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Addendum 1

Statistical Description of Liquid
Low-Level Waste System
Supernatant Liquids
At Oak Ridge National Laboratory,
Oak Ridge, Tennessee

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ACRONYMS AND ABBREVIATIONS

BVEST	Bethel Valley Evaporator Service Tanks
DOE	U.S. Department of Energy
GAAT	Gunit and Associated Tanks
LLLW	liquid low-level waste
MVST	Melton Valley Storage Tank
ORNL	Oak Ridge National Laboratory
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal

ABSTRACT

The Department of Energy has presented plans for processing transuranic low level liquid wastes located at ORNL. The Tennessee Department of Health and Environment has mandated the beginning of processing of these wastes by the year 2002, looking towards permanent disposal at a site located off the reservation. In order to meet this schedule, the DOE will solicit bids from various private sector companies to construct a processing facility to be operated by the private sector on a contract basis. In support of the Request for Proposal (RFP) process to accomplish the private sector involvement, this report is being written to give potential vendors information about the wastes contained in the ORNL tank farm system. This addendum report consolidates all data that presently exist on the properties and composition of the waste supernatant liquids, and presents methods to calculate the error bounds of the data in the best technically defensible manner possible.

1.0 INTRODUCTION

The Department of Energy has presented plans for processing transuranic low level liquid wastes located at ORNL in the Low Level Liquid Waste (LLLW) tank system. These wastes are among the most hazardous on the Oak Ridge Reservation, and exhibit both RCRA toxic and radiological hazards. The Tennessee Department of Health and Environment has mandated the beginning of processing of these wastes by the year 2002, looking towards permanent disposal at a site located off the reservation. In order to meet this schedule, the DOE will solicit bids from various private sector companies to construct a processing facility on land located near the ORNL Melton Valley Storage Tanks, to be operated by the private sector on a contract basis. The present plans are to transfer the wastes now in the GAAT, OHF, and BVEST as well as newly generated wastes to the eight MVSTs for storage prior to treatment by a private sector waste processor. At the present time it cannot be determined which MVST tank will be the destination for waste in any individual BVEST, GAAT or OHF tank, nor which MVST tank will have waste removed or modified to make room for the wastes to be transferred in.

In support of the Request for Proposal (RFP) process to accomplish the private sector involvement, this addendum report is being written to give potential vendors additional information about the supernatant liquids contained in the ORNL tank farm system. The report consolidates all data that presently exist on the properties and composition of these to enable potential vendor calculations of the error bounds of the data in the best technically defensible manner possible. The report includes information for only the tank waste that is to be included in the RFP.

2.0 THE LIQUID LOW LEVEL WASTE SYSTEM AT ORNL

The previous report¹ gives the description of both the LLLW system and wastes, which have been generated during the entire history of ORNL. Appendix A of this report gives an operating history of Tank Waste at ORNL, including GAAT operations, OHF operations, GAAT sluicing operations, the building 2531 evaporator operations, evaporation operations at the MVST facility, and describes waste composition changes due to evaporation.

3.0. DISCUSSION OF DATA USED FOR THE EVALUATION

The ORNL tank system has been sampled on numerous occasions for different reasons. These sampling campaigns are summarized in , Table 3.1 of a previous report¹. Subsequent sampling campaigns have been reported^{2,3,4} and are summarized in Table 3.1 below. Note that tanks W-29 and W-30 were not sampled.

Table 3.1 Summary of Recent ORNL LLLW system tank sampling campaigns

Report Number	Sampling Dates	Tanks Sampled	Reference
ORNL/TM-13357	7/96 and 8/96	W-24,W-25,W-26,W-27,W-28,W-31	2
ORNL/TM-13358	7/96 and 8/96	W-21,W-22,W-23	3
ORNL/TM-13394	12/96 and 1/97	T-1,T-2,T-3,T-4,T-9	4

A general principle to use here is that the later data is generally more accurate. This is for a number of reasons, but generally because the analytical laboratory had more practice at doing the analysis as well as better equipment. The BVEST/MVST systems are part of the active waste systems, and the composition of the wastes reported for them have changed during the time period since the sampling occurred. This is particularly true for the supernatants which are transferred and treated on a regular basis. The data for this data presentation was averaged in two ways. In the first, the data was averaged over all tanks and over all years. This should give an overall bounded picture of the properties of the supernatant liquid in the waste system at present. Since this data contains information on supernatant liquids which have already been solidified, additional averaging on an annual basis was performed.

A description of the sampling and analytical techniques, and known errors in the sampling data is presented in section 3.1 - 3.2 of the previous report¹.

The data used for the supernatant evaluation required careful screening so that the statistical analysis used the best possible data available. The raw data used in this statistical analysis are reproduced in Appendix A. Measurements were standardized from the various reports so that their units were consistent throughout this report. Table 3.1 of the previous report¹ lists the various reports that contained the original data, and the data from those reports that were restricted from this analysis. The newest supernatant data^{2,3,4} was included in the analysis in this addendum report. Analytes which were present in the new data but not present in the old data were ignored when computing the overall averages. These analytes were included in the annual averaging tables. No weighting factors were used in the calculation of the mean and standard deviation as was used in the previous report (p. 3-24)¹. This was because, unlike the sludge, the supernatants in all tanks were produced from the same processes, were treated by the same evaporation process, and have been mixed between some tanks freely. In addition, some of the analytical data in the analysis represent supernatants which have been solidified and are no longer present. They are included in the evaluation because their presence gives greater confidence to the averages. It should be noted that the summary statistics tables should be used to calculate confidence intervals using the methods used in section 4 of the previous report¹.

4.0 DATA

Table 4.1 below contains summary statistics for physical measurements on the liquid samples. Table 4.2 below contains summary statistics for chemical measurements (mg/l) on the liquid samples. Table 4.3 below contains summary statistics for radiological measurements (Bq/ml) on liquid samples.

Table 4.1 Summary statistics for physical measurements on liquid samples.

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Alkalinity	15	30186.67	25066.65	2000.00	72500.00	83.04
Density	129	1.15	0.12	0.97	1.34	10.07
pH	105	11.07	2.18	0.90	13.90	19.70
Si	27	7.13	14.33	1.14	77.10	200.98
TSOL	76	259.35	222.74	2.50	697.00	85.88
DSOL	81	151.37	184.99	1.26	570.00	122.21
SSOL	56	4.32	11.64	0.00	48.00	269.80
TOC	79	695.54	1443.54	2.00	12600.00	207.54
ICAR	52	923.66	1727.88	4.70	9390.00	187.07
TCAR	52	1451.54	2043.15	25.00	11700.00	140.76

Alkalinity (mg/l) TSOL = Total Solids (mg/ml) TOC = Total Organic Carbon (mg/l)
 Density (g/ml) DSOL = Dissolved Solids (mg/ml) ICAR = Inorganic Carbon (mg/l)
 Si (mg/l) SSOL = Suspended Solids (mg/ml) TCAR = Total Carbon (mg/l)

1985

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Alkalinity	15	30186.67	25066.65	2000.00	72500.00	83.04
Density	30	1.21	0.09	0.97	1.33	7.28
pH	4	12.95	0.77	12.10	13.70	5.96
TSOL	24	473.90	130.82	114.90	697.00	27.60
DSOL	8	412.50	78.33	340.00	570.00	18.99

1988

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Density	20	1.24	0.01	1.24	1.26	0.44
pH	20	13.75	0.15	13.60	13.90	1.12

1989

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Density	39	1.08	0.10	1.00	1.29	9.05
pH	39	10.89	1.35	8.70	13.10	12.36
Si	27	7.13	14.33	1.14	77.10	200.98
TSOL	39	135.82	168.55	2.50	478.00	124.10
DSOL	39	134.49	167.40	2.50	485.00	124.46
SSOL	27	0.85	2.17	0.10	11.30	255.78
TOC	39	850.76	1977.97	2.00	12600.00	232.49
ICAR	12	645.45	800.42	4.70	2580.00	124.01
TCAR	12	1108.67	1015.29	364.00	3860.00	91.58

Table 4.1 (continued)

1990						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Density	1	1.24	.	1.24	1.24	.
pH	2	9.85	4.17	6.90	12.80	42.35
TSOL	1	383.00	.	383.00	383.00	.
DSOL	1	381.00	.	381.00	381.00	.
TOC	1	1160.00	.	1160.00	1160.00	.
ICAR	1	8340.00	.	8340.00	8340.00	.
TCAR	1	9500.00	.	9500.00	9500.00	.
1994						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Density	15	1.10	0.13	1.00	1.33	11.60
pH	15	9.93	1.67	7.20	13.00	16.81
TSOL	1	24.60	.	24.60	24.60	.
DSOL	15	138.85	193.84	1.26	524.00	139.60
SSOL	15	14.27	19.45	0.03	48.00	136.26
TOC	15	284.07	318.52	2.00	938.00	112.13
ICAR	15	398.07	344.21	15.00	1131.00	86.47
TCAR	15	690.40	446.71	25.00	1756.00	64.70
1995						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
pH	1	13.00	.	13.00	13.00	.
1996						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Density	18	1.13	0.13	1.01	1.34	11.21
pH	18	9.59	2.71	0.90	12.80	28.28
TSOL	11	239.31	217.50	8.58	580.00	90.89
DSOL	12	97.98	176.43	3.50	530.00	180.07
SSOL	14	0.33	0.53	0.00	1.46	157.94
TOC	18	768.72	692.49	60.00	2310.00	90.08
ICAR	18	1204.67	2187.25	7.20	9390.00	181.56
TCAR	18	1973.33	2632.95	401.00	11700.00	133.43
1997						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Density	6	1.03	0.01	1.02	1.04	0.62
pH	6	9.43	0.55	8.90	10.10	5.79
DSOL	6	12.70	3.99	8.10	17.00	31.39
TOC	6	418.33	92.18	300.00	500.00	22.03
ICAR	6	715.00	307.23	440.00	1100.00	42.97
TCAR	6	1133.33	324.45	910.00	1600.00	28.63

Table 4.2 Summary statistics for chemical measurements (mg/l) on liquid samples.

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Ag	101	0.20	0.36	0.00	2.00	176.81
Al	58	14.08	40.57	0.03	299.00	288.15
As	92	2.01	1.68	0.01	4.00	83.37
B	57	1.26	1.86	0.03	10.00	148.16
Ba	103	1.83	6.33	0.00	60.30	345.96
Be	103	0.01	0.05	0.00	0.48	715.80
Bi	17	2.70	2.56	0.00	5.88	94.62
Ca	58	1363.88	5052.88	1.53	34500.00	370.48
Cd	102	0.39	1.25	0.01	8.77	318.05
Ce	9	0.37	0.92	0.00	2.80	250.58
Co	45	0.16	0.20	0.01	0.62	125.27
Cr	102	6.82	15.73	0.01	145.00	230.53
Cs	28	1.80	4.04	0.10	19.60	224.36
Cu	39	0.86	2.79	0.00	13.70	323.21
Fe	52	10.89	73.69	0.00	532.00	676.73
Ga	9	0.33	0.41	0.00	1.30	124.11
Hg	92	0.79	2.01	0.00	12.80	252.62
I	19	14.79	10.24	2.70	50.00	69.26
K	58	11335.07	15478.79	18.70	78000.00	136.56
La	9	0.04	0.12	0.00	0.35	278.39
Li	19	26.69	40.22	0.12	140.00	150.67
Mg	58	178.49	610.56	0.01	3560.00	342.07
Mn	103	0.33	3.14	0.00	31.90	952.24
Mo	19	1.24	1.87	0.00	8.22	151.31
Na	58	54828.38	47377.05	361.00	126000.00	86.41
Nb	9	0.00	0.00	0.00	0.01	77.35
Ni	79	1.23	3.06	0.01	21.80	248.54
P	24	69.88	121.14	3.27	567.00	173.35
Pb	73	2.53	5.38	0.01	43.20	212.62
Rb	19	1.18	1.32	0.06	4.60	112.12
Sb	39	0.99	2.06	0.16	12.30	207.23
Se	73	0.94	1.72	0.01	4.70	184.16
Si	54	55.11	83.98	0.00	329.00	152.39
Sn	19	0.38	0.83	0.00	3.10	221.02
Sr	57	12.87	36.28	0.01	235.00	281.86
Th	58	11.01	66.52	0.05	507.00	604.01
Ti	19	0.51	0.30	0.05	0.98	57.83
Tl	69	1.77	4.83	0.01	19.00	272.41
U	85	434.76	1138.85	0.09	8530.00	261.95
V	39	0.09	0.12	0.01	0.50	130.03
W	19	0.46	1.35	0.01	5.70	292.23
Zn	45	13.89	32.10	0.02	168.00	231.17
Zr	9	0.03	0.02	0.00	0.07	82.78
Bicarbonate	33	3004.34	2879.09	0.00	6100.00	95.83
Bromide	33	117.69	277.53	0.50	1390.00	235.82
Carbonate	56	6287.25	5532.10	6.00	40000.00	87.99
Chloride	52	2410.52	2081.38	7.20	8830.00	86.35
Chromate	19	21.49	16.89	5.00	56.20	78.56
Fluoride	52	321.60	361.85	0.50	1210.00	112.52
Hydroxide	55	3103.16	2786.63	0.00	8500.00	89.80
Nitrate	72	186519.92	145987.15	1.00	506000.00	78.27
Nitrite	24	3038.38	4121.68	8.00	17300.00	135.65
Phosphate	52	1385.31	2142.79	5.00	5000.00	154.68
Sulfate	52	2562.40	2245.84	51.00	10600.00	87.65
HCN	6	0.07	0.08	0.01	0.22	126.39
Acetate	19	247.89	249.99	3.00	748.00	100.84
Citrate	19	88.68	337.08	5.00	1480.00	380.09
Formate	19	188.21	219.71	3.00	643.00	116.73
Oxalate	19	243.70	354.40	3.00	1120.00	145.43
Phthalate	19	14.65	13.34	5.00	50.00	91.08

Table 4.2 (continued)

1986						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Ag	4	1.11	1.04	0.05	2.00	93.42
As	4	0.61	1.13	0.04	2.30	184.71
Ba	4	8.18	5.89	1.00	13.00	72.08
Be	4	0.00	0.00	0.00	0.00	.
Cd	4	1.38	0.96	0.21	2.30	69.43
Cr	4	7.58	3.00	4.30	11.00	39.58
Hg	4	0.64	0.65	0.21	1.60	101.29
Mn	4	0.00	0.00	0.00	0.00	.
Pb	4	8.88	2.66	5.50	11.00	29.94
Se	4	0.32	0.59	0.01	1.20	181.64
Si	3	0.00	0.00	0.00	0.00	.

1988						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Ag	19	0.20	0.00	0.20	0.20	0.00
Al	6	31.15	18.89	13.40	50.00	60.64
As	19	3.00	0.00	3.00	3.00	0.00
B	6	0.60	0.05	0.51	0.66	8.15
Ba	20	1.24	0.45	0.00	1.90	36.55
Be	20	0.00	0.00	0.00	0.00	.
Ca	6	3.91	0.41	3.31	4.36	10.42
Cd	19	0.10	0.00	0.10	0.10	0.00
Cr	19	3.05	0.49	2.20	3.60	16.17
Hg	20	0.57	0.13	0.00	0.60	23.54
K	6	9411.67	1244.16	7890.00	11100.00	13.22
Mg	6	0.01	0.01	0.01	0.02	38.73
Mn	20	0.00	0.00	0.00	0.00	.
Na	6	106000.00	3898.72	103000.00	111000.00	3.68
Si	6	22.17	10.83	12.00	34.00	48.87
Sr	6	0.98	0.11	0.83	1.12	11.54
Th	6	1.35	0.00	1.35	1.35	0.00
U	6	10.20	0.00	10.20	10.20	0.00
Zn	6	54.63	13.77	41.70	68.50	25.20
Carbonate	20	8280.00	460.66	7200.00	9000.00	5.56
Hydroxide	20	6196.50	2140.76	3910.00	8500.00	34.55
Nitrate	20	285500.00	6048.05	270000.00	290000.00	2.12

Table 4.2 (continued)

1989						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Ag	38	0.23	0.35	0.00	1.20	149.98
Al	12	18.55	14.86	4.20	46.00	80.09
As	39	3.07	1.40	0.40	4.00	45.79
B	12	0.78	1.00	0.20	3.90	128.75
Ba	39	0.68	1.27	0.02	5.80	186.47
Be	39	0.00	0.00	0.00	0.00	.
Ca	12	902.48	2294.49	3.60	7800.00	254.24
Cd	39	0.23	0.71	0.01	4.50	308.55
Co	6	0.57	0.00	0.57	0.57	0.00
Cr	39	9.72	23.34	0.10	145.00	240.18
Fe	12	2.60	0.00	2.60	2.60	0.00
Hg	39	0.89	2.33	0.01	11.00	261.62
K	12	15075.00	12365.36	8500.00	51000.00	82.03
Mg	12	134.71	461.45	1.30	1600.00	342.55
Mn	39	0.00	0.00	0.00	0.00	.
Na	12	97166.67	13360.96	68000.00	110000.00	13.75
Ni	39	0.84	1.27	0.10	8.20	151.72
Pb	39	1.95	1.00	0.50	6.70	51.21
Se	39	1.58	2.13	0.09	4.70	135.14
Si	11	2.68	3.81	1.00	11.90	142.18
Sr	12	10.90	18.63	0.74	65.00	170.97
Th	12	2.25	2.51	1.00	10.00	111.68
Tl	39	0.56	0.64	0.09	2.00	114.68
U	39	623.79	1514.61	0.10	8530.00	242.81
Bicarbonate	12	633.33	115.47	600.00	1000.00	18.23
Carbonate	12	3416.67	3549.35	600.00	12000.00	103.88
Chloride	12	2966.67	635.80	2500.00	4800.00	21.43
Fluoride	12	500.00	0.00	500.00	500.00	0.00
Hydroxide	12	1408.33	1356.10	200.00	4900.00	96.29
Nitrate	12	275333.33	36574.54	204000.00	370000.00	13.28
Phosphate	12	5000.00	0.00	5000.00	5000.00	0.00
Sulfate	12	5000.00	0.00	5000.00	5000.00	0.00

Table 4.2 (continued)

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E.
Ag	1	0.44	.	0.44	0.44	.
Al	1	1.80	.	1.80	1.80	.
As	1	3.00	.	3.00	3.00	.
B	1	10.00	.	10.00	10.00	.
Ba	1	0.19	.	0.19	0.19	.
Be	1	0.00	.	0.00	0.00	.
Ca	1	18.00	.	18.00	18.00	.
Cd	1	1.70	.	1.70	1.70	.
Cr	1	0.42	.	0.42	0.42	.
Fe	1	0.70	.	0.70	0.70	.
Hg	1	0.07	.	0.07	0.07	.
K	1	78000.00	.	78000.00	78000.00	.
Mg	1	3.40	.	3.40	3.40	.
Mn	1	0.00	.	0.00	0.00	.
Na	1	82000.00	.	82000.00	82000.00	.
Ni	1	3.00	.	3.00	3.00	.
Pb	1	2.70	.	2.70	2.70	.
Se	1	2.30	.	2.30	2.30	.
Si	1	1.00	.	1.00	1.00	.
Sr	1	0.40	.	0.40	0.40	.
Th	1	15.80	.	15.80	15.80	.
Tl	1	0.94	.	0.94	0.94	.
U	1	17.00	.	17.00	17.00	.
Carbonate	1	40000.00	.	40000.00	40000.00	.
Chloride	1	3600.00	.	3600.00	3600.00	.
Fluoride	1	1000.00	.	1000.00	1000.00	.
Hydroxide	1	2600.00	.	2600.00	2600.00	.
Nitrate	1	200000.00	.	200000.00	200000.00	.
Phosphate	1	5000.00	.	5000.00	5000.00	.
Sulfate	1	7800.00	.	7800.00	7800.00	.

Table 4.2 (continued)

			1994			
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Ag	15	0.12	0.27	0.01	1.07	231.53
Al	15	3.71	8.36	0.03	32.50	225.17
As	15	0.10	0.11	0.01	0.25	118.61
B	14	0.47	0.41	0.03	1.45	87.16
Ba	15	1.75	3.70	0.00	12.70	211.31
Be	15	0.00	0.01	0.00	0.04	241.05
Ca	15	1510.16	3611.47	3.87	10400.00	239.15
Cd	15	0.20	0.31	0.01	0.82	156.69
Co	15	0.10	0.08	0.01	0.22	81.59
Cr	15	4.07	3.78	0.01	11.80	92.83
Cs	5	0.42	0.10	0.28	0.50	22.87
Cu	15	0.24	0.28	0.00	0.70	113.66
Fe	15	0.12	0.13	0.00	0.45	111.10
Hg	15	0.16	0.23	0.00	0.71	145.04
K	15	8152.89	13127.22	18.70	40900.00	161.01
Mg	15	208.46	538.13	0.02	1870.00	258.14
Mn	15	0.05	0.09	0.00	0.29	158.31
Na	15	32710.73	43952.77	361.00	110000.00	134.37
Ni	15	1.08	1.92	0.01	6.99	177.55
Pb	15	0.97	0.91	0.01	2.20	93.69
Sb	15	1.02	1.26	0.16	2.80	123.62
Se	15	0.18	0.23	0.01	0.50	131.00
Si	9	19.81	17.69	2.36	53.10	89.28
Sr	14	13.96	28.32	0.01	80.90	202.86
Th	15	4.82	10.19	0.05	39.60	211.38
Tl	15	6.60	8.95	0.15	19.00	135.58
U	15	344.22	526.45	0.09	1540.00	152.94
V	15	0.04	0.02	0.02	0.07	54.86
Zn	15	1.95	6.15	0.02	24.10	315.88
Bicarbonate	15	6100.00	0.00	6100.00	6100.00	0.00
Bromide	15	140.20	219.42	0.50	690.00	156.51
Carbonate	15	6000.00	0.00	6000.00	6000.00	0.00
Chloride	15	1647.65	2249.04	7.20	5950.00	136.50
Fluoride	15	459.06	476.89	0.50	1080.00	103.88
Hydroxide	15	1620.00	309.84	500.00	1700.00	19.13
Nitrate	15	106911.14	158406.93	1.00	425000.00	148.17
Phosphate	15	394.09	662.32	10.00	2270.00	168.06
Sulfate	15	1063.20	852.07	51.00	2940.00	80.14
HCN	6	0.07	0.08	0.01	0.22	126.39

Table 4.2 (continued)

		1996				
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Ag	18	0.06	0.07	0.02	0.20	119.91
Al	18	18.78	70.09	0.06	299.00	373.14
As	14	0.11	0.18	0.01	0.68	162.24
B	18	1.92	2.18	0.35	8.65	113.76
Ba	18	4.34	14.09	0.00	60.30	324.91
Be	18	0.03	0.11	0.00	0.48	329.82
Bi	11	1.45	2.33	0.00	5.88	160.79
Ca	18	2529.85	8272.91	1.53	34500.00	327.01
Cd	18	1.06	2.64	0.02	8.77	249.74
Ce	9	0.37	0.92	0.00	2.80	250.58
Co	18	0.12	0.18	0.02	0.62	150.83
Cr	18	8.03	13.60	0.01	57.00	169.35
Cs	17	1.71	4.72	0.10	19.60	275.66
Cu	18	1.58	4.05	0.01	13.70	255.96
Fe	18	29.58	125.39	0.01	532.00	423.85
Ga	9	0.33	0.41	0.00	1.30	124.11
Hg	13	1.69	3.41	0.08	12.80	201.78
I	13	16.62	11.89	2.70	50.00	71.53
K	18	11855.17	15586.82	180.00	51300.00	131.48
La	9	0.04	0.12	0.00	0.35	278.39
Li	13	38.59	44.05	4.10	140.00	114.15
Mg	18	310.74	910.47	0.03	3560.00	293.01
Mn	18	1.84	7.51	0.00	31.90	408.12
Mo	13	1.69	2.14	0.00	8.22	126.53
Na	18	43637.50	45618.15	665.00	126000.00	104.54
Nb	9	0.00	0.00	0.00	0.01	77.35
Ni	18	2.51	5.80	0.03	21.80	231.13
P	18	86.76	136.51	3.27	567.00	157.34
Pb	14	3.99	11.68	0.01	43.20	292.86
Rb	13	1.64	1.37	0.06	4.60	83.75
Sb	18	1.19	2.82	0.33	12.30	236.67
Se	14	0.04	0.03	0.01	0.09	84.38
Si	18	137.16	104.21	4.40	329.00	75.98
Sn	13	0.53	0.98	0.00	3.10	187.11
Sr	18	22.24	57.31	0.04	235.00	257.73
Th	18	28.43	119.44	0.08	507.00	420.09
Ti	13	0.50	0.34	0.05	0.98	68.59
Tl	14	0.04	0.03	0.01	0.09	90.31
U	18	334.86	929.22	0.39	4030.00	277.49
V	18	0.16	0.15	0.01	0.50	93.19
W	13	0.67	1.61	0.01	5.70	240.55
Zn	18	14.75	42.46	0.05	168.00	287.81
Zr	9	0.03	0.02	0.00	0.07	82.78
Bicarbonate	6	7.18	14.81	0.00	37.00	206.16
Bromide	12	145.70	392.88	5.00	1390.00	269.65
Carbonate	8	1935.75	3230.27	6.00	9420.00	166.87
Chloride	18	3240.50	2399.98	168.00	8830.00	74.03
Chromate	13	28.02	16.59	5.00	56.20	59.21
Fluoride	18	141.11	280.46	5.00	1210.00	198.75
Hydroxide	7	420.53	449.24	0.00	1070.00	106.83
Nitrate	18	144769.51	175348.07	25.00	506000.00	121.12
Nitrite	18	3436.06	4699.83	8.00	17300.00	136.78
Phosphate	18	60.25	157.97	5.00	675.00	262.18
Sulfate	18	2406.17	2413.91	153.00	10600.00	100.32
Acetate	13	316.77	261.36	3.00	748.00	82.51
Citrate	13	126.54	406.84	5.00	1480.00	321.51
Formate	13	236.23	240.64	3.00	643.00	101.87
Oxalate	13	285.95	400.04	3.00	1120.00	139.90
Phthalate	13	16.54	15.60	5.00	50.00	94.31

Table 4.2 (continued)

1997						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Ag	6	0.04	0.01	0.03	0.06	34.95
Al	6	1.90	2.92	0.06	6.56	153.62
B	6	1.27	0.50	0.64	1.68	38.95
Ba	6	0.02	0.01	0.01	0.04	78.87
Be	6	0.00	0.00	0.00	0.00	0.00
Bi	6	5.01	0.52	4.56	5.79	10.41
Ca	6	7.39	3.25	1.97	10.80	43.98
Cd	6	0.03	0.00	0.03	0.03	0.00
Co	6	0.04	0.01	0.03	0.06	24.89
Cr	6	3.78	3.96	1.11	8.93	104.78
Cs	6	3.21	3.56	0.10	7.70	111.15
Cu	6	0.27	0.18	0.08	0.49	68.38
Fe	6	0.01	0.00	0.01	0.01	0.00
I	6	10.83	3.35	7.90	17.00	30.94
K	6	1063.00	270.78	706.00	1250.00	25.47
Li	6	0.92	0.71	0.12	1.70	77.09
Mg	6	2.04	2.26	0.04	4.93	110.54
Mn	6	0.01	0.01	0.00	0.02	72.28
Mo	6	0.26	0.06	0.19	0.36	23.86
Na	6	3318.33	1172.01	1940.00	4590.00	35.32
Ni	6	0.05	0.01	0.03	0.06	24.82
P	6	19.25	6.59	13.90	28.30	34.24
Rb	6	0.18	0.04	0.14	0.24	23.37
Sb	6	0.33	0.00	0.33	0.33	0.00
Si	6	27.52	5.90	20.10	35.40	21.45
Sn	6	0.06	0.04	0.02	0.11	67.08
Sr	6	0.15	0.07	0.05	0.22	45.02
Th	6	0.63	0.85	0.08	1.77	133.86
Ti	6	0.53	0.17	0.35	0.77	32.18
U	6	226.33	19.13	206.00	254.00	8.45
V	6	0.02	0.00	0.02	0.02	0.00
W	6	0.01	0.01	0.01	0.02	39.53
Zn	6	0.38	0.79	0.05	2.00	205.96
Bromide	6	5.37	2.33	3.00	8.63	43.35
Chloride	6	517.17	117.92	378.00	635.00	22.80
Chromate	6	7.35	3.86	5.00	14.10	52.58
Fluoride	6	49.52	11.36	36.60	66.00	22.94
Nitrate	6	986.00	1440.72	5.00	2850.00	146.12
Nitrite	6	1845.33	876.45	1150.00	2970.00	47.50
Phosphate	6	6.67	2.58	5.00	10.00	38.73
Sulfate	6	1031.00	458.28	473.00	1490.00	44.45
Acetate	6	98.67	148.24	3.00	295.00	150.24
Citrate	6	6.67	2.58	5.00	10.00	38.73
Formate	6	84.17	125.75	3.00	249.00	149.41
Oxalate	6	152.17	231.09	3.00	453.00	151.87
Phthalate	6	10.55	5.23	5.00	17.00	49.59

Table 4.3 Summary statistics for radiological measurements (Bq/ml) on liquid samples.

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Gross alpha	102	299.88	2076.00	0.10	21000.00	692.27
Gross beta	82	359279.39	492367.12	490.00	2200000.00	137.04
²⁴¹ Am	10	1590.85	1232.07	0.00	3100.00	77.45
¹⁴ C	36	95.45	165.46	1.11	787.00	173.34
¹⁴⁴ Ce	13	1305.38	433.60	740.00	2300.00	33.22
²⁵² Cf	14	2.07	1.84	0.20	5.00	88.94
²⁴⁴ Cm	21	883.44	3922.67	0.40	18000.00	444.02
⁶⁰ Co	102	838.97	1788.27	0.01	12200.00	213.15
¹³⁴ Cs	67	8903.12	16031.95	49.00	82000.00	180.07
¹³⁷ Cs	102	273946.86	368838.28	470.00	2070000.00	134.64
¹⁵² Eu	54	3959.72	25802.27	2.00	190000.00	651.62
¹⁵⁴ Eu	54	1651.86	10450.11	0.70	77000.00	632.63
¹⁵⁵ Eu	54	1037.85	2828.50	3.00	21000.00	272.53
³ H	67	169.53	122.15	0.63	618.00	72.05
¹²⁹ I	7	0.15	0.13	0.01	0.30	88.95
⁹⁵ Nb	13	129.69	164.20	30.00	630.00	126.60
²³⁸ Pu/ ²⁴¹ Am	4	13.50	18.41	0.00	39.00	136.38
²³⁹ Pu/ ²⁴⁰ Pu	28	4.09	12.93	0.00	69.00	316.13
²³⁸ Pu	48	4.22	14.47	0.00	100.00	343.01
²³⁹ Pu	27	3.48	7.31	0.00	39.00	209.98
²⁴⁰ Pu	13	3.39	11.03	0.00	40.00	325.07
²⁴¹ Pu	10	66.80	184.60	0.00	590.00	276.34
²⁴² Pu	20	0.17	0.36	0.00	1.00	216.04
²⁴⁴ Pu	10	0.02	0.04	0.00	0.10	210.82
¹⁰⁶ Ru	14	2314.29	1252.26	1100.00	5800.00	54.11
⁹⁰ Sr	100	11018.92	26586.14	2.60	150000.00	241.28
⁹⁹ Tc	23	1149.98	2721.43	2.50	13000.00	236.65
²³² Th	41	0.04	0.07	0.00	0.20	178.22
²³² U	2	20.00	22.63	4.00	36.00	113.14
²³³ U	62	143.14	280.62	0.00	1800.00	196.05
²³⁴ U	41	2.90	5.28	0.00	27.00	182.18
²³⁵ U	41	0.12	0.19	0.00	0.80	150.16
²³⁶ U	41	0.07	0.10	0.00	0.60	144.36
²³⁸ U	45	3.82	8.17	0.00	50.00	213.50
⁹⁵ Zr	13	147.69	122.00	52.00	500.00	82.60

1988

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Gross alpha	20	2.22	0.64	0.41	3.18	28.87
¹⁴ C	20	3.39	1.98	1.11	6.22	58.44
⁶⁰ Co	20	952.75	193.52	629.00	1258.00	20.31
¹³⁴ Cs	20	5583.30	1618.72	3663.00	8066.00	28.99
¹³⁷ Cs	20	181374.00	54285.89	123025.00	240870.00	29.93
³ H	20	265.22	43.10	220.89	315.98	16.25
⁹⁰ Sr	20	4267.95	558.98	3367.00	5217.00	13.10
²³² Th	6	0.19	0.00	0.19	0.19	0.00

Table 4.3 (continued)

1989

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Gross alpha	39	94.56	200.11	1.00	1030.00	211.62
Gross beta	39	237942.56	373834.18	490.00	2200000.00	157.11
^{14}C	15	220.33	198.87	56.00	787.00	90.26
^{144}Ce	12	1280.83	443.34	740.00	2300.00	34.61
^{252}Cf	14	2.07	1.84	0.20	5.00	88.94
^{244}Cm	14	2.36	1.80	0.40	5.00	76.27
^{60}Co	39	763.50	2343.08	0.01	12200.00	306.89
^{134}Cs	13	3781.92	3799.24	85.00	13100.00	100.46
^{137}Cs	39	223507.95	340830.52	580.00	2070000.00	152.49
^{152}Eu	12	316.08	430.93	93.00	1670.00	136.34
^{154}Eu	12	173.33	184.44	60.00	737.00	106.41
^{155}Eu	12	611.92	267.79	93.00	1200.00	43.76
^{3}H	39	120.43	127.22	0.63	618.00	105.63
^{95}Nb	12	132.17	171.24	30.00	630.00	129.57
$^{238}\text{Pu}/^{241}\text{Am}$	1	15.00	.	15.00	15.00	.
$^{239}\text{Pu}/^{240}\text{Pu}$	1	10.00	.	10.00	10.00	.
^{238}Pu	14	2.71	1.27	2.00	5.00	46.67
^{239}Pu	14	3.43	1.22	2.00	5.00	35.66
^{106}Ru	12	1901.67	606.36	1100.00	3020.00	31.89
^{90}Sr	37	8175.62	21859.31	9.00	122000.00	267.37
^{232}Th	12	0.01	0.01	0.00	0.04	110.54
^{232}U	1	36.00	.	36.00	36.00	.
^{233}U	20	130.95	242.18	2.00	920.00	184.94
^{238}U	4	4.25	3.86	2.00	10.00	90.88
^{95}Zr	12	151.67	126.54	52.00	500.00	83.43

1990

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Gross alpha	2	144.50	88.39	82.00	207.00	61.17
Gross beta	2	344000.00	166877.20	226000.00	462000.00	48.51
^{14}C	1	63.50	.	63.50	63.50	.
^{144}Ce	1	1600.00	.	1600.00	1600.00	.
^{244}Cm	1	4.00	.	4.00	4.00	.
^{60}Co	2	2445.50	2580.23	621.00	4270.00	105.51
^{134}Cs	2	4160.00	664.68	3690.00	4630.00	15.98
^{137}Cs	2	332000.00	147078.21	228000.00	436000.00	44.30
^{152}Eu	1	210.00	.	210.00	210.00	.
^{154}Eu	1	160.00	.	160.00	160.00	.
^{155}Eu	1	850.00	.	850.00	850.00	.
^{3}H	1	119.00	.	119.00	119.00	.
^{95}Nb	1	100.00	.	100.00	100.00	.
$^{238}\text{Pu}/^{241}\text{Am}$	1	39.00	.	39.00	39.00	.
$^{239}\text{Pu}/^{240}\text{Pu}$	1	6.00	.	6.00	6.00	.
^{106}Ru	1	3780.00	.	3780.00	3780.00	.
^{90}Sr	2	25718.00	35754.15	436.00	51000.00	139.02
^{232}Th	1	0.06	.	0.06	0.06	.
^{232}U	1	4.00	.	4.00	4.00	.
^{233}U	1	6.00	.	6.00	6.00	.
^{95}Zr	1	100.00	.	100.00	100.00	.

1993

Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
^{99}Ic	1	20.00	.	20.00	20.00	.
^{232}Th	1	0.00	.	0.00	0.00	.

Table 4.3 (continued)

1994						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Gross alpha	16	69.50	94.31	0.10	300.00	135.70
Gross beta	16	438196.88	587438.59	560.00	1700000.00	134.06
²⁴¹ Am	8	1800.00	1242.12	0.00	3100.00	69.01
²⁴⁴ Cm	2	23.65	21.28	8.60	38.70	90.00
⁶⁰ Co	16	722.28	1368.77	0.30	4900.00	189.51
¹³⁴ Cs	7	31471.43	32907.79	1400.00	82000.00	104.56
¹³⁷ Cs	16	343793.13	481967.87	470.00	1400000.00	140.19
¹⁵² Eu	16	755.00	994.55	2.00	2500.00	131.73
¹⁵⁴ Eu	16	293.83	389.83	0.70	990.00	132.67
¹⁵⁵ Eu	16	497.94	605.43	3.00	1600.00	121.59
³ H	6	146.33	55.21	68.00	200.00	37.73
²³⁸ Pu/ ²⁴¹ Am	2	0.00	0.00	0.00	0.00	.
²³⁹ Pu/ ²⁴⁰ Pu	4	0.02	0.04	0.00	0.07	200.00
²³⁸ Pu	11	0.00	0.00	0.00	0.00	.
²⁴⁰ Pu	10	0.25	0.26	0.00	0.70	105.41
²⁴¹ Pu	10	0.00	0.00	0.00	0.00	.
²⁴² Pu	7	0.00	0.00	0.00	0.00	.
²⁴⁴ Pu	11	0.00	0.00	0.00	0.00	.
⁹⁰ Sr	16	13936.21	32706.21	2.60	120000.00	234.69
⁹⁹ Tc	7	644.64	606.57	2.50	1900.00	94.09
²³² Th	16	0.02	0.05	0.00	0.20	288.02
²³³ U	16	27.45	59.47	0.00	210.80	216.64
²³⁴ U	16	1.51	4.71	0.00	18.80	312.80
²³⁵ U	16	0.14	0.26	0.00	0.80	189.42
²³⁶ U	16	0.01	0.03	0.00	0.10	400.00
²³⁸ U	16	3.98	6.35	0.00	19.00	159.60

1995						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Gross alpha	1	330.00	.	330.00	330.00	.
Gross beta	1	2000000.00	.	2000000.00	2000000.00	.
²⁴¹ Am	1	8.50	.	8.50	8.50	.
²⁴⁴ Cm	1	67.00	.	67.00	67.00	.
⁶⁰ Co	1	1800.00	.	1800.00	1800.00	.
¹³⁴ Cs	1	52000.00	.	52000.00	52000.00	.
¹³⁷ Cs	1	1500000.00	.	1500000.00	1500000.00	.
¹⁵² Eu	1	1100.00	.	1100.00	1100.00	.
¹⁵⁴ Eu	1	620.00	.	620.00	620.00	.
¹⁵⁵ Eu	1	2300.00	.	2300.00	2300.00	.
³ H	1	360.00	.	360.00	360.00	.
¹²⁹ I	1	0.30	.	0.30	0.30	.
²³⁸ Pu	1	7.50	.	7.50	7.50	.
²³⁹ Pu	1	1.80	.	1.80	1.80	.
²⁴⁰ Pu	1	1.60	.	1.60	1.60	.
²⁴¹ Pu	1	30.00	.	30.00	30.00	.
²⁴² Pu	1	0.00	.	0.00	0.00	.
²⁴⁴ Pu	1	0.00	.	0.00	0.00	.
⁹⁰ Sr	1	5100.00	.	5100.00	5100.00	.
⁹⁹ Tc	1	13000.00	.	13000.00	13000.00	.
²³³ U	1	0.10	.	0.10	0.10	.
²³⁴ U	1	0.00	.	0.00	0.00	.
²³⁵ U	1	0.00	.	0.00	0.00	.
²³⁶ U	1	0.00	.	0.00	0.00	.
²³⁸ U	1	0.00	.	0.00	0.00	.

Table 4.3 (continued)

1996						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Gross alpha	18	1315.81	4915.20	1.00	21000.00	373.55
Gross beta	18	535277.78	536604.55	19000.00	1700000.00	100.25
²⁴¹ Am	1	1500.00		1500.00	1500.00	
²⁴⁴ Cm	3	6133.67	10277.78	41.00	18000.00	167.56
⁶⁰ Co	18	995.06	2005.43	17.00	7900.00	201.54
¹³⁴ Cs	18	8543.22	14868.37	49.00	45000.00	174.04
¹³⁷ Cs	18	401811.11	450390.09	3600.00	1400000.00	112.09
¹⁵² Eu	18	10824.00	44717.34	11.00	190000.00	413.13
¹⁵⁴ Eu	18	4460.50	18104.22	18.00	77000.00	405.88
¹⁵⁵ Eu	18	1895.78	4818.29	64.00	21000.00	254.16
¹²⁹ I	6	0.12	0.12	0.01	0.29	100.57
²³⁹ Pu/ ²⁴⁰ Pu	16	5.47	17.01	0.06	69.00	311.20
²³⁸ Pu	16	8.70	24.82	0.03	100.00	285.37
²³⁹ Pu	2	20.85	25.67	2.70	39.00	123.11
²⁴⁰ Pu	2	21.25	26.52	2.50	40.00	124.78
²⁴¹ Pu	2	319.00	383.25	48.00	590.00	120.14
²⁴² Pu	8	0.42	0.48	0.01	1.00	115.81
²⁴⁴ Pu	2	0.10	0.00	0.10	0.10	0.00
¹⁰⁶ Ru	1	5800.00		5800.00	5800.00	
⁹⁰ Sr	18	23278.89	42353.19	240.00	150000.00	181.94
⁹⁹ Tc	14	636.93	1021.17	9.00	3700.00	160.33
²³² Th	5	0.00	0.00	0.00	0.00	
²³³ U	18	228.91	429.16	0.20	1800.00	187.48
²³⁴ U	18	3.64	6.46	0.00	27.00	177.51
²³⁵ U	18	0.13	0.14	0.00	0.70	113.27
²³⁶ U	18	0.12	0.12	0.00	0.60	107.02
²³⁸ U	18	4.16	11.53	0.00	50.00	277.36

1997						
Variable	N	Mean	Std Dev	Minimum	Maximum	%R.E
Gross alpha	6	240.00	35.78	210.00	310.00	14.91
Gross beta	6	141166.67	59087.79	78000.00	210000.00	41.86
⁶⁰ Co	6	97.50	25.64	70.00	130.00	26.30
¹³⁴ Cs	6	213.33	40.82	170.00	260.00	19.14
¹³⁷ Cs	6	116833.33	53704.44	60000.00	180000.00	45.97
¹⁵² Eu	6	301.67	111.97	110.00	400.00	37.12
¹⁵⁴ Eu	6	225.00	16.43	200.00	250.00	7.30
¹⁵⁵ Eu	6	576.67	119.11	440.00	720.00	20.65
²³⁹ Pu/ ²⁴⁰ Pu	6	1.83	1.30	0.20	3.40	71.17
²³⁸ Pu	6	2.98	1.95	0.40	5.00	65.32
⁹⁰ Sr	6	2583.33	767.90	1700.00	3600.00	29.73
²³³ U	6	281.67	16.02	260.00	300.00	5.69
²³⁴ U	6	4.88	0.50	4.20	5.60	10.15
²³⁵ U	6	0.10	0.00	0.10	0.10	0.00
²³⁶ U	6	0.10	0.00	0.10	0.10	0.00
²³⁸ U	6	2.77	0.23	2.50	3.10	8.45

5. REFERENCES

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APPENDIX A

LIQUID DATA

TABLES A.1, A.2 AND A.3

Measurement Data on Liquid Samples: 1985-1997

Table A.1. Physical variable measurements on liquid samples from 1985 to 1997.

Obs	Tank	Year	Sample ID	Alkalinity	Density	pH	Total Si	Disol Solids	Susp Solids	Inorg Carbon	Total Carbon
				mg/kg	g/ml		mg/l	mg/ml	mg/ml	mg/l	mg/l
1	T01	1989	L35	.	1.01	9.7	9.34	7.2	6.4	1	836
2	T01	1989	L36	.	1.01	9.7	6.81	6.9	6.9	0	790
3	T01	1996	0	.	1.01	9.3	.	8.6	8.4	0	478
4	T01	1997	T1L-081	.	1.02	8.9	.	.	8.1	.	320
5	T01	1997	T1L-080	.	1.02	8.9	.	.	8.1	.	300
6	T02	1989	L38	.	1.01	9.9	5.07	12.5	11.4	1	1120
7	T02	1989	L112	.	1.01	9.9	6.81	12.1	11.5	1	1100
8	T02	1989	L39	.	1.01	9.9	6.97	11.6	10.7	1	1310
9	T02	1996	0	.	1.02	9.5	.	13.7	13.5	0	820
10	T02	1997	T2L-079	.	1.03	9.3	.	.	13.0	.	500
11	T02	1997	T2L-078	.	1.04	9.3	.	.	13.0	.	400
12	T03	1989	L42	.	1.04	12.7	77.10	53.4	51.9	2	12600
13	T03	1996	0	.	1.05	11.6	.	56.5	54.2	1	2130
14	T03	1996	T3L-117	.	1.05	9.5	.	.	47.0	.	1600
15	T03	1996	T3L-116	.	1.05	9.6	.	.	47.0	.	1500
16	T04	1989	L111	.	1.02	11.7	1.96	23.9	23.6	0	460
17	T04	1989	L44	.	1.02	11.7	1.96	26.3	23.6	3	460
18	T04	1989	L45	.	1.02	11.7	1.45	23.4	23.7	0	473
19	T04	1996	0	.	1.02	10.4	.	17.5	17.2	0	550
20	T04	1997	T4L-077	.	1.03	10.1	.	.	17.0	.	500
21	T04	1997	T4L-076	.	1.02	10.1	.	.	17.0	.	490
22	T09	1989	L47	.	1.03	9.1	9.76	42.2	41.5	1	850
23	T09	1996	0	.	1.02	9.1	.	16.1	15.9	0	62
24	T09	1996	T9L-119	.	1.02	8.9	.	.	15.0	.	60
25	T09	1996	T9L-118	.	1.02	8.9	.	.	14.0	.	60
26	W10	1989	L93	.	1.00	9.2	1.71	5.5	5.7	0	9
27	W10	1989	L94	.	1.01	10.5	1.90	13.6	13.7	0	86
28	W10	1989	L95	.	1.03	10.9	2.34	36.7	37.1	0	55
29	W10	1994	225	.	1.01	9.9	.	.	11.0	0	2
30	W21	1990	0	.	.	6.9	.	.	.	.	297
31	W21	1996	W21L-013	.	1.27	0.9	.	.	410.0	1	533
32	W22	1985	0	.	.	.	.	114.9	.	.	.
33	W22	1994	W22-L1-1	.	1.01	12.4	.	24.6	23.4	1	98
34	W22	1996	W22L-014	.	1.01	8.9	.	.	3.5	1	67
35	W23	1985	0	.	.	.	.	.	.	.	.
36	W23	1985	0	.	.	.	.	.	.	.	.
37	W23	1985	0	.	.	.	.	575.8	.	.	.
38	W23	1990	W23-L1	.	1.24	12.8	.	383.0	381.0	.	1160
39	W23	1995	W23-115	.	.	13.0	.	.	.	.	8340
40	W23	1996	W23L-167	.	1.34	12.7	.	.	530.0	1	9390
41	W24	1985	0	.	.	.	.	.	.	.	.
42	W24	1985	0	61000	1.28	.	.	469.0	.	.	.
43	W24	1985	0	.	.	.	.	.	.	.	.
44	W24	1985	0	62000	1.27	.	.	539.0	.	.	.
45	W24	1985	0	.	.	.	.	.	.	.	.
46	W24	1985	0	72500	1.30	.	.	697.0	.	.	.
47	W24	1985	0	.	.	.	.	.	.	.	.
48	W24	1985	0	.	1.28	.	.	487.0	.	.	.
49	W24	1989	W24-L2	.	1.23	13.1	.	383.0	377.0	.	489
50	W24	1994	W24-084	.	1.19	13.0	.	.	269.0	32	625
51	W24	1996	W24L-021	.	1.20	12.3	.	320.0	.	0	350
52	W25	1985	0	.	.	.	.	.	.	.	.
53	W25	1985	0	37000	0.97	.	.	517.0	.	.	.
54	W25	1985	0	.	.	.	.	.	.	.	.
55	W25	1985	0	38500	0.99	.	.	499.0	.	.	.
56	W25	1985	0	.	.	.	.	.	.	.	.
57	W25	1985	0	6400	1.08	.	.	430.0	.	.	.
58	W25	1985	0	.	.	.	.	.	.	.	.
59	W25	1985	0	.	1.23	.	.	469.0	.	.	.
60	W25	1989	W25-L2	.	1.20	12.5	.	334.0	348.0	.	462
										16	478

Table A.1 (continued)

Obs	Tank	Year	Sample ID	Alkalinity	Density	pH	Si mg/l	Total Solids	Disol Solids	Susp Solids	TOC mg/l	Inorg Carbon	Total Carbon
				mg/kg	g/ml			mg/ml	mg/ml	mg/ml		mg/l	mg/l
61	W25	1996	W25L-022	.	1.22	12.6	.	360.0	.	0	610	1730	2340
62	W26	1985	0	.	.	.	.	618.0	.	.	.	.	.
63	W26	1985	0	2700	1.30	.	.	655.0	.	.	.	.	.
64	W26	1985	0	.	.	.	.	653.0	.	.	.	.	.
65	W26	1985	0	3200	1.30	.	.	429.0	.	.	.	.	.
66	W26	1985	0	.	.	.	.	366.0	369.0	.	1280	2580	3860
67	W26	1985	0	5000	1.30	.	.	385.0	385.0	38	938	15	938
68	W26	1985	0	.	.	.	.	430.0	.	0	943	7	950
69	W26	1985	0	.	1.25	.	.	405.0	.	.	.	.	.
70	W26	1989	W26-L2	.	1.22	11.2	.	355.0	358.0	.	359	5	364
71	W26	1994	W26-086	.	1.26	9.3	.	407.0	407.0	48	407	90	500
72	W26	1996	W26L-015	.	1.26	8.4	.	390.0	.	0	240	161	401
73	W27	1985	0	.	.	.	.	478.0	.	.	.	.	.
74	W27	1985	0	33000	1.14	.	.	438.0	.	.	.	.	.
75	W27	1985	0	.	.	.	.	310.0	.	.	.	.	.
76	W27	1985	0	32000	1.15	.	.	326.0	.	.	.	.	.
77	W27	1985	0	.	.	.	.	490.0	.	.	.	.	.
78	W27	1985	0	44000	1.16	.	.	570.0	.	.	.	.	.
79	W27	1985	0	.	.	.	.	490.0	.	.	.	.	.
80	W27	1985	0	.	1.22	.	.	490.0	.	.	.	.	.
81	W27	1989	W27-L2	.	1.21	11.8	.	407.0	407.0	48	574	7	581
82	W27	1994	W27-087	.	1.28	7.2	.	390.0	.	0	735	44	779
83	W27	1996	W27L-016	.	1.24	12.8	.	524.0	524.0	46	775	36	811
84	W28	1985	0	.	.	.	.	442.0	.	.	.	.	.
85	W28	1985	0	2000	1.24	.	.	400.0	.	.	.	.	.
86	W28	1985	0	.	.	.	.	390.0	.	.	.	.	.
87	W28	1985	0	2000	1.25	.	.	485.0	.	.	.	.	.
88	W28	1985	0	.	.	.	.	485.0	.	.	.	.	.
89	W28	1985	0	51500	1.27	.	.	580.0	.	0	775	36	811
90	W28	1985	0	.	.	.	.	580.0	.	0	775	36	811
91	W28	1985	0	.	1.33	.	.	580.0	.	0	775	36	811
92	W28	1985	0	.	1.09	12.1	.	524.0	524.0	46	775	36	811
93	W28	1985	0	.	1.27	.	.	490.0	.	.	.	.	.
94	W28	1989	W28-L2	.	1.29	9.1	.	478.0	478.0	48	574	7	581
95	W28	1994	W28-088	.	1.33	7.2	.	524.0	524.0	46	735	44	779
96	W28	1996	W28L-009	.	1.34	7.3	.	580.0	580.0	0	775	36	811
97	W29	1985	0	.	.	.	.	442.0	.	.	.	.	.
98	W29	1985	0	.	1.27	.	.	442.0	.	.	.	.	.
99	W29	1985	0	.	1.22	13.5	.	400.0	.	.	.	.	.
100	W29	1985	0	.	1.24	.	.	390.0	.	.	.	.	.
101	W29	1988	1	.	1.24	13.6	.	.	.	.	.	.	.
102	W29	1988	2	.	1.24	13.6	.	.	.	.	.	.	.
103	W29	1988	3	.	1.24	13.6	.	.	.	.	.	.	.
104	W29	1988	1	.	1.24	13.6	.	.	.	.	.	.	.
105	W29	1988	2	.	1.24	13.6	.	.	.	.	.	.	.
106	W29	1988	2D	.	1.26	13.6	.	.	.	.	.	.	.
107	W29	1988	3	.	1.24	13.6	.	.	.	.	.	.	.
108	W29	1988	1	.	1.25	13.6	.	.	.	.	.	.	.
109	W29	1988	2	.	1.25	13.6	.	.	.	.	.	.	.
110	W29	1988	3	.	1.25	13.6	.	.	.	.	.	.	.
111	W29	1989	W29-L1	.	1.23	12.7	.	377.0	377.0	507	478	985	.
112	W29	1989	W29-L2	.	1.23	12.8	.	379.0	379.0	563	477	1040	.
113	W29	1989	W29-L4	.	1.23	12.7	.	382.0	382.0	377	456	833	.
114	W03	1989	L16	.	1.00	9.0	6.50	2.7	2.7	0	772	.	.
115	W03	1989	L17	.	1.01	10.1	5.30	4.4	4.4	0	1130	.	.
116	W03	1989	L18	.	1.01	11.1	7.20	8.4	8.4	0	1500	.	.
117	W03	1994	203	.	1.00	9.4	.	2.7	2.7	1	197	344	541
118	W03	1994	204	.	1.01	10.6	.	6.5	6.5	2	167	543	876
119	W30	1985	0	.	.	.	.	492.0	492.0	.	.	.	.
120	W30	1985	0	.	1.26	.	.	492.0	492.0	.	.	.	.

Table A.1 (continued)

Obs	Tank	Year	Sample ID	Alkalinity mg/kg	Density g/ml	pH	Total Solids			Disol Solids		Susp Solids		Inorg Carbon mg/l	Total Carbon mg/l
							Si mg/l	Solids mg/ml	Solids mg/ml	TOC mg/l	Solids mg/ml	Solids mg/ml			
121	W30	1985	0	.	1.23	13.7	.	.	390.0	.	.	.	.	.
122	W30	1985	0	.	1.23	.	.	.	370.0	.	.	.	.	.
123	W30	1988	1	.	1.24	13.9	.	.	.	.	.	.	.	.
124	W30	1988	2	.	1.24	13.9	.	.	.	.	.	.	.	.
125	W30	1988	2D	.	1.24	13.9	.	.	.	.	.	.	.	.
126	W30	1988	3	.	1.24	13.9	.	.	.	.	.	.	.	.
127	W30	1988	1	.	1.24	13.9	.	.	.	.	.	.	.	.
128	W30	1988	2	.	1.24	13.9	.	.	.	.	.	.	.	.
129	W30	1988	3	.	1.24	13.9	.	.	.	.	.	.	.	.
130	W30	1988	1	.	1.24	13.9	.	.	.	.	.	.	.	.
131	W30	1988	2	.	1.24	13.9	.	.	.	.	.	.	.	.
132	W30	1988	3	.	1.24	13.9	.	.	.	.	.	.	.	.
133	W30	1989	W30-L1	.	1.22	12.8	.	396.0	371.0	.	203	602	805		
134	W30	1989	W30-L2	.	1.22	12.9	.	391.0	377.0	.	99	596	695		
135	W30	1989	W30-L4	.	1.22	12.8	.	374.0	370.0	.	199	600	799		
136	W31	1985	0	.	1.17	12.5	.	.	350.0	.	.	.	.	.
137	W31	1985	0	.	1.18	.	.	.	340.0	.	.	.	.	.
138	W31	1989	W31-L2	.	1.21	11.7	.	349.0	351.0	.	445	19	464		
139	W31	1994	W31-089	.	1.26	11.9	.	.	391.0	38	741	489	1230		
140	W31	1996	W31L-028	.	1.26	10.0	.	440.0	.	0	749	407	1156		
141	W04	1989	L22	.	1.01	9.1	2.55	6.3	6.1	0	50	.	.		
142	W04	1989	L119	.	1.01	10.0	2.07	10.3	10.1	0	60	.	.		
143	W04	1989	L23	.	1.03	10.9	1.75	27.9	27.4	1	559	.	.		
144	W04	1994	205	.	1.01	9.8	.	.	7.9	2	15	461	461		
145	W05	1989	L73	.	1.04	10.6	12.90	48.2	47.5	1	700	.	.		
146	W05	1994	218	.	1.01	9.8	.	.	11.4	1	77	1006	1083		
147	W06	1989	L77	.	1.00	8.7	3.99	2.5	2.5	0	2	.	.		
148	W06	1989	L78	.	1.01	10.4	2.98	14.7	14.8	0	2	.	.		
149	W06	1989	L79	.	1.06	11.8	1.65	74.1	74.0	0	180	.	.		
150	W06	1994	219	.	1.01	8.4	.	.	1.3	0	4	21	25		
151	W06	1994	220	.	1.02	10.8	.	.	16.7	1	59	424	483		
152	W07	1989	L82	.	1.13	10.7	7.35	170.0	158.7	11	50	.	.		
153	W08	1989	L86	.	1.02	9.6	1.39	29.4	29.4	0	720	.	.		
154	W08	1989	L87	.	1.03	9.7	1.14	37.6	37.8	0	1460	.	.		
155	W08	1994	223	.	1.02	9.3	.	.	15.2	1	107	493	600		
156	W09	1989	L90	.	1.02	10.2	2.53	21.2	21.2	0	290	.	.		
157	W09	1994	222	.	1.01	9.9	.	.	10.7	1	89	598	687		

Table A.2 Chemical variable measurements (mg/l) on liquid samples from 1985 to 1997.

Obs	Tank	Year	Sample ID	Chemical Variable Measurements (mg/l)												
				Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs
1	T01	1989	L35	0.0	.	0.8	.	0.0	0.00	.	.	0.0	.	.	0.3	.
2	T01	1989	L36	0.0	.	0.8	.	0.1	0.00	.	.	0.0	.	0.0	0.2	.
3	T01	1996	0	0.0	0.4	0.0	0.6	0.0	0.00	.	5.8	0.0	.	0.0	1.5	0.3
4	T01	1997	T1L-081	0.0	0.1	.	0.6	0.0	0.00	5.5	7.1	0.0	.	0.0	1.3	0.1
5	T01	1997	T1L-080	0.0	0.1	.	0.6	0.0	0.00	5.8	7.3	0.0	.	0.0	1.3	0.1
6	T02	1989	L38	0.0	.	0.8	.	0.0	0.00	.	.	0.0	.	.	0.4	.
7	T02	1989	L112	0.0	.	0.8	.	0.1	0.00	.	.	0.0	.	.	0.1	.
8	T02	1989	L39	0.0	.	0.8	.	0.0	0.00	.	.	0.0	.	.	0.1	.
9	T02	1996	0	0.0	0.7	0.0	1.8	0.0	0.00	.	9.0	0.0	.	0.0	1.5	19.6
10	T02	1997	T2L-079	0.0	0.1	.	1.7	0.0	0.00	4.6	10.7	0.0	.	0.1	1.1	7.7
11	T02	1997	T2L-078	0.1	0.1	.	1.7	0.0	0.00	4.6	10.8	0.0	.	0.0	1.1	7.7
12	T03	1989	L42	0.0	.	0.4	.	0.0	0.00	.	.	0.0	.	.	14.0	.
13	T03	1996	0	0.0	0.5	0.3	5.0	0.0	0.00	.	2.8	0.0	.	0.0	16.6	0.6
14	T03	1996	T3L-117	0.0	0.1	.	4.0	0.0	0.00	.	5.5	0.0	.	0.1	15.3	0.2
15	T03	1996	T3L-116	0.0	0.1	.	4.1	0.0	0.00	.	6.7	0.0	.	0.1	15.5	0.2
16	T04	1989	L111	0.0	.	0.4	.	0.0	0.00	.	.	0.0	.	.	13.0	.
17	T04	1989	L44	0.0	.	0.8	.	0.0	0.00	.	.	0.0	.	.	9.4	.
18	T04	1989	L45	0.0	.	0.8	.	0.0	0.00	.	.	0.0	.	.	14.0	.
19	T04	1996	0	0.0	5.2	0.0	1.5	0.0	0.00	.	1.5	0.0	.	0.0	8.4	4.4
20	T04	1997	T4L-077	0.0	4.6	.	1.5	0.0	0.00	4.8	2.0	0.0	.	0.0	8.8	1.8
21	T04	1997	T4L-076	0.0	6.6	.	1.6	0.0	0.00	4.8	6.5	0.0	.	0.0	8.9	1.8
22	T09	1989	L47	0.0	.	0.8	.	0.1	0.00	.	.	0.0	.	.	0.4	.
23	T09	1996	0	0.0	0.2	0.0	0.7	0.0	0.00	.	14.2	0.0	.	0.0	0.0	0.7
24	T09	1996	T9L-119	0.0	0.1	.	0.7	0.0	0.00	5.8	15.4	0.0	.	0.1	0.0	0.3
25	T09	1996	T9L-118	0.0	0.1	.	0.7	0.0	0.00	5.9	15.3	0.0	.	0.1	0.1	0.3
26	W10	1989	L93	0.0	.	4.0	.	0.2	0.00	.	.	0.2	.	.	0.6	.
27	W10	1989	L94	0.0	.	4.0	.	0.2	0.00	.	.	0.2	.	.	4.4	.
28	W10	1989	L95	0.0	.	4.0	.	0.2	0.00	.	.	0.2	.	.	19.0	.
29	W10	1994	225	0.0	1.0	0.0	0.3	0.0	0.00	.	16.8	0.0	.	0.0	3.9	.
30	W21	1996	W21L-013	0.2	299	0.1	2.0	60.3	0.48	2.8	34500.0	7.8	2.8	0.3	57.0	0.5
31	W22	1994	W22-L1-1	0.0	0.9	0.0	.	0.6	0.00	.	26.6	0.0	.	0.0	0.0	.
32	W22	1996	W22L-014	0.2	0.3	0.1	0.4	0.0	0.01	1.3	32.3	0.0	0.0	0.2	0.1	.
33	W23	1990	W23-L1	0.4	1.8	3.0	10.0	0.2	0.00	.	18.0	1.7	.	0.4	.	.
34	W23	1996	W23L-167	0.2	5.7	0.7	8.7	0.5	0.06	0.1	111.0	8.8	0.4	0.6	12.4	0.5
35	W24	1989	W24-L2	0.7	46.0	3.7	1.0	0.3	0.00	.	7.2	0.2	.	0.6	3.1	.
36	W24	1994	W24-084	0.1	32.5	0.3	1.5	0.2	0.04	.	5.5	0.8	.	0.1	1.5	0.5
37	W24	1996	W24L-021	0.0	20.0	0.1	1.1	0.3	0.03	0.0	1.6	0.6	0.0	0.0	1.5	0.3
38	W25	1986	21T	0.1	.	0.1	.	1.0	0.00	.	.	0.2	.	.	4.3	.
39	W25	1986	11T	0.4	.	2.3	.	5.7	0.00	.	.	2.3	.	.	9.0	.
40	W25	1986	2TMA	2.0	.	0.0	.	13.0	0.00	.	.	1.0	.	.	6.0	.
41	W25	1986	1TMA	2.0	.	0.0	.	13.0	0.00	.	.	2.0	.	.	11.0	.
42	W25	1989	W25-L2	0.7	4.2	3.7	0.6	3.2	0.00	.	280.0	0.1	.	0.6	1.9	.
43	W25	1996	W25L-022	0.0	0.4	0.1	1.2	1.2	0.00	0.0	2.0	0.5	0.0	0.0	2.5	0.2
44	W26	1989	W26-L2	1.2	4.8	3.7	3.9	0.2	0.00	.	20.0	4.5	.	0.6	1.8	.
45	W26	1994	W26-086	0.1	0.3	0.3	0.9	3.5	0.00	.	1590.0	0.7	.	0.2	1.5	0.5
46	W26	1996	W26L-015	0.0	0.1	0.1	0.6	3.0	0.00	0.0	1390.0	0.4	0.0	0.6	1.0	0.5
47	W27	1989	W27-L2	0.7	4.2	3.7	0.7	4.1	0.00	.	2600.0	0.1	.	0.6	2.8	.
48	W27	1994	W27-087	0.1	0.3	0.3	0.7	12.7	0.00	.	10400.0	0.3	.	0.2	1.0	0.3
49	W27	1996	W27L-016	0.0	0.1	0.0	0.4	5.2	0.00	0.0	117.0	0.0	0.0	0.0	3.0	0.1
50	W28	1989	W28-L2	0.7	5.2	3.7	0.4	5.8	0.00	.	7800.0	0.5	.	0.6	0.4	.
51	W28	1994	W28-088	0.1	0.3	0.3	0.6	7.9	0.00	.	10300.0	0.3	.	0.2	1.0	0.5
52	W28	1996	W28L-009	0.0	3.0	0.0	0.6	6.1	0.00	0.0	9300.0	0.1	0.0	0.1	0.5	0.2
53	W29	1988	1	0.2	.	3.0	.	1.5	0.00	.	.	0.1	.	.	2.4	.
54	W29	1988	2	0.2	13.6	3.0	0.6	1.6	0.00	.	4.2	0.1	.	.	2.6	.
55	W29	1988	3	0.2	.	3.0	.	1.6	0.00	.	.	0.1	.	.	2.6	.
56	W29	1988	1	0.2	.	3.0	.	1.7	0.00	.	.	0.1	.	.	2.6	.
57	W29	1988	2	0.2	13.4	3.0	0.5	1.3	0.00	.	4.0	0.1	.	.	2.2	.
58	W29	1988	20	0.2	.	3.0	.	1.7	0.00	.	.	0.1	.	.	3.0	.
59	W29	1988	3	0.2	.	3.0	.	1.7	0.00	.	.	0.1	.	.	2.9	.
60	W29	1988	1	0.2	14.8	3.0	0.6	1.9	0.00	.	4.0	0.1	.	.	3.1	.

Table A.2 (continued)

Obs	Tank	Year	Sample ID	Sample												
				Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs
61	W29	1988	2	0.2	.	3.0	.	1.7	0.00	.	.	0.1	.	.	2.9	.
62	W29	1988	3	0.2	.	3.0	.	1.4	0.00	.	.	0.1	.	.	2.2	.
63	W29	1989	W29-L1	0.7	18.0	3.7	0.5	1.0	0.00	.	4.1	0.1	.	.	2.4	.
64	W29	1989	W29-L2	0.7	18.0	3.7	0.5	1.1	0.00	.	5.5	0.1	.	.	2.4	.
65	W29	1989	W29-L4	0.7	17.0	3.7	0.4	1.0	0.00	.	3.6	0.1	.	.	2.3	.
66	W03	1989	L16	0.0	.	4.0	.	0.2	0.00	.	.	0.2	.	.	3.3	.
67	W03	1989	L17	0.0	.	4.0	.	0.2	0.00	.	.	0.2	.	.	6.8	.
68	W03	1989	L18	0.0	.	4.0	.	0.2	0.00	.	.	0.2	.	.	20.0	.
69	W03	1994	203	0.1	0.9	0.0	0.2	0.0	0.00	.	19.8	0.0	.	0.0	4.8	.
70	W03	1994	204	0.2	9.4	0.0	0.2	0.0	0.00	.	11.1	0.0	.	0.0	10.5	.
71	W30	1988	1	0.2	.	3.0	.	1.0	0.00	.	.	0.1	.	.	3.5	.
72	W30	1988	2	0.2	47.3	3.0	0.7	1.0	0.00	.	4.4	0.1	.	.	3.6	.
73	W30	1988	2D	0.2	47.8	3.0	0.6	1.0	0.00	.	3.5	0.1	.	.	3.5	.
74	W30	1988	3	.	.	.	.	0.0	0.00	.	.	.	.	.	.	.
75	W30	1988	1	0.2	.	3.0	.	1.0	0.00	.	.	0.1	.	.	3.6	.
76	W30	1988	2	0.2	.	3.0	.	0.9	0.00	.	.	0.1	.	.	3.4	.
77	W30	1988	3	0.2	.	3.0	.	0.9	0.00	.	.	0.1	.	.	3.5	.
78	W30	1988	1	0.2	50.0	3.0	0.6	1.0	0.00	.	3.3	0.1	.	.	3.5	.
79	W30	1988	2	0.2	.	3.0	.	1.0	0.00	.	.	0.1	.	.	3.4	.
80	W30	1988	3	0.2	.	3.0	.	0.9	0.00	.	.	0.1	.	.	3.5	.
81	W30	1989	W30-L1	0.7	34.0	3.7	0.5	0.8	0.00	.	10.0	0.1	.	.	3.0	.
82	W30	1989	W30-L2	0.7	33.0	3.7	0.4	0.8	0.00	.	9.4	0.1	.	.	2.9	.
83	W30	1989	W30-L4	0.7	34.0	3.7	0.4	0.8	0.00	.	11.0	0.1	.	.	2.9	.
84	W31	1989	W31-L2	0.7	4.2	3.7	0.2	3.5	0.00	.	79.0	0.1	.	0.6	6.0	.
85	W31	1994	W31-089	0.1	2.6	0.3	0.8	1.0	0.00	.	153.0	0.8	.	0.2	11.8	0.4
86	W31	1996	W31L-028	0.0	2.3	0.0	0.6	1.4	0.00	0.0	7.2	0.4	0.0	0.0	7.7	0.2
87	W04	1989	L22	0.0	.	4.0	.	0.2	0.00	.	.	0.1	.	.	2.8	.
88	W04	1989	L119	0.0	.	4.0	.	0.2	0.00	.	.	0.1	.	.	5.0	.
89	W04	1989	L23	0.0	.	4.0	.	0.2	0.00	.	.	0.1	.	.	13.5	.
90	W04	1994	205	1.1	2.3	0.0	0.1	0.2	0.00	.	47.1	0.0	.	0.2	7.0	.
91	W05	1989	L73	0.0	.	4.0	.	0.2	0.00	.	.	0.1	.	.	2.7	.
92	W05	1994	218	0.0	0.0	0.0	0.1	0.0	0.00	.	6.8	0.0	.	0.0	0.6	.
93	W06	1989	L77	0.0	.	4.0	.	0.2	0.00	.	.	0.1	.	.	0.3	.
94	W06	1989	L78	0.0	.	4.0	.	0.2	0.00	.	.	0.1	.	.	2.6	.
95	W06	1989	L79	0.0	.	4.0	.	0.2	0.00	.	.	0.1	.	.	32.0	.
96	W06	1994	219	0.0	0.0	0.0	0.0	0.0	0.00	.	19.8	0.0	.	0.0	0.1	.
97	W06	1994	220	0.0	5.0	0.0	0.2	0.0	0.00	.	3.9	0.0	.	0.0	5.1	.
98	W07	1989	L82	.	.	4.0	.	0.2	0.00	.	.	0.1	.	.	145.0	.
99	W08	1989	L86	0.0	.	4.0	.	0.2	0.00	.	.	0.2	.	.	12.0	.
100	W08	1989	L87	0.0	.	4.0	.	0.2	0.00	.	.	0.2	.	.	18.0	.
101	W08	1994	223	0.0	0.0	0.0	0.7	0.1	0.00	.	29.8	0.0	.	0.1	7.6	.
102	W09	1989	L90	0.0	.	4.0	.	0.2	0.00	.	.	0.2	.	.	7.3	.
103	W09	1994	222	0.0	0.0	0.0	0.3	0.1	0.00	.	22.1	0.0	.	0.2	4.8	.

Table A.2 (continued)

Obs	Tank	Year	Sample ID	Sample														
				Cu	Fe	Ga	Hg	I	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P
1	T01	1989	L35	.	.	.	0.1	.	.	.	.	0.0	.	.	.	0.2	.	.
2	T01	1989	L36	.	.	.	0.1	.	.	.	.	0.0	.	.	.	0.2	.	.
3	T01	1996	0	0.2	0.0	.	0.5	.	847.0	.	.	1.1	0.0	.	2210	.	0.0	48.6
4	T01	1997	T1L-081	0.2	0.0	.	.	8.3	706.0	.	1.7	1.2	0.0	0.2	1940	.	0.0	28.3
5	T01	1997	T1L-080	0.2	0.0	.	.	7.9	722.0	.	1.7	1.2	0.0	0.2	1990	.	0.0	27.0
6	T02	1989	L38	.	.	.	0.1	.	.	.	.	0.0	.	.	.	0.2	.	.
7	T02	1989	L112	.	.	.	0.1	.	.	.	.	0.0	.	.	.	0.2	.	.
8	T02	1989	L39	.	.	.	0.2	.	.	.	.	0.0	.	.	.	0.2	.	.
9	T02	1996	0	0.5	0.1	.	0.3	.	1380.0	.	.	4.9	0.0	.	3590	.	0.0	33.4
10	T02	1997	T2L-079	0.5	0.0	.	.	10.0	1240.0	.	0.9	4.8	0.0	0.3	3450	.	0.1	14.1
11	T02	1997	T2L-078	0.5	0.0	.	.	9.8	1210.0	.	0.9	4.9	0.0	0.2	3370	.	0.1	13.9
12	T03	1989	L42	.	.	.	5.7	.	.	.	.	0.0	.	.	.	0.1	.	.
13	T03	1996	0	0.0	0.0	.	12.8	.	3420.0	.	.	0.0	0.0	.	14800	.	0.1	129.0
14	T03	1996	T3L-117	0.2	0.0	.	.	20.0	2860.0	.	4.1	1.3	0.0	1.0	13300	.	0.1	152.0
15	T03	1996	T3L-116	0.2	0.0	.	.	20.0	2720.0	.	4.3	1.4	0.0	0.8	12600	.	0.1	150.0
16	T04	1989	L111	.	.	.	7.9	.	.	.	.	0.0	.	.	.	0.1	.	.
17	T04	1989	L44	.	.	.	1.1	.	.	.	.	0.0	.	.	.	0.2	.	.
18	T04	1989	L45	.	.	.	2.7	.	.	.	.	0.0	.	.	.	0.2	.	.
19	T04	1996	0	0.0	0.0	.	2.0	.	1320.0	.	.	0.1	0.0	.	4550	.	0.0	30.1
20	T04	1997	T4L-077	0.1	0.0	.	.	17.0	1250.0	.	0.1	0.0	0.0	0.4	4570	.	0.0	15.7
21	T04	1997	T4L-076	0.1	0.0	.	.	12.0	1250.0	.	0.1	0.1	0.0	0.3	4590	.	0.0	16.5
22	T09	1989	L47	.	.	.	3.4	.	.	.	.	0.0	.	.	.	0.2	.	.
23	T09	1996	0	0.1	0.0	.	0.9	.	695.0	.	.	3.0	0.0	.	4830	.	0.0	25.6
24	T09	1996	T9L-119	0.1	0.0	.	.	8.9	591.0	.	4.7	3.1	0.0	0.1	4440	.	0.0	3.3
25	T09	1996	T9L-118	0.1	0.0	.	.	9.2	600.0	.	4.5	3.1	0.0	0.1	4490	.	0.0	3.5
26	W10	1989	L93	.	.	.	0.0	.	.	.	.	0.0	.	.	.	1.0	.	.
27	W10	1989	L94	.	.	.	0.1	.	.	.	.	0.0	.	.	.	1.0	.	.
28	W10	1989	L95	.	.	.	0.4	.	.	.	.	0.0	.	.	.	1.0	.	.
29	W10	1994	225	0.1	0.0	.	0.1	.	819.0	.	.	2.8	0.0	.	2800	.	0.1	.
30	W21	1996	W21L-013	11.6	532.0	1.3	1.3	8.9	6810.0	0.4	18.0	3560.0	31.9	1.5	52200	0.0	21.8	239.0
31	W22	1994	W22-L1-1	0.1	0.1	.	0.0	.	40.9	.	.	0.0	0.0	.	5190	.	0.1	.
32	W22	1996	W22L-014	0.1	0.0	0.0	.	2.7	180.0	0.0	8.1	10.0	1.0	0.0	665	0.0	1.1	58.4
33	W23	1990	W23-L1	.	0.7	.	0.1	.	78000.0	.	.	3.4	0.0	.	82000	.	3.0	.
34	W23	1996	W23L-167	13.7	0.0	0.1	0.3	50.0	51300.0	0.0	140.0	0.5	0.1	8.2	126000	0.0	13.7	567.0
35	W24	1989	W24-L2	.	2.6	.	0.0	.	11000.0	.	.	1.3	0.0	.	100000	.	0.4	.
36	W24	1994	W24-084	0.2	0.0	.	0.0	.	20600.0	.	.	0.3	0.0	.	74800	.	0.8	.
37	W24	1996	W24L-021	0.3	0.0	0.1	0.1	18.0	21500.0	0.0	43.0	0.0	0.0	2.5	70700	0.0	0.5	30.8
38	W25	1986	2IT	.	.	.	0.2	.	.	.	.	0.0	.	.	.	.	.	.
39	W25	1986	1IT	.	.	.	0.5	.	.	.	.	0.0	.	.	.	.	.	.
40	W25	1986	2TMA	.	.	.	0.3	.	.	.	.	0.0	.	.	.	.	.	.
41	W25	1986	1TMA	.	.	.	1.6	.	.	.	.	0.0	.	.	.	.	.	.
42	W25	1989	W25-L2	.	2.6	.	0.1	.	17000.0	.	.	1.3	0.0	.	78000	.	0.5	.
43	W25	1996	W25L-022	0.1	0.0	0.1	0.1	22.0	19000.0	0.0	43.0	0.0	0.0	2.7	79800	0.0	0.6	27.9
44	W26	1989	W26-L2	.	2.6	.	0.1	.	51000.0	.	.	3.5	0.0	.	68000	.	8.2	.
45	W26	1994	W26-086	0.2	0.0	.	0.1	.	40900.0	.	.	145.0	0.0	.	79900	.	7.0	.
46	W26	1996	W26L-015	0.3	0.0	0.3	0.9	22.0	41400.0	0.0	51.0	243.0	0.0	1.9	80200	0.0	4.2	14.4
47	W27	1989	W27-L2	.	2.6	.	0.0	.	8500.0	.	.	1.3	0.0	.	90000	.	0.4	.
48	W27	1994	W27-087	0.7	0.0	.	0.6	.	11500.0	.	.	1090.0	0.3	.	95100	.	3.2	.
49	W27	1996	W27L-016	0.0	0.0	0.5	0.3	9.9	9970.0	0.0	34.0	0.3	0.0	1.0	91100	0.0	0.9	12.6
50	W28	1989	W28-L2	.	2.6	.	0.1	.	26000.0	.	.	1600.0	0.0	.	96000	.	1.4	.
51	W28	1994	W28-088	0.7	0.0	.	0.1	.	30100.0	.	.	1870.0	0.0	.	110000	.	2.8	.
52	W28	1996	W28L-009	0.6	0.2	0.5	0.2	7.4	32200.0	0.0	120.0	1760.0	0.0	0.8	117000	0.0	1.4	7.2
53	W29	1988	1	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.	.
54	W29	1988	2	.	.	.	0.6	.	11100.0	.	.	0.0	0.0	.	103000	.	.	.
55	W29	1988	3	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.	.
56	W29	1988	1	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.	.
57	W29	1988	2	.	.	.	0.6	.	9720.0	.	.	0.0	0.0	.	103000	.	.	.
58	W29	1988	2D	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.	.
59	W29	1988	3	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.	.
60	W29	1988	1	.	.	.	0.6	.	10500.0	.	.	0.0	0.0	.	104000	.	.	.

Table A.2 (continued)

Obs	Tank	Year	Sample ID	Sample													
				Cu	Fe	Ga	Hg	I	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P
61	W29	1988	2	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.
62	W29	1988	3	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.
63	W29	1989	W29-L1	.	2.6	.	0.1	.	10000.0	.	.	1.3	0.0	.	110000	.	0.4
64	W29	1989	W29-L2	.	2.6	.	0.1	.	10000.0	.	.	1.3	0.0	.	110000	.	0.4
65	W29	1989	W29-L4	.	2.6	.	0.1	.	10000.0	.	.	1.3	0.0	.	110000	.	0.4
66	W03	1989	L16	.	.	.	0.0	.	.	.	.	0.0	.	.	.	1.0	.
67	W03	1989	L17	.	.	.	0.0	.	.	.	.	0.0	.	.	.	1.0	.
68	W03	1989	L18	.	.	.	0.0	.	.	.	.	0.0	.	.	.	1.0	.
69	W03	1994	203	0.0	0.1	.	0.0	.	18.7	.	.	3.6	0.0	.	1050	.	0.1
70	W03	1994	204	0.0	0.3	.	0.0	.	20.8	.	.	0.8	0.0	.	2360	.	0.1
71	W30	1988	1	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.
72	W30	1988	2	.	.	.	0.6	.	7890.0	.	.	0.0	0.0	.	111000	.	.
73	W30	1988	2D	.	.	.	0.6	.	8440.0	.	.	0.0	0.0	.	104000	.	.
74	W30	1988	3	.	.	.	0.0	.	.	.	.	0.0	.	.	.	.	.
75	W30	1988	1	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.
76	W30	1988	2	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.
77	W30	1988	3	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.
78	W30	1988	1	.	.	.	0.6	.	8820.0	.	.	0.0	0.0	.	111000	.	.
79	W30	1988	2	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.
80	W30	1988	3	.	.	.	0.6	.	.	.	.	0.0	.	.	.	.	.
81	W30	1989	W30-L1	.	2.6	.	0.1	.	9200.0	.	.	1.3	0.0	.	100000	.	0.4
82	W30	1989	W30-L2	.	2.6	.	0.1	.	9300.0	.	.	1.3	0.0	.	100000	.	0.4
83	W30	1989	W30-L4	.	2.6	.	0.1	.	9400.0	.	.	1.3	0.0	.	110000	.	0.4
84	W31	1989	W31-L2	.	2.6	.	0.2	.	9500.0	.	.	1.3	0.0	.	94000	.	0.4
85	W31	1994	W31-089	0.2	0.1	.	0.7	.	16500.0	.	.	0.4	0.0	.	99200	.	0.9
86	W31	1996	W31L-028	0.3	0.0	0.1	2.3	17.0	16600.0	0.0	27.0	1.3	0.0	1.3	103000	0.0	0.5
87	W04	1989	L22	.	.	.	0.0	.	.	.	.	0.0	.	.	.	1.0	.
88	W04	1989	L119	.	.	.	0.0	.	.	.	.	0.0	.	.	.	1.0	.
89	W04	1989	L23	.	.	.	0.0	.	.	.	.	0.0	.	.	.	1.0	.
90	W04	1994	205	0.0	0.4	.	0.0	.	21.3	.	.	0.0	0.2	.	2200	.	0.2
91	W05	1989	L73	.	.	.	0.4	.	.	.	.	0.0	.	.	.	1.0	.
92	W05	1994	218	0.1	0.0	.	0.0	.	76.3	.	.	2.0	0.0	.	4250	.	0.1
93	W06	1989	L77	.	.	.	0.0	.	.	.	.	0.0	.	.	.	1.0	.
94	W06	1989	L78	.	.	.	0.0	.	.	.	.	0.0	.	.	.	1.0	.
95	W06	1989	L79	.	.	.	0.1	.	.	.	.	0.0	.	.	.	1.5	.
96	W06	1994	219	0.0	0.1	.	0.0	.	22.3	.	.	2.1	0.0	.	361	.	0.0
97	W06	1994	220	0.0	0.0	.	0.0	.	151.0	.	.	0.6	0.0	.	6440	.	0.2
98	W07	1989	L82	.	.	.	11.0	.	.	.	.	0.0	.	.	.	1.0	.
99	W08	1989	L86	.	.	.	0.1	.	.	.	.	0.0	.	.	.	1.0	.
100	W08	1989	L87	.	.	.	0.2	.	.	.	.	0.0	.	.	.	1.0	.
101	W08	1994	223	0.6	0.1	.	0.3	.	627.0	.	.	5.4	0.1	.	4370	.	0.3
102	W09	1989	L90	.	.	.	0.1	.	.	.	.	0.0	.	.	.	1.0	.
103	W09	1994	222	0.7	0.3	.	0.2	.	896.0	.	.	4.0	0.2	.	2640	.	0.3

Table A.2 (continued)

Obs	Tank	Year	Sample ID	Sample														
				Pb	Rb	Sb	Se	Si	Sn	Sr	Th	Ti	TL	U	V	W	Zn	Zr
1	T01	1989	L35	1.0	.	.	0.2	.	.	.	.	.	0.2	172.0	.	.	.	.
2	T01	1989	L36	1.0	.	.	0.2	.	.	.	.	.	0.2	175.0	.	.	.	.
3	T01	1996	0	0.0	.	0.4	0.0	103.0	.	0.2	0.2	.	0.0	281.0	0.0	.	0.1	.
4	T01	1997	T1L-081	.	0.1	0.3	.	20.1	0.1	0.2	0.1	0.4	.	246.0	0.0	0.0	2.0	.
5	T01	1997	T1L-080	.	0.2	0.3	.	22.0	0.1	0.2	0.1	0.7	.	254.0	0.0	0.0	0.1	.
6	T02	1989	L38	1.0	.	.	0.1	.	.	.	.	.	0.1	166.0	.	.	.	.
7	T02	1989	L112	1.0	.	.	0.1	.	.	.	.	.	0.1	161.0	.	.	.	.
8	T02	1989	L39	1.0	.	.	0.1	.	.	.	.	.	0.1	158.0	.	.	.	.
9	T02	1996	0	0.0	.	0.4	0.0	118.0	.	0.1	2.0	.	0.0	219.0	0.0	.	0.1	.
10	T02	1997	T2L-079	.	0.2	0.3	.	26.3	0.0	0.2	1.8	0.5	.	221.0	0.0	0.0	0.1	.
11	T02	1997	T2L-078	.	0.2	0.3	.	29.0	0.1	0.2	1.7	0.6	.	206.0	0.0	0.0	0.1	.
12	T03	1989	L42	0.5	.	.	0.5	.	.	.	.	.	0.5	0.2	.	.	.	.
13	T03	1996	0	0.0	.	0.4	0.0	317.0	.	0.0	0.1	.	0.0	0.4	0.4	.	0.1	.
14	T03	1996	T3L-117	.	0.8	0.3	.	329.0	0.0	0.1	0.1	1.0	.	7.7	0.3	0.1	0.1	.
15	T03	1996	T3L-116	.	0.8	0.3	.	268.0	0.0	0.1	0.2	0.6	.	7.7	0.3	0.1	0.1	.
16	T04	1989	L111	0.5	.	.	0.2	.	.	.	.	.	0.2	23.3	.	.	.	.
17	T04	1989	L44	1.0	.	.	0.1	.	.	.	.	.	0.1	25.7	.	.	.	.
18	T04	1989	L45	1.0	.	.	0.1	.	.	.	.	.	0.1	27.8	.	.	.	.
19	T04	1996	0	0.0	.	0.4	0.0	167.0	.	0.0	0.1	.	0.0	195.0	0.0	.	0.0	.
20	T04	1997	T4L-077	.	0.2	0.3	.	35.4	0.0	0.1	0.1	0.8	.	216.0	0.0	0.0	0.1	.
21	T04	1997	T4L-076	.	0.2	0.3	.	32.3	0.0	0.1	0.1	0.4	.	215.0	0.0	0.0	0.1	.
22	T09	1989	L47	1.0	.	.	0.1	.	.	.	.	.	0.1	852.0	.	.	.	.
23	T09	1996	0	0.0	.	0.4	0.0	46.8	.	1.0	0.2	.	0.0	303.0	0.0	.	0.0	.
24	T09	1996	T9L-119	.	0.2	0.3	.	25.6	0.0	0.9	0.1	0.9	.	269.0	0.0	0.0	0.1	.
25	T09	1996	T9L-118	.	0.2	0.3	.	101.0	0.0	0.9	0.1	1.0	.	275.0	0.0	5.7	0.1	.
26	W10	1989	L93	2.2	.	.	0.1	.	.	.	.	.	0.1	34.7	.	.	.	.
27	W10	1989	L94	2.0	.	.	0.1	.	.	.	.	.	0.1	64.5	.	.	.	.
28	W10	1989	L95	2.0	.	.	0.1	.	.	.	.	.	0.1	460.0	.	.	.	.
29	W10	1994	225	0.4	.	0.2	0.0	.	.	0.1	0.1	.	0.2	78.5	0.0	.	0.4	.
30	W21	1996	W21L-013	43.2	1.0	2.0	0.1	52.3	0.1	235.0	507.0	0.3	0.1	4030.0	0.5	0.2	168.0	0.1
31	W22	1994	W22-L1-1	0.4	.	0.2	0.0	6.0	.	.	0.1	.	0.2	0.1	0.0	.	0.0	.
32	W22	1996	W22L-014	0.1	0.1	2.0	0.1	4.4	0.0	0.2	0.6	0.1	0.1	67.0	0.1	0.1	1.3	0.0
33	W23	1990	W23-L1	2.7	.	.	2.3	1.0	.	0.4	15.8	.	0.9	17.0	.	.	.	.
34	W23	1996	W23L-167	11.4	4.6	12.3	0.1	25.1	0.7	1.0	0.5	0.9	0.1	148.0	0.1	2.1	78.7	0.0
35	W24	1989	W24-L2	6.7	.	.	4.7	.	.	0.7	2.2	.	1.4	9.4	.	.	.	.
36	W24	1994	W24-084	2.0	.	2.5	0.5	53.1	.	0.6	0.6	.	18.0	5.8	0.1	.	24.1	.
37	W24	1996	W24L-021	0.3	1.7	0.3	0.0	205.0	0.4	0.7	0.1	0.3	0.0	7.1	0.2	0.2	11.6	0.0
38	W25	1986	21T	5.5	.	.	0.0	0.0	.	.	.	.	.	.	.	.	.	.
39	W25	1986	11T	11.0	.	.	1.2	0.0	.	.	.	.	.	.	.	.	.	.
40	W25	1986	2TMA	8.0	.	.	0.0	.	.	.	.	.	.	.	.	.	.	.
41	W25	1986	1TMA	11.0	.	.	0.0	0.0	.	.	.	.	.	.	.	.	.	.
42	W25	1989	W25-L2	2.1	.	.	4.7	1.0	.	23.0	2.2	.	1.4	0.1	.	.	.	.
43	W25	1996	W25L-022	0.5	2.0	0.3	0.0	222.0	0.3	1.2	0.1	0.1	0.0	3.3	0.2	0.2	3.7	0.0
44	W26	1989	W26-L2	3.2	.	.	4.7	11.9	.	0.7	10.0	.	1.4	1130.0	.	.	.	.
45	W26	1994	W26-086	2.2	.	2.8	0.5	20.6	.	42.8	0.7	.	19.0	1.3	0.1	.	0.5	.
46	W26	1996	W26L-015	0.0	3.3	0.3	0.0	87.7	0.0	38.0	0.1	0.4	0.0	7.8	0.2	0.0	0.7	0.1
47	W27	1989	W27-L2	2.1	.	.	4.7	1.0	.	18.0	2.2	.	1.4	0.1	.	.	.	.
48	W27	1994	W27-087	2.2	.	2.8	0.5	24.5	.	69.1	11.9	.	19.0	503.0	0.1	.	1.9	.
49	W27	1996	W27L-016	0.1	1.4	0.3	0.0	41.0	2.2	38.1	0.1	0.4	0.0	0.7	0.2	0.0	0.2	0.0
50	W28	1989	W28-L2	2.1	.	.	4.7	1.0	.	65.0	2.2	.	1.4	0.1	.	.	.	.
51	W28	1994	W28-088	2.2	.	2.8	0.5	20.8	.	80.9	4.7	.	19.0	234.0	0.1	.	1.0	.
52	W28	1996	W28L-009	0.0	3.1	0.3	0.0	108.0	0.0	81.3	0.1	0.5	0.0	145.0	0.2	0.0	0.4	0.1
53	W29	1988	1	.	.	.	.	12.0	.	.	.	.	.	.	.	.	.	.
54	W29	1988	2	.	.	.	.	.	.	1.1	1.4	.	.	10.2	.	.	65.6	.
55	W29	1988	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
56	W29	1988	1	.	.	.	.	13.0	.	.	.	.	.	.	.	.	.	.
57	W29	1988	2	.	.	.	.	.	.	1.1	1.4	.	.	10.2	.	.	68.5	.
58	W29	1988	2D	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
59	W29	1988	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
60	W29	1988	1	.	.	.	.	12.0	.	1.0	1.4	.	.	10.2	.	.	67.4	.

Table A.2 (continued)

Obs	Tank	Year	ID	Sample														
				Pb	Rb	Sb	Se	Si	Sn	Sr	Th	Ti	Tl	U	V	W	Zn	Zr
61	W29	1988	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
62	W29	1988	3	.	.	.	.	4.7	1.0	.	1.9	1.0	.	1.4	4.5	.	.	.
63	W29	1989	W29-L1	2.1	.	.	.	4.7	1.0	.	2.1	1.0	.	1.4	4.3	.	.	.
64	W29	1989	W29-L2	2.1	.	.	.	4.7	1.0	.	1.9	1.0	.	1.4	4.3	.	.	.
65	W29	1989	W29-L4	2.3	.	.	.	4.7	1.0	.	3.3	.	0.3	127.0	0.0	.	0.0	.
66	W03	1989	L16	2.0	.	.	0.1	.	.	.	.	.	0.1	88.0	.	.	.	.
67	W03	1989	L17	2.0	.	.	0.1	.	.	.	.	.	0.1	163.0	.	.	.	.
68	W03	1989	L18	2.0	.	.	0.1	.	.	.	.	.	0.1	285.0	.	.	.	.
69	W03	1994	203	0.0	.	0.2	0.0	4.9	.	0.0	3.3	.	0.3	127.0	0.0	.	0.0	.
70	W03	1994	204	0.0	.	0.2	0.0	5.3	.	0.0	7.3	.	0.3	284.0	0.0	.	0.0	.
71	W30	1988	1	.	.	.	.	31.0	.	.	.	.	.	.	.	.	.	.
72	W30	1988	2	.	.	.	.	.	.	1.0	1.4	.	.	10.2	.	.	42.8	.
73	W30	1988	2D	.	.	.	.	.	.	0.9	1.4	.	.	10.2	.	.	41.8	.
74	W30	1988	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
75	W30	1988	1	.	.	.	.	31.0	.	.	.	.	.	.	.	.	.	.
76	W30	1988	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
77	W30	1988	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
78	W30	1988	1	.	.	.	.	34.0	.	0.8	1.4	.	.	10.2	.	.	41.7	.
79	W30	1988	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
80	W30	1988	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
81	W30	1989	W30-L1	3.0	.	.	4.7	1.0	.	1.7	1.0	.	1.4	5.5	.	.	.	.
82	W30	1989	W30-L2	2.9	.	.	4.7	1.0	.	1.8	1.0	.	1.4	5.8	.	.	.	.
83	W30	1989	W30-L4	2.3	.	.	4.7	1.0	.	1.9	1.0	.	1.4	5.9	.	.	.	.
84	W31	1989	W31-L2	2.1	.	.	4.7	8.6	.	12.0	2.2	.	1.4	0.3	.	.	.	.
85	W31	1994	W31-089	2.2	.	2.8	0.5	40.8	.	1.4	0.7	.	19.0	2.3	0.1	.	1.0	.
86	W31	1996	W31L-028	0.2	2.2	0.3	0.0	248.0	3.1	1.4	0.2	0.1	0.0	60.8	0.2	0.1	0.5	0.0
87	W04	1989	L22	2.0	.	0.1	.	.	.	.	.	.	0.1	910.0	.	.	.	.
88	W04	1989	L119	2.0	.	0.1	.	.	.	.	.	.	0.1	1780.0	.	.	.	.
89	W04	1989	L23	2.0	.	0.1	.	.	.	.	.	.	0.1	3680.0	.	.	.	.
90	W04	1994	205	0.1	.	0.2	0.0	2.4	.	0.3	39.6	.	0.3	1540.0	0.0	.	0.0	.
91	W05	1989	L73	2.0	.	0.1	.	.	.	.	.	.	0.1	296.0	.	.	.	.
92	W05	1994	218	0.4	.	0.2	0.0	.	.	0.0	0.1	.	0.2	81.9	0.0	.	0.1	.
93	W06	1989	L77	2.0	.	0.1	.	.	.	.	.	.	0.1	16.2	.	.	.	.
94	W06	1989	L78	2.0	.	0.1	.	.	.	.	.	.	0.1	52.3	.	.	.	.
95	W06	1989	L79	2.0	.	0.1	.	.	.	.	.	.	0.1	69.8	.	.	.	.
96	W06	1994	219	0.4	.	0.2	0.0	.	.	0.1	0.1	.	0.2	2.1	0.0	.	0.0	.
97	W06	1994	220	0.4	.	0.2	0.0	.	.	0.0	0.9	.	0.6	37.3	0.0	.	0.0	.
98	W07	1989	L82	2.0	.	2.0	.	.	.	.	.	.	2.0	8530.0	.	.	.	.
99	W08	1989	L86	2.0	.	0.1	.	.	.	.	.	.	0.1	817.0	.	.	.	.
100	W08	1989	L87	2.0	.	0.1	.	.	.	.	.	.	0.1	1760.0	.	.	.	.
101	W08	1994	223	0.5	.	0.2	0.0	.	.	0.1	0.8	.	1.0	746.0	0.0	.	0.0	.
102	W09	1989	L90	2.0	.	0.1	.	.	.	.	.	.	0.1	2390.0	.	.	.	.
103	W09	1994	222	1.0	.	0.2	0.0	.	.	0.1	1.6	.	2.1	1520.0	0.0	.	0.1	.

Table A.2 (continued)

Obs	Tank	Year	Sample ID	Bicar- bonate	Brom- ide	Carbo- nate	Chlo- ride	Chro- mate	Fluo- ride	Hydro- xide	Nitr- ate	Nitr- ite	Phos - phate	Sul- fate	HCN
1	T01	1989	L35	.	.	.	.	.	.	.	.	.	.	.	.
2	T01	1989	L36	.	.	5.0	.	464	.	38	.	141	948	20	557
3	T01	1996	0	.	5.0	.	464	.	38	.	141	948	20	557	.
4	T01	1997	T1L-081	.	3.0	.	382	5	37	.	109	1450	5	473	.
5	T01	1997	T1L-080	.	3.0	.	378	5	37	.	107	1150	5	473	.
6	T02	1989	L38	.	.	.	.	.	.	.	.	.	.	.	.
7	T02	1989	L112	.	.	.	.	.	.	.	.	.	.	.	.
8	T02	1989	L39	.	.	.	.	.	.	.	.	.	.	.	.
9	T02	1996	0	.	10.4	.	737	.	53	.	95	975	20	1380	.
10	T02	1997	T2L-079	.	7.6	.	631	5	51	.	5	1260	5	1130	.
11	T02	1997	T2L-078	.	8.6	.	635	5	51	.	5	1272	5	1150	.
12	T03	1989	L42	.	.	.	.	.	.	.	.	.	.	.	.
13	T03	1996	0	.	25.5	.	1630	.	283	.	7140	6300	20	4890	.
14	T03	1996	T3L-117	.	18.0	.	1360	35	188	.	5900	10100	10	3820	.
15	T03	1996	T3L-116	.	25.9	.	1400	38	196	.	6080	10200	10	3900	.
16	T04	1989	L111	.	.	.	.	.	.	.	.	.	.	.	.
17	T04	1989	L44	.	.	.	.	.	.	.	.	.	.	.	.
18	T04	1989	L45	.	.	.	.	.	.	.	.	.	.	.	.
19	T04	1996	0	.	11.8	.	650	.	59	.	3010	1680	20	1580	.
20	T04	1997	T4L-077	.	5.0	.	493	10	56	.	2840	2970	10	1470	.
21	T04	1997	T4L-076	.	5.0	.	584	14	66	.	2850	2970	10	1490	.
22	T09	1989	L47	.	.	.	.	.	.	.	.	.	.	.	.
23	T09	1996	0	.	50.9	.	5490	.	20	.	2100	8	20	821	.
24	T09	1996	T9L-119	.	45.3	.	4820	5	14	.	1720	163	5	666	.
25	T09	1996	T9L-118	.	44.6	.	4810	5	13	.	1640	152	5	754	.
26	W10	1989	L93	.	.	.	.	.	.	.	.	.	.	.	.
27	W10	1989	L94	.	.	.	.	.	.	.	.	.	.	.	.
28	W10	1989	L95	.	.	.	.	.	.	.	.	.	.	.	.
29	W10	1994	225	6100	10.0	6000	306	.	140	1700	4140	.	40	408	.
30	W21	1996	W21L-013	.	109.0	.	1170	50	236	.	204000	31	50	1400	.
31	W22	1994	W22-L1-1	6100	195.0	6000	355	.	86	500	12700	.	10	119	.01
32	W22	1996	W22L-014	.	12.0	414	168	25	58	.	25	12	169	153	.
33	W23	1990	W23-L1	.	.	40000	3600	.	1000	2600	200000	.	5000	7800	.
34	W23	1996	W23L-167	.	1390.0	9420	8830	50	1210	852	225000	17300	675	10600	.
35	W24	1989	W24-L2	600	.	9000	2600	.	500	4900	260000	.	5000	5000	.
36	W24	1994	W24-084	6100	11.0	6000	4380	.	1080	1700	197000	.	11	1720	.10
37	W24	1996	W24L-021	0	.	3300	4490	20	74	340	254000	1790	11	2060	.
38	W25	1986	21T	.	.	.	.	.	.	.	.	.	.	.	.
39	W25	1986	11T	.	.	.	.	.	.	.	.	.	.	.	.
40	W25	1986	2TMA	.	.	.	.	.	.	.	.	.	.	.	.
41	W25	1986	1TMA	.	.	.	.	.	.	.	.	.	.	.	.
42	W25	1989	W25-L2	600	.	600	2500	.	500	1000	260000	.	5000	5000	.
43	W25	1996	W25L-022	0	.	1740	4590	20	65	680	297000	2000	10	2130	.
44	W26	1989	W26-L2	1000	.	12000	3500	.	500	200	204000	.	5000	5000	.
45	W26	1994	W26-086	6100	690.0	6000	4800	.	1040	1700	299000	.	10	2940	.03
46	W26	1996	W26L-015	6	.	6	4540	20	5	0	361000	2260	10	3170	.
47	W27	1989	W27-L2	600	.	600	2500	.	500	200	280000	.	5000	5000	.
48	W27	1994	W27-087	6100	343.0	6000	3800	.	975	1700	342000	.	10	1570	.03
49	W27	1996	W27L-016	0	.	162	3160	20	5	1070	340000	2070	10	1510	.
50	W28	1989	W28-L2	600	.	600	4800	.	500	200	370000	.	5000	5000	.
51	W28	1994	W28-088	6100	395.0	6000	5950	.	1070	1700	425000	.	10	1750	.01
52	W28	1996	W28L-009	37	.	36	5820	20	5	0	506000	1430	10	2070	.
53	W29	1988	1	.	8400	.	.	.	4250	290000	.	.	.	.	.
54	W29	1988	2	.	8400	.	.	.	4080	280000	.	.	.	.	.
55	W29	1988	3	.	8400	.	.	.	4080	290000	.	.	.	.	.
56	W29	1988	1	.	9000	.	.	.	4080	280000	.	.	.	.	.
57	W29	1988	2	.	8400	.	.	.	4250	290000	.	.	.	.	.
58	W29	1988	2D	.	8400	.	.	.	4250	290000	.	.	.	.	.
59	W29	1988	3	.	9000	.	.	.	3910	290000	.	.	.	.	.
60	W29	1988	1	.	9000	.	.	.	4080	290000	.	.	.	.	.

Table A.2 (continued)

Obs	Tank	Year	Sample ID	Bicar- bonate	Brom- ide	Carbo- nate	Chlo- ride	Chro- mate	Fluo- ride	Hydro- xide	Nitr- ate	Nitr- ite	Phos- phate	Sul- fate	HCN
61	W29	1988	2	.	.	8400	.	.	.	4080	290000	.	.	.	.
62	W29	1988	3	.	.	8400	.	.	.	4080	290000	.	.	.	.
63	W29	1989	W29-L1	600	.	2600	2900	.	500	1100	280000	.	5000	5000	.
64	W29	1989	W29-L2	600	.	2400	2800	.	500	1200	280000	.	5000	5000	.
65	W29	1989	W29-L4	600	.	3200	2900	.	500	1300	280000	.	5000	5000	.
66	W03	1989	L16	.	.	.	.	.	.	.	.	.	.	.	.
67	W03	1989	L17	.	.	.	.	.	.	.	.	.	.	.	.
68	W03	1989	L18	.	.	.	.	.	.	.	.	.	.	.	.
69	W03	1994	203	6100	0.5	6000	7	.	1	1700	1	.	458	335	.
70	W03	1994	204	6100	0.5	6000	10	.	1	1700	2	.	674	529	.
71	W30	1988	1	.	.	8400	.	.	7990	290000	.	.	.	.	.
72	W30	1988	2	.	.	7800	.	.	8160	290000	.	.	.	.	.
73	W30	1988	2D	.	.	8400	.	.	8160	290000	.	.	.	.	.
74	W30	1988	3	.	.	7200	.	.	8500	270000	.	.	.	.	.
75	W30	1988	1	.	.	8400	.	.	8330	280000	.	.	.	.	.
76	W30	1988	2	.	.	7800	.	.	8330	290000	.	.	.	.	.
77	W30	1988	3	.	.	7800	.	.	8500	280000	.	.	.	.	.
78	W30	1988	1	.	.	8400	.	.	8160	280000	.	.	.	.	.
79	W30	1988	2	.	.	7800	.	.	8330	280000	.	.	.	.	.
80	W30	1988	3	.	.	7800	.	.	8330	280000	.	.	.	.	.
81	W30	1989	W30-L1	600	.	3200	2800	.	500	2200	270000	.	5000	5000	.
82	W30	1989	W30-L2	600	.	3100	2900	.	500	2200	270000	.	5000	5000	.
83	W30	1989	W30-L4	600	.	3100	2800	.	500	2200	270000	.	5000	5000	.
84	W31	1989	W31-L2	600	.	600	2600	.	500	200	280000	.	5000	5000	.
85	W31	1994	W31-089	6100	425.0	6000	4370	.	1050	1700	311000	.	10	1670	.22
86	W31	1996	W31L-028	0	.	408	4200	56	18	2	391000	4430	10	1850	.
87	W04	1989	L22	.	.	.	.	.	.	.	.	.	.	.	.
88	W04	1989	L119	.	.	.	.	.	.	.	.	.	.	.	.
89	W04	1989	L23	.	.	.	.	.	.	.	.	.	.	.	.
90	W04	1994	205	6100	0.5	6000	28	.	13	1700	1580	.	38	823	.
91	W05	1989	L73	.	.	.	.	.	.	.	.	.	.	.	.
92	W05	1994	218	6100	10.0	6000	83	.	458	1700	916	.	2270	252	.
93	W06	1989	L77	.	.	.	.	.	.	.	.	.	.	.	.
94	W06	1989	L78	.	.	.	.	.	.	.	.	.	.	.	.
95	W06	1989	L79	.	.	.	.	.	.	.	.	.	.	.	.
96	W06	1994	219	6100	2.5	6000	20	.	49	1700	703	.	15	51	.
97	W06	1994	220	6100	5.0	6000	151	.	808	1700	6260	.	963	1610	.
98	W07	1989	L82	.	.	.	.	.	.	.	.	.	.	.	.
99	W08	1989	L86	.	.	.	.	.	.	.	.	.	.	.	.
100	W08	1989	L87	.	.	.	.	.	.	.	.	.	.	.	.
101	W08	1994	223	6100	10.0	6000	322	.	61	1700	2497	.	82	1770	.
102	W09	1989	L90	.	.	.	.	.	.	.	.	.	.	.	.
103	W09	1994	222	6100	5.0	6000	133	.	55	1700	868	.	1310	401	.

Table A.2 (continued)

Obs	Tank	Year	Sample ID	Acetate	Citrate	Formate	Oxalate	Phthalate
1	T01	1989	L35	.	.	.	.	.
2	T01	1989	L36	.	.	.	.	.
3	T01	1996	0	.	.	.	.	.
4	T01	1997	T1L-081	3	5	3	3	5
5	T01	1997	T1L-080	3	5	3	3	5
6	T02	1989	L38	.	.	.	.	.
7	T02	1989	L112	.	.	.	.	.
8	T02	1989	L39	.	.	.	.	.
9	T02	1996	0	.	.	.	.	.
10	T02	1997	T2L-079	3	5	3	3	16
11	T02	1997	T2L-078	3	5	3	3	17
12	T03	1989	L42	.	.	.	.	.
13	T03	1996	0	.	.	.	.	.
14	T03	1996	T3L-117	737	10	619	860	10
15	T03	1996	T3L-116	748	10	630	880	10
16	T04	1989	L111	.	.	.	.	.
17	T04	1989	L44	.	.	.	.	.
18	T04	1989	L45	.	.	.	.	.
19	T04	1996	0	.	.	.	.	.
20	T04	1997	T4L-077	285	10	249	453	10
21	T04	1997	T4L-076	295	10	244	448	10
22	T09	1989	L47	.	.	.	.	.
23	T09	1996	0	.	.	.	.	.
24	T09	1996	T9L-119	3	5	3	3	5
25	T09	1996	T9L-118	3	5	3	3	5
26	W10	1989	L93	.	.	.	.	.
27	W10	1989	L94	.	.	.	.	.
28	W10	1989	L95	.	.	.	.	.
29	W10	1994	225	.	.	.	.	.
30	W21	1996	W21L-013	127	50	25	34	50
31	W22	1994	W22-L1-1	.	.	.	.	.
32	W22	1996	W22L-014	12	25	12	12	25
33	W23	1990	W23-L1	.	.	.	.	.
34	W23	1996	W23L-167	303	1480	643	1120	50
35	W24	1989	W24-L2	.	.	.	.	.
36	W24	1994	W24-084	.	.	.	.	.
37	W24	1996	W24L-021	332	10	169	303	10
38	W25	1986	21T	.	.	.	.	.
39	W25	1986	11T	.	.	.	.	.
40	W25	1986	2TMA	.	.	.	.	.
41	W25	1986	1TMA	.	.	.	.	.
42	W25	1989	W25-L2	.	.	.	.	.
43	W25	1996	W25L-022	297	10	167	307	10
44	W26	1989	W26-L2	.	.	.	.	.
45	W26	1994	W26-086	.	.	.	.	.
46	W26	1996	W26L-015	465	10	224	10	10
47	W27	1989	W27-L2	.	.	.	.	.
48	W27	1994	W27-087	.	.	.	.	.
49	W27	1996	W27L-016	145	10	119	10	10
50	W28	1989	W28-L2	.	.	.	.	.
51	W28	1994	W28-088	.	.	.	.	.
52	W28	1996	W28L-009	596	10	208	10	10
53	W29	1988	1	.	.	.	.	.
54	W29	1988	2	.	.	.	.	.
55	W29	1988	3	.	.	.	.	.
56	W29	1988	1	.	.	.	.	.
57	W29	1988	2	.	.	.	.	.
58	W29	1988	2D	.	.	.	.	.
59	W29	1988	3	.	.	.	.	.
60	W29	1988	1	.	.	.	.	.

Table A.2 (continued)

Obs	Tank	Year	Sample ID	Acetate	Citrate	Formate	Oxalate	Phthalate
61	W29	1988	2	.	.	.	.	.
62	W29	1988	3	.	.	.	.	.
63	W29	1989	W29-L1	.	.	.	.	.
64	W29	1989	W29-L2	.	.	.	.	.
65	W29	1989	W29-L4	.	.	.	.	.
66	W03	1989	L16	.	.	.	.	.
67	W03	1989	L17	.	.	.	.	.
68	W03	1989	L18	.	.	.	.	.
69	W03	1994	203	.	.	.	.	.
70	W03	1994	204	.	.	.	.	.
71	W30	1988	1	.	.	.	.	.
72	W30	1988	2	.	.	.	.	.
73	W30	1988	2D	.	.	.	.	.
74	W30	1988	3	.	.	.	.	.
75	W30	1988	1	.	.	.	.	.
76	W30	1988	2	.	.	.	.	.
77	W30	1988	3	.	.	.	.	.
78	W30	1988	1	.	.	.	.	.
79	W30	1988	2	.	.	.	.	.
80	W30	1988	3	.	.	.	.	.
81	W30	1989	W30-L1	.	.	.	.	.
82	W30	1989	W30-L2	.	.	.	.	.
83	W30	1989	W30-L4	.	.	.	.	.
84	W31	1989	W31-L2	.	.	.	.	.
85	W31	1994	W31-089	.	.	.	.	.
86	W31	1996	W31L-028	350	10	249	165	10
87	W04	1989	L22	.	.	.	.	.
88	W04	1989	L119	.	.	.	.	.
89	W04	1989	L23	.	.	.	.	.
90	W04	1994	205	.	.	.	.	.
91	W05	1989	L73	.	.	.	.	.
92	W05	1994	218	.	.	.	.	.
93	W06	1989	L77	.	.	.	.	.
94	W06	1989	L78	.	.	.	.	.
95	W06	1989	L79	.	.	.	.	.
96	W06	1994	219	.	.	.	.	.
97	W06	1994	220	.	.	.	.	.
98	W07	1989	L82	.	.	.	.	.
99	W08	1989	L86	.	.	.	.	.
100	W08	1989	L87	.	.	.	.	.
101	W08	1994	223	.	.	.	.	.
102	W09	1989	L90	.	.	.	.	.
103	W09	1994	222	.	.	.	.	.

Table A.3. Radiological variable measurements (bq/ml) on liquid samples from 1985 to 1997.

Obs	Tank	Year	Sample ID	Gross Alpha	Gross Beta	241Am	14C	144Ce	252Cf	244Cm	60Co	134Cs	137Cs	
1	T01	1989	L35	190	81000	.	.	.	.	.	50	.	74000
2	T01	1989	L36	210	78000	.	.	.	.	.	50	.	75000
3	T01	1996	0	340	86000	.	.	.	.	.	21	49	64000
4	T01	1997	T1L-081	210	78000	.	.	.	.	.	75	170	60000
5	T01	1997	T1L-080	310	79000	.	.	.	.	.	70	170	61000
6	T02	1989	L38	200	140000	.	480	.	.	.	75	.	140000	
7	T02	1989	L112	210	140000	.	360	.	.	.	75	.	140000	
8	T02	1989	L39	200	140000	.	230	.	.	.	75	.	140000	
9	T02	1996	0	300	150000	.	.	.	.	.	67	67	120000
10	T02	1997	T2L-079	230	130000	.	.	.	.	.	120	220	110000
11	T02	1997	T2L-078	220	140000	.	.	.	.	.	110	200	110000
12	T03	1989	L42	2	280000	.	.	.	.	.	360	.	270000
13	T03	1996	0	3	230000	.	.	.	.	.	120	82	190000
14	T03	1996	T3L-117	6	200000	.	.	.	.	.	87	260	170000
15	T03	1996	T3L-116	3	200000	.	.	.	.	.	140	270	170000
16	T04	1989	L111	38	310000	.	.	.	.	.	52	.	300000
17	T04	1989	L44	36	280000	.	.	.	.	.	64	.	300000
18	T04	1989	L45	49	310000	.	.	.	.	.	52	.	300000
19	T04	1996	0	270	220000	.	.	.	.	.	17	81	180000
20	T04	1997	T4L-077	230	210000	.	.	.	.	.	130	260	180000
21	T04	1997	T4L-076	240	210000	.	.	.	.	.	80	260	180000
22	T09	1989	L47	700	340000	.	.	.	.	.	0	.	290000
23	T09	1996	0	500	120000	.	.	.	.	.	28	59	92000
24	T09	1996	T9L-119	190	120000	.	.	.	.	.	120	190	84000
25	T09	1996	T9L-118	300	120000	.	.	.	.	.	21	190	84000
26	W10	1989	L93	5	31000	.	.	.	2	3	28	.	31000	
27	W10	1989	L94	10	78000	.	.	.	2	3	34	.	83000	
28	W10	1989	L95	28	190000	.	.	.	2	3	140	.	240000	
29	W10	1994	L225	77	89000	.	.	.	.	.	12	.	74000
30	W21	1990	0	207	226000	.	.	.	.	.	4270	3690	228000
31	W21	1996	W21L-013	21000	610000	1500	.	.	.	2E4	7900	3200	95000	
32	W22	1994	W22-L1-1	0	150000	.	.	.	.	.	13	9700	100000
33	W22	1996	W22L-014	52	19000	41	320	2300	3600
34	W23	1990	W23-L1	82	462000	.	64	1600	.	.	4	621	4630	436000
35	W23	1995	W23-115	330	2000000	9	67	1800	52000	1500000
36	W23	1996	W23L-167	430	1400000	.	.	.	.	360	2200	31000	1100000
37	W24	1989	W24-L2	5	230000	.	787	740	.	.	329	1340	221000	
38	W24	1994	W24-084	45	1300000	2800	.	.	.	.	320	71000	1100000
39	W24	1996	W24L-021	36	1200000	.	.	.	.	.	200	40000	1100000
40	W25	1989	W25-L2	2	392000	.	329	1300	.	.	1880	3770	327000	
41	W25	1993	W25-019	.	.	.	.	.	.	.	.	.	.
42	W25	1994	W25-085	20	1400000	3000	.	.	.	.	310	82000	1200000
43	W25	1996	W25L-022	1	1300000	.	.	.	.	.	180	45000	1100000
44	W26	1989	W26-L2	1030	2200000	.	123	2300	.	.	12200	13100	2070000	
45	W26	1994	W26-086	82	1700000	3100	.	.	.	.	2700	36000	1400000
46	W26	1996	W26L-015	77	1700000	.	.	.	.	.	2200	20000	1400000
47	W27	1989	W27-L2	1	330000	.	181	750	.	.	309	1610	216000	
48	W27	1994	W27-087	300	530000	1500	.	.	.	.	2000	1400	330000
49	W27	1996	W27L-016	4	440000	.	.	.	.	.	320	630	280000
50	W28	1989	W28-L2	44	980000	.	167	1800	.	.	8720	10600	566000	
51	W28	1994	W28-088	180	1000000	2100	.	.	.	.	4900	4200	620000
52	W28	1996	W28L-009	140	980000	.	.	.	.	.	3700	2400	570000
53	W29	1988	1	2	.	.	1	.	.	.	1258	8066	240870	
54	W29	1988	2	2	.	.	2	.	.	.	1110	7141	240130	
55	W29	1988	3	2	.	.	1	.	.	.	1036	7067	230140	
56	W29	1988	1	2	.	.	2	.	.	.	925	7067	234025	
57	W29	1988	2	3	.	.	2	.	.	.	1184	6697	226070	
58	W29	1988	2D	3	.	.	2	.	.	.	777	6734	219040	
59	W29	1988	3	3	.	.	2	.	.	.	1221	7252	238095	
60	W29	1988	1	3	.	.	2	.	.	.	1184	6993	234950	

Table A.3 (continued)

Obs	Tank	Year	Sample ID	Gross Alpha	Gross Beta	^{241}Am	^{14}C	^{144}Ce	^{252}Cf	^{244}Cm	^{60}Co	^{134}Cs	^{137}Cs
61	W29	1988	2	3	.	.	2	.	.	.	1258	6845	237910
62	W29	1988	3	3	.	.	1	.	.	.	925	7474	239020
63	W29	1989	W29-L1	10	211000	.	143	1400	.	.	644	2510	221000
64	W29	1989	W29-L2	10	198000	.	73	1300	.	.	599	2570	222000
65	W29	1989	W29-L4	10	209000	.	56	1300	.	.	626	2530	216000
66	W03	1989	L16	6	490	.	.	.	5	5	10	.	580
67	W03	1989	L17	12	670	.	.	.	5	5	0	.	840
68	W03	1989	L18	17	1200	.	.	.	5	5	0	.	1300
69	W03	1994	L203	7	560	.	.	.	.	.	0	.	470
70	W03	1994	L204	15	960	.	.	.	.	.	0	.	820
71	W30	1988	1	2	.	.	5	.	.	.	925	3885	130055
72	W30	1988	2	2	.	.	5	.	.	.	814	4107	132090
73	W30	1988	2D	2	.	.	6	.	.	.	666	4144	130980
74	W30	1988	3	2	.	.	5	.	.	.	777	4107	126910
75	W30	1988	1	2	.	.	4	.	.	.	851	4107	130980
76	W30	1988	2	2	.	.	6	.	.	.	851	3922	130055
77	W30	1988	3	0	.	.	5	.	.	.	629	4033	123025
78	W30	1988	1	2	.	.	6	.	.	.	962	4255	132090
79	W30	1988	2	2	.	.	5	.	.	.	814	4107	128020
80	W30	1988	3	1	.	.	6	.	.	.	888	3663	123025
81	W30	1989	W30-L1	10	197000	.	68	1200	.	.	493	2050	186000
82	W30	1989	W30-L2	10	193000	.	86	1200	.	.	483	2030	187000
83	W30	1989	W30-L4	10	192000	.	110	1300	.	.	491	1960	190000
84	W31	1989	W31-L2	1	358000	.	112	780	.	.	323	5010	229000
85	W31	1994	W31-089	29	600000	1900	.	.	.	.	350	16000	480000
86	W31	1996	W31L-028	32	540000	.	.	.	.	.	270	8000	430000
87	W04	1989	L22	3	1600	.	.	.	.	.	10	.	890
88	W04	1989	L119	3	2600	.	.	.	.	.	10	.	1400
89	W04	1989	L23	3	2200	.	.	.	.	.	13	.	2100
90	W04	1994	L205	37	1700	.	.	.	.	.	0	.	1100
91	W05	1989	L73	6	4200	.	.	.	0	0	160	.	5500
92	W05	1994	L218	3	1400	.	.	.	.	.	9	.	1100
93	W06	1989	L77	1	2800	.	.	.	0	0	13	.	1600
94	W06	1989	L78	3	6000	.	.	.	0	0	28	.	5600
95	W06	1989	L79	3	19000	.	.	.	0	0	90	.	20000
96	W06	1994	L219	1	8900	.	.	.	.	.	6	.	1000
97	W06	1994	L220	1	7630	.	.	.	.	.	8	.	6200
98	W07	1989	L82	200	560000	.	.	.	0	0	290	.	640000
99	W08	1989	L86	150	240000	.	.	.	2	2	300	.	340000
100	W08	1989	L87	200	280000	.	.	.	2	2	590	.	400000
101	W08	1994	L223	260	190000	0	.	.	.	39	910	.	160000
102	W09	1989	L90	60	71000	.	.	.	3	3	110	85	63000
103	W09	1994	L222	56	31000	0	.	.	.	9	17	.	26000

Table A.3 (continued)

Obs	Tank	Year	Sample ID	152 _{Eu}	154 _{Eu}	155 _{Eu}	3 _H	129 _I	95 _{Nb}	238 _{Pu*}		239 _{Pu*}		241 _{Am}	240 _{Pu}	238 _{Pu}	239 _{Pu}	240 _{Pu}	241 _{Pu}	242 _{Pu}	244 _{Pu}	106 _{Ru}	
										238 _{Pu*}	239 _{Pu*}	241 _{Am}	240 _{Pu}										
1	T01	1989	L35	.	.	.	.	71	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2	T01	1989	L36	.	.	.	.	71	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3	T01	1996	0	35	31	140	.	.	.	.	.	0	1.9	.	.	.	.	.	.	.	.	.	.
4	T01	1997	T1L-081	370	220	440	.	.	.	.	.	0	0.7	.	.	.	.	.	.	.	.	.	.
5	T01	1997	T1L-080	400	230	450	.	.	.	.	.	0	0.4	.	.	.	.	.	.	.	.	.	.
6	T02	1989	L38	.	.	.	210	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
7	T02	1989	L112	.	.	.	210	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
8	T02	1989	L39	.	.	.	210	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
9	T02	1996	0	39	31	190	.	.	.	.	2	3.3	.	.	.	.	.	.	.	.	.	.	.
10	T02	1997	T2L-079	110	250	560	.	.	.	.	2	3.5	.	.	.	.	.	.	.	.	.	.	.
11	T02	1997	T2L-078	320	230	590	.	.	.	.	2	4.3	.	.	.	.	.	.	.	.	.	.	.
12	T03	1989	L42	.	.	.	170	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
13	T03	1996	0	35	50	240	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
14	T03	1996	T3L-117	380	150	730	.	.	.	.	0	0.0	.	.	.	.	.	.	.	.	.	.	.
15	T03	1996	T3L-116	350	220	710	.	.	.	.	0	0.1	.	.	.	.	.	.	.	.	.	.	.
16	T04	1989	L111	.	.	.	110	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
17	T04	1989	L44	.	.	.	110	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
18	T04	1989	L45	.	.	.	110	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
19	T04	1996	0	35	44	240	.	.	.	.	2	3.7	.	.	.	.	.	.	.	.	.	.	.
20	T04	1997	T4L-077	380	220	700	.	.	.	.	3	4.0	.	.	.	.	.	.	.	.	.	.	.
21	T04	1997	T4L-076	230	200	720	.	.	.	.	3	5.0	.	.	.	.	.	.	.	.	.	.	.
22	T09	1989	L47	.	.	.	160	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
23	T09	1996	0	11	35	170	.	.	.	.	0	0.9	.	.	.	.	.	.	.	.	.	.	.
24	T09	1996	T9L-119	110	190	520	.	.	.	.	0	0.4	.	.	.	.	.	.	.	.	.	.	.
25	T09	1996	T9L-118	410	200	520	.	.	.	.	0	0.5	.	.	.	.	.	.	.	.	.	.	.
26	W10	1989	L93	.	.	.	32	.	.	.	2.0	2.0	.	.	.	.	.	.	.	.	.	.	.
27	W10	1989	L94	.	.	.	68	.	.	.	2.0	2.0	.	.	.	.	.	.	.	.	.	.	.
28	W10	1989	L95	.	.	.	140	.	.	.	2.0	2.0	.	.	.	.	.	.	.	.	.	.	.
29	W10	1994	L225	22	18	120	.	.	.	.	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
30	W21	1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
31	W21	1996	W21L-013190000	77000	21000	.	.	.	.	69	100	39.0	40.0	590	0.1	0.1	.	.	.	.	.	.	.
32	W22	1994	W22-L1-1	110	49	180	.	.	.	.	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
33	W22	1996	W22L-014	57	18	64	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5800	.	.
34	W23	1990	W23-L1	210	160	850	119	.	100	39	6	.	.	.	.	.	.	.	.	.	.	3780	.
35	W23	1995	W23-115	1100	620	2300	360	0.3	.	.	7.5	1.8	1.6	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
36	W23	1996	W23L-167	890	530	1900	.	.	.	.	6	20.0	2.7	2.5	48.0	0.1	0.1	.	.	.	.	.	.
37	W24	1989	W24-L2	320	60	400	308	.	280	.	.	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
38	W24	1994	W24-084	2300	890	1400	190	.	.	.	1	1.1	.	.	.	.	.	.	.	.	.	.
39	W24	1996	W24L-021	600	400	2000	0.3	.	.	.	1	1.0	.	.	.	.	.	.	.	.	.	.
40	W25	1989	W25-L2	160	120	690	345	.	63	.	.	.	.	.	.	.	.	.	.	1900	.	.	
41	W25	1993	W25-019	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
42	W25	1994	W25-085	2400	950	1500	190	.	.	.	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
43	W25	1996	W25L-022	500	400	2000	0.3	.	.	.	0	0.6	.	.	.	.	.	.	.	.	.	.
44	W26	1989	W26-L2	210	240	1200	618	.	140	15	10	.	.	.	.	.	.	.	.	.	2800	.	
45	W26	1994	W26-086	2500	990	1600	200	.	.	.	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
46	W26	1996	W26L-015	900	500	2000	0.1	.	.	.	1	1.0	.	.	.	.	.	.	.	1.0	.	.	
47	W27	1989	W27-L2	110	66	400	209	.	30	.	.	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
48	W27	1994	W27-087	1200	470	740	130	.	.	.	1	1.0	.	.	.	.	.	.	.	.	.	.
49	W27	1996	W27L-016	80	90	500	0.0	.	.	.	1	1.0	.	.	.	.	.	.	1.0	.	.		
50	W28	1989	W28-L2	1670	737	93	119	.	120	.	.	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3020	
51	W28	1994	W28-088	1700	650	1100	68	.	.	.	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
52	W28	1996	W28L-009	200	200	600	0.0	.	.	.	1	1.0	.	.	.	.	.	.	1.0	.	.		
53	W29	1988	1	.	.	.	293	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
54	W29	1988	2	.	.	.	302	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
55	W29	1988	3	.	.	.	304	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
56	W29	1988	1	.	.	.	307	.	.	.	.	.	.	.	.	.	.	.	.	.	.
57	W29	1988	2	.	.	.	306	.	.	.	.	.	.	.	.	.	.	.	.	.	.
58	W29	1988	2D	.	.	.	308	.	.	.	.	.	.	.	.	.	.	.	.	.	.
59	W29	1988	3	.	.	.	309	.	.	.	.	.	.	.	.	.	.	.	.	.	.
60	W29	1988	1	.	.	.	313	.	.	.	.	.	.	.	.	.	.	.	.	.	.

* 238Pu/241Am and 239Pu/240Pu are totals for both isotopes.

Table A.3 (continued)

Obs	Tank	Year	Sample ID	152	154	155	3	129	95	238	239	241	240	238	239	240	241	242	244	106
				Eu	Eu	Eu	H	I	Nb	Pu*	Pu	Pu	Pu	Pu	Pu	Pu	Pu	Pu*	Pu	Ru
61	W29	1988	2	.	.	.	316	.	.	.	.	.	.	.	.	.	.	.	.	.
62	W29	1988	3	.	.	.	312	.	.	.	.	.	.	.	.	.	.	.	.	2100
63	W29	1989	W29-L1	160	150	720	201	.	64	.	.	.	.	.	.	.	.	.	.	2000
64	W29	1989	W29-L2	200	160	710	201	.	62	.	.	.	.	.	.	.	.	.	.	2000
65	W29	1989	W29-L4	270	120	720	201	.	630	.	.	.	.	.	.	.	.	.	.	2000
66	W03	1989	L16	.	.	.	1	.	.	.	.	.	5.0	5.0	.	.	.	.	.	.
67	W03	1989	L17	.	.	.	1	.	.	.	.	5.0	5.0	.	.	.	.	.	.	.
68	W03	1989	L18	.	.	.	1	.	.	.	5.0	5.0	.	.	.	.	.	.	.	.
69	W03	1994	L203	2	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
70	W03	1994	L204	2	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
71	W30	1988	1	.	.	.	223	.	.	.	.	.	.	.	.	.	.	.	.	.
72	W30	1988	2	.	.	.	222	.	.	.	.	.	.	.	.	.	.	.	.	.
73	W30	1988	2D	.	.	.	226	.	.	.	.	.	.	.	.	.	.	.	.	.
74	W30	1988	3	.	.	.	221	.	.	.	.	.	.	.	.	.	.	.	.	.
75	W30	1988	1	.	.	.	223	.	.	.	.	.	.	.	.	.	.	.	.	.
76	W30	1988	2	.	.	.	223	.	.	.	.	.	.	.	.	.	.	.	.	.
77	W30	1988	3	.	.	.	223	.	.	.	.	.	.	.	.	.	.	.	.	.
78	W30	1988	1	.	.	.	225	.	.	.	.	.	.	.	.	.	.	.	.	.
79	W30	1988	2	.	.	.	226	.	.	.	.	.	.	.	.	.	.	.	.	.
80	W30	1988	3	.	.	.	222	.	.	.	.	.	.	.	.	.	.	.	.	.
81	W30	1989	W30-L1	170	150	670	204	.	51	.	.	.	.	.	.	.	.	.	1900	
82	W30	1989	W30-L2	220	110	660	201	.	55	.	.	.	.	.	.	.	.	.	1900	
83	W30	1989	W30-L4	210	100	660	201	.	58	.	.	.	.	.	.	.	.	.	1900	
84	W31	1989	W31-L2	93	67	420	156	.	33	.	.	.	.	.	.	.	.	.	1100	
85	W31	1994	W31-O89	1500	580	900	100	.	.	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	
86	W31	1996	W31L-028	200	200	600	0.1	.	3	3.7	.	.	.	0.1	.	.	.	.	.	.
87	W04	1989	L22	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
88	W04	1989	L119	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
89	W04	1989	L23	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
90	W04	1994	L205	2	1	4	.	2	.	0	0.0	.	.	.	0.0	.	.	.	.	.
91	W05	1989	L73	.	.	.	2	.	.	2.0	4.0	.	.	.	.	.	.	.	.	.
92	W05	1994	L218	16	8	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.
93	W06	1989	L77	.	.	.	1	.	.	2.0	4.0	.	.	.	.	.	.	.	.	.
94	W06	1989	L78	.	.	.	1	.	.	2.0	4.0	.	.	.	.	.	.	.	.	.
95	W06	1989	L79	.	.	.	3	.	.	2.0	4.0	.	.	.	.	.	.	.	.	.
96	W06	1994	L219	26	13	19	.	.	.	.	.	.	.	.	.	.	.	.	.	.
97	W06	1994	L220	17	10	37	.	.	.	.	.	.	.	.	.	.	.	.	.	.
98	W07	1989	L82	.	.	.	19	.	.	2.0	4.0	.	.	.	.	.	.	.	.	.
99	W08	1989	L86	.	.	.	8	.	.	2.0	2.0	.	.	.	.	.	.	.	.	.
100	W08	1989	L87	.	.	.	9	.	.	2.0	2.0	.	.	.	.	.	.	.	.	.
101	W08	1994	L223	33	56	270	.	.	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	
102	W09	1989	L90	.	.	.	10	.	.	3.0	3.0	.	.	.	.	.	.	.	.	.
103	W09	1994	L222	250	15	77	.	.	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	

* 238Pu/241Am and 239Pu/240Pu are totals for both isotopes.

Table A.3 (continued)

Obs	Tank	Year	Sample ID	^{90}Sr	^{99}Tc	^{232}Th	^{232}U	^{233}U	^{234}U	^{235}U	^{236}U	^{238}U	^{95}Zr
1	T01	1989	L35	3300	.	.	.	180	.	.	.	.	.
2	T01	1989	L36	3400	.	.	.	200	.	.	.	.	.
3	T01	1996	0	3500	13	0.0	.	340	6.4	0.1	0.1	4	.
4	T01	1997	T1L-081	3300	.	.	.	300	5.6	0.1	0.1	3	.
5	T01	1997	T1L-080	3600	.	.	.	300	5.2	0.1	0.1	3	.
6	T02	1989	L38	2500	.	.	.	190	.	.	.	.	.
7	T02	1989	L112	2800	.	.	.	180	.	.	.	.	.
8	T02	1989	L39	2700	.	.	.	180	.	.	.	.	.
9	T02	1996	0	2800	20	0.0	.	270	5.0	0.1	0.1	3	.
10	T02	1997	T2L-079	2500	.	.	.	270	4.5	0.1	0.1	3	.
11	T02	1997	T2L-078	2600	.	.	.	260	4.2	0.1	0.1	3	.
12	T03	1989	L42	300	.	.	.	2	.	.	.	.	.
13	T03	1996	0	240	29	0.0	.	0	0.0	0.0	0.0	0	.
14	T03	1996	T3L-117	430	.	.	.	5	0.1	0.1	0.1	0	.
15	T03	1996	T3L-116	530	.	.	.	5	0.1	0.1	0.1	0	.
16	T04	1989	L111	1400	.	.	.	23	.	.	.	.	.
17	T04	1989	L44	1200	.	.	.	22	.	.	.	.	.
18	T04	1989	L45	1400	.	.	.	29	.	.	.	.	.
19	T04	1996	0	1700	24	0.0	.	240	4.4	0.1	0.0	2	.
20	T04	1997	T4L-077	1700	.	.	.	280	4.9	0.1	0.1	3	.
21	T04	1997	T4L-076	1800	.	.	.	280	4.9	0.1	0.1	3	.
22	T09	1989	L47	36000	.	.	.	660	.	.	.	.	.
23	T09	1996	0	10000	9	0.0	.	470	6.9	0.1	0.1	4	.
24	T09	1996	T9L-119	7700	.	.	.	420	6.7	0.1	0.1	3	.
25	T09	1996	T9L-118	8300	.	.	.	430	6.2	0.1	0.1	3	.
26	W10	1989	L93	1200	.	.	.	2	.	.	.	2	.
27	W10	1989	L94	760	.	.	.	2	.	.	.	2	.
28	W10	1989	L95	210	.	.	.	7	.	.	.	3	.
29	W10	1994	L225	780	.	0.0	.	6	0.0	0.0	0.0	1	.
30	W21	1990	0	51000	.	.	.	.	.	.	.	.	.
31	W21	1996	W21L-013	87000	490	.	.	1800	27.0	0.7	0.6	50	.
32	W22	1994	W22-L1-1	3900	3	0.0	.	0	0.0	0.0	0.0	0	.
33	W22	1996	W22L-014	320	12	.	.	10	0.8	0.1	0.1	1	.
34	W23	1990	W23-L1	436	.	0.1	4	6	.	.	.	100	.
35	W23	1995	W23-115	5100	13000	.	.	0	0.0	0.0	0.0	0	.
36	W23	1996	W23L-167	4100	3700	.	.	38	1.3	0.1	0.1	2	.
37	W24	1989	W24-L2	886	.	0.0	.	.	.	.	.	500	.
38	W24	1994	W24-084	650	660	0.0	.	2	0.0	0.0	0.0	0	.
39	W24	1996	W24L-021	5800	770	.	.	3	0.1	0.1	0.1	0	.
40	W25	1989	W25-L2	19400	.	0.0	.	.	.	.	.	120	.
41	W25	1993	W25-019	.	20	0.0	.	.	.	.	.	.	.
42	W25	1994	W25-085	1100	720	0.0	.	1	0.0	0.0	0.0	0	.
43	W25	1996	W25L-022	1600	740	.	.	1	0.1	0.1	0.1	0	.
44	W26	1989	W26-L2	251	.	0.0	36	920	.	.	.	10	270
45	W26	1994	W26-086	17000	1900	0.0	.	1	0.0	0.0	0.0	0	.
46	W26	1996	W26L-015	25000	1900	.	.	4	0.1	0.1	0.1	0	.
47	W27	1989	W27-L2	52400	.	0.0	.	.	.	.	.	52	.
48	W27	1994	W27-087	66000	260	0.0	.	211	0.0	0.1	0.0	6	.
49	W27	1996	W27L-016	95000	220	.	.	0	0.1	0.1	0.1	0	.
50	W28	1989	W28-L2	122000	.	0.0	.	.	.	.	.	220	.
51	W28	1994	W28-088	120000	400	0.0	.	98	0.0	0.0	0.0	3	.
52	W28	1996	W28L-009	150000	410	.	.	61	0.1	0.1	0.1	2	.
53	W29	1988	1	4847	.	.	.	.	.	.	.	.	.
54	W29	1988	2	4625	.	0.2	.	.	.	.	.	.	.
55	W29	1988	3	5217	.	.	.	.	.	.	.	.	.
56	W29	1988	1	4736	.	.	.	.	.	.	.	.	.
57	W29	1988	2	5217	.	0.2	.	.	.	.	.	.	.
58	W29	1988	20	4810	.	.	.	.	.	.	.	.	.
59	W29	1988	3	4773	.	.	.	.	.	.	.	.	.
60	W29	1988	1	4514	.	0.2	.	.	.	.	.	.	.

Table A.3 (continued)

Obs	Tank	Year	Sample ID	^{90}Sr	^{99}Tc	^{232}Th	^{232}U	^{233}U	^{234}U	^{235}U	^{236}U	^{238}U	^{95}Zr
61	W29	1988	2	4218	.	.	.	.	.	.	.	.	.
62	W29	1988	3	4255	.	.	.	.	.	.	.	.	.
63	W29	1989	W29-L1	6980	.	0.0	.	.	.	.	.	.	93
64	W29	1989	W29-L2	7080	.	0.0	.	.	.	.	.	.	110
65	W29	1989	W29-L4	7080	.	0.0	.	.	.	.	.	.	100
66	W03	1989	L16	40	.	.	.	5	.	.	.	.	.
67	W03	1989	L17	64	.	.	.	5	.	.	.	.	.
68	W03	1989	L18	90	.	.	.	5	.	.	.	.	.
69	W03	1994	L203	3	.	0.0	.	4	1.7	0.1	0.0	2	.
70	W03	1994	L204	3	.	0.0	.	10	3.6	0.1	0.0	4	.
71	W30	1988	1	3626	.	.	.	.	.	.	.	.	.
72	W30	1988	2	3922	.	0.2	.	.	.	.	.	.	.
73	W30	1988	2D	3552	.	0.2	.	.	.	.	.	.	.
74	W30	1988	3	3441	.	.	.	.	.	.	.	.	.
75	W30	1988	1	3367	.	.	.	.	.	.	.	.	.
76	W30	1988	2	4255	.	.	.	.	.	.	.	.	.
77	W30	1988	3	3959	.	.	.	.	.	.	.	.	.
78	W30	1988	1	4033	.	0.2	.	.	.	.	.	.	.
79	W30	1988	2	3959	.	.	.	.	.	.	.	.	.
80	W30	1988	3	4033	.	.	.	.	.	.	.	.	.
81	W30	1989	W30-L1	6730	.	0.0	.	.	.	.	.	.	95
82	W30	1989	W30-L2	6240	.	0.0	.	.	.	.	.	.	110
83	W30	1989	W30-L4	6550	.	0.0	.	.	.	.	.	.	93
84	W31	1989	W31-L2	6570	.	0.0	.	.	.	.	.	.	57
85	W31	1994	W31-089	8700	570	0.0	.	1	0.0	0.0	0.0	0	.
86	W31	1996	W31L-028	15000	580	.	.	23	0.1	0.1	0.1	1	.
87	W04	1989	L22	.	.	.	.	.	.	.	.	.	.
88	W04	1989	L119	.	.	.	.	.	.	.	.	.	.
89	W04	1989	L23	290	.	.	.	.	.	.	.	.	.
90	W04	1994	L205	200	.	0.2	.	1	18.8	0.8	0.1	19	.
91	W05	1989	L73	9	.	.	.	.	.	.	.	.	.
92	W05	1994	L218	4	.	0.0	.	0	0.0	0.0	0.0	1	.
93	W06	1989	L77	310	.	.	.	.	.	.	.	.	.
94	W06	1989	L78	78	.	.	.	.	.	.	.	.	.
95	W06	1989	L79	190	.	.	.	.	.	.	.	.	.
96	W06	1994	L219	3800	.	0.0	.	0	0.0	0.0	0.0	0	.
97	W06	1994	L220	150	.	0.0	.	0	0.0	0.0	0.0	1	.
98	W07	1989	L82	600	.	.	.	.	.	.	.	.	.
99	W08	1989	L86	660	.	.	.	2	.	.	.	.	.
100	W08	1989	L87	460	.	.	.	2	.	.	.	.	.
101	W08	1994	L223	490	.	0.0	.	104	0.0	0.4	0.0	9	.
102	W09	1989	L90	370	.	.	.	3	.	.	.	.	.
103	W09	1994	L222	200	.	0.0	.	0	0.0	0.7	0.0	19	.

