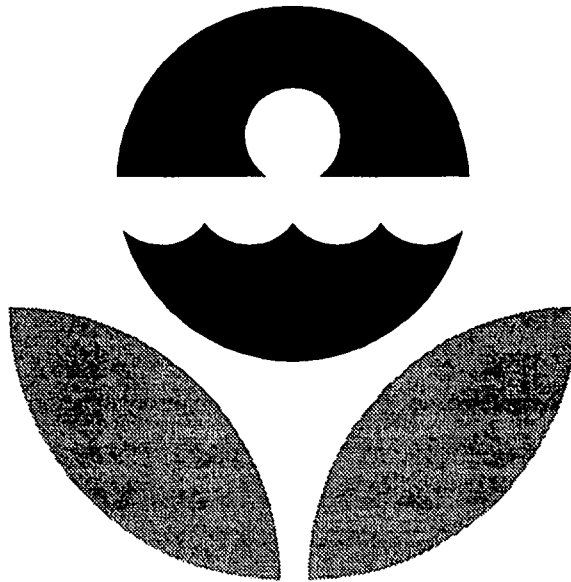




# **Air Filter Performance Evaluation Study**

## **A Statistical Evaluation of the August 26, 1994 Data**

Air Filter  
Performance Evaluation Study  
August 26, 1994



Environmental Protection Agency  
Environmental Monitoring Systems Laboratory  
Las Vegas, Nevada



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF RESEARCH AND DEVELOPMENT  
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS  
P.O. BOX 93478  
LAS VEGAS, NEVADA 89193-3478  
(702/798-2100)

Dear Participant,

Enclosed are the results of the Nuclear Radiation Assessment Division (EMSL-LV) Performance Evaluation Study for *Air Filter; August 26, 1994*.

The known value for each analysis was determined by gravimetric methods, checked by chemical analyses performed by EMSL-LV's Radiochemistry Laboratory, and compared to the participating laboratories' grand average.

The expected precision, determined by the known value, was taken from "Table 3. Laboratory Precision: One Standard Deviation Values and Control Limits for Various Analyses", which is based on data accumulated over the years by the Performance Evaluation Program, and can be found in the Environmental Radioactivity Performance Evaluation Studies Program and Radioactive Standards Distribution Program information brochure.

Please take a few minutes to review this report and the analytical data your laboratory submitted to us. If there are any apparent discrepancies, please notify us immediately.

We encourage you to make use of the computer-automated data-entry system that has been in place for some time now. As the number of participants increases, and it becomes unrealistic for us to receive results by mail or FAX, the computer system will be our only avenue for accepting data.

If you have any questions or comments, please send a message via the data-entry system or contact George Dilbeck at 702/798-2104 or Patricia Honsa at 702/798-2141.

Sincerely,

A handwritten signature in cursive script that reads "George Dilbeck".

George Dilbeck  
Chemist  
Radioanalysis Branch

Enclosure

#### **NOTICE**

**This material has been funded wholly by the U.S. Environmental Protection Agency. It has been subject to the Agency's review, and has been approved for publication as an EPA document.**

The following pages consist of separate sections for each of the nuclides in this study with four parts per section. After the first, each part is separated from the next by a new page or a thick horizontal bar. The first page of each section is a statistical summary for the nuclide and starts with a statement of the known value, the control limits, and the warning limits.

The warning limits are placed at two normalized standard deviations above and below the known value and the control limits are three normalized standard deviations above and below the known value. If you keep control charts, these values will be useful for anticipating problems with the accuracy of your analytical methods.

The coin shaped pie chart at the top of the summary page shows the fate of all the samples sent out in number and percentage terms. The pie chart starts at the top and rotates clockwise. The first sector represents those participants who submitted analytical results within both the warning and control limits. The next sector represents those who are in the warning region but not out of control. The third sector represents those who are out of control, but have passed the outlier test. The fourth sector represents those who have failed the outlier test. The last sector represents those participants who have failed to respond properly. This is the case if no analytical results were returned, or less than three determinations were reported, or if the results were received too late. The reeding on the edge of the coin is spaced at one percent intervals, and the sector shading becomes darker as the data reliability decreases. Sectors with zero width are not shown.

The table in the center shows a number of statistical quantities calculated from the submitted data based on the mean and median values in relation to the known value, both before and after outlier removal. The lower pie chart uses the same construction as the upper chart and shows the distribution of properly submitted data in terms of deviation from the known value divided into sectors representing one, two, three, and greater than three normalized standard deviations.

The second part is an alphabetical listing, in lab-code order, of submitted data and several calculated quantities. An entry that is shaded has been rejected because of one of the reasons listed above or failure of the outlier test. The fifth and sixth columns are a measure of laboratory precision. The Range analysis is a normalized value that you may use to keep precision control charts. If this value is between 2.0 and 3.0, your analytical process precision is in the warning zone; if it exceeds 3.0 it is out of control. The eighth and ninth columns are the differences from the mean of all non-outliers and from the known value, respectively. A tag symbol may appear in the last column. Each page with tags has a symbol definition summary at the bottom. If there is no tag symbol, the data is within the control limits, but it may be in the warning zone.

The third part is a three-column listing of result average, tag symbol, and lab-code in average order excluding those labs not responding properly. In this order, all outliers and out-of-control results appear at the top or bottom of the list.

The last part is two bar chart displays showing frequency distributions of responding participants. The first chart places the known value at the center and a bar at each 0.2 unit of expected precision. The second chart places the mean of the reported measurements at the center and a bar at each 0.2 unit of standard deviation. In both cases, a bar includes those results within 0.1 unit up to the maximum of six. Any results more than six units from the center value are shown cumulatively by a shaded bar one past the sixth unit. If the central tendency of the known value distribution falls away from the center, an error in accuracy is indicated. If the distribution is broad, poor precision is indicated. The mean value distribution is similar but uses the average and standard deviation of reported results as its basis.

The Range Analysis( $R + SR$ ) is calculated from the range, mean range and standard error of the range values. The range is the difference between the maximum and minimum results for the laboratory. The mean range is calculated by multiplying the expected precision by 1.693(for three results). The standard error of the range is calculated by multiplying the mean range by 2.575(for three results), subtracting the mean range from this product, and dividing the result by 3. If the range is greater than the mean range, then the range analysis is calculated by subtracting the mean range from the range, dividing the result by the standard error of the range and adding 1. If the mean range is greater than or equal to the range, then the range analysis is calculated by dividing the range by the mean range.

The normalized deviation of the mean from the grand average is calculated from the deviation of the mean from the grand average and the standard error of the mean values. The deviation of the mean from the grand average is calculated by subtracting the grand average from the average of the laboratory's three results. The standard error of the mean is calculated by dividing the expected precision by the square root of 3(the number of results). The normalized deviation of the mean from the grand average is calculated by dividing the deviation of the mean from the grand average by the standard error of the mean.

The normalized deviation of the mean from the known value is calculated from the deviation of the mean from the known value and the standard error of the mean values. The deviation of the mean from the known value is calculated by subtracting the known value from the average of the laboratory's three results. The standard error of the mean is calculated by dividing the expected precision by the square root of 3(the number of results). The normalized deviation of the mean from the known value is calculated by dividing the deviation of the mean from the known value by the standard error of the mean.

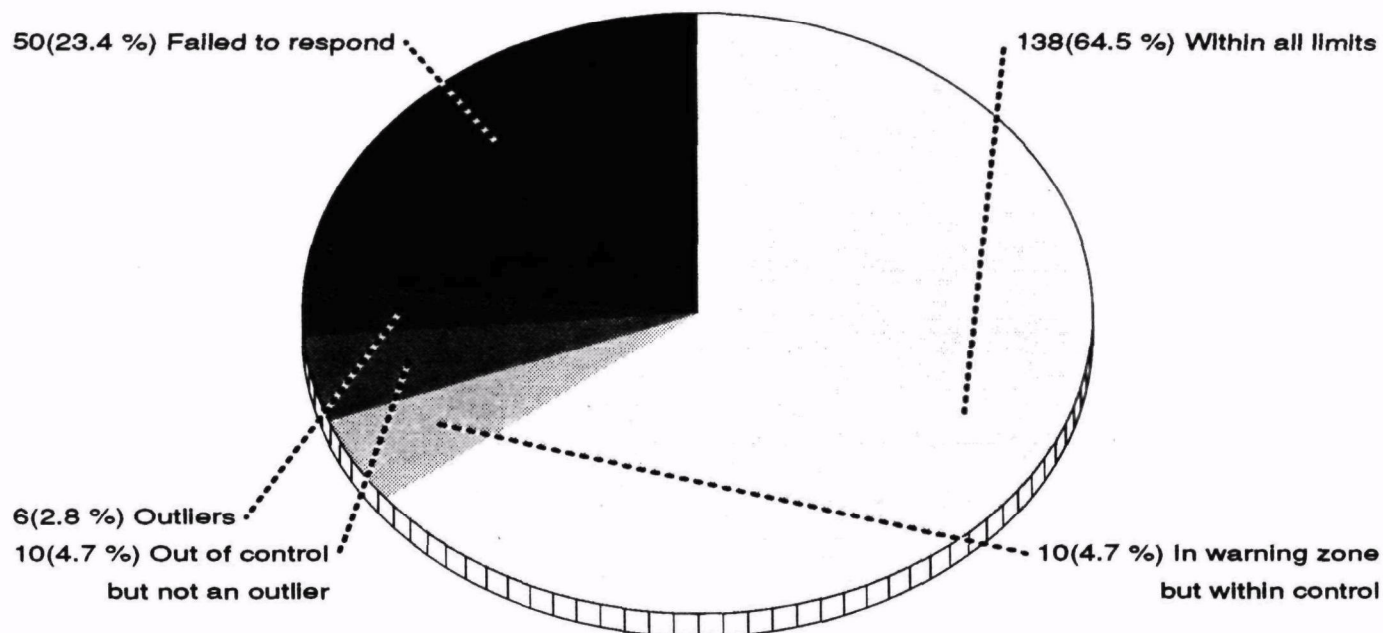
A complete explanation of the statistical calculations involved in the report may be found in the Environmental Radioactivity Performance Evaluation Studies Program information brochure [Draft Revision of EPA-600/4-81-004], available from George Dilbeck, EMSL-LV, 702/798-2104.

**Alpha**

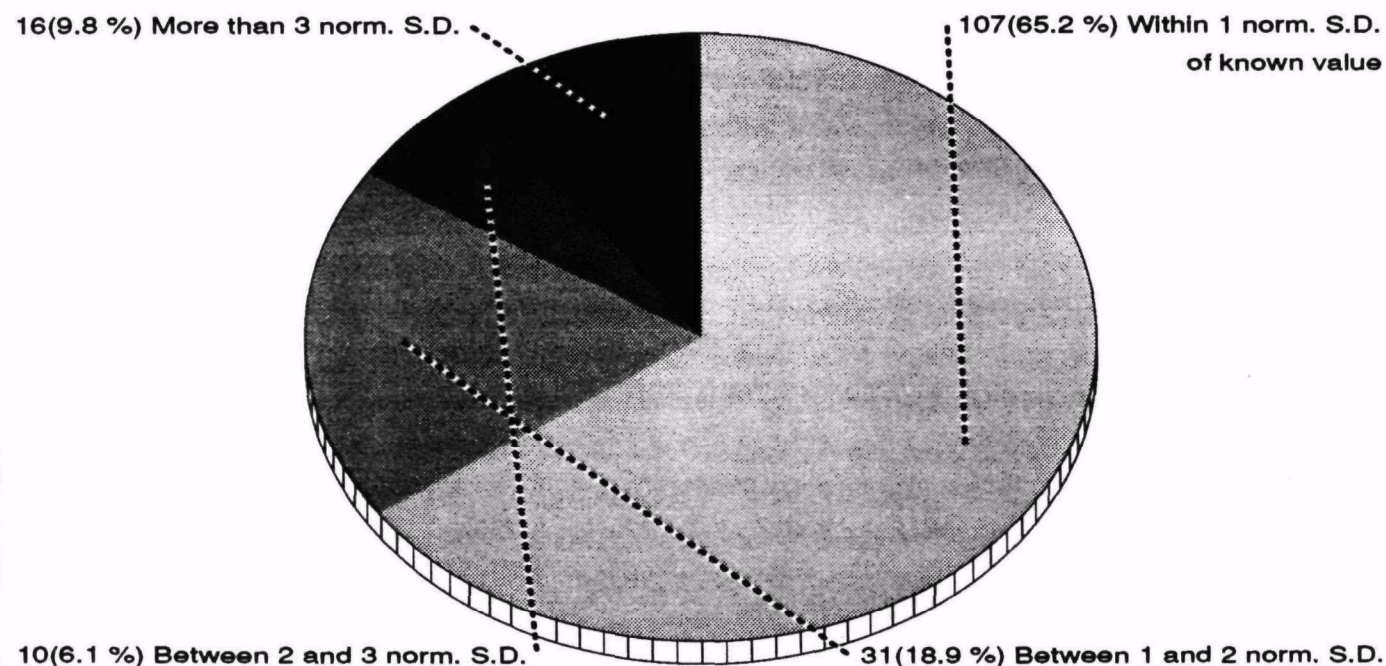
**Statistical Summary**

214 Participants

The known value of this nuclide is **35.0 pCi/F** with an expected precision of **9.0**; the control limits are 19.4 to 50.6; the warning regions are 19.4 to 24.6 and 45.4 to 50.6



| Statistic                              | Respondents | Non-outliers           |
|----------------------------------------|-------------|------------------------|
| Mean                                   | 39.50       | <b>Grand Avg 36.89</b> |
| Std. Dev.                              | 17.30       | 6.62                   |
| Variance                               | 299.45      | 43.78                  |
| % Coef. of Var.                        | 43.81       | 17.94                  |
| % deviation of mean from known value   | 12.85       | 5.40                   |
| Norm. dev. of mean from known value    | 0.26        | 0.29                   |
| Median                                 | 36.00       | 36.00                  |
| % deviation of median from known value | 2.86        | 2.86                   |
| Norm. dev. of median from known value  | 0.06        | 0.15                   |



**Alpha**

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| A   | 42.0   | 40.0   | 38.0   | 2.00            | 0.263                | 40.00   | 0.60                                        | 0.96  |     |
| AA  | 33.0   | 34.0   | 33.0   | 0.58            | 0.066                | 33.33   | -0.68                                       | -0.32 |     |
| AE  | 56.0   | 51.0   | 52.0   | 2.65            | 0.328                | 53.00   | 3.10                                        | 3.46  | ↑   |
| AF  | 38.0   | 32.0   | 39.0   | 3.79            | 0.459                | 36.33   | -0.11                                       | 0.26  |     |
| AI  |        |        |        |                 |                      |         |                                             |       | •   |
| AJ  | 34.0   | 30.0   | 34.0   | 2.31            | 0.263                | 32.67   | -0.81                                       | -0.45 |     |
| AK  | 36.0   | 35.0   | 36.0   | 0.58            | 0.066                | 35.67   | -0.24                                       | 0.13  |     |
| AL  | 24.0   | 27.0   | 23.0   | 2.08            | 0.263                | 24.67   | -2.35                                       | -1.99 |     |
| AN  | 45.0   | 47.0   | 44.0   | 1.53            | 0.197                | 45.33   | 1.62                                        | 1.99  |     |
| AP  | 31.0   | 32.0   | 32.0   | 0.58            | 0.066                | 31.67   | -1.01                                       | -0.64 |     |
| AU  | 38.0   | 42.0   | 39.0   | 2.08            | 0.263                | 39.67   | 0.53                                        | 0.90  |     |
| AZ  | 37.0   | 29.0   | 36.0   | 4.36            | 0.525                | 34.00   | -0.56                                       | -0.19 |     |
| BA  | 37.0   | 35.0   | 39.0   | 2.00            | 0.263                | 37.00   | 0.02                                        | 0.38  |     |
| BC  | 34.0   | 39.0   | 35.0   | 2.65            | 0.328                | 36.00   | -0.17                                       | 0.19  |     |
| BG  | 37.0   | 38.0   | 40.0   | 1.53            | 0.197                | 38.33   | 0.28                                        | 0.64  |     |
| BH  | 35.0   | 34.0   | 37.0   | 1.53            | 0.197                | 35.33   | -0.30                                       | 0.06  |     |
| BI  | 44.0   | 41.0   | 41.0   | 1.73            | 0.197                | 42.00   | 0.98                                        | 1.35  |     |
| BK  | 34.0   | 35.0   | 37.0   | 1.53            | 0.197                | 35.33   | -0.30                                       | 0.06  |     |
| BL  | 31.0   | 32.0   | 31.0   | 0.58            | 0.066                | 31.33   | -1.07                                       | -0.71 |     |
| BM  | 38.0   | 35.0   | 39.0   | 2.08            | 0.263                | 37.33   | 0.09                                        | 0.45  |     |
| BO  | 31.0   | 30.0   | 29.0   | 1.00            | 0.131                | 30.00   | -1.33                                       | -0.96 |     |
| BW  |        |        |        |                 |                      |         |                                             |       | •   |
| C   | 33.0   | 30.0   | 37.0   | 3.51            | 0.459                | 33.33   | -0.68                                       | -0.32 |     |
| CA  | 30.0   | 30.0   | 28.0   | 1.15            | 0.131                | 29.33   | -1.45                                       | -1.09 |     |
| CC  | 31.0   | 30.0   | 33.0   | 1.53            | 0.197                | 31.33   | -1.07                                       | -0.71 |     |
| CE  | 37.0   | 34.0   | 34.0   | 1.73            | 0.197                | 35.00   | -0.36                                       | 0.00  |     |
| CJ  | 32.0   | 33.0   | 29.0   | 2.08            | 0.263                | 31.33   | -1.07                                       | -0.71 |     |
| CM  | 51.0   | 48.0   | 55.0   | 3.51            | 0.459                | 51.33   | 2.78                                        | 3.14  | ↑   |
| CO  | 43.0   | 38.0   | 40.0   | 2.52            | 0.328                | 40.33   | 0.66                                        | 1.03  |     |
| CP  | 38.0   | 38.0   | 40.0   | 1.15            | 0.131                | 38.67   | 0.34                                        | 0.71  |     |
| CQ  | 37.0   | 38.0   | 42.0   | 2.65            | 0.328                | 39.00   | 0.41                                        | 0.77  |     |
| CS  |        |        |        |                 |                      |         |                                             |       | •   |
| CX  | 53.0   | 50.0   | 51.0   | 1.53            | 0.197                | 51.33   | 2.78                                        | 3.14  | ↑   |
| D   | 36.0   | 40.0   | 28.0   | 6.11            | 0.788                | 34.67   | -0.43                                       | -0.06 |     |
| DD  | 36.0   | 35.0   | 35.0   | 0.58            | 0.066                | 35.33   | -0.30                                       | 0.06  |     |
| DE  | 34.0   | 34.0   | 34.0   | 0.00            | 0.000                | 34.00   | -0.56                                       | -0.19 |     |
| DG  | 36.0   | 38.0   | 35.0   | 1.53            | 0.197                | 36.33   | -0.11                                       | 0.26  |     |
| DH  | 42.0   | 41.0   | 40.0   | 1.00            | 0.131                | 41.00   | 0.79                                        | 1.15  |     |
| DI  | 32.0   | 34.0   | 35.0   | 1.53            | 0.197                | 33.67   | -0.62                                       | -0.26 |     |
| DJ  | 67.0   | 60.0   | 69.0   | 4.73            | 0.591                | 65.33   | 5.47                                        | 5.84  | ×   |
| DL  |        |        |        |                 |                      |         |                                             |       | •   |
| DM  |        |        |        |                 |                      |         |                                             |       | •   |
| DO  | 43.0   | 35.0   | 41.0   | 4.16            | 0.525                | 39.67   | 0.53                                        | 0.90  |     |
| DP  |        |        |        |                 |                      |         |                                             |       | •   |
| DT  | 33.0   | 33.0   | 33.0   | 0.00            | 0.000                | 33.00   | -0.75                                       | -0.38 |     |

• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

**Alpha**

| Lab       | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----------|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| <b>DX</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>E</b>  | 33.0   | 31.0   | 32.0   | 1.00            | 0.131                | 32.00   | -0.94                                       | -0.58 |     |
| <b>EA</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EB</b> | 30.0   | 31.0   | 31.0   | 0.58            | 0.066                | 30.67   | -1.20                                       | -0.83 |     |
| <b>EF</b> | 30.0   | 30.0   | 33.0   | 1.73            | 0.197                | 31.00   | -1.13                                       | -0.77 |     |
| <b>EH</b> | 37.0   | 37.0   | 35.0   | 1.15            | 0.131                | 36.33   | -0.11                                       | 0.26  |     |
| <b>EL</b> | 39.0   | 36.0   | 36.0   | 1.73            | 0.197                | 37.00   | 0.02                                        | 0.38  |     |
| <b>EW</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EX</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EZ</b> | 30.0   | 31.0   | 31.0   | 0.58            | 0.066                | 30.67   | -1.20                                       | -0.83 |     |
| <b>FE</b> | 35.0   | 35.0   | 37.0   | 1.15            | 0.131                | 35.67   | -0.24                                       | 0.13  |     |
| <b>FJ</b> | 52.0   | 56.0   | 48.0   | 4.00            | 0.525                | 52.00   | 2.91                                        | 3.27  | ↑   |
| <b>FK</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>FL</b> | 37.0   | 36.0   | 35.0   | 1.00            | 0.131                | 36.00   | -0.17                                       | 0.19  |     |
| <b>FO</b> | 41.0   | 41.0   | 46.0   | 2.89            | 0.328                | 42.67   | 1.11                                        | 1.48  |     |
| <b>FZ</b> | 27.0   | 29.0   | 28.0   | 1.00            | 0.131                | 28.00   | -1.71                                       | -1.35 |     |
| <b>GE</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>GI</b> | 49.0   | 50.0   | 53.0   | 2.08            | 0.263                | 50.67   | 2.65                                        | 3.02  | ↑   |
| <b>GQ</b> | 41.0   | 42.0   | 43.0   | 1.00            | 0.131                | 42.00   | 0.98                                        | 1.35  |     |
| <b>HE</b> | 35.0   | 37.0   | 35.0   | 1.15            | 0.131                | 35.67   | -0.24                                       | 0.13  |     |
| <b>HI</b> | 47.0   | 50.0   | 46.0   | 2.08            | 0.263                | 47.67   | 2.07                                        | 2.44  |     |
| <b>HL</b> | 56.0   | 52.0   | 57.0   | 2.65            | 0.328                | 55.00   | 3.49                                        | 3.85  | ↑   |
| <b>HP</b> | 126.0  | 140.0  | 149.0  | 11.59           | 1.970                | 138.33  | 19.52                                       | 19.89 | ×   |
| <b>HU</b> | 75.0   | 79.0   | 86.0   | 5.57            | 0.722                | 80.00   | 8.30                                        | 8.66  | ×   |
| <b>HX</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>I</b>  | 37.0   | 36.0   | 37.0   | 0.58            | 0.066                | 36.67   | -0.04                                       | 0.32  |     |
| <b>IA</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>IC</b> | 36.0   | 42.0   | 40.0   | 3.06            | 0.394                | 39.33   | 0.47                                        | 0.83  |     |
| <b>IE</b> | 31.0   | 32.0   | 28.0   | 2.08            | 0.263                | 30.33   | -1.26                                       | -0.90 |     |
| <b>II</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>IU</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>IY</b> | 38.0   | 39.0   | 42.0   | 2.08            | 0.263                | 39.67   | 0.53                                        | 0.90  |     |
| <b>J</b>  | 35.0   | 34.0   | 34.0   | 0.58            | 0.066                | 34.33   | -0.49                                       | -0.13 |     |
| <b>JE</b> | 49.0   | 50.0   | 49.0   | 0.58            | 0.066                | 49.33   | 2.39                                        | 2.76  |     |
| <b>JI</b> | 28.0   | 29.0   | 31.0   | 1.53            | 0.197                | 29.33   | -1.45                                       | -1.09 |     |
| <b>JS</b> | 41.0   | 42.0   | 38.0   | 2.08            | 0.263                | 40.33   | 0.66                                        | 1.03  |     |
| <b>JY</b> | 35.0   | 35.0   | 34.0   | 0.58            | 0.066                | 34.67   | -0.43                                       | -0.06 |     |
| <b>K</b>  | 39.0   | 34.0   | 35.0   | 2.65            | 0.328                | 36.00   | -0.17                                       | 0.19  |     |
| <b>KF</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>KH</b> | 30.0   | 29.0   | 31.0   | 1.00            | 0.131                | 30.00   | -1.33                                       | -0.96 |     |
| <b>KL</b> | 36.0   | 38.0   | 37.0   | 1.00            | 0.131                | 37.00   | 0.02                                        | 0.38  |     |
| <b>KM</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>KX</b> | 38.0   | 40.0   | 40.0   | 1.15            | 0.131                | 39.33   | 0.47                                        | 0.83  |     |
| <b>L</b>  | 32.0   | 34.0   | 31.0   | 1.53            | 0.197                | 32.33   | -0.88                                       | -0.51 |     |
| <b>LA</b> |        |        |        |                 |                      |         |                                             |       | •   |

• ≡ No data submitted

**TAG SYMBOLS**

↑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

↓ ≡ Below control limit

## Alpha

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| LE  | 42.0   | 44.0   | 41.0   | 1.53            | 0.197                | 42.33   | 1.05                                        | 1.41  |     |
| LF  | 38.0   | 39.0   | 39.0   | 0.58            | 0.066                | 38.67   | 0.34                                        | 0.71  |     |
| LM  |        |        |        |                 |                      |         |                                             |       | •   |
| LR  | 57.0   | 54.0   | 57.0   | 1.73            | 0.197                | 56.00   | 3.68                                        | 4.04  | ↑   |
| LS  | 81.0   | 70.0   | 81.0   | 6.35            | 0.722                | 77.33   | 7.78                                        | 8.15  | ×   |
| LT  | 37.0   | 35.0   | 37.0   | 1.15            | 0.131                | 36.33   | -0.11                                       | 0.26  |     |
| LZ  | 34.0   | 36.0   | 39.0   | 2.52            | 0.328                | 36.33   | -0.11                                       | 0.26  |     |
| M   | 33.0   | 33.0   | 34.0   | 0.58            | 0.066                | 33.33   | -0.68                                       | -0.32 |     |
| MA  | 38.0   | 43.0   | 41.0   | 2.52            | 0.328                | 40.67   | 0.73                                        | 1.09  |     |
| ML  | 40.0   | 47.0   | 42.0   | 3.61            | 0.459                | 43.00   | 1.18                                        | 1.54  |     |
| MN  |        |        |        |                 |                      |         |                                             |       | •   |
| MP  |        |        |        |                 |                      |         |                                             |       | •   |
| MQ  | 31.0   | 34.0   | 32.0   | 1.53            | 0.197                | 32.33   | -0.88                                       | -0.51 |     |
| MV  | 30.0   | 29.0   | 26.0   | 2.08            | 0.263                | 28.33   | -1.65                                       | -1.28 |     |
| N   | 33.0   | 32.0   | 34.0   | 1.00            | 0.131                | 33.00   | -0.75                                       | -0.38 |     |
| NC  |        |        |        |                 |                      |         |                                             |       | •   |
| NF  |        |        |        |                 |                      |         |                                             |       | •   |
| NH  | 36.0   | 38.0   | 35.0   | 1.53            | 0.197                | 36.33   | -0.11                                       | 0.26  |     |
| NJ  | 42.0   | 47.0   | 44.0   | 2.52            | 0.328                | 44.33   | 1.43                                        | 1.80  |     |
| NK  | 30.0   | 34.0   | 29.0   | 2.65            | 0.328                | 31.00   | -1.13                                       | -0.77 |     |
| NP  | 57.0   | 54.0   | 54.0   | 1.73            | 0.197                | 55.00   | 3.49                                        | 3.85  | ↑   |
| NT  | 33.0   | 41.0   | 33.0   | 4.62            | 0.525                | 35.67   | -0.24                                       | 0.13  |     |
| NZ  | 32.0   | 34.0   | 32.0   | 1.15            | 0.131                | 32.67   | -0.81                                       | -0.45 |     |
| O   | 35.0   | 35.0   | 38.0   | 1.73            | 0.197                | 36.00   | -0.17                                       | 0.19  |     |
| OA  | 38.0   | 33.0   | 37.0   | 2.65            | 0.328                | 36.00   | -0.17                                       | 0.19  |     |
| OB  | 31.0   | 27.0   | 30.0   | 2.08            | 0.263                | 29.33   | -1.45                                       | -1.09 |     |
| OL  |        |        |        |                 |                      |         |                                             |       | •   |
| OM  | 31.0   | 29.0   | 31.0   | 1.15            | 0.131                | 30.33   | -1.26                                       | -0.90 |     |
| OQ  |        |        |        |                 |                      |         |                                             |       | •   |
| OS  |        |        |        |                 |                      |         |                                             |       | •   |
| P   | 29.0   | 29.0   | 28.0   | 0.58            | 0.066                | 28.67   | -1.58                                       | -1.22 |     |
| PB  | 33.0   | 32.0   | 31.0   | 1.00            | 0.131                | 32.00   | -0.94                                       | -0.58 |     |
| PC  |        |        |        |                 |                      |         |                                             |       | •   |
| PI  | 50.0   | 49.0   | 51.0   | 1.00            | 0.131                | 50.00   | 2.52                                        | 2.89  |     |
| PM  | 36.0   | 35.0   | 35.0   | 0.58            | 0.066                | 35.33   | -0.30                                       | 0.06  |     |
| PP  | 36.0   | 34.0   | 29.0   | 3.61            | 0.459                | 33.00   | -0.75                                       | -0.38 |     |
| PQ  | 36.0   | 33.0   | 36.0   | 1.73            | 0.197                | 35.00   | -0.36                                       | 0.00  |     |
| PT  | 48.0   | 46.0   | 49.0   | 1.53            | 0.197                | 47.67   | 2.07                                        | 2.44  |     |
| PU  | 25.0   | 28.0   | 27.0   | 1.53            | 0.197                | 26.67   | -1.97                                       | -1.60 |     |
| PV  | 26.0   | 27.0   | 28.0   | 1.00            | 0.131                | 27.00   | -1.90                                       | -1.54 |     |
| PW  |        |        |        |                 |                      |         |                                             |       | •   |
| Q   | 40.0   | 41.0   | 40.0   | 0.58            | 0.066                | 40.33   | 0.66                                        | 1.03  |     |
| QA  | 35.0   | 35.0   | 35.0   | 0.00            | 0.000                | 35.00   | -0.36                                       | 0.00  |     |
| QB  | 32.0   | 33.0   | 32.0   | 0.58            | 0.066                | 32.33   | -0.88                                       | -0.51 |     |
| QC  | 47.0   | 44.0   | 46.0   | 1.53            | 0.197                | 45.67   | 1.69                                        | 2.05  |     |

• = No data submitted

## TAG SYMBOLS

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

## Alpha

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) Tag |         |
|-----|--------|--------|--------|-----------------|----------------------|---------|-------------------------------------------------|---------|
| QD  | 38.0   | 37.0   | 37.0   | 0.58            | 0.066                | 37.33   | 0.09                                            | 0.45    |
| QI  |        |        |        |                 |                      |         |                                                 | •       |
| QJ  | 48.0   | 34.0   | 66.0   | 16.04           | 3.096                | 49.33   | 2.39                                            | 2.76    |
| QK  |        |        |        |                 |                      |         |                                                 | •       |
| QL  |        |        |        |                 |                      |         |                                                 | •       |
| QM  | 34.0   | 32.0   | 33.0   | 1.00            | 0.131                | 33.00   | -0.75                                           | -0.38   |
| QQ  | 37.0   | 38.0   | 37.0   | 0.58            | 0.066                | 37.33   | 0.09                                            | 0.45    |
| QU  | 33.0   | 34.0   | 35.0   | 1.00            | 0.131                | 34.00   | -0.56                                           | -0.19   |
| QW  | 34.0   | 34.0   | 34.0   | 0.00            | 0.000                | 34.00   | -0.56                                           | -0.19   |
| QX  | 35.0   | 35.0   | 33.0   | 1.15            | 0.131                | 34.33   | -0.49                                           | -0.13   |
| QZ  | 35.0   | 41.0   | 34.0   | 3.79            | 0.459                | 36.67   | -0.04                                           | 0.32    |
| R   | 37.0   | 37.0   | 37.0   | 0.00            | 0.000                | 37.00   | 0.02                                            | 0.38    |
| RA  |        |        |        |                 |                      |         |                                                 | •       |
| RC  | 39.0   | 33.0   | 33.0   | 3.46            | 0.394                | 35.00   | -0.36                                           | 0.00    |
| RG  | 48.0   | 44.0   | 46.0   | 2.00            | 0.263                | 46.00   | 1.75                                            | 2.12    |
| RH  | 31.0   | 32.0   | 31.0   | 0.58            | 0.066                | 31.33   | -1.07                                           | -0.71   |
| RJ  | 33.0   | 33.0   | 34.0   | 0.58            | 0.066                | 33.33   | -0.68                                           | -0.32   |
| RK  |        |        |        |                 |                      |         |                                                 | •       |
| RO  | 32.0   | 34.0   | 32.0   | 1.15            | 0.131                | 32.67   | -0.81                                           | -0.45   |
| RQ  | 19.0   | 22.0   | 20.0   | 1.53            | 0.197                | 20.33   | -3.19                                           | -2.82   |
| RU  | 38.0   | 36.0   | 36.0   | 1.15            | 0.131                | 36.67   | -0.04                                           | 0.32    |
| RV  | 46.0   | 49.0   | 46.0   | 1.73            | 0.197                | 47.00   | 1.95                                            | 2.31    |
| RW  | 44.0   | 38.0   | 38.0   | 3.46            | 0.394                | 40.00   | 0.60                                            | 0.96    |
| S   | 32.0   | 33.0   | 33.0   | 0.58            | 0.066                | 32.67   | -0.81                                           | -0.45   |
| SC  | 48.0   | 48.0   | 47.0   | 0.58            | 0.066                | 47.67   | 2.07                                            | 2.44    |
| SD  | 37.0   | 37.0   | 40.0   | 1.73            | 0.197                | 38.00   | 0.21                                            | 0.58    |
| SF  |        |        |        |                 |                      |         |                                                 | •       |
| SI  | 44.0   | 44.0   | 44.0   | 0.00            | 0.000                | 44.00   | 1.37                                            | 1.73    |
| SM  | 36.0   | 35.0   | 42.0   | 3.79            | 0.459                | 37.67   | 0.15                                            | 0.51    |
| SP  | 38.0   | 41.0   | 41.0   | 1.73            | 0.197                | 40.00   | 0.60                                            | 0.96    |
| SQ  |        |        |        |                 |                      |         |                                                 | •       |
| SR  | 38.0   | 44.0   | 43.0   | 3.21            | 0.394                | 41.67   | 0.92                                            | 1.28    |
| SS  | 48.0   | 54.0   | 57.0   | 4.58            | 0.591                | 53.00   | 3.10                                            | 3.46 ↑  |
| SW  | 35.0   | 36.0   | 35.0   | 0.58            | 0.066                | 35.33   | -0.30                                           | 0.06    |
| SX  | 43.0   | 40.0   | 42.0   | 1.53            | 0.197                | 41.67   | 0.92                                            | 1.28    |
| SZ  | 37.0   | 35.0   | 39.0   | 2.00            | 0.263                | 37.00   | 0.02                                            | 0.38    |
| T   | 34.0   | 33.0   | 37.0   | 2.08            | 0.263                | 34.67   | -0.43                                           | -0.06   |
| TA  | 35.0   | 36.0   | 39.0   | 2.08            | 0.263                | 36.67   | -0.04                                           | 0.32    |
| TB  | 34.0   | 35.0   | 35.0   | 0.58            | 0.066                | 34.67   | -0.43                                           | -0.06   |
| TD  | 37.0   | 38.0   | 36.0   | 1.00            | 0.131                | 37.00   | 0.02                                            | 0.38    |
| TE  | 32.0   | 32.0   | 33.0   | 0.58            | 0.066                | 32.33   | -0.88                                           | -0.51   |
| TH  | 33.0   | 35.0   | 34.0   | 1.00            | 0.131                | 34.00   | -0.56                                           | -0.19   |
| TI  | 36.0   | 34.0   | 34.0   | 1.15            | 0.131                | 34.67   | -0.43                                           | -0.06   |
| TL  | 34.0   | 35.0   | 33.0   | 1.00            | 0.131                | 34.00   | -0.56                                           | -0.19   |
| TP  | 16.0   | 15.0   | 15.0   | 0.58            | 0.066                | 15.33   | -4.15                                           | -3.78 ↓ |

• = No data submitted

## TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

**Alpha**

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) Tag |       |
|-----|--------|--------|--------|-----------------|----------------------|---------|-------------------------------------------------|-------|
| TQ  | 46.0   | 46.0   | 40.0   | 3.46            | 0.394                | 44.00   | 1.37                                            | 1.73  |
| TR  |        |        |        |                 |                      |         |                                                 | •     |
| TS  |        |        |        |                 |                      |         |                                                 | •     |
| TT  |        |        |        |                 |                      |         |                                                 | •     |
| TU  | 31.0   | 30.0   | 28.0   | 1.53            | 0.197                | 29.67   | -1.39                                           | -1.03 |
| TV  |        |        |        |                 |                      |         |                                                 | •     |
| TW  | 102.0  | 82.0   | 89.0   | 10.15           | 1.595                | 91.00   | 10.41                                           | 10.78 |
| UB  |        |        |        |                 |                      |         |                                                 | •     |
| UE  |        |        |        |                 |                      |         |                                                 | •     |
| UJ  | 41.0   | 44.0   | 41.0   | 1.73            | 0.197                | 42.00   | 0.98                                            | 1.35  |
| UK  | 36.0   | 33.0   | 41.0   | 4.04            | 0.525                | 36.67   | -0.04                                           | 0.32  |
| UV  |        |        |        |                 |                      |         |                                                 | •     |
| UX  | 46.0   | 43.0   | 43.0   | 1.73            | 0.197                | 44.00   | 1.37                                            | 1.73  |
| UY  |        |        |        |                 |                      |         |                                                 | •     |
| UZ  | 35.0   | 31.0   | 30.0   | 2.65            | 0.328                | 32.00   | -0.94                                           | -0.58 |
| VA  | 38.0   | 33.0   | 37.0   | 2.65            | 0.328                | 36.00   | -0.17                                           | 0.19  |
| VB  | 33.0   | 33.0   | 37.0   | 2.31            | 0.263                | 34.33   | -0.49                                           | -0.13 |
| VC  | 30.0   | 30.0   | 30.0   | 0.00            | 0.000                | 30.00   | -1.33                                           | -0.96 |
| VE  |        |        |        |                 |                      |         |                                                 | •     |
| VF  | 200.0  | 188.0  | 202.0  | 7.57            | 0.919                | 196.67  | 30.75                                           | 31.11 |
| VG  | 31.0   | 27.0   | 26.0   | 2.65            | 0.328                | 28.00   | -1.71                                           | -1.35 |
| VH  | 38.0   | 40.0   | 39.0   | 1.00            | 0.131                | 39.00   | 0.41                                            | 0.77  |
| VI  |        |        |        |                 |                      |         |                                                 | •     |
| VK  |        |        |        |                 |                      |         |                                                 | •     |
| VL  |        |        |        |                 |                      |         |                                                 | •     |
| VM  | 31.0   | 29.0   | 36.0   | 3.61            | 0.459                | 32.00   | -0.94                                           | -0.58 |
| VO  | 32.0   | 30.0   | 31.0   | 1.00            | 0.131                | 31.00   | -1.13                                           | -0.77 |
| VP  | 40.0   | 37.0   | 39.0   | 1.53            | 0.197                | 38.67   | 0.34                                            | 0.71  |
| VQ  |        |        |        |                 |                      |         |                                                 | •     |
| VT  | 34.0   | 34.0   | 34.0   | 0.00            | 0.000                | 34.00   | -0.56                                           | -0.19 |
| WB  |        |        |        |                 |                      |         |                                                 | •     |
| X   | 32.0   | 33.0   | 32.0   | 0.58            | 0.066                | 32.33   | -0.88                                           | -0.51 |
| Y   | 40.0   | 40.0   | 41.0   | 0.58            | 0.066                | 40.33   | 0.66                                            | 1.03  |
| Z   | 41.0   | 44.0   | 42.0   | 1.53            | 0.197                | 42.33   | 1.05                                            | 1.41  |

**Data sorted by Laboratory Average**

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 15.33   | ↓   | TP  | 28.67   |     | P   | 30.33   |     | OM  |
| 20.33   |     | RQ  | 29.33   |     | OB  | 30.33   |     | IE  |
| 24.67   |     | AL  | 29.33   |     | JI  | 30.67   |     | EZ  |
| 26.67   |     | PU  | 29.33   |     | CA  | 30.67   |     | EB  |
| 27.00   |     | PV  | 29.67   |     | TU  | 31.00   |     | VO  |
| 28.00   |     | VG  | 30.00   |     | VC  | 31.00   |     | NK  |
| 28.00   |     | FZ  | 30.00   |     | KH  | 31.00   |     | EF  |
| 28.33   |     | MV  | 30.00   |     | BO  | 31.33   |     | RH  |

• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

**Alpha****Data sorted by Laboratory Average**

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 31.33   |     | CJ  | 35.00   |     | CE  | 39.33   |     | KX  |
| 31.33   |     | CC  | 35.33   |     | SW  | 39.33   |     | IC  |
| 31.33   |     | BL  | 35.33   |     | PM  | 39.67   |     | IY  |
| 31.67   |     | AP  | 35.33   |     | DD  | 39.67   |     | DO  |
| 32.00   |     | VM  | 35.33   |     | BK  | 39.67   |     | AU  |
| 32.00   |     | UZ  | 35.33   |     | BH  | 40.00   |     | SP  |
| 32.00   |     | PB  | 35.67   |     | NT  | 40.00   |     | RW  |
| 32.00   |     | E   | 35.67   |     | HE  | 40.00   |     | A   |
| 32.33   |     | X   | 35.67   |     | FE  | 40.33   |     | Y   |
| 32.33   |     | TE  | 35.67   |     | AK  | 40.33   |     | Q   |
| 32.33   |     | QB  | 36.00   |     | VA  | 40.33   |     | JS  |
| 32.33   |     | MQ  | 36.00   |     | OA  | 40.33   |     | CO  |
| 32.33   |     | L   | 36.00   |     | O   | 40.67   |     | MA  |
| 32.67   |     | S   | 36.00   |     | K   | 41.00   |     | DH  |
| 32.67   |     | RO  | 36.00   |     | FL  | 41.67   |     | SX  |
| 32.67   |     | NZ  | 36.00   |     | BC  | 41.67   |     | SR  |
| 32.67   |     | AJ  | 36.33   |     | NH  | 42.00   |     | UJ  |
| 33.00   |     | QM  | 36.33   |     | LZ  | 42.00   |     | GQ  |
| 33.00   |     | PP  | 36.33   |     | LT  | 42.00   |     | BI  |
| 33.00   |     | N   | 36.33   |     | EH  | 42.33   |     | Z   |
| 33.00   |     | DT  | 36.33   |     | DG  | 42.33   |     | LE  |
| 33.33   |     | RJ  | 36.33   |     | AF  | 42.67   |     | FO  |
| 33.33   |     | M   | 36.67   |     | UK  | 43.00   |     | ML  |
| 33.33   |     | C   | 36.67   |     | TA  | 44.00   |     | UX  |
| 33.33   |     | AA  | 36.67   |     | RU  | 44.00   |     | TQ  |
| 33.67   |     | DI  | 36.67   |     | QZ  | 44.00   |     | SI  |
| 34.00   |     | VT  | 36.67   |     | I   | 44.33   |     | NJ  |
| 34.00   |     | TL  | 37.00   |     | TD  | 45.33   |     | AN  |
| 34.00   |     | TH  | 37.00   |     | SZ  | 45.67   |     | QC  |
| 34.00   |     | QW  | 37.00   |     | R   | 46.00   |     | RG  |
| 34.00   |     | QU  | 37.00   |     | KL  | 47.00   |     | RV  |
| 34.00   |     | DE  | 37.00   |     | EL  | 47.67   |     | SC  |
| 34.00   |     | AZ  | 37.00   |     | BA  | 47.67   |     | PT  |
| 34.33   |     | VB  | 37.33   |     | QQ  | 47.67   |     | HI  |
| 34.33   |     | QX  | 37.33   |     | QD  | 49.33   |     | QJ  |
| 34.33   |     | J   | 37.33   |     | BM  | 49.33   |     | JE  |
| 34.67   |     | TI  | 37.67   |     | SM  | 50.00   |     | PI  |
| 34.67   |     | TB  | 38.00   |     | SD  | 50.67   | ↑↑  | GI  |
| 34.67   |     | T   | 38.33   |     | BG  | 51.33   | ↑↑  | CX  |
| 34.67   |     | JY  | 38.67   |     | VP  | 51.33   | ↑↑  | CM  |
| 34.67   |     | D   | 38.67   |     | LF  | 52.00   | ↑↑  | FJ  |
| 35.00   |     | RC  | 38.67   |     | CP  | 53.00   | ↑↑  | SS  |
| 35.00   |     | QA  | 39.00   |     | VH  | 53.00   | ↑↑  | AE  |
| 35.00   |     | PQ  | 39.00   |     | CQ  | 55.00   | ↑↑  | NP  |

• = No data submitted

**TAG SYMBOLS**

↑↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓↓ = Below control limit

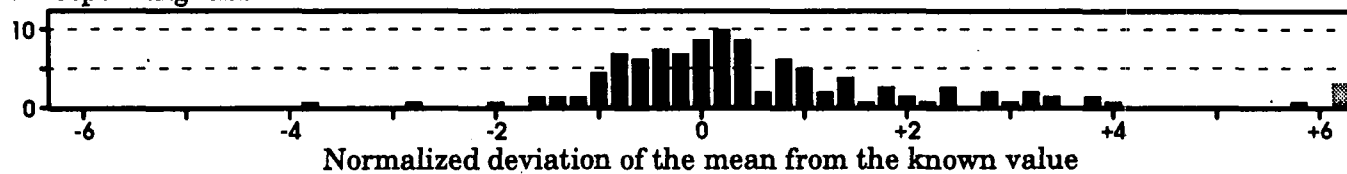
## Alpha

## Data sorted by Laboratory Average

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 55.00   | ↑↑  | HL  | 65.33   | ×   | DJ  | 91.00   | ×   | TW  |
| 56.00   | ↑↑  | LR  | 77.33   | ×   | LS  | 138.33  | ×   | HP  |
|         |     |     | 80.00   | ×   | HU  | 196.67  | ×   | VF  |

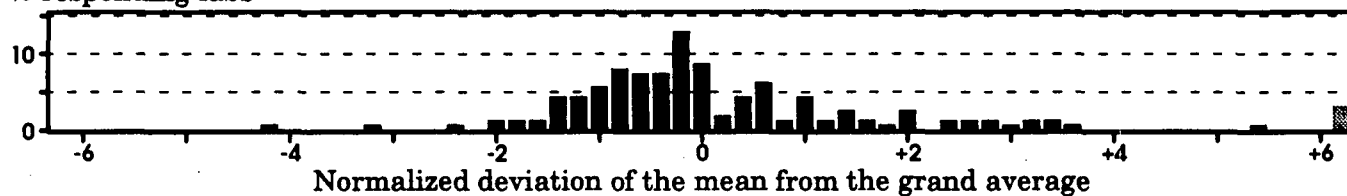
% responding labs

Frequency distribution



% responding labs

Frequency distribution



• ≡ No data submitted

## TAG SYMBOLS

↑↑ ≡ Above control limit

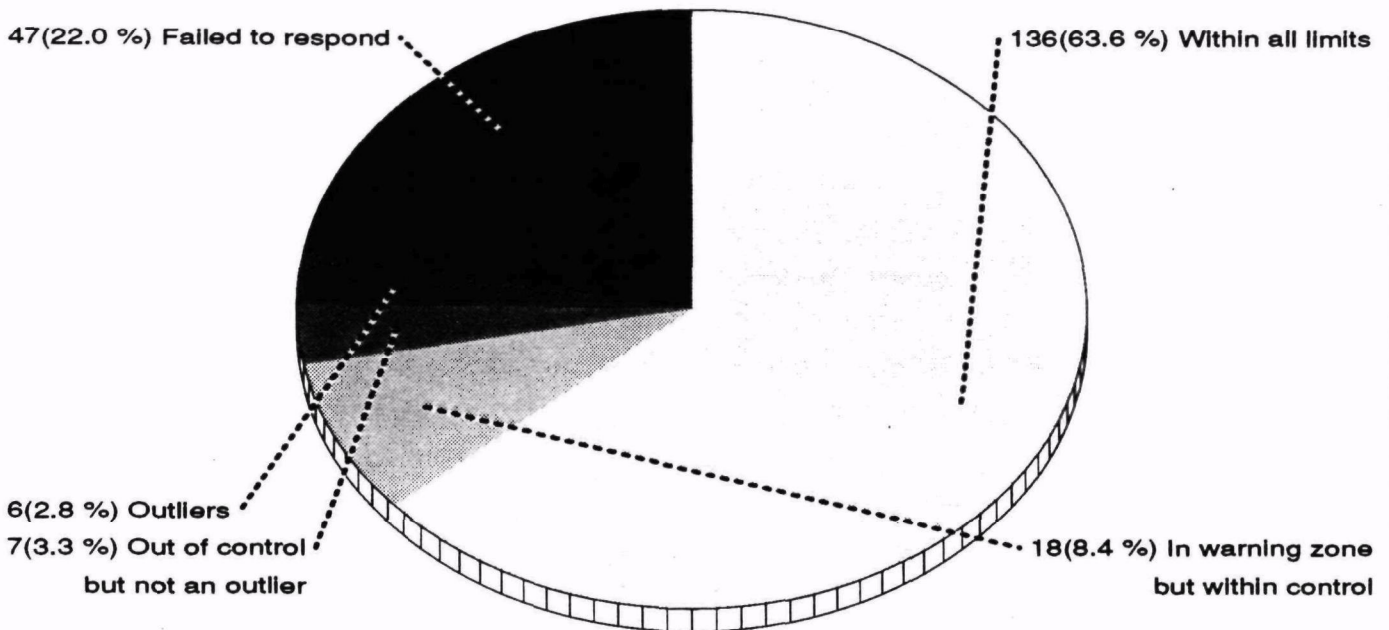
∅ ≡ Insufficient data

× ≡ Determined to be an outlier

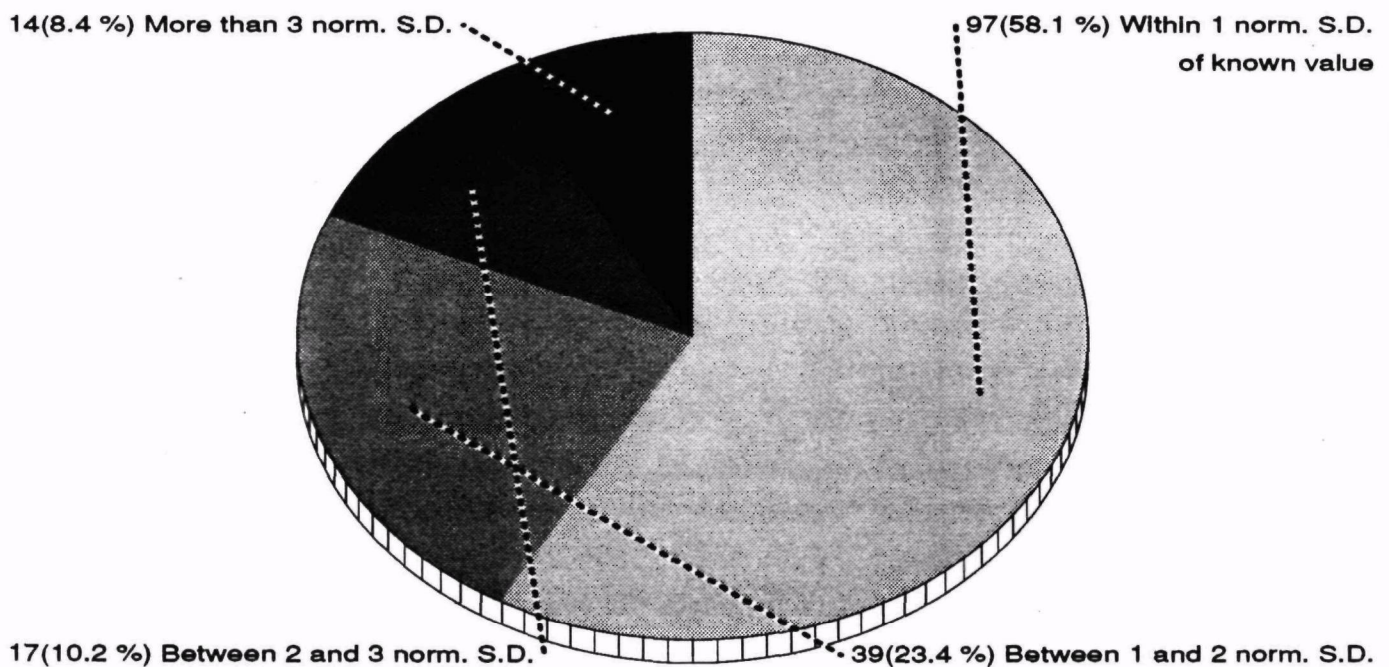
↓↓ ≡ Below control limit

**Beta****Statistical Summary****214 Participants**

The known value of this nuclide is **56.0 pCi/F** with an expected precision of **10.0**; the control limits are 38.7 to 73.3; the warning regions are 38.7 to 44.4 and 67.6 to 73.3



| Statistic                              | Respondents | Non-outliers           |
|----------------------------------------|-------------|------------------------|
| Mean                                   | 60.65       | <b>Grand Avg 59.08</b> |
| Std. Dev.                              | 14.97       | 7.23                   |
| Variance                               | 224.13      | 52.21                  |
| % Coef. of Var.                        | 24.68       | 12.23                  |
| % deviation of mean from known value   | 8.30        | 5.50                   |
| Norm. dev. of mean from known value    | 0.31        | 0.43                   |
| Median                                 | 58.33       | 58.33                  |
| % deviation of median from known value | 4.17        | 4.17                   |
| Norm. dev. of median from known value  | 0.16        | 0.32                   |





| Beta      |        |        |        |              |                   |         |                                              |        |
|-----------|--------|--------|--------|--------------|-------------------|---------|----------------------------------------------|--------|
| Lab       | Res. 1 | Res. 2 | Res. 3 | Exper. Sigma | Rng anal (R + SR) | Average | Normalized deviation (grand-avg) (known) Tag |        |
| <b>DX</b> |        |        |        |              |                   |         |                                              | •      |
| <b>E</b>  | 64.0   | 63.0   | 63.0   | 0.58         | 0.059             | 63.33   | 0.74                                         | 1.27   |
| <b>EA</b> |        |        |        |              |                   |         |                                              | •      |
| <b>EB</b> | 65.0   | 65.0   | 63.0   | 1.15         | 0.118             | 64.33   | 0.91                                         | 1.44   |
| <b>EF</b> | 52.0   | 56.0   | 39.0   | 8.89         | 1.008             | 49.00   | -1.75                                        | -1.21  |
| <b>EH</b> | 61.0   | 59.0   | 61.0   | 1.15         | 0.118             | 60.33   | 0.22                                         | 0.75   |
| <b>EL</b> | 54.0   | 54.0   | 53.0   | 0.58         | 0.059             | 53.67   | -0.94                                        | -0.40  |
| <b>EW</b> | 62.0   | 62.0   | 61.0   | 0.58         | 0.059             | 61.67   | 0.45                                         | 0.98   |
| <b>EX</b> | 68.0   | 66.0   | 69.0   | 1.53         | 0.177             | 67.67   | 1.49                                         | 2.02   |
| <b>EZ</b> | 48.0   | 57.0   | 54.0   | 4.58         | 0.532             | 53.00   | -1.05                                        | -0.52  |
| <b>FE</b> | 58.0   | 58.0   | 58.0   | 0.00         | 0.000             | 58.00   | -0.19                                        | 0.35   |
| <b>FJ</b> | 58.0   | 58.0   | 55.0   | 1.73         | 0.177             | 57.00   | -0.36                                        | 0.17   |
| <b>FK</b> |        |        |        |              |                   |         |                                              | •      |
| <b>FL</b> | 80.0   | 78.0   | 78.0   | 1.15         | 0.118             | 78.67   | 3.39                                         | 3.93 ↑ |
| <b>FO</b> |        |        |        |              |                   |         |                                              | •      |
| <b>FZ</b> | 50.0   | 49.0   | 50.0   | 0.58         | 0.059             | 49.67   | -1.63                                        | -1.10  |
| <b>GE</b> | 58.0   | 59.0   | 60.0   | 1.00         | 0.118             | 59.00   | -0.01                                        | 0.52   |
| <b>GI</b> |        |        |        |              |                   |         |                                              | •      |
| <b>GQ</b> | 48.0   | 50.0   | 47.0   | 1.53         | 0.177             | 48.33   | -1.86                                        | -1.33  |
| <b>HE</b> | 70.0   | 69.0   | 68.0   | 1.00         | 0.118             | 69.00   | 1.72                                         | 2.25   |
| <b>HI</b> | 53.0   | 55.0   | 52.0   | 1.53         | 0.177             | 53.33   | -1.00                                        | -0.46  |
| <b>HL</b> | 70.0   | 70.0   | 72.0   | 1.15         | 0.118             | 70.67   | 2.01                                         | 2.54   |
| <b>HP</b> | 82.0   | 91.0   | 87.0   | 4.51         | 0.532             | 86.67   | 4.78                                         | 5.31 × |
| <b>HU</b> | 105.0  | 104.0  | 111.0  | 3.79         | 0.413             | 106.67  | 8.24                                         | 8.78 × |
| <b>HX</b> |        |        |        |              |                   |         |                                              | •      |
| <b>I</b>  | 60.0   | 60.0   | 60.0   | 0.00         | 0.000             | 60.00   | 0.16                                         | 0.69   |
| <b>IA</b> |        |        |        |              |                   |         |                                              | •      |
| <b>IC</b> | 63.0   | 65.0   | 64.0   | 1.00         | 0.118             | 64.00   | 0.85                                         | 1.39   |
| <b>IE</b> | 67.0   | 64.0   | 60.0   | 3.51         | 0.413             | 63.67   | 0.79                                         | 1.33   |
| <b>II</b> |        |        |        |              |                   |         |                                              | •      |
| <b>IU</b> | 57.0   | 57.0   | 59.0   | 1.15         | 0.118             | 57.67   | -0.24                                        | 0.29   |
| <b>IY</b> | 65.0   | 68.0   | 70.0   | 2.52         | 0.295             | 67.67   | 1.49                                         | 2.02   |
| <b>J</b>  | 59.0   | 60.0   | 60.0   | 0.58         | 0.059             | 59.67   | 0.10                                         | 0.64   |
| <b>JE</b> | 76.0   | 77.0   | 77.0   | 0.58         | 0.059             | 76.67   | 3.05                                         | 3.58 ↑ |
| <b>JI</b> | 51.0   | 52.0   | 51.0   | 0.58         | 0.059             | 51.33   | -1.34                                        | -0.81  |
| <b>JS</b> | 65.0   | 63.0   | 62.0   | 1.53         | 0.177             | 63.33   | 0.74                                         | 1.27   |
| <b>JY</b> | 59.0   | 60.0   | 55.0   | 2.65         | 0.295             | 58.00   | -0.19                                        | 0.35   |
| <b>K</b>  | 69.0   | 66.0   | 68.0   | 1.53         | 0.177             | 67.67   | 1.49                                         | 2.02   |
| <b>KF</b> |        |        |        |              |                   |         |                                              | •      |
| <b>KH</b> | 52.0   | 53.0   | 54.0   | 1.00         | 0.118             | 53.00   | -1.05                                        | -0.52  |
| <b>KL</b> | 61.0   | 66.0   | 62.0   | 2.65         | 0.295             | 63.00   | 0.68                                         | 1.21   |
| <b>KM</b> |        |        |        |              |                   |         |                                              | •      |
| <b>KX</b> | 57.0   | 58.0   | 58.0   | 0.58         | 0.059             | 57.67   | -0.24                                        | 0.29   |
| <b>L</b>  | 61.0   | 61.0   | 62.0   | 0.58         | 0.059             | 61.33   | 0.39                                         | 0.92   |
| <b>LA</b> |        |        |        |              |                   |         |                                              | •      |

• = No data submitted

## TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

## Beta

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| LE  | 70.0   | 67.0   | 69.0   | 1.53            | 0.177                | 68.67   | 1.66                                        | 2.19  |     |
| LF  | 53.0   | 53.0   | 55.0   | 1.15            | 0.118                | 53.67   | -0.94                                       | -0.40 |     |
| LM  |        |        |        |                 |                      |         |                                             |       | •   |
| LR  | 71.0   | 72.0   | 73.0   | 1.00            | 0.118                | 72.00   | 2.24                                        | 2.77  |     |
| LS  | 46.0   | 45.0   | 45.0   | 0.58            | 0.059                | 45.33   | -2.38                                       | -1.85 |     |
| LT  | 59.0   | 62.0   | 58.0   | 2.08            | 0.236                | 59.67   | 0.10                                        | 0.64  |     |
| LZ  | 55.0   | 56.0   | 58.0   | 1.53            | 0.177                | 56.33   | -0.48                                       | 0.06  |     |
| M   | 52.0   | 52.0   | 54.0   | 1.15            | 0.118                | 52.67   | -1.11                                       | -0.58 |     |
| MA  | 61.0   | 62.0   | 60.0   | 1.00            | 0.118                | 61.00   | 0.33                                        | 0.87  |     |
| ML  | 93.0   | 95.0   | 91.0   | 2.00            | 0.236                | 93.00   | 5.88                                        | 6.41  | ×   |
| MN  |        |        |        |                 |                      |         |                                             |       | •   |
| MP  |        |        |        |                 |                      |         |                                             |       | •   |
| MQ  | 57.0   | 54.0   | 57.0   | 1.73            | 0.177                | 56.00   | -0.53                                       | 0.00  |     |
| MV  | 54.0   | 53.0   | 51.0   | 1.53            | 0.177                | 52.67   | -1.11                                       | -0.58 |     |
| N   | 58.0   | 58.0   | 59.0   | 0.58            | 0.059                | 58.33   | -0.13                                       | 0.40  |     |
| NC  |        |        |        |                 |                      |         |                                             |       | •   |
| NF  |        |        |        |                 |                      |         |                                             |       | •   |
| NH  | 64.0   | 62.0   | 60.0   | 2.00            | 0.236                | 62.00   | 0.51                                        | 1.04  |     |
| NJ  | 70.0   | 58.0   | 62.0   | 6.11            | 0.709                | 63.33   | 0.74                                        | 1.27  |     |
| NK  | 73.0   | 61.0   | 59.0   | 7.57            | 0.827                | 64.33   | 0.91                                        | 1.44  |     |
| NP  | 64.0   | 68.0   | 66.0   | 2.00            | 0.236                | 66.00   | 1.20                                        | 1.73  |     |
| NT  | 60.0   | 60.0   | 59.0   | 0.58            | 0.059                | 59.67   | 0.10                                        | 0.64  |     |
| NZ  | 75.0   | 80.0   | 77.0   | 2.52            | 0.295                | 77.33   | 3.16                                        | 3.70  | ↑   |
| O   | 59.0   | 56.0   | 60.0   | 2.08            | 0.236                | 58.33   | -0.13                                       | 0.40  |     |
| OA  | 66.0   | 63.0   | 65.0   | 1.53            | 0.177                | 64.67   | 0.97                                        | 1.50  |     |
| OB  | 60.0   | 59.0   | 61.0   | 1.00            | 0.118                | 60.00   | 0.16                                        | 0.69  |     |
| OL  |        |        |        |                 |                      |         |                                             |       | •   |
| OM  | 55.0   | 56.0   | 58.0   | 1.53            | 0.177                | 56.33   | -0.48                                       | 0.06  |     |
| OQ  |        |        |        |                 |                      |         |                                             |       | •   |
| OS  |        |        |        |                 |                      |         |                                             |       | •   |
| P   | 57.0   | 57.0   | 57.0   | 0.00            | 0.000                | 57.00   | -0.36                                       | 0.17  |     |
| PB  | 59.0   | 58.0   | 57.0   | 1.00            | 0.118                | 58.00   | -0.19                                       | 0.35  |     |
| PC  |        |        |        |                 |                      |         |                                             |       | •   |
| PI  | 52.0   | 51.0   | 52.0   | 0.58            | 0.059                | 51.67   | -1.28                                       | -0.75 |     |
| PM  | 62.0   | 64.0   | 63.0   | 1.00            | 0.118                | 63.00   | 0.68                                        | 1.21  |     |
| PP  | 74.0   | 75.0   | 72.0   | 1.53            | 0.177                | 73.67   | 2.53                                        | 3.06  | ↑   |
| PQ  | 56.0   | 56.0   | 56.0   | 0.00            | 0.000                | 56.00   | -0.53                                       | 0.00  |     |
| PT  | 55.0   | 54.0   | 60.0   | 3.21            | 0.354                | 56.33   | -0.48                                       | 0.06  |     |
| PU  | 65.0   | 67.0   | 64.0   | 1.53            | 0.177                | 65.33   | 1.08                                        | 1.62  |     |
| PV  | 56.0   | 57.0   | 58.0   | 1.00            | 0.118                | 57.00   | -0.36                                       | 0.17  |     |
| PW  |        |        |        |                 |                      |         |                                             |       | •   |
| Q   | 40.0   | 44.0   | 40.0   | 2.31            | 0.236                | 41.33   | -3.07                                       | -2.54 |     |
| QA  | 60.0   | 59.0   | 60.0   | 0.58            | 0.059                | 59.67   | 0.10                                        | 0.64  |     |
| QB  | 49.0   | 50.0   | 49.0   | 0.58            | 0.059                | 49.33   | -1.69                                       | -1.15 |     |
| QC  | 76.0   | 72.0   | 72.0   | 2.31            | 0.236                | 73.33   | 2.47                                        | 3.00  |     |

• = No data submitted

## TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

| Beta |        |        |        |              |                   |         |                                              |        |
|------|--------|--------|--------|--------------|-------------------|---------|----------------------------------------------|--------|
| Lab  | Res. 1 | Res. 2 | Res. 3 | Exper. Sigma | Rng anal (R + SR) | Average | Normalized deviation (grand-avg) (known) Tag |        |
| QD   | 63.0   | 61.0   | 61.0   | 1.15         | 0.118             | 61.67   | 0.45                                         | 0.98   |
| QI   |        |        |        |              |                   |         |                                              | •      |
| QJ   | 54.0   | 42.0   | 66.0   | 12.00        | 1.795             | 54.00   | -0.88                                        | -0.35  |
| QK   | 58.0   | 59.0   | 58.0   | 0.58         | 0.059             | 58.33   | -0.13                                        | 0.40   |
| QL   |        |        |        |              |                   |         |                                              | •      |
| QM   | 57.0   | 56.0   | 56.0   | 0.58         | 0.059             | 56.33   | -0.48                                        | 0.06   |
| QQ   | 58.0   | 58.0   | 56.0   | 1.15         | 0.118             | 57.33   | -0.30                                        | 0.23   |
| QU   | 55.0   | 63.0   | 60.0   | 4.04         | 0.473             | 59.33   | 0.04                                         | 0.58   |
| QW   | 62.0   | 56.0   | 61.0   | 3.21         | 0.354             | 59.67   | 0.10                                         | 0.64   |
| QX   | 65.0   | 65.0   | 64.0   | 0.58         | 0.059             | 64.67   | 0.97                                         | 1.50   |
| QZ   | 46.0   | 43.0   | 45.0   | 1.53         | 0.177             | 44.67   | -2.50                                        | -1.96  |
| R    | 61.0   | 61.0   | 61.0   | 0.00         | 0.000             | 61.00   | 0.33                                         | 0.87   |
| RA   |        |        |        |              |                   |         |                                              | •      |
| RC   | 63.0   | 58.0   | 58.0   | 2.89         | 0.295             | 59.67   | 0.10                                         | 0.64   |
| RG   | 68.0   | 63.0   | 66.0   | 2.52         | 0.295             | 65.67   | 1.14                                         | 1.67   |
| RH   | 52.0   | 52.0   | 53.0   | 0.58         | 0.059             | 52.33   | -1.17                                        | -0.64  |
| RJ   | 55.0   | 55.0   | 57.0   | 1.15         | 0.118             | 55.67   | -0.59                                        | -0.06  |
| RK   |        |        |        |              |                   |         |                                              | •      |
| RO   | 73.0   | 69.0   | 75.0   | 3.06         | 0.354             | 72.33   | 2.30                                         | 2.83   |
| RQ   | 87.0   | 92.0   | 86.0   | 3.21         | 0.354             | 88.33   | 5.07                                         | 5.60 × |
| RU   | 59.0   | 55.0   | 58.0   | 2.08         | 0.236             | 57.33   | -0.30                                        | 0.23   |
| RV   | 61.0   | 62.0   | 60.0   | 1.00         | 0.118             | 61.00   | 0.33                                         | 0.87   |
| RW   | 76.0   | 66.0   | 70.0   | 5.03         | 0.591             | 70.67   | 2.01                                         | 2.54   |
| S    | 58.0   | 55.0   | 56.0   | 1.53         | 0.177             | 56.33   | -0.48                                        | 0.06   |
| SC   | 58.0   | 57.0   | 57.0   | 0.58         | 0.059             | 57.33   | -0.30                                        | 0.23   |
| SD   | 53.0   | 53.0   | 54.0   | 0.58         | 0.059             | 53.33   | -1.00                                        | -0.46  |
| SF   |        |        |        |              |                   |         |                                              | •      |
| SI   | 53.0   | 53.0   | 53.0   | 0.00         | 0.000             | 53.00   | -1.05                                        | -0.52  |
| SM   | 57.0   | 58.0   | 57.0   | 0.58         | 0.059             | 57.33   | -0.30                                        | 0.23   |
| SP   | 69.0   | 72.0   | 76.0   | 3.51         | 0.413             | 72.33   | 2.30                                         | 2.83   |
| SQ   |        |        |        |              |                   |         |                                              | •      |
| SR   | 62.0   | 64.0   | 62.0   | 1.15         | 0.118             | 62.67   | 0.62                                         | 1.15   |
| SS   | 60.0   | 65.0   | 66.0   | 3.21         | 0.354             | 63.67   | 0.79                                         | 1.33   |
| SW   | 53.0   | 54.0   | 54.0   | 0.58         | 0.059             | 53.67   | -0.94                                        | -0.40  |
| SX   | 69.0   | 70.0   | 72.0   | 1.53         | 0.177             | 70.33   | 1.95                                         | 2.48   |
| SZ   | 58.0   | 57.0   | 59.0   | 1.00         | 0.118             | 58.00   | -0.19                                        | 0.35   |
| T    | 55.0   | 55.0   | 55.0   | 0.00         | 0.000             | 55.00   | -0.71                                        | -0.17  |
| TA   | 59.0   | 61.0   | 61.0   | 1.15         | 0.118             | 60.33   | 0.22                                         | 0.75   |
| TB   | 65.0   | 69.0   | 66.0   | 2.08         | 0.236             | 66.67   | 1.31                                         | 1.85   |
| TD   | 51.0   | 51.0   | 52.0   | 0.58         | 0.059             | 51.33   | -1.34                                        | -0.81  |
| TE   | 62.0   | 60.0   | 60.0   | 1.15         | 0.118             | 60.67   | 0.28                                         | 0.81   |
| TH   | 57.0   | 54.0   | 58.0   | 2.08         | 0.236             | 56.33   | -0.48                                        | 0.06   |
| TI   | 57.0   | 62.0   | 66.0   | 4.51         | 0.532             | 61.67   | 0.45                                         | 0.98   |
| TL   | 53.0   | 52.0   | 52.0   | 0.58         | 0.059             | 52.33   | -1.17                                        | -0.64  |
| TP   |        |        |        |              |                   |         |                                              | •      |

• = No data submitted

## TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

## Beta

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) | Tag   |
|-----|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|
| TQ  | 70.0   | 74.0   | 70.0   | 2.31            | 0.236                | 71.33   | 2.12                                        | 2.66  |
| TR  |        |        |        |                 |                      |         |                                             | •     |
| TS  |        |        |        |                 |                      |         |                                             | •     |
| TT  |        |        |        |                 |                      |         |                                             | •     |
| TU  | 65.0   | 65.0   | 64.0   | 0.58            | 0.059                | 64.67   | 0.97                                        | 1.50  |
| TV  |        |        |        |                 |                      |         |                                             | •     |
| TW  | 48.0   | 50.0   | 43.0   | 3.61            | 0.413                | 47.00   | -2.09                                       | -1.56 |
| UB  |        |        |        |                 |                      |         |                                             | •     |
| UE  |        |        |        |                 |                      |         |                                             | •     |
| UJ  |        |        |        |                 |                      |         |                                             | •     |
| UK  | 40.0   | 39.0   | 38.0   | 1.00            | 0.118                | 39.00   | -3.48                                       | -2.94 |
| UV  |        |        |        |                 |                      |         |                                             | •     |
| UX  | 65.0   | 60.0   | 65.0   | 2.89            | 0.295                | 63.33   | 0.74                                        | 1.27  |
| UY  | 66.0   | 64.0   | 63.0   | 1.53            | 0.177                | 64.33   | 0.91                                        | 1.44  |
| UZ  | 45.0   | 50.0   | 55.0   | 5.00            | 0.591                | 50.00   | -1.57                                       | -1.04 |
| VA  | 56.0   | 54.0   | 56.0   | 1.15            | 0.118                | 55.33   | -0.65                                       | -0.12 |
| VB  |        |        |        |                 |                      |         |                                             | •     |
| VC  | 47.0   | 47.0   | 49.0   | 1.15            | 0.118                | 47.67   | -1.98                                       | -1.44 |
| VE  |        |        |        |                 |                      |         |                                             | •     |
| VF  | 212.0  | 216.0  | 208.0  | 4.00            | 0.473                | 212.00  | 26.49                                       | 27.02 |
| VG  | 39.0   | 36.0   | 39.0   | 1.73            | 0.177                | 38.00   | -3.65                                       | -3.12 |
| VH  | 63.0   | 67.0   | 65.0   | 2.00            | 0.236                | 65.00   | 1.03                                        | 1.56  |
| VI  |        |        |        |                 |                      |         |                                             | •     |
| VK  |        |        |        |                 |                      |         |                                             | •     |
| VL  | 54.0   | 51.0   | 53.0   | 1.53            | 0.177                | 52.67   | -1.11                                       | -0.58 |
| VM  | 59.0   | 58.0   | 58.0   | 0.58            | 0.059                | 58.33   | -0.13                                       | 0.40  |
| VO  | 53.0   | 55.0   | 53.0   | 1.15            | 0.118                | 53.67   | -0.94                                       | -0.40 |
| VP  | 54.0   | 54.0   | 52.0   | 1.15            | 0.118                | 53.33   | -1.00                                       | -0.46 |
| VQ  |        |        |        |                 |                      |         |                                             | •     |
| VT  | 53.0   | 59.0   | 60.0   | 3.79            | 0.413                | 57.33   | -0.30                                       | 0.23  |
| WB  |        |        |        |                 |                      |         |                                             | •     |
| X   | 44.0   | 45.0   | 44.0   | 0.58            | 0.059                | 44.33   | -2.55                                       | -2.02 |
| Y   | 63.0   | 61.0   | 63.0   | 1.15            | 0.118                | 62.33   | 0.56                                        | 1.10  |
| Z   | 74.0   | 76.0   | 73.0   | 1.53            | 0.177                | 74.33   | 2.64                                        | 3.18  |

## Data sorted by Laboratory Average

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 30.00   | ×   | DJ  | 47.67   |     | VC  | 51.33   |     | TD  |
| 38.00   | ↓   | VG  | 48.33   |     | GQ  | 51.33   |     | JI  |
| 39.00   |     | UK  | 48.67   |     | CO  | 51.33   |     | C   |
| 41.33   |     | Q   | 49.00   |     | EF  | 51.33   |     | BO  |
| 44.33   |     | X   | 49.33   |     | QB  | 51.67   |     | PI  |
| 44.67   |     | QZ  | 49.67   |     | FZ  | 52.33   |     | TL  |
| 45.33   |     | LS  | 50.00   |     | UZ  | 52.33   |     | RH  |
| 47.00   |     | TW  | 50.00   |     | BM  | 52.67   |     | VL  |

• = No data submitted

## TAG SYMBOLS

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

**Beta****Data sorted by Laboratory Average**

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 52.67   |     | MV  | 57.33   |     | BH  | 61.67   |     | EW  |
| 52.67   |     | M   | 57.33   |     | AJ  | 62.00   |     | NH  |
| 53.00   |     | SI  | 57.33   |     | AE  | 62.00   |     | DH  |
| 53.00   |     | KH  | 57.67   |     | KX  | 62.33   |     | Y   |
| 53.00   |     | EZ  | 57.67   |     | IU  | 62.67   |     | SR  |
| 53.00   |     | AZ  | 57.67   |     | D   | 63.00   |     | PM  |
| 53.33   |     | VP  | 58.00   |     | SZ  | 63.00   |     | KL  |
| 53.33   |     | SD  | 58.00   |     | PB  | 63.33   |     | UX  |
| 53.33   |     | HI  | 58.00   |     | JY  | 63.33   |     | NJ  |
| 53.67   |     | VO  | 58.00   |     | FE  | 63.33   |     | JS  |
| 53.67   |     | SW  | 58.00   |     | DE  | 63.33   |     | E   |
| 53.67   |     | LF  | 58.00   |     | CP  | 63.33   |     | AK  |
| 53.67   |     | EL  | 58.00   |     | A   | 63.67   |     | SS  |
| 54.00   |     | QJ  | 58.33   |     | VM  | 63.67   |     | IE  |
| 54.00   |     | CM  | 58.33   |     | QK  | 64.00   |     | IC  |
| 54.00   |     | AF  | 58.33   |     | O   | 64.00   |     | CX  |
| 55.00   |     | T   | 58.33   |     | N   | 64.33   |     | UY  |
| 55.33   |     | VA  | 58.33   |     | BL  | 64.33   |     | NK  |
| 55.33   |     | BA  | 58.67   |     | AA  | 64.33   |     | EB  |
| 55.33   |     | AU  | 59.00   |     | GE  | 64.67   |     | TU  |
| 55.67   |     | RJ  | 59.00   |     | DL  | 64.67   |     | QX  |
| 56.00   |     | PQ  | 59.33   |     | QU  | 64.67   |     | OA  |
| 56.00   |     | MQ  | 59.33   |     | CJ  | 65.00   |     | VH  |
| 56.00   |     | DT  | 59.67   |     | RC  | 65.33   |     | PU  |
| 56.00   |     | CA  | 59.67   |     | QW  | 65.67   |     | RG  |
| 56.00   |     | BK  | 59.67   |     | QA  | 65.67   |     | BW  |
| 56.33   |     | TH  | 59.67   |     | NT  | 66.00   |     | NP  |
| 56.33   |     | S   | 59.67   |     | LT  | 66.67   |     | TB  |
| 56.33   |     | QM  | 59.67   |     | J   | 67.33   |     | BG  |
| 56.33   |     | PT  | 59.67   |     | DD  | 67.67   |     | K   |
| 56.33   |     | OM  | 59.67   |     | AP  | 67.67   |     | IY  |
| 56.33   |     | LZ  | 60.00   |     | OB  | 67.67   |     | EX  |
| 56.33   |     | CQ  | 60.00   |     | I   | 68.67   |     | LE  |
| 56.33   |     | BC  | 60.33   |     | TA  | 69.00   |     | HE  |
| 56.67   |     | CE  | 60.33   |     | EH  | 70.00   |     | AN  |
| 57.00   |     | PV  | 60.67   |     | TE  | 70.33   |     | SX  |
| 57.00   |     | P   | 61.00   |     | RV  | 70.67   |     | RW  |
| 57.00   |     | FJ  | 61.00   |     | R   | 70.67   |     | HL  |
| 57.00   |     | BI  | 61.00   |     | MA  | 70.67   |     | DO  |
| 57.33   |     | VT  | 61.00   |     | DG  | 71.33   |     | TQ  |
| 57.33   |     | SM  | 61.00   |     | AL  | 72.00   |     | LR  |
| 57.33   |     | SC  | 61.33   |     | L   | 72.33   |     | SP  |
| 57.33   |     | RU  | 61.67   |     | TI  | 72.33   |     | RO  |
| 57.33   |     | QQ  | 61.67   |     | QD  | 73.33   |     | QC  |

• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

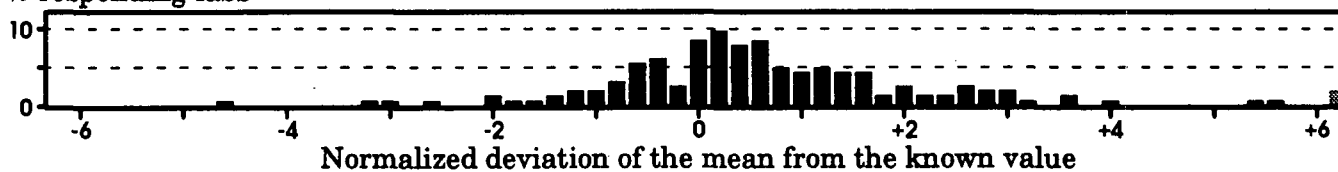
↓ = Below control limit

**Beta****Data sorted by Laboratory Average**

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 73.67   | ↑   | PP  | 76.67   | ↑   | JE  | 88.33   | ×   | RQ  |
| 73.67   | ↑   | CC  | 77.33   | ↑   | NZ  | 93.00   | ×   | ML  |
| 74.33   | ↑   | Z   | 78.67   | ↑   | FL  | 106.67  | ×   | HU  |
|         |     |     | 86.67   | ×   | HP  | 212.00  | ×   | VF  |

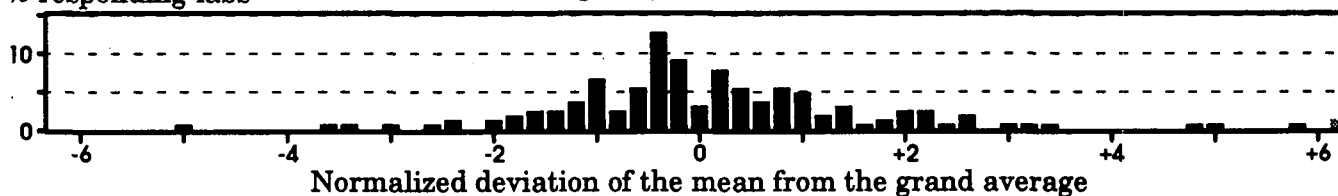
% responding labs

Frequency distribution



% responding labs

Frequency distribution



• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

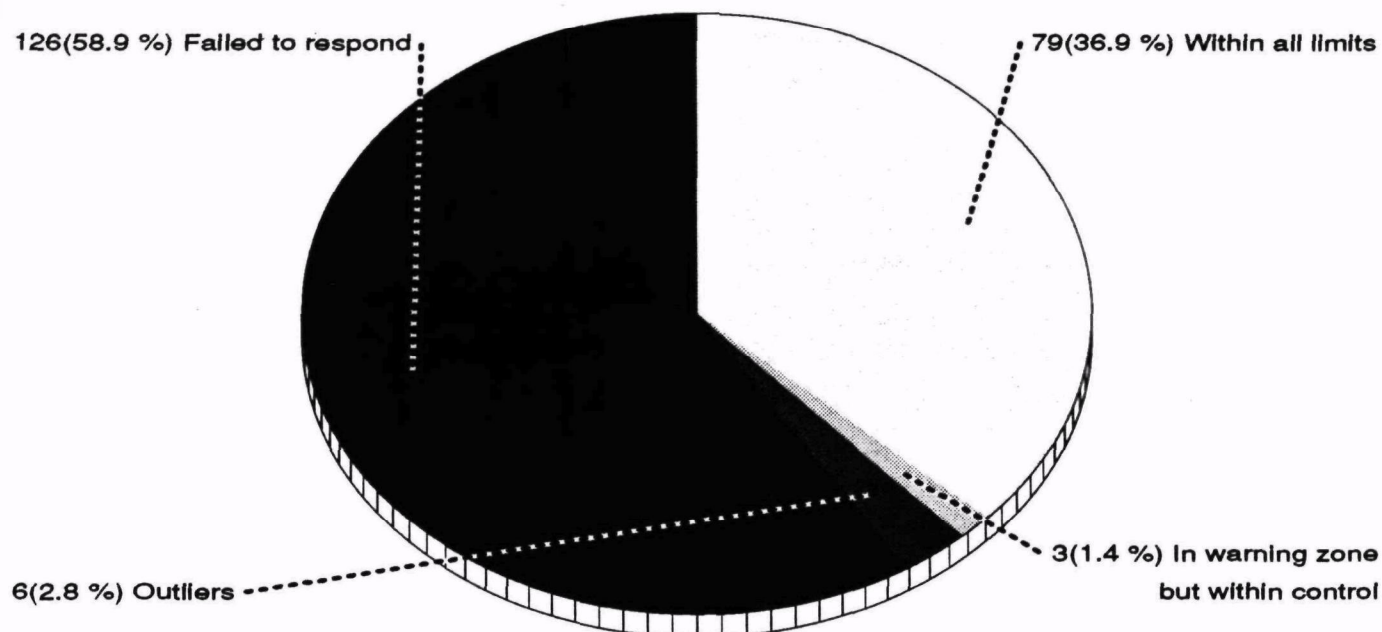
∅ = Insufficient data

× = Determined to be an outlier

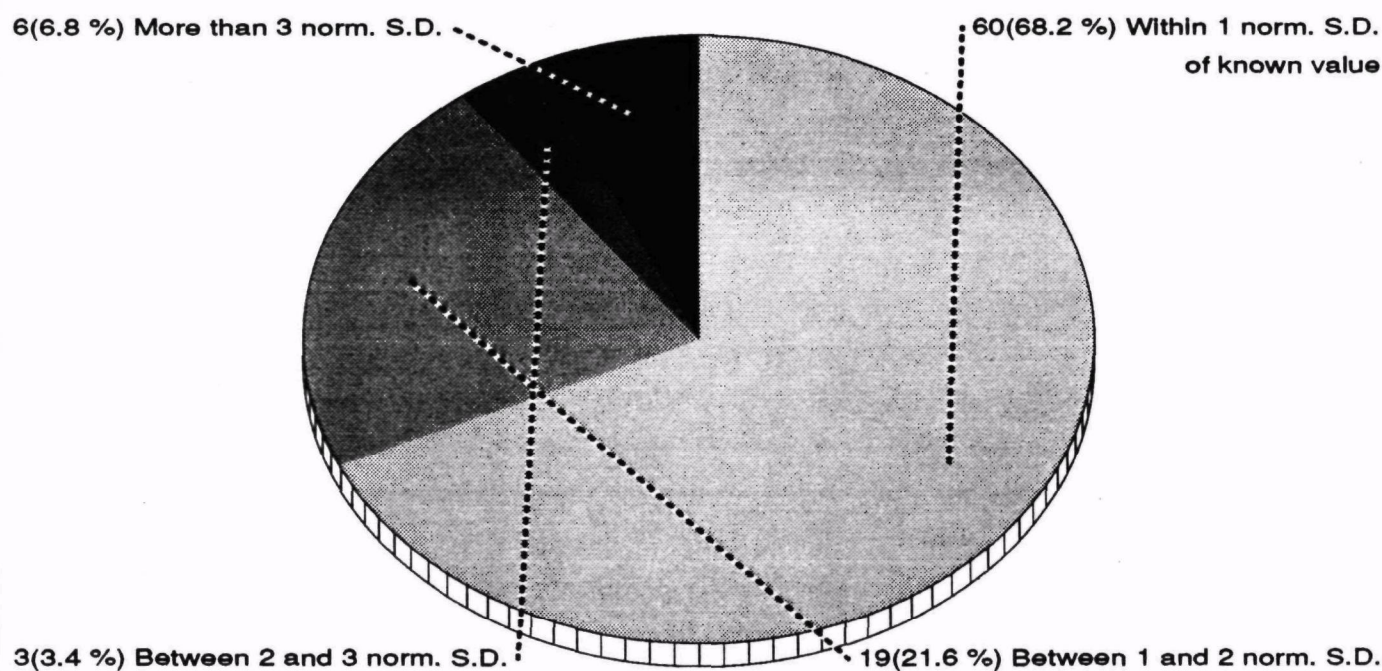
↓ = Below control limit

**Strontium 90****Statistical Summary****214 Participants**

The known value of this nuclide is **20.0 pCi/F** with an expected precision of **5.0**; the control limits are 11.3 to 28.7; the warning regions are 11.3 to 14.2 and 25.8 to 28.7



| Statistic                              | Respondents | Non-outliers           |
|----------------------------------------|-------------|------------------------|
| Mean                                   | 19.65       | <b>Grand Avg 19.57</b> |
| Std. Dev.                              | 4.73        | 2.76                   |
| Variance                               | 22.39       | 7.62                   |
| % Coef. of Var.                        | 24.09       | 14.10                  |
| % deviation of mean from known value   | -1.76       | -2.15                  |
| Norm. dev. of mean from known value    | -0.07       | -0.16                  |
| Median                                 | 19.33       | 19.33                  |
| % deviation of median from known value | -3.33       | -3.33                  |
| Norm. dev. of median from known value  | -0.14       | -0.24                  |



**Strontium 90**

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) Tag |       |
|-----|--------|--------|--------|-----------------|----------------------|---------|-------------------------------------------------|-------|
| A   | 20.0   | 20.0   | 19.0   | 0.58            | 0.118                | 19.67   | 0.03                                            | -0.12 |
| AA  | 20.0   | 19.0   | 20.0   | 0.58            | 0.118                | 19.67   | 0.03                                            | -0.12 |
| AE  |        |        |        |                 |                      |         |                                                 | •     |
| AF  | 19.0   | 17.0   | 18.0   | 1.00            | 0.236                | 18.00   | -0.54                                           | -0.69 |
| AI  |        |        |        |                 |                      |         |                                                 | •     |
| AJ  |        |        |        |                 |                      |         |                                                 | •     |
| AK  | 20.0   | 20.0   | 19.0   | 0.58            | 0.118                | 19.67   | 0.03                                            | -0.12 |
| AL  | 22.0   | 22.0   | 22.0   | 0.00            | 0.000                | 22.00   | 0.84                                            | 0.69  |
| AN  |        |        |        |                 |                      |         |                                                 | •     |
| AP  |        |        |        |                 |                      |         |                                                 | •     |
| AU  |        |        |        |                 |                      |         |                                                 | •     |
| AZ  | 21.0   | 20.0   | 18.0   | 1.53            | 0.354                | 19.67   | 0.03                                            | -0.12 |
| BA  | 17.0   | 16.0   | 21.0   | 2.65            | 0.591                | 18.00   | -0.54                                           | -0.69 |
| BC  | 15.0   | 18.0   | 17.0   | 1.53            | 0.354                | 16.67   | -1.01                                           | -1.15 |
| BG  | 18.0   | 19.0   | 19.0   | 0.58            | 0.118                | 18.67   | -0.31                                           | -0.46 |
| BH  |        |        |        |                 |                      |         |                                                 | •     |
| BI  |        |        |        |                 |                      |         |                                                 | •     |
| BK  |        |        |        |                 |                      |         |                                                 | •     |
| BL  | 18.0   | 17.0   | 20.0   | 1.53            | 0.354                | 18.33   | -0.43                                           | -0.58 |
| BM  |        |        |        |                 |                      |         |                                                 | •     |
| BO  | 19.0   | 20.0   | 20.0   | 0.58            | 0.118                | 19.67   | 0.03                                            | -0.12 |
| BW  |        |        |        |                 |                      |         |                                                 | •     |
| C   |        |        |        |                 |                      |         |                                                 | •     |
| CA  | 18.0   | 19.0   | 17.0   | 1.00            | 0.236                | 18.00   | -0.54                                           | -0.69 |
| CC  |        |        |        |                 |                      |         |                                                 | •     |
| CE  |        |        |        |                 |                      |         |                                                 | •     |
| CJ  | 18.0   | 18.0   | 18.0   | 0.00            | 0.000                | 18.00   | -0.54                                           | -0.69 |
| CM  |        |        |        |                 |                      |         |                                                 | •     |
| CO  |        |        |        |                 |                      |         |                                                 | •     |
| CP  |        |        |        |                 |                      |         |                                                 | •     |
| CQ  | 19.0   | 17.0   | 18.0   | 1.00            | 0.236                | 18.00   | -0.54                                           | -0.69 |
| CS  |        |        |        |                 |                      |         |                                                 | •     |
| CX  | 18.0   | 17.0   | 19.0   | 1.00            | 0.236                | 18.00   | -0.54                                           | -0.69 |
| D   |        |        |        |                 |                      |         |                                                 | •     |
| DD  | 26.0   | 18.0   | 14.0   | 6.11            | 1.795                | 19.33   | -0.08                                           | -0.23 |
| DE  | 22.0   | 22.0   | 22.0   | 0.00            | 0.000                | 22.00   | 0.84                                            | 0.69  |
| DG  | 18.0   | 16.0   | 17.0   | 1.00            | 0.236                | 17.00   | -0.89                                           | -1.04 |
| DH  | 21.0   | 22.0   | 23.0   | 1.00            | 0.236                | 22.00   | 0.84                                            | 0.69  |
| DI  |        |        |        |                 |                      |         |                                                 | •     |
| DJ  |        |        |        |                 |                      |         |                                                 | •     |
| DL  |        |        |        |                 |                      |         |                                                 | •     |
| DM  |        |        |        |                 |                      |         |                                                 | •     |
| DO  | 21.0   | 22.0   | 20.0   | 1.00            | 0.236                | 21.00   | 0.50                                            | 0.35  |
| DP  |        |        |        |                 |                      |         |                                                 | •     |
| DT  | 16.0   | 14.0   | 14.0   | 1.15            | 0.236                | 14.67   | -1.70                                           | -1.85 |

• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

**Strontium 90**

| Lab       | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----------|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| <b>DX</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>E</b>  | 20.0   | 22.0   | 21.0   | 1.00            | 0.236                | 21.00   | 0.50                                        | 0.35  |     |
| <b>EA</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EB</b> | 14.0   | 18.0   | 21.0   | 3.51            | 0.827                | 17.67   | -0.66                                       | -0.81 |     |
| <b>EF</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EH</b> | 18.0   | 18.0   | 18.0   | 0.00            | 0.000                | 18.00   | -0.54                                       | -0.69 |     |
| <b>EL</b> | 18.0   | 17.0   | 17.0   | 0.58            | 0.118                | 17.33   | -0.77                                       | -0.92 |     |
| <b>EW</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EX</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EZ</b> | 17.0   | 20.0   | 20.0   | 1.73            | 0.354                | 19.00   | -0.20                                       | -0.35 |     |
| <b>FE</b> | 19.0   | 21.0   | 19.0   | 1.15            | 0.236                | 19.67   | 0.03                                        | -0.12 |     |
| <b>FJ</b> | 16.0   | 18.0   | 18.0   | 1.15            | 0.236                | 17.33   | -0.77                                       | -0.92 |     |
| <b>FK</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>FL</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>FO</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>FZ</b> | 19.0   | 21.0   | 17.0   | 2.00            | 0.473                | 19.00   | -0.20                                       | -0.35 |     |
| <b>GE</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>GI</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>GQ</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>HE</b> | 27.0   | 27.0   | 27.0   | 0.00            | 0.000                | 27.00   | 2.57                                        | 2.42  |     |
| <b>HI</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>HL</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>HP</b> | 17.0   | 15.0   | 13.0   | 2.00            | 0.473                | 15.00   | -1.58                                       | -1.73 |     |
| <b>HU</b> | 20.0   | 20.0   | 21.0   | 0.58            | 0.118                | 20.33   | 0.26                                        | 0.12  |     |
| <b>HX</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>I</b>  |        |        |        |                 |                      |         |                                             |       | •   |
| <b>IA</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>IC</b> | 17.0   | 18.0   | 17.0   | 0.58            | 0.118                | 17.33   | -0.77                                       | -0.92 |     |
| <b>IE</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>II</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>IU</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>IY</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>J</b>  | 20.0   | 20.0   | 20.0   | 0.00            | 0.000                | 20.00   | 0.15                                        | 0.00  |     |
| <b>JE</b> | 20.0   | 21.0   | 20.0   | 0.58            | 0.118                | 20.33   | 0.26                                        | 0.12  |     |
| <b>JI</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>JS</b> | 16.0   | 18.0   | 18.0   | 1.15            | 0.236                | 17.33   | -0.77                                       | -0.92 |     |
| <b>JY</b> | 24.0   | 24.0   | 25.0   | 0.58            | 0.118                | 24.33   | 1.65                                        | 1.50  |     |
| <b>K</b>  | 21.0   | 23.0   | 23.0   | 1.15            | 0.236                | 22.33   | 0.96                                        | 0.81  |     |
| <b>KF</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>KH</b> | 18.0   | 20.0   | 19.0   | 1.00            | 0.236                | 19.00   | -0.20                                       | -0.35 |     |
| <b>KL</b> | 19.0   | 22.0   | 21.0   | 1.53            | 0.354                | 20.67   | 0.38                                        | 0.23  |     |
| <b>KM</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>KX</b> | 19.0   | 20.0   | 19.0   | 0.58            | 0.118                | 19.33   | -0.08                                       | -0.23 |     |
| <b>L</b>  |        |        |        |                 |                      |         |                                             |       | •   |
| <b>LA</b> |        |        |        |                 |                      |         |                                             |       | •   |

• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

**Strontium 90**

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| LE  |        |        |        |                 |                      |         |                                             |       | •   |
| LF  |        |        |        |                 |                      |         |                                             |       | •   |
| LM  |        |        |        |                 |                      |         |                                             |       | •   |
| LR  | 28.0   | 28.0   | 28.0   | 0.00            | 0.000                | 28.00   | 2.92                                        | 2.77  |     |
| LS  | 14.0   | 16.0   | 14.0   | 1.15            | 0.236                | 14.67   | -1.70                                       | -1.85 |     |
| LT  | 20.0   | 21.0   | 21.0   | 0.58            | 0.118                | 20.67   | 0.38                                        | 0.23  |     |
| LZ  |        |        |        |                 |                      |         |                                             |       | •   |
| M   | 23.0   | 23.0   | 23.0   | 0.00            | 0.000                | 23.00   | 1.19                                        | 1.04  |     |
| MA  |        |        |        |                 |                      |         |                                             |       | •   |
| ML  |        |        |        |                 |                      |         |                                             |       | •   |
| MN  |        |        |        |                 |                      |         |                                             |       | •   |
| MP  |        |        |        |                 |                      |         |                                             |       | •   |
| MQ  | 19.0   | 19.0   | 19.0   | 0.00            | 0.000                | 19.00   | -0.20                                       | -0.35 |     |
| MV  |        |        |        |                 |                      |         |                                             |       | •   |
| N   |        |        |        |                 |                      |         |                                             |       | •   |
| NC  |        |        |        |                 |                      |         |                                             |       | •   |
| NF  |        |        |        |                 |                      |         |                                             |       | •   |
| NH  |        |        |        |                 |                      |         |                                             |       | •   |
| NJ  | 18.0   | 17.0   | 18.0   | 0.58            | 0.118                | 17.67   | -0.66                                       | -0.81 |     |
| NK  |        |        |        |                 |                      |         |                                             |       | •   |
| NP  | 20.0   | 20.0   | 22.0   | 1.15            | 0.236                | 20.67   | 0.38                                        | 0.23  |     |
| NT  |        |        |        |                 |                      |         |                                             |       | •   |
| NZ  |        |        |        |                 |                      |         |                                             |       | •   |
| O   |        |        |        |                 |                      |         |                                             |       | •   |
| OA  | 19.0   | 19.0   | 20.0   | 0.58            | 0.118                | 19.33   | -0.08                                       | -0.23 |     |
| OB  |        |        |        |                 |                      |         |                                             |       | •   |
| OL  |        |        |        |                 |                      |         |                                             |       | •   |
| OM  |        |        |        |                 |                      |         |                                             |       | •   |
| OQ  |        |        |        |                 |                      |         |                                             |       | •   |
| OS  |        |        |        |                 |                      |         |                                             |       | •   |
| P   |        |        |        |                 |                      |         |                                             |       | •   |
| PB  | 20.0   | 21.0   | 20.0   | 0.58            | 0.118                | 20.33   | 0.26                                        | 0.12  |     |
| PC  |        |        |        |                 |                      |         |                                             |       | •   |
| PI  |        |        |        |                 |                      |         |                                             |       | •   |
| PM  |        |        |        |                 |                      |         |                                             |       | •   |
| PP  | 23.0   | 20.0   | 22.0   | 1.53            | 0.354                | 21.67   | 0.73                                        | 0.58  |     |
| PQ  |        |        |        |                 |                      |         |                                             |       | •   |
| PT  | 17.0   | 16.0   | 16.0   | 0.58            | 0.118                | 16.33   | -1.12                                       | -1.27 |     |
| PU  | 18.0   | 17.0   | 18.0   | 0.58            | 0.118                | 17.67   | -0.66                                       | -0.81 |     |
| PV  | 15.0   | 16.0   | 17.0   | 1.00            | 0.236                | 16.00   | -1.24                                       | -1.39 |     |
| PW  |        |        |        |                 |                      |         |                                             |       | •   |
| Q   | 12.0   | 12.0   | 13.0   | 0.58            | 0.118                | 12.33   | -2.51                                       | -2.66 |     |
| QA  |        |        |        |                 |                      |         |                                             |       | •   |
| QB  |        |        |        |                 |                      |         |                                             |       | •   |
| QC  |        |        |        |                 |                      |         |                                             |       | •   |

• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

## Strontium 90

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| QD  |        |        |        |                 |                      |         |                                             |       | •   |
| QI  |        |        |        |                 |                      |         |                                             |       | •   |
| QJ  | 23.0   | 19.0   | 22.0   | 2.08            | 0.473                | 21.33   | 0.61                                        | 0.46  |     |
| QK  | 10.0   | 10.0   | 10.0   | 0.00            | 0.000                | 10.00   | -3.31                                       | -3.46 | ×   |
| QL  |        |        |        |                 |                      |         |                                             |       | •   |
| QM  | 18.0   | 19.0   | 14.0   | 2.65            | 0.591                | 17.00   | -0.89                                       | -1.04 |     |
| QQ  |        |        |        |                 |                      |         |                                             |       | •   |
| QU  | 27.0   | 25.0   | 22.0   | 2.52            | 0.591                | 24.67   | 1.77                                        | 1.62  |     |
| QW  | 26.0   | 26.0   | 23.0   | 1.73            | 0.354                | 25.00   | 1.88                                        | 1.73  |     |
| QX  |        |        |        |                 |                      |         |                                             |       | •   |
| QZ  | 21.0   | 18.0   | 19.0   | 1.53            | 0.354                | 19.33   | -0.08                                       | -0.23 |     |
| R   | 17.0   | 18.0   | 17.0   | 0.58            | 0.118                | 17.33   | -0.77                                       | -0.92 |     |
| RA  | 21.0   | 20.0   | 21.0   | 0.58            | 0.118                | 20.67   | 0.38                                        | 0.23  |     |
| RC  | 16.0   | 16.0   | 15.0   | 0.58            | 0.118                | 15.67   | -1.35                                       | -1.50 |     |
| RG  |        |        |        |                 |                      |         |                                             |       | •   |
| RH  | 18.0   | 18.0   | 18.0   | 0.00            | 0.000                | 18.00   | -0.54                                       | -0.69 |     |
| RJ  |        |        |        |                 |                      |         |                                             |       | •   |
| RK  |        |        |        |                 |                      |         |                                             |       | •   |
| RO  |        |        |        |                 |                      |         |                                             |       | •   |
| RQ  | 1.0    | 1.0    | 1.0    | 0.00            | 0.000                | 1.00    | -6.43                                       | -6.58 | ×   |
| RU  | 40.0   | 37.0   | 30.0   | 5.13            | 1.345                | 35.67   | 5.58                                        | 5.43  | ×   |
| RV  | 20.0   | 18.0   | 21.0   | 1.53            | 0.354                | 19.67   | 0.03                                        | -0.12 |     |
| RW  |        |        |        |                 |                      |         |                                             |       | •   |
| S   |        |        |        |                 |                      |         |                                             |       | •   |
| SC  | 23.0   | 25.0   | 21.0   | 2.00            | 0.473                | 23.00   | 1.19                                        | 1.04  |     |
| SD  | 17.0   | 19.0   | 20.0   | 1.53            | 0.354                | 18.67   | -0.31                                       | -0.46 |     |
| SF  |        |        |        |                 |                      |         |                                             |       | •   |
| SI  | 20.0   | 20.0   | 20.0   | 0.00            | 0.000                | 20.00   | 0.15                                        | 0.00  |     |
| SM  | 7.0    | 8.0    | 7.0    | 0.58            | 0.118                | 7.33    | -4.24                                       | -4.39 | ×   |
| SP  |        |        |        |                 |                      |         |                                             |       | •   |
| SQ  |        |        |        |                 |                      |         |                                             |       | •   |
| SR  |        |        |        |                 |                      |         |                                             |       | •   |
| SS  | 19.0   | 20.0   | 18.0   | 1.00            | 0.236                | 19.00   | -0.20                                       | -0.35 |     |
| SW  | 23.0   | 25.0   | 26.0   | 1.53            | 0.354                | 24.67   | 1.77                                        | 1.62  |     |
| SX  |        |        |        |                 |                      |         |                                             |       | •   |
| SZ  |        |        |        |                 |                      |         |                                             |       | •   |
| T   | 18.0   | 18.0   | 18.0   | 0.00            | 0.000                | 18.00   | -0.54                                       | -0.69 |     |
| TA  |        |        |        |                 |                      |         |                                             |       | •   |
| TB  | 22.0   | 24.0   | 26.0   | 2.00            | 0.473                | 24.00   | 1.53                                        | 1.39  |     |
| TD  | 27.0   | 40.0   | 39.0   | 7.23            | 2.020                | 35.33   | 5.46                                        | 5.31  | ×   |
| TE  |        |        |        |                 |                      |         |                                             |       | •   |
| TH  |        |        |        |                 |                      |         |                                             |       | •   |
| TI  | 18.0   | 18.0   | 22.0   | 2.31            | 0.473                | 19.33   | -0.08                                       | -0.23 |     |
| TL  | 23.0   | 22.0   | 26.0   | 2.08            | 0.473                | 23.67   | 1.42                                        | 1.27  |     |
| TP  |        |        |        |                 |                      |         |                                             |       | •   |

• = No data submitted

## TAG SYMBOLS

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

**Strontium 90**

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) Tag |        |
|-----|--------|--------|--------|-----------------|----------------------|---------|-------------------------------------------------|--------|
| TQ  | 19.0   | 18.0   | 18.0   | 0.58            | 0.118                | 18.33   | -0.43                                           | -0.58  |
| TR  |        |        |        |                 |                      |         |                                                 | •      |
| TS  |        |        |        |                 |                      |         |                                                 | •      |
| TT  |        |        |        |                 |                      |         |                                                 | •      |
| TU  |        |        |        |                 |                      |         |                                                 | •      |
| TV  |        |        |        |                 |                      |         |                                                 | •      |
| TW  |        |        |        |                 |                      |         |                                                 | •      |
| UB  |        |        |        |                 |                      |         |                                                 | •      |
| UE  |        |        |        |                 |                      |         |                                                 | •      |
| UJ  |        |        |        |                 |                      |         |                                                 | •      |
| UK  |        |        |        |                 |                      |         |                                                 | •      |
| UV  |        |        |        |                 |                      |         |                                                 | •      |
| UX  | 23.0   | 20.0   | 22.0   | 1.53            | 0.354                | 21.67   | 0.73                                            | 0.58   |
| UY  |        |        |        |                 |                      |         |                                                 | •      |
| UZ  |        |        |        |                 |                      |         |                                                 | •      |
| VA  | 21.0   | 21.0   | 21.0   | 0.00            | 0.000                | 21.00   | 0.50                                            | 0.35   |
| VB  |        |        |        |                 |                      |         |                                                 | •      |
| VC  |        |        |        |                 |                      |         |                                                 | •      |
| VE  |        |        |        |                 |                      |         |                                                 | •      |
| VF  |        |        |        |                 |                      |         |                                                 | •      |
| VG  | 18.0   | 17.0   | 18.0   | 0.58            | 0.118                | 17.67   | -0.66                                           | -0.81  |
| VH  |        |        |        |                 |                      |         |                                                 | •      |
| VI  |        |        |        |                 |                      |         |                                                 | •      |
| VK  |        |        |        |                 |                      |         |                                                 | •      |
| VL  | 24.0   | 24.0   | 24.0   | 0.00            | 0.000                | 24.00   | 1.53                                            | 1.39   |
| VM  |        |        |        |                 |                      |         |                                                 | •      |
| VO  | 18.0   | 20.0   | 19.0   | 1.00            | 0.236                | 19.00   | -0.20                                           | -0.35  |
| VP  | 35.0   | 34.0   | 36.0   | 1.00            | 0.236                | 35.00   | 5.35                                            | 5.20 × |
| VQ  |        |        |        |                 |                      |         |                                                 | •      |
| VT  |        |        |        |                 |                      |         |                                                 | •      |
| WB  |        |        |        |                 |                      |         |                                                 | •      |
| X   | 17.0   | 19.0   | 15.0   | 2.00            | 0.473                | 17.00   | -0.89                                           | -1.04  |
| Y   |        |        |        |                 |                      |         |                                                 | •      |
| Z   | 19.0   | 20.0   | 20.0   | 0.58            | 0.118                | 19.67   | 0.03                                            | -0.12  |

**Data sorted by Laboratory Average**

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 1.00    | ×   | RQ  | 16.00   |     | PV  | 17.33   |     | IC  |
| 7.33    | ×   | SM  | 16.33   |     | PT  | 17.33   |     | FJ  |
| 10.00   | ×   | QK  | 16.67   |     | BC  | 17.33   |     | EL  |
| 12.33   |     | Q   | 17.00   |     | X   | 17.67   |     | VG  |
| 14.67   |     | LS  | 17.00   |     | QM  | 17.67   |     | PU  |
| 14.67   |     | DT  | 17.00   |     | DG  | 17.67   |     | NJ  |
| 15.00   |     | HP  | 17.33   |     | R   | 17.67   |     | EB  |
| 15.67   |     | RC  | 17.33   |     | JS  | 18.00   |     | T   |

• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

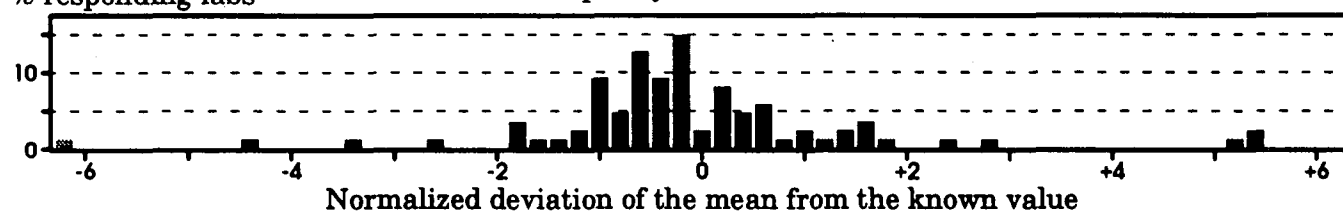
## Strontium 90

## Data sorted by Laboratory Average

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 18.00   |     | RH  | 19.33   |     | KX  | 21.00   |     | DO  |
| 18.00   |     | EH  | 19.33   |     | DD  | 21.33   |     | QJ  |
| 18.00   |     | CX  | 19.67   |     | Z   | 21.67   |     | UX  |
| 18.00   |     | CQ  | 19.67   |     | RV  | 21.67   |     | PP  |
| 18.00   |     | CJ  | 19.67   |     | FE  | 22.00   |     | DH  |
| 18.00   |     | CA  | 19.67   |     | BO  | 22.00   |     | DE  |
| 18.00   |     | BA  | 19.67   |     | AZ  | 22.00   |     | AL  |
| 18.00   |     | AF  | 19.67   |     | AK  | 22.33   |     | K   |
| 18.33   |     | TQ  | 19.67   |     | AA  | 23.00   |     | SC  |
| 18.33   |     | BL  | 19.67   |     | A   | 23.00   |     | M   |
| 18.67   |     | SD  | 20.00   |     | SI  | 23.67   |     | TL  |
| 18.67   |     | BG  | 20.00   |     | J   | 24.00   |     | VL  |
| 19.00   |     | VO  | 20.33   |     | PB  | 24.00   |     | TB  |
| 19.00   |     | SS  | 20.33   |     | JE  | 24.33   |     | JY  |
| 19.00   |     | MQ  | 20.33   |     | HU  | 24.67   |     | SW  |
| 19.00   |     | KH  | 20.67   |     | RA  | 24.67   |     | QU  |
| 19.00   |     | FZ  | 20.67   |     | NP  | 25.00   |     | QW  |
| 19.00   |     | EZ  | 20.67   |     | LT  | 27.00   |     | HE  |
| 19.33   |     | TI  | 20.67   |     | KL  | 28.00   |     | LR  |
| 19.33   |     | QZ  | 21.00   |     | VA  | 35.00   | ×   | VP  |
| 19.33   |     | OA  | 21.00   |     | E   | 35.33   | ×   | TD  |
|         |     |     |         |     |     | 35.67   | ×   | RU  |

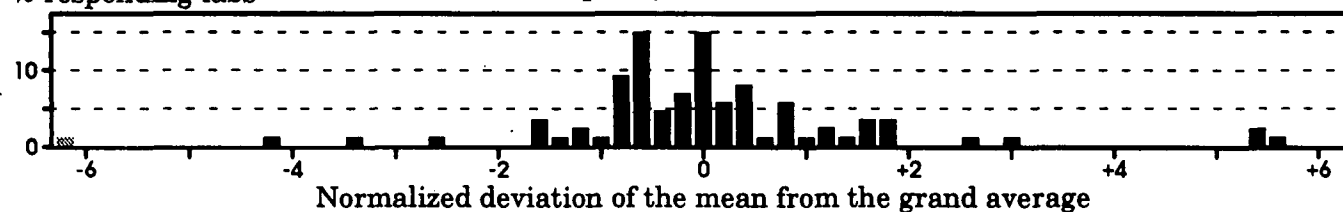
% responding labs

Frequency distribution



% responding labs

Frequency distribution



• ≡ No data submitted

TAG SYMBOLS

↑ ≡ Above control limit

∅ ≡ Insufficient data

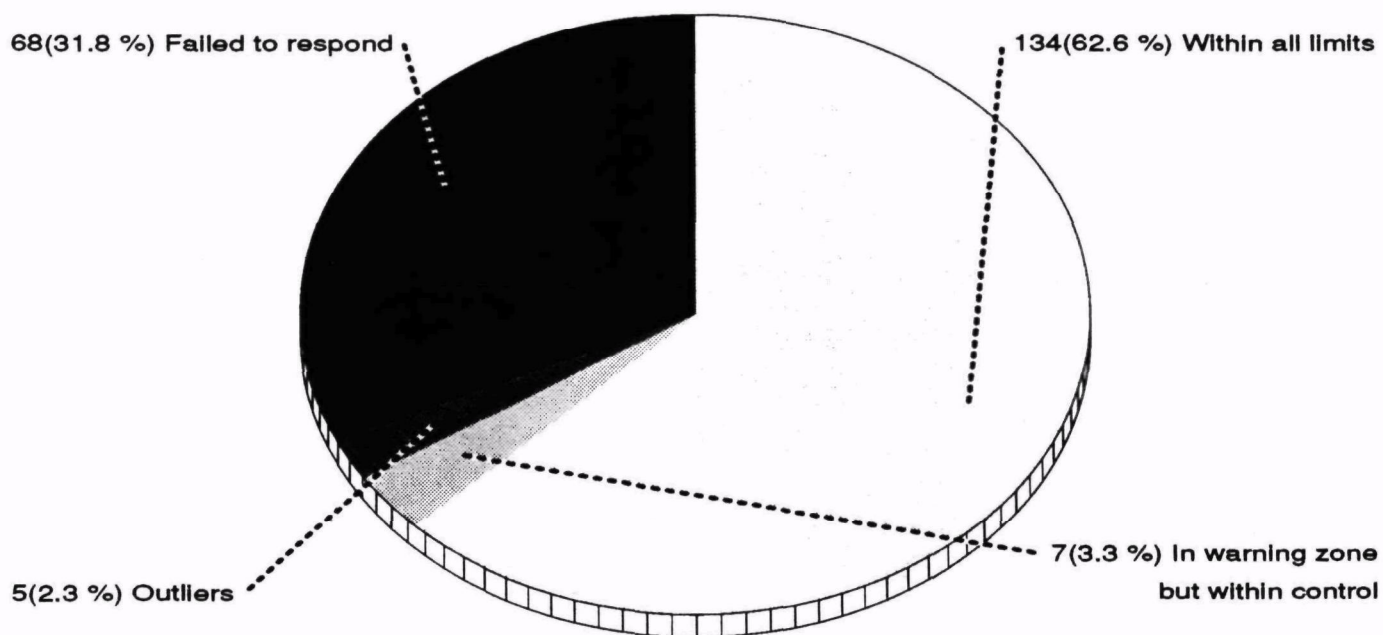
× ≡ Determined to be an outlier

↓ ≡ Below control limit

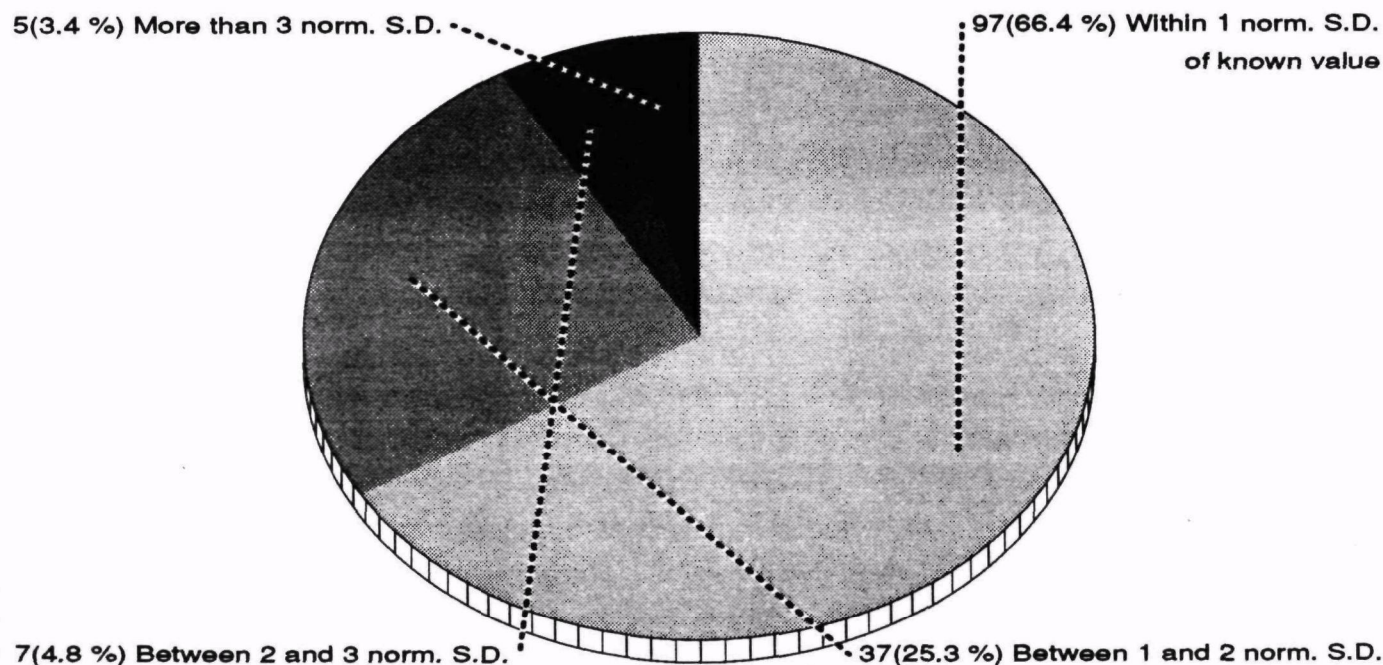
**Cesium 137**
**Statistical Summary**

214 Participants

The known value of this nuclide is **15.0 pCi/F** with an expected precision of **5.0**; the control limits are 6.3 to 23.7; the warning regions are 6.3 to 9.2 and 20.8 to 23.7



| Statistic                              | Respondents | Non-outliers           |
|----------------------------------------|-------------|------------------------|
| Mean                                   | 17.17       | <b>Grand Avg 16.59</b> |
| Std. Dev.                              | 4.10        | 2.42                   |
| Variance                               | 16.83       | 5.87                   |
| % Coef. of Var.                        | 23.90       | 14.61                  |
| % deviation of mean from known value   | 14.44       | 10.59                  |
| Norm. dev. of mean from known value    | 0.53        | 0.66                   |
| Median                                 | 16.33       | 16.33                  |
| % deviation of median from known value | 8.89        | 8.89                   |
| Norm. dev. of median from known value  | 0.33        | 0.55                   |



**Cesium 137**

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) Tag |        |
|-----|--------|--------|--------|-----------------|----------------------|---------|-------------------------------------------------|--------|
| A   | 14.0   | 16.0   | 15.0   | 1.00            | 0.236                | 15.00   | -0.55                                           | 0.00   |
| AA  | 20.0   | 20.0   | 18.0   | 1.15            | 0.236                | 19.33   | 0.95                                            | 1.50   |
| AE  | 20.0   | 18.0   | 18.0   | 1.15            | 0.236                | 18.67   | 0.72                                            | 1.27   |
| AF  | 17.0   | 15.0   | 19.0   | 2.00            | 0.473                | 17.00   | 0.14                                            | 0.69   |
| AI  |        |        |        |                 |                      |         |                                                 | •      |
| AJ  |        |        |        |                 |                      |         |                                                 | •      |
| AK  | 15.0   | 15.0   | 15.0   | 0.00            | 0.000                | 15.00   | -0.55                                           | 0.00   |
| AL  | 15.0   | 14.0   | 15.0   | 0.58            | 0.118                | 14.67   | -0.67                                           | -0.12  |
| AN  | 23.0   | 17.0   | 18.0   | 3.21            | 0.709                | 19.33   | 0.95                                            | 1.50   |
| AP  |        |        |        |                 |                      |         |                                                 | •      |
| AU  | 16.0   | 17.0   | 15.0   | 1.00            | 0.236                | 16.00   | -0.20                                           | 0.35   |
| AZ  | 16.0   | 17.0   | 17.0   | 0.58            | 0.118                | 16.67   | 0.03                                            | 0.58   |
| BA  | 16.0   | 15.0   | 15.0   | 0.58            | 0.118                | 15.33   | -0.43                                           | 0.12   |
| BC  | 23.0   | 23.0   | 22.0   | 0.58            | 0.118                | 22.67   | 2.11                                            | 2.66   |
| BG  | 35.0   | 25.0   | 30.0   | 5.00            | 1.345                | 30.00   | 4.65                                            | 5.20 x |
| BH  | 15.0   | 16.0   | 15.0   | 0.58            | 0.118                | 15.33   | -0.43                                           | 0.12   |
| BI  | 20.0   | 20.0   | 19.0   | 0.58            | 0.118                | 19.67   | 1.07                                            | 1.62   |
| BK  |        |        |        |                 |                      |         |                                                 | •      |
| BL  | 14.0   | 16.0   | 15.0   | 1.00            | 0.236                | 15.00   | -0.55                                           | 0.00   |
| BM  | 16.0   | 16.0   | 16.0   | 0.00            | 0.000                | 16.00   | -0.20                                           | 0.35   |
| BO  | 13.0   | 15.0   | 16.0   | 1.53            | 0.354                | 14.67   | -0.67                                           | -0.12  |
| BW  | 34.0   | 33.0   | 24.0   | 5.51            | 1.345                | 30.33   | 4.76                                            | 5.31 x |
| C   | 14.0   | 15.0   | 15.0   | 0.58            | 0.118                | 14.67   | -0.67                                           | -0.12  |
| CA  | 14.0   | 14.0   | 14.0   | 0.00            | 0.000                | 14.00   | -0.90                                           | -0.35  |
| CC  |        |        |        |                 |                      |         |                                                 | •      |
| CE  | 13.0   | 13.0   | 13.0   | 0.00            | 0.000                | 13.00   | -1.24                                           | -0.69  |
| CJ  | 16.0   | 16.0   | 19.0   | 1.73            | 0.354                | 17.00   | 0.14                                            | 0.69   |
| CM  |        |        |        |                 |                      |         |                                                 | •      |
| CO  | 17.0   | 17.0   | 15.0   | 1.15            | 0.236                | 16.33   | -0.09                                           | 0.46   |
| CP  | 18.0   | 17.0   | 18.0   | 0.58            | 0.118                | 17.67   | 0.37                                            | 0.92   |
| CQ  | 19.0   | 21.0   | 20.0   | 1.00            | 0.236                | 20.00   | 1.18                                            | 1.73   |
| CS  |        |        |        |                 |                      |         |                                                 | •      |
| CX  | 19.0   | 17.0   | 21.0   | 2.00            | 0.473                | 19.00   | 0.84                                            | 1.39   |
| D   | 17.0   | 15.0   | 15.0   | 1.15            | 0.236                | 15.67   | -0.32                                           | 0.23   |
| DD  | 21.0   | 19.0   | 19.0   | 1.15            | 0.236                | 19.67   | 1.07                                            | 1.62   |
| DE  | 16.0   | 16.0   | 17.0   | 0.58            | 0.118                | 16.33   | -0.09                                           | 0.46   |
| DG  | 19.0   | 18.0   | 16.0   | 1.53            | 0.354                | 17.67   | 0.37                                            | 0.92   |
| DH  | 16.0   | 15.0   | 15.0   | 0.58            | 0.118                | 15.33   | -0.43                                           | 0.12   |
| DI  |        |        |        |                 |                      |         |                                                 | •      |
| DJ  |        |        |        |                 |                      |         |                                                 | •      |
| DL  | 15.0   | 14.0   | 16.0   | 1.00            | 0.236                | 15.00   | -0.55                                           | 0.00   |
| DM  |        |        |        |                 |                      |         |                                                 | •      |
| DO  | 18.0   | 17.0   | 17.0   | 0.58            | 0.118                | 17.33   | 0.26                                            | 0.81   |
| DP  |        |        |        |                 |                      |         |                                                 | •      |
| DT  | 18.0   | 18.0   | 15.0   | 1.73            | 0.354                | 17.00   | 0.14                                            | 0.69   |

• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

Ø = Insufficient data

x = Determined to be an outlier

↓ = Below control limit

**Cesium 137**

| Lab       | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----------|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| <b>DX</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>E</b>  | 16.0   | 16.0   | 15.0   | 0.58            | 0.118                | 15.67   | -0.32                                       | 0.23  |     |
| <b>EA</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EB</b> | 15.0   | 15.0   | 14.0   | 0.58            | 0.118                | 14.67   | -0.67                                       | -0.12 |     |
| <b>EF</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EH</b> | 17.0   | 16.0   | 14.0   | 1.53            | 0.354                | 15.67   | -0.32                                       | 0.23  |     |
| <b>EL</b> | 15.0   | 16.0   | 17.0   | 1.00            | 0.236                | 16.00   | -0.20                                       | 0.35  |     |
| <b>EW</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>EX</b> | 20.0   | 20.0   | 18.0   | 1.15            | 0.236                | 19.33   | 0.95                                        | 1.50  |     |
| <b>EZ</b> | 18.0   | 17.0   | 16.0   | 1.00            | 0.236                | 17.00   | 0.14                                        | 0.69  |     |
| <b>FE</b> | 14.0   | 14.0   | 12.0   | 1.15            | 0.236                | 13.33   | -1.13                                       | -0.58 |     |
| <b>FJ</b> | 13.0   | 18.0   | 19.0   | 3.21            | 0.709                | 16.67   | 0.03                                        | 0.58  |     |
| <b>FK</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>FL</b> | 17.0   | 18.0   | 18.0   | 0.58            | 0.118                | 17.67   | 0.37                                        | 0.92  |     |
| <b>FO</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>FZ</b> | 14.0   | 14.0   | 14.0   | 0.00            | 0.000                | 14.00   | -0.90                                       | -0.35 |     |
| <b>GE</b> | 14.0   | 16.0   | 15.0   | 1.00            | 0.236                | 15.00   | -0.55                                       | 0.00  |     |
| <b>GI</b> | 19.0   | 20.0   | 19.0   | 0.58            | 0.118                | 19.33   | 0.95                                        | 1.50  |     |
| <b>GQ</b> | 15.0   | 15.0   | 15.0   | 0.00            | 0.000                | 15.00   | -0.55                                       | 0.00  |     |
| <b>HE</b> | 15.0   | 15.0   | 15.0   | 0.00            | 0.000                | 15.00   | -0.55                                       | 0.00  |     |
| <b>HI</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>HL</b> | 13.0   | 14.0   | 13.0   | 0.58            | 0.118                | 13.33   | -1.13                                       | -0.58 |     |
| <b>HP</b> | 18.0   | 20.0   | 25.0   | 3.61            | 0.827                | 21.00   | 1.53                                        | 2.08  |     |
| <b>HU</b> | 20.0   | 21.0   | 20.0   | 0.58            | 0.118                | 20.33   | 1.30                                        | 1.85  |     |
| <b>HX</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>I</b>  |        |        |        |                 |                      |         |                                             |       | •   |
| <b>IA</b> | 18.0   | 17.0   | 17.0   | 0.58            | 0.118                | 17.33   | 0.26                                        | 0.81  |     |
| <b>IC</b> | 17.0   | 19.0   | 18.0   | 1.00            | 0.236                | 18.00   | 0.49                                        | 1.04  |     |
| <b>IE</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>II</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>IU</b> | 17.0   | 18.0   | 17.0   | 0.58            | 0.118                | 17.33   | 0.26                                        | 0.81  |     |
| <b>IY</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>J</b>  | 17.0   | 16.0   | 18.0   | 1.00            | 0.236                | 17.00   | 0.14                                        | 0.69  |     |
| <b>JE</b> | 18.0   | 17.0   | 20.0   | 1.53            | 0.354                | 18.33   | 0.60                                        | 1.15  |     |
| <b>JI</b> | 13.0   | 14.0   | 12.0   | 1.00            | 0.236                | 13.00   | -1.24                                       | -0.69 |     |
| <b>JS</b> | 14.0   | 14.0   | 15.0   | 0.58            | 0.118                | 14.33   | -0.78                                       | -0.23 |     |
| <b>JY</b> | 20.0   | 16.0   | 19.0   | 2.08            | 0.473                | 18.33   | 0.60                                        | 1.15  |     |
| <b>K</b>  | 19.0   | 27.0   | 22.0   | 4.04            | 0.945                | 22.67   | 2.11                                        | 2.66  |     |
| <b>KF</b> |        |        |        |                 |                      |         |                                             |       | •   |
| <b>KH</b> | 18.0   | 23.0   | 26.0   | 4.04            | 0.945                | 22.33   | 1.99                                        | 2.54  |     |
| <b>KL</b> | 18.0   | 19.0   | 19.0   | 0.58            | 0.118                | 18.67   | 0.72                                        | 1.27  |     |
| <b>KM</b> | 15.0   | 15.0   | 12.0   | 1.73            | 0.354                | 14.00   | -0.90                                       | -0.35 |     |
| <b>KX</b> | 13.0   | 14.0   | 14.0   | 0.58            | 0.118                | 13.67   | -1.01                                       | -0.46 |     |
| <b>L</b>  | 10.0   | 10.0   | 9.0    | 0.58            | 0.118                | 9.67    | -2.40                                       | -1.85 |     |
| <b>LA</b> |        |        |        |                 |                      |         |                                             |       | •   |

• ≡ No data submitted

**TAG SYMBOLS**

↑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

↓ ≡ Below control limit

## Cesium 137

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| LE  | 28.0   | 26.0   | 26.0   | 1.15            | 0.236                | 26.67   | 3.49                                        | 4.04  | ×   |
| LF  | 15.0   | 15.0   | 17.0   | 1.15            | 0.236                | 15.67   | -0.32                                       | 0.23  |     |
| LM  |        |        |        |                 |                      |         |                                             |       | •   |
| LR  | 16.0   | 17.0   | 16.0   | 0.58            | 0.118                | 16.33   | -0.09                                       | 0.46  |     |
| LS  |        |        |        |                 |                      |         |                                             |       | •   |
| LT  | 15.0   | 15.0   | 15.0   | 0.00            | 0.000                | 15.00   | -0.55                                       | 0.00  |     |
| LZ  |        |        |        |                 |                      |         |                                             |       | •   |
| M   | 17.0   | 19.0   | 19.0   | 1.15            | 0.236                | 18.33   | 0.60                                        | 1.15  |     |
| MA  | 11.0   | 17.0   | 11.0   | 3.46            | 0.709                | 13.00   | -1.24                                       | -0.69 |     |
| ML  | 17.0   | 18.0   | 19.0   | 1.00            | 0.236                | 18.00   | 0.49                                        | 1.04  |     |
| MN  |        |        |        |                 |                      |         |                                             |       | •   |
| MP  | 15.0   | 15.0   | 16.0   | 0.58            | 0.118                | 15.33   | -0.43                                       | 0.12  |     |
| MQ  | 19.0   | 19.0   | 18.0   | 0.58            | 0.118                | 18.67   | 0.72                                        | 1.27  |     |
| MV  | 18.0   | 18.0   | 19.0   | 0.58            | 0.118                | 18.33   | 0.60                                        | 1.15  |     |
| N   | 15.0   | 16.0   | 16.0   | 0.58            | 0.118                | 15.67   | -0.32                                       | 0.23  |     |
| NC  |        |        |        |                 |                      |         |                                             |       | •   |
| NF  |        |        |        |                 |                      |         |                                             |       | •   |
| NH  | 20.0   | 18.0   | 19.0   | 1.00            | 0.236                | 19.00   | 0.84                                        | 1.39  |     |
| NJ  | 18.0   | 15.0   | 15.0   | 1.73            | 0.354                | 16.00   | -0.20                                       | 0.35  |     |
| NK  |        |        |        |                 |                      |         |                                             |       | •   |
| NP  | 13.0   | 15.0   | 12.0   | 1.53            | 0.354                | 13.33   | -1.13                                       | -0.58 |     |
| NT  |        |        |        |                 |                      |         |                                             |       | •   |
| NZ  | 23.0   | 23.0   | 14.0   | 5.20            | 1.120                | 20.00   | 1.18                                        | 1.73  |     |
| O   | 17.0   | 16.0   | 15.0   | 1.00            | 0.236                | 16.00   | -0.20                                       | 0.35  |     |
| OA  | 15.0   | 15.0   | 16.0   | 0.58            | 0.118                | 15.33   | -0.43                                       | 0.12  |     |
| OB  | 15.0   | 14.0   | 10.0   | 2.65            | 0.591                | 13.00   | -1.24                                       | -0.69 |     |
| OL  |        |        |        |                 |                      |         |                                             |       | •   |
| OM  | 16.0   | 15.0   | 20.0   | 2.65            | 0.591                | 17.00   | 0.14                                        | 0.69  |     |
| OQ  |        |        |        |                 |                      |         |                                             |       | •   |
| OS  |        |        |        |                 |                      |         |                                             |       | •   |
| P   | 17.0   | 19.0   | 23.0   | 3.06            | 0.709                | 19.67   | 1.07                                        | 1.62  |     |
| PB  | 15.0   | 15.0   | 16.0   | 0.58            | 0.118                | 15.33   | -0.43                                       | 0.12  |     |
| PC  |        |        |        |                 |                      |         |                                             |       | •   |
| PI  | 14.0   | 13.0   | 14.0   | 0.58            | 0.118                | 13.67   | -1.01                                       | -0.46 |     |
| PM  |        |        |        |                 |                      |         |                                             |       | •   |
| PP  | 19.0   | 19.0   | 18.0   | 0.58            | 0.118                | 18.67   | 0.72                                        | 1.27  |     |
| PQ  | 18.0   | 18.0   | 18.0   | 0.00            | 0.000                | 18.00   | 0.49                                        | 1.04  |     |
| PT  | 19.0   | 21.0   | 21.0   | 1.15            | 0.236                | 20.33   | 1.30                                        | 1.85  |     |
| PU  | 22.0   | 25.0   | 18.0   | 3.51            | 0.827                | 21.67   | 1.76                                        | 2.31  |     |
| PV  | 17.0   | 18.0   | 19.0   | 1.00            | 0.236                | 18.00   | 0.49                                        | 1.04  |     |
| PW  | 13.0   | 14.0   | 16.0   | 1.53            | 0.354                | 14.33   | -0.78                                       | -0.23 |     |
| Q   | 16.0   | 17.0   | 18.0   | 1.00            | 0.236                | 17.00   | 0.14                                        | 0.69  |     |
| QA  | 18.0   | 18.0   | 18.0   | 0.00            | 0.000                | 18.00   | 0.49                                        | 1.04  |     |
| QB  | 15.0   | 16.0   | 14.0   | 1.00            | 0.236                | 15.00   | -0.55                                       | 0.00  |     |
| QC  |        |        |        |                 |                      |         |                                             |       | •   |

• ≡ No data submitted

## TAG SYMBOLS

↑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

↓ ≡ Below control limit

## Cesium 137

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| QD  |        |        |        |                 |                      |         |                                             |       | •   |
| QI  |        |        |        |                 |                      |         |                                             |       | •   |
| QJ  | 14.0   | 14.0   | 13.0   | 0.58            | 0.118                | 13.67   | -1.01                                       | -0.46 |     |
| QK  | 14.0   | 14.0   | 14.0   | 0.00            | 0.000                | 14.00   | -0.90                                       | -0.35 |     |
| QL  | 16.0   | 15.0   | 15.0   | 0.58            | 0.118                | 15.33   | -0.43                                       | 0.12  |     |
| QM  | 15.0   | 16.0   | 16.0   | 0.58            | 0.118                | 15.67   | -0.32                                       | 0.23  |     |
| QQ  |        |        |        |                 |                      |         |                                             |       | •   |
| QU  | 15.0   | 12.0   | 11.0   | 2.08            | 0.473                | 12.67   | -1.36                                       | -0.81 |     |
| QW  | 12.0   | 13.0   | 14.0   | 1.00            | 0.236                | 13.00   | -1.24                                       | -0.69 |     |
| QX  | 16.0   | 16.0   | 19.0   | 1.73            | 0.354                | 17.00   | 0.14                                        | 0.69  |     |
| QZ  | 16.0   | 15.0   | 16.0   | 0.58            | 0.118                | 15.67   | -0.32                                       | 0.23  |     |
| R   | 16.0   | 16.0   | 16.0   | 0.00            | 0.000                | 16.00   | -0.20                                       | 0.35  |     |
| RA  | 17.0   | 17.0   | 18.0   | 0.58            | 0.118                | 17.33   | 0.26                                        | 0.81  |     |
| RC  | 19.0   | 18.0   | 19.0   | 0.58            | 0.118                | 18.67   | 0.72                                        | 1.27  |     |
| RG  |        |        |        |                 |                      |         |                                             |       | •   |
| RH  | 12.0   | 12.0   | 11.0   | 0.58            | 0.118                | 11.67   | -1.71                                       | -1.15 |     |
| RJ  |        |        |        |                 |                      |         |                                             |       | •   |
| RK  |        |        |        |                 |                      |         |                                             |       | •   |
| RO  | 15.0   | 14.0   | 17.0   | 1.53            | 0.354                | 15.33   | -0.43                                       | 0.12  |     |
| RQ  | 17.0   | 16.0   | 13.0   | 2.08            | 0.473                | 15.33   | -0.43                                       | 0.12  |     |
| RU  | 16.0   | 18.0   | 18.0   | 1.15            | 0.236                | 17.33   | 0.26                                        | 0.81  |     |
| RV  | 15.0   | 15.0   | 17.0   | 1.15            | 0.236                | 15.67   | -0.32                                       | 0.23  |     |
| RW  |        |        |        |                 |                      |         |                                             |       | •   |
| S   | 15.0   | 16.0   | 16.0   | 0.58            | 0.118                | 15.67   | -0.32                                       | 0.23  |     |
| SC  | 15.0   | 15.0   | 18.0   | 1.73            | 0.354                | 16.00   | -0.20                                       | 0.35  |     |
| SD  | 14.0   | 17.0   | 16.0   | 1.53            | 0.354                | 15.67   | -0.32                                       | 0.23  |     |
| SF  |        |        |        |                 |                      |         |                                             |       | •   |
| SI  | 19.0   | 19.0   | 19.0   | 0.00            | 0.000                | 19.00   | 0.84                                        | 1.39  |     |
| SM  | 15.0   | 20.0   | 22.0   | 3.61            | 0.827                | 19.00   | 0.84                                        | 1.39  |     |
| SP  |        |        |        |                 |                      |         |                                             |       | •   |
| SQ  |        |        |        |                 |                      |         |                                             |       | •   |
| SR  | 15.0   | 16.0   | 19.0   | 2.08            | 0.473                | 16.67   | 0.03                                        | 0.58  |     |
| SS  | 16.0   | 16.0   | 16.0   | 0.00            | 0.000                | 16.00   | -0.20                                       | 0.35  |     |
| SW  | 17.0   | 17.0   | 17.0   | 0.00            | 0.000                | 17.00   | 0.14                                        | 0.69  |     |
| SX  | 15.0   | 15.0   | 15.0   | 0.00            | 0.000                | 15.00   | -0.55                                       | 0.00  |     |
| SZ  | 23.0   | 22.0   | 22.0   | 0.58            | 0.118                | 22.33   | 1.99                                        | 2.54  |     |
| T   | 14.0   | 16.0   | 16.0   | 1.15            | 0.236                | 15.33   | -0.43                                       | 0.12  |     |
| TA  | 17.0   | 17.0   | 18.0   | 0.58            | 0.118                | 17.33   | 0.26                                        | 0.81  |     |
| TB  | 22.0   | 21.0   | 15.0   | 3.79            | 0.827                | 19.33   | 0.95                                        | 1.50  |     |
| TD  | 11.0   | 10.0   | 9.0    | 1.00            | 0.236                | 10.00   | -2.28                                       | -1.73 |     |
| TE  | 19.0   | 19.0   | 18.0   | 0.58            | 0.118                | 18.67   | 0.72                                        | 1.27  |     |
| TH  |        |        |        |                 |                      |         |                                             |       | •   |
| TI  | 17.0   | 16.0   | 16.0   | 0.58            | 0.118                | 16.33   | -0.09                                       | 0.46  |     |
| TL  | 18.0   | 17.0   | 17.0   | 0.58            | 0.118                | 17.33   | 0.26                                        | 0.81  |     |
| TP  | 16.0   | 15.0   | 15.0   | 0.58            | 0.118                | 15.33   | -0.43                                       | 0.12  |     |

• ≡ No data submitted

## TAG SYMBOLS

↑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

↓ ≡ Below control limit

**Cesium 137**

| Lab | Res. 1 | Res. 2 | Res. 3 | Exper.<br>Sigma | Rng anal<br>(R + SR) | Average | Normalized deviation<br>(grand-avg) (known) |       | Tag |
|-----|--------|--------|--------|-----------------|----------------------|---------|---------------------------------------------|-------|-----|
| TQ  | 18.0   | 17.0   | 16.0   | 1.00            | 0.236                | 17.00   | 0.14                                        | 0.69  |     |
| TR  |        |        |        |                 |                      |         |                                             |       | •   |
| TS  |        |        |        |                 |                      |         |                                             |       | •   |
| TT  |        |        |        |                 |                      |         |                                             |       | •   |
| TU  | 52.0   | 50.0   | 38.0   | 7.57            | 2.245                | 46.67   | 10.42                                       | 10.97 | ×   |
| TV  |        |        |        |                 |                      |         |                                             |       | •   |
| TW  |        |        |        |                 |                      |         |                                             |       | •   |
| UB  |        |        |        |                 |                      |         |                                             |       | •   |
| UE  |        |        |        |                 |                      |         |                                             |       | •   |
| UJ  |        |        |        |                 |                      |         |                                             |       | •   |
| UK  |        |        |        |                 |                      |         |                                             |       | •   |
| UV  |        |        |        |                 |                      |         |                                             |       | •   |
| UX  | 19.0   | 20.0   | 22.0   | 1.53            | 0.354                | 20.33   | 1.30                                        | 1.85  |     |
| UY  | 16.0   | 17.0   | 16.0   | 0.58            | 0.118                | 16.33   | -0.09                                       | 0.46  |     |
| UZ  |        |        |        |                 |                      |         |                                             |       | •   |
| VA  | 14.0   | 14.0   | 14.0   | 0.00            | 0.000                | 14.00   | -0.90                                       | -0.35 |     |
| VB  | 16.0   | 18.0   | 17.0   | 1.00            | 0.236                | 17.00   | 0.14                                        | 0.69  |     |
| VC  |        |        |        |                 |                      |         |                                             |       | •   |
| VE  | 19.0   | 17.0   | 13.0   | 3.06            | 0.709                | 16.33   | -0.09                                       | 0.46  |     |
| VF  |        |        |        |                 |                      |         |                                             |       | •   |
| VG  | 16.0   | 15.0   | 15.0   | 0.58            | 0.118                | 15.33   | -0.43                                       | 0.12  |     |
| VH  | 18.0   | 20.0   | 23.0   | 2.52            | 0.591                | 20.33   | 1.30                                        | 1.85  |     |
| VI  |        |        |        |                 |                      |         |                                             |       | •   |
| VK  |        |        |        |                 |                      |         |                                             |       | •   |
| VL  | 15.0   | 16.0   | 17.0   | 1.00            | 0.236                | 16.00   | -0.20                                       | 0.35  |     |
| VM  | 19.0   | 18.0   | 17.0   | 1.00            | 0.236                | 18.00   | 0.49                                        | 1.04  |     |
| VO  | 15.0   | 15.0   | 15.0   | 0.00            | 0.000                | 15.00   | -0.55                                       | 0.00  |     |
| VP  | 23.0   | 25.0   | 20.0   | 2.52            | 0.591                | 22.67   | 2.11                                        | 2.66  |     |
| VQ  |        |        |        |                 |                      |         |                                             |       | •   |
| VT  |        |        |        |                 |                      |         |                                             |       | •   |
| WB  |        |        |        |                 |                      |         |                                             |       | •   |
| X   | 15.0   | 15.0   | 16.0   | 0.58            | 0.118                | 15.33   | -0.43                                       | 0.12  |     |
| Y   | 16.0   | 15.0   | 16.0   | 0.58            | 0.118                | 15.67   | -0.32                                       | 0.23  |     |
| Z   | 32.0   | 34.0   | 35.0   | 1.53            | 0.354                | 33.67   | 5.92                                        | 6.47  | ×   |

**Data sorted by Laboratory Average**

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 9.67    |     | L   | 13.00   |     | CE  | 14.00   |     | QK  |
| 10.00   |     | TD  | 13.33   |     | NP  | 14.00   |     | KM  |
| 11.67   |     | RH  | 13.33   |     | HL  | 14.00   |     | FZ  |
| 12.67   |     | QU  | 13.33   |     | FE  | 14.00   |     | CA  |
| 13.00   |     | QW  | 13.67   |     | QJ  | 14.33   |     | PW  |
| 13.00   |     | OB  | 13.67   |     | PI  | 14.33   |     | JS  |
| 13.00   |     | MA  | 13.67   |     | KX  | 14.67   |     | EB  |
| 13.00   |     | JI  | 14.00   |     | VA  | 14.67   |     | C   |

• = No data submitted

**TAG SYMBOLS**

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

**Cesium 137****Data sorted by Laboratory Average**

| Average | Tag | Lab | Average | Tag | Lab | Average | Tag | Lab |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| 14.67   |     | BO  | 16.00   |     | R   | 18.00   |     | IC  |
| 14.67   |     | AL  | 16.00   |     | O   | 18.33   |     | MV  |
| 15.00   |     | VO  | 16.00   |     | NJ  | 18.33   |     | M   |
| 15.00   |     | SX  | 16.00   |     | EL  | 18.33   |     | JY  |
| 15.00   |     | QB  | 16.00   |     | BM  | 18.33   |     | JE  |
| 15.00   |     | LT  | 16.00   |     | AU  | 18.67   |     | TE  |
| 15.00   |     | HE  | 16.33   |     | VE  | 18.67   |     | RC  |
| 15.00   |     | GQ  | 16.33   |     | UY  | 18.67   |     | PP  |
| 15.00   |     | GE  | 16.33   |     | TI  | 18.67   |     | MQ  |
| 15.00   |     | DL  | 16.33   |     | LR  | 18.67   |     | KL  |
| 15.00   |     | BL  | 16.33   |     | DE  | 18.67   |     | AE  |
| 15.00   |     | AK  | 16.33   |     | CO  | 19.00   |     | SM  |
| 15.00   |     | A   | 16.67   |     | SR  | 19.00   |     | SI  |
| 15.33   |     | X   | 16.67   |     | FJ  | 19.00   |     | NH  |
| 15.33   |     | VG  | 16.67   |     | AZ  | 19.00   |     | CX  |
| 15.33   |     | TP  | 17.00   |     | VB  | 19.33   |     | TB  |
| 15.33   |     | T   | 17.00   |     | TQ  | 19.33   |     | GI  |
| 15.33   |     | RQ  | 17.00   |     | SW  | 19.33   |     | EX  |
| 15.33   |     | RO  | 17.00   |     | QX  | 19.33   |     | AN  |
| 15.33   |     | QL  | 17.00   |     | Q   | 19.33   |     | AA  |
| 15.33   |     | PB  | 17.00   |     | OM  | 19.67   |     | P   |
| 15.33   |     | OA  | 17.00   |     | J   | 19.67   |     | DD  |
| 15.33   |     | MP  | 17.00   |     | EZ  | 19.67   |     | BI  |
| 15.33   |     | DH  | 17.00   |     | DT  | 20.00   |     | NZ  |
| 15.33   |     | BH  | 17.00   |     | CJ  | 20.00   |     | CQ  |
| 15.33   |     | BA  | 17.00   |     | AF  | 20.33   |     | VH  |
| 15.67   |     | Y   | 17.33   |     | TL  | 20.33   |     | UX  |
| 15.67   |     | SD  | 17.33   |     | TA  | 20.33   |     | PT  |
| 15.67   |     | S   | 17.33   |     | RU  | 20.33   |     | HU  |
| 15.67   |     | RV  | 17.33   |     | RA  | 21.00   |     | HP  |
| 15.67   |     | QZ  | 17.33   |     | IU  | 21.67   |     | PU  |
| 15.67   |     | QM  | 17.33   |     | IA  | 22.33   |     | SZ  |
| 15.67   |     | N   | 17.33   |     | DO  | 22.33   |     | KH  |
| 15.67   |     | LF  | 17.67   |     | FL  | 22.67   |     | VP  |
| 15.67   |     | EH  | 17.67   |     | DG  | 22.67   |     | K   |
| 15.67   |     | E   | 17.67   |     | CP  | 22.67   |     | BC  |
| 15.67   |     | D   | 18.00   |     | VM  | 26.67   | ×   | LE  |
| 16.00   |     | VL  | 18.00   |     | QA  | 30.00   | ×   | BG  |
| 16.00   |     | SS  | 18.00   |     | PV  | 30.33   | ×   | BW  |
| 16.00   |     | SC  | 18.00   |     | PQ  | 33.67   | ×   | Z   |
|         |     |     | 18.00   |     | ML  | 46.67   | ×   | TU  |

• ≡ No data submitted

**TAG SYMBOLS**

↑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

↓ ≡ Below control limit

**Cesium 137**