

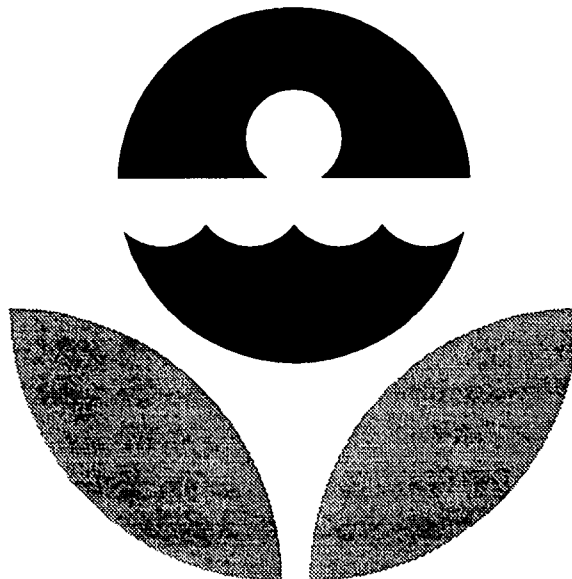


Radionuclides in Milk Performance Evaluation Study

A Statistical Evaluation of the September 30, 1994 Data



Radionuclides in Milk
Performance Evaluation Study
September 30, 1994



Environmental Protection Agency
Environmental Monitoring Systems Laboratory
Las Vegas, Nevada



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

Dear Participant,

Enclosed are the results of the Nuclear Radiation Assessment Division (EMSL-LV) Performance Evaluation Study for *Radionuclides in Milk; September 30, 1994*.

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

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

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

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

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

Sincerely,

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

George Dilbeck
Chemist
Radioanalysis Branch

Enclosure

NOTICE

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

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

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

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

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

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

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

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

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

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

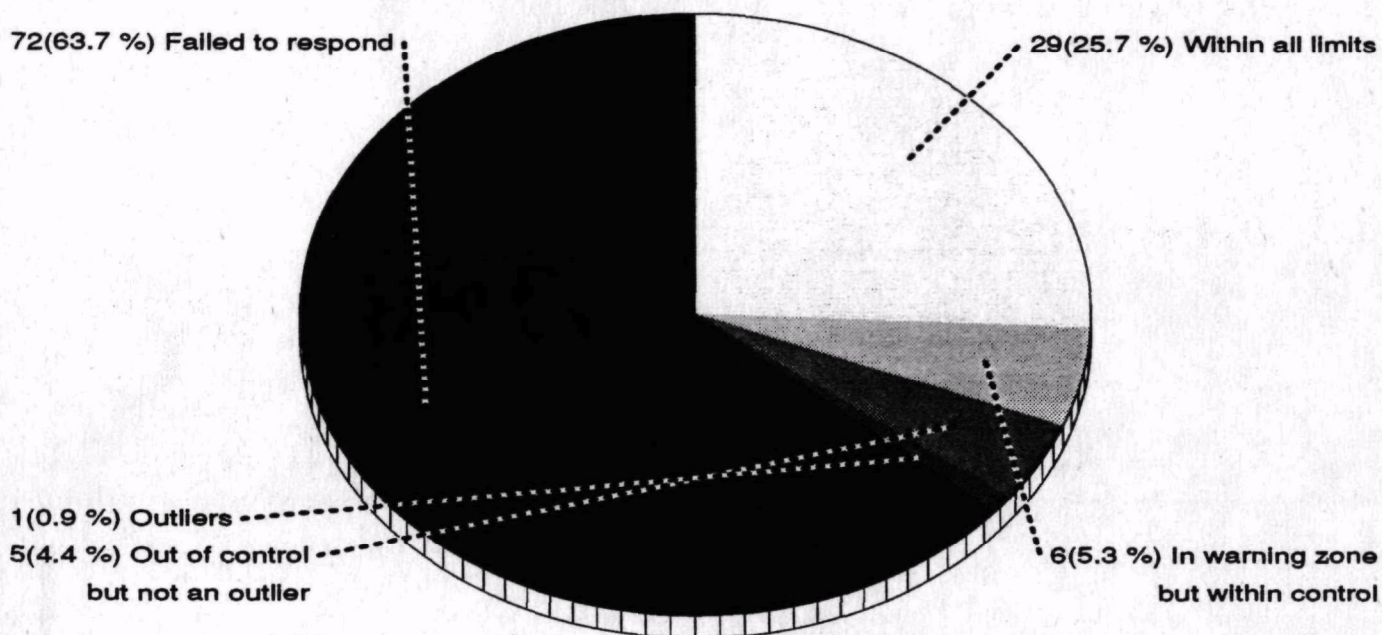
The normalized deviation of the mean from the known value is calculated from the deviation of the mean from the known value and the standard error of the mean values. The deviation of the mean from the known value is calculated by subtracting the known value from the average of the laboratory's three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

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

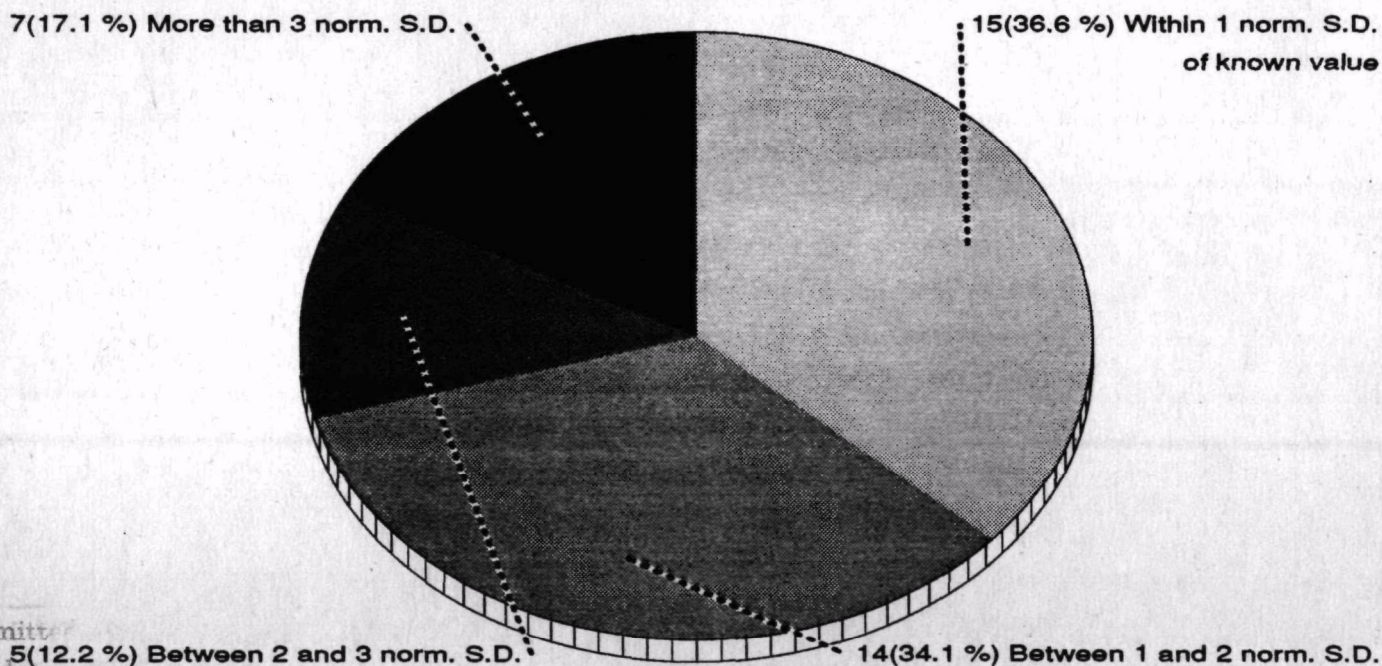
Strontium-89**Statistical Summary**

113 Participants

The known value of this nuclide is **25.0 pCi/l** with an expected precision of **5.0**; the control limits are 16.3 to 33.7; the warning regions are 16.3 to 19.2 and 30.8 to 33.7



Statistic	Respondents	Non-outliers
Mean	22.63	Grand Avg 22.19
Std. Dev.	5.76	5.11
Variance	33.21	26.12
% Coef. of Var.	25.47	23.03
% deviation of mean from known value	-9.50	-11.23
Norm. dev. of mean from known value	-0.41	-0.55
Median	22.33	22.33
% deviation of median from known value	-10.67	-10.67
Norm. dev. of median from known value	-0.46	-0.52



Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) - (known) Tag	
A	21.0	22.0	24.0	1.53	0.354	22.33	0.05	-0.92
AA								•
AE	30.0	31.0	30.0	0.58	0.118	30.33	2.82	1.85
AF								•
AI								•
AJ								•
AK	24.0	24.0	27.0	1.73	0.354	25.00	0.97	0.00
AL								•
AN								•
AP								•
AU	13.0	7.0	10.0	3.00	0.709	10.00	-4.22	-5.20 ↓
AY								•
BA	39.0	40.0	41.0	1.00	0.236	40.00	6.17	5.20 ×
BC	12.0	13.0	11.0	1.00	0.236	12.00	-3.53	-4.50 ↓
BG								•
BH	23.0	22.0	21.0	1.00	0.236	22.00	-0.07	-1.04
BL	28.0	27.0	23.0	2.65	0.591	26.00	1.32	0.35
BM								•
BO	29.0	29.0	25.0	2.31	0.473	27.67	1.90	0.92
BW								•
C	23.0	22.0	22.0	0.58	0.118	22.33	0.05	-0.92
CA	22.0	25.0	22.0	1.73	0.354	23.00	0.28	-0.69
CJ	22.0	27.0	24.0	2.52	0.591	24.33	0.74	-0.23
CO								•
CP								•
CQ								•
D								•
DD								•
DE	22.0	23.0	23.0	0.58	0.118	22.67	0.16	-0.81
DL								•
DM								•
DT	23.0	21.0	22.0	1.00	0.236	22.00	-0.07	-1.04
DY								•
E	24.0	23.0	23.0	0.58	0.118	23.33	0.40	-0.58
EA								•
EB	22.0	26.0	24.0	2.00	0.473	24.00	0.63	-0.35
EH								•
EL	17.0	15.0	18.0	1.53	0.354	16.67	-1.91	-2.89
EX								•
FE	17.0	17.0	18.0	0.58	0.118	17.33	-1.68	-2.66
FL								•
GE								•
HP								•
HU	29.0	29.0	29.0	0.00	0.000	29.00	2.36	1.39
HX								•

• = 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	
I								•
IC								•
IU								•
J	24.0	23.0	24.0	0.58	0.118	23.67	0.51	-0.46
JR								•
JS								•
K								•
KL								•
KX	17.0	23.0	21.0	3.06	0.709	20.33	-0.64	-1.62
L								•
LA								•
LE								•
LF								•
LM	17.0	15.0	17.0	1.15	0.236	16.33	-2.03	-3.00
LR								•
M								•
MA								•
ML								•
MP								•
MQ								•
MV								•
N	24.0	23.0	23.0	0.58	0.118	23.33	0.40	-0.58
NH								•
NJ	14.0	18.0	26.0	6.11	1.795	19.33	-0.99	-1.96
O								•
PB								•
PC	15.0	16.0	16.0	0.58	0.118	15.67	-2.26	-3.23
PI								•
PM								•
PP								•
PT	23.0	28.0	24.0	2.65	0.591	25.00	0.97	0.00
PV								•
PW								•
PY								•
Q	22.0	18.0	25.0	3.51	0.827	21.67	-0.18	-1.15
QB								•
QJ								•
QK	22.0	25.0	24.0	1.53	0.354	23.67	0.51	-0.46
QL	24.0	36.0	38.0	7.57	2.245	32.67	3.63	2.66
QX								•
QZ	16.0	19.0	19.0	1.73	0.354	18.00	-1.45	-2.42
R	22.0	22.0	22.0	0.00	0.000	22.00	-0.07	-1.04
RA								•
RK								•
S	17.0	16.0	15.0	1.00	0.236	16.00	-2.14	-3.12

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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
SM									•
SS	22.0	21.0	23.0	1.00	0.236	22.00	-0.07	-1.04	
SV									•
T	23.0	23.0	18.0	2.89	0.591	21.33	-0.30	-1.27	
TA									•
TD	20.0	23.0	29.0	4.58	1.120	24.00	0.63	-0.35	
TE									•
TI									•
TP									•
TQ	35.0	33.0	29.0	3.06	0.709	32.33	3.51	2.54	
TS									•
U	14.0	12.0	14.0	1.15	0.236	13.33	-3.07	-4.04	↓
UB									•
VG	29.0	28.0	28.0	0.58	0.118	28.33	2.13	1.15	
VL	21.0	18.0	21.0	1.73	0.354	20.00	-0.76	-1.73	
VM									•
VN									•
VQ									•
VX									•
W	19.0	21.0	21.0	1.15	0.236	20.33	-0.64	-1.62	
WA									•
WB									•
Y	29.0	27.0	29.0	1.15	0.236	28.33	2.13	1.15	

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
10.00	↓	AU	21.33		T	24.00		TD
12.00	↓	BC	21.67		Q	24.00		EB
13.33	↓	U	22.00		SS	24.33		CJ
15.67	↓	PC	22.00		R	25.00		PT
16.00	↓	S	22.00		DT	25.00		AK
16.33		LM	22.00		BH	26.00		BL
16.67		EL	22.33		C	27.67		BO
17.33		FE	22.33		A	28.33		Y
18.00		QZ	22.67		DE	28.33		VG
19.33		NJ	23.00		CA	29.00		HU
20.00		VL	23.33		N	30.33		AE
20.33		W	23.33		E	32.33		TQ
20.33		KX	23.67		QK	32.67		QL
			23.67		J	40.00	×	BA

• = No data submitted

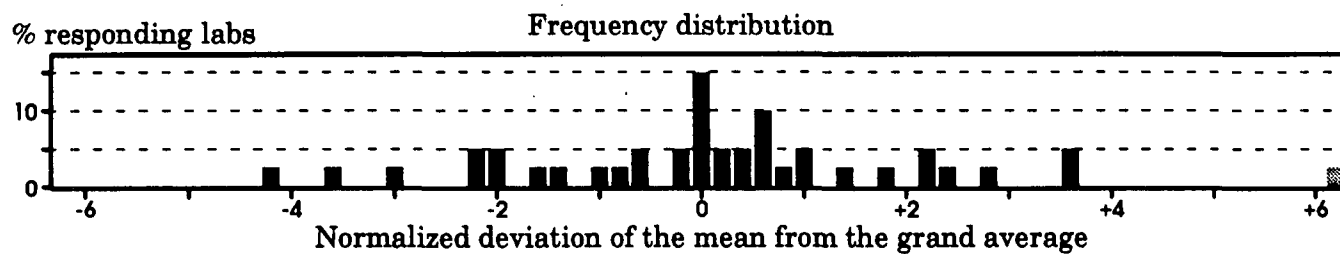
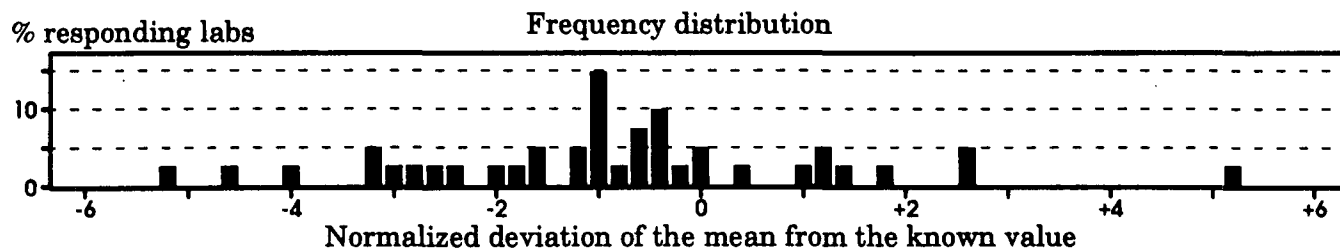
TAG SYMBOLS

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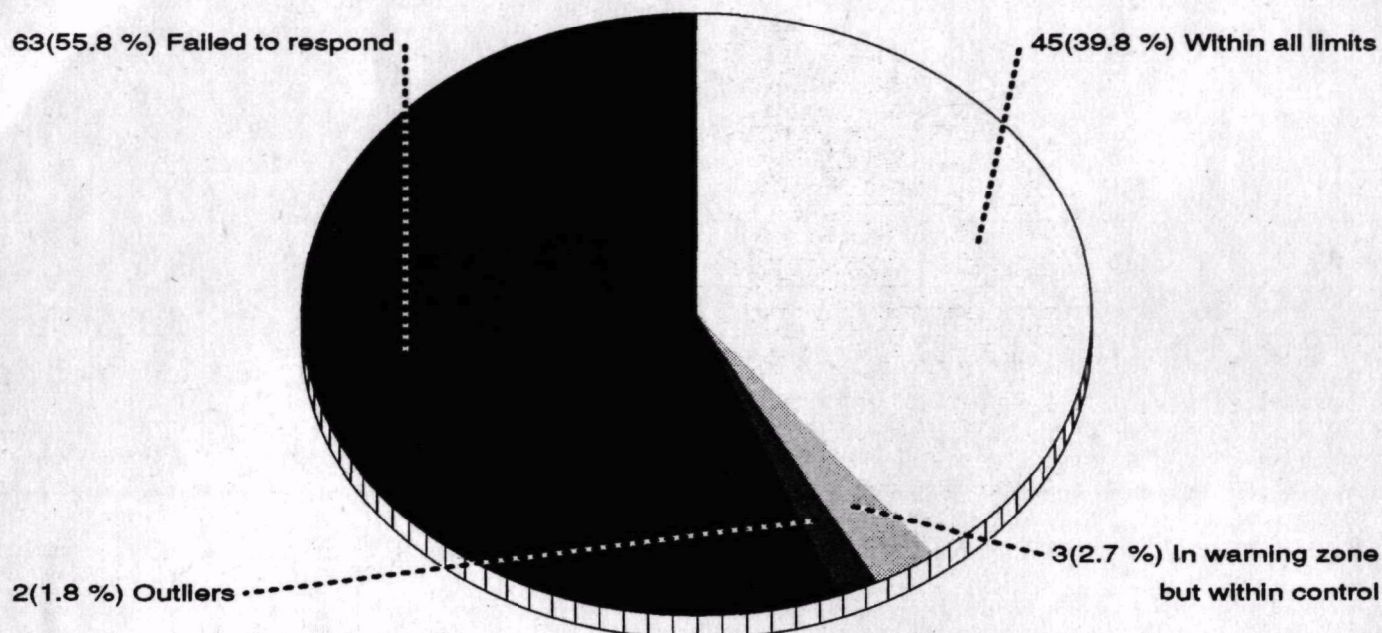
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↓ = Below control limit

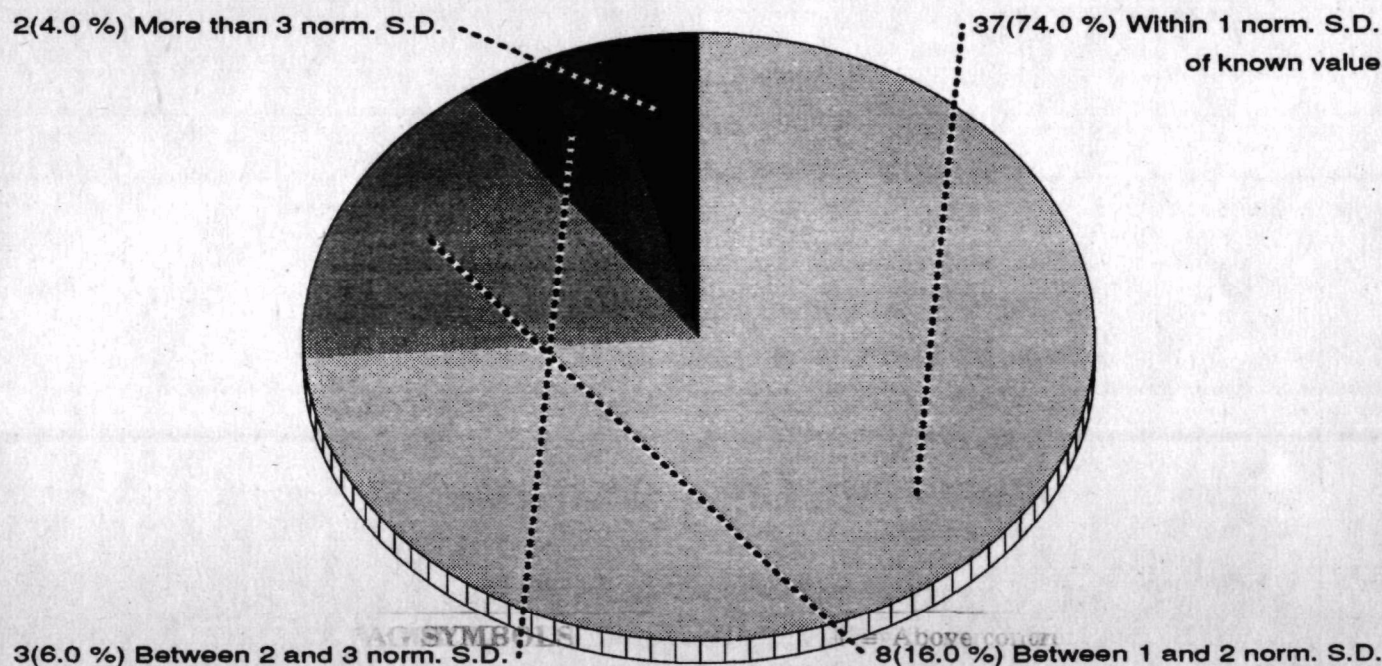
Strontium-89

Strontium-90
Statistical Summary
113 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	15.70	Grand Avg 15.15
Std. Dev.	3.74	2.48
Variance	13.96	6.17
% Coef. of Var.	23.80	16.40
% deviation of mean from known value	4.67	1.02
Norm. dev. of mean from known value	0.19	0.06
Median	15.50	15.33
% deviation of median from known value	3.33	2.22
Norm. dev. of median from known value	0.13	0.13



Strontium-90

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	15.0	0.58	0.118	15.67	0.18	0.23	
AA	16.0	14.0	15.0	1.00	0.236	15.00	-0.05	0.00	
AE	16.0	17.0	16.0	0.58	0.118	16.33	0.41	0.46	
AF	17.0	17.0	16.0	0.58	0.118	16.67	0.52	0.58	
AI									•
AJ									•
AK	15.0	15.0	16.0	0.58	0.118	15.33	0.06	0.12	
AL	17.0	16.0	17.0	0.58	0.118	16.67	0.52	0.58	
AN									•
AP									•
AU	16.0	16.0	18.0	1.15	0.236	16.67	0.52	0.58	
AY	16.0	16.0	16.0	0.00	0.000	16.00	0.29	0.35	
BA	17.0	17.0	17.0	0.00	0.000	17.00	0.64	0.69	
BC	21.0	20.0	17.0	2.08	0.473	19.33	1.45	1.50	
BG	13.0	14.0	13.0	0.58	0.118	13.33	-0.63	-0.58	
BH	14.0	14.0	13.0	0.58	0.118	13.67	-0.51	-0.46	
BL	16.0	16.0	18.0	1.15	0.236	16.67	0.52	0.58	
BM									•
BO	8.0	12.0	6.0	3.06	0.709	8.67	-2.25	-2.19	
BW									•
C	17.0	16.0	17.0	0.58	0.118	16.67	0.52	0.58	
CA	15.0	14.0	15.0	0.58	0.118	14.67	-0.17	-0.12	
CJ	18.0	16.0	19.0	1.53	0.354	17.67	0.87	0.92	
CO	12.0	12.0	15.0	1.73	0.354	13.00	-0.75	-0.69	
CP									•
CQ									•
D	18.0	19.0	18.0	0.58	0.118	18.33	1.10	1.15	
DD									•
DE	16.0	17.0	17.0	0.58	0.118	16.67	0.52	0.58	
DL									•
DM									•
DT	15.0	14.0	15.0	0.58	0.118	14.67	-0.17	-0.12	
DY									•
E	16.0	16.0	16.0	0.00	0.000	16.00	0.29	0.35	
EA									•
EB	15.0	14.0	16.0	1.00	0.236	15.00	-0.05	0.00	
EH									•
EL	15.0	16.0	16.0	0.58	0.118	15.67	0.18	0.23	
EX									•
FE	12.0	14.0	14.0	1.15	0.236	13.33	-0.63	-0.58	
FL									•
GE									•
HP									•
HU	33.0	32.0	34.0	1.00	0.236	33.00	6.18	6.24	×
HX									•

• = No data submitted

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× = 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
I									•
IC									•
IU									•
J	16.0	17.0	16.0	0.58	0.118	16.33	0.41	0.46	
JR									•
JS									•
K									•
KL									•
KX	15.0	15.0	14.0	0.58	0.118	14.67	-0.17	-0.12	
L	16.0	17.0	17.0	0.58	0.118	16.67	0.52	0.58	
LA									•
LE									•
LF									•
LM									•
LR									•
M									•
MA									•
ML									•
MP									•
MQ									•
MV									•
N	14.0	14.0	14.0	0.00	0.000	14.00	-0.40	-0.35	
NH									•
NJ	14.0	15.0	16.0	1.00	0.236	15.00	-0.05	0.00	
O									•
PB									•
PC	19.0	20.0	20.0	0.58	0.118	19.67	1.56	1.62	
PI									•
PM									•
PP									•
PT	13.0	14.0	14.0	0.58	0.118	13.67	-0.51	-0.46	
PV	8.0	9.0	9.0	0.58	0.118	8.67	-2.25	-2.19	
PW									•
PY									•
Q	21.0	16.0	17.0	2.65	0.591	18.00	0.99	1.04	
QB									•
QJ									•
QK	16.0	16.0	17.0	0.58	0.118	16.33	0.41	0.46	
QL	13.0	11.0	10.0	1.53	0.354	11.33	-1.32	-1.27	
QX									•
QZ	12.0	12.0	12.0	0.00	0.000	12.00	-1.09	-1.04	
R	15.0	15.0	15.0	0.00	0.000	15.00	-0.05	0.00	
RA	13.0	12.0	12.0	0.58	0.118	12.33	-0.98	-0.92	
RK									•
S	12.0	10.0	12.0	1.15	0.236	11.33	-1.32	-1.27	

• ≡ 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
SM									•
SS	16.0	16.0	16.0	0.00	0.000	16.00	0.29	0.35	
SV									•
T	13.0	14.0	13.0	0.58	0.118	13.33	-0.63	-0.58	
TA									•
TD	18.0	13.0	15.0	2.52	0.591	15.33	0.06	0.12	
TE									•
TI									•
TP									•
TQ	23.0	25.0	26.0	1.53	0.354	24.67	3.30	3.35	×
TS									•
U	13.0	12.0	11.0	1.00	0.236	12.00	-1.09	-1.04	
UB									•
VG	13.0	17.0	15.0	2.00	0.473	15.00	-0.05	0.00	
VL	22.0	20.0	22.0	1.15	0.236	21.33	2.14	2.19	
VM									•
VN									•
VQ									•
VX									•
W	14.0	16.0	14.0	1.15	0.236	14.67	-0.17	-0.12	
WA									•
WB									•
Y	16.0	16.0	16.0	0.00	0.000	16.00	0.29	0.35	

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
8.67		PV	14.67		DT	16.33		AE
8.67		BO	14.67		CA	16.67		L
11.33		S	15.00		VG	16.67		DE
11.33		QL	15.00		R	16.67		C
12.00		U	15.00		NJ	16.67		BL
12.00		QZ	15.00		EB	16.67		AU
12.33		RA	15.00		AA	16.67		AL
13.00		CO	15.33		TD	16.67		AF
13.33		T	15.33		AK	17.00		BA
13.33		FE	15.67		EL	17.67		CJ
13.33		BG	15.67		A	18.00		Q
13.67		PT	16.00		Y	18.33		D
13.67		BH	16.00		SS	19.33		BC
14.00		N	16.00		E	19.67		PC
14.67		W	16.00		AY	21.33		VL
14.67		KX	16.33		QK	24.67	×	TQ
			16.33		J	33.00	×	HU

• = No data submitted

TAG SYMBOLS

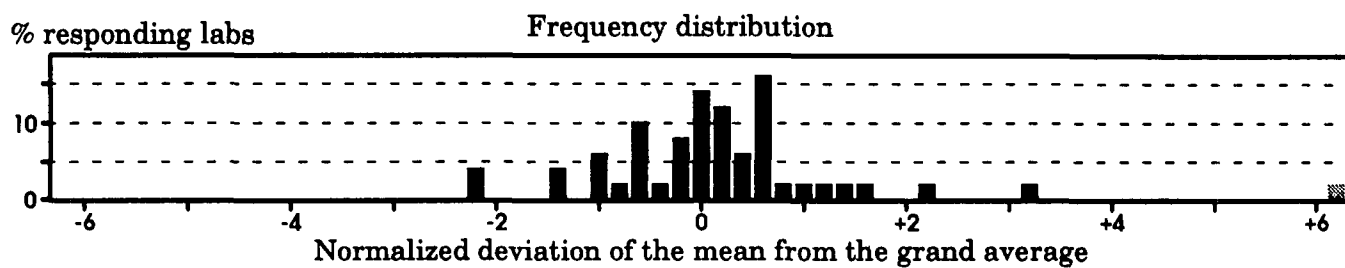
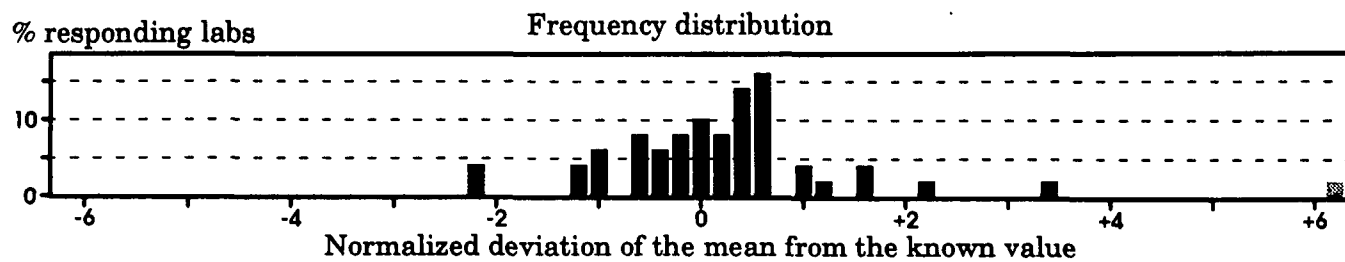
↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

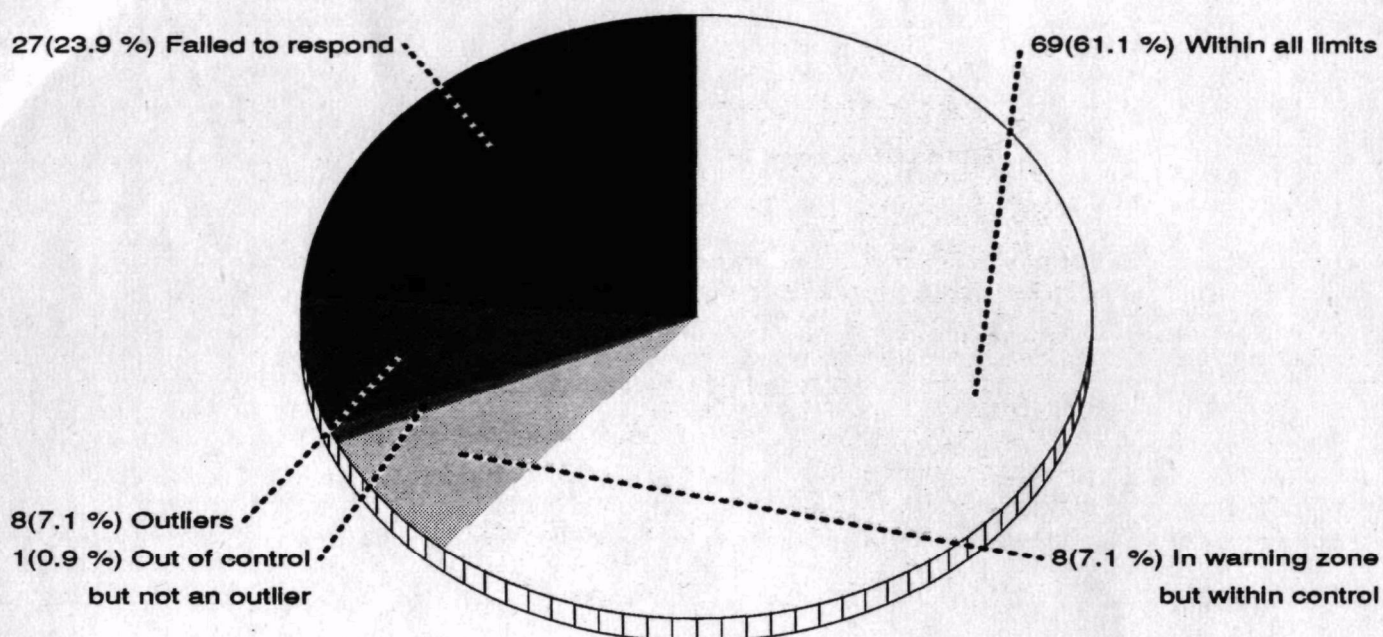
Strontium-90



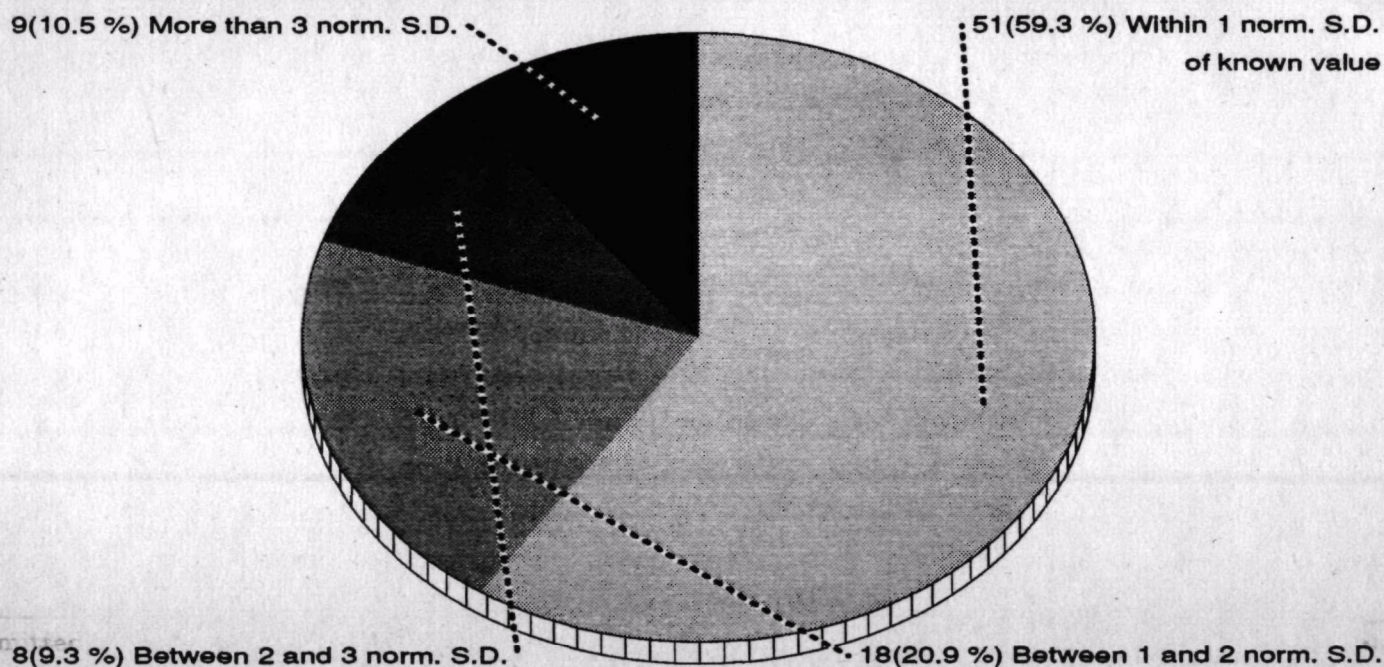
Iodine-131**Statistical Summary**

113 Participants

The known value of this nuclide is **75.0 pCi/l** with an expected precision of **8.0**; the control limits are 61.1 to 88.9; the warning regions are 61.1 to 65.7 and 84.3 to 88.9



Statistic	Respondents	Non-outliers
Mean	86.93	Grand Avg 74.89
Std. Dev.	77.56	5.58
Variance	6016.27	31.16
% Coef. of Var.	89.23	7.45
% deviation of mean from known value	15.91	-0.14
Norm. dev. of mean from known value	0.15	-0.02
Median	75.67	75.17
% deviation of median from known value	0.89	0.22
Norm. dev. of median from known value	0.01	0.03



Iodine-131

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
A	68.0	71.0	77.0	4.58	0.665	72.00	-0.63	-0.65
AA	81.0	83.0	82.0	1.00	0.148	82.00	1.54	1.52
AE	77.0	66.0	67.0	6.08	0.812	70.00	-1.06	-1.08
AF	79.0	77.0	72.0	3.61	0.517	76.00	0.24	0.22
AI								•
AJ	79.0	80.0	76.0	2.08	0.295	78.33	0.74	0.72
AK	80.0	81.0	88.0	4.36	0.591	83.00	1.76	1.73
AL	47.0	42.0	27.0	10.41	1.908	38.67	-7.84	-7.87 ×
AN	70.0	73.0	69.0	2.08	0.295	70.67	-0.92	-0.94
AP								•
AU	78.0	73.0	75.0	2.52	0.369	75.33	0.10	0.07
AY	79.0	82.0	78.0	2.08	0.295	79.67	1.03	1.01
BA	79.0	79.0	75.0	2.31	0.295	77.67	0.60	0.58
BC	79.0	119.0	97.0	20.03	4.721	98.33	5.07	5.05 ×
BG								•
BH	73.0	72.0	74.0	1.00	0.148	73.00	-0.41	-0.43
BL	78.0	79.0	82.0	2.08	0.295	79.67	1.03	1.01
BM	79.0	85.0	82.0	3.00	0.443	82.00	1.54	1.52
BO	73.0	77.0	77.0	2.31	0.295	75.67	0.17	0.14
BW								•
C	77.0	76.0	75.0	1.00	0.148	76.00	0.24	0.22
CA	78.0	75.0	75.0	1.73	0.222	76.00	0.24	0.22
CJ	86.0	75.0	84.0	5.86	0.812	81.67	1.47	1.44
CO	74.0	78.0	75.0	2.08	0.295	75.67	0.17	0.14
CP	79.0	75.0	75.0	2.31	0.295	76.33	0.31	0.29
CQ	71.0	76.0	72.0	2.65	0.369	73.00	-0.41	-0.43
D	72.0	79.0	83.0	5.57	0.812	78.00	0.67	0.65
DD	82.0	83.0	86.0	2.08	0.295	83.67	1.90	1.88
DE	77.0	78.0	78.0	0.58	0.074	77.67	0.60	0.58
DL	78.0	77.0	80.0	1.53	0.222	78.33	0.74	0.72
DM	72.0	71.0	72.0	0.58	0.074	71.67	-0.70	-0.72
DT	70.0	82.0	72.0	6.43	0.886	74.67	-0.05	-0.07
DY	79.0	82.0	81.0	1.53	0.222	80.67	1.25	1.23
E	75.0	72.0	74.0	1.53	0.222	73.67	-0.27	-0.29
EA								•
EB	77.0	74.0	80.0	3.00	0.443	77.00	0.46	0.43
EH	88.0	76.0	76.0	6.93	0.886	80.00	1.11	1.08
EL	74.0	80.0	77.0	3.00	0.443	77.00	0.46	0.43
EX	68.0	65.0	68.0	1.73	0.222	67.00	-1.71	-1.73
FE								•
FL	86.0	79.0	84.0	3.61	0.517	83.00	1.76	1.73
GE	80.0	78.0	77.0	1.53	0.222	78.33	0.74	0.72
HP								•
HU	63.0	65.0	60.0	2.52	0.369	62.67	-2.65	-2.67
HX								•

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

Iodine-131

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
I	76.0	76.0	75.0	0.58	0.074	75.67	0.17	0.14
IC	72.0	69.0	76.0	3.51	0.517	72.33	-0.55	-0.58
IU	75.0	60.0	73.0	8.14	1.205	69.33	-1.20	-1.23
J	70.0	68.0	72.0	2.00	0.295	70.00	-1.06	-1.08
JR								•
JS	73.0	71.0	70.0	1.53	0.222	71.33	-0.77	-0.79
K	74.0	71.0	72.0	1.53	0.222	72.33	-0.55	-0.58
KL	77.0	74.0	74.0	1.73	0.222	75.00	0.02	0.00
KX	73.0	77.0	75.0	2.00	0.295	75.00	0.02	0.00
L	70.0	70.0	77.0	4.04	0.517	72.33	-0.55	-0.58
LA								•
LE								•
LF	75.0	73.0	70.0	2.52	0.369	72.67	-0.48	-0.51
LM								•
LR	142.0	143.0	149.0	3.79	0.517	144.67	15.11	15.08 ×
M	67.0	71.0	69.0	2.00	0.295	69.00	-1.28	-1.30
MA	77.0	78.0	72.0	3.21	0.443	75.67	0.17	0.14
ML	75.0	77.0	73.0	2.00	0.295	75.00	0.02	0.00
MP	63.0	62.0	62.0	0.58	0.074	62.33	-2.72	-2.74
MQ	74.0	66.0	73.0	4.36	0.591	71.00	-0.84	-0.87
MV								•
N	80.0	77.0	81.0	2.08	0.295	79.33	0.96	0.94
NH	76.0	74.0	80.0	3.06	0.443	76.67	0.38	0.36
NJ	65.0	70.0	73.0	4.04	0.591	69.33	-1.20	-1.23
O	74.0	75.0	74.0	0.58	0.074	74.33	-0.12	-0.14
PB	65.0	64.0	62.0	1.53	0.222	63.67	-2.43	-2.45
PC	117.0	126.0	137.0	10.02	1.908	126.67	11.21	11.19 ×
PI	62.0	61.0	64.0	1.53	0.222	62.33	-2.72	-2.74
PM								•
PP								•
PT	72.0	73.0	72.0	0.58	0.074	72.33	-0.55	-0.58
PV	62.0	62.0	70.0	4.62	0.591	64.67	-2.21	-2.24
PW	67.0	61.0	69.0	4.16	0.591	65.67	-2.00	-2.02
PY								•
Q	69.0	71.0	68.0	1.53	0.222	69.33	-1.20	-1.23
QB								•
QJ	730.0	639.0	842.0	101.68	27.644	737.00	143.35	143.33 ×
QK	78.0	78.0	81.0	1.73	0.222	79.00	0.89	0.87
QL	80.0	74.0						∅
QX	76.0	75.0	78.0	1.53	0.222	76.33	0.31	0.29
QZ	86.0	76.0	75.0	6.08	0.812	79.00	0.89	0.87
R	74.0	72.0	74.0	1.15	0.148	73.33	-0.34	-0.36
RA								•
RK								•
S	82.0	81.0	74.0	4.36	0.591	79.00	0.89	0.87

• ≡ No data submitted

TAG SYMBOLS

↑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

↓ ≡ Below control limit

Iodine-131

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
SM	76.0	79.0	76.0	1.73	0.222	77.00	0.46	0.43	
SS	96.0	109.0	103.0	6.51	0.960	102.67	6.01	5.99	×
SV	77.0	70.0	73.0	3.51	0.517	73.33	-0.34	-0.36	
T	69.0	77.0	74.0	4.04	0.591	73.33	-0.34	-0.36	
TA									•
TD	72.0	76.0	80.0	4.00	0.591	76.00	0.24	0.22	
TE	90.0	89.0	87.0	1.53	0.222	88.67	2.98	2.96	
TI	69.0	75.0	71.0	3.06	0.443	71.67	-0.70	-0.72	
TP									•
TQ	68.0	70.0	80.0	6.43	0.886	72.67	-0.48	-0.51	
TS									•
U	45.0	43.0	42.0	1.53	0.222	43.33	-6.83	-6.86	×
UB									•
VG	343.0	343.0	343.0	0.00	0.000	343.00	58.05	58.02	×
VL	84.0	88.0	88.0	2.31	0.295	86.67	2.55	2.53	
VM	75.0	80.0	67.0	6.56	0.960	74.00	-0.19	-0.22	
VN									•
VQ									•
VX	91.0	91.0	91.0	0.00	0.000	91.00	3.49	3.46	↑
W	70.0	74.0	70.0	2.31	0.295	71.33	-0.77	-0.79	
WA	70.0	67.0	71.0	2.08	0.295	69.33	-1.20	-1.23	
WB									•
Y	77.0	76.0	76.0	0.58	0.074	76.33	0.31	0.29	

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
38.67	✓	AL	71.33		JS	75.00		ML
43.33		U	71.67		TI	75.00		KX
62.33		PI	71.67		DM	75.00		KL
62.33		MP	72.00		A	75.33		AU
62.67		HU	72.33		PT	75.67		MA
63.67		PB	72.33		L	75.67		I
64.67		PV	72.33		K	75.67		CO
65.67		PW	72.33		IC	75.67		BO
67.00		EX	72.67		TQ	76.00		TD
69.00		M	72.67		LF	76.00		CA
69.33		WA	73.00		CQ	76.00		C
69.33		Q	73.00		BH	76.00		AF
69.33		NJ	73.33		T	76.33		Y
69.33		IU	73.33		SV	76.33		QX
70.00		J	73.33		R	76.33		CP
70.00		AE	73.67		E	76.67		NH
70.67		AN	74.00		VM	77.00		SM
71.00		MQ	74.33		O	77.00		EL
71.33		W	74.67		DT	77.00		EB

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

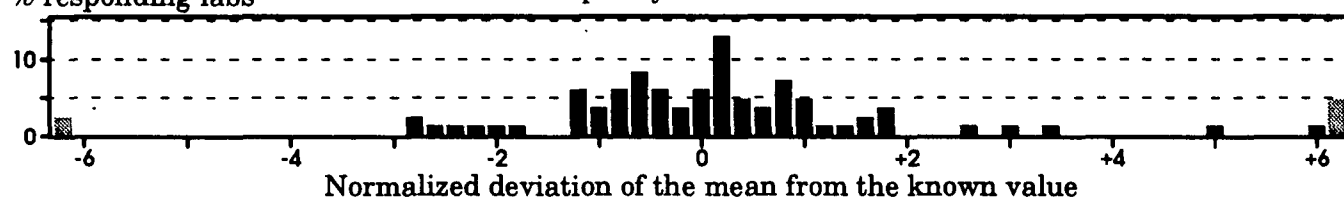
↓ = Below control limit

Iodine-131
Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
77.67		DE	79.33		N	83.67		DD
77.67		BA	79.67		BL	86.67		VL
78.00		D	79.67		AY	88.67		TE
78.33		GE	80.00		EH	91.00	↑	VX
78.33		DL	80.67		DY	98.33	×	BC
78.33		AJ	81.67		CJ	102.67	×	SS
79.00		S	82.00		BM	126.67	×	PC
79.00		QZ	82.00		AA	144.67	×	LR
79.00		QK	83.00		FL	343.00	×	VG
			83.00		AK	737.00	×	QJ

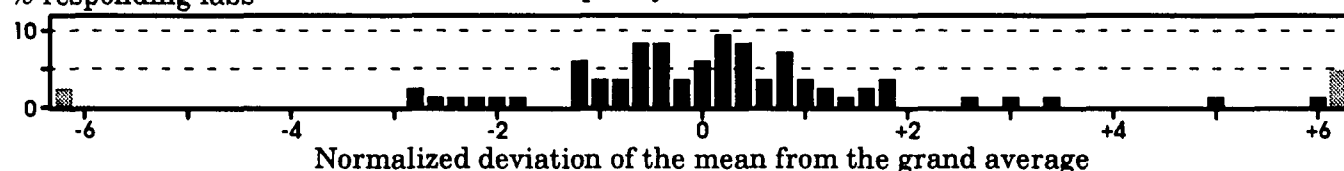
% responding labs

Frequency distribution



% responding labs

Frequency distribution



• = No data submitted

TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

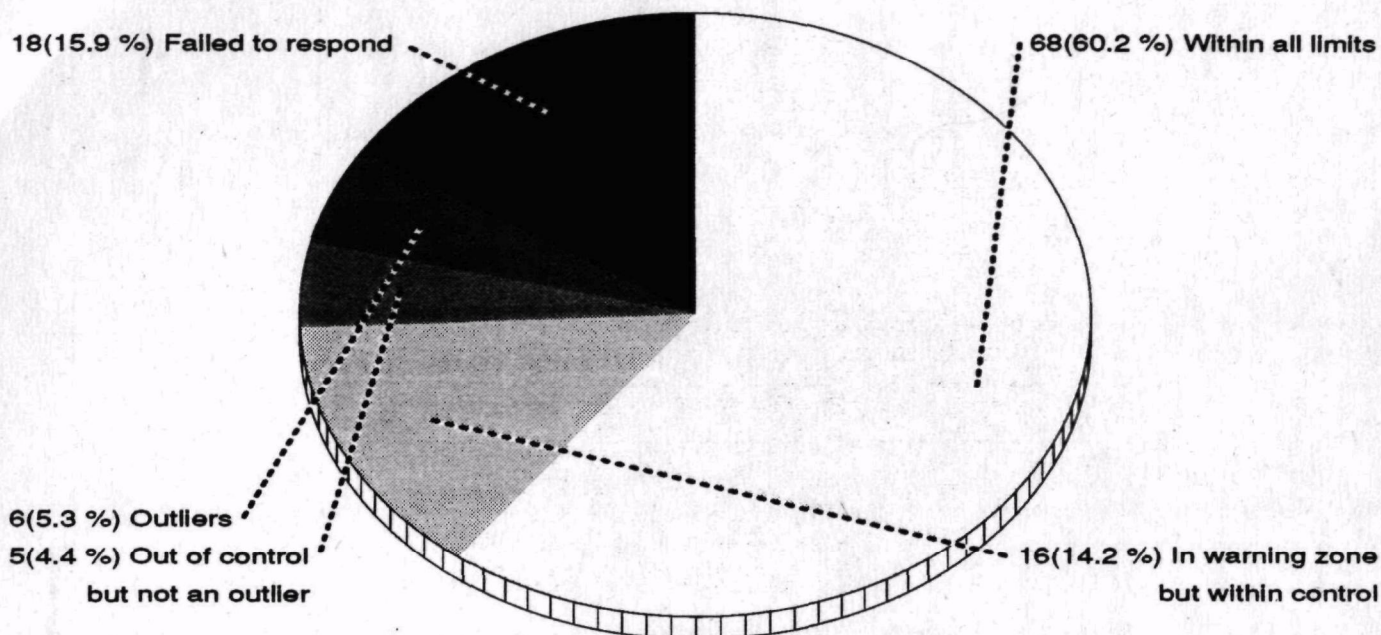
× = Determined to be an outlier

↓ = Below control limit

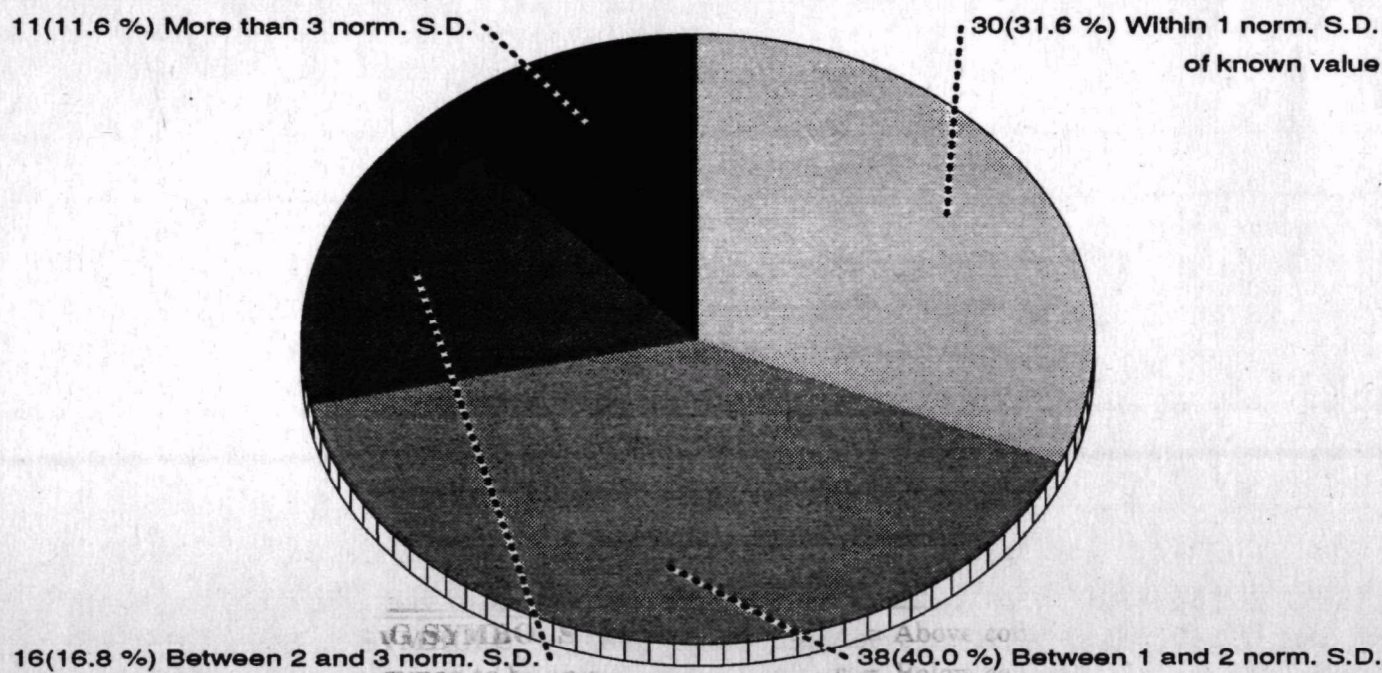
Cesium-137
Statistical Summary

113 Participants

The known value of this nuclide is **59.0 pCi/l** with an expected precision of **5.0**; the control limits are 50.3 to 67.7; the warning regions are 50.3 to 53.2 and 64.8 to 67.7



Statistic	Respondents	Non-outliers
Mean	62.32	Grand Avg 62.39
Std. Dev.	8.38	3.72
Variance	70.31	13.84
% Coef. of Var.	13.45	5.96
% deviation of mean from known value	5.63	5.74
Norm. dev. of mean from known value	0.40	0.91
Median	62.33	62.33
% deviation of median from known value	5.65	5.65
Norm. dev. of median from known value	0.40	0.90



Cesium-137

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
A	59.0	62.0	66.0	3.51	0.827	62.33	-0.02	1.15	
AA	67.0	60.0	63.0	3.51	0.827	63.33	0.33	1.50	
AE	61.0	66.0	63.0	2.52	0.591	63.33	0.33	1.50	
AF	60.0	64.0	68.0	4.00	0.945	64.00	0.56	1.73	
AI	70.0	62.0	61.0	4.93	1.120	64.33	0.67	1.85	
AJ	60.0	63.0	64.0	2.08	0.473	62.33	-0.02	1.15	
AK	68.0	68.0	68.0	0.00	0.000	68.00	1.94	3.12	↑
AL	55.0	50.0	63.0	6.56	2.020	56.00	-2.21	-1.04	
AN	57.0	58.0	58.0	0.58	0.118	57.67	-1.64	-0.46	
AP									•
AU	59.0	63.0	60.0	2.08	0.473	60.67	-0.60	0.58	
AY	67.0	63.0	57.0	5.03	1.345	62.33	-0.02	1.15	
BA	63.0	61.0	62.0	1.00	0.236	62.00	-0.13	1.04	
BC	64.0	55.0	63.0	4.93	1.120	60.67	-0.60	0.58	
BG									•
BH	62.0	63.0	61.0	1.00	0.236	62.00	-0.13	1.04	
BL	63.0	62.0	64.0	1.00	0.236	63.00	0.21	1.39	
BM	65.0	68.0	65.0	1.73	0.354	66.00	1.25	2.42	
BO	62.0	61.0	60.0	1.00	0.236	61.00	-0.48	0.69	
BW	65.0	61.0	61.0	2.31	0.473	62.33	-0.02	1.15	
C	61.0	62.0	63.0	1.00	0.236	62.00	-0.13	1.04	
CA	62.0	61.0	61.0	0.58	0.118	61.33	-0.37	0.81	
CJ	73.0	65.0	73.0	4.62	0.945	70.33	2.75	3.93	↑
CO	67.0	60.0	66.0	3.79	0.827	64.33	0.67	1.85	
CP	60.0	61.0	59.0	1.00	0.236	60.00	-0.83	0.35	
CQ	67.0	65.0	63.0	2.00	0.473	65.00	0.90	2.08	
D	61.0	70.0	68.0	4.73	1.120	66.33	1.37	2.54	
DD	66.0	66.0	66.0	0.00	0.000	66.00	1.25	2.42	
DE	67.0	67.0	68.0	0.58	0.118	67.33	1.71	2.89	
DL	60.0	59.0	58.0	1.00	0.236	59.00	-1.17	0.00	
DM	63.0	63.0	62.0	0.58	0.118	62.67	0.10	1.27	
DT	62.0	64.0	66.0	2.00	0.473	64.00	0.56	1.73	
DY	65.0	67.0	65.0	1.15	0.236	65.67	1.14	2.31	
E	61.0	62.0	61.0	0.58	0.118	61.33	-0.37	0.81	
EA									•
EB	64.0	63.0	63.0	0.58	0.118	63.33	0.33	1.50	
EH	59.0	58.0	57.0	1.00	0.236	58.00	-1.52	-0.35	
EL	64.0	63.0	63.0	0.58	0.118	63.33	0.33	1.50	
EX	60.0	63.0	61.0	1.53	0.354	61.33	-0.37	0.81	
FE	65.0	63.0	59.0	3.06	0.709	62.33	-0.02	1.15	
FL	65.0	63.0	64.0	1.00	0.236	64.00	0.56	1.73	
GE	58.0	59.0	60.0	1.00	0.236	59.00	-1.17	0.00	
HP	74.0	74.0	74.0	0.00	0.000	74.00	4.02	5.20	↑
HU	48.0	50.0	47.0	1.53	0.354	48.33	-4.87	-3.70	×
HX									•

• = 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	
I	65.0	68.0	65.0	1.73	0.354	66.00	1.25	2.42
IC	69.0	66.0	67.0	1.53	0.354	67.33	1.71	2.89
IU	65.0	62.0	65.0	1.73	0.354	64.00	0.56	1.73
J	62.0	63.0	62.0	0.58	0.118	62.33	-0.02	1.15
JR								•
JS	56.0	59.0	55.0	2.08	0.473	56.67	-1.98	-0.81
K	72.0	63.0	60.0	6.24	1.795	65.00	0.90	2.08
KL	67.0	65.0	65.0	1.15	0.236	65.67	1.14	2.31
KX	61.0	61.0	59.0	1.15	0.236	60.33	-0.71	0.46
L	58.0	58.0	57.0	0.58	0.118	57.67	-1.64	-0.46
LA								•
LE	60.0	66.0	70.0	5.03	1.345	65.33	1.02	2.19
LF	62.0	59.0	63.0	2.08	0.473	61.33	-0.37	0.81
LM	68.0	64.0	67.0	2.08	0.473	66.33	1.37	2.54
LR	68.0	64.0	62.0	3.06	0.709	64.67	0.79	1.96
M	54.0	56.0	53.0	1.53	0.354	54.33	-2.79	-1.62
MA	60.0	62.0	63.0	1.53	0.354	61.67	-0.25	0.92
ML	66.0	61.0	60.0	3.21	0.709	62.33	-0.02	1.15
MP	51.0	52.0	52.0	0.58	0.118	51.67	-3.71	-2.54
MQ	62.0	59.0	62.0	1.73	0.354	61.00	-0.48	0.69
MV	71.0	73.0	72.0	1.00	0.236	72.00	3.33	4.50 ↑
N	64.0	63.0	63.0	0.58	0.118	63.33	0.33	1.50
NH	59.0	58.0	58.0	0.58	0.118	58.33	-1.41	-0.23
NJ	61.0	63.0	61.0	1.15	0.236	61.67	-0.25	0.92
O	62.0	62.0	63.0	0.58	0.118	62.33	-0.02	1.15
PB	64.0	60.0	61.0	2.08	0.473	61.67	-0.25	0.92
PC	90.0	98.0	106.0	8.00	2.695	98.00	12.34	13.51 ×
PI	77.0	78.0	79.0	1.00	0.236	78.00	5.41	6.58 ×
PM								•
PP								•
PT	56.0	62.0	59.0	3.00	0.709	59.00	-1.17	0.00
PV	52.0	54.0	55.0	1.53	0.354	53.67	-3.02	-1.85
PW	67.0	63.0	68.0	2.65	0.591	66.00	1.25	2.42
PY								•
Q	59.0	61.0	63.0	2.00	0.473	61.00	-0.48	0.69
QB								•
QJ	59.0	62.0	64.0	2.52	0.591	61.67	-0.25	0.92
QK	58.0	59.0	57.0	1.00	0.236	58.00	-1.52	-0.35
QL	62.0	61.0						Ø
QX	71.0	64.0	69.0	3.61	0.827	68.00	1.94	3.12 ↑
QZ	58.0	61.0	70.0	6.24	1.795	63.00	0.21	1.39
R	62.0	63.0	63.0	0.58	0.118	62.67	0.10	1.27
RA	44.0	42.0	45.0	1.53	0.354	43.67	-6.49	-5.31 ×
RK								•
S	58.0	57.0	59.0	1.00	0.236	58.00	-1.52	-0.35

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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	
SM	63.0	65.0	65.0	1.15	0.236	64.33	0.67	1.85
SS	92.0	87.0	87.0	2.89	0.591	88.67	9.10	10.28 ×
SV	63.0	64.0	60.0	2.08	0.473	62.33	-0.02	1.15
T	59.0	59.0	57.0	1.15	0.236	58.33	-1.41	-0.23
TA								•
TD	62.0	66.0	64.0	2.00	0.473	64.00	0.56	1.73
TE	63.0	64.0	65.0	1.00	0.236	64.00	0.56	1.73
TI	65.0	64.0	61.0	2.08	0.473	63.33	0.33	1.50
TP								•
TQ	57.0	61.0	58.0	2.08	0.473	58.67	-1.29	-0.12
TS								•
U	58.0	61.0	60.0	1.53	0.354	59.67	-0.94	0.23
UB								•
VG	57.0	60.0	59.0	1.53	0.354	58.67	-1.29	-0.12
VL	63.0	63.0	62.0	0.58	0.118	62.67	0.10	1.27
VM	61.0	69.0	66.0	4.04	0.945	65.33	1.02	2.19
VN	9.0	11.0	13.0	2.00	0.473	11.00	-17.80	-16.63 ×
VQ								•
VX	68.0	68.0	64.0	2.31	0.473	66.67	1.48	2.66
W	55.0	64.0	66.0	5.86	1.570	61.67	-0.25	0.92
WA	54.0	53.0	57.0	2.08	0.473	54.67	-2.68	-1.50
WB								•
Y	64.0	60.0	63.0	2.08	0.473	62.33	-0.02	1.15

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
11.00	×	VN	59.00		GE	62.00		C
43.67	×	RA	59.00		DL	62.00		BH
48.33	×	HU	59.67		U	62.00		BA
51.67		MP	60.00		CP	62.33		Y
53.67		PV	60.33		KX	62.33		SV
54.33		M	60.67		BC	62.33		O
54.67		WA	60.67		AU	62.33		ML
56.00		AL	61.00		Q	62.33		J
56.67		JS	61.00		MQ	62.33		FE
57.67		L	61.00		BO	62.33		BW
57.67		AN	61.33		LF	62.33		AY
58.00		S	61.33		EX	62.33		AJ
58.00		QK	61.33		E	62.33		A
58.00		EH	61.33		CA	62.67		VL
58.33		T	61.67		W	62.67		R
58.33		NH	61.67		QJ	62.67		DM
58.67		VG	61.67		PB	63.00		QZ
58.67		TQ	61.67		NJ	63.00		BL
59.00		PT	61.67		MA	63.33		TI

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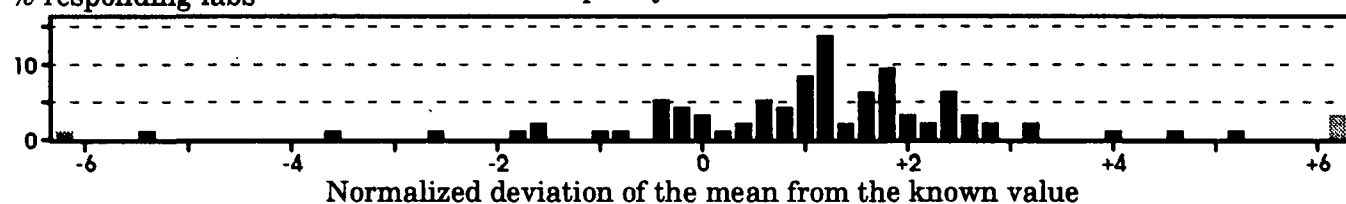
↓ = Below control limit

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

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
63.33		N	64.33		CO	66.33		LM
63.33		EL	64.33		AI	66.33		D
63.33		EB	64.67		LR	66.67		VX
63.33		AE	65.00		K	67.33		IC
63.33		AA	65.00		CQ	67.33		DE
64.00		TE	65.33		VM	68.00	↑	QX
64.00		TD	65.33		LE	68.00	↑	AK
64.00		IU	65.67		KL	70.33	↑	CJ
64.00		FL	65.67		DY	72.00	↑	MV
64.00		DT	66.00		PW	74.00	↑	HP
64.00		AF	66.00		I	78.00	×	PI
64.00		SM	66.00		DD	88.67	×	SS
64.33			66.00		BM	98.00	×	PC

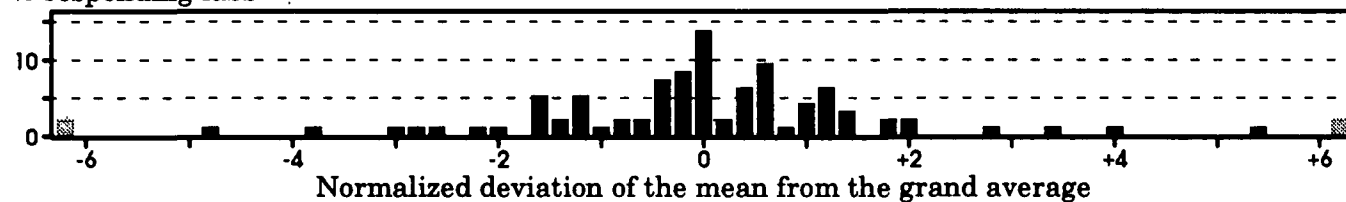
% responding labs

Frequency distribution



% responding labs

Frequency distribution



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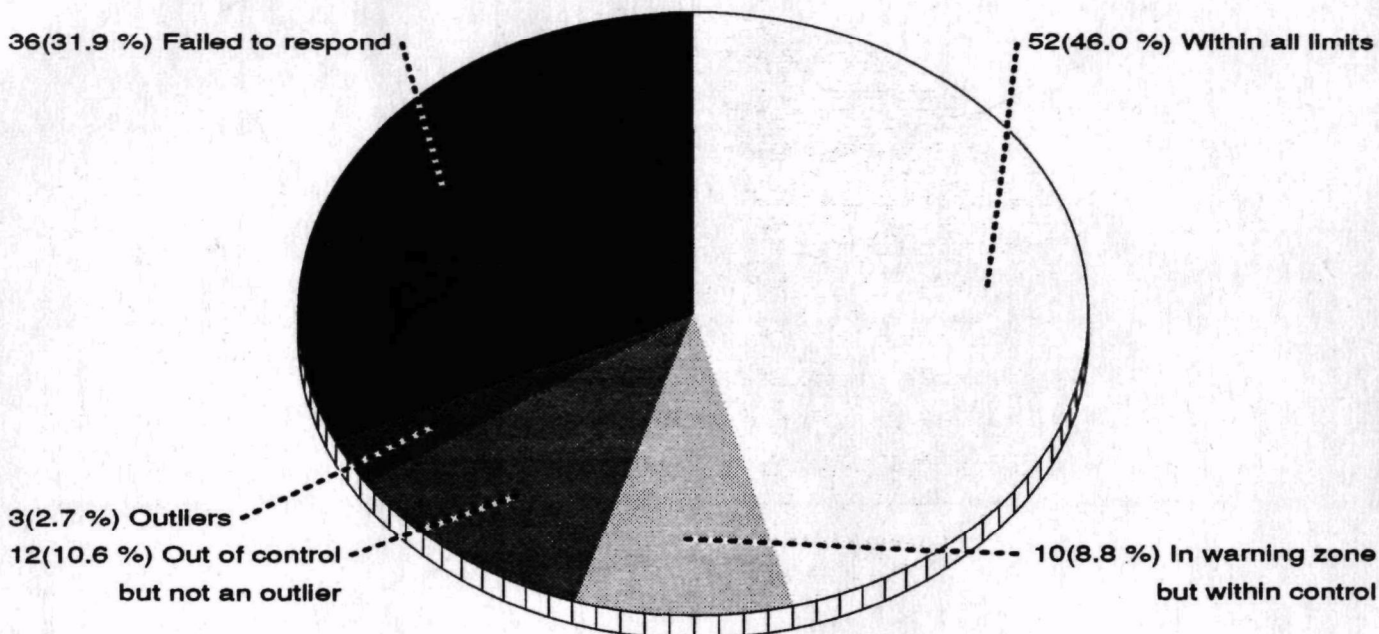
↓ = Below control limit

Total Potassium

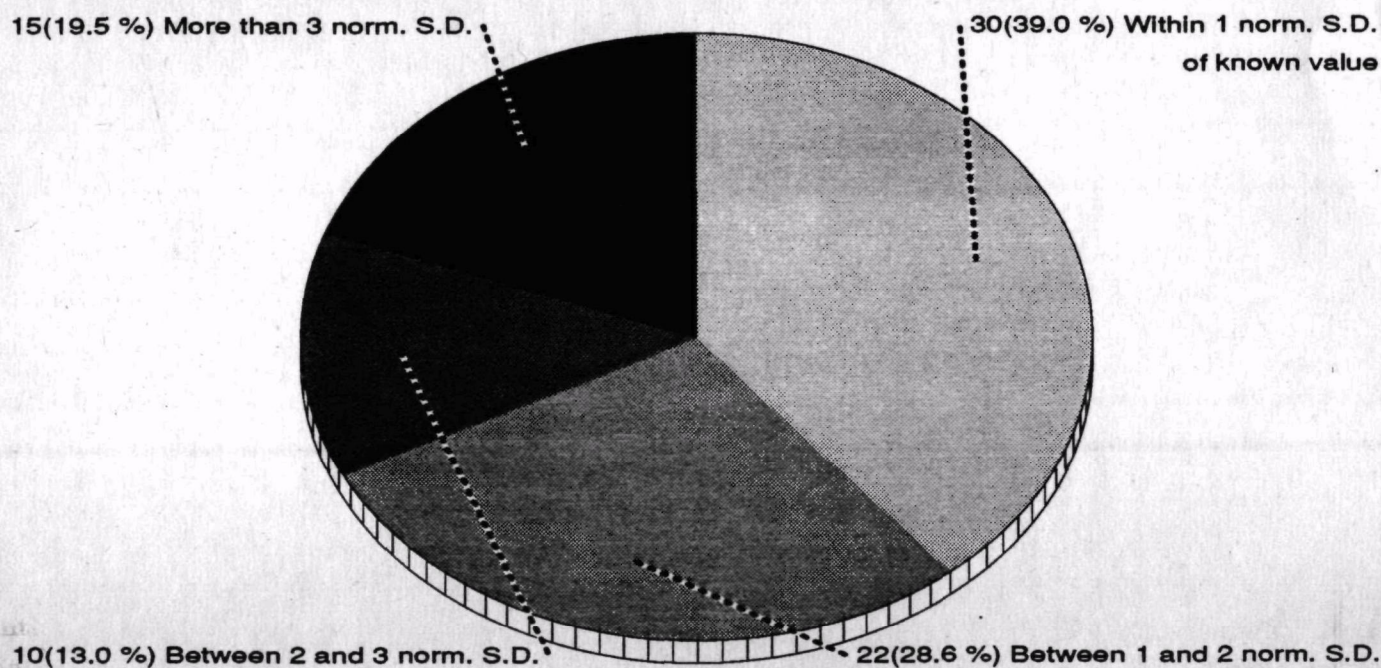
Statistical Summary

113 Participants

The known value of this nuclide is **1715.0 mg/l** with an expected precision of **86.0**; the control limits are 1565.8 to 1864.2; the warning regions are 1565.8 to 1615.4 and 1814.6 to 1864.2



Statistic	Respondents	Non-outliers
Mean	1708.20	Grand Avg 1700.90
Std. Dev.	146.79	109.00
Variance	21546.07	11881.62
% Coef. of Var.	8.59	6.41
% deviation of mean from known value	-0.40	-0.82
Norm. dev. of mean from known value	-0.05	-0.13
Median	1702.67	1697.50
% deviation of median from known value	-0.72	-1.02
Norm. dev. of median from known value	-0.08	-0.16



Total Potassium

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
A	1638.0	1513.0	1644.0	73.96	0.900	1598.33	-2.07	-2.35	
AA	2080.0	2227.0	2150.0	73.53	1.018	2152.33	9.09	8.81	×
AE									•
AF	1698.0	1682.0	1633.0	33.87	0.446	1671.00	-0.60	-0.89	
AI									•
AJ	1729.0	1702.0	1747.0	22.65	0.309	1726.00	0.51	0.22	
AK	1583.0	1593.0	1564.0	14.73	0.199	1580.00	-2.43	-2.72	
AL	1710.0	1640.0	1670.0	35.12	0.481	1673.33	-0.56	-0.84	
AN	1760.0	1720.0	1730.0	20.82	0.275	1736.67	0.72	0.44	
AP									•
AU	1700.0	1600.0	1590.0	60.83	0.756	1630.00	-1.43	-1.71	
AY									•
BA	1724.0	1770.0	1712.0	30.62	0.398	1735.33	0.69	0.41	
BC									•
BG									•
BH	1720.0	1750.0	1750.0	17.32	0.206	1740.00	0.79	0.50	
BL	1776.0	1701.0	1662.0	57.94	0.783	1713.00	0.24	-0.04	
BM	1800.0	1790.0	1850.0	32.15	0.412	1813.33	2.26	1.98	
BO	1661.0	1699.0	1780.0	60.78	0.817	1713.33	0.25	-0.03	
BW									•
C	1644.0	1673.0	1734.0	45.94	0.618	1683.67	-0.35	-0.63	
CA	1730.0	1770.0	1810.0	40.00	0.549	1770.00	1.39	1.11	
CJ	1910.0	1610.0	1700.0	153.95	3.020	1740.00	0.79	0.50	
CO	1664.0	1691.0	1701.0	19.14	0.254	1685.33	-0.31	-0.60	
CP									•
CQ	1528.0	1730.0	1717.0	113.06	1.738	1658.33	-0.86	-1.14	
D	1766.0	1721.0	1698.0	34.59	0.467	1728.33	0.55	0.27	
DD	1480.0	1530.0	1580.0	50.00	0.687	1530.00	-3.44	-3.73	↓
DE	1530.0	1540.0	1550.0	10.00	0.137	1540.00	-3.24	-3.52	↓
DL									•
DM	1630.0	1630.0	1700.0	40.41	0.481	1653.33	-0.96	-1.24	
DT	1733.0	1719.0	1723.0	7.21	0.096	1725.00	0.49	0.20	
DY	1701.0	1759.0	1759.0	33.49	0.398	1739.67	0.78	0.50	
E	1741.0	1851.0	1808.0	55.43	0.756	1800.00	2.00	1.71	
EA									•
EB									•
EH	1730.0	1670.0	1670.0	34.64	0.412	1690.00	-0.22	-0.50	
EL	1731.0	1767.0	1759.0	18.90	0.247	1752.33	1.04	0.75	
EX									•
FE	1610.0	1610.0	1620.0	5.77	0.069	1613.33	-1.76	-2.05	
FL									•
GE									•
HP									•
HU	1266.0	1225.0	1185.0	40.50	0.556	1225.33	-9.58	-9.86	×
HX									•

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Total Potassium

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
I	1725.0	1800.0	1906.0	90.94	1.463	1810.33	2.20	1.92	
IC	1890.0	1866.0	1878.0	12.00	0.165	1878.00	3.57	3.28	↑
IU	1713.0	1801.0	1720.0	48.91	0.604	1744.67	0.88	0.60	
J	1724.0	1677.0	1714.0	24.76	0.323	1705.00	0.08	-0.20	
JR									•
JS	1700.0	1691.0	1638.0	33.50	0.426	1676.33	-0.49	-0.78	
K	1754.0	1577.0	1542.0	113.65	1.869	1624.33	-1.54	-1.83	
KL	1629.0	1675.0	1649.0	23.07	0.316	1651.00	-1.00	-1.29	
KX	1664.0	1711.0	1652.0	31.18	0.405	1675.67	-0.51	-0.79	
L	1590.0	1640.0	1680.0	45.09	0.618	1636.67	-1.29	-1.58	
LA									•
LE	1863.0	1892.0	1933.0	35.17	0.481	1896.00	3.93	3.65	↑
LF	1800.0	1700.0	1900.0	100.00	1.712	1800.00	2.00	1.71	
LM	1646.0	1668.0	1614.0	27.15	0.371	1642.67	-1.17	-1.46	
LR	1649.0	1799.0	1700.0	76.27	1.058	1716.00	0.30	0.02	
M	1680.0	1680.0	1630.0	28.87	0.343	1663.33	-0.76	-1.04	
MA	1874.0	1874.0	1811.0	36.37	0.433	1853.00	3.06	2.78	
ML	1480.0	1510.0	1560.0	40.41	0.549	1516.67	-3.71	-3.99	↓
MP									•
MQ	1664.0	1783.0	1661.0	69.59	0.838	1702.67	0.04	-0.25	
MV	1984.0	1983.0	1992.0	4.93	0.062	1986.33	5.75	5.46	↑
N	1873.0	1841.0	1865.0	16.65	0.220	1859.67	3.20	2.91	
NH	1722.0	1870.0	1731.0	82.97	1.031	1774.33	1.48	1.19	
NJ	1650.0	1650.0	1768.0	68.13	0.810	1689.33	-0.23	-0.52	
O	1640.0	1640.0	1640.0	0.00	0.000	1640.00	-1.23	-1.51	
PB	1573.0	1594.0	1604.0	15.82	0.213	1590.33	-2.23	-2.51	
PC									•
PI									•
PM									•
PP									•
PT	1423.0	1655.0	1655.0	133.95	2.130	1577.67	-2.48	-2.77	
PV	1590.0	1600.0	1600.0	5.77	0.069	1596.67	-2.10	-2.38	
PW	1925.0	1659.0	1864.0	139.34	2.575	1816.00	2.32	2.03	
PY									•
Q	1685.0	1678.0	1583.0	56.98	0.701	1648.67	-1.05	-1.34	
QB									•
QJ									•
QK	1668.0	1694.0	1714.0	23.07	0.316	1692.00	-0.18	-0.46	
QL	1683.0	1694.0	1700.0	8.62	0.117	1692.33	-0.17	-0.46	
QX	1662.0	1674.0	1774.0	61.49	0.769	1703.33	0.05	-0.23	
QZ									•
R	1708.0	1740.0	1730.0	16.37	0.220	1726.00	0.51	0.22	
RA									•
RK									•
S	1687.0	1687.0	1690.0	1.73	0.021	1688.00	-0.26	-0.54	

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Total Potassium

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
SM									•
SS	1846.0	1924.0	1863.0	41.02	0.536	1877.67	3.56	3.28	↑
SV	1437.0	1474.0	1632.0	103.57	1.646	1514.33	-3.76	-4.04	↓
T	1620.0	1700.0	1570.0	65.57	0.893	1630.00	-1.43	-1.71	
TA									•
TD	1619.0	1629.0	1604.0	12.58	0.172	1617.33	-1.68	-1.97	
TE	1769.0	1770.0	1782.0	7.23	0.089	1773.67	1.47	1.18	
TI	1774.0	1759.0	1764.0	7.64	0.103	1765.67	1.30	1.02	
TP									•
TQ	1562.0	1646.0	1729.0	83.50	1.280	1645.67	-1.11	-1.40	
TS									•
U	1552.0	1564.0	1552.0	6.93	0.082	1556.00	-2.92	-3.20	↓
UB									•
VG	1640.0	1760.0	1730.0	62.45	0.824	1710.00	0.18	-0.10	
VL	1499.0	1473.0	1534.0	30.61	0.419	1502.00	-4.01	-4.29	↓
VM	1773.0	1742.0	1787.0	23.03	0.309	1767.33	1.34	1.05	
VN	2382.0	2217.0	2264.0	85.01	1.254	2287.67	11.82	11.53	×
VQ									•
VX	1863.0	1839.0	1816.0	23.50	0.323	1839.33	2.79	2.50	
W	1370.0	1430.0	1340.0	45.83	0.618	1380.00	-6.46	-6.75	↓
WA	2014.0	2037.0	2043.0	15.31	0.199	2031.33	6.66	6.37	↑
WB									•
Y	1810.0	1660.0	1760.0	76.38	1.058	1743.33	0.85	0.57	

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
1225.33	×	HU	1640.00		O	1702.67		MQ
1380.00	↓	W	1642.67		LM	1703.33		QX
1502.00	↓	VL	1645.67		TQ	1705.00		J
1514.33	↓	SV	1648.67		Q	1710.00		VG
1516.67	↓	ML	1651.00		KL	1713.00		BL
1530.00	↓	DD	1653.33		DM	1713.33		BO
1540.00	↓	DE	1658.33		CQ	1716.00		LR
1556.00	↓	U	1663.33		M	1725.00		DT
1577.67		PT	1671.00		AF	1726.00		R
1580.00		AK	1673.33		AL	1726.00		AJ
1590.33		PB	1675.67		KX	1728.33		D
1596.67		PV	1676.33		JS	1735.33		BA
1598.33		A	1683.67		C	1736.67		AN
1613.33		FE	1685.33		CO	1739.67		DY
1617.33		TD	1688.00		S	1740.00		CJ
1624.33		K	1689.33		NJ	1740.00		BH
1630.00		T	1690.00		EH	1743.33		Y
1630.00		AU	1692.00		QK	1744.67		IU
1636.67		L	1692.33		QL	1752.33		EL

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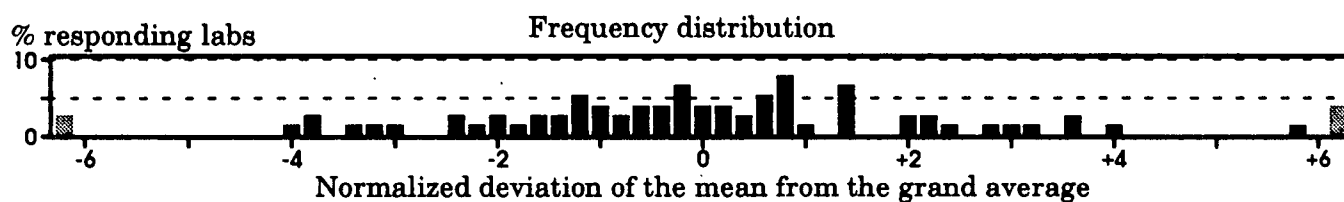
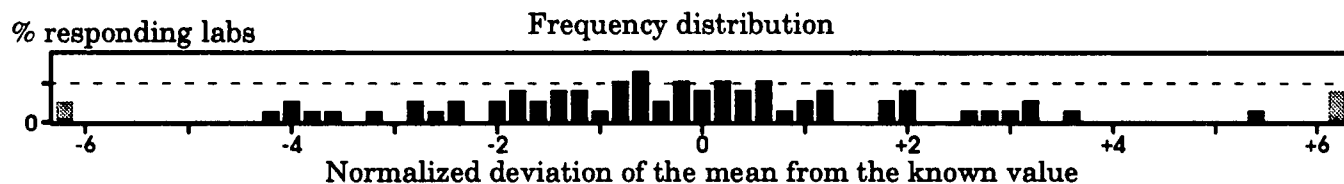
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Total Potassium**Data sorted by Laboratory Average**

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
1765.67		TI	1800.00		E	1877.67	↑	SS
1767.33		VM	1810.33		I	1878.00	↑	IC
1770.00		CA	1813.33		BM	1896.00	↑	LE
1773.67		TE	1816.00		PW	1986.33	↑	MV
1774.33		NH	1839.33		VX	2031.33	↑	WA
1800.00		LF	1853.00		MA	2152.33	×	AA
			1859.67		N	2287.67	×	VN



• ≡ No data submitted

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