United States
Environmental Protection
Agency

Office of Research and
Development
Washington, DC 20460

EPA 600/R-95/116B
August 1995

EPA

Blind-B Performance Evaluation Study

A Statistical Evaluation of the April 18, 1995 Data

0593RSD94 cov-116B

Blind-B

Performance Evaluation Study

April 18, 1995

Environmental Protection Agency

National Exposure Research Laboratory

Characterization Research Division

Las Vegas, Nevada

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

Dear Participant,

Enclosed are the results of the Radiation Sciences Branch (CRD-LV) Performance Evaluation Study for ***Blind-B; April 18, 1995.***

The known value for each analysis was determined by gravimetric methods, checked by chemical analyses performed by CRD-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,

George Dilbeck

George Dilbeck
Chemist
Radioanalysis Program

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.

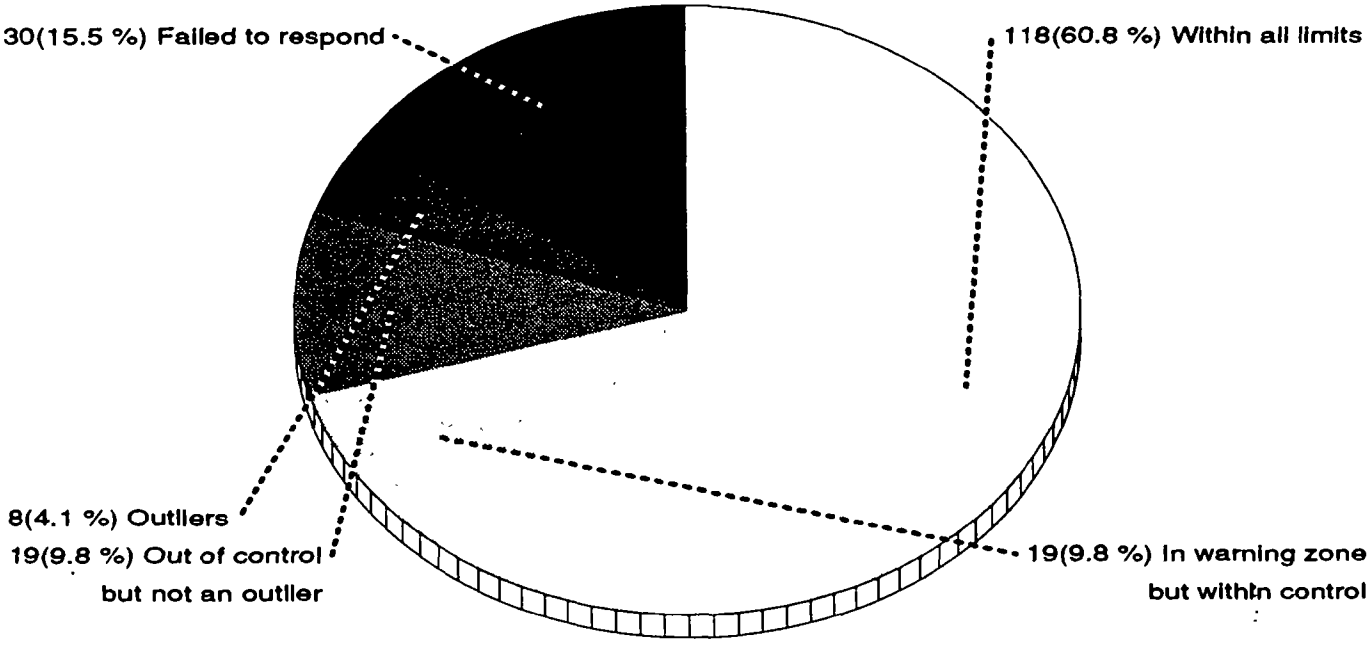
The normalized deviation of the mean from the grand average is calculated from the deviation of the mean from the grand average and the standard error of the mean values. The deviation of the mean from the grand average is calculated by subtracting the grand average from the average of the laboratory's 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.

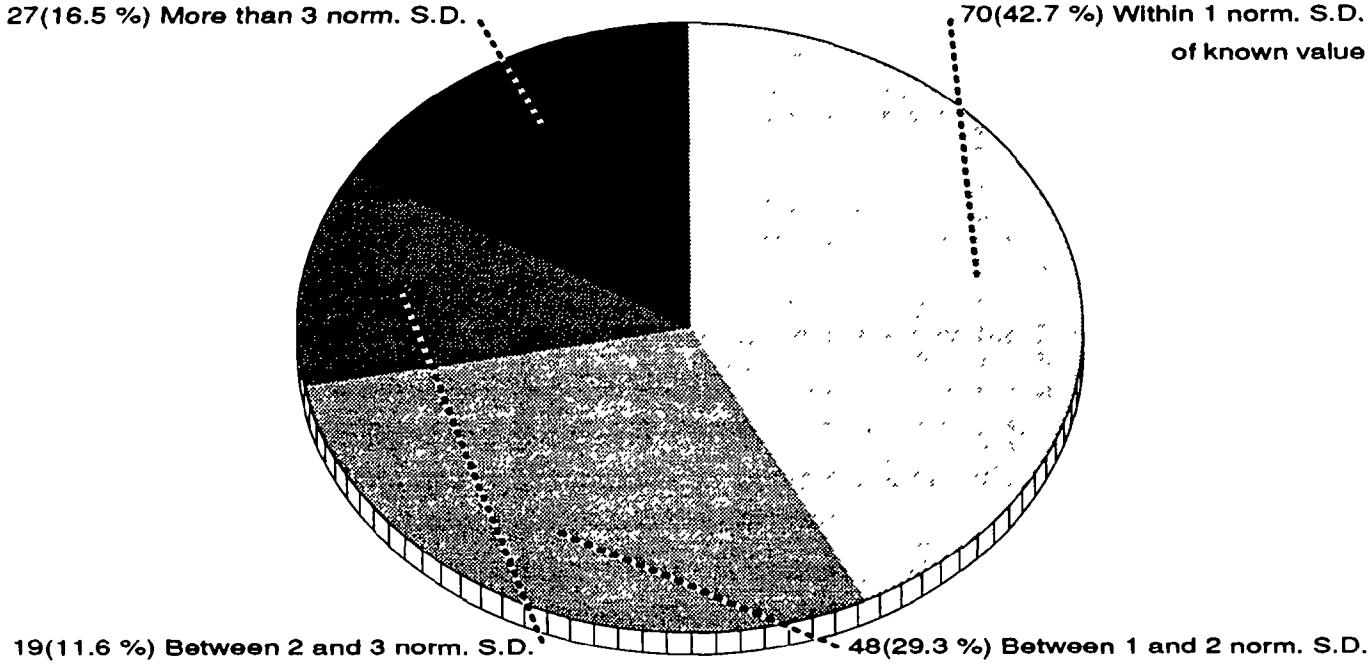
A complete explanation of the statistical calculations involved in the report may be found in the Environmental Radioactivity Performance Evaluation Studies Program information brochure [Draft Revision of EPA-600/4-81-004], available from George Dilbeck, CRD-LV, 702/798-2104.

Gross Beta Statistical Summary 194 Participants

The known value of this nuclide is **86.6 pCi/l** with an expected precision of **10.0**; the control limits are 69.3 to 103.9; the warning regions are 69.3 to 75.0 and 98.2 to 103.9



Statistic	Respondents	Non-outliers
Mean	94.96	**Grand Avg 86.93**
Std. Dev.	83.40	10.42
Variance	6954.79	108.56
% Coef. of Var.	87.83	11.99
% deviation of mean from known value	9.65	0.38
Norm. dev. of mean from known value	0.10	0.03
Median	88.02	87.97
% deviation of median from known value	1.64	1.58
Norm. dev. of median from known value	0.02	0.13



Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
A	91.2	90.1	90.6	0.55	0.065	90.63	0.64	0.70	
AE	66.3	70.0	70.1	2.17	0.224	68.80	-3.14	-3.08	⇓
AF	89.0	86.0	95.0	4.58	0.532	90.00	0.53	0.59	
AH	91.0	93.1	78.2	8.06	0.880	87.43	0.09	0.14	
AI									•
AJ	97.7	96.9	86.3	6.36	0.673	93.63	1.16	1.22	
AK	83.2	87.4	86.1	2.15	0.248	85.57	-0.24	-0.18	
AL	103.7	97.7	99.7	3.05	0.354	100.37	2.33	2.38	
AO									•
AP	90.8	90.4	87.3	1.92	0.207	89.50	0.45	0.50	
AR	103.0	92.2	93.9	5.81	0.638	96.37	1.63	1.69	
AU	107.0	103.0	108.0	2.65	0.295	106.00	3.30	3.36	⇑
AW	92.9	90.1	90.0	1.65	0.171	91.00	0.70	0.76	
AZ	71.0	62.7	60.5	5.54	0.620	64.73	-3.84	-3.79	⇓
BA	86.6	85.7	87.7	1.00	0.118	86.67	-0.05	0.01	
BB	68.6	69.8	69.2	0.60	0.071	69.20	-3.07	-3.01	⇓
BC	81.8	83.1	83.3	0.81	0.089	82.73	-0.73	-0.67	
BG									•
BH	82.2	83.5	83.9	0.89	0.100	83.20	-0.65	-0.59	
BK	91.4	95.6	93.0	2.12	0.248	93.33	1.11	1.17	
BL									•
BM	90.8	90.2	89.8	0.50	0.059	90.27	0.58	0.64	
BN	90.0	90.5	92.1	1.10	0.124	90.87	0.68	0.74	
BO	88.1	91.1	86.9	2.16	0.248	88.70	0.31	0.36	
BS	95.9	97.6	94.3	1.65	0.195	95.93	1.56	1.62	
BW	44.0	62.0	30.0	16.04	2.695	45.33	-7.20	-7.15	×
C	97.1	96.5	95.9	0.60	0.071	96.50	1.66	1.71	
CA	78.2	71.9	74.2	3.19	0.372	74.77	-2.11	-2.05	
CE	94.0	91.5	91.1	1.57	0.171	92.20	0.91	0.97	
CG	90.1	85.6	88.4	2.27	0.266	88.03	0.19	0.25	
CJ	78.0	83.0	80.0	2.52	0.295	80.33	-1.14	-1.09	
CK	85.1	91.1	97.0	5.95	0.703	91.07	0.72	0.77	
CM									•
CO	78.0	78.0	72.7	3.06	0.313	76.23	-1.85	-1.80	
CP	342.0	468.0	405.0	63.00	13.271	405.00	55.09	55.15	×
CQ	85.0	86.0	86.0	0.58	0.059	85.67	-0.22	-0.16	
CS	77.0	83.0	88.1	5.56	0.656	82.70	-0.73	-0.68	
CX	90.3	92.8	93.5	1.68	0.189	92.20	0.91	0.97	
D	96.0	92.3	93.8	1.86	0.219	94.03	1.23	1.29	
DB	98.0	98.0	101.0	1.73	0.177	99.00	2.09	2.15	
DD	91.9	87.6	89.3	2.17	0.254	89.60	0.46	0.52	
DE	89.0	89.0	89.1	0.06	0.006	89.03	0.36	0.42	
DG									•
DJ									•
DL	91.0	89.0	88.0	1.53	0.177	89.33	0.42	0.47	

• ≡ No data submitted

TAG SYMBOLS

⇑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

⇓ ≡ Below control limit

Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
DM	75.7	77.9	80.2	2.25	0.266	77.93	-1.56	-1.50	
DO									•
DS	76.0	76.4	77.6	0.83	0.095	76.67	-1.78	-1.72	
DT	106.0	100.0	106.0	3.46	0.354	104.00	2.96	3.01	⇑
DZ	90.6	91.2	95.0	2.39	0.260	92.27	0.92	0.98	
E	90.0	90.0	90.0	0.00	0.000	90.00	0.53	0.59	
EB	91.5	89.9	89.9	0.92	0.095	90.43	0.61	0.66	
EL									•
EO	86.0	86.0	90.0	2.31	0.236	87.33	0.07	0.13	
ER									•
EV	81.3	81.4	79.6	1.01	0.106	80.77	-1.07	-1.01	
EX									•
FF	67.0	73.0	73.0	3.46	0.354	71.00	-2.76	-2.70	
FJ	75.8	77.1	88.5	6.99	0.750	80.47	-1.12	-1.06	
FL	70.3	75.8	75.2	3.02	0.325	73.77	-2.28	-2.22	
FN	90.9	88.8	87.8	1.58	0.183	89.17	0.39	0.44	
FU	74.2	72.0	75.5	1.77	0.207	73.90	-2.26	-2.20	
FZ	85.0	90.0	89.0	2.65	0.295	88.00	0.19	0.24	
GE	87.0	88.0	88.0	0.58	0.059	87.67	0.13	0.18	
GI									•
GQ	85.3	78.5	80.0	3.57	0.402	81.27	-0.98	-0.92	
GT	67.9	66.4	67.1	0.75	0.089	67.13	-3.43	-3.37	⇓
GZ	122.7	123.5	126.2	1.83	0.207	124.13	6.44	6.50	×
HI	79.0	85.0	75.0	5.03	0.591	79.67	-1.26	-1.20	
HK	93.1	98.7	93.5	3.12	0.331	95.10	1.42	1.47	
HL	81.0	81.0	81.0	0.00	0.000	81.00	-1.03	-0.97	
HP	87.2	86.7	93.2	3.62	0.384	89.03	0.36	0.42	
I	78.8	77.9	76.8	1.00	0.118	77.83	-1.58	-1.52	
IC	75.5	80.0	78.4	2.28	0.266	77.97	-1.55	-1.50	
ID	76.4	80.6	78.6	2.10	0.248	78.53	-1.45	-1.40	
J	87.8	88.9	90.3	1.25	0.148	89.00	0.36	0.42	
JE	100.1	91.6	95.8	4.25	0.502	95.83	1.54	1.60	
JG	95.3	94.6	92.5	1.46	0.165	94.13	1.25	1.30	
JN	76.5	75.2	75.8	0.65	0.077	75.83	-1.92	-1.86	
JQ	121.5	114.9	120.3	3.52	0.390	118.90	5.54	5.59	⇑
JS	102.8	104.9	104.2	1.07	0.124	103.97	2.95	3.01	⇑
JY	79.4	76.9	78.4	1.26	0.148	78.23	-1.51	-1.45	
K	70.2	72.1	72.1	1.10	0.112	71.47	-2.68	-2.62	
KE	80.4	82.2	78.9	1.65	0.195	80.50	-1.11	-1.06	
KT	96.0	96.0	95.0	0.58	0.059	95.67	1.51	1.57	
KX	90.0	91.0	93.0	1.53	0.177	91.33	0.76	0.82	
L	99.0	96.0	98.0	1.53	0.177	97.67	1.86	1.92	
LF	75.0	77.0	73.0	2.00	0.236	75.00	-2.07	-2.01	
LG									•
LL	84.2	81.9	81.6	1.42	0.154	82.57	-0.76	-0.70	

• ≡ No data submitted

∅ ≡ Insufficient data

TAG SYMBOLS

× ≡ Determined to be an outlier

⇑ ≡ Above control limit

⇓ ≡ Below control limit

Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
LR	94.0	91.0	91.0	1.73	0.177	92.00	0.88	0.94	
LT	84.6	75.7	79.9	4.45	0.526	80.07	-1.19	-1.13	
M	104.0	96.0	100.0	4.00	0.473	100.00	2.26	2.32	
MA	37.0	41.0	45.0	4.00	0.473	41.00	-7.96	-7.90	×
MF	77.0	75.1	76.4	0.97	0.112	76.17	-1.86	-1.81	
MP									•
MQ	87.0	88.0	88.0	0.58	0.059	87.67	0.13	0.18	
MV	83.0	87.0	88.0	2.65	0.295	86.00	-0.16	-0.10	
MY									•
N	89.2	89.6	89.1	0.27	0.030	89.30	0.41	0.47	
NA	117.8	121.4	121.0	1.97	0.213	120.07	5.74	5.80	⇑
NH	83.0	81.0	88.0	3.61	0.413	84.00	-0.51	-0.45	
NI									•
NJ	81.0	83.0	81.0	1.15	0.118	81.67	-0.91	-0.85	
NK	94.4	98.7	73.1	13.71	1.975	88.73	0.31	0.37	
NO	98.6	104.0	110.5	5.96	0.703	104.37	3.02	3.08	⇑
NT	88.0	86.6	88.6	1.03	0.118	87.73	0.14	0.20	
O	80.7	79.9	79.6	0.57	0.065	80.07	-1.19	-1.13	
OF	89.5	89.9	86.0	2.15	0.230	88.47	0.27	0.32	
OS	100.7	98.6	98.4	1.27	0.136	99.23	2.13	2.19	
OX									•
OY	1143.0	1090.0	1037.0	53.00	11.021	1090.00	173.74	173.79	×
OZ	164.2	174.0	172.8	5.35	0.579	170.33	14.45	14.50	×
P	101.0	102.0	101.2	0.53	0.059	101.40	2.51	2.56	
PA	90.2	84.9	90.8	3.25	0.348	88.63	0.30	0.35	
PB	99.8	97.1	100.0	1.62	0.171	98.97	2.08	2.14	
PG	88.9	90.7	92.3	1.70	0.201	90.63	0.64	0.70	
PI									•
PM	92.1	88.3	90.1	1.90	0.224	90.17	0.56	0.62	
PQ	86.9	86.6	86.9	0.17	0.018	86.80	-0.02	0.03	
PR	69.0	71.0	70.0	1.00	0.118	70.00	-2.93	-2.88	
PV	77.2	78.3	83.5	3.37	0.372	79.67	-1.26	-1.20	
PW									•
Q	97.7	95.9	96.8	0.90	0.106	96.80	1.71	1.77	
QC	8.2	8.3	7.9	0.21	0.024	8.13	-13.65	-13.59	×
QJ	86.0	87.4	86.7	0.70	0.083	86.70	-0.04	0.02	
QP	98.0	100.0	95.0	2.52	0.295	97.67	1.86	1.92	
QQ	89.0	90.6	90.0	0.81	0.095	89.87	0.51	0.57	
QT	84.2	86.9	88.3	2.08	0.242	86.47	-0.08	-0.02	
QU	76.0	80.8	79.9	2.55	0.284	78.90	-1.39	-1.33	
QW	86.4	85.7	81.3	2.76	0.301	84.47	-0.43	-0.37	
QX	98.6	98.2	95.7	1.57	0.171	97.50	1.83	1.89	
QY									•
QZ	100.6	99.2	101.2	1.03	0.118	100.33	2.32	2.38	
RD	80.0	76.0	81.0	2.65	0.295	79.00	-1.37	-1.32	

• ≡ No data submitted — **TAG SYMBOLS** — ⇑ ≡ Above control limit

∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
RE	67.1	70.1	65.8	2.21	0.254	67.67	-3.34	-3.28	⇓
RF	84.5	85.6	89.5	2.63	0.295	86.53	-0.07	-0.01	
RG	93.0	93.0	96.0	1.73	0.177	94.00	1.22	1.28	
RJ									•
RK	62.1	70.8	61.8	5.11	0.532	64.90	-3.82	-3.76	⇓
RP									•
RR	82.0	83.0	83.0	0.58	0.059	82.67	-0.74	-0.68	
RV	91.0	99.0	99.0	4.62	0.473	96.33	1.63	1.69	
RZ	91.2	90.2	91.6	0.72	0.083	91.00	0.70	0.76	
S	97.3	99.9	97.8	1.38	0.154	98.33	1.98	2.03	
SC	81.1	80.3	86.8	3.54	0.384	82.73	-0.73	-0.67	
SD	65.5	68.1	67.3	1.33	0.154	66.97	-3.46	-3.40	⇓
SF	96.5	90.7	82.5	7.03	0.827	89.90	0.51	0.57	
SI	82.0	84.8	85.5	1.85	0.207	84.10	-0.49	-0.43	
SL	107.0	75.5	104.0	17.39	2.639	95.50	1.48	1.54	
SM	84.5	84.1	83.6	0.45	0.053	84.07	-0.50	-0.44	
SN	79.9	82.3	85.4	2.76	0.325	82.53	-0.76	-0.70	
SO	87.8	85.5	89.3	1.91	0.224	87.53	0.10	0.16	
SR	82.0	82.0	75.0	4.04	0.413	79.67	-1.26	-1.20	
SS	79.8	75.3	72.0	3.92	0.461	75.70	-1.95	-1.89	
ST	85.6	85.3	84.9	0.35	0.041	85.27	-0.29	-0.23	
SX	74.5	100.5	88.8	13.02	2.020	87.93	0.17	0.23	
SZ	117.5	119.8	122.1	2.30	0.272	119.80	5.69	5.75	⇑
T	85.0	82.1	85.0	1.67	0.171	84.03	-0.50	-0.44	
TD	74.2	88.0	72.2	8.60	0.933	78.13	-1.52	-1.47	
TE	71.0	65.0	68.0	3.00	0.354	68.00	-3.28	-3.22	⇓
TH	94.0	96.0	96.0	1.15	0.118	95.33	1.46	1.51	
TI	90.1	97.4	90.3	4.16	0.431	92.60	0.98	1.04	
TL	96.7	97.9	98.8	1.05	0.124	97.80	1.88	1.94	
TN	91.2	100.6	86.1	7.36	0.856	92.63	0.99	1.05	
TQ	76.5	74.9	72.2	2.17	0.254	74.53	-2.15	-2.09	
TS	107.1	104.9	106.4	1.12	0.130	106.13	3.33	3.38	⇑
TY	80.0	79.0	81.0	1.00	0.118	80.00	-1.20	-1.14	
U	85.4	90.3	92.1	3.47	0.396	89.27	0.40	0.46	
UA	130.0	128.0	125.0	2.52	0.295	127.67	7.06	7.11	×
UE	91.9	96.6	89.5	3.61	0.419	92.67	0.99	1.05	
UG									•
UK									•
UN	78.9	68.2	53.3	12.86	1.975	66.80	-3.49	-3.43	⇓
UP	90.3	92.5	92.4	1.24	0.130	91.73	0.83	0.89	
UQ	89.0	90.0	90.0	0.58	0.059	89.67	0.47	0.53	
UW	92.5	93.7	93.6	0.67	0.071	93.27	1.10	1.15	
UY	87.9	86.1	87.1	0.90	0.106	87.03	0.02	0.08	
VA	75.5	52.0	70.7	12.42	1.739	66.07	-3.61	-3.56	⇓
VC									•

• ≡ No data submitted

∅ ≡ Insufficient data

TAG SYMBOLS

× ≡ Determined to be an outlier

⇑ ≡ Above control limit

⇓ ≡ Below control limit

Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
VG	71.6	70.0	68.0	1.80	0.213	69.87	-2.96	-2.90	
VI	69.3	67.6	68.9	0.89	0.100	68.60	-3.17	-3.12	⇓
VJ	76.2	79.8	76.8	1.93	0.213	77.60	-1.62	-1.56	
VM									•
VN									•
VO	90.5	132.0	85.3	25.59	4.349	102.60	2.71	2.77	
VQ									•
VT	91.8	89.4	93.8	2.20	0.260	91.67	0.82	0.88	
VU									•
W	95.7	92.8	93.1	1.59	0.171	93.87	1.20	1.26	
WE	92.1	88.8	89.5	1.74	0.195	90.13	0.55	0.61	
WF	72.3	74.5	76.3	2.00	0.236	74.37	-2.18	-2.12	
X	90.9	86.3	84.9	3.14	0.354	87.37	0.08	0.13	
Z									•

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
8.13	×	QC	76.67		DS	82.73		BC
41.00	×	MA	77.60		VJ	83.20		BH
45.33	×	BW	77.83		I	84.00		NH
64.73	⇓	AZ	77.93		DM	84.03		T
64.90	⇓	RK	77.97		IC	84.07		SM
66.07	⇓	VA	78.13		TD	84.10		SI
66.80	⇓	UN	78.23		JY	84.47		QW
66.97	⇓	SD	78.53		ID	85.27		ST
67.13	⇓	GT	78.90		QU	85.57		AK
67.67	⇓	RE	79.00		RD	85.67		CQ
68.00	⇓	TE	79.67		SR	86.00		MV
68.60	⇓	VI	79.67		PV	86.47		QT
68.80	⇓	AE	79.67		HI	86.53		RF
69.20	⇓	BB	80.00		TY	86.67		BA
69.87		VG	80.07		O	86.70		QJ
70.00		PR	80.07		LT	86.80		PQ
71.00		FF	80.33		CJ	87.03		UY
71.47		K	80.47		FJ	87.33		EO
73.77		FL	80.50		KE	87.37		X
73.90		FU	80.77		EV	87.43		AH
74.37		WF	81.00		HL	87.53		SO
74.53		TQ	81.27		GQ	87.67		MQ
74.77		CA	81.67		NJ	87.67		GE
75.00		LF	82.53		SN	87.73		NT
75.70		SS	82.57		LL	87.93		SX
75.83		JN	82.67		RR	88.00		FZ
76.17		MF	82.70		CS	88.03		CG
76.23		CO	82.73		SC	88.47		OF

• ≡ No data submitted
∅ ≡ Insufficient data

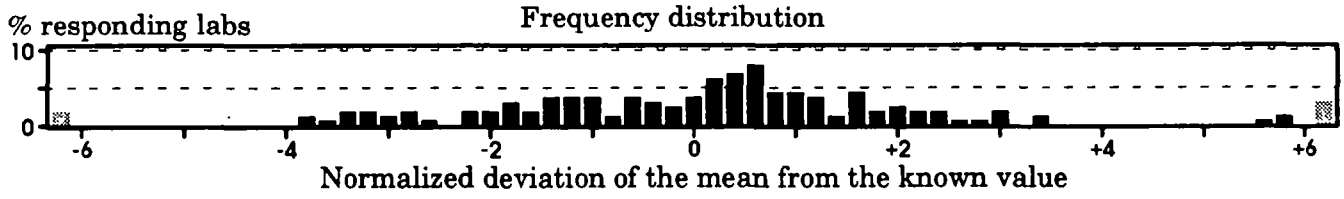
TAG SYMBOLS
× ≡ Determined to be an outlier

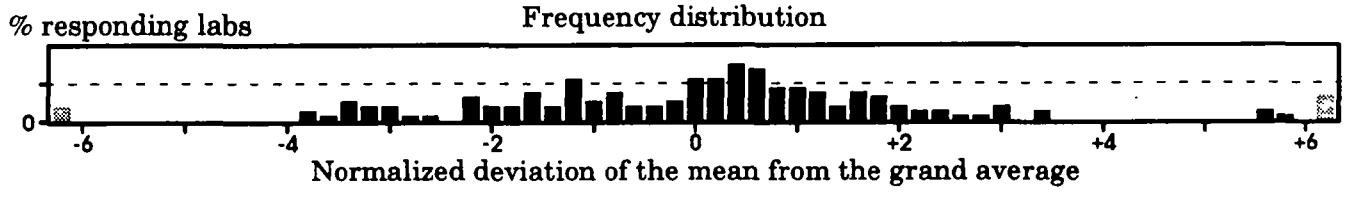
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Gross Beta

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
88.63		PA	91.07		CK	96.80		Q
88.70		BO	91.33		KX	97.50		QX
88.73		NK	91.67		VT	97.67		QP
89.00		J	91.73		UP	97.67		L
89.03		HP	92.00		LR	97.80		TL
89.03		DE	92.20		CX	98.33		S
89.17		FN	92.20		CE	98.97		PB
89.27		U	92.27		DZ	99.00		DB
89.30		N	92.60		TI	99.23		OS
89.33		DL	92.63		TN	100.00		M
89.50		AP	92.67		UE	100.33		QZ
89.60		DD	93.27		UW	100.37		AL
89.67		UQ	93.33		BK	101.40		P
89.87		QQ	93.63		AJ	102.60		VO
89.90		SF	93.87		W	103.97	⇑	JS
90.00		E	94.00		RG	104.00	⇑	DT
90.00		AF	94.03		D	104.37	⇑	NO
90.13		WE	94.13		JG	106.00	⇑	AU
90.17		PM	95.10		HK	106.13	⇑	TS
90.27		BM	95.33		TH	118.90	⇑	JQ
90.43		EB	95.50		SL	119.80	⇑	SZ
90.63		PG	95.67		KT	120.07	⇑	NA
90.63		A	95.83		JE	124.13	×	GZ
90.87		BN	95.93		BS	127.67	×	UA
91.00		RZ	96.33		RV	170.33	×	OZ
91.00		AW	96.37		AR	405.00	×	CP
			96.50		C	1090.00	×	OY

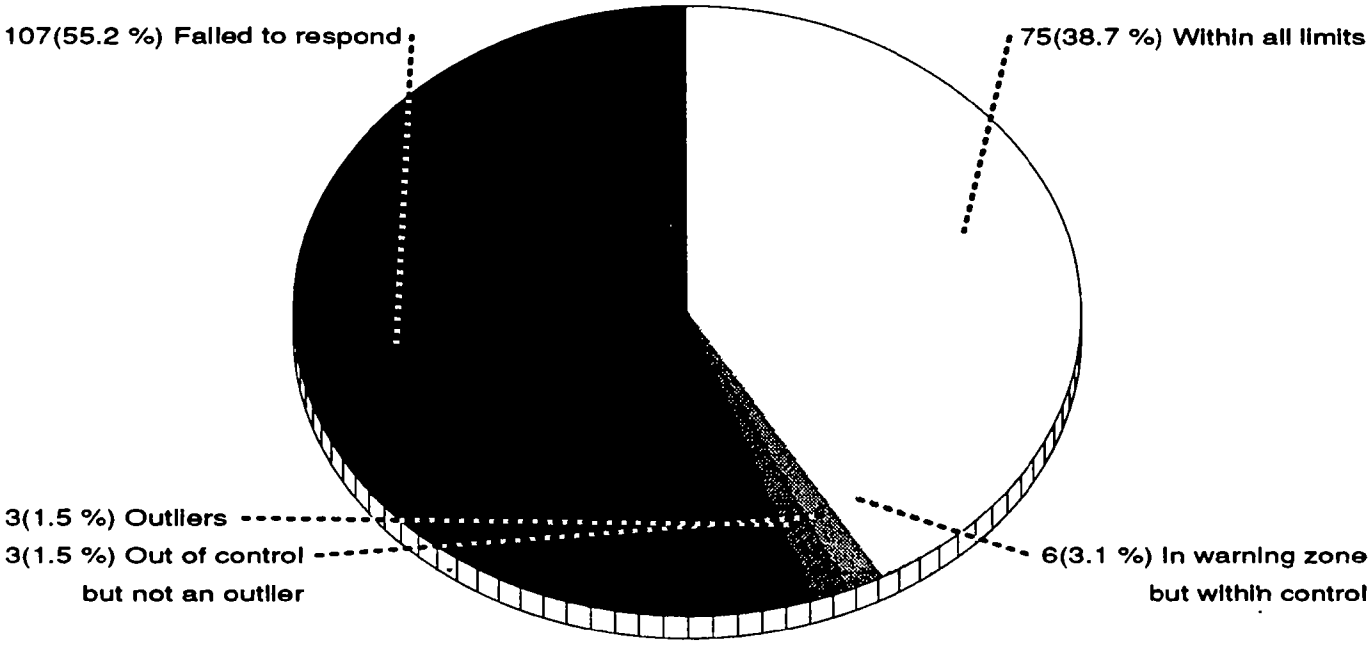




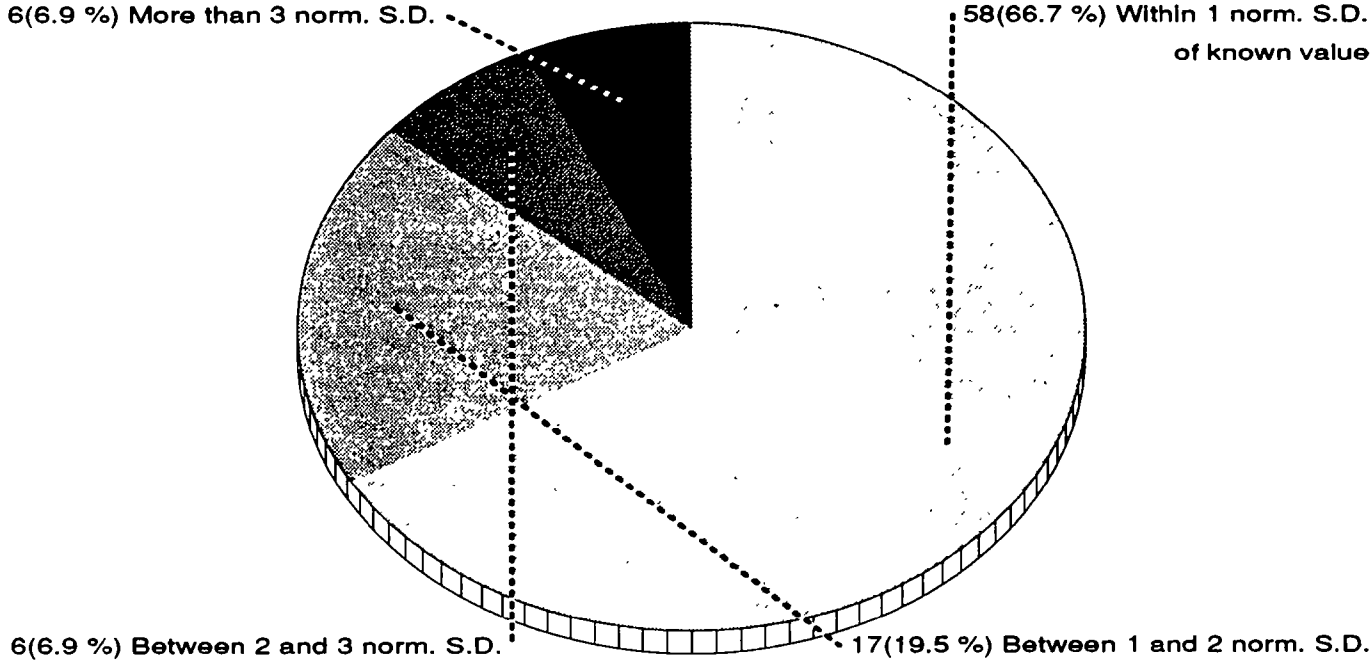
• ≡ No data submitted	**TAG SYMBOLS**	⇑ ≡ Above control limit
∅ ≡ Insufficient data	× ≡ Determined to be an outlier	⇓ ≡ Below control limit

Strontium-89 Statistical Summary 194 Participants

The known value of this nuclide is **20.0 pCi/l** 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	18.65	**Grand Avg 19.09**
Std. Dev.	3.95	3.23
Variance	15.59	10.46
% Coef. of Var.	21.17	16.95
% deviation of mean from known value	-6.76	-4.56
Norm. dev. of mean from known value	-0.34	-0.28
Median	19.67	19.83
% deviation of median from known value	-1.67	-0.83
Norm. dev. of median from known value	-0.08	-0.05



Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
A	18.0	20.0	19.0	1.00	0.236	19.00	-0.03	-0.35	
AE	22.0	23.0	22.0	0.58	0.118	22.33	1.12	0.81	
AF	20.0	21.0	20.0	0.58	0.118	20.33	0.43	0.12	
AH									•
AI									•
AJ	23.0	16.0	17.0	3.79	0.827	18.67	-0.15	-0.46	
AK	20.0	20.0	22.0	1.15	0.236	20.67	0.55	0.23	
AL	23.0	24.0	23.0	0.58	0.118	23.33	1.47	1.15	
AO									•
AP									•
AR									•
AU	20.0	22.0	24.0	2.00	0.473	22.00	1.01	0.69	
AW	20.0	19.0	17.0	1.53	0.354	18.67	-0.15	-0.46	
AZ	20.0	20.0	22.0	1.15	0.236	20.67	0.55	0.23	
BA	20.0	20.0	21.0	0.58	0.118	20.33	0.43	0.12	
BB									•
BC	18.0	18.0	17.0	0.58	0.118	17.67	-0.49	-0.81	
BG									•
BH	21.0	21.0	20.0	0.58	0.118	20.67	0.55	0.23	
BK									•
BL	21.0	23.0	17.0	3.06	0.709	20.33	0.43	0.12	
BM	18.0	20.0	19.0	1.00	0.236	19.00	-0.03	-0.35	
BN									•
BO	21.0	20.0	20.0	0.58	0.118	20.33	0.43	0.12	
BS									•
BW									•
C	25.0	23.0	22.0	1.53	0.354	23.33	1.47	1.15	
CA	17.0	17.0	17.0	0.00	0.000	17.00	-0.72	-1.04	
CE									•
CG	22.0	23.0	23.0	0.58	0.118	22.67	1.24	0.92	
CJ	20.0	20.0	22.0	1.15	0.236	20.67	0.55	0.23	
CK	11.0	11.0	20.0	5.20	1.120	14.00	-1.76	-2.08	
CM									•
CO	18.0	17.0	18.0	0.58	0.118	17.67	-0.49	-0.81	
CP	23.0	26.0	28.0	2.52	0.591	25.67	2.28	1.96	
CQ	17.0	18.0	18.0	0.58	0.118	17.67	-0.49	-0.81	
CS	15.0	19.0	19.0	2.31	0.473	17.67	-0.49	-0.81	
CX	14.0	16.0	19.0	2.52	0.591	16.33	-0.95	-1.27	
D									•
DB									•
DD	21.0	20.0	20.0	0.58	0.118	20.33	0.43	0.12	
DE	20.0	20.0	21.0	0.58	0.118	20.33	0.43	0.12	
DG	12.0	12.0	12.0	0.00	0.000	12.00	-2.46	-2.77	
DJ									•
DL									•

• ≡ No data submitted | **TAG SYMBOLS** | ⇑ ≡ Above control limit

∅ ≡ Insufficient data | × ≡ Determined to be an outlier | ⇓ ≡ Below control limit

Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
DM									•
DO	19.0	21.0	20.0	1.00	0.236	20.00	0.32	0.00	
DS									•
DT	20.0	18.0	17.0	1.53	0.354	18.33	-0.26	-0.58	
DZ	20.0	22.0	21.0	1.00	0.236	21.00	0.66	0.35	
E	20.0	19.0	20.0	0.58	0.118	19.67	0.20	-0.12	
EB	20.0	25.0	22.0	2.52	0.591	22.33	1.12	0.81	
EL	27.0	24.0	24.0	1.73	0.354	25.00	2.05	1.73	
EO									•
ER									•
EV									•
EX									•
FF									•
FJ									•
FL									•
FN									•
FU	24.0	23.0	25.0	1.00	0.236	24.00	1.70	1.39	
FZ									•
GE									•
GI									•
GQ	20.0	20.0	20.0	0.00	0.000	20.00	0.32	0.00	
GT									•
GZ									•
HI									•
HK	17.0	17.0	17.0	0.00	0.000	17.00	-0.72	-1.04	
HL									•
HP	25.0	22.0	18.0	3.51	0.827	21.67	0.89	0.58	
I	22.0	22.0	22.0	0.00	0.000	22.00	1.01	0.69	
IC	17.0	18.0	17.0	0.58	0.118	17.33	-0.61	-0.92	
ID									•
J	20.0	20.0	21.0	0.58	0.118	20.33	0.43	0.12	
JE	8.0	5.0	6.0	1.53	0.354	6.33	-4.42	-4.73	×
JG									•
JN									•
JQ									•
JS	17.0	16.0	16.0	0.58	0.118	16.33	-0.95	-1.27	
JY									•
K	19.0	19.0	22.0	1.73	0.354	20.00	0.32	0.00	
KE									•
KT									•
KX	21.0	21.0	21.0	0.00	0.000	21.00	0.66	0.35	
L	19.0	20.0	21.0	1.00	0.236	20.00	0.32	0.00	
LF									•
LG									•
LL									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
LR									•
LT	9.0	9.0	11.0	1.15	0.236	9.67	-3.26	-3.58	⇓
M	26.0	25.0	28.0	1.53	0.354	26.33	2.51	2.19	
MA									•
MF									•
MP									•
MQ	19.0	20.0	20.0	0.58	0.118	19.67	0.20	-0.12	
MV									•
MY									•
N	21.0	21.0	20.0	0.58	0.118	20.67	0.55	0.23	
NA									•
NH									•
NI									•
NJ	17.0	18.0	18.0	0.58	0.118	17.67	-0.49	-0.81	
NK									•
NO	12.0	13.0	14.0	1.00	0.236	13.00	-2.11	-2.42	
NT	21.0	21.0	22.0	0.58	0.118	21.33	0.78	0.46	
O									•
OF									•
OS									•
OX									•
OY									•
OZ									•
P									•
PA									•
PB	20.0	20.0	20.0	0.00	0.000	20.00	0.32	0.00	
PG									•
PI									•
PM									•
PQ									•
PR									•
PV	17.0	20.0	28.0	5.69	1.570	21.67	0.89	0.58	
PW									•
Q	18.0	20.0	22.0	2.00	0.473	20.00	0.32	0.00	
QC									•
QJ									•
QP									•
QQ									•
QT									•
QU	16.0	12.0	13.0	2.08	0.473	13.67	-1.88	-2.19	
QW	18.0	12.0	14.0	3.06	0.709	14.67	-1.53	-1.85	
QX									•
QY									•
QZ	20.0	21.0	23.0	1.53	0.354	21.33	0.78	0.46	
RD									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
RE									•
RF									•
RG									•
RJ									•
RK	6.0	6.0	5.0	0.58	0.118	5.67	-4.65	-4.97	×
RP									•
RR	21.0	21.0	20.0	0.58	0.118	20.67	0.55	0.23	
RV	19.0	20.0	20.0	0.58	0.118	19.67	0.20	-0.12	
RZ									•
S	19.0	18.0	18.0	0.58	0.118	18.33	-0.26	-0.58	
SC	17.0	21.0	21.0	2.31	0.473	19.67	0.20	-0.12	
SD	20.0	17.0	15.0	2.52	0.591	17.33	-0.61	-0.92	
SF	18.0	17.0	19.0	1.00	0.236	18.00	-0.38	-0.69	
SI	16.0	12.0	13.0	2.08	0.473	13.67	-1.88	-2.19	
SL									•
SM	20.0	22.0	21.0	1.00	0.236	21.00	0.66	0.35	
SN									•
SO									•
SR									•
SS	16.0	20.0	17.0	2.08	0.473	17.67	-0.49	-0.81	
ST	24.0	21.0	27.0	3.00	0.709	24.00	1.70	1.39	
SX									•
SZ									•
T	17.0	17.0	19.0	1.15	0.236	17.67	-0.49	-0.81	
TD	16.0	16.0	15.0	0.58	0.118	15.67	-1.18	-1.50	
TE	18.0	21.0	17.0	2.08	0.473	18.67	-0.15	-0.46	
TH									•
TI	18.0	15.0	16.0	1.53	0.354	16.33	-0.95	-1.27	
TL	20.0	21.0	24.0	2.08	0.473	21.67	0.89	0.58	
TN									•
TQ	18.0	21.0	18.0	1.73	0.354	19.00	-0.03	-0.35	
TS	10.0	11.0	11.0	0.58	0.118	10.67	-2.92	-3.23	⇓
TY									•
U	17.0	17.0	16.0	0.58	0.118	16.67	-0.84	-1.15	
UA									•
UE	22.0	21.0	20.0	1.00	0.236	21.00	0.66	0.35	
UG									•
UK									•
UN	22.0	19.0	21.0	1.53	0.354	20.67	0.55	0.23	
UP	17.0	17.0	16.0	0.58	0.118	16.67	-0.84	-1.15	
UQ									•
UW	22.0	21.0	22.0	0.58	0.118	21.67	0.89	0.58	
UY									•
VA									•
VC									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
VG	15.0	16.0	16.0	0.58	0.118	15.67	-1.18	-1.50	
VI	13.0	8.0	11.0	2.52	0.591	10.67	-2.92	-3.23	⇓
VJ									•
VM									•
VN									•
VO									•
VQ									•
VT									•
VU									•
W	19.0	19.0	18.0	0.58	0.118	18.67	-0.15	-0.46	
WE									•
WF	6.0	8.0	7.0	1.00	0.236	7.00	-4.19	-4.50	×
X	17.0	19.0	15.0	2.00	0.473	17.00	-0.72	-1.04	
Z									•

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
5.67	×	RK	17.67		CQ	20.33		BA
6.33	×	JE	17.67		CO	20.33		AF
7.00	×	WF	17.67		BC	20.67		UN
9.67	⇓	LT	18.00		SF	20.67		RR
10.67	⇓	VI	18.33		S	20.67		N
10.67	⇓	TS	18.33		DT	20.67		CJ
12.00		DG	18.67		W	20.67		BH
13.00		NO	18.67		TE	20.67		AZ
13.67		SI	18.67		AW	20.67		AK
13.67		QU	18.67		AJ	21.00		UE
14.00		CK	19.00		TQ	21.00		SM
14.67		QW	19.00		BM	21.00		KX
15.67		VG	19.00		A	21.00		DZ
15.67		TD	19.67		SC	21.33		QZ
16.33		TI	19.67		RV	21.33		NT
16.33		JS	19.67		MQ	21.67		UW
16.33		CX	19.67		E	21.67		TL
16.67		UP	20.00		Q	21.67		PV
16.67		U	20.00		PB	21.67		HP
17.00		X	20.00		L	22.00		I
17.00		HK	20.00		K	22.00		AU
17.00		CA	20.00		GQ	22.33		EB
17.33		SD	20.00		DO	22.33		AE
17.33		IC	20.33		J	22.67		CG
17.67		T	20.33		DE	23.33		C
17.67		SS	20.33		DD	23.33		AL
17.67		NJ	20.33		BO	24.00		ST
17.67		CS	20.33		BL	24.00		FU

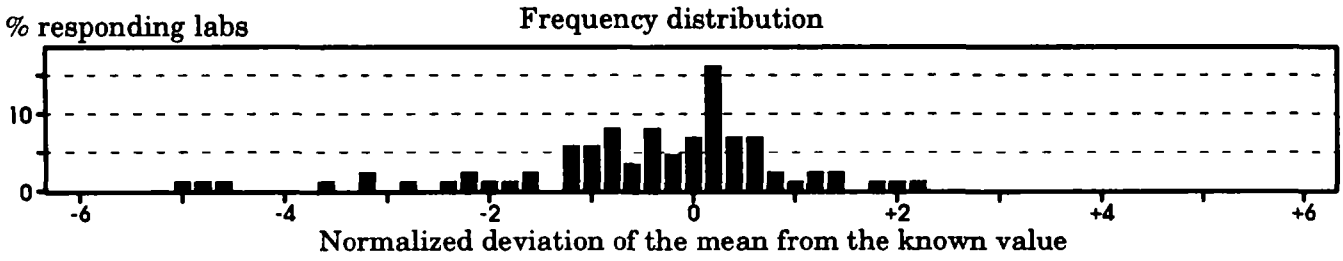
• ≡ No data submitted — **TAG SYMBOLS** — ⇑ ≡ Above control limit

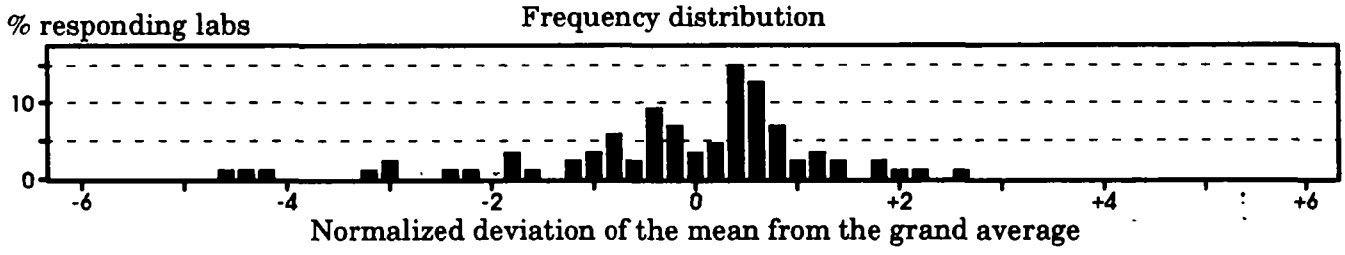
∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Strontium-89

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
25.00		**EL**	25.67		**CP**	26.33		**M**





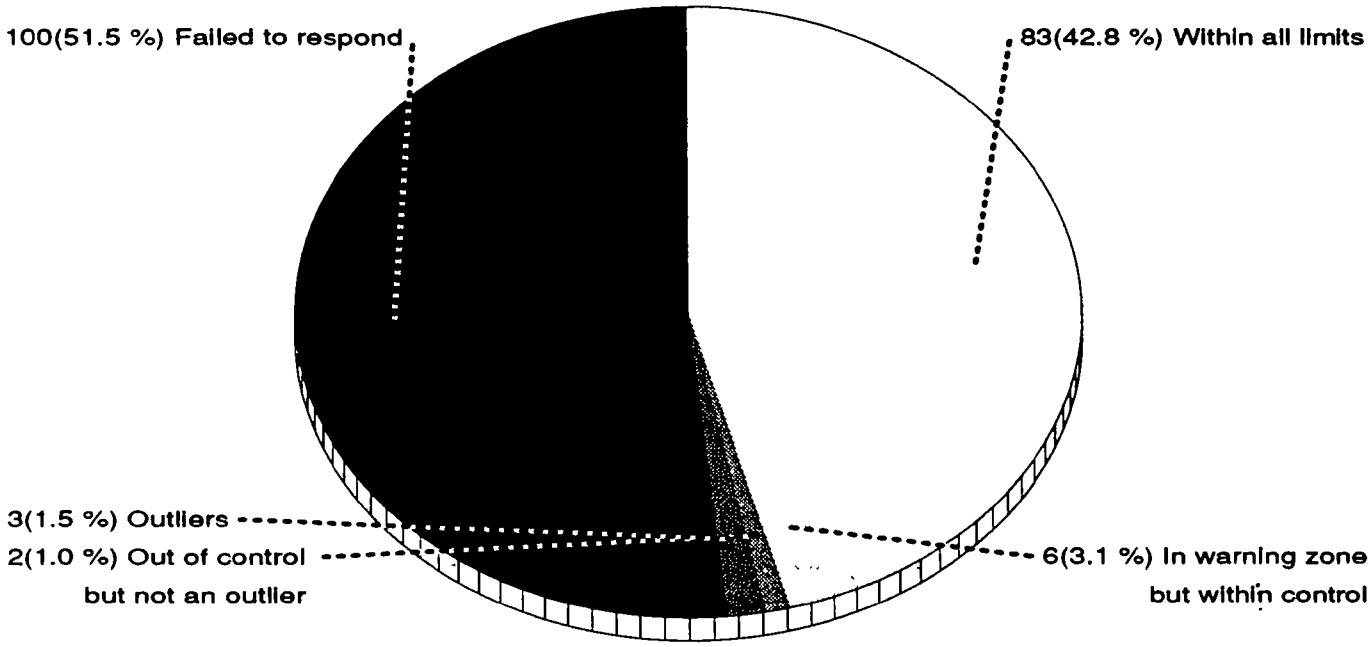
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

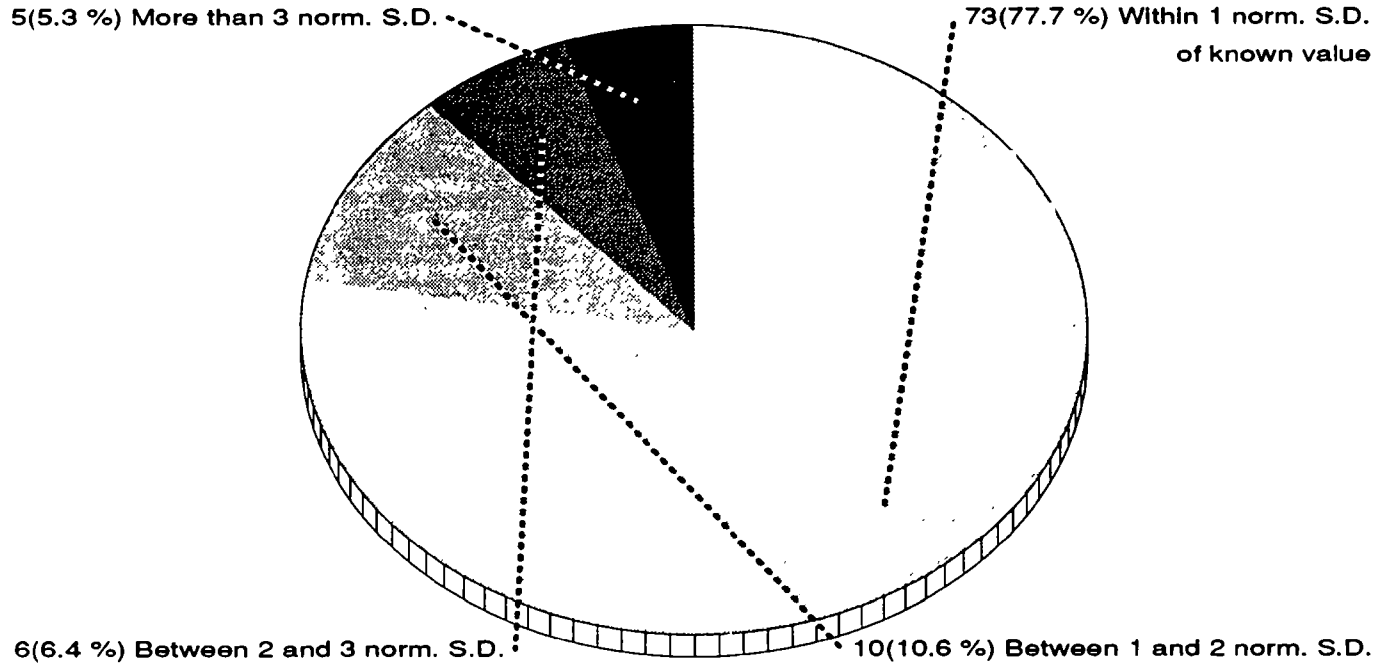
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Strontium-90 Statistical Summary 194 Participants

The known value of this nuclide is **15.0 pCi/l** 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	14.63	**Grand Avg 14.16**
Std. Dev.	3.77	2.74
Variance	14.21	7.48
% Coef. of Var.	25.76	19.31
% deviation of mean from known value	-2.43	-5.57
Norm. dev. of mean from known value	-0.10	-0.31
Median	14.33	14.00
% deviation of median from known value	-4.44	-6.67
Norm. dev. of median from known value	-0.18	-0.37



Strontium-90

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
A	14.0	13.0	14.0	0.58	0.118	13.67	-0.17	-0.46	
AE	11.0	15.0	15.0	2.31	0.473	13.67	-0.17	-0.46	
AF	14.0	14.0	14.0	0.00	0.000	14.00	-0.06	-0.35	
AH									•
AI									•
AJ	13.0	15.0	15.0	1.15	0.236	14.33	0.06	-0.23	
AK	15.0	16.0	15.0	0.58	0.118	15.33	0.40	0.12	
AL	13.0	13.0	13.0	0.00	0.000	13.00	-0.40	-0.69	
AO									•
AP									•
AR									•
AU	14.0	13.0	14.0	0.58	0.118	13.67	-0.17	-0.46	
AW	17.0	18.0	17.0	0.58	0.118	17.33	1.10	0.81	
AZ	14.0	15.0	15.0	0.58	0.118	14.67	0.17	-0.12	
BA	13.0	14.0	14.0	0.58	0.118	13.67	-0.17	-0.46	
BB	12.0	13.0	12.0	0.58	0.118	12.33	-0.63	-0.92	
BC	14.0	14.0	13.0	0.58	0.118	13.67	-0.17	-0.46	
BG									•
BH	14.0	14.0	15.0	0.58	0.118	14.33	0.06	-0.23	
BK									•
BL	15.0	13.0	18.0	2.52	0.591	15.33	0.40	0.12	
BM	15.0	14.0	15.0	0.58	0.118	14.67	0.17	-0.12	
BN									•
BO	14.0	14.0	14.0	0.00	0.000	14.00	-0.06	-0.35	
BS									•
BW									•
C	14.0	15.0	15.0	0.58	0.118	14.67	0.17	-0.12	
CA	14.0	12.0	12.0	1.15	0.236	12.67	-0.52	-0.81	
CE	15.0	15.0	15.0	0.00	0.000	15.00	0.29	0.00	
CG	15.0	15.0	12.0	1.73	0.354	14.00	-0.06	-0.35	
CJ	14.0	15.0	15.0	0.58	0.118	14.67	0.17	-0.12	
CK	22.0	18.0	13.0	4.51	1.120	17.67	1.21	0.92	
CM									•
CO	17.0	17.0	16.0	0.58	0.118	16.67	0.87	0.58	
CP	18.0	26.0	25.0	4.36	0.945	23.00	3.06	2.77	
CQ	13.0	13.0	13.0	0.00	0.000	13.00	-0.40	-0.69	
CS	16.0	15.0	16.0	0.58	0.118	15.67	0.52	0.23	
CX	14.0	15.0	16.0	1.00	0.236	15.00	0.29	0.00	
D									•
DB									•
DD	14.0	15.0	15.0	0.58	0.118	14.67	0.17	-0.12	
DE	16.0	16.0	16.0	0.00	0.000	16.00	0.64	0.35	
DG	12.0	11.0	10.0	1.00	0.236	11.00	-1.10	-1.39	
DJ									•
DL									•

• ≡ 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. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
DM									•
DO	13.0	12.0	14.0	1.00	0.236	13.00	-0.40	-0.69	
DS									•
DT	12.0	15.0	15.0	1.73	0.354	14.00	-0.06	-0.35	
DZ	15.0	16.0	17.0	1.00	0.236	16.00	0.64	0.35	
E	17.0	16.0	16.0	0.58	0.118	16.33	0.75	0.46	
EB	14.0	11.0	12.0	1.53	0.354	12.33	-0.63	-0.92	
EL	17.0	16.0	15.0	1.00	0.236	16.00	0.64	0.35	
EO									•
ER									•
EV									•
EX									•
FF									•
FJ									•
FL									•
FN									•
FU	14.0	12.0	13.0	1.00	0.236	13.00	-0.40	-0.69	
FZ									•
GE									•
GI									•
GQ	18.0	19.0	20.0	1.00	0.236	19.00	1.67	1.39	
GT									•
GZ									•
HI									•
HK	13.0	13.0	13.0	0.00	0.000	13.00	-0.40	-0.69	
HL									•
HP	10.0	16.0	14.0	3.06	0.709	13.33	-0.29	-0.58	
I	13.0	13.0	14.0	0.58	0.118	13.33	-0.29	-0.58	
IC	15.0	14.0	15.0	0.58	0.118	14.67	0.17	-0.12	
ID									•
J	15.0	15.0	15.0	0.00	0.000	15.00	0.29	0.00	
JE	6.0	5.0	6.0	0.58	0.118	5.67	-2.94	-3.23	⇓
JG									•
JN									•
JQ									•
JS	12.0	12.0	12.0	0.00	0.000	12.00	-0.75	-1.04	
JY	17.0	20.0	20.0	1.73	0.354	19.00	1.67	1.39	
K	13.0	12.0	12.0	0.58	0.118	12.33	-0.63	-0.92	
KE									•
KT									•
KX	13.0	14.0	14.0	0.58	0.118	13.67	-0.17	-0.46	
L	14.0	14.0	15.0	0.58	0.118	14.33	0.06	-0.23	
LF									•
LG									•
LL									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Strontium-90

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
LR									•
LT	9.0	8.0	9.0	0.58	0.118	8.67	-1.90	-2.19	
M	8.0	8.0	7.0	0.58	0.118	7.67	-2.25	-2.54	
MA									•
MF									•
MP									•
MQ	14.0	14.0	14.0	0.00	0.000	14.00	-0.06	-0.35	
MV									•
MY									•
N	14.0	14.0	15.0	0.58	0.118	14.33	0.06	-0.23	
NA									•
NH									•
NI									•
NJ	12.0	13.0	13.0	0.58	0.118	12.67	-0.52	-0.81	
NK									•
NO	25.0	26.0	27.0	1.00	0.236	26.00	4.10	3.81	×
NT	15.0	15.0	16.0	0.58	0.118	15.33	0.40	0.12	
O									•
OF									•
OS									•
OX									•
OY									•
OZ									•
P									•
PA									•
PB	15.0	15.0	15.0	0.00	0.000	15.00	0.29	0.00	
PG									•
PI									•
PM									•
PQ									•
PR									•
PV	27.0	31.0	38.0	5.57	1.570	32.00	6.18	5.89	×
PW									•
Q	13.0	14.0	15.0	1.00	0.236	14.00	-0.06	-0.35	
QC									•
QJ	12.0	13.0	14.0	1.00	0.236	13.00	-0.40	-0.69	
QP									•
QQ									•
QT									•
QU	5.0	6.0	6.0	0.58	0.118	5.67	-2.94	-3.23	⇓
QW	14.0	11.0	13.0	1.53	0.354	12.67	-0.52	-0.81	
QX									•
QY									•
QZ	14.0	14.0	13.0	0.58	0.118	13.67	-0.17	-0.46	
RD									•

• ≡ 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. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
RE									•
RF									•
RG									•
RJ									•
RK	11.0	9.0	10.0	1.00	0.236	10.00	-1.44	-1.73	
RP									•
RR	14.0	14.0	14.0	0.00	0.000	14.00	-0.06	-0.35	
RV	16.0	16.0	16.0	0.00	0.000	16.00	0.64	0.35	
RZ									•
S	15.0	15.0	15.0	0.00	0.000	15.00	0.29	0.00	
SC	15.0	16.0	16.0	0.58	0.118	15.67	0.52	0.23	
SD	15.0	14.0	16.0	1.00	0.236	15.00	0.29	0.00	
SF	14.0	12.0	13.0	1.00	0.236	13.00	-0.40	-0.69	
SI	15.0	15.0	15.0	0.00	0.000	15.00	0.29	0.00	
SL									
SM	20.0	20.0	24.0	2.31	0.473	21.33	2.48	2.19	
SN									•
SO									•
SR									•
SS	16.0	15.0	15.0	0.58	0.118	15.33	0.40	0.12	
ST	14.0	15.0	13.0	1.00	0.236	14.00	-0.06	-0.35	
SX									•
SZ	18.0	19.0	20.0	1.00	0.236	19.00	1.67	1.39	
T	12.0	11.0	13.0	1.00	0.236	12.00	-0.75	-1.04	
TD	11.0	12.0	13.0	1.00	0.236	12.00	-0.75	-1.04	
TE	18.0	11.0	15.0	3.51	0.827	14.67	0.17	-0.12	
TH	15.0	17.0	16.0	1.00	0.236	16.00	0.64	0.35	
TI	14.0	16.0	14.0	1.15	0.236	14.67	0.17	-0.12	
TL	16.0	17.0	18.0	1.00	0.236	17.00	0.98	0.69	
TN									•
TQ	16.0	15.0	16.0	0.58	0.118	15.67	0.52	0.23	
TS	8.0	8.0	8.0	0.00	0.000	8.00	-2.14	-2.42	
TY									•
U	14.0	16.0	16.0	1.15	0.236	15.33	0.40	0.12	
UA									•
UE	13.0	13.0	15.0	1.15	0.236	13.67	-0.17	-0.46	
UG									•
UK									•
UN	15.0	16.0	14.0	1.00	0.236	15.00	0.29	0.00	
UP	14.0	12.0	13.0	1.00	0.236	13.00	-0.40	-0.69	
UQ									•
UW	15.0	14.0	14.0	0.58	0.118	14.33	0.06	-0.23	
UY									•
VA									•
VC									•

• ≡ 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. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
VG	10.0	10.0	11.0	0.58	0.118	10.33	-1.33	-1.62	
VI	13.0	11.0	12.0	1.00	0.236	12.00	-0.75	-1.04	
VJ									•
VM									•
VN									•
VO	30.0	29.0	27.0	1.53	0.354	28.67	5.02	4.73	×
VQ									•
VT									•
VU									•
W	13.0	13.0	14.0	0.58	0.118	13.33	-0.29	-0.58	
WE									•
WF	20.0	21.0	22.0	1.00	0.236	21.00	2.37	2.08	
X	12.0	15.0	14.0	1.53	0.354	13.67	-0.17	-0.46	
Z									•

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
5.67	⇓	QU	13.33		HP	14.67		C
5.67	⇓	JE	13.67		X	14.67		BM
7.67		M	13.67		UE	14.67		AZ
8.00		TS	13.67		QZ	15.00		UN
8.67		LT	13.67		KX	15.00		SI
10.00		RK	13.67		BC	15.00		SD
10.33		VG	13.67		BA	15.00		S
11.00		DG	13.67		AU	15.00		PB
12.00		VI	13.67		AE	15.00		J
12.00		TD	13.67		A	15.00		CX
12.00		T	14.00		ST	15.00		CE
12.00		JS	14.00		RR	15.33		U
12.33		K	14.00		Q	15.33		SS
12.33		EB	14.00		MQ	15.33		NT
12.33		BB	14.00		DT	15.33		BL
12.67		QW	14.00		CG	15.33		AK
12.67		NJ	14.00		BO	15.67		TQ
12.67		CA	14.00		AF	15.67		SC
13.00		UP	14.33		UW	15.67		CS
13.00		SF	14.33		N	16.00		TH
13.00		QJ	14.33		L	16.00		RV
13.00		HK	14.33		BH	16.00		EL
13.00		FU	14.33		AJ	16.00		DZ
13.00		DO	14.67		TI	16.00		DE
13.00		CQ	14.67		TE	16.33		E
13.00		AL	14.67		IC	16.67		CO
13.33		W	14.67		DD	17.00		TL
13.33		I	14.67		CJ	17.33		AW

• ≡ No data submitted
∅ ≡ Insufficient data

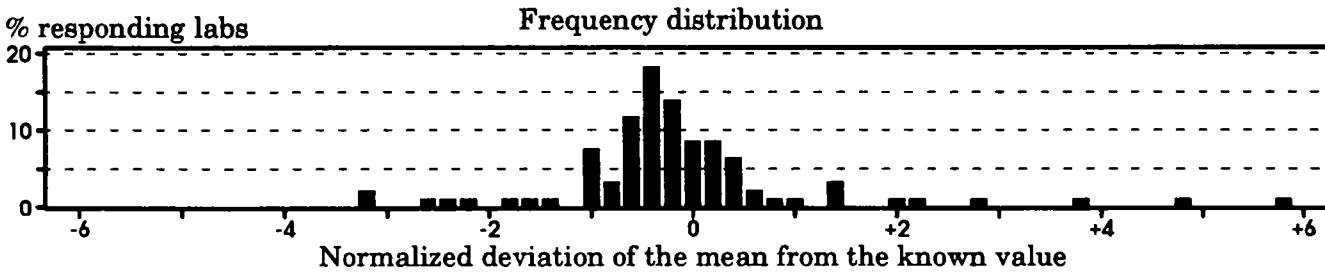
TAG SYMBOLS
× ≡ Determined to be an outlier

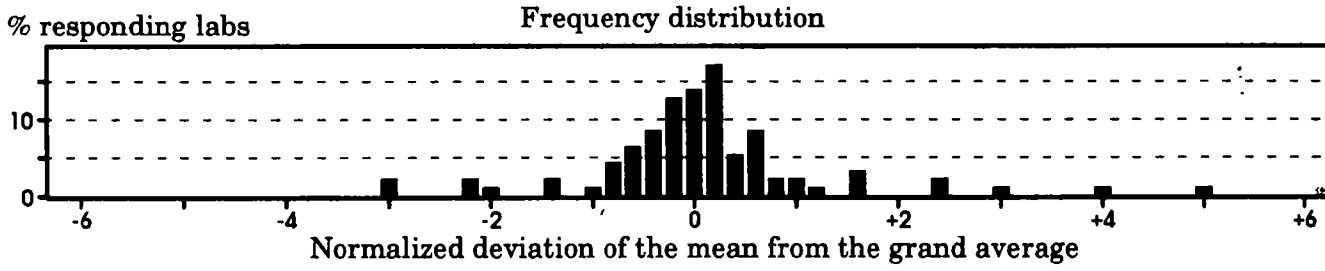
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Strontium-90

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
17.67		**CK**	19.00		**GQ**	23.00		**CP**
19.00		**SZ**	21.00		**WF**	26.00	×	**NO**
19.00		**JY**	21.33		**SM**	28.67	×	**VO**
						32.00	×	**PV**





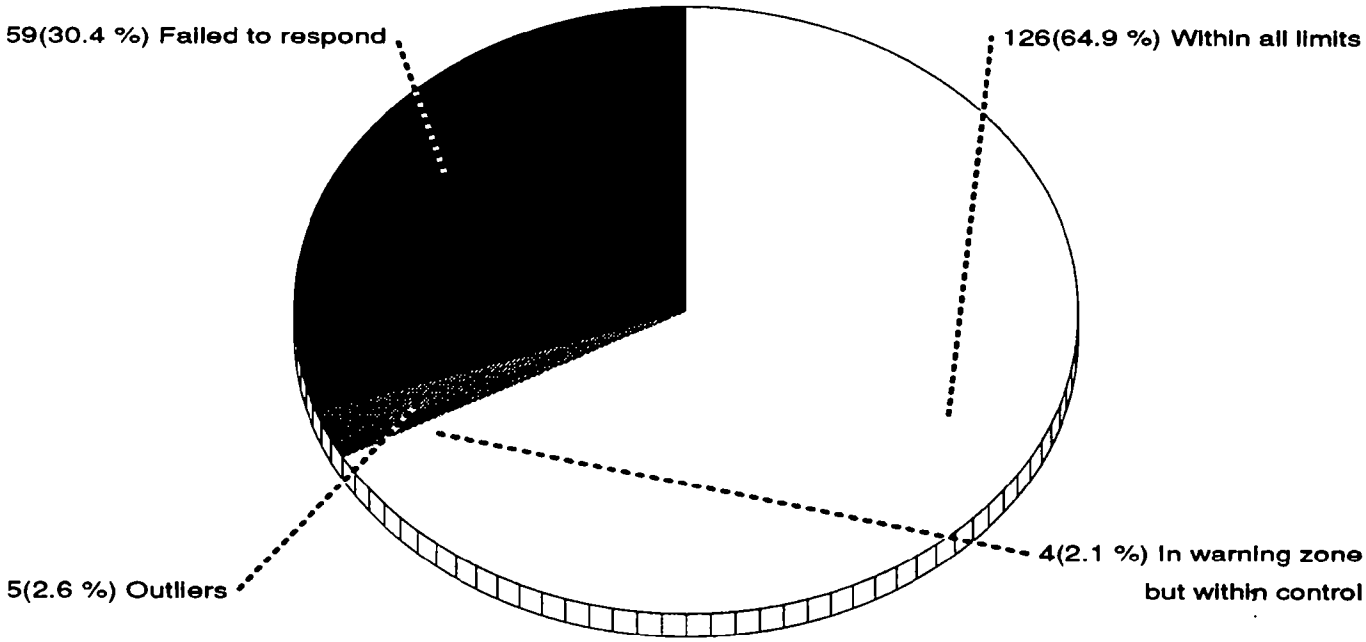
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

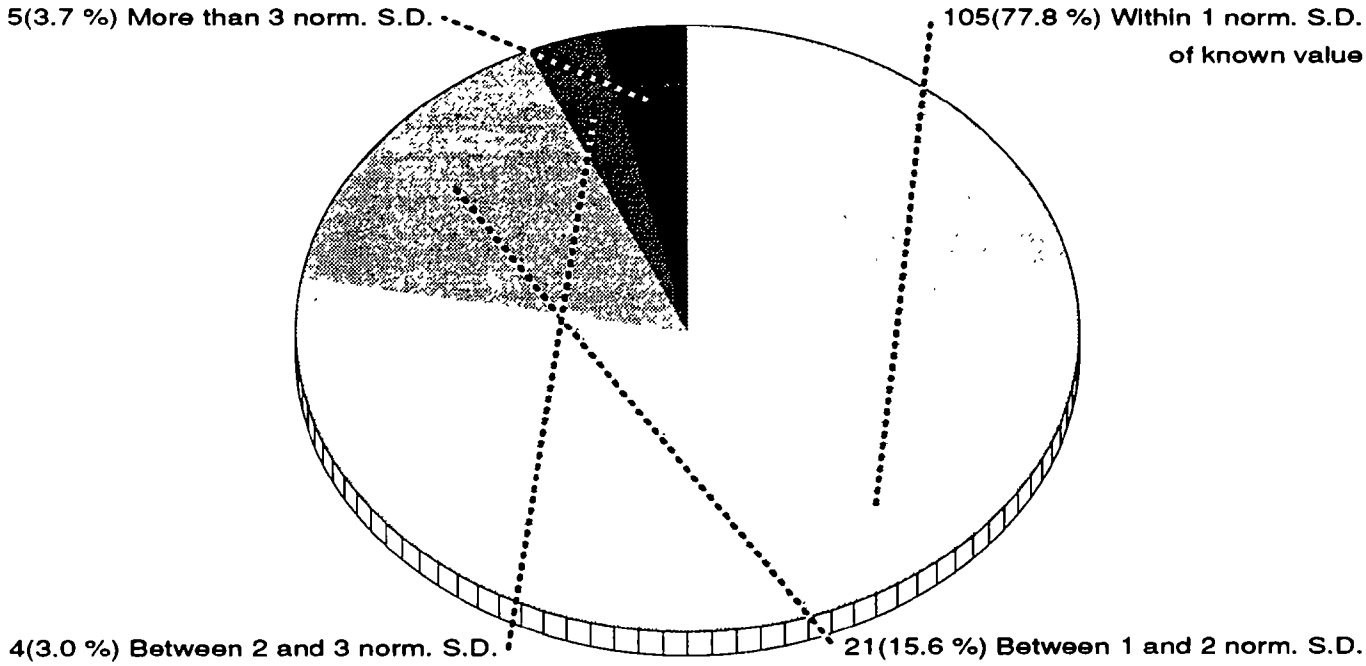
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cobalt-60 Statistical Summary 194 Participants

The known value of this nuclide is **29.0 pCi/l** with an expected precision of **5.0**; the control limits are 20.3 to 37.7; the warning regions are 20.3 to 23.2 and 34.8 to 37.7



Statistic	Respondents	Non-outliers
Mean	30.34	**Grand Avg 29.39**
Std. Dev.	8.73	2.24
Variance	76.17	5.00
% Coef. of Var.	28.77	7.61
% deviation of mean from known value	4.61	1.36
Norm. dev. of mean from known value	0.15	0.18
Median	29.33	29.33
% deviation of median from known value	1.15	1.15
Norm. dev. of median from known value	0.04	0.15



Cobalt-60

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
A	27.0	25.0	27.0	1.15	0.236	26.33	-1.06	-0.92	
AE	31.0	32.0	31.0	0.58	0.118	31.33	0.67	0.81	
AF	29.0	29.0	31.0	1.15	0.236	29.67	0.09	0.23	
AH	27.0	26.0	27.0	0.58	0.118	26.67	-0.95	-0.81	
AI	25.0	25.0	24.0	0.58	0.118	24.67	-1.64	-1.50	
AJ	30.0	28.0	26.0	2.00	0.473	28.00	-0.48	-0.35	
AK	30.0	29.0	30.0	0.58	0.118	29.67	0.09	0.23	
AL	29.0	21.0	30.0	4.93	1.120	26.67	-0.95	-0.81	
AO									•
AP	31.0	30.0	30.0	0.58	0.118	30.33	0.33	0.46	
AR									•
AU	30.0	28.0	28.0	1.15	0.236	28.67	-0.25	-0.12	
AW	29.0	29.0	28.0	0.58	0.118	28.67	-0.25	-0.12	
AZ	26.0	20.0	26.0	3.46	0.709	24.00	-1.87	-1.73	
BA	36.0	32.0	34.0	2.00	0.473	34.00	1.60	1.73	
BB	31.0	33.0	32.0	1.00	0.236	32.00	0.90	1.04	
BC	29.0	28.0	28.0	0.58	0.118	28.33	-0.37	-0.23	
BG									•
BH	31.0	30.0	27.0	2.08	0.473	29.33	-0.02	0.12	
BK	32.0	32.0	32.0	0.00	0.000	32.00	0.90	1.04	
BL	29.0	29.0	29.0	0.00	0.000	29.00	-0.14	0.00	
BM	29.0	29.0	29.0	0.00	0.000	29.00	-0.14	0.00	
BN	29.0	28.0	27.0	1.00	0.236	28.00	-0.48	-0.35	
BO	31.0	31.0	27.0	2.31	0.473	29.67	0.09	0.23	
BS									•
BW	25.0	42.0	20.0	11.53	4.046	29.00	-0.14	0.00	
C	27.0	26.0	26.0	0.58	0.118	26.33	-1.06	-0.92	
CA	30.0	27.0	30.0	1.73	0.354	29.00	-0.14	0.00	
CE	32.0	32.0	34.0	1.15	0.236	32.67	1.13	1.27	
CG									•
CJ	34.0	31.0	30.0	2.08	0.473	31.67	0.79	0.92	
CK	32.0	28.0	28.0	2.31	0.473	29.33	-0.02	0.12	
CM	27.0	28.0	29.0	1.00	0.236	28.00	-0.48	-0.35	
CO	27.0	30.0	29.0	1.53	0.354	28.67	-0.25	-0.12	
CP	32.0	30.0	30.0	1.15	0.236	30.67	0.44	0.58	
CQ	31.0	32.0	33.0	1.00	0.236	32.00	0.90	1.04	
CS	29.0	30.0	27.0	1.53	0.354	28.67	-0.25	-0.12	
CX	31.0	30.0	31.0	0.58	0.118	30.67	0.44	0.58	
D									•
DB									•
DD	32.0	30.0	29.0	1.53	0.354	30.33	0.33	0.46	
DE	30.0	30.0	30.0	0.00	0.000	30.00	0.21	0.35	
DG	31.0	28.0	31.0	1.73	0.354	30.00	0.21	0.35	
DJ									•
DL	31.0	31.0	30.0	0.58	0.118	30.67	0.44	0.58	

• ≡ No data submitted — **TAG SYMBOLS** — ⇑ ≡ Above control limit

∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Cobalt-60

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
DM	30.0	30.0	28.0	1.15	0.236	29.33	-0.02	0.12	
DO	37.0	32.0	33.0	2.65	0.591	34.00	1.60	1.73	
DS									•
DT	28.0	31.0	28.0	1.73	0.354	29.00	-0.14	0.00	
DZ	25.0	24.0	26.0	1.00	0.236	25.00	-1.52	-1.39	
E	30.0	30.0	30.0	0.00	0.000	30.00	0.21	0.35	
EB	28.0	28.0	28.0	0.00	0.000	28.00	-0.48	-0.35	
EL	28.0	29.0	28.0	0.58	0.118	28.33	-0.37	-0.23	
EO									•
ER									•
EV									•
EX	28.0	30.0	32.0	2.00	0.473	30.00	0.21	0.35	
FF									•
FJ	31.0	29.0	30.0	1.00	0.236	30.00	0.21	0.35	
FL	30.0	30.0	29.0	0.58	0.118	29.67	0.09	0.23	
FN									•
FU	30.0	29.0	28.0	1.00	0.236	29.00	-0.14	0.00	
FZ	38.0	33.0	32.0	3.21	0.709	34.33	1.71	1.85	
GE	32.0	30.0	31.0	1.00	0.236	31.00	0.56	0.69	
GI	29.0	30.0	29.0	0.58	0.118	29.33	-0.02	0.12	
GQ	30.0	30.0	30.0	0.00	0.000	30.00	0.21	0.35	
GT									•
GZ									•
HI	22.0	21.0	23.0	1.00	0.236	22.00	-2.56	-2.42	
HK	29.0	31.0	29.0	1.15	0.236	29.67	0.09	0.23	
HL	28.0	29.0	28.0	0.58	0.118	28.33	-0.37	-0.23	
HP	31.0	30.0	29.0	1.00	0.236	30.00	0.21	0.35	
I	31.0	30.0	26.0	2.65	0.591	29.00	-0.14	0.00	
IC	32.0	31.0	31.0	0.58	0.118	31.33	0.67	0.81	
ID									•
J	29.0	30.0	29.0	0.58	0.118	29.33	-0.02	0.12	
JE	29.0	30.0	29.0	0.58	0.118	29.33	-0.02	0.12	
JG	27.0	29.0	25.0	2.00	0.473	27.00	-0.83	-0.69	
JN									•
JQ									•
JS	30.0	30.0	31.0	0.58	0.118	30.33	0.33	0.46	
JY	32.0	41.0	37.0	4.51	1.120	36.67	2.52	2.66	
K	26.0	25.0	28.0	1.53	0.354	26.33	-1.06	-0.92	
KE									•
KT									•
KX	30.0	30.0	29.0	0.58	0.118	29.67	0.09	0.23	
L	30.0	28.0	30.0	1.15	0.236	29.33	-0.02	0.12	
LF	29.0	30.0	30.0	0.58	0.118	29.67	0.09	0.23	
LG									•
LL									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cobalt-60

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
LR	32.0	30.0	29.0	1.53	0.354	30.33	0.33	0.46	
LT	29.0	29.0	30.0	0.58	0.118	29.33	-0.02	0.12	
M	30.0	29.0	30.0	0.58	0.118	29.67	0.09	0.23	
MA	29.0	29.0	28.0	0.58	0.118	28.67	-0.25	-0.12	
MF									•
MP	125.0	121.0	122.0	2.08	0.473	122.67	32.31	32.45	×
MQ	25.0	27.0	26.0	1.00	0.236	26.00	-1.18	-1.04	
MV	18.0	17.0	17.0	0.58	0.118	17.33	-4.18	-4.04	×
MY									•
N	31.0	29.0	32.0	1.53	0.354	30.67	0.44	0.58	
NA									•
NH	28.0	28.0	27.0	0.58	0.118	27.67	-0.60	-0.46	
NI									•
NJ	29.0	29.0	29.0	0.00	0.000	29.00	-0.14	0.00	
NK	28.0	32.0	31.0	2.08	0.473	30.33	0.33	0.46	
NO	32.0	33.0	33.0	0.58	0.118	32.67	1.13	1.27	
NT									•
O	33.0	32.0	33.0	0.58	0.118	32.67	1.13	1.27	
OF									•
OS									•
OX									•
OY									•
OZ	54.0	54.0	54.0	0.00	0.000	54.00	8.52	8.66	×
P	42.0	41.0	42.0	0.58	0.118	41.67	4.25	4.39	×
PA									•
PB	30.0	30.0	30.0	0.00	0.000	30.00	0.21	0.35	
PG									•
PI	29.0	29.0	28.0	0.58	0.118	28.67	-0.25	-0.12	
PM	31.0	33.0	33.0	1.15	0.236	32.33	1.02	1.15	
PQ	30.0	31.0	30.0	0.58	0.118	30.33	0.33	0.46	
PR									•
PV	32.0	35.0	31.0	2.08	0.473	32.67	1.13	1.27	
PW	28.0	27.0	28.0	0.58	0.118	27.67	-0.60	-0.46	
Q	28.0	29.0	28.0	0.58	0.118	28.33	-0.37	-0.23	
QC									•
QJ	31.0	29.0	30.0	1.00	0.236	30.00	0.21	0.35	
QP	29.0	28.0	31.0	1.53	0.354	29.33	-0.02	0.12	
QQ									•
QT	29.0	29.0	29.0	0.00	0.000	29.00	-0.14	0.00	
QU	28.0	29.0	30.0	1.00	0.236	29.00	-0.14	0.00	
QW	27.0	29.0	30.0	1.53	0.354	28.67	-0.25	-0.12	
QX	35.0	37.0	35.0	1.15	0.236	35.67	2.17	2.31	
QY									•
QZ	28.0	28.0	28.0	0.00	0.000	28.00	-0.48	-0.35	
RD									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cobalt-60

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
RE									•
RF	26.0	26.0	25.0	0.58	0.118	25.67	-1.29	-1.15	
RG									•
RJ									•
RK	26.0	26.0	26.0	0.00	0.000	26.00	-1.18	-1.04	
RP									•
RR	30.0	31.0	31.0	0.58	0.118	30.67	0.44	0.58	
RV	23.0	28.0	30.0	3.61	0.827	27.00	-0.83	-0.69	
RZ	31.0	31.0	31.0	0.00	0.000	31.00	0.56	0.69	
S	29.0	29.0	29.0	0.00	0.000	29.00	-0.14	0.00	
SC	27.0	30.0	27.0	1.73	0.354	28.00	-0.48	-0.35	
SD	32.0	29.0	30.0	1.53	0.354	30.33	0.33	0.46	
SF	31.0	30.0	34.0	2.08	0.473	31.67	0.79	0.92	
SI	31.0	34.0	31.0	1.73	0.354	32.00	0.90	1.04	
SL									•
SM	27.0	32.0	29.0	2.52	0.591	29.33	-0.02	0.12	
SN	25.0	28.0	25.0	1.73	0.354	26.00	-1.18	-1.04	
SO									•
SR	24.0	27.0	29.0	2.52	0.591	26.67	-0.95	-0.81	
SS	30.0	28.0	30.0	1.15	0.236	29.33	-0.02	0.12	
ST	27.0	28.0	27.0	0.58	0.118	27.33	-0.71	-0.58	
SX	31.0	29.0	31.0	1.15	0.236	30.33	0.33	0.46	
SZ	28.0	28.0	28.0	0.00	0.000	28.00	-0.48	-0.35	
T	28.0	26.0	29.0	1.53	0.354	27.67	-0.60	-0.46	
TD	29.0	31.0	36.0	3.61	0.827	32.00	0.90	1.04	
TE	28.0	29.0	27.0	1.00	0.236	28.00	-0.48	-0.35	
TH	34.0	32.0	29.0	2.52	0.591	31.67	0.79	0.92	
TI	29.0	30.0	29.0	0.58	0.118	29.33	-0.02	0.12	
TL	25.0	26.0	28.0	1.53	0.354	26.33	-1.06	-0.92	
TN									•
TQ	27.0	27.0	28.0	0.58	0.118	27.33	-0.71	-0.58	
TS	33.0	30.0	31.0	1.53	0.354	31.33	0.67	0.81	
TY									•
U	30.0	30.0	28.0	1.15	0.236	29.33	-0.02	0.12	
UA									•
UE	29.0	29.0	29.0	0.00	0.000	29.00	-0.14	0.00	
UG									•
UK									•
UN	32.0	25.0	24.0	4.36	0.945	27.00	-0.83	-0.69	
UP	28.0	32.0	29.0	2.08	0.473	29.67	0.09	0.23	
UQ									•
UW	29.0	27.0	30.0	1.53	0.354	28.67	-0.25	-0.12	
UY	34.0	30.0	30.0	2.31	0.473	31.33	0.67	0.81	
VA	32.0	30.0	29.0	1.53	0.354	30.33	0.33	0.46	
VC									•

• ≡ No data submitted — TAG SYMBOLS — ⇑ ≡ Above control limit

∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Cobalt-60

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
VG	30.0	29.0	30.0	0.58	0.118	29.67	0.09	0.23	
VI	29.0	29.0	29.0	0.00	0.000	29.00	-0.14	0.00	
VJ									•
VM	42.0	33.0	31.0	5.86	1.570	35.33	2.06	2.19	
VN									•
VO	25.0	27.0	25.0	1.15	0.236	25.67	-1.29	-1.15	
VQ									•
VT									•
VU									•
W	31.0	28.0	27.0	2.08	0.473	28.67	-0.25	-0.12	
WE									•
WF	38.0	40.0	37.0	1.53	0.354	38.33	3.10	3.23	×
X	30.0	31.0	30.0	0.58	0.118	30.33	0.33	0.46	
Z									•

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
17.33	×	MV	28.00		QZ	29.00		BW
22.00		HI	28.00		EB	29.00		BM
24.00		AZ	28.00		CM	29.00		BL
24.67		AI	28.00		BN	29.33		U
25.00		DZ	28.00		AJ	29.33		TI
25.67		VO	28.33		Q	29.33		SS
25.67		RF	28.33		HL	29.33		SM
26.00		SN	28.33		EL	29.33		QP
26.00		RK	28.33		BC	29.33		LT
26.00		MQ	28.67		W	29.33		L
26.33		TL	28.67		UW	29.33		JE
26.33		K	28.67		QW	29.33		J
26.33		C	28.67		PI	29.33		GI
26.33		A	28.67		MA	29.33		DM
26.67		SR	28.67		CS	29.33		CK
26.67		AL	28.67		CO	29.33		BH
26.67		AH	28.67		AW	29.67		VG
27.00		UN	28.67		AU	29.67		UP
27.00		RV	29.00		VI	29.67		M
27.00		JG	29.00		UE	29.67		LF
27.33		TQ	29.00		S	29.67		KX
27.33		ST	29.00		QU	29.67		HK
27.67		T	29.00		QT	29.67		FL
27.67		PW	29.00		NJ	29.67		BO
27.67		NH	29.00		I	29.67		AK
28.00		TE	29.00		FU	29.67		AF
28.00		SZ	29.00		DT	30.00		QJ
28.00		SC	29.00		CA	30.00		PB

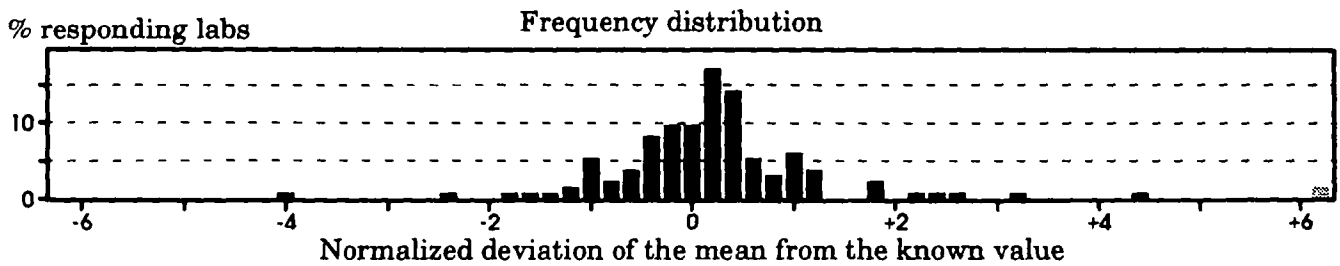
• ≡ No data submitted — **TAG SYMBOLS** — ⇑ ≡ Above control limit

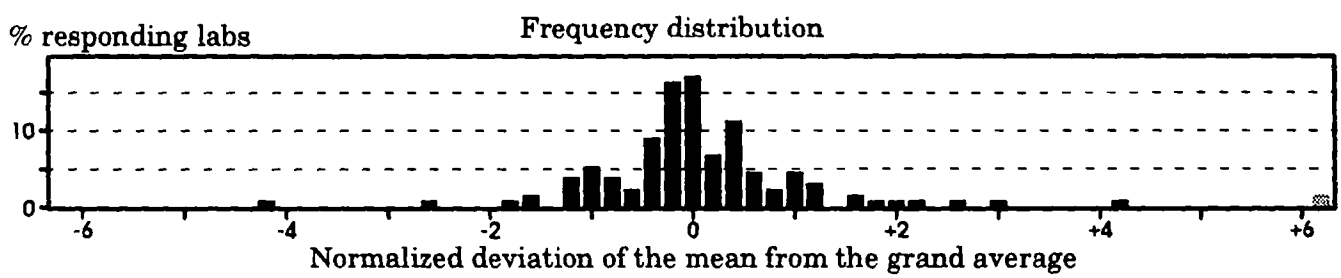
∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Cobalt-60

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
30.00		HP	30.67		RR	32.00		BK
30.00		GQ	30.67		N	32.00		BB
30.00		FJ	30.67		DL	32.33		PM
30.00		EX	30.67		CX	32.67		PV
30.00		E	30.67		CP	32.67		O
30.00		DG	31.00		RZ	32.67		NO
30.00		DE	31.00		GE	32.67		CE
30.33		X	31.33		UY	34.00		DO
30.33		VA	31.33		TS	34.00		BA
30.33		SX	31.33		IC	34.33		FZ
30.33		SD	31.33		AE	35.33		VM
30.33		PQ	31.67		TH	35.67		QX
30.33		NK	31.67		SF	36.67		JY
30.33		LR	31.67		CJ	38.33	×	WF
30.33		JS	32.00		TD	41.67	×	P
30.33		DD	32.00		SI	54.00	×	OZ
30.33		AP	32.00		CQ	122.67	×	MP





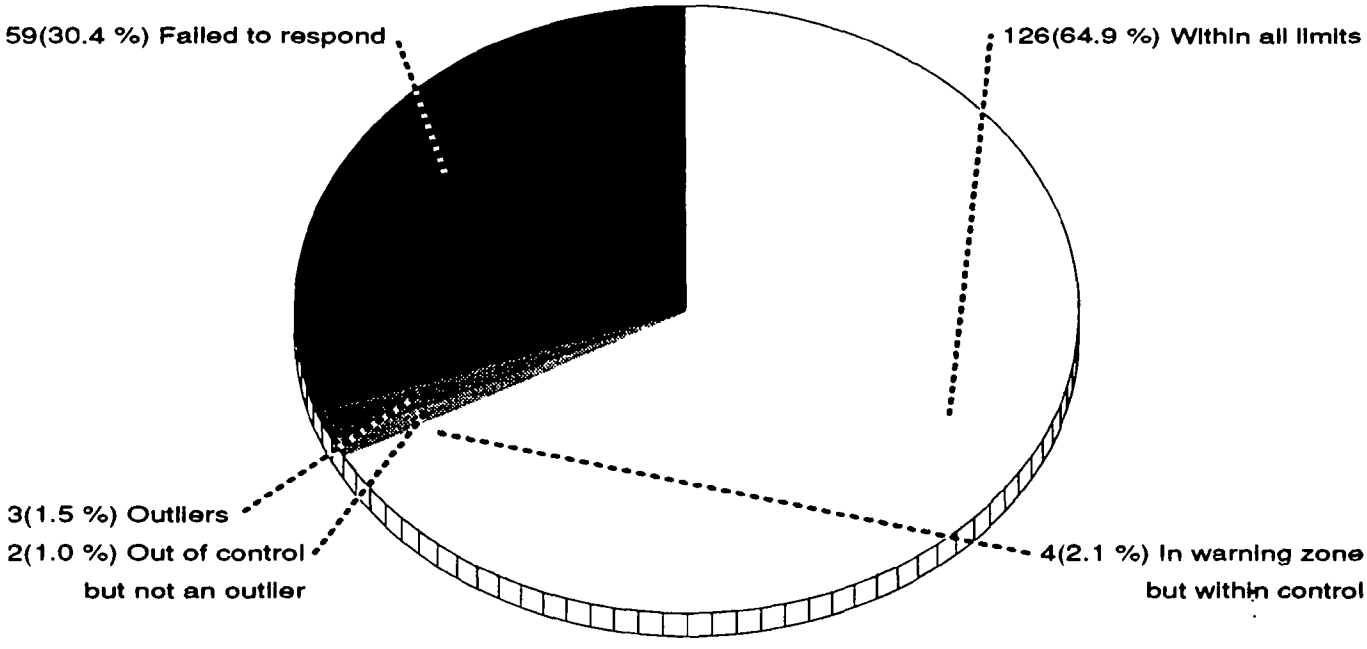
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

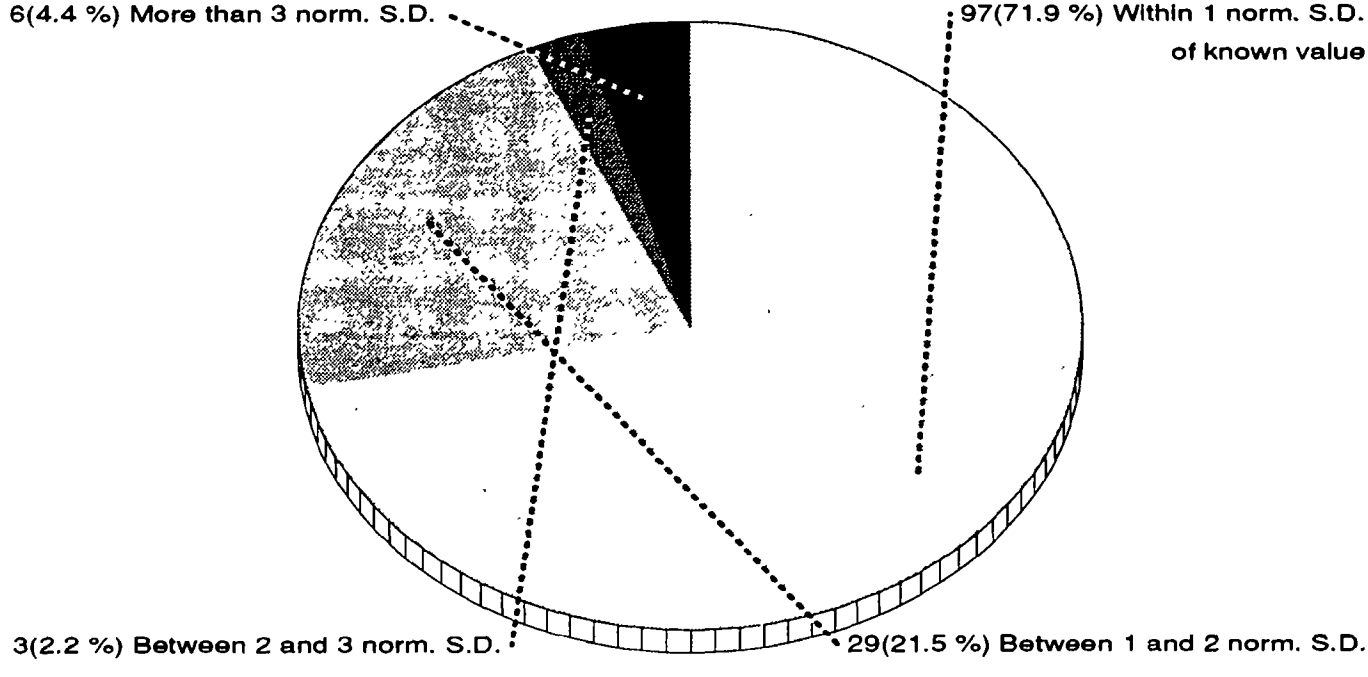
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cesium-134 Statistical Summary 194 Participants

The known value of this nuclide is **20.0 pCi/l** 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	20.26	**Grand Avg 18.33**
Std. Dev.	17.58	2.38
Variance	309.06	5.68
% Coef. of Var.	86.76	13.00
% deviation of mean from known value	1.31	-8.35
Norm. dev. of mean from known value	0.01	-0.70
Median	18.33	18.17
% deviation of median from known value	-8.33	-9.17
Norm. dev. of median from known value	-0.09	-0.77



Cesium-134

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
A	16.0	16.0	16.0	0.00	0.000	16.00	-0.81	-1.39	
AE	16.0	18.0	17.0	1.00	0.236	17.00	-0.46	-1.04	
AF	18.0	18.0	18.0	0.00	0.000	18.00	-0.11	-0.69	
AH	17.0	17.0	17.0	0.00	0.000	17.00	-0.46	-1.04	
AI	16.0	17.0	16.0	0.58	0.118	16.33	-0.69	-1.27	
AJ	14.0	17.0	20.0	3.00	0.709	17.00	-0.46	-1.04	
AK	19.0	18.0	20.0	1.00	0.236	19.00	0.23	-0.35	
AL	13.0	20.0	21.0	4.36	0.945	18.00	-0.11	-0.69	
AO									•
AP	20.0	21.0	22.0	1.00	0.236	21.00	0.92	0.35	
AR									•
AU	20.0	18.0	18.0	1.15	0.236	18.67	0.12	-0.46	
AW	19.0	17.0	17.0	1.15	0.236	17.67	-0.23	-0.81	
AZ	22.0	19.0	21.0	1.53	0.354	20.67	0.81	0.23	
BA	20.0	21.0	20.0	0.58	0.118	20.33	0.69	0.12	
BB	20.0	19.0	21.0	1.00	0.236	20.00	0.58	0.00	
BC	18.0	17.0	18.0	0.58	0.118	17.67	-0.23	-0.81	
BG									•
BH	16.0	17.0	16.0	0.58	0.118	16.33	-0.69	-1.27	
BK	21.0	21.0	21.0	0.00	0.000	21.00	0.92	0.35	
BL	19.0	20.0	18.0	1.00	0.236	19.00	0.23	-0.35	
BM	18.0	19.0	18.0	0.58	0.118	18.33	0.00	-0.58	
BN	18.0	18.0	17.0	0.58	0.118	17.67	-0.23	-0.81	
BO	18.0	19.0	19.0	0.58	0.118	18.67	0.12	-0.46	
BS									•
BW	14.0	26.0	12.0	7.57	2.245	17.33	-0.35	-0.92	
C	14.0	15.0	16.0	1.00	0.236	15.00	-1.15	-1.73	
CA	16.0	18.0	18.0	1.15	0.236	17.33	-0.35	-0.92	
CE	18.0	17.0	18.0	0.58	0.118	17.67	-0.23	-0.81	
CG									•
CJ	18.0	22.0	19.0	2.08	0.473	19.67	0.46	-0.12	
CK	20.0	18.0	18.0	1.15	0.236	18.67	0.12	-0.46	
CM	14.0	13.0	12.0	1.00	0.236	13.00	-1.85	-2.42	
CO	20.0	21.0	17.0	2.08	0.473	19.33	0.35	-0.23	
CP	211.0	216.0	214.0	2.52	0.591	213.67	67.67	67.09	×
CQ	17.0	17.0	18.0	0.58	0.118	17.33	-0.35	-0.92	
CS	17.0	20.0	19.0	1.53	0.354	18.67	0.12	-0.46	
CX	24.0	24.0	19.0	2.89	0.591	22.33	1.39	0.81	
D									•
DB									•
DD	20.0	20.0	23.0	1.73	0.354	21.00	0.92	0.35	
DE	20.0	20.0	20.0	0.00	0.000	20.00	0.58	0.00	
DG	17.0	18.0	18.0	0.58	0.118	17.67	-0.23	-0.81	
DJ									•
DL	17.0	18.0	17.0	0.58	0.118	17.33	-0.35	-0.92	

• ≡ No data submitted — **TAG SYMBOLS** — ⇑ ≡ Above control limit

∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Cesium-134

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
DM	18.0	20.0	18.0	1.15	0.236	18.67	0.12	-0.46	
DO	17.0	20.0	16.0	2.08	0.473	17.67	-0.23	-0.81	
DS									•
DT	17.0	20.0	16.0	2.08	0.473	17.67	-0.23	-0.81	
DZ	15.0	14.0	16.0	1.00	0.236	15.00	-1.15	-1.73	
E	19.0	19.0	19.0	0.00	0.000	19.00	0.23	-0.35	
EB	16.0	17.0	16.0	0.58	0.118	16.33	-0.69	-1.27	
EL	18.0	18.0	18.0	0.00	0.000	18.00	-0.11	-0.69	
EO									•
ER									•
EV									•
EX	22.0	21.0	22.0	0.58	0.118	21.67	1.16	0.58	
FF									•
FJ	19.0	19.0	19.0	0.00	0.000	19.00	0.23	-0.35	
FL	19.0	18.0	19.0	0.58	0.118	18.67	0.12	-0.46	
FN									•
FU	19.0	18.0	18.0	0.58	0.118	18.33	0.00	-0.58	
FZ	21.0	20.0	17.0	2.08	0.473	19.33	0.35	-0.23	
GE	17.0	20.0	17.0	1.73	0.354	18.00	-0.11	-0.69	
GI	17.0	17.0	17.0	0.00	0.000	17.00	-0.46	-1.04	
GQ	20.0	20.0	20.0	0.00	0.000	20.00	0.58	0.00	
GT									•
GZ									•
HI	10.0	13.0	10.0	1.73	0.354	11.00	-2.54	-3.12	⇓
HK	18.0	18.0	18.0	0.00	0.000	18.00	-0.11	-0.69	
HL	19.0	18.0	18.0	0.58	0.118	18.33	0.00	-0.58	
HP	19.0	19.0	18.0	0.58	0.118	18.67	0.12	-0.46	
I	18.0	19.0	17.0	1.00	0.236	18.00	-0.11	-0.69	
IC	19.0	21.0	19.0	1.15	0.236	19.67	0.46	-0.12	
ID									•
J	17.0	17.0	17.0	0.00	0.000	17.00	-0.46	-1.04	
JE	17.0	18.0	17.0	0.58	0.118	17.33	-0.35	-0.92	
JG	14.0	15.0	16.0	1.00	0.236	15.00	-1.15	-1.73	
JN									•
JQ									•
JS	19.0	19.0	19.0	0.00	0.000	19.00	0.23	-0.35	
JY	31.0	25.0	21.0	5.03	1.345	25.67	2.54	1.96	
K	18.0	17.0	18.0	0.58	0.118	17.67	-0.23	-0.81	
KE									•
KT									•
KX	18.0	20.0	21.0	1.53	0.354	19.67	0.46	-0.12	
L	19.0	17.0	20.0	1.53	0.354	18.67	0.12	-0.46	
LF	19.0	18.0	19.0	0.58	0.118	18.67	0.12	-0.46	
LG									•
LL									•

• ≡ No data submitted — **TAG SYMBOLS** — ⇑ ≡ Above control limit

∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Cesium-134

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
LR	32.0	28.0	20.0	6.11	1.795	26.67	2.89	2.31	
LT	20.0	20.0	18.0	1.15	0.236	19.33	0.35	-0.23	
M	17.0	17.0	16.0	0.58	0.118	16.67	-0.58	-1.15	
MA	17.0	16.0	19.0	1.53	0.354	17.33	-0.35	-0.92	
MF									•
MP	74.0	72.0	70.0	2.00	0.473	72.00	18.59	18.01	×
MQ	18.0	19.0	19.0	0.58	0.118	18.67	0.12	-0.46	
MV	9.0	10.0	8.0	1.00	0.236	9.00	-3.23	-3.81	⇓
MY									•
N	20.0	18.0	19.0	1.00	0.236	19.00	0.23	-0.35	
NA									•
NH	17.0	16.0	18.0	1.00	0.236	17.00	-0.46	-1.04	
NI									•
NJ	16.0	20.0	18.0	2.00	0.473	18.00	-0.11	-0.69	
NK	16.0	15.0	13.0	1.53	0.354	14.67	-1.27	-1.85	
NO	21.0	22.0	22.0	0.58	0.118	21.67	1.16	0.58	
NT									•
O	21.0	21.0	21.0	0.00	0.000	21.00	0.92	0.35	
OF									•
OS									•
OX									•
OY									•
OZ	32.0	28.0	30.0	2.00	0.473	30.00	4.04	3.46	×
P	23.0	21.0	21.0	1.15	0.236	21.67	1.16	0.58	
PA									•
PB	20.0	20.0	20.0	0.00	0.000	20.00	0.58	0.00	
PG									•
PI	17.0	17.0	18.0	0.58	0.118	17.33	-0.35	-0.92	
PM	18.0	14.0	23.0	4.51	1.120	18.33	0.00	-0.58	
PQ	18.0	17.0	17.0	0.58	0.118	17.33	-0.35	-0.92	
PR									•
PV	18.0	18.0	25.0	4.04	0.827	20.33	0.69	0.12	
PW	17.0	18.0	18.0	0.58	0.118	17.67	-0.23	-0.81	
Q	17.0	18.0	19.0	1.00	0.236	18.00	-0.11	-0.69	
QC									•
QJ	15.0	17.0	18.0	1.53	0.354	16.67	-0.58	-1.15	
QP	27.0	31.0	28.0	2.08	0.473	28.67	3.58	3.00	
QQ									•
QT	18.0	18.0	18.0	0.00	0.000	18.00	-0.11	-0.69	
QU	13.0	14.0	15.0	1.00	0.236	14.00	-1.50	-2.08	
QW	16.0	13.0	15.0	1.53	0.354	14.67	-1.27	-1.85	
QX	19.0	20.0	19.0	0.58	0.118	19.33	0.35	-0.23	
QY									•
QZ	18.0	16.0	17.0	1.00	0.236	17.00	-0.46	-1.04	
RD									•

• ≡ No data submitted — **TAG SYMBOLS** — ⇑ ≡ Above control limit

∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Cesium-134

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
RE									•
RF	19.0	19.0	19.0	0.00	0.000	19.00	0.23	-0.35	
RG									•
RJ									•
RK	15.0	15.0	15.0	0.00	0.000	15.00	-1.15	-1.73	
RP									•
RR	19.0	17.0	18.0	1.00	0.236	18.00	-0.11	-0.69	
RV	21.0	21.0	22.0	0.58	0.118	21.33	1.04	0.46	
RZ	19.0	19.0	20.0	0.58	0.118	19.33	0.35	-0.23	
S	18.0	18.0	18.0	0.00	0.000	18.00	-0.11	-0.69	
SC	15.0	20.0	20.0	2.89	0.591	18.33	0.00	-0.58	
SD	21.0	22.0	18.0	2.08	0.473	20.33	0.69	0.12	
SF	20.0	17.0	19.0	1.53	0.354	18.67	0.12	-0.46	
SI	20.0	21.0	24.0	2.08	0.473	21.67	1.16	0.58	
SL									•
SM	18.0	19.0	18.0	0.58	0.118	18.33	0.00	-0.58	
SN	16.0	17.0	18.0	1.00	0.236	17.00	-0.46	-1.04	
SO									•
SR	17.0	16.0	18.0	1.00	0.236	17.00	-0.46	-1.04	
SS	18.0	19.0	21.0	1.53	0.354	19.33	0.35	-0.23	
ST	17.0	17.0	17.0	0.00	0.000	17.00	-0.46	-1.04	
SX	16.0	19.0	18.0	1.53	0.354	17.67	-0.23	-0.81	
SZ	17.0	17.0	17.0	0.00	0.000	17.00	-0.46	-1.04	
T	17.0	19.0	18.0	1.00	0.236	18.00	-0.11	-0.69	
TD	20.0	19.0	19.0	0.58	0.118	19.33	0.35	-0.23	
TE	16.0	19.0	18.0	1.53	0.354	17.67	-0.23	-0.81	
TH	18.0	18.0	19.0	0.58	0.118	18.33	0.00	-0.58	
TI	18.0	19.0	19.0	0.58	0.118	18.67	0.12	-0.46	
TL	17.0	18.0	20.0	1.53	0.354	18.33	0.00	-0.58	
TN									•
TQ	16.0	18.0	17.0	1.00	0.236	17.00	-0.46	-1.04	
TS	17.0	18.0	17.0	0.58	0.118	17.33	-0.35	-0.92	
TY									•
U	19.0	18.0	19.0	0.58	0.118	18.67	0.12	-0.46	
UA									•
UE	20.0	18.0	19.0	1.00	0.236	19.00	0.23	-0.35	
UG									•
UK									•
UN	18.0	18.0	19.0	0.58	0.118	18.33	0.00	-0.58	
UP	18.0	15.0	16.0	1.53	0.354	16.33	-0.69	-1.27	
UQ									•
UW	21.0	20.0	20.0	0.58	0.118	20.33	0.69	0.12	
UY	18.0	18.0	17.0	0.58	0.118	17.67	-0.23	-0.81	
VA	18.0	19.0	19.0	0.58	0.118	18.67	0.12	-0.46	
VC									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cesium-134

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
VG	18.0	18.0	19.0	0.58	0.118	18.33	0.00	-0.58	
VI	17.0	16.0	17.0	0.58	0.118	16.67	-0.58	-1.15	
VJ									•
VM	24.0	22.0	24.0	1.15	0.236	23.33	1.73	1.15	
VN									•
VO	19.0	16.0	17.0	1.53	0.354	17.33	-0.35	-0.92	
VQ									•
VT									•
VU									•
W	16.0	17.0	16.0	0.58	0.118	16.33	-0.69	-1.27	
WE									•
WF	21.0	21.0	22.0	0.58	0.118	21.33	1.04	0.46	
X	17.0	17.0	18.0	0.58	0.118	17.33	-0.35	-0.92	
Z									•

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
9.00	⇓	MV	17.00		AJ	18.00		RR
11.00	⇓	HI	17.00		AH	18.00		QT
13.00		CM	17.00		AE	18.00		Q
14.00		QU	17.33		X	18.00		NJ
14.67		QW	17.33		VO	18.00		I
14.67		NK	17.33		TS	18.00		HK
15.00		RK	17.33		PQ	18.00		GE
15.00		JG	17.33		PI	18.00		EL
15.00		DZ	17.33		MA	18.00		AL
15.00		C	17.33		JE	18.00		AF
16.00		A	17.33		DL	18.33		VG
16.33		W	17.33		CQ	18.33		UN
16.33		UP	17.33		CA	18.33		TL
16.33		EB	17.33		BW	18.33		TH
16.33		BH	17.67		UY	18.33		SM
16.33		AI	17.67		TE	18.33		SC
16.67		VI	17.67		SX	18.33		PM
16.67		QJ	17.67		PW	18.33		HL
16.67		M	17.67		K	18.33		FU
17.00		TQ	17.67		DT	18.33		BM
17.00		SZ	17.67		DO	18.67		VA
17.00		ST	17.67		DG	18.67		U
17.00		SR	17.67		CE	18.67		TI
17.00		SN	17.67		BN	18.67		SF
17.00		QZ	17.67		BC	18.67		MQ
17.00		NH	17.67		AW	18.67		LF
17.00		J	18.00		T	18.67		L
17.00		GI	18.00		S	18.67		HP

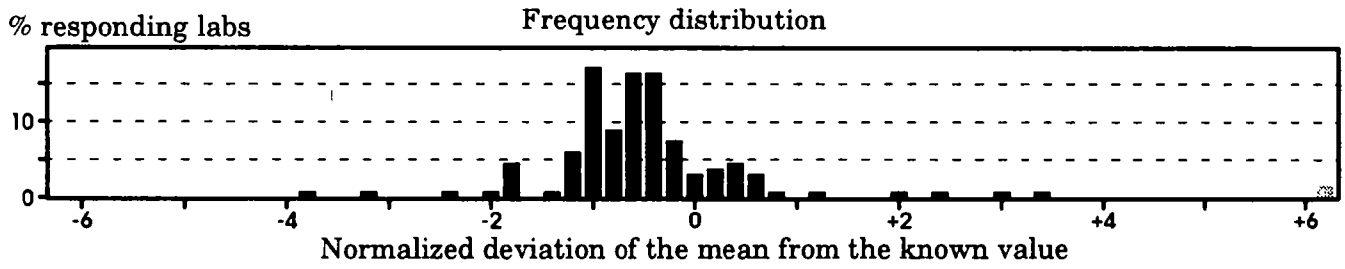
• ≡ No data submitted — **TAG SYMBOLS** — ⇑ ≡ Above control limit

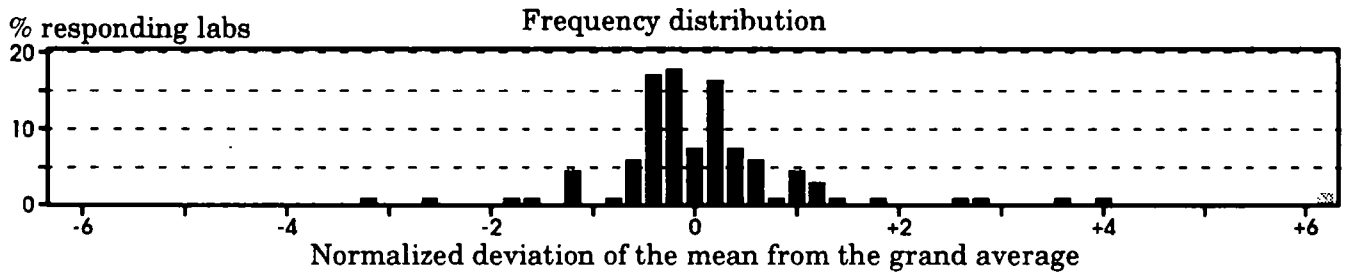
∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Cesium-134

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
18.67		FL	19.33		QX	21.00		DD
18.67		DM	19.33		LT	21.00		BK
18.67		CS	19.33		FZ	21.00		AP
18.67		CK	19.33		CO	21.33		WF
18.67		BO	19.67		KX	21.33		RV
18.67		AU	19.67		IC	21.67		SI
19.00		UE	19.67		CJ	21.67		P
19.00		RF	20.00		PB	21.67		NO
19.00		N	20.00		GQ	21.67		EX
19.00		JS	20.00		DE	22.33		CX
19.00		FJ	20.00		BB	23.33		VM
19.00		E	20.33		UW	25.67		JY
19.00		BL	20.33		SD	26.67		LR
19.00		AK	20.33		PV	28.67		QP
19.33		TD	20.33		BA	30.00	×	OZ
19.33		SS	20.67		AZ	72.00	×	MP
19.33		RZ	21.00		O	213.67	×	CP

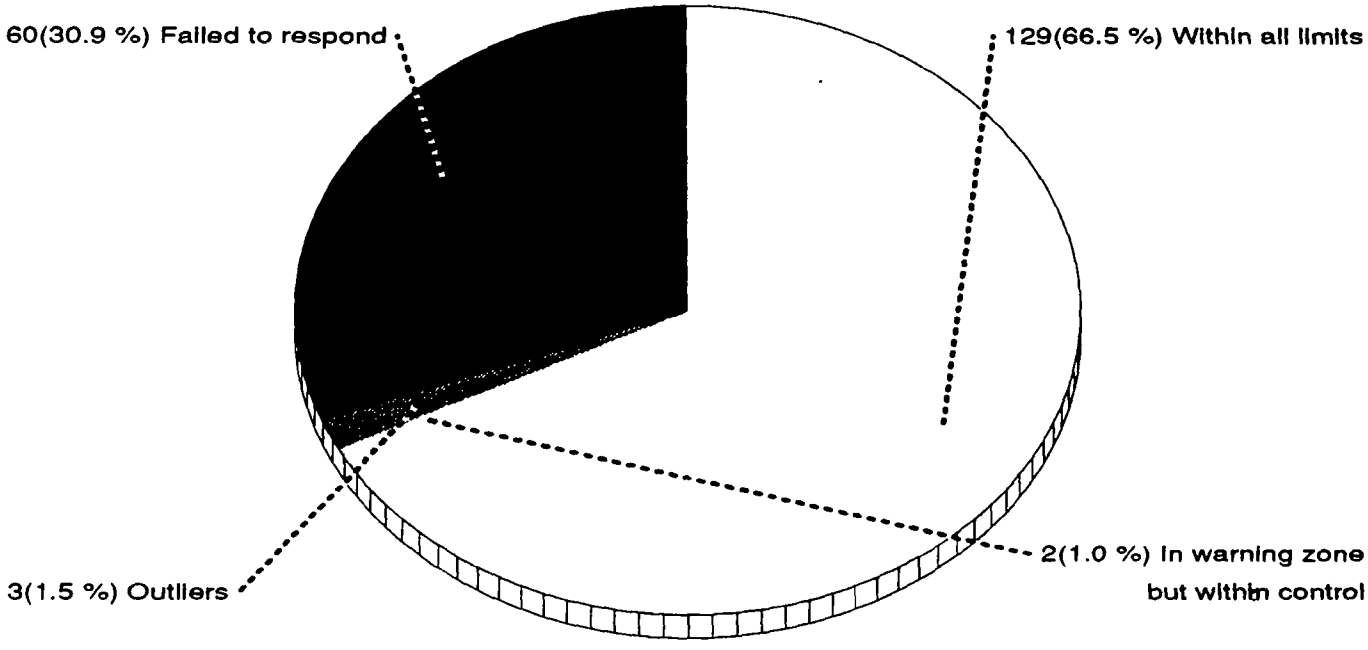




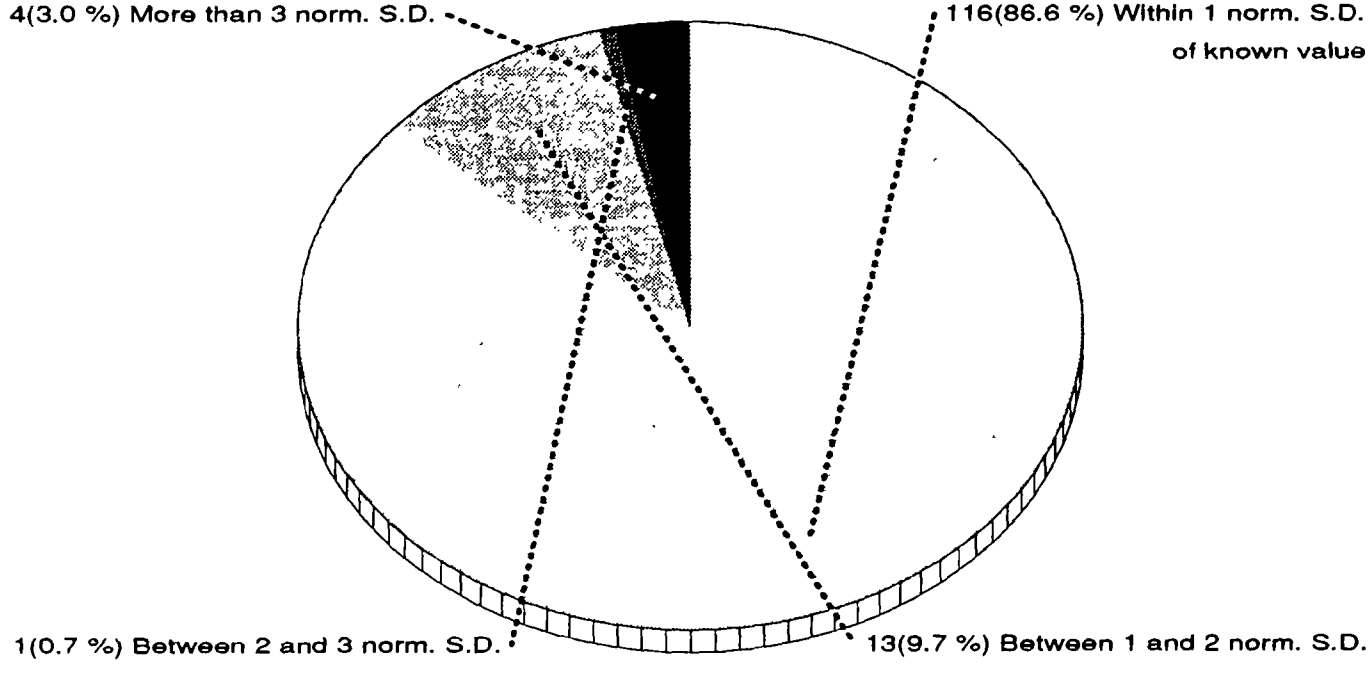
• ≡ No data submitted	**TAG SYMBOLS**	⇑ ≡ Above control limit
∅ ≡ Insufficient data	× ≡ Determined to be an outlier	⇓ ≡ Below control limit

Cesium-137 Statistical Summary 194 Participants

The known value of this nuclide is **11.0 pCi/l** with an expected precision of **5.0**; the control limits are 2.3 to 19.7; the warning regions are 2.3 to 5.2 and 16.8 to 19.7



Statistic	Respondents	Non-outliers
Mean	14.07	**Grand Avg 11.78**
Std. Dev.	23.08	1.68
Variance	532.72	2.84
% Coef. of Var.	164.02	14.29
% deviation of mean from known value	27.93	7.12
Norm. dev. of mean from known value	0.13	0.47
Median	11.67	11.67
% deviation of median from known value	6.06	6.06
Norm. dev. of median from known value	0.03	0.40



Cesium-137

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
A	10.0	10.0	10.0	0.00	0.000	10.00	-0.62	-0.35	
AE	12.0	13.0	10.0	1.53	0.354	11.67	-0.04	0.23	
AF	13.0	11.0	10.0	1.53	0.354	11.33	-0.16	0.12	
AH	11.0	11.0	11.0	0.00	0.000	11.00	-0.27	0.00	
AI	10.0	11.0	11.0	0.58	0.118	10.67	-0.39	-0.12	
AJ	12.0	12.0	12.0	0.00	0.000	12.00	0.07	0.35	
AK	12.0	11.0	13.0	1.00	0.236	12.00	0.07	0.35	
AL	17.0	17.0	11.0	3.46	0.709	15.00	1.11	1.39	
AO									•
AP	15.0	12.0	9.0	3.00	0.709	12.00	0.07	0.35	
AR									•
AU	11.0	13.0	13.0	1.15	0.236	12.33	0.19	0.46	
AW	12.0	13.0	13.0	0.58	0.118	12.67	0.31	0.58	
AZ	16.0	11.0	12.0	2.65	0.591	13.00	0.42	0.69	
BA	5.0	6.0	8.0	1.53	0.354	6.33	-1.89	-1.62	
BB	11.0	11.0	12.0	0.58	0.118	11.33	-0.16	0.12	
BC	12.0	12.0	12.0	0.00	0.000	12.00	0.07	0.35	
BG									•
BH	14.0	14.0	12.0	1.15	0.236	13.33	0.54	0.81	
BK	13.0	14.0	14.0	0.58	0.118	13.67	0.65	0.92	
BL	12.0	12.0	13.0	0.58	0.118	12.33	0.19	0.46	
BM	13.0	12.0	12.0	0.58	0.118	12.33	0.19	0.46	
BN	13.0	12.0	12.0	0.58	0.118	12.33	0.19	0.46	
BO	9.0	11.0	13.0	2.00	0.473	11.00	-0.27	0.00	
BS									•
BW	10.0	17.0	12.0	3.61	0.827	13.00	0.42	0.69	
C	10.0	10.0	10.0	0.00	0.000	10.00	-0.62	-0.35	
CA	10.0	11.0	12.0	1.00	0.236	11.00	-0.27	0.00	
CE	10.0	13.0	12.0	1.53	0.354	11.67	-0.04	0.23	
CG									•
CJ	12.0	13.0	10.0	1.53	0.354	11.67	-0.04	0.23	
CK	15.0	15.0	12.0	1.73	0.354	14.00	0.77	1.04	
CM	19.0	18.0	18.0	0.58	0.118	18.33	2.27	2.54	
CO	12.0	10.0	11.0	1.00	0.236	11.00	-0.27	0.00	
CP	275.0	278.0	276.0	1.53	0.354	276.33	91.64	91.91	×
CQ	12.0	13.0	14.0	1.00	0.236	13.00	0.42	0.69	
CS	11.0	10.0	10.0	0.58	0.118	10.33	-0.50	-0.23	
CX	12.0	15.0	14.0	1.53	0.354	13.67	0.65	0.92	
D									•
DB									•
DD	13.0	12.0	13.0	0.58	0.118	12.67	0.31	0.58	
DE	12.0	12.0	12.0	0.00	0.000	12.00	0.07	0.35	
DG	13.0	15.0	16.0	1.53	0.354	14.67	1.00	1.27	
DJ									•
DL	9.0	12.0	11.0	1.53	0.354	10.67	-0.39	-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. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
DM	10.0	12.0	11.0	1.00	0.236	11.00	-0.27	0.00	
DO	10.0	10.0	7.0	1.73	0.354	9.00	-0.96	-0.69	
DS									•
DT	10.0	13.0	10.0	1.73	0.354	11.00	-0.27	0.00	
DZ	14.0	14.0	14.0	0.00	0.000	14.00	0.77	1.04	
E	14.0	13.0	9.0	2.65	0.591	12.00	0.07	0.35	
EB	11.0	11.0	11.0	0.00	0.000	11.00	-0.27	0.00	
EL	11.0	12.0	14.0	1.53	0.354	12.33	0.19	0.46	
EO									•
ER									•
EV									•
EX	14.0	12.0	12.0	1.15	0.236	12.67	0.31	0.58	
FF									•
FJ	11.0	12.0	14.0	1.53	0.354	12.33	0.19	0.46	
FL	12.0	12.0	12.0	0.00	0.000	12.00	0.07	0.35	
FN									•
FU	12.0	12.0	12.0	0.00	0.000	12.00	0.07	0.35	
FZ	14.0	18.0	16.0	2.00	0.473	16.00	1.46	1.73	
GE	12.0	12.0	11.0	0.58	0.118	11.67	-0.04	0.23	
GI	11.0	11.0	12.0	0.58	0.118	11.33	-0.16	0.12	
GQ	12.0	12.0	12.0	0.00	0.000	12.00	0.07	0.35	
GT									•
GZ									•
HI	10.0	7.0	12.0	2.52	0.591	9.67	-0.73	-0.46	
HK	12.0	12.0	11.0	0.58	0.118	11.67	-0.04	0.23	
HL	14.0	13.0	13.0	0.58	0.118	13.33	0.54	0.81	
HP	12.0	13.0	13.0	0.58	0.118	12.67	0.31	0.58	
I	12.0	14.0	13.0	1.00	0.236	13.00	0.42	0.69	
IC	12.0	11.0	11.0	0.58	0.118	11.33	-0.16	0.12	
ID									•
J	11.0	11.0	11.0	0.00	0.000	11.00	-0.27	0.00	
JE	11.0	11.0	12.0	0.58	0.118	11.33	-0.16	0.12	
JG	12.0	9.0	11.0	1.53	0.354	10.67	-0.39	-0.12	
JN									•
JQ									•
JS	11.0	11.0	11.0	0.00	0.000	11.00	-0.27	0.00	
JY									•
K	10.0	10.0	11.0	0.58	0.118	10.33	-0.50	-0.23	
KE									•
KT									•
KX	11.0	11.0	12.0	0.58	0.118	11.33	-0.16	0.12	
L	13.0	14.0	11.0	1.53	0.354	12.67	0.31	0.58	
LF	11.0	10.0	9.0	1.00	0.236	10.00	-0.62	-0.35	
LG									•
LL									•

• ≡ No data submitted

∅ ≡ Insufficient data

TAG SYMBOLS

× ≡ Determined to be an outlier

⇑ ≡ Above control limit

⇓ ≡ Below control limit

Cesium-137

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
LR	12.0	12.0	10.0	1.15	0.236	11.33	-0.16	0.12	
LT	13.0	11.0	13.0	1.15	0.236	12.33	0.19	0.46	
M	10.0	11.0	11.0	0.58	0.118	10.67	-0.39	-0.12	
MA	12.0	11.0	11.0	0.58	0.118	11.33	-0.16	0.12	
MF									•
MP	47.0	42.0	47.0	2.89	0.591	45.33	11.62	11.89	×
MQ	13.0	12.0	11.0	1.00	0.236	12.00	0.07	0.35	
MV	9.0	7.0	6.0	1.53	0.354	7.33	-1.54	-1.27	
MY									•
N	11.0	12.0	13.0	1.00	0.236	12.00	0.07	0.35	
NA									•
NH	12.0	12.0	11.0	0.58	0.118	11.67	-0.04	0.23	
NI									•
NJ	10.0	10.0	10.0	0.00	0.000	10.00	-0.62	-0.35	
NK	10.0	11.0	9.0	1.00	0.236	10.00	-0.62	-0.35	
NO	11.0	11.0	12.0	0.58	0.118	11.33	-0.16	0.12	
NT									•
O	13.0	13.0	13.0	0.00	0.000	13.00	0.42	0.69	
OF									•
OS									•
OX									•
OY									•
OZ	22.0	20.0	19.0	1.53	0.354	20.33	2.96	3.23	×
P	15.0	13.0	14.0	1.00	0.236	14.00	0.77	1.04	
PA									•
PB	10.0	10.0	10.0	0.00	0.000	10.00	-0.62	-0.35	
PG									•
PI	11.0	11.0	11.0	0.00	0.000	11.00	-0.27	0.00	
PM	14.0	16.0	12.0	2.00	0.473	14.00	0.77	1.04	
PQ	10.0	11.0	10.0	0.58	0.118	10.33	-0.50	-0.23	
PR									•
PV	8.0	11.0	12.0	2.08	0.473	10.33	-0.50	-0.23	
PW	11.0	11.0	11.0	0.00	0.000	11.00	-0.27	0.00	
Q	11.0	12.0	12.0	0.58	0.118	11.67	-0.04	0.23	
QC									•
QJ	12.0	16.0	15.0	2.08	0.473	14.33	0.88	1.15	
QP	16.0	21.0	22.0	3.21	0.709	19.67	2.73	3.00	
QQ									•
QT	11.0	10.0	11.0	0.58	0.118	10.67	-0.39	-0.12	
QU	11.0	10.0	12.0	1.00	0.236	11.00	-0.27	0.00	
QW	9.0	10.0	12.0	1.53	0.354	10.33	-0.50	-0.23	
QX	15.0	14.0	15.0	0.58	0.118	14.67	1.00	1.27	
QY									•
QZ	10.0	10.0	11.0	0.58	0.118	10.33	-0.50	-0.23	
RD									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cesium-137

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
RE									•
RF	11.0	11.0	9.0	1.15	0.236	10.33	-0.50	-0.23	
RG									•
RJ									•
RK	10.0	10.0	10.0	0.00	0.000	10.00	-0.62	-0.35	
RP									•
RR	12.0	11.0	13.0	1.00	0.236	12.00	0.07	0.35	
RV	14.0	12.0	10.0	2.00	0.473	12.00	0.07	0.35	
RZ	11.0	12.0	12.0	0.58	0.118	11.67	-0.04	0.23	
S	12.0	11.0	12.0	0.58	0.118	11.67	-0.04	0.23	
SC	11.0	9.0	10.0	1.00	0.236	10.00	-0.62	-0.35	
SD	12.0	13.0	16.0	2.08	0.473	13.67	0.65	0.92	
SF	10.0	13.0	14.0	2.08	0.473	12.33	0.19	0.46	
SI	13.0	13.0	9.0	2.31	0.473	11.67	-0.04	0.23	
SL									•
SM	13.0	12.0	11.0	1.00	0.236	12.00	0.07	0.35	
SN	12.0	11.0	10.0	1.00	0.236	11.00	-0.27	0.00	
SO									•
SR	15.0	9.0	13.0	3.06	0.709	12.33	0.19	0.46	
SS	14.0	15.0	14.0	0.58	0.118	14.33	0.88	1.15	
ST	11.0	11.0	11.0	0.00	0.000	11.00	-0.27	0.00	
SX	12.0	10.0	10.0	1.15	0.236	10.67	-0.39	-0.12	
SZ	12.0	11.0	12.0	0.58	0.118	11.67	-0.04	0.23	
T	10.0	10.0	12.0	1.15	0.236	10.67	-0.39	-0.12	
TD	12.0	14.0	13.0	1.00	0.236	13.00	0.42	0.69	
TE	11.0	11.0	11.0	0.00	0.000	11.00	-0.27	0.00	
TH	12.0	11.0	12.0	0.58	0.118	11.67	-0.04	0.23	
TI	11.0	11.0	13.0	1.15	0.236	11.67	-0.04	0.23	
TL	8.0	8.0	13.0	2.89	0.591	9.67	-0.73	-0.46	
TN									•
TQ	11.0	12.0	13.0	1.00	0.236	12.00	0.07	0.35	
TS	8.0	10.0	10.0	1.15	0.236	9.33	-0.85	-0.58	
TY									•
U	12.0	12.0	10.0	1.15	0.236	11.33	-0.16	0.12	
UA									•
UE	12.0	11.0	11.0	0.58	0.118	11.33	-0.16	0.12	
UG									•
UK									•
UN	12.0	12.0	13.0	0.58	0.118	12.33	0.19	0.46	
UP	11.0	11.0	10.0	0.58	0.118	10.67	-0.39	-0.12	
UQ									•
UW	10.0	10.0	10.0	0.00	0.000	10.00	-0.62	-0.35	
UY	12.0	13.0	14.0	1.00	0.236	13.00	0.42	0.69	
VA	11.0	12.0	11.0	0.58	0.118	11.33	-0.16	0.12	
VC									•

• ≡ 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. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
VG	10.0	11.0	10.0	0.58	0.118	10.33	-0.50	-0.23	
VI	13.0	11.0	13.0	1.15	0.236	12.33	0.19	0.46	
VJ									•
VM	11.0	13.0	12.0	1.00	0.236	12.00	0.07	0.35	
VN									•
VO	13.0	13.0	11.0	1.15	0.236	12.33	0.19	0.46	
VQ									•
VT									•
VU									•
W	11.0	11.0	9.0	1.15	0.236	10.33	-0.50	-0.23	
WE									•
WF	15.0	14.0	16.0	1.00	0.236	15.00	1.11	1.39	
X	10.0	11.0	13.0	1.53	0.354	11.33	-0.16	0.12	
Z									•

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
6.33		BA	10.67		M	11.33		IC
7.33		MV	10.67		JG	11.33		GI
9.00		DO	10.67		DL	11.33		BB
9.33		TS	10.67		AI	11.33		AF
9.67		TL	11.00		TE	11.67		TI
9.67		HI	11.00		ST	11.67		TH
10.00		UW	11.00		SN	11.67		SZ
10.00		SC	11.00		QU	11.67		SI
10.00		RK	11.00		PW	11.67		S
10.00		PB	11.00		PI	11.67		RZ
10.00		NK	11.00		JS	11.67		Q
10.00		NJ	11.00		J	11.67		NH
10.00		LF	11.00		EB	11.67		HK
10.00		C	11.00		DT	11.67		GE
10.00		A	11.00		DM	11.67		CJ
10.33		W	11.00		CO	11.67		CE
10.33		VG	11.00		CA	11.67		AE
10.33		RF	11.00		BO	12.00		VM
10.33		QZ	11.00		AH	12.00		TQ
10.33		QW	11.33		X	12.00		SM
10.33		PV	11.33		VA	12.00		RV
10.33		PQ	11.33		UE	12.00		RR
10.33		K	11.33		U	12.00		N
10.33		CS	11.33		NO	12.00		MQ
10.67		UP	11.33		MA	12.00		GQ
10.67		T	11.33		LR	12.00		FU
10.67		SX	11.33		KX	12.00		FL
10.67		QT	11.33		JE	12.00		E

• ≡ No data submitted
∅ ≡ Insufficient data

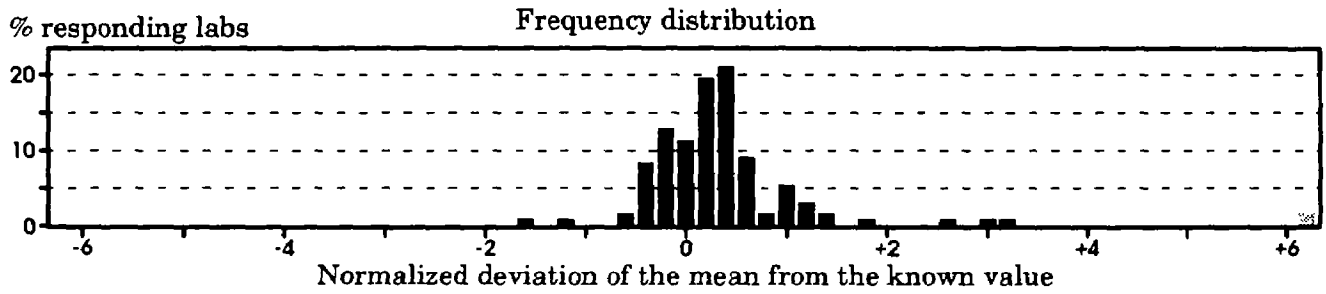
TAG SYMBOLS
× ≡ Determined to be an outlier

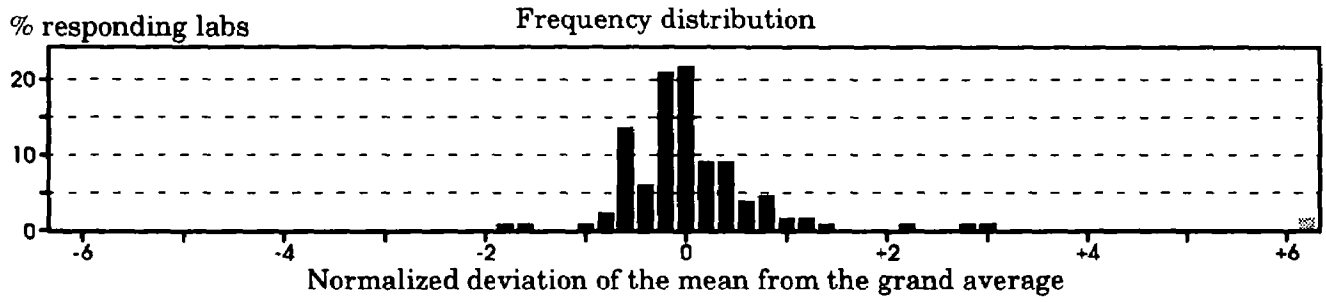
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cesium-137

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
12.00		DE	12.33		AU	13.67		BK
12.00		BC	12.67		L	14.00		PM
12.00		AP	12.67		HP	14.00		P
12.00		AK	12.67		EX	14.00		DZ
12.00		AJ	12.67		DD	14.00		CK
12.33		VO	12.67		AW	14.33		SS
12.33		VI	13.00		UY	14.33		QJ
12.33		UN	13.00		TD	14.67		QX
12.33		SR	13.00		O	14.67		DG
12.33		SF	13.00		I	15.00		WF
12.33		LT	13.00		CQ	15.00		AL
12.33		FJ	13.00		BW	16.00		FZ
12.33		EL	13.00		AZ	18.33		CM
12.33		BN	13.33		HL	19.67		QP
12.33		BM	13.33		BH	20.33	×	OZ
12.33		BL	13.67		SD	45.33	×	MP
			13.67		CX	276.33	×	CP





• ≡ No data submitted	**TAG SYMBOLS**	⇑ ≡ Above control limit
∅ ≡ Insufficient data	× ≡ Determined to be an outlier	⇓ ≡ Below control limit