

Summary of City of Flint (City) Actions In Response to the EPA Emergency Administrative Order Updated: June 16, 2016

Chapters 52, 57, 59a & 59b: Weekly Conference Call Regarding Flint Water Plant Operations June 16, 2016.

EPA Order Due Date: Weekly

MDEQ and the Flint Water Treatment Plant staff held the weekly conference call to review and discuss the weekly summary of water quality and corrosion control parameters that are reported on both the city's June operation report completed to date, and a summary of water quality parameters collected in the distribution system during the week of June 12th. These reports are being used to monitor the city's corrosion control treatment.

The following observations were noted:

- On June 12th, the phosphate residual measured in the water provided to the city of Flint from the Great Lakes Water Authority (GLWA) was at 2.16 milligrams per liter, which is almost twice the amount typically present. The corresponding phosphate residual in the water leaving Control Station #2 after the supplemental phosphate has been added was measured at 4.63 milligrams per liter, which is approximately 1 milligram per liter more than normal, but not unexpected given the higher than usual phosphate residual in the incoming water.
- When Flint WTP staff discovered these inconsistencies, they reduced the supplemental phosphate dosage, which averages ~2.6 milligrams per liter. The dosage calculated for June 13th was 1.7 milligrams per liter. However, the phosphate residual measured in the water received from GLWA on June 13th was now reporting only 1.4 milligrams per liter, and only 2.80 milligrams per liter was detected in the water leaving Control Station #2. The WTP staff again adjusted the supplemental phosphate dosage to increase the phosphate residual in the distribution system.
- As a result of this apparent surge or slug of phosphate that apparently moved quickly through the 72-inch transmission main from GLWA and the city's response of lowering the supplemental phosphate dosage, the phosphate residuals measured at 8 of the 10 Enhanced Water Quality Monitoring (EWQM) sites this past week were below the minimum of 3.1 milligrams per liter. The levels at the 8 sites that were below 3.1 ranged from 3.00 to 3.09 milligrams per liter, with the remaining 2 sites reporting 3.18 and 3.62 milligrams per liter. The reduction in supplemental phosphate dosage that the city initiated to counter the higher concentration measured in the water received from GLWA may have been the reason for the overall residuals to decrease to a greater extent.
- The Utilities Superintendent indicated she plans to contact the GLWA's Lake Huron WTP to determine if they can explain the wave or surge in phosphate residuals received at Control Station #2.
- The city has completed installation of a chemical feed system for supplemental chlorination. They are also planning to accommodate pH adjustment using caustic soda. They will allow the city to better control chlorine residuals and maintain corrosion control throughout the distribution system.
- All pH measurements were greater than 7.0 at the (EWQM) sites and the Point of Entry (Control Station #2) to the system. The pH levels ranged from 7.37 to 7.54 in the water

received from Great Lakes Water Authority and from 7.30 to 7.40 at the distribution system sites.

- Iron levels ranged between 0.02 and 0.11 milligrams per liter at all EWQM sites. Plant tap iron concentrations ranged from 0.01 to 0.05 in the last week.
- All the lead samples collected from the EWQM sites reported no lead detected, providing additional indication that water quality is stabilizing in the distribution system.
- The city of Flint continues to work with Bob London to prepare and submit:
 - An up to date disinfection byproducts monitoring plan;
 - A Revised Total Coliform site sampling plan; and

The water quality monitoring data submitted this week accurately represented the problem discovered by the Flint WTP on June 12th during the management of their supplemental phosphate feed system. The wide variation in GLWA water quality and the Flint WTP actions in response to account for this change resulted in water quality that was just below the range deemed optimal. This incident is emblematic of the difficulty all consecutive water systems face in providing consistent water quality when they do not control the full spectrum of treatment systems applied to their drinking water. Fortunately, the problem was quickly corrected and the Flint WTP is evaluating appropriate measures to minimize the impacts of any future event (see attached letter).



DEPARTMENT OF PUBLIC WORKS AND UTILITIES

Dr. Karen W. Weaver
Mayor

Sylvester Jones
City Administrator

JoLisa McDay
Utilities Administrator

June 17, 2016

VIA E-MAIL

Dear Mr. Benzie:

The Flint Water Treatment Plant began experiencing variations in water quality from the Great Lakes Water Authority (GLWA) on Sunday, June 12, 2016. The changes impacted our ability to maintain a steady, applied orthophosphate dose beginning at approximately 07:00 on Monday, June 13, 2016. GLWA indicated that a number of pump changes occurred at the Lake Huron facility.

At approximately 07:00 on Sunday, June 12, 2016, the water plant measured an abrupt and significantly higher than normal orthophosphate residual of 2.16 mg/L in water supplied by GLWA. At the lab tap, residual phosphate measured 4.63 mg/L. After verifying the reading and calling the county for information, corrective action was taken to restore the normal operating range (3.15 – 4.0 mg/L) and the chemical feed pump settings were lowered. The City of Flint acknowledges that the water quality of the provider (GLWA) is historically consistent and our practice of dosing orthophosphate is flow-paced.

The exact time that orthophosphate levels from GLWA were restored to normal levels, as regarded by the City of Flint, remains unknown. Flow coming into Flint did not change. As a result, the City of Flint experienced a period where the level of orthophosphate reported at the time of the grab sample was lower than the required 3.15 mg/L. At approximately 08:00, the grab sample indicated a residual of 2.81 mg/L. Corrective action was taken and phosphate levels increased. The time it takes for water to flow from the Lake Huron facility to the City of Flint varies with demand in the City of Flint. We sought to have water quality stabilize as we modified our chemical feed for achieving the necessary residual.

The City is now exploring options for inline monitoring of phosphate to improve our response.

Respectfully submitted,

JoLisa McDay
Utilities Administrator (Temp.)

24hr Flow Paced Record of Ortho-Phosphate Used

Date: 6-12-16						Location of PO ₄			
	PO ₄	CS 2	PO ₄	Pump Setting		CS 2	Train Shed	Operator	
	ml/min	MGD	PPM	MA \ MA EXT	Stroke	Gallons on Hand			
0:00	80	13.4	2.68	8.5 28	100	159	1064	MW	
1:00	75	12.4	2.72	8.2 26	100			MW	
2:00	75	12.4	2.72	8.3 26	100			MW	
3:00	85	13.5	2.83	8.5 29	100			MW	
4:00	80	13.1	2.74	8.4 28	100			MW	
5:00	75	13.7	2.46	8.6 29	100			MW	
6:00	75	12.8	2.63	8.3 27	100			MW	
7:00	80	12.9	2.79	8.3 27	100	151	1064	MW	
8:00	80	13.1	2.74	8.3 29	100	150	1064	BE	
9:00	80	13.1	2.74	8.4 28	100			BE	
10:00	80	13.6	2.64	8.6 29	100			BE	
11:00	85	13.7	2.78	8.6 29	100			BE	
12:00	80	13.0	2.76	8.4 28	100			BE	
13:00	75	12.4	2.72	8.2 26	100			BE	
14:00	45	12.8	1.58	8.3 27	50	140	1064	BE	
15:00	45	13.1	1.54	8.4 28	50	276	923	BE	
16:00	45	13.8	1.46	8.7 29	50	275	923	BE	
17:00	45	13.9	1.42	8.6 29	50			BE	
18:00	45	13.3	1.52	8.5 28	50			BE	
19:00	35	10.4	1.51	7.4 22	50			BE	
20:00	35	10.2	1.54	7.4 21	50			BE	
21:00	35	10.0	1.57	7.4 21	50			BE	
22:00	50	10.4	2.14	7.5 22	70			BE	
23:00	65	11.9	2.45	8 25	90	271	923	BE	
ml/min average : 64.583						Total gallons PO ₄ Used: 25.0			
MGD average : 12.6									
PPM average : 2.288 or 2.3						Days of PO ₄ on Hand: 48			
(Train Shed + CS2)									

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PHOSPHATE Level AT CS II (GLWA) Reached 2.16, combined with our dose of 2.70 mg/l Exceeded our set point of 3.95 Thus causing A Reduction in our feed RATE done

24hr Flow Paced Record of Ortho-Phosphate Used

Date: 6-13-16						Location of PO ₄		
	PO ₄	CS 2	PO ₄	Pump Setting		CS 2	Train Shed	Operator
	ml/min	MGD	PPM	MA \ MA EXT	Stroke	Gallons on Hand		
0:00	70	12.7	2.47	8.3 26	90	270	923	MW
1:00	70	12.7	2.47	8.2 26	90			MW
2:00	80	13.8	2.60	8.6 29	90			MW
3:00	45	14.0	1.44	8.7 29	50			MW
4:00	45	14.0	1.44	8.7 29	50			MW
5:00	50	14.9	1.51	9.0 31	50			MW
6:00	50	14.9	1.51	8.9 31	50			MW
7:00	50	14.8	1.51	8.9 31	50	263	923	MW
8:00	50	14.9	1.51	9.0 31	50	262	923	DS
9:00	50	15.1	1.49	9.1 31	50			Done
10:00	50	15.3	1.49	9.2 32	50			↓
11:00	50	15.6	1.44	9.3 33	50			↓
12:00	55	14.9	1.65	8.9 31	60			BE
13:00	50	13.9	1.61	8.7 29	60			AG
14:00	50	14.0	1.60	8.6 29	60			AG
15:00	50	13.5	1.66	8.5 28	60	256	923	AG
16:00	40	11.7	1.53	7.9 24	60	255	923	ET
17:00	40	11.3	1.59	7.8 24	60			ET
18:00	35	10.1	1.50	7.8 23	60			ET
19:00	45	10.7	1.89	7.4 23	70			ET
20:00	40	10.5	1.93	7.5 22	70			ET
21:00	50	11.9	1.88	7.7 23	70			ET
22:00	55	13.4	1.84	8.5 28	70			ET
23:00	60	14.1	1.91	8.7 29	70	250	923	ET
ml/min average :		51.25				Total gallons PO ₄ Used: 20 gal		
MGD average :		13.44						
PPM average :		1.73				Days of PO ₄ on Hand: 58 days		
(Train Shed + CS2)								

* AT 11PM 6-12-16 we resumed original H₃PO₄ dose. A residue TEST REVEALED AT 10⁰⁰ AM 6-13, COMBINED PO₄ WAS 5.7M AGAIN OUR DOSE WAS REDUCED FROM 80ML/MIN TO 45 ML/MIN AGAIN A CHANGE IN OUR FEED RATE DONE

24hr Flow Paced Record of Ortho-Phosphate Used

Date: 6-14-16						Location of PO ₄			
	PO ₄	CS 2	PO ₄	Pump Setting		CS 2	Train Shed	Operator	
	ml/min	MGD	PPM	MA \ MA EXT	Stroke	Gallons on Hand			
0:00	60	14.4	1.87	8.8	30	70	250	923	MW
1:00	60	14.6	1.84	8.8	30	70			MW
2:00	65	14.7	1.99	8.9	31	70			MW
3:00	70	15.0	2.09	9.3	33	70			MW
4:00	65	15.0	1.94	9.0	31	70			MW
5:00	65	15.1	1.93	9.1	32	70			MW
6:00	65	15.2	1.92	9.1	32	70			MW
7:00	65	15.4	1.89	9.0	31	70	241	923	MW
8:00	65	14.8	1.97	9.0	31	70	240	923	ET
9:00	60	14.7	1.83	8.9	31	70			ET
10:00	60	14.0	1.92	8.8	30	70			ET
11:00	70	14.1	2.23	8.6	29	80			ET
12:00	70	14.1	2.23	8.7	29	80			ET
13:00	70	13.7	2.29	8.6	29	80			PS
14:00	70	13.7	2.29	8.7	29	80			ET
15:00	70	14.1	2.23	8.7	29	80	231	923	ET
16:00	70 ^{70 BE} 55	12.9	2.43	8.3	27	80	230	923	BE
17:00	60	12.7	2.12	8.2	26	80			BE
18:00	65	12.7	2.30	8.2	27	80			BE
19:00	65	12.8	2.28	8.2	27	80			BE
20:00	60	12.5	2.15	8.2	26	80			BE
21:00	65	13.3	2.19	8.5	28	80			BE
22:00	70	13.7	2.29	8.6	29	80			BE
23:00	75	14.5	2.32	8.8	31	80	225	923	BE
ml/min average : 65.83						Total gallons PO ₄ Used: 25 gal			
MGD average : 14.05									
PPM average : 2.10						Days of PO ₄ on Hand: 46 days			
(Train Shed + CS2)									
Notes:									

5.2

24hr Feed Rates of NaOCL

Date: 6-14-16						Location of NaOCL			
	NaOCL	CS 2	NaO CL	Pump Setting		CS 2	Train Shed	Operator	
	ml/min	MGD	PPM	Speed	Stroke	Gallons on Hand			
0:00	57	14.4	.29	40	60		1980	MW	
1:00	55	14.6	.27	40	60			MW	
2:00	60	14.7	.29	43	60			MW	
3:00	65	15.0	.31	46	60			MW	
4:00	65	15.0	.31	46	60			MW	
5:00	65	15.1	.31	46	60			MW	
6:00	65	15.2	.31	46	60			MW	
7:00	65	15.4	.30	46	60		1980	MW	
8:00	60	14.8	.29	46	60		1980	MW	
9:00	60	14.7	.3	46	60			MW	
10:00	60	14.0	.31	44	60			MW	
11:00	60	14.1	.29	44	60			MW	
12:00	60	14.1	.29	44	60			MW	
13:00	58	13.7	.3	43	60			MW	
14:00	60	14.1	.29	44	60			MW	
15:00	60	14.0	.31	44	60		1980	MW	
16:00	55	12.8	.31	40	60		1980	BE	
17:00	53	12.7	.30	38	60			BE	
18:00	53	12.7	.30	38	60			BE	
19:00	53	12.8	.30	38	60			BE	
20:00	51	12.5	.29	36	60			BE	
21:00	56	13.3	.30	41	60			BE	
22:00	58	13.7	.30	43	60			BE	
23:00	60	14.5	.30	44	60		1980	BE	
ml/min average :				58.91		Total gallons NaOCL Used:			
MGD average :				14.07					
PPM average :				0.29		Days of NaOCL on Hand:			
(Train Shed + CS2)									
Notes:									