

CASE STUDY

LONG TERM SYSTEM
STABILITY USING CLEARITAS®

clearitas®
safer. cleaner. better.®

INTRODUCTION

Blue Earth Products is the leader in innovative approaches to water quality standards. Our suite of products reduces chlorine demand and disinfection by-products (DBPs) in water systems by eliminating organic and inorganic scale, enabling utilities to comply with EPA Stage 2 DBP rules.

Since 2005, the community of Sabin, Minnesota, has been a high profile U.S. Environmental Protection Agency (EPA) demonstration plant for arsenic removal. Sabin draws its water from the Buffalo aquifer, as well as two city owned wells. The combined incoming water has traditional arsenic levels at approximately 45 ppb. A new arsenic removal facility built by the city lowers these levels to approximately 10 ppb.

Sabin's water operator approached Blue Earth Products about the addition of Clearitas to his system to slowly remove built-up iron deposits within the system that had a negative effect on both maintenance and chlorine residuals. Used to remove scale and reduce chlorine demand, Clearitas is a proprietary formulation of oxidized chlorine that is added to drinking water distribution systems. Used in conjunction with existing disinfectants, Clearitas has been shown to effectively lower chlorine demand and improve DBP levels in many municipal settings.

	DS1 209 4th Ave West								DS2 No. 12 1st Street North						DS3 No. 12 3rd Ave West							
	Date	pH	Alkalinity	As	Fe	Mn	Pb	Cu	pH	Alkalinity	As	Fe	Mn	Pb	Cu	pH	Alkalinity	As	Fe	Mn	Pb	Cu
	2/14/05	8	299	7	39	118	1	116	8	78	63	4527	116	9.1	314	8.3	75	10	159	57	3.3	91
	3/16/05	8.1	299	15	82	187	3	146	7.8	294	124	8002	395	23.1	747	8	308	14	101	18	0.2	17
	4/18/05	7.7	324	12	75	119	1	251	7.7	320	14	140	26	0.3	8	8.2	311	10	220	31	5.0	51
	5/18/05	7.7	308	30	861	172	4	262	7.8	303	17	192	67	0.8	107	7.9	290	14	129	69	0.4	38
New Arsenic Removal Plant	2/22/06	7.6	299	15	25	271	1	163	7.6	295	76	2889	569	26.5	646	7.6	299	14	37	16	0.3	22
	3/29/06	7.8	290	10	65	294	7	344	7.5	298	39	1173	264	14.7	575	7.5	290	5	25	8	0.5	56
	4/18/06	7.7	312	8	67	199	2	390	7.6	308	10	167	110	0.7	116	7.6	308	4	25	7	0.9	96
	5/23/06	7.8	301	6	72	56	2	59	7.5	292	7	77	58	2.0	125	7.7	292	3	25	3	0.4	55
	6/21/06	7.3	289	9	87	51	5	444	7.6	293	13	209	199	0.2	24	7.4	289	5	89	32	0.4	71
	7/11/06	7.5	299	7	49	40	3	244	7.5	297	7	68	95	0.1	17	7.5	293	7	25	4	1.0	103
	8/15/06	7.4	295	6	25	42	2	223	7.4	296	8	55	72	0.5	22	7.6	290	7	35	13	2.9	180
	9/12/06	7.4	333	7	25	28	3	236	7.4	330	7	25	23	0.6	30	7.5	316	6	38	15	1.1	132
	10/18/06	7.4	312	11	34	37	3	274	7.3	354	13	144	62	2.4	163	7.5	316	12	61	26	0.9	87
	11/7/06	7.4	313	8	25	41	1	148	7.5	315	13	25	26	0.3	65	7.6	320	9	25	35	0.3	58
12/13/06	7.4	313	7	25	54	1	90	7.4	330	9	25	0	0.6	153	7.6	324	7	25	17	0.6	82	
1/9/07	7.6	309	7	25	46	2	283	7.6	331	10	91	21	1.8	164	7.7	315	6	34	14	1.2	130	
2/6/07	NR	NR	12	179	80	6	226	NR	NR	9	61	53	3.2	151	NR	NR	8	180	53	2.2	119	
Average Before	7.6	302	8.5	51.9	123	3.1	263	7.5	301	20.9	583	174	5.7	194	7.6	297	6.4	37.4	12.3	0.9	89.4	
Average After	7.5	312	9.0	57.6	52	2.6	204	7.5	333	10.8	69	32	1.7	139	7.6	319	8.4	65.0	29.0	1.0	95.2	

Table 1 - System stability data provided by Battelle at three distribution system sampling points

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However, the EPA had great concern that the scale removing effects of Clearitas may have the unwanted side effect of increasing the levels of arsenic and other heavy metals in the water by releasing these metals from the built-up scale. Thus, the EPA contracted with Batelle scientists to monitor these metal levels throughout the course of this study. Batelle scientists measured a variety of different factors at three sites within the distribution system.

Clearitas was dosed into the system at a rate of 1 gallon of Clearitas to 30,000 gallons of water after the arsenic removal plant.

RESULTS

Prior to the addition of Clearitas, Sabin was regularly required to increase free chlorine added to a significant level in order to maintain residuals within the system. However, these high chlorine levels caused numerous customer complaints, as did turbidity within the system (which was significantly lowered after the addition of Clearitas). After the addition of Clearitas, residual levels improved significantly throughout the system (no data supplied), as did the turbidity issues after system flushing.

Table 1 shows the data collected (before and after Clearitas) supplied by Batelle. As can be noted, little or no increase in pH, As, Fe, Pb, etc. was noted through the course of this study.

DISCUSSION

In this particular system, a very low dosing of Clearitas was very effective at improving residual and turbidity problems throughout the distribution system. Importantly, the data provided by Batelle in this study showed that Clearitas did not have a negative effect on the heavy metals within the system, neither from scale removal nor corrosion.

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