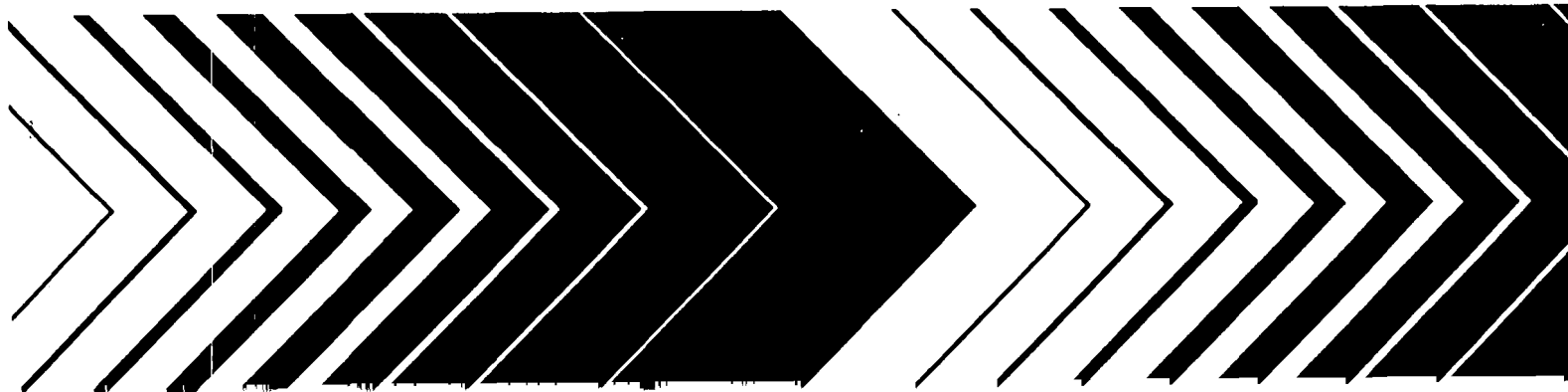




Performance Evaluation-B Intercomparison Study

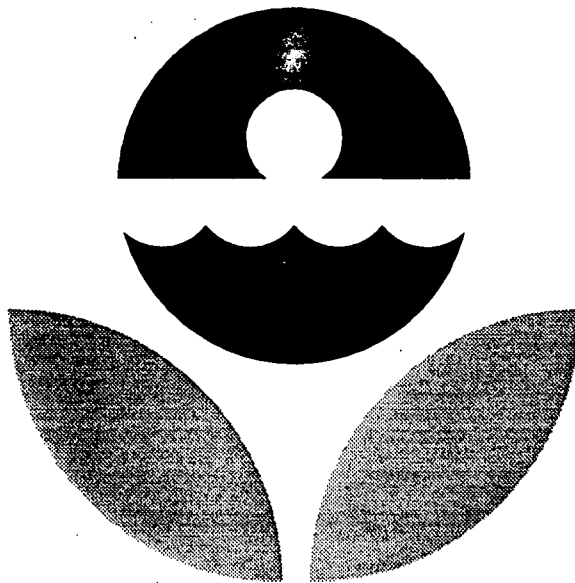
A Statistical Evaluation of the October 20, 1992 Data



Performance Evaluation-B

Intercomparison Study

October 20, 1992



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) Intercomparison Study for *Performance Evaluation-B; October 20, 1992*.

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 Intercomparison Program, and can be found in the Environmental Radioactivity Laboratory Intercomparison 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 Frank Novielli at 702/798-2159 or Patricia Honsa at 702/798-2141.

Sincerely,

A handwritten signature in cursive script, reading "Frank Novielli".

Frank Novielli
Senior 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.

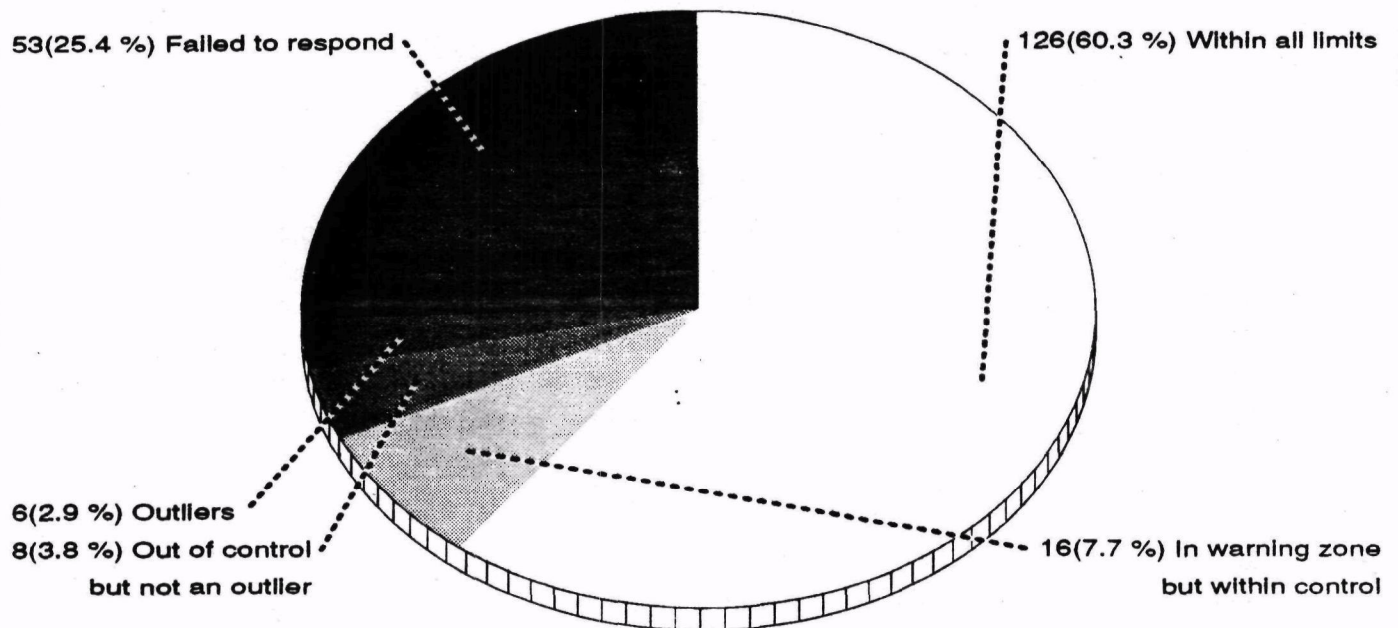
A complete explanation of the statistical calculations involved in the report may be found in the Environmental Radioactivity Laboratory Intercomparison Studies Program information brochure [Draft Revision of EPA-600/4-81-004], available from Frank Novielli, EMSL-LV, 702/798-2159.

Gross Beta

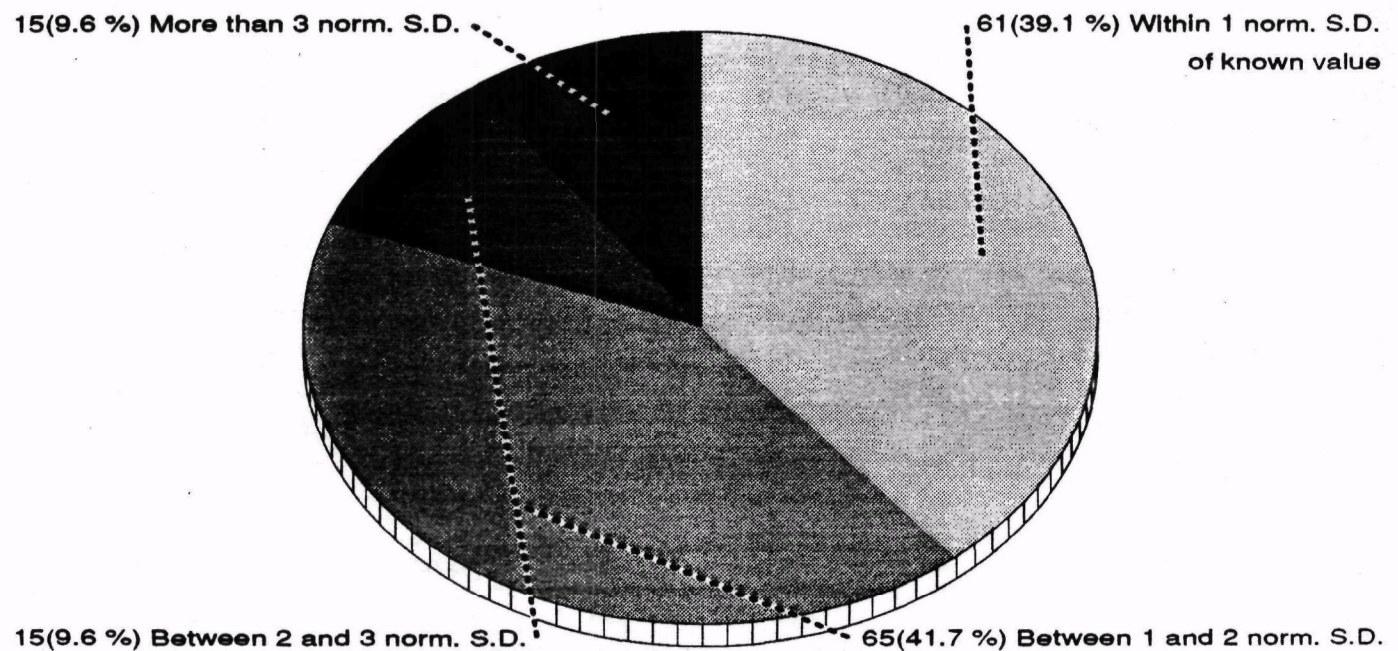
Statistical Summary

209 Participants

The known value of this nuclide is 53.0 pCi/l with an expected precision of 10.0; the control limits are 35.7 to 70.3; the warning regions are 35.7 to 41.4 and 64.6 to 70.3



Statistic	Respondents	Non-outliers
Mean	47.44	Grand Avg 46.53
Std. Dev.	9.19	6.55
Variance	84.52	42.96
% Coef. of Var.	19.38	14.09
% deviation of mean from known value	-10.49	-12.21
Norm. dev. of mean from known value	-0.60	-0.99
Median	46.83	46.67
% deviation of median from known value	-11.64	-11.95
Norm. dev. of median from known value	-0.67	-0.97



Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
A	53.0	52.0	50.0	1.53	0.177	51.67	0.89	-0.23
AE	38.0	37.0	39.0	1.00	0.118	38.00	-1.48	-2.60
AF	48.0	53.0	47.0	3.21	0.354	49.33	0.49	-0.64
AI	51.0	52.0	54.0	1.53	0.177	52.33	1.01	-0.12
AJ	47.0	49.0	49.0	1.15	0.118	48.33	0.31	-0.81
AK	47.0	48.0	47.0	0.58	0.059	47.33	0.14	-0.98
AL	52.0	53.0	53.0	0.58	0.059	52.67	1.06	-0.06
AO	42.0	43.0	47.0	2.65	0.295	44.00	-0.44	-1.56
AP	47.0	49.0	49.0	1.15	0.118	48.33	0.31	-0.81
AR	41.0	42.0	41.0	0.58	0.059	41.33	-0.90	-2.02
AU	50.0	50.0	53.0	1.73	0.177	51.00	0.77	-0.35
AW	41.0	40.0	38.0	1.53	0.177	39.67	-1.19	-2.31
AZ	51.0	48.0	55.0	3.51	0.413	51.33	0.83	-0.29
BA	53.0	53.0	54.0	0.58	0.059	53.33	1.18	0.06
BC	49.0	52.0	50.0	1.53	0.177	50.33	0.66	-0.46
BG	32.0	34.0	25.0	4.73	0.532	30.33	-2.80	-3.93
BH	46.0	41.0	42.0	2.65	0.295	43.00	-0.61	-1.73
BK	43.0	43.0	42.0	0.58	0.059	42.67	-0.67	-1.79
BL								
BM	49.0	48.0	49.0	0.58	0.059	48.67	0.37	-0.75
BN								
BO	41.0	40.0	41.0	0.58	0.059	40.67	-1.01	-2.14
BS	51.0	50.0	51.0	0.58	0.059	50.67	0.72	-0.40
BW	41.0	43.0	44.0	1.53	0.177	42.67	-0.67	-1.79
C	53.0	51.0	50.0	1.53	0.177	51.33	0.83	-0.29
CA	39.0	47.0	42.0	4.04	0.473	42.67	-0.67	-1.79
CE	47.0	48.0	48.0	0.58	0.059	47.67	0.20	-0.92
CG	46.0	48.0	46.0	1.15	0.118	46.67	0.02	-1.10
CJ	52.0	48.0	47.0	2.65	0.295	49.00	0.43	-0.69
CK	46.0	43.0	44.0	1.53	0.177	44.33	-0.38	-1.50
CO	44.0	43.0	43.0	0.58	0.059	43.33	-0.55	-1.67
CQ	46.0	51.0	55.0	4.51	0.532	50.67	0.72	-0.40
CS	46.0	47.0	46.0	0.58	0.059	46.33	-0.03	-1.15
D	48.0	48.0	49.0	0.58	0.059	48.33	0.31	-0.81
DB	52.0	53.0	54.0	1.00	0.118	53.00	1.12	0.00
DD	41.0	44.0	43.0	1.53	0.177	42.67	-0.67	-1.79
DE	52.0	52.0	52.0	0.00	0.000	52.00	0.95	-0.17
DJ								
DL	47.0	46.0	39.0	4.36	0.473	44.00	-0.44	-1.56
DM	36.0	35.0	33.0	1.53	0.177	34.67	-2.05	-3.18
DO								
DS	44.0	49.0	44.0	2.89	0.295	45.67	-0.15	-1.27
DT	48.0	47.0	46.0	1.00	0.118	47.00	0.08	-1.04
DZ	51.0	50.0	49.0	1.00	0.118	50.00	0.60	-0.52
E	50.0	50.0	50.0	0.00	0.000	50.00	0.60	-0.52

• = 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	
EB	50.0	53.0	54.0	2.08	0.236	52.33	1.01	-0.12
EH	49.0	48.0	49.0	0.58	0.059	48.67	0.37	-0.75
EL								•
EO	46.0	48.0	47.0	1.00	0.118	47.00	0.08	-1.04
ER								•
EV	47.0	46.0	46.0	0.58	0.059	46.33	-0.03	-1.15
EX								•
FE								•
FF	47.0	45.0	47.0	1.15	0.118	46.33	-0.03	-1.15
FJ	75.0	69.0	71.0	3.06	0.354	71.67	4.35	3.23 ×
FK	38.0	39.0						∅
FL	44.0	40.0	45.0	2.65	0.295	43.00	-0.61	-1.73
FN	46.0	43.0	40.0	3.00	0.354	43.00	-0.61	-1.73
FU	41.0	42.0	44.0	1.53	0.177	42.33	-0.73	-1.85
FW								•
FZ	38.0	37.0	34.0	2.08	0.236	36.33	-1.77	-2.89
GE	39.0	46.0	47.0	4.36	0.473	44.00	-0.44	-1.56
GI								•
GQ	57.0	61.0	57.0	2.31	0.236	58.33	2.04	0.92
GT	44.0	37.0	45.0	4.36	0.473	42.00	-0.78	-1.91
GZ	51.0	51.0	51.0	0.00	0.000	51.00	0.77	-0.35
HH	47.0	45.0	50.0	2.52	0.295	47.33	0.14	-0.98
HI	48.0	50.0	47.0	1.53	0.177	48.33	0.31	-0.81
HK	51.0	50.0	52.0	1.00	0.118	51.00	0.77	-0.35
HL	49.0	50.0	45.0	2.65	0.295	48.00	0.26	-0.87
HN								•
HP	49.0	44.0	47.0	2.52	0.295	46.67	0.02	-1.10
HU	56.0	56.0	56.0	0.00	0.000	56.00	1.64	0.52
HY								•
I	45.0	46.0	47.0	1.00	0.118	46.00	-0.09	-1.21
IA								•
IC	46.0	52.0	44.0	4.16	0.473	47.33	0.14	-0.98
ID	40.0	41.0	42.0	1.00	0.118	41.00	-0.96	-2.08
IE	55.0	54.0	53.0	1.00	0.118	54.00	1.29	0.17
IU								•
J	46.0	44.0	45.0	1.00	0.118	45.00	-0.26	-1.39
JE	46.0	48.0	43.0	2.52	0.295	45.67	-0.15	-1.27
JG	47.0	46.0	46.0	0.58	0.059	46.33	-0.03	-1.15
JH	72.0	68.0	63.0	4.51	0.532	67.67	3.66	2.54
JN	34.0	35.0	37.0	1.53	0.177	35.33	-1.94	-3.06 ↓
JQ								•
JS	35.0	32.0	32.0	1.73	0.177	33.00	-2.34	-3.46 ↓
JX								•
JY	41.0	41.0	44.0	1.73	0.177	42.00	-0.78	-1.91
K	32.0	36.0	37.0	2.65	0.295	35.00	-2.00	-3.12 ↓

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Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
KE	70.0	74.0	73.0	2.08	0.236	72.33	4.47	3.35 ×
KT	67.0	67.0	68.0	0.58	0.059	67.33	3.60	2.48
KX	49.0	47.0	50.0	1.53	0.177	48.67	0.37	-0.75
KZ	59.0	60.0	60.0	0.58	0.059	59.67	2.28	1.15
L	44.0	43.0	47.0	2.08	0.236	44.67	-0.32	-1.44
LE	47.0	47.0	51.0	2.31	0.236	48.33	0.31	-0.81
LF	44.0	45.0	44.0	0.58	0.059	44.33	-0.38	-1.50
LG								•
LM								•
LR	52.0	48.0	45.0	3.51	0.413	48.33	0.31	-0.81
LT	44.0	50.0	46.0	3.06	0.354	46.67	0.02	-1.10
M	62.0	62.0	63.0	0.58	0.059	62.33	2.74	1.62
MA	44.0	42.0	44.0	1.15	0.118	43.33	-0.55	-1.67
ME	50.0	49.0	51.0	1.00	0.118	50.00	0.60	-0.52
MN								•
MO								•
MP								•
MQ	46.0	46.0	49.0	1.73	0.177	47.00	0.08	-1.04
MS	20.0	19.0	19.0	0.58	0.059	19.33	-4.71	-5.83 ×
MV	51.0	48.0	52.0	2.08	0.236	50.33	0.66	-0.46
MY								•
N								•
NA	59.0	60.0	62.0	1.53	0.177	60.33	2.39	1.27
NG								•
NH	42.0	44.0	46.0	2.00	0.236	44.00	-0.44	-1.56
NJ	51.0	55.0	55.0	2.31	0.236	53.67	1.24	0.12
NK	46.0	47.0	47.0	0.58	0.059	46.67	0.02	-1.10
NO	37.0	40.0	44.0	3.51	0.413	40.33	-1.07	-2.19
NT	54.0	52.0	53.0	1.00	0.118	53.00	1.12	0.00
NZ								•
O	47.0	49.0	51.0	2.00	0.236	49.00	0.43	-0.69
OE	42.0	43.0	44.0	1.00	0.118	43.00	-0.61	-1.73
OF	49.0	46.0	54.0	4.04	0.473	49.67	0.54	-0.58
OK								•
OL								•
OM								•
OS	60.0	59.0	59.0	0.58	0.059	59.33	2.22	1.10
OX	44.0	42.0	44.0	1.15	0.118	43.33	-0.55	-1.67
OY	45.0	44.0	48.0	2.08	0.236	45.67	-0.15	-1.27
OZ								•
P	52.0	48.0	48.0	2.31	0.236	49.33	0.49	-0.64
PA	48.0	46.0	46.0	1.15	0.118	46.67	0.02	-1.10
PB	57.0	61.0	58.0	2.08	0.236	58.67	2.10	0.98
PC								•
PE								•

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Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
PG	48.0	47.0	50.0	1.53	0.177	48.33	0.31	-0.81	
PL									•
PM	48.0	50.0	49.0	1.00	0.118	49.00	0.43	-0.69	
PP									•
PQ	40.0	41.0	41.0	0.58	0.059	40.67	-1.01	-2.14	
PR									•
PT	41.0	43.0	43.0	1.15	0.118	42.33	-0.73	-1.85	
PV	92.0	90.0	88.0	2.00	0.236	90.00	7.53	6.41	×
PW	100.0	80.0	90.0	10.00	1.345	90.00	7.53	6.41	×
PY									•
Q	41.0	46.0	45.0	2.65	0.295	44.00	-0.44	-1.56	
QC	48.0	50.0	51.0	1.53	0.177	49.67	0.54	-0.58	
QK	36.0	36.0	37.0	0.58	0.059	36.33	-1.77	-2.89	
QP	44.0	43.0	42.0	1.00	0.118	43.00	-0.61	-1.73	
QQ	53.0	53.0	53.0	0.00	0.000	53.00	1.12	0.00	
QT	41.0	39.0	39.0	1.15	0.118	39.67	-1.19	-2.31	
QU	48.0	47.0	45.0	1.53	0.177	46.67	0.02	-1.10	
QW	44.0	45.0	47.0	1.53	0.177	45.33	-0.21	-1.33	
QX	42.0	43.0	41.0	1.00	0.118	42.00	-0.78	-1.91	
QZ	48.0	50.0	47.0	1.53	0.177	48.33	0.31	-0.81	
RC	50.0	46.0	57.0	5.57	0.650	51.00	0.77	-0.35	
RD	46.0	45.0	44.0	1.00	0.118	45.00	-0.26	-1.39	
RE	45.0	46.0	48.0	1.53	0.177	46.33	-0.03	-1.15	
RF	47.0	48.0	51.0	2.08	0.236	48.67	0.37	-0.75	
RG	45.0	46.0	50.0	2.65	0.295	47.00	0.08	-1.04	
RJ	76.0	73.0	86.0	6.81	0.768	78.33	5.51	4.39	×
RK	40.0	48.0	37.0	5.69	0.650	41.67	-0.84	-1.96	
RM	50.0	47.0	53.0	3.00	0.354	50.00	0.60	-0.52	
RN	42.0	42.0	41.0	0.58	0.059	41.67	-0.84	-1.96	
RO									•
RP									•
RR									•
RT	55.0	54.0	55.0	0.58	0.059	54.67	1.41	0.29	
RU									•
RV	59.0	46.0	65.0	9.71	1.233	56.67	1.76	0.64	
RZ	40.0	43.0	42.0	1.53	0.177	41.67	-0.84	-1.96	
S	53.0	50.0	51.0	1.53	0.177	51.33	0.83	-0.29	
SC	58.0	53.0	55.0	2.52	0.295	55.33	1.53	0.40	
SD	51.0	50.0	53.0	1.53	0.177	51.33	0.83	-0.29	
SF	40.0	40.0	43.0	1.73	0.177	41.00	-0.96	-2.08	
SG	51.0	50.0	50.0	0.58	0.059	50.33	0.66	-0.46	
SI	47.0	47.0	46.0	0.58	0.059	46.67	0.02	-1.10	
SL	31.0	32.0	31.0	0.58	0.059	31.33	-2.63	-3.75	↓
SN									•
SO	35.0	37.0	35.0	1.15	0.118	35.67	-1.88	-3.00	

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↓ = 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	
SR	46.0	48.0	45.0	1.53	0.177	46.33	-0.03	-1.15
SS	42.0	45.0	47.0	2.52	0.295	44.67	-0.32	-1.44
ST								•
SW								•
SX	43.0	44.0	43.0	0.58	0.059	43.33	-0.55	-1.67
SZ	45.0	48.0	50.0	2.52	0.295	47.67	0.20	-0.92
T	47.0	51.0	44.0	3.51	0.413	47.33	0.14	-0.98
TA								•
TE	25.0	23.0	27.0	2.00	0.236	25.00	-3.73	-4.85 ↓
TG	44.0	45.0	42.0	1.53	0.177	43.67	-0.50	-1.62
TH	50.0	46.0	49.0	2.08	0.236	48.33	0.31	-0.81
TI	47.0	43.0	45.0	2.00	0.236	45.00	-0.26	-1.39
TK								•
TL	41.0	37.0	45.0	4.00	0.473	41.00	-0.96	-2.08
TM	43.0	43.0	43.0	0.00	0.000	43.00	-0.61	-1.73
TN	44.0	44.0	44.0	0.00	0.000	44.00	-0.44	-1.56
TP								•
TQ	49.0	43.0	49.0	3.46	0.354	47.00	0.08	-1.04
TR								•
TS								•
TT								•
TV								•
TW								•
TY	36.0	36.0	38.0	1.15	0.118	36.67	-1.71	-2.83
TZ								•
U	41.0	41.0	43.0	1.15	0.118	41.67	-0.84	-1.96
UA	25.0	25.0	24.0	0.58	0.059	24.67	-3.79	-4.91 ↓
W	45.0	48.0	48.0	1.73	0.177	47.00	0.08	-1.04
X								•

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
19.33	×	MS	38.00		AE	41.67		RK
24.67	↓	UA	39.67		QT	42.00		QX
25.00	↓	TE	39.67		AW	42.00		JY
30.33	↓	BG	40.33		NO	42.00		GT
31.33	↓	SL	40.67		PQ	42.33		PT
33.00	↓	JS	40.67		BO	42.33		FU
34.67	↓	DM	41.00		TL	42.67		DD
35.00	↓	K	41.00		SF	42.67		CA
35.33	↓	JN	41.00		D	42.67		BW
35.67		SO	41.33		AR	42.67		BK
36.33		QK	41.67		U	43.00		TM
36.33		FZ	41.67		RZ	43.00		QP
36.67		TY	41.67		RN	43.00		OE

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

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Gross Beta

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
43.00		FN	47.00		W	50.33		BC
43.00		FL	47.00		TQ	50.67		CQ
43.00		BH	47.00		RG	50.67		BS
43.33		SX	47.00		MQ	51.00		RC
43.33		OX	47.00		EO	51.00		HK
43.33		MA	47.00		DT	51.00		GZ
43.33		CO	47.33		T	51.00		AU
43.67		TG	47.33		IC	51.33		SD
44.00		TN	47.33		HH	51.33		S
44.00		Q	47.33		AK	51.33		C
44.00		NH	47.67		SZ	51.33		AZ
44.00		GE	47.67		CE	51.67		A
44.00		DL	48.00		HL	52.00		DE
44.00		AO	48.33		TH	52.33		EB
44.33		LF	48.33		QZ	52.33		AI
44.33		CK	48.33		PG	52.67		AL
44.67		SS	48.33		LR	53.00		QQ
44.67		L	48.33		LE	53.00		NT
45.00		TI	48.33		HI	53.00		DB
45.00		RD	48.33		D	53.33		BA
45.00		J	48.33		AP	53.67		NJ
45.33		QW	48.33		AJ	54.00		IE
45.67		OY	48.67		RF	54.67		RT
45.67		JE	48.67		KX	55.33		SC
45.67		DS	48.67		EH	56.00		HU
46.00		I	48.67		BM	56.67		RV
46.33		SR	49.00		PM	58.33		GQ
46.33		RE	49.00		O	58.67		PB
46.33		JG	49.00		CJ	59.33		OS
46.33		FF	49.33		P	59.67		KZ
46.33		EV	49.33		AF	60.33		NA
46.33		CS	49.67		QC	62.33		M
46.67		SI	49.67		OF	67.33		KT
46.67		QU	50.00		RM	67.67		JH
46.67		PA	50.00		ME	71.67	×	FJ
46.67		NK	50.00		E	72.33	×	KE
46.67		LT	50.00		DZ	78.33	×	RJ
46.67		HP	50.33		SG	90.00	×	PW
46.67		CG	50.33		MV	90.00	×	PV

• = No data submitted

TAG SYMBOLS

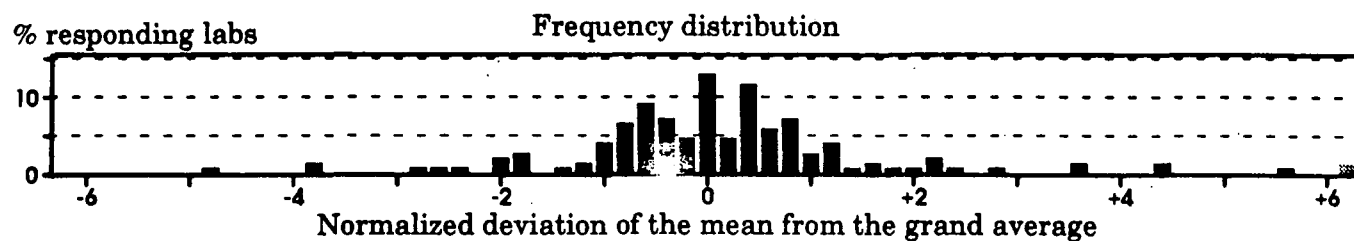
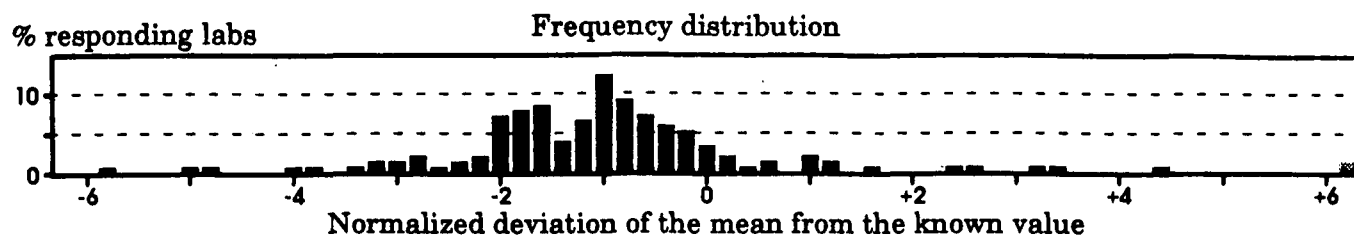
↑ = Above control limit

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× = Determined to be an outlier

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Gross Beta

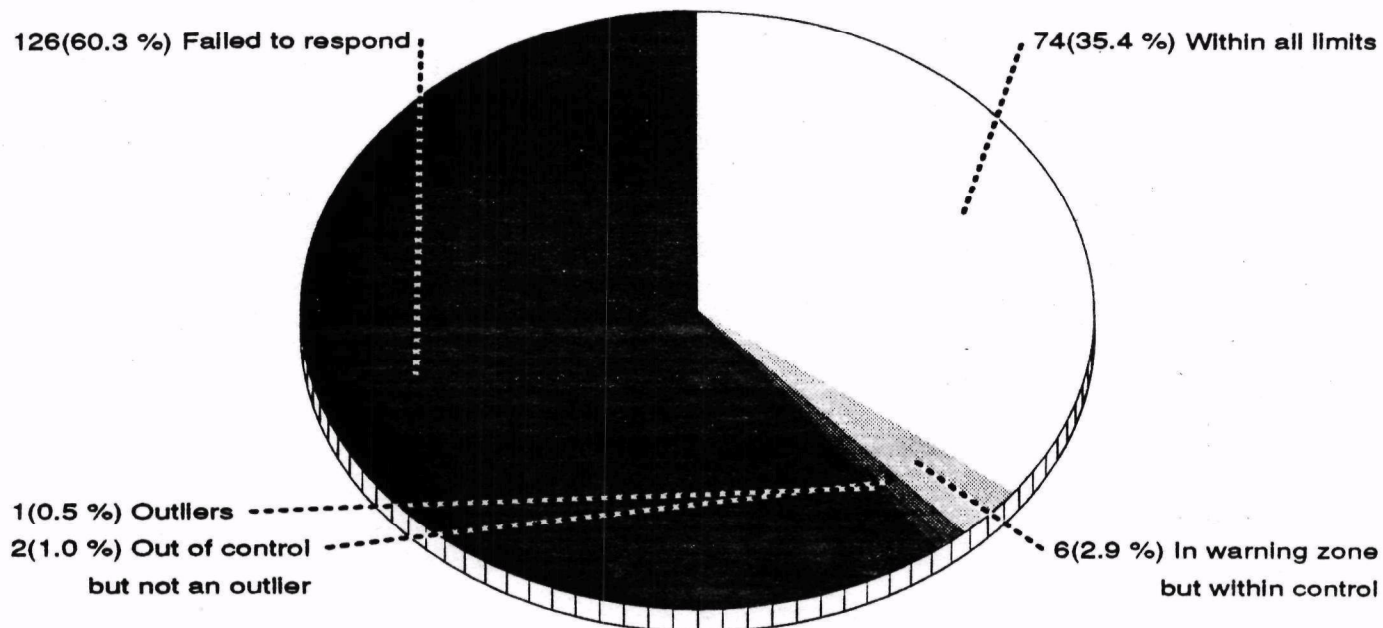


Strontium-89

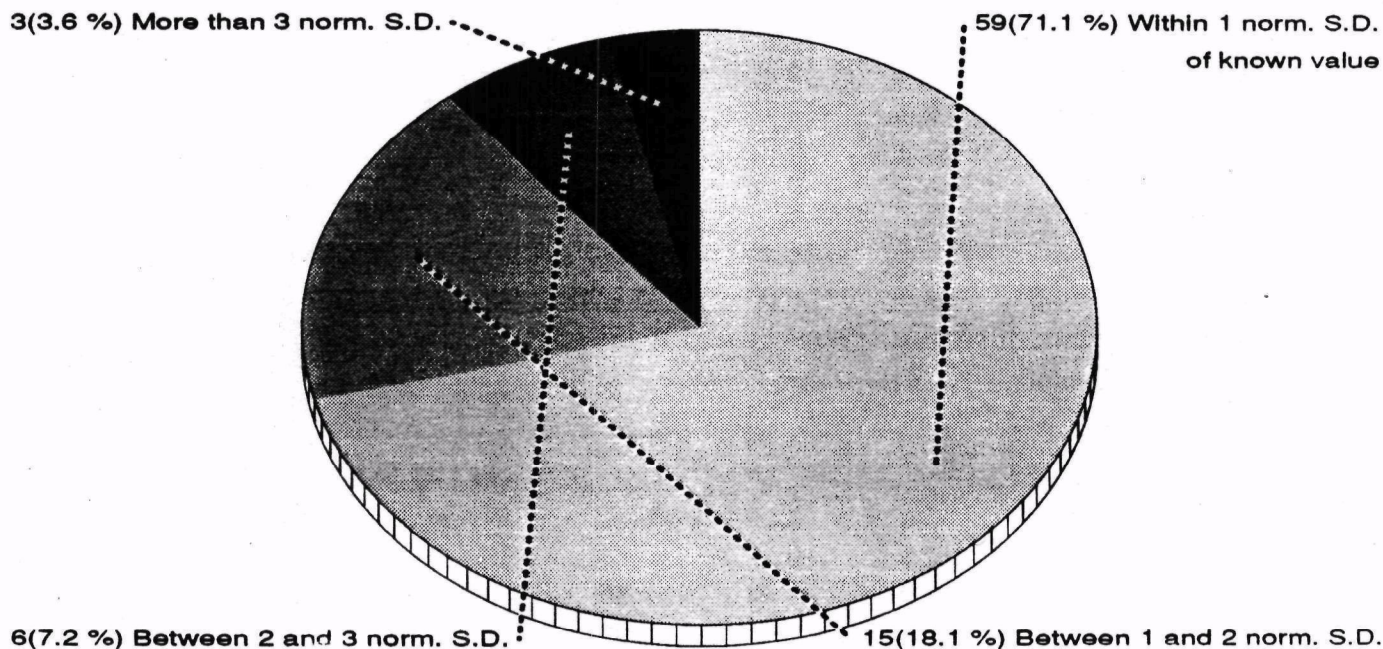
Statistical Summary

209 Participants

The known value of this nuclide is 8.0 pCi/l with an expected precision of 5.0; the control limits are 0.0 to 16.7; the warning regions are 0.0 to 2.2 and 13.8 to 16.7



Statistic	Respondents	Non-outliers
Mean	8.75	Grand Avg 8.60
Std. Dev.	3.34	3.07
Variance	11.17	9.44
% Coef. of Var.	38.20	35.71
% deviation of mean from known value	9.39	7.52
Norm. dev. of mean from known value	0.22	0.20
Median	8.33	8.33
% deviation of median from known value	4.17	4.17
Norm. dev. of median from known value	0.10	0.11



Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
A	9.0	9.0	9.0	0.00	0.000	9.00	0.14	0.35	
AE	6.0	5.0	5.0	0.58	0.118	5.33	-1.13	-0.92	
AF	7.0	7.0	8.0	0.58	0.118	7.33	-0.44	-0.23	
AI	10.0	10.0	6.0	2.31	0.473	8.67	0.02	0.23	
AJ									•
AK	6.0	6.0	6.0	0.00	0.000	6.00	-0.90	-0.69	
AL	3.0	10.0	8.0	3.61	0.827	7.00	-0.55	-0.35	
AO									•
AP									•
AR									•
AU	14.0	11.0	13.0	1.53	0.354	12.67	1.41	1.62	
AW	8.0	7.0	7.0	0.58	0.118	7.33	-0.44	-0.23	
AZ	14.0	12.0	16.0	2.00	0.473	14.00	1.87	2.08	
BA	6.0	6.0	8.0	1.15	0.236	6.67	-0.67	-0.46	
BC	8.0	9.0	8.0	0.58	0.118	8.33	-0.09	0.12	
BG									•
BH	10.0	11.0	13.0	1.53	0.354	11.33	0.95	1.15	
BK									•
BL	6.0	9.0	8.0	1.53	0.354	7.67	-0.32	-0.12	
BM	9.0	9.0	9.0	0.00	0.000	9.00	0.14	0.35	
BN									•
BO	11.0	11.0	11.0	0.00	0.000	11.00	0.83	1.04	
BS									•
BW									•
C	9.0	8.0	9.0	0.58	0.118	8.67	0.02	0.23	
CA	7.0	6.0	7.0	0.58	0.118	6.67	-0.67	-0.46	
CE									•
CG									•
CJ	9.0	9.0	8.0	0.58	0.118	8.67	0.02	0.23	
CK	8.0	9.0	11.0	1.53	0.354	9.33	0.25	0.46	
CO	20.0	10.0	22.0	6.43	1.795	17.33	3.02	3.23	↑
CQ	6.0	6.0	8.0	1.15	0.236	6.67	-0.67	-0.46	
CS	15.0	18.0	13.0	2.52	0.591	15.33	2.33	2.54	
D	9.0	8.0	8.0	0.58	0.118	8.33	-0.09	0.12	
DB									•
DD	8.0	10.0	7.0	1.53	0.354	8.33	-0.09	0.12	
DE	7.0	7.0	7.0	0.00	0.000	7.00	-0.55	-0.35	
DJ									•
DL									•
DM									•
DO	10.0	17.0	17.0	4.04	0.827	14.67	2.10	2.31	
DS									•
DT	8.0	7.0	6.0	1.00	0.236	7.00	-0.55	-0.35	
DZ	11.0	11.0	11.0	0.00	0.000	11.00	0.83	1.04	
E	6.0	6.0	6.0	0.00	0.000	6.00	-0.90	-0.69	

• = 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	
EB	6.0	6.0	8.0	1.15	0.236	6.67	-0.67	-0.46
EH	6.0	8.0	7.0	1.00	0.236	7.00	-0.55	-0.35
EL	9.0	7.0	9.0	1.15	0.236	8.33	-0.09	0.12
EO								•
ER								•
EV								•
EX								•
FE	7.0	7.0	6.0	0.58	0.118	6.67	-0.67	-0.46
FF								•
FJ								•
FK								•
FL								•
FN								•
FU	11.0	12.0	13.0	1.00	0.236	12.00	1.18	1.39
FW								•
FZ								•
GE								•
GI								•
GQ	5.0	5.0	5.0	0.00	0.000	5.00	-1.25	-1.04
GT								•
GZ								•
HH								•
HI								•
HK	7.0	7.0	7.0	0.00	0.000	7.00	-0.55	-0.35
HL								•
HN								•
HP	2.0	2.0	2.0	0.00	0.000	2.00	-2.29	-2.08
HU	5.0	5.0	6.0	0.58	0.118	5.33	-1.13	-0.92
HY								•
I	4.0	2.0	1.0	1.53	0.354	2.33	-2.17	-1.96
IA								•
IC	10.0	13.0	15.0	2.52	0.591	12.67	1.41	1.62
ID								•
IE								•
IU								•
J	8.0	7.0	7.0	0.58	0.118	7.33	-0.44	-0.23
JE	11.0	8.0	9.0	1.53	0.354	9.33	0.25	0.46
JG	25.0	25.0	13.0	6.93	1.795	21.00	4.29	4.50 ×
JH								•
JN								•
JQ								•
JS	12.0	7.0	12.0	2.89	0.591	10.33	0.60	0.81
JX								•
JY	5.0	12.0	8.0	3.51	0.827	8.33	-0.09	0.12
K	5.0	6.0	7.0	1.00	0.236	6.00	-0.90	-0.69

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Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
KE									•
KT									•
KX	15.0	15.0	16.0	0.58	0.118	15.33	2.33	2.54	
KZ									•
L	10.0	8.0	10.0	1.15	0.236	9.33	0.25	0.46	
LE									•
LF									•
LG									•
LM									•
LR									•
LT	17.0	17.0	17.0	0.00	0.000	17.00	2.91	3.12	↑
M	5.0	8.0	6.0	1.53	0.354	6.33	-0.79	-0.58	
MA									•
ME	9.0	7.0	11.0	2.00	0.473	9.00	0.14	0.35	
MN									•
MO									•
MP									•
MQ	8.0	6.0	8.0	1.15	0.236	7.33	-0.44	-0.23	
MS	9.0	12.0	15.0	3.00	0.709	12.00	1.18	1.39	
MV									•
MY									•
N									•
NA									•
NG									•
NH									•
NJ	8.0	6.0	10.0	2.00	0.473	8.00	-0.21	0.00	
NK									•
NO	7.0	8.0	8.0	0.58	0.118	7.67	-0.32	-0.12	
NT	10.0	10.0	10.0	0.00	0.000	10.00	0.48	0.69	
NZ									•
O									•
OE									•
OF									•
OK									•
OL									•
OM									•
OS									•
OX									•
OY									•
OZ									•
P									•
PA									•
PB	9.0	10.0	9.0	0.58	0.118	9.33	0.25	0.46	
PC									•
PE									•

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↓ = 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	
PG								•
PL								•
PM	11.0	11.0	11.0	0.00	0.000	11.00	0.83	1.04
PP								•
PQ								•
PR								•
PT	9.0	11.0	9.0	1.15	0.236	9.67	0.37	0.58
PV	10.0	10.0	12.0	1.15	0.236	10.67	0.72	0.92
PW								•
PY								•
Q	7.0	9.0	9.0	1.15	0.236	8.33	-0.09	0.12
QC								•
QK	7.0	8.0	7.0	0.58	0.118	7.33	-0.44	-0.23
QP								•
QQ								•
QT								•
QU	10.0	10.0	9.0	0.58	0.118	9.67	0.37	0.58
QW	9.0	9.0	8.0	0.58	0.118	8.67	0.02	0.23
QX	6.0	6.0	7.0	0.58	0.118	6.33	-0.79	-0.58
QZ	10.0	7.0	9.0	1.53	0.354	8.67	0.02	0.23
RC	3.0	3.0	3.0	0.00	0.000	3.00	-1.94	-1.73
RD								•
RE								•
RF	12.0	6.0	9.0	3.00	0.709	9.00	0.14	0.35
RG								•
RJ								•
RK								•
RM	8.0	15.0	8.0	4.04	0.827	10.33	0.60	0.81
RN								•
RO								•
RP								•
RR								•
RT								•
RU								•
RV								•
RZ								•
S	8.0	8.0	7.0	0.58	0.118	7.67	-0.32	-0.12
SC	10.0	10.0	9.0	0.58	0.118	9.67	0.37	0.58
SD								•
SF	1.0	1.0	1.0	0.00	0.000	1.00	-2.63	-2.42
SG								•
SI	9.0	8.0	17.0	4.93	1.120	11.33	0.95	1.15
SL								•
SN								•
SO								•

• ≡ No data submitted

TAG SYMBOLS

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↓ ≡ Below control limit

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Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
SR								•
SS	6.0	6.0	6.0	0.00	0.000	6.00	-0.90	-0.69
ST								•
SW								•
SX								•
SZ	5.0	5.0	6.0	0.58	0.118	5.33	-1.13	-0.92
T	7.0	7.0	7.0	0.00	0.000	7.00	-0.55	-0.35
TA								•
TE	12.0	10.0	9.0	1.53	0.354	10.33	0.60	0.81
TG								•
TH								•
TI	8.0	10.0	10.0	1.15	0.236	9.33	0.25	0.46
TK								•
TL	23.0	3.0	9.0	10.26	3.596	11.67	1.06	1.27
TM								•
TN								•
TP	11.0	12.0	12.0	0.58	0.118	11.67	1.06	1.27
TQ	5.0	6.0	5.0	0.58	0.118	5.33	-1.13	-0.92
TR								•
TS								•
TT								•
TV								•
TW								•
TY								•
TZ								•
U	9.0	7.0	9.0	1.15	0.236	8.33	-0.09	0.12
UA								•
W	5.0	4.0	3.0	1.00	0.236	4.00	-1.59	-1.39
X								•

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
1.00		SF	6.00		AK	7.00		AL
2.00		HP	6.33		QX	7.33		QK
2.33		I	6.33		M	7.33		MQ
3.00		RC	6.67		FE	7.33		J
4.00		W	6.67		EB	7.33		AW
5.00		GQ	6.67		CQ	7.33		AF
5.33		TQ	6.67		CA	7.67		S
5.33		SZ	6.67		BA	7.67		NO
5.33		HU	7.00		T	7.67		BL
5.33		AE	7.00		HK	8.00		NJ
6.00		SS	7.00		EH	8.33		U
6.00		K	7.00		DT	8.33		Q
6.00		E	7.00		DE	8.33		JY

• = No data submitted

TAG SYMBOLS

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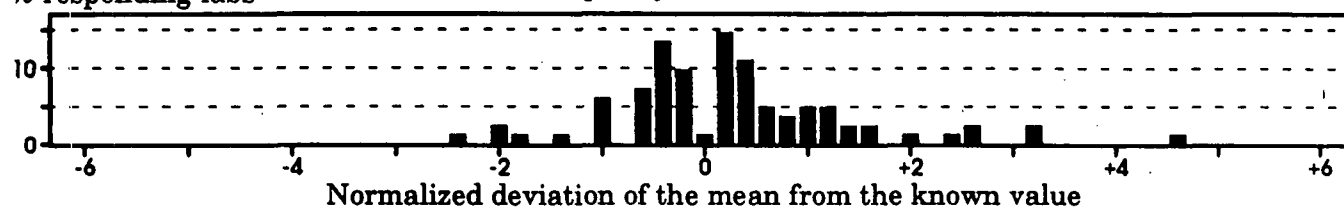
↓ = Below control limit

Strontium-89**Data sorted by Laboratory Average**

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
8.33		EL	9.33		PB	11.33		SI
8.33		DD	9.33		L	11.33		BH
8.33		D	9.33		JE	11.67		TP
8.33		BC	9.33		CK	11.67		TL
8.67		QZ	9.67		SC	12.00		MS
8.67		QW	9.67		QU	12.00		FU
8.67		CJ	9.67		PT	12.67		IC
8.67		C	10.00		NT	12.67		AU
8.67		AI	10.33		TE	14.00		AZ
9.00		RF	10.33		RM	14.67		DO
9.00		ME	10.33		JS	15.33		KX
9.00		BM	10.67		PV	15.33		CS
9.00		A	11.00		PM	17.00	↑↑	LT
9.33		TI	11.00		DZ	17.33	↑↑	CO
			11.00		BO	21.00	×	JG

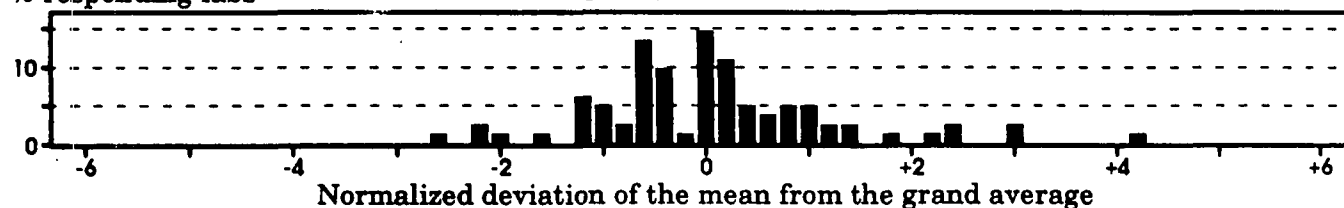
% responding labs

Frequency distribution



% responding labs

Frequency distribution



• = No data submitted

TAG SYMBOLS

↑↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

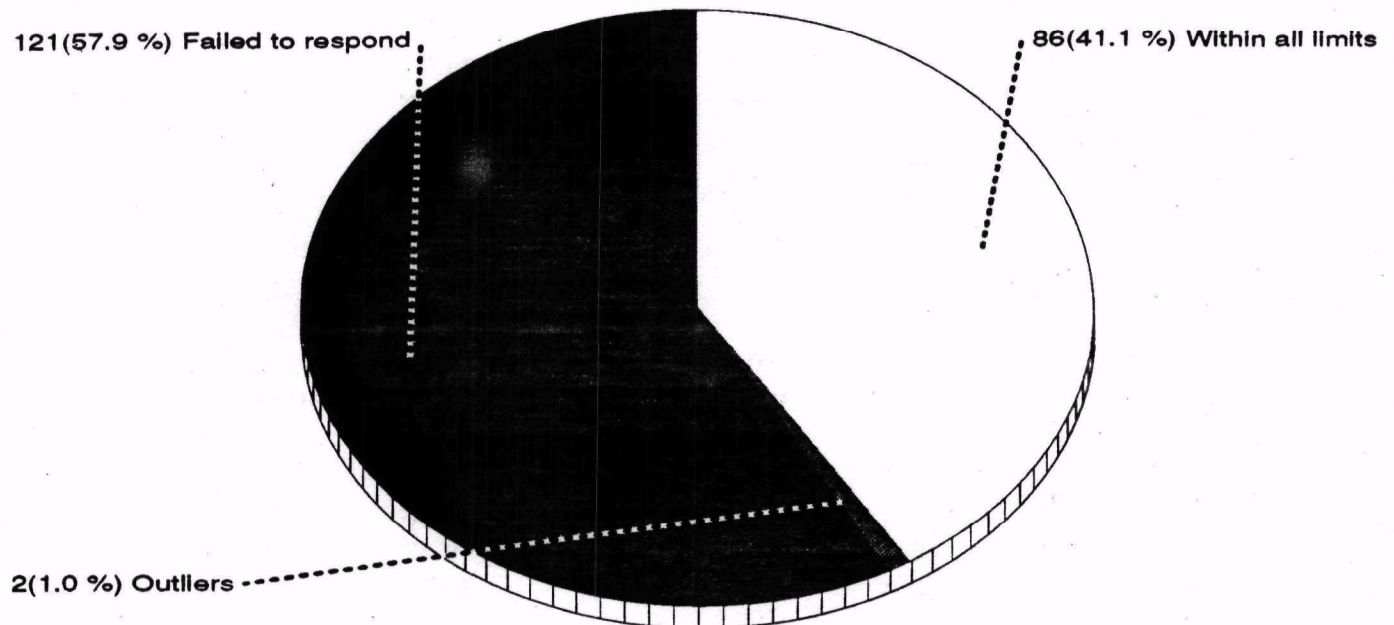
↓↓ = Below control limit

Strontium-90

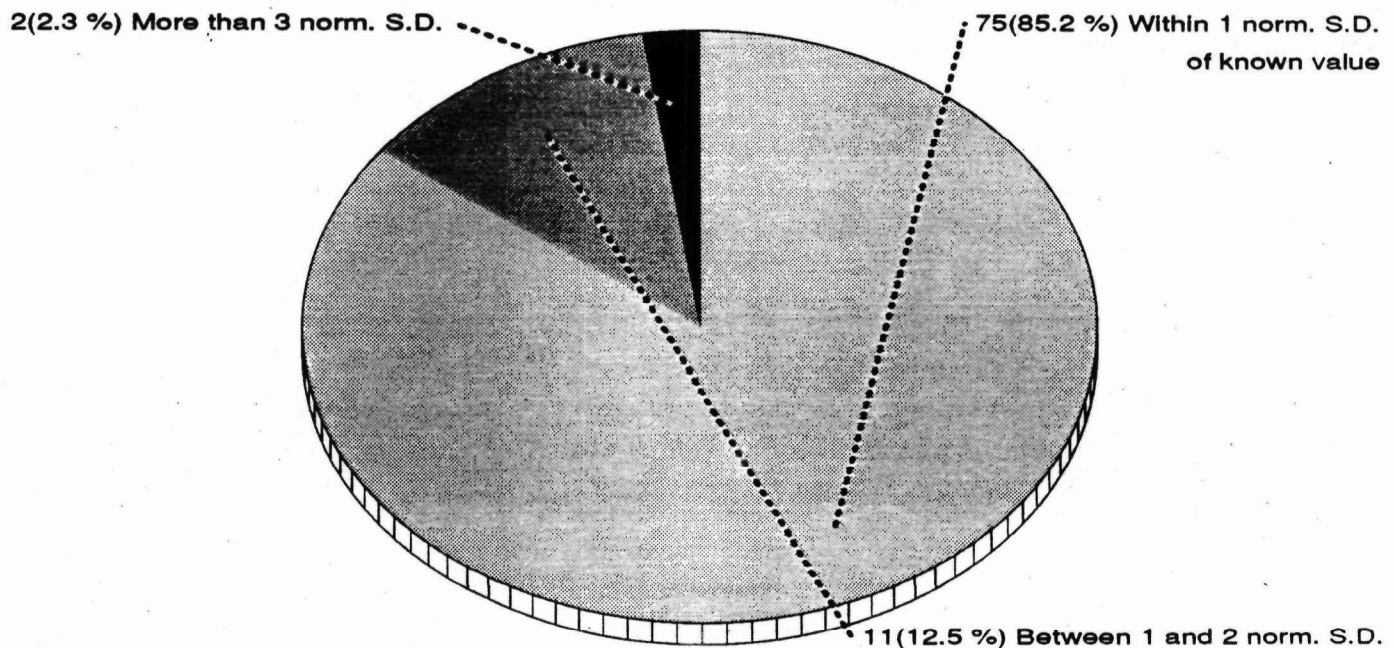
Statistical Summary

209 Participants

The known value of this nuclide is 10.0 pCi/l with an expected precision of 5.0; the control limits are 1.3 to 18.7; the warning regions are 1.3 to 4.2 and 15.8 to 18.7



Statistic	Respondents	Non-outliers
Mean	10.72	Grand Avg 10.50
Std. Dev.	2.36	1.83
Variance	5.55	3.35
% Coef. of Var.	21.98	17.44
% deviation of mean from known value	7.23	4.96
Norm. dev. of mean from known value	0.31	0.27
Median	10.00	10.00
% deviation of median from known value	0.00	0.00
Norm. dev. of median from known value	0.00	0.00



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Strontium-90

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	-0.17	0.00	
AE	11.0	12.0	12.0	0.58	0.118	11.67	0.41	0.58	
AF	11.0	11.0	11.0	0.00	0.000	11.00	0.17	0.35	
AI	10.0	10.0	9.0	0.58	0.118	9.67	-0.29	-0.12	
AJ									•
AK	10.0	11.0	11.0	0.58	0.118	10.67	0.06	0.23	
AL	12.0	10.0	11.0	1.00	0.236	11.00	0.17	0.35	
AO									•
AP									•
AR									•
AU	11.0	12.0	13.0	1.00	0.236	12.00	0.52	0.69	
AW	11.0	10.0	10.0	0.58	0.118	10.33	-0.06	0.12	
AZ	10.0	10.0	10.0	0.00	0.000	10.00	-0.17	0.00	
BA	9.0	10.0	9.0	0.58	0.118	9.33	-0.40	-0.23	
BC	10.0	10.0	11.0	0.58	0.118	10.33	-0.06	0.12	
BG	10.0	9.0	10.0	0.58	0.118	9.67	-0.29	-0.12	
BH	11.0	10.0	10.0	0.58	0.118	10.33	-0.06	0.12	
BK									•
BL	10.0	8.0	9.0	1.00	0.236	9.00	-0.52	-0.35	
BM	10.0	9.0	9.0	0.58	0.118	9.33	-0.40	-0.23	
BN									•
BO	8.0	9.0	8.0	0.58	0.118	8.33	-0.75	-0.58	
BS									•
BW									•
C	9.0	10.0	9.0	0.58	0.118	9.33	-0.40	-0.23	
CA	10.0	11.0	9.0	1.00	0.236	10.00	-0.17	0.00	
CE	11.0	10.0	10.0	0.58	0.118	10.33	-0.06	0.12	
CG									•
CJ	8.0	7.0	9.0	1.00	0.236	8.00	-0.86	-0.69	
CK	13.0	15.0	15.0	1.15	0.236	14.33	1.33	1.50	
CO	5.0	11.0	3.0	4.16	0.945	6.33	-1.44	-1.27	
CQ	13.0	13.0	11.0	1.15	0.236	12.33	0.64	0.81	
CS	9.0	8.0	7.0	1.00	0.236	8.00	-0.86	-0.69	
D	11.0	11.0	11.0	0.00	0.000	11.00	0.17	0.35	
DB									•
DD	10.0	9.0	10.0	0.58	0.118	9.67	-0.29	-0.12	
DE	11.0	12.0	12.0	0.58	0.118	11.67	0.41	0.58	
DJ									•
DL									•
DM									•
DO	24.0	21.0	20.0	2.08	0.473	21.67	3.87	4.04	×
DS									•
DT	10.0	9.0	10.0	0.58	0.118	9.67	-0.29	-0.12	
DZ	15.0	14.0	15.0	0.58	0.118	14.67	1.44	1.62	
E	11.0	11.0	11.0	0.00	0.000	11.00	0.17	0.35	

• = 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. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
EB	9.0	9.0	9.0	0.00	0.000	9.00	-0.52	-0.35
EH	10.0	10.0	10.0	0.00	0.000	10.00	-0.17	0.00
EL	15.0	13.0	12.0	1.53	0.354	13.33	0.98	1.15
EO								•
ER								•
EV								•
EX								•
FE								•
FF								•
FJ								•
FK								•
FL								•
FN								•
FU	9.0	9.0	9.0	0.00	0.000	9.00	-0.52	-0.35
FW								•
FZ								•
GE								•
GI								•
GQ	13.0	13.0	13.0	0.00	0.000	13.00	0.87	1.04
GT								•
GZ								•
HH								•
HI								•
HK	9.0	10.0	10.0	0.58	0.118	9.67	-0.29	-0.12
HL								•
HN								•
HP	12.0	12.0	12.0	0.00	0.000	12.00	0.52	0.69
HU	11.0	12.0	14.0	1.53	0.354	12.33	0.64	0.81
HY								•
I	14.0	14.0	15.0	0.58	0.118	14.33	1.33	1.50
IA								•
IC	10.0	9.0	11.0	1.00	0.236	10.00	-0.17	0.00
ID								•
IE								•
IU								•
J	10.0	9.0	10.0	0.58	0.118	9.67	-0.29	-0.12
JE	10.0	11.0	10.0	0.58	0.118	10.33	-0.06	0.12
JG	12.0	9.0	8.0	2.08	0.473	9.67	-0.29	-0.12
JH								•
JN								•
JQ								•
JS	8.0	9.0	6.0	1.53	0.354	7.67	-0.98	-0.81
JX								•
JY	10.0	7.0	9.0	1.53	0.354	8.67	-0.63	-0.46
K	6.0	8.0	9.0	1.53	0.354	7.67	-0.98	-0.81

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TAG SYMBOLS

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↓ = 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
KE									•
KT									•
KX	20.0	18.0	20.0	1.15	0.236	19.33	3.06	3.23	×
KZ									•
L	10.0	10.0	10.0	0.00	0.000	10.00	-0.17	0.00	
LE									•
LF									•
LG									•
LM									•
LR									•
LT	10.0	10.0	10.0	0.00	0.000	10.00	-0.17	0.00	
M	12.0	12.0	13.0	0.58	0.118	12.33	0.64	0.81	
MA									•
ME	12.0	11.0	11.0	0.58	0.118	11.33	0.29	0.46	
MN									•
MO									•
MP									•
MQ	10.0	11.0	11.0	0.58	0.118	10.67	0.06	0.23	
MS	11.0	10.0	12.0	1.00	0.236	11.00	0.17	0.35	
MV									•
MY									•
N									•
NA									•
NG									•
NH									•
NJ	14.0	14.0	11.0	1.73	0.354	13.00	0.87	1.04	
NK									•
NO	8.0	8.0	8.0	0.00	0.000	8.00	-0.86	-0.69	
NT	10.0	10.0	10.0	0.00	0.000	10.00	-0.17	0.00	
NZ									•
O									•
OE									•
OF									•
OK									•
OL									•
OM									•
OS									•
OX									•
OY									•
OZ									•
P									•
PA									•
PB	10.0	10.0	10.0	0.00	0.000	10.00	-0.17	0.00	
PC									•
PE									•

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↓ = 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
PG									•
PL									•
PM	12.0	9.0	11.0	1.53	0.354	10.67	0.06	0.23	
PP	12.0	11.0	12.0	0.58	0.118	11.67	0.41	0.58	
PQ									•
PR									•
PT	8.0	8.0	9.0	0.58	0.118	8.33	-0.75	-0.58	
PV	11.0	11.0	9.0	1.15	0.236	10.33	-0.06	0.12	
PW									•
PY									•
Q	12.0	12.0	13.0	0.58	0.118	12.33	0.64	0.81	
QC									•
QK	12.0	12.0	11.0	0.58	0.118	11.67	0.41	0.58	
QP									•
QQ									•
QT									•
QU	9.0	9.0	8.0	0.58	0.118	8.67	-0.63	-0.46	
QW	9.0	8.0	10.0	1.00	0.236	9.00	-0.52	-0.35	
QX	8.0	9.0	8.0	0.58	0.118	8.33	-0.75	-0.58	
QZ	9.0	9.0	9.0	0.00	0.000	9.00	-0.52	-0.35	
RC	6.0	8.0	9.0	1.53	0.354	7.67	-0.98	-0.81	
RD									•
RE									•
RF	15.0	11.0	13.0	2.00	0.473	13.00	0.87	1.04	
RG									•
RJ									•
RK	16.0	15.0	16.0	0.58	0.118	15.67	1.79	1.96	
RM	13.0	11.0	11.0	1.15	0.236	11.67	0.41	0.58	
RN									•
RO									•
RP									•
RR									•
RT									•
RU									•
RV									•
RZ									•
S	10.0	10.0	10.0	0.00	0.000	10.00	-0.17	0.00	
SC	10.0	9.0	9.0	0.58	0.118	9.33	-0.40	-0.23	
SD	13.0	9.0	11.0	2.00	0.473	11.00	0.17	0.35	
SF	8.0	9.0	8.0	0.58	0.118	8.33	-0.75	-0.58	
SG									•
SI	10.0	10.0	9.0	0.58	0.118	9.67	-0.29	-0.12	
SL									•
SN									•
SO									•

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

23 / 48 EMSL-LV Intercomparison Study: Performance Evaluation-B, 20-Oct-1992
Strontium-90

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
SR									•
SS	10.0	10.0	10.0	0.00	0.000	10.00	-0.17	0.00	
ST									•
SW									•
SX									•
SZ	10.0	11.0	9.0	1.00	0.236	10.00	-0.17	0.00	
T	9.0	11.0	10.0	1.00	0.236	10.00	-0.17	0.00	
TA									•
TE	14.0	14.0	13.0	0.58	0.118	13.67	1.10	1.27	
TG									•
TH									•
TI	11.0	13.0	14.0	1.53	0.354	12.67	0.75	0.92	
TK									•
TL	9.0	13.0	15.0	3.06	0.709	12.33	0.64	0.81	
TM									•
TN									•
TP	10.0	10.0	9.0	0.58	0.118	9.67	-0.29	-0.12	
TQ	16.0	13.0	18.0	2.52	0.591	15.67	1.79	1.96	
TR									•
TS									•
TT									•
TV									•
TW									•
TY									•
TZ									•
U	10.0	11.0	11.0	0.58	0.118	10.67	0.06	0.23	
UA									•
W	10.0	10.0	9.0	0.58	0.118	9.67	-0.29	-0.12	
X	10.0	10.0	11.0	0.58	0.118	10.33	-0.06	0.12	

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
6.33		CO	9.00		QZ	9.67		J
7.67		RC	9.00		QW	9.67		HK
7.67		K	9.00		FU	9.67		DT
7.67		JS	9.00		EB	9.67		DD
8.00		NO	9.00		BL	9.67		BG
8.00		CS	9.33		SC	9.67		AI
8.00		CJ	9.33		C	10.00		T
8.33		SF	9.33		BM	10.00		SZ
8.33		QX	9.33		BA	10.00		SS
8.33		PT	9.67		W	10.00		S
8.33		BO	9.67		TP	10.00		PB
8.67		QU	9.67		SI	10.00		NT
8.67		JY	9.67		JG	10.00		LT

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

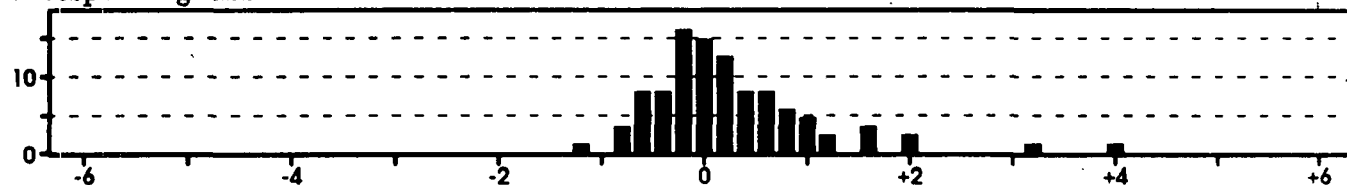
↓ = Below control limit

Strontium-90
Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
10.00		L	10.67		AK	12.33		Q
10.00		IC	11.00		SD	12.33		M
10.00		EH	11.00		MS	12.33		HU
10.00		CA	11.00		E	12.33		CQ
10.00		AZ	11.00		D	12.67		TI
10.00		A	11.00		AL	13.00		RF
10.33		X	11.00		AF	13.00		NJ
10.33		PV	11.33		ME	13.00		GQ
10.33		JE	11.67		RM	13.33		EL
10.33		CE	11.67		QK	13.67		TE
10.33		BH	11.67		PP	14.33		I
10.33		BC	11.67		DE	14.33		CK
10.33		AW	11.67		AE	14.67		DZ
10.67		U	12.00		HP	15.67		TQ
10.67		PM	12.00		AU	15.67		RK
10.67		MQ	12.33		TL	19.33	x	KX
						21.67	x	DO

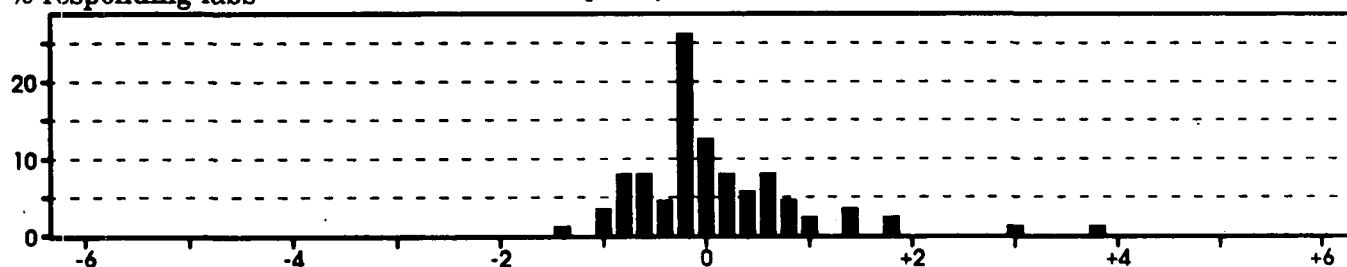
% responding labs

Frequency distribution



% responding labs

Frequency distribution



• ≡ No data submitted

TAG SYMBOLS

↑ ≡ Above control limit

∅ ≡ Insufficient data

x ≡ Determined to be an outlier

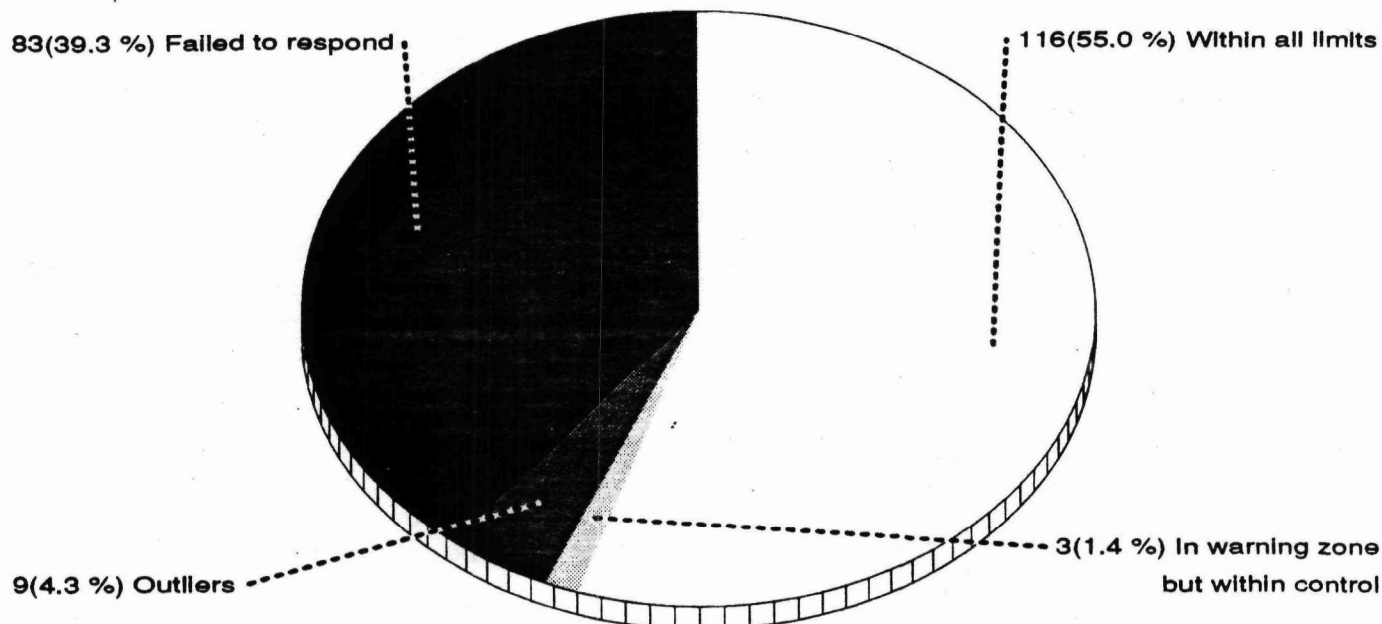
↓ ≡ Below control limit

Cobalt-60

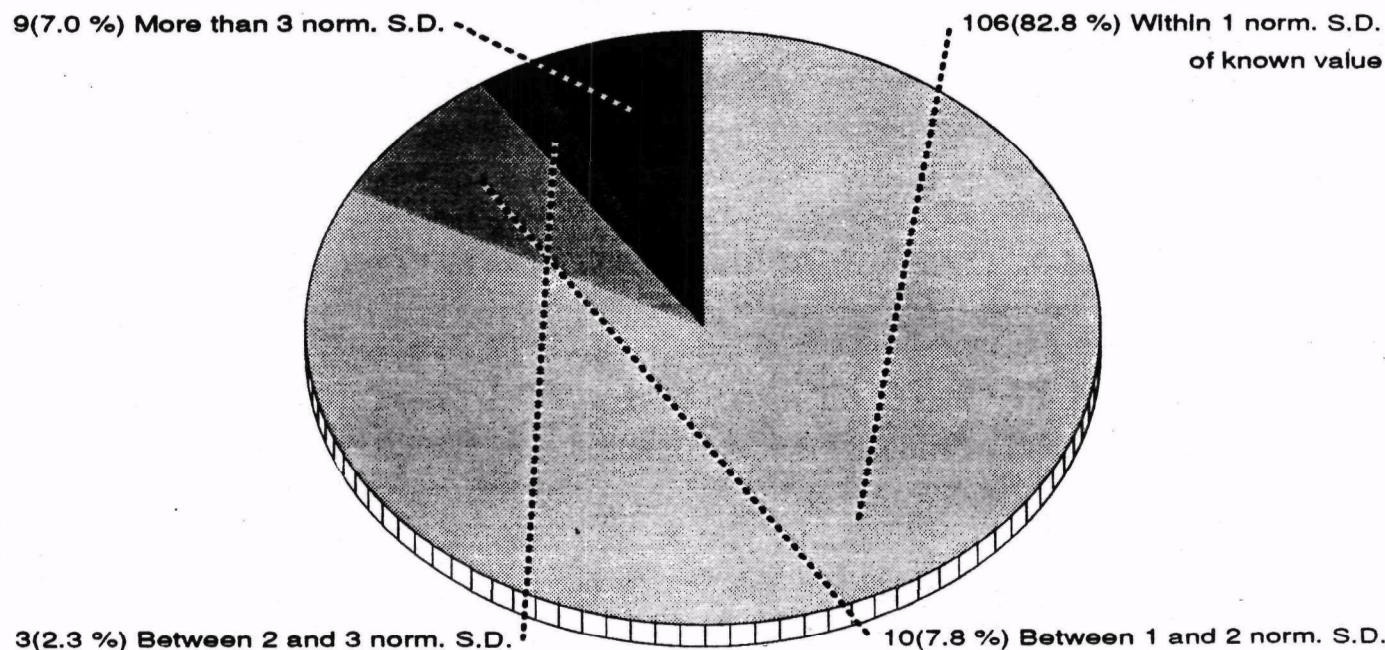
Statistical Summary

211 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	17.50	Grand Avg 15.31
Std. Dev.	18.95	1.97
Variance	359.21	3.89
% Coef. of Var.	108.30	12.88
% deviation of mean from known value	16.67	2.07
Norm. dev. of mean from known value	0.13	0.16
Median	15.00	15.00
% deviation of median from known value	0.00	0.00
Norm. dev. of median from known value	0.00	0.00



Cobalt-60

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
A	14.0	14.0	14.0	0.00	0.000	14.00	-0.45	-0.35
AE	13.0	11.0	13.0	1.15	0.236	12.33	-1.03	-0.92
AF	15.0	16.0	14.0	1.00	0.236	15.00	-0.11	0.00
AI	14.0	15.0	15.0	0.58	0.118	14.67	-0.22	-0.12
AJ	17.0	16.0	16.0	0.58	0.118	16.33	0.35	0.46
AK	14.0	15.0	16.0	1.00	0.236	15.00	-0.11	0.00
AL	20.0	19.0	21.0	1.00	0.236	20.00	1.62	1.73
AO								•
AP	17.0	15.0	15.0	1.15	0.236	15.67	0.12	0.23
AR								•
AU	16.0	14.0	14.0	1.15	0.236	14.67	-0.22	-0.12
AW	19.0	19.0	18.0	0.58	0.118	18.67	1.16	1.27
AZ	11.0	12.0	8.0	2.08	0.473	10.33	-1.72	-1.62
BA	17.0	16.0	17.0	0.58	0.118	16.67	0.47	0.58
BC	14.0	16.0	15.0	1.00	0.236	15.00	-0.11	0.00
BG	41.0	51.0	58.0	8.54	2.921	50.00	12.02	12.12 ×
BH	14.0	13.0	15.0	1.00	0.236	14.00	-0.45	-0.35
BK	15.0	16.0	14.0	1.00	0.236	15.00	-0.11	0.00
BL	16.0	14.0	14.0	1.15	0.236	14.67	-0.22	-0.12
BM	14.0	15.0	15.0	0.58	0.118	14.67	-0.22	-0.12
BN								•
BO	14.0	15.0	16.0	1.00	0.236	15.00	-0.11	0.00
BS								•
BW	18.0	12.0	14.0	3.06	0.709	14.67	-0.22	-0.12
C	15.0	15.0	15.0	0.00	0.000	15.00	-0.11	0.00
CA	16.0	15.0	14.0	1.00	0.236	15.00	-0.11	0.00
CE	15.0	18.0	15.0	1.73	0.354	16.00	0.24	0.35
CG								•
CJ	16.0	15.0	14.0	1.00	0.236	15.00	-0.11	0.00
CK	15.0	16.0	22.0	3.79	0.827	17.67	0.82	0.92
CO	13.0	16.0	14.0	1.53	0.354	14.33	-0.34	-0.23
CQ	15.0	15.0	17.0	1.15	0.236	15.67	0.12	0.23
CS	15.0	15.0	16.0	0.58	0.118	15.33	0.01	0.12
D	14.0	15.0	15.0	0.58	0.118	14.67	-0.22	-0.12
DB								•
DD	13.0	12.0	13.0	0.58	0.118	12.67	-0.92	-0.81
DE	13.0	13.0	13.0	0.00	0.000	13.00	-0.80	-0.69
DJ								•
DL	13.0	13.0	17.0	2.31	0.473	14.33	-0.34	-0.23
DM	15.0	15.0	15.0	0.00	0.000	15.00	-0.11	0.00
DO	30.0	29.0	27.0	1.53	0.354	28.67	4.63	4.73 ×
DS								•
DT	15.0	13.0	16.0	1.53	0.354	14.67	-0.22	-0.12
DZ	11.0	12.0	13.0	1.00	0.236	12.00	-1.15	-1.04
E	15.0	14.0	14.0	0.58	0.118	14.33	-0.34	-0.23

• = 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	
EB	14.0	14.0	15.0	0.58	0.118	14.33	-0.34	-0.23
EH	14.0	17.0	16.0	1.53	0.354	15.67	0.12	0.23
EL	13.0	13.0	14.0	0.58	0.118	13.33	-0.69	-0.58
EO								•
ER								•
EV								•
EX	16.0	14.0	14.0	1.15	0.236	14.67	-0.22	-0.12
FE	19.0	19.0	18.0	0.58	0.118	18.67	1.16	1.27
FF								•
FJ	33.0	29.0	30.0	2.08	0.473	30.67	5.32	5.43 ×
FK	19.0	19.0	20.0	0.58	0.118	19.33	1.39	1.50
FL	15.0	15.0	15.0	0.00	0.000	15.00	-0.11	0.00
FN								•
FU	13.0	14.0	16.0	1.53	0.354	14.33	-0.34	-0.23
FW								•
FZ	17.0	16.0	16.0	0.58	0.118	16.33	0.35	0.46
GE	17.0	13.0	13.0	2.31	0.473	14.33	-0.34	-0.23
GI	13.0	13.0	14.0	0.58	0.118	13.33	-0.69	-0.58
GQ								•
GT								•
GZ								•
HH								•
HI	15.0	15.0	19.0	2.31	0.473	16.33	0.35	0.46
HK	14.0	14.0	14.0	0.00	0.000	14.00	-0.45	-0.35
HL	15.0	15.0	15.0	0.00	0.000	15.00	-0.11	0.00
HN								•
HP	12.0	13.0	12.0	0.58	0.118	12.33	-1.03	-0.92
HU	14.0	14.0	15.0	0.58	0.118	14.33	-0.34	-0.23
HY								•
I	17.0	16.0	16.0	0.58	0.118	16.33	0.35	0.46
IA	24.0	21.0	22.0	1.53	0.354	22.33	2.43	2.54
IC	14.0	13.0	15.0	1.00	0.236	14.00	-0.45	-0.35
ID								•
IE								•
IU								•
J	15.0	14.0	14.0	0.58	0.118	14.33	-0.34	-0.23
JE	16.0	14.0	16.0	1.15	0.236	15.33	0.01	0.12
JG								•
JH								•
JN								•
JQ								•
JS	14.0	12.0	13.0	1.00	0.236	13.00	-0.80	-0.69
JX								•
JY	17.0	15.0	20.0	2.52	0.591	17.33	0.70	0.81
K	18.0	17.0	17.0	0.58	0.118	17.33	0.70	0.81

• = 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
KE									•
KT									•
KX	15.0	16.0	16.0	0.58	0.118	15.67	0.12	0.23	
KZ									•
L	16.0	15.0	15.0	0.58	0.118	15.33	0.01	0.12	
LE	32.0	26.0	14.0	9.17	3.146	24.00	3.01	3.12	×
LF	16.0	15.0	16.0	0.58	0.118	15.67	0.12	0.23	
LG									•
LM									•
LR	14.0	26.0	19.0	6.03	1.795	19.67	1.51	1.62	
LT	14.0	14.0	14.0	0.00	0.000	14.00	-0.45	-0.35	
M	14.0	14.0	14.0	0.00	0.000	14.00	-0.45	-0.35	
MA	16.0	16.0	15.0	0.58	0.118	15.67	0.12	0.23	
ME	14.0	16.0	15.0	1.00	0.236	15.00	-0.11	0.00	
MN									•
MO									•
MP	14.0	15.0	16.0	1.00	0.236	15.00	-0.11	0.00	
MQ	20.0	20.0	19.0	0.58	0.118	19.67	1.51	1.62	
MS	16.0	16.0	16.0	0.00	0.000	16.00	0.24	0.35	
MV	24.0	21.0	22.0	1.53	0.354	22.33	2.43	2.54	
MY									•
N									•
NA									•
NG									•
NH	13.0	16.0	14.0	1.53	0.354	14.33	-0.34	-0.23	
NJ	15.0	14.0	14.0	0.58	0.118	14.33	-0.34	-0.23	
NK	14.0	15.0	14.0	0.58	0.118	14.33	-0.34	-0.23	
NO									•
NT									•
NZ									•
O	16.0	16.0	16.0	0.00	0.000	16.00	0.24	0.35	
OE									•
OF									•
OK	223.0	222.0	227.0	2.65	0.591	224.00	72.29	72.40	×
OL									•
OM									•
OS									•
OX									•
OY									•
OZ	17.0	22.0	20.0	2.52	0.591	19.67	1.51	1.62	
P	12.0	14.0	13.0	1.00	0.236	13.00	-0.80	-0.69	
PA									•
PB	12.0	13.0	13.0	0.58	0.118	12.67	-0.92	-0.81	
PC	17.0	16.0	16.0	0.58	0.118	16.33	0.35	0.46	
PE									•

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

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↓ = 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
PG									•
PL									•
PM	12.0	15.0	16.0	2.08	0.473	14.33	-0.34	-0.23	
PP									•
PQ	15.0	17.0	14.0	1.53	0.354	15.33	0.01	0.12	
PR									•
PT	16.0	14.0	15.0	1.00	0.236	15.00	-0.11	0.00	
PV	13.0	18.0	13.0	2.89	0.591	14.67	-0.22	-0.12	
PW	15.0	15.0	15.0	0.00	0.000	15.00	-0.11	0.00	
PY									•
Q	14.0	14.0	15.0	0.58	0.118	14.33	-0.34	-0.23	
QC									•
QK	15.0	15.0	13.0	1.15	0.236	14.33	-0.34	-0.23	
QP	15.0	12.0	15.0	1.73	0.354	14.00	-0.45	-0.35	
QQ									•
QT	14.0	16.0	13.0	1.53	0.354	14.33	-0.34	-0.23	
QU	17.0	17.0	17.0	0.00	0.000	17.00	0.59	0.69	
QW	16.0	16.0	15.0	0.58	0.118	15.67	0.12	0.23	
QX	18.0	17.0	18.0	0.58	0.118	17.67	0.82	0.92	
QZ	15.0	15.0	15.0	0.00	0.000	15.00	-0.11	0.00	
RC	21.0	24.0	28.0	3.51	0.827	24.33	3.13	3.23	×
RD									•
RE									•
RF	14.0	14.0	14.0	0.00	0.000	14.00	-0.45	-0.35	
RG									•
RJ									•
RK	14.0	17.0	15.0	1.53	0.354	15.33	0.01	0.12	
RM	15.0	15.0	14.0	0.58	0.118	14.67	-0.22	-0.12	
RN	16.0	15.0	15.0	0.58	0.118	15.33	0.01	0.12	
RO	16.0	16.0	15.0	0.58	0.118	15.67	0.12	0.23	
RP									•
RR									•
RT									•
RU									•
RV	13.0	13.0	14.0	0.58	0.118	13.33	-0.69	-0.58	
RZ	15.0	14.0	13.0	1.00	0.236	14.00	-0.45	-0.35	
S	16.0	17.0	18.0	1.00	0.236	17.00	0.59	0.69	
SC	15.0	18.0	14.0	2.08	0.473	15.67	0.12	0.23	
SD	14.0	14.0	15.0	0.58	0.118	14.33	-0.34	-0.23	
SF	14.0	13.0	16.0	1.53	0.354	14.33	-0.34	-0.23	
SG									•
SI	23.0	14.0	22.0	4.93	1.120	19.67	1.51	1.62	
SL									•
SN									•
SO									•

• ≡ No data submitted

∅ ≡ Insufficient data

TAG SYMBOLS

× ≡ Determined to be an outlier

↑ ≡ Above control limit

↓ ≡ Below control limit

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Cobalt-60

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
SR	17.0	16.0	14.0	1.53	0.354	15.67	0.12	0.23
SS	18.0	14.0	17.0	2.08	0.473	16.33	0.35	0.46
ST								•
SW								•
SX								•
SZ	14.0	15.0	15.0	0.58	0.118	14.67	-0.22	-0.12
T	13.0	14.0	13.0	0.58	0.118	13.33	-0.69	-0.58
TA	29.0	29.0	29.0	0.58	0.118	28.67	4.63	4.73 ×
TE	15.0	14.0	16.0	1.00	0.236	15.00	-0.11	0.00
TG	16.0	18.0	15.0	1.53	0.354	16.33	0.35	0.46
TH	15.0	16.0	16.0	0.58	0.118	15.67	0.12	0.23
TI	19.0	20.0	26.0	3.79	0.827	21.67	2.20	2.31
TK								•
TL	16.0	16.0	15.0	0.58	0.118	15.67	0.12	0.23
TM								•
TN								•
TP	14.0	15.0	15.0	0.58	0.118	14.67	-0.22	-0.12
TQ	14.0	14.0	13.0	0.58	0.118	13.67	-0.57	-0.46
TR								•
TS	15.0	16.0	14.0	1.00	0.236	15.00	-0.11	0.00
TT								•
TV	6.0	6.0	5.0	0.58	0.118	5.67	-3.34	-3.23 ×
TW								•
TY								•
TZ								•
U	16.0	14.0	18.0	2.00	0.473	16.00	0.24	0.35
UA								•
UC	2.0	2.0	2.0	0.00	0.000	2.00	-4.61	-4.50 ×
W	14.0	15.0	12.0	1.53	0.354	13.67	-0.57	-0.46
X	14.0	13.0	14.0	0.58	0.118	13.67	-0.57	-0.46
ZZ								•

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
2.00	×	UC	13.33		T	14.00		LT
5.67	×	TV	13.33		RV	14.00		IC
10.33		AZ	13.33		GI	14.00		HK
12.00		DZ	13.33		EL	14.00		BH
12.33		HP	13.67		X	14.00		A
12.33		AE	13.67		W	14.33		SF
12.67		PB	13.67		TQ	14.33		SD
12.67		DD	14.00		RZ	14.33		QT
13.00		P	14.00		RF	14.33		QK
13.00		JS	14.00		QP	14.33		Q
13.00		DE	14.00		M	14.33		PM

• ≡ No data submitted

TAG SYMBOLS

↑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

↓ ≡ Below control limit

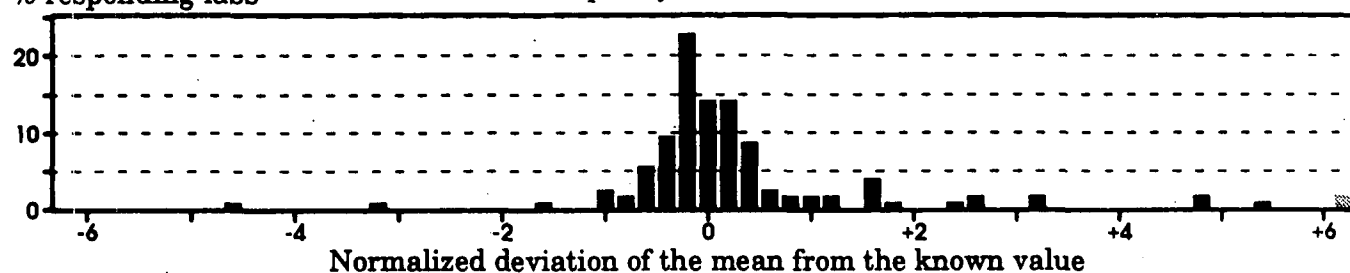
Cobalt-60

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
14.33		NK	15.00		FL	16.33		TG
14.33		NJ	15.00		DM	16.33		SS
14.33		NH	15.00		CJ	16.33		PC
14.33		J	15.00		CA	16.33		I
14.33		HU	15.00		C	16.33		HI
14.33		GE	15.00		BO	16.33		FZ
14.33		FU	15.00		BK	16.33		AJ
14.33		EB	15.00		BC	16.67		BA
14.33		E	15.00		AK	17.00		S
14.33		DL	15.00		AF	17.00		QU
14.33		CO	15.33		RN	17.33		K
14.67		TP	15.33		RK	17.33		JY
14.67		SZ	15.33		PQ	17.67		QX
14.67		RM	15.33		L	17.67		CK
14.67		PV	15.33		JE	18.67		FE
14.67		EX	15.33		CS	18.67		AW
14.67		DT	15.67		TL	19.33		FK
14.67		D	15.67		TH	19.67		SI
14.67		BW	15.67		SR	19.67		OZ
14.67		BM	15.67		SC	19.67		MQ
14.67		BL	15.67		RO	19.67		LR
14.67		AU	15.67		QW	20.00		AL
14.67		AI	15.67		MA	21.67		TI
15.00		TS	15.67		LF	22.33		MV
15.00		TE	15.67		KX	22.33		IA
15.00		QZ	15.67		EH	24.00	x	LE
15.00		PW	15.67		CQ	24.33	x	RC
15.00		PT	15.67		AP	28.67	x	TA
15.00		MP	16.00		U	28.67	x	DO
15.00		ME	16.00		O	30.67	x	FJ
15.00		HL	16.00		MS	50.00	x	BG
			16.00		CE	224.00	x	OK

% responding labs

Frequency distribution



• ≡ No data submitted

TAG SYMBOLS

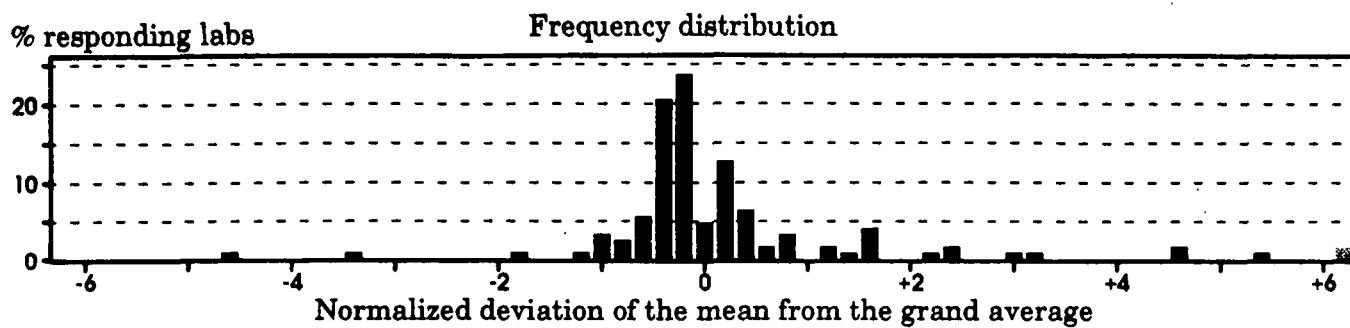
↑ ≡ Above control limit

∅ ≡ Insufficient data

x ≡ Determined to be an outlier

↓ ≡ Below control limit

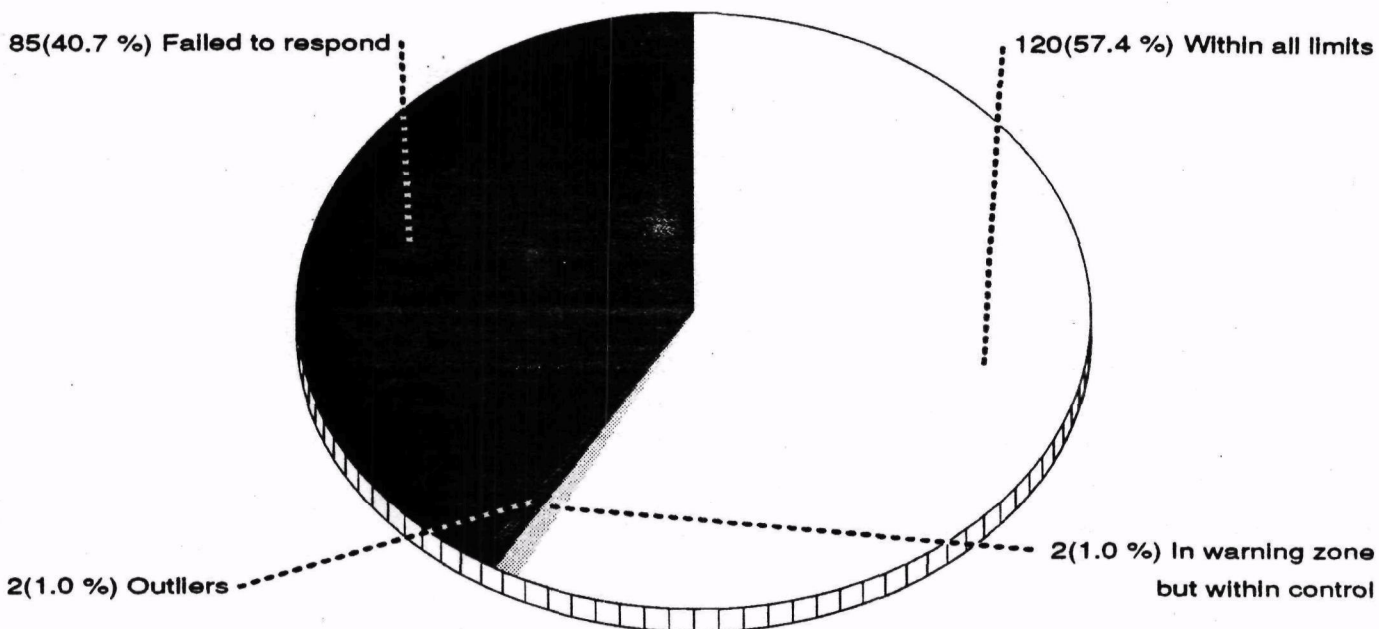
Cobalt-60



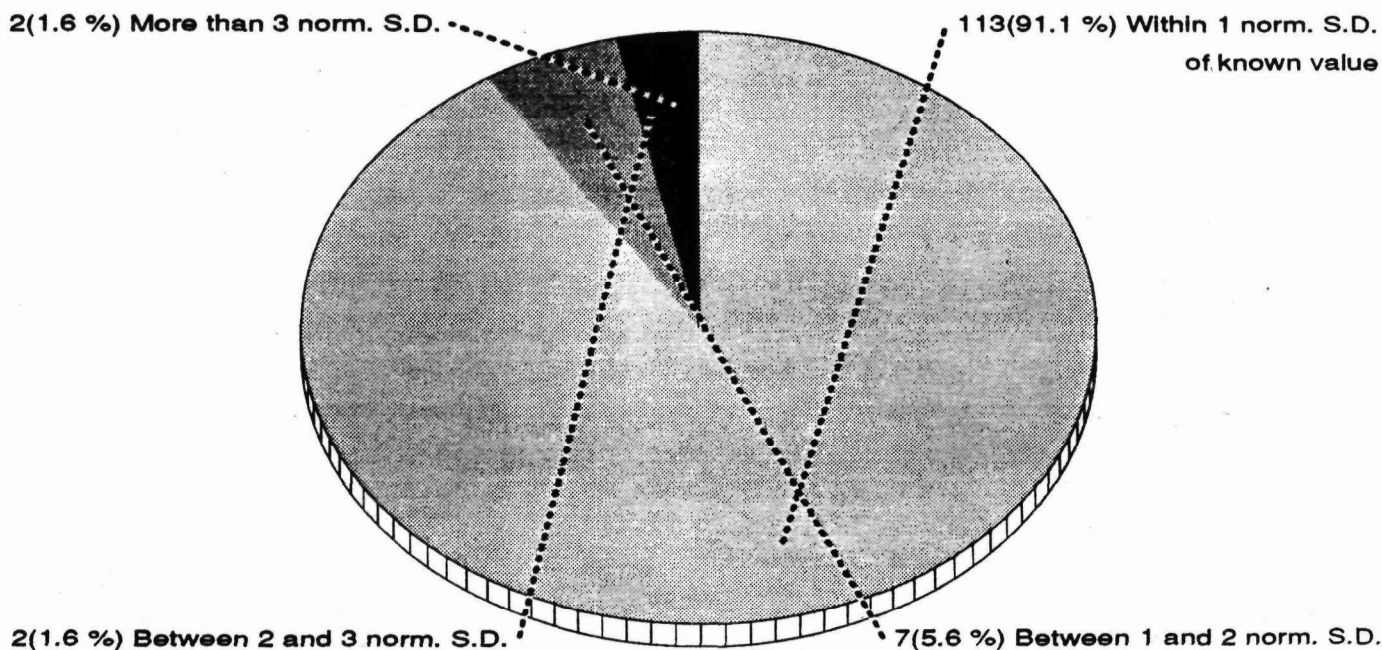
Cesium-134
Statistical Summary

209 Participants

The known value of this nuclide is 5.0 pCi/l with an expected precision of 5.0; the control limits are 0.0 to 13.7; the warning regions are 0.0 to 0.0 and 10.8 to 13.7



Statistic	Respondents	Non-outliers
Mean	6.31	Grand Avg 5.33
Std. Dev.	9.19	1.45
Variance	84.45	2.12
% Coef. of Var.	145.65	27.29
% deviation of mean from known value	26.18	6.61
Norm. dev. of mean from known value	0.14	0.23
Median	5.00	5.00
% deviation of median from known value	0.00	0.00
Norm. dev. of median from known value	0.00	0.00



Cesium-134

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
A	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
AE	6.0	7.0	6.0	0.58	0.118	6.33	0.35	0.46
AF	4.0	4.0	4.0	0.00	0.000	4.00	-0.46	-0.35
AI	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
AJ	5.0	4.0	4.0	0.58	0.118	4.33	-0.35	-0.23
AK	4.0	4.0	4.0	0.00	0.000	4.00	-0.46	-0.35
AL	8.0	6.0	4.0	2.00	0.473	6.00	0.23	0.35
AO								•
AP	7.0	8.0	5.0	1.53	0.354	6.67	0.46	0.58
AR								•
AU	4.0	5.0	6.0	1.00	0.236	5.00	-0.11	0.00
AW	9.0	5.0	7.0	2.00	0.473	7.00	0.58	0.69
AZ	7.0	5.0	5.0	1.15	0.236	5.67	0.12	0.23
BA	6.0	9.0	7.0	1.53	0.354	7.33	0.69	0.81
BC	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
BG	22.0	32.0	30.0	5.29	1.345	28.00	7.85	7.97 ×
BH	4.0	2.0	4.0	1.15	0.236	3.33	-0.69	-0.58
BK	5.0	6.0	5.0	0.58	0.118	5.33	0.00	0.12
BL	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
BM	4.0	5.0	5.0	0.58	0.118	4.67	-0.23	-0.12
BN								•
BO	4.0	5.0	5.0	0.58	0.118	4.67	-0.23	-0.12
BS								•
BW	8.0	3.0	5.0	2.52	0.591	5.33	0.00	0.12
C	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
CA	5.0	6.0	6.0	0.58	0.118	5.67	0.12	0.23
CE	5.0	6.0	6.0	0.58	0.118	5.67	0.12	0.23
CG								•
CJ	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
CK	6.0	4.0	3.0	1.53	0.354	4.33	-0.35	-0.23
CO	7.0	6.0	6.0	0.58	0.118	6.33	0.35	0.46
CQ	5.0	9.0	6.0	2.08	0.473	6.67	0.46	0.58
CS	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
D	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
DB								•
DD	4.0	5.0	5.0	0.58	0.118	4.67	-0.23	-0.12
DE	5.0	5.0	6.0	0.58	0.118	5.33	0.00	0.12
DJ								•
DL	4.0	5.0	4.0	0.58	0.118	4.33	-0.35	-0.23
DM	5.0	5.0	6.0	0.58	0.118	5.33	0.00	0.12
DO	12.0	12.0	11.0	0.58	0.118	11.67	2.19	2.31
DS								•
DT	6.0	4.0	4.0	1.15	0.236	4.67	-0.23	-0.12
DZ	6.0	7.0	6.0	0.58	0.118	6.33	0.35	0.46
E	5.0	4.0	4.0	0.58	0.118	4.33	-0.35	-0.23

• = No data submitted

TAG SYMBOLS

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× = 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	
EB	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
EH	4.0	5.0	5.0	0.58	0.118	4.67	-0.23	-0.12
EL	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
EO								•
ER								•
EV								•
EX	9.0	5.0	8.0	2.08	0.473	7.33	0.69	0.81
FE								•
FF								•
FJ	11.0	13.0	8.0	2.52	0.591	10.67	1.85	1.96
FK								•
FL	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
FN								•
FU	4.0	5.0	5.0	0.58	0.118	4.67	-0.23	-0.12
FW								•
FZ	6.0	3.0	6.0	1.73	0.354	5.00	-0.11	0.00
GE	4.0	5.0	4.0	0.58	0.118	4.33	-0.35	-0.23
GI	4.0	4.0	5.0	0.58	0.118	4.33	-0.35	-0.23
GQ								•
GT								•
GZ								•
HH								•
HI	7.0	6.0	5.0	1.00	0.236	6.00	0.23	0.35
HK	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
HL	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
HN								•
HP	4.0	4.0	4.0	0.00	0.000	4.00	-0.46	-0.35
HU	4.0	5.0	5.0	0.58	0.118	4.67	-0.23	-0.12
HY								•
I	4.0	6.0	6.0	1.15	0.236	5.33	0.00	0.12
IA	6.0	6.0	8.0	1.15	0.236	6.67	0.46	0.58
IC	4.0	5.0	5.0	0.58	0.118	4.67	-0.23	-0.12
ID								•
IE								•
IU								•
J	5.0	4.0	5.0	0.58	0.118	4.67	-0.23	-0.12
JE	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
JG								•
JH								•
JN								•
JQ								•
JS	4.0	4.0	3.0	0.58	0.118	3.67	-0.58	-0.46
JX								•
JY	4.0	4.0	4.0	0.00	0.000	4.00	-0.46	-0.35
K	5.0	4.0	5.0	0.58	0.118	4.67	-0.23	-0.12

• ≡ No data submitted

TAG SYMBOLS

↑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

↓ ≡ Below control limit

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Cesium-134

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
KE									•
KT									•
KX	7.0	6.0	6.0	0.58	0.118	6.33	0.35	0.46	
KZ									•
L	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00	
LE									•
LF	4.0	5.0	4.0	0.58	0.118	4.33	-0.35	-0.23	
LG									•
LM									•
LR	9.0	8.0	10.0	1.00	0.236	9.00	1.27	1.39	
LT	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00	
M	5.0	6.0	5.0	0.58	0.118	5.33	0.00	0.12	
MA	5.0	5.0	4.0	0.58	0.118	4.67	-0.23	-0.12	
ME	5.0	6.0	5.0	0.58	0.118	5.33	0.00	0.12	
MN									•
MO									•
MP	5.0	3.0	5.0	1.15	0.236	4.33	-0.35	-0.23	
MQ	8.0	5.0	6.0	1.53	0.354	6.33	0.35	0.46	
MS	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00	
MV	6.0	5.0	6.0	0.58	0.118	5.67	0.12	0.23	
MY									•
N									•
NA									•
NG									•
NH	6.0	2.0	2.0	2.31	0.473	3.33	-0.69	-0.58	
NJ	4.0	4.0	5.0	0.58	0.118	4.33	-0.35	-0.23	
NK	3.0	4.0	3.0	0.58	0.118	3.33	-0.69	-0.58	
NO									•
NT									•
NZ									•
O	6.0	5.0	5.0	0.58	0.118	5.33	0.00	0.12	
OE									•
OF									•
OK	104.0	100.0	108.0	4.00	0.945	104.00	34.18	34.29	×
OL									•
OM									•
OS									•
OX									•
OY									•
OZ	5.0	6.0	7.0	1.00	0.236	6.00	0.23	0.35	
P	4.0	5.0	2.0	1.53	0.354	3.67	-0.58	-0.46	
PA									•
PB	7.0	10.0	7.0	1.73	0.354	8.00	0.92	1.04	
PC	5.0	7.0	6.0	1.00	0.236	6.00	0.23	0.35	
PE									•

• = 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	
PG								•
PL								•
PM	6.0	5.0	6.0	0.58	0.118	5.67	0.12	0.23
PP								•
PQ	5.0	6.0	4.0	1.00	0.236	5.00	-0.11	0.00
PR								•
PT	3.0	5.0	5.0	1.15	0.236	4.33	-0.35	-0.23
PV	7.0	7.0	10.0	1.73	0.354	8.00	0.92	1.04
PW	4.0	5.0	5.0	0.58	0.118	4.67	-0.23	-0.12
PY								•
Q	4.0	4.0	4.0	0.00	0.000	4.00	-0.46	-0.35
QC								•
QK	5.0	5.0	6.0	0.58	0.118	5.33	0.00	0.12
QP	3.0	7.0	5.0	2.00	0.473	5.00	-0.11	0.00
QQ								•
QT	6.0	5.0	5.0	0.58	0.118	5.33	0.00	0.12
QU	6.0	6.0	6.0	0.00	0.000	6.00	0.23	0.35
QW	5.0	6.0	5.0	0.58	0.118	5.33	0.00	0.12
QX	9.0	9.0	9.0	0.00	0.000	9.00	1.27	1.39
QZ	4.0	4.0	4.0	0.00	0.000	4.00	-0.46	-0.35
RC	8.0	10.0	16.0	4.16	0.945	11.33	2.08	2.19
RD								•
RE								•
RF	6.0	5.0	5.0	0.58	0.118	5.33	0.00	0.12
RG								•
RJ								•
RK	4.0	7.0	5.0	1.53	0.354	5.33	0.00	0.12
RM	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
RN	5.0	5.0	6.0	0.58	0.118	5.33	0.00	0.12
RO	5.0	5.0	6.0	0.58	0.118	5.33	0.00	0.12
RP								•
RR								•
RT								•
RU								•
RV	4.0	4.0	5.0	0.58	0.118	4.33	-0.35	-0.23
RZ	6.0	5.0	4.0	1.00	0.236	5.00	-0.11	0.00
S	4.0	4.0	6.0	1.15	0.236	4.67	-0.23	-0.12
SC	5.0	5.0	4.0	0.58	0.118	4.67	-0.23	-0.12
SD	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
SF	7.0	7.0	9.0	1.15	0.236	7.67	0.81	0.92
SG								•
SI	4.0	6.0	6.0	1.15	0.236	5.33	0.00	0.12
SL								•
SN								•
SO								•

• ≡ No data submitted

∅ ≡ Insufficient data

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↑ ≡ 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	
SR	7.0	6.0	5.0	1.00	0.236	6.00	0.23	0.35
SS	4.0	6.0	5.0	1.00	0.236	5.00	-0.11	0.00
ST								•
SW								•
SX								•
SZ	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
T	4.0	4.0	5.0	0.58	0.118	4.33	-0.35	-0.23
TA	9.0	9.0	8.0	0.58	0.118	8.67	1.16	1.27
TE	3.0	3.0	4.0	0.58	0.118	3.33	-0.69	-0.58
TG	4.0	4.0	5.0	0.58	0.118	4.33	-0.35	-0.23
TH	5.0	5.0	6.0	0.58	0.118	5.33	0.00	0.12
TI	5.0	5.0	7.0	1.15	0.236	5.67	0.12	0.23
TK								•
TL	6.0	6.0	6.0	0.00	0.000	6.00	0.23	0.35
TM								•
TN								•
TP	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
TQ	5.0	4.0	4.0	0.58	0.118	4.33	-0.35	-0.23
TR								•
TS	5.0	5.0	5.0	0.00	0.000	5.00	-0.11	0.00
TT								•
TV	2.0	2.0	2.0	0.00	0.000	2.00	-1.15	-1.04
TW								•
TY								•
TZ								•
U	4.0	4.0	7.0	1.73	0.354	5.00	-0.11	0.00
UA								•
W	5.0	5.0	4.0	0.58	0.118	4.67	-0.23	-0.12
X	5.0	4.0	3.0	1.00	0.236	4.00	-0.46	-0.35

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
2.00		TV	4.00		AF	4.33		CK
3.33		TE	4.33		TQ	4.33		AJ
3.33		NK	4.33		TG	4.67		W
3.33		NH	4.33		T	4.67		SC
3.33		BH	4.33		RV	4.67		S
3.67		P	4.33		PT	4.67		PW
3.67		JS	4.33		NJ	4.67		MA
4.00		X	4.33		MP	4.67		K
4.00		QZ	4.33		LF	4.67		J
4.00		Q	4.33		GI	4.67		IC
4.00		JY	4.33		GE	4.67		HU
4.00		HP	4.33		E	4.67		FU
4.00		AK	4.33		DL	4.67		EH

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

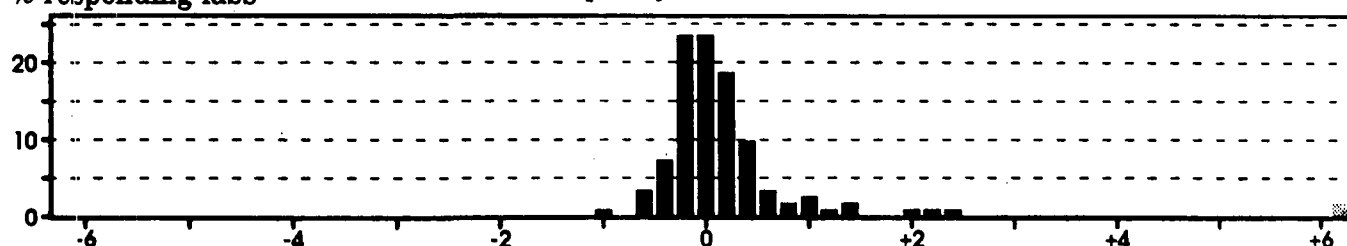
↓ = Below control limit

Cesium-134
Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
4.67		DT	5.00		BL	6.00		TL
4.67		DD	5.00		BC	6.00		SR
4.67		BO	5.00		AU	6.00		QU
4.67		BM	5.00		AI	6.00		PC
5.00		U	5.00		A	6.00		OZ
5.00		TS	5.33		TH	6.00		HI
5.00		TP	5.33		SI	6.00		AL
5.00		SZ	5.33		RO	6.33		MQ
5.00		SS	5.33		RN	6.33		KX
5.00		SD	5.33		RK	6.33		DZ
5.00		RZ	5.33		RF	6.33		CO
5.00		RM	5.33		QW	6.33		AE
5.00		QP	5.33		QT	6.67		IA
5.00		PQ	5.33		QK	6.67		CQ
5.00		MS	5.33		O	6.67		AP
5.00		LT	5.33		ME	7.00		AW
5.00		L	5.33		M	7.33		EX
5.00		JE	5.33		I	7.33		BA
5.00		HL	5.33		DM	7.67		SF
5.00		HK	5.33		DE	8.00		PV
5.00		FZ	5.33		BW	8.00		PB
5.00		FL	5.33		BK	8.67		TA
5.00		EL	5.67		TI	9.00		QX
5.00		EB	5.67		PM	9.00		LR
5.00		D	5.67		MV	10.67		FJ
5.00		CS	5.67		CE	11.33		RC
5.00		CJ	5.67		CA	11.67		DO
5.00		C	5.67		AZ	28.00	x	BG
						104.00	x	OK

% responding labs

Frequency distribution



Normalized deviation of the mean from the known value

• ≡ No data submitted

TAG SYMBOLS

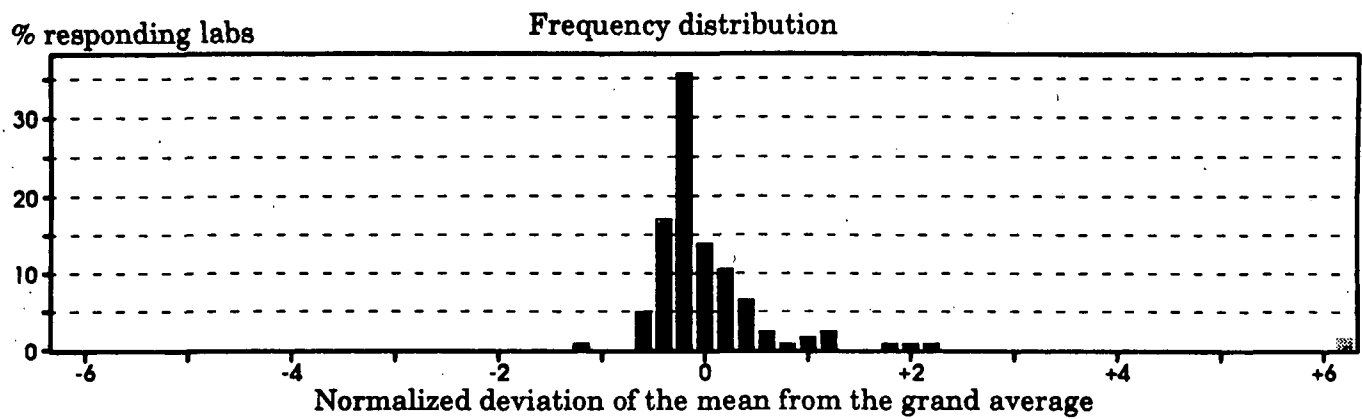
↑ ≡ Above control limit

∅ ≡ Insufficient data

x ≡ Determined to be an outlier

↓ ≡ Below control limit

Cesium-134

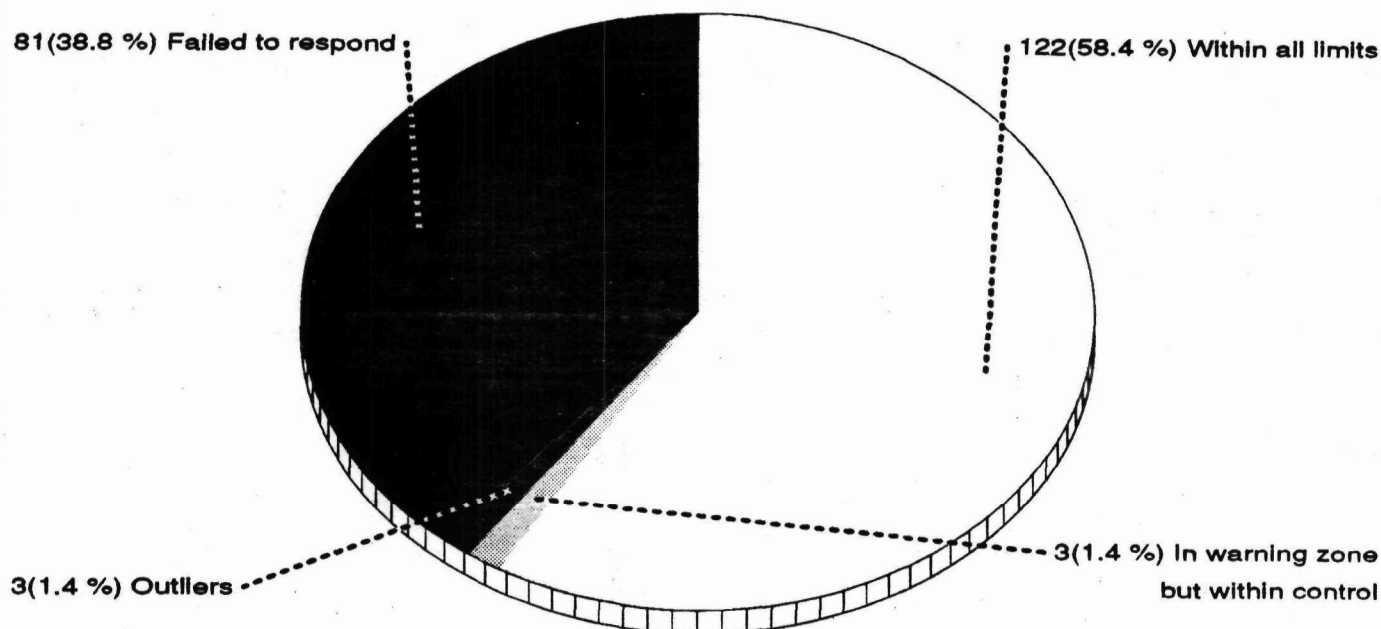


Cesium-137

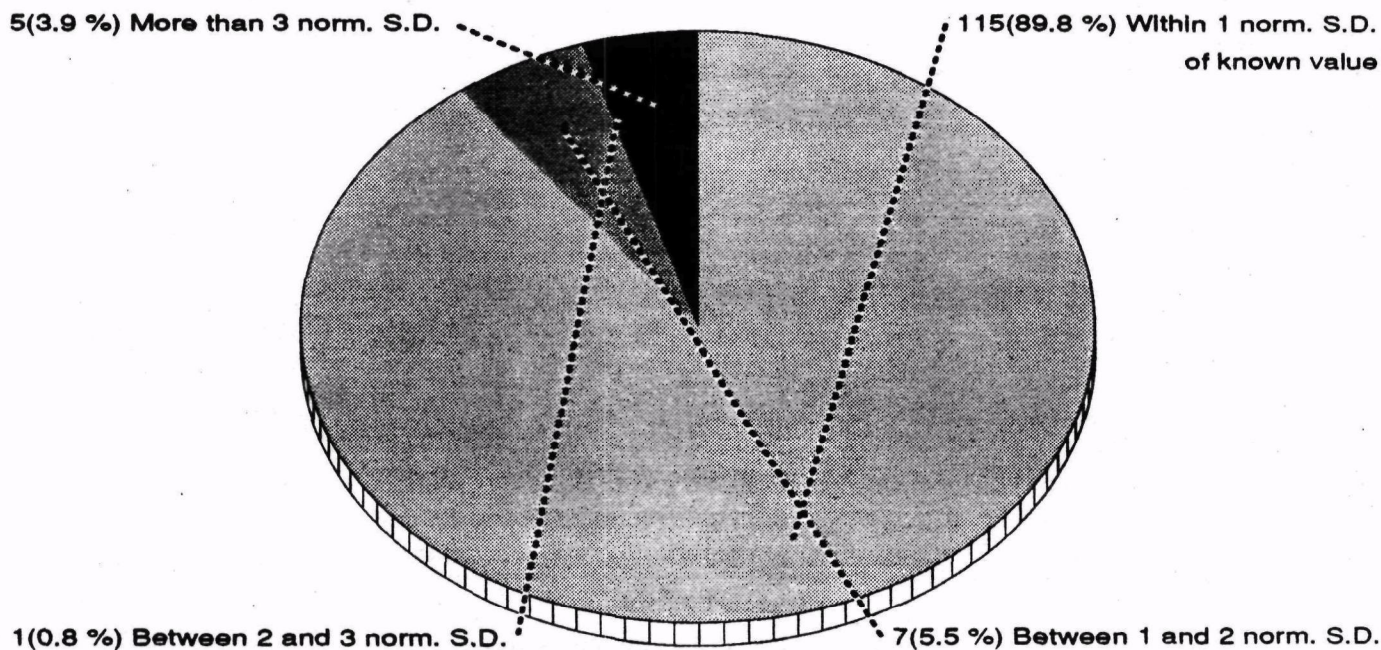
Statistical Summary

209 Participants

The known value of this nuclide is 8.0 pCi/l with an expected precision of 5.0; the control limits are 0.0 to 16.7; the warning regions are 0.0 to 2.2 and 13.8 to 16.7



Statistic	Respondents	Non-outliers
Mean	10.32	Grand Avg 8.86
Std. Dev.	14.75	1.76
Variance	217.61	3.10
% Coef. of Var.	142.94	19.87
% deviation of mean from known value	29.00	10.73
Norm. dev. of mean from known value	0.16	0.49
Median	8.67	8.67
% deviation of median from known value	8.33	8.33
Norm. dev. of median from known value	0.05	0.38



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Cesium-137

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
A	9.0	9.0	8.0	0.58	0.118	8.67	-0.07	0.23
AE	8.0	8.0	7.0	0.58	0.118	7.67	-0.41	-0.12
AF	7.0	9.0	8.0	1.00	0.236	8.00	-0.30	0.00
AI	9.0	8.0	8.0	0.58	0.118	8.33	-0.18	0.12
AJ	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35
AK	8.0	9.0	9.0	0.58	0.118	8.67	-0.07	0.23
AL	9.0	7.0	4.0	2.52	0.591	6.67	-0.76	-0.46
AO								•
AP	8.0	8.0	11.0	1.73	0.354	9.00	0.05	0.35
AR								•
AU	10.0	9.0	7.0	1.53	0.354	8.67	-0.07	0.23
AW	8.0	12.0	10.0	2.00	0.473	10.00	0.40	0.69
AZ	6.0	7.0	7.0	0.58	0.118	6.67	-0.76	-0.46
BA	10.0	11.0	9.0	1.00	0.236	10.00	0.40	0.69
BC	9.0	9.0	8.0	0.58	0.118	8.67	-0.07	0.23
BG	26.0	18.0	23.0	4.04	0.945	22.33	4.67	4.97 ×
BH	9.0	7.0	10.0	1.53	0.354	8.67	-0.07	0.23
BK	9.0	9.0	8.0	0.58	0.118	8.67	-0.07	0.23
BL	9.0	8.0	9.0	0.58	0.118	8.67	-0.07	0.23
BM	8.0	8.0	7.0	0.58	0.118	7.67	-0.41	-0.12
BN								•
BO	8.0	8.0	9.0	0.58	0.118	8.33	-0.18	0.12
BS								•
BW	8.0	12.0	12.0	2.31	0.473	10.67	0.63	0.92
C	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
CA	8.0	7.0	9.0	1.00	0.236	8.00	-0.30	0.00
CE	8.0	9.0	7.0	1.00	0.236	8.00	-0.30	0.00
CG								•
CJ	9.0	9.0	8.0	0.58	0.118	8.67	-0.07	0.23
CK	10.0	10.0	16.0	3.46	0.709	12.00	1.09	1.39
CO	14.0	12.0	8.0	3.06	0.709	11.33	0.86	1.15
CQ	10.0	9.0	10.0	0.58	0.118	9.67	0.28	0.58
CS	8.0	9.0	9.0	0.58	0.118	8.67	-0.07	0.23
D	9.0	8.0	8.0	0.58	0.118	8.33	-0.18	0.12
DB								•
DD	7.0	7.0	7.0	0.00	0.000	7.00	-0.64	-0.35
DE	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
DJ								•
DL	6.0	9.0	7.0	1.53	0.354	7.33	-0.53	-0.23
DM	9.0	9.0	10.0	0.58	0.118	9.33	0.16	0.46
DO	19.0	14.0	19.0	2.89	0.591	17.33	2.94	3.23 ×
DS								•
DT	6.0	10.0	8.0	2.00	0.473	8.00	-0.30	0.00
DZ	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
E	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35

• ≡ 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	
EB	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35
EH	9.0	8.0	7.0	1.00	0.236	8.00	-0.30	0.00
EL	6.0	8.0	8.0	1.15	0.236	7.33	-0.53	-0.23
EO								•
ER								•
EV								•
EX	14.0	9.0	8.0	3.21	0.709	10.33	0.51	0.81
FE	9.0	7.0	11.0	2.00	0.473	9.00	0.05	0.35
FF								•
FJ	16.0	15.0	13.0	1.53	0.354	14.67	2.01	2.31
FK	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35
FL	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35
FN								•
FU	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
FW								•
FZ	9.0	8.0	7.0	1.00	0.236	8.00	-0.30	0.00
GE	7.0	9.0	6.0	1.53	0.354	7.33	-0.53	-0.23
GI	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
GQ								•
GT								•
GZ								•
HH								•
HI	9.0	9.0	11.0	1.15	0.236	9.67	0.28	0.58
HK	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
HL	10.0	10.0	10.0	0.00	0.000	10.00	0.40	0.69
HN								•
HP	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
HU	7.0	7.0	8.0	0.58	0.118	7.33	-0.53	-0.23
HY								•
I	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35
IA	7.0	8.0	8.0	0.58	0.118	7.67	-0.41	-0.12
IC	10.0	7.0	10.0	1.73	0.354	9.00	0.05	0.35
ID								•
IE								•
IU								•
J	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
JE	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35
JG								•
JH								•
JN								•
JQ								•
JS	7.0	9.0	9.0	1.15	0.236	8.33	-0.18	0.12
JX								•
JY	12.0	11.0	14.0	1.53	0.354	12.33	1.20	1.50
K	11.0	10.0	10.0	0.58	0.118	10.33	0.51	0.81

• = No data submitted

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Cesium-137

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
KE									•
KT									•
KX	8.0	9.0	9.0	0.58	0.118	8.67	-0.07	0.23	
KZ									•
L	9.0	7.0	7.0	1.15	0.236	7.67	-0.41	-0.12	
LE	15.0	6.0	11.0	4.51	1.120	10.67	0.63	0.92	
LF	8.0	8.0	9.0	0.58	0.118	8.33	-0.18	0.12	
LG									•
LM									•
LR	11.0	17.0	10.0	3.79	0.827	12.67	1.32	1.62	
LT	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35	
M	10.0	10.0	9.0	0.58	0.118	9.67	0.28	0.58	
MA	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35	
ME	9.0	8.0	10.0	1.00	0.236	9.00	0.05	0.35	
MN									•
MO									•
MP	8.0	8.0	9.0	0.58	0.118	8.33	-0.18	0.12	
MQ	8.0	13.0	9.0	2.65	0.591	10.00	0.40	0.69	
MS	8.0	8.0	9.0	0.58	0.118	8.33	-0.18	0.12	
MV	9.0	11.0	12.0	1.53	0.354	10.67	0.63	0.92	
MY									•
N									•
NA									•
NG									•
NH	8.0	9.0	7.0	1.00	0.236	8.00	-0.30	0.00	
NJ	10.0	10.0	10.0	0.00	0.000	10.00	0.40	0.69	
NK	7.0	6.0	7.0	0.58	0.118	6.67	-0.76	-0.46	
NO									•
NT									•
NZ									•
O	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35	
OE									•
OF									•
OK	179.0	185.0	178.0	7.81	2.245	174.00	57.21	57.50	×
OL									•
OM									•
OS									•
OX									•
OY									•
OZ	10.0	10.0	10.0	0.00	0.000	10.00	0.40	0.69	
P	6.0	6.0	4.0	1.15	0.236	5.33	-1.22	-0.92	
PA									•
PB	9.0	8.0	9.0	0.58	0.118	8.67	-0.07	0.23	
PC	12.0	8.0	10.0	2.00	0.473	10.00	0.40	0.69	
PE									•

• ≡ 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
PG									•
PL									•
PM	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00	
PP									•
PQ	7.0	9.0	8.0	1.00	0.236	8.00	-0.30	0.00	
PR									•
PT	7.0	7.0	8.0	0.58	0.118	7.33	-0.53	-0.23	
PV	7.0	9.0	8.0	1.00	0.236	8.00	-0.30	0.00	
PW	7.0	6.0	8.0	1.00	0.236	7.00	-0.64	-0.35	
PY									•
Q	8.0	8.0	9.0	0.58	0.118	8.33	-0.18	0.12	
QC									•
QK	9.0	10.0	11.0	1.00	0.236	10.00	0.40	0.69	
QP	7.0	7.0	8.0	0.58	0.118	7.33	-0.53	-0.23	
QQ									•
QT	8.0	10.0	8.0	1.15	0.236	8.67	-0.07	0.23	
QU	9.0	10.0	9.0	0.58	0.118	9.33	0.16	0.46	
QW	10.0	9.0	11.0	1.00	0.236	10.00	0.40	0.69	
QX	10.0	10.0	10.0	0.00	0.000	10.00	0.40	0.69	
QZ	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00	
RC	13.0	10.0	10.0	1.73	0.354	11.00	0.74	1.04	
RD									•
RE									•
RF	9.0	8.0	10.0	1.00	0.236	9.00	0.05	0.35	
RG									•
RJ									•
RK	11.0	9.0	10.0	1.00	0.236	10.00	0.40	0.69	
RM	8.0	9.0	8.0	0.58	0.118	8.33	-0.18	0.12	
RN	11.0	9.0	9.0	1.15	0.236	9.67	0.28	0.58	
RO	11.0	9.0	11.0	1.15	0.236	10.33	0.51	0.81	
RP									•
RR									•
RT									•
RU									•
RV	7.0	7.0	8.0	0.58	0.118	7.33	-0.53	-0.23	
RZ	8.0	7.0	7.0	0.58	0.118	7.33	-0.53	-0.23	
S	9.0	10.0	11.0	1.00	0.236	10.00	0.40	0.69	
SC	10.0	10.0	9.0	0.58	0.118	9.67	0.28	0.58	
SD	8.0	8.0	9.0	0.58	0.118	8.33	-0.18	0.12	
SF	9.0	9.0	9.0	0.00	0.000	9.00	0.05	0.35	
SG									•
SI	14.0	8.0	13.0	3.21	0.709	11.67	0.97	1.27	
SL									•
SN									•
SO									•

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TAG SYMBOLS

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Cesium-137

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
SR	7.0	6.0	7.0	0.58	0.118	6.67	-0.76	-0.46
SS	10.0	9.0	8.0	1.00	0.236	9.00	0.05	0.35
ST								•
SW								•
SX	6.0	6.0	7.0	0.58	0.118	6.33	-0.87	-0.58
SZ	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
T	10.0	8.0	9.0	1.00	0.236	9.00	0.05	0.35
TA	17.0	16.0	17.0	0.58	0.118	16.67	2.70	3.00
TE	10.0	7.0	10.0	1.73	0.354	9.00	0.05	0.35
TG	8.0	7.0	8.0	0.58	0.118	7.67	-0.41	-0.12
TH	10.0	10.0	10.0	0.00	0.000	10.00	0.40	0.69
TI	10.0	10.0	12.0	1.15	0.236	10.67	0.63	0.92
TK								•
TL	16.0	16.0	18.0	1.15	0.236	16.67	2.70	3.00
TM								•
TN								•
TP	8.0	8.0	8.0	0.00	0.000	8.00	-0.30	0.00
TQ	8.0	5.0	6.0	1.53	0.354	6.33	-0.87	-0.58
TR								•
TS	9.0	8.0	8.0	0.58	0.118	8.33	-0.18	0.12
TT								•
TV	3.0	3.0	3.0	0.00	0.000	3.00	-2.03	-1.73
TW								•
TY								•
TZ								•
U	8.0	8.0	9.0	0.58	0.118	8.33	-0.18	0.12
UA								•
W	8.0	6.0	8.0	1.15	0.236	7.33	-0.53	-0.23
X	9.0	8.0	9.0	0.58	0.118	8.67	-0.07	0.23

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
3.00		TV	7.33		QP	8.00		QZ
5.33		P	7.33		PT	8.00		PV
6.33		TQ	7.33		HU	8.00		PQ
6.33		SX	7.33		GE	8.00		PM
6.67		SR	7.33		EL	8.00		NH
6.67		NK	7.33		DL	8.00		J
6.67		AZ	7.67		TG	8.00		HP
6.67		AL	7.67		L	8.00		HK
7.00		PW	7.67		LA	8.00		GI
7.00		DD	7.67		BM	8.00		FZ
7.33		W	7.67		AE	8.00		FU
7.33		RZ	8.00		TP	8.00		EH
7.33		RV	8.00		SZ	8.00		DZ

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

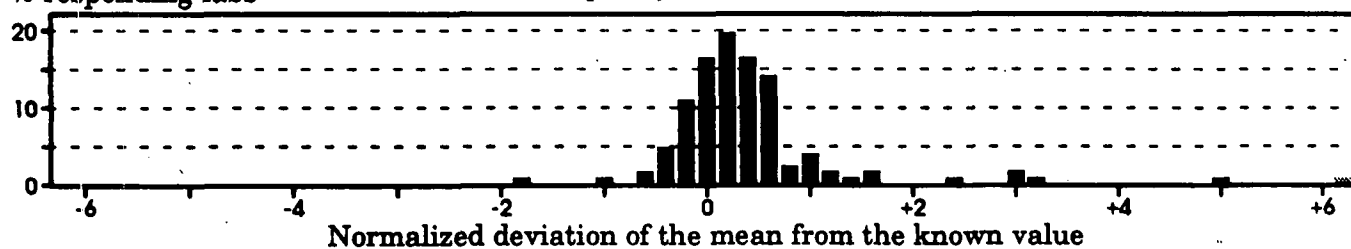
↓ = Below control limit

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

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
8.00		DT	8.67		AK	10.00		RK
8.00		DE	8.67		A	10.00		QX
8.00		CE	9.00		TE	10.00		QW
8.00		CA	9.00		T	10.00		QK
8.00		C	9.00		SS	10.00		PC
8.00		AF	9.00		SF	10.00		OZ
8.33		U	9.00		RF	10.00		NJ
8.33		TS	9.00		O	10.00		MQ
8.33		SD	9.00		ME	10.00		HL
8.33		RM	9.00		MA	10.00		BA
8.33		Q	9.00		LT	10.00		AW
8.33		MS	9.00		JE	10.33		RO
8.33		MP	9.00		IC	10.33		K
8.33		LF	9.00		I	10.33		EX
8.33		JS	9.00		FL	10.67		TI
8.33		D	9.00		FK	10.67		MV
8.33		BO	9.00		FE	10.67		LE
8.33		AI	9.00		EB	10.67		BW
8.67		X	9.00		E	11.00		RC
8.67		QT	9.00		AP	11.33		CO
8.67		PB	9.00		AJ	11.67		SI
8.67		KX	9.33		QU	12.00		CK
8.67		CS	9.33		DM	12.33		JY
8.67		CJ	9.67		SC	12.67		LR
8.67		BL	9.67		RN	14.67		FJ
8.67		BK	9.67		M	16.67		TL
8.67		BH	9.67		HI	16.67		TA
8.67		BC	9.67		CQ	17.33	x	DO
8.67		AU	10.00		TH	22.33	x	BG
			10.00		S	174.00	x	OK

% responding labs

Frequency distribution



• = No data submitted

Ø = Insufficient data

TAG SYMBOLS

x = Determined to be an outlier

↑ = Above control limit

↓ = Below control limit

Cesium-137

