33	120
Area 7, UE-7ns	(e)	0.37	0.32	(d)	0.34	126
Area 8, Stake K-25	0.33	(e)	0.28	0.23	0.28	102
Area 9, 9-300 Bunker	0.36	0.36	0.31	0.34	0.34	125
Area 9, Crater U-9cw	(e)	(e)	0.27	0.27	0.27	99
Area 9, Papoose Lake Road	0.22	(e)	(d)	0.20	0.21	77
Area 9, V&G Road Junction	0.34	(e)	0.28	0.31	0.31	113
Area 10, Circle & L Road	0.37	0.31	0.31	0.32	0.33	120
Area 10, Sedan E Visitor Box	(d)	0.38	0.36	0.37	0.37	135
Area 10, Sedan West	0.96	0.88	0.86	0.90	0.90	329
Area 10, Stake A-24	(d)	0.43	0.29	0.44	0.39	141
Area 10, Stake CA-14	0.38	0.33	0.32	(c)	0.34	125
Area 11, Gate 293	0.35	0.32	0.34	0.35	0.34	124
Area 11, East of U-11b	0.31	0.31	0.31	0.32	0.31	114
Area 12, Building 12-10	0.34	0.33	0.36	(c)	0.34	125
Area 12, Gold Meadows	(e)	(e)	0.26	(d)	0.26	95

(a) Rejected reading due to damaged or unreadable TLD.
(b) No access to the location, locked gate or door, snow on road.
(c) Removed from listing in the fourth quarter.
(d) Missing or lost TLD in the field.
(e) Location not found.
(f) No monitoring for that quarter.

Attachment 4.1 (TLD Network Gamma Exposure Rates - 1995, cont.)

Sampling Location	1st Quarter (mR/day)	2nd Quarter (mR/day)	3rd Quarter (mR/day)	4th Quarter (mR/day)	Annual Average (mR/day)	Annual Total (mR/yr)
Area 12, Stake M-168	0.33	0.30	0.32	0.31	0.31	115
Area 12, Stake M-170	0.31	0.26	0.29	(c)	0.29	105
Area 12, Stake M-175	0.35	0.31	0.36	0.35	0.34	125
Area 12, Stake TH-68.5	0.27	0.23	0.27	0.25	0.25	93
Area 12, T-Tunnel No. 2 Pond	0.77	0.67	0.76	0.73	0.73	268
Area 12, Upper Haines Lake	(d)	0.32	0.33	0.30	0.32	116
Area 12, Upper N Pond	0.34	0.31	0.34	0.32	0.33	120
Area 15, EPA Complex	0.33	0.29	0.29	0.32	0.31	112
Area 15, Lamp Shack	0.41	0.30	0.33	(c)	0.35	127
Area 15, Office	0.33	0.28	0.29	0.33	0.31	112
Area 15, U-15e Substation	0.33	0.25	0.29	0.26	0.28	103
Area 17, Stake M-185	0.34	0.31	0.35	(c)	0.33	122
Area 17, Stake M-190	0.37	0.34	0.39	0.38	0.37	135
Area 18, Gate 30-3P in Cat Canyon	(e)	(e)	(e)	(e)	*	*
Area 18, Stake A-83	0.37	0.27	0.37	0.37	0.34	126
Area 18, Stake A-106	0.41	0.45	0.42	0.44	0.43	157
Area 18, Stake M-196	0.38	0.35	0.40	(c)	0.38	138
Area 18, Stake P-35	0.41	0.36	0.40	0.39	0.39	142
Area 18, Stake P-39	(d)	0.34	(d)	(c)	0.34	124
Area 19, Gate 19-3P	(e)	(e)	0.37	(e)	0.37	135
Area 19, Stake C-16	0.38	0.35	0.40	0.39	0.38	139
Area 19, Stake C-25	0.41	0.34	0.40	0.40	0.39	142
Area 19, Stake C-27	0.38	0.36	0.41	0.40	0.39	142
Area 19, Stake C-31	0.89	(d)	0.41	0.30	0.53	195
Area 19, Stake P-41	0.43	0.37	0.43	0.42	0.41	151
Area 19, Stake P-46	0.34	0.33	0.36	(c)	0.34	125
Area 19, Stake P-54	0.34	0.31	0.37	0.35	0.34	125
Area 19, Stake P-59	0.41	0.38	0.44	(c)	0.41	150
Area 19, Stake P-66	0.40	0.38	(d)	0.42	0.40	146
Area 19, Stake P-71	0.37	0.38	0.41	0.40	0.39	142
Area 19, Stake P-77	0.40	0.49	0.46	0.42	0.44	162
Area 19, Stake P-88	0.45	0.50	0.49	0.45	0.47	173
Area 19, Stake P-91	0.45	0.50	0.50	0.45	0.47	173
Area 19, Stake P-98	0.45	0.43	0.44	(c)	0.44	161
Area 19, Stake R-3	0.33	0.50	0.50	0.45	0.45	163
Area 19, Stake R-8	0.32	0.47	0.47	0.44	0.42	155
Area 19, Stake R-18 (By House)	0.29	0.44	0.42	0.39	0.38	141
Area 19, Stake R-26	0.31	0.47	0.44	0.39	0.40	147

(a) Rejected reading due to damaged or unreadable TLD.
(b) No access to the location, locked gate or door, snow on road.
(c) Removed from listing in the fourth quarter.
(d) Missing or lost TLD in the field.
(e) Location not found.
(f) No monitoring for that quarter.

Attachment 4.1 (TLD Network Gamma Exposure Rates - 1995, cont.)

Sampling Location	1st Quarter (mR/day)	2nd Quarter (mR/day)	3rd Quarter (mR/day)	4th Quarter (mR/day)	Annual Average (mR/day)	Annual Total (mR/yr)
Area 19, Stake R-29	0.32	0.42	0.42	0.37	0.38	140
Area 19, Upper U-19c Reservoir	0.38	0.35	0.34	0.29	0.34	124
Area 20, P & K Road Junction	0.30	(a)	0.40	(c)	0.35	128
Area 20, Stake A-118	0.40	0.45	0.40	0.40	0.41	151
Area 20, Stake J-6	0.42	0.47	0.46	0.40	0.44	160
Area 20, Stake J-16	0.45	0.43	0.41	0.38	0.42	152
Area 20, Stake J-24	0.37	0.43	0.40	(c)	0.40	146
Area 20, Stake J-31	0.71	0.59	0.58	0.54	0.61	221
Area 20, Stake J-41	0.38	0.39	(d)	0.38	0.38	140
Area 20, Stake LC-4	(e)	(d)	0.44	(d)	0.44	161
Area 20, Stake P-116.5	0.29	0.44	0.41	0.41	0.39	142
Area 20, Stake P-120.5	0.30	0.46	0.40	(c)	0.39	141
Area 20, Stake P-124	0.30	0.47	0.43	0.42	0.41	148
Area 20, Stake P-129.5	0.32	0.46	0.44	(c)	0.41	149
Area 20, Stake P-134.5	0.38	0.43	0.40	0.40	0.40	147
Area 22, Army Well No. 1	0.22	(d)	(d)	(d)	0.22	80
Area 22, Desert Rock Control Tower	(d)	(d)	(d)	0.16	0.16	58
Area 23, Building 190 Bench Drawer	0.22	0.21	(d)	(c)	0.21	79
Area 23, Building 610 Gate	0.18	0.14	0.14	0.14	0.15	55
Area 23, Building 610 Bay	(b)	(b)	1.68	(c)	1.68	614
Area 23, Building 650 Dosimetry	0.17	0.13	0.15	0.14	0.15	54
Area 23, Building 650 Storage Room	0.22	(a)	0.18	0.17	0.19	69
Area 23, Building 650 Roof	0.17	0.14	0.14	0.14	0.15	54
Area 23, Gate 100	0.18	0.13	0.31	0.14	0.19	69
Area 23, Post Office	0.23	0.18	0.18	0.19	0.20	71
Area 23, Ramatrol Building 180	0.40	0.26	(d)	(c)	0.33	121
Area 25, 25-4-P Gate	0.36	(e)	0.33	0.42	0.37	135
Area 25, 25-7-P Gate	0.32	(e)	0.34	0.30	0.32	117
Area 25, E-MAD East	0.32	0.32	0.31	0.30	0.31	114
Area 25, E-MAD North	0.30	0.30	0.29	0.27	0.29	106
Area 25, E-MAD South	0.31	0.31	0.31	0.29	0.31	111
Area 25, E-MAD West	0.30	0.32	0.30	0.29	0.30	110
Area 25, Guard Station 510	0.35	(e)	0.34	0.31	0.33	122
Area 25, Henre Site	0.34	0.34	0.32	0.30	0.32	119
Area 25, Jct. Jackass Flats & A27 Roads	0.19	(e)	0.19	0.20	0.19	71
Area 25, NRDS Warehouse	0.34	(d)	0.32	0.41	0.36	130
Area 25, Yucca Mountain	0.56	0.41	0.36	0.37	0.42	155
Area 27, Area 27 Cafeteria	(b)	(b)	0.33	0.33	0.33	121

(a) Rejected reading due to damaged or unreadable TLD.
(b) No access to the location, locked gate or door, snow on road.
(c) Removed from listing in the fourth quarter.
(d) Missing or lost TLD in the field.
(e) Location not found.
(f) No monitoring for that quarter.

Attachment 4.2 Summary of Control TLD Data for 1995

Sampling Location	1st Quarter (mR/day)	2nd Quarter (mR/day)	3rd Quarter (mR/day)	4th Quarter (mR/day)	Annual Average (mR/day)	Annual Total (mR/yr)
Area 3, Hill Top	(a)	(a)	0.36	0.36	0.36	131
Area 5, Well 5B	0.31	0.28	0.28	0.31	0.30	108
Area 5, 3.3 Miles SE of Aggregate Pit	0.16	(a)	0.16	0.16	0.16	58
Area 6, CP-6	(a)	0.18	0.21	0.19	0.19	71
Area 6, Yucca Oil Storage Area	0.27	0.24	0.26	0.28	0.26	96
Area 9, Papoose Lake Road	0.22	(a)	(a)	0.20	0.21	77
Area 11, East of U-11B	0.31	0.31	0.31	0.32	0.31	114
Area 12, Gold Meadows	(a)	(a)	0.26	(a)	0.26	95
Area 15, U-15e Substation	0.33	0.25	0.29	0.26	0.28	103
Area 18, Gate 30-3P in Cat Canyon	(a)	(a)	(a)	(a)	(a)	(a)
Area 18, Stake A-106	0.41	0.45	0.42	0.44	0.43	157
Area 19, Gate 19-3P	(a)	(a)	0.37	(a)	0.37	135
Area 19, Stake C-31	0.89	(a)	0.41	0.30	0.53	195
Area 19, Stake R-29	0.32	0.42	0.42	0.37	0.38	140
Area 20, Stake J-41	0.38	0.39	(a)	0.38	0.38	140
Area 20, Stake LC-4	(a)	(a)	0.44	(a)	0.44	161
Area 22, Army Well No. 1	0.22	(a)	(a)	(a)	0.22	80
Area 23, Building 650 Dosimetry	0.17	0.13	0.15	0.14	0.15	54
Area 23, Building 650 Roof	0.17	0.14	0.14	0.14	0.15	54
Area 23, Post Office	0.23	0.18	0.18	0.19	0.20	71
Area 25, Guard Station 510	0.35	(a)	0.34	0.31	0.33	122
Area 25, Henre Site	0.34	0.34	0.32	0.30	0.32	119
Area 25, Jct. Jackass Flats & A27 Roads	0.19	(a)	0.19	0.20	0.19	71
Area 25, NRDS Warehouse	0.34	(a)	0.32	0.41	0.36	130
Area 25, Yucca Mountain	0.56	0.41	0.36	0.37	0.42	155
Area 27, Area 27 Cafeteria	(a)	(a)	0.33	0.33	0.33	121

(a) Missing data value.

5.0 HISTORICAL TRENDS IN ONSITE THERMOLUMINESCENT DOSIMETER DATA

Film badges were used during early activities on the Nevada Test Site (NTS) for ambient gamma exposure monitoring. Thermoluminescent dosimeters (TLDs) replaced the film badges in 1977 with ten stations chosen to be near work sites. By 1981, this network had expanded to 163 stations covering most areas of the NTS. Since 1981, only a few stations have been added or removed. From 1977 to 1987, the TLDs used were manufactured by the Harshaw Chemical Company. In 1987, a changeover was made to TLDs manufactured by Panasonic. Because of this changeover, a comparison of the early years to current years is not totally appropriate. The designated background stations are most comparable between the two types of TLDs because of the calibration procedures. In late 1988, a calibration problem was discovered that may have caused inaccurate results in the 1988 data. There were a total of 181 active TLD stations at the end of 1995.

At the beginning of 1995, major changes were made to the boundary station locations. In previous years, most of the boundary stations were serviced using helicopters because these stations were in remote locations not reachable by road. In 1995, this type of location was replaced with nearby locations that could be reached by truck. These changes are discussed in the previous chapter (see Table 4.1).

BACKGROUND DATA

Table 5.1 displays the annual average millirem per day data from the 24 original and 15 replacement designated background stations for the current and previous ten years. An alphabetic notation in this table denotes a missing value. Most of these are for the replacement boundary stations for the years before these stations were established. The relationships between the background stations and their replacements are given in Table 4.1. For comparison, the United States average external exposure is generally assumed to be 100 mrem/yr. Figure 5.1 is a time series of box plots of the data in Table 5.1. This figure shows two obvious outliers occurring in the years 1986 and 1987. The 1986 outlier is a value of 376 mR/Yr for Boundary Station 356, and the 1987 outlier is a value of 698 mR/Yr for Stake C-31. The annual reports for these years offer no comments about these values. The review of the statistical properties of all the TLD data (Chapter 4 herein and previous annual reports) concludes that TLD data are historically lognormally distributed, but are normally distributed for 1994 and 1995. This presents a statistical problem since all parametric statistical comparison methods assume all data has the same distribution. Non-parametric methods have to be used otherwise. However, as discussed below, the analysis is limited to the background stations data only. Then data for all years appears to be normally distributed. A one-way analysis of variance (ANOVA) is the appropriate parametric statistical method of analysis to determine if there are any significant differences between years. This statistical test will determine if there are any significant differences between years caused by any type of trend. If significance is found, then an evaluation of the type of trend can be done. This procedure was performed on the data in Table 5.1 and the corresponding data for previous years back to 1978 when TLDs were first used for environmental measurement. Figure 5.2 gives the normal probability plot of the ANOVA residuals. Although the statistical test for normality in Figure 5.2 indicates the data does not fit a normal distribution, the data does visually approximate a straight line. With more than 400 residuals in this figure, the statistical test is extremely powerful and can detect minor departures from normality. Since the ANOVA is robust against minor departures from normality, it was concluded that this ANOVA was valid. Table 5.2 gives the ANOVA of all the control and boundary station data from 1978 through 1995.

Table 5.2 indicates that there are significant differences among the years. A probability or p-value of less than 0.05 indicates that the hypothesis of no differences can be rejected with 95 percent confidence. The next step is to determine what the significant differences are. An examination of the means and confidence intervals plot part of Table 5.2 along with a Tukey's multiple comparison test of these data suggest that perhaps there are three groups of mean values: low, medium, and high groups. Tukey's test indicates that the low group is significantly different from the high group, and the middle group is not significantly different from either the low or the high group. The low group consists of the years 1978, 1979, 1984, 1985, 1986, 1994, and 1995. The middle group consists of the years 1980, 1982, 1983, 1987, and 1991. The high group consists of years 1981, 1988, 1989, 1990, 1992, and 1993.

An examination of the confidence interval portion of Table 5.2 and the time series of box plots given in Figure 5.1 does not suggest any consistent trend in these TLD background data. All except one of the box plots have their inter-quartile range (the portion between the top and bottom of the box) include the value of 100, the generally accepted world-wide background external exposure level. Because of the lack of a consistent pattern of change in the mean values over all years, no further investigation of historical trends in background data was attempted.

ENVIRONMENTAL SAMPLING STATIONS

The data for the present year and the previous five years for all TLD sampling locations are listed in Attachment 5.1. The background station data analyzed in the previous section are included in this data set and are listed in the operational area of the NTS in which they are located. An alphabetic notation in this table denotes a missing value, and the pattern of missing values shows how monitoring stations have been added and removed over the years. Data from TLDs monitoring the Mound Strategic Material Storage Site stations inside the Radiological Waste Management Site and other known contaminated sites were deleted from the statistical analysis because these locations are known to be in high radiation areas. The "boundary" stations are monitoring stations that are somewhat evenly spaced around the perimeter of the NTS and typically are just inside the boundary. The "area" associated with the boundary stations that are outside the NTS is the adjacent NTS area. The statistical procedures used to analyze all the data in Attachment 5.1 are essentially the same as the procedures used to analyze the background station data. Because substantially more data were available than just the background station data, some additional analyses were performed.

In previous reports, probability plots of the data for each year were examined for data distribution characteristics and were found to be skewed with a long tail of data in the direction of higher values. This shape is characteristic of lognormally distributed data, and it is generally accepted that TLD data have a lognormal statistical distribution. However, as discussed in Chapter 4, the 1994 and 1995 data are normally distributed. The same procedure as used above for the background stations was used for the data in Attachment 5.1. For the data in this attachment, the ANOVA residuals were not a reasonable fit to a straight line and transformation of the data did not improve the fit. These residuals appeared to be a mixture of several distributions with different variances. In Chapter 4, an extensive analysis of outliers was performed that identified TLDs measuring contaminated areas. This analysis identified these contaminated locations as those locations with TLD exposures over 0.6 mR per day. Similar analyses were performed in previous years and found similar situations, but the definition of the exposure level that defines a contaminated area has been decreasing over the years of historical data. Therefore it is not possible to apply a single criterion to all the historical data combined. Thus it was necessary to use one of the nonparametric tests that is equivalent to the one-way ANOVA. The Mood Median

Test was used. The one-way ANOVA tests the hypothesis that the means of the several groups are equal. If the hypothesis is accepted, there can be no significant differences between years and thus no trend of any kind is present in the data. The Mood test is for the hypothesis that the medians of the several groups are equal. The use of medians greatly reduces the influence of outlier data values.

Table 5.3 presents the Mood analysis results. This table is structured in approximately the same way as Table 5.2. The hypothesis of no differences between years must be rejected. The plot of the medians and confidence intervals suggests three clusters of median values. The years 1990, 1991, and 1992 have almost identical median values. The median is noticeably higher for 1993. The years 1994 and 1995 have almost identical medians and are lower than the other clusters. Figure 5.3 presents a box plot of the data used in the Mood Median Test. These box plots suggest that the differences between years are not remarkable even though they are statistically significant. An asterisk in this figure plots a data point that the box plot algorithm identifies as a possible outlier.

A two-way ANOVA was used in previous reports to analyze for differences between years and operational areas. As mentioned above, when the 1994 and 1995 data is added to the historical data base the composite data no longer satisfies the distributional assumptions of the ANOVA procedures. The non-parametric analog is the Friedmans Test, but it cannot be used because the data is unbalanced. There are missing cells in the data array and the number of data values in the cells varies greatly. Statistically the data is "rank deficient." The General Linear Model method of performing the ANOVA will analyze this data, but since the distributional assumptions are violated, the results must be considered as approximate and generalized. Both the years factor and the area factor were specified as ANOVA fixed effects for this analysis. This analysis showed a very significant difference among areas and among years and no interaction between areas and years. This is in agreement with the results of the Mood Median Test that found a significant difference among years, and a significant difference among NTS operational areas is expected. The lack of interactions leads to the conclusion that any pattern of responses over the years does not differ among the areas. Thus, annual averages over areas are a reasonable way of summarizing the data. The significant differences among areas means that the average gamma exposure over all years differ from operational area to operational area. In statistical terminology the areas become "blocking" factors.

CONCLUSIONS

Two types of TLD data were analyzed to see if any significant historical trends might be detected. The analysis of the data from the 24 original and 15 replacement designated background (control and boundary) stations for the years 1978 through 1995 showed three clusters of yearly means, with the lower cluster significantly different from the higher cluster. The middle cluster is not significantly different from the other two clusters. Since a calibration problem was discovered in 1988, the data for this year are less reliable than for other years. No long term historical pattern was detected during the period studied. The second type of data consisted of all the data from the NTS for the current year and previous five years. These data showed the median values can be divided into a group of consistent years of 1990 to 1992, then a significantly higher year of 1993 followed by significantly lower years of 1994 and 1995.

Table 5.1 Average Annual Millirem per Year for Designated Background TLD Stations

Location	Year										
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Building 650 Dosimetry	49	112	51	95	69	73	69	66	95	53	54
Building 650 Roof	45	47	62	86	64	69	69	66	90	51	54
Post Office	47	57	89	106	83	83	86	84	109	78	71
NRDS Warehouse	101	100	144	166	139	142	144	135	167	121	130
HENRE	101	99	123	170	138	143	147	132	163	115	119
Area 27 Cafeteria	106	89	139	179	118	146	154	143	169	121	121
Well 5B	93	79	119	157	129	125	133	113	144	125	108
CP-6	60	49	76	131	100	90	86	84	109	69	71
Yucca Oil Storage	82	79	112	106	115	116	120	113	136	98	96
Boundary Station 346	47	53	158	84	77	83	74	81	95	58	(c)
Boundary Station 347	78	98	145	117	99	119	110	117	128	92	(c)
Boundary Station 348	(c)	118	(c)	146	164	165	137	172	164	130	(c)
Boundary Station 349	121	131	201	184	179	174	155	179	195	140	(c)
Boundary Station 350	147	155	172	201	208	207	193	205	240	163	(c)
Boundary Station 351	129	139	202	193	106	113	169	187	179	146	(c)
Boundary Station 352	76	84	134	60	208	173	101	117	131	85	(c)
Boundary Station 353	126	180	214	181	212	157	171	150	170	144	(c)
Boundary Station 354	123	113	146	252	204	165	163	154	163	138	(c)
355/Gold Meadows[b]	89	99	115	135	135	114	119	117	135	97	95
Boundary Station 356	128	376[a]	144	178	179	180	170	172	147	143	(c)
Boundary Station 357	59	69	82	93	91	95	94	102	127	70	(c)
Boundary Station 358	54	64	60	84	88	88	79	88	102	63	(c)
Boundary Station 359	111	127	116	175	172	175	165	172	200	133	(c)
Boundary Station 360	47	62	30	82	80	81	74	77	96	54	(c)
Substation U15e	88	67	129	137	254	109	111	113	135	104	103
Stake C-31	131	137	689[a]	262	164	174	178	176	183	123	195
Stake R-29	127	158	172	179	172	170	167	242	197	142	140
Stake J-41	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	186	143	140
Stake LC-4	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	237	124	161
Stake A-118	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	218	142	126
Papoose Lake Road	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	116	77
Gate 19-3P	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	108	135
Area 3 Hill Top	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	131
East of U11b	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	114
Army Well No. 1	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	80
Jackass Flats & A27 Roads	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	71
3.3 mi SE Aggregate Pit	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	58
Guard Station 510	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	122
Yucca Mountain	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	155

(a) Denotes a statistical outlier that was not used in the statistical analyses.
(b) Boundary station 355 was renamed Gold Meadows in 1995; the geographical location did not change.
(c) Missing data values.

Table 5.2 One-Way ANOVA on Background Station (mR/yr) for Differences Among Years

Source	Degrees of Freedom	Sum of Square	Mean Square	F Statistic	p Value
Year	17	124786	7340	4.33	0.000
Error	449	761563	1696		
Total	466	886349			

Year	Number	Mean	Standard Deviation
78	9	96.44	34.46
79	25	109.88	38.38
80	27	124.44	44.60
81	27	131.85	42.50
82	27	122.59	40.44
83	27	118.89	38.06
84	27	101.70	34.10
85	26	90.96	32.47
86	26	98.65	36.60
87	25	125.40	48.14
88	27	145.89	52.03
89	27	138.78	51.95
90	27	130.70	39.81
91	27	127.33	39.03
92	27	131.74	45.52
93	29	151.45	41.17
94	32	110.00	34.23
95	25	110.12	37.16

Pooled Standard Deviation = 41.18

Individual 95% Confidence Intervals for the Mean Based on Pooled Standard Deviation

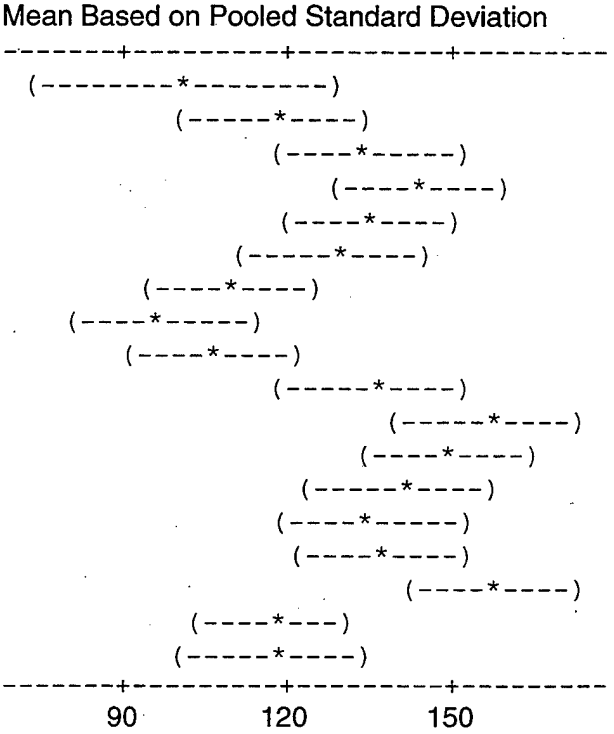


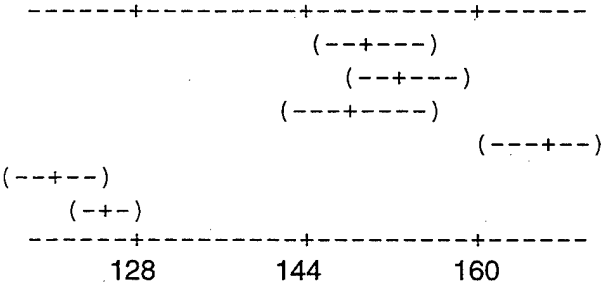
Table 5.3 Mood Median Test for Differences Among Years of (mR/Yr) all Environmental TLDs

Chisquare = 158.85 Degrees of Freedom = 5 p Value = 0.000

Year	N<=	N>	Median	Q3-Q1
90	60	78	146.5	47.0
91	52	91	150.0	42.0
92	64	79	146.0	48.0
93	30	115	169.0	45.0
94	116	33	122.0	39.5
95	115	31	125.0	35.5

Overall Median = 142.0

Individual 95.0% Confidence Intervals for the Mean Based on Pooled Standard Deviation



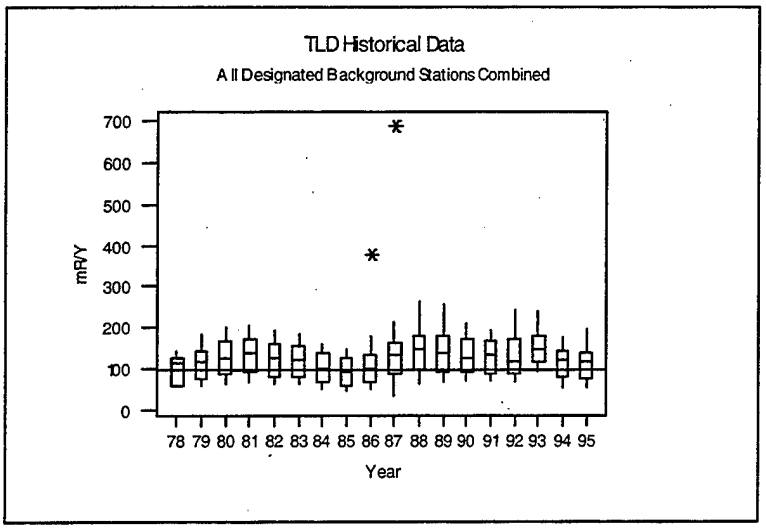


Figure 5.1 Time Series of Box Plots of Historical TLD Data

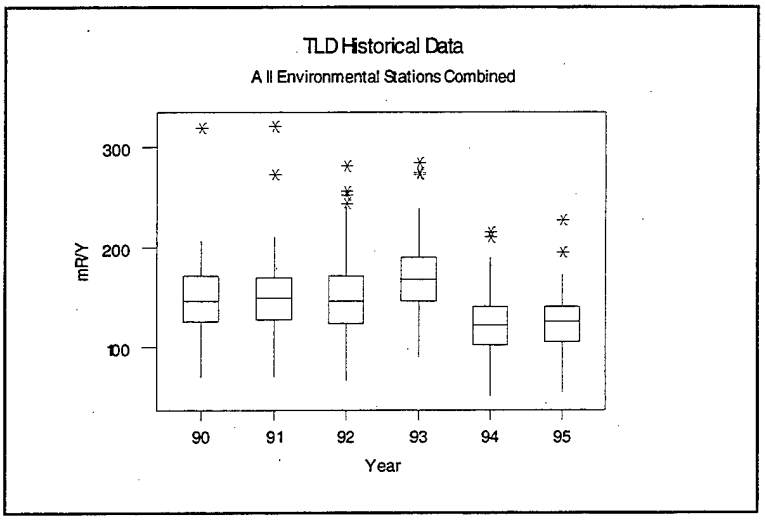


Figure 5.2 Time Series of Box Plots for Environmental TLD Data

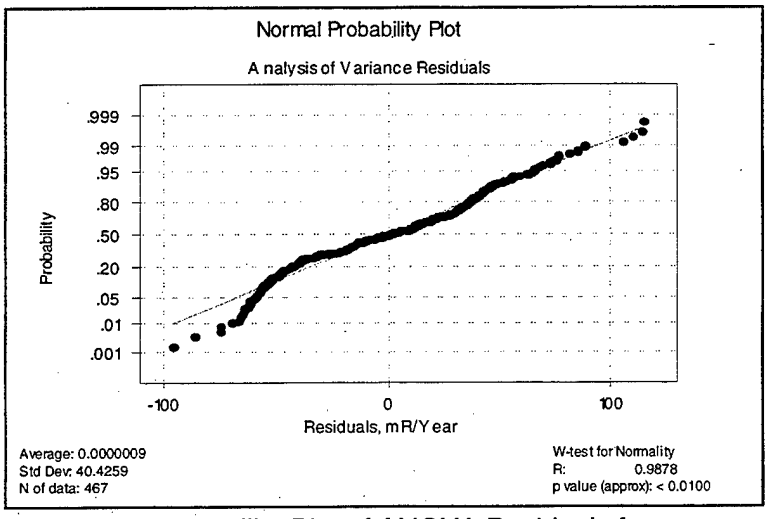


Figure 5.3 Probability Plot of ANOVA Residuals for Background Stations

Attachment 5.1 Average Annual Millirem per Year for NTS Environmental Monitoring TLDs

NTS Identification Number	Station Name	Year 1990	1991	1992	1993	1994	1995
01293	BJY	139	112	113	132	100	92
01318	Stake TH-27/28	125	125	113	136	84	95
01381	Sandbag Storage	132	135	135	161	109	113
02296	Stake M-140	150	150	154	173	141	129
02297	Stake N-8	1445	1130	1116	1046	835	841
02298	Stake L-9	236	230	220	237	194	175
02299	Stake M-150	152	153	161	180	134	139
02321	Stake TH-58	112	114	110	130	83	88
03275	Stake OB-20	104	106	102	121	85	84
03276	U-3ax/bl South	173	181	179	195	137	152
03277	U-3ax/bl Southeast	196	198	190	208	146	161
03278	U-3ax/bl Northeast	319	321	282	286	210	228
03279	U-3ax/bl Northwest	208	210	190	202	152	166
03280	LANL Trailers	141	147	139	159	117	133
03281	Stake A-6.5	186	195	179	209	142	174
03282	U-3du South	203	202	187	210	155	149
03283	U-3by South	181	190	176	202	144	150
03284	U-3bz South	164	165	161	184	133	137
03285	U-3ey South	159	164	154	196	127	136
03286	U-3cj North	196	165	157	191	129	129
03287	U-3bz North	230	217	220	252	187	180
03288	U-3by North	310	311	289	315	242	225
03289	U-3co North	1147	827	981	1051	814	771
03290	U-3co South	710	708	641	680	515	509
03291	U-3du North	186	190	172	205	152	148
04294	Stake A-9	1408	1115	1274	1288	1094	1059
19340	Stake P-71	174	182	172	192	126	142
03358	Boundary Station 358	88	79	88	102	63	[b]
03628	U-3ah/at North	151	158	150	175	126	124
03629	U-3ah/at South	227	231	198	217	192	175
03630	U-3ah/at East	148	145	154	193	124	127
03631	U-3ah/at West	150	158	143	182	122	130
03632	U-3ah/at South Gate	152	172	150	175	131	128
04295	Stake M-130	135	145	146	157	121	131
01319	Stake TH-38	139	139	132	154	102	109
04320	Stake TH-48	148	146	135	163	106	110
05600	RWMS Pit 3 North	140	168	146	262	127	133
05249	Well 5B	125	133	113	144	125	108
05250	RWMS East 1500'	139	145	139	163	117	131
05251	RWMS East 1000'	144	137	139	169	120	132
05252	RWMS East 500'	139	148	135	158	113	120

(a) Missing data value.
(b) No TLD at location.

6.0 RADIOACTIVE NOBLE GASES IN AIR ONSITE

The 1995 data consist of ^{85}Kr concentrations from six permanent sampling stations. The locations of these noble gas sampling stations are shown in Figure 6.1. All tables, figures, and attachments are located at the end of the chapter. Analyses for xenon were discontinued at the beginning of 1995, and the stations located at the DDZ77 transformer, Gravel Pit, U.S. Environmental Protection Agency (EPA) Farm, and Engine Maintenance, Assembly and Diassembly building (E-MAD) were shut down. In October 1995, the stations at Gate 200 South Area 12 Camp and Gate 400 were discontinued, leaving three stations in operation for the last quarter of 1995 and for 1996. The three stations now operating are BJY, Area 20 Camp, and Pahute Substation. Data from the first quarter of the year are missing for stations located on Pahute and Rainier Mesas and Areas 19 and 20. These areas were closed during the winter because of snow on the roads. No data are given for the Area 20 station for dates from April 26 to August 31, 1995. From April 26 to June 27, 1995, the Area 20 station had a variety of mechanical problems; then from June 27 to August 31, 1995, no power was available to operate the pump. The Pahute Substation sampler was not operational from April 26 to June 6, 1995, and from July 26 to September 6, 1995, due to mechanical problems.

The information given in Attachment 6.1 consists of (1) an alphabetic station description, (2) the dates of sample collection given as the date sample collection began (samples were collected for a one-week period), (3) the krypton concentrations in $\mu Ci/mL \times 10^{-12}$ with one standard deviation (1s, counting error), and (4) the analytical counting minimum detectable concentrations (MDC). The units of 10^{-12} $\mu Ci/mL$ are equivalent to pCi/m^3. Attachment 6.1 contains these data for the calendar year 1995. An alphabetic notation denotes a missing value. Six categories of causes for the missing values are identified by the footnote codes and defined at the end of the table. All of the krypton concentrations are above the corresponding MDC. The average MDC is 3.65×10^{-12} $\mu Ci/mL$. The MDCs have a lognormal statistical distribution with a median of 3.44×10^{-12} $\mu Ci/mL$. The standard deviation of the krypton MDCs is 1.47×10^{-12} $\mu Ci/mL$.

Figures 6.2 through 6.8 are time series plots of the data in Attachment 6.1. The first plot contains all the stations combined; then there is one plot for each station. Note that these time series plots have one of two ordinate scales, either 0 to 80 or 0 to 50. The plots for the individual stations contain the detection limits, indicated by the solid line, and the approximate 95 percent confidence interval of the concentrations is indicated by the dotted lines. The confidence intervals were calculated as the concentration plus or minus twice the analytical standard deviation. The abscissa value was approximated by dividing the day of the month by 32, then adding the month number. In general, these plots show most of the values around environmental background levels (approximately 27).

An exploratory data analysis was performed on the krypton data for each of the stations using probability plot and goodness of fit test methods. All stations combined fit a normal, but not a lognormal, distribution except for two outlying observations. These two values are the results close to 80 for Gate 200 South, seen in Figure 6.4 and Area 20 Camp, seen in Figure 6.6. The normal distribution was chosen for further statistical analyses to satisfy the underlying assumptions of the analysis of variance (ANOVA) methods. Table 6.1 gives the basic descriptive statistics of the stations where annual krypton data were collected. The overall mean given in this table is typical of environmental conditions at the NTS. The mean detection limit for all stations combined is 3.65. All values are above the detection limits and most values are about ten times the detection limits.

A one-way ANOVA was used to compare the six locations for equality of krypton means. The ANOVA output is shown in Table 6.2. In an ANOVA table the degrees of freedom, sum of squares, mean squares, and the computed value of the F-statistic are shown. The p-value is the probability associated with the F-statistic. This is the probability that significant differences between the stations would be found if the null hypothesis were true. Since this probability is much larger than the usual 5 percent critical value, the conclusion is that there are no significant differences.

Very few duplicate analyses were performed in 1995, and thus no analysis of duplicates was performed.

HISTORICAL TRENDS

Since 1982, krypton concentrations have ben reported in NTS annual environmental reports at four locations and for a portion of this time period, for an additional seven stations. Before 1982, EPA operated the Noble Gas network. The krypton historical data are shown in Table 6.3. Note that data for the PILE DRIVER location exist only for the years 1987 through 1990. These are the years in which no data were collected at the EPA Farm. For these years a noble gas sampler was moved 1.5 miles northwest from the EPA Farm to the vicinity of the PILE DRIVER event. PILE DRIVER was a weapons effects test detonated on June 2, 1966. The move from the EPA Farm was made when the farm was closed and the move back was made when electrical power was disconnected from the PILE DRIVER location. An assumption can be made that these stations were close enough together that the moves would not significantly affect the concentrations. Thus these stations probably can be considered as one.

Table 6.3 shows that most of the data are clustered between 20 and 30 $\mu Ci/mL \times 10^{-12}$, with a few values in the 40 to 50 range. These three high values occurred at the Area 20 Camp in 1985, 1986, and 1987. During this time period there were several accidental ventings within three miles of this camp. The remaining data in Table 6.3 shows a very consistent pattern of values clustered about 25 $\mu Ci/mL \times 10^{-12}$. Including the high values from the Area 20 Camp, the data in Table 6.3 have an average of 26.8×10^{-12} $\mu Ci/mL$ and a standard deviation of 4.7×10^{-12} $\mu Ci/mL$. Thus most of the data are within one standard deviation of the mean. This is unusual consistency for environmental data and indicates that for the years 1982 through 1995 there has been no historical trend in krypton concentrations on the NTS.

CONCLUSION

The 1995 ^{85}Kr concentrations in the NTS air were all around the world-wide background concentration of 27 $\mu Ci/mL \times 10^{-12}$, except for two individual values. These two values were a concentration of 78.8 $\mu Ci/mL \times 10^{-12}$ at Gate 200 South on April 3,1995, and a concentration of 66.0 $\mu Ci/mL \times 10^{-12}$ at Area 20 Camp on November 13, 1995. No reason is known for these atypical values, and samples immediately preceding and following these values were at background levels. Historical ^{85}Kr data are also typically at background levels except for the Area 20 Camp in 1985, 1986, and 1987 that is attributed to atmospheric pumping of krypton seeping upward from underground tests on Pahute Mesa.

Table 6.1 Descriptive Statistics of 1995 Krypton Data ($\mu Ci/mL \times 10^{-12}$)

Environmental Stations	N	Mean	Median	Standard Deviation	1st Quartile	3rd Quartile	Maximum
BJY	40	27.5	28.5	7.5	24.2	31.2	47.9
Gate 200	29	28.4	29.3	13.1	19.1	32.9	78.8
Area 12 Camp	20	27.4	26.8	4.9	25.4	30.4	34.9
Area 20 Camp	15	33.7	33.5	12.0	26.5	38.5	66.0
Pahute Substation	16	27.2	27.9	7.6	24.2	31.7	41.8
Gate 400	25	27.0	25.7	6.3	22.7	31.3	38.0
All	145	28.2	28.6	9.0	24.1	31.6	78.8

Table 6.2 One-Way ANOVA on Krypton Concentrations for Differences between Stations ($\mu Ci/mL \times 10^{-12}$)

Source	Degree of Freedom	Sum of Square	Mean Square	F-Statistics	p-Value
Station	5	535.0	107.0	1.32	0.261
Error	139	11309.3	81.4		
Total	144	11844.3			

Station	N	Mean	Standard Deviation
BJY	40	27.510	7.504
Gate 200 South	29	28.351	13.109
Area 12 Camp	20	27.374	4.933
Area 20 Camp	15	33.671	12.040
Pahute	16	27.166	7.624
Gate 400	25	27.005	6.252

Pooled Standard Deviation = 9.020

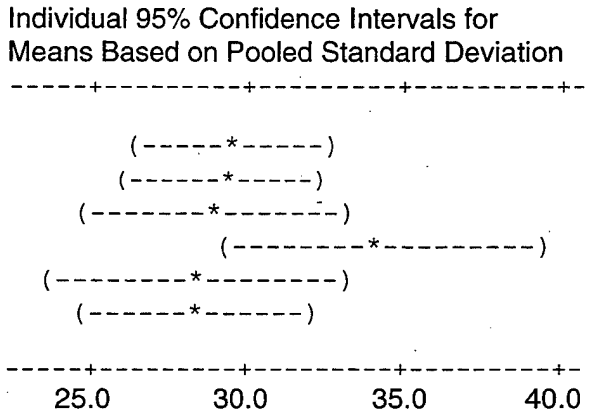


Table 6.3 NTS Krypton History

Historical Krypton Annual Averages, $\mu Ci/mL \times 10^{-12}$

Location	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
BJY	25.4	26.5	28.0	29.0	30.0	25.3	23.7	24.1	23.3	24.0	25.8	26.9	25.3	27.5
Gravel Pit	(a)	(a)	(a)	30.0	29.0	26.2	22.8	22.4	24.8	24.0	26.6	26.8	26.1	(a)
Gate 200 South	(a)	25.3	26.0	27.0	27.0	27.3	23.4	22.7	22.6	22.5	26.6	26.8	23.8	28.4
Area 12 Camp	24.5	24.8	27.0	28.0	30.0	25.7	26.9	22.9	23.9	23.6	25.9	25.7	24.3	27.4
EPA Farm	25.4	24.9	28.0	30.0	31.0	(a)	(a)	(a)	(a)	23.4	26.3	26.0	26.0	(a)
PILEDRIVER	(a)	(a)	(a)	(a)	(a)	26.2	24.4	22.3	24.2	(a)	(a)	(a)	(a)	(a)
Gate 400	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	24.5	26.5	24.6	27.0
Pahute Substation	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	24.4	27.3	23.1	27.2
Area 20 Camp	(a)	22.5	31.0	46.0	58.0	39.3	28.8	26.8	29.3	31.7	29.5	28.4	26.5	33.7
DDZ77 Trans.	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	24.3	27.4	29.7	(a)
E-MAD North	24.4	25.3	27.0	29.0	32.0	26.4	22.5	22.1	21.4	23.8	27.7	25.6	25.8	(a)

(a) Missing data value.

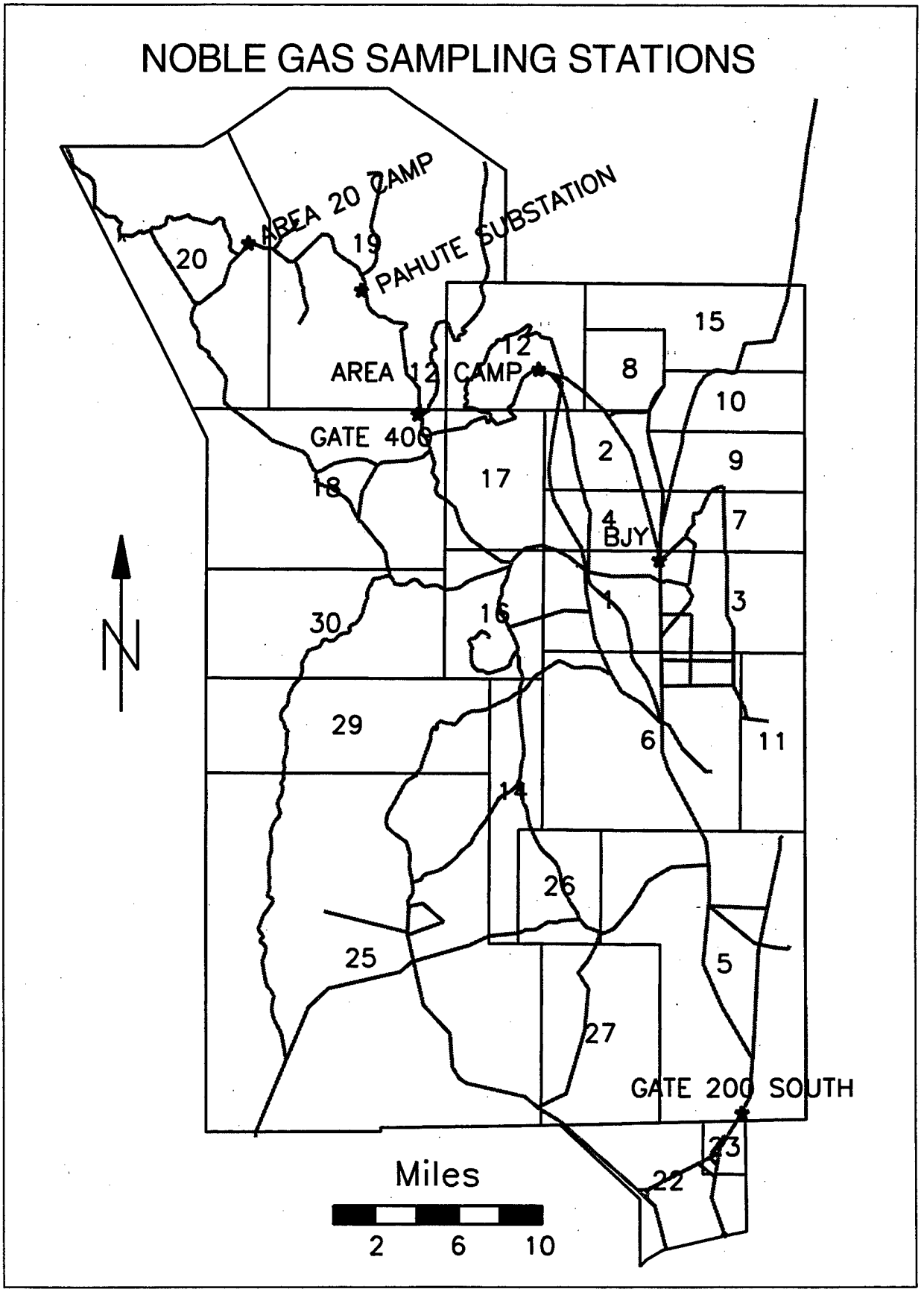


Figure 6.1 Nevada Test Site Map

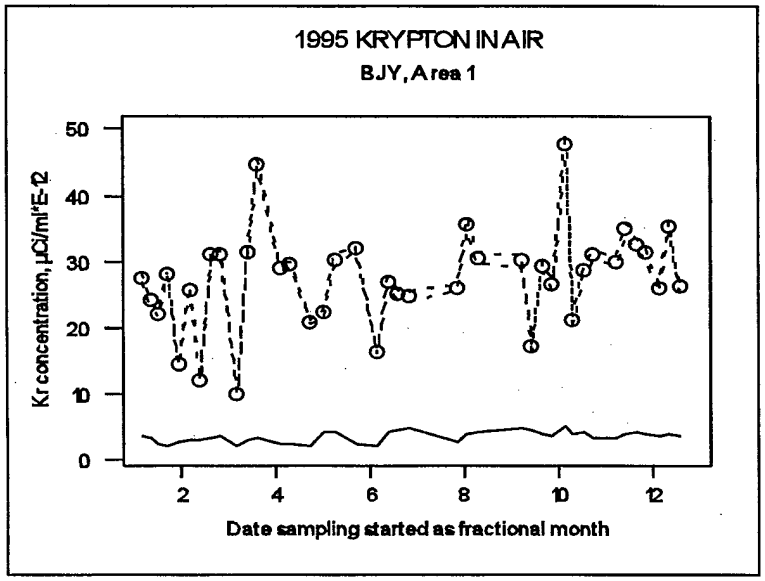


Figure 6.2 Time Series Plot of BJY Results

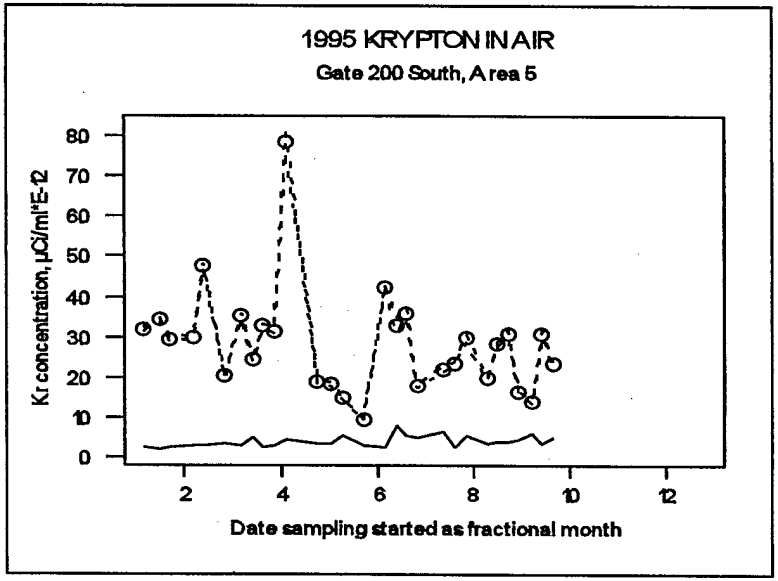


Figure 6.3 Time Series Plot of Gate 200 S Results

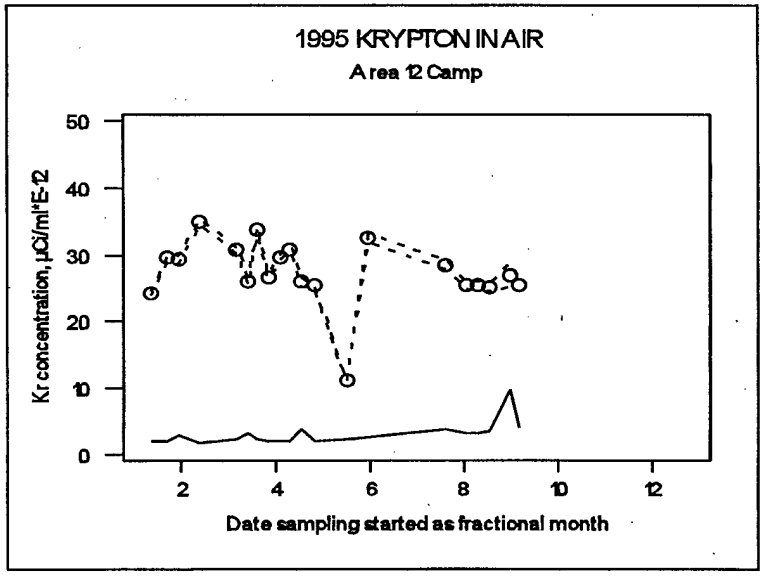


Figure 6.4 Time Series Plot of Area 12 Camp Results

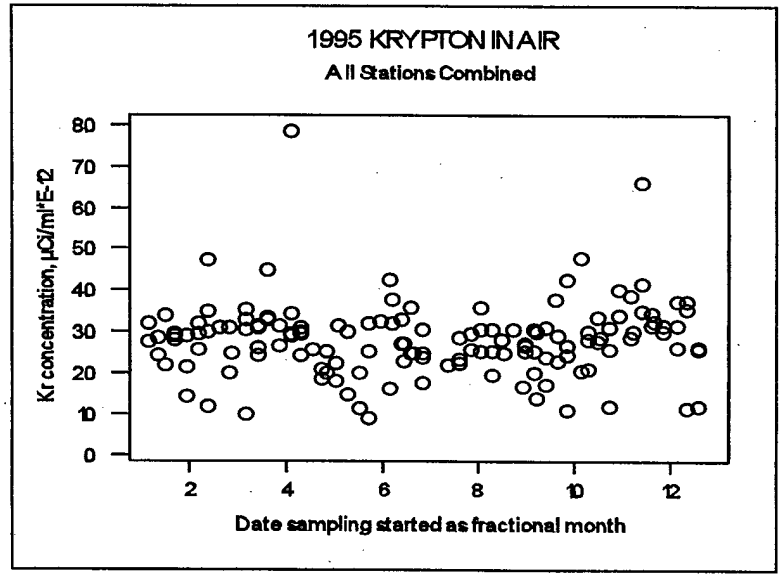


Figure 6.5 Time Series Plot of All Kr Results

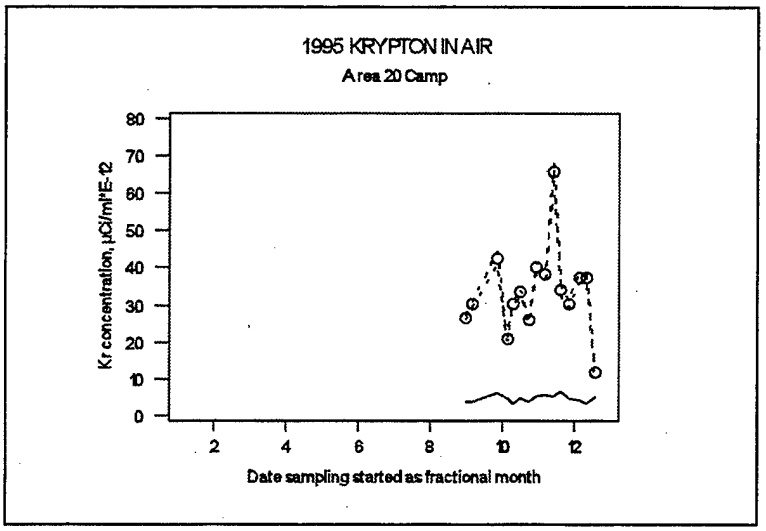


Figure 6.6 Time Series Plot of Area 20 Camp Results

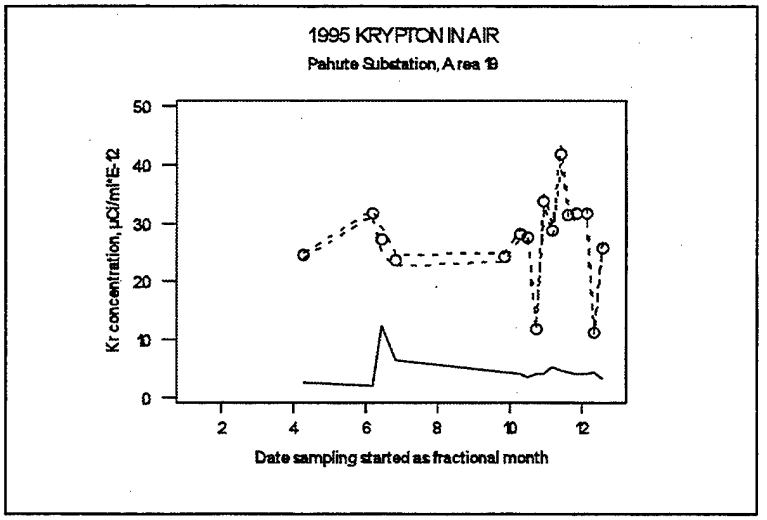


Figure 6.7 Time Series Plot of Pahute Substation Results

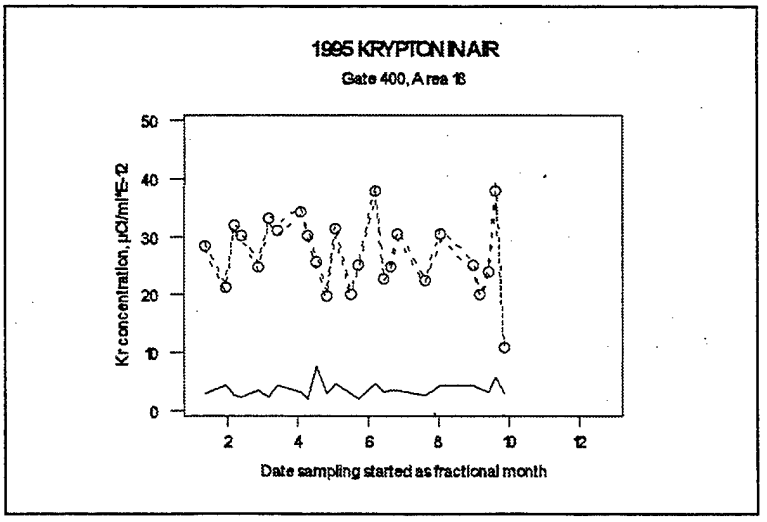


Figure 6.8 Time Series Plot of Gate 400 Results

Attachment 6.1 Sample Results for ^{85}Kr - 1995

Sampling Location	Start Date	Krypton ± 1s 10^{-12} µCi/mL	Detection Limit 10^{-12} µCi/mL
Area 1, BJY	01/05/95	27.6 ± 0.3	3.5
Area 1, BJY	01/11/95	24.1 ± 0.3	3.3
Area 1, BJY	01/17/95	22.0 ± 0.2	2.4
Area 1, BJY	01/23/95	28.2 ± 0.2	2.0
Area 1, BJY	01/30/95	14.4 ± 0.1	2.7
Area 1, BJY	02/06/95	25.8 ± 0.2	2.9
Area 1, BJY	02/13/95	12.0 ± 0.1	2.9
Area 1, BJY	02/21/95	31.2 ± 0.4	3.2
Area 1, BJY	02/27/95	31.2 ± 0.4	3.6
Area 1, BJY	03/06/95	10.0 ± 0.1	2.0
Area 1, BJY	03/13/95	31.4 ± 0.3	2.8
Area 1, BJY	03/20/95	44.9 ± 0.5	3.2
Area 1, BJY	03/27/95	(a) (e)	(a)
Area 1, BJY	04/03/95	29.2 ± 0.2	2.3
Area 1, BJY	04/10/95	29.6 ± 0.2	2.4
Area 1, BJY	04/17/95	(a) (c)	(a)
Area 1, BJY	04/24/95	20.7 ± 0.1	2.0
Area 1, BJY	05/01/95	22.4 ± 0.3	4.1
Area 1, BJY	05/08/95	30.2 ± 0.4	4.0
Area 1, BJY	05/15/95	(a) (c)	(a)
Area 1, BJY	05/22/95	32.0 ± 0.2	2.2
Area 1, BJY	05/30/95	(a) (c)	(a)
Area 1, BJY	06/05/95	16.1 ± 0.1	1.8
Area 1, BJY	06/12/95	27.0 ± 0.4	4.0
Area 1, BJY	06/19/95	25.0 ± 0.4	4.5
Area 1, BJY	06/26/95	24.7 ± 0.4	4.7
Area 1, BJY	07/10/95	(a) (b)	(a)
Area 1, BJY	07/27/95	26.0 ± 0.2	2.6
Area 1, BJY	08/02/95	35.7 ± 0.5	3.9
Area 1, BJY	08/09/95	30.5 ± 0.4	4.0
Area 1, BJY	08/16/95	(a) (b)	(a)
Area 1, BJY	08/23/95	(a) (c)	(a)
Area 1, BJY	08/30/95	(a) (b)	(a)
Area 1, BJY	09/07/95	30.1 ± 0.5	4.8
Area 1, BJY	09/14/95	17.1 ± 0.2	4.3
Area 1, BJY	09/21/95	29.2 ± 0.4	3.9

(a) Missing value code, due to:
(b) Instrument malfunction.
(c) Sample lost in analysis.
(d) No sample collected, insufficient sample, no pressure in sample bottle, sampler failed, loss of power.
(e) Radon daughters detected.
(f) Unknown or undocumented cause.

Attachment 6.1 (Sample Results for ^{85}Kr - 1995, cont.)

Sampling Location	Start Date	Krypton ± 1s 10^{-12} µCi/mL	Detection Limit 10^{-12} µCi/mL
Area 1, BJY	09/28/95	26.6 ± 0.3	3.6
Area 1, BJY	10/05/95	47.9 ± 0.9	5.0
Area 1, BJY	10/10/95	21.2 ± 0.3	3.7
Area 1, BJY	10/17/95	28.8 ± 0.4	4.0
Area 1, BJY	10/24/95	31.1 ± 0.4	3.2
Area 1, BJY	11/07/95	30.1 ± 0.3	3.2
Area 1, BJY	11/14/95	35.0 ± 0.5	3.7
Area 1, BJY	11/21/95	32.6 ± 0.5	4.2
Area 1, BJY	11/27/95	31.3 ± 0.4	3.7
Area 1, BJY	12/04/95	26.0 ± 0.3	3.6
Area 1, BJY	12/11/95	35.4 ± 0.5	3.9
Area 1, BJY	12/18/95	26.3 ± 0.3	3.4
Area 5, Gate 200 South	12/28/94	(a) (f)	(a)
Area 5, Gate 200 South	01/05/95	31.9 ± 0.3	2.3
Area 5, Gate 200 South	01/11/95	(a) (c)	(a)
Area 5, Gate 200 South	01/17/95	34.0 ± 0.2	1.9
Area 5, Gate 200 South	01/23/95	29.3 ± 0.2	2.3
Area 5, Gate 200 South	01/30/95	(a) (c)	(a)
Area 5, Gate 200 South	02/06/95	29.8 ± 0.3	2.7
Area 5, Gate 200 South	02/13/95	47.6 ± 0.5	2.6
Area 5, Gate 200 South	02/21/95	(a) (c)	(a)
Area 5, Gate 200 South	02/27/95	20.1 ± 0.2	3.3
Area 5, Gate 200 South	03/06/95	35.2 ± 0.4	2.9
Area 5, Gate 200 South	03/13/95	24.3 ± 0.4	4.5
Area 5, Gate 200 South	03/20/95	32.8 ± 0.3	2.4
Area 5, Gate 200 South	03/27/95	31.5 ± 0.3	2.6
Area 5, Gate 200 South	04/03/95	78.8 ± 1.2	4.1
Area 5, Gate 200 South	04/10/95	(a) (c)	(a)
Area 5, Gate 200 South	04/17/95	(a) (c)	(a)
Area 5, Gate 200 South	04/24/95	18.6 ± 0.2	3.1
Area 5, Gate 200 South	05/01/95	18.1 ± 0.2	3.4
Area 5, Gate 200 South	05/08/95	14.8 ± 0.2	5.0
Area 5, Gate 200 South	05/15/95	(a) (c)	(a)
Area 5, Gate 200 South	05/22/95	9.1 ± 0.1	2.6
Area 5, Gate 200 South	05/30/95	(a) (c)	(a)
Area 5, Gate 200 South	06/05/95	42.4 ± 0.4	2.4

(a) Missing value code, due to:
(b) Instrument malfunction.
(c) Sample lost in analysis.
(d) No sample collected, insufficient sample, no pressure in sample bottle, sampler failed, loss of power.
(e) Radon daughters detected.
(f) Unknown or undocumented cause.

Attachment 6.1 (Sample Results for ^{85}Kr - 1995, cont.)

Sampling Location	Start Date	Krypton ± 1s 10^{-12} µCi/mL	Detection Limit 10^{-12} µCi/mL
Area 5, Gate 200 South	06/12/95	32.9 ± 0.8	7.7
Area 5, Gate 200 South	06/19/95	35.9 ± 0.7	5.5
Area 5, Gate 200 South	06/26/95	17.7 ± 0.3	4.7
Area 5, Gate 200 South	07/11/95	21.9 ± 0.4	6.3
Area 5, Gate 200 South	07/19/95	23.2 ± 0.2	2.0
Area 5, Gate 200 South	07/27/95	29.6 ± 0.5	5.0
Area 5, Gate 200 South	08/02/95	(a) (b)	(a)
Area 5, Gate 200 South	08/09/95	19.5 ± 0.2	3.3
Area 5, Gate 200 South	08/16/95	28.2 ± 0.4	3.9
Area 5, Gate 200 South	08/23/95	30.8 ± 0.4	3.7
Area 5, Gate 200 South	08/30/95	16.4 ± 0.2	4.3
Area 5, Gate 200 South	09/07/95	13.6 ± 0.3	5.8
Area 5, Gate 200 South	09/14/95	31.0 ± 0.4	3.1
Area 5, Gate 200 South	09/21/95	23.0 ± 0.4	4.7
Area 12, Camp	12/28/94	(a) (d)	(a)
Area 12, Camp	01/11/95	24.2 ± 0.2	1.8
Area 12, Camp	01/17/95	(a) (d)	(a)
Area 12, Camp	01/23/95	29.6 ± 0.2	1.8
Area 12, Camp	01/30/95	29.2 ± 0.3	2.7
Area 12, Camp	02/06/95	(a) (d)	(a)
Area 12, Camp	02/13/95	34.9 ± 0.2	1.7
Area 12, Camp	02/22/95	(a) (d)	(a)
Area 12, Camp	02/27/95	(a) (d)	(a)
Area 12, Camp	03/06/95	30.7 ± 0.2	2.1
Area 12, Camp	03/13/95	26.1 ± 0.3	3.0
Area 12, Camp	03/20/95	33.7 ± 0.3	2.3
Area 12, Camp	03/27/95	26.7 ± 0.2	1.9
Area 12, Camp	04/03/95	29.7 ± 0.2	2.1
Area 12, Camp	04/10/95	30.9 ± 0.2	2.0
Area 12, Camp	04/17/95	26.0 ± 0.3	3.8
Area 12, Camp	04/26/95	25.4 ± 0.2	2.0
Area 12, Camp	05/02/95	(a) (c)	(a)
Area 12, Camp	05/08/95	(a) (c)	(a)
Area 12, Camp	05/16/95	11.1 ± 0.1	2.4
Area 12, Camp	05/23/95	(a) (d)	(a)
Area 12, Camp	05/31/95	32.5 ± 0.3	2.6

(a) Missing value code, due to:
(b) Instrument malfunction.
(c) Sample lost in analysis.
(d) No sample collected, insufficient sample, no pressure in sample bottle, sampler failed, loss of power.
(e) Radon daughters detected.
(f) Unknown or undocumented cause.

Attachment 6.1 (Sample Results for ^{85}Kr - 1995, cont.)

Sampling Location	Start Date	Krypton ± 1s 10^{-12} µCi/mL	Detection Limit 10^{-12} µCi/mL
Area 12, Camp	06/05/95	(a) (c)	(a)
Area 12, Camp	06/14/95	(a) (e)	(a)
Area 12, Camp	06/20/95	(a) (d)	(a)
Area 12, Camp	06/27/95	(a) (d)	(a)
Area 12, Camp	07/19/95	28.6 ± 0.4	3.7
Area 12, Camp	07/26/95	(a) (c)	(a)
Area 12, Camp	08/02/95	25.4 ± 0.3	3.0
Area 12, Camp	08/10/95	25.4 ± 0.3	3.0
Area 12, Camp	08/17/95	25.0 ± 0.3	3.5
Area 12, Camp	08/24/95	(a) (d)	(a)
Area 12, Camp	08/31/95	27.0 ± 0.8	9.7
Area 12, Camp	09/06/95	25.5 ± 0.3	3.9
Area 18, Gate 400	12/28/94	(a) (b)	(a)
Area 18, Gate 400	01/11/95	28.5 ± 0.3	2.8
Area 18, Gate 400	01/17/95	(a) (d)	(a)
Area 18, Gate 400	01/23/95	(a) (d)	(a)
Area 18, Gate 400	01/30/95	21.3 ± 0.3	4.3
Area 18, Gate 400	02/06/95	31.8 ± 0.3	2.6
Area 18, Gate 400	02/13/95	30.1 ± 0.3	2.4
Area 18, Gate 400	02/28/95	24.9 ± 0.3	3.3
Area 18, Gate 400	03/06/95	33.2 ± 0.3	2.4
Area 18, Gate 400	03/13/95	31.2 ± 0.5	4.2
Area 18, Gate 400	03/20/95	(a) (c)	(a)
Area 18, Gate 400	03/27/95	(a) (d)	(a)
Area 18, Gate 400	04/03/95	34.5 ± 0.4	3.1
Area 18, Gate 400	04/10/95	30.3 ± 0.2	2.0
Area 18, Gate 400	04/17/95	25.7 ± 0.6	7.4
Area 18, Gate 400	04/26/95	19.9 ± 0.2	2.9
Area 18, Gate 400	05/02/95	31.3 ± 0.5	4.7
Area 18, Gate 400	05/08/95	(a) (c)	(a)
Area 18, Gate 400	05/16/95	20.2 ± 0.2	2.7
Area 18, Gate 400	05/23/95	25.1 ± 0.2	1.8
Area 18, Gate 400	05/31/95	(a) (b)	(a)
Area 18, Gate 400	06/06/95	37.9 ± 0.6	4.6
Area 18, Gate 400	06/14/95	22.9 ± 0.2	3.1
Area 18, Gate 400	06/20/95	25.0 ± 0.3	3.3

(a) Missing value code, due to:
(b) Instrument malfunction.
(c) Sample lost in analysis.
(d) No sample collected, insufficient sample, no pressure in sample bottle, sampler failed, loss of power.
(e) Radon daughters detected.
(f) Unknown or undocumented cause.

Attachment 6.1 (Sample Results for ^{85}Kr - 1995, cont.)

Sampling Location	Start Date	Krypton ± 1s 10^{-12} µCi/mL	Detection Limit 10^{-12} µCi/mL
Area 18, Gate 400	06/27/95	30.4 ± 0.4	3.4
Area 18, Gate 400	07/19/95	22.5 ± 0.2	2.5
Area 18, Gate 400	07/26/95	(a) (a)	(a)
Area 18, Gate 400	08/02/95	30.5 ± 0.5	4.3
Area 18, Gate 400	08/10/95	(a) (a)	(a)
Area 18, Gate 400	08/31/95	25.0 ± 0.4	4.5
Area 18, Gate 400	09/06/95	20.1 ± 0.3	3.9
Area 18, Gate 400	09/13/95	23.9 ± 0.2	3.0
Area 18, Gate 400	09/20/95	38.0 ± 0.7	5.7
Area 18, Gate 400	09/27/95	11.0 ± 0.1	2.8
Area 19, Pahute Substation	04/10/95	24.4 ± 0.2	2.4
Area 19, Pahute Substation	04/26/95	(a) (d)	(a)
Area 19, Pahute Substation	06/06/95	31.8 ± 0.2	2.0
Area 19, Pahute Substation	06/14/95	27.1 ± 1.1	12.4
Area 19, Pahute Substation	06/20/95	(a) (d)	(a)
Area 19, Pahute Substation	06/27/95	23.6 ± 0.5	6.5
Area 19, Pahute Substation	07/19/95	(a) (d)	(a)
Area 19, Pahute Substation	09/06/95	(a) (c)	(a)
Area 19, Pahute Substation	09/13/95	(a) (c)	(a)
Area 19, Pahute Substation	09/20/95	(a) (d)	(a)
Area 19, Pahute Substation	09/27/95	24.2 ± 0.3	4.2
Area 19, Pahute Substation	10/04/95	(a) (d)	(a)
Area 19, Pahute Substation	10/09/95	28.1 ± 0.4	4.1
Area 19, Pahute Substation	10/16/95	27.7 ± 0.3	3.4
Area 19, Pahute Substation	10/23/95	11.7 ± 0.1	3.9
Area 19, Pahute Substation	10/30/95	33.9 ± 0.5	4.1
Area 19, Pahute Substation	11/06/95	28.8 ± 0.5	5.3
Area 19, Pahute Substation	11/13/95	41.8 ± 0.7	4.5
Area 19, Pahute Substation	11/20/95	31.4 ± 0.5	4.2
Area 19, Pahute Substation	11/27/95	31.6 ± 0.4	3.9
Area 19, Pahute Substation	12/04/95	31.7 ± 0.4	4.0
Area 19, Pahute Substation	12/11/95	11.1 ± 0.2	4.4
Area 19, Pahute Substation	12/18/95	25.8 ± 0.3	3.0
Area 20, Camp	03/06/95	(a) (d)	(a)
Area 20, Camp	04/10/95	(a) (d)	(a)
Area 20, Camp	04/26/95	(a) (d)	(a)

(a) Missing value code, due to:
(b) Instrument malfunction.
(c) Sample lost in analysis.
(d) No sample collected, insufficient sample, no pressure in sample bottle, sampler failed, loss of power.
(e) Radon daughters detected.
(f) Unknown or undocumented cause.

Attachment 6.1 (Sample Results for ^{85}Kr - 1995, cont.)

Sampling Location	Start Date	Krypton ± 1s 10^{-12} µCi/mL	Detection Limit 10^{-12} µCi/mL
Area 20, Camp	08/31/95	26.5 ± 0.3	3.5
Area 20, Camp	09/06/95	30.3 ± 0.4	3.4
Area 20, Camp	09/13/95	(a) (d)	(a)
Area 20, Camp	09/20/95	(a) (d)	(a)
Area 20, Camp	09/27/95	42.8 ± 0.9	6.0
Area 20, Camp	10/04/95	20.6 ± 0.3	4.5
Area 20, Camp	10/09/95	30.2 ± 0.3	3.2
Area 20, Camp	10/16/95	33.5 ± 0.5	4.4
Area 20, Camp	10/23/95	25.8 ± 0.3	3.7
Area 20, Camp	10/30/95	40.3 ± 0.7	5.1
Area 20, Camp	11/06/95	38.5 ± 0.7	5.5
Area 20, Camp	11/13/95	66.0 ± 1.2	5.0
Area 20, Camp	11/20/95	34.2 ± 0.7	6.2
Area 20, Camp	11/27/95	30.0 ± 0.5	4.3
Area 20, Camp	12/04/95	37.2 ± 0.5	4.0
Area 20, Camp	12/11/95	37.5 ± 0.4	3.1
Area 20, Camp	12/18/95	11.6 ± 0.2	5.1

(a) Missing value code, due to
(b) Instrument malfunction.
(c) Sample lost in analysis.
(d) No sample collected, insufficient sample, no pressure in sample bottle, sampler failed, loss of power.
(e) Radon daughters detected.
(f) Unknown or undocumented cause.

7.0 ONSITE GAMMA-EMITTING RADIONUCLIDES IN AIR AND WATER, AND RADIUM AND STRONTIUM IN WATER

Data for gamma-emitting radionuclides in air and water are obtained from gamma spectroscopy of air filters and water samples. More than 2000 samples were submitted for gamma spectroscopy in 1995. A computer program identifies specific isotopes from the spectra. Thousands of spectra are analyzed annually, but only a few show identifiable isotopes. This chapter reports the results of these few, along with radium and strontium in water results.

GAMMA-EMITTING RADIONUCLIDES IN AIR

Naturally-occurring radionuclides not in equilibrium at the time of counting, such as ^{208}Tl, ^{212}Pb, ^{214}Pb, and ^{214}Bi were omitted from the data. This left no gamma-emitting radionuclides other than the naturally-occurring ^{7}Be and ^{40}K, and the non-naturally-occurring ^{137}Cs. Descriptive statistics, in units of µCi/mL, appear in Table 7.1 for these radionuclides. Four of the 11 ^{137}Cs values were below the individual detection limits, and 6 of the 11 were from Radioactive Waste Management Site (RWMS) sampling locations. The ^{137}Cs in air data are given in Attachment 7.1. Note that the maximum concentration is below the individual detection limit. This suggests an analytical problem with this sample. The very limited amount of data preclude any further statistical analysis of the ^{137}Cs data.

GAMMA-EMITTING RADIONUCLIDES IN WATER

The only non-naturally-occurring gamma emitter found in water samples was ^{137}Cs. This was found in five samples, all of which were from Area 12, E Tunnel effluent and Pond No. 1. Water from E Tunnel drains into this effluent and then into the pond. Since this is the site of former experimental activity, the presence of non-naturally-occurring radionuclides is not surprising. Descriptive statistics, in units of µCi/mL, for ^{137}Cs concentrations are:

Number of data values	= 5
Arithmetic mean	= 3.0×10^{-07}
Median	= 2.1×10^{-07}
Standard deviation	= 1.5×10^{-07}
Minimum value	= 1.7×10^{-07}
Maximum value	= 4.7×10^{-07}

All concentrations were above their individual limits of detection. The median limit of detection was 1.1×10^{-07} µCi/mL. These data are given in Attachment 7.2.

RADIUM-226 AND RADIUM-228

Radium concentrations were measured at 11 supply wells around the Nevada Test Site (NTS). The data for ^{226}Ra and ^{228}Ra appear in Attachments 7.3, and Attachment 7.4. For ^{226}Ra, descriptive statistics, (µCi/mL) for the entire network are:

Number of data values	= 40
Arithmetic mean	= 5.6×10^{-10}
Median	= 5.1×10^{-10}
Standard deviation	= 5.4×10^{-10}
Minimum value	= -6.7×10^{-10}
Maximum value	= 1.7×10^{-09}
Median MDC	= 7.2×10^{-09}

For ^{228}Ra, descriptive statistics, (µCi/mL) for the entire network are:

Number of data values	= 40
Arithmetic mean	= 1.4×10^{-11}
Median	= 4.6×10^{-11}
Standard deviation	= 2.9×10^{-10}
Minimum value	= -6.8×10^{-10}
Maximum value	= 9.4×10^{-10}
Median MDC	= 8.9×10^{-10}

Of the ^{226}Ra concentrations, 12.5 percent exceeded the individual limits of detection. Of the ^{228}Ra concentrations, none exceeded the individual limits of detection. Of the ^{226}Ra concentrations, 85 percent were positive, and 15 percent were negative. Of the ^{228}Ra concentrations, 52.5 percent were positive, 7.5 percent were zero, and the remaining 40 percent were negative. Box plots of the ^{226}Ra and ^{228}Ra concentrations appear in Figure 7.1. Three outliers appear in the ^{228}Ra box plot. Although these concentrations are unusual when compared to the other ^{228}Ra concentrations, they are still less than the individual detection limits and thus are of no concern.

A normal distribution fits ^{226}Ra concentrations well. This is demonstrated in Figure 7.2, where a normal scores plot of ^{226}Ra concentrations appear. The straightness of the plot and the p-value of the Anderson-Darling test suggest that normality is an adequate approximation to the distribution of ^{226}Ra concentrations. As none of the ^{228}Ra concentrations exceed the individual limits of detection, the distribution of ^{228}Ra concentrations was not investigated.

Water sources cannot be compared, as only samples gathered from supply wells are analyzed for radium. As samples are gathered quarterly, concentrations can be compared by quarter of sampling. Radium-226 concentrations are compared by means of an analysis of variance (ANOVA) and ^{228}Ra concentrations by means of descriptive statistics. These comparisons appear in Table 7.2 for ^{226}Ra and in Table 7.3 for ^{228}Ra. The ANOVA in Table 7.2 demonstrates that ^{226}Ra concentrations do not vary statistically among quarters.

No obvious differences among quarters in ^{228}Ra concentrations are suggested by Table 7.3. The mean and median values are all smaller in magnitude than the standard deviations and are also smaller than twice the standard errors (standard deviation of the mean). Thus, no statistically significant differences exist in this data set.

Analytic standard deviations for radium concentrations are rarely appreciably smaller than the measured concentrations. This is illustrated in Figures 7.3 and 7.4 where, respectively, empirical coefficients of variation for ^{226}Ra and ^{228}Ra appear as histograms. Typically, the largest coefficients of variation are associated with concentration values very close to zero.

STRONTIUM-90

Strontium-90 concentrations in water were measured at 50 sampling stations placed on the NTS. These sampling stations include 13 supply wells with most sampled quarterly, 7 potable water end points sampled annually, 11 open reservoirs sampled annually, 8 natural springs sampled annually, 2 containment ponds sampled annually, and 9 sewage lagoons sampled annually. A total of 79 analyses for ^{90}Sr were performed for 1995 water samples.

An examination of the strontium data in Attachment 7.5 indicates that the ^{90}Sr concentrations in containment ponds are much higher than for other types of sources. As water from E Tunnel, where experimental activity formerly occurred, drains into this effluent and then into the pond, the presence of non-natural occurring radionuclides there is not surprising. Since the mean value for

the containment pond data is two orders of magnitude higher than the mean of the other stations combined, the containment ponds will be analyzed separately. Descriptive statistics, in units of µCi/mL, for the entire network except the E Tunnel stations are:

Number of data values	= 76
Arithmetic mean	= 2.4×10^{-11}
Median	= -4.0×10^{-12}
Standard deviation	= 1.6×10^{-10}
Minimum value	= -1.9×10^{-10}
Maximum value	= 7.1×10^{-10}
Median MDC	= 2.1×10^{-10}

Descriptive statistics for the E Tunnel sampling stations are not given because the two samples have the same concentration value, 2.4×10^{-9} µCi/mL. These two samples have different analytical errors and detection limits. Their median detection limit is 4.6×10^{-10} µCi/mL.

Descriptive statistics for each of the other five types of sampling stations are given in Table 7.4. In this table there is a large difference between the mean and median for natural springs. An examination of the data in Attachment 7.5 suggests that this difference is due to the high concentration for Gold Meadows Spring collected on June 28, 1995. This high concentration is associated with a sample that was collected when the spring was almost dry and the sample contained suspended solids. This sample condition typically results in high analytical values. However, note that the mean and median are well below the smallest detection limit. Thus, the difference between the mean and median is not consequential.

Figure 7.5 is a time series plot showing the concentrations of ^{90}Sr in supply well water. The ordinate values were approximated by dividing the day of the month of sampling by 32 then adding the number of the month of sampling. This gives the time of sampling as a month and a fractional part. The symbols in the plot indicate which values are above the individual detection limits. All above-detection-limit values occur in the first and second quarter samples, although it is difficult to see the second quarter values because they are similar to those of the below-detection-limit data.

No time series plot is presented, other than for the supply well and E Tunnel stations, because all these samples were collected in the third quarter only. This group consists of the potable water, open reservoir, natural springs, and sewage lagoons samples. In this group, only 1 of 35 concentrations was above the individual detection limit; this is the Gold Meadows Spring value discussed above. Descriptive statistics for this group are given at the beginning of this section and in Table 7.4.

For the entire network, excluding the E Tunnel sampling stations, 50 percent of the observed concentrations are positive, and only 9.2 percent are above the individual detection limits. This lack of values above the individual detection limits renders any rigorous statistical analysis unreasonable. The summary statistics reported above and in the tables and plots are adequate in this situation.

CONCLUSION

The only non-naturally-occurring, gamma-emitting radioniclide found in air was ^{137}Cs, which was detected in 11 air samples from a total of more than 2,000 samples analyzed. The maximum of these 11 samples had a cesium concentration of 1×10^{-14} µCi/mL. The only non-naturally-occurring, gamma-emitting radionuclide found in water samples was also ^{137}Cs, which was found only in the E Tunnel effluents. ^{226}Ra and ^{228}Ra were measured in supply well waters. Most of the

^{226}Ra values were below individual detection limits, and all of the ^{228}Ra values were below individual detection limits. The ^{90}Sr in water data can be divided into two groups: samples from containment ponds and other water sources. For the non-containment pond samples, only 9.2 percent were above individual detection limits.

Table 7.1 Descriptive Statistics for Gamma-Emitting Radionuclides Detected in Air, (μCi/mL)

Nuclide	Number of Samples Containing	Mean	Median	Standard Deviation	Minimum	Maximum
^{7}Be	2078	2.4×10^{-13}	2.4×10^{-13}	7.4×10^{-14}	6.0×10^{-14}	8.2×10^{-13}
^{40}K	13	7.7×10^{-14}	7.1×10^{-14}	1.6×10^{-14}	5.8×10^{-14}	1.1×10^{-13}
^{137}Cs	11	7.0×10^{-15}	7.3×10^{-15}	1.6×10^{-15}	3.7×10^{-15}	1.0×10^{-14}

Table 7.2 Comparison of Concentrations of ^{226}Ra Samples (10^{-9} μCi/mL) Among Quarters of Sample Collection

Source	Degrees of Freedom	Sum of Squares	Mean Squares	F-Statistic	p Value
Quarter	3	1.153	0.384	1.35	0.273
Error	36	10.233	0.284		
Total	39	11.386			

Quarter	N	Mean	Standard Deviation
1	11	0.5659	0.5795
2	11	0.3265	0.4761
3	10	0.6141	0.5836
4	8	0.8158	0.4694

Pooled Standard Deviation = 0.5331

Individual 95 Percent Confidence Intervals for Mean Based on Pooled Standard Deviation

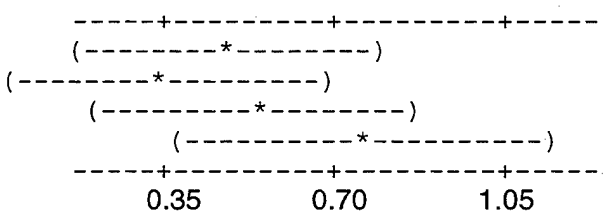


Table 7.3 Comparison of Concentrations of ^{228}Ra Samples Among Quarters of Sample Collection, (μCi/mL)

Quarter	Number of Data Values	Mean	Median	Standard Deviation
Jan-Mar	11	1.7×10^{-10}	1.1×10^{-10}	2.4×10^{-10}
Apr-Jun	11	4.5×10^{-11}	0.0	3.2×10^{-10}
Jul-Sep	10	-6.9×10^{-11}	-1.0×10^{-10}	2.2×10^{-10}
Oct-Dec	8	-1.3×10^{-10}	-1.6×10^{-10}	3.1×10^{-10}

Table 7.4 Summary Statistics for ^{90}Sr Concentrations in Water by Source of Sample, (μCi/mL)

Source	Number	Arithmetic Mean	Median	Standard Deviation
Potable Water	7	-4.1×10^{-12}	-9.2×10^{-12}	7.0×10^{-11}
Open Reservoirs	11	-6.4×10^{-11}	-5.7×10^{-11}	8.0×10^{-11}
Natural Springs	8	1.1×10^{-10}	2.2×10^{-12}	2.6×10^{-10}
Sewage Lagoons	9	-7.9×10^{-11}	-9.1×10^{-11}	7.5×10^{-11}
Supply Wells	41	5.8×10^{-11}	5.6×10^{-11}	1.6×10^{-10}

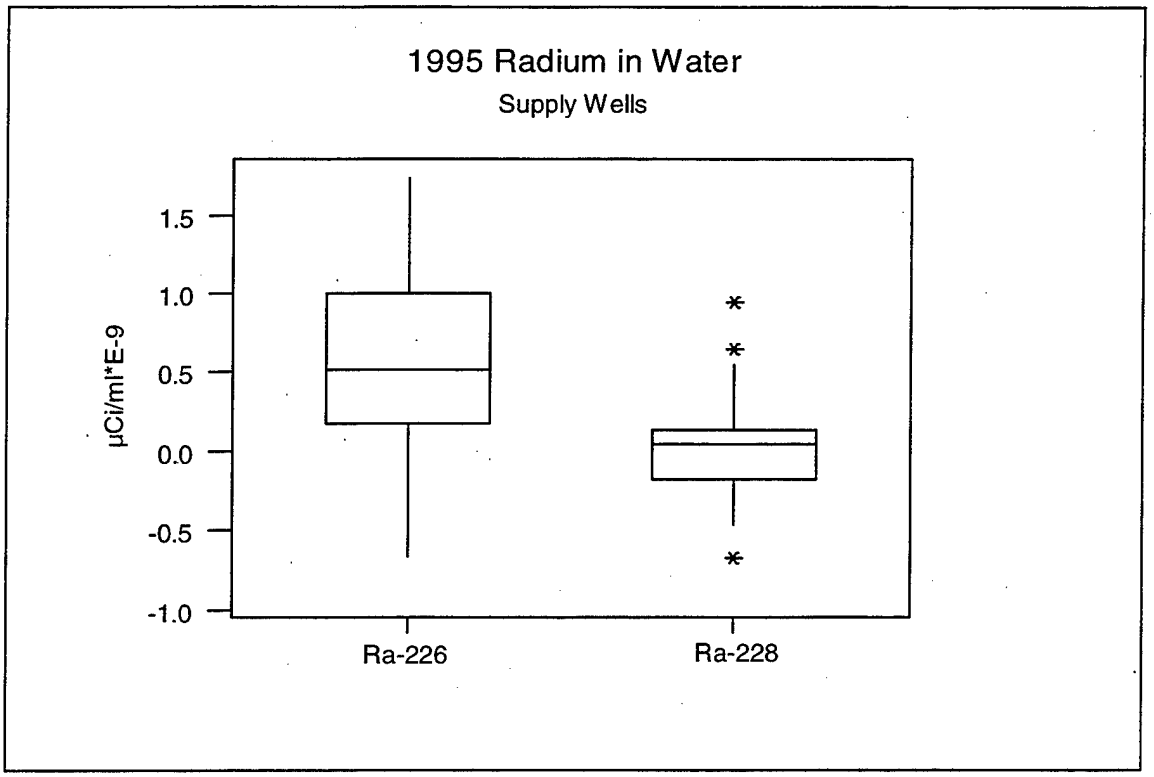


Figure 7.1 Box Plots of Radium Concentrations in Supply Well Water

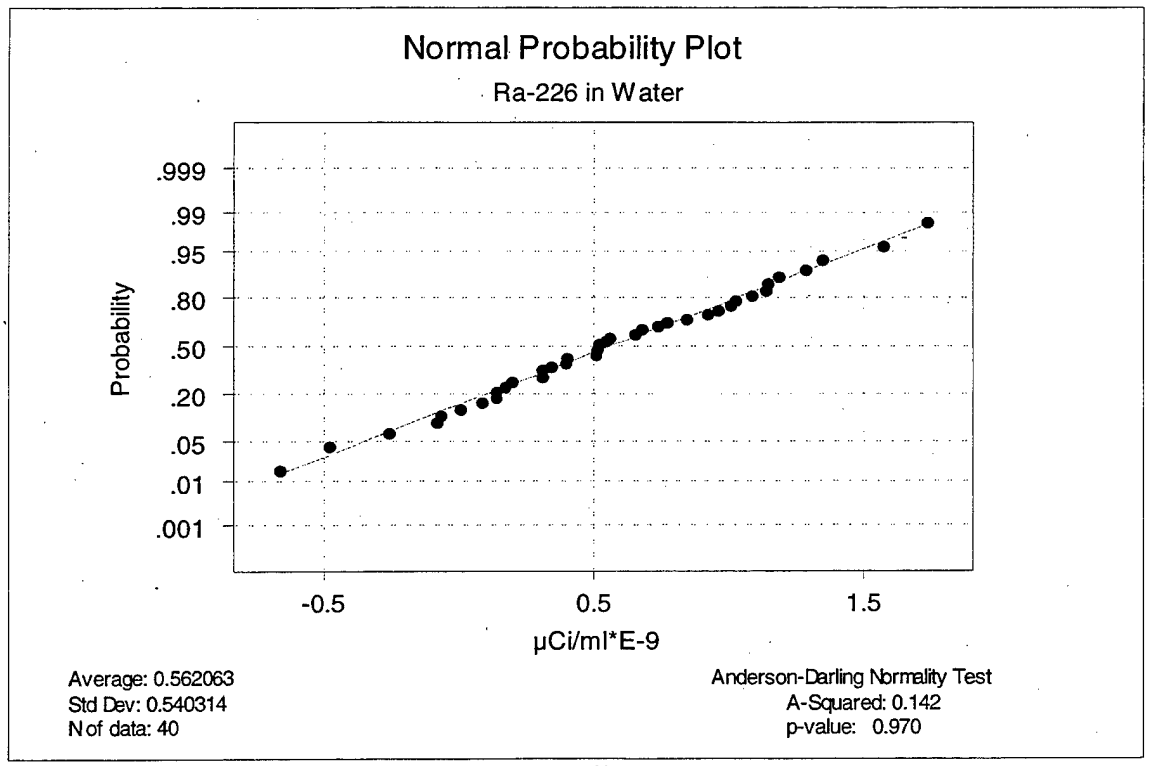


Figure 7.2 Normal Probability Plot of ^{226}Ra Concentrations in Well Water

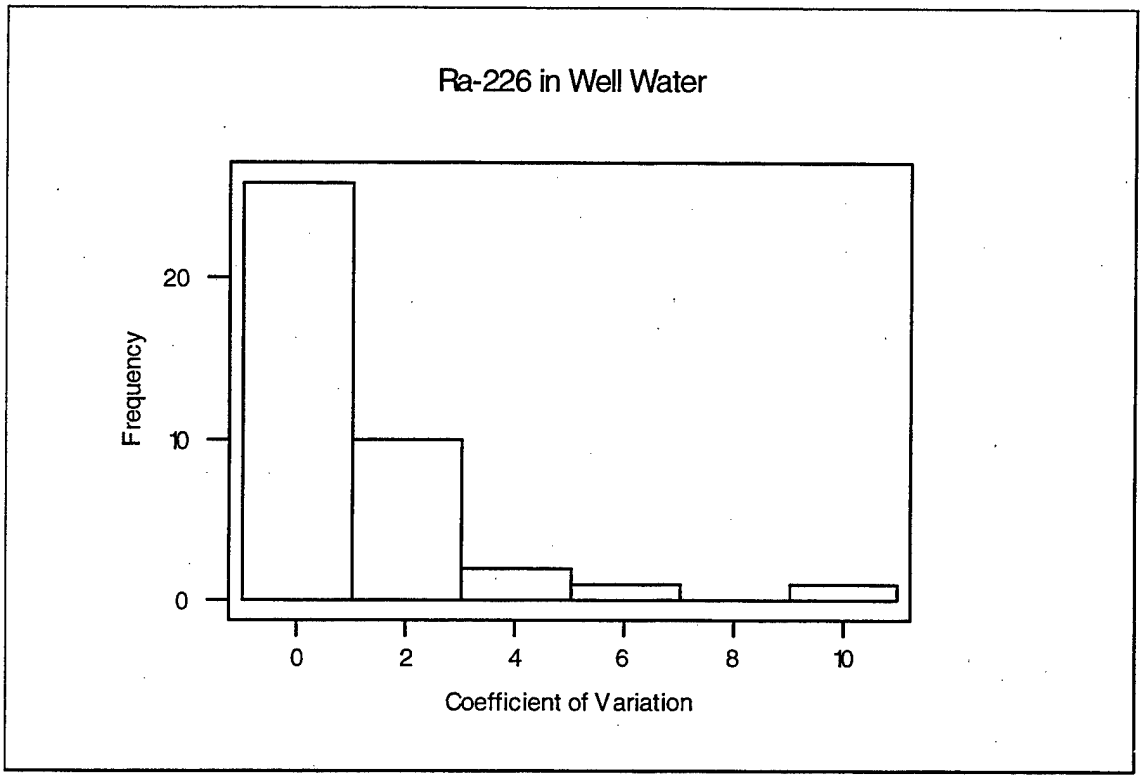


Figure 7.3 Empirical Coefficients of Variation for ^{226}Ra Concentrations (Unitless)

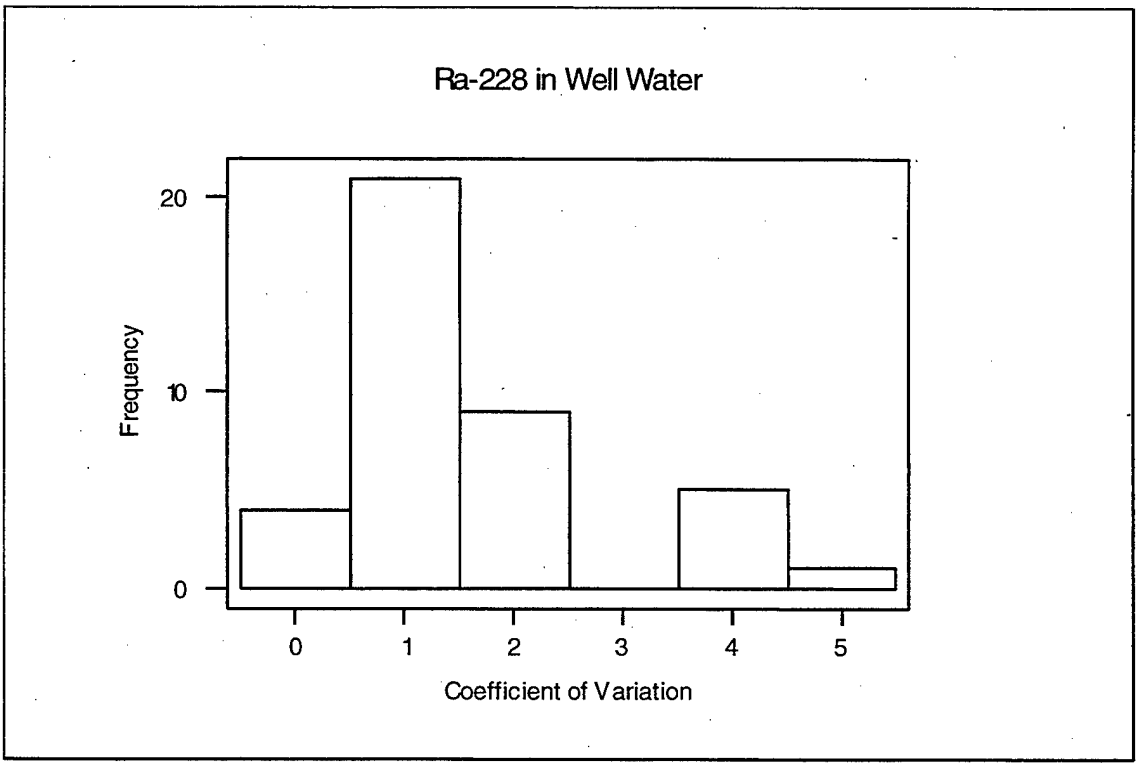


Figure 7.4 Empirical Coefficients of Variation for ^{228}Ra Concentrations (Unitless)

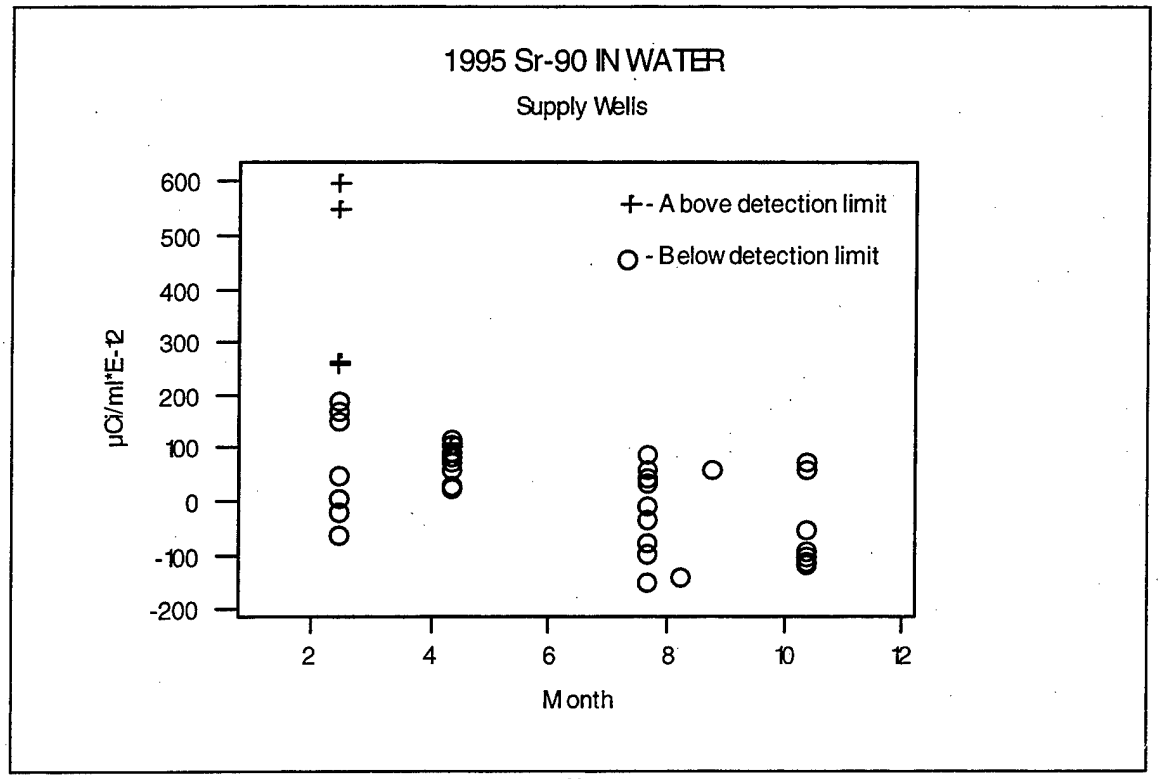


Figure 7.5 Time Series Plot of ^{90}Sr Concentrations in Well Water

Attachment 7.1 ^{137}Cs in Air, 1995

Sampling Location	Sampling Period		µCi/mL x 10^{-15} Concentration	Standard Deviation	Detection Limit
Area 2, 2-1 Substation	05/16/95	05/23/95	7.3	3.2	6.3
Area 3	08/30/95	09/05/95	7.5	3.4	6.8
Area 5, RWMS No. 5	06/05/95	06/12/95	7.3	3.1	6.2
Area 5, RWMS No. 6	05/15/95	05/22/95	7.5	3.5	6.7
Area 5, RWMS No. 6	09/21/95	09/28/95	5.6	2.7	6.1
Area 5, RWMS Pit-3	01/03/95	01/09/95	10.2	5.0	11.0
Area 5, RWMS No. 9	06/19/95	06/26/95	7.0	3.2	6.4
Area 5, Gate 200 S	05/30/95	06/05/95	7.3	3.5	7.9
Area 5, RWMS TP SW	08/09/95	08/16/96	7.0	3.2	6.4
Area 6, Yucca	10/23/95	10/30/95	6.2	3.0	6.0
Area 27	10/17/95	10/24/95	3.7	1.9	3.8

Attachment 7.2 ^{137}Cs in Water, 1995

Sampling Location	Sampling Date	µCi/mL x 10^{-7} Concentration	Standard Deviation	Detection Limit
Area 12, E Tunnel Effluent	03/15/95	4.5	0.9	1.1
Area 12, E Tunnel Effluent	05/09/95	1.7	0.6	1.1
Area 12, E Tunnel Pond No. 1	02/23/95	4.7	0.9	1.1
Area 12, E Tunnel Pond No. 1	05/23/95	2.1	0.5	0.8
Area 12, E Tunnel Pond No. 1	08/07/95	2.0	0.5	0.8

Attachment 7.3 ^{226}Ra in Water, 1995

Sampling Location	Sampling Date	µCi/mL x 10^{-9} Concentration	Standard Deviation	Detection Limit
Area 5, Well 5B	02/15/95	0.13	0.41	1.52
Area 5, Well 5B	04/11/95	0.17	0.52	1.91
Area 5, Well 5B	07/20/95	0.31	0.31	1.09
Area 5, Well 5B	10/12/95	0.34	0.37	1.30
Area 5, Well 5C	02/15/95	0.39	0.42	1.49
Area 5, Well 5C	04/11/95	-0.26	0.37	0.15
Area 5, Well 5C	07/20/95	-0.67	0.50	2.07

Attachment 7.3 (^{226}Ra in Water, 1995, cont.)

Sampling Location	Sampling Date	Concentration (µCi/mL x 10^{-9})	Standard Deviation (µCi/mL x 10^{-9})	Detection Limit (µCi/mL x 10^{-9})
Area 5, Well 5C	10/12/95	1.19	0.40	1.18
Area 6, Well No. 4A	02/15/95	0.31	0.39	1.39
Area 6, Well No. 4A	04/11/95	0.20	0.41	1.49
Area 6, Well No. 4A	07/20/95	0.84	0.30	0.91
Area 6, Well No. 4A	10/12/95	0.96	0.41	1.29
Area 6, Well C	02/15/95	0.56	0.19	1.27
Area 6, Well C	04/11/95	0.77	0.37	1.17
Area 6, Well No. 4	02/15/95	0.51	0.35	1.16
Area 6, Well No. 4	04/11/95	-0.07	0.40	1.53
Area 6, Well No. 4	07/20/95	0.52	0.30	0.99
Area 6, Well No. 4	10/12/95	0.74	0.37	1.20
Area 6, Well C-1	02/15/95	1.57	0.44	1.24
Area 6, Well C-1	04/11/95	1.03	0.34	1.07
Area 6, Well C-1	07/20/95	1.35	0.38	1.08
Area 6, Well C-1	10/12/95	1.74	0.47	1.28
Area 16, Well UE-16d	02/15/95	1.14	0.40	1.18
Area 16, Well UE-16d	04/11/95	0.55	0.34	1.13
Area 16, Well UE-16d	07/20/95	1.29	0.34	0.94
Area 16, Well UE-16d	10/12/95	0.40	0.84	3.04
Area 18, Well HTH No. 8	02/15/95	0.92	0.42	1.31
Area 18, Well HTH No. 8	04/11/95	-0.08	0.23	0.38
Area 18, Well HTH No. 8	07/20/95	0.68	0.31	0.99
Area 22, Well Army No. 1	02/15/95	1.09	0.38	1.13
Area 22, Well Army No. 1	04/11/95	1.15	0.62	2.11
Area 22, Well Army No. 1	07/20/95	0.51	0.32	1.06
Area 25, Well J-12	02/15/95	0.08	0.89	1.90
Area 25, Well J-12	04/11/95	0.14	0.28	1.07
Area 25, Well J-12	07/20/95	0.31	0.28	0.95
Area 25, Well J-12	10/19/95	0.65	0.43	1.44
Area 25, Well J-13	02/15/95	-0.48	0.92	3.66
Area 25, Well J-13	04/11/95	0.00	0.00	1.26
Area 25, Well J-13	07/20/95	1.01	0.40	1.25
Area 25, Well J-13	10/12/95	0.50	0.34	1.15

Attachment 7.4 ^{228}Ra in Water, 1995

Sampling Location	Sampling Date	Concentration (µCi/mL x 10^{-9})	Standard Deviation (µCi/mL x 10^{-9})	Detection Limit (µCi/mL x 10^{-9})
Area 5, Well 5B	02/15/95	0.20	0.28	1.04
Area 5, Well 5B	04/11/95	0.00	0.00	0.14
Area 5, Well 5B	07/20/95	-0.20	0.18	0.83

Attachment 7.4 (^{228}Ra in Water, 1995, cont.)

Sampling Location	Sampling Date	Concentration (µCi/mL x 10^{-9})	Standard Deviation (µCi/mL x 10^{-9})	Detection Limit (µCi/mL x 10^{-9})
Area 5, Well 5B	10/12/95	-0.29	0.24	1.06
Area 5, Well 5C	02/15/95	0.07	0.24	1.02
Area 5, Well 5C	04/11/95	-0.14	0.25	1.10
Area 5, Well 5C	07/20/95	-0.46	0.33	1.57
Area 5, Well 5C	10/12/95	0.05	0.25	0.97
Area 6, Well No. 4A	02/15/95	0.06	0.24	0.95
Area 6, Well No. 4A	04/11/95	0.00	0.00	1.12
Area 6, Well No. 4A	07/20/95	-0.12	0.16	0.69
Area 6, Well No. 4A	10/12/95	-0.29	0.24	1.06
Area 6, Well C	02/15/95	0.11	0.23	0.87
Area 6, Well C	04/11/95	0.00	0.00	0.87
Area 6, Well No. 4	02/15/95	0.10	0.21	0.80
Area 6, Well No. 4	04/11/95	0.07	0.29	1.15
Area 6, Well No. 4	07/20/95	0.13	0.17	0.75
Area 6, Well No. 4	10/12/95	-0.16	0.23	0.99
Area 6, Well C-1	02/15/95	0.55	0.27	0.84
Area 6, Well C-1	04/11/95	0.10	0.20	0.76
Area 6, Well C-1	07/20/95	0.19	0.23	0.53
Area 6, Well C-1	10/12/95	0.11	0.28	1.05
Area 16, Well UE-16d	02/15/95	0.11	0.21	0.81
Area 16, Well UE-16d	04/11/95	-0.17	0.18	0.85
Area 16, Well UE-16d	07/20/95	0.04	0.18	0.71
Area 16, Well UE-16d	10/12/95	-0.68	0.56	2.50
Area 18, Well HTH No. 8	02/15/95	-0.23	0.18	0.90
Area 18, Well HTH No. 8	04/11/95	0.13	0.10	0.69
Area 18, Well HTH No. 8	07/20/95	-0.18	0.17	0.13
Area 22, Well Army No. 1	02/15/95	0.05	0.19	0.77
Area 22, Well Army No. 1	04/11/95	-0.20	0.34	1.50
Area 22, Well Army No. 1	07/20/95	-0.24	0.17	0.80
Area 25, Well J-12	02/15/95	0.17	0.34	1.30
Area 25, Well J-12	04/11/95	-0.25	0.15	0.76
Area 25, Well J-12	07/20/95	-0.09	0.17	0.72
Area 25, Well J-12	10/19/95	0.33	0.26	0.88
Area 25, Well J-13	02/15/95	0.65	0.69	2.50
Area 25, Well J-13	04/11/95	0.95	1.05	0.95
Area 25, Well J-13	07/20/95	0.23	0.26	0.95
Area 25, Well J-13	10/12/95	-0.15	0.22	0.94

Attachment 7.5 ^{90}Sr in Water, 1995

Sampling Location	Sampling Date	Concentration (µCi/mL x 10^{-12})	Standard Deviation (µCi/mL x 10^{-12})	Detection Limit (µCi/mL x 10^{-12})
Supply Wells				
Area 5, Well 5B	02/15/95	258.0	124.9	159.0
Area 5, Well 5B	04/11/95	29.7	83.5	117.0
Area 5, Well 5B	07/20/95	-34.3	105.5	238.0

Attachment 7.5 (^{90}Sr in Water, 1995, cont.)

Sampling Location	Sampling Date	Concentration (µCi/mL x 10^{-12})	Standard Deviation	Detection Limit
(Supply Wells, cont.)				
Area 5, Well 5B	10/12/95	-95.5	109.3	254.0
Area 5, Well 5C	02/15/95	148.0	116.2	155.0
Area 5, Well 5C	04/11/95	107.0	157.3	219.0
Area 5, Well 5C	07/20/95	43.3	106.1	230.0
Area 5, Well 5C	10/12/95	73.5	141.9	307.0
Area 5, Well UE-5c	08/24/95	56.1	107.2	232.0
Area 6, Well No. 4A	02/15/95	-21.7	108.5	142.0
Area 6, Well No. 4A	04/11/95	114.0	94.1	114.0
Area 6, Well No. 4A	07/20/95	-153.0	112.5	269.0
Area 6, Well No. 4A	10/12/95	-121.0	90.1	215.0
Area 6, Well C	02/15/95	261.0	119.5	237.0
Area 6, Well C	04/11/95	81.6	75.5	101.0
Area 6, Well No. 4	02/15/95	172.0	100.6	203.0
Area 6, Well No. 4	04/11/95	108.0	65.3	85.1
Area 6, Well No. 4	07/20/95	-9.2	85.8	191.0
Area 6, Well No. 4	10/12/95	55.9	111.2	240.0
Area 6, Well C-1	02/15/95	600.0	116.4	197.0
Area 6, Well C-1	04/11/95	24.3	57.6	125.0
Area 6, Well C-1	07/20/95	57.1	81.1	174.0
Area 6, Well C-1	10/12/95	-114.0	83.8	201.0
Area 16, Well UE-16d	02/15/95	-66.3	101.4	233.0
Area 16, Well UE-16d	04/11/95	55.7	60.7	81.3
Area 16, Well UE-16d	07/20/95	-34.2	103.8	236.0
Area 16, Well UE-16d	10/12/95	-106.0	92.2	219.0
Area 18, Well HTH No. 8	02/15/95	551.0	129.2	230.0
Area 18, Well HTH No. 8	04/11/95	102.0	72.4	94.1
Area 18, Well HTH No. 8	07/20/95	-79.4	81.4	190.0
Area 20, Well U-20	08/07/95	-143.0	77.9	191.0
Area 22, Well Army No. 1	02/15/95	48.2	96.4	135.0
Area 22, Well Army No. 1	04/11/95	90.9	84.1	113.0
Area 22, Well Army No. 1	07/20/95	-101.0	80.8	192.0
Area 25, Well J-12	02/15/95	1.2	91.1	134.0
Area 25, Well J-12	04/11/95	72.0	73.1	100.0
Area 25, Well J-12	07/20/95	85.6	92.9	197.0
Area 25, Well J-12	10/12/25	Sample lost		
Area 25, Well J-13	02/15/95	191.0	148.0	194.0
Area 25, Well J-13	04/11/95	70.9	98.7	211.0
Area 25, Well J-13	07/20/95	30.8	96.9	212.0
Area 25, Well J-13	10/12/95	-53.6	96.5	221.0
Potable Water				
Area 1, Building 101	07/11/95	17.0	82.4	180.0
Area 2, Rest Room	07/11/95	-9.2	84.8	190.0
Area 6, Cafeteria	07/11/95	-104.0	84.2	198.0
Area 6, Building 6-900	07/11/95	122.0	87.2	181.0

Attachment 7.5 (^{90}Sr in Water, 1995, cont.)

Sampling Location	Sampling Date	μCi/mL x 10^{-12} Concentration	Standard Deviation	Detection Limit
(Potable Water, cont.)				
Area 12, Building 12-23	07/11/95	-35.0	82.1	186.0
Area 23, Mercury	07/11/95	-38.5	88.2	201.0
Area 25, Building 4221	07/11/95	19.0	93.1	204.0
Open Reservoirs				
Area 2, Mud Plant	07/31/95	-192.0	93.0	229.0
Area 2, Well 2 Reservoir	07/31/95	-44.1	101.0	230.0
Area 3, Well A Reservoir	07/31/95	-55.1	102.8	234.0
Area 3, Well 3 Reservoir	07/31/95	28.2	90.7	198.0
Area 5, Well 5B Reservoir	07/31/95	-57.7	86.0	199.0
Area 5, UE-5c Reservoir	07/31/95	-152.0	97.3	233.0
Area 6, Well C-1 Reservoir	07/31/95	-142.0	89.5	215.0
Area 18, Camp 17 Reservoir	07/31/95	-9.5	89.0	199.0
Area 23, Swimming Pool	07/31/95	-97.5	98.5	231.0
Area 25, Well J-11 Reservoir	07/31/95	80.0	96.8	206.0
Area 25, Well J-12 Reservoir	07/31/95	-57.4	87.8	202.0
Natural Springs				
Area 5, Cane Spring	06/29/95	-49.5	76.5	176.0
Area 7, Reitman Seep	06/28/95	233.0	157.3	325.0
Area 12, White Rock Spring	06/28/95	-39.0	88.3	201.0
Area 12, Captain Jack Spring	08/07/95	43.5	103.1	225.0
Area 12, Gold Meadows Spring	06/29/95	707.0	128.7	215.0
Area 15, Tub Springs	06/29/95	-50.9	77.9	179.0
Area 16, Tippipah Spring	08/17/95	134.0	119.9	252.0
Area 29, Topopah Spring	08/28/95	-62.9	114.5	263.0
Containment Ponds				
Area 12, E Tunnel Effluent	08/07/95	2350.0	297.3	438.0
Area 12, E Tunnel Pond No. 1	08/07/95	2350.0	319.6	485.0
Sewage Lagoons				
Area 6, Yucca Sewage Pond	08/09/95	-89.6	116.5	270.0
Area 6, CP-72 Sewage Pond	08/09/95	-51.7	96.4	220.0
Area 6, DAF Sewage Pond	08/09/95	-101.0	115.6	270.0
Area 6, CP-6 Sewage Pond	08/09/95	-91.0	115.6	268.0
Area 11, LANL Sewage Pond	08/09/95	-121.0	135.5	315.0
Area 12, Sewage Pond	08/09/95	-152.0	139.1	326.0
Area 22, Sewage Pond	08/09/95	-176.0	103.0	250.0
Area 23, Sewage Pond	08/09/95	60.4	119.0	257.0
Area 25, Central Supply	08/09/95	10.4	99.3	219.0

8.0 ONSITE GROSS ALPHA AND GROSS BETA IN WATER

For purposes of statistical analysis, sampling stations are divided into the following classes, by source of water:

Class	Sampling Stations
Potable Water	Area 1 Building 101; Area 2 Restroom; Areas 6 and 23 Cafeterias; Area 6 Building 6-900; Area 12 Building 12-23; Area 25 Building 4221.
Natural Springs	Area 5 Cane Spring; Area 7 Reitman Seep; Area 12 Captain Jack, Gold Meadows, and White Rock Springs; Area 15 Tub Springs; Area 16 Tippipah Spring; Area 29 Topopah Spring.
Sewage Lagoons	Area 5 Sewage Lagoon; Area 6 Sewage, Yucca, LANL, CP-72, and DAF Sewage Ponds; Area 12 Sewage; Area 22 Sewage, Area 23 Sewage; Area 25 Reactor Control Sewage and Central Sewage Ponds.
Supply Wells	
Potable Water	Area 5 Well 5B and Well 5C; Area 6 Well No. 4, Well 4-A, and Well C1; Area 16 Well UE-16d; Area 18 Well 8; Area 22 Army Well No. 1; Area 25 Well J-12 and Well J-13.
Non-potable Water	Area 6 Well C; Area 5 Well UE-5c; Area 20 Well U-20.
Open Reservoirs	Area 2 Mud Plant and Well 2 Reservoir; Area 3 Mud Plant, and Well A Reservoir; Area 5 Well UE-5c Reservoir and Well 5B Reservoir; Area 6 Well 3 Reservoir, Well C1 Reservoir; Area 18 Camp 17 Reservoir; Area 19 UE-19c; Area 23 Swimming Pool; Area 25 Well J-11 and Well J-12 Reservoirs.
Containment Ponds	Area 12 E Tunnel Effluent & E Tunnel Pond No. 1.

Sampling locations, sampling dates, measured concentrations, analytic standard deviations, and analytic detection limits for gross alpha and gross beta in water concentrations appear in Attachments 8.1 and 8.2. Tables, figures, and attachments are found in that order at the end of this chapter. Statistical analyses of these data are presented below.

GROSS ALPHA

On the Nevada Test Site (NTS) during 1995, gross alpha concentrations in water were measured at 20 sampling stations all of which are either water supply wells or consumption end points. The supply wells are divided into two groups: potable water wells, and non-potable water well or

industrial wells. Industrial water is typically used for dust control and for construction projects. Gross alpha is not measured in springs, ponds, lagoons, or reservoirs. Descriptive statistics, in units of µCi/mL, for the entire network are:

Number of data values =	66
Number of missing values =	4
Arithmetic mean =	6.1×10^{-09}
Median =	5.8×10^{-09}
Standard deviation =	5.0×10^{-09}
Minimum value =	1.9×10^{-11}
Maximum value =	2.3×10^{-08}
Median MDC =	9.4×10^{-10}

These statistics are about 20 percent higher than the corresponding values reported in 1994, except that in 1994 the minimum value was negative. The four missing values are due to buildings being closed, and thus the sample collectors did not have access to the collection locations. Of the entire network, all of the observed concentrations are positive, and approximately 89 percent of the observations exceed their individual limits of detection.

In previous years, except for 1994, neither the normal nor lognormal distribution has fit the observed gross alpha concentrations particularly well. This has necessitated the use of such nonparametric techniques as the Kruskal-Wallis test. Concentrations observed in 1995 follow this pattern of not fitting a statistical distribution, as is illustrated in the normal probability plot of gross alpha concentrations (10^{-09} µCi/mL) from all stations combined, (see Figure 8.1). In this figure, there appears to be five clusters of data: a single value almost at zero (Building 12-23 sampled on July 11, 1995), three high values, (Area 6 cafeteria on January 4, 1995, Well C on February 15, 1995, and Well C1 on February 15, 1995), and three larger clusters in the middle of the data value range. The three high values have a possible explanation that the samples contained high levels of suspended solids which complicated the sample preparation. The three central clusters were examined to see if they contained certain sampling dates or subsets of stations. No such causes for the groupings were found. The log-normal probability plot of these data showed the same five clusters. Because of the lack of fit to a normal distribution, it is necessary to use nonparametric statistical methods to analyze these data.

The Kruskal-Wallis test is the nonparametric equivalent of the one-way analysis of variance(ANOVA). It is valid under a wide variety of distributional assumptions at the price of lower power (less ability to detect differences when they exist) than classical ANOVA. In the Kruskal-Wallis test, a statistic is calculated for each level of the independent variable, which if concentrations had the same median, these concentrations would have a standard normal distribution. This appears in tables under the heading "Z-value." The Z-values for each row of a table indicate, on a scale of a standardized normal variable, how much the ranks of that row deviate from the overall mean rank. If all rows or categories of data have the same median, the Kruskal-Wallis statistic has approximately a chi-square distribution with degrees of freedom equal to one less than the number of categories.

In Table 8.1, concentrations from supply wells, potable water end points, and industrial wells are compared by means of a Kruskal-Wallis test. No significant differences between the medians are found. However, an examination of the Z-values indicates that the industrial wells are somewhat different from the end points and supply wells. An examination of the dot-plots at the end of this table, which show the individual data values for the groups of samples, shows that the small number of data values for the industrial wells results in a large contribution by the largest value to the average and median values. The small number of data values for industrial wells also is a major contributor to the lack of statistical significance seen in the Kruskal-Wallis

statistic. The three largest values had values above 20 in the dotplot, showing high suspended solids. If they are deleted from the data, the value of the statistic becomes 0.62 and the p-value is increased to 0.74, a very substantial change in the results. Note that these dot-plots show the same clustering as was seen in the normal probability plot.

In Table 8.2, concentrations are compared by month of sampling. The unusual collection of months given in this table is due to the switchover from monthly sampling in 1994 to quarterly sampling in 1995. Because of logistic and scheduling problems, not all samples for each quarter could be collected in the same month. No statistically significant differences between months were found. This is supported by Figure 8.2, in which all gross alpha concentrations, in units of 10^{-9} µCi/mL, are plotted against the month of sampling. No obvious trend or clustering exists. The three high values found in the first quarter have already been discussed. The single sample taken in December 1995 is for Well J-12. It was under repair in October 1995 and thus could not be sampled at the same time as the other locations. There are two sampling dates for the first quarter. This was necessitated by a heavy work load for the sampling technicians. In the third quarter, Well U-20 was sampled in August 1995 rather than in July 1995 when all other samples were taken. This well was under repair in July 1995.

To quantify measurement error for gross alpha in water, the empirical coefficient of variation was calculated for each concentration. The empirical coefficients of variation are displayed as a histogram in Figure 8.3. To enhance readability of the histogram, one empirical coefficient at a value of 5.55 was omitted. This is the coefficient associated with the minimum value in the data, an alpha concentration value near zero. It can be readily seen that the majority of the empirical coefficients of variation are small, less than 0.5. Hence, one can say that analytical uncertainty for gross alpha in water tends to be smaller than observed concentrations.

Analytic standard deviation only accounts for counting variability. In previous years, some samples were split and each sample split was counted to account for other sources of variability. Because of reduced funding, this practice was substantially reduced in 1995, and thus the statistical analysis of replicates was discontinued. A discussion of current quality control practices is presented in the "U.S. Department of Energy, Nevada Operations Office (DOE/NV), Annual Site Environmental Report (ASER) - 1995 DOE/NV/11718-037."

GROSS BETA

Gross beta concentrations in water were measured at 30 sampling stations on the NTS. The individual sample values, analytical standard deviations, and detection limits appear in Attachment 8.2 at the end of this chapter. Descriptive statistics, in units of µCi/mL, for the entire network (all classes combined) are:

Number of data values	=	131
Number of missing values	=	4
Arithmetic mean	=	1.5×10^{-08}
Median	=	8.6×10^{-09}
Standard deviation	=	1.9×10^{-08}
Minimum value	=	2.8×10^{-09}
Maximum value	=	1.5×10^{-07}
Median MDC	=	8.1×10^{-10}

The number of observations in 1995 is less than half of the 1994 number. This is due to a reduced budget which necessitated a reduction in the number of sampling stations and a reduction in the frequency of sampling. For the entire network, all the observed concentrations

are positive and exceed the individual limits of detection. Compared to 1994, the above mean, median, standard deviation, and maximum value are about one-third higher in magnitude. The minimum value changed from a slightly negative value in 1994 to a slightly positive value in 1995.

In Figure 8.4, natural logarithms of gross beta in water concentrations collected from the potable water end points are plotted against normal scores. The straightness of the plot and the p-value of the Anderson-Darling test, a test for normality, indicate the lognormal distribution is a good approximation to the probability distribution of these concentrations. Plots generated with the observations from other sampling classes, not reproduced here, were generally similar. That is, plots of natural logarithms of concentrations versus normal scores produced a graph that was roughly linear, and all the Anderson-Darling test statistics indicated a good fit to a normal distribution. Hence, the gross beta in water data will be treated as lognormally distributed.

Table 8.4 shows results of a two-way analysis of the variance (ANOVA) performed on logarithms of observed concentrations. The ANOVA indicates concentrations differ by source of water but not by month of collection. In the 1994 report, week of sample collection was used rather than the month of collection. Since in 1995 the sampling effort was reduced to quarterly sampling, it is no longer reasonable to use the week of sample collection. Also in the 1994 report, the containment ponds were deleted from the analysis because they had known sources of contamination, the tunnel effluents, and thus generally had high concentrations of gross beta. By 1995, the tunnels had been closed and many of the containment ponds had dried up. Those that remained no longer had unusually high concentrations of gross beta. The ANOVA shown in Table 8.4 was re-run with the containment ponds deleted, and the same pattern of significant differences resulted. The pattern of differences among the classes that caused the significant differences can be elicited using a one-way ANOVA.

Results of a one-way ANOVA, comparing natural logarithms of gross beta concentrations among classes of water sources, appears in Table 8.5. The classes are defined at the beginning of this chapter. The analysis shows a very significant difference between sources, as was expected from the two-way ANOVA. Tukey's multiple comparison procedure allows all pairs of sources of water to be separated from one another at the 0.05 level. These comparisons found three groupings of sampling stations. The containment ponds form a group that is distinct from all other groups. Classes one through five form a second group with no significant differences within the group. Classes four through six form a third group that somewhat overlaps the second group.

An analysis of time trends in concentrations over the year was done for the 1994 and earlier reports. During those years, weekly samples were collected. In 1995, only quarterly samples were collected. Four samples a year are not adequate to find statistical significance for moderate time trends over a year. Thus, the investigation of such trends was not performed for this report.

Measurement error for gross beta concentrations is generally small. This is quantified by means of empirical coefficients of variation, the analytical standard deviation divided by the measured concentration. Empirical coefficients of variation for gross beta in water concentrations appear in Figure 8.5. It can be seen that analytic standard deviations tend to be approximately an order of magnitude less than the observed concentration.

Analytic standard deviation only accounts for counting variability. Other sources of variability include sample preparation variability, sample collection variability, and variability in the sampled waters. In previous years, these types of variability were investigated using sampling duplicates. Because of reductions in budget in 1995, the duplicates program was substantially reduced, and thus the statistical analysis of replicates was discontinued.

HISTORICAL TRENDS

Detailed reporting of historical trends for all contaminants at all sampling stations would result in an unwieldy document. Instead, two representative stations were chosen from each of the water sources, open reservoirs, natural springs, supply wells, and potable water. Representative sampling stations are:

Water Source	NTS Operational Area	Sampling Station
Open Reservoir	2	Mud Plant
Open Reservoir	23	Swimming Pool
Natural Springs	5	Cane Spring
Natural Springs	7	Reitman Seep
Supply Wells	5	Well UE-5c
Supply Wells	25	Well J-13
Potable Water	6	Cafeteria
Potable Water	23	Cafeteria

Annual averages for gross alpha are available only for the two potable water stations and two wells. These data are listed in Table 8.6. Figures 8.6 and 8.7 are time series plots of the annual averages for the end point stations. The solid lines in these figures are Locally Weighted Scatterplot Smoother (LOWESS) lines. LOWESS is a graphical tool for eliciting trends in data. These figures indicate that gross alpha concentrations have been increasing since 1984, when this type of sampling was initiated. However, the actual concentrations are much less than the levels of regulatory concern, and thus, no investigation of causes of these trends was performed. An obvious feature of these figures is the peak in gross alpha concentrations occurring in 1987. As discussed in the 1993 and 1994 ASERs, these peaks were observed at almost all stations, including those not reported here in detail. No physical explanation for these peaks was found.

Plots of annual average gross beta concentrations, in units of 10^{-9} µCi/mL, at the eight representative stations, versus the year of collection appear in Figures 8.8 through 8.11, and the corresponding data values are given in Table 8.7. The high outlier at Reitman Seep in 1991, which is included in the data table, was deleted from the plot of natural springs stations. This high value was due to a single weekly value that was very high, and since the remaining weekly values for that year were much lower, this value is suspect. No historical trends were analyzed for water from sewage lagoons or containment ponds. There is relatively little variability in concentrations of samples taken from sewage ponds. Concentrations from containment ponds vary so greatly among years, depending on the type of experimental activity conducted during those years, that few meaningful conclusions could be drawn.

In general, historical trends for concentrations of gross beta in water are not as clear as those of gross beta in air. Underground water, such as samples from wells, would not have been affected by atmospheric nuclear testing. We see this in samples from Area 23 Army Well No. 1, where no peak was evident. Some samples collected from water sources exposed to the atmosphere, such as open reservoirs and natural springs, showed a peak in the late 1970s, perhaps attributable to foreign nuclear testing; others did not. Among potable water sources, no trends were evident. This is not terribly surprising, as potable water is typically better shielded from environmental factors than water from other sources.

Concentrations of gross beta, as well as other contaminants, observed at Reitman Seep are typically greater than those from other natural springs. This is because samples from Reitman Seep often contain sediment, which carries more contaminants than water.

CONCLUSIONS

Both gross alpha and gross beta levels were slightly higher in 1995 compared to 1994. The average alpha level over all stations and times is 6×10^{-9} µCi/mL. An ANOVA showed no differences among types of sampling stations and no difference related to the quarter in which the samples were collected. The overall average for gross beta is 1.5×10^{-9} µCi/mL. An ANOVA found significant differences by type of sample source and no differences between quarter of sample collection.

Table 8.1 Results of Kruskal-Wallis Test for Equality of Median Gross Alpha Concentrations by Type of Water Source, (µCi/mL x 10^{-9})

Source	Number	Median	Average Rank	Z-Value
Potable Water	24	5.63	32.7	-0.27
Supply Wells	38	4.95	32.7	-0.40
Industrial Wells	4	7.56	46.2	1.37
Overall	66		33.5	

Kruskal-Wallis Statistic = 1.88 Degrees of Freedom = 2 p-Value = 0.39

Dotplot of Gross Alpha in Water

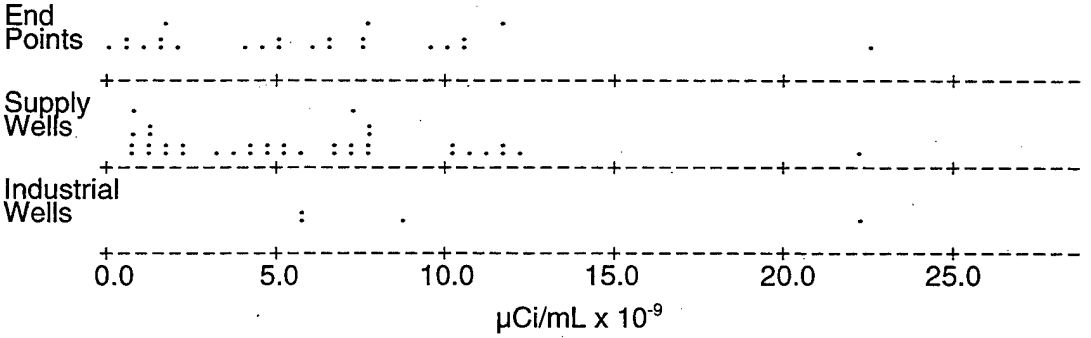


Table 8.2 Results of Kruskal-Wallis Test for Equality of Median Gross Alpha Concentrations by Month of Sampling, (µCi/mL x 10^{-9})

Month	Number	Median	Average Rank	Z-Value
January	6	4.68	33.4	-0.01
February	12	7.01	38.8	1.06
April	16	6.23	32.5	-0.24
July	17	4.78	28.4	-1.28
August	1	5.92	34.0	0.03
October	13	6.67	38.2	0.98
December	1	1.08	12.0	-1.13
Overall	66		33.5	

Kruskal-Wallis Statistic = 4.20 Degrees of Freedom = 6 p-Value = 0.650

Table 8.3 Descriptive Statistics for Gross Alpha Concentrations by Month of Sampling, (µCi/mL x 10^{-9})

Month	Number	Mean	Standard Deviation	First Quartile	Third Quartile
January	6	7.41	8.18	1.31	13.38
February	12	8.31	2.11	2.01	10.55
April	16	5.30	3.25	2.15	7.63
July	17	4.63	3.75	1.21	7.30
August	1	5.92			
October	13	6.58	3.93	3.03	10.25
December	1	1.08			

Table 8.4 ANOVA on Natural Logarithms of Gross Beta in Water by Classes of Sampling Stations and Month of Sample Collection, ($\mu Ci/mL \times 10^{-9}$)

Source	Degrees of Freedom	Sequential Sum of Squares	Adjusted Sum of Squares	Mean Square	F-Statistic	p-Value
Class of Water Source	5	40.294	16.104	3.221	12.43	0.000
Month	10	4.256	4.256	0.426	1.64	0.103
Error	115	29.809	29.259	0.259		
Total	130	74.359				

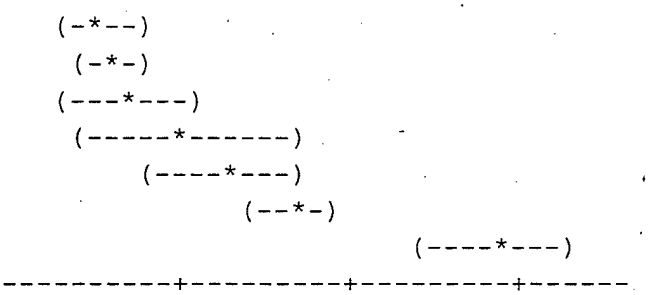
Note: When an interaction term is added this analysis becomes rank deficient.

Table 8.5 One-Way ANOVA on Natural Logarithms of Gross Beta Comparing Concentrations Among NTS Classes of Water Sources, ($\mu Ci/mL \times 10^{-9}$)

Source	Degrees of Freedom	Sum of Squares	Mean Square	F-Statistic	p-Value
Class of Water	6	40.809	6.801	25.14	0.000
Error	124	33.550	0.271		
Total	130	74.359			

Class of Water	Number	Mean	Standard Deviation
1	24	1.8634	0.4387
2	38	1.8968	0.4655
3	12	1.9908	0.2970
4	4	2.2741	0.9486
5	8	2.4565	0.5958
6	37	2.7639	0.4822
7	8	3.9113	0.9698

Individual 95 Percent Confidence Intervals For Ln Median Based on Pooled Standard Deviation



Pooled Standard Deviation = 0.5202

Key:
1 Potable Water (tap)
2 Supply Wells (potable)
3 Open Reservoirs
4 Supply Wells (non-potable)
5 Natural Springs
6 Sewage Lagoons
7 Containment Ponds

Table 8.6 Historical Gross Alpha Annual Averages for Representative Stations, (μCi/mL x 10^{-9})

Year	Well UE-5c	Area 6 Cafeteria	Area 23 Cafeteria	Well J-13
1984	-	2.1	2.1	-
1985	-	5.9	4.6	-
1986	-	6.5	3.5	-
1987	-	12.0	9.6	-
1988	-	7.6	4.6	-
1989	-	8.7	4.9	-
1990	5.1	5.3	5.6	1.7
1991	-	10.7	5.6	1.2
1992	-	10.6	6.9	1.2
1993	-	9.7	5.5	2.2
1994	9.0	7.7	5.8	2.0
1995	5.9	12.7	5.2	1.7

Table 8.7 Historical Gross Beta Annual Averages for Representative Stations, (μCi/mL x 10^{-9})

Year	Area 6 Cafeteria	Area 23 Cafeteria	Well UE-5c	Well J-13	Cane Spring	Reitman Seep	Area 2 Mud Plant	Swim Pool
1967	6.8	2.4	6.6	-	7.2	-	-	-
1968	11.1	5.7	15.0	-	11.7	-	-	-
1969	9.6	4.5	6.9	-	25.4	-	-	-
1970	9.0	4.0	5.5	-	14.0	-	-	-
1971	7.0	5.0	8.7	7.0	25.0	-	-	16.0
1972	13.0	4.0	7.4	5.9	12.0	-	-	5.0
1973	13.0	6.0	-	7.3	9.0	-	-	9.0
1974	15.0	8.0	-	7.4	11.0	-	-	9.0
1975	13.0	7.0	-	6.2	9.0	-	-	9.0
1976	16.0	9.0	-	5.2	8.0	-	-	36.0
1977	16.0	9.0	7.9	6.7	7.0	-	-	30.0
1978	12.0	8.0	8.4	5.3	7.0	47.0	-	23.0
1979	12.0	8.0	7.7	5.1	8.0	26.0	6.0	13.0
1980	9.0	7.0	7.7	5.3	6.0	28.0	6.0	14.0
1981	11.0	9.0	8.1	5.7	7.0	18.0	6.0	11.0
1982	10.0	7.0	6.5	4.1	6.0	16.0	6.0	9.0
1983	9.0	6.0	5.4	4.3	7.0	14.0	6.0	8.0
1984	8.0	3.0	5.6	4.0	6.0	21.0	4.0	9.0
1985	8.0	6.0	5.4	3.8	6.0	26.0	6.0	6.0
1986	9.0	8.0	6.8	4.6	7.0	45.0	7.0	9.0
1987	9.0	7.0	7.0	4.6	6.0	30.0	6.0	6.0
1988	8.0	6.0	7.2	3.8	6.0	24.0	6.0	4.0
1989	10.0	3.0	-	4.2	6.0	22.0	7.0	-
1990	8.7	4.0	7.8	4.7	7.9	68.5	8.1	4.4
1991	9.9	3.5	7.4	4.6	7.5	229.0	5.2	4.4
1992	8.8	4.1	8.5	4.4	6.9	50.7	4.0	3.9
1993	7.6	5.4	7.8	3.9	9.3	36.0	3.8	4.4
1994	14.0	6.8	20.7	3.8	6.1	18.0	3.1	7.7
1995	10.2	8.5	7.5	4.3	5.7	28.4	5.3	8.6

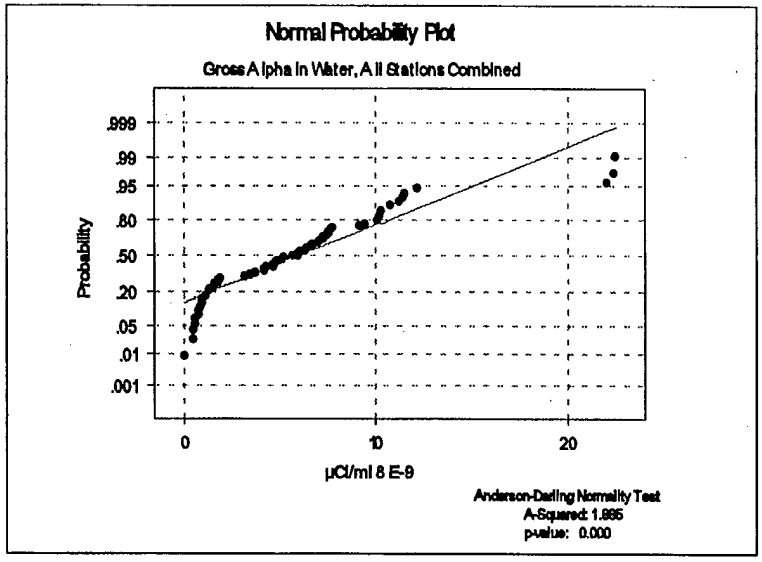


Figure 8.2 Normal Probability Plot of Gross Alpha in Water

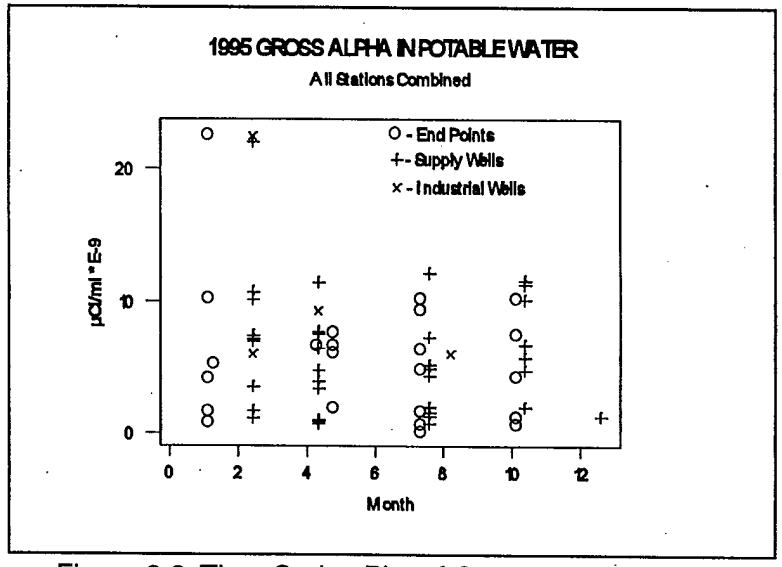


Figure 8.2 Time Series Plot of Gross Alpha in Water

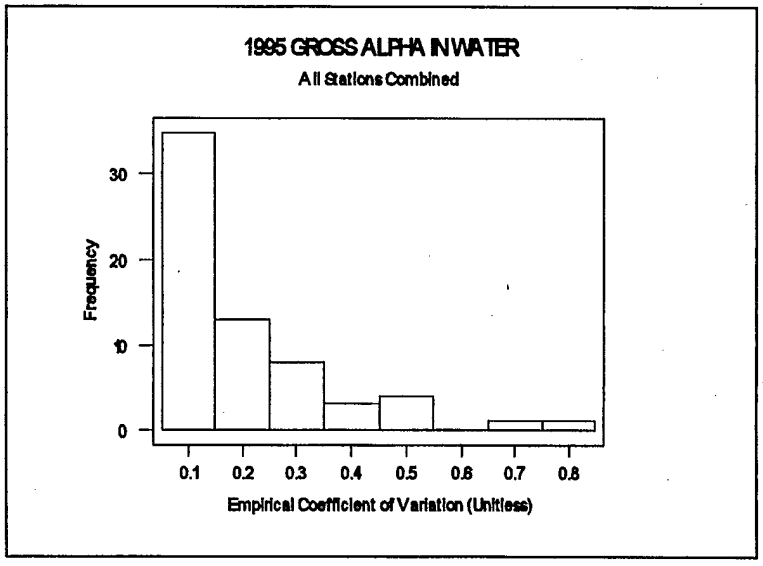


Figure 8.3 Histogram of Gross Alpha Coefficients of Variation

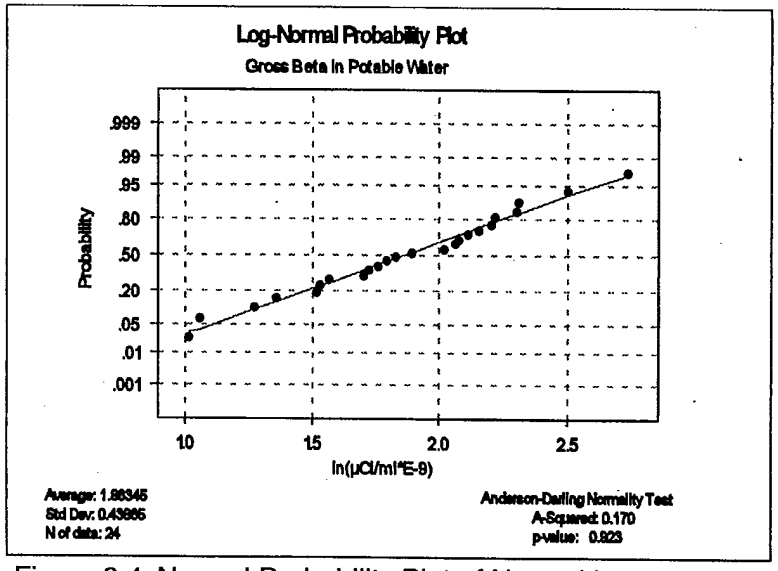


Figure 8.4 Normal Probability Plot of Natural Logarithms of Gross Beta Concentrations

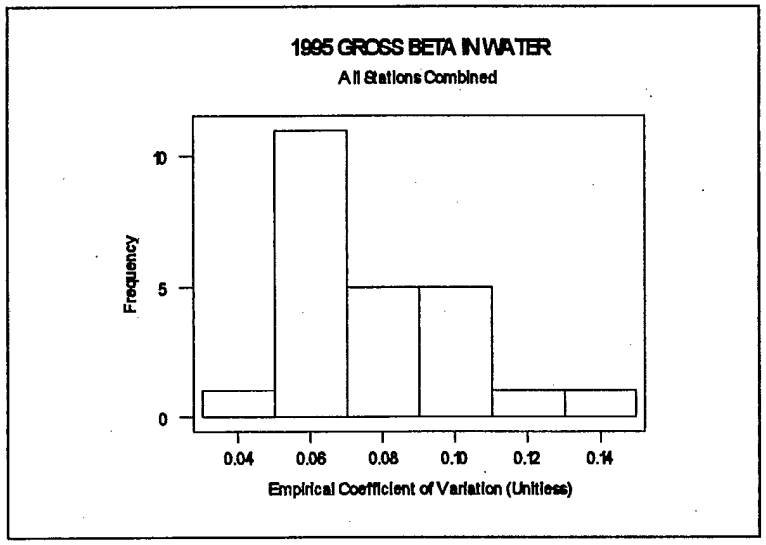


Figure 8.5 Histogram of Gross Beta Coefficients of Variation

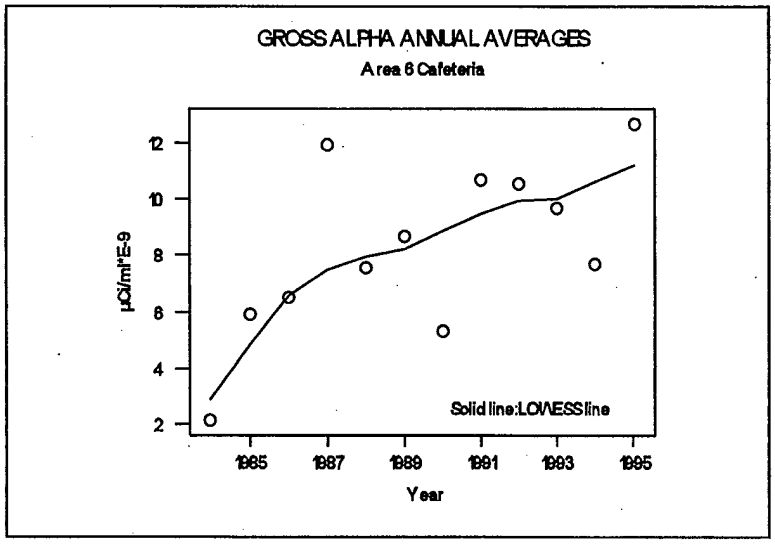


Figure 8.6 Time Series Plot of Area 6 Cafe Annual Averages

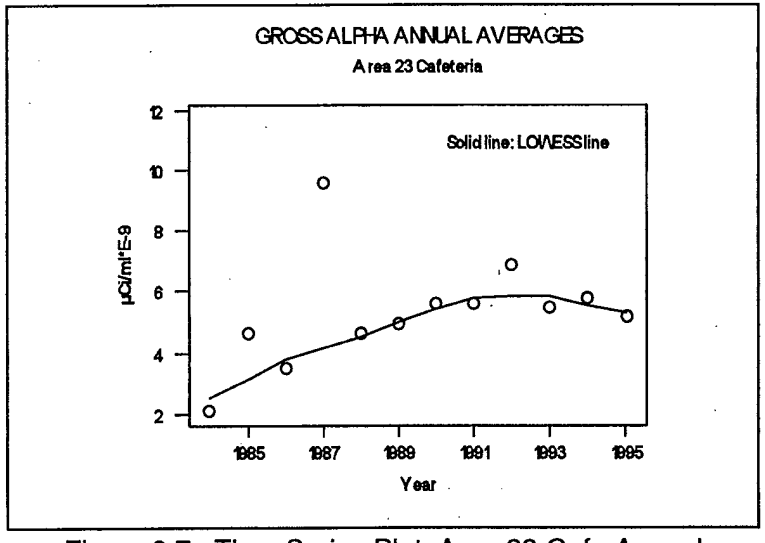


Figure 8.7 Time Series Plot, Area 23 Cafe Annual Averages

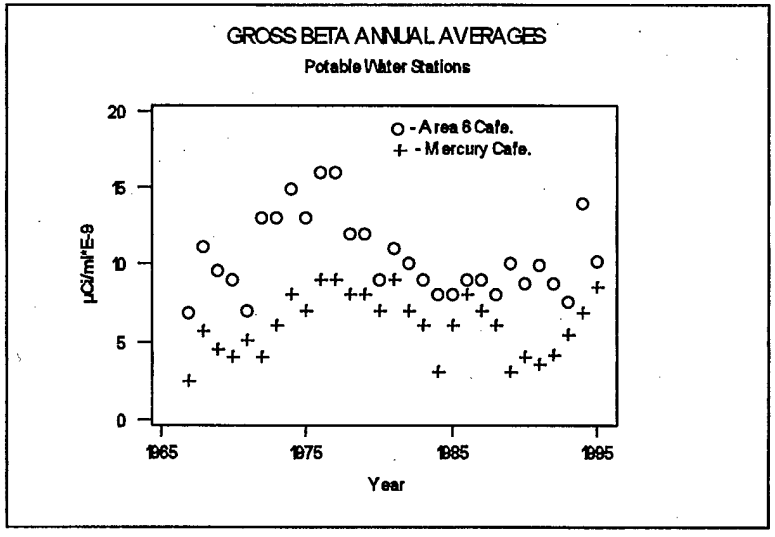


Figure 8.8 Time Series Plot of Representative Stations Potable Water Annual Averages

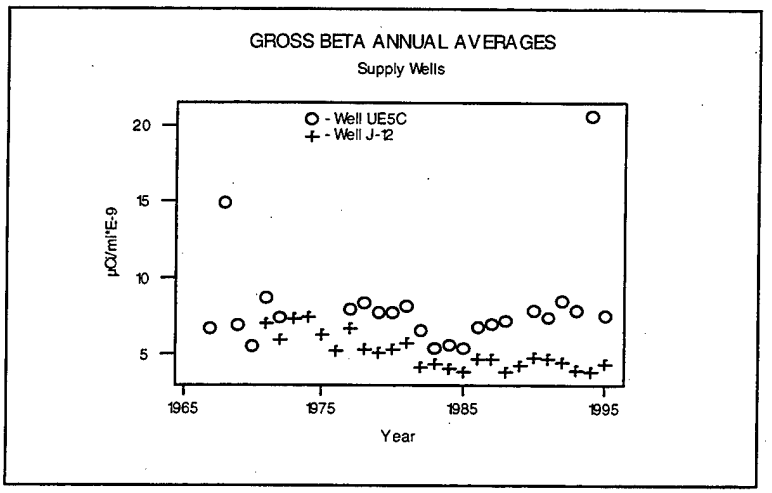


Figure 8.9 Time Series Plot of Representative Stations
Supply Wells Annual Averages

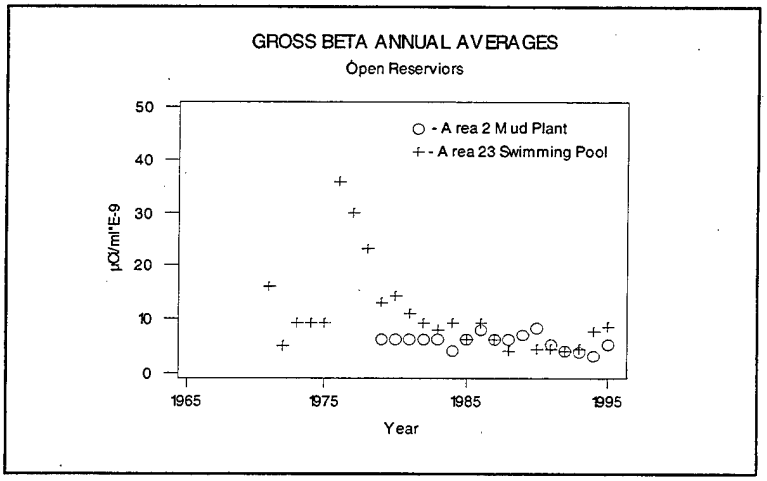


Figure 8.10 Time Series Plot of Representative Stations
Open Reservoirs Annual Averages

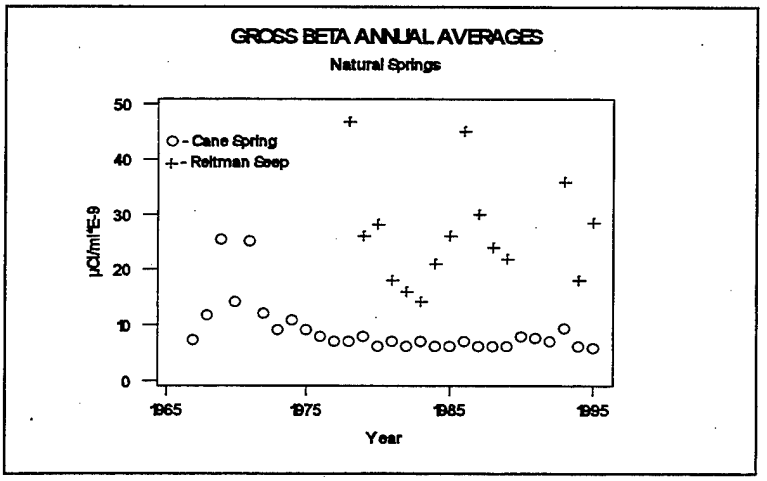


Figure 8.11 Time Series Plot of Representative Stations
Natural Springs Annual Averages

Attachment 8.1 Gross Alpha in Water - 1995

Sampling Location	Collection Date	Concentration (µCi/mL x 10^{-9})	Standard Deviation (s) (µCi/mL x 10^{-9})	Detection Limit (µCi/mL x 10^{-9})
Potable Water				
Area 1, Building 101	01/09/95	5.210	0.80	1.14
Area 1, Building 101	04/24/95	6.700	0.84	1.04
Area 1, Building 101	07/11/95	9.450	1.04	1.17
Area 1, Building 101	10/04/95	7.530	0.75	0.82
Area 2, Restroom	01/04/95	0.701	0.31	0.61
Area 2, Restroom	04/24/95	Building Closed		
Area 2, Restroom	07/11/95	0.513	0.28	0.56
Area 2, Restroom	10/04/95	Building Closed		
Area 6, Cafeteria	01/04/95	22.600	1.66	1.40
Area 6, Cafeteria	04/24/95	7.710	0.89	1.04
Area 6, Cafeteria	07/11/95	10.300	1.08	1.18
Area 6, Cafeteria	10/04/95	10.300	0.82	0.78
Area 6, Building 6-900	01/04/95	10.300	0.99	1.01
Area 6, Building 6-900	04/10/95	6.650	1.22	1.82
Area 6, Building 6-900	07/11/95	4.870	0.85	1.23
Area 6, Building 6-900	10/04/95	10.200	0.85	0.83
Area 12, Building 12-23	01/09/95	Building Closed		
Area 12, Building 12-23	04/24/95	Building Closed		
Area 12, Building 12-23	07/11/95	0.019	0.10	0.25
Area 12, Building 12-23	10/04/95	1.080	0.27	0.45
Area 23, Mercury Cafeteria	01/04/95	4.150	0.71	1.03
Area 23, Mercury Cafeteria	04/24/95	6.040	0.80	1.00
Area 23, Mercury Cafeteria	07/11/95	6.380	0.73	0.85
Area 23, Mercury Cafeteria	10/04/95	4.300	0.62	0.84
Area 25, Building 4221	01/04/95	1.510	0.48	0.86
Area 25, Building 4221	04/24/95	1.800	0.53	0.95
Area 25, Building 4221	07/11/95	1.510	0.45	0.79
Area 25, Building 4221	10/04/95	0.553	0.37	0.76
Supply Wells				
Area 5, Well 5B	02/15/95	7.060	0.84	1.00
Area 5, Well 5B	04/11/95	3.210	0.63	0.96
Area 5, Well 5B	07/20/95	4.190	0.66	0.93
Area 5, Well 5B	10/12/95	4.660	0.60	0.75
Area 5, Well 5C	02/15/95	10.700	0.91	0.86
Area 5, Well 5C	04/11/95	7.650	0.89	1.04
Area 5, Well 5C	07/20/95	7.290	0.91	1.16
Area 5, Well 5C	10/12/95	11.200	0.89	0.81
Area 6, Well 4A	02/15/95	10.100	0.95	0.96
Area 6, Well 4A	04/11/95	6.410	0.79	0.95
Area 6, Well 4A	07/20/95	7.300	0.77	0.88

Attachment 8.1 (Gross Alpha in Water - 1995, cont.)

Sampling Location	Collection Date	Concentration (μCi/mL x 10^{-9})	Standard Deviation (s) (μCi/mL x 10^{-9})	Detection Limit (μCi/mL x 10^{-9})
(Supply Wells, cont.)				
Area 6, Well 4A	10/12/95	11.500	0.86	0.75
Area 6, Well 4	02/15/95	7.460	0.84	0.95
Area 6, Well 4	04/11/95	7.580	0.84	0.95
Area 6, Well 4	07/20/95	5.120	0.67	0.87
Area 6, Well 4	10/12/95	10.100	0.81	0.75
Area 6, Well C-1	02/15/95	22.100	2.55	2.96
Area 6, Well C-1	04/11/95	11.400	1.66	2.21
Area 6, Well C-1	07/20/95	12.100	1.52	1.93
Area 6, Well C-1	10/12/95	6.670	0.72	0.82
Area 16, Well UE-16d	02/15/95	6.960	0.92	1.16
Area 16, Well UE-16d	04/11/95	3.770	0.67	0.99
Area 16, Well UE-16d	07/20/95	4.780	0.96	1.50
Area 16, Well UE-16d	10/12/95	5.680	0.68	0.82
Area 18, Well HTH No. 8	02/15/95	0.972	0.30	0.53
Area 18, Well HTH No. 8	04/11/95	0.797	0.26	0.48
Area 18, Well HTH No. 8	07/20/95	0.511	0.28	0.56
Area 22, Well Army No. 1	02/15/95	0.969	0.50	1.00
Area 22, Well Army No. 1	04/11/95	4.630	0.73	1.01
Area 22, Well Army No. 1	07/20/95	1.880	0.59	1.07
Area 25, Well J-12	02/15/95	1.540	0.52	0.96
Area 25, Well J-12	04/11/95	0.710	0.38	0.78
Area 25, Well J-12	07/20/95	1.340	0.42	0.76
Area 25, Well J-12	12/19/95	1.080	0.41	0.77
Area 25, Well J-13	02/15/95	3.440	0.61	0.89
Area 25, Well J-13	04/11/95	0.490	0.38	0.81
Area 25, Well J-13	07/20/95	1.080	0.42	0.81
Area 25, Well J-13	10/12/95	1.770	0.38	0.61
Industrial Wells				
Area 5, Well UE-5c	02/15/95	5.940	0.77	0.96
Area 6, Well C	02/15/95	22.500	2.58	2.98
Area 6, Well C	04/11/95	9.180	1.74	2.62
Area 20, Well U-20	08/07/95	5.920	0.68	0.81

Attachment 8.2 Gross Beta in Water - 1995

Sampling Location	Collection Dates	µCi/mL x 10^{-9} Concentration	Standard Deviation (s)	Detection Limit
Potable Water				
Area 1, Building 101	01/09/95	4.79	0.467	0.830
Area 1, Building 101	04/24/95	6.01	0.487	0.841
Area 1, Building 101	07/11/95	9.07	0.580	0.958
Area 1, Building 101	10/04/95	5.81	0.398	0.663
Area 2, Restroom	01/04/95	4.61	0.463	0.828
Area 2, Restroom	04/24/95	Building Closed		*
Area 2, Restroom	07/11/95	2.77	0.382	0.709
Area 2, Restroom	10/04/95	Building Closed		*
Area 6, Cafeteria	01/04/95	15.50	0.775	1.200
Area 6, Cafeteria	04/24/95	8.64	0.518	0.841
Area 6, Cafeteria	07/11/95	10.00	0.585	0.952
Area 6, Cafeteria	10/04/95	6.63	0.404	0.657
Area 6, Building 6-900	01/04/95	10.10	0.525	0.828
Area 6, Building 6-900	04/10/95	9.21	0.985	1.770
Area 6, Building 6-900	07/11/95	8.29	0.589	0.990
Area 6, Building 6-900	10/04/95	7.85	0.420	0.663
Area 12, Building 12-23	01/09/95	Building Closed		*
Area 12, Building 12-23	04/24/95	Building Closed		*
Area 12, Building 12-23	07/11/95	2.88	0.348	0.639
Area 12, Building 12-23	10/04/95	3.56	0.365	0.652
Area 23, Mercury	01/04/95	7.97	0.506	0.828
Area 23, Mercury	04/24/95	12.20	0.556	0.841
Area 23, Mercury	07/11/95	7.53	0.437	0.709
Area 23, Mercury	10/04/95	6.24	0.402	0.663
Area 25, Building 4221	01/04/95	5.47	0.473	0.828
Area 25, Building 4221	04/24/95	5.58	0.483	0.841
Area 25, Building 4221	07/11/95	4.56	0.404	0.709
Area 25, Building 4221	10/04/95	3.90	0.370	0.657
Supply Wells, Potable Water				
Area 5, Well 5B	02/15/95	15.40	0.584	0.827
Area 5, Well 5B	04/11/95	11.30	0.547	0.842
Area 5, Well 5B	07/20/95	12.40	0.494	0.717
Area 5, Well 5B	10/12/95	8.04	0.418	0.658
Area 5, Well 5C	02/15/95	9.90	0.525	0.827
Area 5, Well 5C	04/11/95	7.39	0.503	0.842
Area 5, Well 5C	07/20/95	6.51	0.547	0.949
Area 5, Well 5C	10/12/95	6.01	0.400	0.664
Area 6, Well No. 4A	02/15/95	9.47	0.521	0.827
Area 6, Well No. 4A	04/11/95	7.24	0.503	0.842
Area 6, Well No. 4A	07/20/95	6.60	0.432	0.717

Attachment 8.2 (Gross Beta in Water - 1995, cont.)

Sampling Location	Collection Dates	Concentration (µCi/mL x 10^{-9})	Standard Deviation (s)	Detection Limit
(Supply Wells, Potable Water, cont.)				
Area 6, Well No. 4A	10/12/95	4.98	0.383	0.658
Area 6, Well No. 4	02/15/95	8.92	0.513	0.827
Area 6, Well No. 4	04/11/95	6.88	0.499	0.842
Area 6, Well No. 4	07/20/95	6.84	0.434	0.717
Area 6, Well No. 4	10/12/95	4.22	0.376	0.658
Area 6, Well C-1	02/15/95	29.80	1.609	2.540
Area 6, Well C-1	04/11/95	14.00	1.127	1.940
Area 6, Well C-1	07/20/95	14.30	0.879	1.450
Area 6, Well C-1	10/12/95	5.98	0.398	0.664
Area 16, Well UE-16d	02/15/95	7.07	0.544	0.932
Area 16, Well UE-16d	04/11/95	5.61	0.482	0.842
Area 16, Well UE-16d	07/20/95	6.80	0.687	1.230
Area 16, Well UE-16d	10/12/95	6.33	0.402	0.664
Area 18, Well HTH No. 8	02/15/95	4.34	0.456	0.820
Area 18, Well HTH No. 8	04/11/95	4.53	0.467	0.834
Area 18, Well HTH No. 8	07/20/95	3.42	0.393	0.717
Area 22, Well Army No. 1	02/15/95	3.98	0.466	0.853
Area 22, Well Army No. 1	04/11/95	6.75	0.496	0.842
Area 22, Well Army No. 1	07/20/95	6.04	0.492	0.852
Area 25, Well J-12	02/15/95	5.32	0.473	0.827
Area 25, Well J-12	04/11/95	4.61	0.470	0.842
Area 25, Well J-12	07/20/95	3.80	0.399	0.717
Area 25, Well J-12	12/19/95	4.75	0.439	0.775
Area 25, Well J-13	02/15/95	5.01	0.468	0.827
Area 25, Well J-13	04/11/95	4.60	0.469	0.842
Area 25, Well J-13	07/20/95	4.26	0.405	0.717
Area 25, Well J-13	10/12/95	3.51	0.367	0.658
Supply Wells, Non-Potable Water				
Area 5, Well UE-5c	02/15/95	7.46	0.500	0.827
Area 6, Well C	02/15/95	27.40	1.671	2.710
Area 6, Well C	04/11/95	14.60	1.577	2.840
Area 20, Well U-20	08/07/95	2.99	0.371	0.680
Sewage Lagoons				
Area 5, RWMS Sewage Pond	11/01/95	22.60	0.631	0.793
Area 6, Yucca Sewage Pond	02/07/95	20.90	0.641	0.837
Area 6, Yucca Sewage Pond	05/04/95	7.92	0.467	0.757
Area 6, Yucca Sewage Pond	08/09/95	24.10	0.647	0.800

Attachment 8.2 (Gross Beta in Water - 1995, cont.)

Sampling Location	Collection Dates	Concentration (µCi/mL x 10^{-9})	Standard Deviation (s)	Detection Limit
(Sewage Lagoons, cont.)				
Area 6, Yucca Sewage Pond	11/01/95	18.90	0.620	0.836
Area 6, CP-72 Sewage Pond	02/07/95	16.10	0.592	0.829
Area 6, CP-72 Sewage Pond	05/04/95	9.65	0.487	0.757
Area 6, CP-72 Sewage Pond	08/09/95	20.60	0.612	0.793
Area 6, DAF Sewage Pond	02/07/95	26.00	0.683	0.829
Area 6, DAF Sewage Pond	05/04/95	7.99	0.467	0.757
Area 6, DAF Sewage Pond	08/09/95	22.20	0.633	0.807
Area 6, DAF Sewage Pond	11/01/95	16.90	0.583	0.805
Area 6, CP-6 Sewage Pond	02/07/95	20.80	0.639	0.829
Area 6, CP-6 Sewage Pond	05/04/95	7.75	0.465	0.757
Area 6, CP-6 Sewage Pond	08/09/95	23.30	0.610	0.749
Area 11, LANL Sewage Pond	02/07/95	18.80	0.619	0.829
Area 11, LANL Sewage Pond	05/04/95	12.20	0.512	0.757
Area 11, LANL Sewage Pond	08/09/95	31.30	0.704	0.800
Area 11, LANL Sewage Pond	11/01/95	18.20	0.602	0.813
Area 12, Sewage Pond	02/07/95	8.17	0.502	0.822
Area 12, Sewage Pond	05/04/95	10.90	0.499	0.757
Area 12, Sewage Pond	08/09/95	9.94	0.527	0.828
Area 12, Sewage Pond	11/01/95	6.34	0.485	0.828
Area 22, Sewage Pond	02/07/95	20.20	0.636	0.837
Area 22, Sewage Pond	05/04/95	18.70	0.575	0.757
Area 22, Sewage Pond	08/09/95	42.20	0.787	0.800
Area 22, Sewage Pond	11/01/95	17.10	0.596	0.825
Area 23, Sewage Pond	02/07/95	18.90	0.618	0.829
Area 23, Sewage Pond	05/04/95	15.00	0.540	0.757
Area 23, Sewage Pond	08/09/95	54.30	0.834	0.749
Area 23, Sewage Pond	11/01/95	15.60	0.582	0.825
Area 25, Reactor Control	02/07/95	12.40	0.552	0.822
Area 25, Reactor Control	11/08/95	8.22	0.481	0.780
Area 25, Central Supply	02/07/95	16.40	0.595	0.829
Area 25, Central Supply	05/04/95	16.50	0.554	0.757
Area 25, Central Supply	08/09/95	9.81	0.461	0.703
Area 25, Central Supply	11/01/95	12.50	0.518	0.762
Natural Springs				
Area 5, Cane Spring	06/29/95	5.74	0.396	0.666
Area 7, Reitman Seep	06/28/95	28.40	0.615	0.683
Area 12, White Rock Spring	06/28/95	8.74	0.427	0.660
Area 12, Captain Jack Spring	08/07/95	7.81	0.426	0.680
Area 12, Gold Meadows Spring	06/29/95	12.50	0.465	0.660

Attachment 8.2 (Gross Beta in Water - 1995, cont.)

Sampling Location	Collection Dates	Concentration (µCi/mL x 10^{-9})	Standard Deviation (s)	Detection Limit
(Natural Springs, cont.)				
Area 15, Tub Springs	06/29/95	21.10	0.546	0.666
Area 16, Tippipah Spring	08/17/95	6.31	0.439	0.736
Area 29, Topopah Spring	08/28/95	18.50	0.562	0.737
Open Reservoirs				
Area 2, Mud Plant	07/31/95	5.33	0.400	0.680
Area 2, Well 2 Reservoir	07/31/95	9.71	0.450	0.686
Area 3, Well A Reservoir	07/31/95	7.57	0.424	0.680
Area 3, Well 3 Reservoir	07/31/95	9.84	0.448	0.680
Area 5, Well 5B Reservoir	07/31/95	12.10	0.470	0.680
Area 5, UE-5c Reservoir	07/31/95	6.08	0.407	0.680
Area 6, Well C1 Reservoir	07/31/95	6.90	0.417	0.680
Area 18, Camp 17 Reservoir	07/31/95	4.64	0.390	0.680
Area 19, U19c Reservoir	07/18/95	9.26	0.445	0.683
Area 23, Swim Pool	07/31/95	8.61	0.439	0.686
Area 25, Well J-11 Reservoir	07/31/95	5.68	0.403	0.680
Area 25, Well J-12 Reservoir	07/31/95	5.77	0.404	0.680
Containment Ponds				
Area 12, E-Tunnel Effluent	03/15/95	7.67	0.495	0.820
Area 12, E-Tunnel Effluent	05/09/95	87.00	1.022	0.756
Area 12, E-Tunnel Effluent	08/07/95	82.10	1.392	1.340
Area 12, E-Tunnel Effluent	11/08/95	25.50	0.705	0.884
Area 12, E-Tunnel Pond No. 1	03/23/95	145.00	1.689	1.250
Area 12, E-Tunnel Pond No. 1	05/23/95	97.20	1.327	1.100
Area 12, E-Tunnel Pond No. 1	08/07/95	71.70	1.312	1.320
Area 12, E-Tunnel Pond No. 1	11/08/95	27.50	0.708	0.861

9.0 ONSITE ^{238}Pu and $^{239+240}$Pu IN WATER

For purposes of statistical analysis, water sampling stations are divided into the following classes, by source of water:

Class	Sampling Stations
Potable Water	Area 1 Building 101; Area 2 Restroom; Cafeterias in Areas 6 and 23; Area 6 Building 6-900; Area 12 Building 12-23; Area 25 Building 4221.
Natural Springs	Area 5 Cane Spring; Area 7 Reitman Seep; Area 12 Captain Jack, Gold Meadows, and White Rock Springs; Area 15 Tub Springs; Area 16 Tippipah Spring; Area 29 Topopah Spring.
Sewage Lagoons	Area 5 RWMS Sewage Pond; Area 6 CP-6, Yucca, LANL, CP-72, and DAF Sewage Ponds; Area 12 Sewage; Area 22 Sewage; Area 23 Sewage; Area 25 Central Sewage and Reactor Control Sewage Ponds.
Supply Wells	
Potable Water	Area 5 Well 5B and Well 5C; Area 6 Well No. 4, Well 4-A and Well C1; Area 16 Well UE-16d; Area 18 Well 8; Area 22 Army Well No. 1; Area 25 Well J-12 and Well J-13.
Non-potable Water	Area 5 Well UE-5c; Area 6 Well C; Area 20 Well U-20.
Open Reservoirs	Area 2 Mud Plant and Well 2 Reservoir; Area 3 and Well 3 Reservoir; Area 5 Well UE-5c Reservoir and Well 5B Reservoir; Area 6 Well C1 Reservoir; Area 18 Camp 17 Reservoir, Area 19 Well UE-19c Reservoir; Area 23 Swimming Pool; Area 25 Well J-11 and Well J-12 Reservoirs.
Containment Ponds	Area 12 E Tunnel Effluent and E Tunnel Pond No. 1.

Sampling locations, sampling dates, measured concentrations, analytic standard deviations, and detection limits for ^{238}Pu and $^{239+240}$Pu in water appear in Attachments 9.1 and 9.2 at the end of this chapter. Statistical analyses of these data are presented below. The frequency of sampling depends upon the type of sampling station. Potable water, most sewage ponds, most supply wells, and containment ponds were sampled quarterly. Natural springs and open reservoirs were sampled annually.

PLUTONIUM-238

Plutonium-238 concentrations in water were measured at 53 sampling stations on the Nevada Test Site (NTS) in 1995. An examination of the data, displayed in Attachment 9.1, revealed that concentrations in containment ponds (E Tunnel Effluent and E Tunnel Pond No. 1) were much greater than concentrations from other sampling stations. Furthermore, all concentrations from

the containment ponds were much above their detection limits while all concentrations from the remaining stations were below their detection limits. Statistically this situation calls for a division of the data into containment pond data and other data. The containment pond concentrations can be considered measured values of plutonium concentrations. The other data, all being less than detection limit data, cannot be considered actual plutonium concentrations for each sample; however, statistically these data values do yield an estimate of summary statistics for the group as a whole.

Of the other data stations, approximately 46 percent of the observed concentrations are positive and the remaining 54 percent are negative. The following descriptive statistics, in units of µCi/mL, result from separating the E Tunnel from the other stations:

	Containment Ponds	Other Sampling Stations
Number of data values	8	120
Arithmetic mean	3.6×10^{-10}	5.7×10^{-13}
Median	3.6×10^{-10}	-1.1×10^{-12}
Standard deviation	2.3×10^{-10}	4.0×10^{-12}
Minimum value	8.2×10^{-11}	-4.5×10^{-12}
Maximum value	7.1×10^{-10}	2.8×10^{-11}
Median detection limit	2.2×10^{-11}	1.5×10^{-11}

In view of the magnitude of the "other" data values and the obvious difference of the containment pond data, no formal statistical analysis is performed. Rather, ^{238}Pu concentrations are compared across sources of water by simple descriptive statistics, in units of µCi/mL:

Source	Number	Arithmetic Mean	Median	Standard Deviation
Potable Water	24	1.1×10^{-12}	1.0×10^{-12}	3.3×10^{-12}
Natural Springs	8	-3.3×10^{-13}	-1.1×10^{-12}	1.9×10^{-12}
Sewage Lagoons	35	1.3×10^{-12}	-1.2×10^{-12}	5.7×10^{-12}
Supply Wells	41	-1.6×10^{-13}	-1.1×10^{-12}	2.6×10^{-12}
Open Reservoirs	12	4.1×10^{-13}	-1.3×10^{-12}	4.2×10^{-11}

Concentrations are compared over time by means of plots. Results from containment ponds are separated from those from other sampling stations. In Figure 9.1, a plot appears of all observed ^{238}Pu concentrations versus the month of collection, in units of 10^{-12} µCi/mL. Concentrations from Area 12 E Tunnel Effluent and Area 12 E Tunnel Pond No. 1 are not included in the plot. The highest value in this plot is from the Los Alamos National Laboratory sewage lagoon sampled on August 9, 1996; however, it should be noted that all values in this figure are below the individual detection limits. This plot possibly shows a slight increase in variability of the data during the summer months, but no other trends are apparent. The abscissa of this plot was calculated as the month of sampling plus the day of the month divided by 32.

In Figure 9.2, a plot appears of observed ^{238}Pu concentrations from containment ponds (Area 12 E Tunnel Effluent and Area 12 E Tunnel Pond No. 1), in units of 10^{-12} µCi/mL, versus the month of collections. There seems to be an increase in concentrations during the spring of the year followed by declining concentrations for the remainder of the year. Note that all the concentrations in Figure 9.2 are above the individual detection limits.
In previous years, an assessment of measurement errors has been presented, using the empirical coefficients of variation of the concentrations. Since all the concentrations from 1995,

except the eight values from the containment ponds, are below the individual detection limits, an evaluation of measurement errors is of little value and has been eliminated from this report.

Analytic standard deviation only accounts for counting variability. In previous years, duplicate samples were analyzed to quantify other sources of variability. Due to reduced funding, the duplicate samples were eliminated from the 1995 sampling protocol. A short discussion of sources of error can be found in Chapter 4 and in the Quality Assurance section of the "U.S. Department of Energy Nevada Operations Office (DOE/NV), Annual Site Environmental Report (ASER) - 1995", DOE/NV/11718-037.

PLUTONIUM-239+240

Plutonium 239+240 concentrations in water were measured at 53 sampling stations on the NTS. As was the case for ^{238}Pu, an examination of the data in Attachment 2 shows two very distinct clusters of data values. The containment pond concentrations are all about two orders of magnitude larger than the individual detection limits. The-other-than-containment-pond concentrations are almost all less than the individual detection limits. Thus the analysis of the $^{239+240}Pu$ will use the same grouping of sampling stations as was used above for the ^{238}Pu data.

	Containment Ponds	Other Sampling Stations
Number of data values	8	120
Arithmetic mean	2.7×10^{-09}	9.3×10^{-14}
Median	2.9×10^{-09}	-1.8×10^{-12}
Standard deviation	1.6×10^{-09}	5.7×10^{-12}
Minimum value	6.7×10^{-10}	-5.8×10^{-12}
Maximum value	4.7×10^{-09}	4.3×10^{-11}
Median detection limit	2.2×10^{-11}	1.5×10^{-11}

All of the samples from containment ponds were above their individual limits of detection. Two of the remaining 120 samples exceeded their individual limits of detection. Forty-one percent of the "other" samples were positive.

In view of the limited information contained in concentration values that are less than the corresponding detection limits, no formal statistical analysis was performed. Rather, $^{239+240}Pu$ concentrations are compared across sources of water by simple descriptive statistics. In units of µCi/mL, these statistics are as follows:

Source	Number	Arithmetic Mean	Median	Standard Deviation
Potable Water	24	-9.4×10^{-13}	-1.9×10^{-12}	2.2×10^{-12}
Natural Springs	8	2.8×10^{-12}	4.9×10^{-13}	9.0×10^{-12}
Sewage Lagoons	35	1.4×10^{-12}	2.5×10^{-13}	8.6×10^{-12}
Supply Wells	41	-1.1×10^{-12}	-2.0×10^{-12}	2.7×10^{-12}
Open Reservoirs	12	4.1×10^{-13}	-1.3×10^{-12}	4.2×10^{-12}

Concentrations are compared over time by means of plots. Results from containment ponds are separated from those of the other sampling stations.

In Figure 9.3, a plot appears of all observed $^{239+240}Pu$ concentrations, other than those from containment ponds, in units of 10^{-12} µCi/mL, versus the month of collection. The annotation on this plot was done in the same manner as for the plots of ^{238}Pu. These data show no particular pattern or trend. Most of the data are clustered about zero, as is expected from data that are less than the detection limit.

In Figure 9.4, a plot appears of observed $^{239+240}Pu$ concentrations, in units of 10^{-12} µCi/mL, versus the month of collection for containment ponds. In contrast to the data from the "other" stations, all the containment pond concentrations are well above the individual detection limits. The number of data points in this plot is too small to establish if any significant trends exist. The general pattern, that of a peak in the spring then a gradual decline, is the same as that seen for ^{238}Pu.

In previous years, an assessment of measurement errors has been presented, using the empirical coefficients of variation of the concentrations. Since almost all the concentrations from 1995, except the eight values from the containment ponds, are below the individual detection limits, an evaluation of measurement errors is of little value and has been eliminated from this report.

Analytic standard deviation only accounts for counting variability. In previous years, duplicate samples were analyzed to quantify other sources of variability. Due to reduced funding, the duplicate samples were eliminated from the 1995 sampling protocol.

HISTORICAL TRENDS

Detailed reporting of historical trends for all contaminants at all sampling stations would result in an unwieldy document. Instead, two representative stations were chosen from each of the water sources: open reservoirs, natural springs, supply wells, and potable water.

Representative sampling stations are:

Water Source	NTS Operational Area	Sampling Station
Open Reservoir	2	Mud Plant
Open Reservoir	23	Swimming Pool
Natural Springs	5	Cane Spring
Natural Springs	7	Reitman Seep
Supply Wells	5	Well UE5C
Supply Wells	25	Well J-13
Potable Water	6	Cafeteria
Potable Water	23	Cafeteria

Tables 9.1 and 9.2 give the historical annual averages of ^{238}Pu and $^{239+240}Pu$ concentrations. Note that no data are available before 1989 and half of the representative stations have no data available before 1994. The only obvious features are peaks in plutonium concentrations occurring in 1990-1991. As discussed in the "DOE/NV ASER - 1993, DOE/NV/117432-123," these peaks were observed at almost all stations, including those not reported here in detail. No physical explanation for these peaks was found. The 1994 concentrations at Reitman Seep are suspect because of sediments in the samples collected in the winter and spring. These samples were collected during very dry conditions when there was very little water in the springs.

Sediments typically cause substantial increases in the reported concentrations. For the $^{239+240}Pu$ average at Reitman Seep, the April 1995 sample concentration was deleted from the calculation because it contained heavy sediments and was two orders of magnitude higher than the other values.

CONCLUSIONS

The 1995 plutonium in water concentrations can be divided into two groups of sampling stations: the containment ponds and all other stations. The containment ponds had measurable levels of both ^{238}Pu and $^{239+240}Pu$. This was expected since the tunnels were used for nuclear weapons testing, and the containment ponds hold tunnel effluent. Almost all the plutonium data from the other stations were below the individual detection limits in 1995.

Table 9.1 Historical ^{238}Pu in Water Annual Averages for Representative Stations

	μCi/mL x 10^{-12}							
Year	Area 2 Mud Plant	Swim Pool	Cane Spring	Reitman Seep	Well UE5c	Well J-13	Area 6 Cafeteria	Area 23 Cafeteria
1989	-	-	-	-	-	-26.0	1.8	-9.2
1990	-	-	-	-	11.0	12.0	44.0	12.0
1991	-	-	-	-	29.0	0.7	20.1	18.6
1992	-	-	-	-	-2.3	-5.0	-2.3	4.9
1993	-	-	-	-	0.6	-6.9	0.0	0.0
1994	0.3	-1.1	2.3	54.3	14.2	-0.7	1.7	1.3
1995	-1.3	-2.5	-1.5	-1.1	-3.8	-0.4	2.6	1.5

Table 9.2 Historical $^{239+240}Pu$ in Water Annual Averages for Representative Stations

	μCi/mL x 10^{-12}							
Year	Area 2 Mud Plant	Swim Pool	Cane Spring	Reitman Seep	Well UE5c	Well J-13	Area 6 Cafeteria	Area 23 Cafeteria
1989	-	-	-	-	-	-0.3	2.9	3.2
1990	-	-	-	-	4.7	7.8	19.0	0.5
1991	-	-	-	-	5.6	0.3	5.8	2.9
1992	-	-	-	-	0.0	13.2	-0.9	0.1
1993	-	-	-	-	3.4	-6.9	3.2	2.1
1994	1.3	0.4	3.2	184.0	28.0	2.1	0.5	0.6
1995	-1.3	-2.5	0.7	5.0	0.7	-1.6	0.9	-0.1

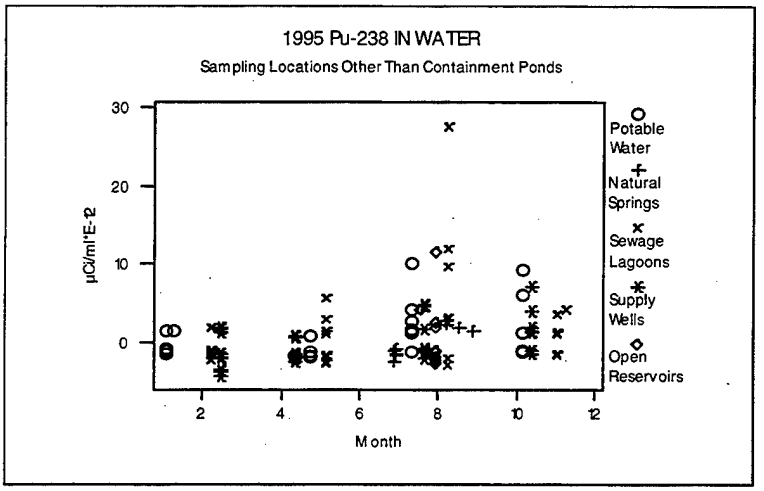


Figure 9.1 Time Series Plot of ^{238}Pu in Water Concentrations

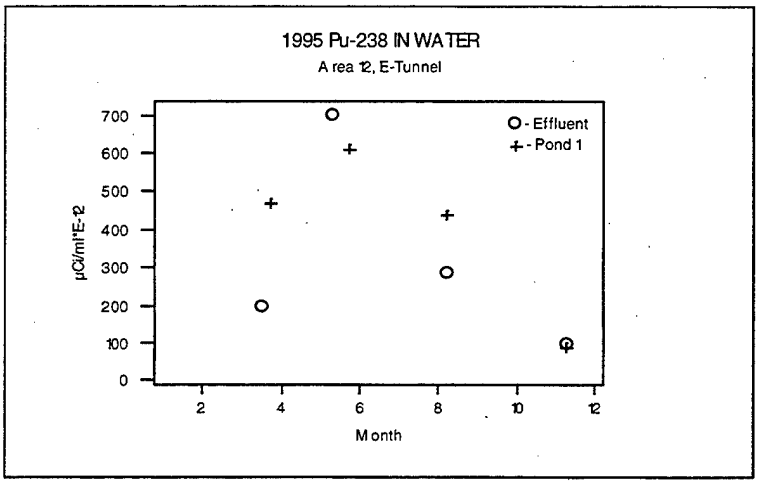


Figure 9.2 Time Series Plot of ^{238}Pu in Water Concentrations at E Tunnel

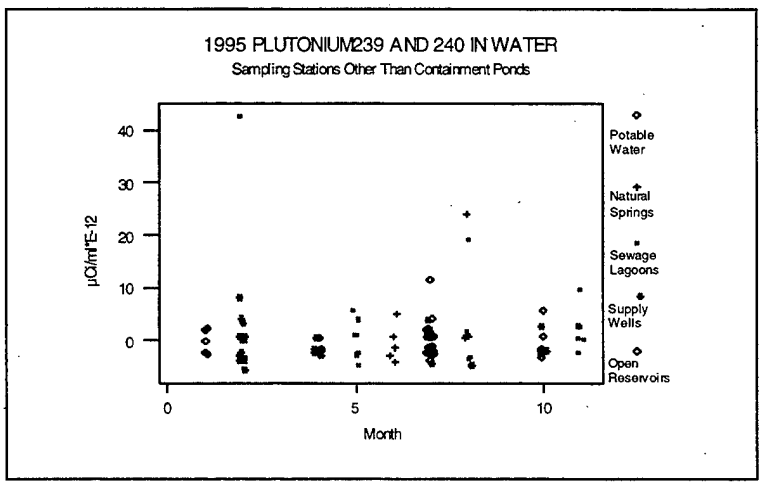


Figure 9.3 Time Series Plot of Sources Other Than Containment Ponds

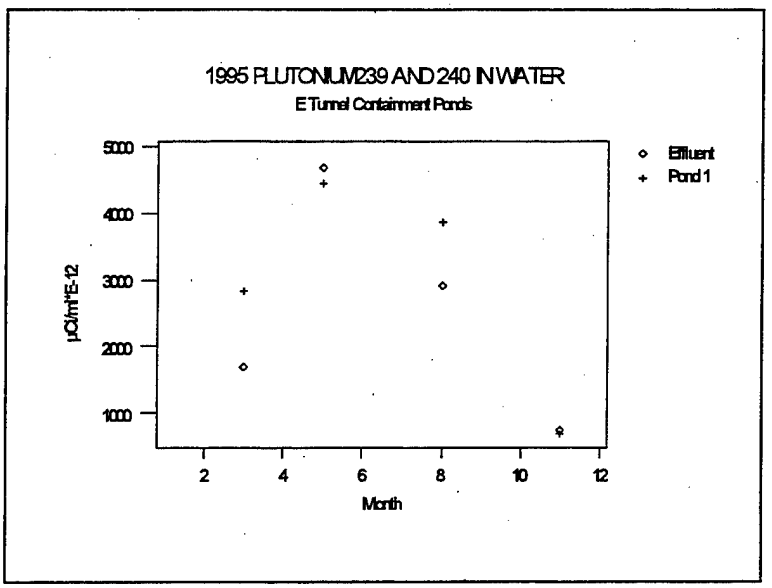


Figure 9.4 Time Series Plot of Containment Pond Sources

Attachment 9.1 ^{238}Pu in Water - 1995

Sampling Location	Collection Dates	µCi/mL x 10^{-12} Concentration	Standard Deviation (s)	Detection Limit
Potable Water				
Area 1, Building 101	01/09/95	1.4	2.9	11.3
Area 1, Building 101	04/24/95	-1.9	2.3	14.0
Area 1, Building 101	07/11/95	1.6	3.9	15.5
Area 1, Building 101	10/04/95	1.1	3.0	12.0
Area 2, Restroom	01/04/95	-1.0	1.5	10.6
Area 2, Restroom	04/24/95	Building Closed		(a)
Area 2, Restroom	07/11/95	10.1	6.2	14.0
Area 2, Restroom	04/24/95	Building Closed		(a)
Area 6, Cafeteria	01/04/95	-0.9	1.3	9.2
Area 6, Cafeteria	04/24/95	-1.9	2.2	13.5
Area 6, Cafeteria	07/11/95	4.1	4.3	13.3
Area 6, Cafeteria	10/04/95	9.2	5.6	13.0
Area 6, Building 6-900	01/04/95	-1.1	1.6	11.6
Area 6, Building 6-900	04/10/95	-1.7	2.1	12.5
Area 6, Building 6-900	07/11/95	1.4	3.3	13.3
Area 6, Building 6-900	10/04/95	6.1	6.6	20.5
Area 12, Building 12-23	01/04/95	Building Closed		(a)
Area 12, Building 12-23	04/24/95	Building Closed		(a)
Area 12, Building 12-23	07/11/95	1.2	3.0	11.9
Area 12, Building 12-23	10/04/95	-1.3	1.7	11.7
Area 23, Mercury	01/04/95	1.3	2.9	11.6
Area 23, Mercury	04/24/95	0.8	3.5	13.7
Area 23, Mercury	07/11/95	2.5	6.3	25.0
Area 23, Mercury	10/04/95	1.2	3.1	12.3
Area 25, Building 4221	01/04/95	-1.6	2.4	17.1
Area 25, Building 4221	04/24/95	-1.4	1.7	10.5
Area 25, Building 4221	07/11/95	-1.4	2.0	13.4
Area 25, Building 4221	10/04/95	-1.4	2.0	13.4
Natural Springs				
Area 5, Cane Spring	06/29/95	-1.5	2.1	14.6
Area 7, Reitman Seep	06/28/95	-1.1	1.6	10.8
Area 12, White Rock Spring	06/28/95	-2.6	3.7	25.5
Area 12, Captain Jack Spring	08/07/95	2.3	8.1	28.0
Area 12, Gold Meadows Spring	06/29/95	-1.9	2.7	18.4
Area 15, Tub Springs	06/29/95	-1.0	1.4	9.8
Area 16, Tippipah Spring	08/17/95	1.8	4.9	19.4
Area 29, Topopah Spring	08/28/95	1.4	3.1	12.3

(a) Missing values.

Attachment 9.1 (^{238}Pu in Water - 1995, cont.)

Sampling Location	Collection Dates	µCi/mL x 10^{-12} Concentration	Standard Deviation (s)	Detection Limit
Sewage Lagoons				
Area 5, RWMS Sewage Pond	11/01/95	-1.6	2.0	12.3
Area 6, Yucca Sewage Pond	02/07/95	-1.8	2.6	18.7
Area 6, Yucca Sewage Pond	05/04/95	-2.0	2.4	15.6
Area 6, Yucca Sewage Pond	08/09/95	3.0	6.7	26.9
Area 6, CP-72 Sewage Pond	05/04/95	2.8	9.6	38.5
Area 6, DAF Sewage Pond	02/07/95	1.7	3.8	15.1
Area 6, DAF Sewage Pond	05/04/95	5.6	6.9	21.6
Area 6, DAF Sewage Pond	08/09/95	11.9	12.3	37.7
Area 6, DAF Sewage Pond	11/01/95	0.9	3.3	12.9
Area 6, CP-6 Sewage Pond	02/07/95	-1.4	3.5	16.3
Area 6, CP-6 Sewage Pond	05/04/95	-2.7	3.4	21.2
Area 6, CP-6 Sewage Pond	08/09/95	-3.1	4.2	28.1
Area 11, LANL Sewage Pond	02/07/95	-2.3	3.5	25.1
Area 11, LANL Sewage Pond	05/04/95	-2.8	3.5	22.2
Area 11, LANL Sewage Pond	08/09/95	27.5	21.2	55.6
Area 11, LANL Sewage Pond	11/01/95	1.1	4.1	16.3
Area 12, Sewage Pond	02/07/95	-1.9	4.8	22.6
Area 12, Sewage Pond	05/04/95	-1.8	2.3	14.5
Area 12, Sewage Pond	08/09/95	-2.3	3.1	20.6
Area 12, Sewage Pond	11/01/95	0.8	3.2	12.7
Area 22, Sewage Pond	02/07/95	1.8	3.9	15.7
Area 22, Sewage Pond	05/04/95	-1.9	2.4	15.0
Area 22, Sewage Pond	08/09/95	9.5	7.3	19.1
Area 22, Sewage Pond	11/01/95	-1.7	2.1	13.0
Area 23, Sewage Pond	02/07/95	-1.6	2.3	16.6
Area 23, Sewage Pond	05/04/95	0.9	3.2	12.7
Area 23, Sewage Pond	08/09/95	2.5	5.7	22.5
Area 23, Sewage Pond	11/01/95	3.5	4.3	13.3
Area 25, Reactor Control	02/07/95	-1.2	1.8	13.1
Area 25, Reactor Control	11/08/95	4.2	5.0	15.4
Area 25, Central Supply	02/07/95	-1.4	2.2	15.6
Area 25, Central Supply	05/04/95	1.3	4.6	18.4
Area 25, Central Supply	08/09/95	(a)	(a)	(a)
Area 25, Central Supply	11/01/95	-1.5	1.8	11.4
Supply Wells				
Area 5, Well 5B	02/15/95	1.9	5.6	22.1
Area 5, Well 5B	04/11/95	0.8	3.4	13.5

(a) Missing values.

Attachment 9.1 (^{238}Pu in Water - 1995, cont.)

Sampling Location	Collection Dates	µCi/mL x 10^{-12} Concentration	Standard Deviation (s)	Detection Limit
(Supply Wells, cont.)				
Area 5, Well 5B	07/20/95	-1.4	1.9	12.9
Area 5, Well 5B	10/12/95	-1.5	1.9	11.8
Area 5, Well 5C	02/15/95	-2.0	2.6	17.0
Area 5, Well 5C	04/11/95	-1.7	2.0	12.0
Area 5, Well 5C	07/20/95	-1.1	1.6	12.1
Area 5, Well 5C	10/12/95	1.2	2.6	10.3
Area 5, Well UE-5c	02/15/95	-3.8	5.6	40. 4
Area 6, Well No. 4A	02/15/95	-2.2	2.9	19.3
Area 6, Well No. 4A	04/11/95	-1.9	2.2	13.7
Area 6, Well No. 4A	07/20/95	-1.3	2.0	15.1
Area 6, Well No. 4A	10/12/95	7.0	5.1	13.0
Area 6, Well C	02/15/95	-2.3	3.0	19.5
Area 6, Well C	04/11/95	0.6	2.7	10.7
Area 6, Well No. 4	02/15/95	1.5	4.6	18.1
Area 6, Well No. 4	04/11/95	0.8	3.6	14.2
Area 6, Well No. 4	07/20/95	4.5	4.5	13.9
Area 6, Well No. 4	10/12/95	1.4	2.9	11.6
Area 6, Well C-1	02/15/95	-1.5	2.0	13.0
Area 6, Well C-1	04/11/95	-1.6	2.0	12.0
Area 6, Well C-1	07/20/95	1.6	3.3	13.1
Area 6, Well C-1	10/12/95	-1.1	1.6	11.8
Area 16, Well UE-16d	02/15/95	-3.7	4.9	32.4
Area 16, Well UE-16d	04/11/95	-1.7	2.0	12.4
Area 16, Well UE-16d	07/20/95	4.6	5.0	15.5
Area 16, Well UE-16d	10/12/95	4.0	4.0	12.2
Area 18, Well HTH No. 8	02/15/95	-4.5	6.0	39.5
Area 18, Well HTH No. 8	04/11/95	0.7	3.1	12.3
Area 18, Well HTH No. 8	07/20/95	-1.1	1.8	13.1
Area 20, Well U-20	08/07/95	2.5	8.9	31.0
Area 22, Well Army No. 1	02/15/95	1.5	4.6	18.0
Area 22, Well Army No. 1	04/11/95	-2.0	2.4	14.4
Area 22, Well Army No. 1	07/20/95	4.7	9.6	38.8
Area 25, Well J-12	02/15/95	-3.6	4.8	31.5
Area 25, Well J-12	04/11/95	-2.7	3.1	19.2
Area 25, Well J-12	07/20/95	-1.2	1.8	12.8
Area 25, Well J-13	02/15/95	1.3	3.8	14.8
Area 25, Well J-13	04/11/95	-2.2	2.6	15.7
Area 25, Well J-13	07/20/95	-2.3	3.6	27.2
Area 25, Well J-13	10/12/95	1.7	3.7	14.9

(a) Missing values.

Attachment 9.1 (^{238}Pu in Water - 1995, cont.)

Sampling Location	Collection Dates	μCi/mL x 10^{-12} Concentration	Standard Deviation (s)	Detection Limit
Open Reservoirs				
Area 2, Mud Plant	07/31/95	-1.3	3.1	13.7
Area 2, Well 2 Reservoir	07/31/95	-2.5	5.9	26.2
Area 3, Well A Reseservoir	07/31/95	-2.9	4.0	26.9
Area 5, Well 5B Reservoir	07/31/95	-2.0	2.9	20.1
Area 5, Well UE-5c Reservoir	07/31/95	-1.1	1.5	10.2
Area 3, Well 3 Reservoir	07/31/95	-1.4	1.9	12.8
Area 6, Well C-1 Reservoir	07/31/95	-1.4	1.8	12.2
Area 18, Camp 17 Reservoir	07/31/95	2.4	6.5	26.1
Area 19, Well U19c Reservoir	07/18/95	4.2	4.1	12.5
Area 23, Swimming Pool	07/31/95	-2.5	5.8	25.5
Area 25, Well J-11 Reservoir	07/31/95	11.5	8.9	23.2
Containment Ponds				
Area 12, E Tunnel Effluent	03/15/95	197.0	29.2	18.8
Area 12, E Tunnel Effluent	05/09/95	707.0	76.4	29.5
Area 12, E Tunnel Effluent	08/07/95	287.0	63.0	58.4
Area 12, E Tunnel Effluent	11/08/95	99.1	15.0	10.4
Area 12, E Tunnel Pond No. 1	03/23/95	468.0	51.5	24.3
Area 12, E Tunnel Pond No. 1	05/23/95	611.0	52.5	15.8
Area 12, E Tunnel Pond No. 1	08/07/95	440.0	68.9	45.7
Area 12, E Tunnel Pond No. 1	11/08/95	82.4	14.1	11.2

(a) Missing values.

Attachment 9.2 $^{239+240}Pu$ in Water - 1995

Sampling Location	Collection Dates	µCi/mL x 10^{-12} Concentration	Standard Deviation (s)	Detection Limit
Potable Water				
Area 1, Building 101	01/09/95	-2.6	2.5	13.4
Area 1, Building 101	04/24/95	-2.1	2.4	14.3
Area 1, Building 101	07/11/95	-2.5	2.8	16.6
Area 1, Building 101	10/04/95	-1.9	2.1	12.8
Area 2, Restroom	01/04/95	2.2	3.8	12.2
Area 2, Restroom	04/24/95	Building Closed		(a)
Area 2, Restroom	07/11/95	-2.2	2.5	15.1
Area 2, Restroom	10/04/95	Building Closed		(a)
Area 6, Cafeteria	01/04/95	1.9	3.3	10.6
Area 6, Cafeteria	04/24/95	0.6	3.5	13.7
Area 6, Cafeteria	07/11/95	0.6	3.6	14.3
Area 6, Cafeteria	10/04/95	0.6	3.5	13.8
Area 6, Building 6-900	01/04/95	-2.5	2.4	13.3
Area 6, Building 6-900	04/10/95	-2.0	2.2	12.8
Area 6, Building 6-900	07/11/95	-2.1	2.4	14.2
Area 6, Building 6-900	10/04/95	-3.2	3.6	21.8
Area 12, Building 12-23	01/04/95	Building Closed		(a)
Area 12, Building 12-23	04/24/95	Building Closed		(a)
Area 12, Building 12-23	07/11/95	-1.9	2.2	12.8
Area 12, Building 12-23	10/04/95	-1.8	2.1	12.5
Area 23, Mercury	01/04/95	-2.5	2.5	13.4
Area 23, Mercury	04/24/95	0.6	3.6	14.0
Area 23, Mercury	07/11/95	-4.0	4.5	26.9
Area 23, Mercury	10/04/95	5.6	4.9	13.0
Area 25, Building 4221	01/04/95	-0.1	5.0	19.7
Area 25, Building 4221	04/24/95	-1.6	1.8	10.7
Area 25, Building 4221	07/11/95	0.6	3.7	14.4
Area 25, Building 4221	10/04/95	-2.1	2.4	14.2
Natural Springs				
Area 5, Cane Spring	06/29/95	0.7	4.0	15.7
Area 7, Reitman Seep	06/28/95	5.0	4.3	11.7
Area 12, White Rock Spring	06/28/95	-4.0	4.6	27.4
Area 12, Captain Jack Spring	08/07/95	0.7	9.4	31.4
Area 12, Gold Meadws Spring	06/29/95	-2.9	3.3	19.8
Area 15, Tub Springs	06/29/95	-1.6	1.8	10.5
Area 16, Tippipah Spring	08/17/95	24.1	11.1	21.1
Area 29, Topopah Spring	08/28/95	0.3	3.5	13.6
Sewage Lagoons				
Area 5, RWMS Sewage Pond	11/01/95	2.7	4.1	13.0
Area 6, Yucca Sewage Pond	02/07/95	-3.9	3.9	21.6
Area 6, Yucca Sewage Pond	05/04/95	1.1	4.0	15.6

(a) Missing values.

Attachment 9.2 ($^{239+240}$Pu in Water - 1995, cont.)

Sampling Location	Collection Dates	µCi/mL x 10^{-12} Concentration	Standard Deviation (s)	Detection Limit
(Sewage Lagoons, cont.)				
Area 6, Yucca Sewage Pond	08/09/95	-4.9	5.2	30.0
Area 6, Yucca Sewage Pond	11/01/95	0.3	3.5	13.8
Area 6, CP-72 Sewage Pond	02/07/95	42.8	12.4	16.9
Area 6, CP-72 Sewage Pond	05/04/95	-4.9	6.1	38.6
Area 6, CP-72 Sewage Pond	08/09/95	(a)	(a)	(a)
Area 6, DAF Sewage Pond	02/07/95	-0.0	4.5	17.4
Area 6, DAF Sewage Pond	05/04/95	-2.8	3.4	21.5
Area 6, DAF Sewage Pond	08/09/95	0.9	10.6	41.9
Area 6, DAF Sewage Pond	11/01/95	2.8	4.3	13.6
Area 6, CP-6 Sewage Pond	02/07/95	-3.1	5.3	19.8
Area 6, CP-6 Sewage Pond	05/04/95	5.7	6.8	21.3
Area 6, CP-6 Sewage Pond	08/09/95	0.8	7.8	30.4
Area 11, LANL Sewage Pond	02/07/95	-5.3	5.3	28.9
Area 11, LANL Sewage Pond	05/04/95	-2.8	3.5	22.3
Area 11, LANL Sewage Pond	08/09/95	1.5	15.3	60.4
Area 11, LANL Sewage Pond	11/01/95	0.3	4.4	17.2
Area 12, Sewage Pond	02/07/95	-4.2	7.3	27.4
Area 12, Sewage Pond	05/04/95	3.9	4.7	14.5
Area 12, Sewage Pond	08/09/95	-3.6	3.9	22.4
Area 12, Sewage Pond	11/01/95	0.3	3.5	13.5
Area 22, Sewage Pond	02/07/95	-3.3	3.3	18.1
Area 22, Sewage Pond	05/04/95	4.0	4.8	15.1
Area 22, Sewage Pond	08/09/95	-3.3	3.6	20.7
Area 22, Sewage Pond	11/01/95	-2.3	2.4	13.8
Area 23, Sewage Pond	02/07/95	-0.0	4.9	19.1
Area 23, Sewage Pond	05/04/95	0.9	3.2	12.8
Area 23, Sewage Pond	08/09/95	19.2	11.3	25.0
Area 23, Sewage Pond	11/01/95	0.3	3.6	14.1
Area 25, Reactor Control	02/07/95	-2.8	2.7	15.0
Area 25, Reactor Control	11/08/95	9.5	6.8	16.4
Area 25, Central Supply	02/07/95	-0.0	4.6	17.9
Area 25, Central Supply	05/04/95	-2.3	2.9	18.4
Area 25, Central Supply	08/09/95	(a)	(a)	(a)
Area 25, Central Supply	11/01/95	2.5	3.8	12.1
Supply Wells				
Area 5, Well 5B	02/15/95	-4.0	4.2	23.9
Area 5, Well 5B	04/11/95	0.5	3.5	13.8
Area 5, Well 5B	07/20/95	-2.3	2.4	14.0
Area 5, Well 5B	10/12/95	-2.1	2.2	12.5

(a) Missing values.

Attachment 9.2 ($^{239+240}$Pu in Water - 1995, cont.)

Sampling Location	Collection Dates	µCi/mL x 10^{-12} Concentration	Standard Deviation (s)	Detection Limit
(Supply Wells, cont.)				
Area 5, Well 5C	02/15/95	-3.0	3.2	18.3
Area 5, Well 5C	04/11/95	-1.9	2.1	12.4
Area 5, Well 5C	07/20/95	-2.0	2.3	13.4
Area 5, Well 5C	10/12/95	2.6	3.6	11.3
Area 5, Well UE-5c	02/15/95	0.7	11.5	45.3
Area 6, Well No. 4A	02/15/95	0.4	5.3	20.8
Area 6, Well C	02/15/95	8.2	7.7	21.0
Area 6, Well C	04/11/95	-1.7	1.9	11.0
Area 6, Well No. 4	02/15/95	4.0	6.2	19.6
Area 6, Well No. 4	04/11/95	-2.3	2.5	14.6
Area 6, Well No. 4	07/20/95	3.7	4.8	15.0
Area 6, Well No. 4	10/12/95	-1.9	2.2	12.8
Area 6, Well C-1	02/15/95	-2.3	2.5	14.0
Area 6, Well C-1	04/11/95	-1.9	2.1	12.3
Area 6, Well C-1	07/20/95	0.6	3.7	14.5
Area 6, Well C-1	10/12/95	-2.0	2.2	12.9
Area 16, Well UE-16d	02/15/95	-5.8	6.1	35.0
Area 16, Well UE-16d	04/11/95	-2.0	2.2	12.7
Area 16, Well UE-16d	07/20/95	-2.7	2.9	16.8
Area 16, Well UE-16d	10/12/95	-2.0	2.3	13.4
Area 18, Well HTH No. 8	02/15/95	0.8	10.8	42.7
Area 18, Well HTH No. 8	04/11/95	-2.0	2.2	12.6
Area 18, Well HTH No. 8	07/20/95	-2.2	2.5	14.5
Area 20, Well U-20	08/07/95	-4.8	8.9	34.7
Area 22, Well Army No. 1	02/15/95	-3.2	3.4	19.5
Area 22, Well Army No. 1	04/11/95	-2.3	2.5	14.8
Area 22, Well Army No. 1	07/20/95	1.7	10.8	42.9
Area 25, Well J-12	02/15/95	0.7	8.6	34.0
Area 25, Well J-12	04/11/95	-3.1	3.4	19.7
Area 25, Well J-12	07/20/95	0.7	3.5	13.8
Area 25, Well J-13	02/15/95	3.3	5.1	16.0
Area 25, Well J-13	04/11/95	-2.5	2.8	16.2
Area 25, Well J-13	07/20/95	-4.5	5.1	30.1
Area 25, Well J-13	10/12/95	-2.5	2.8	16.4
Open Reservoirs				
Area 2, Mud Plant	07/31/95	-2.1	4.0	15.4
Area 2, Well 2 Reservoir	07/31/95	-4.0	7.5	29.3
Area 3, Well A Reservoir	07/31/95	-4.7	5.1	29.2

(a) Missing values.

Attachment 9.2 ($^{239+240}$Pu in Water - 1995, cont.)

Sampling Location	Collection Dates	µCi/mL x 10^{-12} Concentration	Standard Deviation (s)	Detection Limits
(Open reservoirs, cont.)				
Area 3, Well 3 Reservoir	07/31/95	0.3	3.6	13.9
Area 5, Well 5B Reservoir	07/31/95	0.5	5.7	22.4
Area 5, UE-5c Reservoir	07/31/95	4.4	4.1	11.1
Area 6, Well C1 Reservoir	07/31/95	2.8	4.2	13.3
Area 18, Camp 17 Reservoir	07/31/95	-4.6	4.9	28.3
Area 19, U19c Reservoir	07/18/95	-2.1	2.4	13.9
Area 23, Swimming Pool	07/31/95	-3.9	7.3	28.5
Area 25, Well J-11 Reservoir	07/31/95	0.6	6.4	25.2
Area 25, Well J-12 Reservoir	07/31/95	-3.6	6.7	25.9
Containment Ponds				
Area 12, E Tunnel Effluent	03/15/95	1690.0	119.1	19.9
Area 12, E Tunnel Effluent	05/09/95	4690.0	318.9	28.8
Area 12, E Tunnel Effluent	08/07/95	2910.0	283.7	63.4
Area 12, E Tunnel Effluent	11/08/95	740.0	48.5	11.0
Area 12, E Tunnel Pond No. 1	03/23/95	2820.0	166.4	23.9
Area 12, E Tunnel Pond No. 1	05/23/95	4450.0	244.7	15.5
Area 12, E Tunnel Pond No. 1	08/07/95	3850.0	283.0	49.6
Area 12, E Tunnel Pond No. 1	11/08/95	671.0	47.3	11.9

(a) Missing values.

10.0 ONSITE TRITIUM IN WATER

For purposes of statistical analysis, water sampling stations are divided into the following classes, by source of water:

Class	Sampling Stations
Potable Water	Area 1 Building 101; Area 2 Restroom; Cafeterias in Areas 6 and 23; Area 6 Building 6-900; Area 12 Building 12-23; Area 25 Building 4221.
Natural Springs	Area 5 Cane Spring; Area 7 Reitman Seep; Area 12 Captain Jack, Gold Meadows, and White Rock Springs; Area 15, Tub Springs; Area 16 Tippipah Spring; Area 29 Topopah Spring.
Sewage Lagoons	Area 6 Sewage, Yucca, LANL, CP-72, and DAF Sewage Ponds; Area 12 Sewage; Area 22 Sewage, Area 23 Sewage; Area 25 Central Sewage and Reactor Control Sewage Ponds.
Supply Wells	
Potable Water	Area 5 Well 5B and Well 5C; Area 6 Well No. 4, Well 4-A, and Well C1; Area 16 Well UE-16d; Area 18 Well 8; Area 22 Army Well No. 1; Area 25 Well J-12 and Well J-13.
Non-potable Water	Area 5 Well UE-5c, Area 6 Well C, Area 20 Well U-20.
Open Reservoirs	Area 2 Mud Plant and Well 2 Reservoir; Area 3 Mud Plant, Well 3 Reservoir, and Well A Reservoir; Area 5 Well UE-5c Reservoir and Well 5B Reservoir; Area 6 Well C1 Reservoir; Area 18 Camp 17 Reservoir, Area 23 Swimming Pool; Area 25 Well J-11 and Well J-12 Reservoirs.
Containment Ponds	Area 12 E Tunnel Effluent and E Tunnel Pond No. 1.

Sampling locations, sampling dates, measured concentrations, analytic standard deviations, and detection limits for tritium in water appear in Attachment 10.1 at the end of this chapter. Statistical analyses of these data are presented below. Note that in this attachment the scale factor for the containment pond data is 10^{-6} and for all other portions of the attachment the scale factor is 10^{-9}. The purpose of the containment ponds is to contain the water draining from the nuclear weapons test tunnels. Those tests are known to be the source of the higher levels of tritium at these locations.

In previous years, water samples were collected bi-weekly. In 1995, because of reduced funding, the frequency of collection was reduced to quarterly for potable water, sewage lagoons, supply wells, and containment ponds and reduced to annually for open reservoirs and springs.

STATISTICAL ANALYSES

An examination of the attachment will disclose three clusters of data values. One cluster is the containment ponds, which contain effluent from nuclear events in tunnels. The potable water, natural springs, sewage lagoons, and open reservoirs appear to have tritium concentrations and detection limits about two orders of magnitude higher (both positive and negative) than the supply well values. This is a result of the analytical methods used for analysis. The supply well water is analyzed using enriched tritium procedures, while the remaining water samples are analyzed using conventional methods. The enriched tritium method (MDC=12 pCi/L) is used for the well water because of regulatory concerns, and the conventional (MDC=500 pCi/L) methods are used for the remaining samples because of limited funding.

WATER FROM SOURCES OTHER THAN CONTAINMENT PONDS

The two groupings of tritium in water values, other than containment ponds, have values centered at about zero, but their standard deviations are obviously different. The enriched tritium method used for supply wells produces much smaller errors than the conventional method. For all these data combined, 98.4 percent are below their individual detection limits. The two values that were above the detection limit were from the enriched tritium group. This situation renders most statistical procedures meaningless. The less than detection limit values are essentially random numbers. Thus, only a few descriptive statistics are reported herein.

Tritium concentrations in water were measured at 51 sampling stations, other than containment ponds. Descriptive statistics, in units of µCi/mL, for the entire network are:

Number of data values	=	123
Arithmetic mean	=	1.9×10^{-08}
Median	=	1.2×10^{-09}
Standard deviation	=	1.4×10^{-07}
Minimum value	=	-6.9×10^{-07}
Maximum value	=	3.9×10^{-07}
Median MDC	=	3.1×10^{-07}

Of the entire network, 54 percent of the observed concentrations are positive. A normal probability plot of each of these groups indicates that all groups have a normal statistical distribution. Box plots of these data grouped by source of sample, in units of 10^{-9} µCi/mL, appear in Figure 10.1. These plots show the similar magnitude of the means, the much smaller errors produced by the enriched tritium procedure, and the essentially even spread of the data about a value of zero.

Concentrations are best compared among sources of water by means of simple descriptive statistics, as almost all concentrations were below the individual limits of detection. Results, in units of µCi/mL, follow:

Source of Water	Number of Data Values	Mean	Median	Standard Deviation	Median Detection Limit
Sewage Lagoons	37	1.5×10^{-09}	-5.9×10^{-09}	1.6×10^{-07}	4.7×10^{-07}
Open Reservoirs	12	-1.5×10^{-08}	-1.7×10^{-08}	1.5×10^{-07}	4.5×10^{-07}
Natural Springs	8	6.5×10^{-08}	5.8×10^{-08}	2.4×10^{-07}	4.8×10^{-07}
Supply Wells	42	9.7×10^{-10}	-5.2×10^{-10}	8.7×10^{-09}	9.5×10^{-09}
Potable Water	24	8.1×10^{-08}	8.6×10^{-08}	1.6×10^{-07}	4.7×10^{-07}

Concentrations are compared across time by graphical methods. In Figure 10.2, a scatter plot of all observed ^{3}H concentrations (10^{-9} µCi/mL) versus the month of collection appears. Other than the obviously different times for collection of the several types of samples, no unusual features stand out. In particular, there is no visual evidence of any time trend.

WATER FROM CONTAINMENT PONDS

As all tunnels are now sealed, few containment ponds are active. Samples could only be collected from Area 12 E Tunnel Effluent and E Tunnel Pond No.1 during 1995. Descriptive statistics, in units of µCi/mL, for these ponds are:

Number of data values =	8
Arithmetic mean =	8.3×10^{-04}
Median =	7.6×10^{-04}
Standard deviation =	3.3×10^{-04}
Minimum value =	4.9×10^{-04}
Maximum value =	1.3×10^{-03}
Median MDC =	4.7×10^{-07}

All concentrations were above individual limits of detection and therefore positive. This mean and median are approximately an order of magnitude smaller than those statistics reported in 1994. This decrease can be attributed to the closure of the tunnels in the fall of 1994 and thus the containment of most of the tritiated water within the tunnel.

A graphical comparison between the remaining effluent concentrations and the concentrations seen in Pond No.1 can be seen in Figure 10.3. It is obvious that there are no statistically significant differences between these sampling locations.

HISTORICAL TRENDS

Detailed reporting of historical trends for all contaminants at all sampling stations would result in an unwieldy document. Instead, two representative stations have been chosen from each of the water sources, open reservoirs, natural springs, supply wells, and potable water. The same representative stations are used for all isotopes measured in water samples. No historical trends were analyzed for water from sewage lagoons or containment ponds. There is relatively little variability in concentrations of samples taken from sewage ponds. Concentrations from containment ponds vary so greatly among years, depending on the type of experimental activity conducted during those years, that few meaningful conclusions could be drawn.

The representative sampling stations are:

Water Source	NTS Operational Area	Sampling Station
Open Reservoir	2	Mud Plant
Open Reservoir	23	Swimming Pool
Natural Springs	5	Cane Spring
Natural Springs	7	Reitman Seep
Supply Wells	5	Well UE-5c
Supply Wells	25	Well J-13
Potable Water	6	Cafeteria
Potable Water	23	Cafeteria

Annual average tritium concentrations, in units of 10^{-9} µCi/mL, at the representative stations versus the year of collection are given in Table 10.1. When examining this table, one should bear in mind that all the values are below the corresponding detection limits and thus contain limited information about historical trends. The 1995 average detection limit for supply wells is 9.9×10^{-9}, and for the remaining types of representative stations the average detection limit is 465×10^{-9}. This difference in magnitude of detection limits is due to different analytical methods, as noted above.

CONCLUSIONS

Except for the containment ponds, almost all tritium in water results are below the individual detection limits. Measurable levels of tritium are to be expected in containment ponds since these contain effluents from nuclear events in tunnels.

Table 10.1 Historical Annual Averages for Tritium in Water at Representative Stations ($\mu Ci/mL \times 10^{-9}$)

Location	1989	1990	1991	1992	1993	1994	1995
Area 2 Mud Plant	200	151	121	76	22	102	74
Swimming Pool	-	54	-30	34	-13	-10	148
Cane Spring	118	-10	394	-27	17	-180	430
Reitman Seep	167	29	158	102	-81	50	0
Well UE-5c	20	-45	64	3	67	2	-37
Well J-13	120	70	21	48	18	0	-1
Area 6 Cafeteria	52	89	-28	18	60	-11	154
Mercury Cafeteria	75	210	-38	31	29	49	23

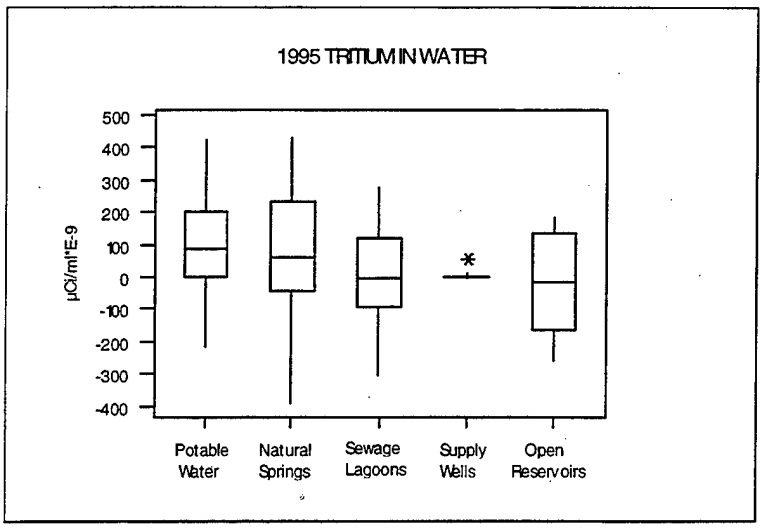


Figure 10.1 Box Plot of Tritium in Water from Sources Other than Containment Ponds

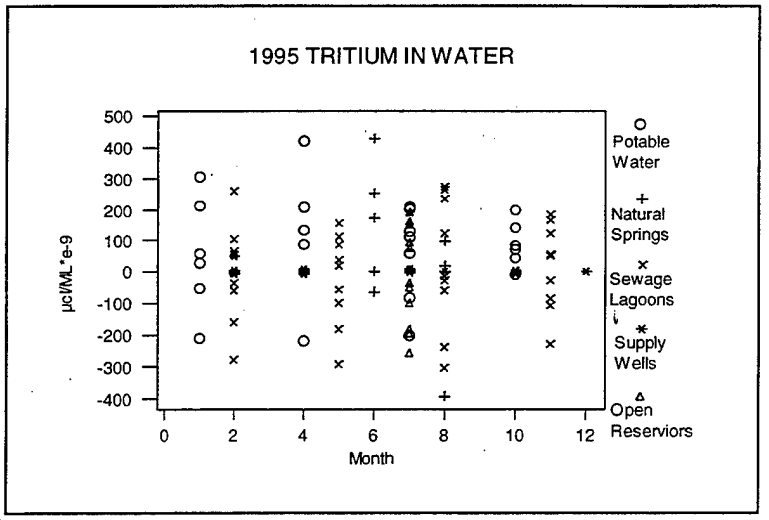


Figure 10.2 Time Series Plot of Tritium from Sources Other than Containment Ponds

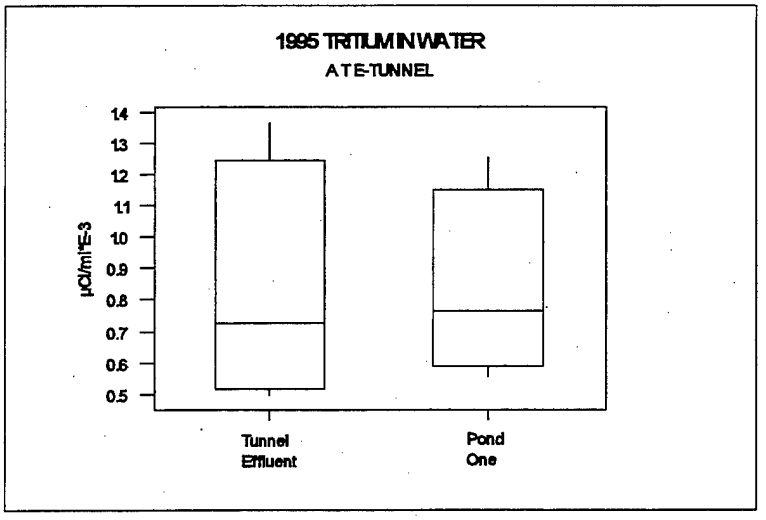


Figure 10.3 Box Plots of Tritium in Water at E Tunnel

Attachment 10.1 Tritium in Water - 1995

Sampling Location	Collection Dates	µCi/mL x 10^{-9} Concentration	Standard Deviation (s)	Detection Limits
Potable Water				
Area 1, Building 101	01/09/95	214.0	229.0	466.0
Area 1, Building 101	04/24/95	134.0	239.0	486.0
Area 1, Building 101	07/11/95	209.0	234.0	473.0
Area 1, Building 101	10/04/95	73.0	217.0	443.0
Area 2, Restroom	01/04/95	60.0	233.0	477.0
Area 2, Restroom	04/24/95	Building Closed		
Area 2, Restroom	07/11/95	113.0	232.0	473.0
Area 2, Restroom	10/04/95	Not Collected		
Area 6, Cafeteria	01/04/95	-210.0	230.0	477.0
Area 6, Cafeteria	04/24/95	424.0	242.0	486.0
Area 6, Cafeteria	07/11/95	203.0	233.0	473.0
Area 6, Cafeteria	10/04/95	198.0	219.0	443.0
Area 6, Building 6-900	01/04/95	30.0	233.0	477.0
Area 6, Building 6-900	04/10/95	-219.0	237.0	490.0
Area 6, Building 6-900	07/11/95	-203.0	228.0	473.0
Area 6, Building 6-900	10/04/95	85.0	217.0	443.0
Area 12, Building 12-23	01/09/95	Not Collected		
Area 12, Building 12-23	04/24/95	Building Closed		
Area 12, Building 12-23	07/11/95	131.0	232.0	473.0
Area 12, Building 12-23	10/04/95	-11.0	215.0	443.0
Area 23, Mercury	01/04/95	-54.0	232.0	477.0
Area 23, Mercury	04/24/95	87.0	238.0	486.0
Area 23, Mercury	07/11/95	-83.0	229.0	473.0
Area 23, Mercury	10/04/95	141.0	217.0	443.0
Area 25, Building 4221	01/04/95	306.0	237.0	477.0
Area 25, Building 4221	04/24/95	209.0	239.0	486.0
Area 25, Building 4221	07/11/95	60.0	231.0	473.0
Area 25, Building 4221	10/04/95	45.0	216.0	443.0
Natural Springs				
Area 5, Cane Spring	06/29/95	430.0	236.5	475.0
Area 7, Reitman Seep	06/28/95	0.396	231.7	475.0
Area 12, White Rock	06/28/95	175.0	232.8	475.0
Area 12, Captain Jack	08/07/95	-394.0	216.7	454.0
Area 12, Gold Meadows	06/29/95	255.0	234.6	475.0
Area 15, Tub Springs	06/29/95	-62.3	230.8	475.0
Area 16, Tippipah Springs	08/17/95	99.6	224.6	458.0
Area 29, Topopah Springs	08/28/95	17.3	219.7	450.0
Sewage Lagoons				
Area 5, RWMS Sewage Pond	11/01/95	185.0	220.1	446.0
Area 6, Yucca Sewage Pond	02/07/95	-59.4	229.9	473.0
Area 6, Yucca Sewage Pond	05/04/95	87.4	241.7	494.0

Attachment 10.1 (Tritium in Water - 1995, cont.)

Sampling Location	Collection Dates	Concentration	µCi/mL x 10^{-9} Standard Deviation (s)	Detection Limits
(Sewage Lagoons, cont.)				
Area 6, Yucca Sewage Pond	08/09/95	-29.3	222.7	459.0
Area 6, Yucca Sewage Pond	11/01/95	168.0	219.2	446.0
Area 6, CP-72 Sewage Pond	02/07/95	261.0	233.6	473.0
Area 6, CP-72 Sewage Pond	05/04/95	18.7	240.3	494.0
Area 6, CP-72 Sewage Pond	08/09/95	-11.7	222.9	459.0
Area 6, DAF Sewage Pond	02/07/95	-59.4	229.9	473.0
Area 6, DAF Sewage Pond	05/04/95	-293.0	235.9	494.0
Area 6, DAF Sewage Pond	08/09/95	-58.6	222.7	459.0
Area 6, DAF Sewage Pond	11/01/95	56.1	218.2	446.0
Area 6, CP-6 Sewage Pond	02/07/95	53.5	231.4	473.0
Area 6, CP-6 Sewage Pond	05/04/95	37.4	241.2	494.0
Area 6, CP-6 Sewage Pond	08/09/95	123.0	225.1	459.0
Area 11, LANL Sewage Pond	02/07/95	-160.0	228.0	473.0
Area 11, LANL Sewage Pond	05/04/95	-181.0	238.0	494.0
Area 11, LANL Sewage Pond	08/09/95	-305.0	219.6	459.0
Area 11, LANL Sewage Pond	11/01/95	-107.0	217.2	446.0
Area 12, Sewage Pond	02/07/95	65.3	231.2	473.0
Area 12, Sewage Pond	05/04/95	112.0	241.4	494.0
Area 12, Sewage Pond	08/09/95	276.0	227.7	459.0
Area 12, Sewage Pond	11/01/95	-230.0	215.1	446.0
Area 22, Sewage Pond	02/07/95	107.0	232.2	473.0
Area 22, Sewage Pond	05/04/95	156.0	242.6	494.0
Area 22, Sewage Pond	08/09/95	235.0	226.8	459.0
Area 22, Sewage Pond	11/01/95	-28.0	217.0	446.0
Area 23, Sewage Pond	02/07/95	-279.0	227.4	473.0
Area 23, Sewage Pond	05/04/95	-56.2	240.0	494.0
Area 23, Sewage Pond	08/09/95	264.0	227.0	459.0
Area 23, Sewage Pond	11/01/95	123.0	218.3	446.0
Area 25, Reactor Control	02/07/95	-35.6	229.6	473.0
Area 25, Reactor Control	11/08/95	-84.0	216.3	446.0
Area 25, Central Supply	02/07/95	-5.9	230.5	473.0
Area 25, Central Supply	05/04/95	-99.8	239.0	494.0
Area 25, Central Supply	08/09/95	-240.0	219.6	459.0
Area 25, Central Supply	11/01/95	50.5	218.2	446.0
Supply Wells, Potable Water				
Area 5, Well 5B	02/15/95	-1.83	4.72	9.78
Area 5, Well 5B	04/11/95	1.24	4.72	9.72
Area 5, Well 5B	07/20/95	-2.00	4.57	9.55
Area 5, Well 5B	10/12/95	-3.81	5.72	11.90
Area 5, Well 5C	02/15/95	-0.58	4.53	9.41
Area 5, Well 5C	04/11/95	-4.55	4.37	9.20
Area 5, Well 5C	07/20/95	2.63	4.42	9.03
Area 5, Well 5C	10/12/95	-4.24	5.53	11.60

Attachment 10.1 (Tritium in Water - 1995, cont.)

Sampling Location	Collection Dates	Concentration	µCi/mL x 10^{-9} Standard Deviation (s)	Detection Limits
(Supply Wells, Potable water, cont.)				
Area 6, Well No. 4A	02/15/95	-5.50	5.11	10.70
Area 6, Well No. 4A	04/11/95	0.72	4.39	9.02
Area 6, Well No. 4A	07/20/95	1.34	4.48	9.20
Area 6, Well No. 4A	10/12/95	-4.50	5.62	11.80
Area 6, Well No. 4	02/15/95	-4.87	4.38	9.22
Area 6, Well No. 4	04/11/95	-3.10	4.65	9.71
Area 6, Well No. 4	07/20/95	-1.78	4.41	9.21
Area 6, Well No. 4	10/12/95	0.55	5.61	11.60
Area 6, Well C-1	02/15/95	52.00	5.04	8.84
Area 6, Well C-1	04/11/95	6.58	4.64	9.37
Area 6, Well C-1	07/20/95	9.16	4.43	8.86
Area 6, Well C-1	10/12/95	-0.74	5.57	11.60
Area 16, Well UE-16d	02/15/95	-4.16	4.41	9.22
Area 16, Well UE-16d	04/11/95	1.26	4.79	9.89
Area 16, Well UE-16d	07/20/95	0.29	4.38	9.04
Area 16, Well UE-16d	10/12/95	2.81	5.73	11.80
Area 18, Well HTH No. 8	02/15/95	-2.93	4.51	9.41
Area 18, Well HTH No. 8	04/11/95	2.64	4.75	9.71
Area 18, Well HTH No. 8	07/20/95	4.46	4.53	9.20
Area 22, Well Army No. 1	02/15/95	-1.22	4.73	9.78
Area 22, Well Army No. 1	04/11/95	-0.15	4.45	9.20
Area 22, Well Army No. 1	07/20/95	3.57	4.52	9.20
Area 25, Well J-12	02/15/95	-2.83	4.60	9.60
Area 25, Well J-12	04/11/95	-0.45	4.53	9.37
Area 25, Well J-12	07/20/95	-4.31	4.37	9.21
Area 25, Well J-12	12/19/95	0.76	5.81	12.00
Area 25, Well J-13	02/15/95	-0.60	4.63	9.59
Area 25, Well J-13	04/11/95	1.86	4.72	9.72
Area 25, Well J-13	07/20/95	-0.77	4.59	9.54
Area 25, Well J-13	10/12/95	-2.95	5.55	11.60
Supply Wells, Non-Potable Water				
Area 5, Well UE-5c	02/15/95	-3.67	5.14	10.70
Area 6, Well C	02/15/95	3.80	4.79	9.79
Area 6, Well C	04/11/95	5.43	4.53	9.19
Area 20, Well U-20	08/07/95	1.33	4.45	9.18
Open Reservoirs				
Area 2, Mud Plant	07/31/95	74.3	222.5	454.0
Area 2, Well 2 Reservoir	07/31/95	5.7	221.3	454.0
Area 3, Well A Reservoir	07/31/95	-40.0	220.0	454.0
Area 3, Well 3 Reservoir	07/31/95	-200.0	219.0	454.0
Area 5, Well 5B Reservoir	07/31/95	-263.0	218.3	454.0

Attachment 10.1 (Tritium in Water - 1995, cont.)

Sampling Location	Collection Date	Concentration	µCi/mL x 10^{-9} Standard Deviation (s)	Detection Limits
(Open Reservoirs, cont.)				
Area 5, UE-5c Reservoir	07/31/95	160.0	223.2	454.0
Area 6, Well C-1 Reservoir	07/31/95	-103.0	220.4	454.0
Area 18, Camp 17 Reservoir	07/31/95	188.0	222.8	454.0
Area 19, U19c Reservoir	07/18/95	-53.6	229.4	472.0
Area 23, Swimming Pool	07/31/95	148.0	222.7	454.0
Area 25, Well J-11 Reservoir	07/31/95	91.4	222.6	454.0
Area 25, Well J-12 Reservoir	07/31/95	-188.0	218.1	454.0
Containment Ponds			µCi/mL x 10^{-6}	
Area 12, E-Tunnel Effluent	03/15/95	565.0	1.88	0.48
Area 12, E-Tunnel Effluent	05/09/95	881.0	2.36	0.49
Area 12, E-Tunnel Effluent	08/07/95	1370.0	2.85	0.46
Area 12, E-Tunnel Effluent	11/08/95	491.0	1.67	0.45
Area 12, E-Tunnel Pond No. 1	03/23/95	691.0	2.10	0.49
Area 12, E-Tunnel Pond No. 1	05/23/95	833.0	2.25	0.48
Area 12, E-Tunnel Pond No. 1	08/07/95	1260.0	2.73	0.46
Area 12, E-Tunnel Pond No. 1	11/08/95	549.0	1.77	0.45

11.0 SUMMARY OF 1995 RESULTS OF OFFSITE TLD AND GROUNDWATER MONITORING

Because of the change in Nevada Test Site operations and a reduced budget, many of the monitoring networks operated by the U.S. Environmental Protection Agency's Remote Sensing Laboratory were eliminated or sharply curtailed. As a result, only tables of personnel and area monitoring with Thermoluminescent Dosimeter (Tables 11.1-11.10) and results from the offsite Long-Term Hydrological Monitoring Program are included in this chapter (see Tables 11.1-11.10). These results are discussed in the "U.S. Department of Energy, Nevada Operations Office, Annual Site Environmental Report - 1995, DOE/NV/11718-037."

Table 11.1 Personnel Thermoluminescent Dosimetry Results - 1995

Station Name		Number of Days	Exposure (mrem) Minimum	Maximum	Mean	Daily Deep Dose Annual[a] Exposure (mrem)	Total Percent Completeness
022	Alamo, NV	307	0.20	0.22	0.21	78	84
040	Goldfield, NV	275	0.25	0.31	0.29	105	75
042	Tonopah, NV	289	0.25	0.32	0.29	110	79
045	St. George, UT	290	0.17	0.29	0.21	71	79
293	Pioche, NV	274	0.24	0.29	0.27	97	75
307	Mina, NV	354	0.24	0.35	0.28	100	97
329	Austin, NV	274	0.33	0.35	0.34	120	75
336	Caliente, NV	355	0.24	0.39	0.31	110	97
344	Delta, UT	205	0.21	0.28	0.25	89	56
345	Delta, UT	238	0.22	0.33	0.27	100	65
346	Milford, UT	80			0.34	120	22
347	Milford, UT	80			0.32	120	22
348	Overton, NV	356	0.20	0.26	0.22	82	98
380	Amargosa Valley, NV	356	0.18	0.22	0.20	70	98
427	Alamo, NV	355	0.22	0.28	0.25	89	97
444	Ely, NV	355	0.23	0.27	0.25	90	97

Total data completeness: 76 percent. Mean of above exposures is 98 mrem.

(a) Total annual exposure is calculated by multiplying the mean daily exposure rate by 365.25.

Table 11.2 Environmental Thermoluminescent Dosimetry Results - 1995

Station Name	Number of Days	Daily Exposure (mR) Minimum	Maximum	Mean	Total Exposure[a] (mR)	Percent Completeness
Alamo, NV	81	0.24	0.24	0.24	87	22
Amargosa Center, NV	82	0.21	0.21	0.21	76	22
Austin, NV	355	0.31	0.37	0.35	130	97
Baker, CA	357	0.23	0.25	0.24	87	98
Barstow, CA	357	0.27	0.30	0.29	100	98

Total data completeness: 84.5 percent.

(a) Total annual exposure is calculated by multiplying the mean daily exposure rate by 365.25.

Table 11.2 (Environmental Thermoluminescent Dosimetry Results - 1995, cont.)

Station Name	Number of Days	Daily Exposure (mR) Minimum	Maximum	Mean	Total Exposure[a] (mR)	Percent Completeness
Beatty, NV	80	0.32	0.32	0.32	120	22
Bishop, CA	356	0.27	0.30	0.29	100	98
Blue Jay, NV	356	0.32	0.36	0.33	120	98
Caliente, NV	356	0.25	0.28	0.26	95	98
Cedar City, UT	365	0.18	0.21	0.20	73	100
Coaldale, NV	355	0.28	0.31	0.29	110	97
Complex I, NV	348	0.27	0.29	0.28	100	95
Coyote Summit, NV	356	0.32	0.34	0.33	120	98
Delta, UT	256	0.19	0.25	0.22	80	73
Ely, NV	356	0.21	0.25	0.23	84	98
Eureka, NV	355	0.27	0.31	0.29	110	97
Gabbs, NV	274	0.21	0.22	0.22	80	75
Garrison, UT	355	0.19	0.23	0.21	76	97
Goldfield, NV	80	0.29	0.29	0.29	110	22
Groom Lake, NV	356	0.22	0.26	0.24	87	98
Hiko, NV	82	0.25	0.25	0.25	91	22
Indian Springs, NV	82	0.16	0.16	0.16	58	22
Las Vegas Airport, NV	177	0.14	0.16	0.15	55	48
Las Vegas UNLV, NV	63	0.23	0.23	0.23	84	17
Las Vegas USDI, NV	158	0.18	0.22	0.20	73	43
Lone Pine, CA	356	0.26	0.28	0.27	99	98
Lund, NV	354	0.23	0.27	0.25	91	97
Lund, UT	266	0.28	0.31	0.30	110	73
Medlins Ranch, NV	357	0.29	0.30	0.30	110	98
Mesquite, NV	266	0.16	0.19	0.18	66	73
Milford, UT	265	0.28	0.34	0.31	110	73
Mina, NV	355	0.26	0.28	0.27	99	97
Moapa, NV	357	0.19	0.28	0.23	84	98
Nyala, NV	356	0.22	0.25	0.23	84	98
Overton, NV	266	0.16	0.19	0.18	66	73
Pahrump, NV	82	0.22	0.22	0.22	80	22
Pioche, NV	356	0.21	0.25	0.24	88	98
Queen City Summit, NV	266	0.36	0.40	0.37	140	73
Rachel, NV	82	0.31	0.31	0.31	110	22
Round Mountain, NV	355	0.29	0.34	0.31	110	97
St. George, UT	168	0.14	0.18	0.16	58	46
Stone Cabin, NV	355	0.28	0.34	0.31	110	97
Sunnyside, NV	354	0.16	0.20	0.18	66	97
Tonopah Test Range, NV	81	0.35	0.35	0.35	130	22
Tonopah, NV	81	0.34	0.34	0.34	120	22
Twin Springs, NV	81	0.33	0.33	0.33	120	22
Uhaldes Ranch, NV	348	0.27	0.33	0.30	110	95

Minimum exposure is 55 at Las Vegas Airport, NV; maximum exposure is 140 at Queen City Summit, NV. Mean of total exposure is 96.

Total data completeness: 84.5 percent.

(a) Total annual exposure is calculated by multiplying the mean daily exposure rate by 365.25.

Table 11.3 Long-Term Hydrological Monitoring Program Summary of Tritium Results for Wells Near the Nevada Test Site - 1995

Location	Number of Samples	Tritium Concentration (pCi/L) Maximum	Minimum	Mean	1Sigma	% of DCG	Mean MDC
Adaven Spring	4	32	26	30	1.8	0.03	5.2
Well 4 City Alamo	2	4.9	0.68	2.8	1.9	NA	6.3
Crystal Pool	4	4.0	-0.50	0.77	1.7	NA	5.5
Fairbanks Spring	2	-0.99	-2.0	-1.5	2.0	NA	6.5
17S-50E-14cac	2	-0.74	-1.2	-0.97	2.1	NA	7.0
Well 18S-51E-7db	2	2.1	-0.35	0.88	1.53	NA	7.0
Low Level Waste Site	4	3.8	0.48	2.5	1.8	NA	5.9
Specie Springs	2	27	22	24	4.8	0.03	7.2
Tolicha Peak	4	0.09	-1.5	-0.59	1.7	NA	5.6
11S-48-1dd Coffer's	5	1.3	-1.3	0.39	1.9	NA	6.0
12S-47E-7dbd City	2	2.2	-1.5	0.35	1.8	NA	6.1
Younghans Ranch	5	5.1	0.06	2.2	1.2	NA	5.2
Crystal Springs	2	2.0	0.23	1.1	4.0	NA	6.7
Well 1 Sewer Co.	2	2.2	1.1	1.6	2.3	NA	7.5
15S-50E-18cdc City	2	0.65	-0.88	-0.12	2.1	NA	7.0
Sharp's Ranch	1			4.9	2.0	NA	6.3
Goss Springs	1			0.85	1.7	NA	5.6
Penoyer Culinary	4	1.7	-0.49	0.69	1.6	NA	5.1
Twin Springs Ranch	4	11.0	0.40	2.5	1.7	NA	5.6

DCG Derived Concentration Guide. Established by DOE Order as 90,000 pCi/L.
N/A Not applicable. Percent of concentration guide is not applicable because the result is less than the MDC or the water is known to be nonpotable.

Table 11.4 Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project FAULTLESS - 1995

Location	Number of Samples	Tritium Concentration (pCi/L) Result	1Sigma	% of DCG	Mean MDC
Hot Creek Ranch	1	4.4	1.7	NA	5.4
Blue Jay Maintenance	1	1.0	1.5	NA	5.1
Bias Well	1	3.1	1.3	NA	4.2
Well HTH-1	1	-1.5	2.0	NA	6.5
Well HTH-2	1	2.2	1.6	NA	5.1
Well Six Mile	Pump Inoperable				

DCG Derived Concentration Guide. Established by DOE Order as 90,000 pCi/L.
N/A Not applicable. Percent of concentration guide is not applicable because the tritium result is less than the MDC or because the water is known to be nonpotable.

Table 11.5 Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project SHOAL - 1995

Location	Number of Samples	Tritium Concentration (pCi/L) Result	1Sigma	% of DCG	Mean MDC
Hunts' Station	1	1.9	1.7	NA	5.6
Smith/James Spring	1	39	1.9	0.04	5.1
Spring Windmill	1	2.1	1.6	NA	5.4
Well Flowing	1	0.87	1.5	NA	4.9
Well H-2	No Access, New Lock				
Well H-3	1	0.55	1.6	NA	5.4
Well HS-1	1	-0.88	1.4	NA	4.5

DCG Derived Concentration Guide. Established by DOE Order as 90,000 pCi/L.
N/A Not applicable. Percent of concentration guide is not applicable because the tritium result is less than the MDC or because the water is known to be nonpotable.

Table 11.6 Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project RULISON - 1995

Location	Number of Samples	Tritium Concentration (pCi/L) Result	1Sigma	% of DCG	Mean MDC
Battlement Creek	1	46	1.8	0.05	4.5
City Springs	1	1.1	1.5	NA	4.9
Gardner Ranch	1	62	2.0	0.07	4.6
Spring 300 Yards N	1	49	2.0	0.05	4.9
Well CER Test	1	73	2.2	0.08	5.2
Hayward Ranch	1	55	2.2	0.06	5.1
Potter Ranch	1	63	1.9	0.07	4.8
Jacobs Ranch	1	68	2.0	0.08	4.4
Searcy Ranch	1	54	2.0	0.06	4.8

DCG Derived Concentration Guide. Established by DOE Order as 90,000 pCi/L.
N/A Not applicable. Percent of concentration guide is not applicable because the tritium result is less than the MDC or because the water is known to be nonpotable.

Table 11.7 Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project RIO BLANCO - 1995

Location	Number of Samples	Tritium Concentration (pCi/L) Result	1Sigma	% of DCG	Mean MDC
B-1 Equity Camp	1	41	1.6	0.05	4.0
Brennan Windmill	1	6.0	1.8	0.01	5.8
CER 1 Black Sulph	1	36	1.5	0.04	4.0

DCG Derived Concentration Guide. Established by DOE Order as 90,000 pCi/L.
N/A Not applicable. Percent of concentration guide is not applicable because the tritium result is less than the MDC or because the water is known to be nonpotable.

Table 11.7 (Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project RIO BLANCO - 1995, cont.)

Location	Number of Samples	Tritium Concentration (pCi/L) Result	1Sigma	% of DCG	Mean MDC
CER 4 Black Sulph	1	40	1.8	0.04	4.8
Fawn Creek 1	1	24	1.6	0.03	4.7
Fawn Creek 500' Up	1	30	1.8	0.03	4.9
Fawn Creek 500' Dn	1	30	1.6	0.03	4.3
Fawn Creek 6800' Up	1	30	1.6	0.03	4.3
Fawn Creek 8400' Dn	1	30	1.6	0.03	4.3
Fawn Creek 3	1	27	2.2	0.03	6.6
Johnson Artesian	1	-2.0	1.5	NA	5.0
Well RB-D-01	1	2.6	1.6	NA	5.0
Well RB-D-03	1	0.68	1.7	NA	5.6
Well RB-S-03	1	1.4	1.6	NA	5.0

DCG Derived Concentration Guide. Established by DOE Order as 90,000 pCi/L.

N/A Not applicable. Percent of concentration guide is not applicable because the tritium result is less than the MDC or because the water is known to be nonpotable.

Table 11.8 Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project GNOME - 1995

Location	Number of Samples	Tritium Concentration (pCi/L) Result	1Sigma	% of DCG	Mean MDC
Well 7 City[a]	1	0.78	1.4	NA	4.6
Well 2 City	1	4.0	1.4	NA	4.2
Well DD-1[b]	1	8.6×10^7	3.4×10^5	9.6×10^4	4.2×10^5
Well LRL-7[c]	1	1.0×10^4	160	11	420
Well PHS 6	1	35	1.7	0.04	4.9
Well PHS 8[d]	1	11	1.7	0.01	5.4
Well PHS 8	1	9.2	1.7	0.01	5.4
Well PHS 9[d]	1	0.12	1.6	NA	5.2
Well PHS 9	1	-0.08	1.3	NA	4.4
Well PHS 10	1	2.9	1.4	NA	4.5
Well USGS 1	1	0.31	1.4	NA	4.5
Well USGS 4[e]	1	8.3×10^4	330	92	420

Table 11.8 (Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project GNOME - 1995, cont.)

Location	Number of Samples	Tritium Concentration (pCi/L) Result	1Sigma	% of DCG	Mean MDC
Well USGS 8[f]	1	8.1×10^4	330	90	420
J. Mobley Ranch	1	4.6	1.3	<0.01	5.4

Note: Conventional and/or enrichment tritium analysis techniques were used for the samples.

DCG Derived Concentration Guide. Established by DOE Order as 90,000 pCi/L.

N/A Not applicable. Percent of concentration guide is not applicable because the tritium result is less than the MDC or because the water is known to be nonpotable.

Additional Results Greater than the MDC:

	Nuclide	Result	1 sd	MDC	Units
(a)	^{90}Sr	2.1	1.6	5.1	pCi/L
	^{238}Pu	7.0×10^{-3}	4.1×10^{-3}	6.4×10^{-3}	pCi/L
	$^{239+240}Pu$	4.7×10^{-3}	5.7×10^{-3}	2.2×10^{-2}	pCi/L
(b)	^{90}Sr	1.1×10^4	1.7×10^3	2.2×10^{-2}	pCi/L
	^{137}Cs	7.5×10^5	5.0×10^4	--	pCi/L
	^{238}Pu	-2.0×10^{-3}	5.3×10^{-3}	2.4×10^{-2}	pCi/L
(c)	^{90}Sr	-22	24	78	pCi/L
	^{137}Cs	160	10	--	pCi/L
	^{238}Pu	2.0×10^{-3}	3.5×10^{-3}	1.5×10^{-2}	pCi/L
	$^{239+240}Pu$	2.0×10^{-3}	4.5×10^{-3}	1.9×10^{-2}	pCi/L
(d)	Samples taken from stock tank.				
(e)	^{90}Sr	5900	64	26	pCi/L
	^{238}Pu	9.3×10^{-3}	6.6×10^{-3}	1.3×10^{-2}	pCi/L
	$^{239+240}Pu$	9.3×10^{-3}	6.6×10^{-3}	1.3×10^{-2}	pCi/L
(f)	^{90}Sr	4200	65	30	pCi/L
	^{238}Pu	2.1×10^{-3}	2.1×10^{-3}	5.8×10^{-3}	pCi/L
	$^{239+240}Pu$	6.4×10^{-3}	4.3×10^{-3}	1.6×10^{-2}	pCi/L

Table 11.9 Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project GASBUGGY - 1995

Location	Number of Samples	Tritium Concentration (pCi/L) Result	1Sigma	% of DCG	Mean MDC
La Jara Creek	1	28	1.6	0.03	4.4
Lower Burro Cany	1	2.1	2.0	NA	3.8
Pond N 30.3.32.3	1	31	2.0	0.04	5.8
Arnold Ranch	1	0.94	1.4	NA	4.5
Bixler Ranch	Ranch Abandoned				
Bubbling Springs	1	30	1.7	0.03	4.6
Cave Springs	1	9.8	1.3	0.01	4.0
Cedar Springs	1	39	1.6	0.04	4.1
Well Jicarilla	1 (from stock tank)	4	1.4	NA	4.3
Well 28.3.33.233	Pump out				
Well 30.3.32.343	Pump out				
Windmill 2	1	0.6	1.4	NA	4.5
Well EPNG 10-36					
Sample Depth 950 ft	1	96	2.0	0.11	4.3
1180 ft	1	124	2.8	0.14	6.1
1410 ft	1	125	2.6	0.14	5.4
1600 ft	1	11	1.3	0.01	3.9
1900 ft	1	127	2.7	0.14	5.8
3590 ft	1	9.4	2.0	0.01	6.2
	No ^{137}Cs detected in this sample				

DCG Derived Concentration Guide. Established by DOE Order as 90,000 pCi/L.

N/A Not applicable. Percent of concentration guide is not applicable because the tritium result is less than the MDC or because the water is known to be nonpotable.

Table 11.10 Long-Term Hydrological Monitoring Program Summary of Tritium Results for SALMON Test Site Area - April 1995

Sample Location	Collection Date	Enriched Tritium pCi/L ± sd	MDC	Tritium pCi/L ± 1sd	MDC
Baxterville, MS					
Anderson, Billy Ray	04/25/95	11 ± 2.1	6.6		
Anderson Pond	04/25/95	13 ± 1.6	5.0		
Anderson, Regina	04/25/95	13 ± 1.8	5.4		

(a) Indicates that results are less than MDC.

Table 11.10 (Long-Term Hydrological Monitoring Program Summary of Tritium Results for SALMON Test Site Area - April 1995, cont.)

Sample Location		Collection Date	Enriched Tritium pCi/L ± sd	MDC	Tritium pCi/L ± 1sd	MDC
(Baxterville, MS, cont.)						
Anderson, Robert Harvey		04/25/95	11 ± 1.8	5.7		
Anderson, Robert Lowell, Jr.		04/25/95	14 ± 2.0	6.1		
Anderson, Robert Lee		04/25/95	19 ± 2.5	7.8		
Anderson, Tony		04/24/95	13 ± 1.5	4.6		
Bilbo, Timothy L.		04/25/95	20 ± 1.9	5.7		
Burge, Joe		04/25/95	11 ± 1.7	5.2		
Daniels, Webster, Jr.		04/24/95	19 ± 1.9	5.7		
Daniels - Well #2 Fish Pond		04/24/95	9.3 ± 1.2	3.9		
Hilbey, Billy[a]		04/24/95	1.5 ± 1.8	5.9		
Kelly, Gertrude[a]		04/24/95	-0.13 ± 1.4	4.6		
Half Moon Creek	Pre	04/23/95	11 ± 1.4	4.4		
	Post	04/25/95	19 ± 1.7	5.0		
Half Moon Creek	Pre	04/23/95	7.9 ± 2.0	4.4		
Overflow	Pre Dup	04/23/95	13 ± 2.0	6.4		
	Post	04/25/95	186 ± 2.9	4.9		
	Post Dup	04/25/95	197 ± 3.1	5.6		
Lee, P. T.		04/25/95	33 ± 2.0	5.7		
Little Creek #1		04/25/95	18 ± 1.7	5.3		
Lower Little Creek #2		04/24/95	10 ± 1.9	6.0		
McGinnis, Gloria		04/27/95	14 ± 1.7	5.2		
Mills, A. C.[a]		04/25/95	-2.5 ± 1.8	6.0		
Mills, Roy		04/25/95	10 ± 2.3	4.2		
Napier, Denise		04/25/95	12 ± 1.8	5.6		
Noble's Pond		04/25/95	16 ± 1.9	5.9		
Noble, W. H., Jr.		04/25/95	31 ± 1.8	5.2		
Pond West of GZ	Pre	04/23/95	10 ± 1.4	4.4		
	Post	04/25/95	8.5 ± 1.6	4.9		
REECo Pit Drainage-A		04/23/95	12 ± 1.5	4.7		
REECo Pit Drainage-B		04/23/95	12 ± 1.5	4.6		
REECo Pit Drainage-C		04/23/95	13 ± 1.6	4.9		
Salt Dome Hunting Club		04/25/95	22 ± 2.0	6.0		
Salt Dome Timber Co.		04/25/95	21 ± 1.9	5.5		
Saucier, Dennis		04/24/95	26 ± 1.8	6.3		
Saucier, Wilma & Yancy[a]		04/24/95	-0.16 ± 1.7	5.5		
Well Ascot 2		04/26/95	28 ± 1.6	4.3		
Baxterville Well City		04/26/95	21 ± 2.0	5.8		
Well E-7		04/26/95	8.8 ± 2.1	6.7		
Well HM-1[a]	Pre	04/24/95	4.7 ± 1.6	5.1		
	½ hour	04/24/95	2.6 ± 1.4	4.7		
	1 hour	04/24/95	2.1 ± 1.3	4.2		
	Post	04/24/95	-0.9 ± 1.4	4.4		

(a) Indicates that results are less than MDC.

Table 11.10 (Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project SALMON - April 1995, cont.)

Sample Location		Collection Date	Enriched Tritium pCi/L ± sd	MDC	Tritium pCi/L ± 1sd	MDC
(Baxterville, MS, cont.)						
Well HM-2A[(a)]	Pre	04/24/95	1.7 ± 1.9	6.3		
	½ hour	04/24/95	-1.2 ± 1.6	5.2		
	1 hour	04/24/95	-0.87 ± 1.9	6.3		
	1½ hour	04/24/95	1.6 ± 1.7	5.5		
	2 hour	04/24/95	-0.3 ± 1.6	5.4		
	Post	04/24/95	-1.7 ± 1.2	3.9		
Well HM-2B[(a)]	Pre	04/24/95	-0.93 ± 1.6	5.3		
	½ hour	04/24/95	-1.8 ± 1.3	4.3		
	1 hour	04/24/95	0.32 ± 1.5	4.9		
	1½ hour	04/24/95	0.79 ± 1.6	5.5		
	2 hour	04/24/95	0.08 ± 1.2	4.1		
	Post	04/24/95	-1.2 ± 1.5	5.2		
Well HM-3[(a)]	Pre	04/24/95	1.4 ± 1.6	5.3		
	½ hour	04/24/95	2.4 ± 1.6	5.2		
	1 hour	04/24/95	1.7 ± 1.6	5.1		
	1½ hour	04/24/95	2.1 ± 1.8	5.9		
	2 hour	04/24/95	-0.71 ± 1.6	5.5		
	Post	04/24/95	0.57 ± 1.6	5.2		
Well HM-L	Pre	04/24/95	880 ± 6	4.7		
	1st hour	04/24/95	900 ± 5	5.4		
	2nd hour	04/24/95	950 ± 6	4.8		
	3rd hour	04/24/95			1100 ± 134	425
	4th hour	04/24/95	1090 ± 6	5.4		
	5th hour	04/24/95			1300 ± 134	425
	6th hour	04/24/95			1300 ± 134	425
	7th hour	04/24/95			1100 ± 133	425
	8th hour	04/24/95			1200 ± 134	425
	9th hour	04/24/95			1500 ± 135	425
	10th hour	04/24/95			1300 ± 134	425
	11th hour	04/24/95			1400 ± 135	425
	12th hour	04/24/95	1330 ± 6.0	5.0		
	13th hour	04/24/95			1700 ± 136	425
	14th hour	04/24/95			1400 ± 135	425
	15th hour	04/25/95			1700 ± 136	425
	16th hour	04/25/95			1600 ± 136	425
	17th hour	04/25/95			1400 ± 135	425
	18th hour	04/25/95			1600 ± 136	425
	19th hour	04/25/95			1200 ± 134	425
	20th hour	04/25/95			1700 ± 136	425
	21st hour	04/25/95			1400 ± 135	425
	22nd hour	04/25/95			1500 ± 135	425
	23rd hour	04/25/95			1600 ± 136	425

(a) Indicates that results are less than MDC.

Table 11.10 (Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project SALMON - April 1995, cont.)

Sample Location		Collection Date	Enriched Tritium pCi/L ± sd	MDC	Tritium pCi/L ± 1sd	MDC
(Baxterville, MS, cont.)						
Well HM-L2[a]	Pre	04/25/95	0.31 ± 1.6	5.3		
	Post	04/25/95	0.84 ± 1.4	4.4		
Well HM-S	Pre	04/23/95			4700 ± 150	425
	Pre Dup				5100 ± 150	425
	Post	04/25/95			4600 ± 150	425
	Post Dup				5100 ± 150	425
Well HMH-1	Pre	04/23/95	404 ± 3.7	5.5		
	Pre Dup		466 ± 5.0	8.2		
	Post	04/24/95	458 ± 4.0	4.9		
	Post Dup	04/24/95	444 ± 4.0	4.8		
Well HMH-2	Pre	04/23/95			2400 ± 139	425
	Post	04/24/95			3600 ± 144	425
Well HMH-3	Pre	04/23/95	12 ± 2.0	6.0		
	Pre Dup		12 ± 1.9	6.0		
	Post	04/24/95	16 ± 1.7	5.3		
	Post Dup		12 ± 1.5	4.8		
Well HMH-4	Pre	04/23/95	14 ± 1.5	4.7		
	Post	04/24/95	11 ± 1.6	4.9		
Well HMH-5	Pre	04/23/95			2400 ± 137	425
	Pre Dup				2000 ± 140	425
	Post	04/24/95			1300 ± 134	425
	Post Dup				1300 ± 134	425
Well HMH-6	Pre	04/23/95	44 ± 2.0	5.1		
	Post	04/24/95	52 ± 2.0	4.2		
Well HMH-7	Pre	04/23/95	9.4 ± 2.0	5.4		
	Pre Dup		6.0 ± 2.0	6.4		
	Post	04/24/95	10 ± 2.0	5.7		
	Post Dup		8.7 ± 1.8	5.5		
Well HMH-8	Pre	04/23/95	12 ± 2.0	5.1		
	Post	04/24/95	14 ± 2.0	5.9		
Well HMH-9	Pre	04/23/95	25 ± 2.0	6.1		
	Post	04/24/95	24 ± 2.0	6.0		
Well HMH-10	Pre	04/23/95	21 ± 2.0	5.9		
	Post	04/24/95	23 ± 2.0	4.9		
Well HMH-11	Pre	04/23/95	18 ± 2.0	5.9		
	Pre Dup		16 ± 1.7	5.1		
	Post	04/24/95	28 ± 2.0	5.0		
	Post Dup	04/24/95	24 ± 1.7	5.2		
Well HMH-12	Pre	04/23/95	9.3 ± 2.0	5.7		
	Post	04/24/95	12 ± 2.0	4.8		
Well HMH-13	Pre	04/23/95	16 ± 2.0	6.8		
	Post	04/24/95	11 ± 2.0	5.0		

(a) Indicates that results are less than MDC.

Table 11.10 (Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project SALMON - April 1995, cont.)

Sample Location		Collection Date	Enriched Tritium pCi/L ± sd	MDC	Tritium pCi/L ± 1sd	MDC
(Baxterville, MS, cont.)						
Well HMH-14	Pre	04/23/95	10 ± 2.0	6.8		
	Post	04/24/95	8.6 ± 1.6	5.0		
Well HMH-15	Pre	04/23/95	12 ± 2.0	5.0		
	Post	04/24/95	12 ± 2.0	6.0		
Well HMH-16	Pre	04/23/95	44 ± 2.0	5.8		
	Post	04/24/95	44 ± 2.0	5.3		
Well HT-2C		04/26/95	12 ± 1.0	4.4		
Well HT-4		04/26/95	8.4 ± 2.0	6.7		
Well HT-5[a]		04/26/95	3.2 ± 1.6	5.2		
Columbia, MS						
Dennis, Buddy[a]		04/26/95	3.3 ± 2.0	6.7		
Dennis, Marvin		04/26/95	11 ± 2.0	6.4		
Well 64B City		04/26/95	13 ± 1.7	5.3		
Lumberton, MS						
Anderson, Arleene		04/25/95	14 ± 2	4.8		
Anderson, Lee L		04/24/95	20 ± 2	4.9		
Rogers, Robert		04/25/95	16 ± 1.0	3.9		
Boren (Gil Ray) Crawfish Pond		04/24/95	11 ± 2.0	5.0		
Gipson, Herman[a]		04/24/95	1.9 ± 1.3	4.1		
Gipson, Michael D.		04/24/95	16 ± 1.8	5.4		
Gipson, Philip		04/24/95	19 ± 1.9	5.7		
Graham, Sylvester[a]		04/24/95	1.2 ± 1.8	6.1		
Hartfield, Ray[a]		04/24/95	0.83 ± 1.2	4.1		
Powell, Shannon		04/24/95	15 ± 2.0	4.9		
Saul, Lee L.[a]		04/24/95	2.6 ± 1.5	4.8		
Saul, Rushing, Debra		04/24/95	24 ± 2.0	6.6		
Saul, Ola		04/24/95	25 ± 2.0	5.4		
Smith, E. J.		04/24/95	12 ± 2.0	4.2		
Smith, Howard[a]		04/24/95	1.4 ± 1.4	4.7		
Smith, Howard - Pond		04/24/95	11 ± 2.0	4.8		
Thompson, Reswell		04/24/95	19 ± 2.0	5.4		
Well 2 City[a]		04/26/95	0.87 ± 2.2	7.2		
Purvis, MS						
Burge, Willie Ray & Grace		04/25/95	15 ± 3.0	8.8		
Boren, Ron[a]		04/24/95	0.8 ± 1.7	5.6		
City Supply[a]		04/26/95	0.05 ± 1.6	5.2		

(a Indicates that results are less than MDC.

Table 11.10 (Long-Term Hydrological Monitoring Program Summary of Tritium Results for Project SALMON - April 1995, cont.)

Sample Location	Collection Date	Enriched Tritium pCi/L ± sd	Enriched Tritium MDC	Tritium pCi/L ± 1sd	Tritium MDC
Rain Sample					
IT Compound (Baxterville)	04/23/95	8.5 ± 1.7	5.5		
Samples were not collected at the following locations:					
Bond, Bradley K.	04/24/95			Moved, Trailer Gone	
Gipson, Hewie	04/24/95			No Longer Sampled	

(a) Indicates that results are less than MDC.

DISTRIBUTION LIST

DOE/NV

Director, Environmental Protection Division, Nevada Operations Office, U.S. Department of Energy, Post Office Box 98518, Las Vegas, NV 89193-8518, M/S 505

N. George McNeill, Environmental Protection Division, Nevada Operations Office, U.S. Department of Energy, Post Office Box 98518, Las Vegas, NV 89193-8518, M/S 505

Technical Information Resource Center, Nevada Operations Office, U.S. Department of Energy, Post Office Box 98518, Las Vegas, NV 89193-8518, M/S 505

BN

Manager, Environmental Management Division, Bechtel Nevada, Post Office Box 98521, Las Vegas, NV 89193-8521, M/S NLV022 (2)

Manager, Waste Operations, Bechtel Nevada, Post Office Box 98521, Las Vegas, NV 89193-8521, M/S NLV080

O. L. Haworth, Analytical Services Project, Bechtel Nevada, Post Office Box 98521, Las Vegas, NV 89193-8521, M/S NTS110

Daniel A. Gonzalez, Health Protection, Bechtel Nevada, Post Office Box 98521, Las Vegas, NV 89193-8521, M/S NTS270

Martha E. DeMarre, Coordination and Information Center, Post Office Box 98521, Las Vegas, NV 89193-8521, M/S NLV040

EPA

Anita A. Mullen, Radiation Sciences Laboratory, U.S. Environmental Protection Agency, P. O. Box 98517, Las Vegas, NV 89193-8517, M/S 513

Angela Haag, Librarian, Radiation Sciences Laboratory, U.S. Environmental Protection Agency, Post Office Box 98517, Las Vegas, NV 89193-8517, M/S 513

Miscellaneous

Office of Scientific and Technical Information, Technical Center, U.S. Department of Energy Post Office Box 62, Oak Ridge, TN 37831 (2)

Available to all others upon request.

Report Number (14) DOE/NV/11718--038

Publ. Date (11) 199710

Sponsor Code (18) DOE/EH, XF

UC Category (19) UC-600, DOE/ER

DOE