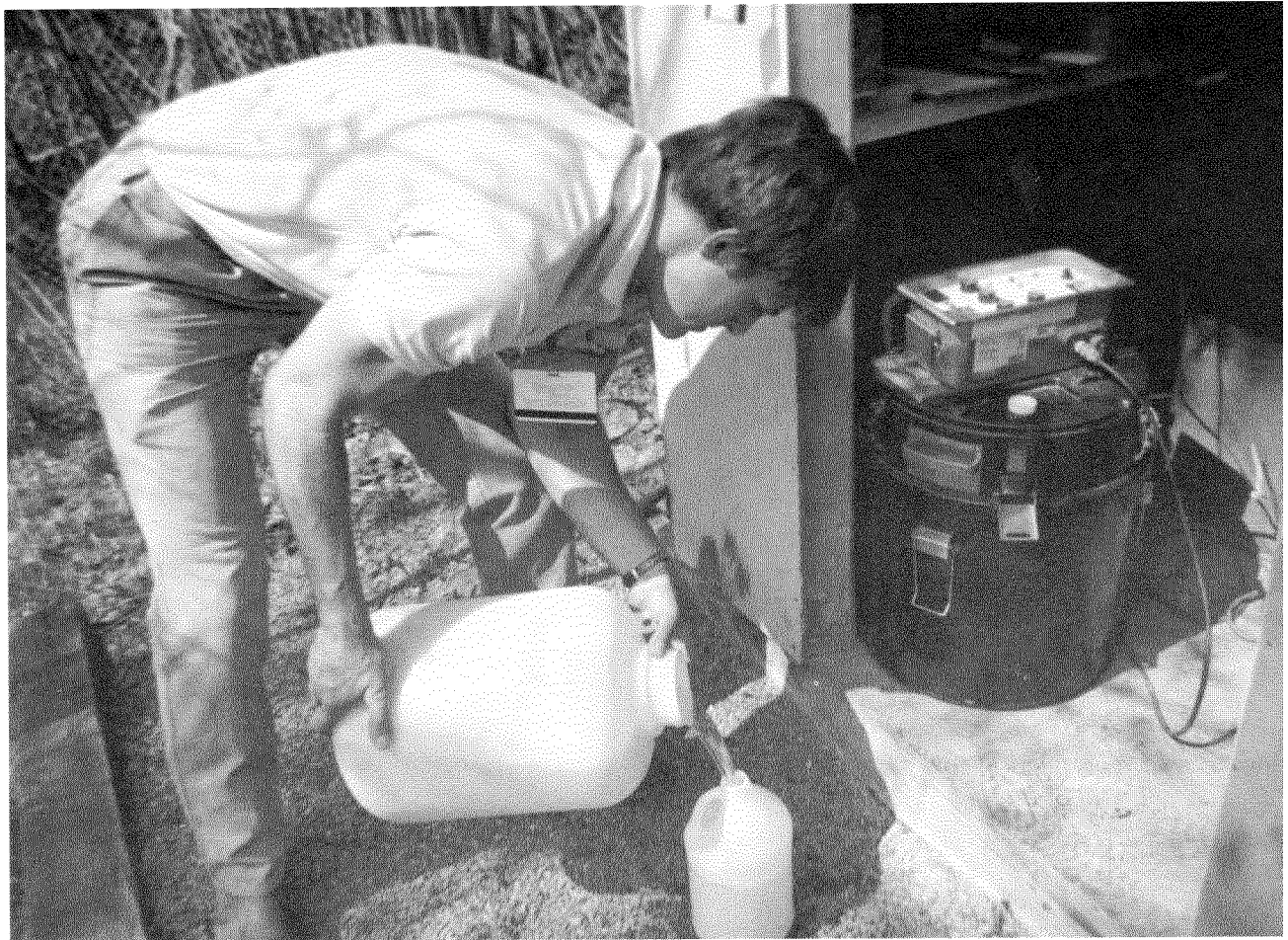


Appendix C - 1

Summary of Water and Sediment Monitoring Data



Collecting a Sample at a Continuous-Stream Sampling Station

Table C - 1.1

**Total Radioactivity of Liquid Effluents Released from
Lagoon 3 in 1992 (curies)**

Quarter	Alpha	Beta	H-3	C-14	Sr-90	I-129
<i>1st Qtr</i>	<7.85E-05	9.63±0.46E-03	1.47±0.05E-01	<1.62E-04	1.09±0.08E-03	7.01±4.01E-05
<i>2nd Qtr</i>	1.01±0.50E-04	7.10±0.24E-03	5.34±0.19E-02	<7.36E-05	3.42±0.28E-04	2.02±1.61E-05
<i>3rd Qtr</i>	9.38±7.47E-05	1.46±0.05E-02	1.74±0.05E-01	<7.27E-05	1.00±0.06E-03	5.10±1.76E-05
<i>4th Qtr</i>	7.89±3.53E-05	5.17±0.19E-03	9.45±0.30E-02	3.77±3.14E-05	1.04±0.04E-03	3.65±0.55E-05
Total	3.35±2.39E-04	3.65±0.14E-02	4.69±0.15E-01	<3.40E-04	3.47±0.21E-03	1.78±0.79E-04
Average ($\mu\text{Ci/mL}$)	9.08±6.47E-09	9.89±0.37E-07	1.27±0.04E-05	<9.20E-09	9.40±0.58E-08	4.82±2.15E-09
	U-232	U-233/234	U-235	U-236	U-238	Cs-137
<i>1st Qtr</i>	8.89±0.92E-05	5.23±0.58E-05	<5.32E-07	<6.77E-07	2.13±0.40E-05	4.84±0.56E-03
<i>2nd Qtr</i>	6.22±0.52E-05	3.99±0.31E-05	4.46±3.27E-07	5.70±3.63E-07	1.61±0.21E-05	9.02±1.14E-04
<i>3rd Qtr</i>	1.12±0.10E-04	6.86±0.60E-05	<4.90E-07	<4.27E-07	2.77±0.35E-05	1.45±0.24E-03
<i>4th Qtr</i>	7.63±0.42E-05	3.73±0.25E-05	<2.12E-07	4.11±2.88E-07	1.57±0.17E-05	<1.12E-04
Total	3.40±0.29E-04	1.98±0.18E-04	<1.56E-06	<1.75E-06	8.08±1.13E-05	7.29±1.03E-03
Average ($\mu\text{Ci/mL}$)	9.19±0.78E-09	5.36±0.48E-09	<4.23E-11	<4.75E-11	2.19±0.31E-09	1.97±0.28E-07
	Pu-238	Pu-239/240	Tc-99	K-40	Am-241	Co-60
<i>1st Qtr</i>	<5.20E-07	7.95±7.65E-07	1.38±0.07E-02	6.63±5.74E-03	9.76±7.59E-07	<1.80E-03
<i>2nd Qtr</i>	<2.96E-07	<2.75E-07	4.77±0.52E-04	<1.64E-03	3.68±3.01E-07	<1.23E-04
<i>3rd Qtr</i>	6.54±6.28E-07	5.48±5.36E-07	8.08±0.54E-03	<3.42E-03	<4.65E-07	<2.94E-04
<i>4th Qtr</i>	1.19±0.59E-06	3.48±3.39E-07	4.20±0.08E-03	<2.07E-03	7.63±3.82E-07	<1.17E-04
Total	2.28±2.04E-06	1.93±1.92E-06	2.66±0.14E-02	<1.29E-02	2.54±1.91E-06	<2.33E-03
Average ($\mu\text{Ci/mL}$)	6.18±5.52E-11	5.24±5.19E-11	7.19±0.37E-07	<3.49E-07	6.88±5.16E-11	<6.32E-08

Table C - 1.2**Comparison of 1992 Lagoon 3 Liquid Effluent Radioactivity Concentrations with Department of Energy Guidelines**

Isotope	Total Ci Released ^a	Avg Conc ($\mu\text{Ci/mL}$)	DCG ($\mu\text{Ci/mL}$)	% of DCG
<i>Alpha</i>	3.35E-04 (1.24E+07 Bq)	9.08E-09	NA ^b	—
<i>Beta</i>	3.65E-02 (1.35E+09 Bq)	9.89E-07	NA ^b	—
<i>H-3</i>	4.69E-01 (1.73E+10 Bq)	1.27E-05	2.00E-03	0.63
<i>Sr-90</i>	3.47E-03 (1.29E+08 Bq)	9.40E-08	1.00E-06	9.40
<i>Cs-137</i>	7.29E-03 (2.70E+08 Bq)	1.97E-07	3.00E-06	6.58
<i>Co-60</i>	<2.33E-03 (<8.63E+07 Bq)	<6.32E-08	5.00E-06	<1.26
<i>K-40</i>	<1.29E-02 (<4.77E+08 Bq)	<3.49E-07	NA ^b	—
<i>U-232^c</i>	3.40E-04 (1.26E+07 Bq)	9.19E-09	1.00E-07	9.19
<i>U-234^c</i>	1.98E-04 (7.33E+06 Bq)	5.36E-09	5.00E-07	1.07
<i>U-235^c</i>	<1.56E-06 (<5.77E+04 Bq)	<4.23E-11	6.00E-07	<0.01
<i>U-236^c</i>	<1.75E-06 (<6.49E+04 Bq)	<4.75E-11	5.00E-07	<0.01
<i>U-238^c</i>	8.08E-05 (2.99E+06 Bq)	2.19E-09	6.00E-07	0.36
<i>Pu-238</i>	2.28E-06 (8.45E+04 Bq)	6.18E-11	4.00E-08	0.15
<i>Pu-239</i>	1.93E-06 (7.16E+04 Bq)	5.24E-11	3.00E-08	0.17
<i>Am-241</i>	2.54E-06 (9.41E+04 Bq)	6.88E-11	3.00E-08	0.23
<i>I-129</i>	1.78E-04 (6.58E+06 Bq)	4.82E-09	5.00E-07	0.96
<i>C-14</i>	<3.40E-04 (<1.26E+07 Bq)	<9.20E-09	7.00E-05	<0.01
<i>Tc-99</i>	2.66E-02 (9.84E+08 Bq)	7.19E-07	1.00E-04	0.72
TOTAL % OF DCG				30.78

^a Total volume released: 3.69E+10 mL; Ci values are also expressed in Bq.

^b Derived concentration guides (DCGs) are not applicable (NA) to gross alpha, gross beta, or potassium-40 activity.

^c Total U (μg) = 2.28E+06; Average U (mg/L) = 6.17E-03.

Table C - 1.3**1992 Radioactivity Concentrations ($\mu\text{Ci/mL}$) in Surface Water
Upstream of the WVDP at Fox Valley (WFBCBKG)**

Month	Alpha	Beta	H-3	Sr-90	Cs-137
January	<9.37E-10	2.06±1.54E-09	<1.00E-07		
February	<1.24E-09	2.21±1.47E-09	<1.00E-07		
March	1.36±1.09E-09	3.90±1.59E-09	<1.00E-07		
1ST QTR				<1.51E-09	<9.92E-09
April	<1.25E-09	2.67±1.67E-09	<1.00E-07		
May	<1.14E-09	2.98±1.58E-09	<1.00E-07		
June	<8.60E-10	2.73±1.75E-09	<1.00E-07		
2ND QTR				4.44±1.91E-09	<6.65E-09
July	<1.37E-09	2.38±1.61E-09	<7.48E-08		
August	<1.50E-09	2.20±1.63E-09	<1.00E-07		
September	<1.31E-09	3.43±1.68E-09	<1.00E-07		
3RD QTR				2.07±1.49E-09	<6.25E-09
October	<1.07E-09	2.26±1.72E-09	<1.00E-07		
November	<1.30E-09	3.91±1.65E-09	<1.00E-07		
December	<1.42E-09	4.60±2.03E-09	<1.00E-07		
4TH QTR				2.92±2.14E-09	<9.49E-09

Table C - 1.4**1992 Radioactivity Concentrations ($\mu\text{Ci/mL}$) in Surface Water
Downstream of the WVDP at Thomas Corners (WFBCTCB)**

Month	Alpha	Beta	H-3	Sr-90	Cs-137
January	<1.38E-09	6.64±1.98E-09	<1.41E-07		
February	<1.89E-09	8.29±2.12E-09	<1.00E-07		
March	1.42±1.13E-09	3.58±1.57E-09	<1.00E-07		
1ST QTR				3.56±1.73E-09	<6.45E-09
April	2.13±1.80E-09	4.01±1.78E-09	<1.00E-07		
May	<1.65E-09	7.12±2.00E-09	<8.05E-08		
June	<1.53E-09	4.82±1.99E-09	<1.00E-07		
2ND QTR				3.49±1.77E-09	<9.43E-09
July	<2.69E-09	7.76±2.17E-09	<7.24E-08		
August	2.15±1.99E-09	5.31±2.00E-09	<1.00E-07		
September	<1.73E-09	7.67±2.10E-09	<1.00E-07		
3RD QTR				2.04±1.46E-09	<9.43E-09
October	<1.17E-09	5.80±2.05E-09	<1.00E-07		
November	<1.38E-09	5.60±1.85E-09	<1.00E-07		
December	2.88±1.88E-09	9.79±2.13E-09	<6.20E-08		
4TH QTR				3.29±2.15E-09	<7.10E-09

Table C - 1.5**1992 Monthly Radioactivity Concentrations ($\mu\text{Ci}/\text{mL}$) in Surface Water Downstream of the WVDP at Frank's Creek (WNSP006)**

Month	Alpha	Beta	H-3
January	<1.14E-09	5.55±0.43E-08	8.03±1.59E-07
February	<1.43E-09	4.66±0.40E-08	4.59±1.43E-07
March	<1.28E-09	4.92±0.41E-08	7.16±1.53E-07
April	<1.62E-09	2.33±0.31E-08	<1.01E-07
May	<3.30E-09	6.72±0.50E-08	3.38±0.90E-07
June	<3.58E-09	5.00±0.47E-08	8.54±1.63E-07
July	<3.83E-09	9.68±0.59E-08	9.96±0.97E-07
August	<3.72E-09	4.12±0.43E-08	1.73±0.76E-07
September	<2.45E-09	1.74±0.07E-07	1.71±0.09E-06
October	<2.18E-09	3.25±0.38E-08	<9.12E-08
November	<1.32E-09	1.96±0.29E-08	<8.90E-08
December	<1.60E-09	3.06±0.35E-08	1.42±0.85E-07

Table C - 1.6**1992 Quarterly Radioactivity Concentrations ($\mu\text{Ci}/\text{mL}$) in Surface Water Downstream of the WVDP at Frank's Creek (WNSP006)**

	C-14	Sr-90	I-129	Cs-137	U-233/234
1st Qtr	<1.57E-08	1.98±0.36E-08	7.80±4.60E-10	<3.08E-08	3.30±1.30E-10
2nd Qtr	<7.30E-09	1.82±0.31E-08	<1.30E-09	<1.83E-08	2.20±0.90E-10
3rd Qtr	<7.30E-09	2.54±0.39E-08	<1.10E-09	<3.02E-08	9.40±6.60E-11
4th Qtr	9.70±7.40E-09	1.66±0.29E-08	<1.53E-09	<2.62E-08	1.00±0.80E-10

	U-235	U-238	Pu-238	Pu-239/240	Am-241
1st Qtr	<2.52E-11	2.40±1.10E-10	<9.99E-13	<3.80E-11	<3.20E-11
2nd Qtr	<3.50E-11	1.00±0.70E-10	<7.86E-11	<7.86E-11	<3.40E-11
3rd Qtr	<3.30E-11	2.40±1.00E-10	<3.02E-11	<3.02E-11	8.10±5.70E-11
4th Qtr	<3.45E-11	1.60±1.00E-10	<4.97E-11	<4.97E-11	<3.30E-11

Table C - 1.7**1992 Monthly Radioactivity Concentrations ($\mu\text{Ci/mL}$) in Surface Water
Downstream of Buttermilk Creek at Felton Bridge (WFFELBR)**

Month	Alpha	Beta	H-3	Sr-90	Cs-137
January	<1.31E-09	3.10 \pm 1.64E-09	<1.00E-07	4.08 \pm 1.75E-09	<7.12E-09
February	<1.83E-09	5.79 \pm 1.91E-09	<1.00E-07	3.87 \pm 1.84E-09	<6.45E-09
March	<1.12E-09	3.06 \pm 1.71E-09	<1.00E-07	3.73 \pm 1.77E-09	<6.45E-09
April	<1.72E-09	3.07 \pm 1.80E-09	<1.00E-07	1.82 \pm 1.55E-09	<6.45E-09
May	<1.79E-09	<1.64E-09	<1.00E-07	<1.54E-09	<9.43E-09
June	<1.79E-09	<1.65E-09	<1.00E-07	2.92 \pm 1.60E-09	<9.43E-09
July	<3.46E-09	4.19 \pm 1.90E-09	<7.58E-08	2.65 \pm 1.64E-09	<6.65E-09
August	<1.92E-09	2.68 \pm 1.73E-09	<1.00E-07	2.73 \pm 1.67E-09	<9.43E-09
September	<2.34E-09	4.67 \pm 1.89E-09	<1.00E-07	4.16 \pm 1.81E-09	<6.25E-09
October	<1.58E-09	<1.81E-09	<1.00E-07	2.56 \pm 1.49E-09	<1.01E-08
November	1.80 \pm 1.44E-09	3.34 \pm 1.60E-09	<1.00E-07	4.25 \pm 2.15E-09	<9.49E-09
December	<1.39E-09	3.76 \pm 1.72E-09	<1.00E-07	2.97 \pm 1.98E-09	<9.49E-09

Table C - 1.8**1992 Results of Sampling of Potable Well Water
around the WVDP**

Well ID	pH	Conductivity ($\mu\text{mhos/cm @ 25}^\circ\text{C}$)	Alpha ($\mu\text{Ci/mL}$)	Beta ($\mu\text{Ci/mL}$)	H-3 ($\mu\text{Ci/mL}$)	Cs-137 ($\mu\text{Ci/mL}$)
WFWELL01	7.62	403	<2.01E-09	2.14 \pm 1.62E-09	<1.00E-07	<2.64E-08
WFWELL02	6.84	325	1.37 \pm 1.34E-09	1.52 \pm 1.42E-09	<1.00E-07	<2.64E-08
WFWELL03	6.81	595	<1.82E-09	3.34 \pm 1.84E-09	<7.90E-08	<2.64E-08
WFWELL04	7.85	1657	<5.14E-09	6.95 \pm 4.15E-09	<1.00E-07	<2.05E-08
WFWELL05	6.68	305	1.37 \pm 1.20E-09	4.43 \pm 1.70E-09	<1.00E-07	<2.14E-08
WFWELL06	7.94	267	<1.33E-09	<1.35E-09	<1.00E-07	<2.14E-08
WFWELL07	7.48	384	<1.42E-09	1.86 \pm 1.58E-09	<1.00E-07	<2.64E-08
WFWELL08	7.41	467	<2.33E-09	2.79 \pm 1.75E-09	<1.00E-07	<2.64E-08
WFWELL09	7.58	689	4.31 \pm 3.45E-09	3.09 \pm 1.74E-09	<1.00E-07	<2.14E-08
WFWELL10	6.96	577	<1.72E-09	2.27 \pm 1.72E-09	<1.00E-07	<2.64E-08

Table C - 1.9**1992 Radioactivity Concentrations in Stream Sediment around the WVDP
($\mu\text{Ci/g}$ dry weight from upper 15 cm)**

Location	Date	Alpha	Beta	K-40	Cs-137	Sr-90	Co-60
SFBCSED	6/92	1.40 \pm 0.60E-05	3.70 \pm 0.30E-05	1.76 \pm 0.18E-05	1.48 \pm 0.65E-07	1.50 \pm 0.50E-07	<3.90E-08
SFSDSED	6/92	1.40 \pm 0.60E-05	4.20 \pm 0.40E-05	1.55 \pm 0.16E-05	4.70 \pm 0.47E-07	<5.10E-08	2.50 \pm 2.40E-08
SFTCED	6/92	1.20 \pm 0.60E-05	3.30 \pm 0.30E-05	1.17 \pm 0.12E-05	1.54 \pm 0.15E-06	2.60 \pm 1.20E-07	<2.03E-08
SFCCSED	6/92	7.70 \pm 4.70E-06	4.80 \pm 0.40E-05	1.12 \pm 0.12E-05	2.59 \pm 0.34E-07	9.30 \pm 6.30E-08	<1.90E-08
SFBISED	6/92	6.60 \pm 4.40E-06	4.20 \pm 0.40E-05	1.66 \pm 0.17E-05	3.80 \pm 3.40E-08	6.20 \pm 3.70E-08	<3.53E-08
SFBCSED	11/92	5.70 \pm 4.00E-06	3.30 \pm 0.30E-05	1.25 \pm 0.13E-05	4.00 \pm 2.10E-08	<3.20E-08	<1.92E-08
SFSDSED	11/92	9.40 \pm 4.90E-06	3.50 \pm 0.30E-05	1.29 \pm 0.13E-05	2.03 \pm 0.32E-07	9.00 \pm 4.00E-08	<1.73E-08
SFTCED	11/92	1.30 \pm 0.60E-05	3.70 \pm 0.30E-05	1.39 \pm 0.14E-05	1.14 \pm 0.11E-06	1.50 \pm 0.50E-07	<2.00E-08
SFCCSED	11/92	1.24 \pm 0.54E-05	3.05 \pm 0.30E-05	1.14 \pm 0.12E-05	1.32 \pm 0.28E-07	5.65 \pm 4.05E-08	<1.60E-08
SFBISED	11/92	7.80 \pm 4.60E-06	3.10 \pm 0.30E-05	1.15 \pm 0.12E-05	2.20 \pm 1.70E-08	6.90 \pm 3.60E-08	<1.50E-08
		U-233/234	U-235	U-238	Pu-238	Pu-239/240	Am-241
SFBCSED	6/92	1.10 \pm 0.30E-07	<5.00E-09	9.10 \pm 2.40E-08	<7.80E-09	<9.30E-09	<1.10E-08
SFTCED	6/92	1.10 \pm 0.30E-07	<6.30E-09	9.40 \pm 2.40E-08	<9.13E-09	<1.20E-08	<3.70E-08

Table C - 1.10**1992 Radioactivity Concentrations in Surface Soil Collected at
Air Sampling Stations around the WVDP ($\mu\text{Ci/g}$ dry weight from upper 15 cm)**

Location	K-40	Cs-137	Sr-90	Am-241	Pu-239/240
SFFXVRD	1.04 \pm 0.10E-05	6.29 \pm 0.63E-07	1.80 \pm 0.50E-07	<1.26E-08	<3.20E-08
SFRSPRD	1.37 \pm 0.14E-05	1.35 \pm 0.14E-06	2.10 \pm 1.00E-07	<1.67E-08	<2.38E-08
SFRT240	1.10 \pm 0.11E-05	8.82 \pm 0.88E-07	3.00 \pm 0.60E-07	2.10 \pm 1.50E-08	<1.09E-07
SFSPRVL	1.43 \pm 0.14E-05	5.17 \pm 0.72E-07	2.60 \pm 1.00E-07	<9.60E-09	<4.46E-07
SFTCORD	1.98 \pm 0.28E-05	4.03 \pm 0.55E-07	1.20 \pm 0.90E-07	<8.50E-09	<1.08E-08
SFWEVAL	1.16 \pm 0.12E-05	6.26 \pm 0.63E-07	2.30 \pm 0.80E-07	<6.66E-09	<9.30E-09
SFGRVAL	1.02 \pm 0.10E-05	3.67 \pm 0.37E-06	2.10 \pm 0.60E-07	2.40 \pm 1.40E-08	<4.80E-08
SFBOEHN	1.75 \pm 0.18E-05	1.63 \pm 0.16E-06	1.80 \pm 0.50E-07	1.40 \pm 1.40E-08	<2.65E-08
SFDNKRK	1.33 \pm 0.13E-05	5.99 \pm 0.60E-07	<5.12E-08	<4.80E-09	<2.30E-08
SFBLKST	1.77 \pm 0.18E-05	2.74 \pm 0.51E-07	8.90 \pm 5.20E-08	<1.60E-08	<1.50E-08
	U-233/234	U-235	U-238		
SFRSPRD	1.60 \pm 0.40E-07	<5.55E-09	1.00 \pm 0.30E-07		
SFGRVAL	9.00 \pm 4.40E-08	<1.58E-08	1.00 \pm 0.50E-07		
SFBOEHN	8.70 \pm 4.20E-08	<1.39E-08	6.80 \pm 3.80E-08		

Table C - 1.11

**1992 Water Quality Concentrations (mg/L) in Surface Water
at Locations WFBCBKG and WNSP006**

Location	Date	pH	Conductivity*	TOC	TOX	Chloride	Sulfate	Nitrate-N	Fluoride	Bicarbonate	Carbonate
										Alkalinity (as CaCO ₃)	Alkalinity (as CaCO ₃)
WFBCBKG	6/11	7.34**	N/A	1.8	0.006	12.0	18.7	0.19	<0.1	102	<10.0
WFBCBKG	11/25	7.62	N/A	3.2	0.006	7.4	37.2	0.10	<0.1	60.1	<1.0
WNSP006	6/11	7.65***	479***	3.4	0.115	174	42.0	11.50	<0.1	114	<10.0
WNSP006	11/25	7.48	476	3.9	0.010	12.4	27.4	2.00	<0.1	71.7	<1.0

		Ca	Mg	Na	K	Ba	Mn		Fe	
							Total	Soluble	Total	Soluble
WFBCBKG	6/11	39	5.8	8.4	1.1	0.089	0.030	N/A	0.280	N/A
WFBCBKG	11/25	20	4.8	6.1	1.6	0.054	0.091	0.025	5.320	0.518
WNSP006	6/11	52	7.9	89	5.6	0.068	0.032	N/A	0.330	N/A
WNSP006	11/25	28	5.9	9.2	1.6	<0.050	0.044	0.029	2.210	0.365

* Measured in $\mu\text{mhos/cm}$ at 25°C.

** Average of biweekly measurements during semiannual period.

*** Average of weekly measurements during semiannual period.

N/A - Not available.