

APPENDIX 3.4-I

TVA Groundwater Quality Data

This page intentionally left blank

Historical Water Quality Data from Well 2

Analyte	6/15/79	10/6/80	1/16/81	4/6/81	7/6/81	10/19/81	4/12/82	7/26/82	4/11/83	4/17/84
Alkalinity (mg/L)	200	229	218	220	218	210	220	242	220	218
Arsenic (mg/L)	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	0.021	<0.005	<0.005	<0.005
Bicarbonate as HCO ₃ (mg/L)	171	229	218	220	218	210	220	242	220	218
Boron (mg/L)	<1									
Calcium (mg/L)	50	60	86	91	64	63	46	49	51	50
Carbonate (mg/L)	36									
Cation/Anion Balance (%)	-67.8								0.8	2.86
Chloride (mg/L)	16	5.5	9	10	10	9	10	8	11	10
Conductivity (umhos)	1450	1525	1530	1475	1520	1505	1590	1560	1570	1750
Hardness (mg/L)	203	233	234	226	220	240	184	190	192	192
Iron (mg/L)	0.34	0.45	0.95	0.32	0.48	6.4	0.5	0.8	1.3	1.19
Lead (mg/L)	<0.05	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005
Magnesium (mg/L)	19	20	16	20	22	20	16	15	15	16
Manganese (mg/L)	0.14	0.1	0.28	0.1	0.1	0.25	0.15	0.1	0.09	0.09
Nitrogen (mg/L)	1.5	<0.1	0.21	0.13	<0.1	0.49	0.15	<0.1	1.39	0.94
pH	8.2	7.74	7.57	7.67	7.89	7.16	7.69	7.78	7.69	7.63
Phosphate (mg/L)	<0.01	<0.03	<0.03	<0.03	0.03	0.08	0.069	0.06	0.04	<0.03
Potassium (mg/L)	16	15	16.6	16	13	16	15	14	14	14
Radium 226 (pCi/L)					1.04		1.26	0.09		0.5
Selenium (mg/L)	<0.01								297	
Silicon (mg/L)	7.3	4.44	<1	9.4	6.42	8.6	<2	9.2	8.7	9.73
Sodium (mg/L)	288	269	251	264	280	244	306	300	297	318
Sulfate (mg/L)	604	415	536	556	556	626	580	582	574	590
Total Dissolved Solids (mg/L)	1113	1030	1004	1039	1052	1008	1038	1062	1010	1074
Total Suspended Solids (mg/L)	1.6	1	1	<1	<1	22	<1	<1	3	5
Uranium (ug/L)					0.007		1.6	0.4		
Vanadium (mg/L)	<0.05									
Zinc (mg/L)	0.01	0.005	<0.01	<0.01	<0.01	<0.01	<0.03	<0.01	<0.03	<0.005

Historical Water Quality Data from Well 7

Analyte	6/15/79	8/10/79	9/12/79
Alkalinity (mg/L)	191		171
Arsenic (mg/L)	<0.01		<0.01
Bicarbonate as HCO ₃ (mg/L)	159		37
Boron (mg/L)	<1		<1
Calcium (mg/L)	33		38
Carbonate (mg/L)	36		84
Cation/Anion Balance (%)	-73.2		-64.9
Chloride (mg/L)	18		6
Conductivity (umhos)	1350		1325
Hardness (mg/L)	153		182
Iron (mg/L)	0.48		0.5
Lead (mg/L)	<0.05		<0.05
Magnesium (mg/L)	17		21
Manganese (mg/L)	0.04		0.03
Nitrogen (mg/L)	2.3		0.39
pH	8.3		8.7
Phosphate (mg/L)	<0.01		<0.01
Potassium (mg/L)	15		14
Radium 226 (pCi/L)		1	
Selenium (mg/L)	<0.01		<0.01
Silicon (mg/L)	6.6		6.4
Sodium (mg/L)	307		277
Sulfate (mg/L)	600		600
Total Dissolved Solids (mg/L)	1104		1058
Total Suspended Solids (mg/L)	1.2		3.2
Uranium (ug/L)			
Vanadium (mg/L)	<0.05		<0.05
Zinc (mg/L)	0.08		0.08

Historical Water Quality Data from Well 8

Analyte	6/15/79	8/14/79	9/12/79	10/6/80	1/6/81	4/8/81	7/6/81	10/19/81	4/12/82	7/26/82	4/11/83	4/17/84
Alkalinity (mg/L)	170		180	181	166	182	176	184	170	194	178	177
Arsenic (mg/L)	<0.01		<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Bicarbonate as HCO ₃ (mg/L)	207		195	181	166	182	148	184	170	194	178	177
Boron (mg/L)	<1		<1									
Calcium (mg/L)	52		58	52	74	79	55	55	59	60	54	60
Carbonate (mg/L)			12				28					
Cation/Anion Balance (%)	-66.7		-64.1								0.03	3.71
Chloride (mg/L)	16		16	9	9	12	12	13	11	8.5	12	12
Conductivity (umhos)	1285		1300	1450	1430	1375	1400	1380	1425	1390	1390	1410
Hardness (mg/L)	233		243	229	264	216	218	220	248	232	260	266
Iron (mg/L)	0.71		0.13	0.25	0.46	0.26	0.15	0.3	0.25	0.17	0.26	0.25
Lead (mg/L)	<0.05		<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium (mg/L)	25		24	25	22	22	25	23	26	22	24	26
Manganese (mg/L)	0.11		0.08	0.08	0.23	0.09	0.07	0.13	0.14	0.08	0.09	0.1
Nitrogen (mg/L)	2.9		0.29	0.1	0.15	1.62	0.1	1.23	0.24	<0.1	0.81	0.17
pH	8.5		8.3	7.8	7.74	7.85	8.08	7.59	7.62	7.67	7.74	7.64
Phosphate (mg/L)	<0.01		<0.01	<0.03	<0.03	<0.03	0.03	0.03	<0.03	<0.03	0.03	<0.03
Potassium (mg/L)	18		19	16	18.9	18	14	18	19	17	18	17
Radium 226 (pCi/L)		1.9					1.27	0	1.37	1.44		1.6
Selenium (mg/L)	<0.01		<0.01								218	
Silicon (mg/L)	6.6		4.9	3.6	<1	8.1	10.7	7.5	<2	5.8	6.7	7.23
Sodium (mg/L)	277		265	226	215	232	245	210	218	253	218	242
Sulfate (mg/L)	640		616	400	504	536	488	520	520	514	520	530
Total Dissolved Solids (mg/L)	1130		1106	918	942	972	974	904	904	964	860	942
Total Suspended Solids (mg/L)	4.8		0.4	1	2	4	1	1	2	<1	<1	5
Uranium (ug/L)							0.007		0.8	2.2		1
Vanadium (mg/L)	<0.05		<0.05									
Zinc (mg/L)	0.01		0.01	0.005	<0.01	<0.01	<0.01	0.01	<0.03	<0.01	<0.03	<0.005

September 2012

3.4-1-3

Appendix 3.4-1

Historical Water Quality Data from Well 13

Analyte	6/15/79	8/16/79	9/12/79	10/7/80	1/13/81	4/6/81	7/6/81	10/19/81	4/12/82	7/26/82	4/11/83	4/17/84
Alkalinity (mg/L)	160		170	180	176	166	167	183	169	196	168	172
Arsenic (mg/L)	<0.01		<0.01	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005
Bicarbonate as HCO ₃ (mg/L)	171		207	180	176	166	167	183	169	196	168	172
Boron (mg/L)	<1		<1									
Calcium (mg/L)	66		74	66	102	103	67	70	68	65	67	69
Carbonate (mg/L)	12											
Cation/Anion Balance (%)	-58.6		-54.7								4.84	3.57
Chloride (mg/L)	16		14	9	9	12	11	9	11	8	11	11
Conductivity (umhos)	1200		1100	1290	1400	1275	1300	1280	1300	1310	1280	1275
Hardness (mg/L)	284		304	298	248	262	264	268	268	274	266	276
Iron (mg/L)	1.61		1.38	4.3	8.1	1.18	0.6	2.3	1.6	1.65	1.8	1.62
Lead (mg/L)	<0.05		<0.05	<0.005	0.027	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005
Magnesium (mg/L)	29		29	34	23	25	28	26	27	24	26	25
Manganese (mg/L)	0.13		0.09	0.14	0.45	0.08	0.09	0.13	0.15	0.1	0.09	0.1
Nitrogen (mg/L)	0.78		0.24	<0.1	0.69	<0.1	<0.1	0.52	0.11	<0.1	0.94	0.28
pH	8.1		8.1	7.69	7.79	7.94	7.86	7.5	7.48	7.55	7.75	7.63
Phosphate (mg/L)	<0.01		<0.01	<0.03	0.06	0.09	0.03	0.03	<0.03	0.03	0.03	<0.03
Potassium (mg/L)	15		14	14	16.2	15	11	16	15	15	15	15
Radium 226 (pCi/L)		2.1					2.01		2.98	2.37		1
Selenium (mg/L)	<0.01		<0.01								199	
Silicon (mg/L)	6.4		6.6	2.4	7.8	6.6	10.7	7.5	<2	7.1	7.4	7.85
Sodium (mg/L)	216		169	164	185	191	195	162	184	207	199	205
Sulfate (mg/L)	568		480	404	464	480	468	500	472	492	456	480
Total Dissolved Solids (mg/L)	1006		882	950	936	854	912	862	836	842	792	876
Total Suspended Solids (mg/L)	0.4		1.6	11	71	4	3	2	2	1	1	6
Uranium (ug/L)							0.004		0.6	2.5		1
Vanadium (mg/L)	<0.05		<0.05									
Zinc (mg/L)	<0.01		<0.01	0.03	0.3	<0.01	<0.01	<0.01	0.13	<0.01	<0.03	<0.005

Historical Water Quality Data from Well 16

Analyte	7/22/81	10/19/81	4/12/82
Alkalinity (mg/L)	157	156	144
Arsenic (mg/L)	0.005	<0.005	<0.005
Bicarbonate as HCO ₃ (mg/L)	157	156	144
Boron (mg/L)			
Calcium (mg/L)	130	130	128
Carbonate (mg/L)			
Cation/Anion Balance (%)			
Chloride (mg/L)	7	7	6
Conductivity (umhos)	1150	1160	1175
Hardness (mg/L)	540	520	528
Iron (mg/L)	0.25	0.12	0.05
Lead (mg/L)	<0.005	0.015	<0.005
Magnesium (mg/L)	55	51	54
Manganese (mg/L)	0.15	0.17	0.17
Nitrogen (mg/L)	<0.1	0.28	0.22
pH	7.32	7.31	7.39
Phosphate (mg/L)	<0.03	0.03	<0.03
Potassium (mg/L)	28	24	21
Radium 226 (pCi/L)	4.9		5.38
Selenium (mg/L)			
Silicon (mg/L)	14.27	7.5	<2
Sodium (mg/L)	55	45	50
Sulfate (mg/L)	510	494	488
Total Dissolved Solids (mg/L)	894	796	848
Total Suspended Solids (mg/L)	1	1	<1
Uranium (ug/L)	0.007		1.7
Vanadium (mg/L)			
Zinc (mg/L)	<0.01	0.05	0.07

Historical Water Quality Data from Well 18

Analyte	8/6/79	8/15/79	9/12/79	10/9/80	1/8/81	4/8/81	7/1/81	10/1/81	4/13/82	7/27/82	4/11/83	4/17/84
Alkalinity (mg/L)	200		238	202	180	192	195	184	190	214	184	182
Arsenic (mg/L)	<0.01		<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	0.018	<0.005	<0.005	<0.005
Bicarbonate as HCO ₃ (mg/L)	195		168	202	180	162	195	184	190	214	184	182
Boron (mg/L)	<1		<1									
Calcium (mg/L)	37		39	35	44	53	38	38	19	40	38	37
Carbonate (mg/L)	24		60			30						
Cation/Anion Balance (%)	-75.4		-75.9								2.69	2.47
Chloride (mg/L)	14		20	13	13	12	11	12	12	8	12	13
Conductivity (umhos)	1325		1300	1420	1370	1375	1410	1350	1400	1390	1420	1410
Hardness (mg/L)	142		139	136	136	138	140	140	124	141	140	135
Iron (mg/L)	7.42		1.25	1.4	2.1	1.34	1.9	1.4	1.3	2.6	2.6	1.45
Lead (mg/L)	<0.05		<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium (mg/L)	12		10	15.5	12	13	14	13	7	12	14	13
Manganese (mg/L)	0.15		0.05	0.08	0.16	0.07	0.07	0.06	0.12	0.08	0.08	0.08
Nitrogen (mg/L)	0.87		0.28	0.34	0.35	0.39	0.25	1.4	0.36	<0.1	1.04	0.42
pH	8.4		8.3	7.88	7.98	8.02	7.82	7.77	7.81	7.69	7.89	7.75
Phosphate (mg/L)	<0.01		<0.01	<0.03	<0.03	<0.03	0.03	0.03	0.033	0.03	0.04	<0.03
Potassium (mg/L)	10		11	9	9.4	10	9	12	10	9	10	9
Radium 226 (pCi/L)		0.96					1.87		4.44	1.26		2.2
Radium 226 (pCi/L)										0.57		
Selenium (mg/L)	<0.01		<0.01								279	
Silicon (mg/L)	6.4		5.6	3	<1	7.4	2.14	6.4	<2	7.9	7.4	7.85
Sodium (mg/L)	281		325	287	263	266	280	252	137	287	279	280
Sulfate (mg/L)	525		570	538	504	468	520	510	520	530	506	506
Total Dissolved Solids (mg/L)	999		1118	926	948	974	898	876	906	922	908	520
Total Suspended Solids (mg/L)	3.6		0.4	1	3	4	4	2	2	2	1	5
Uranium (ug/L)		8					0.008		7.6	6.7		8
Vanadium (mg/L)	<0.05		<0.05									
Zinc (mg/L)	0.01		<0.01	<0.005	<0.01	<0.01	0.03	<0.01	<0.03	<0.01	<0.03	<0.005

Historical Water Quality Data from Well 42

Analyte	8/6/79	8/15/79	9/12/79	10/9/80	1/8/81	4/8/81	7/22/81	10/21/81	4/13/82	7/27/82	4/11/83
Alkalinity (mg/L)	180		180	198	188	189	192	179	186	204	188
Arsenic (mg/L)	<0.01		<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	0.025	<0.005	<0.005
Bicarbonate as HCO ₃ (mg/L)	171		195	198	188	165	192	179	186	204	188
Boron (mg/L)	<1		<1								
Calcium (mg/L)	47		49	39	48	54	38	39	36	42	37
Carbonate (mg/L)	24		12			24					
Cation/Anion Balance (%)	-75.1		-75.8								0.33
Chloride (mg/L)	14		14	12	9	11	12	11	12	10.5	12
Conductivity (umhos)	1250		1200	1400	1360	1380	1400	1365	1400	1375	1400
Hardness (mg/L)	138		147	142	140	142	144	140	148	146	164
Iron (mg/L)	0.61		0.63	0.25	1.5	0.42	0.55	0.4	0.5	0.84	0.38
Lead (mg/L)	<0.05		<0.05	0.026	<0.005	<0.005	<0.005	0.01	<0.005	<0.005	<0.005
Magnesium (mg/L)	5		6	16	13	13	14	13	13	13	11
Manganese (mg/L)	0.12		0.07	0.08	0.2	0.1	0.08	0.07	0.12	0.09	0.09
Nitrogen (mg/L)	0.52		0.05	0.38	0.28	0.17	<0.1	0.4	0.13	<0.1	0.84
pH	8.3		8.4	7.86	7.96	8	7.79	7.67	7.86	7.68	7.92
Phosphate (mg/L)	<0.01		<0.01	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.03	<0.03
Potassium (mg/L)	10		10	10	9.4	10	9	12	10	10	10
Radium 226 (pCi/L)		51					37.4		82.62	80.33	
Selenium (mg/L)	<0.01		<0.01								276
Silicon (mg/L)	6.4		5.8	3	1.7	6.6	4.81	7.5	<2	7.9	8
Sodium (mg/L)	274		286	282	260	266	280	252	264	283	276
Sulfate (mg/L)	525		560	576	504	498	520	520	520	514	516
Total Dissolved Solids (mg/L)	984		1033	920	964	964	910	906	903	916	888
Total Suspended Solids (mg/L)	4.8		5.2		2	8	2	1	<1	<1	<1
Uranium (ug/L)		7					0.02		13.6	12	
Vanadium (mg/L)	<0.05		<0.05								
Zinc (mg/L)	0.01		<0.01	0.01	<0.01	<0.01	0.01	0.01	<0.03	<0.01	<0.03

Historical Water Quality Data from Well 4002

Analyte	9/12/79	4/12/82	7/26/82	7/27/82	4/11/83	4/17/84
Alkalinity (mg/L)	150	144	202		146	146
Arsenic (mg/L)	<0.01	<0.005	<0.005		<0.005	<0.005
Bicarbonate as HCO ₃ (mg/L)	134	144	202		146	146
Boron (mg/L)	<1					
Calcium (mg/L)	45	46	23		45	46
Carbonate (mg/L)	24					
Cation/Anion Balance (%)	-62.2				0.99	0.12
Chloride (mg/L)	8	5	3		6	7
Conductivity (umhos)	1100	1195	1160		1160	1190
Hardness (mg/L)	187	90	168		168	184
Iron (mg/L)	2.3	2.6	1.38		8.3	3.35
Lead (mg/L)	<0.05	<0.005	<0.005		<0.005	0.005
Magnesium (mg/L)	18	16	10		13	15
Manganese (mg/L)	0.06	0.14	0.1		0.09	0.1
Nitrogen (mg/L)	0.46	0.17	<0.1		0.67	0.91
pH	8.5	7.52	7.51		7.6	7.61
Phosphate (mg/L)	<0.01	0.033	<0.03		0.03	<0.03
Potassium (mg/L)	13	10	9		9	9
Radium 226 (pCi/L)		43.36	32.13	32.13		
Selenium (mg/L)	<0.01				212	
Silicon (mg/L)	5.1	<2	3.4		8	7.23
Sodium (mg/L)	191	198	226		212	197
Sulfate (mg/L)	440	448	427		450	440
Total Dissolved Solids (mg/L)	805	766	770		740	784
Total Suspended Solids (mg/L)	1.6	6	2		5	9
Uranium (ug/L)		2.1	5	5		
Vanadium (mg/L)	<0.05					
Zinc (mg/L)	0.01	<0.03	<0.01		<0.03	<0.005

Historical Water Quality Data from Well 7002

Analyte	6/15/79	9/12/79	10/6/80	1/6/81	4/6/81	7/6/81	10/19/81	4/12/82	7/26/82	4/11/83	4/17/84
Alkalinity (mg/L)	210	224	269	264	264	263	280	264	300	268	267
Arsenic (mg/L)	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005
Bicarbonate as HCO ₃ (mg/L)	256	273	269	264	264	263	280	264	300	268	267
Boron (mg/L)	<1	<1									
Calcium (mg/L)	194	233	235	337	375	238	230	243	238	242	243
Carbonate (mg/L)											
Cation/Anion Balance (%)	-37.9	-39.3								0.55	3.52
Chloride (mg/L)	16	16	6	9	10	9	8	9	6	9	10
Conductivity (umhos)	1925	2000	2500	2400	2400	2400	2400	2400	2400	2400	2500
Hardness (mg/L)	1002	948	990	904	968	956	928	944	970	1020	928
Iron (mg/L)	3.56	2.48	2.5	3.38	2.55	2.1	2.7	2.5	2.47	5.8	2.16
Lead (mg/L)	<0.05	<0.05	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium (mg/L)	126	89	95	72	96	100	93	98	90	90	109
Manganese (mg/L)	0.46	0.32	0.38	0.82	0.37	0.3	0.38	0.51	0.37	0.39	0.33
Nitrogen (mg/L)	1.6	0.29	<0.1	0.16	0.52	<0.1	1.01	0.15	<0.1	0.44	0.37
pH	7.8	8	7.27	7.33	7.59	7.63	7.14	7.21	7.26	7.3	7.26
Phosphate (mg/L)	<0.01	<0.01	0.03	<0.03	<0.03	0.03	0.03	0.045	<0.03	0.04	<0.03
Potassium (mg/L)	25	25	32	33	35	24	33	29	30	32	27
Radium 226 (pCi/L)								8.69	9.37		
Selenium (mg/L)	<0.01	<0.01								200	
Silicon (mg/L)	7.3	7.3	4.17	<1	7.4	8.83	8.6	<2	8.6	8.7	8.45
Sodium (mg/L)	181	191	172	181	193	201	180	210	195	200	192
Sulfate (mg/L)	1150	1105	800	973	1097	1107	987	973	1090	1107	1077
Total Dissolved Solids (mg/L)	1818	1793	1940	1822	1942	1970	1690	1780	1886	1820	1810
Total Suspended Solids (mg/L)	4	7.2	8	4	6	4	6	5	2	6	10
Uranium (ug/L)								0.2	2		10
Vanadium (mg/L)	<0.05	<0.05									
Zinc (mg/L)	<0.01	<0.01	0.005	<0.01	<0.01	<0.01	<0.01	<0.03	<0.01	<0.03	<0.005