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Memorandum

TO : Chief, Quality of Water Branch, WRD, Reston, VA **DATE:** February 11, 1976

FROM : D. E. Erdmann, WRD, Lakewood, CO

SUBJECT: QUALITY CONTROL

Enclosed is a report summarizing one aspect of the quality-control program operated by the Methods Development Project for the three Central Laboratories. This involves the regular analysis by the three laboratories of Standard Reference Water Samples and a tabulation and evaluation of each laboratory's performance on the analysis of these samples. The report covers a 6-month period, from July to December 1975, and is a valid documentation of the reliability of water-quality data provided by our laboratories over this period.

Quality control of the data output of our laboratories is an important part of the Division's programs. The program, of which this summary report is a part, serves a significant purpose in monitoring our efforts to continue to provide data of a high degree of reliability in which other agencies and data users can have confidence.

I trust that you will find the report to be of interest and to be useful.

David Erdmann

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cc: w/enclosures
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A semiannual Review of the Quality-Control Program for the Albany, Atlanta, and Salt Lake City Central Laboratories for the period from July through December 1975.

During the last six months, the Central Laboratories, as part of their quality-assurance program have analyzed the following number of Standard Reference Water Samples (SRWS) and blind samples.

	Alb	Atl	SLC
No. of SRWS	103	131	194
No. of blind samples	19	27	23

In order to eliminate possible bias and to give an accurate idea of the quality of work performed by the Central Laboratories, the blind samples were submitted through the district offices of the Survey with appropriate fictional location names. A great majority of the submitted blind samples were prepared by either mixing two SRWS or by diluting a SRWS with demineralized water. This was done to provide additional concentration ranges and also to further camouglage these samples. The remainder of the SRWS analyzed were submitted directly to the Central Laboratories to assist in maintaining quality control on a day-to-day basis. These latter samples were introduced into the analysis scheme by supervisory personnel without being labeled as a SRWS. The ensuing results received appropriate quality-assurance checks before they were forwarded to the Methods Research Project (Denver). Means and standard deviations were then calculated for each determination of each sample from these values and are listed in the enclosed tables. Also included, for comparison, are the means and standard deviations which were obtained when the samples were originally analyzed under the regular SRWS Program.

A computerized system is being used by the Central Laboratories which quickly informs supervisory personnel when one or more results from a SRWS exceed the established limit of 1.5 standard deviations from the mean. Results from SRWS and other samples in that particular run can therefore be quickly updated when necessary. It should be emphasized, however, that the SRWS results received by the Methods Research Project are positively biased because of this innovative program. Therefore, even though the accompaning tables are still useful, especially in locating trends of a particular determination within the established limits, the performance of a laboratory must be judged to a much greater extent by its performance on blind samples.

The number of blind sample determinations and the percentage of results which were more than 1.5 s.d. from the established means are listed below. The rejection rate for blind samples is especially informative because it should be indicative of the quality of work performed by a laboratory on all samples.

Blind values	Alb		Atl	
	No. of det'n's	% rejected (>1.5 s.d.)	No. of det'ns	% rejected (>1.5 s.d.)
Major constituents	77	10.4	118	11.0
Trace metals	96	9.4	116	12.9
Total	173	9.8	234	12.0

Blind values	SLC	
	No. of det'ns	% rejected (>1.5 s.d.)
Major constituents	97	12.4
Trace metals	109	18.3
Total	206	15.5

Although increasing somewhat over the first six months of 1975, the percent rejection rate for the major constituents remained quite similar for the three laboratories. The rejection rate for the trace metal determinations again differs widely between laboratories with the Salt Lake City Laboratory having a rejection rate which is nearly twice as high as the Albany Laboratory. A comparison of this reporting period with the first half of 1975 shows that the blind sample rejection rate for the Albany Laboratory remains very good although it did increase somewhat from 7.8% to 9.8%. At the same time, the Atlanta Laboratory's rate increased very slightly from 11.4% to 12.0%, and the rate for the Salt Lake City Laboratory again worsened moderately to 15.5% with both the major constituent and trace metal determinations showing an increased rejection rate of more than 2%.

The blind sample determinations which proved troublesome for each laboratory and the number of times the reported values were rejected are listed below.

Albany

Determination	Cl	Ag	Fe
Number of rejections	2	3	2

Atlanta

Determination	Ca	HCO_3	F	Hg	Mn	Zn
Number of rejections	3	2	4	3	2	6

Salt Lake City

Determination	Ca	F	Mg	SO_4	Cd	Cu	Fe	Hg	Mn
Number of rejections	3	2	2	3	2	2	4	4	4

The trace metal results from the Albany Laboratory have remained excellent. It would appear that the major problem is with the silver determination. A consistent type error is indicated because the outlying values from the blind samples were much higher than the established means.

Two of the chloride values on blind samples were rejected because they were higher than the established means. This does not appear to be a severe problem, but this determination should be watched quite closely. The standard deviation for the silica determination has improved significantly over the previous reporting period.

Atlanta has a problem with the zinc determination. Nearly half of the zinc blind values were rejected because they were too far above the theoretical means. It would appear to be a standard or some other consistent-type problem. In any event, it deserves immediate attention. Blind sample results also indicate that the mercury and manganese determinations are not extremely reliable; therefore they should be given additional attention until the problems are corrected. The arsenic values continue to be slightly lower than either the other two laboratories or the SRWS means. Improvement has been shown for the chromium, cobalt, and nickel determinations.

Blind sample results indicate that the calcium, bicarbonate, and fluoride determinations are deficient in quality and will require corrective measures. The calcium values tend to be high and it should be determined if this is caused by baseline drift, faulty standards, etc. A significant deterioration, as shown by worsening standard deviations, has occurred for the bicarbonate determination. A correction of this trend should be considered mandatory. When the fluoride concentration is less than 1.0 mg/l, Atlanta's values tend to be somewhat high. If this is corrected, most values would become satisfactory. The high standard deviations for the DSRD 180 continue. It is thought that additional attention to technique should correct this problem. General improvement has been shown for the specific conductance determination.

The iron, manganese, and mercury determinations have often proved troublesome for the Salt Lake City Laboratory. All of the erroneous iron values were reported during the first half of this period; therefore, although this determination will bear watching, the problem appears to have been corrected. The manganese values tend to be high; therefore the standards and the like should be investigated in order to eliminate the source of error. On the other hand, the mercury values are consistently low. The cadmium and copper values have on occasions, been outside the satsifactory limits and will bear watching. A very low cadmium mean was also reported for SRWS 48. A serious problem would appear to exist for the nickel determination as indicated by the very low means for SRWS 48 and 49. Blind sample results were limited, but they were also low. A thorough review of this procedure would be in order.

Blind sample results indicate that calcium, fluoride, magnesium, and sulfate values were rejected more often than other major constituents. These errors appear to be quite sporadic in nature and again emphasizes the need for paying continual attention to the quality-assurance process. The bicarbonate determination has deteriorated significantly in the last six months and corrective measures should be taken to reverse this trend. The silica determination and the nitrite-plus-nitrate determination at higher concentrations have relatively high standard deviations.

Several SRWS were analyzed after they had been digested under the conditions used for suspended sediment-water mixtures in order to obtain an idea of the accuracy and precision which can be expected for this type of an analysis. The means and standard deviations were quite comparable with undigested trace metal determinations; consequently these values were also included in calculating the values for the enclosed tables.

It should be noted in conclusion that the help of the district offices in submitting blind samples is greatly appreciated.

A comparison of Standard Reference Water Sample results from the Albany, Atlanta, and Salt Lake City Laboratories.

July to December 1975

Constituent	Mean concentration[1/] SRWS	Alb	Atl	SLC	C.L Mean	Standard deviation SRWS	Alb	Atl	SLC	C.L. Mean
Al	84	108	80	83	95	26	30	2/	14	26
	96	98	74	78	82	40	23	9	24	23
	229	240	202	206	208	51	2/	23	16	25
	597	598	557	589	582	147	13	51	55	51
Ag	6.1	4.5	2/	4.2	4.3	1.9	2/	2/	.7	1.7
	6.3	2/	5.3	5.3	5.4	1.0	2/	2/	1.1	1.1
	10.1	2/	7.5	8.1	8.0	1.2	2/	2.9	2.8	2.6
As	4.9	4.0	2/	5.2	5.0	2.1	2/	2/	1.2	1.2
	18.1	18.8	15.7	18.4	18.2	2.6	2.3	2/	2.0	2.4
	19.1	19.5	2/	15.0	16.5	8.0	2.4	2/	2.9	3.4
	29	2/	27.1	30.3	28.5	7	2/	3.5	5.6	4.7
	44.6	46.8	42.6	45.4	44.8	8.8	2.6	7.5	5.7	5.9
	45.8	48.3	44.4	49.6	47.1	14.1	2.9	9.4	14.5	11.9
	136	150	128	135	134	12	2/	26	22	24
B	20	22	13	12	14	19	19	10	14	13
	90	80	90	2/	86	46	7	24	2/	19
	92	78	82	83	82	29	26	18	15	17
	258	235	226	249	239	74	2/	18	14	19
	454	395	474	457	459	90	2/	44	42	46
Ba	570	2/	520	420	452	110	2/	45	101	103
Be	14	2/	2/	14	14	5	2/	2/	5	5
Br	.24	2/	.28	.37	.35	.18	2/	.08	.09	.09
	40	2/	.13	.10	.107	.43	2/	2/	0	.06

Constituent	Mean concentration[1/] SRWS	Alb	Atl	SLC	C.L. Mean	Standard deviation SRWS	Alb	Atl	SLC	C.L. Mean
Ca	3.87	3.66	3.57	3.71	3.64	.24	.15	.55	.23	.39
	10.7	11.2	10.6	10.9	11.0	.8	.6	.8	.5	.6
	26.3	25.8	25.6	26.3	25.9	1.0	.8	.6	.5	.7
	43.5	42.6	43.6	43.4	43.3	2.3	1.2	1.1	1.5	1.3
	61.7	62.3	62.3	61.9	62.2	2.8	1.4	1.4	1.8	1.5
	69.5	68.8	69.5	69.5	69.3	2.5	2.0	.9	2.6	2.1
	84.6	83.0	82.6	2/	82.8	2.8	3.3	8.5	2/	6.7
Cd	4.6	4.5	4.3	4.1	4.4	1.0	.7	2/	1.3	.9
	6.4	6.0	5.9	5.7	5.8	2.0	2/	1.9	.5	1.2
	8.0	7.7	7.6	7.9	7.8	.7	1.5	1.8	1.2	1.4
	16.0	16.8	15.3	11.2	13.6	3.7	1.0	.8	2.0	2.8
Cl	1.84	1.64	1.41	1.62	1.58	.63	.27	.29	.43	.37
	22.9	22.6	22.4	2/	22.5	2.2	.5	.5	2/	.5
	26.2	25.5	25.8	26.2	25.9	.8	.8	.4	1.0	.8
	72.2	72.9	72.4	73.0	72.8	2.3	.9	1.0	1.4	1.2
	95.4	96.7	95.9	95.0	95.8	3.1	1.1	.8	1.7	1.4
	174	178	173	176	176	10	4	5	6	5
	213	216	211	213	213	7	5	6	7	6
Co	5.1	5.1	5.0	4.1	4.7	.6	.7	2/	1.2	1.0
	6.0	6.0	5.1	4.3	4.8	1.1	2/	1.2	1.6	1.4
	7.9	11.5	7.2	6.4	7.2	1.4	2/	1.3	1.7	2.5
	13.6	14.5	13.7	11.5	12.6	1.8	2/	1.2	1.5	1.8
CO_3	31.6	34.2	41.6	2/	38.2	8.0	9.0	11.7	2/	10.8
Cr	8.5	10.0	5.5	6.2	6.3	2.7	2/	3.5	6.5	5.3
	14.9	15.0	15.0	15.3	15.2	3.7	5.3	2/	6.6	5.5
	21.2	25.0	20.8	18.5	20.6	3.8	8.4	1.0	5.5	6.4
	30.3	35.0	26.7	29.9	29.9	6.5	10.0	5.4	9.7	9.0
Cu	27	27	26	30	29	7	5	1	7	6
	101	100	103	104	103	9	2/	9	5	6
	227	220	220	227	224	13	8	15	13	13
	385	378	393	409	395	19	6	2/	46	35

Constituent	Mean concentration[1/] SRWS	Alb	Atl	SLC	C.L. Mean	Standard deviation SRWS	Alb	Atl	SLC	C.L. Mean
DSRD 180	61.2	59.8	59.6	56.1	57.9	6.5	5.5	10.9	3.5	6.5
	361.5	375.2	377.0	365.4	368.1	11.3	6.9	2/	8.0	8.8
	555.5	582.0	617.3	578.3	588.6	57.7	31.9	47.1	24.7	36.3
	560.1	560.6	552.7	2/	556.1	11.8	8.4	20.4	2/	16.6
F	.49	.48	.56	.49	.50	.07	.08	.08	.07	.08
	.65	.63	.70	.63	.66	.08	.07	.15	.05	.11
	.82	.76	.87	.77	.79	.09	.05	.15	.12	.12
	1.00	.98	1.05	2/	1.02	.11	.07	.19	2/	.15
	1.01	1.01	1.03	.98	1.01	.13	.09	.08	.07	.08
	1.04	1.08	1.06	1.02	1.04	.09	.08	.08	.09	.09
	3.75	3.96	3.64	3.66	3.70	.30	.15	.25	.43	.34
Fe	79	80	74	76	76	21	14	15	29	23
	87	92	90	81	86	16	14	2/	16	16
	454	482	440	488	469	28	28	29	15	32
	498	485	460	502	487	29	2/	14	22	27
HCO_3	28.7	29.8	30.8	29.5	29.9	2.7	1.2	3.9	2.4	2.6
	44.4	44.1	44.3	45.1	44.6	1.8	1.9	2.9	2.9	2.7
	46.4	48.4	49.0	48.8	48.7	4.2	1.6	2.4	3.4	2.8
	46.7	48.0	46.9	47.0	47.2	2.7	1.4	3.8	1.6	2.7
	74.6	76.0	73.8	74.8	74.7	2.8	1.6	4.8	2.7	3.5
	101.7	105.4	102.6	103.3	103.4	7.3	1.5	5.2	4.8	4.7
	330.3	339.5	340.5	2/	340.1	15.6	9.9	33.6	2/	25.8
Hg	.42	.63	.60	.33	.51	.09	.16	2/	.12	.17
	.68	.60	.51	.34	.42	.19	2/	.09	.11	.14
	3.51	3.80	3.32	3.29	3.36	.49	2/	.46	.69	.59
	7.34	7.25	7.03	6.69	6.83	.77	2/	1.06	.60	.73
I	.018	2/	.030	.029	.029	.020	2/	2/	.006	.005
	.024	2/	.040	.040	.040	.027	2/	0	.010	.009

Constituent	Mean concentration[1/] SRWS	Alb	Atl	SLC	C.L. Mean	Standard deviation SRWS	Alb	Atl	SLC	C.L. Mean
K	0.66	0.66	0.68	0.55	0.61	0.11	0.06	0.06	0.10	0.10
	2.14	2.23	2.19	1.98	2.14	.26	.07	.05	.15	.14
	2.37	2.49	2.41	2.30	2.38	.82	.09	.06	.16	.15
	2.55	2.49	2.51	2/	2.50	.39	.10	.10	2/	.10
	7.03	7.06	7.04	6.93	7.00	.53	.17	.13	.28	.21
	16.5	16.8	16.2	16.2	16.3	1.7	.8	.5	1.7	1.3
	26.6	25.7	26.1	24.3	25.3	3.3	.5	.8	2.4	1.8
Li	52	50	54	48	50	5	2/	5	8	7
	110	110	113	105	107	5	0	2/	11	9
Mg	.46	.47	.46	.56	.50	.12	.15	.22	.11	.17
	1.99	1.81	1.87	2.04	1.94	.19	.22	.24	.29	.28
	7.92	7.88	7.92	7.84	7.87	.70	.17	.24	.61	.46
	8.28	8.41	8.27	8.45	8.37	.61	.42	.20	.28	.30
	11.9	12.4	12.1	12.0	12.2	.9	.7	.3	.7	.6
	18.3	18.8	19.2	18.9	18.9	.9	.6	.4	.8	.7
	22.2	22.3	22.6	2/	22.5	1.6	1.7	.5	2/	1.1
Mn	63	55	64	64	62	9	5	5	5	6
	115	100	115	119	116	15	2/	5	8	8
	162	159	170	174	167	12	6	2/	8	10
	261	252	253	275	265	13	5	11	11	15
Mo	1.6	2.0	2/	1.1	1.2	1.1	2/	2/	.7	.7
	14.6	16.3	15.2	14.9	15.1	3.2	2/	2.5	1.8	1.9
	18.8	18.2	2/	18.2	18.2	1.6	1.3	2/	2.1	1.9
	56.6	63.6	58.3	56.5	59.2	4.6	9.4	2/	5.0	7.2
Na	2.88	2.77	2.90	2.99	2.91	.17	.14	.04	.43	.33
	15.4	15.4	15.9	16.0	15.8	.9	.5	.3	0	.4
	20.7	21.0	20.9	20.8	20.9	.6	.5	.3	.5	.4
	43.5	43.2	43.7	44.1	43.8	1.7	.7	.7	1.0	.9

Constituent	Mean concentration[1/] SRWS	Alb	Atl	SLC	C.L. Mean	Standard deviation SRWS	Alb	Atl	SLC	C.L. Mean
Na.--cont'd.	70.3	70.3	70.5	71.5	71.0	2.6	1.2	1.0	1.4	1.4
	79.4	79.5	79.9	2/	79.7	2.9	1.2	1.4	2/	1.3
	223	220	220	218	219	9	0	0	4	3
Ni	5.5	4.5	4.1	4.4	4.3	2.0	2/	1.7	1.4	1.5
	7.8	7.3	8.0	3.7	6.2	4.2	2.0	2/	2.0	2.6
	10.9	11.2	9.5	9.1	9.8	1.9	2.6	1.7	2.5	2.5
	13.0	12.2	12.1	5.0	8.8	4.7	2.2	3.3	4.2	5.1
$NO_2 + NO_3$ -N	.10	.10	.10	.09	.10	0	.02	.06	.04	.04
	.23	.18	.19	.15	.18	.14	.02	.02	.04	.03
	2.84	2.92	2.95	2.84	2.89	.45	.07	.05	.17	.13
	2.93	3.00	3.02	3.01	3.01	.87	.07	.07	.21	.13
	5.83	5.84	6.25	2/	6.07	.56	.38	.47	2/	.47
	3.32	8.77	8.61	7.82	8.32	.84	.15	.24	1.78	1.20
	12.1	12.3	12.0	12.2	12.1	1.3	.5	0	1.3	.9
Pb	8.8	7.5	7.4	9.1	8.2	3.1	2/	1.3	4.2	3.0
	11.6	11.0	11.0	11.2	11.1	1.3	1.7	.7	1.3	1.3
	24.1	25.2	23.3	21.9	23.8	5.8	1.5	1.2	1.7	2.1
	47.5	47.0	47.0	48.7	47.8	6.8	2.6	1.3	18	12
P, Total	.323	.334	.312	.322	.321	.032	.025	.013	.031	.027
	.809	.788	.748	2/	.759	.068	.038	.118	2/	.103
Se	6.3	6.5	2/	6.1	6.2	1.0	2/	2/	1.0	1.0
	15.5	17.4	20.3	14.2	16.0	10.9	1.7	2/	4.8	5.0
	23.3	21.5	2/	23.2	22.9	3.2	2.1	2/	4.4	4.1
	34.8	33.5	41.0	35.6	36.8	25.3	2/	1.4	8.2	7.1
SiO_2	4.22	4.67	4.75	4.57	4.64	.67	.12	.16	1.05	.76
	4.53	4.68	4.76	4.63	4.70	.64	.06	.09	.27	.18
	5.70	5.68	5.84	5.72	5.76	.95	.13	.14	.27	.20

Constituent	Mean concentration[1/] SRWS	Alb	Atl	SLC	C.L. Mean	Standard deviation SRWS	Alb	Atl	SLC	C.L. Mean
SiO_2.--cont'd.	9.16	9.00	9.43	9.22	9.27	1.2	.15	.16	.53	.39
	17.3	17.9	18.7	17.6	17.9	.9	.5	.5	1.0	.9
	22.8	22.2	23.6	2/	23.1	1.7	.5	.5	2/	.8
	37.0	36.4	38.1	36.2	36.8	1.3	.9	.7	1.6	1.5
SO_4	16.1	16.5	16.6	17.2	16.9	2.7	.8	1.2	1.0	1.1
	22.9	21.7	22.1	21.3	21.6	4.3	1.3	.9	1.7	1.5
	46.8	46.6	47.0	46.6	46.8	2.3	1.6	1.1	2.8	1.9
	59.6	59.3	56.0	58.8	57.8	4.0	2.2	2.5	3.9	3.3
	106	108	102	2/	104	7	5	4	2/	5
	106	106	101	105	105	7	6	4	6	6
	142	140	137	141	139	10	0	5	10	7
sp cond	94.6	90.9	95.4	95.0	94.0	3.9	1.2	2.1	1.8	2.5
	310.4	311.7	311.4	310.8	311.2	4.6	6.1	.8	1.5	3.2
	556.4	548.4	553.8	549.6	550.8	18.6	10.3	3.3	10.5	8.6
	559.4	556.4	562.6	562.4	561.5	10.7	6.5	5.3	5.3	5.8
	848.9	837.4	830.8	2/	833.5	12.9	4.1	23.6	2/	18.2
	896.4	892.1	897.7	895.1	895.0	39	7.0	4.6	7.8	7.1
	1188	1187	1196	1193	1193	12	24	10	12	14
Sr	55	55	64	69	67	11	2/	9	24	21
	70	65	69	74	71	9	2/	9	9	9
	181	2/	198	181	186	75	2/	37	25	30
	185	167	185	181	182	27	6	23	14	14
	236	2/	226	251	237	21	2/	41	15	33
	590	570	599	609	604	62	30	24	44	39
	727	726	738	2/	734	45	45	17	2/	28

Constitutent	Mean concentration[1/] SRWS	Alb	Atl	SLC	C.L Mean	Standard deviation SRWS	Alb	Atl	SLC	C.L Mean
Zn	42	40	41	46	44	8	2/	4	7	6
	259	245	256	264	258	29	8	11	48	37
	345	339	347	342	341	18	7	2/	19	14
	432	418	426	444	435	26	10	8	22	20

1/ Concentration units are consist nt with USGS policy.
2/ Calculations not made because of insufficient data.

Summary of Standard Reference Water Sample results analyzed by the Albany Central Laboratory

July to December 1975

Constituent	No. of det'n	SRWS	Range[1]	Mean concentration SRWS	Mean concentration Alb	Standard deviation SRWS	Standard deviation Alb
Al	10	49	70 - 180	84	108	26	30
	6	45	60 - 130	96	98	40	23
	2	44	200 - 280	229	240	51	2/
	4	48	580 - 610	597	598	147	13
Ag	2	45	1 - 8	6.1	4.5	1.9	2/
As	2	44	4	4.9	4.0	2.1	2/
	10	49	15 - 23	18.1	18.8	2.6	2.3
	6	45	16 - 21	19.1	19.5	8.0	2.4
	4	48	44 - 49	44.6	46.8	8.8	2.6
	3	43	45 - 50	45.8	48.3	14.1	2/
	3	34	140 - 160	136	150	12	2/
B	4	40	10 - 50	20	22	19	19
	5	30	70 - 90	90	80	46	7
	8	47	50 - 120	92	78	29	26
	2	36	230 - 240	258	235	74	2/
	2	43	360 - 430	454	395	90	2/
Ca	7	43	3.4 - 3.8	3.87	3.66	.24	.15
	16	46	11 - 13	10.7	11.2	.8	.6
	10	40	24 - 27	26.3	25.8	1.0	.8
	9	34	41 - 44	43.5	42.6	2.3	1.2
	10	36	60 - 65	61.7	62.3	2.8	1.4
	17	47	65 - 72	69.5	68.8	2.5	2.0
	8	30	77 - 86	84.6	83.0	2.8	3.3

Constituent	No. of det'n	SRWS	Range 1/	Mean concentration SRWS	Mean concentration Alb	Standard deviation SRWS	Standard deviation Alb
Cd	10	49	4 - 6	4.6	4.5	1.0	0.7
	2	44	6	6.4	6.0	2.0	2/
	6	45	6 - 9	8.0	7.7	.7	1.5
	4	48	16 - 18	16.0	16.8	3.7	1.0
Cl	16	46	1.3 - 2.4	1.84	1.64	.63	.27
	8	30	22 - 23	22.9	22.6	2.2	.5
	10	40	24 - 26	26.2	25.5	.8	.8
	9	34	72 - 74	72.2	72.9	2.3	.9
	10	36	95 - 98	95.4	96.7	3.1	1.1
	17	47	170 - 180	174	178	10	4
	7	43	210 - 220	213	216	7	5
Co	7	49	4 - 6	5.1	5.1	.6	.7
	2	44	6	6.0	6.0	1.1	2/
	2	45	8 - 15	7.9	11.5	1.4	2/
	2	48	14 - 15	13.6	14.5	1.8	2/
CO_3	6	30	18 - 45	31.6	34.2	8.0	9.0
Cr	2	44	10	8.5	10.0	2.7	2/
	10	49	10 - 20	14.9	15.0	3.7	5.3
	6	45	10 - 30	21.2	25.0	3.8	8.4
	4	48	30 - 50	30.3	35.0	6.5	10.0
Cu	6	45	20 - 30	27	27	7	5
	2	44	100	101	100	9	2/
	4	48	210 - 230	227	220	13	8
	10	49	80 - 130	385	378	19	6
DSRD 180	16	46	48 - 68	61.2	59.8	6.5	5.5
	9	34	367 - 390	361.5	375.2	11.3	6.9
	17	47	544 - 657	555.5	582.0	57.7	31.9
	8	30	548 - 569	560.1	560.6	11.8	8.4

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration Alb	Standard deviation SRWS	Standard deviation Alb
F	16	46	.4 - .6	.49	.48	.07	.08
	10	40	.5 - .7	.65	.63	.08	.07
	17	47	.7 - .8	.82	.76	.09	.05
	8	30	.9 - 1.1	1.00	.98	.11	.07
	10	36	.9 - 1.1	1.01	1.01	.13	.09
	9	34	1.0 - 1.2	1.04	1.08	.09	.08
	7	43	3.7 - 4.1	3.75	3.96	.30	.15
Fe	4	48	60 - 90	79	80	21	14
	10	49	80 - 130	87	92	16	14
	6	45	460 - 530	454	482	28	28
	2	44	480 - 490	498	485	29	2/
HCO_3	16	46	28 - 32	28.7	29.8	2.7	1.2
	7	43	41 - 47	44.4	44.1	1.8	1.9
	17	47	46 - 50	46.4	48.4	4.2	1.6
	10	36	46 - 50	46.7	48.0	2.7	1.4
	10	40	74 - 79	74.6	76.0	2.8	1.6
	9	34	104 - 108	101.7	105.4	7.3	1.5
	8	30	324 - 351	330.3	339.5	15.6	9.9
Hg	2	44	.5 - .7	.42	.63	.09	.16
	7	49	.5 - .9	.68	.60	.19	2/
	2	45	3.8	3.51	3.80	.49	2/
	2	48	7.0 - 7.5	7.34	7.25	.77	2/
K	16	46	.5 - .7	.66	.66	.11	.06
	10	40	2.1 - 2.3	2.14	2.23	.26	.07
	17	47	2.4 - 2.7	2.37	2.49	.82	.09
	8	30	2.3 - 2.6	2.55	2.49	.39	.10
	10	36	6.7 - 7.3	7.03	7.06	.53	.17
	9	34	16 - 18	16.5	16.8	1.7	.8
	7	43	25 - 26	26.6	25.7	3.3	.5

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration Alb	Standard deviation SRWS	Standard deviation Alb
Li	2	48	50	52	50	5	2/
	4	49	110	110	110	5	0
Mg	7	43	.4 - .8	.46	.47	.12	.15
	16	46	1.4 - 2.1	1.99	1.81	.19	.22
	9	34	7.6 - 8.1	7.92	7.88	.70	.17
	10	40	8.0 - 9.4	8.28	8.41	.61	.42
	10	36	11 - 13	11.9	12.4	.9	.7
	17	47	17 - 20	18.3	18.8	.9	.6
	8	30	21 - 26	22.2	22.3	1.6	1.7
Mn	6	45	50 - 60	63	55	9	5
	2	44	100	115	100	15	2/
	10	49	150 - 170	162	159	12	6
	4	48	250 - 260	261	252	13	5
Mo	2	44	2	1.6	2.0	1.1	2/
	3	48	15 - 17	14.6	16.3	3.2	2/
	5	45	17 - 20	18.8	18.2	1.6	1.3
	7	49	50 - 77	56.6	63.6	4.6	9.4
Na	16	46	2.4 - 2.9	2.88	2.77	.17	.14
	10	36	15 - 16	15.4	15.4	.9	.5
	10	40	20 - 22	20.7	21.0	.6	.5
	9	34	42 - 44	43.5	43.2	1.7	.7
	17	47	67 - 72	70.3	70.3	2.6	1.2
	8	30	78 - 81	79.4	79.5	2.9	1.2
	7	43	220	223	220	9	0
Ni	2	44	3 - 6	5.5	4.5	2.0	2/
	10	49	4 - 10	7.8	7.3	4.2	2.0
	6	45	8 - 15	10.9	11.2	1.9	2.6
	4	48	9 - 14	13.0	12.2	4.7	2.2

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration Alb	Standard deviation SRWS	Standard deviation Alb
$NO_2 + NO_3 - N$	16	46	0.08 - 0.17	0.10	0.10	0	0.02
	10	40	.16 - .22	.23	.18	.14	.02
	17	47	2.8 - 3.0	2.84	2.92	.45	.07
	10	36	2.9 - 3.1	2.93	3.00	.87	.07
	8	30	5.5 - 6.7	5.83	5.84	.56	.38
	7	43	8.6 - 9.0	8.32	8.77	.84	.15
	9	34	12 - 13	12.1	12.3	1.3	.5
Pb	2	44	7 - 8	8.8	7.5	3.1	2/
	6	45	9 - 14	11.6	11.0	1.3	1.7
	10	49	23 - 29	24.1	25.2	5.8	1.5
	4	48	44 - 50	47.5	47.0	6.8	2.6
P, Total	7	47	.31 - .38	.323	.334	.032	.025
	4	30	.75 - .84	.809	.788	.068	.038
Se	2	44	3 - 6	6.3	6.5	1.0	2/
	7	49	15 - 20	15.5	17.4	10.9	1.7
	2	45	20 - 23	23.3	21.5	3.2	2.1
	2	48	30 - 37	34.8	33.5	25.3	2/
SiO_2	16	46	4.5 - 5.0	4.22	4.67	.67	.12
	10	36	4.6 - 4.8	4.53	4.68	.64	.06
	10	40	5.6 - 6.0	5.70	5.68	.95	.13
	7	43	8.8 - 9.2	9.16	9.00	1.2	.15
	17	47	17 - 19	17.3	17.9	.9	.5
	8	30	22 - 23	22.8	22.2	1.7	.5
	9	34	35 - 38	37.0	36.4	1.3	.9
SO_4	16	46	15 - 18	16.1	16.5	2.7	.8
	9	34	20 - 23	22.9	21.7	4.3	1.3
	10	40	43 - 48	46.8	46.6	2.3	1.6
	10	36	55 - 62	59.6	59.3	4.0	2.2
	17	47	94 - 110	106	108	7	5
	8	30	100 - 110	106	106	7	6
	7	43	140	142	140	10	0

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration Alb	Standard deviation SRWS	Standard deviation Alb
sp cond	16	46	89 - 93	94.6	90.9	3.9	1.2
	10	40	305 - 325	310.4	311.7	4.6	6.1
	7	36	528 - 559	556.4	548.4	18.6	10.3
	9	34	548 - 567	559.4	556.4	10.7	6.5
	7	30	832 - 843	848.9	837.4	12.9	4.1
	16	47	880 - 903	896.4	892.1	39	7.0
	7	43	1150 - 1220	1188	1187	12	24
Sr	2	46	50 - 60	55	55	11	2/
	2	43	60 - 70	70	65	9	2/
	3	36	160 - 170	185	167	27	6
	3	47	540 - 600	590	570	62	2/
	5	30	650 - 760	727	726	45	45
Zn	2	44	40	42	40	8	2/
	6	45	230 - 250	259	245	29	8
	10	49	330 - 350	345	339	18	7
	4	48	410 - 430	432	418	26	10

1/ Concentration units are consistent with USGS policy
2/ Not calculated because of insufficient data

Summary of Standard Reference Water Sample results analyzed by the Atlanta Central Laboratory

July to December 1975

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration Atl	Standard deviation SWRS	Standard deviation Atl
Al	3	49	80	84	80	26	2/
	5	45	60 - 80	96	74	40	9
	8	44	170 - 240	229	202	51	23
	7	48	490 - 600	597	557	147	51
Ag	3	49	4 - 7	6.3	5.3	1.0	2/
	4	48	5 - 10	10.1	7.5	1.2	2.9
As	3	49	12 - 19	18.1	15.7	2.6	2/
	15	36	20 - 32	29	27.1	7	3.5
	7	48	30 - 53	44.6	42.6	8.8	7.5
	18	43	29 - 60	45.8	44.4	14.1	9.4
	17	34	74 - 150	136	128	12	26
B	11	40	0 - 30	20	13	19	10
	7	30	60 - 130	90	90	46	24
	11	47	50 - 120	92	82	29	18
	10	36	190 - 340	258	226	74	18
	11	43	400 - 550	454	474	90	44
Ba	5	48	500 - 600	570	520	110	45
Br	5	43	.2 - .4	.24	.28	.18	.08
	3	40	0 - .3	.40	.13	.43	2/
Ca	18	43	2.7 - 5.2	3.87	3.57	.24	.55
	14	46	9.7 - 12	10.7	10.6	.8	.8
	15	40	25 - 27	26.3	25.6	1.0	.6
	19	34	41 - 45	43.5	43.6	2.3	1.1
	16	36	60 - 65	61.7	62.3	2.8	1.4
	15	47	68 - 71	69.5	69.5	2.5	.9
	11	30	58 - 90	84.6	82.6	2.8	8.5

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration Atl	Standard deviation SRWS	Standard deviation Atl
Cd	3	49	4 - 5	4.6	4.3	1.0	2/
	8	44	2 - 8	6.4	5.9	2.0	1.9
	5	45	5 - 10	8.0	7.6	.7	1.8
	7	48	14 - 16	16.0	15.3	3.7	.8
Cl	14	46	1.0 - 2.0	1.84	1.41	.63	.29
	11	30	22 - 23	22.9	22.4	2.2	.5
	15	40	25 - 26	26.2	25.8	.8	.4
	19	34	70 - 74	72.2	72.4	2.3	1.0
	16	36	95 - 98	95.4	95.9	3.1	.8
	15	47	170 - 180	174	173	10	5
	18	43	200 - 230	213	211	7	6
Co	3	49	5	5.1	5.0	.6	2/
	8	44	3 - 7	6.0	5.1	1.1	1.2
	5	45	6 - 9	7.9	7.2	1.4	1.3
	6	48	12 - 15	13.6	13.7	1.8	1.2
CO_3	7	30	22 - 57	31.6	41.6	8.0	11.7
Cr	8	44	0 - 10	8.5	5.5	2.7	3.5
	3	49	14 - 16	14.9	15.0	3.7	2/
	4	45	20 - 22	21.2	20.8	3.8	1.0
	6	48	20 - 31	30.3	26.7	6.5	5.4
Cu	5	45	25 - 27	27	26	7	1
	8	44	85 - 110	101	103	9	9
	7	48	190 - 240	227	220	13	15
	3	49	80 - 110	385	393	19	2/
DSRD 180	14	46	40 - 76	61.2	59.6	6.5	10.9
	2	34	373 - 381	361.5	377.0	11.3	2/
	15	47	563 - 675	555.5	617.3	57.7	47.1
	11	30	507 - 580	560.1	552.7	11.8	20.4

Constituent	No. of det'n		Range[1/]	Mean concentration SRWS	Mean concentration Atl	Standard deviation SRWS	Standard deviation Atl
F	14	46	0.4 - 0.7	0.49	0.56	0.07	0.08
	15	40	.4 - 1.0	.65	.70	.08	.15
	15	47	.7 - 1.2	.82	.87	.09	.15
	11	30	.9 - 1.6	1.00	1.05	.11	.19
	15	36	.9 - 1.2	1.01	1.03	.13	.08
	19	34	.9 - 1.2	1.04	1.06	.09	.08
	18	43	3.0 - 4.1	3.75	3.64	.30	.25
Fe	7	48	60 - 100	79	74	21	15
	3	49	80 - 110	87	90	16	2/
	5	45	400 - 470	454	440	28	29
	7	44	440 - 480	498	460	29	14
HCO_3	14	46	20 - 34	28.7	30.8	2.7	3.9
	18	43	40 - 48	44.4	44.3	1.8	2.9
	15	47	44 - 53	46.4	49.0	4.2	2.4
	16	36	40 - 52	46.7	46.9	2.7	3.8
	15	40	60 - 81	74.6	73.8	2.8	4.8
	19	34	85 - 108	101.7	102.6	7.3	5.2
	11	30	285 - 384	330.3	340.5	15.6	33.6
Hg	7	44	.4 - .6	.42	.60	.09	2/
	2	49	.4 - .8	.68	.51	.19	.09
	5	45	2.9 - 4.1	3.51	3.32	.49	.46
	6	48	6.2 - 8.9	7.34	7.03	.77	1.06
I	2	40	.03	.018	.030	.020	2/
	4	43	.04	.024	.040	.027	0
K	14	46	.5 - .7	.66	.68	.11	.06
	15	40	2.1 - 2.3	2.14	2.19	.26	.05
	15	47	2.3 - 2.6	2.37	2.41	.82	.06
	11	30	2.3 - 2.6	2.55	2.51	.39	.10
	14	36	7.0 - 7.5	7.03	7.04	.53	.13
	19	34	16 - 18	16.5	16.2	1.7	.5
	18	43	24 - 28	26.6	26.1	3.3	.8

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration Atl	Standard deviation SRWS	Standard deviation Atl
Li	5	48	50 - 60	52	50	5	5
	3	49	110 - 120	110	110	5	2/
Mg	18	43	.1 - .8	.46	.46	.12	.22
	14	46	1.2 - 2.2	1.99	1.87	.19	.24
	19	34	7.4 - 8.4	7.92	7.92	.70	.24
	15	40	7.9 - 8.6	8.28	8.27	.61	.20
	16	36	12 - 13	11.9	12.1	.9	.3
	15	47	19 - 20	18.3	19.2	.9	.4
	11	30	22 - 23	22.2	22.6	1.6	.5
Mn	5	45	60 - 70	63	64	9	5
	8	44	110 - 120	115	115	15	5
	3	49	170	162	170	12	2/
	7	48	240 - 270	261	253	13	11
Mo	7	48	12 - 19	14.6	15.2	3.2	2.5
	3	49	55 - 60	56.6	58.3	4.6	2/
Na	14	46	2.8 - 3.0	2.88	2.90	.17	.04
	16	36	15 - 16	15.4	15.9	.9	.3
	15	40	20 - 21	20.7	20.9	.6	.3
	19	34	42 - 44	43.5	43.7	1.7	.7
	15	47	70 - 73	70.3	70.5	2.6	1.0
	11	30	79 - 83	79.4	79.9	2.9	1.4
	18	43	220	223	220	9	0
Ni	7	44	2 - 6	5.5	4.1	2.0	1.7
	3	49	7 - 9	7.8	8.0	4.2	2/
	4	45	7 - 11	10.9	9.5	1.9	1.7
	7	48	7 - 18	13.0	12.1	4.7	3.3

Constitutent	No. of det'n	SRWS	Range 1/	Mean concentration SRWS	Mean concentration Atl	Standard deviation SRWS	Standard deviation Atl
$NO_2 + NO_3 - N$	14	46	0.08 - 0.31	0.10	0.10	0	0.06
	15	40	.17 - .23	.23	.19	.14	.02
	14	47	2.9 - 3.0	2.84	2.95	.45	.05
	16	36	2.9 - 3.2	2.93	3.02	.87	.07
	11	30	5.3 - 6.6	5.83	6.25	.56	.47
	18	43	8.0 - 8.8	8.32	8.61	.84	.24
	19	34	12	12.1	12.0	1.3	0
Pb	8	44	5 - 9	8.8	7.4	3.1	1.3
	5	45	10 - 12	11.6	11.0	1.3	.7
	3	49	22 - 24	24.1	23.3	5.8	1.2
	7	48	45 - 48	47.5	47.0	6.8	1.3
P, Total	13	47	.29 - .33	.323	.312	.032	.013
	11	30	.42 - .84	.809	.748	.068	.118
Se	3	49	12 - 29	15.5	20.3	10.9	2/
	5	48	40 - 43	34.8	41.0	25.3	1.4
SiO_2	14	46	4.6 - 5.1	4.22	4.75	.67	.16
	16	36	4.6 - 5.0	4.53	4.76	.64	.09
	15	40	5.6 - 6.1	5.70	5.84	.95	.14
	18	43	9.2 - 9.8	9.16	9.43	1.2	.16
	15	47	18 - 19	17.3	18.7	.9	.5
	11	30	23 - 24	22.8	23.6	1.7	.5
	19	34	36 - 39	37.0	38.1	1.3	.7
SO_4	14	46	14 - 19	16.1	16.6	2.7	1.2
	19	34	20 - 24	22.9	22.1	4.3	.9
	15	40	46 - 49	46.8	47.0	2.3	1.1
	16	36	52 - 61	59.6	56.0	4.0	2.5
	11	30	99 - 110	106	102	7	4
	15	47	99 - 110	106	101	7	4
	18	43	130 - 140	142	137	10	5

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration Atl	Standard deviation SRWS	Standard deviation Atl
sp cond	14	46	91 - 100	94.6	95.4	3.9	2.1
	14	40	310 - 312	310.4	311.4	4.6	.8
	11	36	549 - 560	556.4	553.8	18.6	3.3
	19	34	557 - 581	559.4	562.6	10.7	5.3
	10	30	765 - 845	848.9	830.8	12.9	23.6
	15	47	892 - 908	896.4	897.7	39	4.6
	18	43	1180 - 1220	1188	1196	12	10
Sr	14	46	50 - 80	55	64	11	9
	17	43	60 - 90	70	69	9	9
	16	34	140 - 290	181	198	75	37
	15	36	140 - 240	185	185	27	23
	14	40	100 - 280	236	226	21	41
	14	47	550 - 650	590	599	62	24
	11	30	720 - 780	727	738	45	17
Zn	7	44	40 - 50	42	41	8	4
	5	45	240 - 270	259	256	29	11
	3	49	340 - 350	345	347	18	2/
	7	48	420 - 440	432	426	26	8

1/ Concentration units are consistent with USGS policy
2/ Not calculated because of insufficient data

Summary of Standard Reference Water Sample results analyzed by the Salt Lake City Central Laboratory

July to December 1975

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration SLC	Standard deviation SRWS	Standard deviation SLC
Al	7	49	60 - 100	84	83	26	14
	14	45	30 - 130	96	78	40	24
	9	44	180 - 230	229	206	51	16
	15	48	500 - 690	597	589	147	55
Ag	9	45	3 - 5	6.1	4.2	1.9	.7
	7	49	4 - 7	6.3	5.3	1.0	1.1
	10	48	2 - 11	10.1	8.1	1.2	2.8
As	11	44	4 - 7	4.9	5.2	2.1	1.2
	11	49	16 - 23	18.1	18.4	2.6	2.0
	12	45	11 - 19	19.1	15.0	8.0	2.9
	11	36	24 - 42	29	30.3	7	5.6
	14	48	34 - 55	44.6	45.4	8.8	5.7
	18	43	32 - 95	45.8	49.6	14.1	14.5
	30	34	55 - 180	136	135	12	22
B	12	40	0 - 50	20	12	19	14
	31	47	50 - 130	92	83	29	15
	13	36	230 - 280	258	249	74	14
	18	43	300 - 490	454	457	90	42
Ba	15	48	100 - 500	570	420	110	101
Be	12	44	10 - 20	14	14	5	5
Br	18	43	.1 - .5	.24	.37	.18	.09
	12	40	.1	.40	.10	.43	0
Ca	18	43	3.2 - 4.1	3.87	3.71	.24	.23
	32	46	9.3 - 12	10.7	10.9	.8	.5
	12	40	25 - 28	26.3	26.3	1.0	.5

Constituent	No. of det'n	SRWS	Range 1/	Mean concentration SRWS	Mean concentration SLC	Standard deviation SRWS	Standard deviation SLC
Ca.--cont'd	31	34	39 - 46	43.5	43.4	2.3	1.5
	14	36	58 - 65	61.7	61.9	2.8	1.8
	31	47	63 - 75	69.5	69.5	2.5	2.6
Cd	7	49	3 - 7	4.6	4.1	1.0	1.3
	9	44	5 - 6	6.4	5.7	2.0	.5
	10	45	5 - 10	8.0	7.9	.7	1.2
	10	48	8 - 14	16.0	11.2	3.7	2.0
Cl	32	46	1.0 - 2.6	1.84	1.62	.63	.43
	12	40	25 - 28	26.2	26.2	.8	1.0
	31	34	70 - 76	72.2	73.0	2.3	1.4
	14	36	91 - 98	95.4	95.0	3.1	1.7
	31	47	170 - 190	174	176	10	6
	18	43	200 - 220	213	213	7	7
Co	7	49	3 - 6	5.1	4.1	.6	1.2
	9	44	2 - 6	6.0	4.3	1.1	1.6
	10	45	4 - 8	7.9	6.4	1.4	1.7
	10	48	9 - 14	13.6	11.5	1.8	1.5
Cr	13	44	0 - 20	8.5	6.2	2.7	6.5
	12	49	10 - 30	14.9	15.3	3.7	6.6
	13	45	10 - 30	21.2	18.5	3.8	5.5
	15	48	23 - 60	30.3	29.9	6.5	9.7
Cu	14	45	20 - 47	27	30	7	7
	13	44	100 - 110	101	104	9	5
	15	48	200 - 240	227	227	13	13
	12	49	50 - 110	385	409	19	46
DSRD 180	31	46	48 - 62	61.2	56.1	6.5	3.5
	30	34	346 - 390	361.5	365.4	11.3	8.0
	31	47	532 - 617	555.5	578.3	57.7	24.7

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration SLC	Standard deviation SRWS	Standard deviation SLC
F	29	46	0.4 - 0.7	0.49	0.49	0.07	0.07
	12	40	.6 - .7	.65	.63	.08	.05
	30	47	.2 - .8	.82	.77	.09	.12
	13	36	.9 - 1.1	1.01	.98	.13	.07
	31	34	.8 - 1.2	1.04	1.02	.09	.09
	18	43	3.2 - 5.1	3.75	3.66	.30	.43
Fe	15	48	0 - 110	79	76	21	29
	12	49	50 - 110	87	81	16	16
	4	45	480 - 510	454	488	28	15
	13	44	480 - 550	498	502	29	22
HCO_3	32	46	22 - 34	28.7	29.5	2.7	2.4
	18	43	39 - 51	44.4	45.1	1.8	2.9
	31	47	42 - 60	46.4	48.8	4.2	3.4
	14	36	44 - 50	46.7	47.0	2.7	1.6
	12	40	70 - 76	74.6	74.8	2.8	2.7
	31	34	83 - 109	101.7	103.3	7.3	4.8
Hg	13	44	.1 - .4	.42	.33	.09	.12
	12	49	.2 - .6	.68	.34	.19	.11
	10	45	1.8 - 3.7	3.51	3.29	.49	.69
	15	48	5.5 - 7.3	7.34	6.69	.77	.60
I	10	40	.02 - .04	.018	.029	.020	.006
	16	43	.01 - .06	.024	.040	.027	.010
K	32	46	.2 - .7	.66	.55	.11	.10
	12	40	1.8 - 2.2	2.14	1.98	.26	.15
	30	47	2.0 - 2.6	2.37	2.30	.82	.16
	14	36	6.5 - 7.3	7.03	6.93	.53	.28
	31	34	13 - 19	16.5	16.2	1.7	1.7
	18	43	20 - 27	26.6	24.3	3.3	2.4

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration SLC	Standard deviation SRWS	Standard deviation SLC
Li	15	48	30 - 60	52	48	5	8
	12	49	80 - 120	110	105	5	11
Mg	18	43	.5 - .9	.46	.56	.12	.11
	32	46	1.2 - 2.7	1.99	2.04	.19	.29
	31	34	5.1 - 8.7	7.92	7.84	.70	.61
	12	40	8.1 - 9.0	8.28	8.45	.61	.28
	14	36	11 - 13	11.9	12.0	.9	.7
	31	47	18 - 21	18.3	18.9	.9	.8
Mn	14	45	60 - 70	63	64	9	5
	13	44	110 - 130	115	119	15	8
	11	49	160 - 190	162	174	12	8
	15	48	250 - 290	261	275	13	11
Mo	11	44	0 - 2	1.6	1.1	1.1	.7
	15	48	10 - 17	14.6	14.9	3.2	1.8
	12	45	13 - 21	18.8	18.2	1.6	2.1
	11	49	43 - 60	56.6	56.5	4.6	5.0
Na	32	46	2.7 - 5.2	2.88	2.99	.17	.43
	14	36	16	15.4	16.0	.9	0
	12	40	20 - 21	20.7	20.8	.6	.5
	31	34	42 - 46	43.5	44.1	1.7	1.0
	31	47	69 - 74	70.3	71.5	2.6	1.4
	18	43	210 - 220	223	218	9	4
Ni	9	44	2 - 7	5.5	4.4	2.0	1.4
	7	49	1 - 7	7.8	3.7	4.2	2.0
	10	45	5 - 12	10.9	9.1	1.9	2.5
	10	48	1 - 14	13.0	5.0	4.7	4.2
$NO_2 + NO_3 - N$	32	46	.04 - .22	.10	.09	0	.04
	11	40	.08 - .22	.23	.15	.14	.04
	30	47	2.6 - 3.3	2.84	2.84	.45	.17

Constituent	No. of det'n	SRWS	Range 1/	Mean concentration SRWS	Mean concentration SLC	Standard deviation SRWS	Standard deviation SLC
$NO_2 + NO_3$ - N.--cont'd	14	36	2.5 - 3.4	2.93	3.01	0.87	0.21
	17	43	1.7 - 9.1	8.32	7.82	.84	1.78
	31	34	11 - 16	12.1	12.2	1.3	1.3
Pb	9	44	6 - 20	8.8	9.1	3.1	4.2
	10	45	9 - 13	11.6	11.2	1.3	1.3
	7	49	19 - 24	24.1	21.9	5.8	1.7
	10	48	41 - 100	47.5	48.7	6.8	18
P, Total	28	47	.24 - .40	.323	.322	.032	.031
Se	11	44	4 - 7	6.3	6.1	1.0	1.0
	12	49	3 - 19	15.5	14.2	10.9	4.8
	12	45	12 - 28	23.3	23.2	3.2	4.4
	13	48	14 - 48	34.8	35.6	25.3	8.2
SiO_2	32	46	3.9 - 9.9	4.22	4.57	.67	1.05
	14	36	4.0 - 5.2	4.53	4.63	.64	.27
	12	40	5.4 - 6.3	5.70	5.72	.95	.27
	18	43	8.7 - 11	9.16	9.22	1.2	.53
	30	47	16 - 20	17.3	17.6	.9	1.0
	31	34	33 - 39	37.0	36.2	1.3	1.6
SO_4	32	46	15 - 20	16.1	17.2	2.7	1.0
	31	34	18 - 24	22.9	21.3	4.3	1.7
	12	40	41 - 51	46.8	46.6	2.3	2.8
	14	36	53 - 66	59.6	58.8	4.0	3.9
	31	47	98 - 120	106	105	7	6
	18	43	130 - 160	142	141	10	10
sp cond	32	46	89 - 99	94.6	95.0	3.9	1.8
	12	40	309 - 314	310.4	310.8	4.6	1.5
	13	36	516 - 557	556.4	549.6	18.6	10.5
	31	34	555 - 576	559.4	562.4	10.7	5.3
	31	47	881 - 906	896.4	895.1	39	7.8
	18	43	1160 - 1210	1188	1193	12	12

Constituent	No. of det'n	SRWS	Range[1/]	Mean concentration SRWS	Mean concentration SLC	Standard deviation SRWS	Standard deviation SLC
Sr	32	46	0 - 120	55	69	11	24
	17	43	60 - 90	70	74	9	9
	30	34	100 - 230	181	181	75	25
	14	36	170 - 220	185	181	27	14
	12	40	240 - 290	236	251	21	15
	31	47	540 - 750	590	609	62	44
Zn	13	44	40 - 60	42	46	8	7
	14	45	200 - 420	259	264	29	48
	12	49	300 - 360	345	342	18	19
	15	48	400 - 490	432	444	26	22

1/ Concentration untis are consistent with USGS policy
2/ Not calculated because of insufficient data