1. What volume storage tank would be required to achieve 3 log inactivation of giardia cysts for a water treatment facility operating at 5 mgd (million gallons per day)? Assume a free chlorine residual concentration of 0.8 mg/L, pH = 8.5, and temperature = 10°C. Use the following Table for your calculation.

Chlorine concentration (mg/L)	pH = 6.0 Log inactivations						pH = 7.0 Log inactivations						pH = 8.0 Log inactivations						pH = 9.0 Log inactivations					
	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0	0.5	1.0	1.5	2.0	2.5	3.0
≤ 0.4	12	24	37	49	61	73	17	35	52	69	87	104	25	50	75	99	124	149	35	70	105	139	174	209
0.6	13	25	38	50	63	75	18	36	54	71	89	107	26	51	77	102	128	153	36	73	109	145	182	218
0.8	13	26	39	52	65	78	18	37	55	73	92	110	26	53	79	105	132	158	38	75	113	151	188	226
1	13	26	40	53	66	79	19	37	56	75	93	112	27	54	81	108	135	162	39	78	117	156	195	234
1.2	13	27	40	53	67	80	19	38	57	76	95	114	28	55	83	111	138	166	40	80	120	160	200	240
1.4	14	27	41	55	68	82	19	39	58	77	97	116	28	57	85	113	142	170	41	82	124	165	206	247
1.6	14	28	42	55	69	83	20	40	60	79	99	119	29	58	87	116	145	174	42	84	127	169	211	253
1.8	14	29	43	57	72	86	20	41	61	81	102	122	30	60	90	119	149	179	43	86	130	173	216	259
2	15	29	44	58	73	87	21	41	62	83	103	124	30	61	91	121	152	182	44	88	133	177	221	265
2.2	15	30	45	59	74	89	21	42	64	85	106	127	31	62	93	124	155	186	45	90	136	181	226	271
2.4	15	30	45	60	75	90	22	43	65	86	108	129	32	63	95	127	158	190	46	92	138	184	230	276
2.6	15	31	46	61	77	92	22	44	66	87	109	131	32	65	97	129	162	194	47	94	141	187	234	281
2.8	16	31	47	62	78	93	22	45	67	89	112	134	33	66	99	131	164	197	48	96	144	191	239	287
3	16	32	48	63	79	95	23	46	69	91	114	137	34	67	101	134	168	201	49	97	146	195	243	292

Source: U.S. EPA, 1991.