5.0 ONSITE THERMOLUMINESCENT DOSIMETER DATA

Thermoluminescent dosimeters (TLDs) were placed at 179 monitoring locations on the Nevada Test Site (NTS) during 1996. These locations are classified into four types. Environmental TLDs are in locations that monitor ambient gamma levels. Boundary TLDs are close to the NTS perimeter. Control TLDs are in areas believed to have no inventory of man-made radionuclides. Operational TLDs are within or on the perimeter of Radiological Waste Management Sites (RWMSs), where locations may have elevated exposures from nearby stored waste. The dosimeters are exchanged quarterly and processed at the Bechtel Nevada Radiological Laboratory in Mercury, Nevada. Attachment 5.1 lists the individual quarterly data for each location and also gives annual exposure values. (Figures, tables, and attachments are at the end of each chapter.) "Area" refers to the NTS operational area within which the TLD is located, and "Name" is a descriptive identifier for each sampling location. Figure 5.1 is an NTS map showing the TLD locations.

There were 24 TLD locations in the 1995 report that are not in this 1996 report. This decrease is due to reduced operational activity on the NTS. Eighteen of these locations were removed from service in the last quarter of 1995 and the choice of these locations for inactivation is discussed in last years data report. In addition to these, the four Device Assembly Facility (DAF) locations were eliminated at the end of 1995 because of the nonoperational status of that facility. Finally, the two locations at the RWMS Pit 3 were eliminated at the end of 1995, when that pit was covered and closed. There were also 12 new locations established in 1996, mandated by requirements in the NTS Radiological Control Manual. Monitoring at the corners of the Area 3 RWMS and the Area 6 Decontamination Pad commenced in the third quarter of the year. These two new monitoring locations have been operational for many years but not routinely monitored for gamma exposure. Monitoring at the corners of the Waste Examination Facility (WEF) commenced at the beginning of the fourth quarter. The WEF is a new facility still in preoperational monitoring status.

In annual reports prior to 1993, the boundary locations were not considered to be essentially the same as control locations. Boundary locations were established in late 1989 and data were first reported in the 1990 report. Data from 1990 to the present show that no statistically significant differences exist between control and boundary locations, and since the 1994 report these two types of locations have been assumed to represent background exposure levels.

The environmental surveillance program uses Panasonic™ model UD-814 TLDs. These TLDs are specially designed for environmental monitoring purposes. They contain three identical $CaSO_4$:Tm elements and one $Li_2B_4O_7$:Cu element. The lithium element is shielded with 14 mg/cm^2 of shielding material to monitor beta particles in the environment. The three calcium elements are encapsulated in 1000 mg/cm^2 shielding of plastic and lead to monitor ambient gamma levels. Since the calcium elements are about 30 times more sensitive than the lithium element, they are an excellent phosphor to measure the low levels of gamma radiation generally encountered in the environment, about 10 mR/month. The element readings are converted into exposure values using an algorithm supplied with commercial software.

The radiation source used to calibrate the TLD reader is Cs-137, a radionuclide which has a 30 year half-life and contributes to the external gamma exposures on the NTS. Calibration of the TLD reader is conducted using dosimeters that have individual responses within 3 percent of the mean of all the calibration dosimeters. The dosimeters used for calibration are irradiated in a geometry similar to the environment; that is, freely suspended in air. Element correction factors (ECF) and run correction factors (RCF) are applied to all the elements. Quality control checks of the TLD reader are done each time the reader is used. Unirradiated and irradiated control TLDs are processed with each batch of TLDs loaded into the automatic changer of the reader, a Panasonic™ model UD-710 TLD reader. Quarterly exposure levels are computed by averaging the ECF and RCF corrected responses of the calcium elements, then dividing by the days of exposure.

In 1996, the days of deployment, the difference between the deployment and collection dates for each TLD, ranged from 50 to 147 days or about 7 to 21 weeks. The first deployment was on November 16, 1995, and the last collection was on January 30, 1997. The median days of deployment was 91 days, which is one quarter of a year. The days of exposure for each location and quarter vary because of the work schedules of the technicians. It takes several weeks to visit all locations.

DATA ANALYSIS

The analysis of the TLD data 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 sampling locations.

The exploratory data analysis primarily consisted of probability plots of the data and logarithms of the data grouped by quarter and NTS operational areas. Figure 5.2 is a probability plot of the 1996 TLD annual averages for the environmental sampling locations. The data in this plot includes the boundary and control locations but excludes the operational locations and the atypical values listed in Table 5.2. Atypical values were identified from probability plots and histograms of the data and subsets of the data as points plotting at some distance from most of the other data points in that subset. Figure 5.3 is a probability plot of the data classified as atypical. The notes at the bottom of Figures 5.2 and 5.3 summarize the Ryan - Joiner correlation coefficient goodness of fit test for the data in the plot. This test is performed by calculating the product moment correlation coefficient between the data values and the corresponding expected quantiles. This procedure can be considered a measure of the linearity of the data in a probability plot. Tables published in the statistical literature are then used to find the probability of a good fit from the correlation coefficient and the sample size.

The data in Figure 5.2 fit a normal statistical distribution very well, and the data in Figure 5.3 fit a lognormal statistical distribution very well. Thus it may be concluded that the TLD data is composed of two distinct groups of values with different statistical distributions. The group of environmental stations has a normal statistical distribution with a mean value of 0.334 mR/day, and the upper limit of exposures from this group is about 0.55 mR/day or 200 mR/year. The second group is defined as data from operational stations (sampling locations adjacent to stored radioactive materials) and locations having an exposure rate above approximately 200 mR/year. The data from this group of sampling stations has a lognormal statistical distribution with a median value of 2.5 mR/day or 931 mR/year. The 1994 and 1995 data reports found that the data was similarly divided into two groups, a higher exposure group with a lognormal statistical distribution and a lower exposure group with a normal distribution. In 1994 and 1995 the criterion for classifying a data value in one or the other of the groups was 0.6 mR/day or 220 mR/year.

The list of operational stations is almost the same as last years list. In late 1995, RWMS Pit 4 was closed. The two TLDs that were used to monitor that pit were moved to the newly opened Pit 5. Data for Pit 5 begins with the first quarter of 1996. All operational locations are in Area 5 and are locations used to monitor radiological waste management activities. Table 5.2 list the names of the operational locations. The data from the operational locations is included in Attachment 5.1 for reporting purposes, but is not used in the data analyses.

The data values that were judged to be atypical and not from operational locations are listed in Table 5.3. The last column of data, the "Group Mean" column, gives the average annual exposure for the operational area with all atypical values deleted. This list is substantially shorter than in previous years. The following locations were on this list for 1995 but not on this 1996 list. Sampling at Building 610 Bay was discontinued at the end of 1995 and thus this location is no longer listed. Sampling at ah/at south was discontinued after the first quarter of 1996. Extrapolating from the existing data yields an annual total of 130 mR/year. Sampling at this location began in 1990. The annual average for that year was 227 mR/year, and since then, the annual averages have varied around a value of 200 mR/year. Also, on the list in 1995, but not in 1996, are sampling locations Stake A-6.5, Stake C-31, and Stake J-31. These three locations are active sampling locations. In past years, Stake A-6.5 and Stake C-31 have shown single quarter data that is atypically high, but such was not the case in 1996. Stake J-31 has shown a decreasing trend in exposure levels since monitoring began there in 1980, with an annual total of 790 mR/year. The 1996 annual total was 191 mR/year. New on the atypical values list in Table 5.3 is the result for Area 3 RWMS south. This location is about a tenth of a mile from three of the early atmospheric testing locations and thus may be influenced by residual materials from those tests.

Most of the values reported in Table 5.3 are from sampling locations in Yucca Flat, in areas known to be contaminated by early atmospheric testing of nuclear devices. The SEDAN west location is adjacent to the SEDAN Crater. The tunnel ponds contain products from the nuclear tests performed within the tunnels.

Descriptive statistics for the environmental stations are given in Table 5.4. Since this subset of the data is normally distributed, the statistics in this table are estimates of the parameters of the distribution. Figure 5.2 is the normal probability plot of this subset of data. In this figure, note that the straight line from the data crosses the fiftieth percentile line at about a data value of 0.33 or 0.34. Normally distributed data have the mean equal to the median and half the data is above the median and half below. Also, the slope of the line in a probability plot is determined by the standard deviation. For comparison with previous years, the 1995 average from environmental locations is 0.34 mR/day and in 1994 the environmental average was 0.33 mR/day. Thus, the average environmental gamma exposure levels at the NTS seem to have been constant for the past three years.

The first step in the formal statistical analysis of the 1996 environmental TLD data was to perform a two-way ANOVA to simultaneously test for differences among operational areas and among quarters of the year. Most ANOVA programs require equal sample sizes within the cells of a data matrix and thus cannot be used with this data. It is necessary to use a "Generalized Linear Model" program in order to calculate the two-way ANOVA for the 1996 TLD data. The generalized linear model program that was used 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 analyses of variance were calculated using the actual data values in mR/day. Since this analysis was for environmental data, the atypical values and operational location data were removed before the analysis.

The data are rank deficient for an interaction term because of an empty cell in the data matrix. There were no data for Area 30 in the first quarter. An ANOVA interaction term is a part of the analysis that measures any correlation between the effects. For these TLDs data, the effects are due to the differences between operational areas and the differences between quarters. The interaction determines if the pattern of differences between quarters varies between areas. No interaction means that the pattern between quarters is essentially the same for all operational areas. Rank deficiency is a statistical problem that results in a theoretical nonexistence of the interaction term. Statisticians have devised a number of approximations to get around this problem. One of the most often used is to replace the missing data with a reasonable value such as a mean value for that cell of data. This is the approach used here. The missing value for Area 30 first quarter was replaced by the mean value at that location of the second, third, and fourth quarters. These values are very close in magnitude, and thus this approximation should have very little influence on the ANOVA results, while allowing the analysis to be computed with an interaction term. Table 5.5 presents the ANOVA results.

The ANOVA is summarized in Table 5.5. Significant differences were found among operational areas, no differences between quarters, and no interaction. This is the same as the ANOVA results for the past several years. Since this two-way analysis found that the only statistically significant effect is differences between operational areas, it is appropriate to further analyze these differences using a one-way ANOVA. An important feature of a one-way analysis is the ability to use “multiple comparisons” to elucidate the pattern of differences between operational areas. Multiple comparisons are a statistical tool for simultaneously performing multiple simple statistical comparisons while maintaining the overall level of significance at a fixed level. Tukey’s multiple comparison method was used with a one-way ANOVA to further analyze the differences between operational areas. Table 5.6 presents the results of the one-way analysis. As expected from the two-way analysis, the one-way analysis found a very significant difference among operational areas. The lower portion of Table 5.6 contains a simple plotting of the area mean values and their confidence intervals. The areas have been rearranged in order of increasing magnitude of the mean values. The obvious differences in the lengths of the confidence intervals are due to the differences in the number of data values for each area.

The thematic map of area mean values in Figure 5.1 and the cross tabulation of mean values in Table 5.7 should be used along with the confidence intervals in Table 5.6 to interpret the pattern of differences among operational areas. The highest exposure value is for Area 30. This is actually the boundary station located at the junction of the NTS west boundary and the boundary between Areas 18 and 30. This is in a geographic region with high natural radiation levels from prehistoric lava flows. Aerial surveys of this region detect high levels of thallium-208, also known as thorium-C. The lowest exposure levels occur in Areas 22 and 23 and these two areas form a statistical group that is significantly different from all other areas. Areas 22 and 23 have low natural levels and no man-made contamination. Between the lower and highest exposure levels there is a continuum of gradually increasing values of the ranked means. The lower values are significantly different from the higher values, but no distinct groupings can be found. The thematic map shows highest means for Areas 3, 19, and 20. Area 3 is part of Yucca Valley, where much of the nuclear testing has occurred. Areas 19 and 20 contain Pahute and Rainier Mesas, which were used for many of the larger test events.

The reason that some operational areas show no TLD locations in Figure 5.1, while others show a few locations and still others show many locations is that TLDs were originally used to monitor operational activities rather than environmental conditions. The TLDs were first located in locations adjacent to construction activities. The areas with no TLD locations are generally rugged mountainous regions in which test activities would be difficult. Statistically it would be desirable to aggregate the sampling locations into groups of more equal size; however, the grouping must be based upon *a priori* considerations of sampling location characteristics. The current grouping, with the very unequal number of data per group, is based upon *a priori* considerations. The NTS operational areas were originally established as an area for each particular testing program, but recent usage is usually different from the original purpose. The operational areas also have various geological characteristics. Many of the areas are totally contained within valley floors while others are mountainous or located on high plateaus. This is a good way to separate groups since the localized meteorology and geomorphology are consistent within areas. Since areas associated with a small number of sampling locations 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 locations into subgroups more equal in number of sampling locations as the currently defined groups containing few locations. This would significantly reduce the statistical power of the ANOVA procedures; that is, the ability of the procedure to find significant differences when in fact they do exist. Within the NTS such an alternative is statistically a poor choice. The sampling locations are close together in areas of high testing activity by choice for the purpose of localized detection of small increases in exposure levels. In areas where there are no potential sources of elevated exposures, there is no reason to have sampling locations. The localized meteorology and geomorphology is similar for all sampling locations within the established operational areas. In fact, it seems reasonable to combine the areas within Yucca Valley into one group, even though these areas already have the highest density of sampling locations, because of the almost identical meteorology and geomorphology within the valley. Typically each NTS area within Yucca Valley is used by a different testing organization and thus there may be a different potential for elevated exposure levels among 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 approximately 0.55 mR/day or 200 mR/year, a normal statistical distribution, and contains 79 percent of all the data. This part of the data was considered the environmental data and subject to further statistical analyses. The second data set generally has values over 0.55 mR/day and is composed of the operational monitoring locations within the RWMS and a few atypical values from environmental locations. Most of the atypical values can be associated with known contamination events adjacent to those sampling locations. The general conclusions from the ANOVA on the environmental data is that there are significant differences in exposure levels between the NTS operational areas, but the pattern of differences cannot be well defined because of vastly different numbers of sampling locations within the many areas.

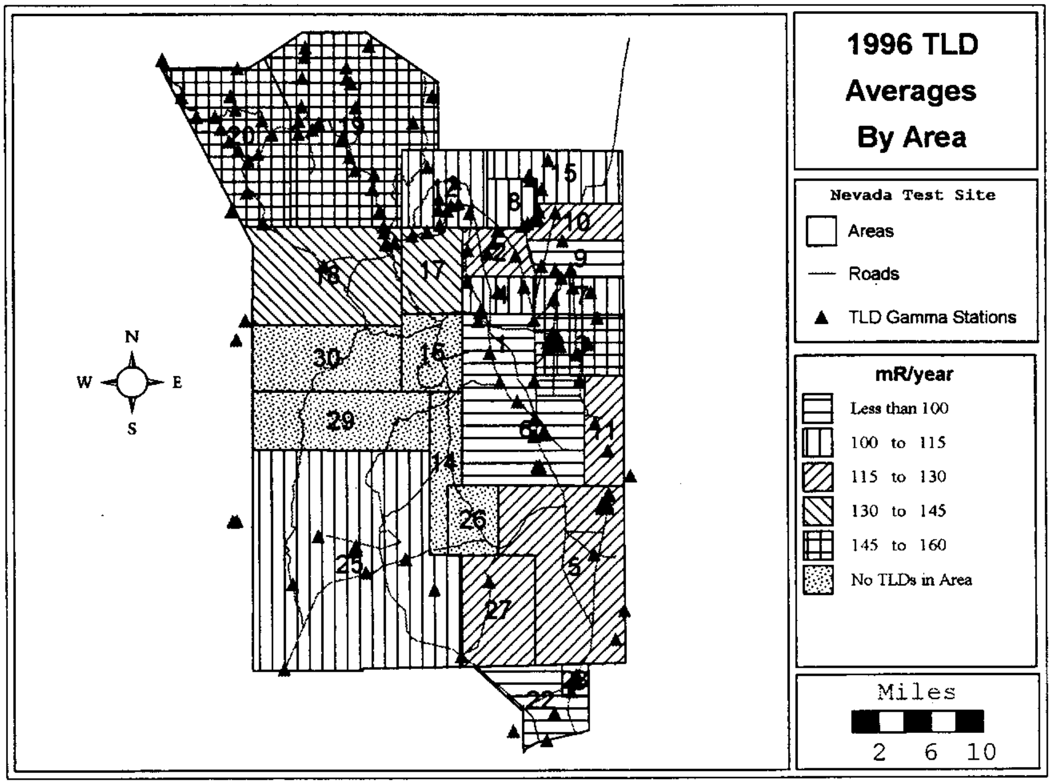

Figure 5.1 Thematic Map of NTS Environmental TLD Averages by Area

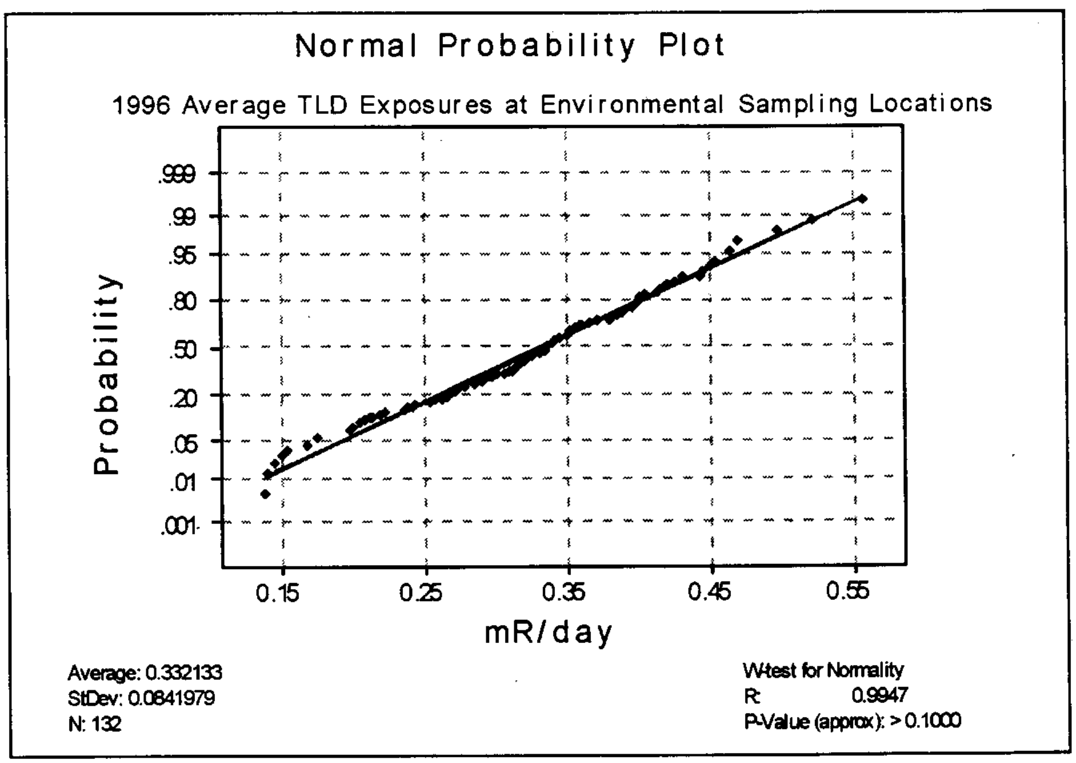

Figure 5.2 Probability Plot for 1996 TLD Annual Averages

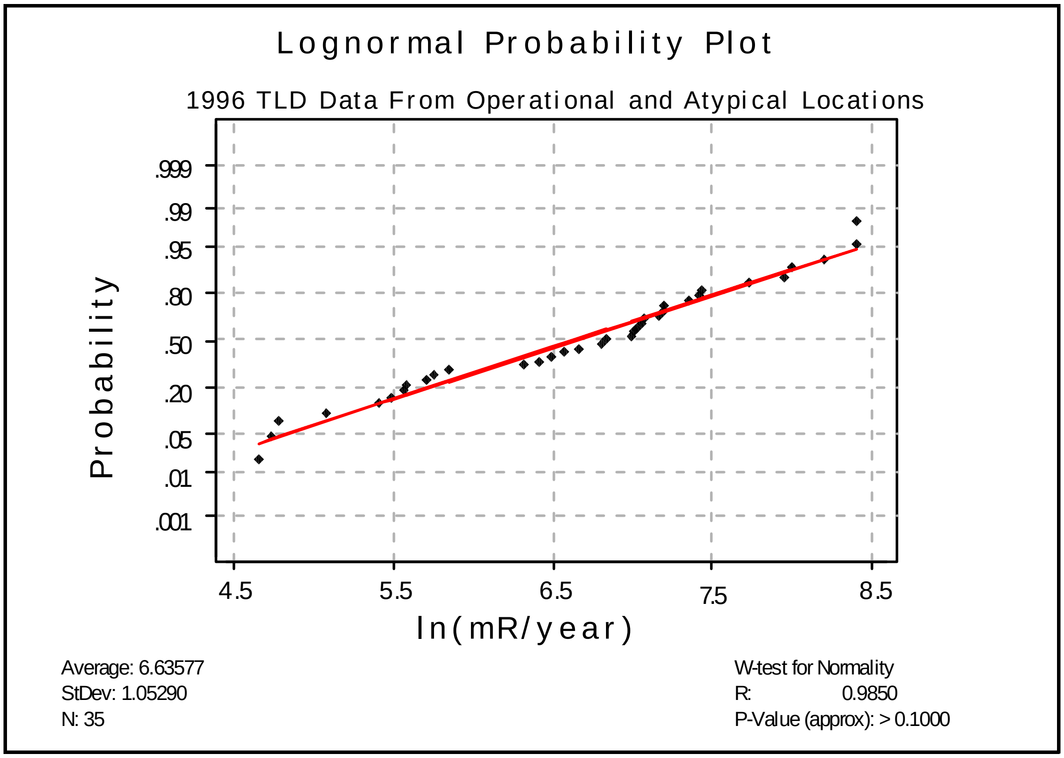

Figure 5.3 Probability Plot of Operational and Atypical Sampling Locations

Table 5.1 Summary of Boundary (B) and Control (C) TLD Data for 1996

Sampling Location Type/Area/Name	First Quarter mR/day	Second Quarter mR/day	Third Quarter mR/day	Fourth Quarter mR/day	Annual Average mR/day	Annual Total mR/Yr
B 3 Hill Top	0.37	0.34	0.35	0.34	0.35	128
C 5 Well 5B	0.30	0.31	0.30	0.29	0.30	109
B 5 3.3 Miles SE of Aggregate Pit	0.17	0.17	0.16	0.17	0.17	61
C 6 CP-6	0.23	0.21	0.20	0.19	0.21	75
C 6 Yucca Oil Storage Area	0.26	0.26	0.34	0.27	0.28	102
B 9 Papoose Lake Road	0.22	0.22	0.20	0.19	0.21	76
B 11 East of U-11b	0.34	0.31	0.31	0.31	0.32	115
B 12 Gold Meadows	0.29	0.29	0.27	(a)	0.28	102
B 15 U-15e Substation	0.26	0.26	0.26	0.23	0.25	93
B 18 Stake A-106	0.39	0.44	0.43	0.43	0.42	154
B 19 Stake C-31	0.36	0.42	0.42	0.40	0.40	146
B 19 Stake R-29	0.39	0.39	0.42	0.41	0.40	147
B 19 Gate 19-3P	0.40	0.40	0.41	(a)	0.40	147
B 20 Stake J-41	0.33	0.36	0.36	0.35	0.35	129
B 20 Stake LC-4	0.47	0.45	0.44	0.44	0.45	166
B 20 Stake A-118	0.37	0.41	0.42	0.40	0.40	146
B 22 Army Well No. 1	(a)	0.21	0.21	0.22	0.21	78
C 23 Building 650 Dosimetry	0.12	0.15	0.14	0.14	0.14	51
C 23 Building 650 Roof	0.12	0.14	0.15	0.14	0.14	50
C 23 Post Office	0.17	0.18	0.18	0.17	0.18	64
C 25 NRDS Warehouse	0.32	0.33	0.32	0.31	0.32	115
B 25 Jct. Jackass Flats & Area 27 Rds.	0.21	0.21	0.21	0.24	0.22	80
C 25 HENRE Site	0.33	0.32	0.33	0.37	0.34	123
B 25 Guard Station 510	0.31	0.38	0.33	0.36	0.35	126
B 25 Yucca Mountain	0.35	0.34	0.34	0.38	0.35	129
C 27 Area 27 Cafeteria	0.34	0.34	0.34	0.35	0.34	124
B 30 Gate 30-3P in Cat Canyon	(a)	0.44	0.43	0.51	0.45	165

(a) Signifies a missing data value.

Table 5.2 List of Operational Monitoring Thermoluminescent Dosimeter Locations

RWMS TRU Pad Northeast
RWMS TRU Pad North
RWMS TRU Pad Northwest
RWMS TRU Pad Southwest
RWMS TRU Pad South
RWMS TRU Pad Southeast
RWMS MSM-1 Southeast
RWMS MSM-1 East
RWMS MSM-1 Northeast
RWMS MSM-1 North-Northeast
RWMS MSM-1 North-Northwest
RWMS MSM-1 Northwest
RWMS MSM-1 West
RWMS MSM-1 Southwest
RWMS MSM-1 South-Southwest
RWMS MSM-1 South-Southeast
RWMS MSM-2 Northeast
RWMS MSM-2 North
RWMS MSM-2 Northwest
RWMS MSM-2 West
RWMS MSM-2 Southwest
RWMS MSM-2 South
RWMS MSM-2 Southeast
RWMS MSM-2 East
RWMS Pit 5 West Side
RWMS Pit 5 East Side

Table 5.3 Listing of Atypical TLD Data Values for 1996

Sampling Location	First Quarter mR/day	Second Quarter mR/day	Third Quarter mR/day	Fourth Quarter mR/day	Annual Average mR/day	Annual Total mR/Yr	Group Mean mR/day
2 Stake N-8	2.13	2.41	2.21	1.87	2.13	779	0.35
3 U-3ax/bl Northeast	0.56	Sampling Terminated			0.56	204	0.39
3 U-3bz North	0.51	0.69	Sampling Terminated		0.62	225	0.39
3 U-3by North	0.66	Sampling Terminated			0.66	241	0.39
3 U-3co North	2.15	2.89	Sampling Terminated		2.54	931	0.39
3 U-3co South	1.49	1.83	Sampling Terminated		1.67	611	0.39
3 A3 RWMS South	New Location		1.59	1.46	1.51	554	0.39
4 Stake A-9	2.62	2.58	2.49	2.30	2.48	906	0.30
7 7-300 Bunker	0.80	0.77	0.75	0.63	0.73	266	0.31
10 SEDAN West	0.81	0.89	0.86	0.75	0.82	301	0.32
12 T Tunnel Pond No. 2	0.63	0.67	0.84	0.74	0.72	264	0.31

Table 5.4 Descriptive Statistics for TLD Exposure Levels at Environmental Sampling Locations

Statistics from Location Annual Averages

Number of Locations = 143	Mean =	0.334 mR/day	Median =	0.338 mR/day
Standard Deviation =0.082	Minimum =	0.136 mR/day	Maximum =	0.557 mR/day
	First Quartile =	0.288 mR/day	Third Quartile =	0.390 mR/day

Statistics from Quarterly Data

Number of Datum = 499	Mean =	0.329 mR/day	Median =	0.335 mR/day
Standard Deviation =0.083	Minimum =	0.121 mR/day	Maximum =	0.565 mR/day
	First Quartile =	0.282 mR/day	Third Quartile =	0.385 mR/day

Table 5.5 Two-Way ANOVA on 1996 Environmental TLD Data

Source Term	Degrees of Freedom	Sum of Squares	Mean Square	F-Ratio	Probability Value
Area	21	2.2765	0.1084	46.01	0.0
Quarter	3	0.001044	3.48×10^{-3}	1.48	0.220
Area x Quarter	63	0.1196	1.90×10^{-3}	0.81	0.853
Error	412	0.9708	2.36×10^{-3}		
Total	499	3.4277			

Table 5.6 One-Way ANOVA on 1996 Environmental TLD Data

ANOVA for mR/day by Operational Area

Source	Degrees of Freedom	Sum of Squares	Mean Square	F-Ratio	Probability Value
Area	21	2.29607	0.10934	46.71	0.000
Error	477	1.11646	0.00234		
Total	498	3.41254			

```
                                  Individual 95 Percent Confidence Intervals for
                     Standard     the Mean Based on Pooled Standard Deviation
Area   N     Mean    Deviation    ---------+---------+---------+-------
 23   24   0.15371   0.02032     (-*)
 22    7   0.17815   0.03466     (--*--)
  6   46   0.25609   0.06229             (*-)
  8    4   0.27190   0.01665            (---*---)
  9   16   0.27342   0.05191              (-*-)
  1   16   0.27848   0.03090              (-*-)
 15   12   0.28372   0.03299              (--*-)
  4    8   0.30298   0.01913               (--*--)
 12   22   0.30940   0.03648                 (-*)
  7    8   0.31024   0.02289                (--*--)
 25   44   0.31297   0.04060                  (*)
  5   75   0.32187   0.04383                   (*)
 11    8   0.32822   0.01601                  (-*--)
 27    4   0.34048   0.00496                 (---*---)
 10   11   0.34824   0.05181                    (-*-)
  2   20   0.34926   0.07982                    (-*-)
  3   53   0.37504   0.07280                       (*)
 17    4   0.38887   0.01627                     (---*---)
 18   12   0.39400   0.02832                        (-*-)
 20   36   0.40901   0.05058                          (*)
 19   66   0.41811   0.03545                           (*)
 30    3   0.45870   0.04565                           (---*----)
                                 ---------+---------+---------+-------
Pooled Standard Deviation = 0.04838     0.24      0.36      0.48
```

Table 5.7 Cross Tabulation of Counts and Average mR/day of 1996 Environmental TLD Data

Cell contents: Count (number of data values)
Average

Area	Quarter 1	Quarter 2	Quarter 3	Quarter 4	All Quarters
1	4 0.277	4 0.278	4 0.281	4 0.277	16 0.278
2	5 0.337	5 0.371	5 0.372	5 0.317	20 0.349

Table 5.7 (Cross Tabulation of Counts and Average mR/day of 1996 Environmental TLD Data, cont.)

Cell contents: Count (number of data values)
Average

	Quarter				
Area	1	2	3	4	All Quarters
3	19 0.380	16 0.404	9 0.348	9 0.340	53 0.375
4	2 0.289	2 0.309	2 0.321	2 0.293	8 0.303
5	18 0.328	18 0.316	18 0.331	21 0.314	75 0.322
6	11 0.228	11 0.238	12 0.292	12 0.262	46 0.256
7	2 0.322	2 0.323	2 0.312	2 0.284	8 0.310
8	1 0.282	1 0.282	1 0.276	1 0.247	4 0.272
9	4 0.287	4 0.300	4 0.274	4 0.233	16 0.273
10	3 0.345	2 0.394	3 0.367	3 0.303	11 0.348
11	2 0.336	2 0.322	2 0.327	2 0.328	8 0.328
12	6 0.288	6 0.311	6 0.316	4 0.329	22 0.309
15	3 0.281	3 0.297	3 0.297	3 0.260	12 0.284
17	1 0.370	1 0.383	1 0.409	1 0.394	4 0.389
18	3 0.366	3 0.403	3 0.406	3 0.401	12 0.394
19	17 0.390	17 0.421	17 0.434	15 0.429	66 0.418
20	9 0.389	9 0.420	9 0.420	9 0.407	36 0.409
22	1 0.132	2 0.186	2 0.186	2 0.186	7 0.178
23	6 0.140	6 0.158	6 0.158	6 0.159	24 0.154
25	11 0.313	11 0.312	11 0.309	11 0.318	44 0.313
27	1 0.337	1 0.338	1 0.338	1 0.348	4 0.340
30	0 --	1 0.436	1 0.429	1 0.511	3 0.459
All Areas	129 0.323	127 0.336	122 0.336	121 0.321	499 0.329