

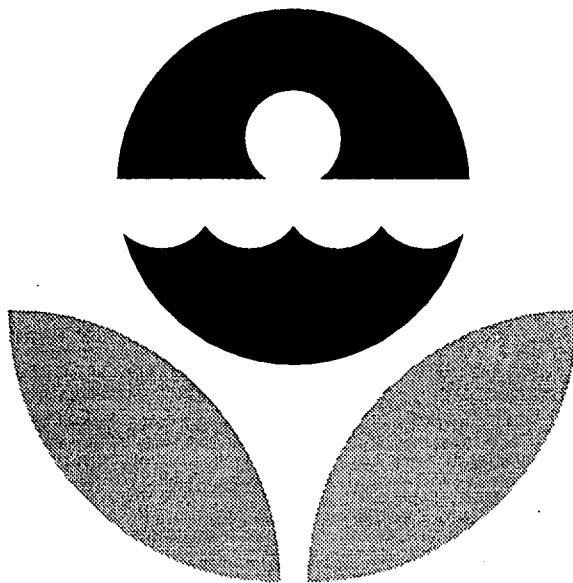


Gross Alpha-Beta in Water Intercomparison Study

A Statistical Evaluation of the January 29, 1993 Data



Gross Alpha-Beta in Water
Intercomparison Study
January 29, 1993



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 *Gross Alpha-Beta in Water; January 29, 1993*.

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 that reads "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.

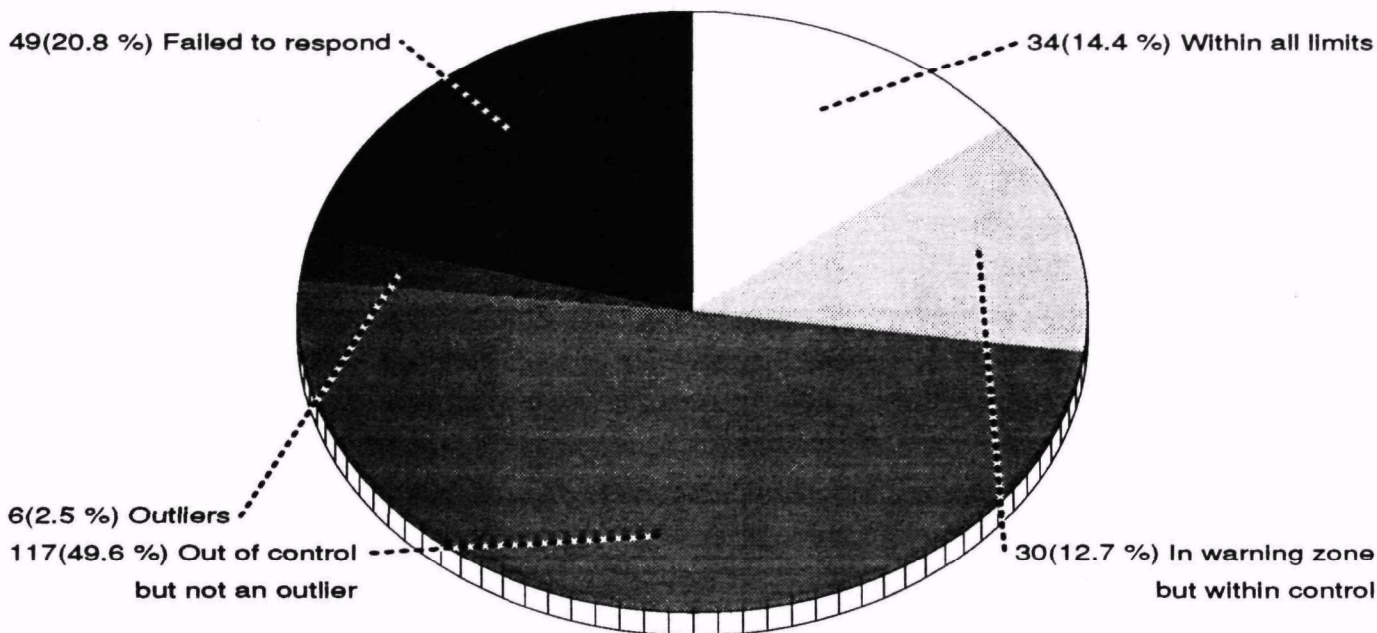
A complete explanation of the statistical calculations involved in the report may be found in the Environmental Radioactivity Laboratory Intercomparison Studies Program information brochure [Draft Revision of EPA-600/4-81-004], available from Frank Novielli, EMSL-LV, 702/798-2159.

Gross Alpha

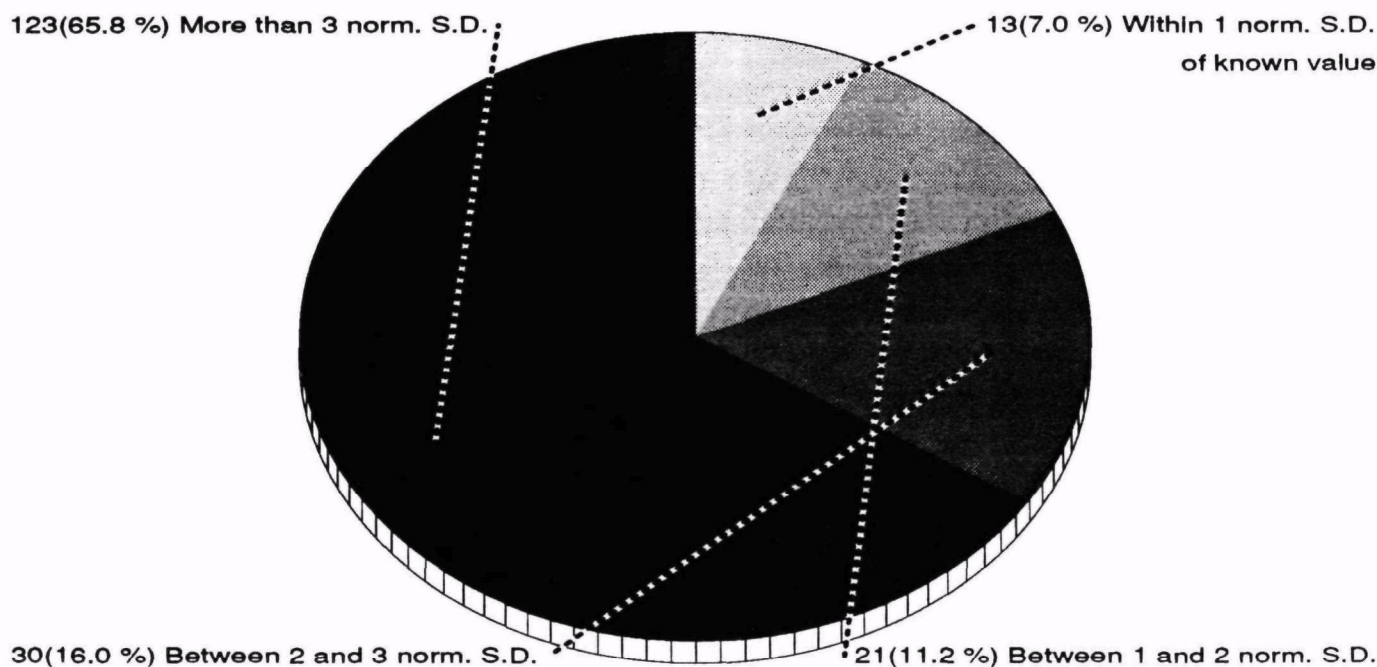
Statistical Summary

236 Participants

The known value of this nuclide is **34.0 pCi/l** with an expected precision of **9.0**; the control limits are 18.4 to 49.6; the warning regions are 18.4 to 23.6 and 44.4 to 49.6



Statistic	Respondents	Non-outliers
Mean	25.29	Grand Avg 17.09
Std. Dev.	82.39	7.54
Variance	6787.81	56.83
% Coef. of Var.	325.81	44.10
% deviation of mean from known value	-25.63	-49.72
Norm. dev. of mean from known value	-0.11	-2.24
Median	17.33	16.67
% deviation of median from known value	-49.02	-50.98
Norm. dev. of median from known value	-0.20	-2.30



Gross Alpha

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
A	24.0	25.0	22.0	1.53	0.197	23.67	1.26	-1.99	
AE	10.0	9.0	10.0	0.58	0.066	9.67	-1.43	-4.68	↓
AF	41.0	34.0	36.0	3.61	0.459	37.00	3.83	0.58	
AI	18.0	18.0	14.0	2.31	0.263	16.67	-0.08	-3.34	↓
AJ	29.0	26.0	26.0	1.73	0.197	27.00	1.91	-1.35	
AK	18.0	19.0	19.0	0.58	0.066	18.67	0.30	-2.95	
AL	15.0	15.0	16.0	0.58	0.066	15.33	-0.34	-3.59	↓
AN	11.0	17.0	19.0	4.16	0.525	15.67	-0.27	-3.53	↓
AO	46.0	47.0	57.0	6.08	0.722	50.00	6.33	3.08	×
AP	19.0	20.0	18.0	1.00	0.131	19.00	0.37	-2.89	
AR	31.0	36.0	34.0	2.52	0.328	33.67	3.19	-0.06	
AW	12.0	11.0	13.0	1.00	0.131	12.00	-0.98	-4.23	↓
AY	9.0	9.0	8.0	0.58	0.066	8.67	-1.62	-4.88	↓
AZ	14.0	16.0	13.0	1.53	0.197	14.33	-0.53	-3.78	↓
BA	10.0	11.0	12.0	1.00	0.131	11.00	-1.17	-4.43	↓
BB									•
BC	18.0	16.0	18.0	1.15	0.131	17.33	0.05	-3.21	↓
BG	9.0	5.0	4.0	2.65	0.328	6.00	-2.14	-5.39	↓
BH	19.0	20.0	20.0	0.58	0.066	19.67	0.50	-2.76	
BI	8.0	10.0	12.0	2.00	0.263	10.00	-1.37	-4.62	↓
BK	13.0	14.0	14.0	0.58	0.066	13.67	-0.66	-3.91	↓
BL	26.0	24.0	30.0	3.06	0.394	26.67	1.84	-1.41	
BM	9.0	9.0	10.0	0.58	0.066	9.33	-1.49	-4.75	↓
BN	16.0	14.0	19.0	2.52	0.328	16.33	-0.15	-3.40	↓
BO	13.0	15.0	14.0	1.00	0.131	14.00	-0.60	-3.85	↓
BW									•
C	28.0	27.0	27.0	0.58	0.066	27.33	1.97	-1.28	
CA	17.0	18.0	18.0	0.58	0.066	17.67	0.11	-3.14	↓
CE	15.0	15.0	24.0	5.20	0.591	18.00	0.17	-3.08	↓
CG	28.0	28.0	34.0	3.46	0.394	30.00	2.48	-0.77	
CJ	18.0	16.0	18.0	1.15	0.131	17.33	0.05	-3.21	↓
CK									•
CO	17.0	12.0	19.0	3.61	0.459	16.00	-0.21	-3.46	↓
CP	21.0	18.0	18.0	1.73	0.197	19.00	0.37	-2.89	
CQ									•
CS									•
CX	68.0	13.0	10.0	32.65	6.346	30.33	2.55	-0.71	
D	37.0	36.0	38.0	1.00	0.131	37.00	3.83	0.58	
DB	19.0	23.0	25.0	3.06	0.394	22.33	1.01	-2.25	
DD	19.0	21.0	17.0	2.00	0.263	19.00	0.37	-2.89	
DE	24.0	25.0	25.0	0.58	0.066	24.67	1.46	-1.80	
DG									•
DH	18.0	17.0	15.0	1.53	0.197	16.67	-0.08	-3.34	↓
DJ	5.0	6.0	6.0	0.58	0.066	5.67	-2.20	-5.45	↓
DM									•

• = No data submitted

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↓ = Below control limit

Gross Alpha

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
DO	8.0	8.0	8.0	0.00	0.000	8.00	-1.75	-5.00	↓
DP	11.0	12.0	12.0	0.58	0.066	11.67	-1.04	-4.30	↓
DR									•
DS	6.0	9.0	6.0	1.73	0.197	7.00	-1.94	-5.20	↓
DT	16.0	16.0	18.0	1.15	0.131	16.67	-0.08	-3.34	↓
DX									•
DZ	15.0	17.0	16.0	1.00	0.131	16.00	-0.21	-3.46	↓
E	18.0	19.0	15.0	2.08	0.263	17.33	0.05	-3.21	↓
EA	33.0	39.0	37.0	3.06	0.394	36.33	3.70	0.45	
EB	18.0	21.0	22.0	2.08	0.263	20.33	0.62	-2.63	
EH	20.0	14.0	15.0	3.21	0.394	16.33	-0.15	-3.40	↓
EL									•
EN	22.0	27.0	20.0	3.61	0.459	23.00	1.14	-2.12	
EO	20.0	22.0	21.0	1.00	0.131	21.00	0.75	-2.50	
ER	24.0	25.0	26.0	1.00	0.131	25.00	1.52	-1.73	
ES	27.0	23.0	22.0	2.65	0.328	24.00	1.33	-1.92	
EV	13.0	9.0	8.0	2.65	0.328	10.00	-1.37	-4.62	↓
EW									•
FE	18.0	18.0	18.0	0.00	0.000	18.00	0.17	-3.08	↓
FF	13.0	14.0	16.0	1.53	0.197	14.33	-0.53	-3.78	↓
FJ	16.0	17.0	14.0	1.53	0.197	15.67	-0.27	-3.53	↓
FK	4.0	4.0	2.0	1.15	0.131	3.33	-2.65	-5.90	↓
FL	9.0	12.0	11.0	1.53	0.197	10.67	-1.24	-4.49	↓
FN	16.0	14.0	15.0	1.00	0.131	15.00	-0.40	-3.66	↓
FP	19.0	17.0	16.0	1.53	0.197	17.33	0.05	-3.21	↓
FU	4.0	5.0	5.0	0.58	0.066	4.67	-2.39	-5.65	↓
FW									•
FZ	26.0	27.0	22.0	2.65	0.328	25.00	1.52	-1.73	
GE									•
GJ	23.0	15.0	14.0	4.93	0.591	17.33	0.05	-3.21	↓
GQ	16.0	16.0	16.0	0.00	0.000	16.00	-0.21	-3.46	↓
GT	13.0	13.0	15.0	1.15	0.131	13.67	-0.66	-3.91	↓
GZ	14.0	17.0	18.0	2.08	0.263	16.33	-0.15	-3.40	↓
HH	9.0	10.0	8.0	1.00	0.131	9.00	-1.56	-4.81	↓
HI	4.0	4.0	4.0	0.00	0.000	4.00	-2.52	-5.77	↓
HK	132.0	156.0	122.0	17.47	3.346	136.67	23.01	19.76	×
HL	18.0	18.0	18.0	0.00	0.000	18.00	0.17	-3.08	↓
HN	16.0	23.0	19.0	3.51	0.459	19.33	0.43	-2.82	
HP	14.0	16.0	19.0	2.52	0.328	16.33	-0.15	-3.40	↓
HU									•
HY	26.0	23.0	23.0	1.73	0.197	24.00	1.33	-1.92	
I	26.0	24.0	21.0	2.52	0.328	23.67	1.26	-1.99	
IC	26.0	18.0	25.0	4.36	0.525	23.00	1.14	-2.12	
ID									•
IE	42.0	42.0	47.0	2.89	0.328	43.67	5.11	1.86	

• = No data submitted

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Gross Alpha

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
IU									•
J	30.0	34.0	29.0	2.65	0.328	31.00	2.68	-0.58	
JE	1.0	1.0	2.0	0.58	0.066	1.33	-3.03	-6.29	↓
JG	15.0	14.0	14.0	0.58	0.066	14.33	-0.53	-3.78	↓
JH	3.0	4.0	4.0	0.58	0.066	3.67	-2.58	-5.84	↓
JM	10.0	10.0	11.0	0.58	0.066	10.33	-1.30	-4.55	↓
JN	11.0	11.0	13.0	1.15	0.131	11.67	-1.04	-4.30	↓
JP	18.0	17.0	17.0	0.58	0.066	17.33	0.05	-3.21	↓
JQ	16.0	18.0	22.0	3.06	0.394	18.67	0.30	-2.95	
JS	20.0	20.0	21.0	0.58	0.066	20.33	0.62	-2.63	
K	20.0	16.0	18.0	2.00	0.263	18.00	0.17	-3.08	↓
KC	14.0	14.0	13.0	0.58	0.066	13.67	-0.66	-3.91	↓
KE	12.0	12.0	13.0	0.58	0.066	12.33	-0.92	-4.17	↓
KT	19.0	19.0	19.0	0.00	0.000	19.00	0.37	-2.89	
KX	12.0	15.0	19.0	3.51	0.459	15.33	-0.34	-3.59	↓
KZ	18.0	18.0	18.0	0.00	0.000	18.00	0.17	-3.08	↓
L	16.0	16.0	17.0	0.58	0.066	16.33	-0.15	-3.40	↓
LA									•
LE	15.0	17.0	12.0	2.52	0.328	14.67	-0.47	-3.72	↓
LF	19.0	16.0	19.0	1.73	0.197	18.00	0.17	-3.08	↓
LG									•
LL	25.0	26.0	25.0	0.58	0.066	25.33	1.59	-1.67	
LM									•
LR	8.0	6.0	5.0	1.53	0.197	6.33	-2.07	-5.32	↓
LS									•
LT	29.0	37.0	32.0	4.04	0.525	32.67	3.00	-0.26	
M									•
MA									•
ME	30.0	37.0	29.0	4.36	0.525	32.00	2.87	-0.38	
MN									•
MQ	11.0	16.0	15.0	2.65	0.328	14.00	-0.60	-3.85	↓
MS	18.0	17.0	18.0	0.58	0.066	17.67	0.11	-3.14	↓
MV									•
MX									•
MY	7.0	12.0	7.0	2.89	0.328	8.67	-1.62	-4.88	↓
N	20.0	17.0	18.0	1.53	0.197	18.33	0.24	-3.02	↓
NA	13.0	13.0	14.0	0.58	0.066	13.33	-0.72	-3.98	↓
NE	35.0	35.0	34.0	0.58	0.066	34.67	3.38	0.13	
NF	6.0	7.0	6.0	0.58	0.066	6.33	-2.07	-5.32	↓
NG	18.0	20.0	20.0	1.15	0.131	19.33	0.43	-2.82	
NH	15.0	17.0	13.0	2.00	0.263	15.00	-0.40	-3.66	↓
NI	16.0	11.0	9.0	3.61	0.459	12.00	-0.98	-4.23	↓
NJ	12.0	12.0	12.0	0.00	0.000	12.00	-0.98	-4.23	↓
NK	20.0	18.0	16.0	2.00	0.263	18.00	0.17	-3.08	↓
NO	16.0	18.0	20.0	2.00	0.263	18.00	0.17	-3.08	↓

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Gross Alpha

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
NP									•
NT	13.0	14.0	14.0	0.58	0.066	13.67	-0.66	-3.91	↓
O	16.0	17.0	17.0	0.58	0.066	16.67	-0.08	-3.34	↓
OA	25.0	25.0	26.0	0.58	0.066	25.33	1.59	-1.67	
OB	16.0	16.0	21.0	2.89	0.328	17.67	0.11	-3.14	↓
OE	10.0	12.0	13.0	1.53	0.197	11.67	-1.04	-4.30	↓
OF	3.0	3.0	2.0	0.58	0.066	2.67	-2.78	-6.03	↓
OK									•
OL									•
OS	12.0	14.0	17.0	2.52	0.328	14.33	-0.53	-3.78	↓
OT									•
OY	24.0	20.0	35.0	7.77	0.984	26.33	1.78	-1.48	
OZ									•
P	9.0	16.0	15.0	3.79	0.459	13.33	-0.72	-3.98	↓
PA	8.0	9.0	9.0	0.58	0.066	8.67	-1.62	-4.88	↓
PB	16.0	14.0	15.0	1.00	0.131	15.00	-0.40	-3.66	↓
PC	2.0	2.0	2.0	0.00	0.000	2.00	-2.90	-6.16	↓
PE									•
PG	13.0	14.0	14.0	0.58	0.066	13.67	-0.66	-3.91	↓
PP									•
PQ	17.0	15.0	14.0	1.53	0.197	15.33	-0.34	-3.59	↓
PR	29.0	30.0	24.0	3.21	0.394	27.67	2.03	-1.22	
PV	12.0	10.0	11.0	1.00	0.131	11.00	-1.17	-4.43	↓
PW	132.0	119.0	118.0	7.81	0.919	123.00	20.38	17.13	×
Q	61.0	58.0	54.0	3.51	0.459	57.67	7.81	4.55	×
QC	14.0	9.0	17.0	4.04	0.525	13.33	-0.72	-3.98	↓
QJ	17.0	19.0	16.0	1.53	0.197	17.33	0.05	-3.21	↓
QK									•
QM	6.0	9.0	6.0	1.73	0.197	7.00	-1.94	-5.20	↓
QP	3.0	5.0	4.0	1.00	0.131	4.00	-2.52	-5.77	↓
QQ	16.0	16.0	23.0	4.04	0.459	18.33	0.24	-3.02	↓
QT	28.0	35.0	30.0	3.61	0.459	31.00	2.68	-0.58	
QU									•
QW									•
QX	8.0	8.0	8.0	0.00	0.000	8.00	-1.75	-5.00	↓
QZ	29.0	24.0	24.0	2.89	0.328	25.67	1.65	-1.60	
R	142.0	152.0	143.0	5.51	0.656	145.67	24.74	21.49	×
RB	16.0	7.0	8.0	4.93	0.591	10.33	-1.30	-4.55	↓
RC	16.0	11.0	10.0	3.21	0.394	12.33	-0.92	-4.17	↓
RD	18.0	18.0	23.0	2.89	0.328	19.67	0.50	-2.76	
RE	17.0	12.0	12.0	2.89	0.328	13.67	-0.66	-3.91	↓
RG	17.0	18.0	19.0	1.00	0.131	18.00	0.17	-3.08	↓
RH	9.0	4.0	5.0	2.65	0.328	6.00	-2.14	-5.39	↓
RI	23.0	15.0	16.0	4.36	0.525	18.00	0.17	-3.08	↓
RJ	21.0	22.0	25.0	2.08	0.263	22.67	1.07	-2.18	

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

Gross Alpha

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
RL	8.0	11.0	13.0	2.52	0.328	10.67	-1.24	-4.49	↓
RM	35.0	34.0	38.0	2.08	0.263	35.67	3.57	0.32	
RN	9.0	12.0	10.0	1.53	0.197	10.33	-1.30	-4.55	↓
RQ									•
RR	19.0	18.0	19.0	0.58	0.066	18.67	0.30	-2.95	
RT	1051.0	1192.0	1122.0	70.50	16.722	1121.67	212.58	209.32	×
RV									•
RW	17.0	19.0	17.0	1.15	0.131	17.67	0.11	-3.14	↓
RZ	20.0	20.0	17.0	1.73	0.197	19.00	0.37	-2.89	
S	20.0	22.0	23.0	1.53	0.197	21.67	0.88	-2.37	
SA	4.0	6.0	4.0	1.15	0.131	4.67	-2.39	-5.65	↓
SC	23.0	18.0	19.0	2.65	0.328	20.00	0.56	-2.69	
SD	13.0	16.0	14.0	1.53	0.197	14.33	-0.53	-3.78	↓
SF	21.0	18.0	20.0	1.53	0.197	19.67	0.50	-2.76	
SG	19.0	20.0	20.0	0.58	0.066	19.67	0.50	-2.76	
SI	25.0	24.0	25.0	0.58	0.066	24.67	1.46	-1.80	
SL	34.0	26.0	28.0	4.16	0.525	29.33	2.36	-0.90	
SM	15.0	13.0	14.0	1.00	0.131	14.00	-0.60	-3.85	↓
SN	9.0	11.0	13.0	2.00	0.263	11.00	-1.17	-4.43	↓
SO	18.0	19.0	19.0	0.58	0.066	18.67	0.30	-2.95	
SR	14.0	16.0	15.0	1.00	0.131	15.00	-0.40	-3.66	↓
SS	18.0	23.0	22.0	2.65	0.328	21.00	0.75	-2.50	
ST	9.0	9.0	12.0	1.73	0.197	10.00	-1.37	-4.62	↓
SU	11.0	12.0	8.0	2.08	0.263	10.33	-1.30	-4.55	↓
SW									•
SX									•
SZ	27.0	23.0	31.0	4.00	0.525	27.00	1.91	-1.35	
T	22.0	29.0	17.0	6.03	0.788	22.67	1.07	-2.18	
TA	22.0	22.0	27.0	2.89	0.328	23.67	1.26	-1.99	
TE	12.0	11.0	10.0	1.00	0.131	11.00	-1.17	-4.43	↓
TG									•
TH	22.0	25.0	25.0	1.73	0.197	24.00	1.33	-1.92	
TI	18.0	16.0	21.0	2.52	0.328	18.33	0.24	-3.02	↓
TK									•
TL	14.0	14.0	20.0	3.46	0.394	16.00	-0.21	-3.46	↓
TM									•
TN	18.0	19.0	25.0	3.79	0.459	20.67	0.69	-2.57	
TQ	10.0	12.0	11.0	1.00	0.131	11.00	-1.17	-4.43	↓
TS									•
TT									•
TV	5.0	5.0	6.0	0.58	0.066	5.33	-2.26	-5.52	↓
TW	14.0	10.0	18.0	4.00	0.525	14.00	-0.60	-3.85	↓
TY	19.0	19.0	25.0	3.46	0.394	21.00	0.75	-2.50	
TZ									•
U	18.0	19.0	17.0	1.00	0.131	18.00	0.17	-3.08	↓

• = No data submitted

TAG SYMBOLS

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Ø = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

Gross Alpha

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
UA	16.0	14.0	16.0	1.15	0.131	15.33	-0.34	-3.59 ↓
UB								•
UC								•
UE	17.0	14.0	13.0	2.08	0.263	14.67	-0.47	-3.72 ↓
UG	10.0	7.0	9.0	1.53	0.197	8.67	-1.62	-4.88 ↓
UI	18.0	23.0	21.0	2.52	0.328	20.67	0.69	-2.57
UJ								•
W	18.0	24.0	20.0	3.06	0.394	20.67	0.69	-2.57
X	15.0	15.0	16.0	0.58	0.066	15.33	-0.34	-3.59 ↓
Y								•
Z	26.0	22.0	26.0	2.31	0.263	24.67	1.46	-1.80

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
1.33	↓	JE	10.33	↓	RB	14.33	↓	OS
2.00	↓	PC	10.33	↓	JM	14.33	↓	JG
2.67	↓	OF	10.67	↓	RL	14.33	↓	FF
3.33	↓	FK	10.67	↓	FL	14.33	↓	AZ
3.67	↓	JH	11.00	↓	TQ	14.67	↓	UE
4.00	↓	QP	11.00	↓	TE	14.67	↓	LE
4.00	↓	HI	11.00	↓	SN	15.00	↓	SR
4.67	↓	SA	11.00	↓	PV	15.00	↓	PB
4.67	↓	FU	11.00	↓	BA	15.00	↓	NH
5.33	↓	TV	11.67	↓	OE	15.00	↓	FN
5.67	↓	DJ	11.67	↓	JN	15.33	↓	X
6.00	↓	RH	11.67	↓	DP	15.33	↓	UA
6.00	↓	BG	12.00	↓	NJ	15.33	↓	PQ
6.33	↓	NF	12.00	↓	NI	15.33	↓	KX
6.33	↓	LR	12.00	↓	AW	15.33	↓	AL
7.00	↓	QM	12.33	↓	RC	15.67	↓	FJ
7.00	↓	DS	12.33	↓	KE	15.67	↓	AN
8.00	↓	QX	13.33	↓	QC	16.00	↓	TL
8.00	↓	DO	13.33	↓	P	16.00	↓	GQ
8.67	↓	UG	13.33	↓	NA	16.00	↓	DZ
8.67	↓	PA	13.67	↓	RE	16.00	↓	CO
8.67	↓	MY	13.67	↓	PG	16.33	↓	L
8.67	↓	AY	13.67	↓	NT	16.33	↓	HP
9.00	↓	HH	13.67	↓	KC	16.33	↓	GZ
9.33	↓	BM	13.67	↓	GT	16.33	↓	EH
9.67	↓	AE	13.67	↓	BK	16.33	↓	BN
10.00	↓	ST	14.00	↓	TW	16.67	↓	O
10.00	↓	EV	14.00	↓	SM	16.67	↓	DT
10.00	↓	BI	14.00	↓	MQ	16.67	↓	DH
10.33	↓	SU	14.00	↓	BO	16.67	↓	AI
10.33	↓	RN	14.33	↓	SD	17.33	↓	QJ

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

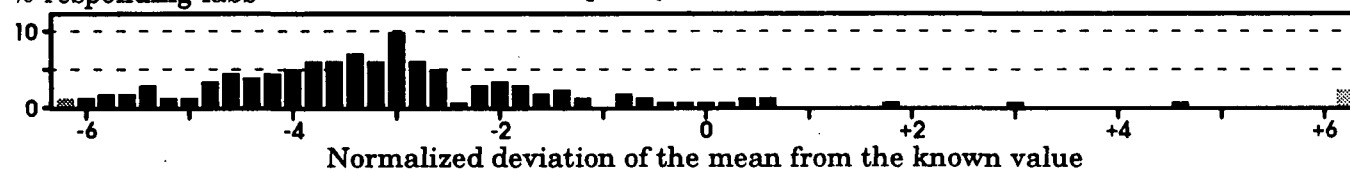
↓ = Below control limit

Gross Alpha**Data sorted by Laboratory Average**

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
17.33	↓	JP	19.00		CP	24.67		DE
17.33	↓	GJ	19.00		AP	25.00		FZ
17.33	↓	FP	19.33		NG	25.00		ER
17.33	↓	E	19.33		HN	25.33		OA
17.33	↓	CJ	19.67		SG	25.33		LL
17.33	↓	BC	19.67		SF	25.67		QZ
17.67	↓	RW	19.67		RD	26.33		OY
17.67	↓	OB	19.67		BH	26.67		BL
17.67	↓	MS	20.00		SC	27.00		SZ
17.67	↓	CA	20.33		JS	27.00		AJ
18.00	↓	U	20.33		EB	27.33		C
18.00	↓	RI	20.67		W	27.67		PR
18.00	↓	RG	20.67		UI	29.33		SL
18.00	↓	NO	20.67		TN	30.00		CG
18.00	↓	NK	21.00		TY	30.33		CX
18.00	↓	LF	21.00		SS	31.00		QT
18.00	↓	KZ	21.00		EO	31.00		J
18.00	↓	K	21.67		S	32.00		ME
18.00	↓	HL	22.33		DB	32.67		LT
18.00	↓	FE	22.67		T	33.67		AR
18.00	↓	CE	22.67		RJ	34.67		NE
18.33	↓	TI	23.00		IC	35.67		RM
18.33	↓	QQ	23.00		EN	36.33		EA
18.33	↓	N	23.67		TA	37.00		D
18.67		SO	23.67		I	37.00		AF
18.67		RR	23.67		A	43.67		IE
18.67		JQ	24.00		TH	50.00	×	AO
18.67		AK	24.00		HY	57.67	×	Q
19.00		RZ	24.00		ES	123.00	×	PW
19.00		KT	24.67		Z	136.67	×	HK
19.00		DD	24.67		SI	145.67	×	R
						1121.67	×	RT

% responding labs

Frequency distribution



• = No data submitted

TAG SYMBOLS

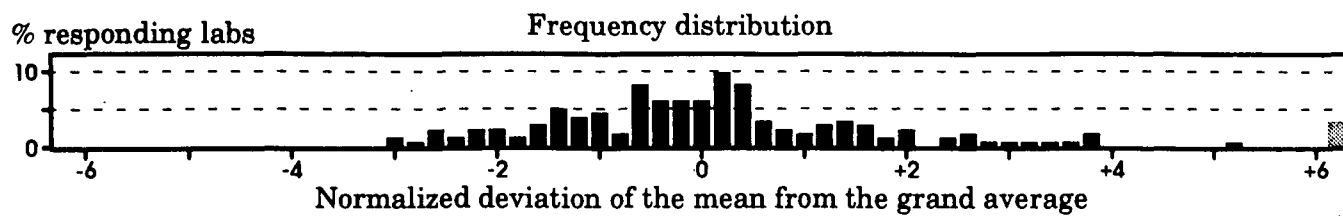
↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

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Gross Alpha

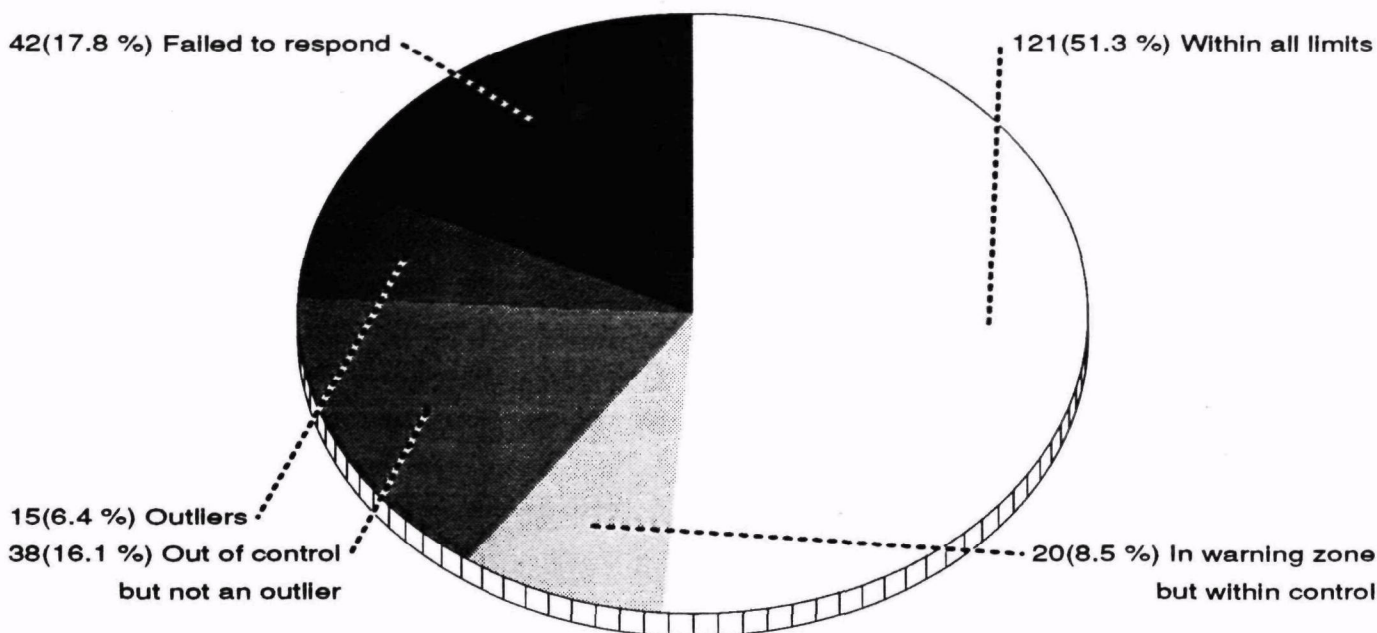


Gross Beta

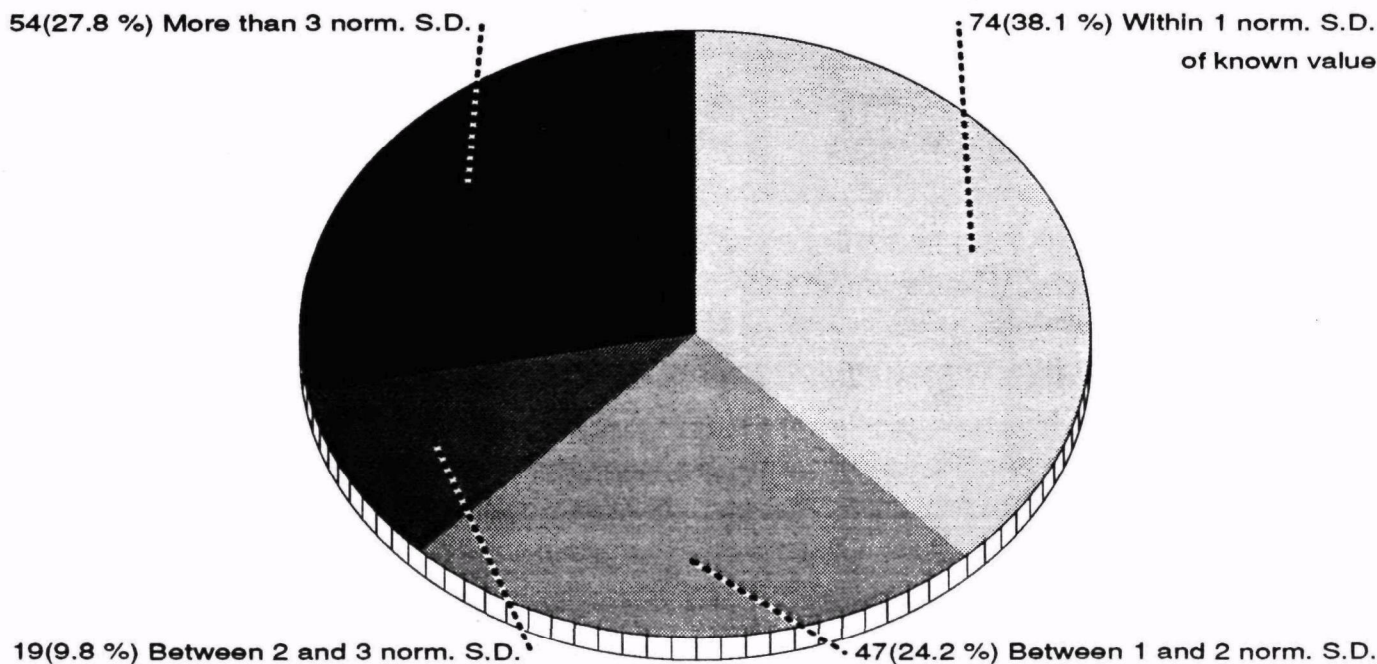
Statistical Summary

236 Participants

The known value of this nuclide is **44.0 pCi/l** with an expected precision of **5.0**; the control limits are 35.3 to 52.7; the warning regions are 35.3 to 38.2 and 49.8 to 52.7



Statistic	Respondents	Non-outliers
Mean	44.29	Grand Avg 41.99
Std. Dev.	25.92	7.41
Variance	672.05	54.96
% Coef. of Var.	58.53	17.66
% deviation of mean from known value	0.66	-4.57
Norm. dev. of mean from known value	0.01	-0.27
Median	42.67	42.67
% deviation of median from known value	-3.03	-3.03
Norm. dev. of median from known value	-0.05	-0.18



13 / 20 EMSL-LV Intercomparison Study: Gross Alpha-Beta in Water, 29-Jan-1993

Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
A	42.0	42.0	43.0	0.58	0.118	42.33	0.12	-0.58	
AE	36.0	36.0	39.0	1.73	0.354	37.00	-1.73	-2.42	
AF	44.0	42.0	42.0	1.15	0.236	42.67	0.23	-0.46	
AI	39.0	47.0	40.0	4.36	0.945	42.00	0.00	-0.69	
AJ	45.0	42.0	40.0	2.52	0.591	42.33	0.12	-0.58	
AK	45.0	46.0	43.0	1.53	0.354	44.67	0.93	0.23	
AL	28.0	29.0	36.0	4.36	0.945	31.00	-3.81	-4.50	↓
AN	18.0	19.0	24.0	3.21	0.709	20.33	-7.50	-8.20	↓
AO	32.0	35.0	40.0	4.04	0.945	35.67	-2.19	-2.89	
AP	43.0	42.0	40.0	1.53	0.354	41.67	-0.11	-0.81	
AR	45.0	44.0	43.0	1.00	0.236	44.00	0.70	0.00	
AW	44.0	47.0	45.0	1.53	0.354	45.33	1.16	0.46	
AY	10.0	13.0	15.0	2.52	0.591	12.67	-10.16	-10.85	×
AZ	38.0	39.0	41.0	1.53	0.354	39.33	-0.92	-1.62	
BA	40.0	40.0	41.0	0.58	0.118	40.33	-0.57	-1.27	
BB									•
BC	37.0	38.0	38.0	0.58	0.118	37.67	-1.50	-2.19	
BG	38.0	38.0	39.0	0.58	0.118	38.33	-1.27	-1.96	
BH	41.0	41.0	40.0	0.58	0.118	40.67	-0.46	-1.15	
BI	43.0	44.0	52.0	4.93	1.120	46.33	1.50	0.81	
BK	46.0	47.0	43.0	2.08	0.473	45.33	1.16	0.46	
BL	45.0	43.0	46.0	1.53	0.354	44.67	0.93	0.23	
BM	52.0	40.0	46.0	6.00	1.795	46.00	1.39	0.69	
BN	42.0	44.0	43.0	1.00	0.236	43.00	0.35	-0.35	
BO	46.0	47.0	47.0	0.58	0.118	46.67	1.62	0.92	
BW									•
C	48.0	47.0	45.0	1.53	0.354	46.67	1.62	0.92	
CA	49.0	43.0	48.0	3.21	0.709	46.67	1.62	0.92	
CE	41.0	36.0	42.0	3.21	0.709	39.67	-0.80	-1.50	
CG	36.0	32.0	32.0	2.31	0.473	33.33	-3.00	-3.70	↓
CJ	51.0	53.0	52.0	1.00	0.236	52.00	3.47	2.77	
CK									•
CO	35.0	33.0	39.0	3.06	0.709	35.67	-2.19	-2.89	
CP	39.0	38.0	40.0	1.00	0.236	39.00	-1.04	-1.73	
CQ	43.0	44.0	45.0	1.00	0.236	44.00	0.70	0.00	
CS									•
CX	362.0	280.0	176.0	93.22	40.948	272.67	79.91	79.21	×
D	44.0	44.0	43.0	0.58	0.118	43.67	0.58	-0.12	
DB	46.0	46.0	41.0	2.89	0.591	44.33	0.81	0.12	
DD	46.0	46.0	47.0	0.58	0.118	46.33	1.50	0.81	
DE	54.0	54.0	55.0	0.58	0.118	54.33	4.28	3.58	↑
DG									•
DH	40.0	41.0	41.0	0.58	0.118	40.67	-0.46	-1.15	
DJ	58.0	58.0	75.0	9.81	2.921	63.67	7.51	6.81	↑
DM	37.0	40.0	34.0	3.00	0.709	37.00	-1.73	-2.42	

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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	
DO	42.0	45.0	46.0	2.08	0.473	44.33	0.81	0.12
DP	44.0	46.0	44.0	1.15	0.236	44.67	0.93	0.23
DR	42.0	40.0	43.0	1.53	0.354	41.67	-0.11	-0.81
DS	50.0	45.0	47.0	2.52	0.591	47.33	1.85	1.15
DT	45.0	38.0	43.0	3.61	0.827	42.00	0.00	-0.69
DX								•
DZ	40.0	42.0	42.0	1.15	0.236	41.33	-0.23	-0.92
E	44.0	51.0	46.0	3.61	0.827	47.00	1.74	1.04
EA	47.0	44.0	48.0	2.08	0.473	46.33	1.50	0.81
EB	39.0	41.0	42.0	1.53	0.354	40.67	-0.46	-1.15
EH	42.0	39.0	38.0	2.08	0.473	39.67	-0.80	-1.50
EL								•
EN	36.0	31.0	29.0	3.61	0.827	32.00	-3.46	-4.16 ↓
EO	45.0	50.0	47.0	2.52	0.591	47.33	1.85	1.15
ER								•
ES	36.0	37.0	37.0	0.58	0.118	36.67	-1.84	-2.54
EV	42.0	43.0	49.0	3.79	0.827	44.67	0.93	0.23
EW	45.0	45.0	51.0	3.46	0.709	47.00	1.74	1.04
FE	41.0	38.0	37.0	2.08	0.473	38.67	-1.15	-1.85
FF	38.0	39.0	40.0	1.00	0.236	39.00	-1.04	-1.73
FJ	62.0	60.0	59.0	1.53	0.354	60.33	6.35	5.66 ↑
FK	120.0	104.0	295.0	105.96	42.073	173.00	45.38	44.69 ×
FL	4.0	4.0	4.0	0.00	0.000	4.00	-13.16	-13.86 ×
FN	54.0	47.0	47.0	4.04	0.827	49.33	2.54	1.85
FP	42.0	41.0	42.0	0.58	0.118	41.67	-0.11	-0.81
FU	35.0	35.0	35.0	0.00	0.000	35.00	-2.42	-3.12 ↓
FW								•
FZ	17.0	28.0	21.0	5.57	1.570	22.00	-6.92	-7.62 ↓
GE	45.0	41.0	42.0	2.08	0.473	42.67	0.23	-0.46
GJ	246.0	299.0	123.0	90.29	38.698	222.67	62.59	61.89 ×
GQ	45.0	45.0	45.0	0.00	0.000	45.00	1.04	0.35
GT	74.0	118.0	58.0	31.07	12.596	83.33	14.32	13.63 ×
GZ	45.0	47.0	48.0	1.53	0.354	46.67	1.62	0.92
HH	39.0	40.0	41.0	1.00	0.236	40.00	-0.69	-1.39
HI	35.0	34.0	36.0	1.00	0.236	35.00	-2.42	-3.12 ↓
HK	46.0	47.0	48.0	1.00	0.236	47.00	1.74	1.04
HL	55.0	55.0	55.0	0.00	0.000	55.00	4.51	3.81 ↑
HN								•
HP	29.0	32.0	30.0	1.53	0.354	30.33	-4.04	-4.73 ↓
HU								•
HY								•
I	47.0	50.0	35.0	7.94	2.470	44.00	0.70	0.00
IC	49.0	44.0	52.0	4.04	0.945	48.33	2.20	1.50
ID								•
IE	49.0	42.0	40.0	4.73	1.120	43.67	0.58	-0.12

• = No data submitted

TAG SYMBOLS

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∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

15 / 20 EMSL-LV Intercomparison Study: Gross Alpha-Beta in Water, 29-Jan-1993

Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
IU	40.0	39.0	39.0	0.58	0.118	39.33	-0.92	-1.62	
J	44.0	44.0	43.0	0.58	0.118	43.67	0.58	-0.12	
JE	6.0	6.0	5.0	0.58	0.118	5.67	-12.58	-13.28	×
JG	48.0	48.0	44.0	2.31	0.473	46.67	1.62	0.92	
JH	14.0	16.0	14.0	1.15	0.236	14.67	-9.46	-10.16	×
JM	46.0	46.0	47.0	0.58	0.118	46.33	1.50	0.81	
JN	37.0	38.0	36.0	1.00	0.236	37.00	-1.73	-2.42	
JP	45.0	44.0	43.0	1.00	0.236	44.00	0.70	0.00	
JQ									•
JS	45.0	43.0	41.0	2.00	0.473	43.00	0.35	-0.35	
K	36.0	34.0	40.0	3.06	0.709	36.67	-1.84	-2.54	
KC	20.0	21.0	20.0	0.58	0.118	20.33	-7.50	-8.20	↓
KE	42.0	44.0	43.0	1.00	0.236	43.00	0.35	-0.35	
KT	2.0	2.0	2.0	0.00	0.000	2.00	-13.85	-14.55	×
KX	39.0	39.0	40.0	0.58	0.118	39.33	-0.92	-1.62	
KZ	43.0	44.0	44.0	0.58	0.118	43.67	0.58	-0.12	
L	39.0	41.0	38.0	1.53	0.354	39.33	-0.92	-1.62	
LA									•
LE	31.0	30.0	39.0	4.93	1.120	33.33	-3.00	-3.70	↓
LF	41.0	38.0	43.0	2.52	0.591	40.67	-0.46	-1.15	
LG									•
LL	48.0	49.0	50.0	1.00	0.236	49.00	2.43	1.73	
LM									•
LR	52.0	50.0	46.0	3.06	0.709	49.33	2.54	1.85	
LS									•
LT	54.0	55.0	55.0	0.58	0.118	54.67	4.39	3.70	↑
M									•
MA	33.0	28.0	30.0	2.52	0.591	30.33	-4.04	-4.73	↓
ME	44.0	46.0	46.0	1.15	0.236	45.33	1.16	0.46	
MN									•
MQ	42.0	37.0	39.0	2.52	0.591	39.33	-0.92	-1.62	
MS	43.0	44.0	46.0	1.53	0.354	44.33	0.81	0.12	
MV									•
MX									•
MY	76.0	78.0	81.0	2.52	0.591	78.33	12.59	11.89	×
N	33.0	36.0	35.0	1.53	0.354	34.67	-2.54	-3.23	↓
NA	38.0	40.0	42.0	2.00	0.473	40.00	-0.69	-1.39	
NE	30.0	33.0	33.0	1.73	0.354	32.00	-3.46	-4.16	↓
NF	49.0	47.0	47.0	1.15	0.236	47.67	1.97	1.27	
NG	28.0	33.0	32.0	2.65	0.591	31.00	-3.81	-4.50	↓
NH	49.0	43.0	43.0	3.46	0.709	45.00	1.04	0.35	
NI	41.0	40.0	38.0	1.53	0.354	39.67	-0.80	-1.50	
NJ	89.0	100.0	103.0	7.37	2.245	97.33	19.17	18.48	×
NK	34.0	35.0	34.0	0.58	0.118	34.33	-2.65	-3.35	↓
NO	45.0	47.0	49.0	2.00	0.473	47.00	1.74	1.04	

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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
NP									•
NT	40.0	44.0	42.0	2.00	0.473	42.00	0.00	-0.69	
O	45.0	44.0	47.0	1.53	0.354	45.33	1.16	0.46	
OA	44.0	42.0	42.0	1.15	0.236	42.67	0.23	-0.46	
OB	42.0	38.0	39.0	2.08	0.473	39.67	-0.80	-1.50	
OE	46.0	47.0	48.0	1.00	0.236	47.00	1.74	1.04	
OF	4.0	5.0	4.0	0.58	0.118	4.33	-13.04	-13.74	×
OK									•
OL									•
OS	41.0	45.0	51.0	5.03	1.345	45.67	1.27	0.58	
OT	46.0	39.0	42.0	3.51	0.827	42.33	0.12	-0.58	
OY	33.0	35.0	35.0	1.15	0.236	34.33	-2.65	-3.35	↓
OZ									•
P	56.0	43.0	43.0	7.51	2.020	47.33	1.85	1.15	
PA	50.0	52.0	46.0	3.06	0.709	49.33	2.54	1.85	
PB	43.0	48.0	45.0	2.52	0.591	45.33	1.16	0.46	
PC	4.0	5.0	5.0	0.58	0.118	4.67	-12.93	-13.63	×
PE									•
PG	42.0	43.0	44.0	1.00	0.236	43.00	0.35	-0.35	
PP									•
PQ	43.0	43.0	44.0	0.58	0.118	43.33	0.47	-0.23	
PR	48.0	44.0	48.0	2.31	0.473	46.67	1.62	0.92	
PV	32.0	37.0	37.0	2.89	0.591	35.33	-2.31	-3.00	
PW	82.0	32.0	60.0	25.06	10.346	58.00	5.55	4.85	↑
Q	50.0	50.0	45.0	2.89	0.591	48.33	2.20	1.50	
QC	28.0	30.0	37.0	4.73	1.120	31.67	-3.58	-4.27	↓
QJ	35.0	40.0	29.0	5.51	1.570	34.67	-2.54	-3.23	↓
QK	43.0	40.0	40.0	1.73	0.354	41.00	-0.34	-1.04	
QM	32.0	33.0	35.0	1.53	0.354	33.33	-3.00	-3.70	↓
QP	35.0	35.0	34.0	0.58	0.118	34.67	-2.54	-3.23	↓
QQ	45.0	44.0	44.0	0.58	0.118	44.33	0.81	0.12	
QT	48.0	43.0	43.0	2.89	0.591	44.67	0.93	0.23	
QU	36.0	37.0	38.0	1.00	0.236	37.00	-1.73	-2.42	
QW									•
QX	37.0	38.0	39.0	1.00	0.236	38.00	-1.38	-2.08	
QZ	46.0	43.0	43.0	1.73	0.354	44.00	0.70	0.00	
R	47.0	45.0	45.0	1.15	0.236	45.67	1.27	0.58	
RB	67.0	55.0	60.0	6.03	1.795	60.67	6.47	5.77	↑
RC	48.0	40.0	40.0	4.62	0.945	42.67	0.23	-0.46	
RD	47.0	52.0	48.0	2.65	0.591	49.00	2.43	1.73	
RE	42.0	42.0	41.0	0.58	0.118	41.67	-0.11	-0.81	
RG	40.0	41.0	41.0	0.58	0.118	40.67	-0.46	-1.15	
RH	38.0	37.0	35.0	1.53	0.354	36.67	-1.84	-2.54	
RI	47.0	51.0	56.0	4.51	1.120	51.33	3.24	2.54	
RJ	51.0	57.0	49.0	4.16	0.945	52.33	3.58	2.89	

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17 / 20 EMSL-LV Intercomparison Study: Gross Alpha-Beta in Water, 29-Jan-1993

Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
RL	56.0	38.0	50.0	9.17	3.146	48.00	2.08	1.39
RM	50.0	51.0	50.0	0.58	0.118	50.33	2.89	2.19
RN	20.0	29.0	28.0	4.93	1.120	25.67	-5.65	-6.35 ↓
RQ								•
RR	44.0	46.0	40.0	3.06	0.709	43.33	0.47	-0.23
RT	52.0	46.0	49.0	3.00	0.709	49.00	2.43	1.73
RV								•
RW	30.0	29.0	33.0	2.08	0.473	30.67	-3.92	-4.62 ↓
RZ	27.0	24.0	28.0	2.08	0.473	26.33	-5.42	-6.12 ↓
S	42.0	44.0	46.0	2.00	0.473	44.00	0.70	0.00
SA	55.0	68.0	63.0	6.56	2.020	62.00	6.93	6.24 ↑
SC	39.0	42.0	41.0	1.53	0.354	40.67	-0.46	-1.15
SD	49.0	46.0	39.0	5.13	1.345	44.67	0.93	0.23
SF	42.0	41.0	43.0	1.00	0.236	42.00	0.00	-0.69
SG	66.0	67.0	67.0	0.58	0.118	66.67	8.55	7.85 ↑
SI	41.0	46.0	43.0	2.52	0.591	43.33	0.47	-0.23
SL	53.0	42.0	41.0	6.66	1.795	45.33	1.16	0.46
SM	13.0	11.0	13.0	1.15	0.236	12.33	-10.27	-10.97 ×
SN	33.0	24.0	35.0	5.86	1.570	30.67	-3.92	-4.62 ↓
SO	40.0	41.0	41.0	0.58	0.118	40.67	-0.46	-1.15
SR	47.0	46.0	44.0	1.53	0.354	45.67	1.27	0.58
SS	41.0	41.0	42.0	0.58	0.118	41.33	-0.23	-0.92
ST	37.0	35.0	37.0	1.15	0.236	36.33	-1.96	-2.66
SU	19.0	22.0	23.0	2.08	0.473	21.33	-7.16	-7.85 ↓
SW								•
SX								•
SZ	50.0	48.0	52.0	2.00	0.473	50.00	2.78	2.08
T	41.0	40.0	42.0	1.00	0.236	41.00	-0.34	-1.04
TA	44.0	40.0	43.0	2.08	0.473	42.33	0.12	-0.58
TE	42.0	41.0	42.0	0.58	0.118	41.67	-0.11	-0.81
TG								•
TH	31.0	34.0	36.0	2.52	0.591	33.67	-2.88	-3.58 ↓
TI	39.0	40.0	37.0	1.53	0.354	38.67	-1.15	-1.85
TK								•
TL	40.0	41.0	44.0	2.08	0.473	41.67	-0.11	-0.81
TM								•
TN	36.0	38.0	39.0	1.53	0.354	37.67	-1.50	-2.19
TQ	49.0	52.0	45.0	3.51	0.827	48.67	2.31	1.62
TS								•
TT								•
TV	85.0	89.0	92.0	3.51	0.827	88.67	16.17	15.47 ×
TW	43.0	45.0	41.0	2.00	0.473	43.00	0.35	-0.35
TY	38.0	37.0	35.0	1.53	0.354	36.67	-1.84	-2.54
TZ								•
U	36.0	40.0	43.0	3.51	0.827	39.67	-0.80	-1.50

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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
UA	31.0	28.0	27.0	2.08	0.473	28.67	-4.61	-5.31	↓
UB									•
UC									•
UE	48.0	47.0	43.0	2.65	0.591	46.00	1.39	0.69	
UG	20.0	28.0	23.0	4.04	0.945	23.67	-6.35	-7.04	↓
UI	44.0	39.0	48.0	4.51	1.120	43.67	0.58	-0.12	
UJ									•
W	46.0	46.0	46.0	0.00	0.000	46.00	1.39	0.69	
X	33.0	29.0	34.0	2.65	0.591	32.00	-3.46	-4.16	↓
Y	49.0	48.0	44.0	2.65	0.591	47.00	1.74	1.04	
Z	45.0	47.0	46.0	1.00	0.236	46.00	1.39	0.69	

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
2.00	×	KT	34.33	↓	NK	39.67		U
4.00	×	FL	34.67	↓	QP	39.67		OB
4.33	×	OF	34.67	↓	QJ	39.67		NI
4.67	×	PC	34.67	↓	N	39.67		EH
5.67	×	JE	35.00	↓	HI	39.67		CE
12.33	×	SM	35.00	↓	FU	40.00		NA
12.67	×	AY	35.33		PV	40.00		HH
14.67	×	JH	35.67		CO	40.33		BA
20.33	↓	KC	35.67		AO	40.67		SO
20.33	↓	AN	36.33		ST	40.67		SC
21.33	↓	SU	36.67		TY	40.67		RG
22.00	↓	FZ	36.67		RH	40.67		LF
23.67	↓	UG	36.67		K	40.67		EB
25.67	↓	RN	36.67		ES	40.67		DH
26.33	↓	RZ	37.00		QU	40.67		BH
28.67	↓	UA	37.00		JN	41.00		T
30.33	↓	MA	37.00		DM	41.00		QK
30.33	↓	HP	37.00		AE	41.33		SS
30.67	↓	SN	37.67		TN	41.33		DZ
30.67	↓	RW	37.67		BC	41.67		TL
31.00	↓	NG	38.00		QX	41.67		TE
31.00	↓	AL	38.33		BG	41.67		RE
31.67	↓	QC	38.67		TI	41.67		FP
32.00	↓	X	38.67		FE	41.67		DR
32.00	↓	NE	39.00		FF	41.67		AP
32.00	↓	EN	39.00		CP	42.00		SF
33.33	↓	QM	39.33		MQ	42.00		NT
33.33	↓	LE	39.33		L	42.00		DT
33.33	↓	CG	39.33		KX	42.00		AI
33.67	↓	TH	39.33		IU	42.33		TA
34.33	↓	OY	39.33		AZ	42.33		OT

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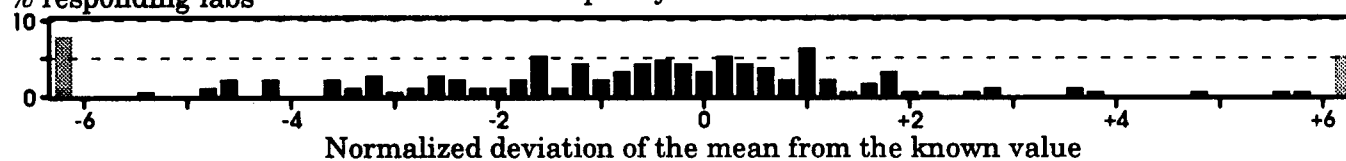
Gross Beta

Data sorted by Laboratory Average

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
42.33		AJ	44.67		BL	47.33		EO
42.33		A	44.67		AK	47.33		DS
42.67		RC	45.00		NH	47.67		NF
42.67		OA	45.00		GQ	48.00		RL
42.67		GE	45.33		SL	48.33		Q
42.67		AF	45.33		PB	48.33		IC
43.00		TW	45.33		O	48.67		TQ
43.00		PG	45.33		ME	49.00		RT
43.00		KE	45.33		BK	49.00		RD
43.00		JS	45.33		AW	49.00		LL
43.00		BN	45.67		SR	49.33		PA
43.33		SI	45.67		R	49.33		LR
43.33		RR	45.67		OS	49.33		FN
43.33		PQ	46.00		Z	50.00		SZ
43.67		UI	46.00		W	50.33		RM
43.67		KZ	46.00		UE	51.33		RI
43.67		J	46.00		BM	52.00		CJ
43.67		IE	46.33		JM	52.33		RJ
43.67		D	46.33		EA	54.33	↑↑	DE
44.00		S	46.33		DD	54.67	↑↑	LT
44.00		QZ	46.33		BI	55.00	↑↑	HL
44.00		JP	46.67		PR	58.00	↑↑	PW
44.00		I	46.67		JG	60.33	↑↑	FJ
44.00		CQ	46.67		GZ	60.67	↑↑	RB
44.00		AR	46.67		CA	62.00	↑↑	SA
44.33		QQ	46.67		C	63.67	↑↑	DJ
44.33		MS	46.67		BO	66.67	↑↑	SG
44.33		DO	47.00		Y	78.33	×	MY
44.33		DB	47.00		OE	83.33	×	GT
44.67		SD	47.00		NO	88.67	×	TV
44.67		QT	47.00		HK	97.33	×	NJ
44.67		EV	47.00		EW	173.00	×	FK
44.67		DP	47.00		E	222.67	×	GJ
			47.33		P	272.67	×	CX

% responding labs

Frequency distribution



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Gross Beta

