

Research and Development



# Tritium in Water Intercomparison Study

## A Statistical Evaluation of the June 4, 1993 Data

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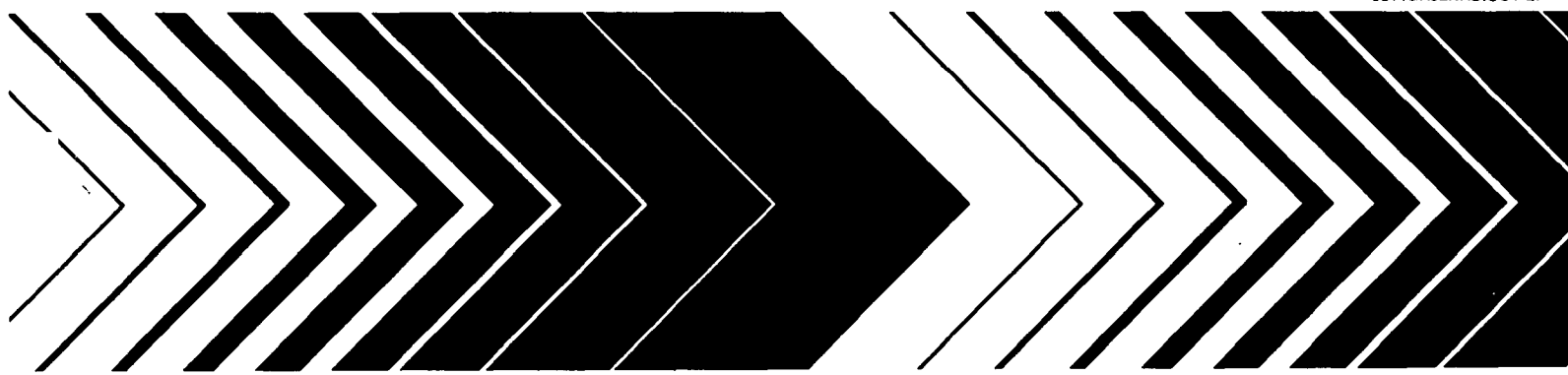
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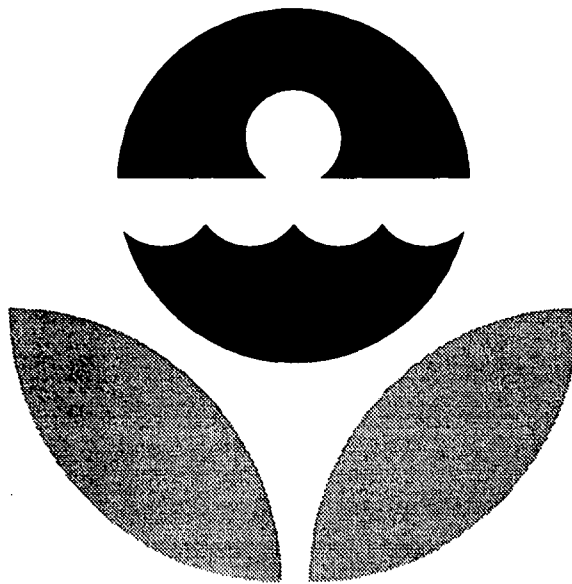
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Tritium in Water  
Intercomparison Study  
June 4, 1993



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 *Tritium in Water*; June 4, 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.

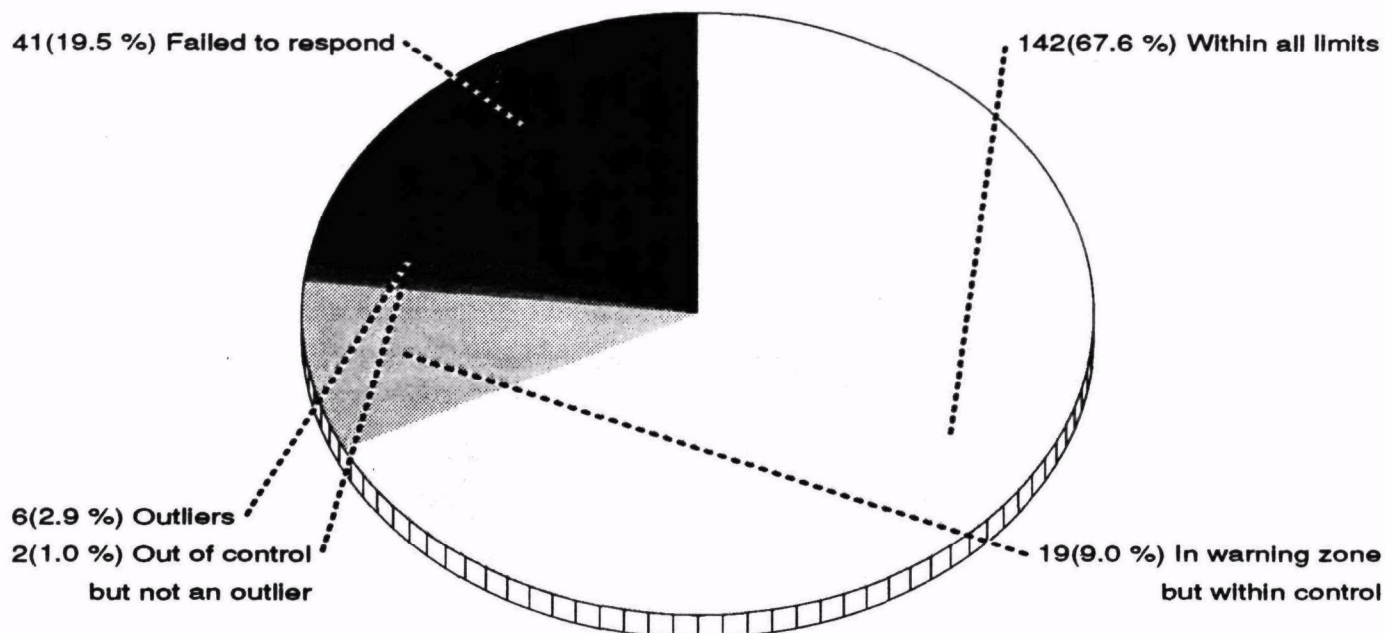
The normalized deviation of the mean from the grand average is calculated from the deviation of the mean from the grand average and the standard error of the mean values. The deviation of the mean from the grand average is calculated by subtracting the grand average from the average of the laboratory's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

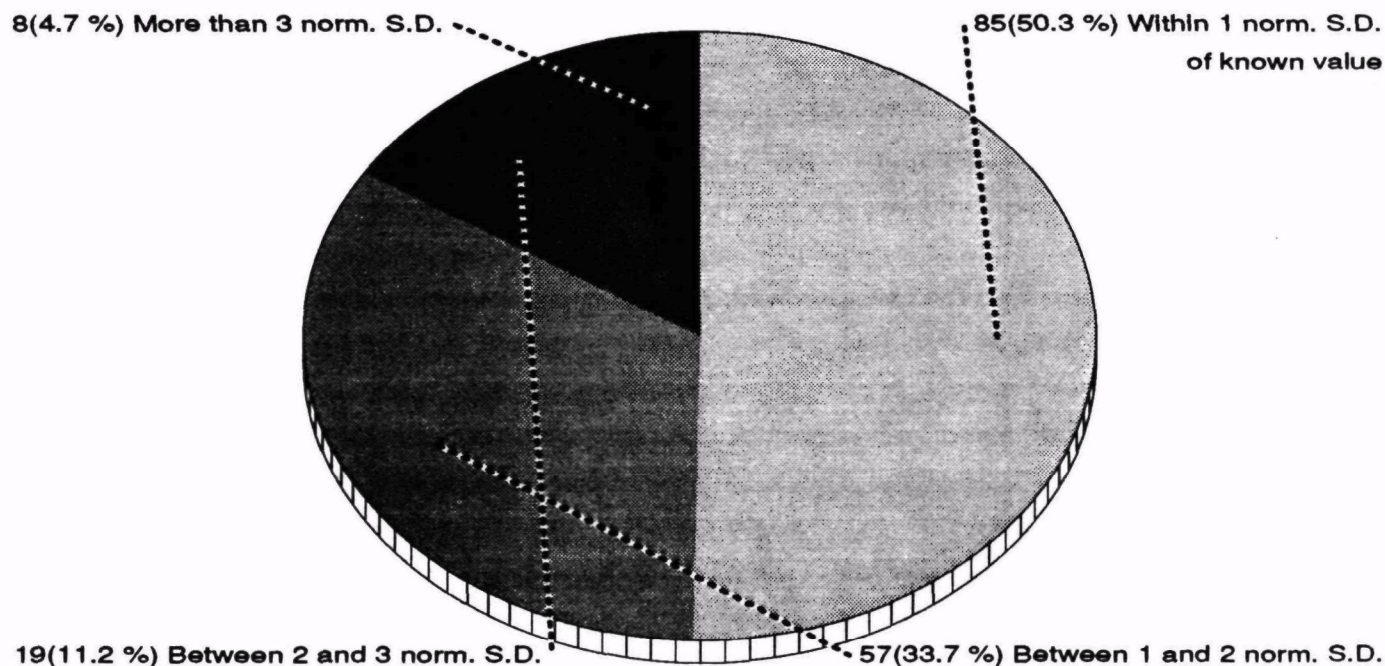
A complete explanation of the statistical calculations involved in the report may be found in the Environmental Radioactivity Laboratory Intercomparison Studies Program information brochure [Draft Revision of EPA-600/4-81-004], available from Frank Novielli, EMSL-LV, 702/798-2159.

**Tritium****Statistical Summary****210 Participants**

The known value of this nuclide is **9844.0 pCi/l** with an expected precision of **984.0**; the control limits are 8136.8 to 11551.2; the warning regions are 8136.8 to 8704.9 and 10983.1 to 11551.2



Statistic	Respondents	Non-outliers
Mean	9434.52	<b>Grand Avg 9591.82</b>
Std. Dev.	1299.62	689.10
Variance	1689014.67	474852.55
% Coef. of Var.	13.78	7.18
% deviation of mean from known value	-4.16	-2.56
Norm. dev. of mean from known value	-0.32	-0.37
Median	9546.00	9580.00
% deviation of median from known value	-3.03	-2.68
Norm. dev. of median from known value	-0.23	-0.38



Tritium								
Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)	Tag
A	9356.0	9235.0	9230.0	71.36	0.076	9273.67	-0.56	-1.00
AB	10483.0	10416.0	10388.0	48.85	0.057	10429.00	1.47	1.03
AE	9200.0	9218.0	9140.0	40.82	0.047	9186.00	-0.71	-1.16
AF	9007.0	9139.0	9390.0	194.56	0.230	9178.67	-0.73	-1.17
AH	10824.0	10826.0	10994.0	97.56	0.102	10881.33	2.27	1.83
AI	9590.0	9670.0	9480.0	95.37	0.114	9580.00	-0.02	-0.46
AJ								•
AK	9664.0	9643.0	9284.0	213.58	0.228	9530.33	-0.11	-0.55
AP	9721.0	9201.0	9052.0	351.23	0.402	9324.67	-0.47	-0.91
AU	9800.0	9600.0	9900.0	152.78	0.180	9766.67	0.31	-0.14
AW	9612.0	9608.0	9694.0	48.60	0.052	9638.00	0.08	-0.36
AY	9234.0	9202.0	9282.0	40.29	0.048	9239.33	-0.62	-1.06
AZ	8467.0	8010.0	8747.0	372.02	0.442	8408.00	-2.08	-2.53
BA	9400.0	9400.0	9365.0	20.29	0.021	9388.33	-0.36	-0.80
BB	9349.0	9548.0	9463.0	99.87	0.119	9453.33	-0.24	-0.69
BC	10960.0	10520.0	10480.0	266.33	0.288	10653.33	1.87	1.42
BG	10300.0	11000.0	11000.0	404.16	0.420	10766.67	2.07	1.62
BI								•
BL	9157.0	9062.0	8990.0	83.76	0.100	9069.67	-0.92	-1.36
BM	10900.0	10700.0	10700.0	115.50	0.120	10766.67	2.07	1.62
BO	9200.0	9300.0	9200.0	57.74	0.060	9233.33	-0.63	-1.07
BW	8500.0	8300.0	8800.0	251.66	0.300	8533.33	-1.86	-2.31
C	11261.0	11121.0	11644.0	270.75	0.314	11342.00	3.08	2.64
CA	9600.0	9600.0	9640.0	23.09	0.024	9613.33	0.04	-0.41
CC								•
CE	9930.0	10130.0	10030.0	99.97	0.120	10030.00	0.77	0.33
CG								•
CJ	9400.0	9500.0	9200.0	152.75	0.180	9366.67	-0.40	-0.84
CK	8800.0	9300.0	9300.0	288.68	0.300	9133.33	-0.81	-1.25
CM	9800.0	9913.0	10034.0	117.05	0.140	9915.67	0.57	0.13
CO	8670.0	9140.0	8900.0	235.01	0.282	8903.33	-1.21	-1.66
CP	9422.0	9113.0	9267.0	154.50	0.185	9267.33	-0.57	-1.02
CQ	9040.0	8960.0	9320.0	189.03	0.216	9106.67	-0.85	-1.30
CS								•
CX	9764.0	9955.0	9178.0	404.89	0.466	9632.33	0.07	-0.37
D	9198.0	9322.0	9379.0	92.54	0.109	9299.67	-0.51	-0.96
DD	9670.0	9800.0	9700.0	68.11	0.078	9723.33	0.23	-0.21
DE	9400.0	9416.0	9432.0	16.00	0.019	9416.00	-0.31	-0.75
DG	9710.0	10200.0	9240.0	480.03	0.576	9716.67	0.22	-0.22
DH	9425.0	9438.0	9601.0	98.06	0.106	9488.00	-0.18	-0.63
DI	9660.0	9590.0	9490.0	85.46	0.102	9580.00	-0.02	-0.46
DJ	8888.0	9232.0	9099.0	173.48	0.206	9073.00	-0.91	-1.36
DL	9800.0	9800.0	9800.0	0.00	0.000	9800.00	0.37	-0.08
DM	10300.0	10400.0	10660.0	185.83	0.216	10453.33	1.52	1.07
DR								•
• = No data submitted			TAG SYMBOLS			↑ = Above control limit		
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Tritium								
Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known) Tag
DT	9400.0	9700.0	9300.0	208.17	0.240	9466.67	-0.22	-0.66
DY								
E	9648.0	9492.0	9746.0	128.12	0.152	9628.67	0.06	-0.38
EA	10300.0	10300.0	10300.0	2.83	0.000	10300.00	1.25	0.80
EB	8920.0	9010.0	9180.0	132.03	0.156	9036.67	-0.98	-1.42
EH	8490.0	9080.0	8460.0	349.62	0.372	8676.67	-1.61	-2.05
EL	10477.0	11105.0	10228.0	451.95	0.526	10603.33	1.78	1.34
EN	9050.0	9010.0	9900.0	502.70	0.534	9320.00	-0.48	-0.92
EW	8488.0	8288.0	8474.0	111.64	0.120	8416.67	-2.07	-2.51
EX	8377.0	8316.0	8440.0	62.00	0.074	8377.67	-2.14	-2.58
FA								
FB								
FE	9680.0	9680.0	9570.0	63.49	0.066	9643.33	0.09	-0.35
FK	10395.0	10602.0	10502.0	103.52	0.124	10499.67	1.60	1.15
FL	9049.0	9193.0	9268.0	111.29	0.131	9170.00	-0.74	-1.19
FU	9400.0	9470.0	9640.0	123.42	0.144	9503.33	-0.16	-0.60
FZ	12000.0	11000.0	11000.0	577.35	0.600	11333.33	3.07	2.62
GE	9800.0	9800.0	9800.0	0.00	0.000	9800.00	0.37	-0.08
GO								
GQ	9200.0	9000.0	9100.0	100.00	0.120	9100.00	-0.87	-1.31
HI	9417.0	9418.0	9392.0	14.65	0.016	9409.00	-0.32	-0.77
HJ	9670.0	9390.0	9380.0	164.63	0.174	9480.00	-0.20	-0.64
HK	9959.0	9813.0	9878.0	73.10	0.088	9883.33	0.51	0.07
HP	10300.0	9940.0	10500.0	283.80	0.336	10246.67	1.15	0.71
HR	10292.0	10241.0	10329.0	44.17	0.053	10287.33	1.22	0.78
HU	10245.0	10213.0	10063.0	97.20	0.109	10173.67	1.02	0.58
I	8796.0	8978.0	8814.0	100.31	0.109	8862.67	-1.28	-1.73
IA								
IC	9600.0	10170.0	10080.0	306.43	0.342	9950.00	0.63	0.19
II								
IU	10000.0	10378.0	9973.0	226.44	0.243	10117.00	0.92	0.48
J	9940.0	9684.0	10071.0	196.85	0.232	9898.33	0.54	0.10
JE	9943.0	10166.0	9671.0	247.90	0.297	9926.67	0.59	0.15
JG								
JI	9650.0	9900.0	9840.0	130.53	0.150	9796.67	0.36	-0.08
JK	10012.0	9567.0	10017.0	258.39	0.270	9865.33	0.48	0.04
JM	10687.0	10584.0	9502.0	656.45	0.711	10257.67	1.17	0.73
JP	9600.0	9678.0	9819.0	111.01	0.131	9699.00	0.19	-0.26
JR	8630.0	8530.0	8750.0	110.16	0.132	8636.67	-1.68	-2.13
JS	9800.0	10000.0	9700.0	152.78	0.180	9833.33	0.43	-0.02
JY	9750.0	9600.0	9040.0	374.21	0.426	9463.33	-0.23	-0.67
K	8447.0	8506.0	8447.0	34.02	0.035	8466.67	-1.98	-2.42
KH	9177.0	9156.0	9215.0	29.89	0.035	9182.67	-0.72	-1.16
KM	10208.0	9479.0	11991.0	1292.33	1.967	10559.33	1.70	1.26
KX	9560.0	9290.0	8930.0	316.08	0.378	9260.00	-0.58	-1.03

• = No data submitted

TAG SYMBOLS

↑ = Above control limit

∅ = Insufficient data

× = Determined to be an outlier

↓ = Below control limit

**Tritium**

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
L	9784.0	9757.0	9795.0	19.73	0.023	9778.67	0.33	-0.12
LA								•
LE								•
LF	9700.0	10000.0	9900.0	152.75	0.180	9866.67	0.48	0.04
LM								•
LR								•
LS								•
LT	10046.0	10083.0	10222.0	92.84	0.106	10117.00	0.92	0.48
MA	8966.0	9314.0	9154.0	174.19	0.209	9144.67	-0.79	-1.23
ML	10400.0	9940.0	10500.0	298.66	0.336	10280.00	1.21	0.77
MN	9700.0	9300.0	9300.0	230.94	0.240	9433.33	-0.28	-0.72
MQ	9790.0	9530.0	9690.0	131.13	0.156	9670.00	0.14	-0.31
MS	6380.0	6470.0	6510.0	66.58	0.078	6453.33	-5.52	-5.97 ×
MT								•
MV	9100.0	9035.0	8867.0	120.23	0.140	9000.67	-1.04	-1.48
N	9805.0	9681.0	9621.0	93.83	0.110	9702.33	0.19	-0.25
NB	9551.0	9377.0	9392.0	96.42	0.104	9440.00	-0.27	-0.71
NH	9372.0	9329.0	9298.0	37.13	0.044	9333.00	-0.46	-0.90
NI								•
NJ	11000.0	11000.0	12000.0	577.35	0.600	11333.33	3.07	2.62
NO								•
NP	8941.0	8726.0	9378.0	332.24	0.391	9015.00	-1.02	-1.46
O	9206.0	9300.0	9236.0	47.99	0.056	9247.33	-0.61	-1.05
OA	9830.0	9630.0	9730.0	99.97	0.120	9730.00	0.24	-0.20
OK	8759.0	8984.0	8676.0	159.36	0.185	8806.33	-1.38	-1.83
OL	8032.0	7739.0	8497.0	382.24	0.455	8089.33	-2.64	-3.09 ↓
OM								•
OT	8940.0	8560.0	9580.0	515.49	0.612	9026.67	-0.99	-1.44
OX	9400.0	9560.0	9430.0	85.04	0.096	9463.33	-0.23	-0.67
PB	9522.0	9798.0	9542.0	153.88	0.166	9620.67	0.05	-0.39
PC	10520.0	10300.0	10620.0	163.71	0.192	10480.00	1.56	1.12
PD	8303.0	8280.0	8334.0	27.05	0.032	8305.67	-2.26	-2.71
PI	9046.0	9227.0	9012.0	115.58	0.129	9095.00	-0.87	-1.32
PJ								•
PM	8949.0	9056.0	8622.0	226.11	0.261	8875.67	-1.26	-1.70
PP								•
PQ	9465.0	8809.0	8947.0	345.86	0.394	9073.67	-0.91	-1.36
PT	8694.0	8640.0	8667.0	27.03	0.032	8667.00	-1.63	-2.07
PU								•
PV	9526.0	9435.0	9415.0	59.17	0.067	9458.67	-0.23	-0.68
PY								•
Q	10702.0	10534.0	10394.0	154.19	0.185	10543.33	1.67	1.23
QA	12913.0	12237.0	12763.0	355.00	0.406	12637.67	5.36	4.92 ×
QB	9800.0	9530.0	9800.0	155.88	0.162	9710.00	0.21	-0.24
QC	66.0	65.0	65.0	0.58	0.001	65.33	-16.77	-17.21 ×

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**Tritium**

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known)		Tag
QD	9167.0	8864.0	8960.0	154.85	0.182	8997.00	-1.05	-1.49	
QI	9034.0	10230.0	9470.0	605.27	0.718	9578.00	-0.02	-0.47	
QJ	9730.0	10300.0	9820.0	306.43	0.342	9950.00	0.63	0.19	
QK	10629.0	11008.0	10939.0	201.88	0.228	10858.67	2.23	1.79	
QL	10100.0	9900.0	10500.0	305.52	0.360	10166.67	1.01	0.57	
QM	9156.0	9244.0	9269.0	59.38	0.068	9223.00	-0.65	-1.09	
QP	11150.0	11320.0	11040.0	141.06	0.168	11170.00	2.78	2.33	
QQ	8648.0	8632.0	8587.0	31.68	0.037	8622.33	-1.71	-2.15	
QT	9974.0	10563.0	11317.0	673.18	0.806	10618.00	1.81	1.36	
QU	10119.0	10226.0	10129.0	59.14	0.064	10158.00	1.00	0.55	
QW	10237.0	10216.0	10022.0	118.51	0.129	10158.33	1.00	0.55	
QX	10876.0	11060.0	10976.0	92.12	0.110	10970.67	2.43	1.98	
QZ	9619.0	9502.0	9680.0	90.42	0.107	9600.33	0.01	-0.43	
R	9816.0	9758.0	9696.0	59.99	0.072	9756.67	0.29	-0.15	
RA	9850.0	9440.0	9620.0	205.52	0.246	9636.67	0.08	-0.36	
RC	9520.0	9270.0	9420.0	125.82	0.150	9403.33	-0.33	-0.78	
RF	8200.0	8381.0	8257.0	92.56	0.109	8279.33	-2.31	-2.75	
RH									•
RL	5184.0	4947.0	4851.0	171.40	0.200	4994.00	-8.09	-8.54	×
RM	8743.0	8552.0	8797.0	128.74	0.147	8697.33	-1.57	-2.02	
RN	9510.0	9340.0	9460.0	87.36	0.102	9436.67	-0.27	-0.72	
RO	8999.0	9357.0	9237.0	182.21	0.215	9197.67	-0.69	-1.14	
RQ									•
RR	9763.0	10059.0	9987.0	154.35	0.178	9936.33	0.61	0.16	
RS									•
RV	7340.0	7759.0	7505.0	211.07	0.252	7534.67	-3.62	-4.06	↓
RX	9328.0	9548.0	9371.0	116.62	0.132	9415.67	-0.31	-0.75	
S	9440.0	9390.0	9480.0	45.07	0.054	9436.67	-0.27	-0.72	
SA									•
SC	10000.0	9800.0	9500.0	251.68	0.300	9766.67	0.31	-0.14	
SD	10250.0	10660.0	10370.0	210.80	0.246	10426.67	1.47	1.03	
SF	4755.0	4751.0	4698.0	31.83	0.034	4734.67	-8.55	-8.99	×
SI	9290.0	9310.0	8790.0	294.62	0.312	9130.00	-0.81	-1.26	
SK									•
SM	8649.0	8463.0	8182.0	235.10	0.280	8431.33	-2.04	-2.49	
SN	9840.0	9890.0	9660.0	120.99	0.138	9796.67	0.36	-0.08	
SQ	9066.0	9341.0	9026.0	171.49	0.189	9144.33	-0.79	-1.23	
SS	9090.0	9337.0	9176.0	125.37	0.148	9201.00	-0.69	-1.13	
ST	9500.0	9460.0	9490.0	20.77	0.024	9483.33	-0.19	-0.63	
SU	8406.0	8256.0	8174.0	117.67	0.139	8278.67	-2.31	-2.76	
SW									•
SZ	9875.0	9720.0	9768.0	79.32	0.093	9787.67	0.34	-0.10	
T	9750.0	9620.0	9590.0	85.07	0.096	9653.33	0.11	-0.34	
TA	9580.0	8820.0	8820.0	438.79	0.456	9073.33	-0.91	-1.36	
TD	9220.0	9270.0	11880.0	1521.53	2.137	10123.33	0.94	0.49	

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**Tritium**

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg) (known) Tag	
TE	9842.0	9755.0	9706.0	68.88	0.082	9767.67	0.31	-0.13
TF								•
TG	8080.0	8360.0	8310.0	149.33	0.168	8250.00	-2.36	-2.81
TH	8700.0	9200.0	8800.0	264.58	0.300	8900.00	-1.22	-1.66
TI	10341.0	9800.0	10071.0	270.49	0.325	10070.67	0.84	0.40
TL	9050.0	9050.0	8930.0	69.30	0.072	9010.00	-1.02	-1.47
TO	10900.0	10800.0	10500.0	208.17	0.240	10733.33	2.01	1.57
TQ	9784.0	10773.0	11106.0	687.59	0.794	10554.33	1.69	1.25
TS	9052.0	8605.0	9126.0	281.88	0.313	8927.67	-1.17	-1.61
TU	8800.0	8600.0	9700.0	585.95	0.660	9033.33	-0.98	-1.43
TV	1441.0	2883.0	1922.0	734.19	0.866	2082.00	-13.22	-13.66 ×
TX	10326.0	10337.0	10537.0	118.79	0.127	10400.00	1.42	0.98
U	9940.0	10160.0	9810.0	176.94	0.210	9970.00	0.67	0.22
UB								•
UC								•
UD	9730.0	9700.0	9790.0	45.87	0.054	9740.00	0.26	-0.18
UE	10388.0	10548.0	10785.0	199.74	0.238	10573.67	1.73	1.28
UF								•
UH								•
UI								•
UK	9990.0	10020.0	9950.0	35.18	0.042	9986.67	0.70	0.25
UL	10000.0	10205.0	10100.0	102.53	0.123	10101.67	0.90	0.45
UM								•
UN	8906.0	8936.0	9012.0	54.62	0.064	8951.33	-1.13	-1.57
UO								•
UP	9558.0	9603.0	9477.0	63.83	0.076	9546.00	-0.08	-0.52
W	10655.0	10663.0	10431.0	131.72	0.139	10583.00	1.74	1.30
X								•
Y	9997.0	10025.0	9595.0	240.60	0.258	9872.33	0.49	0.05
Z	9946.0	9632.0	9812.0	157.58	0.188	9796.67	0.36	-0.08

**Data sorted by Laboratory Average**

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
65.33	×	QC	8408.00		AZ	8875.67		PM
2082.00	×	TV	8416.67		EW	8900.00		TH
4734.67	×	SF	8431.33		SM	8903.33		CO
4994.00	×	RL	8466.67		K	8927.67		TS
6453.33	×	MS	8533.33		BW	8951.33		UN
7534.67	⇓	RV	8622.33		QQ	8997.00		QD
8089.33	⇓	OL	8636.67		JR	9000.67		MV
8250.00		TG	8667.00		PT	9010.00		TL
8278.67		SU	8676.67		EH	9015.00		NP
8279.33		RF	8697.33		RM	9026.67		OT
8305.67		PD	8806.33		OK	9033.33		TU
8377.67		EX	8862.67		I	9036.67		EB

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**Tritium****Data sorted by Laboratory Average**

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
9069.67		BL	9483.33		ST	9936.33		RR
9073.00		DJ	9488.00		DH	9950.00		QJ
9073.33		TA	9503.33		FU	9950.00		IC
9073.67		PQ	9530.33		AK	9970.00		U
9095.00		PI	9546.00		UP	9986.67		UK
9100.00		GQ	9578.00		QI	10030.00		CE
9106.67		CQ	9580.00		DI	10070.67		TI
9130.00		SI	9580.00		AI	10101.67		UL
9133.33		CK	9600.33		QZ	10117.00		LT
9144.33		SQ	9613.33		CA	10117.00		IU
9144.67		MA	9620.67		PB	10123.33		TD
9170.00		FL	9628.67		E	10158.00		QU
9178.67		AF	9632.33		CX	10158.33		QW
9182.67		KH	9636.67		RA	10166.67		QL
9186.00		AE	9638.00		AW	10173.67		HU
9197.67		RO	9643.33		FE	10246.67		HP
9201.00		SS	9653.33		T	10257.67		JM
9223.00		QM	9670.00		MQ	10280.00		ML
9233.33		BO	9699.00		JP	10287.33		HR
9239.33		AY	9702.33		N	10300.00		EA
9247.33		O	9710.00		QB	10400.00		TX
9260.00		KX	9716.67		DG	10426.67		SD
9267.33		CP	9723.33		DD	10429.00		AB
9273.67		A	9730.00		OA	10453.33		DM
9299.67		D	9740.00		UD	10480.00		PC
9320.00		EN	9756.67		R	10499.67		FK
9324.67		AP	9766.67		SC	10543.33		Q
9333.00		NH	9766.67		AU	10554.33		TQ
9366.67		CJ	9767.67		TE	10559.33		KM
9388.33		BA	9778.67		L	10573.67		UE
9403.33		RC	9787.67		SZ	10583.00		W
9409.00		HI	9796.67		Z	10603.33		EL
9415.67		RX	9796.67		SN	10618.00		QT
9416.00		DE	9796.67		JI	10653.33		BC
9433.33		MN	9800.00		GE	10733.33		TO
9436.67		S	9800.00		DL	10766.67		BM
9436.67		RN	9833.33		JS	10766.67		BG
9440.00		NB	9865.33		JK	10858.67		QK
9453.33		BB	9866.67		LF	10881.33		AH
9458.67		PV	9872.33		Y	10970.67		QX
9463.33		OX	9883.33		HK	11170.00		QP
9463.33		JY	9898.33		J	11333.33		NJ
9466.67		DT	9915.67		CM	11333.33		FZ
9480.00		HJ	9926.67		JE	11342.00		C

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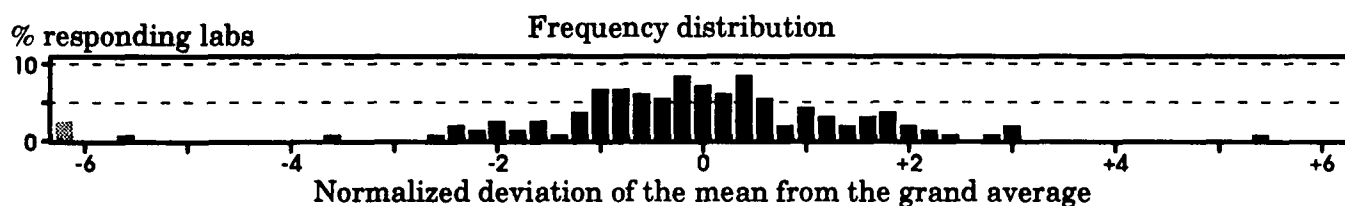
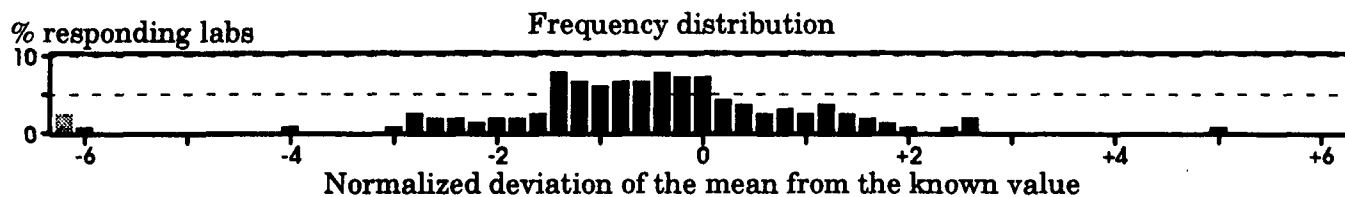
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**Tritium****Data sorted by Laboratory Average**

Average	Tag	Lab	Average	Tag	Lab	Average	Tag	Lab
						12637.67	x	QA



• ≡ No data submitted

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