0034355
9401571

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

94-ASB-010

FEB 16 '94

Mr. Doug Sherwood
Hanford Project Manager
U. S. Environmental Protection Agency
712 Swift Boulevard, Suite 5
Richland, Washington 99352

Mr. Roger F. Stanley, Director
Tri-Party Agreement Implementation
State of Washington
Department of Ecology
P. O. Box 47600
Olympia, Washington 98504-7600

FEB 22 1994

Dear Messrs. Sherwood and Stanley,

QUARTERLY PERFORMANCE EVALUATION (PE) RESULTS

Enclosed are the PE results and corrective actions received from the laboratories supporting Hanford. This submittal includes the results from the following laboratories:

- Battelle Pacific Northwest Laboratories, Richland, Washington
- Westinghouse Hanford Company, 222-S Laboratory, Richland, Washington
- DataChem Laboratories, Salt Lake City, Utah
- Ortek Environmental Laboratory, Green Bay, Wisconsin
- Martin Marietta Energy System, Incorporated, K-25 Laboratory, Oak Ridge, Tennessee
- Maxwell Laboratories, S-Cubed Divsion, San Diego, California

Overall, the evaluation has not identified any significant problems with the laboratories' performance, with the exception of the WHC's 222-S Laboratory performance on the Contract Laboratory Performance metal results. 222-S is currently working on solutions to correct this problem. If you have any questions, please feel free to contact Donna Wanek of my staff on (509) 376-5778.

Sincerely,

June M. Hennig, Director
Waste Management Division

WMD:DMW

Enclosure

cc w/encl:
B. A. Austin, WHC
B. Mauss, Ecology

FEB 1994
RECEIVED
EPIC

FEB 1994
RECEIVED
Becky A. Austin

PNL

PERFORMANCE EVALUATION

RESULTS

FEB 1994
RECEIVED
EPIC

PERFORMANCE EVALUATION SUMMARY SHEET

Laboratory: Battlle Pacific Northwest Laboratory

PE sample	Number Acceptable	Number Analyzed	% Acceptable
WP-030 (325 Lab.)			
Metals	44	48	91.7
Inorganic	20	20	100.0
Organic	52	54	96.3
WP-030 (3708 Lab.)			
Metals	45	48	93.8

	EPA/CLP Score
EMSL-LV QB4 FY93	
Metals	85.5
Organics	91.1
EMSL-LV QB3 FY93 (Remedial)	
Metals	71.4
EMSL-LV QB3 FY93	
Organics	60.0

PE Sample	EMSL-LV Acceptance Range (%)	% of EMSL-LV True Value	% of all Participating Laboratory's Grand Average
April 20, 1993			
Alpha	56.2 to 143.8	95.1	97.9
Uranium	82.0 to 118.0	94.2	98.5
Beta	73.6 to 126.4	92.5	98.7
Sr-89	78.8 to 121.2	89.4	97.6
Sr-90	70.0 to 130.0	97.7	101.8
June 4, 1993			
Tritium	82.7 to 117.3	92.2	94.6
June 11, 1993			
Co-60	42.0 to 158.0	86.7	87.2
Zn-65	83.2 to 116.8	105.2	100.7
Ru-106	82.5 to 117.5	87.7	100.4
Cs-134	0.0 to 274.0	73.4	68.1
Cs-137	0.0 to 274.0	93.4	81.1
Ba-133	82.5 to 117.5	103.7	106.1
July 23, 1993			
Alpha	42.0 to 158.0	64.5	80.2
Beta	72.1 to 127.9	76.7	111.6

bcc: AG King
JM Latkovich
SA Schubert
TM Stram, Jr. / DOE
MW Urie
Project File/T5-CLP
(93-09170)-(93-09172)
Quarterly File
File/LB

Battelle
Pacific Northwest Laboratories
Battelle Boulevard
P.O. Box 999
Richland, Washington 99352
Telephone (509) 372-0398

November 17, 1993

Dr. Larry C. Butler, Supervisor
Performance Evaluation Program
Quality Assurance Research Branch (QAB)
Quality Assurance and Methods Development Division (QAD)
Environmental Protection Agency
944 East Harmon
Las Vegas, Nevada 89119

Dear Dr. Butler:

REQUEST FOR INVESTIGATION OF REMEDIAL PREDICTION INTERVALS

Battelle, Pacific Northwest Laboratories Analytical Chemistry Laboratory (ACL) submitted results to you for Remedial QB3/FY93. The ACL obtained a score of 71.4% for this study. As you are aware, scores below 75% are considered unacceptable.

The ACL conducted a thorough investigation into performance for the Remedial study and was unable to detect any errors. I would therefore ask that you reevaluate the prediction intervals stated for this study to further ensure their adequacy.

This request is based upon the following information:

1. The ACL prepared and analyzed the Remedials along with the QB4/FY93 PEs. The QB4/FY93 PEs scored 85.5% (acceptable) with only silver and lead in Waters 1 and 2 showing a potential laboratory problem. These analytes did not fail in the Remedials; however, completely different analytes did fail. The two studies, therefore, conflict with each other.

2. The ACL prepared all samples in duplicate. The ACL also prepared all samples by two different techniques: one, the CLP beaker digestion; the other, a closed-vessel digestion using the same acid additions as the beaker. Furthermore, the ACL ran all samples on two different ICP systems. All Remedial Water 2 results obtained (8 data points) failed for Al, Cr, Co, Mn and V, which is quite unusual. Reanalysis by GFAA for Ag, Pb, Sb and As were performed, and results indicated that the laboratory had a correctable problem with As and Ag; Sb and Pb are still under investigation. None of these analytes showed problems in the Remedial Waters; again this is unusual.

Battelle

3. The ACL compared its results to that obtained by the Westinghouse Hanford Company 222S Laboratory. Both laboratories show similar low bias on Remedial Water 2 for Cr, Co, Mn and V. Both laboratories also show unusually low bias for Hg in Water 1.

Investigation of 1 through 3 above indicates that a problem exists with Remedial Water 2 and potentially with Hg in Water 1. Considering that multiple samples, multiple preparative procedures and multiple instruments were used, the high failure rate seems suspect.

The ACL would appreciate your reevaluation of the prediction intervals given for this remedial study. It is felt that an error may have occurred.

If you have any questions regarding the above or would like more information, please contact me at your earliest convenience at (509) 372-0398. I look forward to hearing from you regarding this issue.

Sincerely,

Kristine J. Kuhl-Klinger

Kristine J. Kuhl-Klinger
QA/QC Manager
Analytical Chemistry Laboratory

KJK:pl

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WA015 (325)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	1070	1100	896- 1300	949- 1250	ACCEPTABLE
	2	3980	4000	3370- 4570	3520- 4410	ACCEPTABLE
ARSENIC	1	248	260	225- 334	238- 320	ACCEPTABLE
BERYLLIUM	1	61.2	63.0	51.1- 74.5	54.1- 71.5	ACCEPTABLE
CADMIUM	1	7.63	8.12	6.30- 10.3	6.80- 9.79	ACCEPTABLE
	2	77.3	93.9	78.3- 110	82.2- 106	NOT ACCEPTABLE
COBALT	1	490	480	416- 536	431- 521	ACCEPTABLE
	2	249	240	206- 275	214- 266	ACCEPTABLE
CHROMIUM	1	58.8	62.0	49.2- 73.7	52.3- 70.6	ACCEPTABLE
	2	463	460	378- 533	397- 514	ACCEPTABLE
COPPER	1	70.5	62.0	53.5- 69.8	55.6- 67.8	NOT ACCEPTABLE
	2	431	410	365- 452	377- 450	ACCEPTABLE
IRON	1	3890	3600	3350- 4230	3460- 4120	ACCEPTABLE
	2	853	860	755- 963	781- 937	ACCEPTABLE
MERCURY	1	0.935	0.953	0.620- 1.42	0.719- 1.32	ACCEPTABLE
	2	1.92	2.10	1.57- 2.75	1.72- 2.61	ACCEPTABLE
MANGANESE	1	2190	2200	1950- 2450	2010- 2390	ACCEPTABLE
	2	222	221	196- 244	202- 238	ACCEPTABLE
NICKEL	1	136	130	111- 150	116- 145	ACCEPTABLE
	2	1350	1300	1160- 1450	1200- 1420	ACCEPTABLE
LEAD	1	75.6	79.2	62.7- 97.1	67.0- 92.8	ACCEPTABLE
	2	400	450	393- 513	408- 498	CHECK FOR ERROR

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WA015 (325)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1	20.9	23.0	14.3- 29.1	16.1- 27.3	ACCEPTABLE
	2	74.1	78.1	52.8- 94.6	58.1- 89.3	ACCEPTABLE
VANADIUM	1	7550	8000	7110- 8830	7330- 8610	ACCEPTABLE
	2	14400	15000	12700-17400	13300-16800	ACCEPTABLE
ZINC	1	1190	1100	961- 1220	993- 1190	ACCEPTABLE
	2	302	240	209- 271	216- 263	NOT ACCEPTABLE
ANTIMONY	3	107	116	79.4- 140	87.2- 133	ACCEPTABLE
	4	13.5	14.0	7.01- 20.4	8.73- 18.7	ACCEPTABLE
SILVER	3	2.44	2.39	1.80- 2.96	1.95- 2.82	ACCEPTABLE
	4	9.90	9.75	7.80- 11.5	8.25- 11.0	ACCEPTABLE
THALLIUM	3	90.9	90.2	70.7- 108	75.5- 103	ACCEPTABLE
	4	9.82	9.00	6.71- 11.3	7.29- 10.7	ACCEPTABLE
MOLYBDENUM	3	< 20	6.48	3.34- 9.82	4.04- 8.12	UNUSABLE DATA
	4	39.8	39.0	30.3- 47.9	32.6- 45.6	ACCEPTABLE
STRONTIUM	3	4.7	4.01	3.01- 4.99	3.26- 4.73	ACCEPTABLE
	4	53.6	51.0	41.4- 60.1	43.8- 57.7	ACCEPTABLE
TITANIUM	3	65.8	66.0	51.5- 76.5	54.7- 73.3	ACCEPTABLE
	4	182	182	149- 205	156- 198	ACCEPTABLE
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
PH-UNITS	3	8.59	8.70	8.31- 9.05	8.40- 9.96	ACCEPTABLE
	4	5.99	6.10	5.96- 6.22	5.99- 6.19	ACCEPTABLE
SPEC. COND.	1	266	253	226- 278	232- 268	ACCEPTABLE
(UMHOS/CM AT 25 C)	2	895	868	819- 916	831- 904	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

00-136

PERFORMANCE EVALUATION REPORT DATE: 6/20/93

WATER POLLUTION STUDY NUMBER WPC30

LABORATORY: WA015 (325 lab)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
CALCIUM	1	3.65	3.69	3.00- 4.47	3.18- 4.29	ACCEPTABLE
	2	78.9	80.9	73.4- 90.2	75.5- 88.1	ACCEPTABLE
MAGNESIUM	1	16.5	16.1	14.0- 18.1	14.5- 17.6	ACCEPTABLE
	2	5.64	5.64	4.84- 6.32	5.03- 6.13	ACCEPTABLE
SODIUM	1	16.6	15.9	14.0- 17.9	14.5- 17.4	ACCEPTABLE
	2	67.9	65.6	59.6- 72.0	61.2- 70.4	ACCEPTABLE
POTASSIUM	1	3.0	2.60	2.05- 3.22	2.19- 3.08	ACCEPTABLE
	2	19.5	19.0	16.2- 21.9	16.9- 21.1	ACCEPTABLE
CHLORIDE	1	55.7	54.3	48.2- 59.1	49.6- 57.9	ACCEPTABLE
	2	180	178	166- 191	170- 188	ACCEPTABLE
FLUORIDE	1	2.40	2.40	2.09- 2.65	2.16- 2.58	ACCEPTABLE
	2	0.260	0.230	0.175-0.296	0.189-0.272	ACCEPTABLE
SULFATE	1	9.06	9.10	6.48- 11.8	7.10- 10.8	ACCEPTABLE
	2	40.9	42.0	35.2- 48.1	36.8- 46.5	ACCEPTABLE
NUTRIENTS IN MILLIGRAMS PER LITER:						
AMMONIA-NITROGEN	1	5.40	5.50	4.35- 6.65	4.62- 6.37	ACCEPTABLE
	2	9.30	9.30	7.90- 11.6	8.25- 11.2	ACCEPTABLE
NITRATE-NITROGEN	1	33.2	34.0	27.5- 40.2	29.0- 38.7	ACCEPTABLE
	2	6.77	7.10	5.70- 8.43	6.03- 8.10	ACCEPTABLE
ORTHOPHOSPHATE	1	0.773	0.830	0.692-0.951	0.728-0.929	ACCEPTABLE
	2	0.083	0.090	.0617-0.122	.0689-0.115	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

00-137

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WA015 (325 Lab.)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
DEMANDS IN MILLIGRAMS PER LITER:						
TOC	1	9.20	8.61	7.22- 10.2	7.61- 9.30	ACCEPTABLE
	2	14.7	14.0	11.9- 16.3	12.5- 15.7	ACCEPTABLE
PCB'S IN MICROGRAMS PER LITER:						
PCB-AROCLOR 1016/1242	2	5.41	4.29	1.86- 5.71	2.35- 5.22	CHECK FOR ERROR
PCB-AROCLOR 1232	1	1.39	1.43	0.657- 1.79	0.800- 1.64	ACCEPTABLE
PCB'S IN OIL IN MILLIGRAMS PER KILOGRAM:						
PCB IN OIL- 1016/1242	1	15.7	21.5	5.04- 27.6	7.92- 24.7	ACCEPTABLE
PCB IN OIL- 1260	2	42.7	36.6	7.82- 57.8	14.2- 51.4	ACCEPTABLE
PESTICIDES IN MICROGRAMS PER LITER:						
CHLORDANE	3	0.329	0.964	0.469- 1.32	0.575- 1.21	NOT ACCEPTABLE
	4	4.95	9.48	5.36- 12.4	6.26- 11.5	NOT ACCEPTABLE
ALDRIN	1	0.112	0.159	.0344-0.214	.0572-0.191	ACCEPTABLE
	2	0.386	0.444	.0957-0.577	0.156-0.517	ACCEPTABLE
DIELDRIN	1	0.087	0.121	.0572-0.163	.0704-0.150	ACCEPTABLE
	2	0.472	0.553	0.270-0.750	0.330-0.690	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

00-138

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WA015 (325 Lab)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
PESTICIDES IN MICROGRAMS PER LITER:						
DDD	1	0.167	0.216	.0863-0.217	0.115-0.288	ACCEPTABLE
	2	0.581	0.626	0.334-0.855	0.400-0.799	ACCEPTABLE
DDE	1	0.084	0.131	.0562-0.171	.0706-0.157	ACCEPTABLE
	2	0.418	0.495	0.228-0.699	0.298-0.639	ACCEPTABLE
DDT	1	0.130	0.186	.0628-0.294	.0905-0.257	ACCEPTABLE
	2	0.464	0.576	0.252-0.844	0.326-0.770	ACCEPTABLE
HEPTACHLOR	1	0.150	0.157	.0488-0.221	.0706-0.199	ACCEPTABLE
	2	0.507	0.514	0.180-0.715	0.247-0.648	ACCEPTABLE
HEPTACHLOR EPOXIDE	1	0.070	0.087	.0427-0.120	.0526-0.110	ACCEPTABLE
	2	0.332	0.375	0.189-0.513	0.229-0.473	ACCEPTABLE
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
1,2 DICHLOROETHANE	1	43.6	48.6	34.5- 62.8	38.0- 59.2	ACCEPTABLE
	2	11.4	10.2	7.26- 13.8	8.21- 12.9	ACCEPTABLE
CHLOROFORM	1	44.9	45.7	31.6- 59.5	35.1- 56.0	ACCEPTABLE
	2	13.3	13.8	9.42- 18.0	10.5- 16.9	ACCEPTABLE
1,1,1 TRICHLOROETHANE	1	47.0	52.0	32.3- 67.9	36.8- 63.4	ACCEPTABLE
	2	7.68	9.34	5.56- 12.5	6.45- 11.7	ACCEPTABLE
TRICHLOROETHENE	1	35.3	38.8	26.8- 49.1	29.6- 46.2	ACCEPTABLE
	2	8.76	9.91	6.52- 13.0	7.34- 12.2	ACCEPTABLE
CARBONTETRACHLORIDE	1	42.4	46.3	29.8- 63.7	34.1- 59.4	ACCEPTABLE
	2	10.8	13.5	8.93- 18.2	10.1- 17.0	ACCEPTABLE
TETRACHLOROETHENE	1	51.6	57.2	39.7- 71.9	43.8- 67.8	ACCEPTABLE
	2	14.8	16.2	10.9- 21.1	12.2- 19.8	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WA015 (325 Lab)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
BROMODICHLOROMETHANE	1	50.5	49.5	34.2- 64.3	38.0- 60.5	ACCEPTABLE
	2	6.04	7.75	4.88- 10.6	5.59- 9.86	ACCEPTABLE
DIBROMOCHLOROMETHANE	1	35.2	42.2	30.0- 54.8	33.1- 51.3	ACCEPTABLE
	2	11.3	16.4	10.9- 21.5	12.2- 20.2	CHECK FOR ERROR
BROMOFORM	1	48.3	53.7	33.5- 73.7	38.6- 68.6	ACCEPTABLE
	2	7.75	11.9	6.48- 17.1	7.83- 15.7	CHECK FOR ERROR
METHYLENE CHLORIDE	1	36.8	37.3	24.1- 53.2	27.7- 49.6	ACCEPTABLE
	2	9.03	8.77	4.21- 13.5	5.39- 12.3	ACCEPTABLE
CHLOROBENZENE	1	38.2	43.2	30.8- 55.0	33.9- 51.9	ACCEPTABLE
	2	11.3	12.9	8.99- 16.7	9.97- 15.7	ACCEPTABLE
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
BENZENE	1	9.74	10.3	7.34- 13.4	8.11- 12.6	ACCEPTABLE
	2	49.3	54.1	37.7- 70.8	41.9- 66.6	ACCEPTABLE
ETHYLBENZENE	1	10.0	11.3	7.71- 14.7	8.60- 13.8	ACCEPTABLE
	2	53.1	52.4	36.2- 68.5	40.3- 64.4	ACCEPTABLE
TOLUENE	1	12.6	13.9	9.86- 17.7	10.9- 16.7	ACCEPTABLE
	2	32.5	33.9	24.0- 43.1	26.4- 40.7	ACCEPTABLE
1,2-DICHLOROBENZENE	1	10.7	12.1	8.47- 15.4	9.37- 14.5	ACCEPTABLE
	2	53.0	52.0	36.1- 66.4	40.0- 62.5	ACCEPTABLE
1,3-DICHLOROBENZENE	1	8.40	9.43	6.17- 12.1	6.92- 11.4	ACCEPTABLE
	2	49.5	47.8	33.6- 61.2	37.2- 57.6	ACCEPTABLE
1,4-DICHLOROBENZENE	1	10.1	11.7	7.95- 15.2	8.86- 14.2	ACCEPTABLE
	2	56.4	58.1	39.1- 75.5	43.9- 71.7	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WA015 (325 Lab.)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MISCELLANEOUS PARAMETERS:						
TOTAL CYANIDE	1	0.231	0.250	0.138-0.341	0.164-0.316	ACCEPTABLE
(IN MG/L)	2	0.114	0.130	.0821-0.159	.0932-0.158	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WA184 (3708 Lab)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	1130	1100	898- 1300	949- 1250	ACCEPTABLE
	2	4070	4000	3370- 4570	3520- 4410	ACCEPTABLE
ARSENIC	1	295	280	225- 334	238- 320	ACCEPTABLE
BERYLLIUM	1	66.5	63.0	51.1- 74.5	54.1- 71.5	ACCEPTABLE
CADMIUM	1	7.87	8.12	6.30- 10.3	6.80- 9.79	ACCEPTABLE
	2	96.8	93.9	78.3- 110	82.2- 106	ACCEPTABLE
COBALT	1	475	480	416- 536	431- 521	ACCEPTABLE
	2	252	240	206- 275	214- 266	ACCEPTABLE
CHROMIUM	1	58.5	62.0	49.2- 73.7	52.3- 70.6	ACCEPTABLE
	2	446	460	378- 533	397- 514	ACCEPTABLE
COPPER	1	65.2	62.0	53.5- 69.8	55.6- 67.8	ACCEPTABLE
	2	426	410	365- 462	377- 450	ACCEPTABLE
IRON	1	3950	3800	3350- 4230	3460- 4120	ACCEPTABLE
	2	823	860	755- 963	781- 937	ACCEPTABLE
MERCURY	1	1.50	0.983	0.620- 1.42	0.719- 1.32	NOT ACCEPTABLE
	2	2.89	2.10	1.57- 2.75	1.72- 2.61	NOT ACCEPTABLE
MANGANESE	1	2240	2200	1950- 2450	2010- 2380	ACCEPTABLE
	2	222	221	196- 244	202- 238	ACCEPTABLE
NICKEL	1	133	130	111- 150	116- 145	ACCEPTABLE
	2	1350	1300	1160- 1450	1200- 1420	ACCEPTABLE
LEAD	1	86.9	79.2	62.7- 97.1	67.0- 92.8	ACCEPTABLE
	2	470	450	393- 513	408- 498	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

00-143

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WA184 (3708 Lab)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1	23.9	23.0	14.3- 29.1	16.1- 27.3	ACCEPTABLE
	2	103	78.1	52.9- 94.6	58.1- 89.3	NOT ACCEPTABLE
VANADIUM	1	7490	8000	7110- 8830	7330- 8610	ACCEPTABLE
	2	14800	15000	12700-17400	13300-16800	ACCEPTABLE
ZINC	1	1140	1100	961- 1220	993- 1190	ACCEPTABLE
	2	268	240	209- 271	216- 263	CHECK FOR ERROR
ANTIMONY	3	117	116	79.4- 140	87.2- 133	ACCEPTABLE
	4	15.9	14.0	7.01- 20.4	8.73- 18.7	ACCEPTABLE
SILVER	3	2.04	2.39	1.80- 2.96	1.95- 2.82	ACCEPTABLE
	4	9.99	9.75	7.80- 11.5	8.25- 11.0	ACCEPTABLE
THALLIUM	3	86.9	90.2	70.7- 108	75.5- 103	ACCEPTABLE
	4	9.78	9.00	6.71- 11.3	7.29- 10.7	ACCEPTABLE
MOLYBDENUM	3	5.77	6.48	3.34- 8.82	4.04- 8.12	ACCEPTABLE
	4	38.3	39.0	30.3- 47.9	32.6- 45.6	ACCEPTABLE
STRONTIUM	3	4.06	4.01	3.01- 4.99	3.26- 4.73	ACCEPTABLE
	4	51.9	51.0	41.4- 60.1	43.8- 57.7	ACCEPTABLE
TITANIUM	3	65.9	66.0	51.5- 76.5	54.7- 73.3	ACCEPTABLE
	4	178	182	149- 205	156- 198	ACCEPTABLE
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
CALCIUM	1	3.63	3.69	3.00- 4.47	3.18- 4.29	ACCEPTABLE
	2	81.8	80.9	73.4- 90.2	75.5- 88.1	ACCEPTABLE
MAGNESIUM	1	15.4	16.1	14.0- 18.1	14.5- 17.6	ACCEPTABLE
	2	5.20	5.64	4.84- 6.32	5.03- 6.13	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WA184 (3708 lab)

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
SODIUM	1	16.3	15.9	14.0- 17.9	14.5- 17.4	ACCEPTABLE
	2	64.4	65.6	59.6- 72.0	61.2- 70.4	ACCEPTABLE
POTASSIUM	1	2.69	2.60	2.05- 3.22	2.19- 3.08	ACCEPTABLE
	2	17.9	19.0	16.2- 21.9	16.9- 21.1	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

00-145

Battelle
Pacific Northwest Laboratories

RECEIVED
NOV 15 1993
KJ KUHL - KLINGER

Project Number 95116

Internal Distribution

AG King
JM Latkovich
SA Schubert
File/LB

Date November 15, 1993

To KJ Kuhl-Klinger

From MW Urie MWUrie

Subject GFAA Reanalysis of QB4-FY93 for Ag/Pb/Sb/As

GFAA analyses for samples that exceeded EPA QB4-93 acceptance criteria showed mixed results:

Reruns of Ag in Water 1 and Water 2 passed; however, Ag on Remedial Water 1 failed. The original results were bracketed with CCV's between 92-95%; suggesting that the laboratory should recalibrate when CCV is below 100%.

Reruns of Pb did not provide any significant change in the Pb concentration indicating that either the EPA result is bias or the samples were contaminated with Pb during processing; however, the processing blank shows no indication of Pb contamination.

Reruns of Sb in the Remedial Soil passed (barely); however, the Sb results for QB4 Water 1 still failed (by more) suggesting the loss of Sb as Sb2O5.

Reruns of As in Remedial Soil passed; however, improvement was only marginal (the original result was only slightly outside the acceptance limit).

********** GFAA Reanalysis QB4-93 and Remedial **********

		Rerun	Original	Range	
Ag	QB4-W1 µg/L	35.0	26.6	30.2 - 40.1	Pass
	QB4-W2 µg/L	43.2	35.2	37.5 - 50.8	Pass
	Remedial W1 µg/L	56.0	47.4	45.8 - 54.4	Fail
Pb	QB4-W1 µg/L	15.8	16.4	10.8 - 14.4	Fail
	QB4-W2 µg/L	27.7	28.6	11.0 - 16.8	Fail
Sb	QB4-W1 µg/L	372	423	427 - 518	Fail
	Remedial S mg/kg	12.7	11.6	12.0 - 27.5	Pass
As	Remedial S mg/kg	992	1037	894 - 1013	Pass

Battelle
Pacific Northwest Laboratories

RECEIVED
NOV 1 1993
KJ KUHL - KLINGER

Project Number 95116

Internal Distribution

AG King
JM Latkovich
SA Schubert
File/LB

Date November 1, 1993

To KJ Kuhl-Klinger

From MW Urie

Subject Response to USEPA CLP QB4/FY93 & Remedial Analytical Deficiencies

Graphite Furnace Results:

Problem: Ag low for QB4-Water 1 and QB4-Water 2.
Discussion: Two issues have been identified as potentials for the apparent low bias in the Ag results. The bracketing CCV analyses, although within limits, were quite low (9.1 to 9.55 as compared to a true of 10.00 ppb). Also, the modifier used for the Ag analyses appear to have a significant Ag background, and may contribute to the uncertainty of the reported result.
Action: The modifier is being changed to eliminate the significant Ag background. Also, future CCV results outside 95-105% will initiate additional evaluation. Presently, the Ag analyses are being reanalyzed using modified instrument parameters and modifier.

Problem: Pb high for QB4-Water 1 and QB4-Water 2.
Discussion: The high bias demonstrated on these samples is not consistent with the acceptable results obtained for the Remedial waters and soil and the QB4-Soil. The bracketing CCV values do indicate a "very slight" high bias, ranging from 25.3 to 26.8 ppb for a 25.0 standard. An independent NIST water standard processed with the QB4 set, analyzed at 35.7 ppb verses a true of 35.3 ppb. After the QB4 data were reported the laboratory obtained results for other routinely analyzed water samples which suggested a high bias for the Pb, corrective action included hardware maintenance and modifier evaluation.
Action: Reanalyze QB4 and Remedial samples to evaluate effects of hardware maintenance. Also, the use of the Pd modifier is being evaluated and an alternate modifier may be used for future work.

Problem: Sb low for QB4-Water 1 and Remedial Soil
Discussion: All QC results (CCV, spikes, CRA, etc.) appear to be very good for the Sb analyses and the QB4-Water 1 and Remedial Soil were prepared and analyzed in triplicate. Also, the results from an alternate preparation technique (water bath) gave Sb results within the acceptance window. This suggests that the hot plate preparation may have oxidized a small portion of the Sb to Sb2O5.
Action: None at this point; however, Sb will be monitored to identify any potential systematic problems. The results were only slightly

outside the acceptance limit and all other Sb results were acceptable; no systematic problem has been identified. However, NIST soils may be incorporated in future preparations as a secondary check on the results.

Problem: As high in Remedial Soil
Discussion: All QC results (CCV, spikes, CRA, etc.) appear to be very good for the GFAA As analyses. The As analyses were performed in solutions prepared in triplicate. No systematic or analyst errors can be attributed to the failure of the As.
Action: None; however, monitoring of As will continue.

CVAA Hg Results:

Problem: Hg low in Remedial Water 1
Discussion: There is some concern over whether or not the Hg has been preserved properly in either of the Remedial samples. Both Water 1 and Water 2 measured very low Hg values, with Water 2 barely meeting the acceptance criteria. Past successes on Hg analyses for QB and WP PEs suggest that the Hg concentrations of the Remedial Waters are closer to the values reported by this laboratory than the stated EPA prediction interval. To support this, it should be noted that the Hg results for the QB4 waters were nearly exactly at the midpoint of the acceptance range.
Action: None.

ICP Results:

Problem: Be low in Remedial Soil
Discussion: Spectral scans of the Remedial Soil digestate for Be display an interfering peak, slightly lower in wavelength than the center of the analytical channel, contributing significantly to an "apparent" Be concentration. Based on this and the fact that the Be prediction interval is only 2-20 times the IDL, this laboratory contends that there is actually little, if any, Be in the Remedial Soil and that the prediction interval of 0.5 to 4.4 ppm is bias high.
Action: None

Problem: Al high in Remedial Water 1 and Remedial Water 2
Discussion: The levels measured in both water samples were about ten times the laboratory's detection limit for the wavelength used for quantitation and about three times the CRDL. Based on the level

of the analyte, the accuracy is expected to be no better than 10%; thus for values about 600 ppb, the best the laboratory would expect is 540 to 660 ppb. A contributing factor to the less precise measurement at the low concentration was the use of an all-plastic spray chamber and HF-Torch assembly (required for other work in the laboratory at the same time).

Action: Consider alternate technique for Al whenever the Al measures in the 0 to 1 ppm range by ICP. Also, attempts will be made to schedule the QB analyses at a time when the standard glass spray chamber and torch assembly are in use.

Problem: Cr, Co, Mn, V low in Remedial Water 2

Discussion: There is no reason to believe that the prediction intervals are correct for most of the analytes in Remedial Water 2. Samples were prepared by two different methods (water bath and hot plate), duplicates were processed for each preparation method, and the resulting digestates analyzed on two difference ICP systems. At a minimum this provided eight analytical results for each sample; not one single analysis for Cr, Co, Mn, or V fell within the prediction interval.

Action: None.

Battelle
Pacific Northwest Laboratories

Project Number 95116

Internal Distribution

Gaylord King
John Latkovich
Steve Schubert
Quarterly File
Project File/T5
File/LB

Date October 15, 1993

To Mike Urie

From Kris Kuhl-Klinger KK

Subject USEPA CLP QB4/FY93 and Remedial Results

Attached please find a copy of the results your Group obtained on the U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) QB4/FY93 and Remedial Performance Evaluation (PE) Studies. Results indicate a score of 85.5% was achieved on the QB4 and 71.4% on the Remedial. These scores represent improvement since the QB3/FY93 PE (score of 54.5%). It should be noted, however, that the Remedial score of 71.4% is considered unacceptable under the CLP Program.

Review of the QB4 results indicated acceptable performance on the soil sample, with only one result (selenium) recovering at the upper Action Limit (no points deducted). Water 1 and Water 2 silver and lead results fell outside the Action Limit, with lead showing a high bias and silver showing a low bias in both samples. Antimony fell outside the Action Limit, bias low, for Water 1 only. The failures noted above warrant investigation, especially in the case of silver and lead.

Review of the Remedial results indicated aluminum to be unacceptable, bias high, in both waters. Mercury was unacceptable, bias low, in Water 1. Chromium, cobalt, manganese and vanadium were all unacceptable, bias low, in Water 2. Antimony (low), arsenic (high), and beryllium (low) were unacceptable in the soil. It is important to note that the Remedial results do not include warning and action limits; only a "Prediction Interval" is provided. Clearly, the same trends are <u>not</u> apparent between the QB4 and Remedial results, even though these PEs were prepared and analyzed together.

As is the case with any PE study, your response is requested. The response should document your investigation of each failure, the results of the investigation, and corrective actions which will be taken to alleviate similar failure in future work. This response is required on or before November 1, 1993.

This office is concerned with the disparity between the two PE result sets. I know the great effort that was expended in the preparation and analysis of both of these PEs. Hopefully, careful review of the data generated will provide answers to the discrepancies noted.

If you require my assistance, please call at your earliest convenience.

KJK:pl

Attachment

00-009

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 · FTS 545-2100)

RECEIVED
OCT 12 1993
KJ KUHL - KLINGER

OCT 07 1993

Battele Pacfic Northwest
J.L. Daniel
6th Street Warehouse
Building 329
Richland, WA 99352

Dear Mr. Daniel:

The Individual Laboratory Summary Report (ILSR) summarizing your laboratory's results for the most recent Quarterly Blind (QB) Performance Evaluation (PE) Sample (QB4, FY93) is enclosed for your information and review. Please review your score as listed on the ILSR to determine the actions which are required to correct any deficiencies. The wording of these Performance Categories below was established by your contract and the Administrative Project Officers of the National Program Office:

- o Acceptable, No Response Required (Score greater than or equal to 90 percent):

  Data meets most or all of the scoring criteria. No response is required.

- o Acceptable, Response Explaining Deficiency(ies) Required (Score greater than or equal to 75 percent but less than 90 percent):

  Deficiencies exist in the Contractor's performance.

Within 14 days of receipt of this notification from EPA, the Contractor shall describe the deficiency(ies) and the action(s) taken to correct the deficiency(ies) in a letter to the Administrative Project Officer, the Technical Project Officer and the Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV)

- o Unacceptable, Response Explaining Deficiency(ies) Required (Score less than 75 percent):

  Deficiencies exist in the Contractor's performance to the extent that the National Program Office has determined that the Contractor has not demonstrated the capability to meet the contract requirements.

Within 14 days of receipt of notification from EPA, the Contractor shall describe the deficiency(ies) and the action)s) taken to correct the deficiency(ies) in a letter to the Administrative Project Officer, the Technical Project Officer, and EMSL-LV.

The Contractor shall be notified by the Technical Project Officer or Administrative Project Officer concerning the remedy for their unacceptable performance. A Contractor may expect, but the Agency is not limited to, the following actions: reduction of the number of samples sent under the contract, suspension of sample shipment to the Contractor, an On-Site laboratory evaluation, GC/MS tape audit, data package audit, remedial laboratory evaluation sample, and/or a contract sanction, such as a Cure Notice.

Note: A Contractor's prompt response demonstrating that corrective actions have been taken to ensure the Contractor's capability to meet contract requirements may facilitate continuation of full sample delivery.

Your initial response, if any, to this letter should be to your Regional EPA Technical Project Officer for your contract.

Sincerely,

Larry C. Butler
Research Chemist
Quality Assurance Research Branch, QAD

Enclosures

Individual Laboratory Summary Report
Performance Evaluation Material Preparation Instructions
Performance Evaluation Material Scoring Procedure
Description of the Individual Laboratory Summary Report

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 93

LABORATORY NAME: Battelle Pacific NW (WA) [C2] (BATPNW)
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 18 Same = 0 Below = 10

% Score: 85.5
REPORT DATE: 9/16/1993
MATRIX: SOIL

ELEMENT	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	2970	7560	2470	8060	5320			0	0	0	1	0	29
ANTIMONY	12.0	15.2	12.0	17.0	6.4			1	7	0	21	0	29
ARSENIC	136	203	129	210	186			0	4	0	1	0	29
BARIUM	d	d	d	d	32.6	B		0	0	0	0	0	29
BERYLLIUM	d	d	d	d	1	U		0	0	2	0	0	29
CADMIUM	5.4	22.1	3.6	23.9	15.5			1	4	0	2	1	29
CALCIUM	38101	48901	36901	50001	44200			0	0	0	0	0	29
CHROMIUM	6.8	17.4	5.6	18.5	13.7			1	3	0	0	0	29
COBALT	15.6	31.5	13.8	33.2	26.3			0	0	0	0	0	29
CO[illegible]	1180	1450	1150	1480	1250			0	6	0	1	0	29
I[illegible]	130000	183000	124000	189000	158000			0	0	0	0	0	29
LEAD	806	1030	781	1060	968			0	2	0	1	0	29
MAGNESIUM	1180	1800	1110	1870	1490			0	0	0	0	0	29
MANGANESE	706	974	677	1000	872			0	0	0	0	0	29
MERCURY	0.097	0.32	0.074	0.34	0.18	B		0	2	0	3	1	29
NICKEL	8.0	9.0	8.0	9.6	8	U		0	1	0	0	0	29
POTASSIUM	1000.0	1450	1000.0	1520	1000			1	0	0	0	0	29
SELENIUM	1.0	3.2	1.0	3.4	3.4		$	2	1	0	10	0	29
SILVER	50.1	77.4	47.1	80.3	68.3			0	2	0	1	0	29
SODIUM	d	d	d	d	269	B		0	0	0	0	0	29
THALLIUM	d	d	d	d	0.92			0	0	2	4	0	29
VANADIUM	10.0	56.0	10.0	61.4	52			0	0	0	0	1	29
ZINC	4520	6370	4320	6570	5860			0	1	0	1	0	29

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 0
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 0
SOIL :

OF DUPLICATES OUT: 0
:

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 93

LABORATORY NAME: Battelle Pacific NW (WA) [C2] (BATPNW)
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 18 Same = 0 Below = 10

% Score: 85.5
REPORT DATE: 9/16/1993
MATRIX: WATER 1

ELEMENT	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	c	c	c	c	60	U		0	0	1	1	0	29
ANTIMONY	435	510	427	518	423		X	0	2	0	0	0	29
ARSENIC	583	734	567	750	674			0	2	0	1	0	29
BARIUM	821	920	810	930	897			0	4	0	0	0	29
BERYLLIUM	31.6	38.3	30.9	39.0	36			0	2	0	0	0	29
CADMIUM	33.7	39.0	33.1	39.6	38.3			0	2	0	0	0	29
CALCIUM	c	c	c	c	50	U		0	0	0	1	0	29
CHROMIUM	48.0	61.2	46.6	62.6	56.5			0	0	0	0	0	29
CO[illegible]	139	165	137	167	155			0	0	0	1	0	29
C[illegible]	283	339	277	345	313			0	1	0	0	0	29
IRON	458	545	448	555	512			0	0	0	0	0	29
LEAD	11.1	14.1	10.8	14.4	16.4		X	0	6	0	1	0	29
MAGNESIUM	c	c	c	c	50	U		0	0	0	0	0	29
MANGANESE	48.4	59.0	47.2	60.1	53.8			0	1	0	0	0	29
MERCURY	8.0	10.8	7.6	11.1	9.4			0	4	0	1	0	29
NICKEL	180	215	176	218	203			0	1	0	0	0	29
POTASSIUM	c	c	c	c	500	U		0	0	0	0	0	29
SELENIUM	37.8	53.7	36.1	55.4	45.7			1	1	0	2	1	29
SILVER	31.1	39.2	30.2	40.1	28.6		X	0	3	0	2	0	29
SODIUM	d	d	d	d	50	U		0	0	0	0	0	29
THALLIUM	c	c	c	c	0.33	U		0	0	0	0	0	29
VANADIUM	339	383	334	388	362			0	2	0	1	0	29
ZINC	259	294	256	298	271			0	1	0	0	1	29

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 3
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 0
WATER :

[illegible]UPLICATES OUT: 0
WATER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 93

LABORATORY NAME: Battelle Pacific NW (WA) [C2] (BATPNW)
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 18 Same = 0 Below = 10

% Score: 85.5
REPORT DATE: 9/16/1993
MATRIX: WATER 2

ELEMENT	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	1160	1470	1130	1510	1350			0	1	0	1	0	29
ANTIMONY	272	346	264	354	302			0	2	0	0	0	29
ARSENIC	201	282	192	291	265			0	1	0	1	0	29
BARIUM	c	c	c	c	5	U		0	0	0	0	0	29
BERYLLIUM	45.0	52.8	44.1	53.6	51.1			0	1	0	0	0	29
CADMIUM	25.6	30.8	25.0	31.4	29.8			0	3	0	0	0	29
CALCIUM	14400	17000	14100	17200	15500			0	0	0	1	0	29
CHROMIUM	87.7	95.6	86.8	96.5	92.8			0	8	0	0	0	29
COBALT	138	158	136	160	150			0	1	0	1	0	29
COPPER	c	c	c	c	5	U		0	0	0	0	0	29
IRON	828	939	816	951	902			0	0	0	0	0	29
LEAD	11.5	16.3	11.0	16.8	23.1		X	0	5	0	1	0	29
MAGNESIUM	d	d	d	d	2580	B		0	0	0	0	0	29
MANGANESE	c	c	c	c	5	U		0	0	0	0	0	29
MERCURY	5.2	9.5	4.7	10.0	7.4			0	1	0	1	0	29
NICKEL	c	c	c	c	10	U		0	0	0	0	0	29
POTASSIUM	18400	21500	18000	21800	20100			0	0	0	0	0	29
SELENIUM	38.5	61.0	36.1	63.5	49			1	0	0	2	1	29
SILVER	38.7	49.7	37.5	50.8	35.2		X	0	2	0	2	0	29
SODIUM	28500	32300	28100	32700	30900			0	4	0	0	0	29
THALLIUM	70.0	101	66.7	105	86.4			0	1	0	0	0	29
VANADIUM	c	c	c	c	15	U		0	0	0	1	0	29
ZINC	c	c	c	c	10	U		0	0	2	0	1	29

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 2
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 0
WATER :

OF DUPLICATES OUT: 0
WATER :

REMEDIAL
INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 93

LABORATORY NAME: Battelle Pacific Northwest (WA)
PERFORMANCE LEVEL: Unacceptable - Corrective Action Mandatory
LABORATORY RANK: Above = 0 Same = 0 Below = 1

% Score: 71.4
REPORT DATE: 09/27/93
MATRIX: SOIL

ELEMENT	PREDICTION INTERVAL LOWER	PREDICTION INTERVAL UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	3310	9520	7350								1
ANTIMONY	12	27.5	11.6		X						1
ARSENIC	893.5	1013	1037		X						1
BARIUM	123.5	1092	747								1
BERYLLIUM	0.5	4.4	0.20	U	X						1
CADMIUM	107.5	134	120								1
CALCIUM	30461	36676	33200								1
CHROMIUM	71.4	101	91.3								1
COBALT	15.2	26.7	20.3								1
COPPER	3295	4940	3960								1
IRON	40251	56401	47600								1
LEAD	5403	6707	6163								1
MAGNESIUM	15405	18096	16600								1
MAN[illegible]E	2729	3230	3040								1
MERCU[illegible]	0.4	1.2	0.75								1
NICKEL	21.6	30.1	25.9								1
POTASSIUM	1945	4550	3530								1
SELENIUM	1	3.5	2.7								1
SILVER	6.5	15.6	10.4								1
SODIUM	2050	3305	2530								1
THALLIUM	1.3	2.7	2.1								1
VANADIUM	650	843	795								1
ZINC	4807	6431	5900								1

OF ELEMENTS NOT-IDENTIFIED: 1
OF ELEMENTS MIS-QUANTIFIED: 2
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 0
SOIL:

OF DUPLICATES OUT: 0
SOIL:

REMEDIAL
INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 93

LABORATORY NAME: Battelle Pacific Northwest (WA)
PERFORMANCE LEVEL: Unacceptable - Corrective Action Mandatory
LABORATORY RANK: Above = 0 Same = 0 Below = 1

% Score: 71.4
REPORT DATE: 09/27/93
MATRIX: WATER1

ELEMENT	PREDICTION INTERVAL LOWER	PREDICTION INTERVAL UPPER	LABORATORY REPORTED VALUE	Q	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	535	570	628	X						1
ANTIMONY	308	366	333							1
ARSENIC	54.9	68.5	62.3							1
BARIUM	c	c	5.0	U						1
BERYLLIUM	59	68	65.7							1
CADMIUM	27.8	32.9	28.2							1
CALCIUM	27000	30950	28700							1
CHROMIUM	70.7	86.1	83.6							1
COBALT	251	292	277							1
COPPER	235	267	248							1
IRON	419	492	461							1
L[illegible]	12.6	17	16.2							1
M[illegible]SIUM	19900	22500	20600							1
MANGANESE	c	c	5.0	U						1
MERCURY	5.5	9.3	4.3	X						1
NICKEL	252	303	279							1
POTASSIUM	c	c	500	U						1
SELENIUM	49.1	65.2	59.2							1
SILVER	45.8	54.4	47.4							1
SODIUM	d	d	50.0	U						1
THALLIUM	82.4	108	104							1
VANADIUM	c	c	15.0	U						1
ZINC	228	273	241							1

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 2
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT:
WATER:

OF DUPLICATES OUT: 0
WATER:

REMEDIAL
INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 93

LABORATORY NAME: Battelle Pacific Northwest (WA) % Score: 71.4
PERFORMANCE LEVEL: Unacceptable - Corrective Action Mandatory REPORT DATE: 09/27/93
LABORATORY RANK: Above = 0 Same = 0 Below = 1 MATRIX: WATER2

ELEMENT	PREDICTION INTERVAL LOWER	PREDICTION INTERVAL UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	585	710	716		X						1
ANTIMONY	309	483	367								1
ARSENIC	32.8	52.1	40.4								1
BARIUM	880	1255	997								1
BERYLLIUM	40.2	60.3	42.4								1
CADMIUM	17.3	29.1	22.6								1
CALCIUM	c	c	50.0	U							1
CHROMIUM	86.7	126	73.6		X						1
COBALT	346	482	311		X						1
COPPER	c	c	5.0	U							1
IRON	594	799	719								1
LEAD	20.3	34.7	26.0								1
MAGNESIUM	c	c	50.0	U							1
MANGANESE	124	166	122		X						1
MERCURY	4.6	6.6	4.9								1
NICKEL	c	c	10.0	U							1
POTASSIUM	16800	25450	20600								1
SELENIUM	25.2	40.8	36.4								1
SILVER	31.3	78.5	44.4								1
SODIUM	21550	30351	23900								1
THALLIUM	c	c	0.33	U							1
VANADIUM	443	603	439		X						1
ZINC	c	c	10.0	U							1

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 5
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 0
WATER:

OF DUPLICATES OUT: 0
WATER:

[267] From: Eric W Hoppe 11/4/93 11:51AM (1081 bytes: 1 ln)
To: Kristine J Kuhl-Klinger
cc: Eric W Hoppe
Subject: QB3 standards comparison
---------- Message Contents ----------

Text item 1: Text_1

Kris,

The latest info I have is that the standards for Semi-Voa were not received in time. The only comparison we have for the SV is between analysts using the same vendor standards. For pesticides there is data comparing Restek and Ultra standards. Of most concern are delta-BHC and alpha-chlordane which varied between the two vendors by almost 10%. The third vendors standard arrived too late to act as a "tie breaker" in this case and the variation was within the vendor certification. I'll send you a copy of this comparison.

We do have comments regarding the QB4 results and will submit them shortly.

If you feel the need for more info please give me a call.

Eric

RECEIVED

NOV 4 1993

KJ KUHL - KLINGER

Report Date : 21-Oct-1993 14:04

Battelle PNL

SUMMARY REPORT

Method File: /chem/gc.i/aug31a.b/1701.m
Batch File: /chem/gc.i/aug31a.b
Inst ID: gc2.i
Reviewer 1 _____ Date: _____
Reviewer 2 _____ Date: _____

Compound	RESTEK A 001f0102	ULTRA A 003f0101	RESTEK B 002f0102	ULTRA 2 004f0102	
alpha-BHC	0.090	0.090	+++++++	+++++++	
beta-BHC	+++++++	+++++++	0.043	0.045	
delta-BHC	+++++++	+++++++	0.086	0.078	-9.3%
gamma-BHC (Lindane)	0.090	0.091	+++++++	+++++++	
Heptachlor	0.087	0.089	+++++++	+++++++	
Aldrin	+++++++	+++++++	0.18	0.16	
Heptachlor epoxide	+++++++	+++++++	0.086	0.087	
Endosulfan I	0.089	0.089	+++++++	+++++++	
Dieldrin	0.18	0.17	+++++++	+++++++	
4,4'-DDE	+++++++	+++++++	0.17	0.16	
Endrin	0.17	0.18	+++++++	+++++++	
Endosulfan II	+++++++	+++++++	0.17	0.14	
4,4'-DDD	0.18	0.18	+++++++	+++++++	
Endosulfan sulfate	+++++++	+++++++	0.17	0.15	
4,4'-DDT	0.18	0.18	+++++++	+++++++	
Methoxychlor	0.79	0.84	+++++++	+++++++	
Endrin ketone	+++++++	+++++++	0.17	0.15	
Endrin aldehyde	+++++++	+++++++	0.17	0.13	
alpha-Chlordane	+++++++	+++++++	0.086	0.078	-9.3%
gamma-Chlordane	+++++++	+++++++	0.087	0.083	
Toxaphene	+++++++	+++++++	+++++++	+++++++	
Aroclor-1016	+++++++	+++++++	+++++++	+++++++	
Aroclor-1221	+++++++	+++++++	+++++++	+++++++	
Aroclor-1232	+++++++	+++++++	+++++++	+++++++	
Aroclor-1242	+++++++	+++++++	+++++++	+++++++	
Aroclor-1248	+++++++	+++++++	+++++++	+++++++	
Aroclor-1254	+++++++	+++++++	+++++++	+++++++	
Aroclor-1260	+++++++	+++++++	+++++++	+++++++	
$ Tetrachloro-m-xylene	0.088	0.090	0.093	0.084	
$ Decachlorobiphenyl	0.17	0.16	0.17	0.16	

[257] From: Eric W Hoppe 11/1/93 1:38PM (567 bytes: 1 ln)
To: Kristine J Kuhl-Klinger
Receipt Requested
cc: Eric W Hoppe
Subject: QB3 PE response
---------- Message Contents ----------

Text item 1: Text_1

Kris,

I have not received a summary for the standards check. I will try to sort through this data myself, but I don't think I can give you information before Wednesday. If this is a problem let me know and I'll try to get you something today. (I'm gone tomorrow)

Eric

[173] From: Eric W Hoppe 9/30/93 2:47PM (1849 bytes: 37 ln)
To: Kristine J Kuhl-Klinger
cc: Steven A Schubert, Tamara L Claypatch, Eric W Hoppe
Subject: Re: QB3/FY93 Organic Response
---------- Message Contents ----------

Eric,

In trying to develope a response to the above PE results, I found that your cc:mail reply was insufficient. It does not indicate all areas investigated, what your investigation uncovered and what corrective actions you have taken.

Can you please meet with me tomorrow morning from 9 to 10am, please come to my office, I can write up the response with you there.

I have been trying to coordinate this for a while and I am afraid I can't delay any longer.

If you can't make this meeting please notify me as soon as possible, you may also update your original response if you feel that will be more efficient.

Steve, if you are available I would appreciate your attendance as well.

Thanks,

Kris

Kris,

Given the amount of time generally allowed to respond after receiving PE results, it is difficult to offer much detail. As you know, the responses must often be rather speculative. I have set up a meeting time with Tamara to meet with you and Steve Tuesday, 10-5, at 1:00 in his office. Lets plan to discuss this then.

Thanks

Eric

[62] From: Eric W Hoppe 8/13/93 3:19PM (1964 bytes: 29 ln)
To: Kristine J Kuhl-Klinger
cc: A Gaylord King, Steven A Schubert, Walter C Weimer
Subject: Re: PE Status
---------- Message Contents ----------

Kris, As we have discussed, in order to achieve results which would closely match other CLP PE participants, we have been extracting using continuous liq-liq for the last several PE sets. Following your review of data from our preliminary blank test set, we have performed the extractions using the liq-liq for this set in order to meet our hold time but have not performed the separatory funnel extractions yet. Of course, results for the sep funnel extractions are not admissible, but they will provide significant data for historical comparison. We have about 0.3 mL of each of the solutions remaining. We will reduce the reagents employed during the sep funnel extractions proportionally. We intend to perform these extractions early next week. We will notify Wally (you are gone next week, right?) prior to this extraction.

An interesting note. After we received the scores on the EPA WP study I reviewed the data. When comparing our results to the true values and acceptable ranges, in almost all cases we are equal to or lower than the EPA value for all fractions. With the exception of acetone, this was the same observation made for the EPA QB3 PE set. The conclusion is that the standards are the problem. As discussed, we suspected the standards may be the problem. Last week we ordered full sets of standards from two additional vendors. We will perform comparisons of all standards prior to analyzing the performance evaluation set.

Eric

REGION 10
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 93

LABORATORY: Battelle Pacific NW (WA)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 1 Same = 2 Below = 4

% SCORE: 91.1
REPORT DATE: 09/15/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
2-BUTANONE	130	210	120	220	190		3	0	44	44
TETRACHLOROETHENE	NU	NU	NU	NU	12		0	0	44	44
1,1,2,2-TETRACHLOROETHANE	81	110	76	120	98		1	0	44	44
TOLUENE	NU	NU	NU	NU	11		0	0	44	44
STYRENE	89	110	86	110	100		2	0	44	44
TCL SEMIVOLATILE										
BIS(2-CHLOROETHYL)ETHER	19	27	18	28	24		4	0	44	44
2,2'-OXYBIS(1-CHLOROPROPANE)	18	28	17	29	30	X	4	0	44	44
NITROBENZENE	26	37	25	43	35		3	0	44	44
2,4-DIMETHYLPHENOL	32	52	29	63	50		1	0	44	44
NAPHTHALENE	16	25	15	29	24		2	0	44	44
DIMETHYL PHTHALATE	29	34	28	35	34		10	0	44	44
ACENAPHTHENE	23	31	22	32	31		3	0	44	44
2,4-DINITROPHENOL	49	82	44	87	62		6	1	43	44
4-BROMOPHENYL PHENYL ETHER	23	31	22	32	30		3	0	44	44
HEXACHLOROBENZENE	24	32	23	36	32		4	0	44	44
PHENANTHRENE	16	21	16	22	21		6	0	44	44
ANTHRACENE	18	22	17	23	20		8	0	44	44
PYRENE	48	79	43	97	68		1	0	44	44
BENZO(K)FLUORANTHENE	14	20	13	21	17		10	2	42	44
DIBENZ(A,H)ANTHRACENE	22	37	20	39	26		7	0	44	44
TCL PESTICIDES										
BETA-BHC	0.079	0.12	0.072	0.13	0.095		5	2	42	44
GAMMA-BHC (LINDANE)	0.48	0.78	0.44	0.82	0.69		4	0	44	44
ALDRIN	0.15	0.24	0.14	0.26	0.42	X	4	0	44	44
DIELDRIN	0.2	0.28	0.19	0.29	0.24		6	0	44	44
4,4'-DDE	0.53	0.73	0.5	0.75	0.7		3	0	44	44
ENDRIN	0.56	0.76	0.54	0.79	0.78	S	7	0	44	44
ENDOSULFAN SULFATE	0.53	0.75	0.5	0.78	0.72		7	1	43	44
4,4'-DDT	0.55	0.77	0.52	0.8	0.74		3	0	44	44
METHOXYCHLOR	1.2	1.8	1.1	1.9	1.4		2	0	44	44
GAMMA-CHLORDANE	0.5	0.69	0.48	0.79	0.73	S	2	0	44	44
NON-TCL VOLATILE										
BENZENE,DICHLORO- (O,M, OR P)					41			5	39	44
HYDRAZINE,DIMETHYL-					0	NR		44	0	44
PROPANE,1,2-DIBROMO-3-CHLORO-					41			14	30	44
NON-TCL SEMIVOLATILE										
ANILINE					84			30	14	44
BENZOIC ACID					15			7	37	44
BENZYL ALCOHOL					80			3	41	44

REGION 10
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 93

LABORATORY: Battelle Pacific NW (WA)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 1 Same = 2 Below = 4

% SCORE: 91.1
REPORT DATE: 09/15/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
DIBENZOTHIOPHENE					36			0	44	44
TCL VOLATILE (Contaminants)										
TRICHLOROETHENE					6			4	40	44

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 2
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

REGION 10
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 93

LABORATORY: Battelle Pacific NW (WA)
PERFORMANCE: UNACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 5 Same = 0 Below = 1

% SCORE: 60.0
REPORT DATE: 06/28/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
BROMOMETHANE	23	38	21	46	34		2	0	42	42
VINYL CHLORIDE	46	80	41	99	71		2	0	42	42
ACETONE	46	200	24	220	260	X	4	2	40	42
CHLOROFORM	10	13	10	13	12		3	0	42	42
CARBON TETRACHLORIDE	56	76	53	80	70		2	0	42	42
BROMODICHLOROMETHANE	120	150	120	150	150		4	0	42	42
DIBROMOCHLOROMETHANE	50	59	49	60	54		7	0	42	42
1,1,2-TRICHLOROETHANE	51	61	50	62	57		3	0	42	42
BROMOFORM	12	15	11	16	13		1	0	42	42
1,1,2,2-TETRACHLOROETHANE	120	150	110	150	150		4	0	42	42
ETHYL BENZENE	NU	NU	NU	NU	12		0	0	42	42
STYRENE	170	220	160	230	210		5	0	42	42
TCL SEMIVOLATILE										
2,2'-OXYBIS(1-CHLOROPROPANE)	38	56	36	66	35	X	4	0	42	42
NAPHTHALENE	17	26	15	31	16	$	2	0	42	42
ACENAPHTHENE	44	65	40	76	42	$	1	0	42	42
HEXACHLOROBENZENE	22	31	21	35	19	X	5	0	42	42
FLUORANTHENE	17	25	16	26	15	X	2	0	42	42
PYRENE	53	74	50	86	46	X	4	0	42	42
DIBENZ(A,H)ANTHRACENE	11	20	10	22	11		1	0	42	42
TCL PESTICIDES										
DELTA-BHC	0.076	0.1	0.073	0.1	0.06	X	5	0	42	42
ALDRIN	0.12	0.2	0.11	0.21	0.12		5	0	42	42
DIELDRIN	0.36	0.43	0.34	0.44	0.3	X	7	1	41	42
ENDRIN	0.67	0.92	0.63	0.96	0.67		4	0	42	42
ENDOSULFAN II	NU	NU	NU	NU	0.09		0	2	40	42
4,4'-DDT	0.26	0.34	0.24	0.35	0.23	X	9	0	42	42
ENDRIN KETONE	0.27	0.36	0.25	0.38	0.28		3	0	42	42
ENDRIN ALDEHYDE	0.13	0.26	0.11	0.28	0.28	$	3	1	41	42
NON-TCL VOLATILE										
BENZENE,N-PROPYL-					46			6	36	42
2-PROPENENITRILE					50			2	40	42
VINYL ACETATE					0	NR		42	0	42
NON-TCL SEMIVOLATILE										
ANILINE					61			25	17	42
BENZYL ALCOHOL					67			5	37	42
TCL VOLATILE (Contaminants)										
2-BUTANONE					16			18	24	42

REGION 10
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 93

LABORATORY: Battelle Pacific NW (WA)
PERFORMANCE: UNACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 5 Same = 0 Below = 1

% SCORE: 60.0
REPORT DATE: 06/28/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	PREDICTION INTERVALS WARNING UPPER	PREDICTION INTERVALS ACTION LOWER	PREDICTION INTERVALS ACTION UPPER	LABORATORY DATA CONC	LABORATORY DATA Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	PROGRAM DATA #LABS ID-CPD	TOTAL #LABS
NON-TCL VOLATILE (Contaminants)										
2-PROPANOL					70			16	26	42
ACETIC ACID,METHYL ESTER					10			31	11	42
NON-TCL SEMIVOLATILE (Contaminants)										
PROPANE,1,1'-OXYBIS [2-CHLOR					10			41	1	42

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 8
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

Performance Evaluation-A

Intercomparison Study

April 20, 1993

Environmental Protection Agency

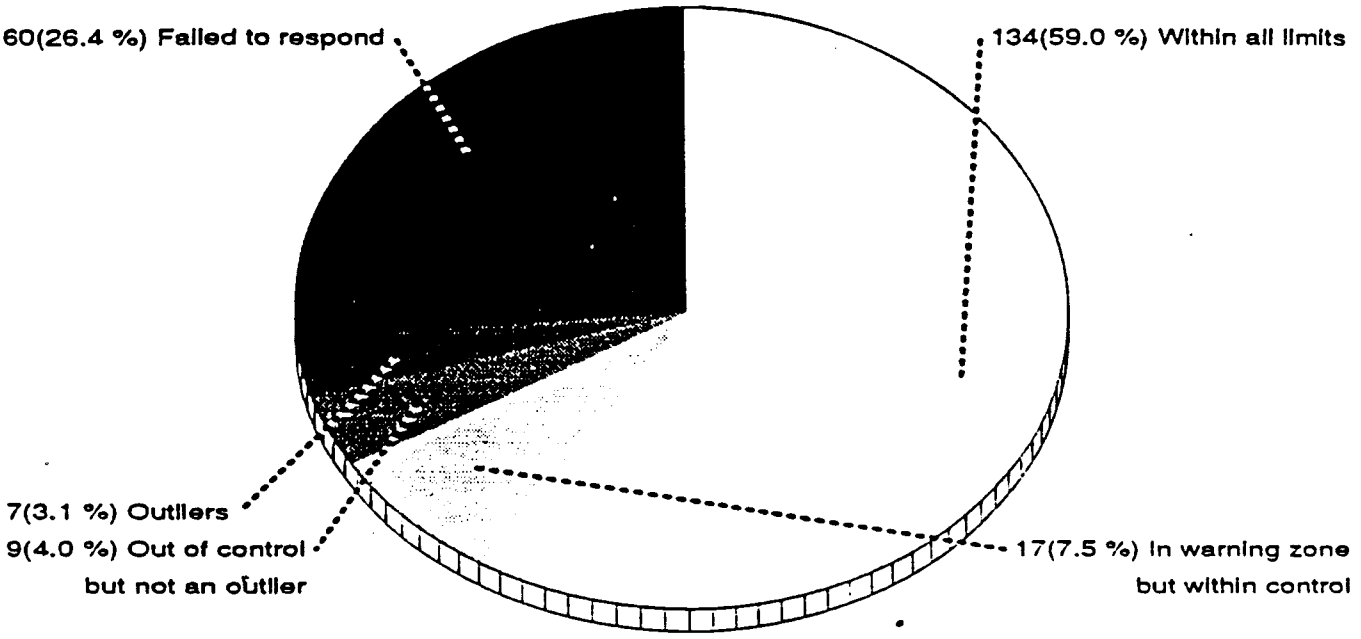
Environmental Monitoring Systems Laboratory

Las Vegas, Nevada

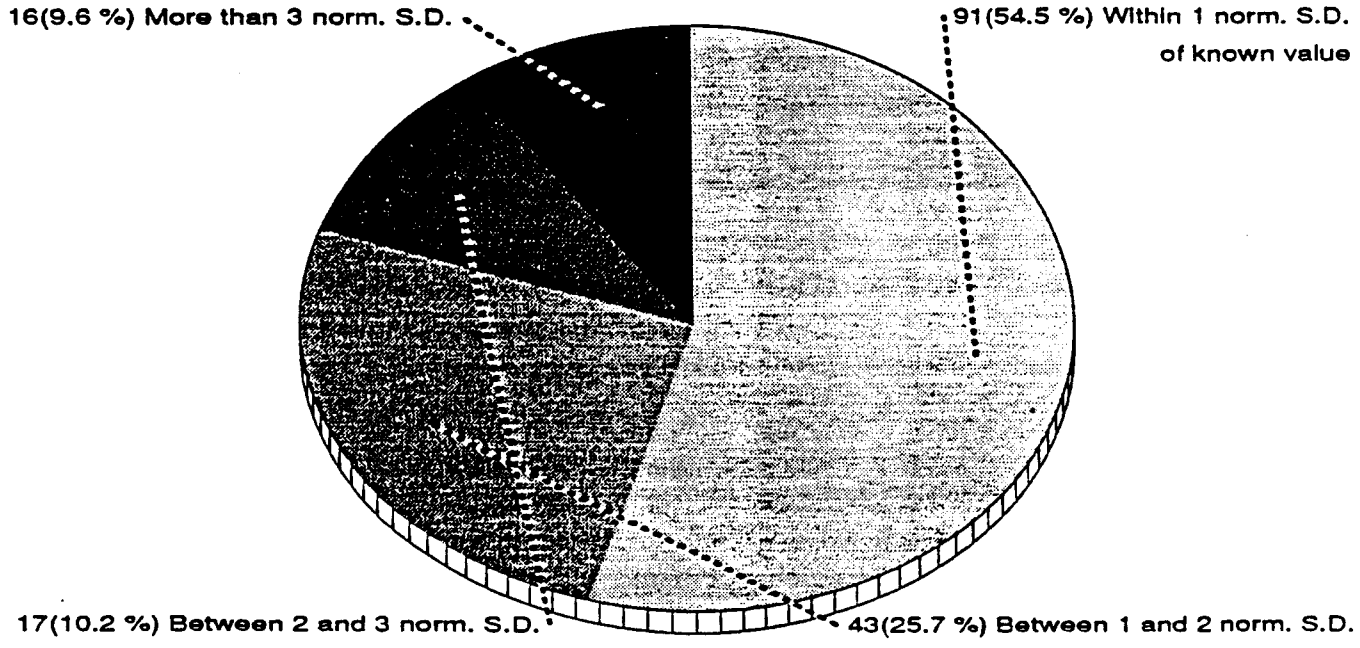
00-058

Gross Alpha Statistical Summary 227 Participants

The known value of this nuclide is 95.0 pCi/l with an expected precision of 24.0; the control limits are 53.4 to 136.6; the warning regions are 53.4 to 67.2 and 122.8 to 136.6



Statistic	Respondents	Non-outliers
Mean	102.98	Grand Avg 96.63
Std. Dev.	76.32	20.17
Variance	5824.22	406.86
% Coef. of Var.	74.11	20.87
% deviation of mean from known value	8.40	1.71
Norm. dev. of mean from known value	0.10	0.08
Median	95.00	95.00
% deviation of median from known value	0.00	0.00
Norm. dev. of median from known value	0.00	0.00



Gross Alpha

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
OS	343.0	345.0	353.0	5.29	0.246	347.00	18.07	18.19	×
OX	81.0	66.0	80.0	8.39	0.369	75.67	-1.51	-1.40	
OY	131.0	133.0	135.0	2.00	0.098	133.00	2.62	2.74	
OZ									•
P	117.0	111.0	107.0	5.03	0.246	111.67	1.09	1.20	
PA	64.0	62.0	67.0	2.52	0.123	64.33	-2.33	-2.21	
PB	103.0	104.0	103.0	0.58	0.025	103.33	0.48	0.60	
PC	132.0	130.0	130.0	1.15	0.049	130.67	2.46	2.57	
PE									•
PG	90.0	96.0	93.0	3.00	0.148	93.00	-0.26	-0.14	
PM	96.0	96.0	101.0	2.89	0.123	97.67	0.08	0.19	
PP									•
PQ	87.0	90.0	94.0	3.51	0.172	90.33	-0.45	-0.34	
PR	89.0	85.0	80.0	4.51	0.222	84.67	-0.86	-0.75	
PT	55.0	73.0	70.0	9.64	0.443	66.00	-2.21	-2.09	
PV	89.0	88.0	99.0	6.08	0.271	92.00	-0.33	-0.22	
PW									•
PY									•
Q	109.0	93.0	126.0	16.50	0.812	109.33	0.92	1.03	
QC	106.0	110.0	94.0	8.33	0.394	103.33	0.48	0.60	
QJ	104.0	142.0	131.0	19.55	0.935	125.67	2.10	2.21	
QK									•
QL									•
QP									•
QQ	139.0	141.0	142.0	1.53	0.074	140.67	3.18	3.30	⇑
QT	87.0	101.0	93.0	7.02	0.345	93.67	-0.21	-0.10	
QU	116.0	115.0	121.0	3.21	0.148	117.33	1.49	1.61	
QW	107.0	115.0	114.0	4.36	0.197	112.00	1.11	1.23	
QX	68.0	68.0	69.0	0.58	0.025	68.33	-2.04	-1.92	
QY									•
QZ	87.0	91.0	87.0	2.31	0.098	88.33	-0.60	-0.48	
RC									•
RD	92.0	94.0	91.0	1.53	0.074	92.33	-0.31	-0.19	
RE	94.0	99.0	71.0	14.93	0.689	88.00	-0.62	-0.51	
RF	100.0	98.0	98.0	1.15	0.049	98.67	0.15	0.26	
RG	68.0	68.0	79.0	6.35	0.271	71.67	-1.80	-1.68	
RJ	136.0	124.0	135.0	6.66	0.295	131.67	2.53	2.65	
RK	50.0	55.0	63.0	6.56	0.320	56.00	-2.93	-2.81	
RL	17.0	17.0	17.0	0.00	0.000	17.00	-5.75	-5.63	×
RM	77.0	77.0	86.0	5.20	0.222	80.00	-1.20	-1.08	
RN	74.0	69.0	78.0	4.51	0.222	73.67	-1.66	-1.54	
RP	1.0								∅
RR	83.0	83.0	81.0	1.15	0.049	82.33	-1.03	-0.91	
RT									•
RV	88.0	89.0	87.0	1.00	0.049	88.00	-0.62	-0.51	

• ≡ No data submitted

∅ ≡ Insufficient data

TAG SYMBOLS

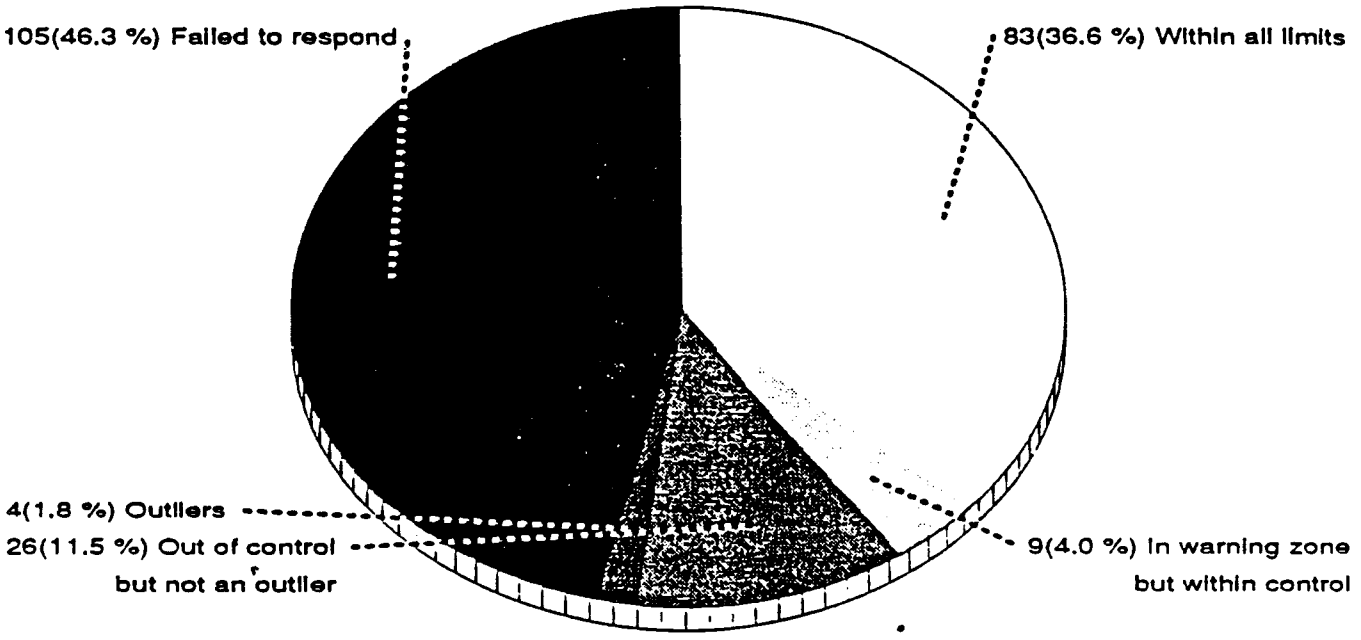
× ≡ Determined to be an outlier

⇑ ≡ Above control limit

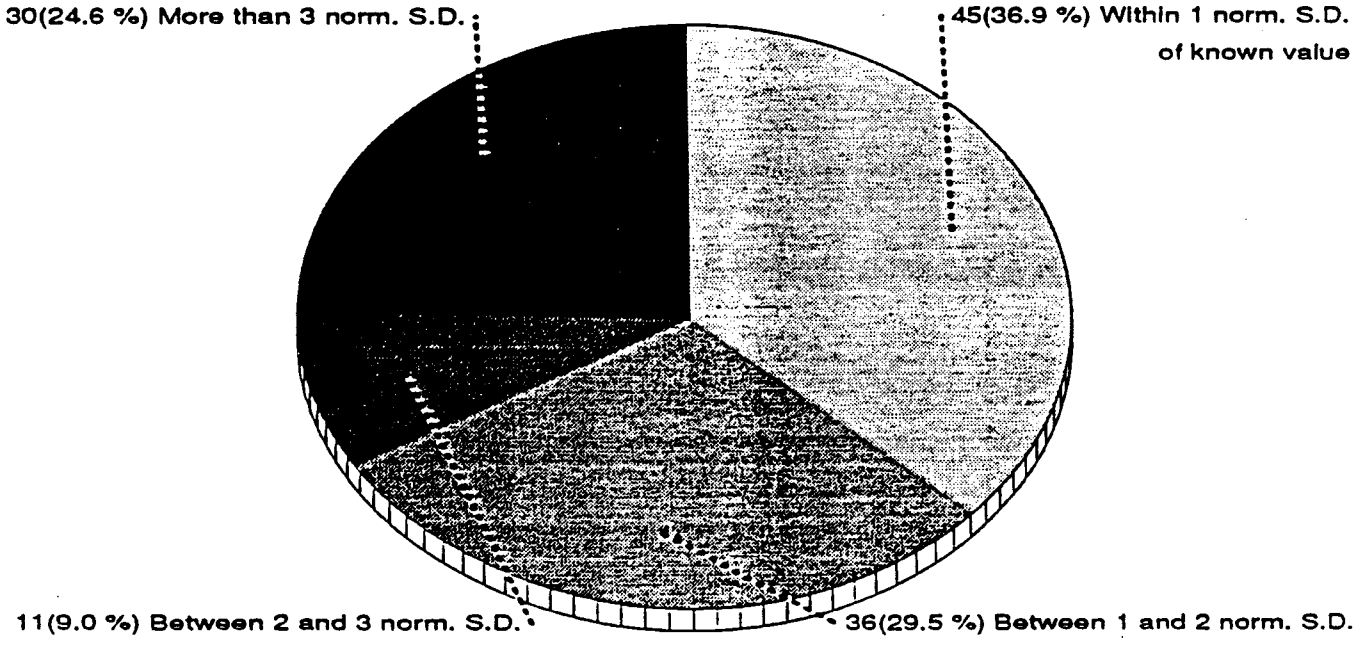
⇓ ≡ Below control limit

Uranium (Natural) Statistical Summary 227 Participants

The known value of this nuclide is 28.9 pCi/l with an expected precision of 3.0; the control limits are 23.7 to 34.1; the warning regions are 23.7 to 25.4 and 32.4 to 34.1



Statistic	Respondents	Non-outliers
Mean	30.76	Grand Avg 27.64
Std. Dev.	20.83	5.01
Variance	433.77	25.13
% Coef. of Var.	67.70	18.14
% deviation of mean from known value	6.44	-4.35
Norm. dev. of mean from known value	0.09	-0.25
Median	28.32	28.25
% deviation of median from known value	-2.02	-2.25
Norm. dev. of median from known value	-0.03	-0.13



Uranium (Natural)

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
OS	28.8	27.1	26.3	1.28	0.492	27.40	-0.14	-0.87	
OX									•
OY	27.2	27.7	27.5	0.25	0.098	27.47	-0.10	-0.83	
OZ									•
P	32.5	30.6	32.1	1.00	0.374	31.73	2.36	1.64	
PA									•
PB	35.2	35.6	35.0	0.31	0.118	35.27	4.40	3.68	⇑
PC									•
PE									•
PG									•
PM	32.0	33.0	32.0	0.58	0.197	32.33	2.71	1.98	
PP	22.0	21.6	21.6	0.23	0.079	21.73	-3.41	-4.14	⇓
PQ	27.4	27.6	26.7	0.47	0.177	27.23	-0.24	-0.96	
PR									•
PT	23.0	22.7	22.1	0.46	0.177	22.60	-2.91	-3.64	⇓
PV	23.5	21.9	21.2	1.18	0.453	22.20	-3.14	-3.87	⇓
PW									•
PY									•
Q	25.5	26.6	27.1	0.82	0.315	26.40	-0.72	-1.44	
QC									•
QJ	28.7	28.1	28.8	0.38	0.138	28.53	0.51	-0.21	
QK									•
QL									•
QP									•
QQ	26.0	25.5	24.8	0.60	0.236	25.43	-1.28	-2.00	
QT									•
QU	30.3	30.4	31.7	0.78	0.276	30.80	1.82	1.10	
QW									•
QX	32.6	32.3	32.8	0.25	0.098	32.57	2.84	2.12	
QY	29.2	28.6	28.9	0.30	0.118	28.90	0.73	0.00	
QZ	31.4	33.4	33.7	1.25	0.453	32.83	3.00	2.27	
RC	29.8	31.9	30.3	1.10	0.413	30.67	1.75	1.02	
RD	42.1	43.6	42.9	0.75	0.295	42.87	8.79	8.06	⇑
RE									•
RF	28.5	28.5	29.3	0.46	0.158	28.77	0.65	-0.08	
RG	29.7	29.7	29.0	0.40	0.138	29.47	1.05	0.33	
RJ									•
RK	27.9	26.5	27.2	0.70	0.276	27.20	-0.26	-0.98	
RL	15.0	18.0	20.0	2.52	0.984	17.67	-5.76	-6.49	⇓
RM	20.0	19.0	22.9	2.03	0.768	20.63	-4.05	-4.77	⇓
RN	35.5	35.0	33.6	0.98	0.374	34.70	4.07	3.35	⇑
RP	30.6	30.6	30.6	0.01	0.000	30.60	1.71	0.98	
RR	28.8	30.3	29.6	0.75	0.295	29.57	1.11	0.38	
RT									•
RV	14.1	14.7	14.6	0.32	0.118	14.47	-7.61	-8.33	⇓

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

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

Performance Evaluation-B

Intercomparison Study

April 20, 1993

Environmental Protection Agency

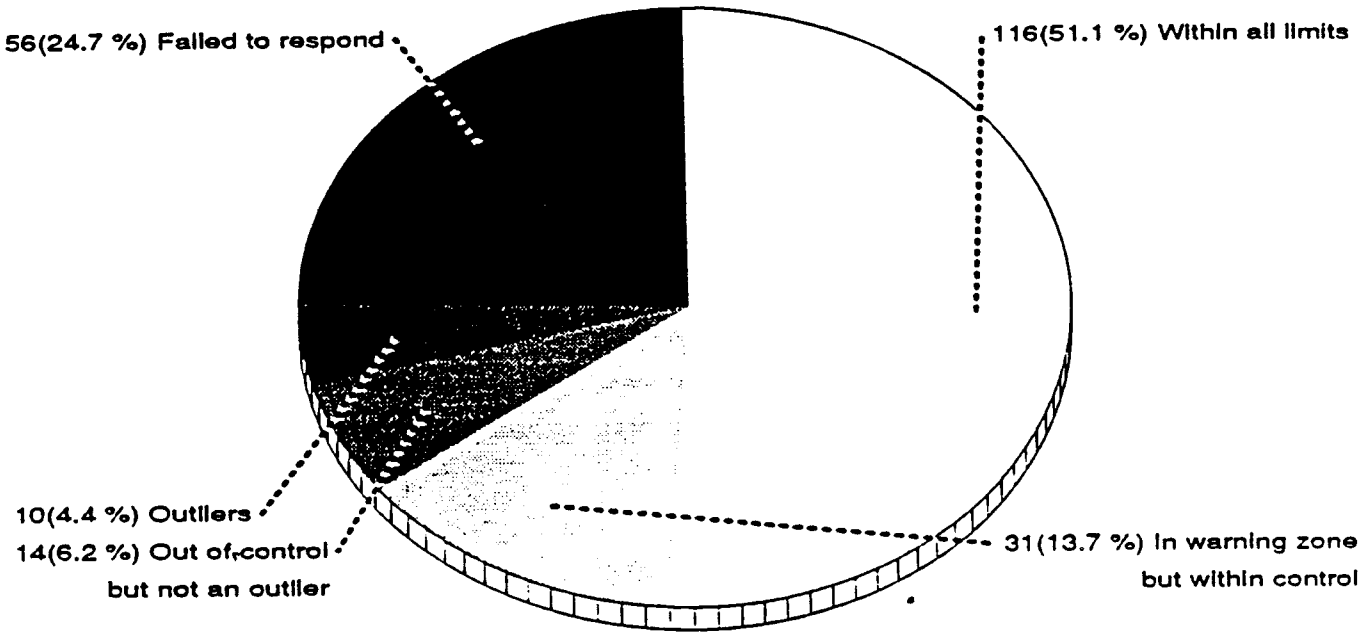
Environmental Monitoring Systems Laboratory

Las Vegas, Nevada

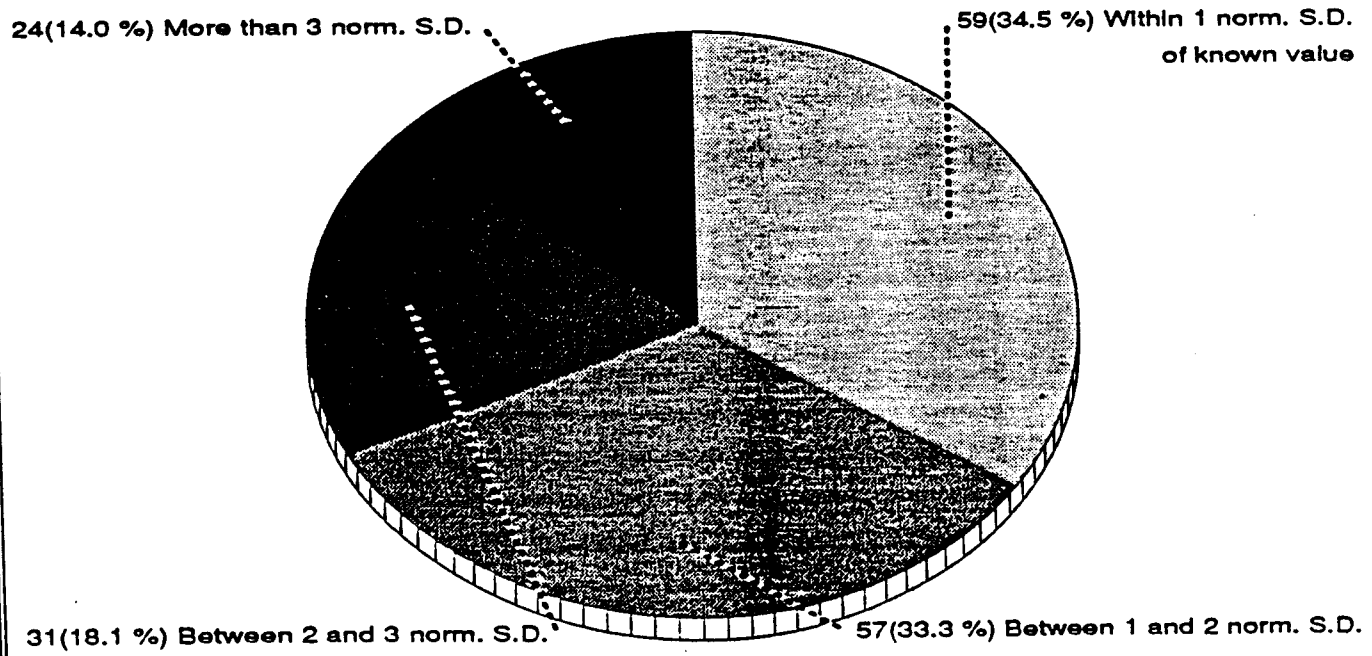
00=078

Gross Beta Statistical Summary 227 Participants

The known value of this nuclide is 177.0 pCi/l with an expected precision of 27.0; the control limits are 130.2 to 223.8; the warning regions are 130.2 to 145.7 and 208.3 to 223.8



Statistic	Respondents	Non-outliers
Mean	209.02	Grand Avg 155.52
Std. Dev.	665.59	18.41
Variance	443014.07	338.96
% Coef. of Var.	318.44	11.84
% deviation of mean from known value	18.09	-12.14
Norm. dev. of mean from known value	0.05	-1.17
Median	156.67	157.00
% deviation of median from known value	-11.49	-11.30
Norm. dev. of median from known value	-0.03	-1.09



Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
OS	748.0	740.0	741.0	4.36	0.175	743.00	37.69	36.31	×
OX	163.0	158.0	151.0	6.03	0.263	157.33	0.12	-1.26	
OY	133.0	137.0	121.0	8.33	0.350	130.33	-1.62	-2.99	
OZ									•
P	170.0	153.0	149.0	11.15	0.459	157.33	0.12	-1.26	
PA	156.0	160.0	158.0	2.00	0.088	158.00	0.16	-1.22	
PB	176.0	167.0	182.0	7.55	0.328	175.00	1.25	-0.13	
PC	133.0	134.0	137.0	2.08	0.088	134.67	-1.34	-2.72	
PE									•
PG	162.0	155.0	166.0	5.57	0.241	161.00	0.35	-1.03	
PM	151.0	173.0	156.0	11.53	0.481	160.00	0.29	-1.09	
PP									•
PQ	164.0	164.0	163.0	0.58	0.022	163.67	0.52	-0.86	
PR	130.0	125.0	120.0	5.00	0.219	125.00	-1.96	-3.34	⇓
PT	74.0	84.0	76.0	5.29	0.219	78.00	-4.97	-6.35	×
PV	148.0	152.0	156.0	4.00	0.175	152.00	-0.23	-1.60	
PW									•
PY									•
Q	150.0	147.0	152.0	2.52	0.109	149.67	-0.38	-1.75	
QC	154.0	168.0	173.0	9.85	0.416	165.00	0.61	-0.77	
QJ	145.0	127.0	142.0	9.64	0.394	138.00	-1.12	-2.50	
QK	154.0	151.0	159.0	4.04	0.175	154.67	-0.05	-1.43	
QL	376.0	364.0	368.0	6.11	0.263	369.33	13.72	12.34	×
QP	135.0	135.0	141.0	3.46	0.131	137.00	-1.19	-2.57	
QQ	157.0	160.0	162.0	2.52	0.109	159.67	0.27	-1.11	
QT	169.0	163.0	165.0	3.06	0.131	165.67	0.65	-0.73	
QU	177.0	180.0	181.0	2.08	0.088	179.33	1.53	0.15	
QW	179.0	185.0	185.0	3.46	0.131	183.00	1.76	0.38	
QX	150.0	151.0	153.0	1.53	0.066	151.33	-0.27	-1.65	
QY									•
QZ	166.0	162.0	171.0	4.51	0.197	166.33	0.69	-0.68	
RC									•
RD	182.0	184.0	165.0	10.44	0.416	177.00	1.38	0.00	
RE	167.0	170.0	149.0	11.36	0.459	162.00	0.42	-0.96	
RF	161.0	160.0	157.0	2.08	0.088	159.33	0.24	-1.13	
RG	150.0	146.0	151.0	2.65	0.109	149.00	-0.42	-1.80	
RJ	169.0	168.0	174.0	3.21	0.131	170.33	0.95	-0.43	
RK	161.0	111.0	131.0	25.17	1.179	134.33	-1.36	-2.74	
RL	23.0	24.0	24.0	0.58	0.022	23.67	-8.46	-9.84	×
RM	173.0	176.0	184.0	5.69	0.241	177.67	1.42	0.04	
RN	129.0	143.0	130.0	7.81	0.306	134.00	-1.38	-2.76	
RP									•
RR	161.0	148.0	157.0	6.66	0.284	155.33	-0.01	-1.39	
RT									•
RV	127.0	128.0	125.0	1.53	0.066	126.67	-1.85	-3.23	⇓

• ≡ No data submitted

∅ ≡ Insufficient data

TAG SYMBOLS

× ≡ Determined to be an outlier

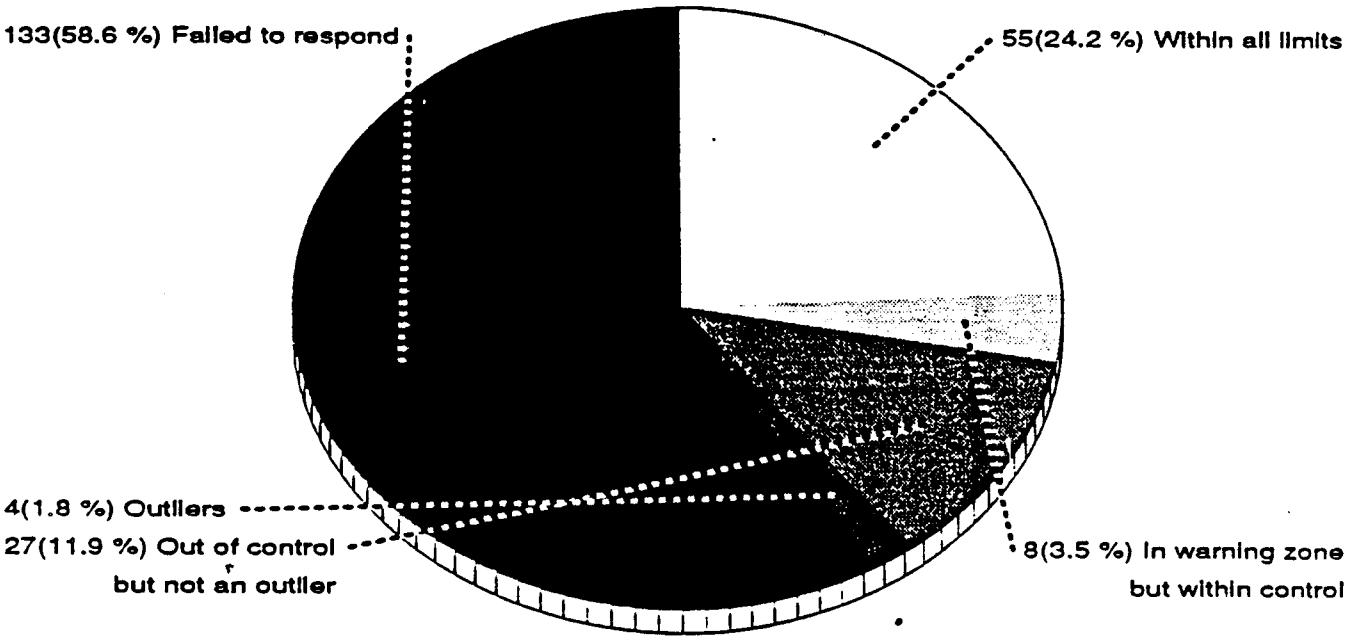
⇑ ≡ Above control limit

⇓ ≡ Below control limit

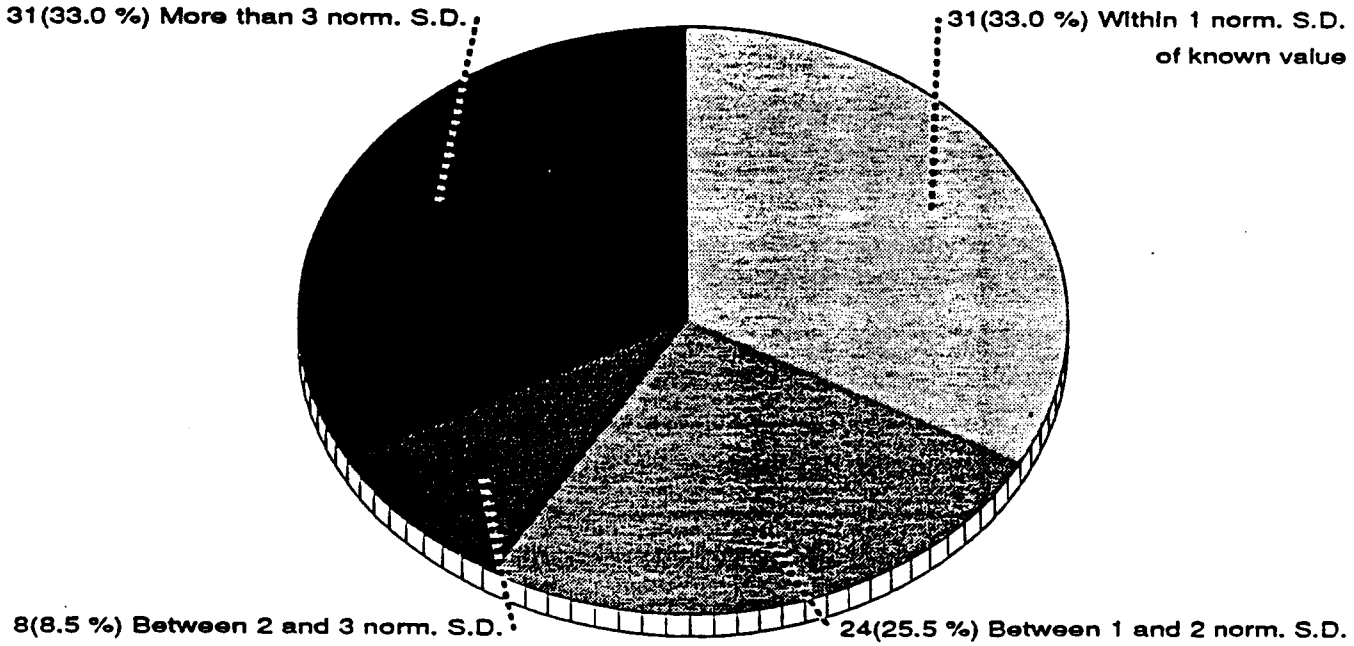
00-083

Strontium-89 Statistical Summary 227 Participants

The known value of this nuclide is 41.0 pCi/l with an expected precision of 5.0; the control limits are 32.3 to 49.7; the warning regions are 32.3 to 35.2 and 46.8 to 49.7



Statistic	Respondents	Non-outliers
Mean	55.28	Grand Avg 37.59
Std. Dev.	166.21	8.32
Variance	27625.90	69.30
% Coef. of Var.	300.69	22.15
% deviation of mean from known value	34.82	-8.33
Norm. dev. of mean from known value	0.09	-0.41
Median	38.83	38.67
% deviation of median from known value	-5.28	-5.69
Norm. dev. of median from known value	-0.01	-0.28



Strontium-89

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
OS									•
OX									•
OY									•
OZ									•
P									•
PA									•
PB	42.0	45.0	48.0	3.00	0.709	45.00	2.57	1.39	
PC	30.0	50.0	45.0	10.41	3.596	41.67	1.41	0.23	
PE									•
PG									•
PM	37.0	38.0	32.0	3.21	0.709	35.67	-0.66	-1.85	
PR									•
PQ	36.0	34.0	40.0	3.06	0.709	36.67	-0.32	-1.50	
PR									•
PT	48.0	56.0	61.0	6.56	2.020	55.00	6.03	4.85	⇑
PV	35.0	38.0	43.0	4.04	0.945	38.67	0.37	-0.81	
PW									•
PY									•
Q	36.0	35.0	36.0	0.58	0.118	35.67	-0.66	-1.85	
QC									•
QJ									•
QK	41.0	42.0	43.0	1.00	0.236	42.00	1.53	0.35	
QL	51.0	102.0	70.0	25.77	10.571	74.33	12.73	11.55	×
QP									•
QQ	28.0	28.0	28.0	0.00	0.000	28.00	-3.32	-4.50	⇓
QT									•
QU	37.0	39.0	41.0	2.00	0.473	39.00	0.49	-0.69	
QW	40.0	43.0	39.0	2.08	0.473	40.67	1.07	-0.12	
QX	25.0	23.0	23.0	1.15	0.236	23.67	-4.82	-6.00	⇓
QY									•
QZ	36.0	35.0	35.0	0.58	0.118	35.33	-0.78	-1.96	
RC									•
RD									•
RE									•
RF	48.0	41.0	51.0	5.13	1.345	46.67	3.15	1.96	
RG									•
RJ									•
RK	37.0	43.0	32.0	5.51	1.570	37.33	-0.09	-1.27	
RL	6.0	7.0	12.0	3.21	0.709	8.33	-10.13	-11.32	×
RM	48.0	45.0	52.0	3.51	0.827	48.33	3.72	2.54	
RN	24.0	27.0	28.0	2.08	0.473	26.33	-3.90	-5.08	⇓
RP									•
RR	43.0	45.0	41.0	2.00	0.473	43.00	1.88	0.69	
RT									•
RV									•

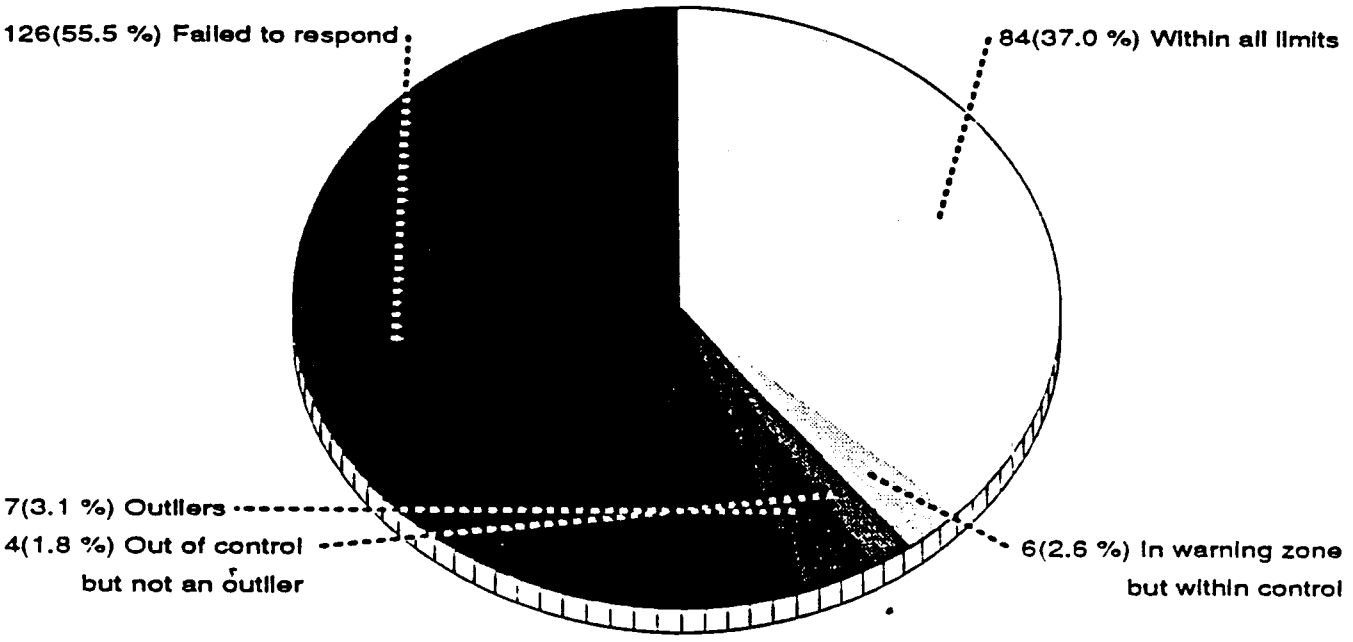
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

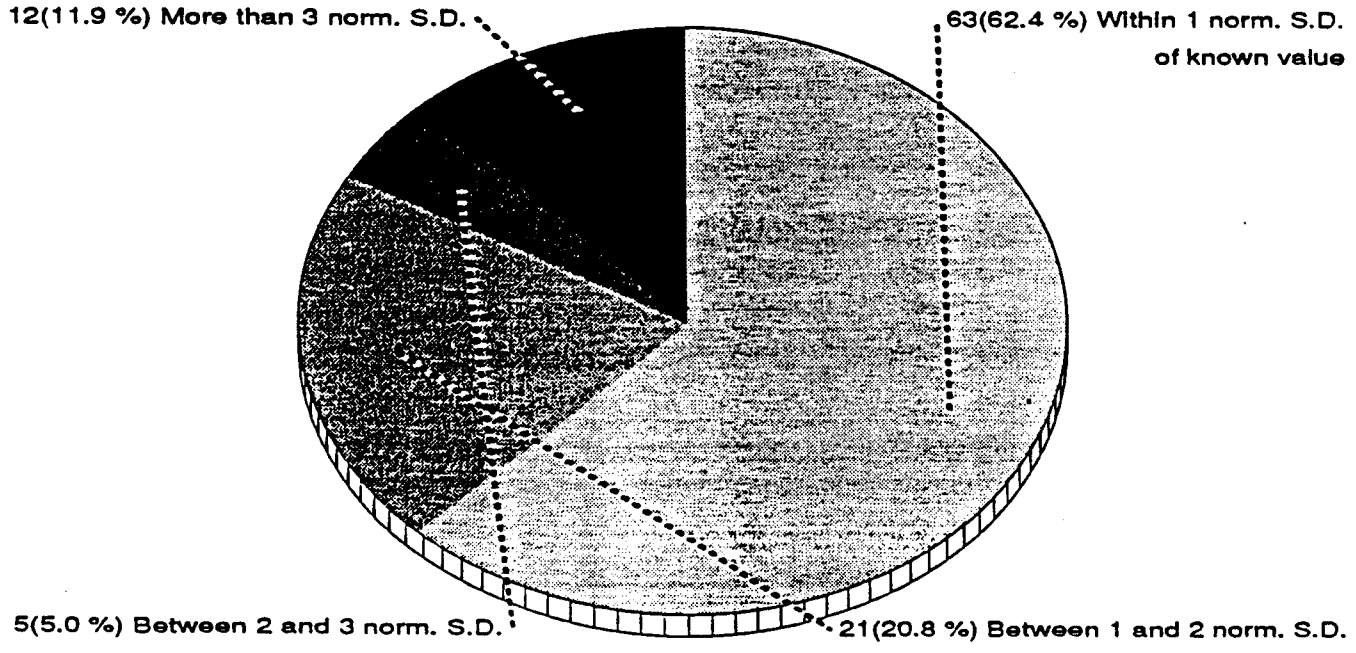
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Strontium-90 Statistical Summary 227 Participants

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



Statistic	Respondents	Non-outliers
Mean	97.24	Grand Avg 27.82
Std. Dev.	689.22	3.45
Variance	475019.12	11.87
% Coef. of Var.	708.77	12.38
% deviation of mean from known value	235.31	-4.06
Norm. dev. of mean from known value	0.10	-0.34
Median	28.00	28.00
% deviation of median from known value	-3.45	-3.45
Norm. dev. of median from known value	0.00	-0.29



Strontium-90

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
OS									•
OX									•
OY									•
OZ									•
P									•
PA									•
PB	30.0	28.0	32.0	2.00	0.473	30.00	0.75	0.35	
PC	35.0	30.0	30.0	2.89	0.591	31.67	1.33	0.92	
PE									•
PG									•
PM	27.0	28.0	28.0	0.58	0.118	27.67	-0.05	-0.46	
PP	6.0	6.0	6.0	0.00	0.000	6.00	-7.56	-7.97	×
PQ	30.0	29.0	26.0	2.08	0.473	28.33	0.18	-0.23	
PR									•
PT	24.0	23.0	24.0	0.58	0.118	23.67	-1.44	-1.85	
PV	31.0	29.0	30.0	1.00	0.236	30.00	0.75	0.35	
PW									•
PY									•
Q	30.0	35.0	38.0	4.04	0.945	34.33	2.26	1.85	
QC									•
QJ	26.0	30.0	28.0	2.00	0.473	28.00	0.06	-0.35	
QK	30.0	29.0	29.0	0.58	0.118	29.33	0.52	0.12	
QL	51.0	48.0	50.0	1.53	0.354	49.67	7.57	7.16	×
QP									•
QQ									•
QT									•
QU	30.0	29.0	31.0	1.00	0.236	30.00	0.75	0.35	
QW	28.0	29.0	32.0	2.08	0.473	29.67	0.64	0.23	
QX	20.0	25.0	22.0	2.52	0.591	22.33	-1.90	-2.31	
QY									•
QZ	23.0	24.0	24.0	0.58	0.118	23.67	-1.44	-1.85	
RC									•
RD									•
RE									•
RF	37.0	45.0	38.0	4.36	0.945	40.00	4.22	3.81	×
RG									•
RJ									•
RK	20.0	19.0	27.0	4.36	0.945	22.00	-2.02	-2.42	
RL	10.0	16.0	12.0	3.06	0.709	12.67	-5.25	-5.66	×
RM	33.0	33.0	29.0	2.31	0.473	31.67	1.33	0.92	
RN	20.0	17.0	18.0	1.53	0.354	18.33	-3.29	-3.70	⇓
RP									•
RR	28.0	28.0	28.0	0.00	0.000	28.00	0.06	-0.35	
RT									•
RV									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

90-091

Tritium in Water

Intercomparison Study

June 4, 1993

Environmental Protection Agency

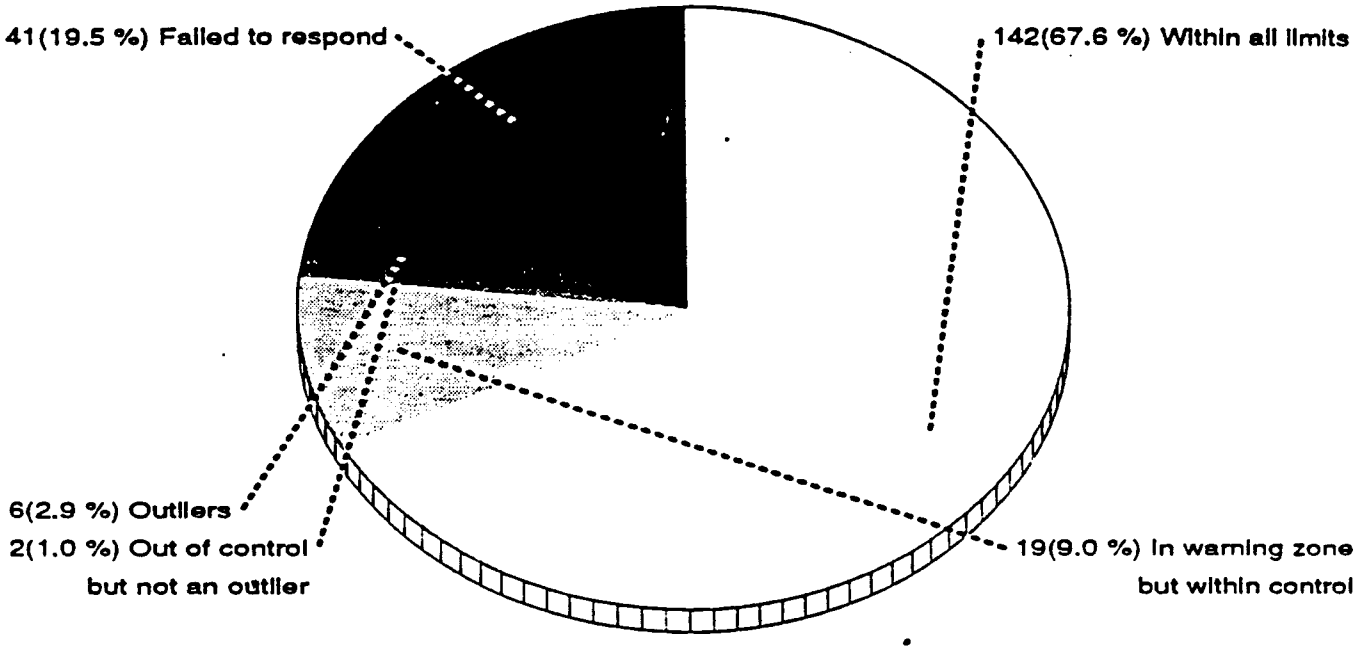
Environmental Monitoring Systems Laboratory

Las Vegas, Nevada

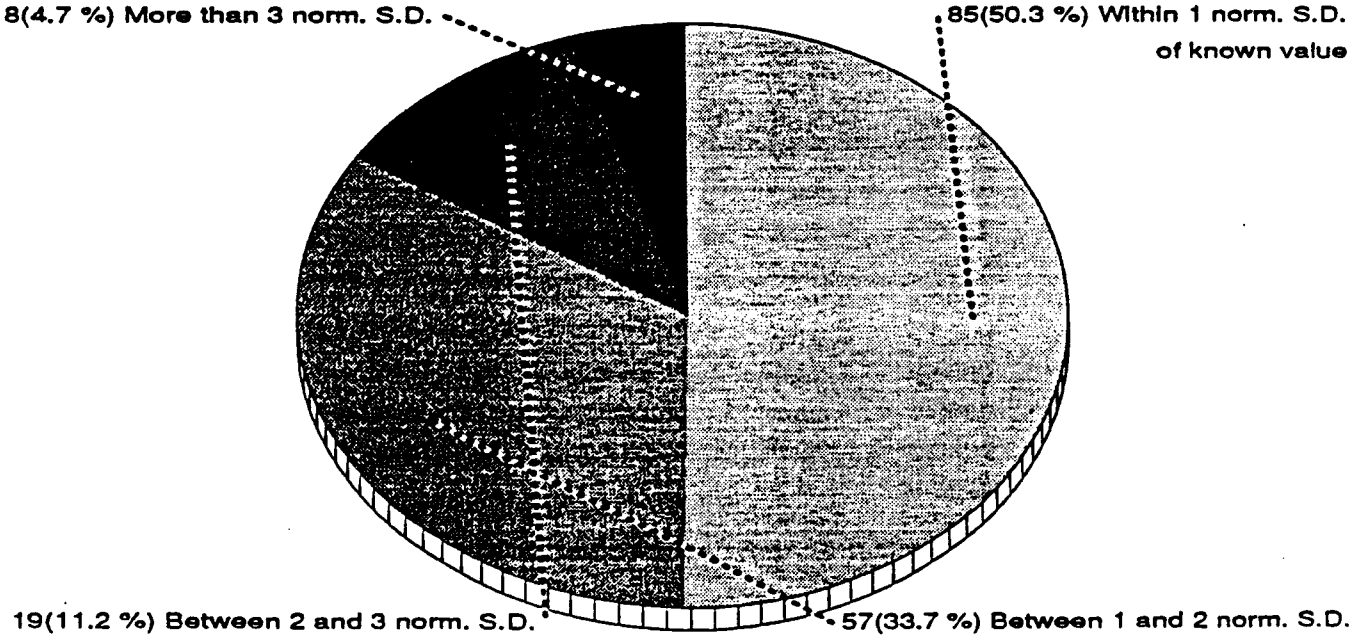
00-048

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	Grand Avg 9591.82
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
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									•
N[illegible]	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	
Q[illegible]	12913.0	12237.0	12763.0	355.00	0.406	12637.67	5.36	4.92	×
Q[illegible]	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	×

• ≡ No data submitted

TAG SYMBOLS

⇑ ≡ Above control limit

∅ ≡ Insufficient data

× ≡ Determined to be an outlier

⇓ ≡ Below control limit

Gamma in Water

Intercomparison Study

June 11, 1993

Environmental Protection Agency

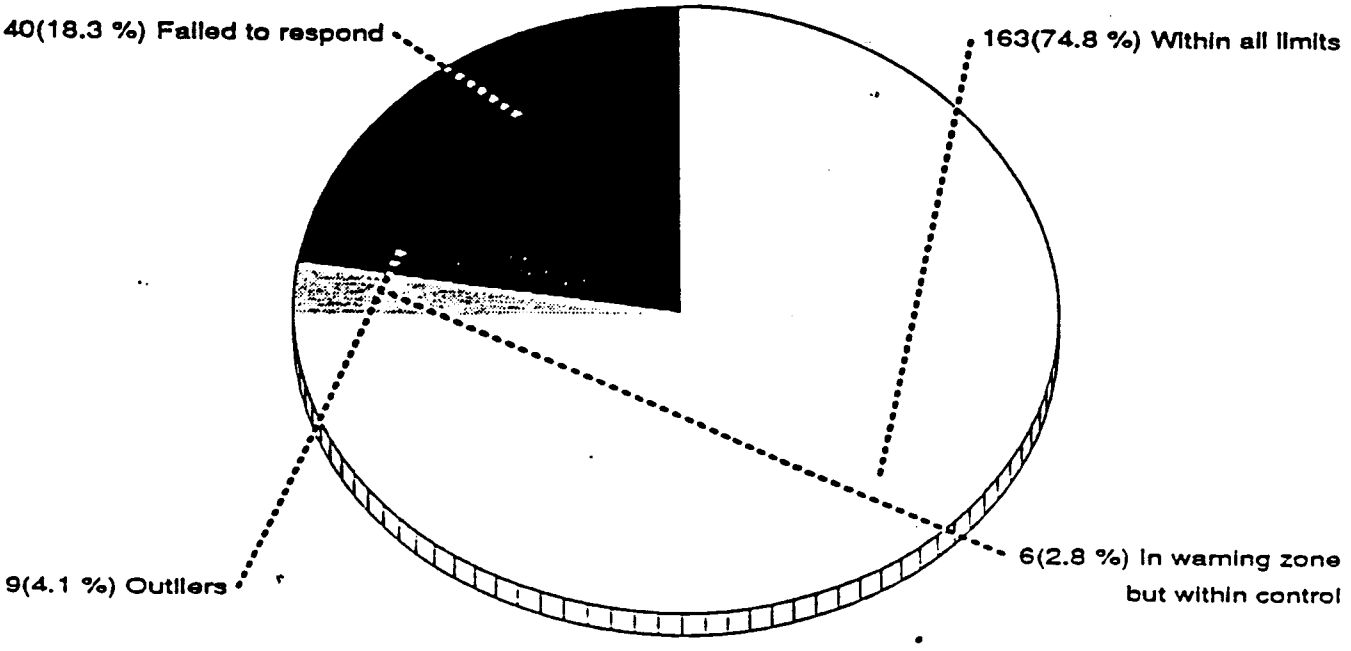
Environmental Monitoring Systems Laboratory

Las Vegas, Nevada

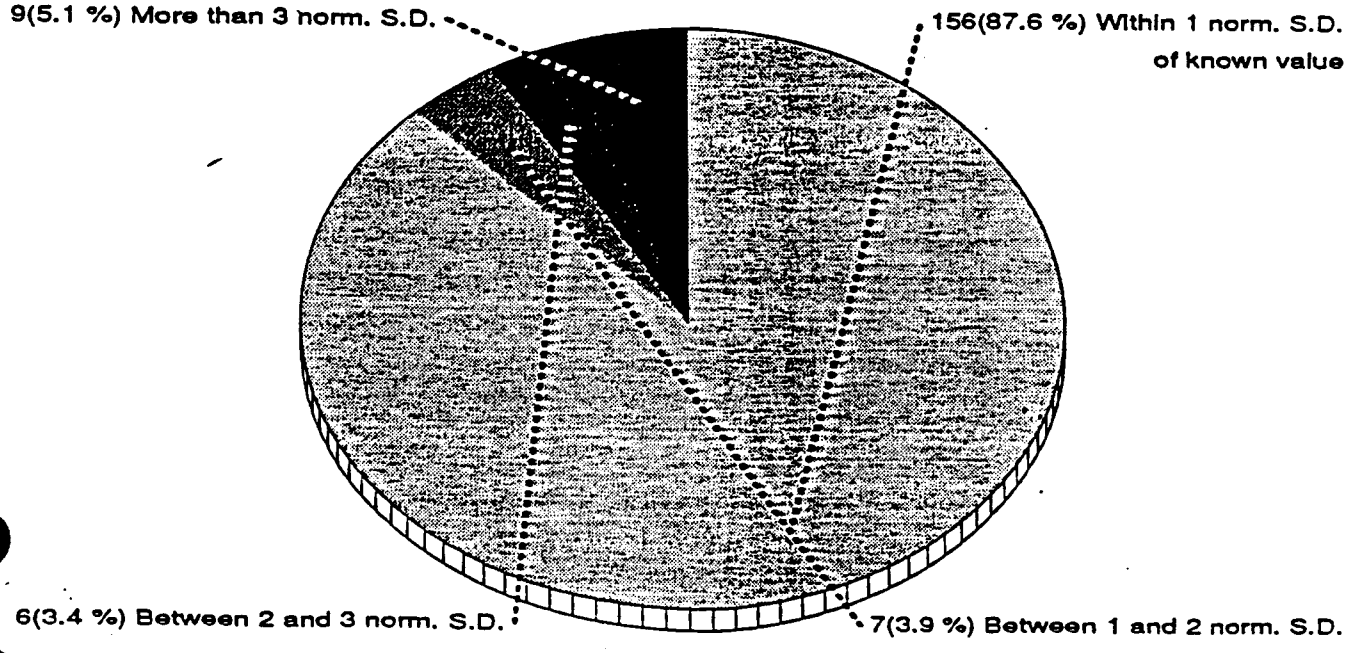
QC-107

Cobalt-60 Statistical Summary 218 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	16.07	Grand Avg 14.90
Std. Dev.	11.04	2.08
Variance	121.95	4.32
% Coef. of Var.	68.71	13.96
% deviation of mean from known value	7.15	-0.68
Norm. dev. of mean from known value	0.10	-0.05
Median	15.00	15.00
% deviation of median from known value	0.00	0.00
Norm. dev. of median from known value	0.00	0.00



Cobalt-60

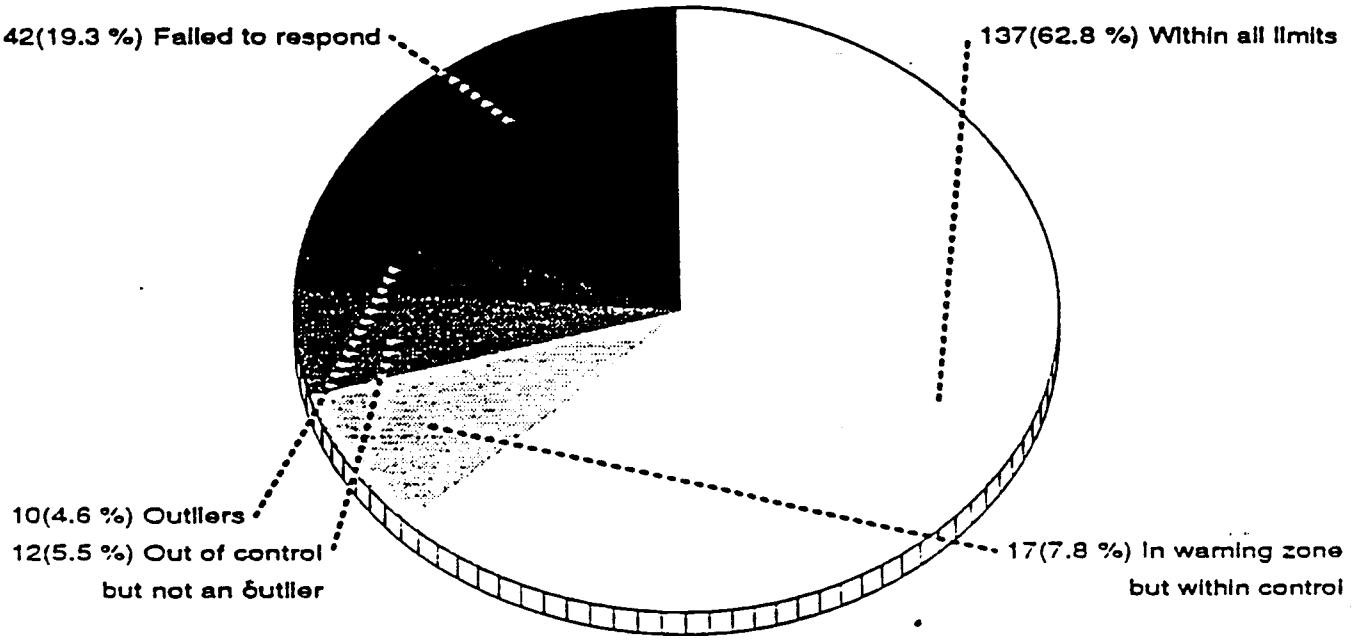
Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
PQ	11.0	13.0	15.0	2.00	0.473	13.00	-0.66	-0.69	
PT	14.0	16.0	16.0	1.15	0.236	15.33	0.15	0.12	
PU									•
PV	16.0	16.0	15.0	0.58	0.118	15.67	0.27	0.23	
PW									•
PX	14.0	14.0	14.0	0.00	0.000	14.00	-0.31	-0.35	
PY									•
Q	14.0	15.0	15.0	0.58	0.118	14.67	-0.08	-0.12	
QB	16.0	16.0	16.0	0.00	0.000	16.00	0.38	0.35	
QJ	15.0	19.0	16.0	2.08	0.473	16.67	0.61	0.58	
QK	14.0	15.0	15.0	0.58	0.118	14.67	-0.08	-0.12	
QL									•
QM	14.0	13.0	13.0	0.58	0.118	13.33	-0.54	-0.58	
QP	42.0	41.0	32.0	5.51	1.345	38.33	8.12	8.08	×
QQ									•
QT	14.0	17.0	16.0	1.53	0.354	15.67	0.27	0.23	
QU	2.0	3.0	2.0	0.58	0.118	2.33	-4.35	-4.39	×
QX	22.0	24.0	22.0	1.15	0.236	22.67	2.69	2.66	
QZ	15.0	15.0	15.0	0.00	0.000	15.00	0.04	0.00	
R	14.0	14.0	14.0	0.00	0.000	14.00	-0.31	-0.35	
RC	14.0	14.0	14.0	0.00	0.000	14.00	-0.31	-0.35	
RF	14.0	13.0	15.0	1.00	0.236	14.00	-0.31	-0.35	
RH									•
RK	14.0	14.0	14.0	0.00	0.000	14.00	-0.31	-0.35	
RL	13.0	13.0	13.0	0.00	0.000	13.00	-0.66	-0.69	
RM	15.0	14.0	15.0	0.58	0.118	14.67	-0.08	-0.12	
RO	19.0	15.0	17.0	2.00	0.473	17.00	0.73	0.69	
RQ									•
RR	16.0	17.0	15.0	1.00	0.236	16.00	0.38	0.35	
RV	16.0	15.0	12.0	2.08	0.473	14.33	-0.20	-0.23	
RX	4.0	5.0	5.0	0.58	0.118	4.67	-3.54	-3.58	×
RZ	16.0	15.0	15.0	0.58	0.118	15.33	0.15	0.12	
S	15.0	15.0	14.0	0.58	0.118	14.67	-0.08	-0.12	
SA									•
SC	15.0	14.0	14.0	0.58	0.118	14.33	-0.20	-0.23	
SD	13.0	15.0	14.0	1.00	0.236	14.00	-0.31	-0.35	
SF	7.0	6.0	7.0	0.58	0.118	6.67	-2.85	-2.89	
SI	17.0	16.0	14.0	1.53	0.354	15.67	0.27	0.23	
SK	10.0	10.0	10.0	0.00	0.000	10.00	-1.70	-1.73	
SM	16.0	15.0	15.0	0.58	0.118	15.33	0.15	0.12	
SN									•
SR	13.0	16.0	13.0	1.73	0.354	14.00	-0.31	-0.35	
SS	14.0	17.0	16.0	1.53	0.354	15.67	0.27	0.23	
ST	12.0	13.0	13.0	0.58	0.118	12.67	-0.77	-0.81	
SU									•

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

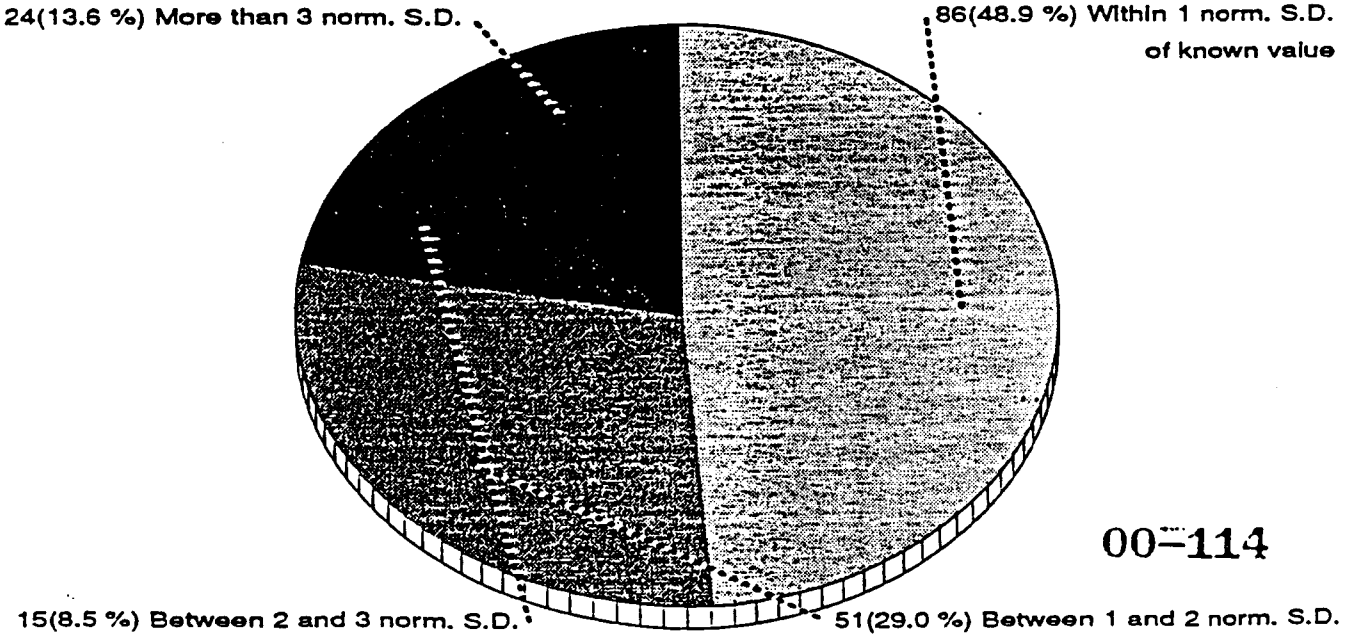
∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Zinc-65 Statistical Summary 218 Participants

The known value of this nuclide is 103.0 pCi/l with an expected precision of 10.0; the control limits are 85.7 to 120.3; the warning regions are 85.7 to 91.4 and 114.6 to 120.3



Statistic	Respondents	Non-outliers
Mean	106.02	Grand Avg 107.54
Std. Dev.	16.66	7.83
Variance	277.55	61.36
% Coef. of Var.	15.71	7.28
% deviation of mean from known value	2.93	4.41
Norm. dev. of mean from known value	0.18	0.58
Median	107.33	107.33
% deviation of median from known value	4.21	4.21
Norm. dev. of median from known value	0.26	0.55



00-114

Zinc-65

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
PQ	110.0	109.0	106.0	2.08	0.236	108.33	0.14	0.92	
PT	115.0	106.0	112.0	4.58	0.532	111.00	0.60	1.39	
PU									•
PV	107.0	107.0	108.0	0.58	0.059	107.33	-0.04	0.75	
PW									•
PX	105.0	105.0	104.0	0.58	0.059	104.67	-0.50	0.29	
PY									•
Q	110.0	107.0	106.0	2.08	0.236	107.67	0.02	0.81	
QB	117.0	108.0	115.0	4.73	0.532	113.33	1.00	1.79	
QJ	114.0	111.0	120.0	4.58	0.532	115.00	1.29	2.08	
QK	104.0	107.0	107.0	1.73	0.177	106.00	-0.27	0.52	
QL									•
QM	107.0	93.0	100.0	7.00	0.827	100.00	-1.31	-0.52	
QP									•
QQ									•
QT	98.0	102.0	102.0	2.31	0.236	100.67	-1.19	-0.40	
QU	88.0	84.0	86.0	2.00	0.236	86.00	-3.73	-2.94	
QX	115.0	119.0	119.0	2.31	0.236	117.67	1.75	2.54	
QZ	109.0	117.0	116.0	4.36	0.473	114.00	1.12	1.91	
R	108.0	106.0	106.0	1.15	0.118	106.67	-0.15	0.64	
RC	108.0	106.0	104.0	2.00	0.236	106.00	-0.27	0.52	
RF	108.0	111.0	115.0	3.51	0.413	111.33	0.66	1.44	
RH									•
RK	102.0	92.0	95.0	5.13	0.591	96.33	-1.94	-1.15	
RL	96.0	96.0	96.0	0.00	0.000	96.00	-2.00	-1.21	
RM	105.0	98.0	100.0	3.61	0.413	101.00	-1.13	-0.35	
RO	119.0	117.0	116.0	1.53	0.177	117.33	1.70	2.48	
RQ									•
RR	100.0	108.0	107.0	4.36	0.473	105.00	-0.44	0.35	
RV	110.0	103.0	109.0	3.79	0.413	107.33	-0.04	0.75	
RX	12.0	12.0	12.0	0.00	0.000	12.00	-16.55	-15.76	×
RZ	112.0	110.0	115.0	2.52	0.295	112.33	0.83	1.62	
S	109.0	114.0	112.0	2.52	0.295	111.67	0.71	1.50	
SA									•
SC	108.0	99.0	108.0	5.20	0.532	105.00	-0.44	0.35	
SD	110.0	104.0	104.0	3.46	0.354	106.00	-0.27	0.52	
SF	53.0	51.0	52.0	1.00	0.118	52.00	-9.62	-8.83	×
SI	115.0	113.0	112.0	1.53	0.177	113.33	1.00	1.79	
SK	89.0	89.0	89.0	0.00	0.000	89.00	-3.21	-2.42	
SM	106.0	105.0	106.0	0.58	0.059	105.67	-0.32	0.46	
SN									•
SR	105.0	109.0	109.0	2.31	0.236	107.67	0.02	0.81	
SS	98.0	123.0	97.0	14.73	2.020	106.00	-0.27	0.52	
ST	103.0	105.0	102.0	1.53	0.177	103.33	-0.73	0.06	
SU									•

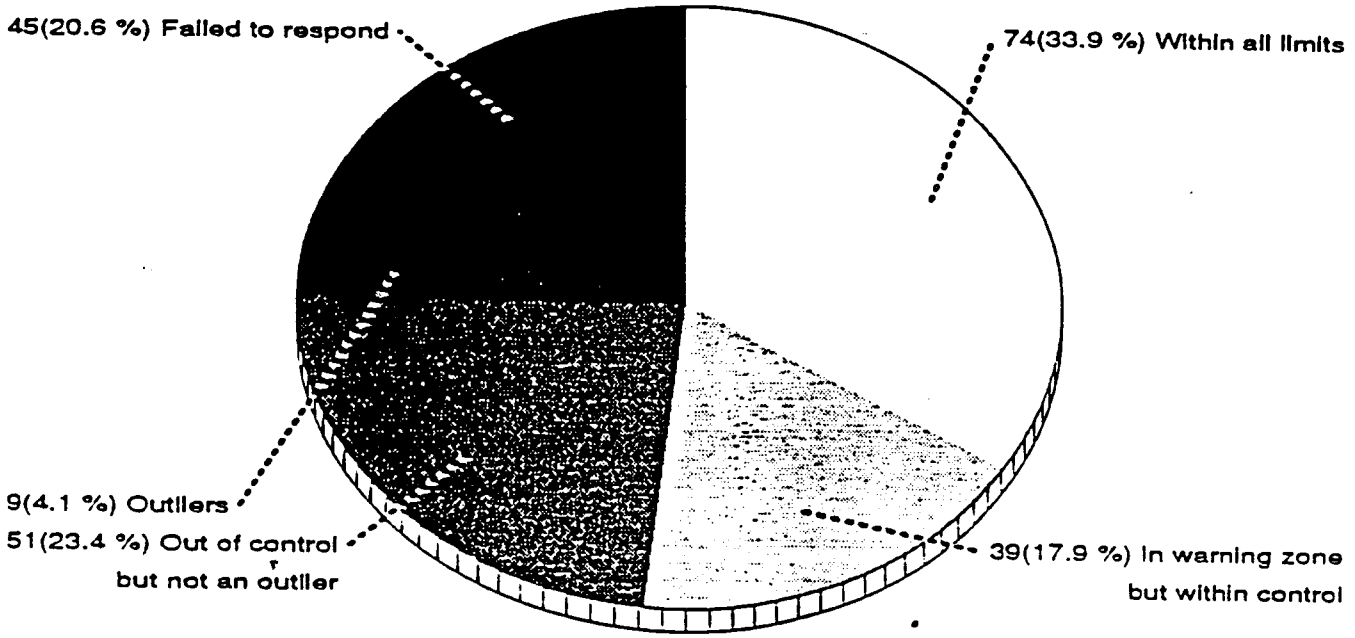
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

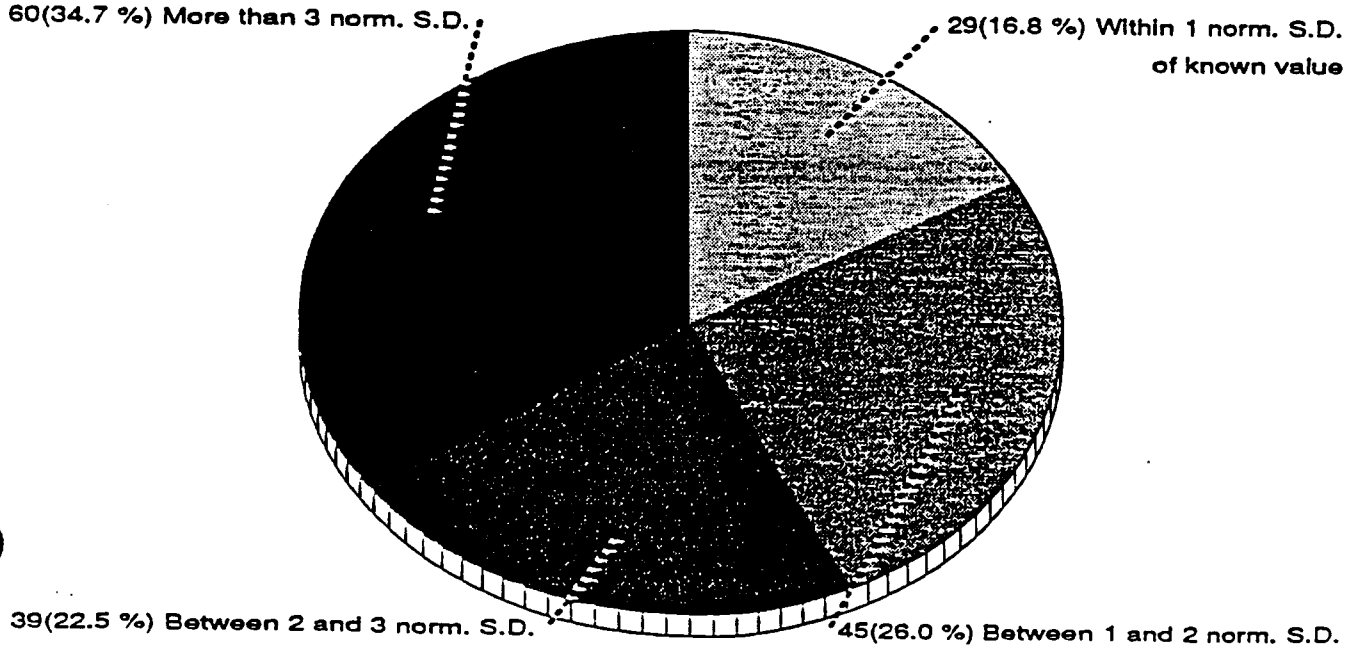
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Ruthenium-106 Statistical Summary 218 Participants

The known value of this nuclide is 119.0 pCi/l with an expected precision of 12.0; the control limits are 98.2 to 139.8; the warning regions are 98.2 to 105.1 and 132.9 to 139.8



Statistic	Respondents		Non-outliers
Mean	104.84	Grand Avg	103.87
Std. Dev.	25.58		12.83
Variance	654.41		164.65
% Coef. of Var.	24.40		12.35
% deviation of mean from known value	-11.90		-12.72
Norm. dev. of mean from known value	-0.55		-1.18
Median	103.33		103.50
% deviation of median from known value	-13.17		-13.03
Norm. dev. of median from known value	-0.61		-1.21



Ruthenium-106

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
PQ	107.0	102.0	104.0	2.52	0.246	104.33	0.07	-2.12	
PT	113.0	105.0	122.0	8.50	0.837	113.33	1.37	-0.82	
PU									•
PV	109.0	106.0	110.0	2.08	0.197	108.33	0.64	-1.54	
PW									•
PX	106.0	114.0	109.0	4.04	0.394	109.67	0.84	-1.35	
PY									•
Q	107.0	108.0	109.0	1.00	0.098	108.00	0.60	-1.59	
QB	95.0	97.0	112.0	9.29	0.837	101.33	-0.37	-2.55	
QJ	102.0	113.0	105.0	5.69	0.541	106.67	0.40	-1.78	
QK	130.0	122.0	117.0	6.56	0.640	123.00	2.76	0.58	
QL									•
QM	100.0	100.0	93.0	4.04	0.345	97.67	-0.90	-3.08	⇓
QP									•
QQ									•
QT	112.0	115.0	100.0	7.94	0.738	109.00	0.74	-1.44	
QU	62.0	64.0	67.0	2.52	0.246	64.33	-5.71	-7.89	⇓
QX	130.0	124.0	138.0	7.02	0.689	130.67	3.87	1.68	
QZ	111.0	103.0	100.0	5.69	0.541	104.67	0.12	-2.07	
R	104.0	103.0	103.0	0.58	0.049	103.33	-0.08	-2.26	
RC	96.0	95.0	95.0	0.58	0.049	95.33	-1.23	-3.42	⇓
RF	91.0	76.0	88.0	7.94	0.738	85.00	-2.72	-4.91	⇓
RH									•
RK	101.0	108.0	90.0	9.07	0.886	99.67	-0.61	-2.79	
RL	81.0	81.0	81.0	0.00	0.000	81.00	-3.30	-5.48	⇓
RM	220.0	219.0	218.0	1.00	0.098	219.00	16.62	14.43	×
RO	122.0	122.0	113.0	5.20	0.443	119.00	2.18	0.00	
RQ									•
RR	92.0	104.0	115.0	11.50	1.252	103.67	-0.03	-2.21	
RV	96.0	78.0	69.0	13.75	1.627	81.00	-3.30	-5.48	⇓
RX	47.0	41.0	53.0	6.00	0.591	47.00	-8.21	-10.39	×
RZ	108.0	102.0	112.0	5.03	0.492	107.33	0.50	-1.68	
S	89.0	85.0	91.0	3.06	0.295	88.33	-2.24	-4.43	⇓
SA									•
SC	106.0	107.0	108.0	1.00	0.098	107.00	0.45	-1.73	
SD	91.0	107.0	97.0	8.08	0.788	98.33	-0.80	-2.98	
SF	43.0	43.0	40.0	1.73	0.148	42.00	-8.93	-11.11	×
SI	91.0	111.0	96.0	10.41	0.984	99.33	-0.65	-2.84	
SK	72.0	72.0	72.0	0.00	0.000	72.00	-4.60	-6.78	⇓
SM	122.0	113.0	114.0	4.93	0.443	116.33	1.80	-0.38	
SN									•
SR	107.0	115.0	104.0	5.69	0.541	108.67	0.69	-1.49	
SS	103.0	121.0	102.0	10.69	0.935	108.67	0.69	-1.49	
ST	98.0	99.0	107.0	4.93	0.443	101.33	-0.37	-2.55	
SU									•

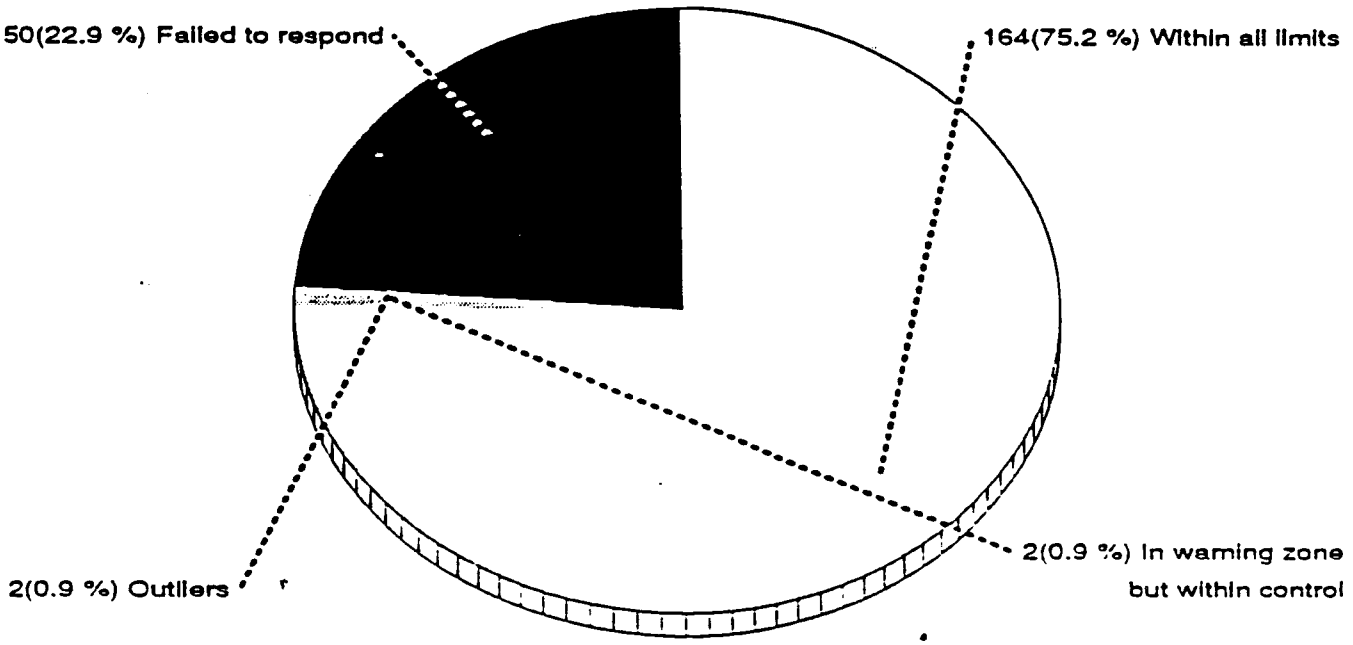
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

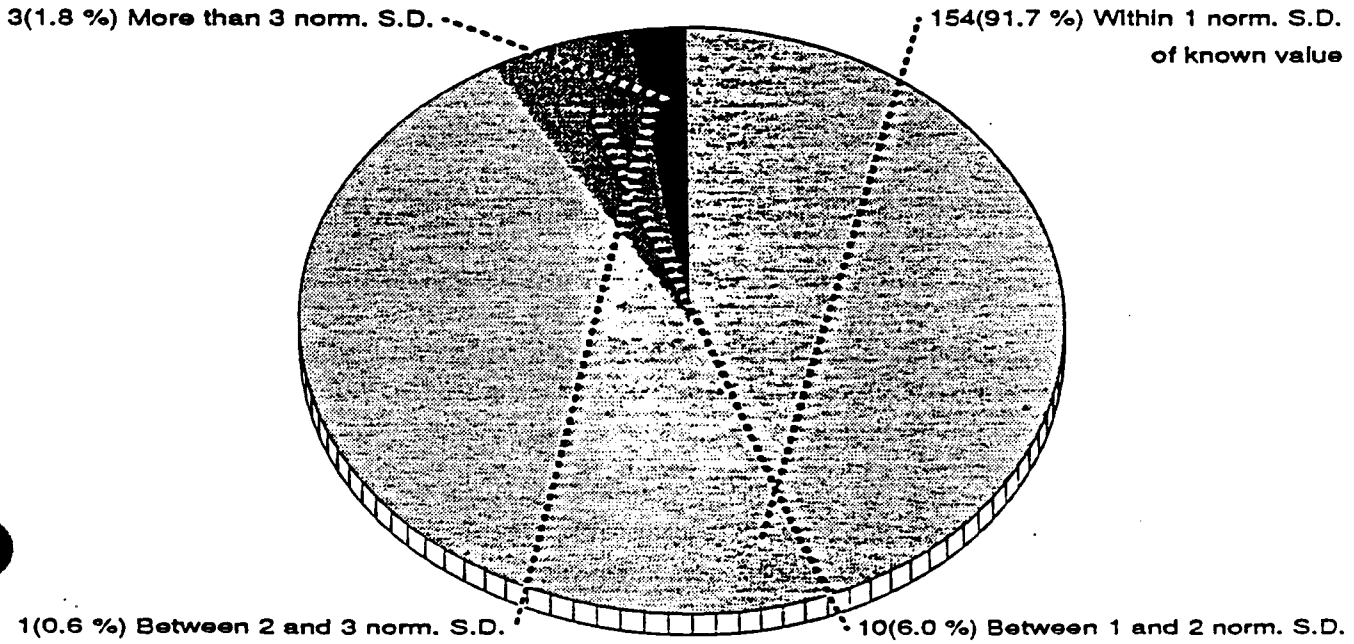
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cesium-134 Statistical Summary 218 Participants

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



Statistic	Respondents	Non-outliers
Mean	5.71	Grand Avg 5.39
Std. Dev.	3.40	1.57
Variance	11.58	2.46
% Coef. of Var.	59.60	29.14
% deviation of mean from known value	14.21	7.71
Norm. dev. of mean from known value	0.21	0.25
Median	5.00	5.00
% deviation of median from known value	0.00	0.00
Norm. dev. of median from known value	0.00	0.00



Cesium-134

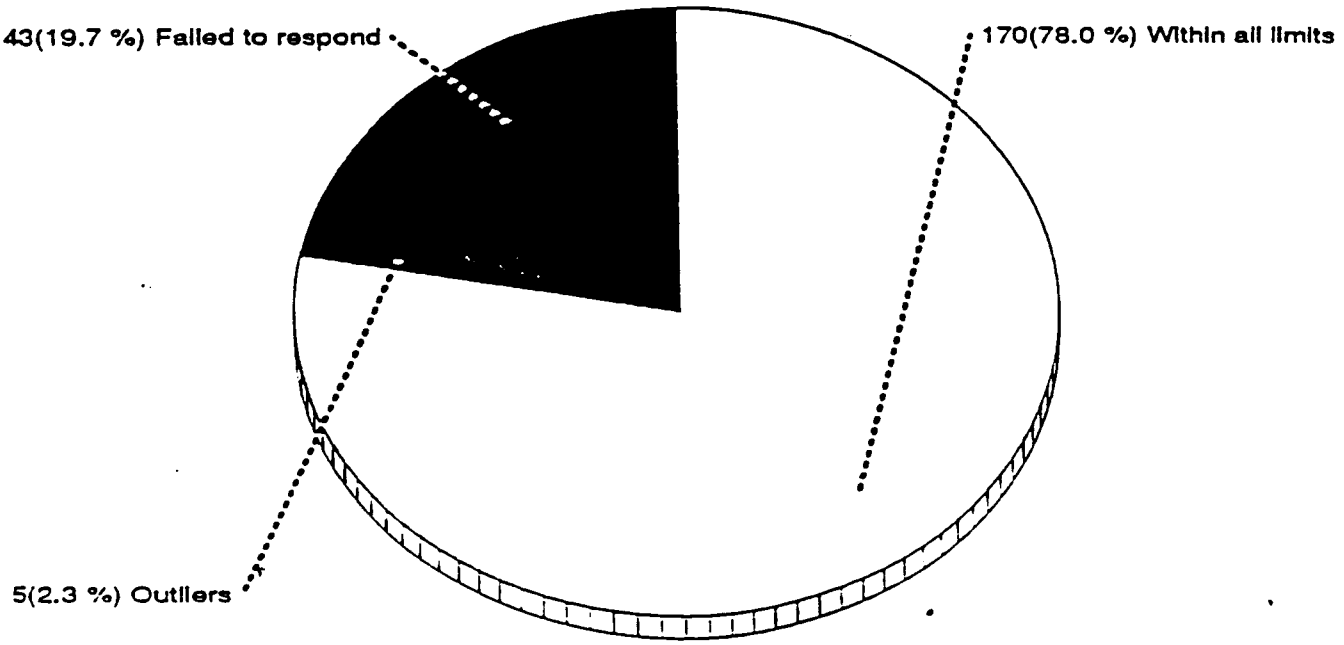
Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
PQ	4.0	4.0	3.0	0.58	0.118	3.67	-0.60	-0.46	
PT	4.0	5.0	5.0	0.58	0.118	4.67	-0.25	-0.12	
PU									•
PV	8.0	6.0	4.0	2.00	0.473	6.00	0.21	0.35	
PW									•
PX	5.0	5.0	5.0	0.00	0.000	5.00	-0.13	0.00	
PY									•
Q	5.0	5.0	5.0	0.00	0.000	5.00	-0.13	0.00	
QB	6.0	4.0	6.0	1.15	0.236	5.33	-0.02	0.12	
QJ									•
QK	5.0	6.0	5.0	0.58	0.118	5.33	-0.02	0.12	
QL									•
QM	5.0	5.0	5.0	0.00	0.000	5.00	-0.13	0.00	
QP									•
QQ									•
QT	6.0	6.0	6.0	0.00	0.000	6.00	0.21	0.35	
QU	3.0	4.0	3.0	0.58	0.118	3.33	-0.71	-0.58	
QX	6.0	6.0	6.0	0.00	0.000	6.00	0.21	0.35	
QZ	5.0	5.0	5.0	0.00	0.000	5.00	-0.13	0.00	
R	5.0	5.0	5.0	0.00	0.000	5.00	-0.13	0.00	
RC	3.0	3.0	4.0	0.58	0.118	3.33	-0.71	-0.58	
RF	5.0	4.0	5.0	0.58	0.118	4.67	-0.25	-0.12	
RH									•
RK	4.0	5.0	3.0	1.00	0.236	4.00	-0.48	-0.35	
RL	4.0	4.0	4.0	0.00	0.000	4.00	-0.48	-0.35	
RM	5.0	6.0	5.0	0.58	0.118	5.33	-0.02	0.12	
RO	6.0	6.0	7.0	0.58	0.118	6.33	0.33	0.46	
RQ									•
RR	6.0	6.0	5.0	0.58	0.118	5.67	0.10	0.23	
RV	5.0	4.0	4.0	0.58	0.118	4.33	-0.36	-0.23	
RX	2.0	3.0	4.0	1.00	0.236	3.00	-0.83	-0.69	
RZ	8.0	7.0	6.0	1.00	0.236	7.00	0.56	0.69	
S	4.0	5.0	5.0	0.58	0.118	4.67	-0.25	-0.12	
SA									•
SC	5.0	5.0	5.0	0.00	0.000	5.00	-0.13	0.00	
SD	5.0	4.0	5.0	0.58	0.118	4.67	-0.25	-0.12	
SF	2.0	2.0	2.0	0.00	0.000	2.00	-1.17	-1.04	
SI	5.0	7.0	6.0	1.00	0.236	6.00	0.21	0.35	
SK	38.0	38.0	38.0	0.00	0.000	38.00	11.30	11.43	×
SM	6.0	5.0	7.0	1.00	0.236	6.00	0.21	0.35	
SN									•
SR	5.0	6.0	5.0	0.58	0.118	5.33	-0.02	0.12	
SS	5.0	5.0	6.0	0.58	0.118	5.33	-0.02	0.12	
ST	4.0	5.0	4.0	0.58	0.118	4.33	-0.36	-0.23	
SU									•

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

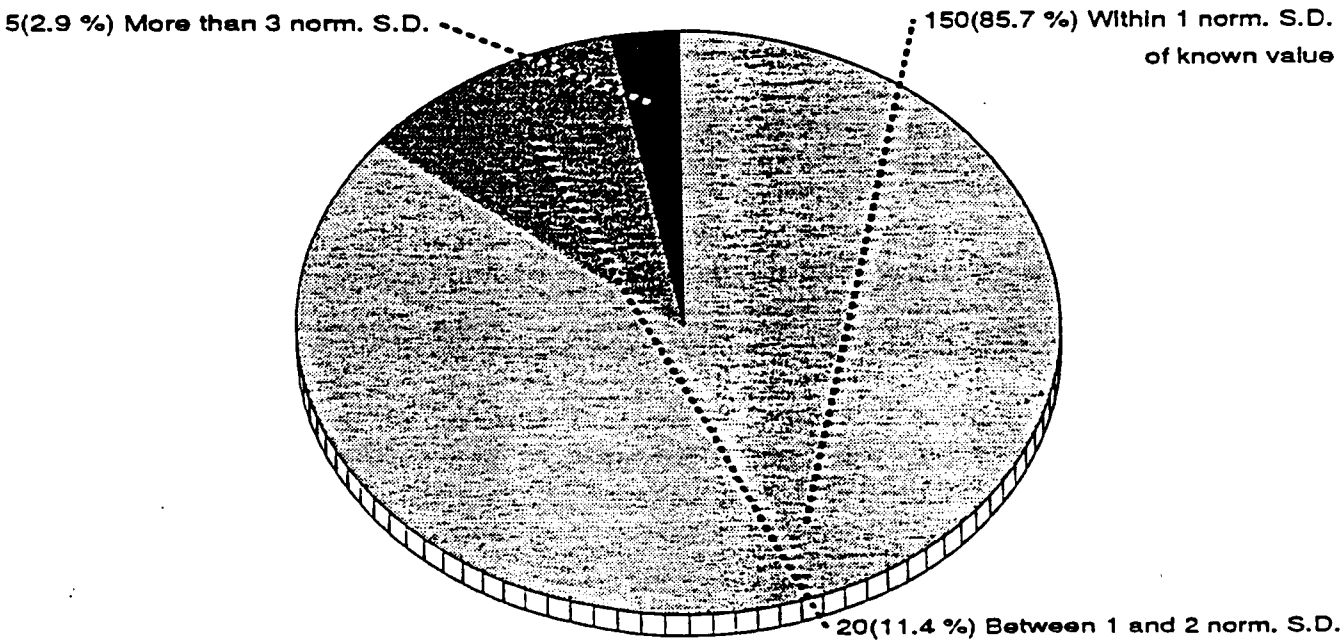
∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Cesium-137 Statistical Summary 218 Participants

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



Statistic	Respondents	Non-outliers
Mean	14.23	Grand Avg 5.76
Std. Dev.	106.03	1.47
Variance	11242.71	2.16
% Coef. of Var.	745.20	25.50
% deviation of mean from known value	184.57	15.29
Norm. dev. of mean from known value	0.09	0.52
Median	5.33	5.33
% deviation of median from known value	6.67	6.67
Norm. dev. of median from known value	0.00	0.23



Cesium-137

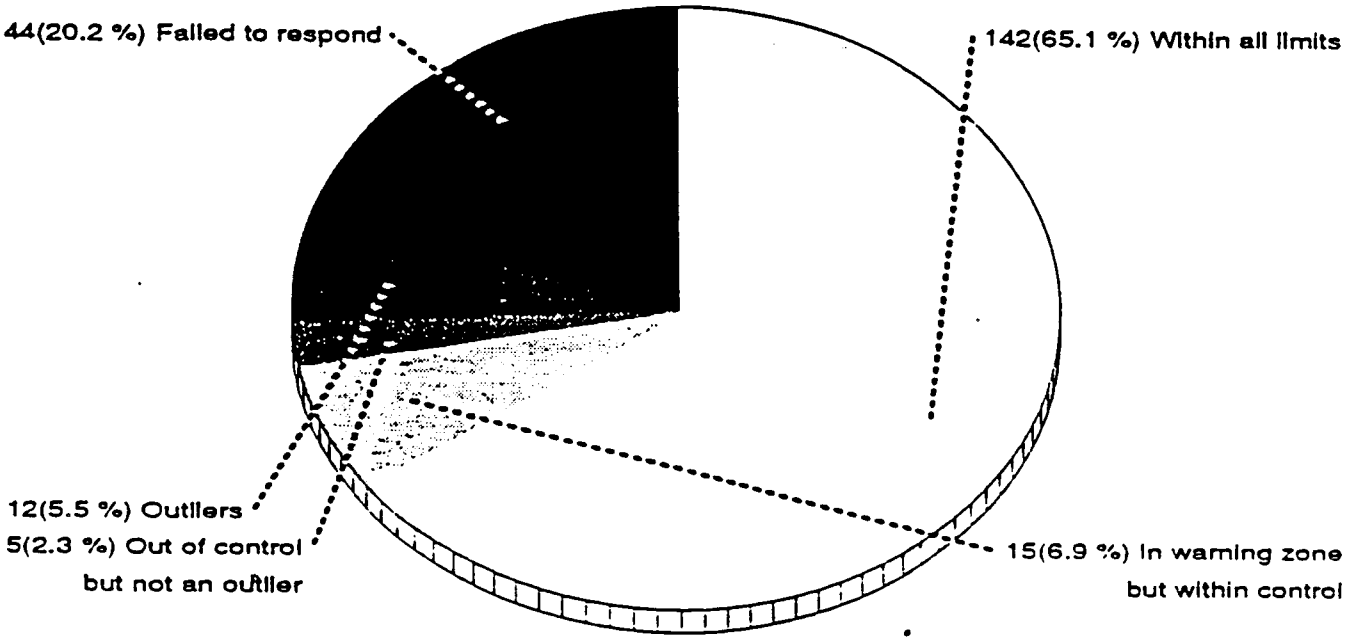
Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
PQ	5.0	4.0	5.0	0.58	0.118	4.67	-0.38	-0.12	
PT	4.0	6.0	6.0	1.15	0.236	5.33	-0.15	0.12	
PU									•
PV	4.0	6.0	8.0	2.00	0.473	6.00	0.08	0.35	
PW									•
PX	6.0	4.0	5.0	1.00	0.236	5.00	-0.26	0.00	
PY									•
Q	5.0	5.0	5.0	0.00	0.000	5.00	-0.26	0.00	
QB	6.0	7.0	4.0	1.53	0.354	5.67	-0.03	0.23	
QJ									•
QK	6.0	6.0	5.0	0.58	0.118	5.67	-0.03	0.23	
QL									•
QM	6.0	6.0	6.0	0.00	0.000	6.00	0.08	0.35	
QP									•
QQ									•
QT	8.0	8.0	8.0	0.00	0.000	8.00	0.77	1.04	
QU	4.0	3.0	4.0	0.58	0.118	3.67	-0.73	-0.46	
QX	7.0	6.0	7.0	0.58	0.118	6.67	0.31	0.58	
QZ	5.0	5.0	5.0	0.00	0.000	5.00	-0.26	0.00	
R	5.0	4.0	5.0	0.58	0.118	4.67	-0.38	-0.12	
RC	5.0	5.0	5.0	0.00	0.000	5.00	-0.26	0.00	
RF	4.0	4.0	4.0	0.00	0.000	4.00	-0.61	-0.35	
RH									•
RK	6.0	5.0	7.0	1.00	0.236	6.00	0.08	0.35	
RL	4.0	4.0	4.0	0.00	0.000	4.00	-0.61	-0.35	
RM	6.0	5.0	5.0	0.58	0.118	5.33	-0.15	0.12	
RO	5.0	4.0	7.0	1.53	0.354	5.33	-0.15	0.12	
RQ									•
RR	6.0	6.0	7.0	0.58	0.118	6.33	0.20	0.46	
RV	4.0	2.0	4.0	1.15	0.236	3.33	-0.84	-0.58	
RX	1.0	1.0	1.0	0.00	0.000	1.00	-1.65	-1.39	
RZ	4.0	4.0	4.0	0.00	0.000	4.00	-0.61	-0.35	
S	5.0	6.0	6.0	0.58	0.118	5.67	-0.03	0.23	
SA									•
SC	6.0	5.0	6.0	0.58	0.118	5.67	-0.03	0.23	
SD	6.0	5.0	5.0	0.58	0.118	5.33	-0.15	0.12	
SF	2.0	2.0	2.0	0.00	0.000	2.00	-1.30	-1.04	
SI	7.0	7.0	5.0	1.15	0.236	6.33	0.20	0.46	
SK	10.0	10.0	10.0	0.00	0.000	10.00	1.47	1.73	
SM	7.0	6.0	5.0	1.00	0.236	6.00	0.08	0.35	
SN									•
SR	8.0	5.0	7.0	1.53	0.354	6.67	0.31	0.58	
SS	4.0	7.0	5.0	1.53	0.354	5.33	-0.15	0.12	
ST	4.0	5.0	4.0	0.58	0.118	4.33	-0.50	-0.23	
SU									•

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

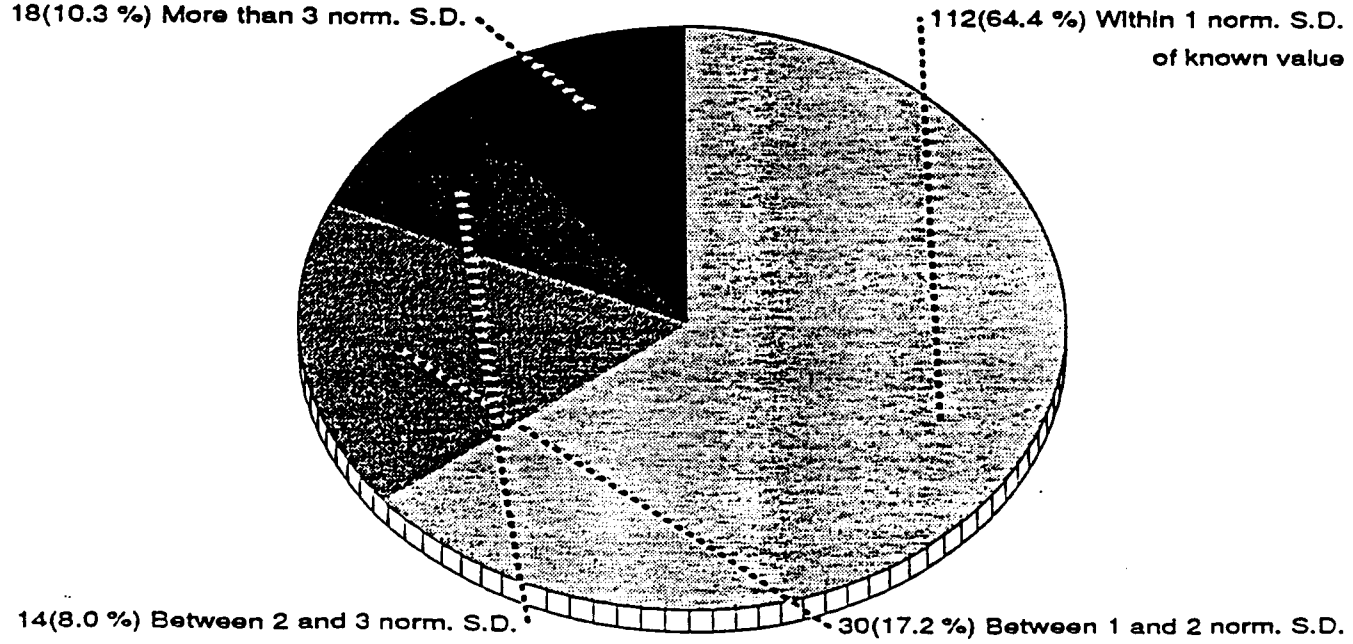
∅ ≡ Insufficient data — × ≡ Determined to be an outlier — ⇓ ≡ Below control limit

Barium-133 Statistical Summary 218 Participants

The known value of this nuclide is 99.0 pCi/l with an expected precision of 10.0; the control limits are 81.7 to 116.3; the warning regions are 81.7 to 87.4 and 110.6 to 116.3



Statistic	Respondents	Non-outliers
Mean	95.16	Grand Avg 96.74
Std. Dev.	14.34	6.87
Variance	205.73	47.19
% Coef. of Var.	15.07	7.10
% deviation of mean from known value	-3.87	-2.28
Norm. dev. of mean from known value	-0.27	-0.33
Median	97.00	97.00
% deviation of median from known value	-2.02	-2.02
Norm. dev. of median from known value	-0.14	-0.29



Barium-133

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
PQ	104.0	96.0	108.0	6.11	0.709	102.67	1.03	0.64	
PT	97.0	95.0	104.0	4.73	0.532	98.67	0.33	-0.06	
PU									•
PV	93.0	93.0	93.0	0.00	0.000	93.00	-0.65	-1.04	
PW									•
PX	97.0	97.0	98.0	0.58	0.059	97.33	0.10	-0.29	
PY									•
Q	87.0	87.0	91.0	2.31	0.236	88.33	-1.46	-1.85	
QB	97.0	97.0	103.0	3.46	0.354	99.00	0.39	0.00	
QJ	97.0	92.0	99.0	3.61	0.413	96.00	-0.13	-0.52	
QK	94.0	101.0	97.0	3.51	0.413	97.33	0.10	-0.29	
QL									•
QM	95.0	94.0	96.0	1.00	0.118	95.00	-0.30	-0.69	
QP									•
QQ									•
QT	97.0	98.0	96.0	1.00	0.118	97.00	0.04	-0.35	
QU	86.0	88.0	84.0	2.00	0.236	86.00	-1.86	-2.25	
QX	121.0	121.0	117.0	2.31	0.236	119.67	3.97	3.58	⇑
QZ	104.0	96.0	103.0	4.36	0.473	101.00	0.74	0.35	
R	95.0	95.0	96.0	0.58	0.059	95.33	-0.24	-0.64	
RC	85.0	84.0	86.0	1.00	0.118	85.00	-2.03	-2.42	
RF	91.0	92.0	95.0	2.08	0.236	92.67	-0.71	-1.10	
RH									•
RK	89.0	90.0	88.0	1.00	0.118	89.00	-1.34	-1.73	
RL	81.0	81.0	81.0	0.00	0.000	81.00	-2.73	-3.12	⇓
RM	99.0	97.0	99.0	1.15	0.118	98.33	0.28	-0.12	
RO	105.0	105.0	104.0	0.58	0.059	104.67	1.37	0.98	
RQ									•
RR	98.0	102.0	100.0	2.00	0.236	100.00	0.56	0.17	
RV	102.0	103.0	103.0	0.58	0.059	102.67	1.03	0.64	
RX	48.0	54.0	60.0	6.00	0.709	54.00	-7.40	-7.79	×
RZ	100.0	101.0	102.0	1.00	0.118	101.00	0.74	0.35	
S	99.0	99.0	98.0	0.58	0.059	98.67	0.33	-0.06	
SA									•
SC	90.0	94.0	96.0	3.06	0.354	93.33	-0.59	-0.98	
SD	94.0	79.0	88.0	7.55	0.886	87.00	-1.69	-2.08	
SF	41.0	41.0	40.0	0.58	0.059	40.67	-9.71	-10.10	×
SI	96.0	104.0	100.0	4.00	0.473	100.00	0.56	0.17	
SK	96.0	96.0	96.0	0.00	0.000	96.00	-0.13	-0.52	
SM	96.0	100.0	98.0	2.00	0.236	98.00	0.22	-0.17	
SN									•
SR	87.0	92.0	99.0	6.03	0.709	92.67	-0.71	-1.10	
SS	102.0	107.0	103.0	2.65	0.295	104.00	1.26	0.87	
ST	98.0	96.0	94.0	2.00	0.236	96.00	-0.13	-0.52	
SU									•

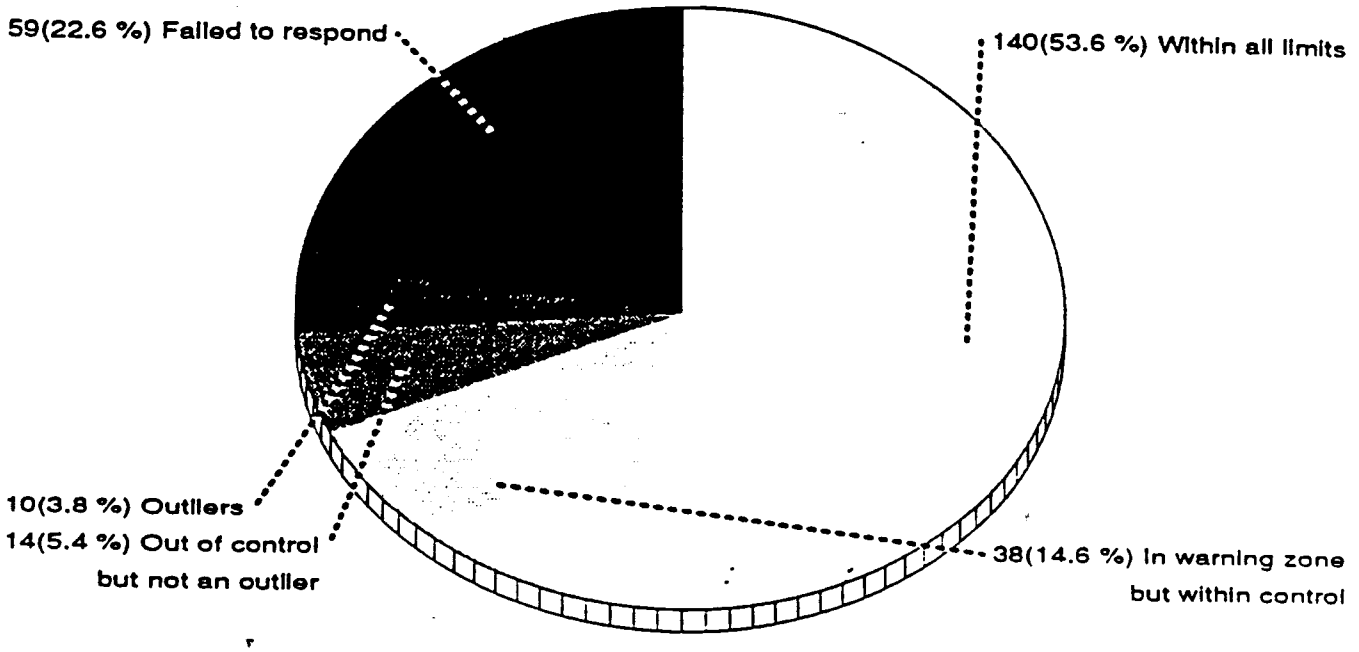
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

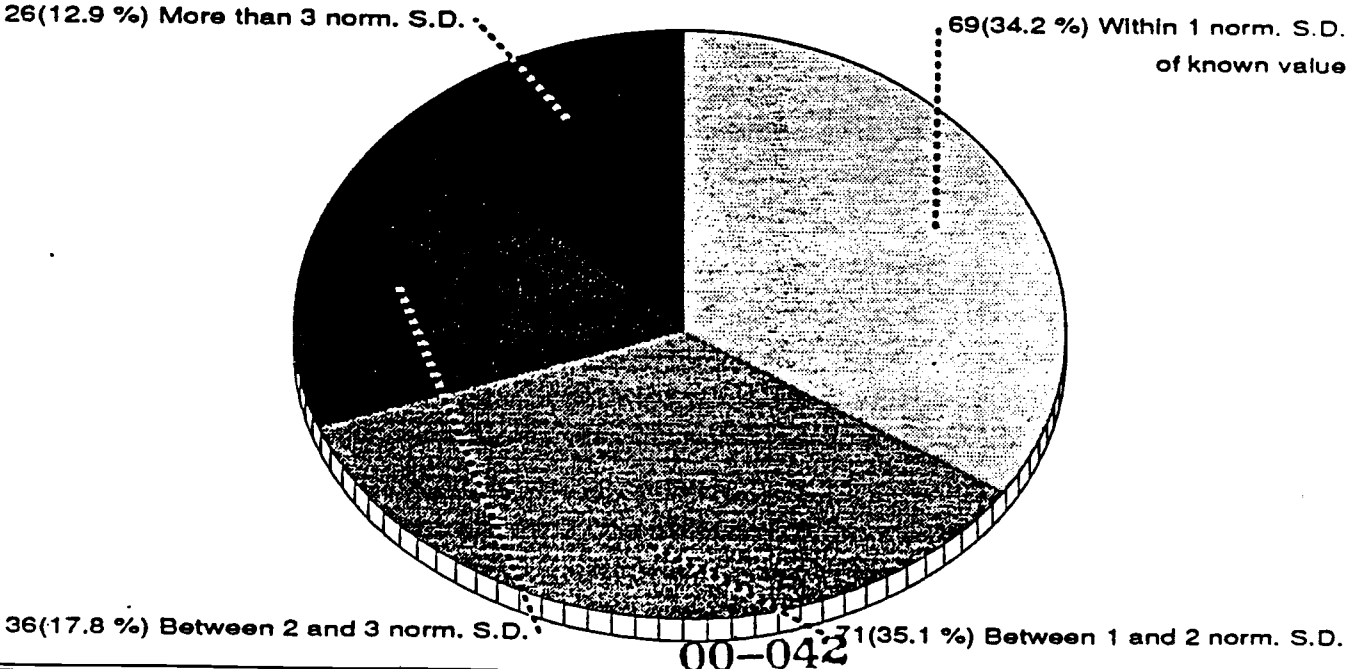
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Gross Alpha Statistical Summary 261 Participants

The known value of this nuclide is 15.0 pCi/l with an expected precision of 5.0; the control limits are 6.3 to 23.7; the warning regions are 6.3 to 9.2 and 20.8 to 23.7



Statistic	Respondents	Non-outliers
Mean	14.84	Grand Avg 12.06
Std. Dev.	17.73	4.28
Variance	314.42	18.28
% Coef. of Var.	119.50	35.45
% deviation of mean from known value	-1.08	-19.59
Norm. dev. of mean from known value	-0.01	-0.69
Median	12.00	11.67
% deviation of median from known value	-20.00	-22.22
Norm. dev. of median from known value	-0.17	-0.78



Gross Alpha

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
NA	18.0	19.0	18.0	0.58	0.118	18.33	2.17	1.15	
NB	20.0	16.0	18.0	2.00	0.473	18.00	2.06	1.04	
NE	26.0	30.0	29.0	2.08	0.473	28.33	5.64	4.62	×
NF	9.0	10.0	8.0	1.00	0.236	9.00	-1.06	-2.08	
NG	8.0	7.0	8.0	0.58	0.118	7.67	-1.52	-2.54	
NH	10.0	11.0	14.0	2.08	0.473	11.67	-0.14	-1.15	
NI									•
NJ	10.0	10.0	10.0	0.00	0.000	10.00	-0.71	-1.73	
NK	8.0	9.0	8.0	0.58	0.118	8.33	-1.29	-2.31	
NO	17.0	18.0	19.0	1.00	0.236	18.00	2.06	1.04	
NP									•
NT	13.0	12.0	11.0	1.00	0.236	12.00	-0.02	-1.04	
O	16.0	14.0	14.0	1.15	0.236	14.67	0.90	-0.12	
OA	12.0	13.0	13.0	0.58	0.118	12.67	0.21	-0.81	
OB	15.0	12.0	11.0	2.08	0.473	12.67	0.21	-0.81	
OF	19.0	20.0	17.0	1.53	0.354	18.67	2.29	1.27	
OK									•
OM									•
OS	9.0	10.0	8.0	1.00	0.236	9.00	-1.06	-2.08	
OT									•
OX	11.0	13.0	11.0	1.15	0.236	11.67	-0.14	-1.15	
OY	14.0	14.0	13.0	0.58	0.118	13.67	0.56	-0.46	
P	15.0	24.0	16.0	4.93	1.120	18.33	2.17	1.15	
PA	6.0	7.0	5.0	1.00	0.236	6.00	-2.10	-3.12	⇓
PB	10.0	10.0	10.0	0.00	0.000	10.00	-0.71	-1.73	
PC	17.0	17.0	21.0	2.31	0.473	18.33	2.17	1.15	
PD									•
PG	10.0	13.0	11.0	1.53	0.354	11.33	-0.25	-1.27	
PM	14.0	15.0	13.0	1.00	0.236	14.00	0.67	-0.35	
PP									•
PQ	11.0	10.0	8.0	1.53	0.354	9.67	-0.83	-1.85	
PR	14.0	13.0	13.0	0.58	0.118	13.33	0.44	-0.58	
PT	10.0	8.0	8.0	1.15	0.236	8.67	-1.18	-2.19	
PV	12.0	13.0	14.0	1.00	0.236	13.00	0.33	-0.69	
Q	8.0	9.0	10.0	1.00	0.236	9.00	-1.06	-2.08	
QA	9.0	10.0	9.0	0.58	0.118	9.33	-0.94	-1.96	
QB									•
QC	12.0	15.0	12.0	1.73	0.354	13.00	0.33	-0.69	
QI	3.0	3.0	2.0	0.58	0.118	2.67	-3.25	-4.27	⇓
QJ	14.0	15.0	14.0	0.58	0.118	14.33	0.79	-0.23	
QK									•
QM	204.0	179.0	176.0	15.37	5.396	186.33	60.37	59.35	×
QP	5.0	3.0	3.0	1.15	0.236	3.67	-2.91	-3.93	⇓
QQ	17.0	13.0	14.0	2.08	0.473	14.67	0.90	-0.12	
QT	14.0	15.0	16.0	1.00	0.236	15.00	1.02	0.00	

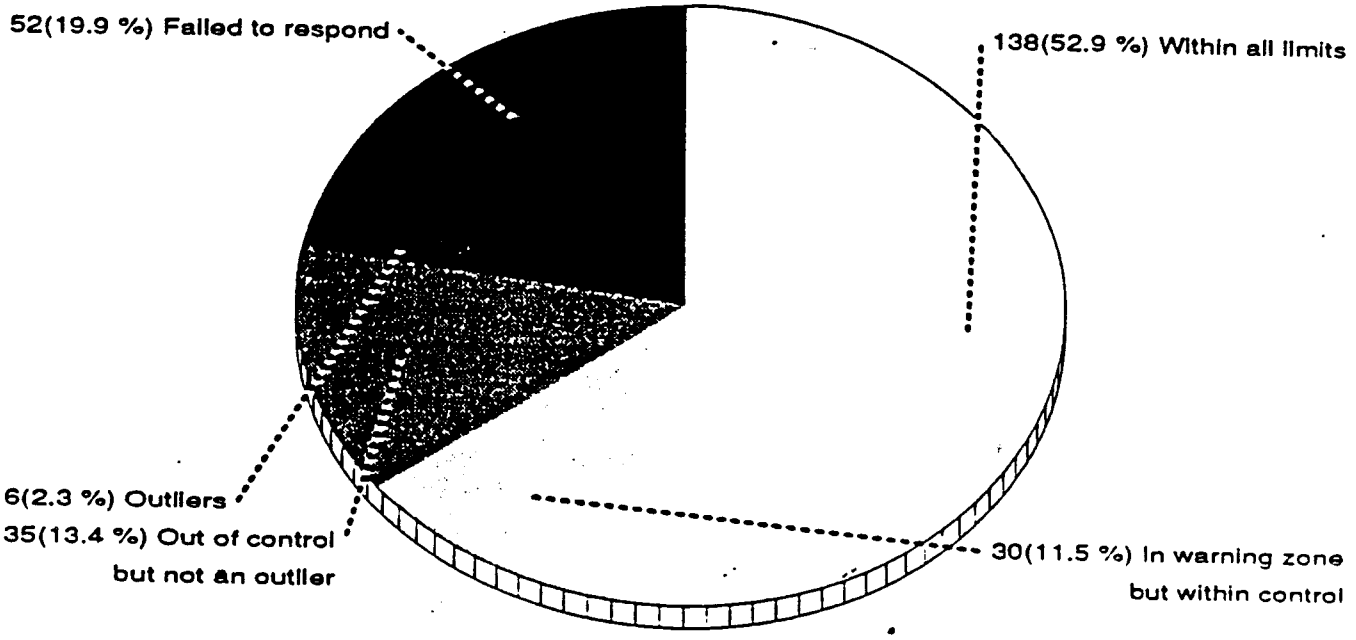
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

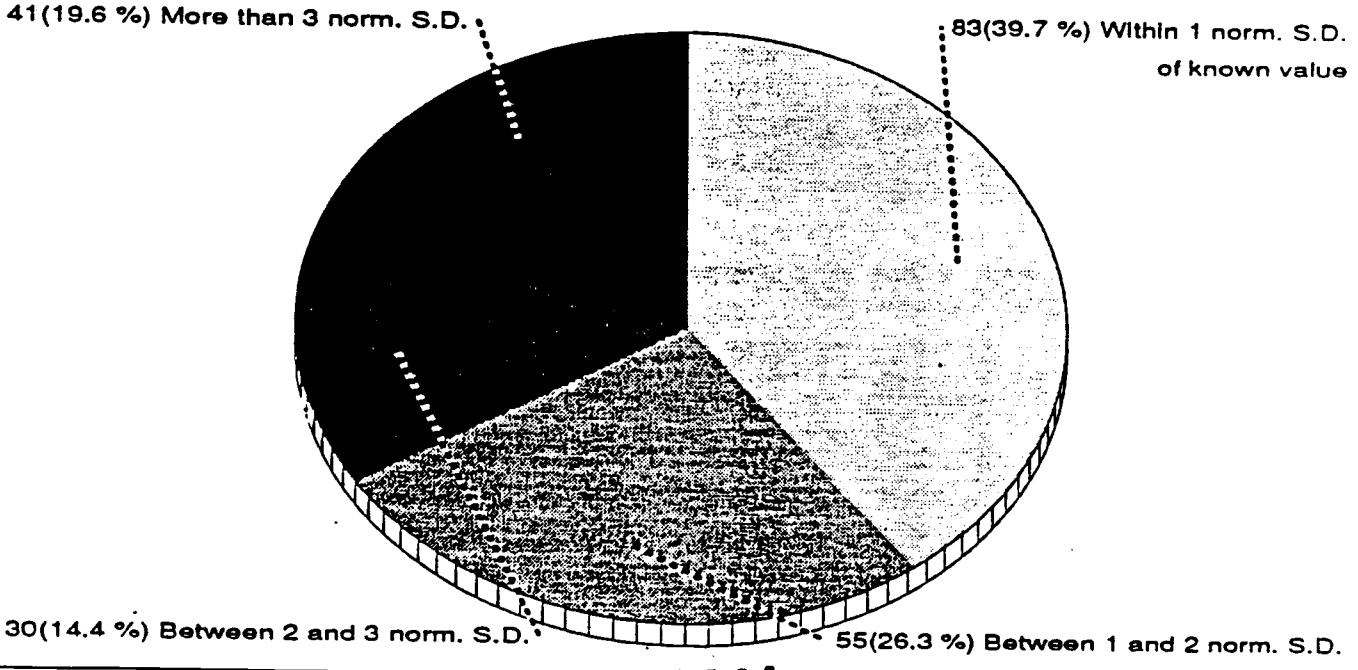
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Gross Beta Statistical Summary 261 Participants

The known value of this nuclide is **43.0 pCi/l** with an expected precision of **6.9**; the control limits are 31.0 to 55.0; the warning regions are 31.0 to 35.0 and 51.0 to 55.0



Statistic	Respondents	Non-outliers
Mean	43.74	Grand Avg 37.65
Std. Dev.	79.25	8.49
Variance	6281.29	72.09
% Coef. of Var.	181.19	22.55
% deviation of mean from known value	1.72	-12.44
Norm. dev. of mean from known value	0.01	-0.63
Median	38.67	38.67
% deviation of median from known value	-10.08	-10.08
Norm. dev. of median from known value	-0.05	-0.51



				1.53	0.256	30.67	-1.75	-3.08	⇓
NB	40.0	40.0	37.0	1.73	0.256	39.00	0.34	-1.00	
NE	24.0	28.0	26.0	2.00	0.341	26.00	-2.91	-4.25	⇓
NF	48.0	47.0	50.0	1.53	0.256	48.33	2.67	1.33	
NG	32.0	31.0	32.0	0.58	0.085	31.67	-1.50	-2.83	
NH	39.0	36.0	38.0	1.53	0.256	37.67	0.00	-1.33	
NI									•
NJ	26.0	27.0	25.0	1.00	0.170	26.00	-2.91	-4.25	⇓
NK	23.0	23.0	19.0	2.31	0.341	21.67	-4.00	-5.33	⇓
NO	38.0	43.0	53.0	7.64	1.530	44.67	1.75	0.42	
NP									•
NT	23.0	28.0	26.0	2.52	0.426	25.67	-3.00	-4.33	⇓
O	34.0	38.0	37.0	2.08	0.341	36.33	-0.33	-1.67	
OA	41.0	42.0	42.0	0.58	0.085	41.67	1.00	-0.33	
OB	59.0	53.0	48.0	5.51	0.938	53.33	3.92	2.58	
OF	41.0	41.0	42.0	0.58	0.085	41.33	0.92	-0.42	
OK									•
OM									•
OS	54.0	53.0	53.0	0.58	0.085	53.33	3.92	2.58	
OT									•
OX	36.0	36.0	33.0	1.73	0.256	35.00	-0.66	-2.00	
OY	27.0	23.0	26.0	2.08	0.341	25.33	-3.08	-4.42	⇓
P	30.0	38.0	33.0	4.04	0.682	33.67	-1.00	-2.33	
PA	44.0	42.0	46.0	2.00	0.341	44.00	1.59	0.25	
PB	35.0	34.0	36.0	1.00	0.170	35.00	-0.66	-2.00	
PC	38.0	35.0	35.0	1.73	0.256	36.00	-0.41	-1.75	
PD									•
PG	39.0	41.0	36.0	2.52	0.426	38.67	0.25	-1.08	
PM	35.0	40.0	38.0	2.52	0.426	37.67	0.00	-1.33	
PP									•
PQ	42.0	42.0	42.0	0.00	0.000	42.00	1.09	-0.25	
PR	31.0	30.0	30.0	0.58	0.085	30.33	-1.83	-3.17	⇓
PT	36.0	33.0	39.0	3.00	0.511	36.00	-0.41	-1.75	
PV	33.0	36.0	37.0	2.08	0.341	35.33	-0.58	-1.92	
Q	40.0	46.0	36.0	5.03	0.852	40.67	0.75	-0.58	
QA	43.0	42.0	45.0	1.53	0.256	43.33	1.42	0.08	
QB									•
QC	36.0	37.0	39.0	1.53	0.256	37.33	-0.08	-1.42	
QI	16.0	17.0	16.0	0.58	0.085	16.33	-5.33	-6.66	⇓
QJ	39.0	37.0	34.0	2.52	0.426	36.67	-0.25	-1.58	
QK	42.0	44.0	43.0	1.00	0.170	43.00	1.34	0.00	
QM	36.0	39.0	34.0	2.52	0.426	36.33	-0.33	-1.67	
QP	27.0	31.0	33.0	3.06	0.511	30.33	-1.83	-3.17	⇓
QQ	42.0	45.0	43.0	1.53	0.256	43.33	1.42	0.08	
QT	44.0	66.0	42.0	13.32	2.992	50.67	3.25	1.92	

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

WHC 222S

PERFORMANCE EVALUATION

RESULTS

PERFORMANCE EVALUATION SUMMARY SHEET

Laboratory: Westinghouse 222-S Laboratory

PE sample	EPA/CLP Score
EMSL-LV QB4 FY93	
Organics	91.1

PE Sample	EMSL-LV Acceptance Range (%)	% of EMSL-LV True Value	% of all Participating Laboratory's Grand Average
April 20, 1993			
Uranium	82.0 to 118.0	100.5	102.1
Beta	73.6 to 126.4	92.5	98.7
July 23, 1993			
Alpha	42.0 to 158.0	77.8	96.8
Beta	72.1 to 127.9	120.2	137.2

REGION 10
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 93

LABORATORY: Westinghouse Hanford (WA)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 1 Same = 2 Below = 4

% SCORE: 91.1
REPORT DATE: 09/15/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
2-BUTANONE	130	210	120	220	190		3	0	44	44
TETRACHLOROETHENE	NU	NU	NU	NU	11		0	0	44	44
1,1,2,2-TETRACHLOROETHANE	81	110	76	120	93		1	0	44	44
TOLUENE	NU	NU	NU	NU	10		0	0	44	44
STYRENE	89	110	86	110	110		2	0	44	44
TCL SEMIVOLATILE										
BIS(2-CHLOROETHYL)ETHER	19	27	18	28	26		4	0	44	44
2,2'-OXYBIS(1-CHLOROPROPANE)	18	28	17	29	28		4	0	44	44
NITROBENZENE	26	37	25	43	37		3	0	44	44
2,4-DIMETHYLPHENOL	32	52	29	63	53	S	1	0	44	44
NAPHTHALENE	16	25	15	29	24		2	0	44	44
DIMETHYL PHTHALATE	29	34	28	35	34		10	0	44	44
ACENAPHTHENE	23	31	22	32	30		3	0	44	44
2,4-DINITROPHENOL	49	82	44	87	72		6	1	43	44
4-BROMOPHENYL PHENYL ETHER	23	31	22	32	29		3	0	44	44
HEXACHLOROBENZENE	24	32	23	36	30		4	0	44	44
PHENANTHRENE	16	21	16	22	19		6	0	44	44
FLUORANTHENE	18	22	17	23	20		8	0	44	44
PYRENE	48	79	43	97	63		1	0	44	44
BENZO(K)FLUORANTHENE	14	20	13	21	15		10	2	42	44
DIBENZ(A,H)ANTHRACENE	22	37	20	39	19	X	7	0	44	44
TCL PESTICIDES										
BETA-BHC	0.079	0.12	0.072	0.13	0.12		5	2	42	44
GAMMA-BHC (LINDANE)	0.48	0.78	0.44	0.82	0.73		4	0	44	44
ALDRIN	0.15	0.24	0.14	0.26	0.21		4	0	44	44
DIELDRIN	0.2	0.28	0.19	0.29	0.27		6	0	44	44
4,4'-DDE	0.53	0.73	0.5	0.75	0.73		3	0	44	44
ENDRIN	0.56	0.76	0.54	0.79	0.8	X	7	0	44	44
ENDOSULFAN SULFATE	0.53	0.75	0.5	0.78	0.77	S	7	1	43	44
4,4'-DDT	0.55	0.77	0.52	0.8	0.79	S	3	0	44	44
METHOXYCHLOR	1.2	1.8	1.1	1.9	1.9	S	2	0	44	44
GAMMA-CHLORDANE	0.5	0.69	0.48	0.79	0.77	S	2	0	44	44
NON-TCL VOLATILE										
BENZENE,DICHLORO- (O,M, OR P)					58			5	39	44
HYDRAZINE,DIMETHYL-					0	NR		44	0	44
PROPANE,1,2-DIBROMO-3-CHLORO-					48			14	30	44
NON-TCL SEMIVOLATILE										
ANILINE					0	NR		30	14	44
BENZOIC ACID					50			7	37	44
BENZYL ALCOHOL					49			3	41	44

REGION 10
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 93

LABORATORY: Westinghouse Hanford (WA)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 1 Same = 2 Below = 4

% SCORE: 91.1
REPORT DATE: 09/15/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
DIBENZOTHIOPHENE					32			0	44	44
TCL VOLATILE (Contaminants)										
METHYLENE CHLORIDE					0.2			25	19	44
ACETONE					6			36	8	44
TRICHLOROETHENE					4			4	40	44
TCL SEMIVOLATILE (Contaminants)										
BIS(2-ETHYLHEXYL)PHTHALATE					16			33	11	44
NON-TCL VOLATILE (Contaminants)										
UNKNOWN					7			38	6	44

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 2
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

Westinghouse Hanford Company

RECEIVED JUN 02 1993 G. C. MOOERS

Internal Memo

From: Organic Chemistry 124FO-OC93-023
Phone: 3-2872 T6-50
Date: June 1, 1993
Subject: SAMPLE DATA GROUP NARRATIVE - 18208 - PERFORMANCE EVALUATION SAMPLE RESULTS THIRD QUARTER FY93

JOHN TICCHIO
cc: [illegible]

To: L. P. Markel T6-16

cc: M. L. Bell T6-16
D. A. Dodd T6-50
E. J. Kosiancic T6-16
R. P. Marshall T6-14
G. C. Mooers H4-19
RRG:DRH File/LB

JUN 1993 RECEIVED K. N. Pool

VOLATILE ORGANICS

EPA Sample Number 28705
EPA Case Number 19693
Lab Sample Number R-3780

The initial gas chromatograph/mass spectrometer (GC/MS) calibration and continuing calibration met all protocols except for 1,1,2,2-tetrachloroethane. The required individual relative response factor for 1,1,2,2-tetrachlorethane is 0.500. The average and individual response factors for the 10, 20, 50, 100, and 200 PPB standards are: 0.511, 0.505, 0.494, 0.497, 0.492, and 0.565, respectively. In the continuing calibration it was 0.511. All mass spectral tuning requirements were met for all standards, blanks, and samples. The method blank met all applicable protocols and requirements. All internal standards and system monitoring compounds retention times and peak areas met all protocols. All system monitoring compound recoveries were within the required limits. The sample holding time was met. The Sample Number ZZZZZ refers to samples not associated with the Sample Data Group (SDG). Styrene overran the calibration curve so a dilution of the sample was made by adding 5 ul of sample to 5 ml of reagent grade water.

SEMI-VOLATILE ORGANICS

EPA Sample Number 18208
EPA Case Number 19693
Lab Sample Number S12693U02

The initial GC/MS calibration and continuing calibration met all criteria, with the following exceptions: 4-Chlorophenyl-phenylether and Fluorene exceeded the percent standard deviation (%RSD) limit of 20.5%, but

both were well below the maximum of 40% (25.6% and 27.5%, respectively). Both compounds also went below the minimum relative response factor allowed on the top calibration standard (SSTD160). However, both were well above the minimum 0.01 required (0.363 and 0.688, respectively). All mass spectral tuning requirements were met for all standards, blanks, and samples. All internal standard and system monitoring compound retention times, and peak areas met all criteria. The method blank met all criteria. All system monitoring compound recoveries were within the required limits. The sample holding time was met. The Sample Number ZZZZZ refers to samples not associated with the SDG.

PESTICIDES AND POLYCHLORINATED BIPHENYLS (PCBs)

EPA Sample Number	0022874
EPA Case Number	19693
Lab Sample Number	R3783

The sample was extracted, diluted to a final volume of 10 mL, and analyzed by dual column (simultaneous injection) electron capture detection. %RSD values from the initial calibration curve were stable. The recovery of tetrachloro-m-xylene (surrogate) was consistently on the low side, but comparison with previous data did not indicate a serious problem. The results from the analysis of the mentioned sample were tabulated in the Form I. The Sample Number ZZZZZ refers to samples not associated with the SDG.

R. R. Grabbe, Manager
Organic Chemistry

lrm

Westinghouse
Hanford Company

Internal
Memo

From: Inorganic Chemistry 124E0-IC94-001
Phone: 372-0894 T6-30
Date: October 26, 1993
Subject: CORRECTIVE ACTION REQUEST - EPA INORGANIC PERFORMANCE EVALUATION PROGRAM

OCT 1993
RECEIVED
L.P. MARKEL

To: L. P. Markel T6-16

cc: R. E. Skoda T6-30
B. R. Wels T6-30
THB File/LB

Attached is the 222-S Laboratory Inorganic Chemistry department's corrective action report regarding the failure of the Remedial QB3FY93 Performance Evaluation standards, as well as the < 90% score received on the QB4FY93 Performance Evaluation standards.

Several of the corrective actions are currently under investigation. However, some of these action items will require more time than that available before the start of the QB1FY94 standard analysis. Therefore, these items may be investigated during or immediately following the current QB1FY94 sample analysis.

T. H. Bushaw
Manager, PAL Inorganic Chemistry

RES

Attachment

Attachment

CORRECTIVE ACTION REPORT

EPA Performance Evaluation Program
QB3-FY93 remedial, and QB4-FY93 Samples

A general overview of the results for both sets of Performance Evaluation (PE) Samples (QB3-FY93 remedial, and QB4-FY93) shows that the instruments were in good control. There was no obvious calibration bias.

Graphite Furnace (GFAA) Failures:

QB3-FY93: Soil - Sb, Tl
Remedial Water1 - Sb, Pb, Se

QB4-FY93: Water1 - Sb, Pb, Se (Se outside warning limits only)
Water2 - Sb, Pb

The graphite furnace instrument used for the Performance Evaluation analyses has not, to date, been used for any of the laboratory's production work.

There are two major contributors to the GFAA failures in the recent PE sample sets that PAL laboratory has submitted. They are: 1) Matrix interference, causing low results,
2) Problems with the instrument's sample deposition system, causing high results.

The matrix interference problem is difficult to correct for. Possible corrective actions are listed below.

The Thermo Jarrell Ash GFAA that this laboratory employs for its furnace analyses uses an aerosol deposition system for introducing the sample into the graphite cuvette. This system has an air-syphon with a venturi orifice for creating a vacuum which draws excess sample away from the spray tip prior to actual sample deposition. The lab has been experiencing a problem with solids building up at the venturi, thus blocking the vacuum. It appears that the blocking occurs to a greater extent during Sb analysis. However, since the recent transfer of the instrument from the benchtop into the hood, the problem has become more acute with all analyses.

There are several things that have changed since the instrument has been put in the hood that may contribute to the problem of solids building up in the vacuum system. The unit that contains the venturi orifice was moved from a ventilated box near the floor up into the hood, at the same level as the instrument. The autosampler, which was directly in front of the instrument, was

moved into the hood to the far left side of the instrument. This move raised the autosampler position with respect to the instrument, and required a longer length of sipper tubing. Also, in the same time frame, the manufacturer changed the size of the sipper probe. With the above mentioned changes, the following parameters were adjusted to reduce carry-over of sample: the nebulizer flow rate, tubing flush time, deposit delay time, and sample deposit time. Also, with the instrument in the hood, it appears that there is an increase in the rate of dust build-up on the instrument. This may contribute to the vacuum problem, but it may also cause increased noise in the analysis if dust randomly enters the cuvette at the time of analysis.

The lack of vacuum, as well as increased sample flow and deposition time, causes an increased amount of sample to be deposited on the graphite. When the deposition of the high standard on the cuvette is above the pre-set parameters for a linear calibration, the instrument response is lower than expected, forcing the slope of the calibration to be low. Thus, samples analyzed in the low range of the curve are falsely calculated high. Spiked samples read in the high portion of the calibration are falsely calculated low causing poor recoveries. Pb and Se have small linear ranges and, therefore, are effected to a larger extent than As and Tl. This is apparent in the numerous failures of Pb and Se on the high side of the acceptance ranges.

One additional factor that changed at the time these two PE sets were received is that there were two new chemical technicians in training on this instrument. One was just beginning training, and the other was just finishing training. This may have impacted the analyses due to lack of experience in identifying slightly out-of-normal operating conditions. However, past experience has shown that the most common problem that we have encountered during training on this instrument is incorrect/non-reported dilution factors. This does not appear to be the case in this reported study.

Corrective Actions

As mentioned above, matrix interferences are difficult to correct for. The best we can do is to re-evaluate the temperature programs and the matrix modifier concentrations that are needed. When iron concentrations in the sample are high, there is a suppression of the Se response. This is corrected to some extent with the use of palladium in the matrix modifier. However, the background correction is also supposed to correct for this interference. The Smith-Hieftje (S-H) method of background correction used with this instrumentation may not be adequate for correcting for large concentrations of iron. A study of the effect of Fe on Se must be performed to determine the concentration of Fe at

which the matrix modifier and background correction methods are no longer effective.

We have increased the frequency of our cleaning schedule for rinsing the venturi orifice. Also, glass wool was added to the trap bottle in an effort to trap more of the liquid before it could enter the venturi.

We are re-optimizing the actual deposit, flush and delay times required for sampling to minimize the amount of excess sample being drawn into the vacuum system. This will also decrease the amount of sample deposited on the graphite.

A study should be performed where the height and location of the autosampler are changed to determine an optimum condition for setting flush and deposit times.

Due to priority of the routine samples in the lab, the second chem. tech. had to delay training. This training should be complete within one or two weeks.

Inductively Coupled Plasma (ICP) Failures:

QB3-FY93:	Soil	- Ag
Remedial	Water1	- Al, Ca, Mg, Zn
	Water2	- Al, Cr, Co, Mn, V
QB4-FY93:	Soil	- Cd, Cr, Cu
	Water1	- V outside warning limits only
	Water2	- Cr outside warning limits only

Examination of the calibration check standards for the two PE sets shows that the instrument was in very good control, with the following exceptions: Ca in both the soil and water runs for QB4-93 (~115% recovery); and Cd in the water run only for QB4-93 (~115% recovery). This check standard may be analyzed either at 500 ppb or 1000 ppb. It is routine procedure to calibrate the instrument with standards ranging from 500 ppb to 10,000 ppb for most analytes, and up to 50,000 ppb for Al, Ca, Fe, K, and Na. Nearly 70% of the analytes that failed these two PE sets were measured below the 500 ppb level.

In the case of Al and Mg in QB3-FY93 Water1, the reported results were within the acceptable QC range of ± 10% (106.5% for Al; 92% for Mg), used to evaluate the instrument check standards, with respect to the mid-point value of the Prediction Interval. These results would not be suspect during a data review.

The QB4-FY93 soil sample contained a very high concentration of Fe (>160,000 mg/kg in the solid, > 800,000 ppb in the solution analyzed). A concentration of this magnitude may exhibit an adverse effect on the accuracy of the three analytes (Cd, Cr, and Cu) which failed this analysis. There was no interelement correction used in this run.

Corrective Actions

Since many of the analytes in the Performance Evaluation samples are at concentrations less than 500 ppb, the instrument calibration range will be adjusted to use a lower STD1 concentration. This will give improved accuracy of results at these lower levels. Also, an additional standard will be analyzed at a concentration which will more closely match that of the samples.

An interelement interference study has been performed to determine the effective concentration of Cd, Cu, and Cr when a 100,000 ppb Fe standard is analyzed. Results indicate that the presence of Fe at this level does not effect the Cu or Cr determination. However, Cd did have a minor interference.

Recent power fluctuations in the Rf generator of the ICP have been observed. The line conditioner is suspected to be inadequate for the application and will be replaced. It is unclear whether this condition is responsible for the failures, but it may be a contributing factor.

United States
Environmental Protection
Agency

Environmental Monitoring
Systems Laboratory
P.O. Box 93478
Las Vegas NV 89193-3478

EPA 600/R-93/215
November 1993

5476

Research and Development

EPA

Uranium in Water Performance Evaluation Study

DEC 1993
RECEIVED
D.A. SEBELIEN

A Statistical Evaluation of the August 13, 1993 Data

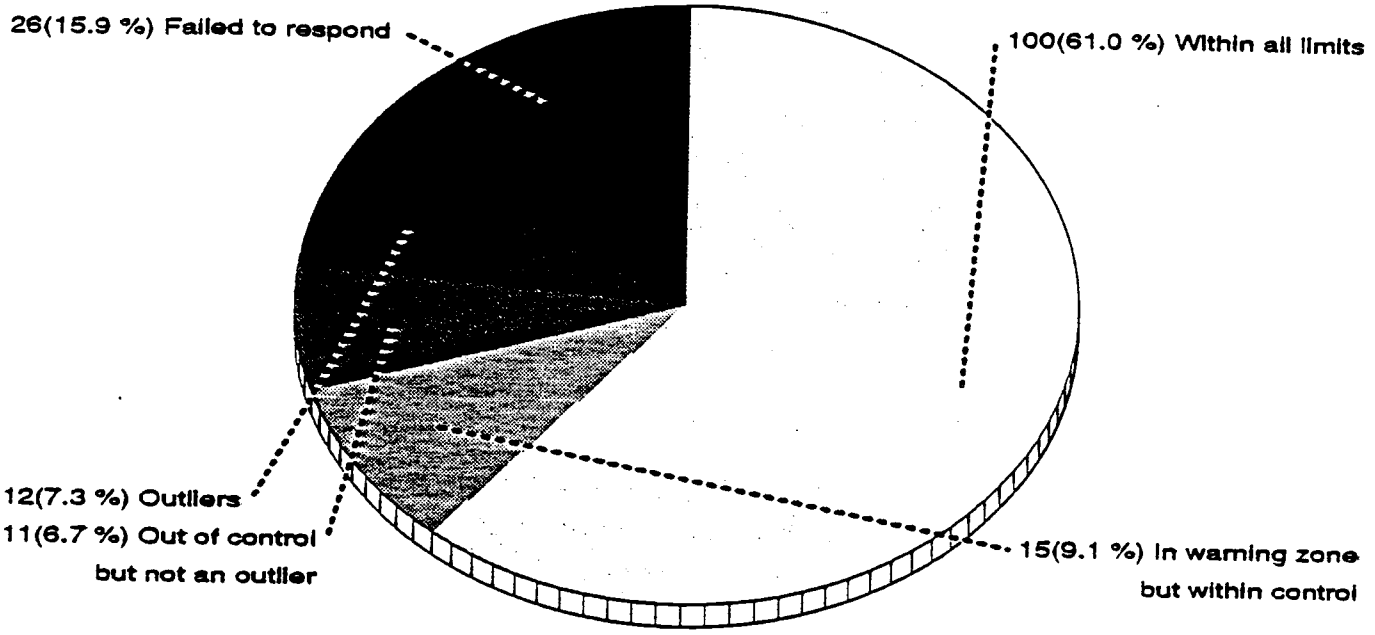
Did not report results.

* See Page # 3

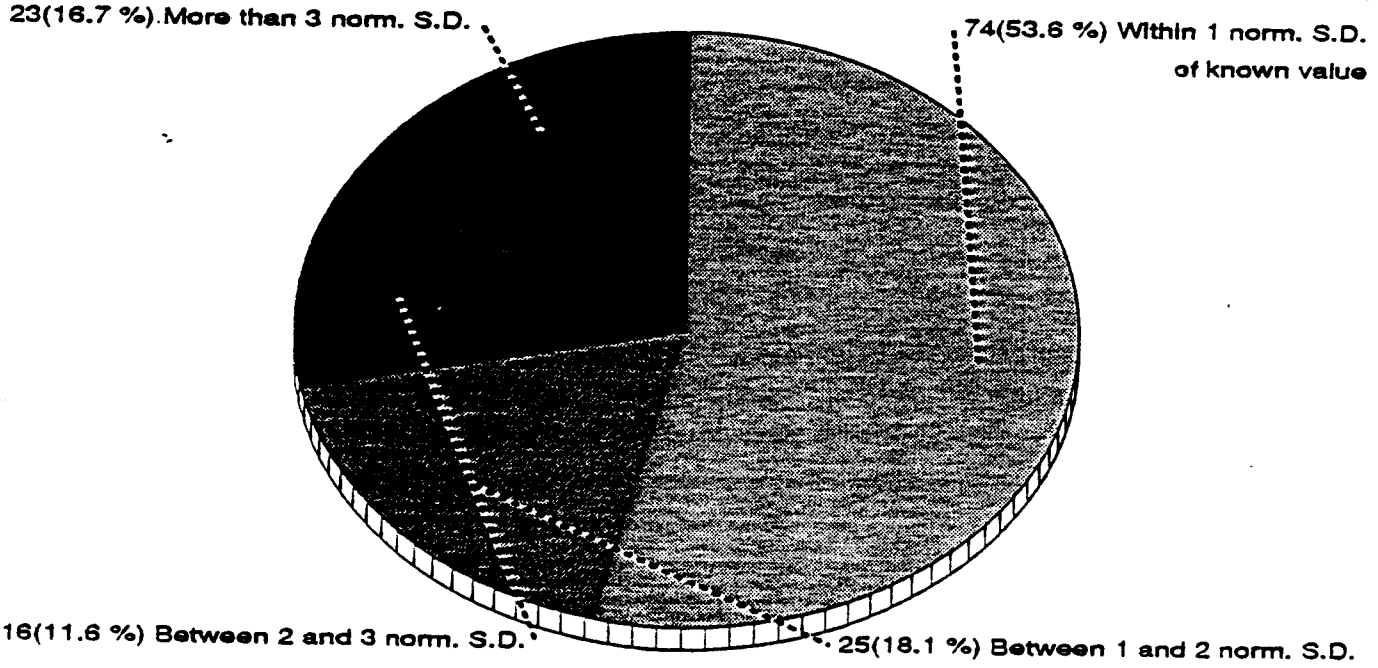
9311-0138nrd215

Uranium (Natural) Statistical Summary 164 Participants

The known value of this nuclide is **25.3 pCi/l** with an expected precision of **3.0**; the control limits are 20.1 to 30.5; the warning regions are 20.1 to 21.8 and 28.8 to 30.5



Statistic	Respondents	Non-outliers
Mean	24.41	**Grand Avg 24.91**
Std. Dev.	5.65	2.85
Variance	31.98	8.13
% Coef. of Var.	23.17	11.45
% deviation of mean from known value	-3.53	-1.55
Norm. dev. of mean from known value	-0.16	-0.14
Median	24.90	24.97
% deviation of median from known value	-1.58	-1.32
Norm. dev. of median from known value	-0.07	-0.12



5496

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 - FTS 545-2100)

NUCLEAR RADIATION ASSESSMENT DIVISION
NRA-RADQA

Analysis Results

Uranium in Water
Performance Evaluation Study

Laboratory FJ

Contact Person _____ Phone _____

Date Sample Received 8/17/93 Collection Date August 13, 1993
0400PST

IMPORTANT NOTICE

REPORT RESULTS CORRECTED FOR DECAY AS OF COLLECTION DATE.
'LESS THAN' AND ZERO RESULTS WILL NOT BE ACCEPTED.

LAB CODE FJ

Radionuclide	E1396 Analysis 1	E1397 Analysis 2	E1398 Analysis 3
Uranium (Natural)	25.3 pCi/l	25.4 pCi/l	25.6 pCi/l

RESULTS RECEIVED AFTER THE DUE-DATE, AND RESULT SHEETS NOT HAVING YOUR LAB CODE ENTERED MAY NOT BE INCLUDED IN THE PERFORMANCE EVALUATION STUDY FINAL REPORT. THANK YOU FOR YOUR COOPERATION.

In order to be included in the final report, your results must be received no later than 2400 hours on September 24, 1993.

Please report results using NRA-RADQA Computer Phone-In Program (702) 798-2143

[FAX for Foreign & Emergency Use Only, 702 798-2236]

United States
Environmental Protection
Agency

Environmental Monitoring
Systems Laboratory
P.O. Box 93478
Las Vegas NV 89193-3478

EPA 600/R-93/185
September 1993

5495

Research and Development

EPA

Gross Alpha-Beta in Water Performance Evaluation Study

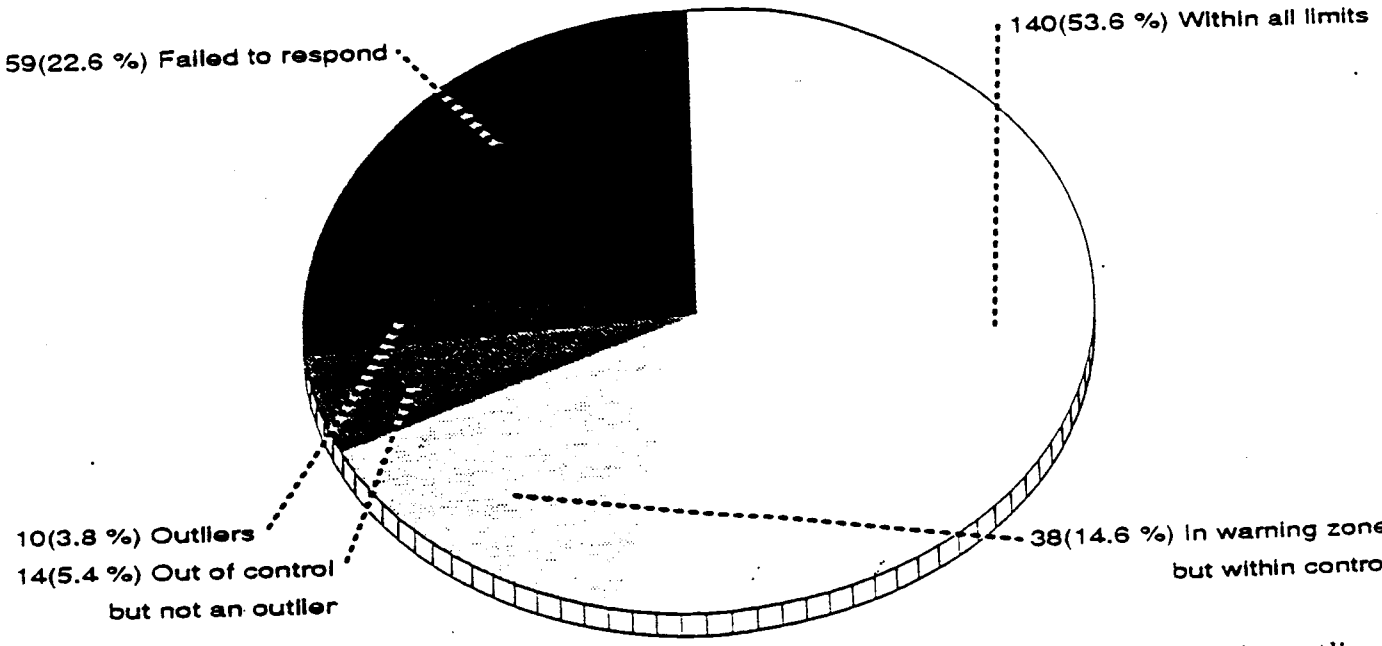
A Statistical Evaluation of the July 23, 1993 Data

OCT 1993
RECEIVED
EA LIBRARY

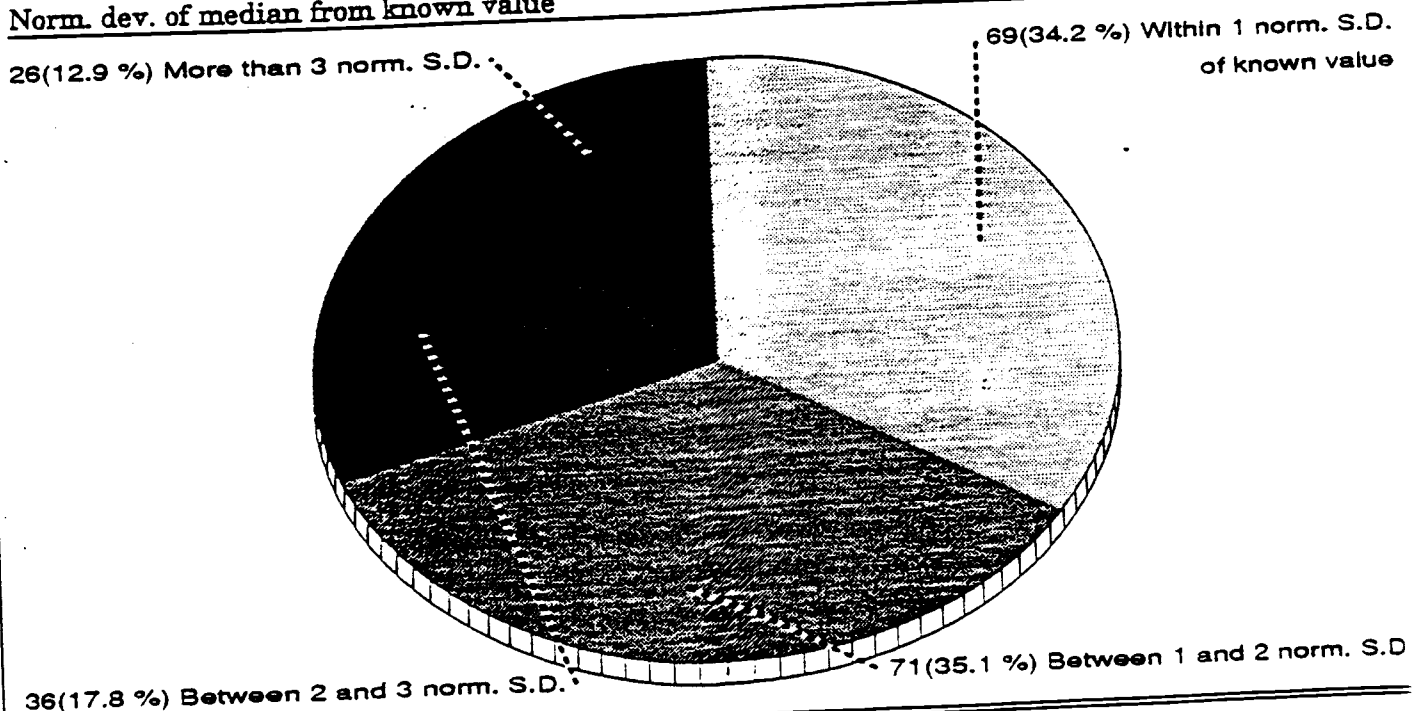
5514GR92NRD.COV21

Gross Alpha Statistical Summary 261 Participants

The known value of this nuclide is **15.0 pCi/l** with an expected precision of **5.0**; the control limits are 6.3 to 23.7; the warning regions are 6.3 to 9.2 and 20.8 to 23.7



Statistic	Respondents	Non-outliers
Mean	14.84	Grand Avg 12.06
Std. Dev.	17.73	4.28
Variance	314.42	18.28
% Coef. of Var.	119.50	35.45
% deviation of mean from known value	-1.08	-19.59
Norm. dev. of mean from known value	-0.01	-0.69
Median	12.00	11.67
% deviation of median from known value	-20.00	-22.22
Norm. dev. of median from known value	-0.17	-0.78



Gross Alpha

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
DJ	11.0	14.0	4.0	5.13	1.345	9.67	-0.83	-1.85	
DM	30.0	21.0	23.0	4.73	1.120	24.67	4.37	3.35	⇑
DO	13.0	12.0	14.0	1.00	0.236	13.00	0.33	-0.69	
DP									•
DR									•
DS	15.0	10.0	10.0	2.89	0.591	11.67	-0.14	-1.15	
DT	12.0	13.0	12.0	0.58	0.118	12.33	0.09	-0.92	
DX	7.0	8.0	8.0	0.58	0.118	7.67	-1.52	-2.54	
DY									•
DZ	19.0	20.0	21.0	1.00	0.236	20.00	2.75	1.73	
E	10.0	11.0	12.0	1.00	0.236	11.00	-0.37	-1.39	
EA	43.0	34.0	38.0	4.51	1.120	38.33	9.10	8.08	×
EB	11.0	11.0	12.0	0.58	0.118	11.33	-0.25	-1.27	
EH	12.0	13.0	14.0	1.00	0.236	13.00	0.33	-0.69	
EL									•
EN									•
EO	17.0	18.0	18.0	0.58	0.118	17.67	1.94	0.92	
ER	15.0	15.0	14.0	0.58	0.118	14.67	0.90	-0.12	
ES									•
EV	9.0	10.0	8.0	1.00	0.236	9.00	-1.06	-2.08	
EW	45.0	38.0	37.0	4.36	0.945	40.00	9.68	8.66	×
FE									•
FF	13.0	10.0	9.0	2.08	0.473	10.67	-0.48	-1.50	
FJ	12.0	11.0	12.0	0.58	0.118	11.67	-0.14	-1.15	
FK									•
FL	7.0	7.0	6.0	0.58	0.118	6.67	-1.87	-2.89	
FN									•
FP	8.0	9.0	10.0	1.00	0.236	9.00	-1.06	-2.08	
FU									•
FW									•
FZ	10.0	17.0	19.0	4.73	1.120	15.33	1.13	0.12	
GE									•
GJ	6.0	9.0	11.0	2.52	0.591	8.67	-1.18	-2.19	
GO	38.0	32.0	40.0	4.16	0.945	36.67	8.52	7.51	×
GQ	16.0	16.0	15.0	0.58	0.118	15.67	1.25	0.23	
GT	5.0	13.0	16.0	5.69	1.570	11.33	-0.25	-1.27	
GZ	13.0	12.0	15.0	1.53	0.354	13.33	0.44	-0.58	
HE	21.0	20.0	19.0	1.00	0.236	20.00	2.75	1.73	
HH	6.0	7.0	7.0	0.58	0.118	6.67	-1.87	-2.89	
HI	8.0	9.0	8.0	0.58	0.118	8.33	-1.29	-2.31	
HK	14.0	14.0	14.0	0.00	0.000	14.00	0.67	-0.35	
HL	12.0	12.0	12.0	0.00	0.000	12.00	-0.02	-1.04	
HN									•
HP	18.0	16.0	18.0	1.15	0.236	17.33	1.83	0.81	
HU	20.0	20.0	20.0	0.00	0.000	20.00	2.75	1.73	

TAG SYMBOLS

• ≡ No data submitted

∅ ≡ Insufficient data

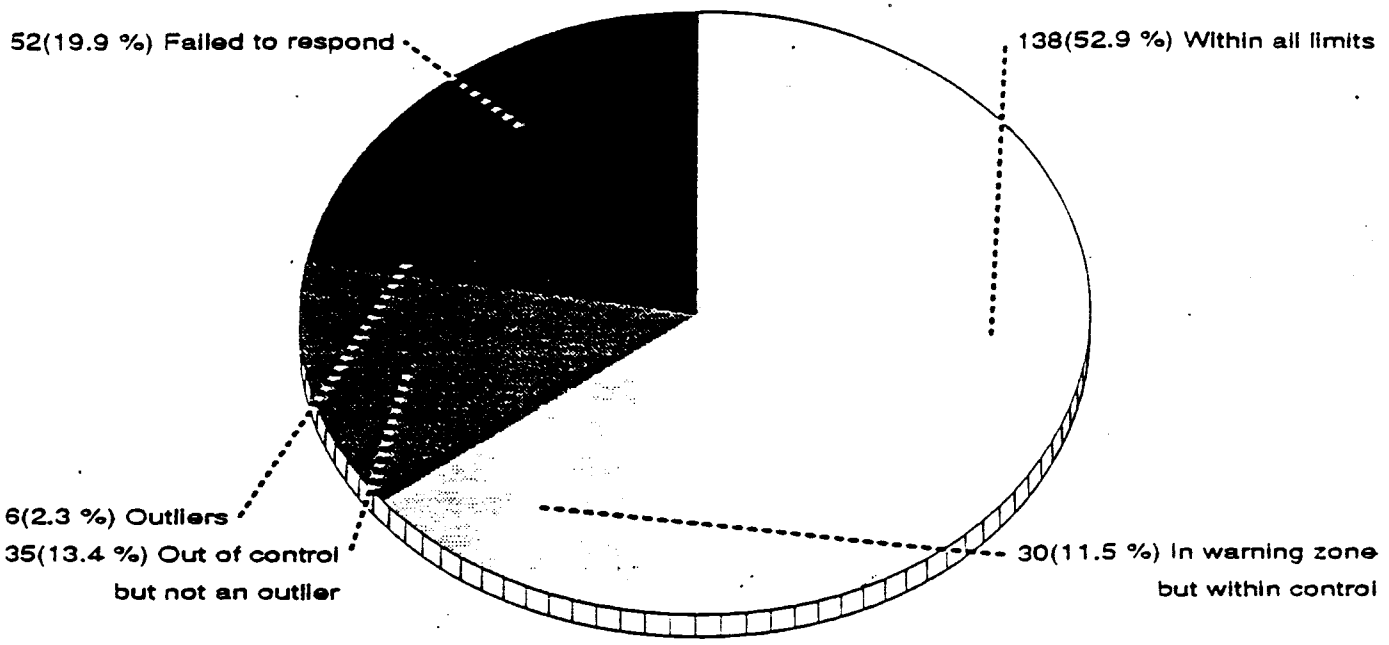
× ≡ Determined to be an outlier

⇑ ≡ Above control limit

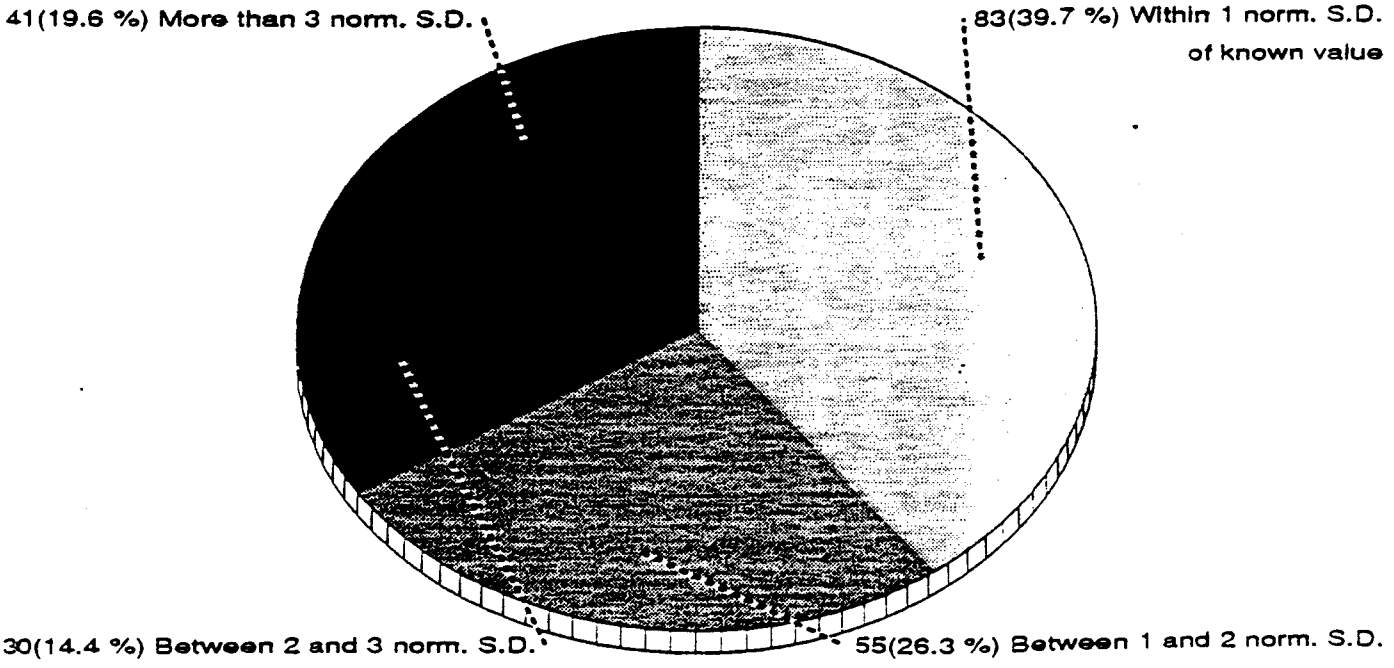
⇓ ≡ Below control limit

Gross Beta Statistical Summary 261 Participants

The known value of this nuclide is **43.0 pCi/l** with an expected precision of **6.9**; the control limits are 31.0 to 55.0; the warning regions are 31.0 to 35.0 and 51.0 to 55.0



Statistic	Respondents	Non-outliers
Mean	43.74	**Grand Avg 37.65**
Std. Dev.	79.25	8.49
Variance	6281.29	72.09
%.Coef. of Var.	181.19	22.55
% deviation of mean from known value	1.72	-12.44
Norm. dev. of mean from known value	0.01	-0.63
Median	38.67	38.67
% deviation of median from known value	-10.08	-10.08
Norm. dev. of median from known value	-0.05	-0.51



Gross Beta

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
DJ	93.0	57.0	24.0	34.51	10.297	58.00	5.09	3.75	⇑
DM									•
DO	36.0	44.0	42.0	4.16	0.682	40.67	0.75	-0.58	
DP									•
DR	45.0	45.0	45.0	0.00	0.000	45.00	1.84	0.50	
DS	41.0	43.0	51.0	5.29	0.852	45.00	1.84	0.50	
DT	37.0	37.0	35.0	1.15	0.170	36.33	-0.33	-1.67	
DX	38.0	41.0	41.0	1.73	0.256	40.00	0.59	-0.75	
DY									•
DZ	38.0	38.0	38.0	0.00	0.000	38.00	0.09	-1.25	
E	37.0	41.0	35.0	3.06	0.511	37.67	0.00	-1.33	
EA	44.0	45.0	45.0	0.58	0.085	44.67	1.75	0.42	
EB	39.0	40.0	41.0	1.00	0.170	40.00	0.59	-0.75	
EH	40.0	38.0	39.0	1.00	0.170	39.00	0.34	-1.00	
EL	46.0	41.0	41.0	2.89	0.426	42.67	1.25	-0.08	
EN									•
EO	40.0	41.0	37.0	2.08	0.341	39.33	0.42	-0.92	
ER									•
ES									•
EV	41.0	40.0	39.0	1.00	0.170	40.00	0.59	-0.75	
EW	45.0	38.0	37.0	4.36	0.682	40.00	0.59	-0.75	
FE									•
FF	27.0	35.0	35.0	4.62	0.682	32.33	-1.33	-2.67	
FJ	51.0	54.0	50.0	2.08	0.341	51.67	3.50	2.17	
FK									•
FL	38.0	36.0	37.0	1.00	0.170	37.00	-0.16	-1.50	
FN									•
FP	30.0	38.0	37.0	4.36	0.682	35.00	-0.66	-2.00	
FU									•
FW									•
FZ	25.0	23.0	26.0	1.53	0.256	24.67	-3.25	-4.58	⇓
GE	38.0	40.0	38.0	1.15	0.170	38.67	0.25	-1.08	
GJ	7.0	12.0	15.0	4.04	0.682	11.33	-6.58	-7.91	⇓
GO	21.0	21.0	27.0	3.46	0.511	23.00	-3.66	-5.00	⇓
GQ	45.0	45.0	45.0	0.00	0.000	45.00	1.84	0.50	
GT	12.0	21.0	26.0	7.09	1.368	19.67	-4.50	-5.83	⇓
GZ	38.0	37.0	36.0	1.00	0.170	37.00	-0.16	-1.50	
HE	36.0	36.0	37.0	0.58	0.085	36.33	-0.33	-1.67	
HH	18.0	19.0	20.0	1.00	0.170	19.00	-4.66	-6.00	⇓
HI	31.0	33.0	39.0	4.16	0.682	34.33	-0.83	-2.17	
HK	44.0	44.0	46.0	1.15	0.170	44.67	1.75	0.42	
HL	36.0	36.0	36.0	0.00	0.000	36.00	-0.41	-1.75	
HN									•
HP	41.0	44.0	42.0	1.53	0.256	42.33	1.17	-0.17	
HU	29.0	29.0	29.0	0.00	0.000	29.00	-2.16	-3.50	⇓

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

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

DATACHEM

PERFORMANCE EVALUATION

RESULTS

PERFORMANCE EVALUATION SUMMARY SHEET

Laboratory: DataChem Laboratories

PE Sample	Number Acceptable	Number Analyzed	% Acceptable
WS-032			
Metal	19	19	100.0
Inorganic	12	13	92.3
Organic	44	44	100.0
WP-030			
Metal	47	48	97.9
Inorganic	37	40	92.5
Organic	54	54	100.0

EMSL-LV PE Samples (CLP)	EPA/CLP Score
QB1 FY92	
Metals	86.0
Organic	97.8
QB2 FY92	
Metals	89.1
Organic	100.0
QB3 FY92	
Metals	78.4
Organic	84.9
QB4 FY92	
Metals	92.1
Organic	91.4
QB1 FY93	
Metals	96.1
Organic	96.4
QB2 FY93	
Organic	97.8
QB3 FY93	
Organic	95.0
QB4 FY93	
Organic	100.0

DATA CHEM
LABORATORIES
A SORENSON COMPANY

September 28, 1993
Refer to: 93QA276

Mr. Stewart L. Huggins, Senior Enginner
Westinghouse Hanford Company
Office of Sample Management
Mailstop T6-08
P.O. Box 1970
Richland, WA 99352

Dear Mr. Huggins:

Enclosed, for your files, is a copy of the EPA WS032 performance evaluation report for DataChem Laboratories (and a follow-up report for any parameters which have an evaluation of "Not Acceptable").

If you have any questions, please call me at (801) 266-7700.

Sincerely,

Donald R. Lewis

Donald R. Lewis
Quality Control Section

Encl.
DRL/mp

SALT LAKE CITY OFFICE
[illegible]

CINCINNATI OFFICE
4388 GLENDALE MILFORD ROAD
CINCINNATI, OHIO 45242-3706
513 733-5336 FAX 513 733-5347

BALTIMORE OFFICE
10 JULIET LANE, SUITE #206
BALTIMORE, MARYLAND 21236-1220
410 494-3612 FAX 513 733-5347

RICHLAND OFFICE
313 WELLSIAN WAY
RICHLAND, WASHINGTON 99352-4111
509 943-5858 FAX 509 943-5654

LEADING ANALYTICAL CHEMISTRY INTO THE 21ST CENTURY℠

PERFORMANCE EVALUATION REPORT DATE: 8/13/93

WATER SUPPLY STUDY NUMBER WS032

DATACHEM LABORATORIES
8012667700 / SALT LAKE CITY, UT / CDO

LABORATORY UT009

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
TRACE METALS IN MICROGRAMS PER LITER:					
ALUMINUM	1	309	309	274- 335	ACCEPTABLE
ANTIMONY	2	5.25	5.58	3.34- 7.41	ACCEPTABLE
ARSENIC	1	92.4	91.4	76.5- 103	ACCEPTABLE
BARIUM	2	495	511	434- 588	ACCEPTABLE
BERYLLIUM	1	1.02	0.933	0.699- 1.17	ACCEPTABLE
BO[illegible]	2	942 **	864	810- 1010	ACCEPTABLE
CADMIUM	1	4.22	4.80	3.84- 5.76	ACCEPTABLE
CHROMIUM	1	65.0	68.1	57.9- 78.3	ACCEPTABLE
COPPER	1	807	820	738- 902	ACCEPTABLE
LEAD	1	4.82	5.16	3.61- 6.71	ACCEPTABLE
MANGANESE	1	218	221	203- 234	ACCEPTABLE
MERCURY	1	6.16	6.23	4.36- 8.10	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.

PERFORMANCE EVALUATION REPORT DATE: 8/13/93

WATER SUPPLY STUDY NUMBER WS032

LABORATORY UT009

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
TRACE METALS IN MICROGRAMS PER LITER:					
MOLYBDENUM	2	6.51	6.58	4.80- 8.58	ACCEPTABLE
NICKEL	1	93.4	95.2	80.9- 109	ACCEPTABLE
SELENIUM	1	65.5	65.9	52.7- 79.1	ACCEPTABLE
SILVER	2	23.8	25.1	21.2- 29.4	ACCEPTABLE
THALLIUM	2	2.32	2.56	1.79- 3.33	ACCEPTABLE
VANADIUM	1	154	160	143- 174	ACCEPTABLE
ZINC	1	81.7	83.8	73.7- 91.1	ACCEPTABLE
NITRATE/NITRITE/FLUORIDE IN MILLIGRAMS PER LITER:					
NITRATE AS N	1	3.88	3.60	3.24- 3.96	ACCEPTABLE
NITRITE AS N	1	2.33	2.30	1.95- 2.64	ACCEPTABLE
FLUORIDE	1	2.01	2.00	1.80- 2.20	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 8/13/93

WATER SUPPLY STUDY NUMBER WS032

LABORATORY UT009

ANALYTES	SAMPLE NUMBER	REPORTED VALUE		TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
INSECTICIDES IN MICROGRAMS PER LITER:						
CHLORDANE (TOTAL)	3	4.31		5.33	2.93- 7.73	ACCEPTABLE
HEPTACHLOR	4	0.383		0.443	0.244-0.642	ACCEPTABLE
HEPTACHLOR EPOXIDE	4	0.357		0.346	0.190-0.502	ACCEPTABLE
LINDANE	1	0.235		0.214	0.119-0.310	ACCEPTABLE
METHOXYCHLOR	1	19.0		17.4	9.57- 25.2	ACCEPTABLE
T[illegible]PHENE	2	3.40		3.71	2.04- 5.38	ACCEPTABLE
HERBICIDES IN MICROGRAMS PER LITER:						
2,4-D	1	16.2		18.6	9.30- 27.9	ACCEPTABLE
2,4,5-TP (SILVEX)	1	7.35		8.31	4.16- 12.5	ACCEPTABLE
DALAPON	2	8.96	**	12.5	D.L.- 20.8	ACCEPTABLE
DICAMBA	2	3.99		4.73	2.28- 7.05	ACCEPTABLE
DINOSEB	2	3.93	**	6.52	D.L.- 9.19	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.
D.L. STANDS FOR DETECTION LIMIT

PERFORMANCE EVALUATION REPORT DATE: 8/13/93

WATER SUPPLY STUDY NUMBER WS032

LABORATORY UT009

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
HERBICIDES IN MICROGRAMS PER LITER:					
PENTACHLOROPHENOL	1	5.90	10.7	5.35- 16.0	ACCEPTABLE
PICLORAM	2	5.50	10.6	D.L.- 20.0	ACCEPTABLE
TRIHALOMETHANES IN MICROGRAMS PER LITER:					
BROMODICHLOROMETHANE	1	21.7	22.4	17.9- 26.9	ACCEPTABLE
BROMOFORM	1	27.2	26.4	21.1- 31.7	ACCEPTABLE
CHLORODIBROMOMETHANE	1	17.6	17.9	14.3- 21.5	ACCEPTABLE
CHLOROFORM	1	17.8	17.1	13.7- 20.5	ACCEPTABLE
TOTAL TRIHALOMETHANE	1	84.30	83.8	67.0- 101	ACCEPTABLE
VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:					
BENZENE	1	17.4	16.5	13.2- 19.8	ACCEPTABLE
CARBON TETRACHLORIDE	1	13.3	14.5	11.6- 17.4	ACCEPTABLE
CHLOROBENZENE	2	12.6	13.5	10.8- 16.2	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
D.L. STANDS FOR DETECTION LIMIT

PERFORMANCE EVALUATION REPORT DATE: 3/13/93

WATER SUPPLY STUDY NUMBER WS032

LABORATORY UT009

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:					
1,2 DICHLOROBENZENE	2	11.6	13.5	10.8- 16.2	ACCEPTABLE
1,4-DICHLOROBENZENE	1	12.6	13.6	10.9- 16.3	ACCEPTABLE
1,2-DICHLOROETHANE	1	15.1	13.3	10.6- 16.0	ACCEPTABLE
1,1-DICHLOROETHYLENE	1	11.1	9.13	5.48- 12.8	ACCEPTABLE
C 1,2 DICHLOROETHYLENE	2	12.0	12.3	9.84- 14.8	ACCEPTABLE
T[illegible] DICHLOROETHYLENE	2	15.8	16.9	13.5- 20.3	ACCEPTABLE
1,2 DICHLOROPROPANE	2	5.54	6.46	3.88- 9.04	ACCEPTABLE
ETHYLBENZENE	2	10.6	11.8	9.44- 14.2	ACCEPTABLE
STYRENE	2	8.30	8.66	5.20- 12.1	ACCEPTABLE
TETRACHLOROETHYLENE	2	6.69	7.43	4.46- 10.4	ACCEPTABLE
TOLUENE	2	6.10	6.54	3.92- 9.16	ACCEPTABLE
1,1,1-TRICHLOROETHANE	1	8.54	10.1	8.08- 12.1	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 3/13/93

WATER SUPPLY STUDY NUMBER WS032

LABORATORY UT009

ANALYTES	SAMPLE NUMBER	REPORTED VALUE		TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:						
TRICHLOROETHYLENE	1	13.0		11.2	8.96- 13.4	ACCEPTABLE
VINYL CHLORIDE	1	3.53		2.57	1.54- 3.60	ACCEPTABLE
TOTAL XYLENES	2	7.20		7.54	4.52- 10.6	ACCEPTABLE
BROMOMETHANE	3	16.8		16.0	7.98- 22.3	ACCEPTABLE
1,2DIBROMO3CHLOROPROPANE	4	1.62		1.78	1.07- 2.49	ACCEPTABLE
D[illegible]LOROMETHANE	3	8.63		7.77	5.45- 10.2	ACCEPTABLE
ETHYLENE DIBROMIDE (EDB)	4	2.41		2.29	1.37- 3.21	ACCEPTABLE
HEXACHLOROBUTADIENE	3	16.8		19.3	14.1- 23.8	ACCEPTABLE
1,2,4-TRICHLOROBENZENE	3	12.9		14.1	9.90- 17.1	ACCEPTABLE
1,1,2-TRICHLOROETHANE	3	11.6		13.2	9.58- 15.7	ACCEPTABLE
1,2,3-TRICHLOROPROPANE	3	10.3		9.85	5.96- 12.4	ACCEPTABLE
MISCELLANEOUS ANALYTES:						
RESIDUAL FREE CHLORINE (MILLIGRAMS PER LITER)	1	1.15	**	1.09	0.805- 1.21	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.

PERFORMANCE EVALUATION REPORT DATE: 8/13/93

WATER SUPPLY STUDY NUMBER WS032

LABORATORY UT009

ANALYTES	SAMPLE NUMBER	REPORTED VALUE		TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
MISCELLANEOUS ANALYTES:						
TURBIDITY (NTU'S)	1	4.10	**	4.10	3.76- 4.93	ACCEPTABLE
TOTAL FILTERABLE RESIDUE (MILLIGRAMS PER LITER)	1	302	**	275	201- 463	ACCEPTABLE
CALCIUM (MG. CACO3/L)	1	160		160	149- 172	ACCEPTABLE
PH-UNITS	1	9.06		9.12	8.85- 9.34	ACCEPTABLE
ALKALINITY (MG. CACO3/L)	1	26.2	**	29.0	27.0- 33.6	NOT ACCEPTABLE
CORROSIVITY (LANGELIER IND. AT 20C)	1	0.738		0.846	0.465- 1.13	ACCEPTABLE
SODIUM (MILLIGRAMS PER LITER)	1	13.1		13.3	11.9- 14.8	ACCEPTABLE
SULFATE (MILLIGRAMS PER LITER)	1	26.0		27.0	24.7- 29.4	ACCEPTABLE
TOTAL CYANIDE (MILLIGRAMS PER LITER)	1	0.399		0.400	0.300-0.500	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.

DataChem Laboratories
EPA LAB NUMBER UT009
WS032 FOLLOW-UP REPORT ON DEFICIENT PARAMETERS
9/24/93

1. ALKALINITY (Sample #1)
   Reported Value: 26.2 mg/L
   Acceptance Limits: 27.0-33.6 mg/L
   Performance Eval.: Not Acceptable
   Root Cause & Corrective Action: A review of the data has been completed, and no assignable cause for the reported value being slightly below the acceptance limit has been determined. All of the QC samples which were run had good recoveries: the LCS was 99.9%, the ICV was 97.1%, the CCV was 97.5%, and QC46129 was 96%. Two sample preparations were performed and two aliquots were analyzed from each prepared sample. The results of these four analyses were close together (25.80, 26.14, 25.55, 27.45 mg/L) and the mean was used for reporting. The history of alkalinity analyses shows no chronic problem, and this deficiency is considered to be an isolated incident requiring no corrective action.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

DATACHEM LABORATORIES
8012667700 / SALT LAKE CITY, UT / CDO

LABORATORY: UT009

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	1070	1100	898- 1300	949- 1250	ACCEPTABLE
	2	3930	4000	3370- 4570	3520- 4410	ACCEPTABLE
ARSENIC	1	275	280	225- 334	238- 320	ACCEPTABLE
BERYLLIUM	1	62.6	63.0	51.1- 74.5	54.1- 71.5	ACCEPTABLE
CADMIUM	1	6.52	8.12	6.30- 10.3	6.80- 9.79	CHECK FOR ERROR
	2	91.3	93.9	78.3- 110	82.2- 106	ACCEPTABLE
COBALT	1	474	480	416- 536	431- 521	ACCEPTABLE
	2	242	240	206- 275	214- 266	ACCEPTABLE
CHROMIUM	1	61.4	62.0	49.2- 73.7	52.3- 70.6	ACCEPTABLE
	2	454	460	378- 533	397- 514	ACCEPTABLE
COPPER	1	60.5	62.0	53.5- 69.8	55.6- 67.8	ACCEPTABLE
	2	409	410	365- 462	377- 450	ACCEPTABLE
IRON	1	3960	3800	3350- 4230	3460- 4120	ACCEPTABLE
	2	884	860	755- 963	781- 937	ACCEPTABLE
MERCURY	1	0.854	0.983	0.620- 1.42	0.719- 1.32	ACCEPTABLE
	2	1.80	2.10	1.57- 2.75	1.72- 2.61	ACCEPTABLE
MANGANESE	1	2200	2200	1950- 2450	2010- 2380	ACCEPTABLE
	2	220	221	196- 244	202- 238	ACCEPTABLE
NICKEL	1	131	130	111- 150	116- 145	ACCEPTABLE
	2	1310	1300	1160- 1450	1200- 1420	ACCEPTABLE
LEAD	1	71.0	79.2	62.7- 97.1	67.0- 92.8	ACCEPTABLE
	2	468	450	393- 513	408- 498	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: UT009

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1	16.8	23.0	14.3- 29.1	16.1- 27.3	ACCEPTABLE
	2	83.8	78.1	52.8- 94.6	58.1- 89.3	ACCEPTABLE
VANADIUM	1	8080	8000	7110- 8830	7330- 8610	ACCEPTABLE
	2	15300	15000	12700-17400	13300-16800	ACCEPTABLE
ZINC	1	1070	1100	961- 1220	993- 1190	ACCEPTABLE
	2	230	240	209- 271	216- 263	ACCEPTABLE
ANTIMONY	3	105	116	79.4- 140	87.2- 133	ACCEPTABLE
	4	13.8	14.0	7.01- 20.4	8.73- 18.7	ACCEPTABLE
SILVER	3	2.28	2.39	1.80- 2.96	1.95- 2.82	ACCEPTABLE
	4	9.42	9.75	7.80- 11.5	8.25- 11.0	ACCEPTABLE
THALLIUM	3	88.9	90.2	70.7- 108	75.5- 103	ACCEPTABLE
	4	6.35	9.00	6.71- 11.3	7.29- 10.7	NOT ACCEPTABLE
MOLYBDENUM	3	6.59	6.48	3.34- 8.82	4.04- 8.12	ACCEPTABLE
	4	40.5	39.0	30.3- 47.9	32.6- 45.6	ACCEPTABLE
STRONTIUM	3	4.07	4.01	3.01- 4.99	3.26- 4.73	ACCEPTABLE
	4	50.6	51.0	41.4- 60.1	43.8- 57.7	ACCEPTABLE
TITANIUM	3	66.1	66.0	51.5- 76.5	54.7- 73.3	ACCEPTABLE
	4	181	182	149- 205	156- 198	ACCEPTABLE
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
PH-UNITS	3	8.70	8.70	8.31- 9.05	8.40- 8.96	ACCEPTABLE
	4	6.09	6.10	5.96- 6.22	5.99- 6.19	ACCEPTABLE
SPEC. COND.	1	253	253	226- 274	232- 268	ACCEPTABLE
(UMHOS/CM AT 25 C)	2	853	868	819- 916	831- 904	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: UT009

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
TDS AT 180 C	1	116	116	76.2- 166	87.5- 155	ACCEPTABLE
	2	482	480	385- 617	414- 588	ACCEPTABLE
TOTAL HARDNESS (AS CACO3)	1	75.8	75.6	66.7- 84.1	68.8- 82.0	ACCEPTABLE
	2	223	225	209- 242	213- 238	ACCEPTABLE
CALCIUM	1	3.80	3.69	3.00- 4.47	3.18- 4.29	ACCEPTABLE
	2	80.2	80.9	73.4- 90.2	75.5- 88.1	ACCEPTABLE
MAGNESIUM	1	16.1	16.1	14.0- 18.1	14.5- 17.6	ACCEPTABLE
	2	5.60	5.64	4.84- 6.32	5.03- 6.13	ACCEPTABLE
SODIUM	1	16.0	15.9	14.0- 17.9	14.5- 17.4	ACCEPTABLE
	2	66.1	65.6	59.6- 72.0	61.2- 70.4	ACCEPTABLE
POTASSIUM	1	2.62	2.60	2.05- 3.22	2.19- 3.08	ACCEPTABLE
	2	18.6	19.0	16.2- 21.9	16.9- 21.1	ACCEPTABLE
TOTAL ALKALINITY (AS CACO3)	1	21.0	21.1	17.2- 26.1	18.3- 25.0	ACCEPTABLE
	2	96.5	97.0	85.0- 109	88.0- 106	ACCEPTABLE
CHLORIDE	1	52.6	54.3	48.2- 59.1	49.6- 57.8	ACCEPTABLE
	2	156	178	166- 191	170- 188	NOT ACCEPTABLE
FLUORIDE	1	2.49	2.40	2.09- 2.65	2.16- 2.58	ACCEPTABLE
	2	0.288	0.230	0.175-0.286	0.189-0.272	NOT ACCEPTABLE
SULFATE	1	8.95	9.10	6.48- 11.4	7.10- 10.8	ACCEPTABLE
	2	41.0	42.0	35.2- 48.1	36.8- 46.5	ACCEPTABLE
NUTRIENTS IN MILLIGRAMS PER LITER:						
AMMONIA-NITROGEN	1	5.30	5.50	4.35- 6.65	4.62- 6.37	ACCEPTABLE
	2	9.51	9.80	7.80- 11.6	8.25- 11.2	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: UT009

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
NUTRIENTS IN MILLIGRAMS PER LITER:						
NITRATE-NITROGEN	1	33.6	34.0	27.5- 40.2	29.0- 38.7	ACCEPTABLE
	2	7.30	7.10	5.70- 8.43	6.03- 8.10	ACCEPTABLE
ORTHOPHOSPHATE	1	0.853	0.830	0.692-0.961	0.724-0.929	ACCEPTABLE
	2	.0877	0.090	.0617-0.122	.0689-0.115	ACCEPTABLE
KJELDAHL-NITROGEN	3	9.77	9.30	6.67- 11.5	7.26- 10.9	ACCEPTABLE
	4	20.2	19.0	13.9- 23.1	15.0- 22.0	ACCEPTABLE
TOTAL PHOSPHORUS	3	3.33	3.20	2.35- 3.57	2.49- 3.42	ACCEPTABLE
	4	1.83	1.60	1.25- 1.94	1.33- 1.86	ACCEPTABLE
DEMANDS IN MILLIGRAMS PER LITER:						
COD	1	20.3	21.8	12.6- 30.5	14.9- 28.2	ACCEPTABLE
	2	33.0	35.4	23.6- 43.0	26.0- 40.5	ACCEPTABLE
TOC	1	8.01	8.61	7.22- 10.2	7.61- 9.80	ACCEPTABLE
	2	13.1	14.0	11.9- 16.3	12.5- 15.7	ACCEPTABLE
PCB'S IN MICROGRAMS PER LITER:						
PCB-AROCLOR 1016/1242	2	3.99	4.29	1.86- 5.71	2.35- 5.22	ACCEPTABLE
PCB-AROCLOR 1232	1	1.11	1.43	0.657- 1.79	0.800- 1.64	ACCEPTABLE
PCB'S IN OIL IN MILLIGRAMS PER KILOGRAM:						
PCB IN OIL- 1016/1242	1	15.8	21.5	5.04- 27.6	7.92- 24.7	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: UT009

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
PCB'S IN OIL IN MILLIGRAMS PER KILOGRAM:						
PCB IN OIL- 1260	2	36.5	36.6	7.82- 57.8	14.2- 51.4	ACCEPTABLE
PESTICIDES IN MICROGRAMS PER LITER:						
CHLORDANE	3	0.881	0.964	0.469- 1.32	0.575- 1.21	ACCEPTABLE
	4	8.78	9.48	5.38- 12.4	6.26- 11.5	ACCEPTABLE
ALDRIN	1	0.121	0.159	.0344-0.214	.0572-0.191	ACCEPTABLE
	2	0.419	0.444	.0957-0.577	0.156-0.517	ACCEPTABLE
DIELDRIN	1	0.121	0.121	.0572-0.163	.0704-0.150	ACCEPTABLE
	2	0.574	0.553	0.270-0.750	0.330-0.690	ACCEPTABLE
DDD	1	0.187	0.216	.0863-0.317	0.115-0.288	ACCEPTABLE
	2	0.649	0.626	0.334-0.865	0.400-0.799	ACCEPTABLE
DDE	1	.0995	0.131	.0562-0.171	.0706-0.157	ACCEPTABLE
	2	0.432	0.495	0.228-0.699	0.288-0.639	ACCEPTABLE
DDT	1	0.161	0.186	.0628-0.284	.0905-0.257	ACCEPTABLE
	2	0.589	0.576	0.252-0.844	0.326-0.770	ACCEPTABLE
HEPTACHLOR	1	0.136	0.157	.0488-0.221	.0706-0.199	ACCEPTABLE
	2	0.492	0.514	0.180-0.715	0.247-0.648	ACCEPTABLE
HEPTACHLOR EPOXIDE	1	.0839	0.087	.0427-0.120	.0526-0.110	ACCEPTABLE
	2	0.399	0.375	0.189-0.513	0.229-0.473	ACCEPTABLE
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
1,2 DICHLOROETHANE	1	56.3	48.6	34.5- 62.8	38.0- 59.2	ACCEPTABLE
	2	11.0	10.2	7.28- 13.8	8.11- 12.9	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: UT009

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
CHLOROFORM	1	49.2	45.7	31.6- 59.5	35.1- 56.0	ACCEPTABLE
	2	13.3	13.8	9.42- 18.0	10.5- 16.9	ACCEPTABLE
1,1,1 TRICHLOROETHANE	1	52.9	52.0	32.3- 67.9	36.8- 63.4	ACCEPTABLE
	2	9.20	9.34	5.56- 12.6	6.46- 11.7	ACCEPTABLE
TRICHLOROETHENE	1	38.9	38.8	26.8- 49.1	29.6- 46.2	ACCEPTABLE
	2	7.92	9.91	6.52- 13.0	7.34- 12.2	ACCEPTABLE
CARBONTETRACHLORIDE	1	49.1	46.3	29.8- 63.7	34.1- 59.4	ACCEPTABLE
	2	12.9	13.5	8.93- 18.2	10.1- 17.0	ACCEPTABLE
TETRACHLOROETHENE	1	57.4	57.2	39.7- 71.9	43.8- 67.8	ACCEPTABLE
	2	14.1	16.2	10.9- 21.1	12.2- 19.8	ACCEPTABLE
BROMODICHLOROMETHANE	1	52.2	49.5	34.2- 64.3	38.0- 60.5	ACCEPTABLE
	2	8.46	7.75	4.88- 10.6	5.59- 9.86	ACCEPTABLE
DIBROMOCHLOROMETHANE	1	42.9	42.2	30.0- 54.4	33.1- 51.3	ACCEPTABLE
	2	14.5	16.4	10.9- 21.5	12.2- 20.2	ACCEPTABLE
BROMOFORM	1	53.5	53.7	33.5- 73.7	38.6- 68.6	ACCEPTABLE
	2	11.5	11.9	6.48- 17.1	7.83- 15.7	ACCEPTABLE
METHYLENE CHLORIDE	1	41.6	37.3	24.1- 53.2	27.7- 49.6	ACCEPTABLE
	2	8.53	8.77	4.21- 13.5	5.39- 12.3	ACCEPTABLE
CHLOROBENZENE	1	43.0	43.2	30.8- 55.0	33.9- 51.9	ACCEPTABLE
	2	11.4	12.9	8.99- 16.7	9.97- 15.7	ACCEPTABLE
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
BENZENE	1	9.16	10.3	7.34- 13.4	8.11- 12.6	ACCEPTABLE
	2	47.6	54.1	37.7- 70.8	41.9- 66.6	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: UT009

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
ETHYLBENZENE	1	9.58	11.3	7.71- 14.7	8.60- 13.8	ACCEPTABLE
	2	45.1	52.4	36.2- 68.5	40.3- 64.4	ACCEPTABLE
TOLUENE	1	12.1	13.9	9.86- 17.7	10.9- 16.7	ACCEPTABLE
	2	29.6	33.9	24.0- 43.1	26.4- 40.7	ACCEPTABLE
1,2-DICHLOROBENZENE	1	10.8	12.1	8.47- 15.4	9.37- 14.5	ACCEPTABLE
	2	44.7	52.0	36.1- 66.4	40.0- 62.5	ACCEPTABLE
1,3-DICHLOROBENZENE	1	8.11	9.43	6.17- 12.1	6.92- 11.4	ACCEPTABLE
	2	42.4	47.8	33.6- 61.2	37.2- 57.6	ACCEPTABLE
1,4-DICHLOROBENZENE	1	10.2	11.7	7.95- 15.2	8.86- 14.2	ACCEPTABLE
	2	54.0	58.1	39.1- 76.5	43.9- 71.7	ACCEPTABLE
MISCELLANEOUS PARAMETERS:						
TOTAL CYANIDE (IN MG/L)	1	0.233	0.250	0.138-0.341	0.164-0.316	ACCEPTABLE
	2	0.116	0.130	.0821-0.169	.0932-0.158	ACCEPTABLE
NON-FILTERABLE RESIDUE (IN MG/L)	1	41.3	43.2	34.7- 45.2	36.0- 43.9	ACCEPTABLE
	2	30.8	33.0	24.0- 34.6	25.3- 33.2	ACCEPTABLE
OIL AND GREASE (IN MG/L)	1	10.1	15.0	8.13- 19.4	9.56- 18.0	ACCEPTABLE
	2	13.3	23.0	14.1- 28.1	15.9- 26.3	NOT ACCEPTABLE
TOTAL PHENOLICS (IN MG/L)	1	.0242	.0271	.0093-.0449	.0139-.0403	ACCEPTABLE
	2	0.267	0.291	0.125-0.457	0.167-0.414	ACCEPTABLE
TOTAL RESIDUAL CHLORINE (IN MG/L)	1	0.625	0.729	0.469-0.912	0.528-0.853	ACCEPTABLE
	2	0.200	0.240	.0866-0.280	0.112-0.254	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

DataChem Laboratories
EPA LAB NUMBER UT009
WP030 FOLLOW-UP REPORT ON DEFICIENT PARAMETERS

1. PARAMETER: Thallium
   SAMPLE NUMBER: 4
   REPORTED VALUE: 6.35 ug/L
   TRUE VALUE: 9.00 ug/L
   ACCEPTANCE LIMITS: 6.71-11.3 ug/L
   PERFORMANCE EVALUATION: Not acceptable.
   ROOT CAUSE & CORRECTIVE ACTION: Thallium was analyzed first by ICP and generated a value of 9.00 ug/L, which was exactly what the true value turned out to be. The analyst felt that the low level of thallium shown by ICP warranted re-analysis by graphite furnace. The sample was then analyzed by GFAA and the results were reported. A review of the data has revealed no assignable cause for the GFAA value being slightly below the acceptance limit, but it is considered to be an isolated incident requiring no corrective action.

2. PARAMETER: Chloride
   SAMPLE NUMBER: 2
   REPORTED VALUE: 156 mg/L
   TRUE VALUE: 178 mg/L
   ACCEPTANCE LIMITS: 166-191 mg/L
   PERFORMANCE EVALUATION: Not acceptable.
   ROOT CAUSE & CORRECTIVE ACTION: A review of the data has been completed and no assignable cause for the reported value being slightly below the acceptance limit has been determined. The dilution of the sample by a factor of one hundred put it at the low end of the calibration curve, which may possibly be related to the lower value. In the future, the analysts will keep the sample closer to the middle of the working range of the curve.

3. PARAMETER: Fluoride
   SAMPLE NUMBER: 2
   REPORTED VALUE: 0.288 mg/L
   TRUE VALUE: 0.230 mg/L
   ACCEPTANCE LIMITS: 0.175-0.286 mg/L
   PERFORMANCE EVALUATION: Not acceptable.
   ROOT CAUSE & CORRECTIVE ACTION: As noted above, the upper acceptance limit was 0.286 mg/L, and the DCL result was 0.288 mg/L (a difference of only 0.002 mg/L). A review of the data has been completed and no assignable cause for the reported value being slightly above the acceptance limit has been determined. However, new stock standard for fluoride has been purchased and will be used in the future.

WP030 FOLLOW-UP REPORT ON DEFICIENT PARAMETERS (continued)

4. PARAMETER: Oil and Grease
   SAMPLE NUMBER: 2
   REPORTED VALUE: 13.3 mg/L
   TRUE VALUE: 23.0 mg/L
   ACCEPTANCE LIMITS: 14.1-28.1 mg/L
   PERFORMANCE EVALUATION: Not acceptable.
   ROOT CAUSE & CORRECTIVE ACTION: It is suspected that the cause of the reported value being slightly below the acceptance limit was that the hotplate temperature was too high (and therefore evaporated some of the target analytes). The method called for heating at 70°C, but the temperature was not recorded by the analyst. To assure that the temperature requirement is met in the future, a surface thermometer will be placed on the hotplate and the temperature will be recorded in the analyst's notebook.

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 93

LABORATORY NAME: DataChem Laboratories (UT) [F1] (DATAC) % Score: 96.1
PERFORMANCE LEVEL: ACCEPTABLE REPORT DATE: 12/9/1992
LABORATORY RANK: Above = 5 Same = 0 Below = 9 MATRIX: SOIL

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	11400	23000	10200	24200	18700			0	0	0	0	0	15
ANTIMONY	c	c	c	c	12.2	U		0	0	0	13	0	15
ARSENIC	80.2	105	77.5	108	93.1			0	1	0	0	0	15
BARIUM	170	212	166	217	199			0	0	0	0	0	15
BERYLLIUM	1.0	1.5	1.0	1.6	1			0	1	0	0	0	15
CADMIUM	33.3	44.6	32.1	45.8	40.4			0	0	0	0	0	15
CALCIUM	18900	21700	18600	22000	21700			0	0	0	0	0	15
CHROMIUM	15.6	21.6	15.0	22.2	19.1			0	2	0	0	0	15
CO[illegible]	10.0	10.7	10.0	11.2	10.1			0	0	0	0	0	15
C[illegible]	96.6	116	94.5	118	111			0	1	0	0	0	15
IRON	16800	22600	16100	23300	20800			0	1	0	0	0	15
LEAD	999	1200	977	1220	1160	S		0	1	0	0	0	15
MAGNESIUM	6280	8250	6070	8460	7590			0	0	0	0	0	15
MANGANESE	444	539	434	550	532			0	0	0	0	0	15
MERCURY	4.0	8.4	3.5	8.9	6.4			0	1	0	1	0	15
NICKEL	12.1	19.0	11.3	19.8	17.1			0	0	0	0	0	15
POTASSIUM	3020	5320	2770	5570	4350			0	1	0	0	0	15
SELENIUM	1.0	1.6	1.0	1.8	2.1	B	X	1	3	0	9	1	15
SILVER	2.7	5.3	2.4	5.5	4.2			0	0	0	4	0	15
SODIUM	d	d	d	d	272	B		0	0	0	0	0	15
THALLIUM	0.86	2.0	2.0	2.2	1.1	BW		0	0	0	5	0	15
VANADIUM	31.9	47.8	30.2	49.5	40.9			0	4	0	0	0	15
ZINC	275	337	268	344	325			0	0	0	0	0	15

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 3
SOIL : Sb, Se, Tl

[illegible]UPLICATES OUT: 0
SOIL :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 93

LABORATORY NAME: DataChem Laboratories (UT) [F1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE
LABORATORY RANK: Above = 5 Same = 0 Below = 9

% Score: 96.1
REPORT DATE: 12/9/1992
MATRIX: WATER 1

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	1070	1140	1060	1150	1100		0	1	0	0	0	15
ANTIMONY	346	401	340	407	370		0	1	0	0	0	15
ARSENIC	58.3	76.5	56.3	78.5	65.5		0	0	0	3	1	15
BARIUM	c	c	c	c	6.7	U	0	0	0	0	0	15
BERYLLIUM	63.5	74.3	62.3	75.5	68.1		0	0	0	0	0	15
CADMIUM	38.8	42.6	38.4	43.0	40.3		0	2	0	0	0	15
CALCIUM	28100	31300	27700	31700	30400		0	0	0	0	0	15
CHROMIUM	64.1	78.2	62.6	79.7	73.6		0	0	0	0	0	15
C[illegible]	185	214	182	217	204		0	0	0	0	0	15
C[illegible]	228	261	224	265	261		0	1	0	0	0	15
IRON	379	448	372	455	424		0	0	0	0	0	15
LEAD	11.7	17.0	11.1	17.6	15.5		0	0	0	0	0	15
MAGNESIUM	21300	23500	21000	23800	22200		0	0	0	0	0	15
MANGANESE	c	c	c	c	2.2	U	0	0	0	0	0	15
MERCURY	2.4	7.8	1.8	8.4	6.9		0	0	0	0	0	15
NICKEL	227	286	221	292	282		0	0	0	0	0	15
POTASSIUM	c	c	c	c	1140	U	0	0	0	0	0	15
SELENIUM	49.2	65.0	47.5	66.7	54.7		0	1	0	1	1	15
SILVER	46.9	53.7	46.2	54.4	50.3		0	0	0	3	0	15
SODIUM	d	d	d	d	217	B	0	0	0	0	0	15
THALLIUM	83.4	110	80.4	113	103		0	1	0	3	0	15
VANADIUM	c	c	c	c	11.1	U	0	0	0	0	0	15
ZINC	226	274	220	279	241		0	0	0	0	0	15

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 0
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 0
WATER :

OF DUPLICATES OUT: 0
WATER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 93

LABORATORY NAME: DataChem Laboratories (UT) [F1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE
LABORATORY RANK: Above = 5 Same = 0 Below = 9

% Score: 96.1
REPORT DATE: 12/9/1992
MATRIX: WATER 2

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	c	c	c	c	46.7	U	0	0	0	0	0	15
ANTIMONY	270	559	239	590	352		0	0	0	0	0	15
ARSENIC	35.0	59.2	32.3	61.9	42.7		0	0	0	3	1	15
BARIUM	827	1470	757	1540	1040		0	0	0	0	0	15
BERYLLIUM	36.2	64.6	33.2	67.7	46.1		0	0	0	0	0	15
CADMIUM	13.2	29.2	11.5	30.9	14.5		0	0	0	0	0	15
CALCIUM	c	c	c	c	31.1	U	0	0	0	0	0	15
CHROMIUM	77.7	136	71.3	142	101		0	0	0	0	0	15
COBALT	311	528	288	551	388		0	1	0	0	0	15
CO[illegible]	c	c	c	c	7.8	U	0	0	0	0	0	15
IRON	554	871	519	906	665		0	1	0	0	0	15
LEAD	18.0	34.1	16.3	35.9	26.2		0	0	0	0	0	15
MAGNESIUM	c	c	c	c	71.1	U	0	0	0	0	0	15
MANGANESE	108	173	101	180	136		0	1	0	0	0	15
MERCURY	0.2	1.6	0.2	1.7	0.64		0	0	0	0	0	15
NICKEL	c	c	c	c	32.2	U	0	0	0	0	0	15
POTASSIUM	15400	29200	13800	30700	20400		0	0	0	0	0	15
SELENIUM	24.2	51.0	21.3	53.9	32.5		0	0	0	1	1	15
SILVER	43.3	82.5	39.0	86.8	56.2		0	0	0	3	0	15
SODIUM	19800	34201	18200	35801	24500		0	0	0	0	0	15
THALLIUM	c	c	c	c	1.1	UW	0	0	0	3	0	15
VANADIUM	389	663	359	693	483		0	0	0	0	0	15
ZINC	c	c	c	c	10	U	0	0	0	0	0	15

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 0
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 0
WATER :

[illegible]PLICATES OUT: 0
WATER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 92

LABORATORY NAME: DataChem Laboratories (UT) [F1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE
LABORATORY RANK: Above = 9 Same = 0 Below = 6

% Score: 92.1
REPORT DATE: 9/11/1992
MATRIX: WATER 1

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	c	c	c	c	21.1	B		0	0	0	0	0	16
ANTIMONY	269	330	262	336	301			0	1	0	1	0	[illegible]
ARSENIC	51.5	60.5	50.5	61.4	56.2	S		0	4	0	0	0	16
BARIUM	c	c	c	c	2	U		0	0	0	0	0	16
BERYLLIUM	54.4	61.6	53.7	62.3	60.5			0	1	0	0	0	16
CADMIUM	16.8	23.1	16.1	23.7	20.2			0	0	0	0	0	16
CALCIUM	25900	30600	25400	31200	29000			0	0	0	0	0	16
CHROMIUM	77.2	94.0	75.4	95.8	86.5			0	1	0	0	0	16
CO[illegible]	317	370	311	375	356			0	0	0	0	0	16
CO[illegible]	242	273	239	276	266	E		0	1	0	0	0	16
IRON	459	535	451	544	535			0	2	0	0	0	16
LEAD	13.4	16.9	13.0	17.3	15.4			0	3	0	2	2	16
MAGNESIUM	18500	21500	18200	21800	20100			0	0	0	0	0	16
MANGANESE	c	c	c	c	1	U		0	0	0	0	0	16
MERCURY	8.6	10.8	8.4	11.0	9.5			1	4	0	0	1	16
NICKEL	276	319	272	324	335		X	0	1	0	0	0	16
POTASSIUM	c	c	c	c	358	U		0	0	0	0	0	16
SELENIUM	49.0	65.4	47.2	67.2	59.4			0	1	0	0	1	16
SILVER	44.6	55.1	43.5	56.2	53.1			0	0	0	1	0	16
SODIUM	d	d	d	d	109	B		0	0	0	0	0	16
THALLIUM	81.3	106	78.6	109	95.9			0	1	0	2	0	16
VANADIUM	c	c	c	c	3	U		0	0	0	0	0	16
ZINC	230	272	226	276	265	E		0	0	0	0	0	16

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
WATER : Tl

OF DUPLICATES OUT: 0
WATER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 92

LABORATORY NAME: DataChem Laboratories (UT) [F1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE
LABORATORY RANK: Above = 9 Same = 0 Below = 6

% Score: 92.1
REPORT DATE: 9/11/1992
MATRIX: WATER 2

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	1060	1360	1030	1390	1220		0	0	0	0	0	16
ANTIMONY	392	487	381	498	428		0	1	0	1	0	16
ARSENIC	29.8	41.0	28.6	42.2	34.9		0	2	0	0	0	16
BARIUM	931	1030	920	1040	1000		0	0	0	0	0	16
BERYLLIUM	36.5	42.9	35.8	43.6	41.6		0	0	0	0	0	16
CADMIUM	25.5	34.6	24.5	35.6	34.9	S	0	1	0	0	0	16
CALCIUM	c	c	c	c	33.7	B	0	0	0	0	0	16
CHROMIUM	46.0	57.3	44.8	58.6	53.8		0	0	0	0	0	16
CO[illegible]	238	266	235	269	258		0	1	0	0	0	16
CO[illegible]	c	c	c	c	15.3	BE	0	0	0	0	0	16
IRON	732	857	719	871	829		0	1	0	0	0	16
LEAD	25.6	35.0	24.6	36.0	33		0	2	0	2	2	16
MAGNESIUM	c	c	c	c	24	U	0	0	0	0	0	16
MANGANESE	112	125	111	127	121		0	1	0	0	0	16
MERCURY	12.0	16.5	11.5	17.0	14.8		1	3	0	0	1	16
NICKEL	c	c	c	c	18	U	0	0	0	0	0	16
POTASSIUM	18400	21200	18000	21500	19700		0	0	0	0	0	16
SELENIUM	27.9	41.0	26.5	42.4	37.9		0	0	0	0	1	16
SILVER	53.8	64.8	52.7	65.9	59.1		0	1	0	1	0	16
SODIUM	23000	26000	22700	26300	24700		0	1	0	0	0	16
THALLIUM	c	c	c	c	1	UW	0	0	0	2	0	16
VANADIUM	419	470	414	476	453		0	1	0	0	0	16
ZINC	c	c	c	c	9.1	BE	0	0	0	0	0	16

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 0
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
WATER : Tl

OF DUPLICATES OUT: 0
WATER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 92

LABORATORY NAME: DataChem Laboratories (UT) [F1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE
LABORATORY RANK: Above = 9 Same = 0 Below = 6

% Score: 92.1
REPORT DATE: 9/11/1992
MATRIX: SOIL

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	9580	21000	8350	22200	16500		0	0	0	0	1	16
ANTIMONY	12.0	16.5	12.0	18.5	10.9	B	0	1	0	14	0	16
ARSENIC	453	731	423	760	556		0	0	0	1	1	16
BARIUM	286	347	280	353	333		0	1	0	0	0	16
BERYLLIUM	1.0	1.8	1.0	1.9	1.6		0	0	0	0	0	16
CADMIUM	17.3	23.6	16.6	24.3	22		0	0	0	0	0	16
CALCIUM	3940	5060	3820	5180	4750		0	0	0	0	0	16
CHROMIUM	9.1	23.5	7.6	25.0	17.4		0	0	0	0	0	16
COBALT	10.0	11.5	10.0	12.1	9.9	B	0	0	0	0	0	16
COPPER	2490	2880	2450	2920	2800		0	1	0	0	0	16
IRON	19900	28400	18900	29400	26300		0	0	0	0	0	16
LEAD	4610	5270	4540	5340	5540	X	0	2	0	0	1	16
MAGNESIUM	3900	5910	3680	6130	5160		0	0	0	0	0	16
MANGANESE	6800	8260	6640	8420	8020		0	1	0	0	0	16
MERCURY	22.6	40.9	20.6	42.9	32.4		1	2	0	0	0	16
NICKEL	8.0	14.1	8.0	15.2	7.4	B	0	1	0	0	0	16
POTASSIUM	4050	5310	3910	5450	4920		0	0	0	0	0	16
SELENIUM	c	c	c	c	0.42	BW	0	0	2	5	0	16
SILVER	22.1	33.9	20.8	35.2	32.9		0	0	0	1	0	16
SODIUM	d	d	d	d	524	B	0	0	0	0	0	16
THALLIUM	d	d	d	d	0.53	BW	0	0	0	4	0	16
VANADIUM	32.3	51.4	30.2	53.5	44.7		0	1	0	0	0	16
ZINC	5190	6080	5090	6180	6100	S	0	1	0	0	0	16

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 2
SOIL : Sb, Se

OF DUPLICATES OUT: 1
SOIL : Pb

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 92

LABORATORY NAME: Datachem (UT) [S1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 7 Same = 0 Below = 1

% Score: 78.4
REPORT DATE: 6/9/1992
MATRIX: SOIL

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	2540	7440	2020	7960	5280			0	0	0	0	0	9
ANTIMONY	12.0	37.9	12.0	41.8	18.2			4	0	0	6	0	9
ARSENIC	827	996	809	1010	1680		X	0	1	0	0	0	9
BARIUM	207	2140	40.0	2340	938			0	0	0	3	0	9
BERYLLIUM	1.0	8.8	1.0	9.9	4			1	0	0	0	0	9
CADMIUM	215	268	209	274	240			0	0	0	0	0	9
CALCIUM	59401	71501	58101	72801	66300			0	0	0	0	0	9
CHROMIUM	134	168	130	171	154			0	1	0	0	0	9
COBALT	11.6	27.0	10.0	28.7	28.2		$	0	0	0	0	0	9
C[illegible]	5000	7740	4700	8030	8270		X	0	1	0	0	0	9
IR[illegible]	48901	66001	47101	67801	57800	E		0	0	0	0	0	9
LEAD	10800	13400	10500	13700	23800		X	0	1	0	0	0	9
MAGNESIUM	29800	34901	29300	35401	33400			0	0	0	0	0	9
MANGANESE	5270	6210	5170	6310	5910			0	1	0	0	0	9
MERCURY	0.76	2.1	0.61	2.2	1.3			0	1	0	1	0	9
NICKEL	30.1	40.7	29.0	41.8	41.2		$	0	2	0	0	0	9
POTASSIUM	1260	3100	1070	3300	2460			0	0	0	0	0	9
SELENIUM	1.0	3.1	1.0	3.4	2	UW	X	4	2	0	3	0	9
SILVER	6.9	22.7	5.2	24.4	19.1			0	1	0	2	0	9
SODIUM	4100	6610	3830	6870	7710		X	0	1	0	0	0	9
THALLIUM	2.6	5.4	2.3	5.7	8.7	B	X	0	1	0	4	0	9
VANADIUM	1290	1670	1250	1710	1550			0	0	0	0	0	9
ZINC	9570	12800	9220	13200	11000			0	0	0	0	0	9

OF ELEMENTS NOT-IDENTIFIED: 1
OF ELEMENTS MIS-QUANTIFIED: 5
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 4
SOIL : Sb, Ba, Se, Tl

[illegible]PLICATES OUT: 0
SOIL :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 92

LABORATORY NAME: Datachem (UT) [S1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 7 Same = 0 Below = 1

% Score: 78.4
REPORT DATE: 6/9/1992
MATRIX: WATER 1

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	c	c	c	c	71.6	B	0	0	0	0	0	9
ANTIMONY	299	361	292	368	358		1	1	0	0	0	9
ARSENIC	34.0	47.0	32.6	48.4	40.5		0	1	0	1	0	9
BARIUM	c	c	c	c	2.2	U	0	0	0	0	0	9
BERYLLIUM	55.8	69.6	54.3	71.0	57.5	E	0	1	0	0	0	9
CADMIUM	32.4	37.1	31.9	37.6	34.4		1	1	0	0	1	9
CALCIUM	31100	35201	30600	35601	32900		0	1	0	0	0	9
CHROMIUM	89.6	108	87.5	110	104		0	1	0	0	0	9
COBALT	267	308	262	313	295		0	1	0	0	0	9
C[illegible]	200	220	198	223	210		0	2	0	0	0	9
IR[illegible]	558	675	546	687	618	E	0	1	0	0	0	9
LEAD	14.8	20.7	14.2	21.4	15.6		0	2	0	0	0	9
MAGNESIUM	23500	26500	23200	26900	24400		0	1	0	0	0	9
MANGANESE	c	c	c	c	2.2	U	0	0	0	0	0	9
MERCURY	8.3	12.3	7.9	12.8	10.7		0	2	0	1	0	9
NICKEL	218	250	214	254	246		0	2	0	0	0	9
POTASSIUM	c	c	c	c	563	U	0	0	0	0	0	9
SELENIUM	42.7	59.0	41.0	60.7	53.3		0	2	0	0	0	9
SILVER	57.0	72.8	55.4	74.5	68		1	1	0	1	0	9
SODIUM	c	c	c	c	12.2	U	0	0	0	0	0	9
THALLIUM	70.3	87.3	68.4	89.1	79.5		1	4	0	3	0	9
VANADIUM	c	c	c	c	6.7	U	0	0	0	0	0	9
ZINC	174	221	169	226	187		0	1	0	0	0	9

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 0
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
WATER : Tl

[illegible]PLICATES OUT: 1
WATER : Cd

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 92

LABORATORY NAME: Datachem (UT) [S1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 7 Same = 0 Below = 1

% Score: 78.4
REPORT DATE: 6/9/1992
MATRIX: WATER 2

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	945	1110	927	1130	1020			0	1	0	0	0	9
ANTIMONY	458	551	448	560	487			0	1	0	0	0	9
ARSENIC	49.9	71.3	47.7	73.5	56.7			0	2	0	1	0	9
BARIUM	200.0	520	200.0	576	196	B		0	3	0	0	0	9
BERYLLIUM	37.7	52.7	36.1	54.3	37.9	E		0	1	0	0	0	9
CADMIUM	21.8	27.8	21.2	28.4	23			1	1	0	0	1	9
CALCIUM	6600	8440	6400	8640	7210			0	1	0	0	0	9
CHROMIUM	54.3	63.4	53.4	64.3	60.5			0	1	0	0	0	9
COBALT	178	207	174	210	195			0	1	0	0	0	9
CO[illegible]	71.0	98.5	68.1	101	63.7		X	1	2	0	0	0	9
IR[illegible]	903	1140	877	1170	932	E		0	1	0	0	0	9
LEAD	13.5	38.0	10.9	40.6	19.8			0	1	0	0	0	9
MAGNESIUM	d	d	d	d	2760	B		0	0	0	0	0	9
MANGANESE	136	159	134	161	144			0	1	0	0	0	9
MERCURY	2.8	4.7	2.5	4.9	3.4			0	1	0	1	0	9
NICKEL	c	c	c	c	44.4	U		0	0	0	0	0	9
POTASSIUM	25300	27800	25000	28000	26400			0	1	0	0	0	9
SELENIUM	27.6	34.3	26.9	35.0	31.3			1	3	0	0	0	9
SILVER	10.0	23.0	10.0	25.5	8.7	B		3	0	0	1	0	9
SODIUM	36101	41801	35501	42401	38000			0	1	0	0	0	9
THALLIUM	c	c	c	c	1.1	UW		0	0	0	3	0	9
VANADIUM	361	423	355	430	395			0	1	0	0	0	9
ZINC	d	d	d	d	11.1	U		0	0	0	0	0	9

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
WATER : Tl

[illegible]PLICATES OUT: 1
WATER : Cd

DATA CHEM
LABORATORIES
A SORENSON COMPANY

July 27, 1992
Refer to: 92PM265

Reply to:
Salt Lake Office

Steve Callio
Technical Project Officer
U.S. Environmental Protection Agency
Region VIII
999 18th Street, Suite 500
Denver, CO 80202-2405

Re: Third Quarter Inorganic Performance Evaluation Sample (QB3-FY92)

Dear Steve:

Pursuant to the Individual Laboratory Summary Report (ILSR) for the above-referenced performance evaluation sample, this letter is intended to outline the deficiencies and the actions taken to correct the deficiencies listed on the ILSR.

DEFICIENCY

An error in the inorganic forms generating procedure resulted in the misquantification of all furnace analytes for the soil sample. Values of "1.0000" for the weight, and "0.2000" for the volume, were incorrectly entered. This was due to the fact that the sample was digested using Microwave digestion procedures. The correct weight should have been "0.5000," and the correct volume "0.0500." This caused the reported concentrations on Forms 1, 5A, 5B, 6, 7, and 9 to be off by a factor of two of the actual values. It is worth noting, however, that when the correct values are in place, the reported results fall right in the center of the acceptable value range.

CORRECTIVE ACTION

Modifications have been made in the procedure for generating inorganic deliverables to reduce the risk of this type of mistake. DCL has implemented the use of programmed function keys to perform multiple related tasks sequentially for each type of digestion and analysis. Therefore, when the correct keystroke is used, all unique variables such as weight and volume are automatically correctly entered into the database.

SALT LAKE CITY OFFICE
960 WEST LeVON DRIVE
SALT LAKE CITY, UTAH 84123-2547
801 266-7700 FAX 801 266-9992

CINCINNATI OFFICE
4388 GLENDALE-MILFORD ROAD
CINCINNATI, OHIO 45242-3706
513 733-5336 FAX 513 733-5347

BALTIMORE OFFICE
10 JULIET LANE, SUITE #203
BALTIMORE, MARYLAND 21236-1220
410 494-3612 FAX 513 733-5347

RICHLAND OFFICE
313 WELLSIAN WAY
RICHLAND, WASHINGTON 99352-4116
509 943-5856 FAX 509 943-5654

GENERAL OBSERVATIONS

1. The copper analysis for soil sample MX3272 and the duplicate were high. When the spike added is subtracted from the spiked sample the value falls in range. The variation in results appears to be random sampling error.

2. The sodium analysis for soil sample MX3272 and the duplicate were high. The spiked sample is essentially another duplicate since it is not spiked. The results for the spiked sample were within range, therefore the variation in results appears to be random sampling error.

3. The water sample MX3271 resulted in a copper result of 63.7. The CRDL for Cu is 25. The results for CRII, which is twice the CRDL, was slightly low with a result of 40.9. The CCB's before and after the sample analysis were negative at -4.8 and -13.0 respectively. The analyst has been instructed to watch for baseline drift and correct the situation using the appropriate analytical procedures.

If I may provide additional information, please call me at (801) 266-7700.

Sincerely,

Joni Saatkamp
for
Ken R. Olson, J.D.
Project Manager

/ls

cc: L.C. Butler, Ph.D., *EMSL-LV*
S.D. Lessley, Ph.D., *DCL Executive Vice President*
R. McCallister, *USEPA Headquarters*
J.H. Nelson, Ph.D., *DCL President*
B.D. Tidwell, *DCL QA Coordinator, EPA-CLP*
A.B. Torgensen, *Inorganic Department Manager*

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 92

LABORATORY NAME: Datachem (UT) [A1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 4 Same = 0 Below = 2

% Score: 89.1
REPORT DATE: 3/17/1992
MATRIX: SOIL

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	4080	11600	3100	12600	9620			0	0	0	0	0	7
ANTIMONY	12.0	17.0	12.0	19.2	9.1	B		1	0	0	5	0	7
ARSENIC	960	1030	951	1040	1010			0	0	0	0	0	7
BARIUM	40.0	43.8	40.0	47.2	35.8	B		0	0	0	0	0	7
BERYLLIUM	c	c	c	c	0.38	B		0	0	0	0	0	7
CADMIUM	c	c	c	c	0.8	U		0	0	1	0	1	7
CALCIUM	1520	1850	1470	1900	2090		X	0	1	0	0	0	7
CHROMIUM	8.7	34.0	5.5	37.3	22.6			0	0	0	0	0	7
COB[illegible]	18.7	26.3	17.8	27.3	24.2			0	0	0	0	0	7
CO[illegible]	1590	2140	1520	2210	1980			0	0	0	0	0	7
IRON	31600	46801	29600	48801	42000			0	0	0	0	0	7
LEAD	5.0	14.2	3.8	15.4	10.9	NS		0	0	0	4	0	7
MAGNESIUM	1010	1290	1000.0	1320	1190			0	0	0	0	0	7
MANGANESE	188	250	180	258	228			0	0	0	0	0	7
MERCURY	0.044	0.22	0.0	0.24	0.14			1	1	0	0	1	7
NICKEL	13.1	19.5	12.3	20.3	18			0	0	0	0	0	7
POTASSIUM	2630	6000	2190	6440	5030			0	0	0	0	0	7
SELENIUM	1.0	3.9	1.0	4.4	2.3			0	1	0	4	2	7
SILVER	6.0	8.5	5.7	8.8	7.7			0	2	0	0	0	7
SODIUM	d	d	d	d	335	B		0	0	0	0	0	7
THALLIUM	c	c	c	c	0.59	BW		0	0	0	0	0	7
VANADIUM	10.0	16.4	10.0	17.5	12.3			0	0	0	0	0	7
ZINC	43.5	61.4	41.2	63.7	54.1			0	0	0	0	0	7

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 3
SOIL : Sb, Pb, Se

O[illegible]PLICATES OUT: 1
SOIL : Hg

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 92

LABORATORY NAME: Datachem (UT) [A1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 4 Same = 0 Below = 2

% Score: 89.1
REPORT DATE: 3/17/1992
MATRIX: WATER 1

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP. OUT	TOTAL #LABS
ALUMINUM	1250	1570	1210	1610	1510		0	0	0	0	0	7
ANTIMONY	376	459	365	470	425		0	0	0	0	0	7
ARSENIC	62.6	77.9	60.6	79.9	74		0	0	0	1	0	7
BARIUM	1330	1370	1320	1380	1400	X	0	3	0	0	0	7
BERYLLIUM	31.6	35.8	31.1	36.3	33.9		0	0	0	0	0	7
CADMIUM	60.2	73.1	58.5	74.8	66.7		0	0	0	0	0	7
CALCIUM	31000	37501	30200	38301	36100		0	0	0	0	0	7
CHROMIUM	60.6	73.8	58.9	75.5	69.5		0	0	0	0	0	7
COBALT	308	377	300	385	358		0	0	0	0	0	7
COPPER	144	191	138	197	181		0	0	0	0	0	7
IRON	639	784	620	804	755		0	0	0	0	0	7
LEAD	16.1	28.3	14.5	29.9	24		0	0	0	0	0	7
MAGNESIUM	32100	37501	31400	38201	35600		0	0	0	0	0	7
MANGANESE	96.7	115	94.4	117	109		0	0	0	0	0	7
MERCURY	c	c	c	c	0.2	U	0	0	2	0	0	7
NICKEL	256	290	251	294	276		1	2	0	0	0	7
POTASSIUM	31400	36901	30700	37601	34700		0	0	0	0	0	7
SELENIUM	30.1	37.3	29.2	38.2	33.8		0	1	0	1	1	7
SILVER	59.5	74.0	57.6	75.9	68.6		0	0	0	1	0	7
SODIUM	29800	37401	28800	38401	35000		0	0	0	0	0	7
THALLIUM	26.6	97.0	17.5	106	56.5		0	0	0	2	1	7
VANADIUM	297	388	285	400	362		0	0	0	0	0	7
ZINC	119	173	112	180	154		0	0	0	0	0	7

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
WATER : Tl

OF DUPLICATES OUT: 0
WATER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 92

LABORATORY NAME: Datachem (UT) [A1] (DATAC)
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 4 Same = 0 Below = 2

% Score: 89.1
REPORT DATE: 3/17/1992
MATRIX: WATER 2

ELEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q		PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	c	c	c	c	80.3	B		0	0	0	0	0	7
ANTIMONY	276	306	272	310	300			0	1	0	0	0	7
ARSENIC	42.7	57.4	40.8	59.3	50.8			0	0	0	1	0	7
BARIUM	924	1030	910	1040	999			0	1	0	0	0	7
BERYLLIUM	21.4	26.4	20.8	27.1	23.9			0	0	0	0	0	7
CADMIUM	47.9	51.1	47.5	51.6	50.1			0	2	0	0	0	7
CALCIUM	c	c	c	c	23	U		0	0	0	0	0	7
CHROMIUM	42.5	53.0	41.2	54.4	54		$	0	0	0	0	0	7
COBALT	231	267	226	271	253			0	1	0	0	0	7
CO[illegible]	119	124	119	124	136		X	0	3	0	0	0	7
IRON	432	581	412	601	541			0	0	0	0	0	7
LEAD	11.5	21.4	10.2	22.6	17.3			0	0	0	0	0	7
MAGNESIUM	c	c	c	c	58	U		0	0	0	0	0	7
MANGANESE	64.9	85.2	62.3	87.8	78.6			0	0	0	0	0	7
MERCURY	c	c	c	c	0.2	U		0	0	1	0	0	7
NICKEL	c	c	c	c	17	U		0	0	0	0	0	7
POTASSIUM	20300	27400	19400	28300	24600			0	0	0	0	0	7
SELENIUM	18.4	29.9	16.9	31.4	23			0	0	0	1	1	7
SILVER	39.6	55.6	37.5	57.7	49.9			0	0	0	1	0	7
SODIUM	20900	27000	20100	27800	25300			0	0	0	0	0	7
THALLIUM	c	c	c	c	1	U		0	0	0	2	1	7
VANADIUM	229	263	225	268	255			0	1	0	0	0	7
ZINC	c	c	c	c	10.5	B		0	0	1	0	0	7

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
WATER : Tl

[illegible]PLICATES OUT: 0
WATER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
PROGRAM SUMMARY REPORT
FOR QB 2 FY 92

MATRIX: SOIL

REPORT DATE: 3/17/1992

		TOLERANCE INTERVALS						PROGRAM DATA					
	SPIKE	WARNING		ACTION		MEAN	STD	#LABS	#LABS	#LABS	#LABS	#LABS	TOTAL
ELEMENT	LEVEL	LOWER	UPPER	LOWER	UPPER	REC	DEV	NOT-ID	MIS-QUANT	FALSE POS	MSPK OUT	DUP OUT	#LABS
ALUMINUM	-	4080	11600	3100	12600	7847	1809	0	0	0	0	0	7
ANTIMONY	-	12.0	17.0	12.0	19.2	8.67	3.84	1	0	0	5	0	7
ARSENIC	-	960	1030	951	1040	995	16.9	0	0	0	0	0	7
BARIUM	-	40.0	43.8	40.0	47.2	30.6	6.34	0	0	0	0	0	7
BERYLLIUM	-	c	c	c	c	0	0	0	0	0	0	0	7
CADMIUM	-	c	c	c	c	0	0	0	0	1	0	1	7
CALCIUM	-	1520	1850	1470	1900	1686	80.7	0	1	0	0	0	7
CHROMIUM	-	8.7	34.0	5.5	37.3	21.4	6.16	0	0	0	0	0	7
COBALT	-	18.7	26.3	17.8	27.3	22.5	1.80	0	0	0	0	0	7
COPPER	-	1590	2140	1520	2210	1866	133	0	0	0	0	0	7
IRON	-	31600	46801	29600	48801	39222	3671	0	0	0	0	0	7
LEAD	-	5.0	14.2	3.8	15.4	9.56	2.24	0	0	0	4	0	7
MAGNESIUM	-	1010	1290	1000.0	1320	1148	66.8	0	0	0	0	0	7
MANGANESE	-	188	250	180	258	219	14.8	0	0	0	0	0	7
M[illegible]Y	-	0.044	0.22	0.0	0.24	0.132	0.0408	1	1	0	0	1	7
NICKEL	-	13.1	19.5	12.3	20.3	16.3	1.54	0	0	0	0	0	7
POTASSIUM	-	2630	6000	2190	6440	4313	810	0	0	0	0	0	7
SELENIUM	-	1.0	3.9	1.0	4.4	2.24	0.822	0	1	0	4	2	7
SILVER	-	6.0	8.5	5.7	8.8	7.24	0.590	0	2	0	0	0	7
SODIUM	-	d	d	d	d	188	78.6	0	0	0	0	0	7
THALLIUM	-	c	c	c	c	0	0	0	0	0	0	0	7
VANADIUM	-	10.0	16.4	10.0	17.5	11.7	2.26	0	0	0	0	0	7
ZINC	-	43.5	61.4	41.2	63.7	52.4	4.28	0	0	0	0	0	7

OF LABS WITH ACCEPTABLE PERFORMANCE: 4
OF LABS WITH ACCEPTABLE PERFORMANCE - CORRECTIVE ACTION NECESSARY: 2
OF LABS WITH UNACCEPTABLE PERFORMANCE - CORRECTIVE ACTION MANDATORY: 1

INORGANIC PERFORMANCE EVALUATION SAMPLE
PROGRAM SUMMARY REPORT
FOR QB 2 FY 92

MATRIX: WATER 1

REPORT DATE: 3/17/1992

ELEMENT	SPIKE LEVEL	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	MEAN REC	STD DEV	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	1400	1250	1570	1210	1610	1411	76.8	0	0	0	0	0	7
ANTIMONY	420	376	459	365	470	418	20.2	0	0	0	0	0	7
ARSENIC	70	62.6	77.9	60.6	79.9	70.3	3.69	0	0	0	1	0	7
BARIUM	1400	1330	1370	1320	1380	1352	10.7	0	3	0	0	0	7
BERYLLIUM	35	31.6	35.8	31.1	36.3	33.7	0.922	0	0	0	0	0	7
CADMIUM	70	60.2	73.1	58.5	74.8	66.6	3.13	0	0	0	0	0	7
CALCIUM	35000	31000	37501	30200	38301	34275	1548	0	0	0	0	0	7
CHROMIUM	70	60.6	73.8	58.9	75.5	67.2	3.21	0	0	0	0	0	7
COBALT	350	308	377	300	385	342	16.4	0	0	0	0	0	7
COPPER	173.3	144	191	138	197	168	11.4	0	0	0	0	0	7
IRON	700	639	784	620	804	712	35.4	0	0	0	0	0	7
LEAD	21	16.1	28.3	14.5	29.9	22.2	2.94	0	0	0	0	0	7
MAGNESIUM	35000	32100	37501	31400	38201	34780	1304	0	0	0	0	0	7
MANGANESE	105	96.7	115	94.4	117	106	4.43	0	0	0	0	0	7
MERCURY	7	c	c	c	c	0	0	0	0	2	0	0	7
NICKEL	280	256	290	251	294	273	7.73	1	2	0	0	0	7
POTASSIUM	35000	31400	36901	30700	37601	34179	1327	0	0	0	0	0	7
SELENIUM	35	30.1	37.3	29.2	38.2	33.7	1.74	0	1	0	1	1	7
SILVER	70	59.5	74.0	57.6	75.9	66.8	3.54	0	0	0	1	0	7
SODIUM	35000	29800	37401	28800	38401	33600	1886	0	0	0	0	0	7
THALLIUM	70	26.6	97.0	17.5	106	61.8	17.0	0	0	0	2	1	7
VANADIUM	350	297	388	285	400	342	22.8	0	0	0	0	0	7
ZINC	140	119	173	112	180	146	13.2	0	0	0	0	0	7

OF LABS WITH ACCEPTABLE PERFORMANCE: 4

OF LABS WITH ACCEPTABLE PERFORMANCE - CORRECTIVE ACTION NECESSARY: 2

OF LABS WITH UNACCEPTABLE PERFORMANCE - CORRECTIVE ACTION MANDATORY: 1

INORGANIC PERFORMANCE EVALUATION SAMPLE
PROGRAM SUMMARY REPORT
FOR QB 2 FY 92

MATRIX: WATER 2

REPORT DATE: 3/17/1992

		TOLERANCE INTERVALS						PROGRAM DATA					
	SPIKE	WARNING		ACTION		MEAN	STD	#LABS	#LABS	#LABS	#LABS	#LABS	TOTAL
ELEMENT	LEVEL	LOWER	UPPER	LOWER	UPPER	REC	DEV	NOT-ID	MIS-QUANT	FALSE POS	MSPK OUT	DUP OUT	#LABS
ALUMINUM	-	c	c	c	c	0	0	0	0	0	0	0	7
ANTIMONY	300	276	306	272	310	291	7.34	0	1	0	0	0	7
ARSENIC	50	42.7	57.4	40.8	59.3	50.0	3.56	0	0	0	1	0	7
BARIUM	1000	924	1030	910	1040	977	26.0	0	1	0	0	0	7
BERYLLIUM	25	21.4	26.4	20.8	27.1	23.9	1.22	0	0	0	0	0	7
CADMIUM	50	47.9	51.1	47.5	51.6	49.5	0.784	0	2	0	0	0	7
CALCIUM	-	c	c	c	c	0	0	0	0	0	0	0	7
CHROMIUM	50	42.5	53.0	41.2	54.4	47.8	2.04	0	0	0	0	0	7
COBALT	250	231	267	226	271	249	8.59	0	1	0	0	0	7
COPPER	126.7	119	124	119	124	122	1.13	0	3	0	0	0	7
IRON	500	432	581	412	601	506	36.6	0	0	0	0	0	7
LEAD	15	11.5	21.4	10.2	22.6	16.4	2.43	0	0	0	0	0	7
MAGNESIUM	-	c	c	c	c	0	0	0	0	0	0	0	7
[illegible]NESE	75	64.9	85.2	62.3	87.8	75.0	4.91	0	0	0	0	0	7
MERCURY	7	c	c	c	c	0	0	0	0	1	0	0	7
NICKEL	-	c	c	c	c	0	0	0	0	0	0	0	7
POTASSIUM	25000	20300	27400	19400	28300	23858	1715	0	0	0	0	0	7
SELENIUM	25	18.4	29.9	16.9	31.4	24.1	2.78	0	0	0	1	1	7
SILVER	50	39.6	55.6	37.5	57.7	47.6	3.88	0	0	0	1	0	7
SODIUM	25000	20900	27000	20100	27800	23960	1477	0	0	0	0	0	7
THALLIUM	-	c	c	c	c	0	0	0	0	0	2	1	7
VANADIUM	250	229	263	225	268	246	8.08	0	1	0	0	0	7
ZINC	-	c	c	c	c	0	0	0	0	1	0	0	7

OF LABS WITH ACCEPTABLE PERFORMANCE: 4
OF LABS WITH ACCEPTABLE PERFORMANCE - CORRECTIVE ACTION NECESSARY: 2
OF LABS WITH UNACCEPTABLE PERFORMANCE - CORRECTIVE ACTION MANDATORY: 1

DATA CHEM
LABORATORIES
A SORENSON COMPANY

April 24, 1992
Refer to: 92PM164

Reply to:
Salt Lake Office

Steve Callio
Technical Project Officer
U.S. Environmental Protection Agency,
Region VIII
999 18th Street, Suite 500
Denver, CO 80202-2405

Re: Second Quarter Inorganic Performance Evaluation Study (QB2 FY92)

Dear Steve:

DataChem Laboratories (DCL) has reviewed the Individual Laboratory Summary Report for the above-referenced performance evaluation (PE) samples. DCL's Laboratory Reported Values where high for barium (Water 1), calcium (Soil), and copper (Water 2). Prior to DCL analyzing the PE samples the DCL instrument ICAP 61B was starting to show a deterioration in its sensitivity.

On April 9, 1992 the above-referenced instrument was serviced by Thermo Jarrell Ash Corporation. Enclosed with this letter is the Instrument Service Log which documents the service and maintenance which was performed. New IDLs have been run and the performance was satisfactory.

If this response requires further clarification please feel free to contact me.

Sincerely,

Ken R. Olson, J.D.
Project Manager

/slq
Enclosure
cc: R. McCallister, *APO*
W.R. Newberry, III, Ph.D.
J.H. Nelson, Ph.D., *President*
A.B. Torgensen, *Department Manager*

Thermo Jarrell Ash
ICAP 61 "B"

Instrument Service
Log

THERMO JARRELL ASH CORPORATION
8 EAST FORGE PARKWAY
FRANKLIN, MA 02038 (617) 520-1880

Bob 415-327 5605 is sent PO

SERVICE ORDER
36662

CUSTOMER NO. _____

CUSTOMER NO. _____

4-9-92

CUSTOMER ADDRESS:	BILL TO:
INSTITUTION: Data chem	
USER: Mr. John Kershbaum	same.
STREET: 960 W. Leroy dr.	
CITY & STATE / ZIP: Salt Lake city, UT. 84123	
BLDG. / ROOM / PHONE / EXTEN.: 388-228-5527	

MODEL	SERIAL NO.
Icap 61	42782

CALL BACK ☐ PARTS ☐ ASSISTANCE

CALL COMPLETE ☒

INST STATUS:
☐ WARRANTY
☐ WARRANTY EXTENSION
☐ FULL SERVICE CONTRACT NO. _____
☐ 5-DAY CONTRACT
☐ PM CONTRACT
☒ BILLABLE P.O. NO. _____

PROBLEM: PM

ACTION TAKEN: check RF Gen.
check serial port communication problems.
update software
See notes.
all parts on order • UPS •

DATE	START	STOP	HOURS	
4/8	13.0	19.0	6.0	L
4/9	9.0	13.0	4.0	L

CHG CODE	PART NUMBER	PART DESCRIPTION	QTY.	EST. PRICE	EST. TOTAL PRICE
B	96979	COIL	2	148.—	296.
B	95970E01	Blower	2	182.—	364.
B	11100308	resistor 50K500	1	28.—	28.
B	11100409	resistor 1Ω	1	13.—	13.
B	~~12578500~~	~~software~~	~~1~~		
B	13006000	5/4 software kit	1	300.—	300.
B	08570700	Bonnet	2	45.—	90.
					1091.

JK 04/09/92

		HOURS	RATE		
B	LABOR	10	180	1800	
B	TRAVEL	2 mel	300	300	
				2100	

EST. PARTS SUB-TOTAL 1091.—

EST. TRAVEL AND LABOR 2100.00

EST. TOTAL TO BE BILLED 3191.00

I ACKNOWLEDGE THAT THE SERVICE HAS BEEN PERFORMED AS DESCRIBED ABOVE AND THAT THE SAID INSTRUMENT IS FUNCTIONALLY SATISFACTORY.

X John Kershbaum
CUSTOMER SIGNATURE

4-9-92
DATE

AN INVOICE WILL BE MAILED TO YOU AT A LATER DATE

SERVICE REPRESENTATIVE

60730
REP. NO

CUSTOMER COPY (THIS IS NOT AN INVOICE)

JTK 04/09/92

*----------
: File: NOTES
: Saved: 04-09-92 at 12:25:04 pm Page 1
*----------

notes
1. CHECKED WHLT
   NEXT TIME CHECK LOW COUNTS ON
   ZN SN TL SE MO SB CD
2. INCREASED SAMPLE PRESSURE FROM 30 TO 40 PSI
3. CHECKED IO. PROBLEM
   FOUND BAD INTERMITTENT COM2 AND COM1
   CUSTOMER WILL ORDER A NEW SERIAL CARD WITH IRQ5 PROGRAMABILITY.
4. FOUND BROWN ON 5 V. FIL. SHOWING BAD CONNECTION.
   SOLDERED LUGS ON WIRES.
5. FOUND BAD SPARE PA TUBE MARKED 1985 MANUFACTURE.
6. CHECKED ORIGINAL TUBE OUTPUT PREFORMANCE.
   RUNS 1.9 KW. NEW IS 2.25 KW.
7. DRESS BUFFER TUBE LEADS FOR BETTER BYPASS. PARASITIC PROBLEMS.
8. INSTALLED BONNET ON TORCH.
9. TORCH SAMPLE TUBE MISALIGNED.
10. CHANGED ACTIVATED CHARCOAL.
11. NEW TUBING ON TORCH GAS HOOK UP.
12. ADJUSTED TORCH HEIGHT AND SAMPLE FLOW RATES.
13 ******* SUGGEST NOT RUNING AUX GAS.
   COIL MAY BE MOVED UP AND BONNET USED FOR ISSOLATION WHEN IGNITING.
14. CHECKED PROFILES. PROFILES SEEMED TO BE GOOD.
15. OPEN 50K RESISTOR IN RF GENERATOR ORDERED
   ALSO ORDERED 1K.
16. UPDATE SOFTWARE. TO 5.02 ORDER NEW SOFTWARE.

FINAL CONDITION

A NEW SERIAL CARD MUST BE ORDERED AND INSTALLED IN THE COMPUTER AND CHECKED
"PORTTEST" WILL CHECK THE PORTS WITH A WRAP CONNECTOR.

ACQUIRED NEW SIO CARD. FOUND CONFLICTS
WITH E-NET CARD. WITH NO E-NET
OLD SIO TESTS GOOD. NEW CARD MAKES
NO DIFFERENCE.
INTERMITTANT COMM. FAILURES WILL CONTINUE,
BUT WILL NOT DEGRADE DATA QUALITY.
INSTALLED NEW SIO CABLE WITH RFI PROT

4-21-92

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 92

.ABORATORY NAME: Datachem (UT) [D1] (DATAC)
'ERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
.ABORATORY RANK: Above = 12 Same = 0 Below = 4

% Score: 86
REPORT DATE: 12/18/1991
MATRIX: SOIL

LEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
LUMINUM	3800	8960	3250	9510	7950		0	0	0	0	0	17
NTIMONY	12.0	29.6	12.0	32.8	9.1	B	5	1	0	14	0	17
RSENIC	297	538	271	564	497	S	0	0	0	0	1	17
ARIUM	40.0	1200	40.0	1330	375		0	0	0	10	5	17
ERYLLIUM	d	d	d	d	0.4	B	0	0	2	0	0	17
ADMIUM	35.1	46.2	33.9	47.4	42.3		0	4	0	0	0	17
ALCIUM	12400	15600	12000	15900	14700		0	0	0	0	0	17
HROMIUM	25.0	39.5	23.4	41.1	34		0	1	0	0	0	17
OBAL	10.0	16.3	10.0	18.0	8.4	B	0	0	0	0	0	17
OPP	922	1030	910	1040	996		0	4	0	0	0	17
RON	116001	144001	113001	147001	133000		0	1	0	0	0	17
EAD	5530	7320	5340	7510	6510		0	1	0	1	0	17
AGNESIUM	6240	7310	6120	7430	6820		0	0	0	0	0	17
ANGANESE	8080	10600	7820	10800	9660		0	0	0	0	0	17
ERCURY	0.59	1.1	0.53	1.2	0.74		0	1	0	5	2	17
ICKEL	8.0	9.9	8.0	10.4	6.5	B	2	0	0	0	0	17
OTASSIUM	1500	2960	1350	3120	2660		0	0	0	0	0	17
ELENIUM	1.0	3.0	1.0	3.4	0.48	B+	6	2	0	11	2	17
ILVER	20.7	35.2	19.1	36.8	31.3		1	2	0	2	0	17
ODIUM	d	d	d	d	652	B	0	0	0	0	0	17
HALLIUM	d	d	d	d	1.5	B	0	0	0	4	0	17
ANADIUM	35.6	69.6	31.9	73.3	57.2		0	1	0	0	0	17
INC	5180	7370	4940	7610	6410	E	0	2	0	0	0	17

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 0
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 3
OIL : Sb, Ba, Se

OF DUPLICATES OUT: 1
OIL : As

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 92

ABORATORY NAME: Datachem (UT) [D1] (DATAC)
ERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
ABORATORY RANK: Above = 12 Same = 0 Below = 4

% Score: 86
REPORT DATE: 12/18/1991
MATRIX: WATER 1

	TOLERANCE INTERVALS				LABORATORY		PROGRAM DATA					
	WARNING		ACTION		REPORTED		#LABS	#LABS	#LABS	#LABS	#LABS	TOTAL
LEMENT	LOWER	UPPER	LOWER	UPPER	VALUE	Q	NOT-ID	MIS-QUANT	FALSE POS	MSPK OUT	DUP OUT	#LABS
LUMINUM	c	c	c	c	25.4	B	0	0	1	0	0	17
NTIMONY	209	269	202	276	258		0	0	0	1	0	17
RSENIC	57.0	73.4	55.3	75.1	64.9		0	0	0	1	0	17
ARIUM	c	c	c	c	1	U	0	0	0	0	0	17
ERYLLIUM	68.8	79.2	67.7	80.3	74.2		0	0	0	0	0	17
DMIUM	72.8	84.2	71.6	85.4	80.1		0	1	0	2	0	17
ALCIUM	37101	41501	36601	42001	40600		0	1	0	0	0	17
HROMIUM	186	205	183	207	199		0	1	0	0	0	17
OBA[illegible]	91.1	106	89.5	108	101		0	0	0	0	0	17
OPP[illegible]	318	354	314	358	338		0	1	0	1	0	17
RON	729	792	723	798	757		0	3	0	0	0	17
EAD	1720	2250	1660	2310	1900		0	1	0	0	1	17
AGNESIUM	d	d	d	d	134	B	0	0	0	0	0	17
ANGANESE	c	c	c	c	2	U	0	0	0	0	0	17
ERCURY	0.2	0.69	0.2	0.75	0.69		2	4	0	4	3	17
CKEL	60.5	75.5	58.9	77.1	75.2		0	1	0	0	0	17
OTASSIUM	c	c	c	c	442	U	0	0	0	0	0	17
ELENIUM	46.6	77.3	43.3	80.6	74	S	0	0	0	1	3	17
LVER	77.0	96.8	74.8	98.9	65.3	X	0	1	0	4	0	17
ODIUM	c	c	c	c	88.6	B	0	0	0	0	0	17
ALLIUM	37.1	48.4	35.9	49.6	40.6		0	2	0	1	0	17
ANADIUM	c	c	c	c	5.7	B	0	0	0	0	0	17
NC	2290	2680	2250	2720	2570		0	1	0	0	0	17

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 0
ATER :

OF DUPLICATES OUT: 1
ATER : Se

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 92

.ABORATORY NAME: Datachem (UT) [D1] (DATAC)
'ERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
.ABORATORY RANK: Above = 12 Same = 0 Below = 4

% Score: 86
REPORT DATE: 12/18/1991
MATRIX: WATER 2

:LEMENT	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY REPORTED VALUE	Q	#LABS NOT-ID	#LABS MIS-QUANT	PROGRAM DATA #LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
.LUMINUM	2510	2770	2480	2800	2630		0	2	0	0	0	17
.NTIMONY	66.0	108	61.6	112	94.2		0	0	0	1	0	17
RSENIC	190	257	182	264	307	BS X	0	1	0	1	0	17
ARIUM	350	404	344	410	376		0	1	0	0	0	17
ERYLLIUM	114	131	112	133	123		0	1	0	0	0	17
ADMIUM	27.2	38.2	26.0	39.4	31.1		0	0	0	2	0	17
ALCIUM	c	c	c	c	20	U	0	0	0	0	0	17
HROMIUM	329	362	326	365	342		0	2	0	0	0	17
OBA[illegible]	224	266	219	270	243		0	2	0	0	0	17
OP[illegible]	c	c	c	c	4	U	0	0	0	1	0	17
RON	311	380	304	387	335		0	1	0	0	0	17
EAD	39.2	50.4	38.0	51.6	41.7		0	1	0	0	1	17
AGNESIUM	c	c	c	c	26	U	0	0	0	0	0	17
ANGANESE	45.5	52.5	44.8	53.2	47.4		0	1	0	0	0	17
ERCURY	c	c	c	c	0.25	#	0	0	9	4	3	17
ICKEL	c	c	c	c	16	U	0	0	0	0	0	17
OTASSIUM	23900	28200	23500	28600	25700		0	1	0	0	0	17
ELENIUM	67.2	98.8	63.8	102	78.5		0	1	0	1	3	17
ILVER	155	193	151	197	124	X	0	1	0	4	0	17
ODIUM	23400	26500	23000	26800	24600		0	1	0	0	0	17
HALLIUM	c	c	c	c	1	UW	0	0	0	1	0	17
ANADIUM	717	815	707	825	770		0	1	0	0	0	17
INC	d	d	d	d	7	B	0	0	0	0	0	17

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 2
OF FALSE POSITIVES: 1

OF MATRIX SPIKES OUT: 0
ATER :

OF [illegible]PLICATES OUT: 1
ATER : Se

INORGANIC PERFORMANCE EVALUATION SAMPLE
PROGRAM SUMMARY REPORT
FOR QB 1 FY 92

MATRIX: SOIL

REPORT DATE: 12/19/1991

		TOLERANCE INTERVALS						PROGRAM DATA					
	SPIKE	WARNING		ACTION		MEAN	STD	#LABS	#LABS	#LABS	#LABS	#LABS	TOTAL
ELEMENT	LEVEL	LOWER	UPPER	LOWER	UPPER	REC	DEV	NOT-ID	MIS-QUANT	FALSE POS	MSPK OUT	DUP OUT	#LABS
ALUMINUM	-	3800	8960	3250	9510	6377	1450	0	0	0	0	0	17
ANTIMONY	-	12.0	29.6	12.0	32.8	15.8	7.42	5	1	0	14	0	17
ARSENIC	-	297	538	271	564	418	67.1	0	0	0	0	1	17
BARIUM	-	40.0	1200	40.0	1330	557	356	0	0	0	10	5	17
BERYLLIUM	-	d	d	d	d	0.500	0.147	0	0	2	0	0	17
CADMIUM	-	35.1	46.2	33.9	47.4	40.6	3.07	0	4	0	0	0	17
CALCIUM	-	12400	15600	12000	15900	13995	894	0	0	0	0	0	17
CHROMIUM	-	25.0	39.5	23.4	41.1	32.3	4.04	0	1	0	0	0	17
COBALT	-	10.0	16.3	10.0	18.0	8.26	4.51	0	0	0	0	0	17
COPPER	-	922	1030	910	1040	977	30.7	0	4	0	0	0	17
IRON	-	116001	144001	113001	147001	130155	7728	0	1	0	0	0	17
LEAD	-	5530	7320	5340	7510	6424	500	0	1	0	1	0	17
MAGNESIUM	-	6240	7310	6120	7430	6775	299	0	0	0	0	0	17
MANGANESE	-	8080	10600	7820	10800	9322	690	0	0	0	0	0	17
MERCURY	-	0.59	1.1	0.53	1.2	0.858	0.150	0	1	0	5	2	17
NICKEL	-	8.0	9.9	8.0	10.4	7.42	1.35	2	0	0	0	0	17
POTASSIUM	-	1500	2960	1350	3120	2232	406	0	0	0	0	0	17
SELENIUM	-	1.0	3.0	1.0	3.4	1.60	0.755	6	2	0	11	2	17
SILVER	-	20.7	35.2	19.1	36.8	28.0	4.03	1	2	0	2	0	17
SODIUM	-	d	d	d	d	630	46.8	0	0	0	0	0	17
THALLIUM	-	d	d	d	d	1.30	0.311	0	0	0	4	0	17
VANADIUM	-	35.6	69.6	31.9	73.3	52.6	9.49	0	1	0	0	0	17
ZINC	-	5180	7370	4940	7610	6274	610	0	2	0	0	0	17

OF LABS WITH ACCEPTABLE PERFORMANCE: 6
OF LABS WITH ACCEPTABLE PERFORMANCE - CORRECTIVE ACTION NECESSARY: 8
OF LABS WITH UNACCEPTABLE PERFORMANCE - CORRECTIVE ACTION MANDATORY: 3

INORGANIC PERFORMANCE EVALUATION SAMPLE
PROGRAM SUMMARY REPORT
FOR QB 1 FY 92

MATRIX: WATER 1

REPORT DATE: 12/19/1991

		TOLERANCE INTERVALS						PROGRAM DATA					
	SPIKE	WARNING		ACTION		MEAN	STD	#LABS	#LABS	#LABS	#LABS	#LABS	TOTAL
ELEMENT	LEVEL	LOWER	UPPER	LOWER	UPPER	REC	DEV	NOT-ID	MIS-QUANT	FALSE POS	MSPK OUT	DUP OUT	#LABS
ALUMINUM	-	c	c	c	c	90.7	103	0	0	1	0	0	17
ANTIMONY	2400	209	269	202	276	239	16.8	0	0	0	1	0	17
ARSENIC	650	57.0	73.4	55.3	75.1	65.2	4.54	0	0	0	1	0	17
BARIUM	-	c	c	c	c	0	0	0	0	0	0	0	17
BERYLLIUM	750	68.8	79.2	67.7	80.3	74.0	2.90	0	0	0	0	0	17
CADMIUM	800	72.8	84.2	71.6	85.4	78.5	3.16	0	1	0	2	0	17
CALCIUM	405000	37101	41501	36601	42001	39310	1222	0	1	0	0	0	17
CHROMIUM	2000	186	205	183	207	195	5.48	0	1	0	0	0	17
COBALT	1000	91.1	106	89.5	108	98.5	4.14	0	0	0	0	0	17
COPPER	3400	318	354	314	358	336	10.1	0	1	0	1	0	17
IRON	7500	729	792	723	798	760	17.2	0	3	0	0	0	17
LEAD	20000	1720	2250	1660	2310	1986	148	0	1	0	0	1	17
MAGNESIUM	1600	d	d	d	d	160	23.0	0	0	0	0	0	17
MANGANESE	-	c	c	c	c	0	0	0	0	0	0	0	17
MERCURY	750	0.2	0.69	0.2	0.75	0.434	0.143	2	4	0	4	3	17
NICKEL	670	60.5	75.5	58.9	77.1	68.0	4.17	0	1	0	0	0	17
POTASSIUM	-	c	c	c	c	0	0	0	0	0	0	0	17
SELENIUM	620	46.6	77.3	43.3	80.6	62.0	8.60	0	0	0	1	3	17
SILVER	850	77.0	96.8	74.8	98.9	86.9	5.54	0	1	0	4	0	17
SODIUM	-	c	c	c	c	347	256	0	0	0	0	0	17
THALLIUM	430	37.1	48.4	35.9	49.6	42.8	3.16	0	2	0	1	0	17
VANADIUM	-	c	c	c	c	0	0	0	0	0	0	0	17
ZINC	25000	2290	2680	2250	2720	2486	106	0	1	0	0	0	17

OF LABS WITH ACCEPTABLE PERFORMANCE: 6
OF LABS WITH ACCEPTABLE PERFORMANCE - CORRECTIVE ACTION NECESSARY: 8
OF LABS WITH UNACCEPTABLE PERFORMANCE - CORRECTIVE ACTION MANDATORY: 3

INORGANIC PERFORMANCE EVALUATION SAMPLE
PROGRAM SUMMARY REPORT
FOR QB 1 FY 92

MATRIX: WATER 2

REPORT DATE: 12/19/1991

		TOLERANCE INTERVALS						PROGRAM DATA					
	SPIKE	WARNING		ACTION		MEAN	STD	#LABS	#LABS	#LABS	#LABS	#LABS	TOTAL
ELEMENT	LEVEL	LOWER	UPPER	LOWER	UPPER	REC	DEV	NOT-ID	MIS-QUANT	FALSE POS	MSPK OUT	DUP OUT	#LABS
ALUMINUM	27000	2510	2770	2480	2800	2640	74.0	0	2	0	0	0	17
ANTIMONY	870	66.0	108	61.6	112	86.8	11.6	0	0	0	1	0	17
ARSENIC	2300	190	257	182	264	223	18.7	0	1	0	1	0	17
BARIUM	3750	350	404	344	410	377	15.0	0	1	0	0	0	17
BERYLLIUM	1250	114	131	112	133	123	4.72	0	1	0	0	0	17
CADMIUM	330	27.2	38.2	26.0	39.4	32.7	3.05	0	0	0	2	0	17
CALCIUM	-	c	c	c	c	87.0	104	0	0	0	0	0	17
CHROMIUM	3500	329	362	326	365	346	9.10	0	2	0	0	0	17
COBALT	2500	224	266	219	270	245	11.7	0	2	0	0	0	17
COPPER	-	c	c	c	c	7.98	10.6	0	0	0	1	0	17
IRON	3300	311	380	304	387	345	19.1	0	1	0	0	0	17
LEAD	450	39.2	50.4	38.0	51.6	44.8	3.11	0	1	0	0	1	17
MAGNESIUM	-	c	c	c	c	0	0	0	0	0	0	0	17
MANGANESE	450	45.5	52.5	44.8	53.2	49.0	1.95	0	1	0	0	0	17
MERCURY	320	c	c	c	c	0.263	0.138	0	0	9	4	3	17
NICKEL	-	c	c	c	c	0	0	0	0	0	0	0	17
POTASSIUM	270000	23900	28200	23500	28600	26057	1190	0	1	0	0	0	17
SELENIUM	860	67.2	98.8	63.8	102	83.0	8.79	0	1	0	1	3	17
SILVER	1750	155	193	151	197	174	10.6	0	1	0	4	0	17
SODIUM	257000	23400	26500	23000	26800	24918	858	0	1	0	0	0	17
THALLIUM	-	c	c	c	c	0	0	0	0	0	1	0	17
VANADIUM	7500	717	815	707	825	766	27.1	0	1	0	0	0	17
ZINC	-	d	d	d	d	6.75	4.88	0	0	0	0	0	17

OF LABS WITH ACCEPTABLE PERFORMANCE: 6
OF LABS WITH ACCEPTABLE PERFORMANCE - CORRECTIVE ACTION NECESSARY: 8
OF LABS WITH UNACCEPTABLE PERFORMANCE - CORRECTIVE ACTION MANDATORY: 3

DATA CHEM
LABORATORIES
A SORENSON COMPANY

February 20, 1992
Refer to: 92PM082

Reply to:
Salt Lake Office

W.R. Newberry, III, Ph.D.
Chemist
Quality Assurance Research Branch, QAD
US EPA
P.O. Box 93478
Las Vegas, NV 89193-3478

Re: Deficiencies and Corrective Action for First Quarter Inorganic Performance Evaluation Study (QB1 FY92)

Dear Dr. Newberry:

DataChem Laboratories (DCL) has reviewed our performance as represented by the Individual Laboratory Summary Report (ILSR) for the above-referenced evaluation study.

Outlined below is DCL's description of the deficiencies and the corrective action taken:

DEFICIENCY ONE

Sample and Analyte Identification

Sample:	CLP 8951	DCL ID:	MX3163
Analyte:	As	Matrix:	Soil

Description of Deficiency

Duplicate is out of control limits.

Response

The initial result for the sample was 408.2 mg/kg with a post-digestion spike recovery of 83.8%. The result for the sample duplicate was 407.6 mg/kg with a post-digestion spike recovery of 90.2%. Due to the fact that the spike recovery for the sample was less than 85%, MSA was required to quantitate the final results. This yielded a reported value with a greater than 20% RPD with

respect to the sample duplicate. Due to the limitations of MSA analysis, this problem is likely to be encountered when comparing a result determined by MSA with a value derived directly from the calibration curve.

Corrective Action

None required.

DEFICIENCY TWO

Sample and Analyte Identification

Sample: CLP 8951 DCL ID: MX3163
Analyte: Se Matrix: Soil

Description of Deficiency

Matrix spike is out of control limits.

Response

Review of post-digestion spike recoveries indicate that matrix interferences are present in this sample at the wavelength for Se. Matrix spikes for the sample were prepared for a single aliquot of solution containing all furnace analytes in the proportions necessary to achieve the correct spiking levels. Although the Se spike yielded a recovery of 61.2% (confirming the presence of interference), when the sample was analyzed for Tl, a matrix spike recovery of 91% was achieved indicating that the matrix spikes were prepared correctly. Very large dilutions were required for the analysis of As and Pb to keep the uncorrected sample results within the range of the standards, thereby diminishing the ability to effectively judge the extent of interference in the undiluted digestate for these analytes at these particular wavelengths.

Corrective Action

None required.

DEFICIENCY THREE

Sample and Analyte Identification

Sample: CLP 8949 DCL ID: MX3113
Analyte: Se Matrix: Water I

Description of Deficiency

Duplicate is out of control limits.

Response

After obtaining initial results which were within the 20% RPD control limit, but having poor spike recoveries, the final results for both the sample and duplicate were quantified by MSA. Although both were prepared for MSA in an identical fashion, and instrument response for each of the samples was very similar at each spiking level of the MSA, the slight variations in instrument response (coupled with a 6-fold dilution) yielded final MSA results which were in excess of the 20% RPD control limit.

Corrective Action

The results of this audit will be discussed in a training meeting and this training will be documented in each analyst's training file.

DEFICIENCY FOUR

Sample and Analyte Identification

Sample: CLP 8950
Analyte: Se

DCL ID: MX3162
Matrix: Water II

Description of Deficiency

Duplicate is out of control limits.

Response

No duplicate of this sample was prepared for analysis by GFAA.

Corrective Action

None required.

DEFICIENCY FIVE

Sample and Analyte Identification

Sample: CLP 8950
Analyte: As

DCL ID: MX3162
Matrix: Water II

Description of Deficiency

Mis-quantified - result is above the action limit.

Response

An incorrect dilution factor was applied to the sample result to obtain the corrected reporting value. The dilution factor should have been 40, instead of 50.

Corrective Action

DCL will set up a training meeting and all analysts will be trained and instructed that the correct dilution factors must be properly recorded, or entered, onto all raw data before the peer review process. The review of all data shall preclude the reporting of any MSA results derived from samples which have been diluted below the CRDL. This training will be documented in each analyst's training file.

DEFICIENCY SIX

Sample and Analyte Identification

Sample: CLP 8950 DCL ID: MX3162
Analyte: Hg Matrix: Water II

Description of Deficiency

Analyte was quantitated false-positive with sample results greater than CRDL.

Response

A review of all the data indicates the presence of Hg for this sample at the reported concentration. A matrix spike was prepared for this sample yielding a recovery of 104.3%, which confirms the reported result. No trace of Hg contamination was observed in the preparation blanks for either the water or soil matrices. Additionally, an internal quality control sample (spiked by the DCL Quality Control Laboratory) was prepared for analysis which yielded a recovery of 95.2%, thereby validating the accuracy of the results.

Corrective Action

No corrective action is required. Since tolerance intervals were not applicable for this sample, due to the fact that 40% or more of the laboratories submitted a "non-usable value", it would seem that the possibility of correctly reporting a value just above the CRDL should not be discounted. It is DCL's position the result reported is accurate.

DEFICIENCY SEVEN

Sample and Analyte Identification

Sample: CLP 3113
Analyte: Ag

DCL ID: MX3113 and MX3162
Matrix: Water

Description of Deficiency

Ag recovery out of range, low.

Response

Ag appears to have dropped out of solution.

Corrective Action

After the digestate has been reduced in volume HCl is added, heated for 15 minutes, and brought to volume. Digestion personnel have been trained to be certain that the sample has been heated sufficiently to bring Ag back into solution, and the HCl has been added. This appears to be critical for the recovery of Ag.

The information provided to us by the ILSR's is helpful in evaluating our overall technical capability and performance. If I may provide any additional information or clarification please feel free to contact me.

Sincerely,

Ken R. Olson

Ken R. Olson, J.D.
Project Manager

/slq
cc: S. Callio, *EPA, TPO*
R. McCallister, *APO*
J.H. Nelson, Ph.D., *DCL, President*
A.B. Torgensen, *DCL, Inorganic Department Manager*

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 93

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 0 Same = 9 Below = 26

% SCORE: 100
REPORT DATE: 09/03/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
2-BUTANONE	130	210	120	220	190		3	0	40	40
TETRACHLOROETHENE	NU	NU	NU	NU	12		0	0	40	40
1,1,2,2-TETRACHLOROETHANE	81	110	76	120	100		0	0	40	40
TOLUENE	NU	NU	NU	NU	12		0	0	40	40
STYRENE	89	110	86	110	110		2	0	40	40
TCL SEMIVOLATILE										
BIS(2-CHLOROETHYL)ETHER	19	27	18	28	23		3	0	40	40
2,2'-OXYBIS(1-CHLOROPROPANE)	18	28	17	29	24		3	0	40	40
NITROBENZENE	26	37	25	43	33		3	0	40	40
2,4-DIMETHYLPHENOL	32	52	29	63	42		1	0	40	40
NAPHTHALENE	16	25	15	29	22		2	0	40	40
DIMETHYL PHTHALATE	29	34	28	35	32		8	0	40	40
ACENAPHTHENE	23	31	22	32	29		3	0	40	40
2,4-DINITROPHENOL	49	82	44	87	64		6	0	40	40
4-BROMOPHENYL PHENYL ETHER	23	31	22	32	26		3	0	40	40
[illegible]CHLOROBENZENE	24	32	23	36	28		4	0	40	40
[illegible]ANTHRENE	16	21	16	22	20		4	0	40	40
FLUORANTHENE	18	22	17	23	19		7	0	40	40
PYRENE	48	79	43	97	70		1	0	40	40
BENZO(K)FLUORANTHENE	14	20	13	21	16		9	1	39	40
DIBENZ(A,H)ANTHRACENE	22	37	20	39	26		7	0	40	40
TCL PESTICIDES										
BETA-BHC	0.079	0.12	0.072	0.13	0.12		4	2	38	40
GAMMA-BHC (LINDANE)	0.48	0.78	0.44	0.82	0.6		4	0	40	40
ALDRIN	0.15	0.24	0.14	0.26	0.19		2	0	40	40
DIELDRIN	0.2	0.28	0.19	0.29	0.22		6	0	40	40
4,4'-DDE	0.53	0.73	0.5	0.75	0.64		3	0	40	40
ENDRIN	0.56	0.76	0.54	0.79	0.69		6	0	40	40
ENDOSULFAN SULFATE	0.53	0.75	0.5	0.78	0.6		6	1	39	40
4,4'-DDT	0.55	0.77	0.52	0.8	0.65		3	0	40	40
METHOXYCHLOR	1.2	1.8	1.1	1.9	1.4		2	0	40	40
GAMMA-CHLORDANE	0.5	0.69	0.48	0.79	0.6		2	0	40	40
NON-TCL VOLATILE										
BENZENE,DICHLORO- (O,M, OR P)					42			5	35	40
HYDRAZINE,DIMETHYL-					0	NR		40	0	40
PROPANE,1,2-DIBROMO-3-CHLORO-					0	NR		13	27	40
NON-TCL SEMIVOLATILE										
ANILINE					0	NR		30	10	40
BENZOIC ACID					10			7	33	40
BENZYL ALCOHOL					37			3	37	40

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 93

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 0 Same = 9 Below = 26

% SCORE: 100
REPORT DATE: 09/03/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
DIBENZOTHIOPHENE					36			0	40	40
TCL VOLATILE (Contaminants)										
METHYLENE CHLORIDE					1			21	19	40
TRICHLOROETHENE					4			4	36	40
TCL PESTICIDES (Contaminants)										
ALPHA-BHC					0.006			35	5	40
DELTA-BHC					0.02			39	1	40
ENDRIN KETONE					0.022			32	8	40

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 0
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 93

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 12 Same = 5 Below = 16

% SCORE: 95.0
REPORT DATE: 06/09/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
BROMOMETHANE	23	38	21	46	35		1	0	34	34
VINYL CHLORIDE	46	80	41	99	69		2	0	34	34
ACETONE	46	200	24	220	88		3	1	33	34
CHLOROFORM	10	13	10	13	12		2	0	34	34
CARBON TETRACHLORIDE	56	76	53	80	64		2	0	34	34
BROMODICHLOROMETHANE	120	150	120	150	130		3	0	34	34
DIBROMOCHLOROMETHANE	50	59	49	60	53		5	0	34	34
1,1,2-TRICHLOROETHANE	51	61	50	62	58		1	0	34	34
BROMOFORM	12	15	11	16	13		1	0	34	34
1,1,2,2-TETRACHLOROETHANE	120	150	110	150	130		3	0	34	34
ETHYL BENZENE	NU	NU	NU	NU	10		0	0	34	34
STYRENE	170	220	160	230	210		5	0	34	34
TCL SEMIVOLATILE										
2,2'-OXYBIS(1-CHLOROPROPANE)	38	56	36	66	41		2	0	34	34
NAPHTHALENE	17	26	15	31	22		1	0	34	34
ACENAPHTHENE	44	65	40	76	51		0	0	34	34
HEXACHLOROBENZENE	22	31	21	35	27		2	0	34	34
FLUORANTHENE	17	25	16	26	20		0	0	34	34
PYRENE	53	74	50	86	60		3	0	34	34
DIBENZ(A,H)ANTHRACENE	11	20	10	22	15		1	0	34	34
TCL PESTICIDES										
DELTA-BHC	0.076	0.1	0.073	0.1	0.088		3	0	34	34
ALDRIN	0.12	0.2	0.11	0.21	0.15		3	0	34	34
DIELDRIN	0.36	0.43	0.34	0.44	0.38		4	0	34	34
ENDRIN	0.67	0.92	0.63	0.96	0.82		3	0	34	34
ENDOSULFAN II	NU	NU	NU	NU	0.11		0	1	33	34
4,4'-DDT	0.26	0.34	0.24	0.35	0.28		5	0	34	34
ENDRIN KETONE	0.27	0.36	0.25	0.38	0.31		1	0	34	34
ENDRIN ALDEHYDE	0.13	0.26	0.11	0.28	0.035	X	2	1	33	34
NON-TCL VOLATILE										
BENZENE,N-PROPYL-					49			5	29	34
2-PROPENENITRILE					50			2	32	34
VINYL ACETATE					0	NR		34	0	34
NON-TCL SEMIVOLATILE										
ANILINE					0	NR		20	14	34
BENZYL ALCOHOL					81			4	30	34
TCL VOLATILE (Contaminants)										
METHYLENE CHLORIDE					2			23	11	34

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 93

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 12 Same = 5 Below = 16

% SCORE: 95.0
REPORT DATE: 06/09/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
2-BUTANONE					9			15	19	34
TCL SEMIVOLATILE (Contaminants)										
PHENOL					2			13	21	34
HEXACHLOROETHANE					2			14	20	34
2,4-DIMETHYLPHENOL					1			20	14	34
1,2,4-TRICHLOROBENZENE					2			12	22	34
NON-TCL VOLATILE (Contaminants)										
2-PROPANOL					31			12	22	34
METHYL ACETATE					10			33	1	34
NON-TCL SEMIVOLATILE (Contaminants)										
UNKNOWN COMPOUND,CHLORINATED					7			33	1	34
BENZALDEHYDE					2			33	1	34

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 1
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 93

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 5 Same = 3 Below = 30

% SCORE: 97.8
REPORT DATE: 03/17/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
CHLOROMETHANE	38	100	28	110	100		2	0	44	44
1,1-DICHLOROETHENE	71	91	68	94	85		6	0	44	44
DIBROMOCHLOROMETHANE	71	89	68	91	84		6	0	44	44
BENZENE	59	72	57	74	66		5	0	44	44
BROMOFORM	NU	NU	NU	NU	10		0	0	44	44
2-PENTANONE,4-METHYL-	40	64	36	68	52		3	1	43	44
2-HEXANONE	280	460	260	490	270	$	6	0	44	44
1,1,2,2-TETRACHLOROETHANE	57	76	54	79	71		3	0	44	44
CHLOROBENZENE	30	36	30	37	34		4	0	44	44
STYRENE	170	220	170	220	210		9	0	44	44
XYLENES (TOTAL)	140	180	130	180	170		3	0	44	44
TCL SEMIVOLATILE										
PHENOL	26	37	25	43	27		3	0	44	44
2-CHLOROPHENOL	18	25	17	29	18		1	0	44	44
1,4-DICHLOROBENZENE	19	29	17	34	23		3	0	44	44
2,2'-OXYBIS(1-CHLOROPROPANE)	14	20	13	21	13	$	5	1	43	44
[illegible]PHTHALENE	11	16	11	18	13		1	0	44	44
[illegible]ENAPHTHENE	17	23	16	24	19		1	0	44	44
DIBENZOFURAN	14	19	13	20	17		1	0	44	44
DIETHYLPHTHALATE	20	28	19	29	20		4	0	44	44
FLUORENE	65	100	60	120	100		1	1	43	44
HEXACHLOROBENZENE	18	26	17	31	23		0	0	44	44
PENTACHLOROPHENOL	56	96	50	100	82		3	0	44	44
FLUORANTHENE	12	17	12	18	15		1	0	44	44
PYRENE	29	46	26	56	32		0	0	44	44
DIBENZ(A,H)ANTHRACENE	29	47	26	49	48	$	3	0	44	44
TCL PESTICIDES										
BETA-BHC	0.12	0.18	0.11	0.18	0.13		4	3	41	44
GAMMA-BHC (LINDANE)	0.53	0.84	0.49	0.89	0.68		4	0	44	44
HEPTACHLOR	0.41	0.63	0.38	0.66	0.47		3	0	44	44
ALDRIN	0.26	0.42	0.23	0.44	0.27		1	0	44	44
DIELDRIN	0.14	0.22	0.13	0.23	0.17		6	1	43	44
4,4'-DDE	0.44	0.59	0.42	0.62	0.46		4	0	44	44
ENDRIN	0.71	1	0.66	1.1	0.83		3	0	44	44
ENDOSULFAN II	0.1	0.13	0.1	0.14	0.098		0	3	41	44
ENDOSULFAN SULFATE	0.4	0.6	0.37	0.63	0.49		4	1	43	44
4,4'-DDT	0.6	0.88	0.56	0.92	0.67		3	0	44	44
METHOXYCHLOR	1.6	2.3	1.5	2.4	1.9		3	0	44	44
ALPHA-CHLORDANE	0.7	1	0.66	1.1	0.83		2	0	44	44
GAMMA-CHLORDANE	0.42	0.57	0.39	0.66	0.46		1	0	44	44
NON-TCL VOLATILE										
ACETONITRILE					0	NR		31	13	44

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 93

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 5 Same = 3 Below = 30

% SCORE: 97.8
REPORT DATE: 03/17/93
MATRIX: WATER

COMPOUND	PREDICTION INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
OCTANE,N-					0	&		11	33	44
NON-TCL SEMIVOLATILE										
ANILINE					0	NR		41	3	44
BENZYL ALCOHOL					32			7	37	44
DIPHENYLHYDRAZINE					33			3	41	44
PARATHION					21			1	43	44
TCL VOLATILE (Contaminants)										
METHYLENE CHLORIDE					2			26	18	44
TCL SEMIVOLATILE (Contaminants)										
NITROBENZENE					4			0	44	44
TCL PESTICIDES (Contaminants)										
ENDRIN KETONE					0.018			35	9	44
ENDRIN ALDEHYDE					0.016			39	5	44
NON-TCL VOLATILE (Contaminants)										
2-PROPANOL					29			18	26	44
NON-TCL SEMIVOLATILE (Contaminants)										
OXYGENATED CYCLIC HYDROCARBO					7			43	1	44
UNKNOWN MONOCHLORINATED COMP					5			43	1	44
UNKNOWN PNA MW=168					10			43	1	44
SQUALENE					3			43	1	44

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 0
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 1
OF NON-TCL CONTAMINANTS: 0

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 93

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 4 Same = 6 Below = 31

% SCORE: 96.4
REPORT DATE: 12/24/92
MATRIX: WATER

COMPOUND	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
CHLOROMETHANE	35	71	29	91	90	$	2	1	58	59
1,1-DICHLOROETHANE	NU	NU	NU	NU	10		0	0	59	59
CHLOROFORM	61	75	59	83	62		1	0	59	59
2-BUTANONE	71	110	66	110	46	X	15	2	57	59
CIS-1,3-DICHLOROPROPENE	66	87	63	98	76		3	1	58	59
BROMOFORM	57	74	54	77	65		8	0	59	59
2-HEXANONE	110	250	92	270	110		3	0	59	59
1,1,2,2-TETRACHLOROETHANE	120	160	110	160	130		5	0	59	59
CHLOROBENZENE	34	41	34	44	36		3	0	59	59
STYRENE	160	200	150	210	190		3	0	59	59
XYLENES (TOTAL)	73	92	70	100	88		2	3	56	59
TCL SEMIVOLATILE										
PHENOL	17	28	16	29	18		4	1	58	59
BIS(2-CHLOROETHYL)ETHER	32	46	30	54	32		3	0	59	59
4-METHYLPHENOL	23	34	21	40	28		6	0	59	59
HEXACHLOROETHANE	33	60	28	76	39		0	0	59	59
2,4-DIMETHYLPHENOL	17	30	15	38	17.		6	2	57	59
BIS(2-CHLOROETHOXY)METHANE	20	25	19	28	21		11	0	59	59
1,2,4-TRICHLOROBENZENE	28	43	26	51	32		2	0	59	59
HEXACHLOROCYCLOPENTADIENE	NU	NU	NU	NU	10	U	0	31	28	59
2,4,6-TRICHLOROPHENOL	21	31	20	32	23		7	0	59	59
4-NITROPHENOL	41	64	38	67	50		11	1	58	59
4-BROMOPHENYL PHENYL ETHER	13	22	12	24	13		0	0	59	59
HEXACHLOROBENZENE	34	44	32	49	39		5	0	59	59
ANTHRACENE	NU	NU	NU	NU	8		0	0	59	59
PYRENE	74	140	65	180	110		3	0	59	59
BUTYL BENZYL PHTHALATE	38	63	35	67	45		9	0	59	59
BENZO(A)PYRENE	25	43	22	52	34		5	0	59	59
TCL PESTICIDES										
ALPHA-BHC	0.16	0.22	0.16	0.23	0.18		10	1	58	59
BETA-BHC	0.16	0.24	0.14	0.26	0.19		4	4	55	59
GAMMA-BHC (LINDANE)	0.15	0.22	0.14	0.23	0.17		6	0	59	59
HEPTACHLOR	0.29	0.43	0.27	0.45	0.35		8	1	58	59
ALDRIN	0.12	0.2	0.11	0.21	0.16		5	0	59	59
HEPTACHLOR EPOXIDE	0.31	0.43	0.29	0.44	0.37		7	1	58	59
ENDOSULFAN I	0.21	0.38	0.19	0.48	0.3		4	1	58	59
ENDOSULFAN II	0.43	0.7	0.39	0.84	0.58		2	1	58	59
ENDOSULFAN SULFATE	0.82	1.3	0.74	1.4	1.2		4	1	58	59
4,4'-DDT	0.95	1.5	0.87	1.5	1.2		6	0	59	59
ENDRIN KETONE	0.68	1.1	0.62	1.1	0.9		6	1	58	59
NON-TCL VOLATILE										
EPICHLOROHYDRIN					0	NR		59	0	59

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 93

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 4 Same = 6 Below = 31

% SCORE: 96.4
REPORT DATE: 12/24/92
MATRIX: WATER

COMPOUND	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
PROPANE,1,2-DIBROMO-3-CHLORO-					17			23	36	59
TOLUENE,2-CHLORO-					140			7	52	59
NON-TCL SEMIVOLATILE										
4,4'-DDT					36			15	44	59
TCL VOLATILE (Contaminants)										
ACETONE					6			33	26	59
TRICHLOROETHENE					2			28	31	59
NON-TCL VOLATILE (Contaminants)										
2-PROPANOL					13			23	36	59
NON-TCL SEMIVOLATILE (Contaminants)										
UNKNOWN COMPOUND,CHLORINATED					3			58	1	59

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 1
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 92

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 23 Same = 12 Below = 8

% SCORE: 91.4
REPORT DATE: 09/20/92
MATRIX: WATER

COMPOUND	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	PROGRAM DATA #LABS MIS-ONT	#LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
BROMOMETHANE	22	36	20	44	33		3	0	60	60
CHLOROFORM	10	12	10	13	11		2	0	60	60
CARBON TETRACHLORIDE	57	72	55	74	57		4	0	60	60
BROMODICHLOROMETHANE	74	91	71	94	84		6	0	60	60
DIBROMOCHLOROMETHANE	49	62	47	64	59		4	0	60	60
BROMOFORM	11	16	10	17	16		2	0	60	60
1,1,2,2-TETRACHLOROETHANE	58	78	55	81	66		2	0	60	60
STYRENE	88	110	85	120	100		2	0	60	60
TCL SEMIVOLATILE										
PHENOL	15	23	14	24	17		4	1	59	60
2-METHYLPHENOL	32	49	29	58	47		6	0	60	60
HEXACHLOROETHANE	10	16	10	20	11		2	0	60	60
ISOPHORONE	26	38	24	44	33		4	0	60	60
2,4-DIMETHYLPHENOL	10	17	10	21	10		2	1	59	60
BIS(2-CHLOROETHOXY)METHANE	12	18	10	19	15		1	1	59	60
1,2,4-TRICHLOROBENZENE	10	15	10	17	11		1	0	60	60
NAPHTHALENE	23	34	21	40	30		6	0	60	60
HEXACHLOROCYCLOPENTADIENE	NU	NU	NU	NU	10	U	0	27	33	60
2,4,6-TRICHLOROPHENOL	12	17	12	18	10	X	8	0	60	60
2,4-DINITROTOLUENE	30	45	27	54	32		3	0	60	60
4-CHLOROPHENYL PHENYL ETHER	14	21	13	22	15		9	0	60	60
ANTHRACENE	NU	NU	NU	NU	2		0	5	55	60
PYRENE	64	140	53	190	120		1	0	60	60
DI-N-OCTYL PHTHALATE	24	44	21	47	58	X	8	1	59	60
BENZO(A)PYRENE	11	15	10	18	11		1	1	59	60
TCL PESTICIDES										
ALPHA-BHC	0.1	0.16	0.096	0.16	0.14		5	0	60	60
HEPTACHLOR	0.17	0.28	0.16	0.3	0.21		5	0	60	60
ENDOSULFAN II	0.59	0.88	0.55	0.92	0.77		5	0	60	60
ENDOSULFAN SULFATE	0.3	0.45	0.27	0.47	0.41		4	0	60	60
ENDRIN KETONE	0.19	0.28	0.18	0.29	0.25		6	0	60	60
ENDRIN ALDEHYDE	0.44	0.87	0.38	0.93	0.79		7	2	58	60
AROCLOR-1248	1.4	2.1	1.3	2.2	1.8		12	3	57	60
NON-TCL VOLATILE										
BENZENE,N-PROPYL-					42			4	56	60
VINYL ACETATE					0	NR		60	0	60
NON-TCL SEMIVOLATILE										
BETA-BHC					37			44	16	60
TCL PESTICIDES (Contaminants)										
ALPHA-CHLORDANE					0.022			58	2	60

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 92

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 23 Same = 12 Below = 8

% SCORE: 91.4
REPORT DATE: 09/20/92
MATRIX: WATER

COMPOUND	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
NON-TCL VOLATILE (Contaminants)										
2-PROPANOL					45			28	32	60

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 2
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 92

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 23 Same = 1 Below = 17

% SCORE: 84.9
REPORT DATE: 06/08/92
MATRIX: WATER

COMPOUND	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
BROMOMETHANE	110	180	97	220	130		3	0	63	63
BROMODICHLOROMETHANE	100	130	100	140	110		3	0	63	63
TRICHLOROETHENE	32	46	30	49	36		3	0	63	63
TRANS-1,3-DICHLOROPROPENE	41	57	39	59	36	X	4	2	61	63
2-PENTANONE,4-METHYL-	110	190	100	200	150		4	0	63	63
2-HEXANONE	110	300	79	340	180		4	0	63	63
TETRACHLOROETHENE	56	74	54	76	60		3	0	63	63
1,1,2,2-TETRACHLOROETHANE	150	210	140	220	180		4	0	63	63
ETHYL BENZENE	14	20	13	20	20	U &	3	1	62	63
STYRENE	270	390	260	410	330		5	0	63	63
TCL SEMIVOLATILE										
4-METHYLPHENOL	25	47	21	50	30		5	2	61	63
ISOPHORONE	14	22	12	23	15		4	1	62	63
1,2,4-TRICHLOROBENZENE	26	44	23	55	29		4	1	62	63
2-METHYLNAPHTHALENE	13	18	12	20	14		7	1	62	63
2,4-DINITROTOLUENE	63	91	59	110	72		2	1	62	63
PYRENE	14	23	13	28	18		5	1	62	63
BENZO(G,H,I)PERYLENE	21	39	18	42	34		7	1	62	63
TCL PESTICIDES										
ALPHA-BHC	0.26	0.39	0.24	0.41	0.33		9	0	63	63
BETA-BHC	0.4	0.61	0.36	0.64	0.54		5	0	63	63
GAMMA-BHC (LINDANE)	0.096	0.14	0.091	0.14	0.13		13	1	62	63
HEPTACHLOR	0.31	0.46	0.29	0.48	0.39		14	0	63	63
ALDRIN	0.36	0.58	0.33	0.61	0.45		9	0	63	63
HEPTACHLOR EPOXIDE	0.34	0.47	0.32	0.49	0.44		6	6	57	63
ENDOSULFAN I	0.25	0.46	0.22	0.57	0.38		4	1	62	63
ENDRIN	0.51	0.77	0.47	0.81	0.66		7	0	63	63
ENDOSULFAN II	0.34	0.57	0.31	0.69	0.49		1	2	61	63
ENDOSULFAN SULFATE	0.62	0.88	0.58	0.92	0.8		13	0	63	63
4,4'-DDT	0.66	0.94	0.62	0.98	0.8		10	0	63	63
ENDRIN KETONE	0.52	0.75	0.48	0.79	0.61		9	0	63	63
NON-TCL VOLATILE										
BENZENE,1,2-DICHLORO-					34			13	50	63
BENZENE,1,3-DICHLORO-					170			11	52	63
BENZENE,1,4-DICHLORO-					0	&		14	49	63
ETHER,2-CHLORO-ETHYL-VINYL					0	NR		63	0	63
PROPANE,1,2-DIBROMO-3-CHLORO-					45			23	40	63
2-PROPENENITRILE					48			4	59	63
NON-TCL SEMIVOLATILE										
BETA-BHC					0	NR		62	1	63

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 92

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 23 Same = 1 Below = 17

% SCORE: 84.9
REPORT DATE: 06/08/92
MATRIX: WATER

COMPOUND	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
PHENOL,4-CHLORO-					66			18	45	63
NON-TCL VOLATILE (Contaminants)										
UNKNOWN					9			44	19	63
2-PROPANOL					100			31	32	63
NON-TCL SEMIVOLATILE (Contaminants)										
BHC, .GAMMA. -					28			62	1	63

OF TCL COMPOUNDS NOT-IDENTIFIED: 1
OF TCL COMPOUNDS MIS-QUANTIFIED: 1
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 1
OF NON-TCL CONTAMINANTS: 0

DATA CHEM
LABORATORIES
A SORENSON COMPANY

July 21, 1992
Refer to: 92PM258

Reply to:
Salt Lake Office

Steve Callio
Technical Project Officer
U.S. Environmental Protection Agency
Region VIII
999 18th Street, Suite 500
Denver, CO 80202-2405

Re: Third Quarter Organic Performance Evaluation Sample (QB3-FY92)

Dear Steve:

Pursuant to the Individual Laboratory Summary Report (ILSR) for the above-referenced performance evaluation sample, enclosed as Exhibit 1 is a memorandum prepared by Richard Wade, DataChem Laboratories (DCL) Organic Department Manager, outlining the deficiencies and the actions taken to correct the deficiencies listed on the ILSR.

If I may provide additional information, please call me at (801) 266-7700.

Sincerely,

Ken R. Olson

Ken R. Olson, J.D.
Project Manager

/ls

Enclosure

cc: L.C. Butler, Ph.D., *EMSL-LV*
S.D. Lessley, Ph.D., *DCL Executive Vice President*
R. McCallister, *USEPA Headquarters*
J.H. Nelson, Ph.D., *DCL, President*
B.D. Tidwell, *DCL QA Coordinator, EPA-CLP*
R.W. Wade, *DCL, Organic Department Manager*

SALT LAKE CITY OFFICE
960 WEST LeVOY DRIVE
SALT LAKE CITY UTAH 84123-2547
801 266-7700 FAX 801 268-9992

CINCINNATI OFFICE
4388 GLENDALE-MILFORD ROAD
CINCINNATI OHIO 45242-3706
513 733-5336 FAX 513 733-5347

BALTIMORE OFFICE
10 JULIET LANE SUITE #203
BALTIMORE MARYLAND 21236-1220
410 494-3612 FAX 513 733-5347

RICHLAND OFFICE
313 WELLSIAN WAY
RICHLAND WASHINGTON 99352-4116
509 943-5858 FAX 509 943-5654

EXHIBIT

1

DATA CHEM LABORATORIES

A SORENSON COMPANY

MEMORANDUM

To: Ken R. Olson
From: Richard Wade Richard Wade
Subject: Third Quarter Organic Performance Evaluation Sample
Date: July 20, 1992
Refer To: 92PM240

A perfect score was obtained for semivolatile and pesticide fractions. This means that in addition to performing well on the analytical portion, both semivolatile and pesticide extractions were completed without contamination and with appropriate recoveries.

VOA FRACTION

Two problems were apparent for the VOA fraction. These are discussed separately below.

1. The analyte ethyl benzene was not reported because it was low level and masked by the unknown compound 1,2-dibromo-3-chloro propane (DBCP). The unknown compound coeluted with ethyl benzene. The computer did not call the ethyl benzene because the dominant spectra of the peak was DBCP. The computer has a fit threshold for calling an analyte present or not present. The fit threshold for ethyl benzene is set at 900 (a perfect fit is 1000). The fit with the coeluting unknown was about 300, therefore the analyte was not automatically picked up by the quantitation procedure.

   ### CORRECTIVE ACTION

   The analyst must be aware of possible low level hits for any of the HSL analytes. This can be done by investigating the spectra of every chromatographic peak. Each peak's spectra is then searched against the user library and any differences are further investigated. Additional caution will be exercised in the future to look for very low level concentrations coeluting with other compounds.

2. The analyte trans-1,3-dichloropropene was reported below the lower warning limit. The analytes cis and trans-1,3-dichloropropene tend to isomerize and a 50:50 mixture of the two isomers is hard to obtain. The standards used were purchased from Ultra Scientific and are certified by Ultra Scientific.

SALT LAKE CITY OFFICE
960 WEST LeVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
801 266-7700 FAX 801 268-9992

CINCINNATI OFFICE
4388 GLENDALE-MILFORD ROAD
CINCINNATI, OHIO 45242-3706
513 733-5336 FAX 513 733-5347

BALTIMORE OFFICE
10 JULIET LANE SUITE #203
BALTIMORE, MARYLAND 21236-1220
410 494-3612 FAX 513 733-5347

RICHLAND OFFICE
313 WELLSIAN WAY
RICHLAND, WASHINGTON 99352-4116
509 943-5858 FAX 509 943-5654

CORRECTIVE ACTION

In accordance with DCL SOP-EPA-500 new standard solutions will be verified. During this procedure the ratio of the cis and trans 1,3-dichloropropene isomers will be evaluated in standards from more than one vendor. DCL will use standards from the vendor that provides the highest quality solution.

/ls

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 92

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 0 Same = 5 Below = 22

% SCORE: 100
REPORT DATE: 03/14/9
MATRIX: WATER

COMPOUND	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM #LABS NOT-ID	DATA #LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
BROMOMETHANE	10	16	10	21	13		0	2	40	42
BROMODICHLOROMETHANE	110	140	100	150	110		1	0	42	42
TRICHLOROETHENE	34	44	32	45	37		1	0	42	42
2-PENTANONE,4-METHYL-	130	190	120	200	180		4	2	40	42
TETRACHLOROETHENE	57	77	54	80	67		1	0	42	42
1,1,2,2-TETRACHLOROETHANE	43	57	41	59	52		4	0	42	42
ETHYL BENZENE	14	20	14	20	18		2	0	42	42
STYRENE	120	170	120	170	150		2	0	42	42
TCL SEMIVOLATILE										
PHENOL	34	56	31	68	34		3	0	42	42
HEXACHLOROETHANE	22	43	19	55	31		1	0	42	42
2,4-DIMETHYLPHENOL	22	50	18	54	24		2	1	41	42
BIS(2-CHLOROETHOXY)METHANE	15	23	14	24	16		7	1	41	42
1,2,4-TRICHLOROBENZENE	22	37	20	45	30		1	0	42	42
HEXACHLOROCYCLOPENTADIENE	24	63	19	84	37		0	1	41	42
2,4,6-TRICHLOROPHENOL	27	43	25	46	26	S	3	0	42	42
ANTHRACENE	NU	NU	NU	NU	3		0	2	40	42
PYRENE	80	140	72	170	88		1	0	42	42
TCL PESTICIDES										
ALPHA-BHC	0.071	0.11	0.065	0.11	0.094		6	1	41	42
BETA-BHC	0.25	0.34	0.24	0.35	0.31		7	0	42	42
GAMMA-BHC (LINDANE)	0.14	0.2	0.13	0.21	0.19		5	0	42	42
ALDRIN	0.13	0.22	0.11	0.24	0.18		5	0	42	42
ENDOSULFAN SULFATE	0.14	0.24	0.12	0.25	0.21		4	6	36	42
4,4'-DDT	0.8	1.2	0.74	1.3	1		4	0	42	42
METHOXYCHLOR	0.53	0.89	0.5	0.94	0.67		3	1	41	42
ENDRIN KETONE	0.33	0.57	0.3	0.61	0.47		6	0	42	42
AROCLOR-1221	NU	NU	NU	NU	2	U	0	20	23	42
AROCLOR-1248	1.1	1.6	1	1.7	0.81	S	2	14	29	42
NON-TCL VOLATILE										
2-PROPENENITRILE					53			1	41	42
TCL VOLATILE (Contaminants)										
ACETONE					68			19	23	42
2-BUTANONE					11			17	25	42
NON-TCL SEMIVOLATILE (Contaminants)										
UNKNOWN					2			26	16	42

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 0
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 92

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 0 Same = 4 Below = 19

% SCORE: 97.8
REPORT DATE: 12/30/91
MATRIX: WATER

COMPOUND	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
BROMOMETHANE	26	51	22	55	32		3	0	46	46
VINYL CHLORIDE	48	100	40	110	51		1	0	46	46
ACETONE	66	170	51	180	150		8	4	42	46
CHLOROFORM	10	14	10	14	11		2	0	46	46
CARBON TETRACHLORIDE	56	80	53	83	63		1	0	46	46
BROMODICHLOROMETHANE	120	160	120	160	130		2	0	46	46
DIBROMOCHLOROMETHANE	47	62	45	64	58		2	0	46	46
1,1,2-TRICHLOROETHANE	49	64	47	66	56		3	0	46	46
BROMOFORM	11	16	10	17	16		0	1	45	46
1,1,2,2-TETRACHLOROETHANE	120	160	110	160	150		2	0	46	46
ETHYL BENZENE	10	13	10	14	11		0	0	46	46
STYRENE	170	210	170	220	200		5	0	46	46
TCL SEMIVOLATILE										
PHENOL	24	38	22	47	30		9	3	43	46
2-CHLOROPHENOL	17	26	16	32	18		5	2	44	46
1,4-DICHLOROBENZENE	19	28	18	33	24		8	1	45	46
2,2'-OXYBIS(1-CHLOROPROPANE)	13	20	12	21	16		7	4	42	46
NAPHTHALENE	11	16	11	18	12		10	0	46	46
ACENAPHTHENE	16	22	15	25	17		7	1	45	46
DIBENZOFURAN	13	18	13	19	16		9	1	45	46
DIETHYLPHTHALATE	18	30	16	32	20		6	3	43	46
FLUORENE	59	100	52	130	76		1	1	45	46
HEXACHLOROBENZENE	17	25	15	30	22		4	2	44	46
PENTACHLOROPHENOL	60	91	55	96	66		9	2	44	46
FLUORANTHENE	12	16	11	17	13		6	1	45	46
PYRENE	29	46	26	56	36		3	0	46	46
DIBENZ(A,H)ANTHRACENE	26	46	23	57	32		4	2	44	46
TCL PESTICIDES										
ALPHA-BHC	0.1	0.18	0.089	0.19	0.15		7	0	46	46
BETA-BHC	0.075	0.14	0.065	0.15	0.14		5	3	43	46
DELTA-BHC	0.061	0.12	0.051	0.13	0.11		3	2	44	46
HEPTACHLOR	0.16	0.28	0.15	0.3	0.18		5	1	45	46
ALDRIN	0.23	0.42	0.2	0.45	0.25		5	0	46	46
HEPTACHLOR EPOXIDE	0.25	0.5	0.21	0.54	0.39		2	3	43	46
ENDOSULFAN I	0.57	1.1	0.48	1.5	0.85		2	0	46	46
DIELDRIN	0.29	0.52	0.26	0.55	0.41		3	0	46	46
ENDRIN	0.61	1.4	0.49	1.5	1.1		4	0	46	46
ENDOSULFAN II	0.1	0.2	0.1	0.22	0.15		4	7	39	46
4,4'-DDT	0.24	0.45	0.21	0.48	0.33		6	0	46	46
ENDRIN KETONE	0.22	0.37	0.2	0.39	0.29		11	0	46	46
ENDRIN ALDEHYDE	0.1	0.33	0.1	0.36	0.17		2	2	44	46
AROCLOR-1254	1	1.6	1	1.7	1.1		3	12	34	46
NON-TCL VOLATILE										
BENZENE,N-PROPYL-					13			10	36	46

REGION 8
ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 92

LABORATORY: DataChem (UT)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 0 Same = 4 Below = 19

% SCORE: 97.8
REPORT DATE: 12/30/91
MATRIX: WATER

COMPOUND	TOLERANCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
2-PROPENENITRILE					100			3	43	46
VINYL ACETATE					0	NR		44	2	46
NON-TCL SEMIVOLATILE										
ANILINE					0	NR		37	9	46
BENZYL ALCOHOL					17			10	36	46
HYDRAZINE,DIPHENYL-					0	NR		41	5	46
PARATHION					17			3	43	46
TCL VOLATILE (Contaminants)										
2-BUTANONE					12			22	24	46
TCL SEMIVOLATILE (Contaminants)										
NITROBENZENE					3			10	36	46
NON-TCL VOLATILE (Contaminants)										
2-PROPANOL					260			22	24	46
ACETIC ACID,METHYL ESTER					18			28	18	46
NON-TCL SEMIVOLATILE (Contaminants)										
PROPENE,TRICHLORO-					3.2			45	1	46
UNKNOWN					15	C		28	18	46
DIAZENE (1,2-DIPHENY),DIPHENYL-					44			45	1	46

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 0
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 1

ORTEK

PERFORMANCE EVALUATION

RESULTS

PERFORMANCE EVALUATION SUMMARY SHEET

Laboratory: Ortek Laboratories

PE Sample	Number Acceptable	Number Analyzed	% Acceptable
WP-030			
Metal	43	44	97.7
Inorganic	35	42	83.3
Organic	54	54	87.5
Wisconsin State Proficiency Testing Samples			
E1_93			
Metals	23	24	95.8
Inorganic	15	15	100.0
Organic	46	51	90.2
E2_93			
Metal	13	13	100.0
Inorganic	2	3	66.7
Organic	10	11	90.9
Analytical Standards Incorporated PE Samples - March 1993			
Metals	10	11	90.9
Inorganic	18	20	90.0
Organic	16	16	100.0

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

ORTEK ENVIRONMENTAL LABORATORY
4144982222 / GREEN BAY, WI / GCL

LABORATORY: WI041

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	1120	1100	898- 1300	949- 1250	ACCEPTABLE
	2	4010	4000	3370- 4570	3520- 4410	ACCEPTABLE
ARSENIC	1	289	280	225- 334	238- 320	ACCEPTABLE
BERYLLIUM	1	62.1	63.0	51.1- 74.5	54.1- 71.5	ACCEPTABLE
CADMIUM	1	7.75	8.12	6.30- 10.3	6.80- 9.79	ACCEPTABLE
	2	93.2	93.9	78.3- 110	82.2- 106	ACCEPTABLE
COBALT	1	481	480	416- 536	431- 521	ACCEPTABLE
	2	238	240	206- 275	214- 266	ACCEPTABLE
CHROMIUM	1	59.9	62.0	49.2- 73.7	52.3- 70.6	ACCEPTABLE
	2	453	460	378- 533	397- 514	ACCEPTABLE
COPPER	1	60.5	62.0	53.5- 69.8	55.6- 67.8	ACCEPTABLE
	2	407	410	365- 462	377- 450	ACCEPTABLE
IRON	1	3770	3800	3350- 4230	3460- 4120	ACCEPTABLE
	2	858	860	755- 963	781- 937	ACCEPTABLE
MERCURY	1	1.02	0.983	0.620- 1.42	0.719- 1.32	ACCEPTABLE
	2	2.24	2.10	1.57- 2.75	1.72- 2.61	ACCEPTABLE
MANGANESE	1	2160	2200	1950- 2450	2010- 2380	ACCEPTABLE
	2	215	221	196- 244	202- 230	ACCEPTABLE
NICKEL	1	128	130	111- 150	116- 145	ACCEPTABLE
	2	1320	1300	1160- 1450	1200- 1420	ACCEPTABLE
LEAD	1	79.0	79.2	62.7- 97.1	67.0- 92.8	ACCEPTABLE
	2	444	450	393- 513	408- 498	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WI041

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1	21.6	23.0	14.3- 29.1	16.1- 27.3	ACCEPTABLE
	2	74.2	78.1	52.8- 94.6	58.1- 89.3	ACCEPTABLE
VANADIUM	1	7950	8000	7110- 8830	7330- 8610	ACCEPTABLE
	2	15200	15000	12700-17400	13300-16800	ACCEPTABLE
ZINC	1	1080	1100	961- 1220	993- 1190	ACCEPTABLE
	2	237	240	209- 271	216- 263	ACCEPTABLE
ANTIMONY	3	122	116	79.4- 140	87.2- 133	ACCEPTABLE
	4	17.6	14.0	7.01- 20.4	8.73- 18.7	ACCEPTABLE
SILVER	3	2.50	2.39	1.80- 2.96	1.95- 2.82	ACCEPTABLE
	4	9.70	9.75	7.80- 11.5	8.25- 11.0	ACCEPTABLE
THALLIUM	3	91.9	90.2	70.7- 108	75.5- 103	ACCEPTABLE
	4	8.80	9.00	6.71- 11.3	7.29- 10.7	ACCEPTABLE
TITANIUM	3	65.0	66.0	51.5- 76.5	54.7- 73.3	ACCEPTABLE
	4	182	182	149- 205	156- 198	ACCEPTABLE
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
PH-UNITS	3	8.48	8.70	8.31- 9.05	8.40- 8.96	ACCEPTABLE
	4	6.07	6.10	5.96- 6.22	5.99- 6.19	ACCEPTABLE
SPEC. COND. (UMHOS/CM AT 25 C)	1	239	253	226- 274	232- 268	ACCEPTABLE
	2	781	868	819- 916	831- 904	NOT ACCEPTABLE
TDS AT 180 C	1	91.0	116	76.2- 166	87.5- 155	ACCEPTABLE
	2	462	480	385- 617	414- 588	ACCEPTABLE
TOTAL HARDNESS (AS CACO3)	1	84.8	75.6	66.7- 84.1	68.8- 82.0	NOT ACCEPTABLE
	2	238	225	209- 242	213- 238	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WI041

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
CALCIUM	1	3.76	3.69	3.00- 4.47	3.18- 4.29	ACCEPTABLE
	2	51.5	80.9	73.4- 90.2	75.5- 88.1	NOT ACCEPTABLE
MAGNESIUM	1	16.1	16.1	14.0- 18.1	14.5- 17.6	ACCEPTABLE
	2	5.56	5.64	4.84- 6.32	5.03- 6.13	ACCEPTABLE
SODIUM	1	16.1	15.9	14.0- 17.9	14.5- 17.4	ACCEPTABLE
	2	65.0	65.6	59.6- 72.0	61.2- 70.4	ACCEPTABLE
POTASSIUM	1	2.49	2.60	2.05- 3.22	2.19- 3.08	ACCEPTABLE
	2	19.0	19.0	16.2- 21.9	16.9- 21.1	ACCEPTABLE
TOTAL ALKALINITY (AS CACO3)	1	23.8	21.1	17.2- 26.1	18.3- 25.0	ACCEPTABLE
	2	101	97.0	85.0- 109	88.0- 106	ACCEPTABLE
CHLORIDE	1	54.3	54.3	48.2- 59.1	49.6- 57.8	ACCEPTABLE
	2	177	178	166- 191	170- 188	ACCEPTABLE
FLUORIDE	1	2.48	2.40	2.09- 2.65	2.16- 2.58	ACCEPTABLE
	2	0.23	0.230	0.175-0.286	0.189-0.272	ACCEPTABLE
SULFATE	1	< 10	9.10	6.48- 11.4	7.10- 10.8	UNUSABLE DATA
	2	33.2	42.0	35.2- 48.1	36.8- 46.5	NOT ACCEPTABLE
NUTRIENTS IN MILLIGRAMS PER LITER:						
AMMONIA-NITROGEN	1	6.48	5.50	4.35- 6.65	4.62- 6.37	CHECK FOR ERROR
	2	11.3	9.80	7.80- 11.6	8.25- 11.2	CHECK FOR ERROR
NITRATE-NITROGEN	1	33.8	34.0	27.5- 40.2	29.0- 38.7	ACCEPTABLE
	2	7.04	7.10	5.70- 8.43	6.03- 8.10	ACCEPTABLE
ORTHOPHOSPHATE	1	0.843	0.830	0.692-0.961	0.724-0.929	ACCEPTABLE
	2	0.078	0.090	.0617-0.122	.0689-0.115	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WI041

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
NUTRIENTS IN MILLIGRAMS PER LITER:						
KJELDAHL-NITROGEN	3	9.42	9.30	6.67- 11.5	7.26- 10.9	ACCEPTABLE
	4	14.8	19.0	13.9- 23.1	15.0- 22.0	CHECK FOR ERROR
TOTAL PHOSPHORUS	3	2.98	3.20	2.35- 3.57	2.49- 3.42	ACCEPTABLE
	4	1.62	1.60	1.25- 1.94	1.33- 1.86	ACCEPTABLE
DEMANDS IN MILLIGRAMS PER LITER:						
COD	1	29.8	21.8	12.6- 30.5	14.9- 28.2	CHECK FOR ERROR
	2	41.2	35.4	23.6- 43.0	26.0- 40.5	CHECK FOR ERROR
TOC	1	9.57	8.61	7.22- 10.2	7.61- 9.80	ACCEPTABLE
	2	14.9	14.0	11.9- 16.3	12.5- 15.7	ACCEPTABLE
5-DAY BOD	1	12.2	14.0	7.36- 20.7	9.03- 19.0	ACCEPTABLE
	2	19.3	21.8	11.8- 31.9	14.3- 29.4	ACCEPTABLE
PCB'S IN MICROGRAMS PER LITER:						
PCB-AROCLOR 1016/1242	2	4.46	4.29	1.86- 5.71	2.35- 5.22	ACCEPTABLE
PCB-AROCLOR 1232	1	0.98	1.43	0.657- 1.79	0.800- 1.64	ACCEPTABLE
PCB'S IN OIL IN MILLIGRAMS PER KILOGRAM:						
PCB IN OIL- 1016/1242	1	21.8	21.5	5.04- 27.6	7.92- 24.7	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WI041

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
PCB'S IN OIL IN MILLIGRAMS PER KILOGRAM:						
PCB IN OIL- 1260	2	29.1	36.6	7.82- 57.8	14.2- 51.4	ACCEPTABLE
PESTICIDES IN MICROGRAMS PER LITER:						
CHLORDANE	3	1.01	0.964	0.469- 1.32	0.575- 1.21	ACCEPTABLE
	4	9.76	9.48	5.38- 12.4	6.26- 11.5	ACCEPTABLE
ALDRIN	1	0.17	0.159	.0344-0.214	.0572-0.191	ACCEPTABLE
	2	0.31	0.444	.0957-0.577	0.156-0.517	ACCEPTABLE
DIELDRIN	1	0.15	0.121	.0572-0.163	.0704-0.150	ACCEPTABLE
	2	0.50	0.553	0.270-0.750	0.330-0.690	ACCEPTABLE
DDD	1	0.21	0.216	.0863-0.317	0.115-0.288	ACCEPTABLE
	2	0.44	0.626	0.334-0.865	0.400-0.799	ACCEPTABLE
DDE	1	0.16	0.131	.0562-0.171	.0706-0.157	CHECK FOR ERROR
	2	0.36	0.495	0.228-0.699	0.288-0.639	ACCEPTABLE
DDT	1	0.20	0.186	.0628-0.284	.0905-0.257	ACCEPTABLE
	2	0.40	0.576	0.252-0.844	0.326-0.770	ACCEPTABLE
HEPTACHLOR	1	0.20	0.157	.0488-0.221	.0706-0.199	CHECK FOR ERROR
	2	0.46	0.514	0.180-0.715	0.247-0.648	ACCEPTABLE
HEPTACHLOR EPOXIDE	1	0.10	0.087	.0427-0.120	.0526-0.110	ACCEPTABLE
	2	0.30	0.375	0.189-0.513	0.229-0.473	ACCEPTABLE
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
1,2 DICHLOROETHANE	1	36.3	48.6	34.5- 62.8	38.0- 59.2	CHECK FOR ERROR
	2	7.75	10.2	7.28- 13.8	8.11- 12.9	CHECK FOR ERROR

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WI041

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
CHLOROFORM	1	45.2	45.7	31.6- 59.5	35.1- 56.0	ACCEPTABLE
	2	12.6	13.8	9.42- 18.0	10.5- 16.9	ACCEPTABLE
1,1,1 TRICHLOROETHANE	1	46.1	52.0	32.3- 67.9	36.8- 63.4	ACCEPTABLE
	2	9.20	9.34	5.56- 12.6	6.46- 11.7	ACCEPTABLE
TRICHLOROETHENE	1	34.6	38.8	26.8- 49.1	29.6- 46.2	ACCEPTABLE
	2	9.52	9.91	6.52- 13.0	7.34- 12.2	ACCEPTABLE
CARBONTETRACHLORIDE	1	38.6	46.3	29.8- 63.7	34.1- 59.4	ACCEPTABLE
	2	12.2	13.5	8.93- 18.2	10.1- 17.0	ACCEPTABLE
TETRACHLOROETHENE	1	50.2	57.2	39.7- 71.9	43.8- 67.8	ACCEPTABLE
	2	17.0	16.2	10.9- 21.1	12.2- 19.8	ACCEPTABLE
BROMODICHLOROMETHANE	1	49.1	49.5	34.2- 64.3	38.0- 60.5	ACCEPTABLE
	2	6.74	7.75	4.88- 10.6	5.59- 9.86	ACCEPTABLE
DIBROMOCHLOROMETHANE	1	41.5	42.2	30.0- 54.4	33.1- 51.3	ACCEPTABLE
	2	15.2	16.4	10.9- 21.5	12.2- 20.2	ACCEPTABLE
BROMOFORM	1	54.8	53.7	33.5- 73.7	38.6- 68.6	ACCEPTABLE
	2	10.9	11.9	6.48- 17.1	7.83- 15.7	ACCEPTABLE
METHYLENE CHLORIDE	1	36.3	37.3	24.1- 53.2	27.7- 49.6	ACCEPTABLE
	2	7.75	8.77	4.21- 13.5	5.39- 12.3	ACCEPTABLE
CHLOROBENZENE	1	41.4	43.2	30.8- 55.0	33.9- 51.9	ACCEPTABLE
	2	12.7	12.9	8.99- 16.7	9.97- 15.7	ACCEPTABLE
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
BENZENE	1	8.24	10.3	7.34- 13.4	8.11- 12.6	ACCEPTABLE
	2	44.1	54.1	37.7- 70.8	41.9- 66.6	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: WI041

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
ETHYLBENZENE	1	10.7	11.3	7.71- 14.7	8.60- 13.8	ACCEPTABLE
	2	51.0	52.4	36.2- 68.5	40.3- 64.4	ACCEPTABLE
TOLUENE	1	12.1	13.9	9.86- 17.7	10.9- 16.7	ACCEPTABLE
	2	30.1	33.9	24.0- 43.1	26.4- 40.7	ACCEPTABLE
1,2-DICHLOROBENZENE	1	12.8	12.1	8.47- 15.4	9.37- 14.5	ACCEPTABLE
	2	56.7	52.0	36.1- 66.4	40.0- 62.5	ACCEPTABLE
1,3-DICHLOROBENZENE	1	9.76	9.43	6.17- 12.1	6.92- 11.4	ACCEPTABLE
	2	51.0	47.8	33.6- 61.2	37.2- 57.6	ACCEPTABLE
1,4-DICHLOROBENZENE	1	11.9	11.7	7.95- 15.2	8.86- 14.2	ACCEPTABLE
	2	62.2	58.1	39.1- 76.5	43.9- 71.7	ACCEPTABLE
MISCELLANEOUS PARAMETERS:						
TOTAL CYANIDE	1	0.271	0.250	0.138-0.341	0.164-0.316	ACCEPTABLE
(IN MG/L)	2	0.128	0.130	.0821-0.169	.0932-0.158	ACCEPTABLE
NON-FILTERABLE RESIDUE	1	42	43.2	34.7- 45.2	36.0- 43.9	ACCEPTABLE
(IN MG/L)	2	29	33.0	24.0- 34.6	25.3- 33.2	ACCEPTABLE
OIL AND GREASE	1	16.4	15.0	8.13- 19.4	9.56- 18.0	ACCEPTABLE
(IN MG/L)	2	21.2	23.0	14.1- 28.1	15.9- 26.3	ACCEPTABLE
TOTAL PHENOLICS	1	0.021	.0271	.0093-.0449	.0139-.0403	ACCEPTABLE
(IN MG/L)	2	0.266	0.291	0.125-0.457	0.167-0.414	ACCEPTABLE
TOTAL RESIDUAL CHLORINE	1	1.51	0.729	0.469-0.912	0.520-0.853	NOT ACCEPTABLE
(IN MG/L)	2	1.33	0.240	.0866-0.280	0.112-0.254	NOT ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

Wisconsin State Laboratory of Hygiene
465 Henry Mall
Madison, WI 53706-1578
(608) 262-3436

Proficiency Testing

University of Wisconsin Center for Health Sciences

12 July 1993

E2_93 -- Organic Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
GRO	62	368	370	38	265-476 µg/L	385
Your result is a correct answer						
Satisfactory performance for Gasoline Range Organics.						
Your score = 100%						
DRO	60	361	357	79	137-577 µg/L	431
Your result is a correct answer						
Satisfactory performance for Diesel Range Organics.						
Your score = 100%						
t-methyl butyl Ether	40	26.6	26.7	5.4	11.6-41.8 µg/L	No reply
Your laboratory did not report a result for this analyte.						
Benzene	44	42.4	43.5	5.1	29.2-57.8 µg/L	45.15
Your result is a correct answer						
Toluene	44	40.7	41.7	4.0	30.6-52.8 µg/L	43.01
Your result is a correct answer						
Ethyl benzene	44	18.2	18.2	2.1	12.4-24.0 µg/L	18.66
Your result is a correct answer						
meta Xylene	43	47.3	41.4	4.3	29.5-53.4 µg/L	37.64
Your result is a correct answer						
para Xylene	43	35.6	41.4	4.3	29.5-53.4 µg/L	37.64
Your result is a correct answer						
ortho Xylene	43	29.6	32.3	4.7	19.3-45.4 µg/L	37.64
Your result is a correct answer						
1,3,5 trimethyl Benzene	41	42.1	41.7	5.0	27.8-55.5 µg/L	42.46
Your result is a correct answer						
1,2,4 trimethyl Benzene	44	19.2	20.3	3.1	11.7-28.9 µg/L	22.91
Your result is a correct answer						
Satisfactory performance for Petroleum Volatile Organic Carbon.						
Your score = 89%						

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison, September 21, 1993.
You will get samples at that time to repeat any current wrong or outlying results.

Wisconsin State Laboratory of Hygiene
465 Henry Mall
Madison, WI 53706-1578
(608) 262-3438

Proficiency Testing

University of Wisconsin Center for Health Sciences

12 July 1993

E2_93 -- Inorganic and Metal Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
Nitrate	31	1.32	1.22	0.20	0.66-1.77 mg/L	0.68
Your result is marginally acceptable, review your procedure						
Ammonia	35	0.62	0.62	0.15	0.21-1.02 mg/L	<0.2
Your result is an unacceptable answer						
Potassium	27	1500	1457	282	673-2241 µg/L	1340
Your result is a correct answer						

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison, September 21, 1993.
You will get samples at that time to repeat any current wrong or outlying results.

ORTEK
ENVIRONMENTAL LABORATORY
2609 Western Avenue
P.O. Box 12435
(414) 498-2222
(800) 236-4067
FAX (414) 498-4067
Green Bay, WI 54307-2435

June 18, 1993

Ronald C. Arneson
Laboratory Certification Program Manager
Office of Technical Services
Wisconsin DNR
101 S. Webster Street
Box 7921
Madison, Wi. 53707

Dear Mr. Arneson:

This is to alert you to the fact that the nitrate sample on our latest round of proficiency evaluation samples was analyzed after the holding time had expired. The ampule was opened and diluted by the analyst and not analyzed within the holding time period.

As a course of corrective action I have ordered PET samples to be reanalyzed under the proper analytical conditions. I will then submit these results to you.

If you have any questions regarding this matter please feel free to contact me at 1-800-236-4067.

Sincerely,

Rebecca Detaege MT(ASCP)

Rebecca Detaege MT(ASCP)
Quality Assurance/Quality Control Officer

Wisconsin State Laboratory of Hygiene
465 Henry Mall
Madison, WI 53706-1578
(608) 262-3436

Proficiency Testing

University of Wisconsin Center for Health Sciences

09 April 1993

E1_93 -- Organic Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
Benzene	40	10.6	11.3	1.3	7.7-14.8 µg/L	11.5
Your result is a correct answer						
Ethyl Benzene	39	11.6	11.8	1.1	8.8-14.8 µg/L	11.8
Your result is a correct answer						
Toluene	40	7.8	8.0	0.9	5.6-10.4 µg/L	8.2
Your result is a correct answer						
Trichloroethylene	40	12.1	11.7	1.6	7.3-16.1 µg/L	11.3
Your result is a correct answer						
Chlorobenzene	39	7.2	7.2	1.0	4.4-10.0 µg/L	7.2
Your result is a correct answer						

Satisfactory performance for Purgeable Halocarbons and Aromatics.
Your score = 100%

bis (2 ethyl hexyl) Phtha	22	55.7	46.8	14.2	7.4-86.1 µg/L	55.8
Your result is a correct answer						
butyl benzyl Phthalate	22	43.4	30.3	12.6	DL-65.3 µg/L	5.04
Your result is marginally acceptable, review your procedure						
di-methyl Phthalate	22	52.9	32.1	14.7	DL-73.0 µg/L	2.20
Your result is marginally acceptable, review your procedure						
di-n-octyl Phthalate	24	89.0	73.8	27.3	DL-149.7 µg/L	98.0
Your result is a correct answer						
di-ethyl Phthalate	22	46.6	35.2	10.9	4.9-65.5 µg/L	17.6
Your result is a correct answer						

Satisfactory performance for Phthalates.
Your score = 100%

n-nitrosodimethylamine	17	38.2	16.6	6.8	DL-35.6 µg/L	20.2
Your result is a correct answer						
n-nitrosodiphenylamine	21	28.9	19.7	3.7	9.5-29.9 µg/L	19.7
Your result is a correct answer						
n-nitroso, di-n-propylami	19	33.8	20.4	5.7	4.6-36.1 µg/L	29.9
Your result is a correct answer						

Satisfactory performance for Nitrosamines.
Your score = 100%

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison May 18, 1993. You will get samples at that time to repeat any current wrong or outlying results.

Wisconsin State Laboratory of Hygiene
465 Henry Mall
Madison, WI 53706-1578
(608) 262-3438

Proficiency Testing

University of Wisconsin Center for Health Sciences

09 April 1993

Environmental Proficiency Testing -- Report of results

E1_93 -- Organic Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
GC/MS Naphthalene	25	47.0	37.1	6.4	19.4-54.8 µg/L	46.7
Your result is a correct answer						
GC/MS Acenaphthene	27	30.4	26.1	5.2	11.6-40.5 µg/L	28.2
Your result is a correct answer						
GC/MS Anthracene	27	38.6	36.3	5.5	21.2-51.5 µg/L	37.4
Your result is a correct answer						
GC/MS Pyrene	27	91.2	83.6	14.2	44.2-123.0 µg/L	74.5
Your result is a correct answer						
GC/MS Chrysene	26	40.3	34.4	7.0	14.9-53.9 µg/L	35.4
Your result is a correct answer						

Satisfactory performance for PAH's by GC/MS.
Your score = 100%

4,4 - DDD	26	6.84	5.88	1.28	2.31-9.45 µg/L	6.3
Your result is a correct answer						
4,4 - DDE	26	7.74	6.59	1.64	2.04-11.14 µg/L	7.8
Your result is a correct answer						
4,4 - DDT	27	5.76	4.91	0.97	2.21-7.61 µg/L	5.4
Your result is a correct answer						
Heptachlor	26	7.20	5.72	1.18	2.44-8.99 µg/L	7.2
Your result is a correct answer						
Heptachlor epoxide	27	4.89	4.23	0.68	2.34-6.12 µg/L	4.9
Your result is a correct answer						

Satisfactory performance for Organochlorine Pesticides.
Your score = 100%

PCB Aqueous	29	6.91	5.60	1.51	1.41-9.79 µg/L	6.3
Your result is a correct answer						

Satisfactory performance for PCB's (aqueous).
Your score = 100%

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison May 18, 1993. You will get samples at that time to repeat any current wrong or outlying results.

Wisconsin State Laboratory of Hygiene
465 Henry Mall
Madison, WI 53706-1578
(608) 262-3438

Proficiency Testing

University of Wisconsin Center for Health Sciences

09 April 1993

Environmental Proficiency Testing -- Report of results

E1_93 -- Organic Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
Pentachloro. (phenol)	27	70.0	56.6	19.5	2.5-110.6 µg/L	53.2
Your result is a correct answer						
2,4 Dichlorophenol	27	28.7	21.4	6.0	4.7-38.1 µg/L	12.1
Your result is a correct answer						
2,4,6 Trichlorophenol	27	48.4	39.1	6.0	22.4-55.9 µg/L	38.7
Your result is a correct answer						
2,4 Dinitrophenol	26	86.3	63.9	32.3	DL-153.7 µg/L	30.0
Your result is a correct answer						
4-chloro, 3-methyl Phenol	26	17.9	14.5	2.0	9.1-19.9 µg/L	14.4
Your result is a correct answer						

Satisfactory performance for Phenols or Substituted Phenols.
Your score = 100%

2,4-D	16	8.70	7.93	2.83	0.06-15.79 µg/L	9.17
Your result is a correct answer						
2,4,5-T	15	6.27	3.84	2.14	DL-9.79 µg/L	No reply
Your laboratory did not report a result for this analyte.						
Dicamba**	8	5.43			UNGRADED	No reply
Your laboratory did not report a result for this analyte.						
Pentachloro. (herbicide)**	4	7.83			DL-13.03 µg/L	No reply
Your laboratory did not report a result for this analyte.						
Dinoseb**	9	5.34			DL-8.93 µg/L	No reply
Your laboratory did not report a result for this analyte.						

Unsatisfactory performance for Chlorinated Acid Herbicides.
Your score = 20%

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison May 18, 1993. You will get samples at that time to repeat any current wrong or outlying results.

Wisconsin State Laboratory of Hygiene
465 Henry Mall
Madison, WI 53706-1578
(608) 262-3438

Proficiency Testing

University of Wisconsin Center for Health Sciences

09 April 1993

Environmental Proficiency Testing -- Report of results

E1_93 -- Organic Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
bis (2-chloroethyl) Ether	19	42.9	36.7	7.7	15.4-58.0 µg/L	50.6
Your result is a correct answer						
bis (2-chloroethoxy) Meth	21	55.6	44.0	6.5	26.0-62.0 µg/L	52.3
Your result is a correct answer						
bis (2-chloroisopropyl) E	20	35.0	27.5	7.8	5.8-49.2 µg/L	35.7
Your result is a correct answer						
4-bromophenyl phenyl Ethe	20	49.5	45.5	6.1	28.5-62.4 µg/L	53.6
Your result is a correct answer						
4-chlorophenyl phenyl Eth	21	42.0	39.3	5.6	23.7-54.9 µg/L	37.3
Your result is a correct answer						

Satisfactory performance for Haloethers.
Your score = 100%

GRO	36	301	303	40	212-394 µg/L	296
Your result is a correct answer						

Satisfactory performance for Gasoline Range Organics.
Your score = 100%

DRO	36	320	391	126	273-508 µg/L	525
Your result is an unacceptable answer						

Unsatisfactory performance for Diesel Range Organics.
Your score = 0%

TP	20	31.3	27.5	9.6	19.2-35.7 mg/L	24.5
Your result is a correct answer						

Satisfactory performance for Total Recoverable Petroleum Hydrocarbons.
Your score = 100%

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison May 18, 1993. You will get samples at that time to repeat any current wrong or outlying results.

Wisconsin State Laboratory of Hygiene
465 Henry Mall
Madison, WI 53706-1578
(608) 262-3438

Proficiency Testing

University of Wisconsin Center for Health Sciences

09 April 1993

Environmental Proficiency Testing -- Report of results

E1_93 -- Organic Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
t-methyl butyl Ether	31	29.8	27.8	4.3	15.9-39.7 µg/L	27.5
Your result is a correct answer						
Benzene	33	30.0	30.1	3.7	19.8-40.4 µg/L	29.2
Your result is a correct answer						
Toluene	34	42.1	29.7	3.9	18.9-40.5 µg/L	30.7
Your result is a correct answer						
Ethyl benzene	34	26.5	25.5	3.1	16.8-34.1 µg/L	25.7
Your result is a correct answer						
meta Xylene	33	29.8	28.2	4.9	14.5-41.9 µg/L	30.3
Your result is a correct answer						
para Xylene	33	28.6	28.2	4.9	14.5-41.9 µg/L	30.4
Your result is a correct answer						
ortho Xylene	33	29.7	28.8	4.0	17.7-39.9 µg/L	25.8
Your result is a correct answer						
1,3,5 trimethyl Benzene	29	27.2	26.8	5.0	12.8-40.8 µg/L	29.5
Your result is a correct answer						
1,2,4 trimethyl Benzene	31	31.0	31.0	4.4	18.7-43.3 µg/L	30.4
Your result is a correct answer						

Satisfactory performance for Petroleum Volatile Organic Carbon.
Your score = 100%

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison May 18, 1993. You will get samples at that time to repeat any current wrong or outlying results.

Wisconsin State Laboratory of Hygiene
465 Henry Mal
Madison, WI 53706-1578
(608) 262-3438

Proficiency Testing

University of Wisconsin Center for Health Sciences

08 April 1993

E1_93 -- Inorganic and Metal Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
BOD	271	37	39	6	22-56 mg/L	34
Your result is a correct answer						
COD	59	56.9	55.5	7.6	34.4-76.6 mg/L	51
Your result is a correct answer						
pH	38	9.18	9.11	0.14	8.73-9.49	9.05
Your result is a correct answer						
Nitrate	52	3.25	3.14	0.29	2.33-3.96 mg/L	1.76
See the sheet attachment #1 for the results of this sample						
Ammonia	115	1.67	1.67	0.17	1.19-2.15 mg/L	1.33
See the sheet attachment #1 for the results of this sample						
Kjeldahl Nitrogen	44	3.23	3.23	0.34	2.29-4.18 mg/L	3.14
Your result is a correct answer						
Phosphorus	92	1.22	1.29	0.10	1.02-1.57 mg/L	1.13
Your result is a correct answer						
Suspended Solids	291	45	38	5	25-52 mg/L	35
Your result is a correct answer						
Chloride	67	39.6	39.6	1.5	35.4-43.8 mg/L	40.3
Your result is a correct answer						
Fluoride	52	1.36	1.35	0.09	1.09-1.60 mg/L	1.26
Your result is a correct answer						
Sulfate	58	46.1	45.9	2.8	38.3-53.6 mg/L	52.6
Your result is marginally acceptable, review your procedure						
Cyanide	44	0.19	0.18	0.03	0.09-0.28 mg/L	0.249
Your result is a correct answer						
Phenolics	41	67	70	8	48-92 µg/L	81
Your result is a correct answer						

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison May 18, 1993. You will get samples at that time to repeat any current wrong or outlying results.

Wisconsin State Laboratory of Hygiene
465 Henry Mall
Madison, WI 53706-1578
(608) 262-3438

Proficiency Testing

University of Wisconsin Center for Health Sciences

08 April 1993

Environmental Proficiency Testing -- Report of results

E1_93 -- Inorganic and Metal Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
Hardness (EDTA)	48	165	164	5	150-179 mg/L	170
Your result is a correct answer						
Oil and Grease	16	25	16	6	DL-32 mg/L	13
Your result is a correct answer						
Aluminum	49	1500	1539	73	1337-1741 µg/L	1460
Your result is a correct answer						
Antimony	31	625	577	55	424-729 µg/L	553
Your result is a correct answer						
Arsenic	55	40.0	39.5	4.3	27.5-51.4 µg/L	40.4
Your result is a correct answer						
Barium	55	1500	1503	52	1359-1646 µg/L	1430
Your result is a correct answer						
Beryllium	29	62.5	61.2	5.1	47.2-75.3 µg/L	60.6
Your result is a correct answer						
Cadmium	59	150	152	8	130-175 µg/L	140
Your result is a correct answer						
Calcium	51	13750	14038	665	12189-15886 µg/L	13500
Your result is a correct answer						
Chromium	59	150	148	9	122-174 µg/L	150
Your result is a correct answer						
Cobalt	35	150	149	9	123-175 µg/L	140
Your result is a correct answer						
Copper	60	1500	1484	54	1332-1635 µg/L	1440
Your result is a correct answer						
Iron	58	3000	2986	155	2555-3418 µg/L	2860
Your result is a correct answer						

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison May 18, 1993. You will get samples at that time to repeat any current wrong or outlying results.

Wisconsin State Laboratory of Hygiene
465 Henry Mall
Madison, WI 53706-1578
(608) 262-3438

Proficiency Testing

University of Wisconsin Center for Health Sciences

08 April 1993

Environmental Proficiency Testing -- Report of results

E1_93 -- Inorganic and Metal Analytes

0234
Laboratory Supervisor
Oneida Research & Technology
1609 Western
Green Bay, WI 54307

Parameter Tested	Number Reporting	True* Value	Mean	SD	Acceptable Range	Your Answer
Lead	62	600	599	38	494-703 µg/L	570
Your result is a correct answer						
Magnesium	51	13750	13785	654	11967-15602 µg/L	13500
Your result is a correct answer						
Manganese	51	1500	1496	54	1345-1646 µg/L	1430
Your result is a correct answer						
Mercury	55	4.00	3.96	0.51	2.55-5.38 µg/L	4.05
Your result is a correct answer						
Molybdenum	27	625	579	52	434-723 µg/L	557
Your result is a correct answer						
Nickel	54	1500	1487	77	1274-1700 µg/L	1440
Your result is a correct answer						
Potassium	51	250	270	43	150-389 µg/L	<300
Your result is an unacceptable answer						
Selenium	52	40	39	6	22-56 µg/L	41.5
Your result is a correct answer						
Silver	59	28	29	4	19-39 µg/L	28.9
Your result is a correct answer						
Sodium	55	13750	13705	732	11669-15741 µg/L	13600
Your result is a correct answer						
Thallium	30	625	613	42	496-730 µg/L	641
Your result is a correct answer						
Vanadium	24	250	242	17	196-289 µg/L	223
Your result is a correct answer						
Zinc	58	750	753	37	651-855 µg/L	725
Your result is a correct answer						

* True value is based on a calculated value of the added analyte.
The next shipment will be sent from Madison May 18, 1993. You will get samples at that time to repeat any current wrong or outlying results.

Attachment #1

Because we did not correctly anticipate the demand for the Nutrients A sample, we sent your laboratory a Nutrients A from a previous round of environmental reference sample testing. The sample did not yield good results for your laboratory or the few other laboratories that also received this sample. Therefore, we do not think it would be fair to grade you based on the results of this test. We will send you another sample for Nutrients A testing in the second round of testing May 18, 1993.

There will not be a charge for this sample. If you have any questions, please call (608)262-3438.

The Environmental Performance Audit

EPA0293 March 1993

asi Analytical Standards, Incorporated

Ortek Environmental Laboratory # 000049

Inorganic Summary Report

Compound	Reported Values	Mean Recovery	# of Labs	Acceptance Limits	Warning Limits	Performance Evaluation
Trace Metals				Units reported in milligrams per liter		
Chromium (Cr)	47.000	48.761	27	37.181 - 60.341	41.041 - 56.481	Acceptable
Copper (Cu)	22.000	23.013	28	18.612 - 27.414	20.079 - 25.947	Acceptable
Nickel (Ni)	110.000	115.600	28	93.787 - 137.413	101.058 - 130.142	Acceptable
Zinc (Zn)	160.000	164.708	28	128.801 - 200.615	140.770 - 188.646	Acceptable

PLEASE NOTE: Test were requested for cobalt, molybdenum and lead, which were not in this sample. Your laboratory correctly reported BDL for lead and molybdenum. However, you reported a value of 17 PPB for cobalt, incorrectly.

Cyanide & Phenol				Units reported in milligrams per liter		
Cyanide	0.510	0.323	26	0.023 - 0.623	0.123 - 0.523	Acceptable
Phenol	1.200	1.422	26	0.666 - 2.178	0.918 - 1.926	Acceptable

Demand				Units reported in milligrams per liter		
Biological Oxygen Demand (BOD)	> 27.900	51.882	24	16.833 - 86.931	28.516 - 75.248	* See Below
Chemical Oxygen Demand (COD)	70.000	80.610	25	48.750 - 112.470	59.370 - 101.850	Acceptable
Total Organic Carbon (TOC)	*********	30.600	24	18.111 - 43.089	22.274 - 38.926	Not Reporting

PLEASE NOTE: The reported mean was around 53 PPM which is greater than 27.9 as you reported. However, this sample should have been diluted to provide a more precise value.

The Environmental Performance Audit

EPA0293

March 1993

asi Analytical Standards, Incorporated

Ortek Environmental

Laboratory # 000049

Inorganic Summary Report

Compound	Reported Values	Mean Recovery	# of Labs	Acceptance Limits	Warning Limits	Performance Evaluation
Oil & Grease				**Units reported in milligrams per liter**		
Oil & Grease	29.000	28.443	28	4.908 - 51.978	12.753 - 44.133	Acceptable
Nutrients				**Units reported in milligrams per liter**		
Ammonia-Nitrogen as N	2.100	2.282	27	0.203 - 4.361	0.896 - 3.668	Acceptable
Nitrate-Nitrogen as N	< 0.200	2.407	27	0.655 - 4.159	1.239 - 3.575	Not Acceptable
Kjeldahl-Nitrogen as N	12.000	13.220	27	1.199 - 25.241	5.206 - 21.234	Acceptable
Orthophosphate as P	3.400	3.509	28	-1.744 - 8.762	0.007 - 7.011	Acceptable
Total Phosphorus as P	3.000	2.881	28	1.405 - 4.357	1.897 - 3.865	Acceptable
Minerals - pH				**Units reported in Standard Units**		
pH	6.200	5.175	29	3.696 - 6.654	4.189 - 6.161	Check for Error
Minerals - Specific Conductivity				**Units reported in UMHOS per centimeter**		
Specific Conductivity	110.000	594.083	27	462.563 - 725.603	506.403 - 681.763	Not Acceptable
Minerals				**Units reported in milligrams per liter**		
Total Dissolved Solids (TDS)	340.000	345.000	29	295.431 - 394.569	311.954 - 378.046	Acceptable
Total Suspended Solids (TSS)	48.000	44.208	29	14.988 - 73.428	24.728 - 63.688	Acceptable

The Environmental Performance Audit

EPA0293 March 1993

Ortek Environmental Laboratory # 000049

Inorganic Summary Report

asi Analytical Standards, Incorporated

Compound	Reported Values	Mean Recovery	# of Labs	Acceptance Limits	Warning Limits	Performance Evaluation
Minerals				Units reported in milligrams per liter		
Total Solids (TS)	10000.000	9889.900	28	9287.086 - 10492.714	9488.024 - 10291.776	Acceptable
Hardness as CaCO3	240.000	238.640	29	182.144 - 295.136	200.976 - 276.304	Acceptable
Calcium (Ca)	30.000	28.484	29	22.346 - 34.622	24.392 - 32.576	Acceptable
Magnesium (Mg)	19.000	18.628	29	14.863 - 22.393	16.118 - 21.138	Acceptable
Potassium (K)	19.000	19.408	29	13.963 - 24.853	15.778 - 23.038	Acceptable
Sodium (Na)	77.000	75.746	29	52.079 - 99.413	59.968 - 91.524	Acceptable
Total Alkalinity	120.000	122.700	27	97.713 - 147.687	106.042 - 139.358	Acceptable
Chloride (Cl-)	180.000	168.214	25	133.642 - 202.786	145.166 - 191.262	Acceptable
Fluoride (F-)	8.900	7.811	27	4.832 - 10.790	5.825 - 9.797	Acceptable
Sulfate	130.000	128.160	27	66.912 - 189.408	87.328 - 168.992	Acceptable
Residual Chlorine				Units reported in milligrams per liter		
Residual Chlorine	*********	2.249	18	0.917 - 3.581	1.361 - 3.137	Not Reporting

The Environmental Performance Audit

EPA0293 March 1993

asi Analytical Standards, Incorporated

Ortek Environmental Laboratory # 000049

Organic Summary Report

Compound	Reported Values	Mean Recovery	# of Labs	Acceptance Limits	Warning Limits	Performance Evaluation
Aromatic Volatile Organics (BTEX)				**Units reported in micrograms per liter**		
Benzene	19.000	21.229	28	13.678 - 28.780	16.195 - 26.263	Acceptable
Toluene	38.000	39.333	28	26.721 - 51.945	30.925 - 47.741	Acceptable
Organochlorine Pesticides				**Units reported in micrograms per liter**		
Aldrin	15.000	11.720	27	1.376 - 22.064	4.824 - 18.616	Acceptable
Γ-BHC (Lindane)	18.000	10.415	27	1.298 - 19.532	4.337 - 16.493	Check for Error
PCB'S				**Units reported in micrograms per liter**		
PCB-1248	8.600	8.806	28	0.217 - 17.395	3.080 - 14.532	Acceptable
PCB's in Oil				**Units reported in milligrams per kilogram**		
PCB-1248	8.000	8.749	27	2.305 - 15.193	4.453 - 13.045	Acceptable
Polynuclear Aromatic Hydrocarbons (PAH's)				**Units reported in micrograms per liter**		
Naphthalene	*********	11.272	27	0.514 - 22.030	4.100 - 18.444	Not Reporting
Pyrene	*********	12.063	27	6.252 - 17.874	8.189 - 15.937	Not Reporting

The Environmental Performance Audit

EPA0293 March 1993

asi Analytical Standards, Incorporated

Ortek Environmental Laboratory # 000049

Organic Summary Report

Compound	Reported Values	Mean Recovery	# of Labs	Acceptance Limits	Warning Limits	Performance Evaluation
Chlorinated Herbicides				Units reported in micrograms per liter		
2,4-D	*********	5.625	25	0.777 - 10.473	2.393 - 8.857	Not Reporting
2,4,5-TP (Silvex)	*********	4.776	25	0.849 - 8.703	2.158 - 7.394	Not Reporting
Volatiles				Units reported in micrograms per liter		
Carbon tetrachloride	81.000	73.723	26	26.947 - 120.499	42.539 - 104.907	Acceptable
Chloroform	33.000	39.996	26	22.680 - 57.312	28.452 - 51.540	Acceptable
Methylene chloride	91.000	105.633	26	54.627 - 156.639	71.629 - 139.637	Acceptable
Toluene	5.000	6.480	27	2.721 - 10.239	3.974 - 8.986	Acceptable
Trichloroethene	62.000	62.391	26	36.411 - 88.371	45.071 - 79.711	Acceptable
Base/Neutrals & Acids				Units reported in micrograms per liter		
Benzo(b)fluoranthene	38.000	27.286	27	8.968 - 45.604	15.074 - 39.498	Acceptable
2,4-Dimethylphenol	25.000	26.568	27	10.761 - 42.375	16.030 - 37.106	Acceptable
Hexachlorobenzene	28.000	22.619	27	10.481 - 34.757	14.527 - 30.711	Acceptable
Hexachlorocyclopentadiene	55.000	42.867	27	-11.925 - 97.659	6.339 - 79.395	Acceptable
Phenol	31.000	32.540	27	-7.996 - 73.076	5.516 - 59.564	Acceptable

The Environmental Performance Audit

EPA0293 March 1993

Ortek Environmental Laboratory # 000049

Organic Summary Report

asi Analytical Standards, Incorporated

Compound	Reported Values	Mean Recovery	# of Labs	Acceptance Limits	Warning Limits	Performance Evaluation
Total Petroleum Hydrocarbon (TPH)				**Units reported in milligrams per liter**		
Total Petroleum Hydrocarbon (TPH)	< 1.000	1.102	28	-0.329 - 2.533	0.148 - 2.056	* See Below

PLEASE NOTE: The original level established for this parameter was set around 1 PPM. We now find that many labs can not see this low. Therefore, we are calling this parameter no contest and will raise the level on all subsequent studies.

MARTIN MARIETTA K-25

PERFORMANCE EVALUATION

RESULTS

PERFORMANCE EVALUATION SUMMARY SHEET

Laboratory: Martin Marietta K-25 Laboratory

PE sample	Number Acceptable	Number Analyzed	% Acceptable
WS-032			
Metals	17	21	81.0
Inorganic	9	10	90.0
Organics	29	39	80.6
WP-030			
Metals	46	48	95.8
Inorganic	34	40	90.0
DMR-QA No. 013			
Metals	13	15	86.7
DOE-EML-556	19	23	82.6
APG-August 1993	80	80	100.0

	EMSL-LV Acceptance Range (%)	% of EMSL-LV True Value	% of all Participating Laboratory's Grand Average
April 20, 1993			
Uranium	82.0 to 118.0	215.9 (Outlier)	225.8
Co-60	77.7 to 122.3	202.6 (Outlier)	200.7
Cs-134	67.8 to 132.2	171.6 (Outlier)	182.4
Cs-137	72.8 to 127.2	210.4 (Outlier)	206.5
June 11, 1993			
Co-60	42.0 to 158.0	100.0	100.7
Zn-65	83.2 to 116.8	113.3	99.2
Ru-106	82.5 to 117.5	84.6	96.9
Cs-137	0.0 to 274.0	73.4	63.7
Ba-133	82.5 to 117.5	105.0	107.5

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 - FTS 545-2100)

JUL 21 1993

Mr. D.C. Canada
Oak Ridge Gaseous Diffusion Plant
Martin Marietta Energy System, Inc.
Hwy. 58, Drop Point A-20, Box 2003
Oak Ridge, TN 37831-7440

Dear Mr. Canada:

A report of your participation in the water pollution sample study, WP030, is enclosed. True values and acceptance limits for analytes in the multi-laboratory study are also furnished.

We would be glad to provide any further assistance you may require regarding the WP030 study.

Sincerely,

Harold A Vincent
Chemist
Quality Assurance Research Branch, QAD

Enclosure

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: TN043

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	1050	1100	898- 1300	949- 1250	ACCEPTABLE
	2	4010	4000	3370- 4570	3520- 4410	ACCEPTABLE
ARSENIC	1	278	280	225- 334	238- 320	ACCEPTABLE
BERYLLIUM	1	59.1	63.0	51.1- 74.5	54.1- 71.5	ACCEPTABLE
CADMIUM	1	8.35	8.12	6.30- 10.3	6.80- 9.79	ACCEPTABLE
	2	94.9	93.9	78.3- 110	82.2- 106	ACCEPTABLE
COBALT	1	483	480	416- 536	431- 521	ACCEPTABLE
	2	243	240	206- 275	214- 266	ACCEPTABLE
CHROMIUM	1	62.1	62.0	49.2- 73.7	52.3- 70.6	ACCEPTABLE
	2	457	460	378- 533	397- 514	ACCEPTABLE
COPPER	1	72	62.0	53.5- 69.8	55.6- 67.8	NOT ACCEPTABLE
	2	438	410	365- 462	377- 450	ACCEPTABLE
IRON	1	3920	3800	3350- 4230	3460- 4120	ACCEPTABLE
	2	911	860	755- 963	781- 937	ACCEPTABLE
MERCURY	1	1.08	0.983	0.620- 1.42	0.719- 1.32	ACCEPTABLE
	2	2.12	2.10	1.57- 2.75	1.72- 2.61	ACCEPTABLE
MANGANESE	1	2220	2200	1950- 2450	2010- 2380	ACCEPTABLE
	2	219	221	196- 244	202- 238	ACCEPTABLE
NICKEL	1	152	130	111- 150	116- 145	NOT ACCEPTABLE
	2	1350	1300	1160- 1450	1200- 1420	ACCEPTABLE
LEAD	1	81.5	79.2	62.7- 97.1	67.0- 92.8	ACCEPTABLE
	2	462	450	393- 513	408- 498	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 5/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: TN043

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1	24.8	23.0	14.3- 29.1	16.1- 27.3	ACCEPTABLE
	2	79.0	78.1	52.8- 94.6	58.1- 89.3	ACCEPTABLE
VANADIUM	1	8030	8000	7110- 8830	7330- 8610	ACCEPTABLE
	2	15100	15000	12700-17400	13300-16800	ACCEPTABLE
ZINC	1	1100	1100	961- 1220	993- 1190	ACCEPTABLE
	2	247	240	209- 271	216- 263	ACCEPTABLE
ANTIMONY	3	109	116	79.4- 140	87.2- 133	ACCEPTABLE
	4	12.7	14.0	7.01- 20.4	8.73- 18.7	ACCEPTABLE
SILVER	3	2.31	2.39	1.80- 2.96	1.95- 2.82	ACCEPTABLE
	4	8.91	9.75	7.80- 11.5	8.25- 11.0	ACCEPTABLE
THALLIUM	3	83.0	90.2	70.7- 108	75.5- 103	ACCEPTABLE
	4	8.90	9.00	6.71- 11.3	7.29- 10.7	ACCEPTABLE
MOLYBDENUM	3	7.05	6.48	3.34- 8.82	4.04- 8.12	ACCEPTABLE
	4	41.1	39.0	30.3- 47.9	32.6- 45.6	ACCEPTABLE
STRONTIUM	3	3.96	4.01	3.01- 4.99	3.26- 4.73	ACCEPTABLE
	4	51.3	51.0	41.4- 60.1	43.8- 57.7	ACCEPTABLE
TITANIUM	3	64.9	66.0	51.5- 76.5	54.7- 73.3	ACCEPTABLE
	4	180	182	149- 205	156- 198	ACCEPTABLE
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
PH-UNITS	3	8.6	8.70	8.31- 9.05	8.40- 8.96	ACCEPTABLE
	4	6.1	6.10	5.96- 6.22	5.99- 6.19	ACCEPTABLE
SPEC. COND. (UMHOS/CM AT 25 C)	1	246	253	226- 274	232- 268	ACCEPTABLE
	2	824	868	819- 916	831- 904	CHECK FOR ERROR

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 5/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: TN043

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
TDS AT 180 C	1	127	116	76.2- 166	87.5- 155	ACCEPTABLE
	2	545	480	385- 617	414- 588	ACCEPTABLE
TOTAL HARDNESS (AS CACO3)	1	68	75.6	66.7- 84.1	68.8- 82.0	CHECK FOR ERROR
	2	206	225	209- 242	213- 238	NOT ACCEPTABLE
CALCIUM	1	3.95	3.69	3.00- 4.47	3.18- 4.29	ACCEPTABLE
	2	84.6	80.9	73.4- 90.2	75.5- 88.1	ACCEPTABLE
MAGNESIUM	1	16.0	16.1	14.0- 18.1	14.5- 17.6	ACCEPTABLE
	2	5.50	5.64	4.84- 6.32	5.03- 6.13	ACCEPTABLE
SODIUM	1	16.3	15.9	14.0- 17.9	14.5- 17.4	ACCEPTABLE
	2	67.2	65.6	59.6- 72.0	61.2- 70.4	ACCEPTABLE
POTASSIUM	1	2.74	2.60	2.05- 3.22	2.19- 3.08	ACCEPTABLE
	2	19.0	19.0	16.2- 21.9	16.9- 21.1	ACCEPTABLE
TOTAL ALKALINITY (AS CACO3)	1	20	21.1	17.2- 26.1	18.3- 25.0	ACCEPTABLE
	2	92	97.0	85.0- 109	88.0- 106	ACCEPTABLE
CHLORIDE	1	54.05	54.3	48.2- 59.1	49.6- 57.8	ACCEPTABLE
	2	177.4	178	166- 191	170- 188	ACCEPTABLE
FLUORIDE	1	2.3	2.40	2.09- 2.65	2.16- 2.58	ACCEPTABLE
	2	0.255	0.230	0.175-0.286	0.189-0.272	ACCEPTABLE
SULFATE	1	10.8	9.10	6.48- 11.4	7.10- 10.8	ACCEPTABLE
	2	42.8	42.0	35.2- 48.1	36.8- 46.5	ACCEPTABLE
NUTRIENTS IN MILLIGRAMS PER LITER:						
AMMONIA-NITROGEN	1	5.59	5.50	4.35- 6.65	4.62- 6.37	ACCEPTABLE
	2	9.72	9.80	7.80- 11.6	8.25- 11.2	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: TN043

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
NUTRIENTS IN MILLIGRAMS PER LITER:						
NITRATE-NITROGEN	1	28.7	34.0	27.5- 40.2	29.0- 38.7	CHECK FOR ERROR
	2	6.28	7.10	5.70- 8.43	6.03- 8.10	ACCEPTABLE
ORTHOPHOSPHATE	1	0.86	0.830	0.692-0.961	0.724-0.929	ACCEPTABLE
	2	0.12	0.090	.0617-0.122	.0689-0.115	CHECK FOR ERROR
TOTAL PHOSPHORUS	3	3.36	3.20	2.35- 3.57	2.49- 3.42	ACCEPTABLE
	4	1.80	1.60	1.25- 1.94	1.33- 1.86	ACCEPTABLE
DEMANDS IN MILLIGRAMS PER LITER:						
COD	1	23	21.8	12.6- 30.5	14.9- 28.2	ACCEPTABLE
	2	37	35.4	23.6- 43.0	26.0- 40.5	ACCEPTABLE
TOC	1	8.65	8.61	7.22- 10.2	7.61- 9.80	ACCEPTABLE
	2	13.8	14.0	11.9- 16.3	12.5- 15.7	ACCEPTABLE
5-DAY BOD	1	14.44	14.0	7.36- 20.7	9.03- 19.0	ACCEPTABLE
	2	23.12	21.8	11.8- 31.9	14.3- 29.4	ACCEPTABLE
MISCELLANEOUS PARAMETERS:						
TOTAL CYANIDE (IN MG/L)	1	0.134	0.250	0.138-0.341	0.164-0.316	NOT ACCEPTABLE
	2	0.248	0.130	.0821-0.169	.0932-0.158	NOT ACCEPTABLE
NON-FILTERABLE RESIDUE (IN MG/L)	1	39	43.2	34.7- 45.2	36.0- 43.9	ACCEPTABLE
	2	24	33.0	24.0- 34.6	25.3- 33.2	CHECK FOR ERROR
OIL AND GREASE (IN MG/L)	1	7.95	15.0	8.13- 19.4	9.56- 18.0	NOT ACCEPTABLE
	2	14.8	23.0	14.1- 28.1	15.9- 26.3	CHECK FOR ERROR
TOTAL PHENOLICS (IN MG/L)	1	0.030	.0271	.0093-.0449	.0139-.0403	ACCEPTABLE
	2	0.323	0.291	0.125-0.457	0.167-0.414	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT

DATE: 6/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: TN043

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MISCELLANEOUS PARAMETERS:						
TOTAL RESIDUAL CHLORINE (IN MG/L)	1	0.17	0.729	0.469-0.912	0.528-0.853	NOT ACCEPTABLE
	2	0.55	0.240	.0866-0.280	0.112-0.254	NOT ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 7/15/

DMR-QA STUDY NUMBER 013

ERMITTEE: TN0002950 OAK RIDGE K-25 SITE FF

ANALYTES	VP	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMA EVALUATIO
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM		1160	1100	898- 1300	949- 1250	ACCEPT
ARSENIC		301	280	225- 334	238- 320	ACCEPT
BERYLLIUM		70.2	63.0	51.1- 74.5	54.1- 71.5	ACCEPT
CADMIUM		8.24	8.12	6.30- 10.3	6.80- 9.79	ACCEPT
CHROMIUM		81.6	62.0	49.2- 73.7	52.3- 70.6	NOT ACCEPT
COBALT		509	480	416- 536	431- 521	ACCEPT
COPPER		52.1	62.0	53.5- 69.8	55.6- 67.8	NOT ACCEPT
IRON		4060	3800	3350- 4230	3460- 4120	ACCEPT
LEAD		81.4	79.2	62.7- 97.1	67.0- 92.8	ACCEPT
MANGANESE		2320	2200	1950- 2450	2010- 2380	ACCEPT
MERCURY		1.27	0.983	0.620- 1.42	0.719- 1.32	ACCEPT
NICKEL		136	130	111- 150	116- 145	ACCEPT

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSAR

PERFORMANCE EVALUATION REPORT DATE: 7/15/9

DMR-QA STUDY NUMBER 013

RMITTEE: TN0002950 OAK RIDGE K-25 SITE FF

ANALYTES	V P	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANC EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM		21.7	23.0	14.3- 29.1	16.1- 27.3	ACCEPTAE
VANADIUM		8720	8000	7110- 8830	7330- 8610	CHECK FOR ER
ZINC		1180	1100	961- 1220	993- 1190	ACCEPTAE
MISCELLANEOUS ANALYTES:						
PH-UNITS		8.60	8.70	8.31- 9.05	8.40- 8.96	ACCEPTAB
TOTAL SUSPENDED SOLIDS (IN MG/L)		40	43.2	34.7- 45.2	36.0- 43.9	ACCEPTAB
IL AND GREASE N MG/L)		12.5	15.0	8.13- 19.4	9.56- 18.0	ACCEPTAB
NUTRIENTS IN MILLIGRAMS PER LITER:						
AMMONIA-NITROGEN		5.61	5.50	4.35- 6.65	4.62- 6.37	ACCEPTAB
NITRATE-NITROGEN		32.5	34.0	27.5- 40.2	29.0- 38.7	ACCEPTAB
TOTAL PHOSPHORUS		3.20	3.20	2.35- 3.57	2.49- 3.42	ACCEPTAB
ORTHOPHOSPHATE		0.86	0.830	0.692-0.961	0.724-0.929	ACCEPTAB

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY

PERFORMANCE EVALUATION REPORT DATE: 7/15/

DMR-QA STUDY NUMBER 013

RMITTEE: TN0002950 OAK RIDGE K-25 SITE FF

ANALYTES	VP	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMAN EVALUATIO
DEMANDS IN MILLIGRAMS PER LITER:						
COD		18	21.8	12.6- 30.5	14.9- 28.2	ACCEPTA
TOC		8.8	8.61	7.22- 10.2	7.61- 9.80	ACCEPTA
5-DAY BOD		10.46	14.0	7.36- 20.7	9.03- 19.0	ACCEPTA
ADDITIONAL MISCELLANEOUS ANALYTES:						
TOTAL CYANIDE (IN MG/L)		0.253	0.250	0.138-0.341	0.164-0.316	ACCEPTA
TOTAL PHENOLICS (IN MG/L)		0.026	.0271	.0093-.0449	.0139-.0403	ACCEPTA
TOTAL RESIDUAL CHLORINE N MG/L)		0.62	0.729	0.469-0.912	0.528-0.853	ACCEPTA
FATHEAD MINNOW ACUTE DATA AS % OF SAMPLE:						
LC50 - DMW, 25 DEG.		29.73	31.3	7.56- 55.0	-	ACCEPTA
FATHEAD MINNOW CHRONIC DATA AS % OF SAMPLE:						
SURVIVAL, NOEC - DMW		25.00	25.0	12.5- 50.0	-	ACCEPTA

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSAR

PERFORMANCE EVALUATION REPORT DATE: 7/15/

DMR-QA STUDY NUMBER 013

RMITTEE: TN0002950 OAK RIDGE K-25 SITE FF

ANALYTES	VP	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANC EVALUATIO
FATHEAD MINNOW CHRONIC DATA AS % OF SAMPLE:						
GROWTH, IC25 - DMW		15.11	25.0	D.L.- 56.7	-	ACCEPTA
GROWTH, NOEC - DMW		6.250	12.5	6.25- 25.0	-	ACCEPTA
CERIODAPHNIA ACUTE DATA AS % OF SAMPLE:						
LC50 - DMW, 25 DEG.		27.74	22.6	D.L.- 45.4	-	ACCEPTA
CERIODAPHNIA CHRONIC DATA AS % OF SAMPLE:						
SURVIVAL, NOEC - DMW		50.00	50.0	25.0- 100	-	ACCEPTA
REPROD., IC25 - DMW		20.43	27.9	D.L.- 56.1	-	ACCEPTA
REPROD., NOEC - DMW		25.00	25.0	12.5- 50.0	-	ACCEPTA

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSAR

D.L. STANDS FOR DETECTION LIMIT

STATE OF TENNESSEE
LABORATORY SERVICES
630 BEN ALLEN ROAD
TENNESSEE DEPARTMENT OF HEALTH
NASHVILLE, TENNESSEE 37247-0801
FAX # (615) 262-6393

September 23, 1993

ROY MORROW
MM ORGDP
P.O. BOX 2003
(K-1004-C MS 7440)
OAK RIDGE, TN 37831-7440

Laboratory Number 02019

Dear Dr.MORROW:

Enclosed is your laboratory's performance evaluation report for Water Supply Study 32 (WS032).

Based on the results of this study, your laboratory certification status will change as follows:

- No changes.

The raw data for parameters missed in this study, if any, should be examined carefully to determine the cause for analytical errors. A report of your findings should be sent to this office.

Your laboratory will be included in the next Water Supply Study, WS033, for any parameters missed. The study is to be shipped October 8, 1993.

Sincerely,

Charles E. Mickle
Laboratory Certification Officer
Laboratory Quality Assurance

State of Tennessee
Certified Parameter List
Safe Drinking Water

September 23, 1993 MM ORGDP 02019

Inorganic Chemicals

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Selenium
Thallium

Nitrate
Nitrite
Fluoride

Total Filterable Residue
Calcium
pH
Alkalinity
Langelier Index
Sodium
Sulfate
Cyanide

Organic Chemicals

Endrin
Heptachlor
Heptachlor Epoxide
Lindane
Methoxychlor
Toxaphene

2,4-D
2,4,5-TP(Silvex)

Trihalomethanes

All

Volatile Organic Chemicals (including Vinyl Chloride)

Radiochemistry

Gross Alpha
Gross Beta
Cesium 134
Uranium

PERFORMANCE EVALUATION REPORT DATE: 4/13/91

WATER SUPPLY STUDY SUPPER WSO32

LABORATORY 73001

ANALYTES	SAMPLE NUMBER	REPORTED VALUE		TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	94.3		309	274- 335	NOT ACCEPTABLE
ANTIMONY	2	5.83		5.58	3.38- 7.41	ACCEPTABLE
ARSENIC	1	88.3		91.4	78.5- 103	ACCEPTABLE
BARIUM	2	507		511	438- 588	ACCEPTABLE
BERYLLIUM	1	1.14		1.033	1.099- 1.17	ACCEPTABLE
BORON	2	979	**	868	810- 1010	ACCEPTABLE
CADMIUM	1	4.71		4.80	3.38- 5.76	ACCEPTABLE
CHROMIUM	1	66.6		68.1	57.9- 78.3	ACCEPTABLE
COPPER	1	923		820	739- 902	ACCEPTABLE
LEAD	1	4.75		5.16	3.61- 6.71	ACCEPTABLE
MANGANESE	1	226		221	201- 239	ACCEPTABLE
MERCURY	1	5.46		6.23	4.35- 8.13	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.

PERFORMANCE EVALUATION REPORT DATE: 8/13/93

WATER SUPPLY STUDY NUMBER WS032

LABORATORY IW043

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
TRACE METALS IN MICROGRAMS PER LITER:					
MOLYBDENUM	2	6.40	5.58	4.20- 6.58	ACCEPTABLE
NICKEL	1	94.3	95.2	90.9- 109	ACCEPTABLE
SELENIUM	1	60.9	65.9	52.7- 79.1	ACCEPTABLE
SILVER	2	25.1	25.1	21.3- 29.9	ACCEPTABLE
THALLIUM	2	3.62	2.56	1.79- 3.31	NOT ACCEPTABLE
VANADIUM	1	161	160	143- 178	ACCEPTABLE
ZINC	1	85	83.6	73.7- 91.1	ACCEPTABLE
NITRATE/NITRITE/FLUORIDE IN MILLIGRAMS PER LITER:					
NITRATE AS N	1	3.55	3.60	3.24- 3.96	ACCEPTABLE
NITRITE AS N	1	2.01	2.30	1.75- 2.68	ACCEPTABLE
FLUORIDE	1	1.89	2.00	1.80- 2.20	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE 2/13/91

WATER SUPPLY STUDY NUMBER WS032

LABORATORY CN043

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
INSECTICIDES IN MICROGRAMS PER LITER:					
CHLORDANE (TOTAL)	3	1.9	5.33	2.93- 7.73	NOT ACCEPTABLE
HEPTACHLOR	4	0.27	0.443	0.244-0.642	ACCEPTABLE
HEPTACHLOR EPOXIDE	4	0.34	0.346	0.190-0.502	ACCEPTABLE
LINDANE	1	0.17	0.214	0.118-0.310	ACCEPTABLE
METHOXYCHLOR	1	14	17.4	9.57- 25.2	ACCEPTABLE
TOXAPHENE	2	3.5	3.71	2.04- 5.38	ACCEPTABLE
HERBICIDES IN MICROGRAMS PER LITER:					
2,4-D	1	17	15.6	9.36- 22.9	ACCEPTABLE
2,4,5-TP (SILVEX)	1	4.3	8.31	4.15- 12.5	ACCEPTABLE
TRIHALOMETHANES IN MICROGRAMS PER LITER:					
BROMODICHLOROMETHANE	1	27.7	22.4	17.3- 26.7	NOT ACCEPTABLE
BROMOFORM	1	29.2	26.4	21.1- 31.7	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 9/13/93

WATER SUPPLY STUDY NUMBER W5012

LABORATORY 13043

ANALYTE	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
TRIHALOMETHANES IN MICROGRAMS PER LITER:					
CHLORODIBROMOMETHANE	1	22.6	17.9	16.3- 21.5	ACCEPTABLE
CHLOROFORM	1	20.0	17.1	13.7- 20.5	ACCEPTABLE
TOTAL TRIHALOMETHANE	1	98.00	83.8	67.0- 101	ACCEPTABLE
VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:					
BENZENE	1	19.1	16.5	13.2- 17.8	ACCEPTABLE
CARBON TETRACHLORIDE	1	17.5	14.5	11.6- 17.0	ACCEPTABLE
CHLOROBENZENE	2	14.3	13.5	10.9- 16.2	ACCEPTABLE
1,2 DICHLOROBENZENE	2	11.3	13.5	10.9- 16.2	ACCEPTABLE
1,4-DICHLOROBENZENE	1	14.1	13.6	10.9- 16.3	ACCEPTABLE
1,2-DICHLOROETHANE	1	17.2	13.3	10.6- 16.0	ACCEPTABLE
1,1-DICHLOROETHYLENE	1	9.3	9.13	5.48- 12.8	ACCEPTABLE
C 1,2 DICHLOROETHYLENE	2	11.6	12.3	9.84- 14.8	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 9/13/93

WATER SUPPLY STUDY SUMMER 1993

LABORATORY 2HOM3

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:					
T 1,2 DICHLOROETHYLENE	2	17.0	16.9	13.5- 20.3	ACCEPTABLE
1,2 DICHLOROPROPANE	2	6.9	6.46	3.89- 9.08	ACCEPTABLE
ETHYLBENZENE	2	12.3	11.9	9.88- 14.2	ACCEPTABLE
STYRENE	2	8.0	8.66	5.20- 12.1	ACCEPTABLE
TETRACHLOROETHYLENE	2	7.4	7.83	4.65- 10.4	ACCEPTABLE
TOLUENE	2	6.5	6.54	3.92- 9.15	ACCEPTABLE
1,1,1-TRICHLOROETHANE	1	11.4	10.1	6.06- 13.2	ACCEPTABLE
TRICHLOROETHYLENE	1	12.9	11.2	8.96- 13.4	ACCEPTABLE
VINYL CHLORIDE	1	2.4	2.57	1.54- 3.60	ACCEPTABLE
TOTAL XYLENES	2	7.4	7.50	4.50- 10.5	ACCEPTABLE
BROMOBENZENE	3	0.11		D.L.- D.L.	NOT ACCEPTABLE
BROMOMETHANE	3	13.9	16.0	7.98- 22.3	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
D.L. STANDS FOR DETECTION LIMIT

WATER SUPPLY STUDY NUMBER [illegible]

LABORATORY [illegible]

ANALYTES	SAMPLE NUMBER	REPORTED VALUE		TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:						
DICHLOROMETHANE	3			7.77	5.85- 10.2	NOT ACCEPTABLE
HEXACHLOROBUTADIENE	3	18.5		19.3	14.1- 23.9	ACCEPTABLE
1,2,3-TRICHLOROBENZENE	3	12.9			D.L.- D.L.	NOT ACCEPTABLE
1,2,4-TRICHLOROBENZENE	3	< 0.20		14.1	9.90- 17.1	NOT ACCEPTABLE
1,1,2-TRICHLOROETHANE	3	10.6		13.2	9.59- 15.7	ACCEPTABLE
1,2,3-TRICHLOROPROPANE	3	< 0.03		9.55	5.99- 12.4	NOT ACCEPTABLE
MISCELLANEOUS ANALYTES:						
RESIDUAL FREE CHLORINE (MILLIGRAMS PER LITER)	1	1.052	**	1.09	0.805- 1.21	ACCEPTABLE
TURBIDITY (NTU'S)	1	4.5	**	4.10	3.74- 4.93	ACCEPTABLE
TOTAL FILTERABLE RESIDUE (MILLIGRAMS PER LITER)	1	320	**	275	201- 363	ACCEPTABLE
CALCIUM (MG. CACO3/L)	1	141		160	100- 172	NOT ACCEPTABLE
PH-UNITS	1	9.1		9.12	8.85- 9.39	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WERE NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.
D.L. STANDS FOR DETECTION LIMIT

Sep 30 '95 9:24 No.006 P.09/1
TEL:615-267-6395
IWR LAB SERVICES

PERFORMANCE EVALUATION REP[illegible] DATE: 9/13/93

WATER SUPPLY STUDY NUMBER [illegible]

LABORATORY [illegible]

ANALYTES	SAMPLE NUMBER	REPORTED VALUE		TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
MISCELLANEOUS ANALYTES:						
ALKALINITY (MG/L CACO3/L)	1	26	**	23.0	27.[illegible]- 33.6	NOT ACCEPTABLE
SODIUM (MILLIGRAMS PER LITER)	1	14.5		13.3	11.9- 14.8	ACCEPTABLE
SULFATE (MILLIGRAMS PER LITER)	1	28.7		27.0	24.7- 29.9	ACCEPTABLE
TOTAL CYANIDE (MILLIGRAMS PER LITER)	1	0.376		0.400	0.[illegible]-0.500	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.

PAGE 7 (LAST PAGE)

EML-556

Environmental Measurements Laboratory

SEMI-ANNUAL REPORT OF THE DEPARTMENT OF ENERGY, OFFICE OF ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT, QUALITY ASSESSMENT PROGRAM

Colin G. Sanderson and Catherine S. Klusek

July 1, 1993

DEPARTMENT OF ENERGY

NEW YORK, N. Y. 10014

EML-556

SEMI-ANNUAL REPORT OF THE DEPARTMENT OF ENERGY, OFFICE OF ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT, QUALITY ASSESSMENT PROGRAM

Colin G. Sanderson and Catherine S. Klusek

Environmental Measurements Laboratory
U. S. Department of Energy
New York, NY 10014-3621

July 1, 1993

DISCLAIMER

"This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof."

This report has been reproduced directly from the best available copy.

Available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

ABSTRACT

This report presents the results from the analysis of the 38th set of environmental quality assessment samples (QAP XXXVIII) that were received on or before June 2, 1993.

STATISTICAL SUMMARY

Isotope		Type	No. Avgd	EML Value	Mean * Reported	Ratio Range 0.8-1.2	0.5-1.5	Outside
H	3	Water	46	0.970E+02	0.962E+02	60%	82%	18%
BE	7	Air	61	0.274E+02	0.274E+02	81%	100%	0%
K	40	Soil	58	0.321E+03	0.330E+03	71%	90%	10%
K	40	Vegetn	47	0.383E+03	0.406E+03	66%	94%	6%
MN	54	Air	59	0.117E+02	0.116E+02	91%	98%	2%
MN	54	Water	65	0.105E+03	0.110E+03	94%	97%	3%
FE	55	Water	5	0.237E+02	0.293E+02	28%	71%	29%
CO	57	Air	59	0.271E+01	0.239E+01	78%	96%	4%
CO	60	Air	60	0.170E+01	0.168E+01	86%	98%	2%
CO	60	Water	66	0.453E+02	0.477E+02	89%	97%	3%
SR	90	Air	17	0.152E+00	0.176E+00	35%	60%	40%
SR	90	Soil	39	0.417E+02	0.378E+02	66%	92%	8%
SR	90	Vegetn	27	0.237E+03	0.220E+03	55%	79%	21%
SR	90	Water	36	0.103E+01	0.118E+01	34%	76%	24%
CS	134	Air	59	0.196E+01	0.202E+01	90%	98%	2%
CS	134	Water	63	0.424E+02	0.462E+02	87%	96%	4%
CS	137	Air	61	0.307E+01	0.309E+01	85%	98%	2%
CS	137	Soil	64	0.923E+03	0.998E+03	73%	98%	2%
CS	137	Vegetn	53	0.246E+02	0.268E+02	64%	98%	2%
CS	137	Water	66	0.508E+02	0.551E+02	86%	97%	3%
CE	144	Air	57	0.193E+02	0.164E+02	61%	96%	4%
CE	144	Water	63	0.836E+02	0.871E+02	90%	98%	2%
PU	238	Air	33	0.363E-01	0.339E-01	67%	89%	11%
PU	238	Vegetn	27	0.114E+01	0.121E+01	68%	84%	16%
PU	238	Water	49	0.494E+00	0.505E+00	81%	92%	8%
PU	239	Air	36	0.234E-01	0.233E-01	84%	94%	6%
PU	239	Soil	52	0.116E+02	0.109E+02	74%	96%	4%
PU	239	Vegetn	27	0.323E+00	0.347E+00	47%	79%	21%
PU	239	Water	49	0.828E+00	0.845E+00	86%	92%	8%
AM	241	Air	21	0.414E-01	0.401E-01	64%	84%	16%
AM	241	Soil	30	0.650E+01	0.612E+01	52%	88%	12%
AM	241	Vegetn	13	0.231E+00	0.247E+00	31%	68%	32%
AM	241	Water	34	0.440E+00	0.467E+00	71%	89%	11%
U	234	Air	15	0.220E-01	0.250E-01	63%	78%	22%
U	234	Soil	26	0.378E+02	0.316E+02	61%	100%	0%
U	234	Water	20	0.151E+00	0.150E+00	73%	86%	14%
U	238	Air	16	0.240E-01	0.232E-01	68%	84%	16%
U	238	Soil	27	0.376E+02	0.331E+02	74%	100%	0%
U	238	Water	22	0.147E+00	0.153E+00	65%	95%	5%
U	BQ	Air	7	0.460E-01	0.471E-01	60%	70%	30%
U	BQ	Soil	9	0.769E+02	0.677E+02	50%	56%	44%
U	BQ	Water	10	0.289E+00	0.280E+00	50%	83%	17%
U	UG	Air	12	0.180E+01	0.187E+01	71%	85%	15%
U	UG	Soil	11	0.304E+01	0.250E+01	50%	78%	22%
U	UG	Water	21	0.117E-01	0.120E-01	83%	87%	13%

* : Mean of submitted data in range of 0.5 to 1.5 times EML value.

Laboratory Listing

Date	Type	Lab	Isotope	Ser	Reported Value	Reported % Error	EML Value	Ratio Rp/EML	Ratio +/-
93 03	AIR	UK	BE 7	1	0.276E+02	17	0.274E+02	1.01	0.18
93 03	AIR	UK	MN 54	1	0.112E+02	4	0.117E+02	0.96	0.05
93 03	AIR	UK	CO 57	1	0.239E+01	8	0.271E+01	0.88	0.08
93 03	AIR	UK	CO 60	1	0.152E+01	14	0.170E+01	0.89	0.14
93 03	AIR	UK	SR 90	1	0.273E+00	69	0.152E+00	1.80	1.26
93 03	AIR	UK	CS 134	1	0.165E+01	12	0.196E+01	0.84	0.11
93 03	AIR	UK	CS 137	1	0.289E+01	11	0.307E+01	0.94	0.12
93 03	AIR	UK	CE 144	1	0.146E+02	9	0.193E+02	0.76	0.08
93 03	AIR	UK	U BQ	1	0.101E+00	38	0.460E-01	2.20	0.85
93 03	SOIL	UK	K 40	1	0.595E+03	33	0.321E+03	1.85	0.63
93 03	SOIL	UK	SR 90	1	0.384E+02	23	0.417E+02	0.92	0.22
93 03	SOIL	UK	CS 137	1	0.574E+03	3	0.923E+03	0.62	0.02
93 03	SOIL	UK	PU 239	1	0.963E+01	14	0.116E+02	0.83	0.14
93 03	SOIL	UK	U BQ	1	0.378E+02	15	0.769E+02	0.49	0.08
93 03	WATER	UK	MN 54	1	0.110E+03	2	0.105E+03	1.05	0.03
93 03	WATER	UK	CO 60	1	0.477E+02	3	0.453E+02	1.05	0.05
93 03	WATER	UK	SR 90	1	0.737E+00	113	0.103E+01	0.72	0.82
93 03	WATER	UK	CS 134	1	0.458E+02	2	0.424E+02	1.08	0.06
93 03	WATER	UK	CS 137	1	0.556E+02	3	0.508E+02	1.09	0.05
93 03	WATER	UK	CE 144	1	0.857E+02	6	0.836E+02	1.03	0.07
93 03	WATER	UK	PU 238	1	0.589E+00	13	0.494E+00	1.19	0.16
93 03	WATER	UK	PU 239	1	0.901E+00	10	0.828E+00	1.09	0.12
93 03	WATER	UK	U BQ	1	0.387E+00	13	0.289E+00	1.34	0.21

Performance Evaluation-A

Intercomparison Study

April 20, 1993

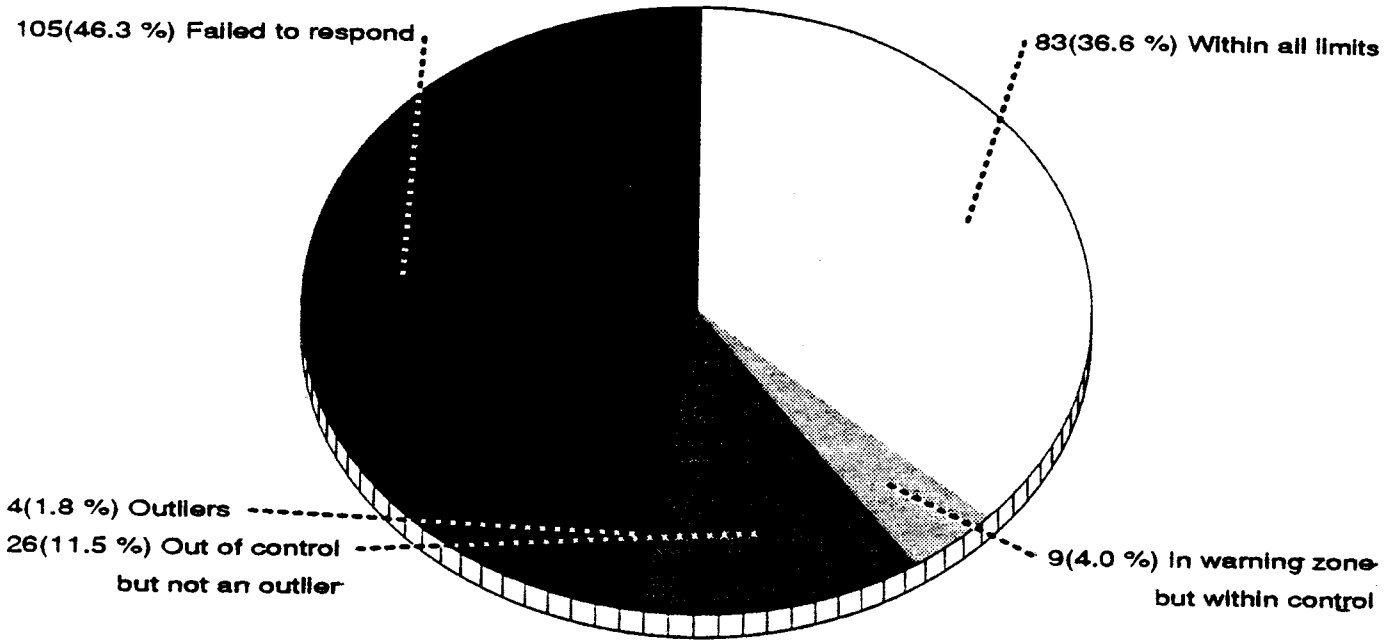
Environmental Protection Agency

Environmental Monitoring Systems Laboratory

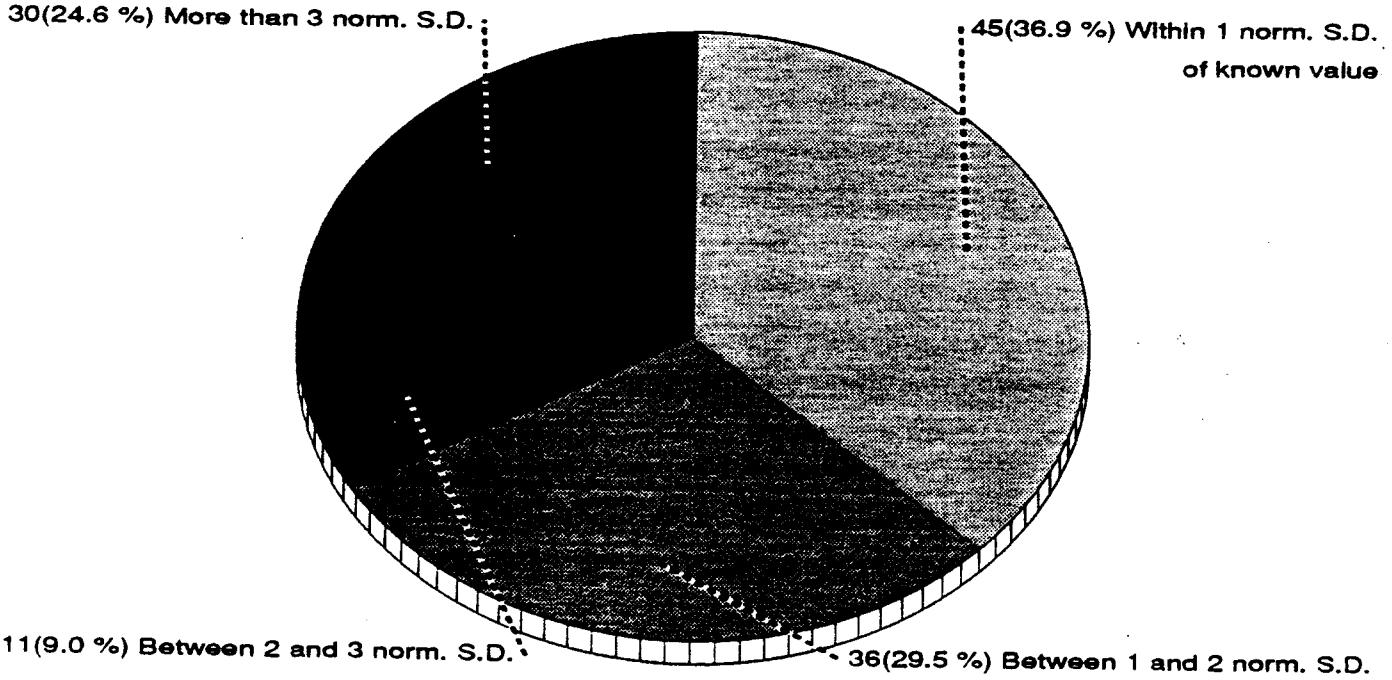
Las Vegas, Nevada

Uranium (Natural) Statistical Summary 227 Participants

The known value of this nuclide is **28.9 pCi/l** with an expected precision of **3.0**; the control limits are 23.7 to 34.1; the warning regions are 23.7 to 25.4 and 32.4 to 34.1



Statistic	Respondents	Non-outliers
Mean	30.76	**Grand Avg 27.64**
Std. Dev.	20.83	5.01
Variance	433.77	25.13
% Coef. of Var.	67.70	18.14
% deviation of mean from known value	6.44	-4.35
Norm. dev. of mean from known value	0.09	-0.25
Median	28.32	28.25
% deviation of median from known value	-2.02	-2.25
Norm. dev. of median from known value	-0.03	-0.13



Uranium (Natural)

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
JN	14.0	13.5	12.6	0.71	0.276	13.37	-8.24	-8.97	⇓
JQ									•
JS	81.9	81.2	80.6	0.65	0.256	81.23	30.94	30.21	×
JY	12.5	22.5	22.8	5.86	2.958	19.27	-4.84	-5.56	⇓
K	33.2	30.8	31.3	1.27	0.473	31.77	2.38	1.66	
KE									•
KF									•
KM									•
KT	24.0	23.0	23.0	0.58	0.197	23.33	-2.49	-3.21	⇓
KX									•
KZ									•
L	32.5	30.7	31.1	0.95	0.354	31.43	2.19	1.46	
LA									•
LE									•
LF									•
LG									•
LL									•
LM									•
LR									•
LT	28.9	27.4	27.3	0.90	0.315	27.87	0.13	-0.60	
M	10.0	14.0	15.0	2.65	0.984	13.00	-8.45	-9.18	⇓
MA									•
ME									•
MN									•
MO									•
MP									•
MQ									•
MS	26.2	25.8	25.1	0.56	0.217	25.70	-1.12	-1.85	
MV									•
MY									•
N	27.8	27.3	28.1	0.40	0.158	27.73	0.05	-0.67	
NA	26.0	27.0	28.0	1.00	0.394	27.00	-0.37	-1.10	
NG									•
NH	33.5	32.7	33.5	0.46	0.158	33.23	3.23	2.50	
NI									•
NJ	27.0	26.0	27.0	0.58	0.197	26.67	-0.56	-1.29	
NK	60.7	62.2	64.3	1.81	0.709	62.40	20.07	19.34	×
NO	29.2	30.1	31.0	0.90	0.354	30.10	1.42	0.69	
NT	26.1	22.5	24.3	1.80	0.709	24.30	-1.93	-2.66	
NZ									•
O									•
OE									•
OF	26.0	22.2	23.3	1.96	0.748	23.83	-2.20	-2.93	
OK									•
OM									•

• ≡ No data submitted

∅ ≡ Insufficient data

TAG SYMBOLS

× ≡ Determined to be an outlier

⇑ ≡ Above control limit

⇓ ≡ Below control limit

Performance Evaluation-B

Intercomparison Study

April 20, 1993

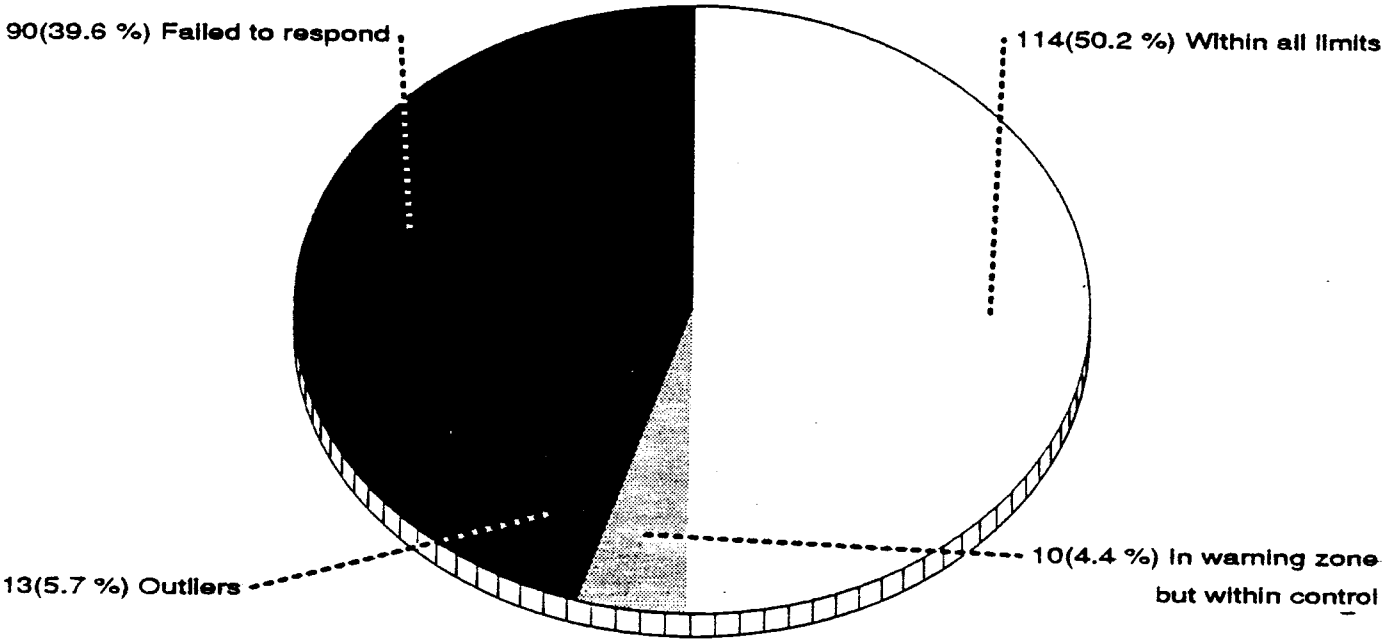
Environmental Protection Agency

Environmental Monitoring Systems Laboratory

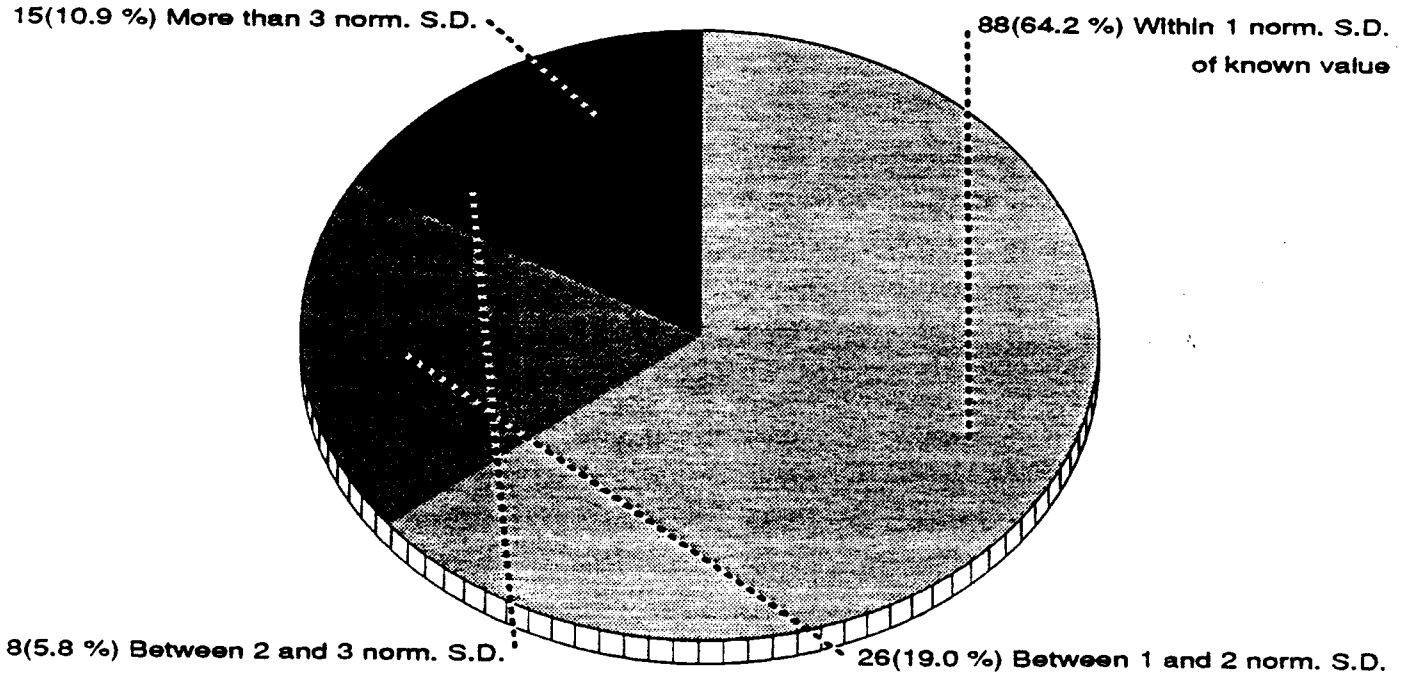
Las Vegas, Nevada

Cobalt-60 Statistical Summary 227 Participants

The known value of this nuclide is **39.0 pCi/l** with an expected precision of **5.0**; the control limits are 30.3 to 47.7; the warning regions are 30.3 to 33.2 and 44.8 to 47.7



Statistic	Respondents	Non-outliers
Mean	49.27	**Grand Avg 39.36**
Std. Dev.	75.74	2.90
Variance	5736.53	8.39
% Coef. of Var.	153.74	7.36
% deviation of mean from known value	26.32	0.92
Norm. dev. of mean from known value	0.14	0.12
Median	39.00	39.00
% deviation of median from known value	0.00	0.00
Norm. dev. of median from known value	0.00	0.00



Cobalt-60

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
JN									•
JQ									•
JS	54.0	46.0	39.0	7.51	2.470	46.33	2.42	2.54	
JY	40.0	45.0	41.0	2.65	0.591	42.00	0.92	1.04	
K	43.0	47.0	43.0	2.31	0.473	44.33	1.72	1.85	
KE									•
KF									•
KM	37.0	38.0	37.0	0.58	0.118	37.33	-0.70	-0.58	
KT									•
KX	43.0	41.0	39.0	2.00	0.473	41.00	0.57	0.69	
KZ									•
L	33.0	31.0	33.0	1.15	0.236	32.33	-2.43	-2.31	
LA									•
LE									•
LF	36.0	39.0	39.0	1.73	0.354	38.00	-0.47	-0.35	
LG									•
LL									•
LM									•
LR	41.0	31.0	36.0	5.00	1.345	36.00	-1.16	-1.04	
LT	35.0	35.0	35.0	0.00	0.000	35.00	-1.51	-1.39	
M	38.0	38.0	40.0	1.15	0.236	38.67	-0.24	-0.12	
MA	37.0	38.0	38.0	0.58	0.118	37.67	-0.59	-0.46	
ME									•
MN									•
MO									•
MP	38.0	38.0	35.0	1.73	0.354	37.00	-0.82	-0.69	
MQ	38.0	36.0	43.0	3.61	0.827	39.00	-0.12	0.00	
MS	36.0	41.0	41.0	2.89	0.591	39.33	-0.01	0.12	
MV	17.0	19.0	15.0	2.00	0.473	17.00	-7.74	-7.62	×
MY	37.0	37.0	38.0	0.58	0.118	37.33	-0.70	-0.58	
N	43.0	40.0	43.0	1.73	0.354	42.00	0.92	1.04	
NA									•
NG									•
NH	38.0	37.0	38.0	0.58	0.118	37.67	-0.59	-0.46	
NI									•
NJ	40.0	39.0	41.0	1.00	0.236	40.00	0.22	0.35	
NK	80.0	80.0	77.0	1.73	0.354	79.00	13.73	13.86	×
NO									•
NT									•
NZ									•
O	42.0	42.0	42.0	0.00	0.000	42.00	0.92	1.04	
OE									•
OF									•
OK									•
OM									•

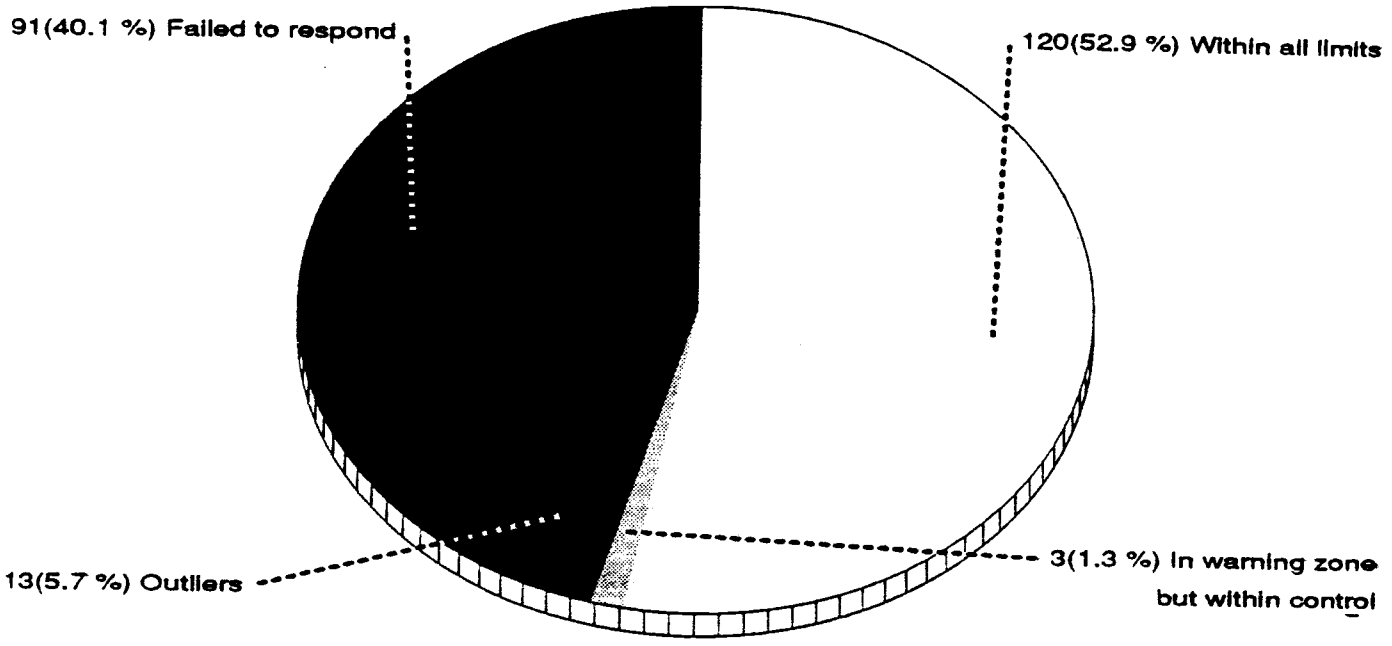
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

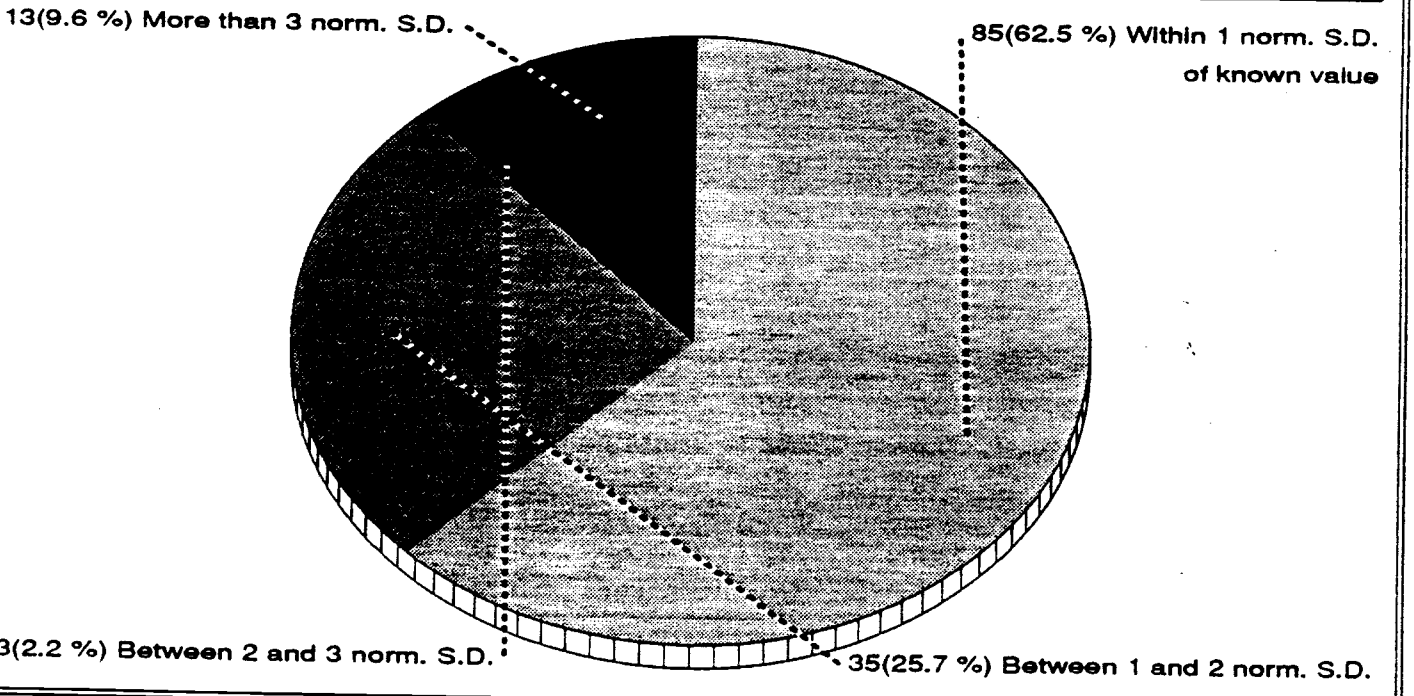
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cesium-134 Statistical Summary 227 Participants

The known value of this nuclide is **27.0 pCi/l** with an expected precision of **5.0**; the control limits are 18.3 to 35.7; the warning regions are 18.3 to 21.2 and 32.8 to 35.7



Statistic	Respondents	Non-outliers
Mean	31.75	**Grand Avg 25.40**
Std. Dev.	46.22	2.14
Variance	2136.22	4.58
% Coef. of Var.	145.57	8.42
% deviation of mean from known value	17.59	-5.91
Norm. dev. of mean from known value	0.10	-0.75
Median	25.33	25.00
% deviation of median from known value	-6.17	-7.41
Norm. dev. of median from known value	-0.04	-0.94



Cesium-134

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
JN									•
JQ									•
JS	23.0	23.0	22.0	0.58	0.118	22.67	-0.95	-1.50	
JY	24.0	27.0	27.0	1.73	0.354	26.00	0.21	-0.35	
K	23.0	27.0	24.0	2.08	0.473	24.67	-0.26	-0.81	
KE									•
KF									•
KM	25.0	24.0	24.0	0.58	0.118	24.33	-0.37	-0.92	
KT									•
KX	27.0	29.0	26.0	1.53	0.354	27.33	0.67	0.12	
KZ									•
L	22.0	22.0	26.0	2.31	0.473	23.33	-0.72	-1.27	
LA									•
LE									•
LF	26.0	25.0	25.0	0.58	0.118	25.33	-0.02	-0.58	
LG									•
LL									•
LM									•
LR	52.0	48.0	53.0	2.65	0.591	51.00	8.87	8.31	×
LT	25.0	25.0	25.0	0.00	0.000	25.00	-0.14	-0.69	
M	28.0	31.0	27.0	2.08	0.473	28.67	1.13	0.58	
MA	23.0	24.0	24.0	0.58	0.118	23.67	-0.60	-1.15	
ME									•
MN									•
MO									•
MP	25.0	24.0	28.0	2.08	0.473	25.67	0.09	-0.46	
MQ	25.0	23.0	25.0	1.15	0.236	24.33	-0.37	-0.92	
MS	22.0	24.0	28.0	3.06	0.709	24.67	-0.26	-0.81	
MV	10.0	8.0	9.0	1.00	0.236	9.00	-5.68	-6.24	×
MY	24.0	26.0	26.0	1.15	0.236	25.33	-0.02	-0.58	
N	25.0	27.0	26.0	1.00	0.236	26.00	0.21	-0.35	
NA									•
NG									•
NH	24.0	25.0	24.0	0.58	0.118	24.33	-0.37	-0.92	
NI									•
NJ	26.0	24.0	28.0	2.00	0.473	26.00	0.21	-0.35	
NK	50.0	45.0	44.0	3.21	0.709	46.33	7.25	6.70	×
NO									•
NT									•
NZ									•
O	27.0	27.0	27.0	0.00	0.000	27.00	0.55	0.00	
OE									•
OF									•
OK									•
OM									•

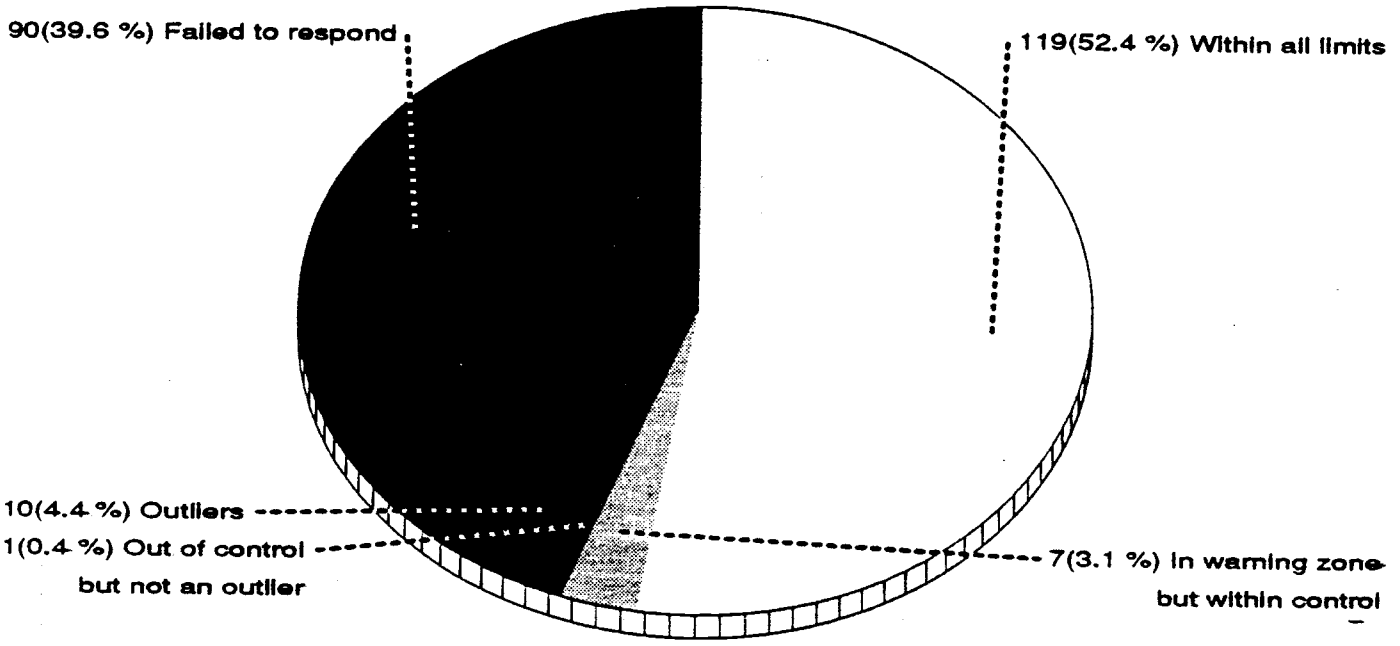
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

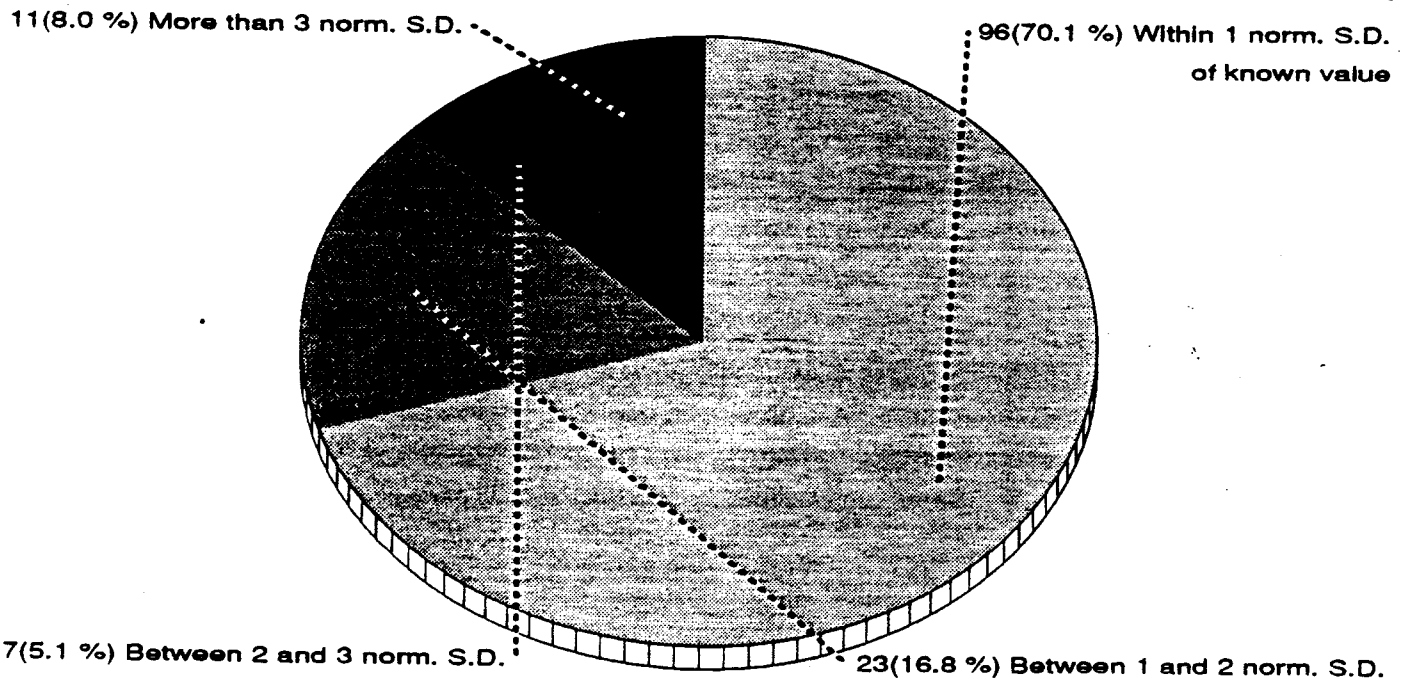
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Cesium-137 Statistical Summary 227 Participants

The known value of this nuclide is **32.0 pCi/l** with an expected precision of **5.0**; the control limits are 23.3 to 40.7; the warning regions are 23.3 to 26.2 and 37.8 to 40.7



Statistic	Respondents	Non-outliers
Mean	39.46	**Grand Avg 32.60**
Std. Dev.	55.82	2.81
Variance	3116.03	7.89
% Coef. of Var.	141.45	8.62
% deviation of mean from known value	23.33	1.86
Norm. dev. of mean from known value	0.13	0.21
Median	32.67	32.33
% deviation of median from known value	2.08	1.04
Norm. dev. of median from known value	0.01	0.12



Cesium-137

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
JN									•
JQ									•
JS	45.0	38.0	36.0	4.73	1.120	39.67	2.45	2.66	
JY	35.0	35.0	36.0	0.58	0.118	35.33	0.95	1.15	
K	38.0	39.0	41.0	1.53	0.354	39.33	2.33	2.54	
KE									•
KF									•
KM	30.0	32.0	31.0	1.00	0.236	31.00	-0.55	-0.35	
KT									•
KX	31.0	30.0	33.0	1.53	0.354	31.33	-0.44	-0.23	
KZ									•
L	30.0	27.0	30.0	1.73	0.354	29.00	-1.25	-1.04	
LA									•
LE									•
LF	36.0	32.0	31.0	2.65	0.591	33.00	0.14	0.35	
LG									•
LL									•
LM									•
LR	39.0	27.0	64.0	18.88	7.421	43.33	3.72	3.93	×
LT	33.0	33.0	33.0	0.00	0.000	33.00	0.14	0.35	
M	36.0	35.0	36.0	0.58	0.118	35.67	1.06	1.27	
MA	30.0	32.0	31.0	1.00	0.236	31.00	-0.55	-0.35	
ME									•
MN									•
MO									•
MP	29.0	29.0	31.0	1.15	0.236	29.67	-1.01	-0.81	
MQ	33.0	32.0	34.0	1.00	0.236	33.00	0.14	0.35	
MS	27.0	27.0	30.0	1.73	0.354	28.00	-1.59	-1.39	
MV	14.0	18.0	14.0	2.31	0.473	15.33	-5.98	-5.77	×
MY	32.0	32.0	34.0	1.15	0.236	32.67	0.02	0.23	
N	34.0	33.0	31.0	1.53	0.354	32.67	0.02	0.23	
NA									•
NG									•
NH	34.0	34.0	34.0	0.00	0.000	34.00	0.49	0.69	
NI									•
NJ	33.0	35.0	36.0	1.53	0.354	34.67	0.72	0.92	
NK	69.0	66.0	67.0	1.53	0.354	67.33	12.03	12.24	×
NO									•
NT									•
NZ									•
O	34.0	34.0	34.0	0.00	0.000	34.00	0.49	0.69	
OE									•
OF									•
OK									•
OM									•

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Gamma in Water

Intercomparison Study

June 11, 1993

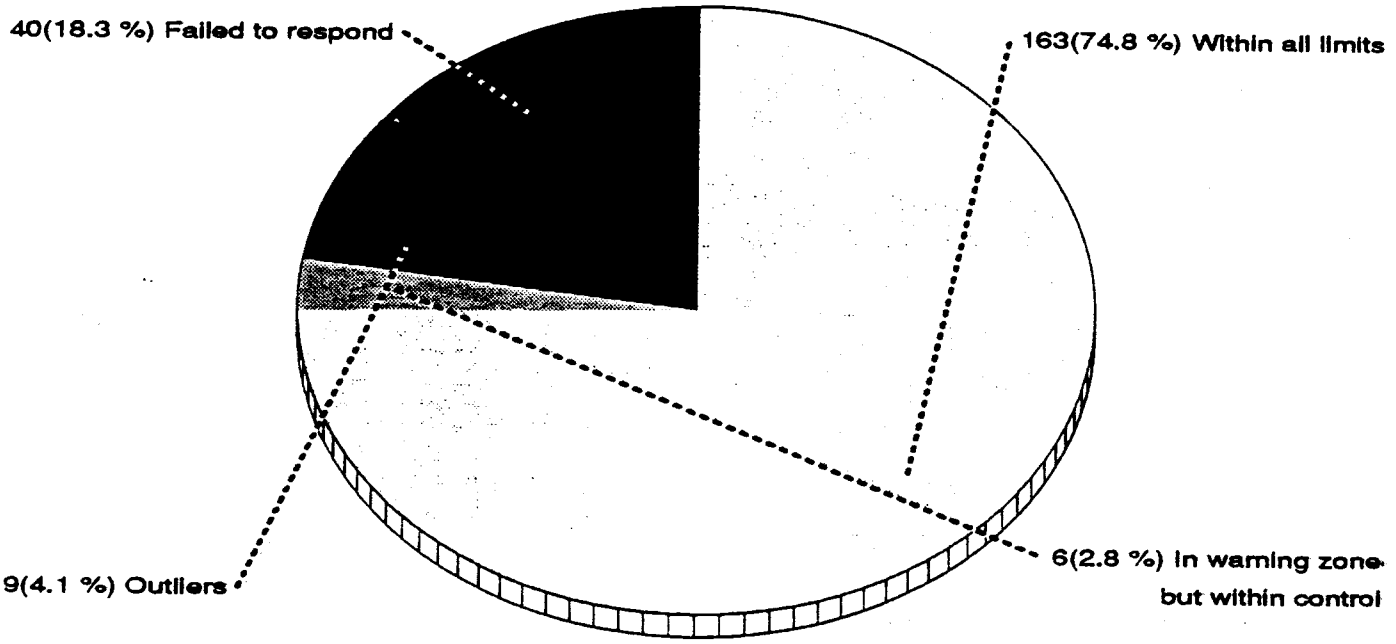
Environmental Protection Agency

Environmental Monitoring Systems Laboratory

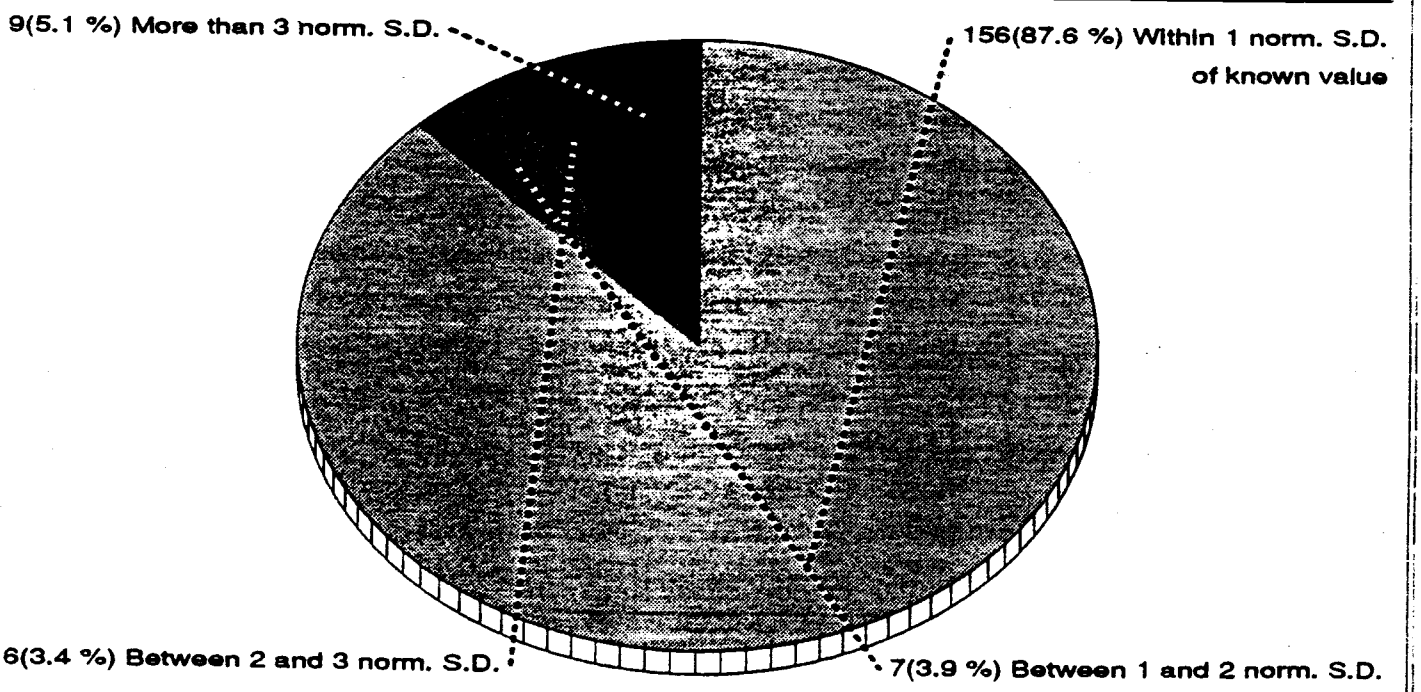
Las Vegas, Nevada

Cobalt-60 Statistical Summary 218 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	16.07	**Grand Avg 14.90**
Std. Dev.	11.04	2.08
Variance	121.95	4.32
% Coef. of Var.	68.71	13.96
% deviation of mean from known value	7.15	-0.68
Norm. dev. of mean from known value	0.10	-0.05
Median	15.00	15.00
% deviation of median from known value	0.00	0.00
Norm. dev. of median from known value	0.00	0.00



Cobalt-60

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
KF									•
KH	16.0	18.0	16.0	1.15	0.236	16.67	0.61	0.58	
KL	16.0	15.0	17.0	1.00	0.236	16.00	0.38	0.35	
KM	14.0	14.0	14.0	0.00	0.000	14.00	-0.31	-0.35	
KX	15.0	15.0	16.0	0.58	0.118	15.33	0.15	0.12	
L	15.0	13.0	12.0	1.53	0.354	13.33	-0.54	-0.58	
LA									•
LE	11.0	15.0	11.0	2.31	0.473	12.33	-0.89	-0.92	
LF	14.0	14.0	15.0	0.58	0.118	14.33	-0.20	-0.23	
LM									•
LR	11.0	18.0	9.0	4.73	1.120	12.67	-0.77	-0.81	
LT	15.0	15.0	15.0	0.00	0.000	15.00	0.04	0.00	
M	15.0	15.0	16.0	0.58	0.118	15.33	0.15	0.12	
MA	15.0	14.0	15.0	0.58	0.118	14.67	-0.08	-0.12	
ML	19.0	25.0	32.0	6.51	2.020	25.33	3.82	3.58	×
MN									•
MP	15.0	15.0	14.0	0.58	0.118	14.67	-0.08	-0.12	
MQ	20.0	15.0	18.0	2.52	0.591	17.67	0.96	0.92	
MS	14.0	16.0	15.0	1.00	0.236	15.00	0.04	0.00	
MT									•
MV	12.0	14.0	16.0	2.00	0.473	14.00	-0.31	-0.35	
MY									•
N	16.0	15.0	15.0	0.58	0.118	15.33	0.15	0.12	
NB	12.0	13.0	15.0	1.53	0.354	13.33	-0.54	-0.58	
NH	14.0	13.0	15.0	1.00	0.236	14.00	-0.31	-0.35	
NI	18.0	14.0	14.0	2.31	0.473	15.33	0.15	0.12	
NJ	15.0	16.0	16.0	0.58	0.118	15.67	0.27	0.23	
NK	15.0	16.0	14.0	1.00	0.236	15.00	0.04	0.00	
NP	18.0	15.0	13.0	2.52	0.591	15.33	0.15	0.12	
NZ	23.0	24.0	18.0	3.21	0.709	21.67	2.34	2.31	
O	16.0	16.0	16.0	0.00	0.000	16.00	0.38	0.35	
OA									•
OB	14.0	14.0	14.0	0.00	0.000	14.00	-0.31	-0.35	
OK	13.0	14.0	14.0	0.58	0.118	13.67	-0.43	-0.46	
OL									•
OM	156.0	160.0	156.0	8.21	0.709	153.67	48.07	48.04	×
OT									•
OZ									•
PB	15.0	15.0	15.0	0.00	0.000	15.00	0.04	0.00	
PC	13.0	14.0	12.0	1.00	0.236	13.00	-0.66	-0.69	
PD	17.0	16.0	17.0	0.58	0.118	16.67	0.61	0.58	
PE	43.0	31.0	17.0	13.01	4.946	30.33	5.35	5.31	×
PI	17.0	17.0	16.0	0.58	0.118	16.67	0.61	0.58	
PM	13.0	18.0	16.0	2.52	0.591	15.67	0.27	0.23	
PP	15.0	15.0	14.0	0.58	0.118	14.67	-0.08	-0.12	

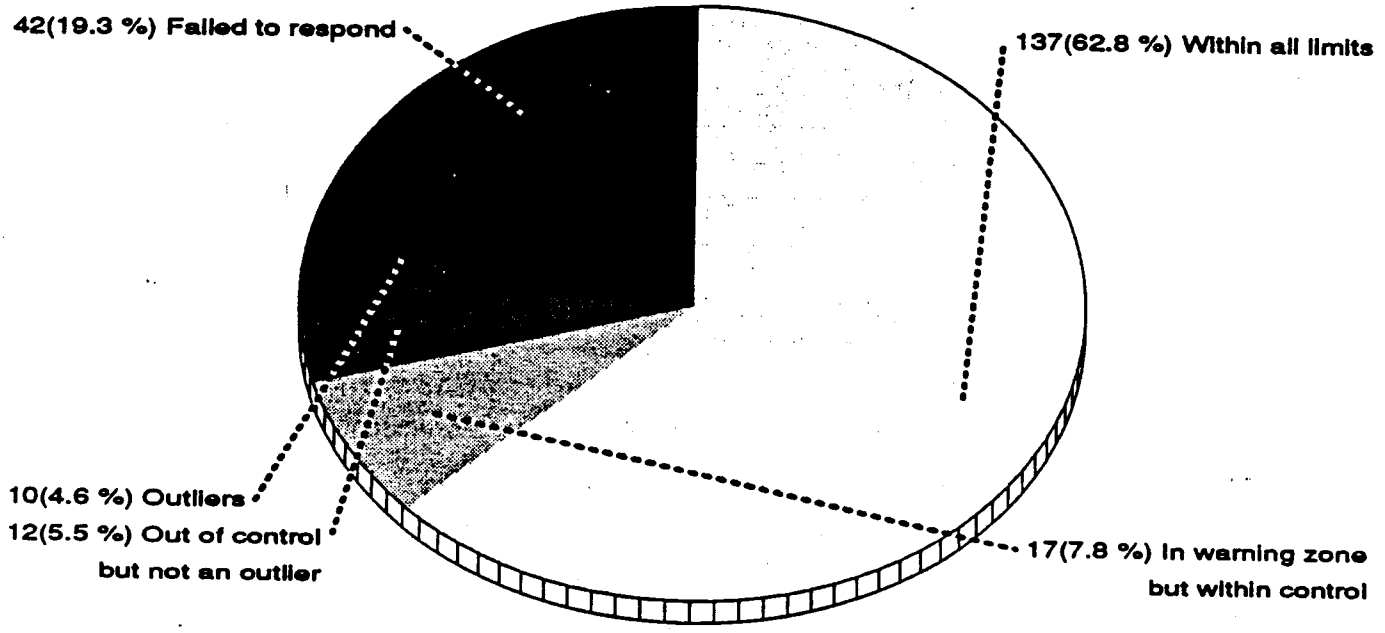
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

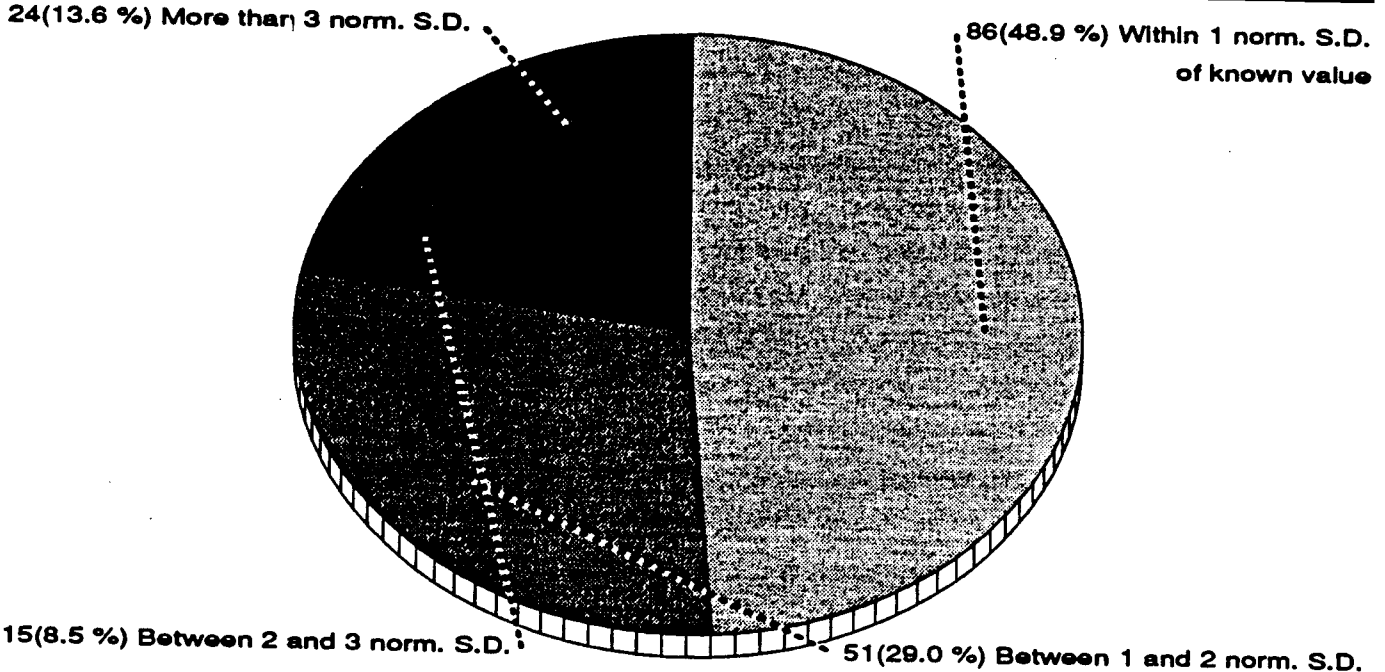
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Zinc-65 Statistical Summary 218 Participants

The known value of this nuclide is 103.0 pCi/l with an expected precision of 10.0; the control limits are 85.7 to 120.3; the warning regions are 85.7 to 91.4 and 114.6 to 120.3



Statistic	Respondents	Non-outliers
Mean	106.02	Grand Avg 107.54
Std. Dev.	16.66	7.83
Variance	277.55	61.36
% Coef. of Var.	15.71	7.28
% deviation of mean from known value	2.93	4.41
Norm. dev. of mean from known value	0.18	0.58
Median	107.33	107.33
% deviation of median from known value	4.21	4.21
Norm. dev. of median from known value	0.26	0.55



Zinc-65

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
KF									•
KH	125.0	99.0	105.0	13.61	2.020	109.67	0.37	1.15	
KL	110.0	113.0	111.0	1.53	0.177	111.33	0.66	1.44	
KM	106.0	106.0	106.0	0.00	0.000	106.00	-0.27	0.52	
KX	107.0	100.0	103.0	3.51	0.413	103.33	-0.73	0.06	
L	91.0	94.0	95.0	2.08	0.236	93.33	-2.46	-1.67	
LA									•
LE	114.0	9.0	114.0	60.62	10.909	79.00	-4.94	-4.16	×
LF	100.0	89.0	110.0	10.50	1.458	99.67	-1.36	-0.58	
LM									•
LR	124.0	136.0	103.0	16.70	2.808	121.00	2.33	3.12	⇑
LT	110.0	110.0	110.0	0.00	0.000	110.00	0.43	1.21	
M	122.0	125.0	123.0	1.53	0.177	123.33	2.74	3.52	⇑
MA	106.0	110.0	109.0	2.08	0.236	108.33	0.14	0.92	
ML	95.0	115.0	75.0	20.00	3.596	95.00	-2.17	-1.39	
MN									•
MP	122.0	120.0	119.0	1.53	0.177	120.33	2.22	3.00	
MQ	96.0	106.0	102.0	5.03	0.591	101.33	-1.08	-0.29	
MS	116.0	120.0	117.0	2.08	0.236	117.67	1.75	2.54	
MT									•
MV	102.0	106.0	106.0	2.31	0.236	104.67	-0.50	0.29	
MY									•
N	101.0	108.0	102.0	3.79	0.413	103.67	-0.67	0.12	
NB	104.0	109.0	105.0	2.65	0.295	106.00	-0.27	0.52	
NH	114.0	112.0	113.0	1.00	0.118	113.00	0.95	1.73	
NI	98.0	97.0	103.0	3.21	0.354	99.33	-1.42	-0.64	
NJ	110.0	110.0	110.0	0.00	0.000	110.00	0.43	1.21	
NK	116.0	119.0	115.0	2.08	0.236	116.67	1.58	2.37	
NP	98.0	106.0	99.0	4.36	0.473	101.00	-1.13	-0.35	
NZ	110.0	108.0	116.0	4.16	0.473	111.33	0.66	1.44	
O	114.0	114.0	115.0	0.58	0.059	114.33	1.18	1.96	
OA									•
OB									•
OK	97.0	93.0	90.0	3.51	0.413	93.33	-2.46	-1.67	
OL									•
OM	113.0	122.0	120.0	4.73	0.532	118.33	1.87	2.66	
OT									•
OZ									•
PB	98.0	96.0	99.0	1.53	0.177	97.67	-1.71	-0.92	
PC	90.0	106.0	94.0	8.33	0.945	96.67	-1.88	-1.10	
PD	105.0	108.0	174.0	39.00	6.858	129.00	3.72	4.50	⇑
PE	108.0	121.0	120.0	7.23	0.768	116.33	1.52	2.31	
[illegible]	127.0	121.0	125.0	3.06	0.354	124.33	2.91	3.70	⇑
PM									•
PP	83.0	101.0	90.0	9.07	1.120	91.33	-2.81	-2.02	

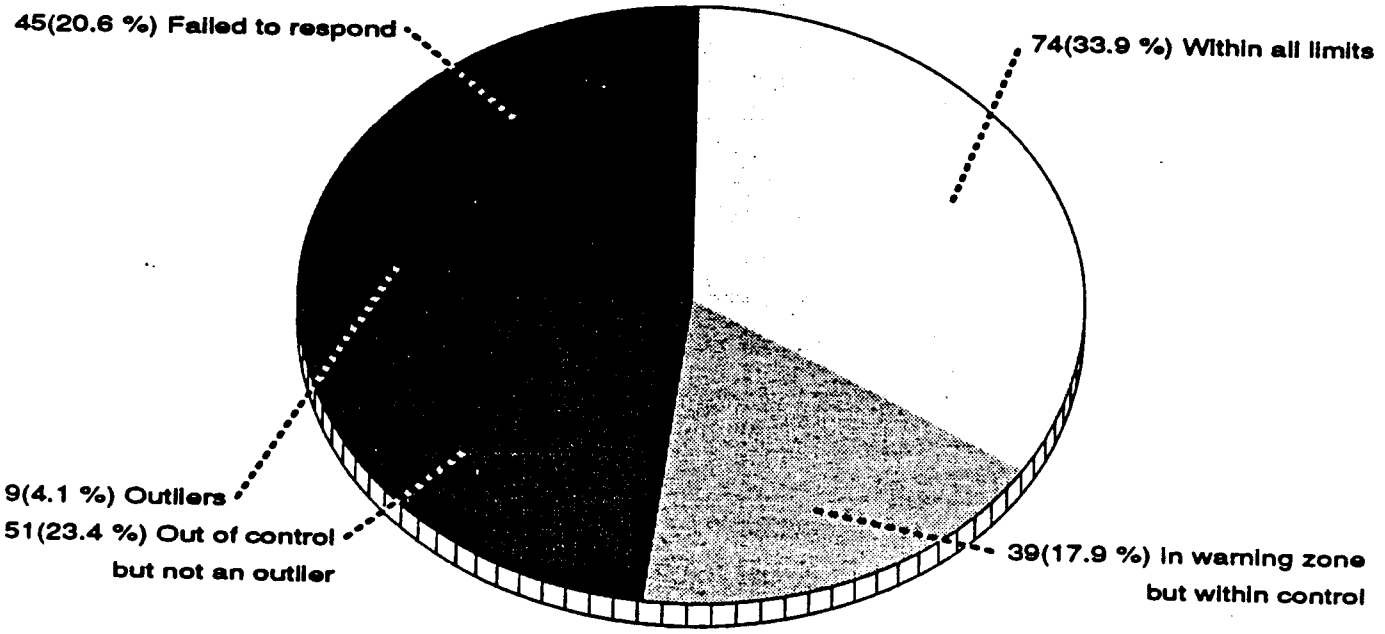
• ≡ No data submitted
Ø ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

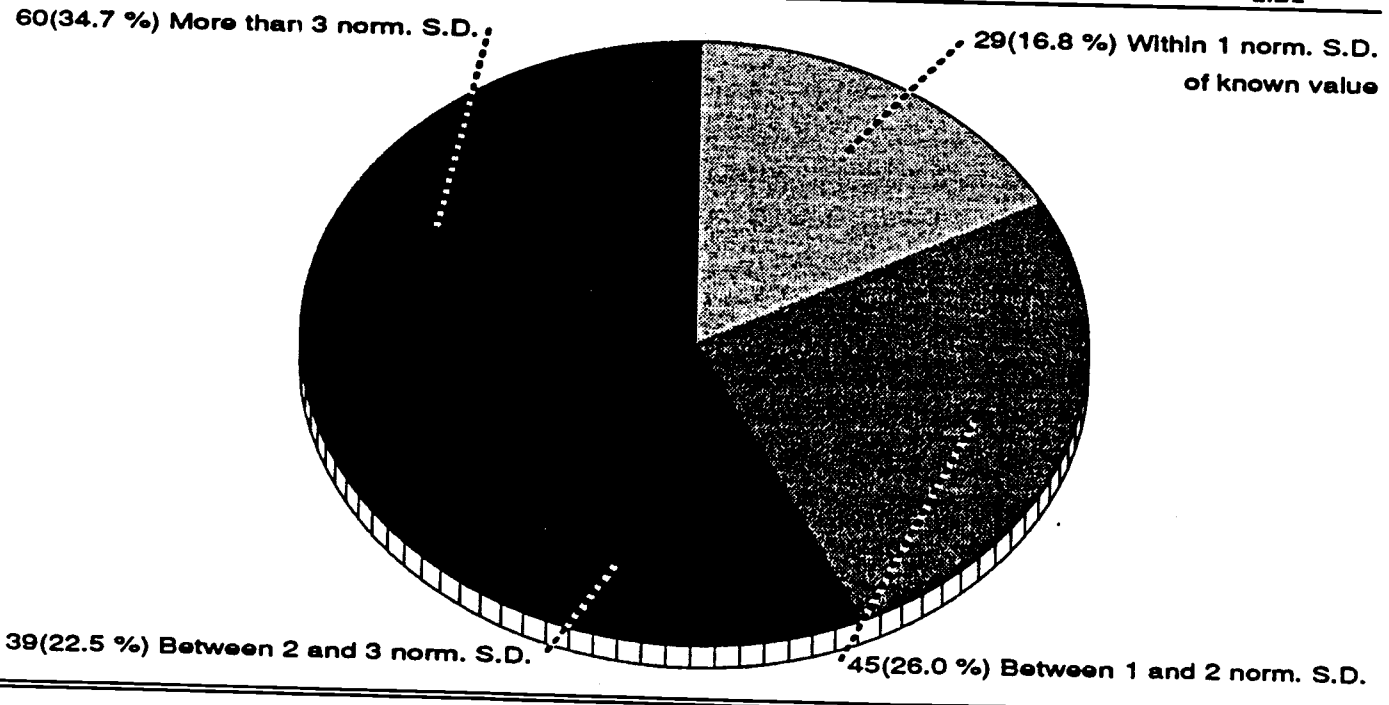
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Ruthenium-106 Statistical Summary 218 Participants

The known value of this nuclide is 119.0 pCi/l with an expected precision of 12.0; the control limits are 98.2 to 139.8; the warning regions are 98.2 to 105.1 and 132.9 to 139.8



Statistic	Respondents		Non-outliers
Mean	104.84	Grand Avg	103.87
Std. Dev.	25.58		12.83
Variance	654.41		164.65
% Coef. of Var.	24.40		12.35
% deviation of mean from known value	-11.90		-12.72
Norm. dev. of mean from known value	-0.55		-1.18
Median	103.33		103.50
% deviation of median from known value	-13.17		-13.03
Norm. dev. of median from known value	-0.61		-1.21



Ruthenium-106

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
KF									•
KH	116.0	122.0	110.0	6.00	0.591	116.00	1.75	-0.43	
KL	134.0	115.0	117.0	10.44	0.935	122.00	2.62	0.43	
KM	109.0	104.0	100.0	4.51	0.443	104.33	0.07	-2.12	
KX	104.0	101.0	95.0	4.58	0.443	100.00	-0.56	-2.74	
L	94.0	105.0	87.0	9.07	0.886	95.33	-1.23	-3.42	⇓
LA									•
LE	98.0	129.0	98.0	17.90	2.002	108.33	0.64	-1.54	
LF	83.0	110.0	90.0	14.01	1.627	94.33	-1.38	-3.56	⇓
LM									•
LR	112.0	97.0	99.0	8.14	0.738	102.67	-0.17	-2.36	
LT	110.0	110.0	110.0	0.00	0.000	110.00	0.89	-1.30	
M	95.0	98.0	99.0	2.08	0.197	97.33	-0.94	-3.13	⇓
MA	88.0	84.0	88.0	2.31	0.197	86.67	-2.48	-4.67	⇓
ML	74.0	68.0	73.0	3.21	0.295	71.67	-4.65	-6.83	⇓
MN									•
MP	119.0	105.0	101.0	9.45	0.886	108.33	0.64	-1.54	
MQ	138.0	123.0	135.0	7.94	0.738	132.00	4.06	1.88	
MS	106.0	94.0	86.0	10.07	0.984	95.33	-1.23	-3.42	⇓
MT									•
MV	131.0	112.0	115.0	10.21	0.935	119.33	2.23	0.05	
MY									•
N	100.0	104.0	104.0	2.31	0.197	102.67	-0.17	-2.36	
NB	92.0	98.0	95.0	3.00	0.295	95.00	-1.28	-3.46	⇓
NH	107.0	101.0	96.0	5.51	0.541	101.33	-0.37	-2.55	
NI	84.0	83.0	63.0	11.85	1.064	76.67	-3.93	-6.11	⇓
NJ	100.0	110.0	110.0	5.77	0.492	106.67	0.40	-1.78	
NK	89.0	105.0	108.0	10.21	0.935	100.67	-0.46	-2.65	
NP	112.0	117.0	130.0	9.29	0.886	119.67	2.28	0.10	
NZ	71.0	115.0	113.0	24.85	3.221	99.67	-0.61	-2.79	
O	98.0	101.0	100.0	1.53	0.148	99.67	-0.61	-2.79	
OA									•
OB									•
OK	126.0	123.0	116.0	5.13	0.492	121.67	2.57	0.38	
OL									•
OM	104.0	100.0	100.0	2.31	0.197	101.33	-0.37	-2.55	
OT									•
OZ									•
PB	111.0	115.0	102.0	6.66	0.640	109.33	0.79	-1.40	
PC	81.0	86.0	84.0	2.52	0.246	83.67	-2.92	-5.10	⇓
PD	99.0	90.0	135.0	23.81	3.314	108.00	0.60	-1.59	
PE	226.0	211.0	212.0	8.39	0.738	216.33	16.23	14.05	×
PI	113.0	109.0	104.0	4.51	0.443	108.67	0.69	-1.49	
PM									•
PP	82.0	107.0	106.0	14.15	1.439	98.33	-0.80	-2.98	

• ≡ No data submitted

∅ ≡ Insufficient data

TAG SYMBOLS

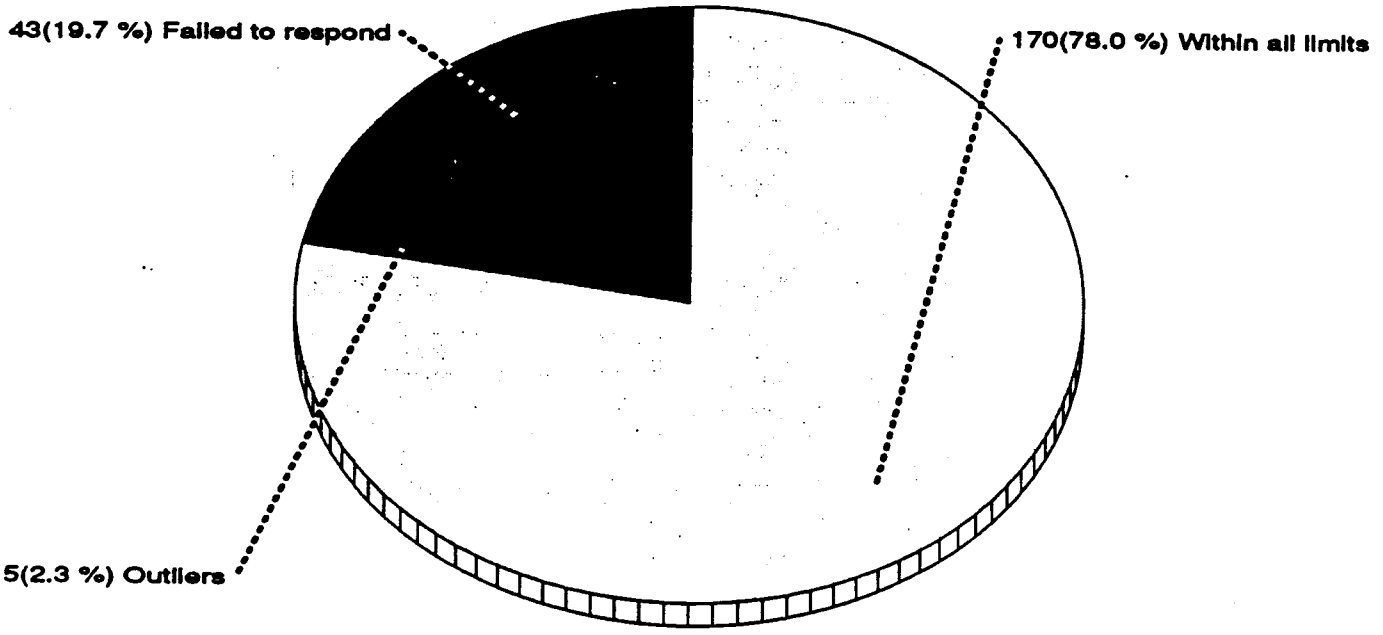
× ≡ Determined to be an outlier

⇑ ≡ Above control limit

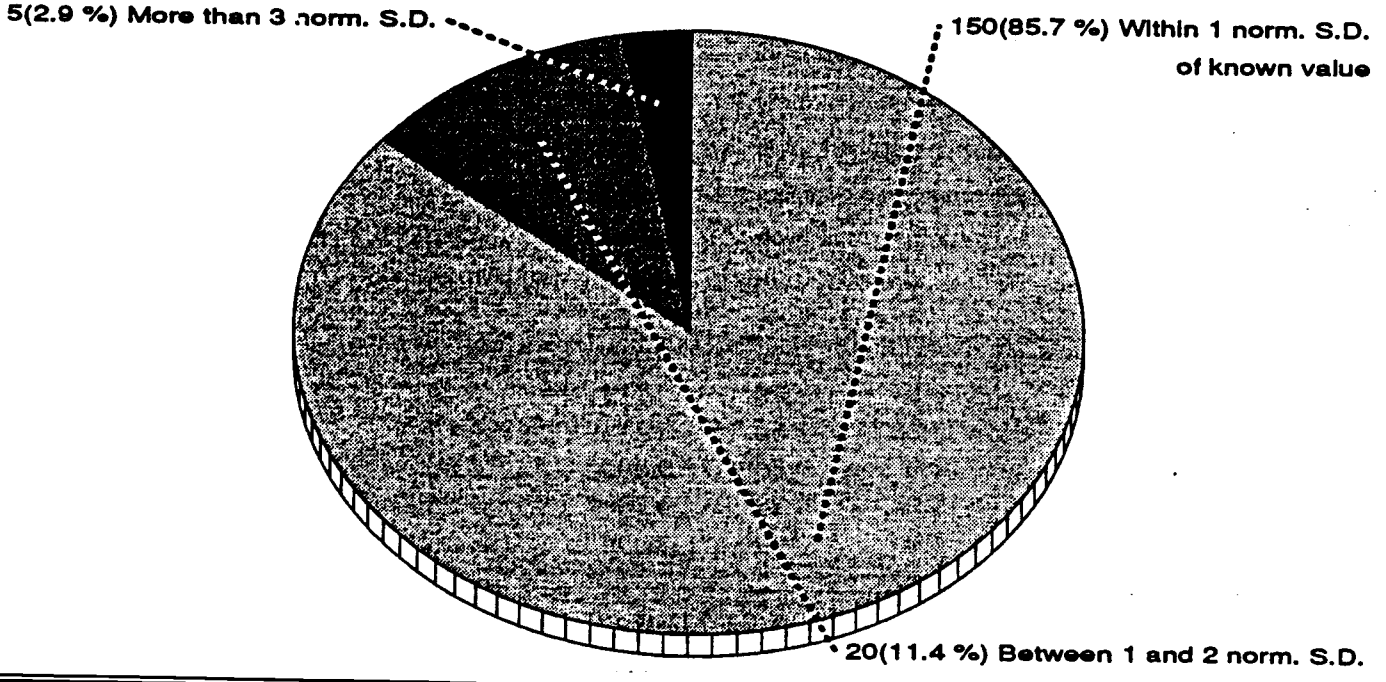
⇓ ≡ Below control limit

Cesium-137 Statistical Summary 218 Participants

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



Statistic	Respondents	Non-outliers
Mean	14.23	Grand Avg 5.76
Std. Dev.	106.03	1.47
Variance	11242.71	2.16
% Coef. of Var.	745.20	25.50
% deviation of mean from known value	184.57	15.29
Norm. dev. of mean from known value	0.09	0.52
Median	5.33	5.33
% deviation of median from known value	6.67	6.67
Norm. dev. of median from known value	0.00	0.23



Cesium-137

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
KF									•
KH	5.0	7.0	8.0	1.53	0.354	6.67	0.31	0.58	
KL	5.0	5.0	5.0	0.00	0.000	5.00	-0.26	0.00	
KM	4.0	6.0	5.0	1.00	0.236	5.00	-0.26	0.00	
KX	6.0	8.0	6.0	1.15	0.236	6.67	0.31	0.58	
L	4.0	5.0	5.0	0.58	0.118	4.67	-0.38	-0.12	
LA									•
LE	11.0	5.0	4.0	3.79	0.827	6.67	0.31	0.58	
LF	5.0	8.0	6.0	1.53	0.354	6.33	0.20	0.46	
LM									•
LR	1.0	10.0	10.0	5.20	1.120	7.00	0.43	0.69	
LT	5.0	5.0	5.0	0.00	0.000	5.00	-0.26	0.00	
M	5.0	6.0	5.0	0.58	0.118	5.33	-0.15	0.12	
MA	4.0	6.0	5.0	1.00	0.236	5.00	-0.26	0.00	
ML	33.0	44.0	59.0	13.05	4.946	45.33	13.71	13.97	×
MN									•
MP	5.0	5.0	6.0	0.58	0.118	5.33	-0.15	0.12	
MQ	6.0	12.0	8.0	3.06	0.709	8.67	1.01	1.27	
MS	6.0	6.0	8.0	1.15	0.236	6.67	0.31	0.58	
MT									•
MV	6.0	5.0	5.0	0.58	0.118	5.33	-0.15	0.12	
MY									•
N	6.0	6.0	5.0	0.58	0.118	5.67	-0.03	0.23	
NB	7.0	5.0	6.0	1.00	0.236	6.00	0.08	0.35	
NH	6.0	5.0	5.0	0.58	0.118	5.33	-0.15	0.12	
NI	6.0	5.0	64.0	33.78	12.371	25.00	6.66	6.93	×
NJ	10.0	8.0	9.0	1.00	0.236	9.00	1.12	1.39	
NK	4.0	3.0	4.0	0.58	0.118	3.67	-0.73	-0.46	
NP	5.0	7.0	7.0	1.15	0.236	6.33	0.20	0.46	
NZ									•
O	5.0	5.0	5.0	0.00	0.000	5.00	-0.26	0.00	
OA									•
OB	6.0	4.0	5.0	1.00	0.236	5.00	-0.26	0.00	
OK	4.0	4.0	5.0	0.58	0.118	4.33	-0.50	-0.23	
OL									•
OM	16.0	15.0	15.0	0.58	0.118	15.33	3.31	3.58	×
OT									•
OZ									•
PB	5.0	4.0	5.0	0.58	0.118	4.67	-0.38	-0.12	
PC	6.0	6.0	5.0	0.58	0.118	5.67	-0.03	0.23	
PD	8.0	6.0	9.0	1.53	0.354	7.67	0.66	0.92	
PE	7.0	7.0	10.0	1.73	0.354	8.00	0.77	1.04	
PI	6.0	6.0	6.0	0.00	0.000	6.00	0.08	0.35	
PM	5.0	5.0	5.0	0.00	0.000	5.00	-0.26	0.00	
PP	7.0	7.0	7.0	0.00	0.000	7.00	0.43	0.69	

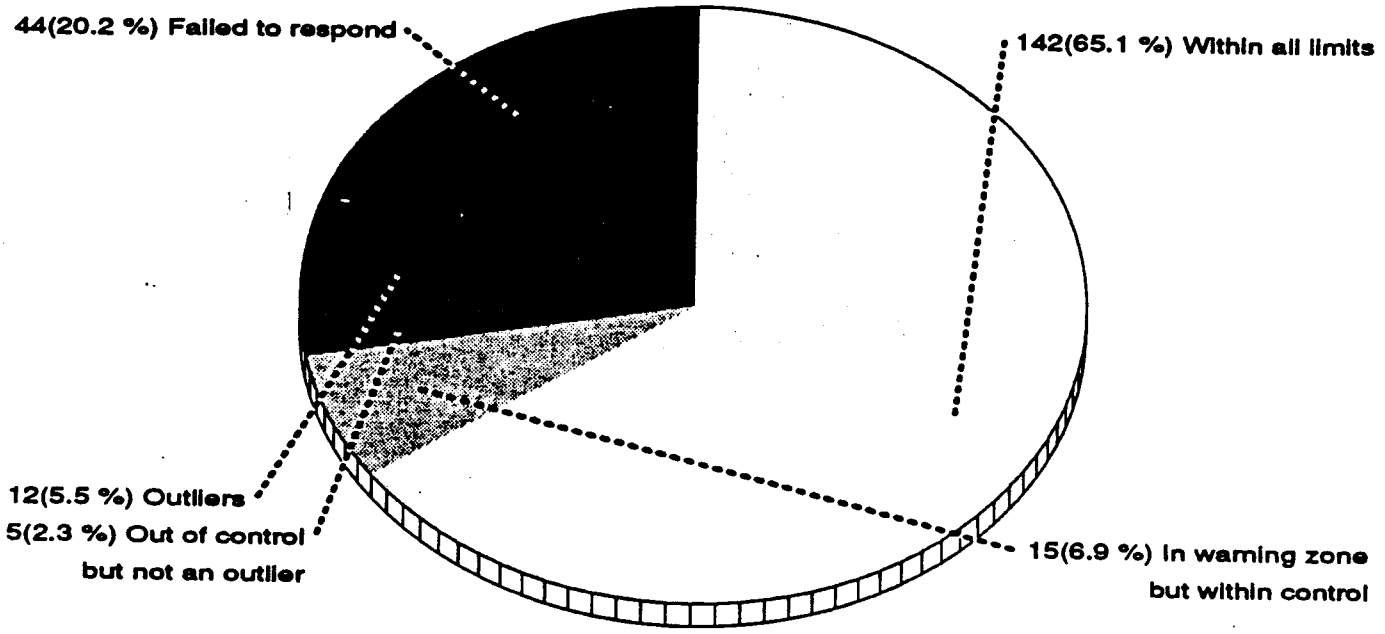
• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

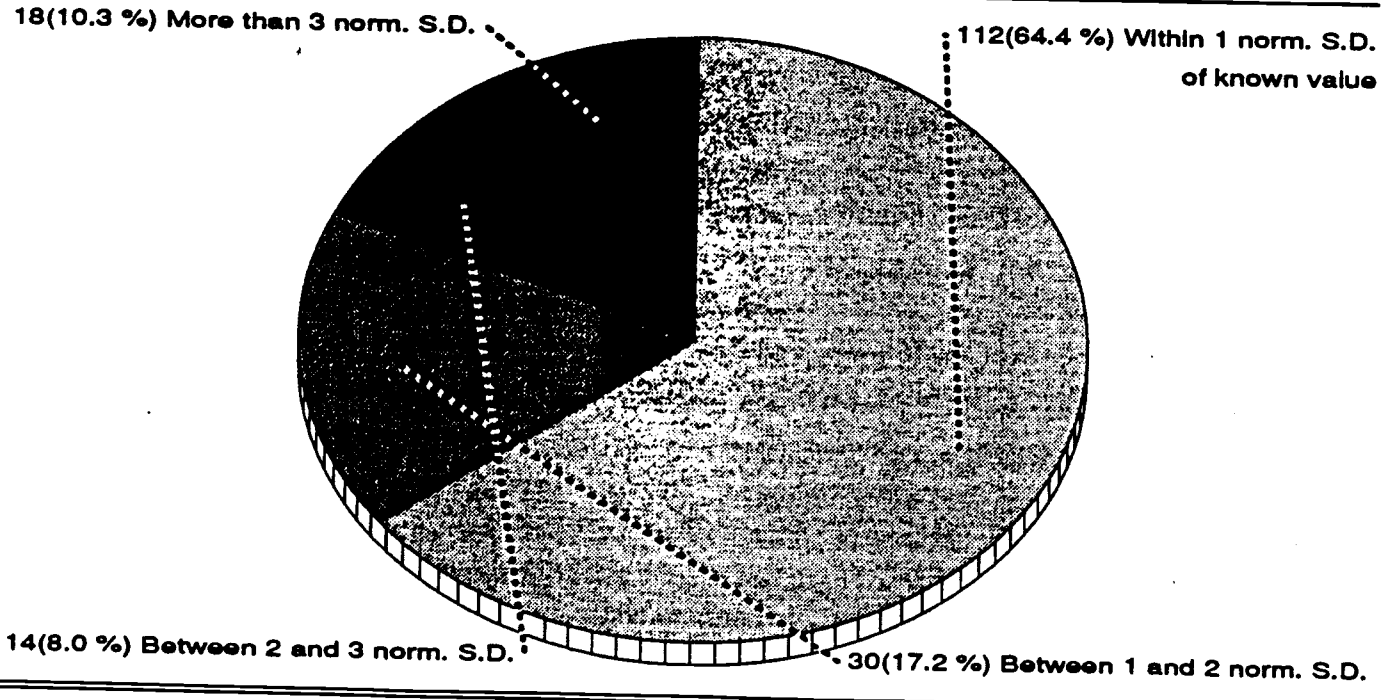
⇑ ≡ Above control limit
⇓ ≡ Below control limit

Barium-133 Statistical Summary 218 Participants

The known value of this nuclide is 99.0 pCi/l with an expected precision of 10.0; the control limits are 81.7 to 116.3; the warning regions are 81.7 to 87.4 and 110.6 to 116.3



Statistic	Respondents	Non-outliers
Mean	95.16	Grand Avg 96.74
Std. Dev.	14.34	6.87
Variance	205.73	47.19
% Coef. of Var.	15.07	7.10
% deviation of mean from known value	-3.87	-2.28
Norm. dev. of mean from known value	-0.27	-0.33
Median	97.00	97.00
% deviation of median from known value	-2.02	-2.02
Norm. dev. of median from known value	-0.14	-0.29



Barium-133

Lab	Res. 1	Res. 2	Res. 3	Exper. Sigma	Rng anal (R + SR)	Average	Normalized deviation (grand-avg)	(known)	Tag
KF									•
KH	99.0	102.0	102.0	1.73	0.177	101.00	0.74	0.35	
KL	103.0	102.0	101.0	1.00	0.118	102.00	0.91	0.52	
KM	91.0	90.0	90.0	0.58	0.059	90.33	-1.11	-1.50	
KX	97.0	92.0	94.0	2.52	0.295	94.33	-0.42	-0.81	
L	88.0	90.0	87.0	1.53	0.177	88.33	-1.46	-1.85	
LA									•
LE	88.0	89.0	88.0	0.58	0.059	88.33	-1.46	-1.85	
LF	94.0	95.0	97.0	1.53	0.177	95.33	-0.24	-0.64	
LM									•
LR	116.0	114.0	124.0	5.29	0.591	118.00	3.68	3.29	⇑
LT	100.0	100.0	100.0	0.00	0.000	100.00	0.56	0.17	
M	94.0	96.0	93.0	1.53	0.177	94.33	-0.42	-0.81	
MA	97.0	96.0	95.0	1.00	0.118	96.00	-0.13	-0.52	
ML	92.0	102.0	90.0	6.43	0.709	94.67	-0.36	-0.75	
MN									•
MP	93.0	97.0	99.0	3.06	0.354	96.33	-0.07	-0.46	
MQ	96.0	101.0	98.0	2.52	0.295	98.33	0.28	-0.12	
MS	99.0	99.0	105.0	3.46	0.354	101.00	0.74	0.35	
MT									•
MV	97.0	94.0	94.0	1.73	0.177	95.00	-0.30	-0.69	
MY									•
N	100.0	104.0	96.0	4.00	0.473	100.00	0.56	0.17	
NB	78.0	75.0	100.0	13.65	1.908	84.33	-2.15	-2.54	
NH	108.0	108.0	109.0	0.58	0.059	108.33	2.01	1.62	
NI	75.0	86.0	84.0	5.86	0.650	81.67	-2.61	-3.00	
NJ	96.0	90.0	92.0	3.06	0.354	92.67	-0.71	-1.10	
NK	109.0	107.0	96.0	7.00	0.768	104.00	1.26	0.87	
NP	83.0	89.0	91.0	4.16	0.473	87.67	-1.57	-1.96	
NZ	71.0	68.0	73.0	2.52	0.295	70.67	-4.52	-4.91	×
O	99.0	100.0	100.0	0.58	0.059	99.67	0.51	0.12	
OA									•
OB									•
OK	127.0	123.0	125.0	2.00	0.236	125.00	4.89	4.50	×
OL									•
OM	79.0	80.0	83.0	2.08	0.236	80.67	-2.78	-3.18	⇓
OT									•
OZ									•
PB	89.0	88.0	90.0	1.00	0.118	89.00	-1.34	-1.73	
PC	107.0	104.0	91.0	8.50	0.945	100.67	0.68	0.29	
PD	102.0	101.0	104.0	1.53	0.177	102.33	0.97	0.58	
PE	57.0	59.0	56.0	1.53	0.177	57.33	-6.83	-7.22	×
PL	115.0	115.0	116.0	0.58	0.059	115.33	3.22	2.83	
PM									•
PP	105.0	101.0	104.0	2.08	0.236	103.33	1.14	0.75	

• ≡ No data submitted
∅ ≡ Insufficient data

TAG SYMBOLS
× ≡ Determined to be an outlier

⇑ ≡ Above control limit
⇓ ≡ Below control limit

Analytical Products Group, Inc.

Proficiency Environmental Testing

Program Report

August 1993

Prepared for

Martin Marietta Energy Systems
Plant K-25
Hwy 58 at Blair Rd
Oak Ridge, TN 37831

8254

100% Acceptable

Analytical Products Group, Inc.

2730 Washington Blvd.
Belpre, Ohio 45714

APG Analytical Products Group, Inc.

August 1993

Prepared for

Martin Marietta Energy Systems
Plant K-25
Hwy 58 at Blair Rd
Oak Ridge, TN 37831

8254

2730 Washington Blvd. Belpre, Ohio 45714 (614) 423-4200

INTRODUCTION

The Proficiency Environmental Testing Program is designed to evaluate your laboratory's performance against other participating laboratories on the same set of standards. Standard levels have been chosen to assist you in ensuring that the procedure is in-control. In most cases, standard levels are not designed to challenge the detection limits of the method.

The following information is provided to assist you in the evaluation of the report. All statistical measures have been calculated based upon generally accepted formulae.

Your Result: Every effort has been made to insure correct data entry. Should you find a data entry error please notify Analytical Products Group and we will adjust the data and reissue the report.

Reference Value: The reported Reference Value is the calculated True Value of the standard based upon the actual composition of the standard.

Mean of Reporting Laboratories: This value is the Mean value of all reporting laboratories after Outliers have been removed. Please note the normalization of Solids data discussed below.

Standard Deviation: This parameter is also calculated on the data set after Outliers have been removed.

Outliers: Outliers are evaluated based upon the ASTM recommended t Test at the 0.05 significance level. Outliers are marked in the report for rapid identification. APG will provide additional information on Outliers as requested. Outliers do not necessarily indicate poor performance. They can be caused by a faulty standard, calculation errors, or a dilution error. However, a review each element of the analytical process is indicated. If we can assist you in determination of why a value was an Outlier, please contact APG.

Solids Standards: Solids standards are individually prepared gravimetrically and each standard has a unique Reference Value. In order to allow comparison between laboratories, the reported Means and Standard Deviation have been normalized based upon the following formula:

X = (Reference Value-Your Result)/Reference Value

The resulting statistics are therefore reported as relative values. The Relative Error is related to the Mean Recovery and the Relative Deviation is related to the Standard Deviation.

Deviation from the Mean or z score: This result is an expression of how far your reported value was from the Mean of all reporting laboratories in terms of number of Standard Deviations. As a point of reference, EPA Warning Limits are 1.96 deviations from the Mean and EPA Acceptance Limits are 2.58 deviations from the Mean.

Comment Line: Following the Deviation from the Mean for each parameter is a Comment line. The Comment line may have one of the four entries:

Entry	Description
Unreported	No data was submitted
Warning	Data between 1.97 and 2.58 Deviations Data outside 95% Confidence Interval
Unacceptable	Data more than 2.58 Deviations Data outside 99% Confidence Interval
Blank	Data within 95% Confidence Interval

These notations can be used as a guideline in evaluating your performance.

Comment Section: This section contains comments submitted to Analytical Products Group by program participants. It also contains comments from APG to participants concerning unusual characteristics of the data set or problems with standards which could influence the interpretation of the data.

Organic Standards: The analysis of environmental samples for organic compounds requires complex methodologies. The Organics report is divided into two sections. The first section is a summary of your performance on the samples based upon the compounds which were spiked into the standards. The spiked value is the theoretical true value of the sample based upon the gravimetric preparation and the dilution instructions included with the sample. The Mean and Standard Deviation are calculated using generally accepted procedures.

The second section of the report covers compounds which you reported, but which were not intentionally added to the sample. Rather than make a judgement as to whether this data represents false positives or actual contamination of the sample, APG has provided an analysis of laboratories reporting the same compound.

Performances Evaluation Summary: The section summarizes performance data in a format similar to the USEPA DMR-QA Report. Detailed information on each parameter is included in the main report.

Submitted: September 17, 1993

Thomas V. Coyner
General Manager

APG Analytical Products Group, Inc.

Comments

August 1993

1. **TKN Level 1:**

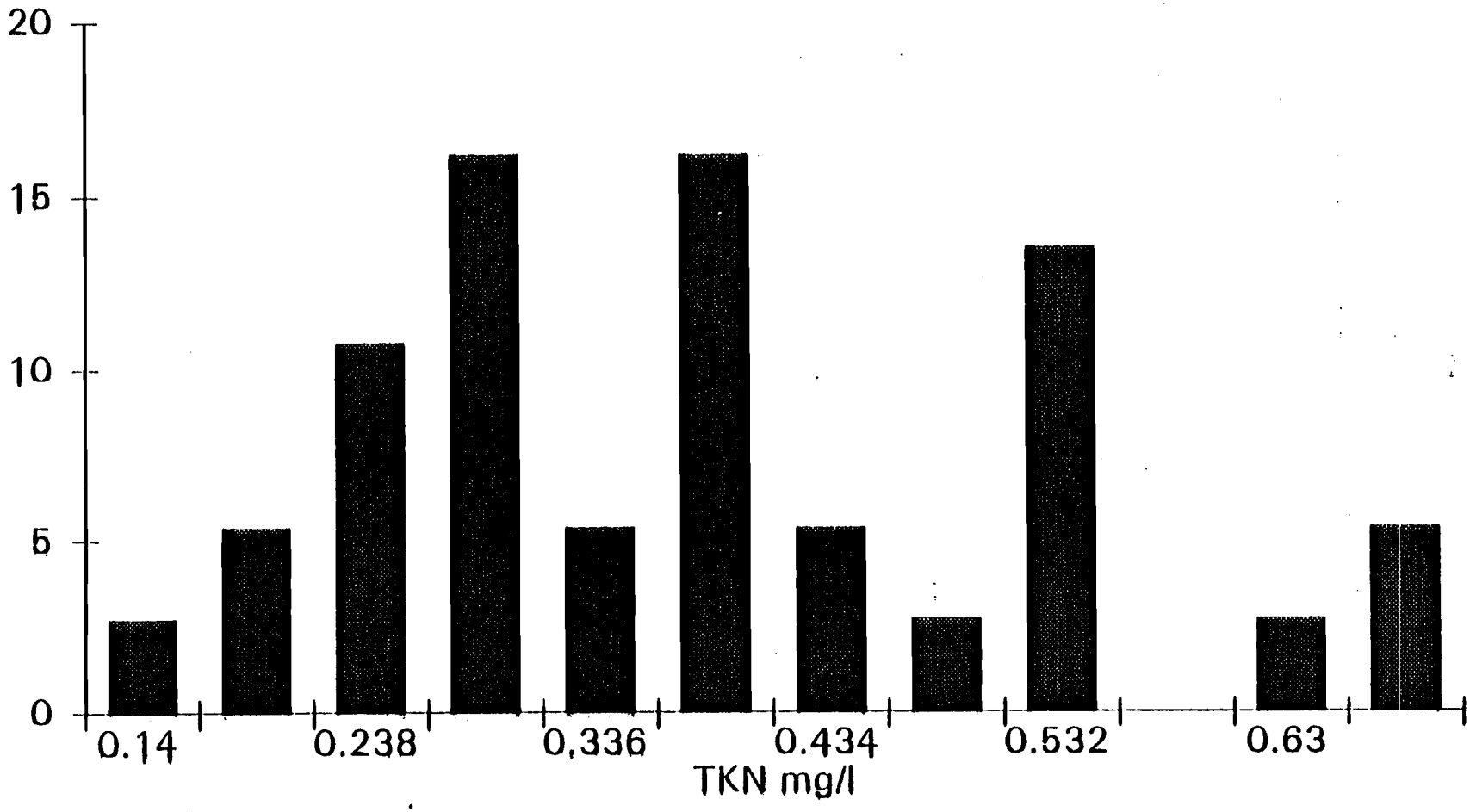
The reported results for TKN Level 1 are inconsistent with previous studies. A frequency distribution of the data set is attached for your review. It shows three distinct peaks of approximately equal height. These are at 0.287, 0.385, and 0.532 mg/l. The first peak at 0.287 mg/l is consistent with the True Value of the sample which was 0.290 mg/l. However, the results suggest that there may have been a problem with the sample. APG is currently evaluating the homogeneity of the retained samples; however, initial testing does not confirm a standards problem.

APG suggests that you disregard the results for this parameter until a resolution of the problem can be found.

2730 Washington Blvd. Belpre, Ohio 45714 (614) 423-4200

Frequency Distribution

TKN Level 1



APG Analytical Products Group, Inc.

2730 Washington Blvd. Belpre, Ohio 45714 (614) 423-4200

Performance Evaluation Summary

Customer Code: 8254 August, 1993

Parameter	Level	Reported	Reference Value	Mean	Standard Deviation	Acceptance Range	Comment
Standard: Demand mg/L							
Biochemical Oxygen Demand	1	287.1	293.400	277.261	26.856	207.972 - 346.550	
Biochemical Oxygen Demand	2	6.9	7.040	7.476	1.871	2.648 - 12.304	
Chemical Oxygen Demand	1	450	427.300	449.585	27.688	378.149 - 521.020	
Chemical Oxygen Demand	2	12	11.340	10.760	3.543	1.620 - 19.900	
Total Organic Carbon	1	181.817	177.800	180.221	4.796	167.846 - 192.596	
Total Organic Carbon	2	4.161	4.270	4.909	1.118	2.025 - 7.792	
Standard: Nutrients mg/L							
Ammonia Nitrogen as N	1	0.82	0.857	0.826	0.130	0.490 - 1.163	
Ammonia Nitrogen as N	2	9.00	9.155	8.968	0.832	6.821 - 11.116	
Nitrate Nitrogen as N	1	0.35	0.349	0.370	0.073	0.183 - 0.557	
Nitrate Nitrogen as N	2	4.25	4.236	4.241	0.238	3.627 - 4.854	
Orthophosphate as P	1	0.13	0.117	0.120	0.016	0.080 - 0.160	
Orthophosphate as P	2	9.94	9.795	9.831	0.360	8.903 - 10.760	
Total Kjeldahl Nitrogen	1	0.28	0.290	0.477	0.237	0.000 - 1.090	
Total Kjeldahl Nitrogen	2	7.07	9.606	8.279	1.907	3.360 - 13.198	
Total Phosphorus as P	1	0.35	0.307	0.311	0.048	0.187 - 0.436	
Total Phosphorus as P	2	5.12	4.609	4.644	0.422	3.554 - 5.733	
Standard: Solids mg/L							
Total Suspended Solids	1	50	57.200	50.573	4.981	37.721 - 63.425	
Total Suspended Solids	2	166	190.700	176.323	14.647	138.532 - 214.113	
Total Dissolved Solids	1	151	124.600	127.715	36.932	32.430 - 223.000	
Total Dissolved Solids	2	409	379.900	382.573	34.377	293.881 - 471.265	

Parameter	Level	Reported	Reference Value	Mean	Standard Deviation	Acceptance Range	Comment
Standard: Oil & Grease mg/L							
Oil & Grease	1	4.5	5.031	5.888	2.882	0.000 - 13.324	
Oil & Grease	2	20.8	24.620	22.795	2.769	15.651 - 29.940	
Standard: Minerals mg/L							
Alkalinity as CaCO3	1	12	12.920	13.574	2.031	8.333 - 18.815	
Alkalinity as CaCO3	2	145	149.340	144.330	7.332	125.413 - 163.248	
Calcium	1	62.7	55.880	55.632	3.194	47.391 - 63.874	Warning
Calcium	2	6.23	6.100	6.151	0.194	5.651 - 6.650	
Chloride	1	106.85	108.580	108.151	2.517	101.657 - 114.645	
Chloride	2	50.10	51.230	51.031	2.782	43.855 - 58.208	
Conductivity umho/cm	1	670	705.300	699.668	25.094	634.925 - 764.411	
Conductivity umho/cm	2	739	783.000	773.348	33.222	687.634 - 859.062	
Magnesium	1	1.94	1.940	1.919	0.125	1.596 - 2.243	
Magnesium	2	5.88	6.020	5.789	0.550	4.370 - 7.208	
Potassium	1	3.26	2.920	3.056	0.340	2.180 - 3.932	
Potassium	2	26.2	25.290	25.908	1.944	20.892 - 30.925	
Sodium	1	80.2	77.350	77.100	4.424	65.685 - 88.515	
Sodium	2	139	138.940	136.388	5.617	121.897 - 150.879	
Sulfate	1	138	148.700	146.718	8.850	123.884 - 169.552	
Sulfate	2	129	147.940	146.236	7.355	127.259 - 165.213	Warning
Total Hardness as CaCO3	1	NA	147.520	146.784	4.052	136.329 - 157.239	Unreported
Total Hardness as CaCO3	2	NA	40.000	40.192	4.281	29.147 - 51.237	Unreported
Standard: pH Units							
pH	1	2.6	2.630	2.642	0.096	2.395 - 2.888	

Parameter	Level	Reported	Reference Value	Mean	Standard Deviation	Acceptance Range	Comment
pH	2	7.3	7.350	7.136	0.151	6.746 - 7.526	

Standard: Trace Metals ug/L

Aluminum	1	30.4	30.820	39.327	14.490	1.943 - 76.711	
Aluminum	2	154	164.400	178.929	27.312	108.464 - 249.394	
Antimony	1	55.5	58.740	57.939	10.591	30.614 - 85.263	
Antimony	2	1980	1888.100	1975.672	119.409	1667.597 - 2283.747	
Arsenic	1	15.6	18.670	19.245	3.948	9.059 - 29.431	
Arsenic	2	157	164.300	165.246	16.225	123.384 - 207.107	
Barium	1	233	238.900	244.094	17.620	198.635 - 289.553	
Barium	2	1100	1114.700	1134.974	73.422	945.546 - 1324.402	
Beryllium	1	43.9	47.740	47.758	4.020	37.386 - 58.131	
Beryllium	2	459	489.900	490.105	28.536	416.483 - 563.727	
Boron	1	154	161.570	169.294	16.627	126.395 - 212.193	
Boron	2	233	242.400	249.167	23.027	189.756 - 308.578	
Cadmium	1	24.4	23.570	23.930	1.742	19.435 - 28.424	
Cadmium	2	175	176.700	177.913	7.254	159.197 - 196.629	
Chromium	1	26.9	25.090	25.931	2.724	18.904 - 32.958	
Chromium	2	113	111.500	114.541	12.724	81.714 - 147.368	
Cobalt	1	71.1	70.790	70.368	4.391	59.038 - 81.697	
Cobalt	2	476	480.400	474.219	23.315	414.065 - 534.372	
Copper	1	31.3	30.320	30.711	3.513	21.647 - 39.776	
Copper	2	109	106.100	109.492	8.323	88.019 - 130.965	
Iron	1	101	100.900	105.666	17.094	61.563 - 149.769	
Iron	2	792	782.200	770.767	43.984	657.288 - 884.246	
Lead	1	84.4	89.190	89.212	6.270	73.035 - 105.389	
Lead	2	196	206.300	210.781	10.798	182.921 - 238.641	
Manganese	1	39.3	39.610	39.204	2.397	33.020 - 45.389	
Manganese	2	126	126.800	126.789	4.992	113.909 - 139.668	
Mercury	1	1.01	0.950	1.027	0.251	0.378 - 1.676	
Mercury	2	3.98	4.290	4.128	0.543	2.728 - 5.529	

Customer Code: 8254 August, 1993 Page: 4

Parameter	Level	Reported	Reference Value	Mean	Standard Deviation	Acceptance Range	Comment
Molybdenum	1	189	191.940	188.304	8.456	166.487 - 210.122	
Molybdenum	2	379	361.800	366.778	27.253	296.466 - 437.090	
Nickel	1	55.3	54.850	55.396	4.627	43.460 - 67.333	
Nickel	2	296	289.500	291.902	15.832	251.055 - 332.749	
Selenium	1	30.6	33.500	33.306	4.657	21.290 - 45.322	
Selenium	2	115	128.400	125.547	16.778	82.260 - 168.833	
Silver	1	46.6	46.200	46.592	2.966	38.938 - 54.245	
Silver	2	105	107.800	109.133	5.603	94.676 - 123.589	
Thallium	1	93	95.490	93.413	12.316	61.637 - 125.188	
Thallium	2	946	989.000	937.550	84.316	720.015 - 1155.085	
Vanadium	1	30.5	30.420	31.554	1.530	27.606 - 35.502	
Vanadium	2	1960	1977.100	1955.207	105.493	1683.035 - 2227.379	
Zinc	1	24.1	24.880	27.157	5.659	12.557 - 41.756	
Zinc	2	114	114.500	117.333	11.859	86.738 - 147.928	
Standard: Phenol mg/L							
Phenol	1	0.421	0.400	0.396	0.038	0.298 - 0.494	
Phenol	2	4.60	4.500	4.438	0.440	3.302 - 5.574	
Standard: Cyanide mg/L							
Cyanide	1	0.0870	0.098	0.098	0.011	0.070 - 0.127	
Cyanide	2	1.034	1.054	1.029	0.164	0.604 - 1.453	
Standard: Residual Chlorine mg/L							
Residual Chlorine	1	0.43	0.352	0.334	0.054	0.195 - 0.474	
Residual Chlorine	2	9.25	9.433	8.689	0.912	6.336 - 11.042	

Customer Code: 8254 August, 1993 Page: 5

Parameter	Level	Reported	Reference Value	Mean	Standard Deviation	Acceptance Range	Comment
Standard: Fluoride mg/L							
Fluoride	1	0.12	0.120	0.131	0.028	0.060 - 0.202	
Fluoride	2	15.3	14.400	14.478	0.734	12.584 - 16.371	
Standard: Total Organic Halide ug/L							
Total Organic Halide	1	21.4	18.900	20.911	6.483	4.186 - 37.637	
Total Organic Halide	2	282	276.200	255.205	30.526	176.447 - 333.963	
Standard: Hexavalent Chromium mg/L							
Hexavalent Chromium	1	NA	0.089	0.085	0.013	0.053 - 0.118	Unreported
Hexavalent Chromium	2	NA	0.474	0.471	0.039	0.371 - 0.571	Unreported
Standard: Uranium ug/L							
Uranium	1	204	180.200	180.800	13.936	144.846 - 216.754	
Uranium	2	530	500.500	493.000	26.391	424.910 - 561.090	

APG Analytical Products Group, Inc.

Customer Code: 8254

Parameter: Biochemical Oxygen Demand mg/L

	Level 1	Level 2
Your Result:	287.1	6.9
Reference Value:	293.400	7.040
Mean of Reporting Laboratories:	277.261	7.476
Actual Standard Deviation:	26.856	1.871
Number Reporting:	77	85
Average % Recovery:	94.499	106.189
Your % Recovery:	97.853	98.011
Deviation from Mean - z Score:	0.366	0.308

Comment:

Parameter: Chemical Oxygen Demand mg/L

	Level 1	Level 2
Your Result:	450	12
Reference Value:	427.300	11.340
Mean of Reporting Laboratories:	449.585	10.760
Actual Standard Deviation:	27.688	3.543
Number Reporting:	37	38
Average % Recovery:	105.215	94.885
Your % Recovery:	105.312	105.820
Deviation from Mean - z Score:	0.015	0.350

Comment:

Parameter: Total Organic Carbon mg/L

	Level 1	Level 2
Your Result:	181.817	4.161
Reference Value:	177.800	4.270
Mean of Reporting Laboratories:	180.221	4.909
Actual Standard Deviation:	4.796	1.118
Number Reporting:	26	31
Average % Recovery:	101.362	114.959
Your % Recovery:	102.259	97.447
Deviation from Mean - z Score:	0.333	0.669

Comment:

2730 Washington Blvd. Belpre, Ohio 45714 (614) 423-4200

APG Analytical Products Group, Inc.

Customer Code: 8254

Parameter: Ammonia Nitrogen as N

	mg/L Level 1	Level 2
Your Result:	0.82	9.00
Reference Value:	0.857	9.155
Mean of Reporting Laboratories:	0.826	8.968
Actual Standard Deviation:	0.130	0.832
Number Reporting:	69	66
Average % Recovery:	96.423	97.963
Your % Recovery:	95.683	98.307
Deviation from Mean - z Score:	0.049	0.038

Comment:

Parameter: Nitrate Nitrogen as N

	mg/L Level 1	Level 2
Your Result:	0.35	4.25
Reference Value:	0.349	4.236
Mean of Reporting Laboratories:	0.370	4.241
Actual Standard Deviation:	0.073	0.238
Number Reporting:	45	42
Average % Recovery:	106.015	100.107
Your % Recovery:	100.287	100.330
Deviation from Mean - z Score:	0.275	0.040

Comment:

Parameter: Orthophosphate as P

	mg/L Level 1	Level 2
Your Result:	0.13	9.94
Reference Value:	0.117	9.795
Mean of Reporting Laboratories:	0.120	9.831
Actual Standard Deviation:	0.016	0.360
Number Reporting:	33	31
Average % Recovery:	103.303	100.370
Your % Recovery:	111.492	101.480
Deviation from Mean - z Score:	0.615	0.302

Comment:

2730 Washington Blvd. Belpre, Ohio 45714 (614) 423-4200

Customer Code: 8254

Parameter: Total Kjeldahl Nitrogen

	mg/L Level 1	Level 2
Your Result:	0.28	7.07
Reference Value:	0.290	9.606
Mean of Reporting Laboratories:	0.477	8.279
Actual Standard Deviation:	0.237	1.907
Number Reporting:	37	38
Average % Recovery:	164.511	86.187
Your % Recovery:	96.552	73.600
Deviation from Mean - z Score:	0.830	0.634

Comment:

Parameter: Total Phosphorus as P

	mg/L Level 1	Level 2
Your Result:	0.35	5.12
Reference Value:	0.307	4.609
Mean of Reporting Laboratories:	0.311	4.644
Actual Standard Deviation:	0.048	0.422
Number Reporting:	46	46
Average % Recovery:	101.401	100.755
Your % Recovery:	113.969	111.087
Deviation from Mean - z Score:	0.798	1.128

Comment:

Parameter: Total Suspended Solids

	mg/L Level 1	Level 2
Your Result:	50	166
Reference Value:	57.200	190.700
Relative Error % :	11.586	7.539
Relative Deviation % :	8.709	7.681
Number Reporting:	117	116
Average % Recovery:	88.414	92.461
Your % Recovery:	87.413	87.048
Deviation from Mean - z Score:	0.115	0.705

Comment:

Customer Code: 8254

Parameter: Total Dissolved Solids

	mg/L Level 1	Level 2
Your Result:	151	409
Reference Value:	124.600	379.900
Relative Error % :	2.500	0.704
Relative Deviation % :	29.641	9.049
Number Reporting:	49	47
Average % Recovery:	102.500	100.704
Your % Recovery:	121.188	107.660
Deviation from Mean - z Score:	0.630	0.769

Comment:

Parameter: Oil & Grease

	mg/L Level 1	Level 2
Your Result:	4.5	20.8
Reference Value:	5.031	24.620
Mean of Reporting Laboratories:	5.888	22.795
Actual Standard Deviation:	2.882	2.769
Number Reporting:	55	52
Average % Recovery:	117.038	92.588
Your % Recovery:	89.445	84.484
Deviation from Mean - z Score:	0.482	0.721

Comment:

Parameter: Alkalinity as CaCO3

	mg/L Level 1	Level 2
Your Result:	12	145
Reference Value:	12.920	149.340
Mean of Reporting Laboratories:	13.574	144.330
Actual Standard Deviation:	2.031	7.332
Number Reporting:	39	43
Average % Recovery:	105.063	96.645
Your % Recovery:	92.879	97.094
Deviation from Mean - z Score:	0.775	0.091

Comment:

APG Analytical Products Group, Inc.

Customer Code: 8254

Parameter: Calcium

	mg/L Level 1	Level 2
Your Result:	62.7	6.23
Reference Value:	55.880	6.100
Mean of Reporting Laboratories:	55.632	6.151
Actual Standard Deviation:	3.194	0.194
Number Reporting:	31	27
Average % Recovery:	99.557	100.831
Your % Recovery:	112.205	102.131
Deviation from Mean - z Score:	2.213	0.410

Comment: Warning

Parameter: Chloride

	mg/L Level 1	Level 2
Your Result:	106.85	50.10
Reference Value:	108.580	51.230
Mean of Reporting Laboratories:	108.151	51.031
Actual Standard Deviation:	2.517	2.782
Number Reporting:	38	43
Average % Recovery:	99.605	99.612
Your % Recovery:	98.407	97.794
Deviation from Mean - z Score:	0.517	0.335

Comment:

Parameter: Conductivity umho/cm

	umhos/cm Level 1	Level 2
Your Result:	670	739
Reference Value:	705.300	783.000
Mean of Reporting Laboratories:	699.668	773.348
Actual Standard Deviation:	25.094	33.222
Number Reporting:	47	50
Average % Recovery:	99.201	98.767
Your % Recovery:	94.995	94.381
Deviation from Mean - z Score:	1.182	1.034

Comment:

2730 Washington Blvd. Belpre, Ohio 45714 (614) 423-4200

Customer Code: 8254

Parameter: Magnesium

	mg/L Level 1	Level 2
Your Result:	1.94	5.88
Reference Value:	1.940	6.020
Mean of Reporting Laboratories:	1.919	5.789
Actual Standard Deviation:	0.125	0.550
Number Reporting:	26	30
Average % Recovery:	98.920	96.158
Your % Recovery:	100.000	97.674
Deviation from Mean - z Score:	0.167	0.166

Comment:

Parameter: Potassium

	mg/L Level 1	Level 2
Your Result:	3.26	26.2
Reference Value:	2.920	25.290
Mean of Reporting Laboratories:	3.056	25.908
Actual Standard Deviation:	0.340	1.944
Number Reporting:	23	26
Average % Recovery:	104.655	102.445
Your % Recovery:	111.644	103.598
Deviation from Mean - z Score:	0.601	0.150

Comment:

Parameter: Sodium

	mg/L Level 1	Level 2
Your Result:	80.2	139
Reference Value:	77.350	138.940
Mean of Reporting Laboratories:	77.100	136.388
Actual Standard Deviation:	4.424	5.617
Number Reporting:	29	28
Average % Recovery:	99.677	98.163
Your % Recovery:	103.685	100.043
Deviation from Mean - z Score:	0.701	0.465

Comment:

Customer Code: 8254

Parameter: Sulfate

	mg/L Level 1	Level 2
Your Result:	138	129
Reference Value:	148.700	147.940
Mean of Reporting Laboratories:	146.718	146.236
Actual Standard Deviation:	8.850	7.355
Number Reporting:	39	38
Average % Recovery:	98.667	98.848
Your % Recovery:	92.804	87.198
Deviation from Mean - z Score:	0.985	2.343
Comment:		Warning

Parameter: Total Hardness as CaCO3

	mg/L Level 1	Level 2
Your Result:	NA	NA
Reference Value:	147.520	40.000
Mean of Reporting Laboratories:	146.784	40.192
Actual Standard Deviation:	4.052	4.281
Number Reporting:	35	37
Average % Recovery:	99.501	100.480
Your % Recovery:		
Deviation from Mean - z Score:	0.000	0.000
Comment:	Unreported	Unreported

Parameter: pH

	Units Level 1	Level 2
Your Result:	2.6	7.3
Reference Value:	2.630	7.350
Mean of Reporting Laboratories:	2.642	7.136
Actual Standard Deviation:	0.096	0.151
Number Reporting:	123	125
Average % Recovery:	100.441	97.089
Your % Recovery:	98.859	99.320
Deviation from Mean - z Score:	0.435	1.084
Comment:		

Customer Code: 8254

Parameter: Aluminum

	ug/L Level 1	Level 2
Your Result:	30.4	154
Reference Value:	30.820	164.400
Mean of Reporting Laboratories:	39.327	178.929
Actual Standard Deviation:	14.490	27.312
Number Reporting:	33	35
Average % Recovery:	127.602	108.838
Your % Recovery:	98.637	93.674
Deviation from Mean - z Score:	0.616	0.913

Comment:

Parameter: Antimony

	ug/L Level 1	Level 2
Your Result:	55.5	1980
Reference Value:	58.740	1888.100
Mean of Reporting Laboratories:	57.939	1975.672
Actual Standard Deviation:	10.591	119.409
Number Reporting:	36	36
Average % Recovery:	98.636	104.638
Your % Recovery:	94.484	104.867
Deviation from Mean - z Score:	0.230	0.036

Comment:

Parameter: Arsenic

	ug/L Level 1	Level 2
Your Result:	15.6	157
Reference Value:	18.670	164.300
Mean of Reporting Laboratories:	19.245	165.246
Actual Standard Deviation:	3.948	16.225
Number Reporting:	49	48
Average % Recovery:	103.078	100.576
Your % Recovery:	83.557	95.557
Deviation from Mean - z Score:	0.923	0.508

Comment:

Customer Code: 8254

Parameter: Barium

	ug/L Level 1	Level 2
Your Result:	233	1100
Reference Value:	238.900	1114.700
Mean of Reporting Laboratories:	244.094	1134.974
Actual Standard Deviation:	17.620	73.422
Number Reporting:	46	48
Average % Recovery:	102.174	101.819
Your % Recovery:	97.530	98.681
Deviation from Mean - z Score:	0.630	0.476

Comment:

Parameter: Beryllium

	ug/L Level 1	Level 2
Your Result:	43.9	459
Reference Value:	47.740	489.900
Mean of Reporting Laboratories:	47.758	490.105
Actual Standard Deviation:	4.020	28.536
Number Reporting:	48	47
Average % Recovery:	100.038	100.042
Your % Recovery:	91.956	93.693
Deviation from Mean - z Score:	0.960	1.090

Comment:

Parameter: Boron

	ug/L Level 1	Level 2
Your Result:	154	233
Reference Value:	161.570	242.400
Mean of Reporting Laboratories:	169.294	249.167
Actual Standard Deviation:	16.627	23.027
Number Reporting:	17	18
Average % Recovery:	104.781	102.792
Your % Recovery:	95.315	96.122
Deviation from Mean - z Score:	0.920	0.702

Comment:

Customer Code: 8254

Parameter: Cadmium

	ug/L Level 1	Level 2
Your Result:	24.4	175
Reference Value:	23.570	176.700
Mean of Reporting Laboratories:	23.930	177.913
Actual Standard Deviation:	1.742	7.254
Number Reporting:	63	61
Average % Recovery:	101.527	100.686
Your % Recovery:	103.521	99.038
Deviation from Mean - z Score:	0.270	0.402

Comment:

Parameter: Chromium

	ug/L Level 1	Level 2
Your Result:	26.9	113
Reference Value:	25.090	111.500
Mean of Reporting Laboratories:	25.931	114.541
Actual Standard Deviation:	2.724	12.724
Number Reporting:	58	65
Average % Recovery:	103.352	102.727
Your % Recovery:	107.214	101.345
Deviation from Mean - z Score:	0.356	0.121

Comment:

Parameter: Cobalt

	ug/L Level 1	Level 2
Your Result:	71.1	476
Reference Value:	70.790	480.400
Mean of Reporting Laboratories:	70.368	474.219
Actual Standard Deviation:	4.391	23.315
Number Reporting:	30	29
Average % Recovery:	99.403	98.713
Your % Recovery:	100.438	99.084
Deviation from Mean - z Score:	0.167	0.076

Comment:

Customer Code: 8254

Parameter: Copper

	ug/L Level 1	Level 2
Your Result:	31.3	109
Reference Value:	30.320	106.100
Mean of Reporting Laboratories:	30.711	109.492
Actual Standard Deviation:	3.513	8.323
Number Reporting:	59	62
Average % Recovery:	101.291	103.197
Your % Recovery:	103.232	102.733
Deviation from Mean - z Score:	0.168	0.059

Comment:

Parameter: Iron

	ug/L Level 1	Level 2
Your Result:	101	792
Reference Value:	100.900	782.200
Mean of Reporting Laboratories:	105.666	770.767
Actual Standard Deviation:	17.094	43.984
Number Reporting:	52	54
Average % Recovery:	104.724	98.538
Your % Recovery:	100.099	101.253
Deviation from Mean - z Score:	0.273	0.483

Comment:

Parameter: Lead

	ug/L Level 1	Level 2
Your Result:	84.4	196
Reference Value:	89.190	206.300
Mean of Reporting Laboratories:	89.212	210.781
Actual Standard Deviation:	6.270	10.798
Number Reporting:	58	64
Average % Recovery:	100.025	102.172
Your % Recovery:	94.629	95.007
Deviation from Mean - z Score:	0.767	1.369

Comment:

Customer Code: 8254

Parameter: Manganese

	ug/L Level 1	Level 2
Your Result:	39.3	126
Reference Value:	39.610	126.800
Mean of Reporting Laboratories:	39.204	126.789
Actual Standard Deviation:	2.397	4.992
Number Reporting:	50	47
Average % Recovery:	98.976	99.991
Your % Recovery:	99.217	99.369
Deviation from Mean - z Score:	0.040	0.158

Comment:

Parameter: Mercury

	ug/L Level 1	Level 2
Your Result:	1.01	3.98
Reference Value:	0.950	4.290
Mean of Reporting Laboratories:	1.027	4.128
Actual Standard Deviation:	0.251	0.543
Number Reporting:	41	41
Average % Recovery:	108.087	96.235
Your % Recovery:	106.316	92.774
Deviation from Mean - z Score:	0.067	0.273

Comment:

Parameter: Molybdenum

	ug/L Level 1	Level 2
Your Result:	189	379
Reference Value:	191.940	361.800
Mean of Reporting Laboratories:	188.304	366.778
Actual Standard Deviation:	8.456	27.253
Number Reporting:	23	23
Average % Recovery:	98.106	101.376
Your % Recovery:	98.468	104.754
Deviation from Mean - z Score:	0.082	0.448

Comment:

Customer Code: 8254

Parameter: Nickel

	ug/L Level 1	Level 2
Your Result:	55.3	296
Reference Value:	54.850	289.500
Mean of Reporting Laboratories:	55.396	291.902
Actual Standard Deviation:	4.627	15.832
Number Reporting:	60	67
Average % Recovery:	100.996	100.830
Your % Recovery:	100.820	102.245
Deviation from Mean - z Score:	0.021	0.259

Comment:

Parameter: Selenium

	ug/L Level 1	Level 2
Your Result:	30.6	115
Reference Value:	33.500	128.400
Mean of Reporting Laboratories:	33.306	125.547
Actual Standard Deviation:	4.657	16.778
Number Reporting:	47	46
Average % Recovery:	99.421	97.778
Your % Recovery:	91.343	89.564
Deviation from Mean - z Score:	0.581	0.629

Comment:

Parameter: Silver

	ug/L Level 1	Level 2
Your Result:	46.6	105
Reference Value:	46.200	107.800
Mean of Reporting Laboratories:	46.592	109.133
Actual Standard Deviation:	2.966	5.603
Number Reporting:	48	47
Average % Recovery:	100.848	101.236
Your % Recovery:	100.866	97.403
Deviation from Mean - z Score:	0.003	0.738

Comment:

Customer Code: 8254

Parameter: Thallium

	ug/L Level 1	Level 2
Your Result:	93	946
Reference Value:	95.490	989.000
Mean of Reporting Laboratories:	93.413	937.550
Actual Standard Deviation:	12.316	84.316
Number Reporting:	39	37
Average % Recovery:	97.824	94.798
Your % Recovery:	97.392	95.652
Deviation from Mean - z Score:	0.033	0.100

Comment:

Parameter: Vanadium

	ug/L Level 1	Level 2
Your Result:	30.5	1960
Reference Value:	30.420	1977.100
Mean of Reporting Laboratories:	31.554	1955.207
Actual Standard Deviation:	1.530	105.493
Number Reporting:	24	28
Average % Recovery:	103.728	98.893
Your % Recovery:	100.263	99.135
Deviation from Mean - z Score:	0.689	0.045

Comment:

Parameter: Zinc

	ug/L Level 1	Level 2
Your Result:	24.1	114
Reference Value:	24.880	114.500
Mean of Reporting Laboratories:	27.157	117.333
Actual Standard Deviation:	5.659	11.859
Number Reporting:	46	56
Average % Recovery:	109.151	102.474
Your % Recovery:	96.865	99.563
Deviation from Mean - z Score:	0.540	0.281

Comment:

Customer Code: 8254

Parameter: Phenol

	mg/L Level 1	Level 2
Your Result:	0.421	4.60
Reference Value:	0.400	4.500
Mean of Reporting Laboratories:	0.396	4.438
Actual Standard Deviation:	0.038	0.440
Number Reporting:	27	26
Average % Recovery:	99.009	98.614
Your % Recovery:	105.250	102.222
Deviation from Mean - z Score:	0.655	0.369

Comment:

Parameter: Cyanide

	mg/L Level 1	Level 2
Your Result:	0.0870	1.034
Reference Value:	0.098	1.054
Mean of Reporting Laboratories:	0.098	1.029
Actual Standard Deviation:	0.011	0.164
Number Reporting:	28	29
Average % Recovery:	100.167	97.599
Your % Recovery:	88.595	98.102
Deviation from Mean - z Score:	1.041	0.032

Comment:

Parameter: Residual Chlorine

	mg/L Level 1	Level 2
Your Result:	0.43	9.25
Reference Value:	0.352	9.433
Mean of Reporting Laboratories:	0.334	8.689
Actual Standard Deviation:	0.054	0.912
Number Reporting:	68	64
Average % Recovery:	95.088	92.109
Your % Recovery:	122.298	98.060
Deviation from Mean - z Score:	1.771	0.615

Comment:

Customer Code: 8254

Parameter: Fluoride

	mg/L Level 1	Level 2
Your Result:	0.12	15.3
Reference Value:	0.120	14.400
Mean of Reporting Laboratories:	0.131	14.478
Actual Standard Deviation:	0.028	0.734
Number Reporting:	31	30
Average % Recovery:	109.193	100.540
Your % Recovery:	100.000	106.250
Deviation from Mean - z Score:	0.399	1.120
Comment:		

Parameter: Total Organic Halide

	ug/L Level 1	Level 2
Your Result:	21.4	282
Reference Value:	18.900	276.200
Mean of Reporting Laboratories:	20.911	255.205
Actual Standard Deviation:	6.483	30.526
Number Reporting:	9	10
Average % Recovery:	110.641	92.399
Your % Recovery:	113.228	102.100
Deviation from Mean - z Score:	0.075	0.878
Comment:		

Parameter: Hexavalent Chromium

	mg/L Level 1	Level 2
Your Result:	NA	NA
Reference Value:	0.089	0.474
Mean of Reporting Laboratories:	0.085	0.471
Actual Standard Deviation:	0.013	0.039
Number Reporting:	26	25
Average % Recovery:	95.657	99.419
Your % Recovery:		
Deviation from Mean - z Score:	0.000	0.000
Comment:	Unreported	Unreported

Customer Code: 8254

Parameter: Uranium

	ug/L Level 1	Level 2
Your Result:	204	530
Reference Value:	180.200	500.500
Mean of Reporting Laboratories:	180.800	493.000
Actual Standard Deviation:	13.936	26.391
Number Reporting:	5	5
Average % Recovery:	100.333	98.501
Your % Recovery:	113.208	105.894
Deviation from Mean - z Score:	1.665	1.402

Comment:

Data Return Instructions

Data Reporting:

The P.E.T. Program has been designed to allow you to compare your results with those of other participating laboratories. In order to insure comparability of results, please check the units for each parameter with the data reporting form. Your results should be returned on the enclosed reporting form.

All data is handled as proprietary information and will not be exchanged with other laboratories. Therefore, feel free to add additional information for your own internal use. Reports will include a transcription of your original data for verification.

Each data form should [illegible] signed by the laboratory supervisor before submittal. In order to be included in the statistical analysis your data must be received by the submittal date shown on the front of this form. If you choose to submit your data by FAX, you must also return the original of this form by mail. Please note that the FAX results must have the customer code on every page.

Should you have any questions regarding the P.E.T. Program Contact:

Analytical Products Group, Inc.
2730 Washington Blvd.
Belpre, OH 45714
614-423-4200 800-272-4442
FAX 614-423-5588

DATA MUST BE RETURNED BY:

SEP 9 1995

LAB SUPERVISOR:

8254

AUG 1993

Demand		Level 1	Level 2	Test Method
Biochemical Oxygen Demand	mg/L	287.1	6.9	EPA-405.1
Chemical Oxygen Demand	mg/L	450	12	EPA-410.4
Total Organic Carbon	mg/L	181.817	4.161	EPA-415.1
Nutrients				
Ammonia Nitrogen as N	mg/L	0.82	9.00	EPA-350.3
Nitrate Nitrogen as N	mg/L	0.35	4.25	EPA-300.0
Orthophosphate as P	mg/L	0.13	9.94	SM-424
Total Kjeldahl Nitrogen	mg/L	0.28	7.07	EPA-351.3
Total Phosphorus as P	mg/L	0.35	5.12	SM-422
Solids				
Total Suspended Solids	mg/L	50	166	EPA-160.2
Total Dissolved Solids	mg/L	151	409	EPA-160.1
Oil & Grease				
Oil & Grease	mg/L	4.5	20.8	EPA-413.1
Minerals				
Alkalinity as CaC03	mg/L	12	145	EPA-310.1
Calcium	mg/L	62.7	6.23	EPA-200.7
Chloride	mg/L	106.85	50.10	EPA-325.3
Conductivity	umho/cm	670	739	EPA-120.1
Magnesium	mg/L	1.94	5.88	EPA-200.7
Potassium	mg/L	3.26	26.2	EPA-200.7
Sodium	mg/L	80.2	139	EPA-200.7
Sulfate	mg/L	138	129	EPA-300.0
Total Hardness as CaC02	mg/L	Not Analyzed		
pH				
pH	units	2.6	7.3	EPA-150.1

Report ALL results as mg/L except as indicated

-18

Trace Meta 8254 AUG 1993

		Level 1	Level 2	Test Method
Aluminum	ug/L	30.4	154	EPA-200.7
Antimony	ug/L	55.5	1980	EPA-200.7
Arsenic	ug/L	15.6	157	EPA-206.2
Barium	ug/L	233	1100	EPA-200.7
Beryllium	ug/L	43.9	459	EPA-200.7
Boron	ug/L	154	233	EPA-200.7
Cadmium	ug/L	24.4	175	EPA-200.7
Chromium	ug/L	26.9	113	EPA-200.7
Cobalt	ug/L	71.1	476	EPA-200.7
Copper	ug/L	31.3	109	EPA-200.7
Iron	ug/L	101	792	EPA-200.7
Lead	ug/L	84.4	196	EPA-239.2
Manganese	ug/L	39.3	126	EPA-200.7
Mercury	ug/L	1.01	3.98	EPA-245.1
Molybdenum	ug/L	189	379	EPA-200.7
Nickel	ug/L	55.3	296	EPA-200.7
Selenium	ug/L	30.6	115	EPA-270.2
Silver	ug/L	46.6	105	EPA-200.7
Thallium	ug/L	93	946	EPA-279.2
Vanadium	ug/L	30.5	1960	EPA-200.7
Zinc	ug/L	24.1	114	EPA-200.7

Phenol	mg/L	0.421	4.60	EPA-420.1
Cyanide	mg/L	0.0870	1.034	EPA-335.2
Residual Chlorine	mg/L	0.43	9.25	SM-408C
Aluminum High Level	mg/L	Not Analyzed		
Fluoride	mg/L	0.12	15.3	EPA-340.2
Total Organic Halides (TOX)	ug/L	21.4	282	EPA-9020
Hexavalent Chromium	mg/L	Not Analyzed		
Uranium	ug/L	204	530	EC-1910

JR

8254 **Volatiles** AUG

		Level 1	Level 2	Method
Benzene	ug/L			
Chlorobenzene	ug/L			
1,2-Dichlorobenzene	ug/L			
1,3-Dichlorobenzene	ug/L			
1,4-Dichlorobenzene	ug/L			
Ethylbenzene	ug/L			
Toluene	ug/L			
Bromodichloromethane	ug/L			
Bromoform	ug/L			
Bromomethane	ug/L			
Carbon tetrachloride	ug/L			
Chloroethane	ug/L			
2-Chloroethyl vinyl ether	ug/L			
Chloroform	ug/L			
Chloromethane	ug/L			
Dibromochloromethane	ug/L			
Dichlorodifluoromethane	ug/L			
1,1-Dichlorethane	ug/L			
1,2-Dichloroethane	ug/L			
1,1-Dichloroethane	ug/L			
trans-1,2-Dichloroethene	ug/L			
1,2-Dichloropropane	ug/L			
cis-1,3-Dichloropropene	ug/L			
trans-1,3-Dichloropropene	ug/L			
Methylene chloride	ug/L			

JR

MAXWELL S-CUBED

PERFORMANCE EVALUATION

RESULTS

PERFORMANCE EVALUATION SUMMARY SHEET

Laboratory: Maxwell Laboratories, Inc. S-Cubed Div

PE Sample	Number Acceptable	Number Analyzed	% Acceptable
WP-028			
Metal	36	50	72.0
Inorganic	21	30	70.0
Organic	52	54	96.3
WP-029			
Metal	34	50	68.0
Inorganic	27	30	90.0
Organic	52	52	100.0
WP-030			
Metal	46	48	95.8
Inorganic	37	38	97.4
Organic	52	54	96.3
WS-032			
Metals	19	19	100.0
Inorganic	6	6	100.0
Organic	43	53	81.1

PERFORMANCE EVALUATION REPORT DATE: 6/22/92

WATER POLLUTION STUDY NUMBER WP028

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	1810	2100	1790- 2420	1870- 2340	CHECK FOR ERROR
	2	794	950	778- 1130	823- 1090	CHECK FOR ERROR
ARSENIC	1	97.7	100	71.8- 127	78.7- 120	ACCEPTABLE
	2	518	430	348- 508	368- 488	NOT ACCEPTABLE
BERYLLIUM	1	104	100	74.9- 126	81.4- 120	ACCEPTABLE
	2	41	40	30.0- 50.9	32.6- 48.2	ACCEPTABLE
CADMIUM	1	296	250	210- 290	220- 280	NOT ACCEPTABLE
	2	48	40	32.3- 48.7	34.8- 46.7	CHECK FOR ERROR
COBALT	1	124	110	95.4- 126	99.3- 122	CHECK FOR ERROR
	2	410	370	322- 414	334- 403	CHECK FOR ERROR
CHROMIUM	1	888	800	658- 927	691- 893	ACCEPTABLE
	2	346	315	266- 371	279- 358	ACCEPTABLE
COPPER	1	842	790	714- 877	735- 856	ACCEPTABLE
	2	135	130	113- 144	117- 140	ACCEPTABLE
IRON	1	1630	1500	1310- 1690	1360- 1650	ACCEPTABLE
	2	576	540	471- 613	489- 595	ACCEPTABLE
MERCURY	1	4.51	5.30	3.89- 6.65	4.24- 6.30	ACCEPTABLE
	2	0.43	0.330	.0869-0.620	0.154-0.552	ACCEPTABLE
MANGANESE	1	881	810	731- 886	750- 867	CHECK FOR ERROR
	2	119	110	94.1- 125	97.9- 121	ACCEPTABLE
NICKEL	1	834	740	660- 814	680- 794	NOT ACCEPTABLE
	2	2450	2200	1970- 2410	2020- 2360	NOT ACCEPTABLE
LEAD	1	576	550	474- 623	493- 604	ACCEPTABLE
	2	164	150	120- 179	127- 172	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/92

WATER POLLUTION STUDY NUMBER WP028

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1	14.4	14.0	6.59- 18.8	8.11- 17.3	ACCEPTABLE
	2	55.7	55.0	31.6- 72.0	36.6- 67.0	ACCEPTABLE
VANADIUM	1	10600	10000	8530-11300	8890-11000	ACCEPTABLE
	2	6290	6000	5250- 6690	5440- 6510	ACCEPTABLE
ZINC	1	385	360	318- 406	329- 395	ACCEPTABLE
	2	1470	1400	1230- 1570	1270- 1520	ACCEPTABLE
ANTIMONY	3	< 70	84.9	56.2- 106	62.7- 99.6	UNUSABLE DATA
	4	< 70	39.1	24.7- 50.6	28.1- 47.2	UNUSABLE DATA
SILVER	3	< 10	1.03	0.652- 1.40	0.748- 1.30	UNUSABLE DATA
	4	< 10	10.6	8.45- 12.6	8.98- 12.1	UNUSABLE DATA
THALLIUM	3	38.1	33.9	25.9- 41.8	28.0- 39.7	ACCEPTABLE
	4	< 4.0	3.07	1.25- 5.01	1.74- 4.32	UNUSABLE DATA
MOLYBDENUM	3	< 14	4.79	2.04- 7.64	2.83- 6.85	UNUSABLE DATA
	4	27	21.0	14.2- 27.3	16.1- 25.4	CHECK FOR ERROR
STRONTIUM	3	84	80.9	64.9- 96.7	69.2- 92.4	ACCEPTABLE
	4	< 20	9.09	7.04- 11.1	7.59- 10.6	UNUSABLE DATA
TITANIUM	3	187	150	125- 171	131- 165	NOT ACCEPTABLE
	4	134	106	87.9- 121	92.4- 117	NOT ACCEPTABLE
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
PH-UNITS	3	9.41	9.40	9.09- 9.64	9.16- 9.57	ACCEPTABLE
	4	6.79	6.80	6.63- 6.96	6.67- 6.92	ACCEPTABLE
SPEC. COND.	1	521	545	487- 570	498- 560	ACCEPTABLE
(UMHOS/CM AT 25 C)	2	693	742	660- 810	679- 791	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/92

WATER POLLUTION STUDY NUMBER WP028

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
TDS AT 180 C	1	290	316	217- 370	236- 351	ACCEPTABLE
	2	570	405	306- 605	344- 568	CHECK FOR ERROR
CALCIUM	1	6.38	6.00	5.03- 6.84	5.26- 6.61	ACCEPTABLE
	2	110	98.0	85.2- 109	88.2- 106	NOT ACCEPTABLE
MAGNESIUM	1	31.7	33.0	29.2- 36.8	30.1- 35.9	ACCEPTABLE
	2	0.541	0.600	0.465-0.741	0.500-0.706	ACCEPTABLE
SODIUM	1	27.6	25.4	23.2- 28.2	23.9- 27.6	ACCEPTABLE
	2	25	24.4	21.9- 27.0	22.5- 26.4	ACCEPTABLE
POTASSIUM	1	21.8	22.0	19.0- 25.5	19.8- 24.7	ACCEPTABLE
	2	12.3	12.0	10.3- 13.9	10.7- 13.5	ACCEPTABLE
TOTAL ALKALINITY (AS CACO3)	1	13.7	15.0	10.9- 20.1	12.1- 18.9	ACCEPTABLE
	2	37.9	36.0	30.8- 41.4	32.1- 40.1	ACCEPTABLE
CHLORIDE	1	101	108	96.1- 116	98.5- 113	ACCEPTABLE
	2	158	176	159- 190	163- 186	NOT ACCEPTABLE
FLUORIDE	1	1.93	1.20	1.01- 1.35	1.05- 1.30	NOT ACCEPTABLE
	2	0.168	0.140	.0851-0.204	0.100-0.189	ACCEPTABLE
SULFATE	1	65.1	63.0	53.4- 70.6	55.5- 68.5	ACCEPTABLE
	2	29.1	29.0	23.5- 33.2	24.7- 32.0	ACCEPTABLE
NUTRIENTS IN MILLIGRAMS PER LITER:						
AMMONIA-NITROGEN	1	2.51	2.50	1.86- 3.07	2.01- 2.93	ACCEPTABLE
	2	13.3	14.0	11.2- 16.8	11.8- 16.0	ACCEPTABLE
NITRATE-NITROGEN	1	14.6	15.0	12.1- 17.6	12.8- 16.9	ACCEPTABLE
	2	4.61	4.80	3.75- 5.72	3.99- 5.48	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/92

WATER POLLUTION STUDY NUMBER WP028

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
NUTRIENTS IN MILLIGRAMS PER LITER:						
ORTHOPHOSPHATE	1	0.64	0.510	0.419-0.598	0.440-0.577	NOT ACCEPTABLE
	2	2.50	2.30	1.92- 2.63	2.01- 2.54	ACCEPTABLE
DEMANDS IN MILLIGRAMS PER LITER:						
COD	1	55.3	56.3	38.2- 69.5	42.2- 65.6	ACCEPTABLE
	2	101	98.8	75.4- 117	80.7- 112	ACCEPTABLE
TOC	1	31.1	22.2	18.3- 25.1	19.7- 23.1	NOT ACCEPTABLE
	2	54.4	39.1	33.2- 45.4	34.8- 43.8	NOT ACCEPTABLE
PCB'S IN MICROGRAMS PER LITER:						
PCB-AROCLOR 1232	2	6.08	7.23	2.95- 9.57	3.79- 8.73	ACCEPTABLE
PCB-AROCLOR 1260	1	5.10	5.77	3.19- 7.46	3.72- 6.92	ACCEPTABLE
PCB'S IN OIL IN MILLIGRAMS PER KILOGRAM:						
PCB IN OIL- 1016/1242	1	11.2	22.8	2.64- 32.1	6.42- 28.3	ACCEPTABLE
PCB IN OIL- 1260	2	22.4	17.6	2.58- 27.5	5.79- 24.3	ACCEPTABLE
PESTICIDES IN MICROGRAMS PER LITER:						
CHLORDANE	3	0.490	1.28	0.678- 1.75	0.813- 1.61	NOT ACCEPTABLE
	4	2.89	7.21	3.85- 9.24	4.54- 8.55	NOT ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/92

WATER POLLUTION STUDY NUMBER WP028

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
PESTICIDES IN MICROGRAMS PER LITER:						
ALDRIN	1	0.101	0.139	.0286-0.181	.0478-0.162	ACCEPTABLE
	2	0.402	0.516	0.124-0.699	0.196-0.627	ACCEPTABLE
DIELDRIN	1	0.087	0.101	.0416-0.155	.0561-0.141	ACCEPTABLE
	2	0.419	0.464	0.236-0.660	0.290-0.606	ACCEPTABLE
DDD	1	0.180	0.200	.0875-0.298	0.114-0.271	ACCEPTABLE
	2	1.02	0.925	0.493- 1.24	0.588- 1.14	ACCEPTABLE
DDE	1	0.104	0.119	.0469-0.173	.0631-0.157	ACCEPTABLE
	2	0.568	0.615	0.295-0.850	0.366-0.779	ACCEPTABLE
DDT	1	0.163	0.175	.0645-0.283	.0923-0.255	ACCEPTABLE
	2	0.959	0.850	0.436- 1.20	0.533- 1.10	ACCEPTABLE
HEPTACHLOR	1	0.146	0.200	.0637-0.282	.0916-0.254	ACCEPTABLE
	2	0.454	0.640	0.227-0.864	0.308-0.782	ACCEPTABLE
HEPTACHLOR EPOXIDE	1	0.067	0.081	.0390-0.113	.0484-0.104	ACCEPTABLE
	2	0.354	0.444	0.254-0.600	0.298-0.555	ACCEPTABLE
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
1,2 DICHLOROETHANE	1	52.5	51.5	34.4- 68.7	38.7- 64.4	ACCEPTABLE
	2	12	12.2	8.27- 16.7	9.35- 15.7	ACCEPTABLE
CHLOROFORM	1	57.8	57.8	37.4- 75.3	42.2- 71.0	ACCEPTABLE
	2	15.7	15.4	10.4- 20.2	11.6- 18.9	ACCEPTABLE
1,1,1 TRICHLOROETHANE	1	39.8	43.6	23.3- 60.3	28.3- 55.7	ACCEPTABLE
	2	13.3	16.4	10.0- 22.0	11.6- 20.5	ACCEPTABLE
TRICHLOROETHENE	1	41.5	45.4	27.3- 59.6	31.3- 55.6	ACCEPTABLE
	2	10.6	12.1	8.24- 15.9	9.19- 14.9	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/92

WATER POLLUTION STUDY NUMBER WP028

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
CARBONTETRACHLORIDE	1	33.7	39.1	22.7- 56.4	26.9- 52.2	ACCEPTABLE
	2	14.9	18.4	11.4- 25.3	13.2- 23.6	ACCEPTABLE
TETRACHLOROETHENE	1	53.2	53.5	31.8- 71.4	36.8- 66.4	ACCEPTABLE
	2	9.42	9.73	6.02- 13.3	6.95- 12.4	ACCEPTABLE
BROMODICHLOROMETHANE	1	61.5	56.7	37.2- 80.3	42.6- 74.9	ACCEPTABLE
	2	9.77	10.9	7.94- 14.5	8.76- 13.7	ACCEPTABLE
DIBROMOCHLOROMETHANE	1	35.3	37.8	26.1- 49.9	29.0- 46.9	ACCEPTABLE
	2	10.8	14.9	9.91- 19.3	11.2- 18.6	CHECK FOR ERROR
BROMOFORM	1	58.4	61.2	36.9- 89.4	43.5- 82.8	ACCEPTABLE
	2	8.37	13.4	7.47- 19.2	8.96- 17.7	CHECK FOR ERROR
METHYLENE CHLORIDE	1	53.2	48.4	25.3- 70.7	31.0- 65.0	ACCEPTABLE
	2	13	9.37	4.48- 14.6	5.76- 13.3	ACCEPTABLE
CHLOROBENZENE	1	43.9	38.2	25.8- 50.0	28.9- 46.9	ACCEPTABLE
	2	19.2	17.8	12.0- 23.4	13.4- [illegible]	ACCEPTABLE
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
BENZENE	1	16.6	16.7	11.5- 22.1	12.8- 20.7	ACCEPTABLE
	2	68.6	67.3	45.6- 87.5	50.9- 82.3	ACCEPTABLE
ETHYLBENZENE	1	14	14.2	8.97- 18.9	10.2- 17.7	ACCEPTABLE
	2	38.6	36.8	24.0- 49.9	27.2- 46.6	ACCEPTABLE
TOLUENE	1	10.1	11.5	7.68- 15.1	8.63- 14.2	ACCEPTABLE
	2	45.2	45.2	31.6- 56.9	34.7- 53.7	ACCEPTABLE
1,2-DICHLOROBENZENE	1	13.8	13.9	9.57- 17.8	10.6- 16.7	ACCEPTABLE
	2	44.9	48.2	32.8- 62.1	36.6- 58.3	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/92

WATER POLLUTION STUDY NUMBER WP028

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
1,3-DICHLOROBENZENE	1	12.6	14.0	9.49- 17.9	10.6- 16.8	ACCEPTABLE
	2	54.8	53.9	34.0- 73.5	39.0- 68.5	ACCEPTABLE
1,4-DICHLOROBENZENE	1	15	15.7	10.7- 20.7	12.0- 19.4	ACCEPTABLE
	2	41.8	42.5	28.5- 56.5	32.1- 52.9	ACCEPTABLE
MISCELLANEOUS PARAMETERS:						
TOTAL CYANIDE (IN MG/L)	1	515	0.610	0.415-0.771	0.460-0.726	NOT ACCEPTABLE
	2	145	0.180	0.117-0.233	0.132-0.213	NOT ACCEPTABLE
OIL AND GREASE (IN MG/L)	1	15.5	19.0	8.01- 25.6	10.2- 23.3	ACCEPTABLE
	2	9.5	11.0	4.13- 15.7	5.59- 14.2	ACCEPTABLE
TOTAL PHENOLICS (IN MG/L)	1	0.2	0.207	0.103-0.312	0.130-0.285	ACCEPTABLE
	2	0.064	0.054	.0235-.0853	.0314-.0774	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

WP028 Responses

Analyte:	Response:
Trace metals	For the ICP analytes, all of the QC data were good. The initial calibration verification, continuing calibration verifications, and an independent purchased check standard yielded results that were well within the control limits for the analysis. For the ICP analytes, it was noted that , in addition to Cd, Ca, Ni, and Ti, many of the results were biased high. The cause of this was investigated, and it was found that there was possibly some contamination from metal deposition inside the torch exhaust vent cone. This has been cleaned and sprayed with teflon to eliminate the contamination. The error in the GFAA result for As was identified as one of the instrument automatic dilution accuracy. The result reported was from a 10x automatic dilution. The accuracy of this dilution was checked and it was fouund that the automatic dilution was accurate only up to 4x; any higher dilution requires manual dilution. The As result from the ICP analysis was 405 µg/L, which is in the acceptable range.
Chloride	The error in the reported Cl result was due to a data reporting error. The correct result for Cl is 172 mg/L, which is within the acceptable range. The acceptable value to report will be clearly indicated in the run log from now on, to eliminate such reporting error.
Fluoride	The F error was due to a peak integration problem. There was an overlap peak berfore the fluoride peak which caused a baseline integration problem. The samples will be diluted to minimize the background problem.
Total Cyanide	This error was in data reporting. The results were reported in µg/L, while the results were requested in mg/L. The result for concentration 1 was 0.315 mg/L and the result for concentration 2 was 0.145 mgL. This error has been observed on previous PE sample results; the corrective action to prevent its recurrence is to have a member of S-Cubed's quality staff appropriately

	examine the results before they are returned to the EPA. This has been implemented with our most recent PE samples.
Orthophosphate	The error in this result was most probably due to the dilution technique. The dilution was performed unnecessarily because the sample did not require dilution for o-PO_4. An undiluted sample result was 0.471 mg/L, which fell within the acceptable range for this analysis. The corrective action for the error in dilution technique will be that an analyst will check the pipets before they are used for diluting a sample, and the pipet precision will be monitored weekly.
TDS	A possibility for the error in this result is that the oven was dirty, causing crucible contamination during the drying step. All ovens are now cleaned weekly to prevent this contamination.
TOC	The instrument calibration and the laboratory control sample were within the specifications for these parameters. The error could possibly have been caused by the incorrect dilution of the samples, or the samples may not have been well-mixed.
Chlordane	It is assumed that chlordane has been calculated incorrectly. The calculation has been performed by taking the area under 5 peaks in the chromatogram. From now on, the calculation will be performed by taking the total area. S-Cubed used this method of calculation in the most recent EPA PE sample.
Dibromochloroethane and Bromoform	These compounds yielded low but acceptable results in the low level sample. The low bias is likely due to the fact that the spiked level was very close to the practical quantitation limit of 10 μg/L.

PERFORMANCE EVALUATION REPORT DATE: 12/21/92

WATER POLLUTION STUDY NUMBER WP029

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	63.0	65.9	40.1- 100	47.7- 92.6	ACCEPTABLE
	2	609	548	435- 645	462- 619	ACCEPTABLE
ARSENIC	1	150	140	113- 168	120- 161	ACCEPTABLE
	2	18.5	15.0	11.1- 19.4	12.2- 18.4	CHECK FOR ERRO
BERYLLIUM	1	18.5	16.8	12.4- 21.4	13.5- 20.2	ACCEPTABLE
	2	705	609	497- 714	525- 686	CHECK FOR ERRO
CADMIUM	1	19.5	16.8	12.2- 21.5	13.4- 20.4	ACCEPTABLE
	2	495	380	319- 440	334- 425	NOT ACCEPTABLE
COBALT	1	805	651	566- 724	586- 703	NOT ACCEPTABLE
	2	15.6	13.3	9.54- 17.0	10.5- 16.0	ACCEPTABLE
CHROMIUM	1	730	620	516- 717	541- 691	NOT ACCEPTABLE
	2	9.25	8.11	3.37- 12.3	4.49- 11.2	ACCEPTABLE
COPPER	1	7.35	6.33	3.68- 8.58	4.30- 7.97	ACCEPTABLE
	2	280	241	213- 267	219- 260	NOT ACCEPTABLE
IRON	1	825	711	625- 800	647- 778	NOT ACCEPTABLE
	2	101	83.0	68.2- 97.7	71.9- 94.0	NOT ACCEPTABLE
MERCURY	1	7.40	8.12	6.26- 10.3	6.77- 9.81	ACCEPTABLE
	2	11.1	13.0	9.49- 16.9	10.4- 15.9	ACCEPTABLE
MANGANESE	1	399	340	303- 373	312- 364	NOT ACCEPTABLE
	2	37.0	30.6	25.7- 35.6	26.9- 34.3	NOT ACCEPTABLE
NICKEL	1	39.0	31.7	25.5- 37.4	27.0- 35.9	NOT ACCEPTABLE
	2	707	569	498- 632	515- 616	NOT ACCEPTABLE
LEAD	1	1130	959	831- 1080	862- 1050	NOT ACCEPTABLE
	2	1800	1500	1300- 1680	1350- 1630	NOT ACCEPTABLE

* BASED UPON THECRETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 12/21/92

WATER POLLUTION STUDY NUMBER WP029

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1	6.43	6.01	3.28- 8.06	3.88- 7.46	ACCEPTABLE
	2	174	170	116- 203	127- 192	ACCEPTABLE
VANADIUM	1	555	490	431- 541	445- 527	NOT ACCEPTABLE
	2	42.5	38.2	30.6- 46.8	32.7- 44.7	ACCEPTABLE
ZINC	1	18.4	17.0	11.3- 22.9	12.8- 21.4	ACCEPTABLE
	2	708	612	536- 689	555- 670	NOT ACCEPTABLE
ANTIMONY	3	22.7	22.0	12.4- 29.9	14.6- 27.6	ACCEPTABLE
	4	160	146	96.6- 182	107- 171	ACCEPTABLE
SILVER	3	5.90	5.59	4.20- 7.01	4.56- 6.66	ACCEPTABLE
	4	14.6	14.0	11.1- 16.8	11.8- 16.1	ACCEPTABLE
THALLIUM	3	5.60	5.30	3.45- 7.01	3.92- 6.54	ACCEPTABLE
	4	77.3	76.2	58.3- 94.0	63.0- 89.4	ACCEPTABLE
MOLYBDENUM	3	57.0	49.0	38.0- 61.2	41.0- 58.2	ACCEPTABLE
	4	8.90	7.96	4.27- 12.2	5.31- 11.2	ACCEPTABLE
STRONTIUM	3	14.0	12.9	10.1- 15.4	10.8- 14.7	ACCEPTABLE
	4	66.0	61.9	50.3- 71.9	53.2- 69.1	ACCEPTABLE
TITANIUM	3	233	214	185- 237	192- 230	CHECK FOR ERRO
	4	87.0	78.0	65.4- 88.2	68.5- 85.2	CHECK FOR ERRO
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
PH-UNITS	3	4.44	4.40	4.28- 4.48	4.31- 4.45	ACCEPTABLE
	4	7.93	8.00	7.76- 8.21	7.81- 8.16	ACCEPTABLE
SPEC. COND. (UMHOS/CM AT 25 C)	1	177	182	162- 199	167- 194	ACCEPTABLE
	2	812	812	752- 882	769- 865	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 12/21/92

WATER POLLUTION STUDY NUMBER WP029

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
TOTAL HARDNESS (AS CACO3)	1	50.0	46.5	39.6- 51.0	41.0- 49.6	CHECK FOR ERRO
	2	218	221	203- 237	207- 233	ACCEPTABLE
CALCIUM	1	16.0	15.0	12.8- 15.9	13.2- 15.5	NOT ACCEPTABLE
	2	56.4	49.0	44.7- 54.1	45.9- 53.0	NOT ACCEPTABLE
MAGNESIUM	1	2.44	2.48	2.07- 2.90	2.17- 2.79	ACCEPTABLE
	2	24.8	24.0	21.0- 26.9	21.8- 26.2	ACCEPTABLE
SODIUM	1	10.4	9.68	8.19- 11.3	8.59- 10.9	ACCEPTABLE
	2	50.4	48.4	42.4- 55.2	44.0- 53.6	ACCEPTABLE
POTASSIUM	1	6.44	6.30	5.16- 7.32	5.44- 7.05	ACCEPTABLE
	2	33.8	34.0	29.1- 38.9	30.3- 37.6	ACCEPTABLE
TOTAL ALKALINITY (AS CACO3)	1	10.0	9.70	6.65- 14.1	7.58- 13.2	ACCEPTABLE
	2	52.0	54.0	47.2- 62.0	49.0- 60.1	ACCEPTABLE
CHLORIDE	1	34.3	33.3	28.8- 36.0	29.7- 35.1	ACCEPTABLE
	2	160	159	143- 171	146- 167	ACCEPTABLE
FLUORIDE	1	0.452	0.460	0.378-0.544	0.399-0.523	ACCEPTABLE
	2	1.44	1.80	1.55- 2.02	1.61- 1.96	NOT ACCEPTABLE
SULFATE	1	16.5	17.0	13.2- 20.2	14.1- 19.4	ACCEPTABLE
	2	107	84.0	70.1- 93.9	73.1- 90.9	NOT ACCEPTABLE
NUTRIENTS IN MILLIGRAMS PER LITER:						
NITRATE-NITROGEN	1	0.209	0.170	.0849-0.256	0.105-0.235	ACCEPTABLE
	2	1.25	1.30	1.00- 1.59	1.07- 1.52	ACCEPTABLE
ORTHOPHOSPHATE	1	0.096	0.030	.0116-.0498	.0162-.0452	NOT ACCEPTABLE
	2	0.652	0.670	0.555-0.779	0.582-0.752	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 12/21/9

WATER POLLUTION STUDY NUMBER WP029

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
DEMANDS IN MILLIGRAMS PER LITER:						
COD	1	308	304	240- 341	253- 328	ACCEPTABL
	2	168	157	122- 179	129- 172	ACCEPTABL
TOC	1	117	120	100- 142	105- 136	ACCEPTABL
	2	56.7	62.0	51.8- 73.6	54.6- 70.8	ACCEPTABL
PCB'S IN MICROGRAMS PER LITER:						
PCB-AROCLOR 1248	2	1.76	1.76	0.538- 2.74	0.816- 2.46	ACCEPTABL
PCB-AROCLOR 1254	1	2.16	2.37	1.41- 2.95	1.60- 2.76	ACCEPTABL
PESTICIDES IN MICROGRAMS PER LITER:						
CHLORDANE	3	5.07	6.48	3.59- 8.25	4.19- 7.65	ACCEPTABL
	4	1.16	1.43	0.764- 1.88	0.907- 1.74	ACCEPTABL
ALDRIN	1	0.598	0.676	0.179-0.834	0.262-0.751	ACCEPTABL
	2	0.080	0.126	.0254-0.176	.0446-0.157	ACCEPTABL
DIELDRIN	1	0.686	0.617	0.309-0.892	0.384-0.817	ACCEPTABL
	2	0.124	0.137	.0650-0.200	.0823-0.183	ACCEPTABL
DDD	1	0.874	0.777	0.431- 1.05	0.510-0.973	ACCEPTABL
	2	0.104	0.129	.0511-0.192	.0690-0.175	ACCEPTABL
DDE	1	0.522	0.548	0.245-0.785	0.314-0.716	ACCEPTABL
	2	0.061	0.087	.0352-0.124	.0465-0.112	ACCEPTABL
DDT	1	0.738	0.674	0.353-0.856	0.416-0.792	ACCEPTABL
	2	0.170	0.150	.0572-0.210	.0766-0.191	ACCEPTABL

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT

DATE: 12/21/9

WATER POLLUTION STUDY NUMBER WP029

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
PESTICIDES IN MICROGRAMS PER LITER:						
HEPTACHLOR	1	0.411	0.486	0.168-0.657	0.231-0.594	ACCEPTABLE
	2	0.098	0.129	.0346-0.190	.0545-0.170	ACCEPTABLE
HEPTACHLOR EPOXIDE	1	0.535	0.571	0.312-0.722	0.364-0.670	ACCEPTABLE
	2	0.120	0.143	.0705-0.189	.0855-0.174	ACCEPTABLE
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
1,2 DICHLOROETHANE	1	13.5	13.8	9.64- 18.6	10.8- 17.4	ACCEPTABLE
	2	56.0	58.5	40.8- 76.1	45.3- 71.6	ACCEPTABLE
CHLOROFORM	1	8.35	8.40	5.60- 11.2	6.32- 10.5	ACCEPTABLE
	2	37.1	38.3	26.1- 50.9	29.3- 47.8	ACCEPTABLE
1,1,1 TRICHLOROETHANE	1	10.8	12.6	7.58- 17.0	8.77- 15.8	ACCEPTABLE
	2	58.9	63.8	41.9- 83.7	47.2- 78.4	ACCEPTABLE
TRICHLOROETHENE	1	14.5	15.5	10.2- 20.0	11.5- 18.8	ACCEPTABLE
	2	50.7	53.3	36.1- 67.2	40.1- 63.3	ACCEPTABLE
CARBONTETRACHLORIDE	1	9.49	10.7	6.73- 14.8	7.76- 13.8	ACCEPTABLE
	2	56.3	54.5	34.2- 77.3	39.6- 71.9	ACCEPTABLE
TETRACHLOROETHENE	1	15.1	14.9	9.77- 19.5	11.0- 18.3	ACCEPTABLE
	2	43.6	46.2	30.5- 60.2	34.2- 56.5	ACCEPTABLE
BROMODICHLOROMETHANE	1	15.9	16.4	11.1- 21.3	12.4- 20.0	ACCEPTABLE
	2	68.2	62.9	43.6- 82.9	48.6- 77.9	ACCEPTABLE
DIBROMOCHLOROMETHANE	1	10.8	12.5	8.09- 16.6	9.17- 15.6	ACCEPTABLE
	2	42.6	45.4	28.8- 61.3	32.9- 57.2	ACCEPTABLE
BROMOFORM	1	12.5	16.3	7.67- 24.0	9.73- 21.9	ACCEPTABLE
	2	34.3	37.7	22.7- 52.3	26.4- 48.6	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 12/21/92

WATER POLLUTION STUDY NUMBER WP029

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
METHYLENE CHLORIDE	1	15.8	12.8	6.66- 19.0	8.22- 17.4	ACCEPTABLE
	2	71.3	65.6	43.6- 91.0	49.5- 85.0	ACCEPTABLE
CHLOROBENZENE	1	10.5	10.3	6.92- 13.5	7.76- 12.7	ACCEPTABLE
	2	54.1	57.2	39.7- 73.8	44.1- 69.5	ACCEPTABLE
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
BENZENE	1	40.0	43.9	30.0- 59.0	33.6- 55.4	ACCEPTABLE
	2	11.5	12.7	9.00- 17.0	10.0- 16.0	ACCEPTABLE
ETHYLBENZENE	1	46.0	47.7	31.4- 64.3	35.6- 60.2	ACCEPTABLE
	2	9.17	9.71	6.19- 13.0	7.06- 12.2	ACCEPTABLE
TOLUENE	1	57.4	59.7	42.1- 76.7	46.5- 72.3	ACCEPTABLE
	2	16.5	17.2	12.0- 22.0	13.3- 20.8	ACCEPTABLE
1,[illegible]-DICHLOROBENZENE	1	56.6	57.1	36.9- 74.5	41.7- 69.7	ACCEPTABLE
	2	16.0	15.4	10.6- 19.7	11.8- 18.5	ACCEPTABLE
1,3-DICHLOROBENZENE	1	45.7	47.0	32.1- 59.6	35.6- 56.2	ACCEPTABLE
	2	16.0	16.5	11.4- 21.2	12.6- 19.9	ACCEPTABLE
1,4-DICHLOROBENZENE	1	50.2	50.0	30.3- 67.8	35.1- 63.0	ACCEPTABLE
	2	14.0	13.3	9.91- 17.8	10.9- 16.8	ACCEPTABLE
MISCELLANEOUS PARAMETERS:						
TOTAL CYANIDE	1	0.035	0.040	.0108-.0592	.0169-.0531	ACCEPTABLE
(IN MG/L)	2	0.331	0.350	0.206-0.461	0.239-0.429	ACCEPTABLE
NON-FILTERABLE RESIDUE	1	15.5	18.0	9.17- 19.8	10.5- 18.4	ACCEPTABLE
(IN MG/L)	2	82.5	93.0	71.8- 98.0	75.1- 94.8	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 12/21/92

WATER POLLUTION STUDY NUMBER WP029

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MISCELLANEOUS PARAMETERS=						
OIL AND GREASE	1	63.6	72.0	43.7- 84.3	48.8- 79.2	ACCEPTABLE
(IN MG/L)	2	26.2	30.0	17.1- 36.7	19.6- 34.2	ACCEPTABLE
TOTAL PHENOLICS	1	0.930	1.06	0.572- 1.55	0.697- 1.42	ACCEPTABLE
(IN MG/L)	2	0.464	0.484	0.258-0.709	0.316-0.651	ACCEPTABLE

* BASED UPON THECRETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

DATE: March 30, 1993

TO: Jane Goodins

FROM: Wipawan Nisamaneepong

SUBJECT: Corrective Action Responses - PE Sample Results to Memo on March 12, 1993

cc: B. Beimer, J. Wallace

Responses to your questions on memo dated on March 12, 1993 for PE sample results are as follows:

A) ICP Analysis Results

Problems relating to ICP analysis results were found and corrected. The causes of the problems were found to be on stray light effect and spectral overlap interferences.

Corrective Action:

Stray Light Effects Problem: Baffles were installed to reduce stray light following optical paths which deviate from the intended ones. Radiation from orders other than the one of interest are trapped though the use of baffles. Results of ERA standard #9946 analyzed before and after baffles installation were indicated that the stray light problems were reduced in most of the affected lines as shown in Table 1.

Spectral Interferences Probelm: There were still some problems observed in some analytes after baffles installation. Spectral interferences were verifed as the cause of the problem. Ca and Mg spectral lines were found to cause spectral interferences to Cd, Co, Cr, Mn, Mo, Ni, and Pb. Corrective actions to minimize this problem are as follows:

The Ca and Mg standards were separated from the interferant standards in the calibration solutions.

New interelement correction factors (IEC) were calibrated and applied to reduce the spectral overlap interferences.

The ERA #9946, EPA #1085, and PE WP029 were then analyzed using the new calibration standards and new IEC. All results were found to agree well with the true values as shown in Table 2 and 3.

Table 1

Results of ERA #9946 before and after baffles installation.

ANALYTE	TRUE VALUE (PPB)	FOUND BEFORE INSTALLATION	%REC	FOUND AFTER INSTALLATION	%REC
Al	450	514	114	423	94
Ba	115	128	111	119	103
Be	101	108	107	102	101
Cd	91.3	109	119	98.7	108
Co	110	133	121	120	109
Cr	650	746	115	704	108
Cu	159	168	106	161	101
Fe	525	619	117	565	108
Mn	101	115	114	107	106
Mo	103	115	112	120	117
Ni	163	194	119	176	108
Pb	145	188	130	155	107
V	132	160	121	140	106
Zn	175	192	110	171	102

TABLE 3

Results and percent recovery of ERA #9946 and EPA #1085

ANALYTE	S-CUBED FOUND (ug/L)	ERA #9946 TRUE VALUE (ug/L)	%REC	EPA #1085 TRUE VALUE (ug/L)	%REC
Al	498	450	111		
Ba	117	115	102		
Be	106	101	105		
Cd	90	91.3	98.6		
Co	118	110	107		
Cr	868	850	103		
Cu	165	159	104		
Fe	562	525	107		
Mn	102	101	101		
Mo	102	103	99.0		
Ni	165	163	101		
Pb	147	145	101		
V	146	132	111		
Zn	178	175	101		
Cd	970			1000	97.0
Cr	4920			5000	98.4
Pb	4880			5000	97.6
Ba	98300			100000	98.3
As	4800			5000	96.0

PERFORMANCE EVALUATION REPORT

DATE: 5/22/93

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	1090	1100	898- 1300	949- 1250	ACCEPTABLE
	2	4010	4000	3370- 4570	3520- 4410	ACCEPTABLE
ARSENIC	1	289	280	225- 334	238- 320	ACCEPTABLE
BERYLLIUM	1	63.3	63.0	51.1- 74.5	54.1- 71.5	ACCEPTABLE
CADMIUM	1	8.00	8.12	6.30- 10.3	6.80- 9.79	ACCEPTABLE
	2	90.1	93.9	78.3- 110	82.2- 106	ACCEPTABLE
COBALT	1	479	480	416- 536	431- 521	ACCEPTABLE
	2	244	240	206- 275	214- 266	ACCEPTABLE
CHROMIUM	1	59.3	62.0	49.2- 73.7	52.3- 70.6	ACCEPTABLE
	2	446	460	378- 533	397- 514	ACCEPTABLE
COPPER	1	60.1	62.0	53.5- 69.8	55.6- 67.8	ACCEPTABLE
	2	413	410	365- 462	377- 450	ACCEPTABLE
IRON	1	3870	3800	3350- 4230	3460- 4120	ACCEPTABLE
	2	899	860	755- 963	781- 937	ACCEPTABLE
MERCURY	1	1.52	0.983	0.620- 1.42	0.719- 1.32	NOT ACCEPTABLE
	2	3.14	2.10	1.57- 2.75	1.72- 2.61	NOT ACCEPTABLE
MANGANESE	1	2090	2200	1950- 2450	2010- 2380	ACCEPTABLE
	2	214	221	196- 244	202- 238	ACCEPTABLE
NICKEL	1	127	130	111- 150	116- 145	ACCEPTABLE
	2	1270	1300	1160- 1450	1200- 1420	ACCEPTABLE
LEAD	1	34.5	79.2	62.7- 97.1	67.0- 92.8	ACCEPTABLE
	2	439	450	393- 513	408- 498	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 5/22/9

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1	24.0	23.0	14.3- 29.1	16.1- 27.3	ACCEPTABLE
	2	85.1	78.1	52.8- 94.6	58.1- 89.3	ACCEPTABLE
VANADIUM	1	7840	8000	7110- 8830	7330- 8610	ACCEPTABLE
	2	15300	15000	12700-17400	13300-15800	ACCEPTABLE
ZINC	1	1060	1100	961- 1220	993- 1190	ACCEPTABLE
	2	246	240	209- 271	215- 263	ACCEPTABLE
ANTIMONY	3	123	116	79.4- 140	87.2- 133	ACCEPTABLE
	4	14.8	14.0	7.01- 20.4	8.73- 18.7	ACCEPTABLE
SILVER	3	2.40	2.39	1.80- 2.96	1.95- 2.82	ACCEPTABLE
	4	10.1	9.75	7.80- 11.5	8.25- 11.0	ACCEPTABLE
THALLIUM	3	92.1	90.2	70.7- 109	75.5- 103	ACCEPTABLE
	4	9.35	9.00	6.71- 11.3	7.29- 10.7	ACCEPTABLE
MOLYBDENUM	3	6.30	6.48	3.34- 8.92	4.04- 8.12	ACCEPTABLE
	4	38.8	39.0	30.3- 47.9	32.6- 45.6	ACCEPTABLE
STRONTIUM	3	4.05	4.01	3.01- 4.99	3.26- 4.73	ACCEPTABLE
	4	53.5	51.0	41.4- 60.1	43.3- 57.7	ACCEPTABLE
TITANIUM	3	65.3	66.0	51.5- 76.5	54.7- 73.3	ACCEPTABLE
	4	186	182	149- 205	156- 198	ACCEPTABLE
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
PH-UNITS	3	8.72	8.70	8.31- 9.05	8.40- 8.96	ACCEPTABLE
	4	6.07	6.10	5.96- 6.22	5.99- 6.19	ACCEPTABLE
SPEC. COND.	1	243	253	226- 274	232- 268	ACCEPTABLE
(UMHOS/CM AT 25 C)	2	824	868	819- 916	831- 904	CHECK FOR ERRO

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

LAB ACCREDITATION PROGRAM

JUL 9 1993

CAL DEPT HEALTH SERVICES

PERFORMANCE EVALUATION REPORT DATE: 6/22/9?

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
TDS AT 180 C	1	145	116	76.2- 166	87.5- 155	ACCEPTABLE
	2	612	480	385- 617	414- 588	CHECK FOR ERRO
TOTAL HARDNESS (AS CACO3)	1	74.3	75.6	66.7- 84.1	68.8- 82.0	ACCEPTABLE
	2	225	225	209- 242	213- 238	ACCEPTABLE
CALCIUM	1	3.72	3.69	3.00- 4.47	3.18- 4.29	ACCEPTABLE
	2	79.4	80.9	73.4- 90.2	75.5- 88.1	ACCEPTABLE
MAGNESIUM	1	15.9	16.1	14.0- 18.1	14.5- 17.6	ACCEPTABLE
	2	5.14	5.64	4.84- 6.32	5.03- 6.13	ACCEPTABLE
SODIUM	1	15.6	15.9	14.0- 17.9	14.5- 17.4	ACCEPTABLE
	2	64.0	65.6	59.6- 72.0	61.2- 70.4	ACCEPTABLE
POTASSIUM	1	2.47	2.60	2.05- 3.22	2.19- 3.08	ACCEPTABLE
	2	18.2	19.0	16.2- 21.9	16.9- 21.1	ACCEPTABLE
TOTAL ALKALINITY (AS CACO3)	1	22.0	21.1	17.2- 26.1	18.3- 25.0	ACCEPTABLE
	2	96.0	97.0	85.0- 109	88.0- 106	ACCEPTABLE
CHLORIDE	1	51.0	54.3	48.2- 59.1	49.6- 57.8	ACCEPTABLE
	2	173	178	166- 191	170- 188	ACCEPTABLE
FLUORIDE	1	2.58	2.40	2.09- 2.65	2.16- 2.58	ACCEPTABLE
	2	0.235	0.230	0.175-0.286	0.189-0.272	ACCEPTABLE
SULFATE	1	9.29	9.10	6.48- 11.4	7.10- 10.8	ACCEPTABLE
	2	42.1	42.0	35.2- 48.1	36.8- 46.5	ACCEPTABLE
NUTRIENTS IN MILLIGRAMS PER LITER:						
AMMONIA-NITROGEN	1	4.79	5.50	4.35- 6.65	4.62- 6.37	ACCEPTABLE
	2	9.22	9.80	7.80- 11.6	8.25- 11.2	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/9

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
NUTRIENTS IN MILLIGRAMS PER LITER:						
NITRATE-NITROGEN	1	34.5	34.0	27.5- 40.2	29.0- 38.7	ACCEPTABL
	2	7.33	7.10	5.70- 8.43	6.03- 8.10	ACCEPTABL
ORTHOPHOSPHATE	1	0.832	0.830	0.692-0.961	0.724-0.929	ACCEPTABL
	2	0.093	0.090	.0617-0.122	.0689-0.115	ACCEPTABL
KJELDAHL-NITROGEN	3	7.07	9.30	6.67- 11.5	7.26- 10.9	CHECK FOR ERR
	4	15.8	19.0	13.9- 23.1	15.0- 22.0	ACCEPTABL
TOTAL PHOSPHORUS	3	2.68	3.20	2.35- 3.57	2.49- 3.42	ACCEPTABL
	4	1.44	1.60	1.25- 1.94	1.33- 1.86	ACCEPTABL
DEMANDS IN MILLIGRAMS PER LITER:						
COD	1	22.7	21.8	12.6- 30.5	14.9- 28.2	ACCEPTABL
	2	37.5	35.4	23.6- 43.0	26.0- 40.5	ACCEPTABL
T[illegible]	1	7.81	8.61	7.22- 10.2	7.61- 9.80	ACCEPTABL
	2	12.3	14.0	11.9- 16.3	12.5- 15.7	CHECK FOR ERR
PCB'S IN MICROGRAMS PER LITER:						
PCB-AROCLOR 1016/1242	2	3.05	4.29	1.86- 5.71	2.35- 5.22	ACCEPTABLE
PCB-AROCLOR 1232	1	1.04	1.43	0.657- 1.79	0.800- 1.64	ACCEPTABLE
PCB'S IN OIL IN MILLIGRAMS PER KILOGRAM:						
PCB IN OIL- 1016/1242	1	86.3	21.5	5.04- 27.6	7.92- 24.7	NOT ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/9

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
PCB'S IN OIL IN MILLIGRAMS PER KILOGRAM:						
PCB IN OIL- 1260	2	156.0	36.6	7.82- 57.8	14.2- 51.4	NOT ACCEPTABL
PESTICIDES IN MICROGRAMS PER LITER:						
CHLORDANE	3	0.871	0.964	0.469- 1.32	0.575- 1.21	ACCEPTABL
	4	6.86	9.48	5.38- 12.4	6.26- 11.5	ACCEPTABL
ALDRIN	1	0.095	0.159	.0344-0.214	.0572-0.191	ACCEPTABL
	2	0.306	0.444	.0957-0.577	0.156-0.517	ACCEPTABL
DIELDRIN	1	0.09	0.121	.0572-0.163	.0704-0.150	ACCEPTABL
	2	0.479	0.553	0.270-0.750	0.330-0.690	ACCEPTABLE
DDD	1	0.160	0.216	.0863-0.317	0.115-0.288	ACCEPTABL
	2	0.588	0.626	0.334-0.865	0.400-0.799	ACCEPTABL
[illegible]	1	0.095	0.131	.0562-0.171	.0706-0.157	ACCEPTABL
	2	0.427	0.495	0.228-0.599	0.298-0.639	ACCEPTABLE
DDT	1	0.132	0.186	.0628-0.284	.0905-0.257	ACCEPTABL
	2	0.482	0.576	0.252-0.844	0.326-0.770	ACCEPTABL
HEPTACHLOR	1	0.114	0.157	.0488-0.221	.0706-0.199	ACCEPTABLE
	2	0.395	0.514	0.180-0.715	0.247-0.648	ACCEPTABLE
HEPTACHLOR EPOXIDE	1	0.063	0.087	.0427-0.120	.0526-0.110	ACCEPTABLE
	2	0.279	0.375	0.189-0.513	0.229-0.473	ACCEPTABLE
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
1,2 DICHLOROETHANE	1	53.9	48.6	34.5- 62.8	38.0- 59.2	ACCEPTABL
	2	11.0	10.2	7.28- 13.8	8.11- 12.9	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANC EVALUATION
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
CHLOROFORM	1	54.5	45.7	31.6- 59.5	35.1- 56.0	ACCEPTABI
	2	16.0	13.8	9.42- 19.0	10.5- 16.9	ACCEPTABI
1,1,1 TRICHLOROETHANE	1	57.5	52.0	32.3- 67.9	36.8- 63.4	ACCEPTABI
	2	9.70	9.34	5.56- 12.6	6.46- 11.7	ACCEPTABI
TRICHLOROETHENE	1	42.7	38.8	26.8- 49.1	29.6- 46.2	ACCEPTABI
	2	11.0	9.91	6.52- 13.0	7.34- 12.2	ACCEPTABI
CARBONTETRACHLORIDE	1	63.0	46.3	29.8- 63.7	34.1- 59.4	CHECK FOR ERI
	2	16.9	13.5	8.93- 18.2	10.1- 17.0	ACCEPTABI
TETRACHLOROETHENE	1	53.6	57.2	39.7- 71.9	43.8- 67.8	ACCEPTABI
	2	15.8	16.2	10.9- 21.1	12.2- 19.8	ACCEPTABI
BROMODICHLOROMETHANE	1	57.9	49.5	34.2- 64.3	38.0- 60.5	ACCEPTABI
	2	8.86	7.75	4.88- 10.6	5.59- 9.86	ACCEPTABI
DIBROMOCHLOROMETHANE	1	48.1	42.2	30.0- 54.4	33.1- 51.3	ACCEPTABI
	2	18.1	15.4	10.9- 21.5	12.2- 20.2	ACCEPTABI
BROMOFORM	1	61.4	53.7	33.5- 73.7	38.6- 68.6	ACCEPTABI
	2	12.7	11.9	5.48- 17.1	7.83- 15.7	ACCEPTABI
METHYLENE CHLORIDE	1	40.3	37.3	24.1- 53.2	27.7- 49.6	ACCEPTABI
	2	10.0	8.77	4.21- 13.5	5.39- 12.3	ACCEPTABI
CHLOROBENZENE	1	43.6	43.2	30.8- 55.0	33.9- 51.9	ACCEPTABI
	2	12.4	12.9	8.99- 16.7	9.97- 15.7	ACCEPTABI
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
BENZENE	1	11.4	10.3	7.34- 13.4	8.11- 12.6	ACCEPTABI
	2	47.6	54.1	37.7- 70.8	41.9- 66.6	ACCEPTABI

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 6/22/9

WATER POLLUTION STUDY NUMBER WP030

LABORATORY: CA061

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
ETHYLBENZENE	1	11.0	11.3	7.71- 14.7	8.60- 13.8	ACCEPTABL
	2	52.5	52.4	36.2- 68.5	40.3- 64.4	ACCEPTABL
TOLUENE	1	13.0	13.9	9.86- 17.7	10.9- 15.7	ACCEPTABL
	2	31.8	33.9	24.0- 43.1	26.4- 40.7	ACCEPTABL
1,2-DICHLOROBENZENE	1	10.9	12.1	8.47- 15.4	9.37- 14.5	ACCEPTABL
	2	49.0	52.0	36.1- 66.4	40.0- 62.5	ACCEPTABL
1,3-DICHLOROBENZENE	1	9.54	9.43	6.17- 12.1	6.92- 11.4	ACCEPTABL
	2	49.3	47.8	33.6- 61.2	37.2- 57.6	ACCEPTABL
1,4-DICHLOROBENZENE	1	10.5	11.7	7.95- 15.2	8.86- 14.2	ACCEPTABL
	2	53.8	58.1	39.1- 76.5	43.9- 71.7	ACCEPTABL
MISCELLANEOUS PARAMETERS:						
TOTAL CYANIDE	1	0.254	0.250	0.138-0.341	0.164-0.316	ACCEPTABL
(IN MG/L)	2	0.130	0.130	.0821-0.169	.0932-0.158	ACCEPTABL
NON-FILTERABLE RESIDUE	1	44.0	43.2	34.7- 45.2	36.0- 43.9	CHECK FOR ERR
(IN MG/L)	2	29.0	33.0	24.0- 34.6	25.3- 33.2	ACCEPTABL
OIL AND GREASE	1	13.6	15.0	8.13- 19.4	9.56- 18.0	ACCEPTABL
(IN MG/L)	2	21.5	23.0	14.1- 28.1	15.9- 26.3	ACCEPTABL
TOTAL PHENOLICS	1	0.058	.0271	.0093-.0449	.0139-.0403	NOT ACCEPTABL
(IN MG/L)	2	0.283	0.291	0.125-0.457	0.167-0.414	ACCEPTABL.

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

Corrective Action Plans
WP030

Mercury analysis, Samples 1 and 2

All of the QC samples, including the LCS and a separate internal check standard, were well within the required limits. However, the instrument had exhibited some intermittent instability. The CPU board was determined to be the problem and was replaced on the instrument used for mercury analysis. The WP030 sample was subsequently reanalyzed and the results obtained were well within the acceptance limits, as shown below. Copies of the digestion log and the analysis log are attached.

Sample Number	True Value	Found	Acceptance Limits
1	0.983	0.96	0.620-1.42
2	2.10	2.01	1.72-2.61

Phenol analysis, Sample 1

The concentration of this sample was below the S-Cubed method detection limit of 20 µg/L, so the quantitation was not very accurate. We have shifted the calibration curve to lower concentrations and have tightened the distillation parameters in order to improve accuracy at low concentrations and decrease our MDL.

PCBs in Oil, Samples 1 and 2

These concentrations were calculated on the basis of initial volumes; they should have been calculated on the basis of initial weights. In future, a calculation sheet will be provided by the laboratory with the calculations reported in mg/kg. The recalculated values are shown below (mg/kg).

Sample Number	True Value	Found	Acceptance Limits
1	21.5	10.8	5.04-27.6
2	36.6	19.5	14.2-51.4

PERFORMANCE EVALUATION REPORT DATE: 3/13/

WATER SUPPLY STUDY NUMBER WS032

LABORATORY CA061

ANALYTES	SAMPLE NUMBER	REPORTED VALUE		TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	291		309	274- 335	ACCEPTABLE
ANTIMONY	2	5.50		5.58	3.34- 7.41	ACCEPTABLE
ARSENIC	1	93.4		91.4	76.5- 103	ACCEPTABLE
BARIUM	2	499		511	434- 588	ACCEPTABLE
BERYLLIUM	1	0.900		0.933	0.699- 1.17	ACCEPTABLE
BORON	2	902	**	864	810- 1010	ACCEPTABLE
CADMIUM	1	4.70		4.80	3.84- 5.76	ACCEPTABLE
CHROMIUM	1	65.0		68.1	57.9- 79.3	ACCEPTABLE
COPPER	1	781		820	738- 902	ACCEPTABLE
LEAD	1	4.85		5.16	3.61- 6.71	ACCEPTABLE
MANGANESE	1	213		221	203- 234	ACCEPTABLE
MERCURY	1	5.12		6.23	4.36- 8.10	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.

LAB ACCREDITATION PROGRAM

AUG 27 1993

CAL DEPT HEALTH SERVICES

PERFORMANCE EVALUATION REPORT DATE: 8/13/

WATER SUPPLY STUDY NUMBER WS032

LABORATORY CA061

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
TRACE METALS IN MICROGRAMS PER LITER:					
MOLYBDENUM	2	6.10	6.58	4.80- 8.58	ACCEPTABLE
NICKEL	1	87.0	95.2	80.9- 109	ACCEPTABLE
SELENIUM	1	66.0	65.9	52.7- 79.1	ACCEPTABLE
SILVER	2	23.5	25.1	21.2- 29.4	ACCEPTABLE
THALLIUM	2	2.71	2.56	1.79- 3.33	ACCEPTABLE
VANADIUM	1	155	160	143- 174	ACCEPTABLE
ZINC	1	78.0	83.8	73.7- 91.1	ACCEPTABLE
NITRATE/NITRITE/FLUORIDE IN MILLIGRAMS PER LITER:					
NITRATE AS N	1	3.31	3.60	3.24- 3.96	ACCEPTABLE
NITRITE AS N	1	2.13	2.30	1.95- 2.64	ACCEPTABLE
FLUORIDE	1	1.92	2.00	1.80- 2.20	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY

PERFORMANCE EVALUATION REPORT DATE: 8/13/

WATER SUPPLY STUDY NUMBER WS032

LABORATORY CA061

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
INSECTICIDES IN MICROGRAMS PER LITER:					
CHLORDANE (TOTAL)	3	3.82	5.33	2.93- 7.73	ACCEPTABLE
HEPTACHLOR	4	0.438	0.443	0.244-0.642	ACCEPTABLE
HEPTACHLOR EPOXIDE	4	0.330	0.346	0.190-0.502	ACCEPTABLE
LINDANE	1	0.181	0.214	0.118-0.310	ACCEPTABLE
METHOXYCHLOR	1	17.9	17.4	9.57- 25.2	ACCEPTABLE
TOXAPHENE	2	4.00	3.71	2.04- 5.38	ACCEPTABLE
HERBICIDES IN MICROGRAMS PER LITER:					
2,4-D	1	11.8	18.6	9.30- 27.9	ACCEPTABLE
2,4,5-TP (SILVEX)	1	6.08	8.31	4.15- 12.5	ACCEPTABLE
DALAPON	2	5.34 **	12.5	D.L.- 20.8	ACCEPTABLE
DICAMBA	2	3.97	4.73	2.28- 7.05	ACCEPTABLE
DINOSEB	2	3.10 **	6.52	D.L.- 9.19	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.
D.L. STANDS FOR DETECTION LIMIT

PERFORMANCE EVALUATION REPORT DATE: 8/13/9

WATER SUPPLY STUDY NUMBER WS032

LABORATORY CA061

ANALYTES	SAMPLE NUMBER	REPORTED VALUE		TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
POLYCHLORINATED BIPHENYLS IN MICROGRAMS PER LITER:						
DECACHLOROBIPHENYL	1	0.700		0.959	D.L.- 1.92	ACCEPTABLE
PAH'S IN MICROGRAMS PER LITER:						
BENZO(A)PYRENE	1	< 10.0	**	0.337	.0282-0.525	NOT ACCEPTABLE
BENZO(K)FLUORANTHENE	1	< 10.0	**	0.200	.0261-0.289	NOT ACCEPTABLE
DIBENZO(A,H)ANTHRACENE	1	< 10.0		0.169	.0393-0.302	NOT ACCEPTABLE
NAPHTHALENE	1	18.9	**	21.4	3.83- 28.1	ACCEPTABLE
PYRENE	1	0.902		1.26	0.454- 1.81	ACCEPTABLE
ADIPATE/PHTHALATES IN MICROGRAMS PER LITER:						
BIS(2-ETHYLHEXYL)ADIPATE	1	6.06		10.6	D.L.- 18.0	ACCEPTABLE
BIS(2-ETHYLHEXYL)PHTHAL.	1	8.82		9.28	0.236- 17.0	ACCEPTABLE
BUTYLBENZYL PHTHALATE	1	< 10.0		5.20	2.36- 8.50	NOT ACCEPTABLE
DI-N-BUTYL PHTHALATE	1	3.78	**	22.6	7.39- 30.2	NOT ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.
D.L. STANDS FOR DETECTION LIMIT

PERFORMANCE EVALUATION REPORT DATE: 8/13/

WATER SUPPLY STUDY NUMBER WS032

LABORATORY CA061

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
ADIPATE/PHTHALATES IN MICROGRAMS PER LITER:					
DIETHYL PHTHALATE	1	< 10.0	8.22	3.66- 12.6	NOT ACCEPTABLE
TRIHALOMETHANES IN MICROGRAMS PER LITER:					
BROMODICHLOROMETHANE	1	27.2	22.4	17.9- 26.9	NOT ACCEPTABLE
BROMOFORM	1	29.1	26.4	21.1- 31.7	ACCEPTABLE
CHLORODIBROMOMETHANE	1	20.4	17.9	14.3- 21.5	ACCEPTABLE
CHLOROFORM	1	20.0	17.1	13.7- 20.5	ACCEPTABLE
TOTAL TRIHALOMETHANE	1	96.70	83.8	67.0- 101	ACCEPTABLE
VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:					
BENZENE	1	17.4	16.5	13.2- 19.8	ACCEPTABLE
CARBON TETRACHLORIDE	1	16.0	14.5	11.6- 17.4	ACCEPTABLE
CHLOROBENZENE	2	14.5	13.5	10.8- 16.2	ACCEPTABLE
1,2 DICHLOROBENZENE	2	14.3	13.5	10.8- 16.2	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY

PERFORMANCE EVALUATION REPORT DATE: 8/13/

WATER SUPPLY STUDY NUMBER WS032

LABORATORY CA061

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:					
1,4-DICHLOROBENZENE	1	12.6	13.6	10.9- 16.3	ACCEPTABLE
1,2-DICHLOROETHANE	1	14.0	13.3	10.6- 16.0	ACCEPTABLE
1,1-DICHLOROETHYLENE	1	10.2	9.13	5.48- 12.8	ACCEPTABLE
C 1,2 DICHLOROETHYLENE	2	13.4	12.3	9.84- 14.8	ACCEPTABLE
T 1,2 DICHLOROETHYLENE	2	18.8	16.9	13.5- 20.3	ACCEPTABLE
1,2 DICHLOROPROPANE	2	6.43	6.46	3.88- 9.04	ACCEPTABLE
ETHYLBENZENE	2	13.4	11.8	9.44- 14.2	ACCEPTABLE
STYRENE	2	8.95	8.66	5.20- 12.1	ACCEPTABLE
TETRACHLOROETHYLENE	2	8.00	7.43	4.46- 10.4	ACCEPTABLE
TOLUENE	2	6.90	6.54	3.92- 9.16	ACCEPTABLE
1,1,1-TRICHLOROETHANE	1	10.8	10.1	8.08- 12.1	ACCEPTABLE
TRICHLOROETHYLENE	1	11.5	11.2	8.96- 13.4	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY

PERFORMANCE EVALUATION REPORT DATE: 8/13/

WATER SUPPLY STUDY NUMBER WS032

LABORATORY CA061

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
VOLATILE ORGANIC COMPOUNDS IN MICROGRAMS PER LITER:					
VINYL CHLORIDE	1	3.56	2.57	1.54- 3.60	ACCEPTABLE
TOTAL XYLENES	2	7.73	7.54	4.52- 10.6	ACCEPTABLE
BROMOMETHANE	3	19.5	16.0	7.98- 22.3	ACCEPTABLE
1,2DIBROMO3CHLOROPROPANE	4	1.83	1.78	1.07- 2.49	ACCEPTABLE
DICHLOROMETHANE	3	9.21	7.77	5.45- 10.2	ACCEPTABLE
ETHYLENE DIBROMIDE (EDB)	4	2.25	2.29	1.37- 3.21	ACCEPTABLE
HEXACHLOROBUTADIENE	3	27.3	19.3	14.1- 23.8	NOT ACCEPTABLE
1,2,4-TRICHLOROBENZENE	3	18.3	14.1	9.90- 17.1	NOT ACCEPTABLE
1,1,2-TRICHLOROETHANE	3	15.2	13.2	9.58- 15.7	ACCEPTABLE
1,2,3-TRICHLOROPROPANE	3	12.7	9.85	5.96- 12.4	NOT ACCEPTABLE
MISCELLANEOUS ANALYTES:					
TURBIDITY (NTU'S)	1	4.62 **	4.10	3.76- 4.93	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
** SIGNIFICANT BIAS IS ANTICIPATED FOR THIS RESULT.

PERFORMANCE EVALUATION REPORT DATE: 8/13/9

WATER SUPPLY STUDY NUMBER WS032

LABORATORY CA061

ANALYTES	SAMPLE NUMBER	REPORTED VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	PERFORMANCE EVALUATIONS
MISCELLANEOUS ANALYTES:					
SULFATE (MILLIGRAMS PER LITER)	1	25.4	27.0	24.7- 29.4	ACCEPTABLE
TOTAL CYANIDE (MILLIGRAMS PER LITER)	1	0.401	0.400	0.300-0.500	ACCEPTABLE

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

Corrective Action Plans
WS032

Polynuclear Aromatic Hydrocarbons (PAH) and Adipates/Phthalates

The results indicate that the semivolatile compounds (PAHs) were spiked into sample WS032 at concentration levels at or below the S-Cubed limits of detection, thus they were not detected by S-Cubed. The spiking levels for benzo(a)pyrene (0.337 µg/L), benzo(k)fluoranthene (0.200 µg/L), and dibenzo(a,h)anthracene (0.169 µg/L) were too low for the quantitation of these compounds by normal low concentration methods (e.g., Method 8270). Method 525 is a more appropriate method for the determination of these semivolatile analytes; however, S-Cubed does not currently have this method in place, and is not certified for this method, so it is inappropriate to report these results.

It should be noted that when the 2-step extraction (base/neutral and acid) is performed, base-catalyzed hydrolysis of the phthalates will occur and will significantly reduce their recovery. Since the laboratory was directed the 2-step extraction, it is not surprising that butylbenzyl phthalate and diethyl phthalate were not detected at their respective spike concentrations of 5.2 µg/L and 8.22 µg/L. one solution to this problem would be to utilize the 1-step acid/neutral extraction.

Volatile Organic Compounds

The reported concentrations exhibited a high bias which caused the recoveries of bromodichloromethane, hexachlorobutadiene, 1,2,4-trichlorobenzene, and 1,2,3-trichloropropane to be outside of the acceptable limits. In addition, the GC/MS and purge-and-trap system response to hexachlorobutadiene, 1,2,4-trichlorobenzene, and 1,2,3-trichloropropane was poor. The small response factors that resulted contained a high relative error when they were used to quantitate the sample. A new trap will be incorporated in order to increase the system response to the heavy, later-eluting compounds. Additionally, the standards used in this analysis (Method 524.2) were not the standards normally used by S-Cubed, but were purchased from a different-manufacturer. S-Cubed will determine the accuracy of the standards that were used against S-Cubed's normal standards and against a second source of standards before they are used again for quantitation.

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
J. M. Hennig, RL	D. R. Sherwood, EPA R. F. Stanley, Ecology	Incoming: 9401571

Subject: QUARTERLY PERFORMANCE EVALUATION (PE) RESULTS

INTERNAL DISTRIBUTION

Approval	Date	Name	Location	w/att
		Correspondence Control	A3-01	X
		President's Office		
		B. A. Austin	B2-35	X
		M. L. Bell,	T6-16	
	Assignee/Level 1 . .	R. J. Bliss,	B3-04	
		J. L. Deichman	H4-19	
		S. M. Joyce	H4-19	
		J. H. Kessner	H4-23	X
		P. J. Mackey	B3-15	
		H. E. McGuire	B3-63	
		S. R. Moreno	B3-06	
		C. R. Stroup	B2-23	
		J. L. Waite	B2-35	
		EPIC	H6-08	X

RECEIVED
FEB 2 2 1994
CORRESPONDENCE CONTROL